

# INSTRUCTIONS FOR INSTALLATION OF DEEP WATER FORDING KIT

## NOTE

1. THIS DRAWING IS FOR INSTALLATION PURPOSES ONLY. ALL ITEMS MARKED ★ ARE INCLUDED IN KIT.
2. CALLOUTS ARE IDENTIFIED AS FOLLOWS:
  - ★ NEW PARTS
  - # PARTS TO BE REMOVED AND DISCARDED
  - △ PARTS TO BE REMOVED AND REUSED

## SECTION I. INTRODUCTION

- 1-1. PURPOSE. THE PURPOSE OF THESE INSTRUCTIONS IS TO PROVIDE A PROCEDURE FOR INSTALLATION OF DEEP WATER FORDING KITS ON M998 SERIES VEHICLES.

## SECTION II. INSTALLATION KIT

- 2-1. NEW MATERIAL. INSTALLATION KIT 5705693 CONTAINS THE FOLLOWING ITEMS:

<u>PART NO.</u>	<u>NOMENCLATURE</u>	<u>QTY.</u>
12338339	GASKET	1
✓ 12339109	NAME PLATE	1
✓ 12339147-2	TUBE, TRANS OIL DIPSTICK	1
12339397-3	WELLNUT	2-1 (★A)
✓ 12339829	WRENCH, SPECIAL	1
12339832	SUPPORT, STACK	1
✓ 12339833	TUBE, VENT STACK	1
✓ 12339836	INSERT SHIPPING	1
12339840	ELBOW, EXTENSION	1
✓ 12339842	INSTALLATION INSTRUCTIONS	1
12339843	STACK, INTAKE	1
✓ 12339844	TUBE, ENG. OIL DIPSTICK	1
✓ 12339845	CUP, SENSOR	1
✓ 12339846	DIPSTICK, ENGINE	1
(★A) 12339397-6	WELLNUT	1
(A1) COML 737	RTV SEALANT	2 oz

B-12339842  
RL  
Sht.  
10/10

REV	INIT
DATE	DATE
BY	BY
CHARGE DATE	CHARGE DATE
★A 12-21-20	★A 12-21-20
4/9-29-89	4/9-29-89



✓ 12339847	DIPSTICK, TRANSMISSION	1
12339848	REINFORCEMENT, EXHAUST	1
12339849	EXHAUST, FORDING	1
12339964-1	ELBOW	2
✓ 12339969 12339973-1	TEE, BRANCH	1
12339978	CONNECTOR - MALE	1
12339981-2	HOSE, CDR VALVE TO SENSOR CUP (25.00 INCH LONG)	1
12339981-5	HOSE, CDR VALVE TO SELECTOR VALVE (42.00 INCH LONG)	1
12339981-7 ERR104470-1	<del>HOSE, POWER STEERING PUMP (18.00 INCH LONG)</del> -20.00-	1
12339983	ELBOW	1
12339996	CAP, DUST	1
12339997	CAP, POWER STEERING PUMP	1
12340260	CDR VALVE	1
12340331	FITTING	1
12340524	SELECTOR VALVE	1
12340915	INSTALLATION DRAWING	1
12341027	ISOLATOR	2
MS21333-67	CLAMP	3
✓ MS21333-98	CLAMP	1
✓ MS27183-16	WASHER	1
✓ MS28775-113	SEAL	1
✓ MS35340-43	WASHER	2
✓ MS51412-27	SPACER	2
✓ MS51470-3	NUT	1
✓ MS51943-31	NUT	16
✓ MS51943-35	NUT	5
MS35207-263 MS51958-63	SCREW	1
✓ MS51967-12	NUT	1
✓ MS90725-6	SCREW	11
✓ MS90725-10	SCREW	2
✓ MS90725-66	SCREW	3
✓ MS90725-94	SCREW	1
MS90728-6	SCREW	2
24617-11501906	STRAP	4
24617-11608950-18	CLAMP	2
✓ 24617-167163	SCREW	1
✓ 24617-2436161	WASHER	26
✓ 24617-2436163	WASHER	6
✓ 24617-2436164	WASHER	1
✓ 24617-271169	NUT	1
✓ 24617-274244	O-RING	1
24617-9414920	WASHER	2

10/4/12-28-	-A/12-27-8	12/12-28-	CHANGE DA	DRAWING CONTROL
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✓ 24617-9417793  
CPR104420-1

WASHER  
TUBE

2  
177.00-157.00-  
INCH

(-A<sub>1</sub>)

CPR104420-2

TUBE

11.00  
INCH

✓ WWC440  
B 1/2 TYPE E

CLAMP

4

WWC440 B SIZE 38

CLAMP

2

~~TYPE E~~

(-A<sub>1</sub>)

- 2-2. THE FOLLOWING ITEM IS REQUIRED, BUT IS NOT INCLUDED IN THE KIT AND MUST BE REQUISITIONED:

PART NO.

NOMENCLATURE

QTY.

12297953

SEALANT

AR

- 2-3. EXISTING MATERIAL. ALL MATERIAL REMOVED AND NOT REUSED DURING INSTALLATION WILL BE RETURNED TO STOCK FOR DISPOSITION IN ACCORDANCE WITH AR 725-50.

### SECTION III. INSTALLATION INSTRUCTIONS

#### NOTE

CUT AND MARK CRP104420-1 TUBE TO THE FOLLOWING:

70.00 INCHES

AIR CLEANER TO SELECTOR VALVE

20.00 INCHES

HYDRO-BOOST

26.00 INCHES

SELECTOR VALVE TO BRANCH TEE

41.00 INCHES

BRANCH TEE TO EXISTING TEE

20.00 INCHES

POWER STEERING PUMP

(-A<sub>2</sub>)

#### 3-1. VEHICLE PREPARATION.

- A. REMOVE WEATHERCAP (TM 9-2320-280-20).
- B. REMOVE ENGINE OIL DIPSTICK TUBE (TM 9-2320-280-20).
- C. REMOVE TRANSMISSION OIL DIPSTICK TUBE (TM 9-2320-280-20).
- D. REMOVE AIR CLEANER ASSEMBLY (TM 9-2320-280-20).
- E. REMOVE CDR VALVE (TM 9-2320-280-20).
- F. REMOVE TAILPIPE (TM 9-2320-280-20).

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- G. REMOVE LEFT SPLASH SHIELD (TM 9-2320-280-20).
- H. REMOVE AIR INTAKE VENT LINE (TM 9-2320-280-20).
- I. REMOVE RIGHT EXHAUST MANIFOLD REAR HEAT SHIELD (TM 9-2320-280-20).
- J. REMOVE THREE SCREWS AND WASHERS SECURING INTAKE DUCT TO AIR INDUCTION BOX AND REMOVE INTAKE DUCT AS SHOWN IN FIGURE 1.

### 3-2. BRAKE HYDRO-BOOST VENTING.

- A. INSTALL 12339964-1 ELBOW TO UNDERSIDE OF HYDRO-BOOST AS SHOWN IN FIGURE 2.
- B. REMOVE NUT, WASHER, AND SCREW SECURING HARNESS CLAMP TO BODY AS SHOWN IN FIGURE 2.
- C. CONNECT 20.00 INCH LONG HYDRO-BOOST TUBE TO ELBOW ON HYDRO-BOOST AS SHOWN IN FIGURE 2.
- D. INSTALL MS21333-67 CLAMP TO HYDRO-BOOST TUBE AND SECURE HARNESS CLAMP AND CLAMP TO BODY WITH EXISTING SCREW, WASHER, AND 24617-271169 NUT AS SHOWN IN FIGURE 2.
- E. INSTALL MS21333-98 CLAMP TO HYDRO-BOOST TUBE AND SECURE CLAMP TO BODY WITH MS90725-6 SCREW, TWO 24617-2436161 WASHERS, AND MS51943-31 NUT AS SHOWN IN FIGURE 2.

### 3-3. CDR VALVE INSTALLATION.

- A. INSTALL 12340260 CDR VALVE TO INTAKE MANIFOLD HOSE AND BRACKET AS SHOWN IN FIGURE 3.
- B. CONNECT INTAKE MANIFOLD HOSE TO CDR VALVE AND SECURE WITH EXISTING CLAMP AS SHOWN IN FIGURE 3.
- C. SECURE CDR VALVE AND HEATER CONTROL CABLE CLAMP TO BRACKET WITH TWO EXISTING WASHERS AND SCREWS AS SHOWN IN FIGURE 3. TIGHTEN SCREWS TO 15 LB-FT (20 N·m).
- D. CONNECT OIL FILL TUBE HOSE TO CDR VALVE AND SECURE WITH EXISTING CLAMP AS SHOWN IN FIGURE 3.



- E. CONNECT 12339981-5 CDR VALVE TO SELECTOR VALVE HOSE TO CDR VALVE AND SECURE WITH WWC 440 B 1/2 TYPE E CLAMP AS SHOWN IN FIGURE 4.
- F. CONNECT 12339981-2 CDR VALVE TO SENSOR CUP HOSE TO CDR VALVE AND SECURE WITH WWC440 B 1/2 TYPE E CLAMP AS SHOWN IN FIGURE 4.

#### 3-4. SENSOR CUP INSTALLATION.

- A. INSTALL 12339845 SENSOR CUP TO BODY AND SECURE WITH TWO MS90725-6 SCREWS, FOUR 24617-2436161 WASHERS, AND TWO MS51943-31 NUTS AS SHOWN IN FIGURE 5.
- B. ROUTE CDR VALVE TO SENSOR CUP HOSE THROUGH "A" BEAM AS SHOWN IN FIGURE 5.
- C. CONNECT CDR VALVE TO SENSOR CUP HOSE TO SENSOR CUP AND SECURE WITH WWC 440 B 1/2 TYPE E AS SHOWN IN FIGURE 5.

#### 3-5. TRANSMISSION OIL DIPSTICK TUBE ASSEMBLY INSTALLATION.

- A. LUBRICATE MS28775-113 SEAL WITH DEXRON II TRANSMISSION FLUID AND INSTALL ON 12339147-2 TUBE ASSEMBLY AS SHOWN IN FIGURE 6.
- B. INSTALL TUBE ASSEMBLY INTO TRANSMISSION AS SHOWN IN FIGURE 6.
- C. SECURE TUBE ASSEMBLY TO RIGHT SIDE CYLINDER HEAD WITH EXISTING SCREW AS SHOWN IN FIGURE 6. TIGHTEN SCREW TO 25-37 LB-FT (34-50 N·m).
- D. INSTALL 12339847 DIPSTICK INTO TUBE ASSEMBLY AS SHOWN IN FIGURE 6.
- E. INSTALL RIGHT EXHAUST MANIFOLD REAR HEAT SHIELD (TM 9-2320-280-20).

#### 3-6. ENGINE OIL DIPSTICK TUBE ASSEMBLY INSTALLATION.

- A. APPLY 12297953 SEALANT TO 24617-274244 O-RING AND INSTALL O-RING ON 12339844 TUBE ASSEMBLY AS SHOWN IN FIGURE 7. INSTALL TUBE ASSEMBLY INTO ENGINE OIL PAN AS SHOWN IN FIGURE 7.



- B. SECURE TUBE TO EXHAUST MANIFOLD WITH EXISTING WASHER AND SCREW AS SHOWN IN FIGURE 7. USING 8 MM HEX HEAD DRIVER, TIGHTEN SCREW TO 18-25 LB-FT (24-34 N.m) AS SHOWN IN FIGURE 7.
- C. SECURE TUBE TO FUEL LINE BRACKETS WITH TWO EXISTING SCREWS AS SHOWN IN FIGURE 7. TIGHTEN SCREWS TO 3 - 4 LB-FT (4-5 N.m).
- D. SECURE HARNESS CLAMP TO TUBE WITH EXISTING SCREW AND NUT AS SHOWN IN FIGURE 7.
- E. INSTALL 12339846 DIPSTICK INTO TUBE ASSEMBLY AS SHOWN IN FIGURE 7.

### 3-7. AIR CLEANER EXTENSION ELBOW INSTALLATION.

- A. INSTALL SHORT END OF 12339840 ELBOW ON AIR CLEANER ASSEMBLY AND SECURE WITH 24617-11608950-18 CLAMP AS SHOWN IN FIGURE 8.
- B. INSTALL 12339996 CAP ON AIR CLEANER ASSEMBLY AND SECURE WITH EXISTING CLAMP AS SHOWN IN FIGURE 8.
- C. INSTALL AIR CLEANER AND EXISTING CLAMPS TO BRACKETS AND POSITION ELBOW INTO AIR INDUCTION BOX AS SHOWN IN FIGURE 8.
- D. SECURE AIR CLEANER ASSEMBLY TO BRACKETS WITH TWO OUTER CLAMPS AS SHOWN IN FIGURE 8.
- E. CONNECT AIR RESTRICTION HOSE TO AIR CLEANER ASSEMBLY AS SHOWN IN FIGURE 8.

### 3-8. AIR INTAKE STACK ASSEMBLY INSTALLATION.

- A. REMOVE TWO PLUGS FROM WINDSHIELD AS SHOWN IN FIGURE 9.
- B. USING D-100-MIL-1 RIVETER TOOL KIT, INSTALL TWO ONE 12339397-3 WELLNUTS IN WINDSHIELD AS SHOWN IN FIGURE 9, AND ONE 12339397-6 WELLNUT
- C. INSTALL 12339832 SUPPORT TO WINDSHIELD AND SECURE WITH TWO 24617-9414920 WASHERS AND MS90725-10 SCREWS AS SHOWN IN FIGURE 9. TIGHTEN SCREWS TO 6 LB-FT (8 N.m).
- D. INSTALL 12339843 STACK ASSEMBLY INTO ELBOW AND SECURE WITH 24617-11608950-18 CLAMP AS SHOWN IN FIGURE 10.

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- E. SECURE STACK ASSEMBLY TO SUPPORT WITH MS27183-16 WASHER, MS90725-94 SCREW, 24617-2436164 WASHER, AND MS51967-12 NUT AS SHOWN IN FIGURE 10.
- F. INSTALL TWO *MS21333-67 CLIPS ON* 12339833 TUBE. INSTALL TUBE TO STACK ASSEMBLY, AND SECURE WITH MS35340-43 WASHER AND 24617-167163 SCREW AS SHOWN IN FIGURE 11.
- G. SECURE TUBE TO STACK ASSEMBLY WITH *MS35207-263* ~~MS51958-63~~ SCREW, MS35340-43 WASHER, AND MS51470-3 NUT AS SHOWN IN FIGURE 11.
- H. INSTALL AND CONNECT CPR104420-2 FUEL TANK VENT TUBE TO FILTER AND TUBE AS SHOWN IN FIGURE 11.

3-9. SELECTOR VALVE ASSEMBLY INSTALLATION.

- A. INSTALL 12339964-1 ELBOW ON 12340524 VALVE AS SHOWN IN FIGURE 12.
- B. INSTALL 12339983 ELBOW ON VALVE AS SHOWN IN FIGURE 12.
- C. INSTALL 12339978 CONNECTOR TO VALVE AS SHOWN IN FIGURE 12.
- D. REMOVE THREE PLUGS FROM BODY PANEL AT LEFT SIDE OF ENGINE AS SHOWN IN FIGURE 12.
- E. REMOVE TWO EXISTING SCREWS AND WASHERS SECURING FUEL FILTER TO BODY AND PULL FUEL FILTER AWAY FOR ACCESS TO INSTALL VALVE AS SHOWN IN FIGURE 13.
- F. CONNECT CDR VALVE TO SELECTOR VALVE HOSE TO ELBOW ON VALVE AND SECURE WITH WWC440 B 1/2 TYPE E CLAMP AS SHOWN IN FIGURE 12.
- G. CONNECT 70.00-INCH LONG AIR CLEANER TO SELECTOR VALVE TUBE TO ELBOW ON VALVE AS SHOWN IN FIGURE 12.
- H. CONNECT 26.00-INCH LONG SELECTOR VALVE TO BRANCH TEE TUBE TO CONNECTOR ON VALVE AS SHOWN IN FIGURE 12.
- I. REMOVE SCREW AND HANDLE FROM VALVE AS SHOWN IN FIGURE 12.



- J. INSTALL VALVE AND 12339109 NAME PLATE TO BODY AND SECURE WITH TWO MS90728-6 SCREWS, FOUR 24617-2436161 WASHERS, AND TWO MS51943-31 NUTS AS SHOWN IN FIGURE 12. TIGHTEN NUTS TO 6 LB-FT (8 N·m).
- K. SECURE FUEL FILTER TO BODY WITH TWO EXISTING WASHERS AND SCREWS AS SHOWN IN FIGURE 13. TIGHTEN SCREWS TO 17 LB-FT (23 N·m).
- L. INSTALL HANDLE TO VALVE AND SECURE WITH EXISTING SCREW AS SHOWN IN FIGURE 12.

### 3-10. VENT LINE TUBES INSTALLATION.

~~A. INSTALL 12340331 FITTING TO 12339969 TEE AS SHOWN IN FIGURE 14.~~

- A B. INSTALL TEE TO SELECTOR VALVE TO BRANCH TEE TUBE AS SHOWN IN FIGURE 14.
- B C. ROUTE CDR VALVE TO SELECTOR VALVE HOSE, AIR CLEANER TO SELECTOR VALVE TUBE, AND SELECTOR VALVE TO BRANCH TEE TUBE ALONG LEFT SIDE OF "A" BEAM AND SECURE TO HARNESS WITH 24617-11501906 STRAP AS SHOWN IN FIGURE 14.
- C D. CONNECT AIR CLEANER TO SELECTOR VALVE TUBE TO AIR CLEANER AS SHOWN IN FIGURE 14.
- D E. CONNECT 41.00-INCH LONG BRANCH TEE TO EXISTING TEE TUBE TO BRANCH TEE ON "A" BEAM AND ROUTE TO EXISTING TEE ALONG RIGHT SIDE FRAME AND CONNECT AS SHOWN IN FIGURE 14.
- E F. INSTALL THREE 24617-11501906 STRAPS ALONG "A" BEAM AND COWL, SECURING VENT LINES TO HARNESS AND FUEL TANK VENT LINE AS SHOWN IN FIGURE 14.

### 3-11. POWER STEERING RESERVOIR CAP INSTALLATION.

- A. REMOVE POWER STEERING RESERVOIR CAP AS SHOWN IN FIGURE 15.
- B. INSTALL 12339997 CAP TO RESERVOIR AS SHOWN IN FIGURE 15.

C. *CPR 104420-1 (20. IN)*  
INSTALL TWO WWC440B SIZE 38 TYPE E CLAMPS TO 12339981-7 HOSE AND INSTALL HOSE TO CAP AND BRANCH TEE ON "A" BEAM AS SHOWN IN FIGURE 15.

#### 3-11.1 POWER STUD SEALING

POWER POSITIVE STUD SHALL BE COMPLETELY COVERED AND WATER-PROOFED WITH RTV SEALANT - COML 737 AFTER LEADS ARE ASSEMBLED. .06 MIN. THICK AS SHOWN IN FIG. 19.

REV	
INITIALS	



### 3-12. EXHAUST ASSEMBLY INSTALLATION.

#### NOTE

BEFORE INSTALLING REINFORCEMENT TO WHEELHOUSING, REFER TO FIGURE 16 FOR LOCATION OF PLUGS TO BE REMOVED AND MOUNTING HOLES TO BE USED.

- A. REMOVE SIX PLUGS FROM TOP OF WHEELHOUSING, AND FOUR PLUGS FROM SIDE OF WHEELHOUSING AS SHOWN IN FIGURE 17.
- B. INSTALL 12339848 REINFORCEMENT TO WHEELHOUSING AND SECURE WITH EIGHT MS90725-6 SCREWS, SIXTEEN 24617-2436161 WASHERS, AND EIGHT MS51943-31 NUTS AS SHOWN IN FIGURE 17.
- C. INSTALL TWO 12341027 ISOLATORS TO WHEELHOUSING AS SHOWN IN FIGURE 17.
- D. INSTALL 12339849 EXHAUST ASSEMBLY, AND TWO MS51412-27 SPACERS TO WHEELHOUSING AND SECURE WITH TWO 24617-9417793 WASHERS AND MS51943-35 NUTS AS SHOWN IN FIGURE 18.
- E. INSTALL 12338339 GASKET AND EXHAUST ASSEMBLY TO MUFFLER AND SECURE WITH THREE MS90725-66 SCREWS, SIX 24617-2436163 WASHERS, AND THREE MS51943-35 NUTS AS SHOWN IN FIGURE 18. TIGHTEN NUTS TO 37 LB-FT (50 N.m).

### 3-13. VEHICLE ASSEMBLY.

- A. INSTALL LEFT SPLASH SHIELD (TM 9-2320-280-20).
- B. INSTALL AIR INTAKE VENT LINE (TM 9-2320-280-20).

#### NOTE

12339829 SPECIAL WRENCH AND 12339836 SHIPPING INSERT ARE FURNISHED WITH THE DEEP WATER FORDING KIT FOR USE BY THE VEHICLE OPERATOR (TM 9-2320-280-10). THESE ITEMS MUST ACCOMPANY VEHICLE WHEN RETURNED TO OPERATION AFTER KIT INSTALLATION AND TESTING.



3-14. VENT SYSTEM LEAK TEST.



- A. BLOCK OFF ENGINE AIR INTAKE AND EXHAUST, *SET SELECTOR VALVE TO VENT.*
- B. DISCONNECT 42-INCH LONG CDR VALVE TO SELECTOR VALVE HOSE FROM CDR VALVE AS SHOWN IN FIGURE 4. ~~PLUG CDR VALVE HOSE PORT ON CDR VALVE.~~
- C. WITH SELECTOR VALVE <sup>*IN VENT POSITION*</sup> ~~OPEN~~, ENTER 2.5 TO 3.5 AIR PRESSURE INTO CDR VALVE, ~~TO SELECTOR VALVE HOSE.~~ SHUT OFF AIR SUPPLY. SYSTEM MUST HAVE 1 P.S.I. AIR PRESSURE MINIMUM AFTER 1 MINUTE MINIMUM. *THIS WILL CHECK ENTIRE DWF SYSTEM.*
- D. CONNECT CDR VALVE TO SELECTOR VALVE HOSE TO CDR VALVE AND SECURE WITH CLAMP AS SHOWN IN FIGURE 4.



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  - △ PARTS TO BE REMOVED AND REUSED

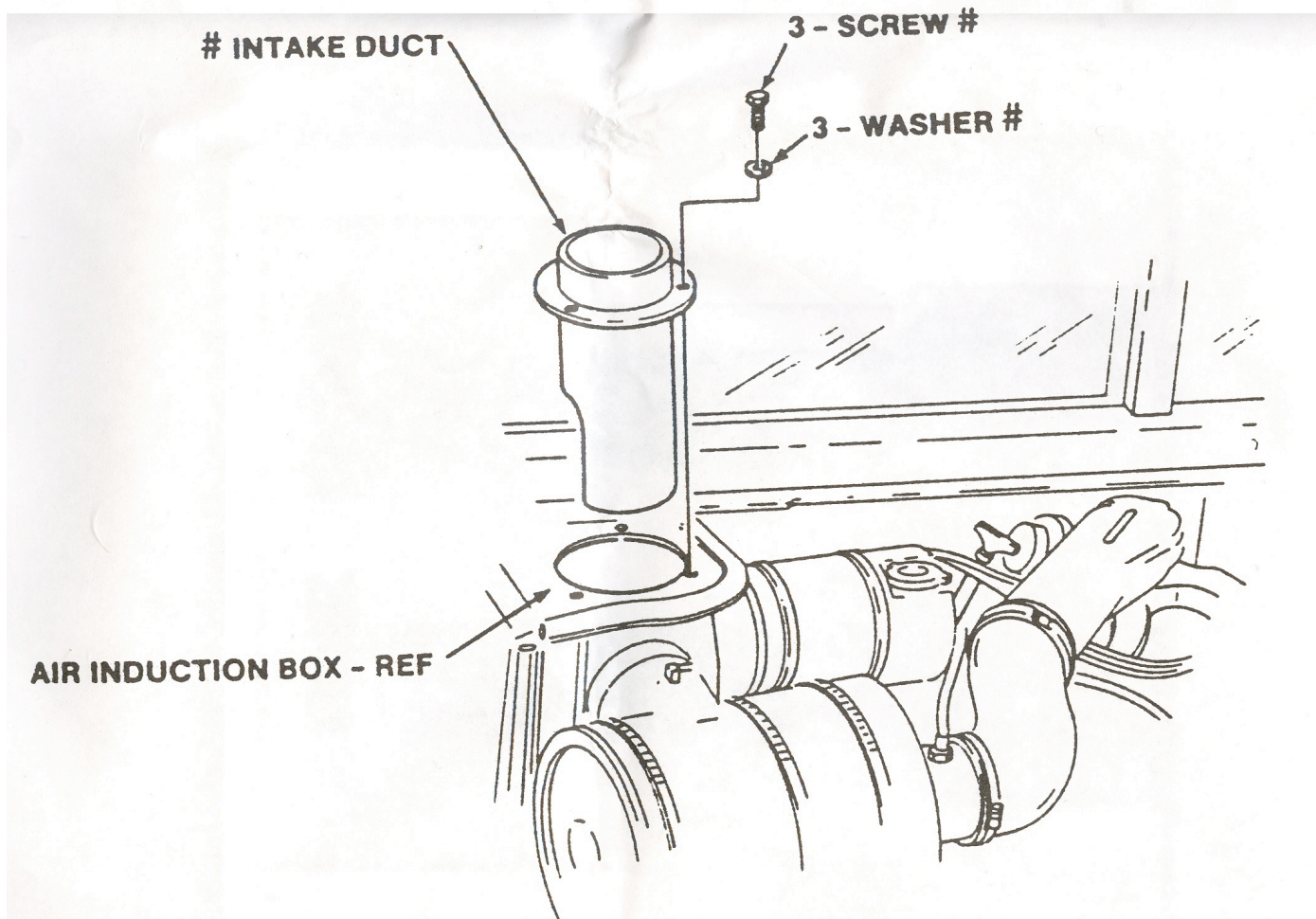
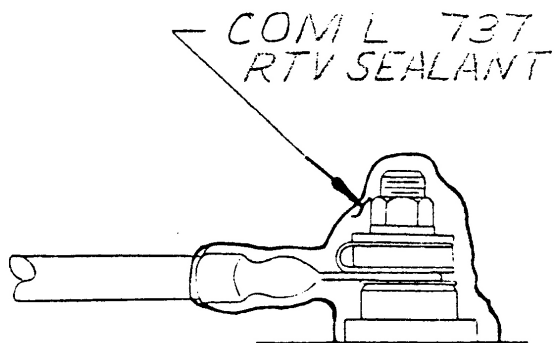


FIGURE 1





VIEW X



For 200 amp alt only

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C-0998

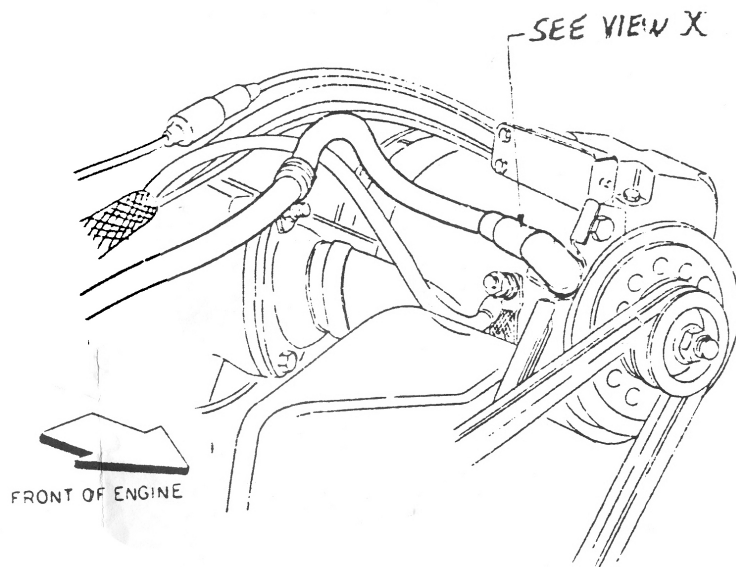


FIGURE 10  
2000 AMP. ALT. (REF)



EAR R0515  
9-29-89



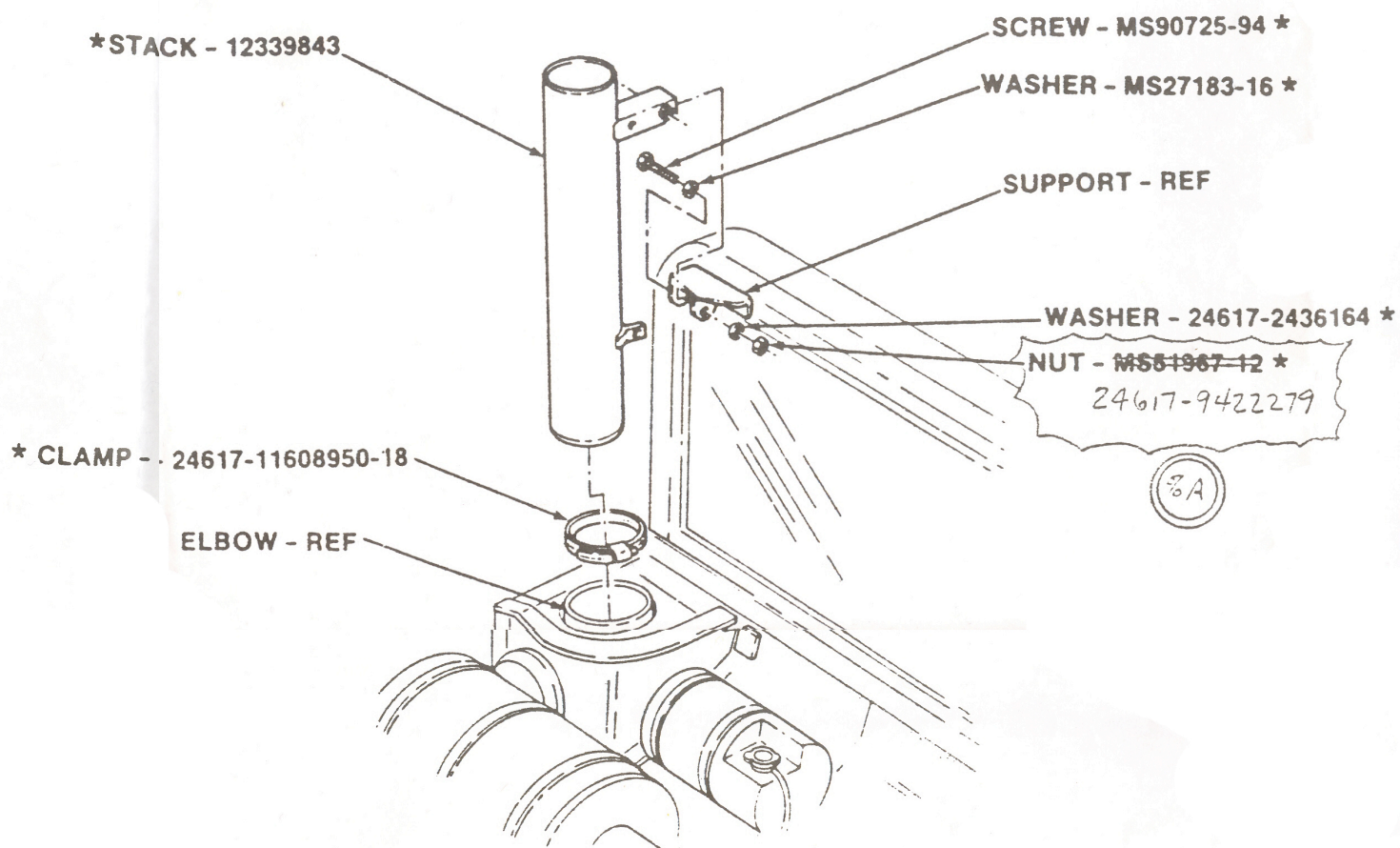


FIGURE 10



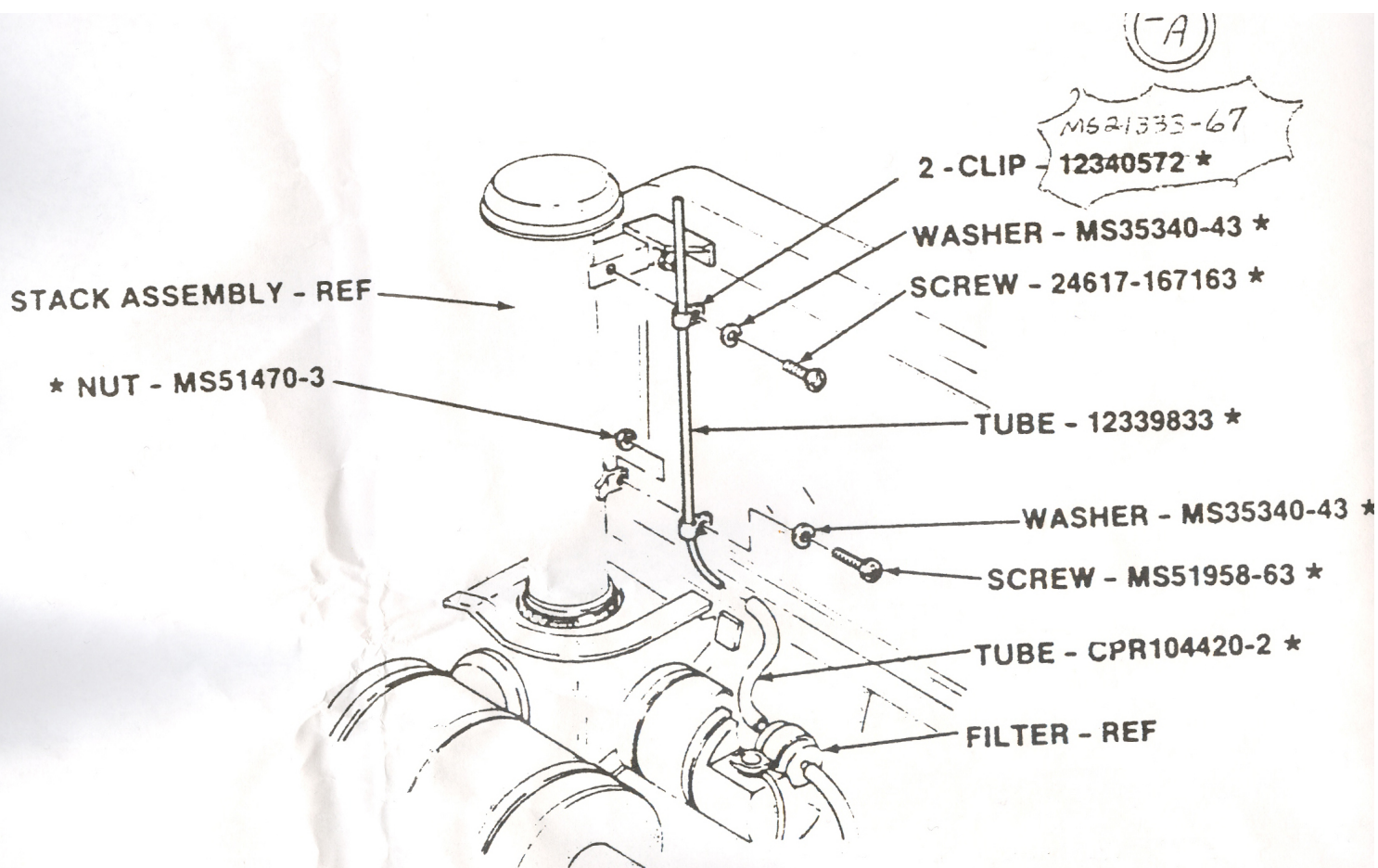


FIGURE 11



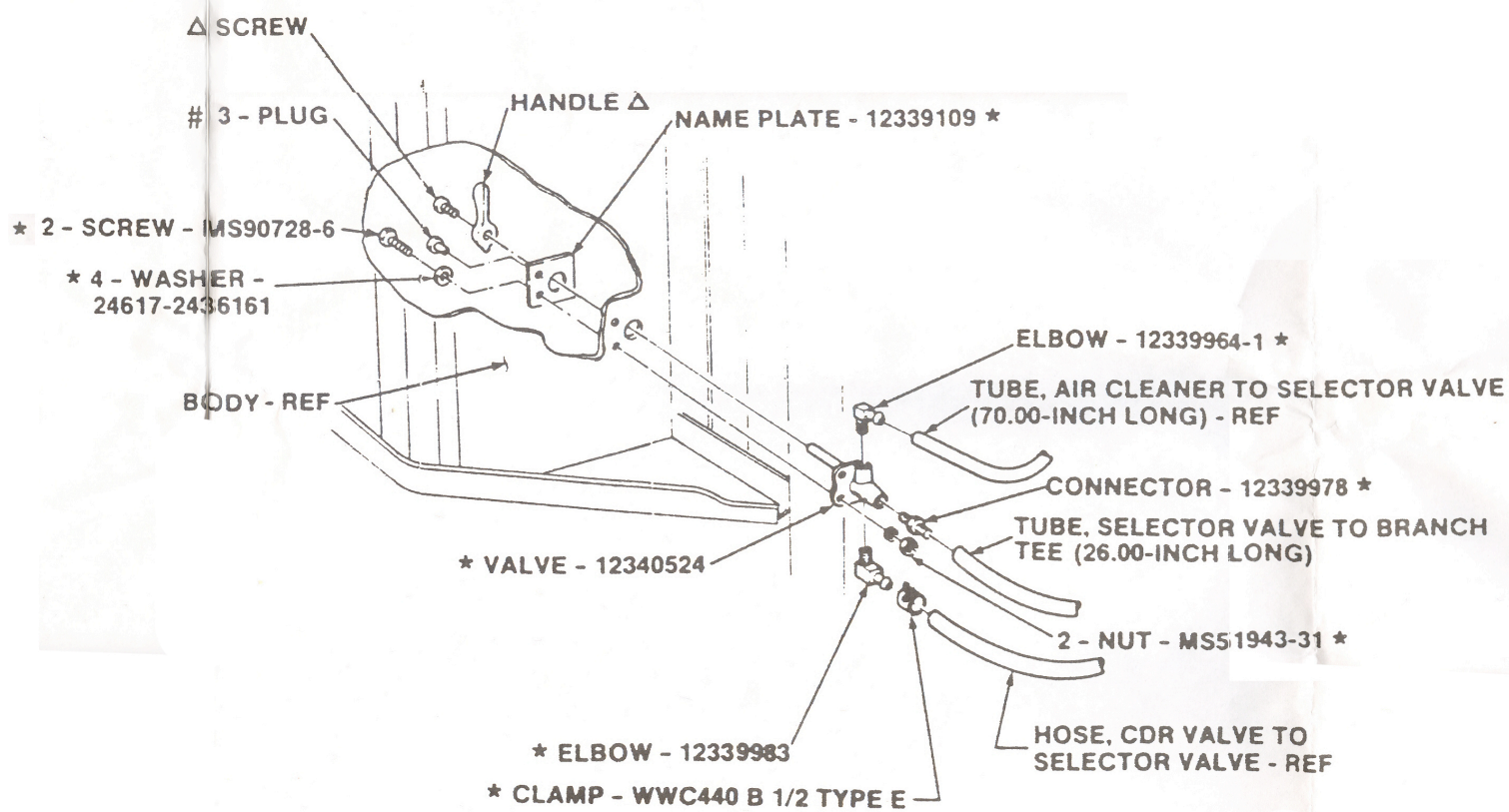
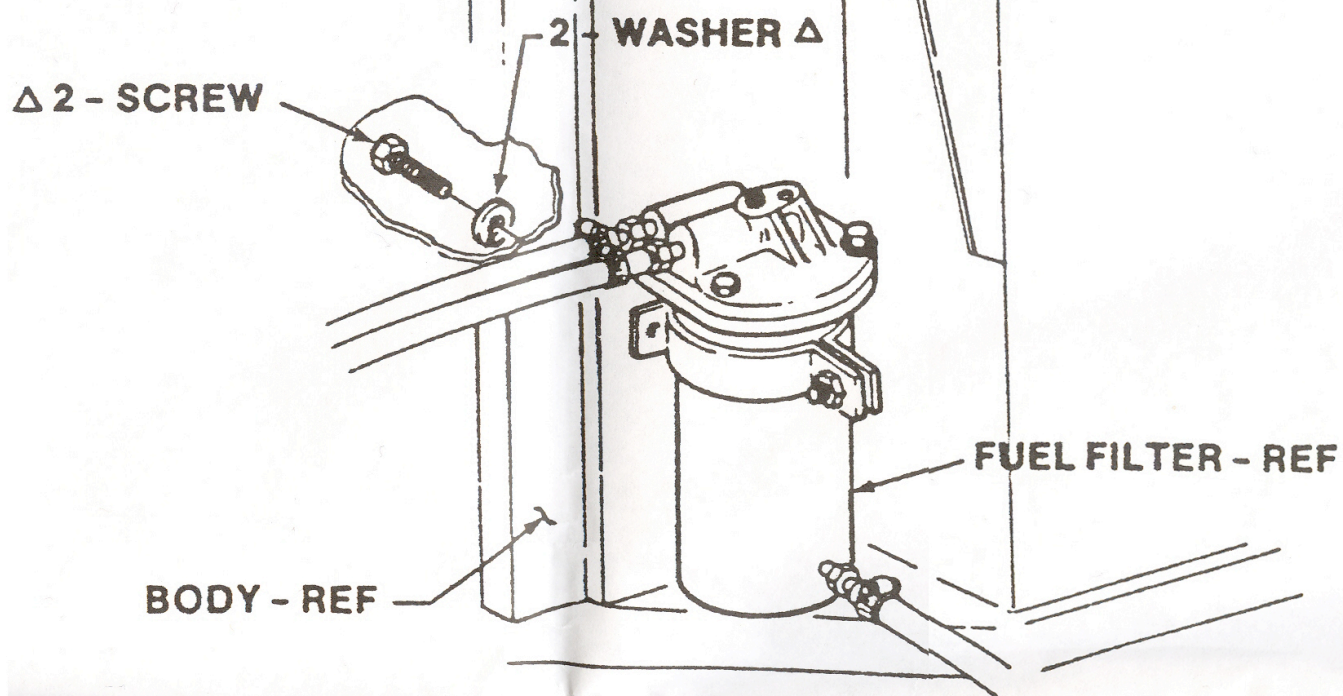


FIGURE 12





**FIGURE 13**



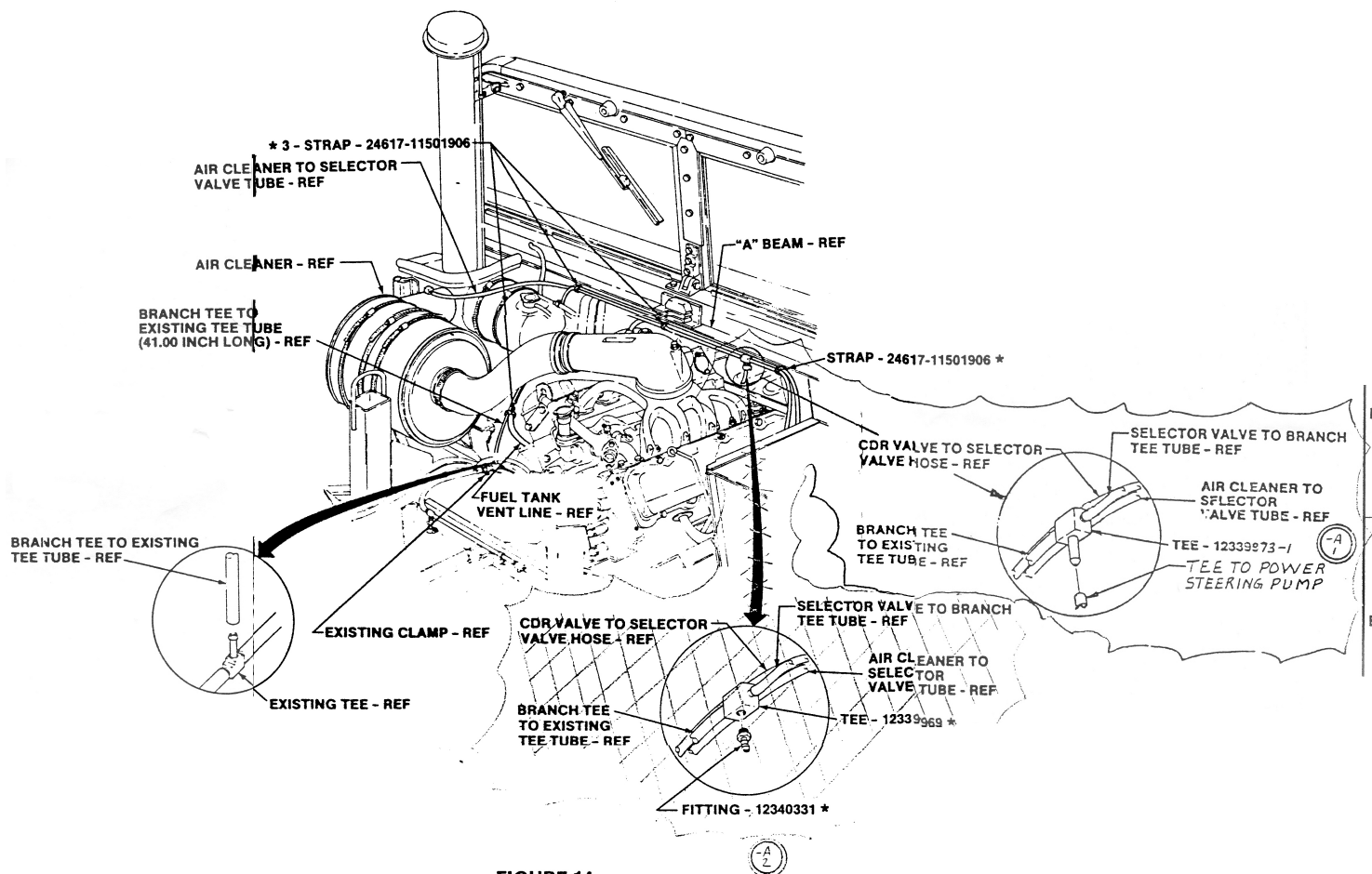
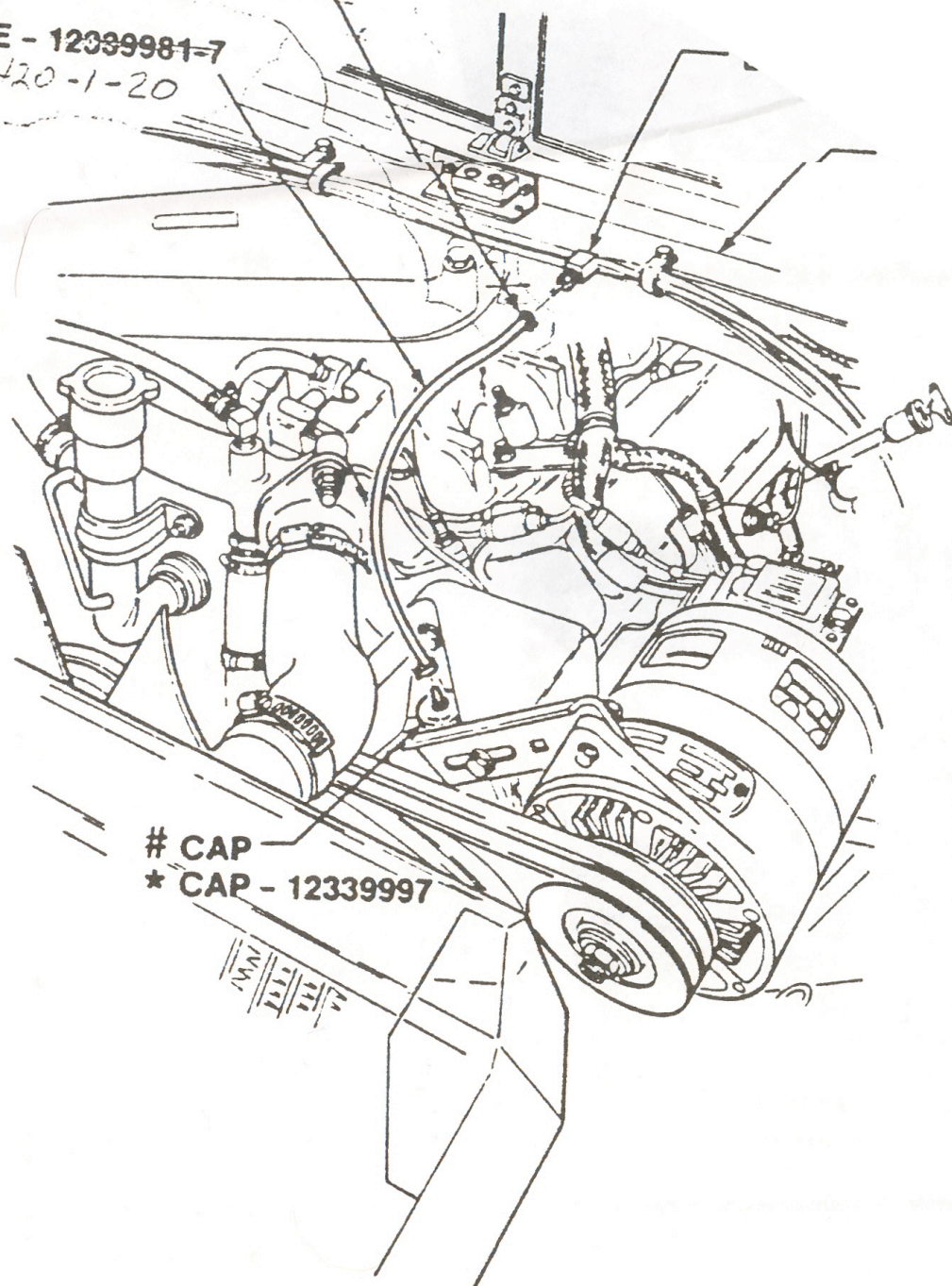


FIGURE 14



WWC440B-SIZE-38-TYPE-E

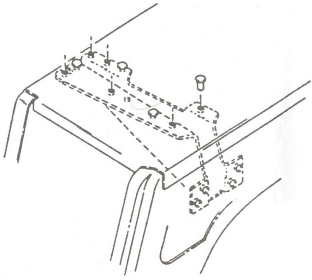
\* HOSE - 12339981-7  
CPR104420-1-20



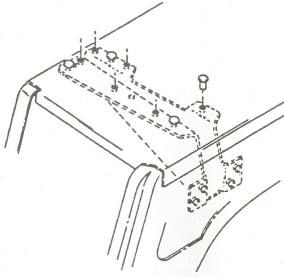
# CAP  
\* CAP - 12339997

FIGURE 15

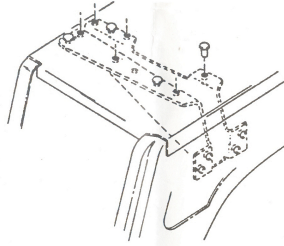




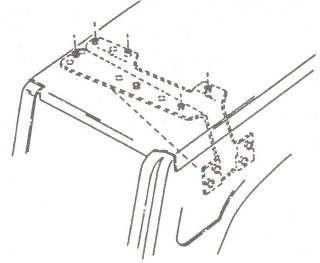
DEEP WATER FORDING  
WITH BATTERY RACK



DEEP WATER FORDING  
WITH TROOP SEATS



DEEP WATER FORDING



DEEP WATER FORDING WITH  
MARINE OR ARMY EQUIPMENT STOWAGE

REINFORCEMENT MOUNTING HOLE USAGE - REFERENCE VIEW

FIGURE 16



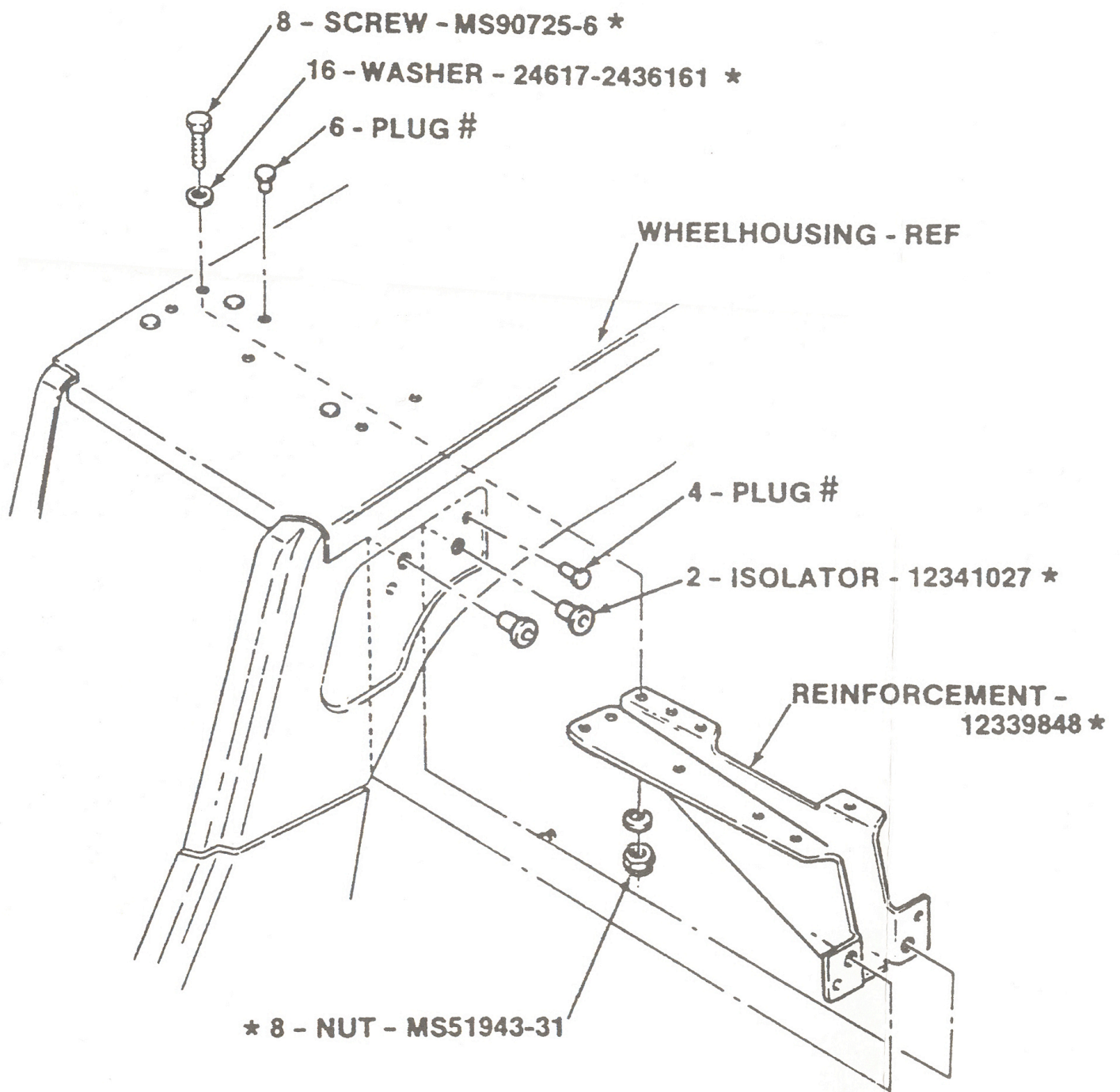


FIGURE 17

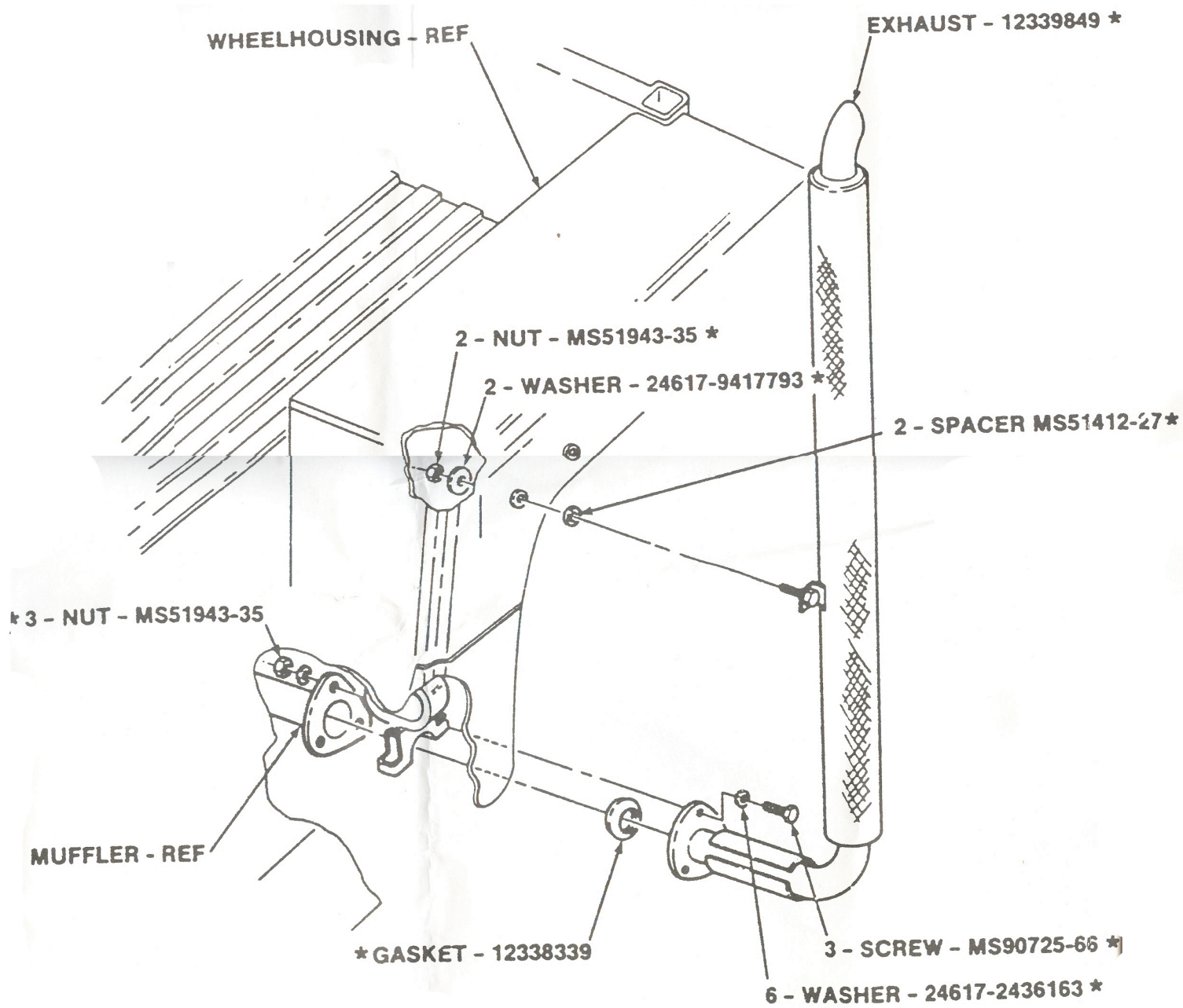
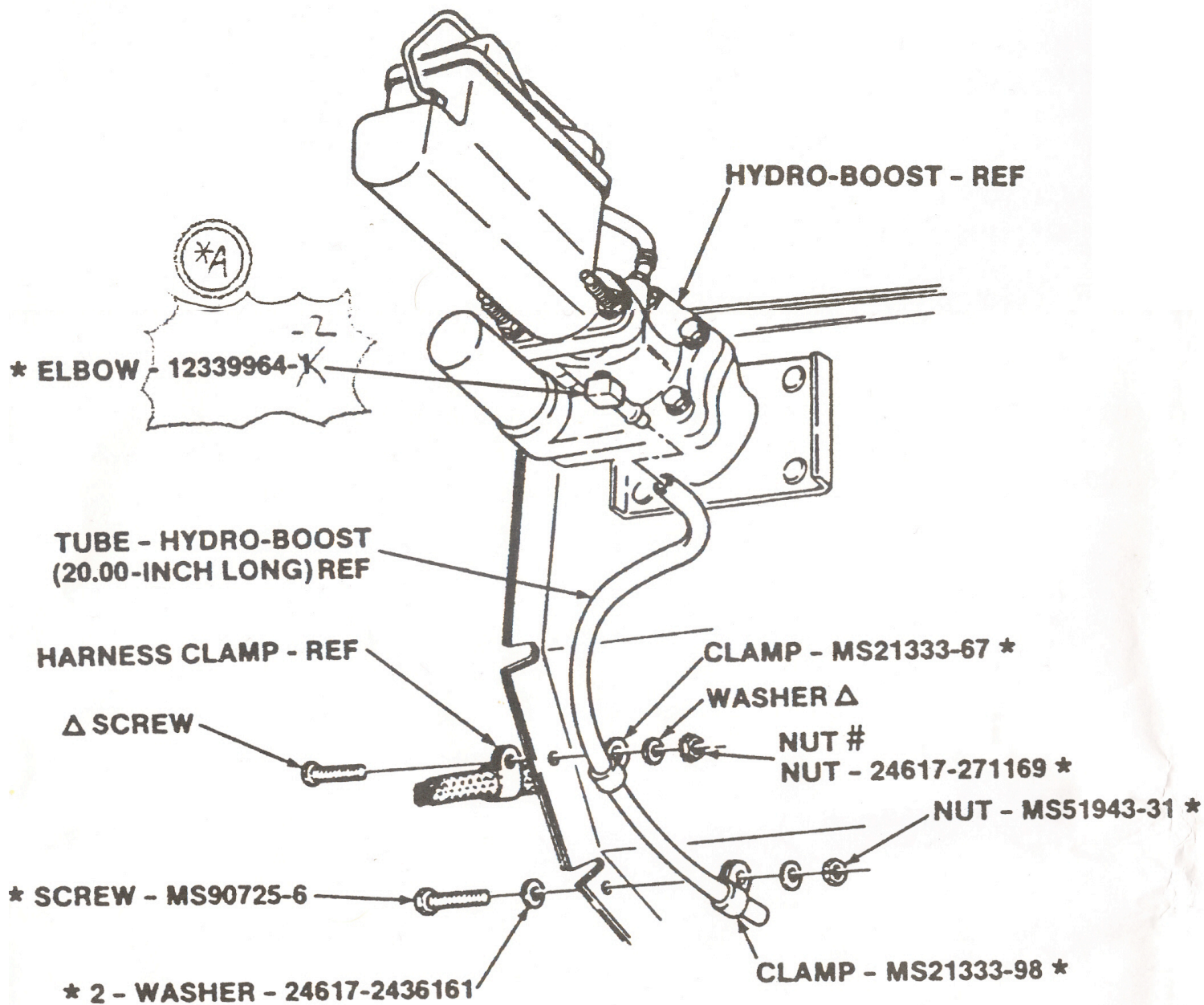


FIGURE 18





**FIGURE 2**

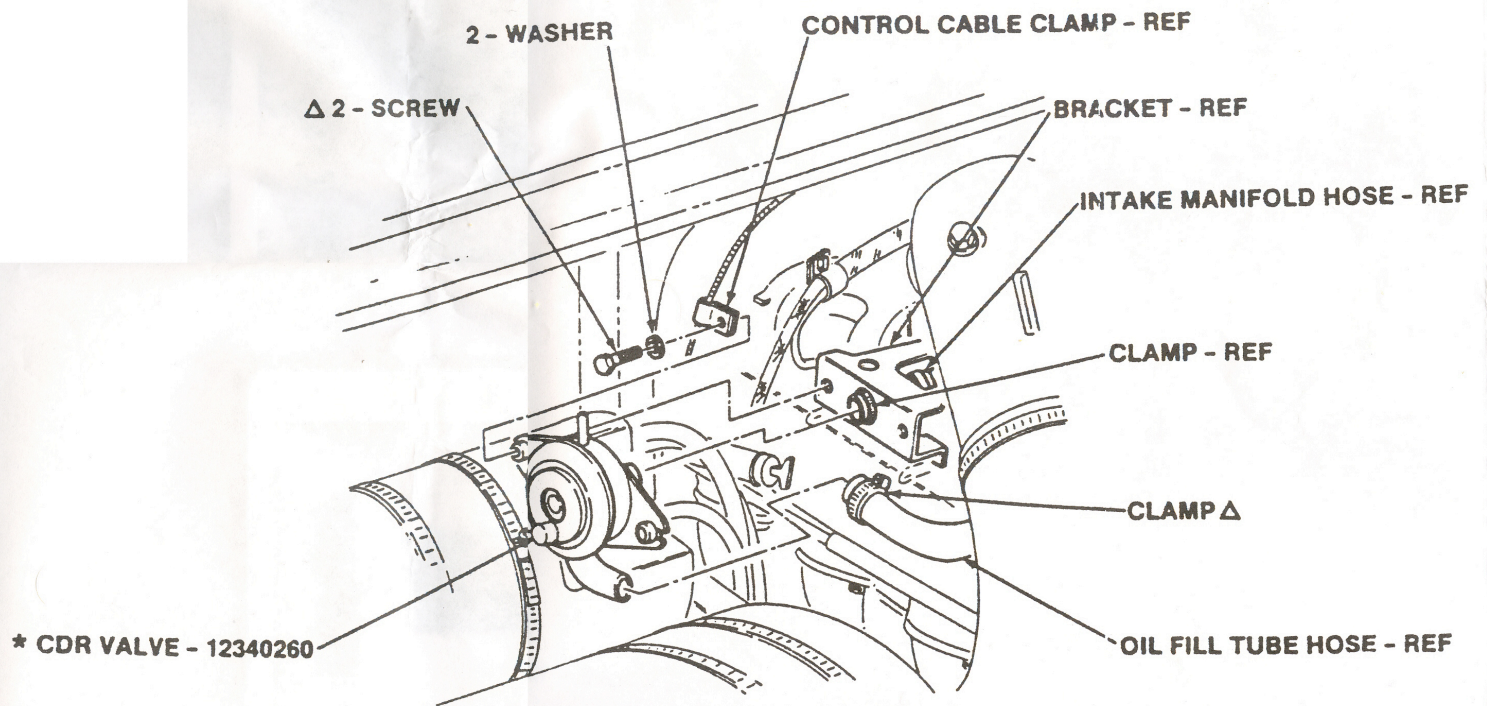
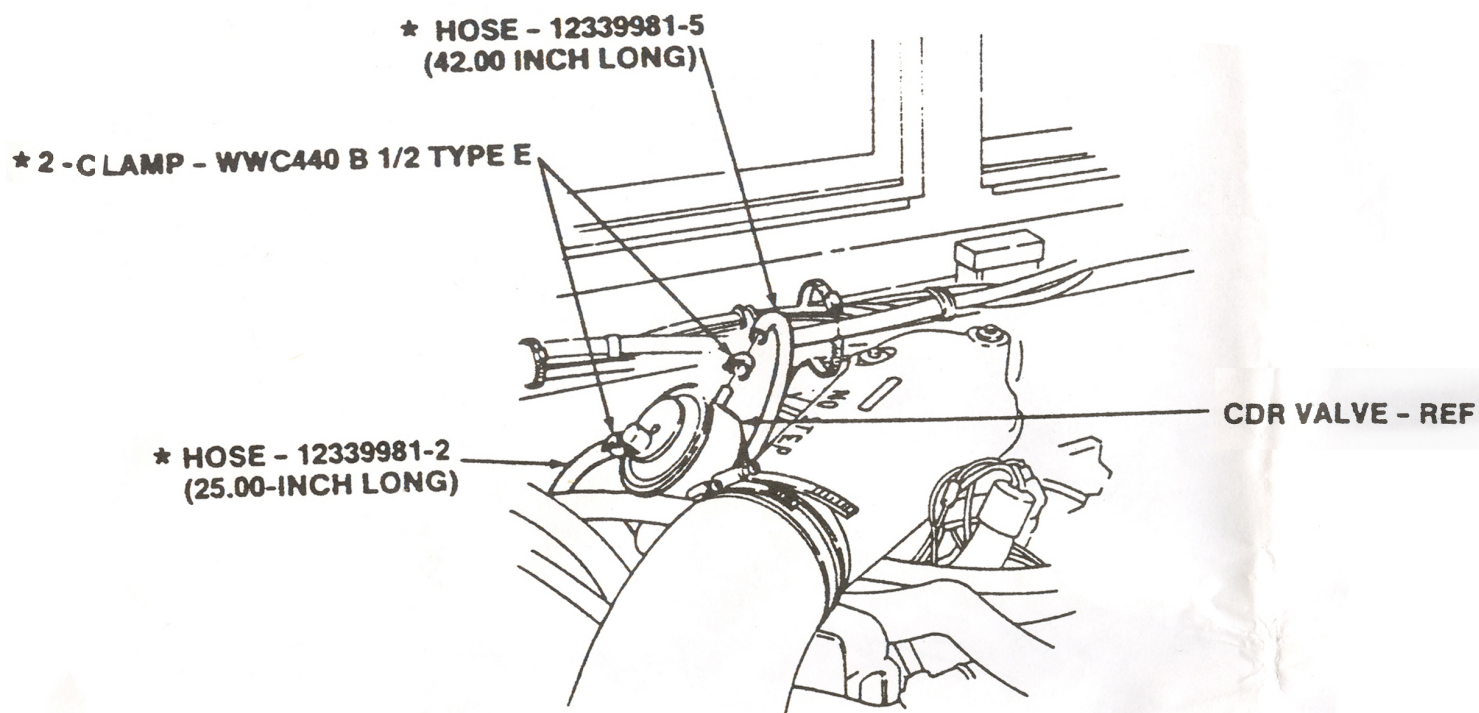
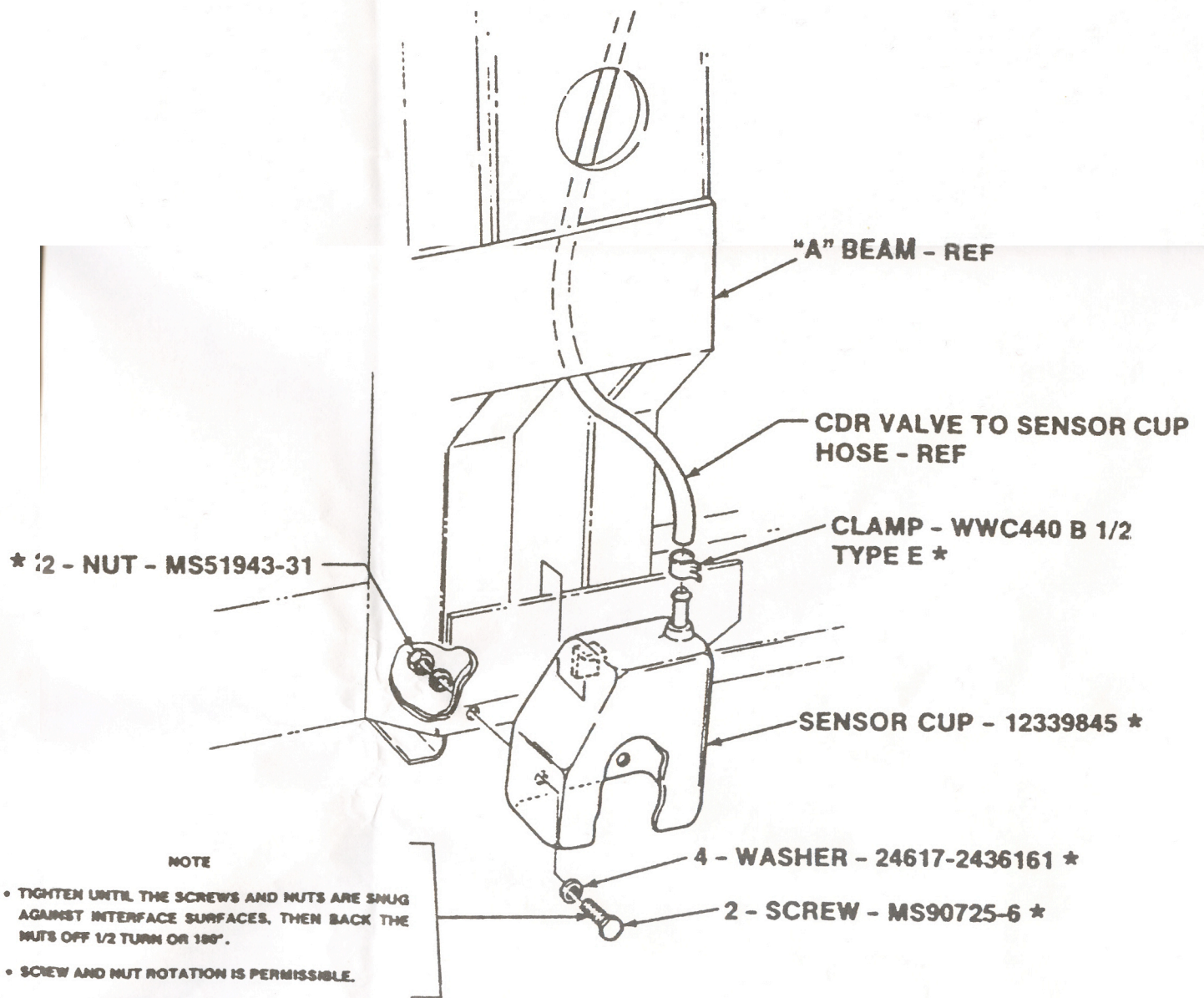


FIGURE 3



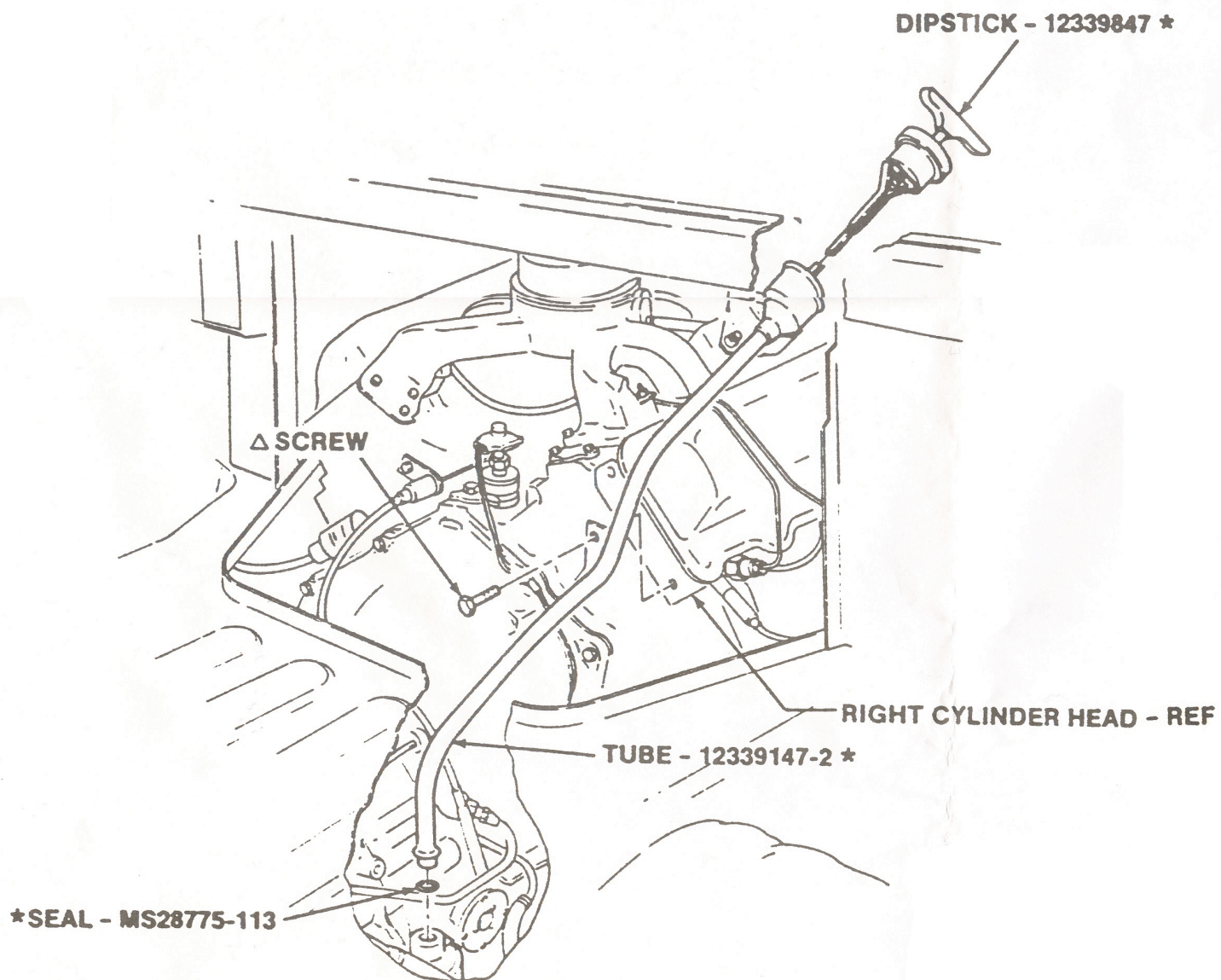


**FIGURE 4**

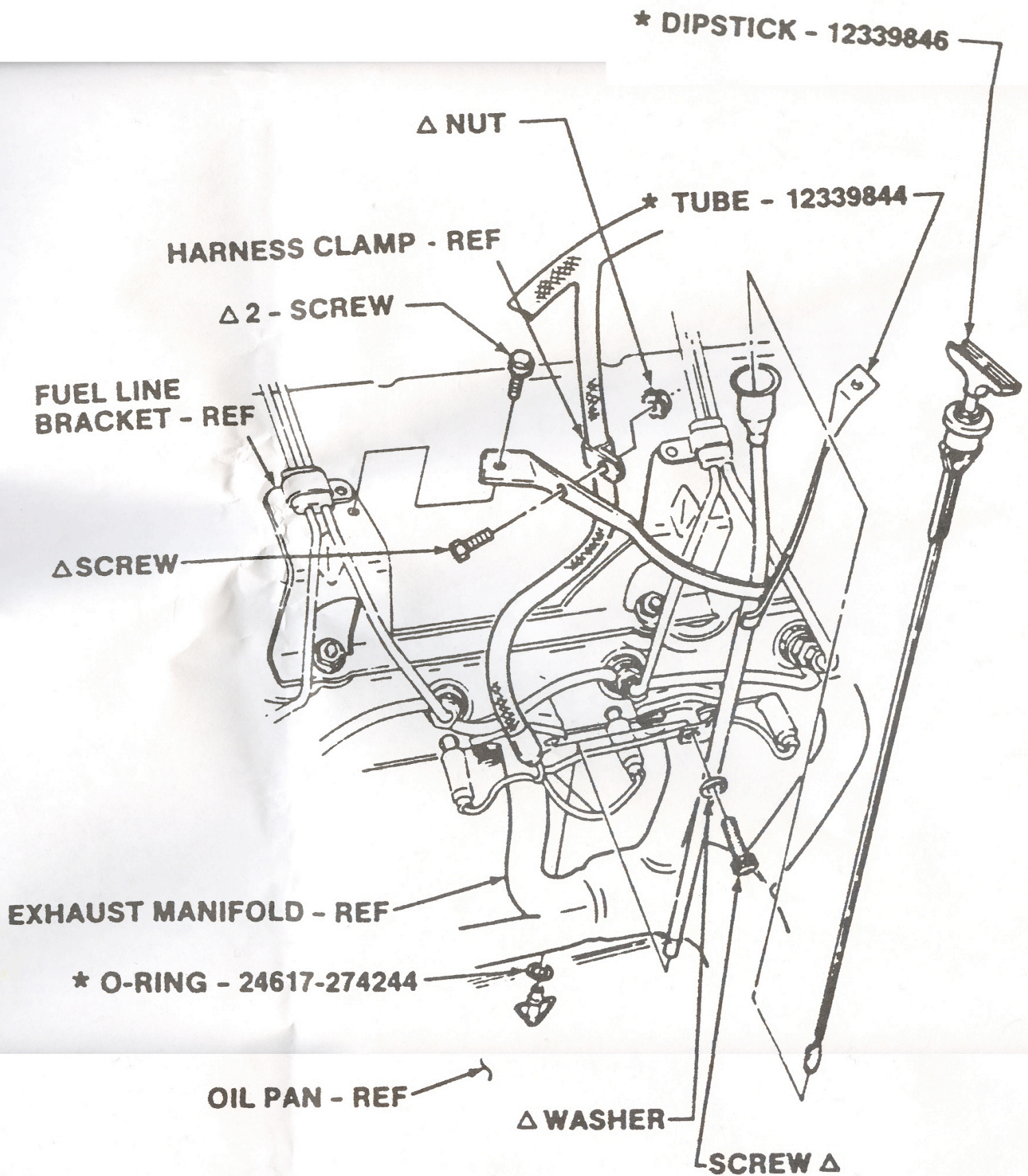


**FIGURE 5**



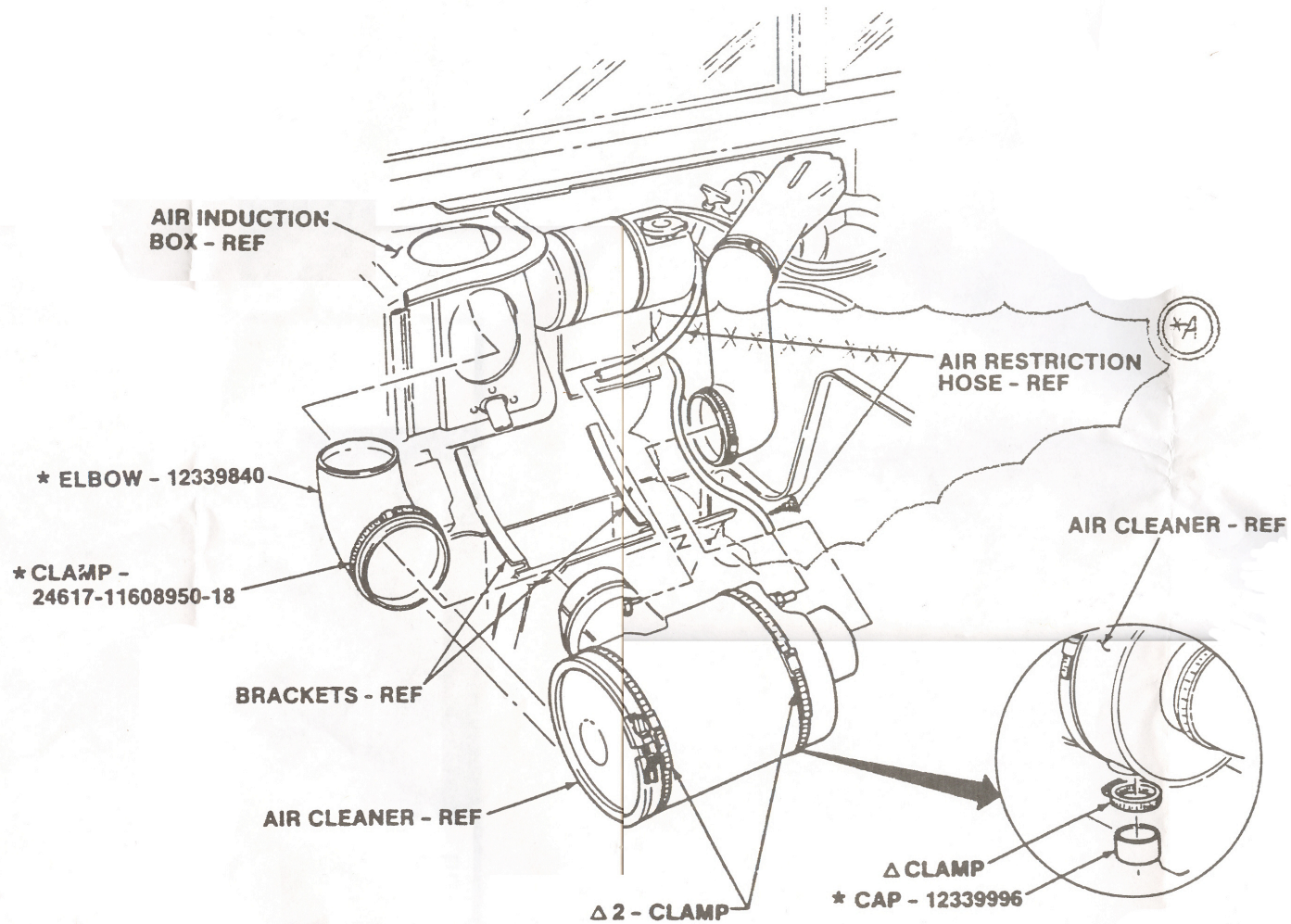


**FIGURE 6**



**FIGURE 7**





**FIGURE 8**

