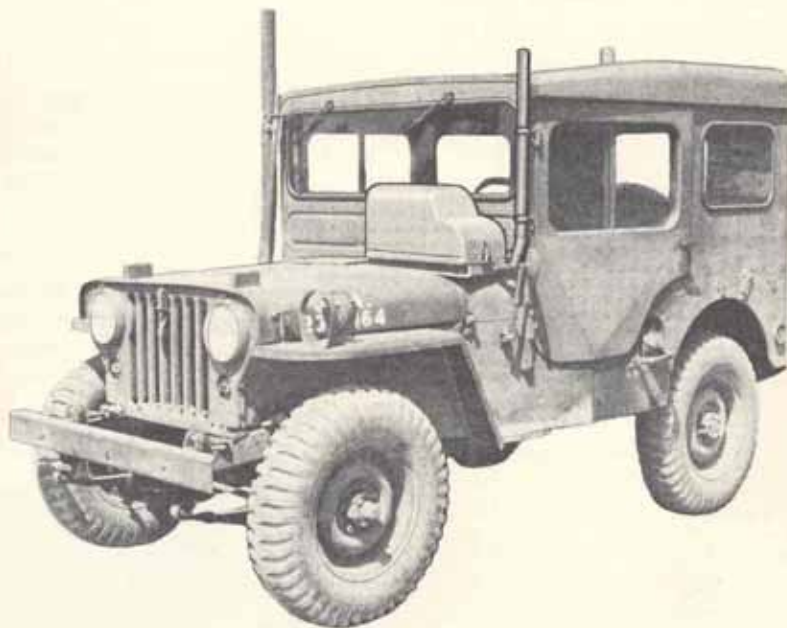


INSTALLATION INSTRUCTIONS

**PERSONNEL HEATER KIT
ORD. NO. 7387261
FOR**



TRUCK, 1/4 TON, 4 x 4, UTILITY, M38 (24V)

KEEP MANUAL WITH VEHICLE

Section I

INSTALLING MODEL 978-M-R24 PERSONNEL HEATER

NOTE: Before starting heater installation, refer to the exploded parts view, Figure 15, on page 8. This drawing, in conjunction with the numerical parts list on page 9 will provide identification of the parts referred to in the following procedure.

INTERFERENCE WITH VEHICLE

In some cases it may be found that, due to modification or damage to a vehicle, it is impossible to install the personnel heater kit exactly as directed. In such cases, installation personnel, under the direction and at the discretion of a competent supervisor, should resort to a field expedient to overcome the interference with the particular vehicle and alter the installation procedure accordingly.

INSTALLING HEATER BOX

1. Disassemble the heater box as follows:
 - a. Release the snap fastener at the end of the heater box and raise the end of the box lid; this will release the other end and the lid may be lifted off.
 - b. Unscrew the clamp screws and remove the two heater retaining clamps.
 - c. Remove the six #10-32 x $\frac{3}{8}$ machine screws at the edges of the heater mounting plate. Do not remove the four screws near the exhaust hole.
 - d. Remove the heater mounting plate from the bottom section of the heater box.

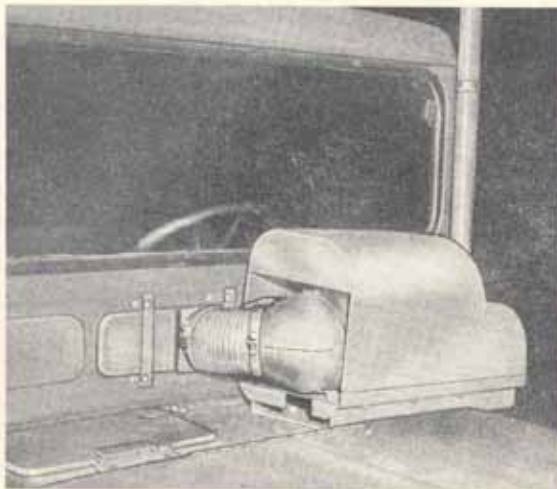


Figure 1

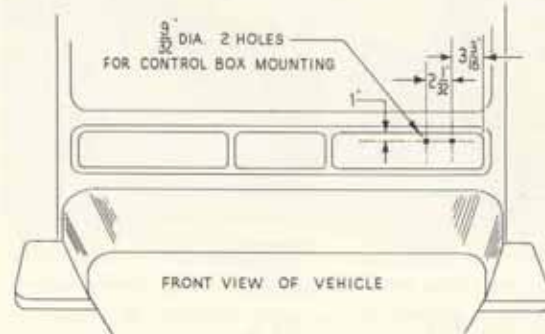


Figure 2

2. Place the bottom section of the heater box on the cowling in front of the windshield with the exhaust tube toward the left. Locate the assembly so that the front edge is $\frac{7}{8}$ inch to the rear of the hood and the end is $7\frac{1}{2}$ inches to the left of the battery box lid (see Figure 1). With the bottom of the box in this position, mark through the four mounting screw holes in the plate.

3. Remove the box and drill four $\frac{11}{32}$ -inch diameter holes.

4. Place the box in position and secure it to the cowling with the four $\frac{5}{16}$ -18 x 1 hex hd. cap screws, lockwashers and the two channel strips with weld nuts. Place the two channel strips underneath the cowling inside the vehicle and install the cap screws through the box and into the weld nuts in the mounting strips.

5. Using the dimensions shown in Figure 2, drill two $\frac{9}{32}$ -inch holes in the panel below the windshield next to the heater box section just installed.

6. Remove the cover of the ventilating louver in the center of the windshield panel. Discard the cover and install the cover supplied with the heater kit in its place as shown in Figure 1. Secure the new cover using the same screws which were removed from the discarded cover.

INSTALLING HEATER ASSEMBLY

1. Place the heater mounting plate in the lower section of the heater box and secure the plate with the six #10-32 x $\frac{3}{8}$ machine screws and lockwashers provided. Tighten the screws securely in the weld nuts to prevent rattling.

2. Fit the heater onto the mounting plate with the exhaust tube in the hole provided and then install

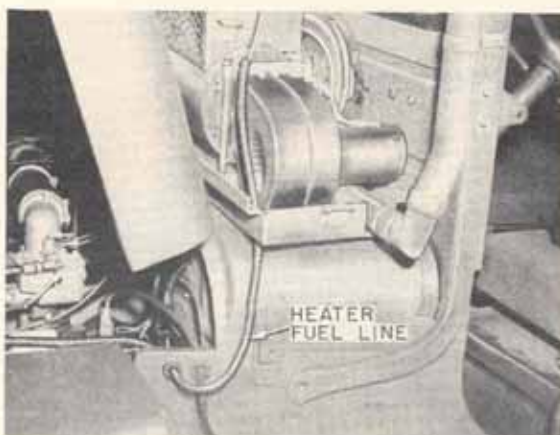


Figure 3

the two hold-down clamps (Figure 3). Make sure the exhaust gaskets are in place around the heater exhaust outlet. Do not place the lid on the heater box as yet.

3. Pass the free end of the wiring harness through the hole in the vent cover previously installed under the center of the windshield and fit the grommet into the hole.

4. Remove the cover from the heater control box by unscrewing the two center screws at the top edge of the panel. Install the cover above the instrument panel of the vehicle, as shown in Figure 4, using the two $\frac{1}{4}$ -20 x $\frac{3}{4}$ cap screws, lockwashers and nuts which are already in the box cover. Use the two holes previously drilled in the instrument panel (Figure 2) when mounting the cover.

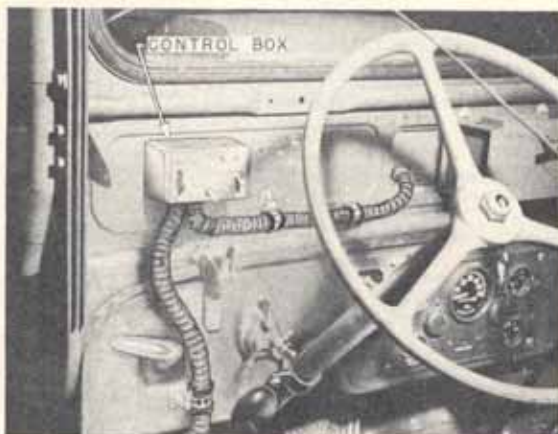


Figure 4

5. Connect the short wires that come out of the wiring harness near the control box to like numbered terminals within the control box assembly and then reassemble the control box to the cover previously mounted in the instrument panel.

6. Attach the wiring harness to the instrument panel in three places as shown in Figure 4, using three harness clamps and the #10-32 x 1 machine

screws provided. Use two lockwashers, two flat washers and a square nut on each screw. These parts are assembled finger-tight in the clamps. Leave the rest of the harness loose for the present.

RELOCATING WINDSHIELD WIPERS

1. To prevent interference with the defroster assembly, it is necessary to relocate the windshield wipers at the top of the windshield. Remove the wiper motors, lines and fittings from below the windshield and drill new holes at the top of the windshield as shown in Figure 5.

2. Reshape the manual operation handles of the wipers as shown in Figure 5 to provide additional clearance from the windshield and install the wiper motors, using the original fittings and connecting tubes. Stagger the lower tube two inches to the left. Cut a hole in the canvas top for the wiper arms.

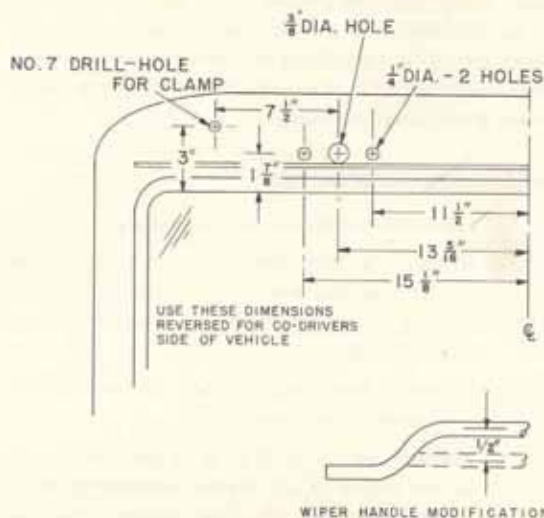


Figure 5

3. Connect wiper motor vacuum line as follows:
 - a. Straighten vacuum lines and air lines.
 - b. Remove upper compression nut and section of $\frac{1}{4}$ -inch hose from short line and shut-off cock at the driver's side.
 - c. Discard the short line but save the short hose and compression nut.
 - d. With the sleeve furnished and original compression nut, install the 20 $\frac{1}{2}$ -inch section of $\frac{1}{4}$ -inch copper tubing on the shut-off cock.
 - e. Drill a $\frac{1}{8}$ -inch hole and install the original tube clamp one inch below the shut-off cock.
 - f. Drill a $\frac{3}{16}$ -inch hole 5 $\frac{1}{4}$ inches from outer edge of windshield frame and 2 $\frac{1}{4}$ inches above the windshield, then install the tube clamp with the No. 10-32 screw, nut and lockwasher.
 - g. Connect wiper motor to the vacuum line with "Y" fitting and rubber hose using the 12-inch hose furnished in the kit.

4. Connect the vacuum return line on the assistant driver's side as follows:

- a. Straighten the air line and drill a $\frac{1}{8}$ -inch hole for the tube clamp $\frac{1}{2}$ inch below the compression nut.
- b. Install compression union and $25\frac{1}{2}$ -inch copper line.
- c. Attach original clamp below compression union to wall using original metal screw.
- d. Clamp the line above the windshield with the clamp and No. 10-32 screw, lockwasher, and nut furnished.
- e. Cut one inch from the hose not used on the driver's side to make the connection to the "Y" fitting on the assistant driver's side.

WIRING CONNECTIONS

1. On the firewall underneath the engine cover, measure in four inches from the left side and up $1\frac{1}{4}$ inches from the break where the firewall slants backward. Drill a $1\frac{1}{8}$ -inch hole at this point for the heater wiring harness.

2. Pull the wiring harness through from inside the vehicle and fit the rubber grommet into the hole.

3. Using the dimensions shown in Figure 6, drill three $9/32$ -inch holes for the safety valve mounting bracket.

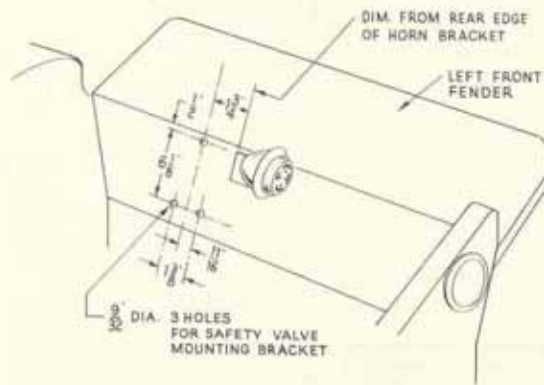


Figure 6

4. Mount the heater safety valve using the three holes just drilled. The safety valve and filter are already assembled to the mounting bracket which has three $\frac{1}{4}$ -20 x $\frac{3}{8}$ cap screws, lockwashers and nuts for mounting purposes (Figure 7). Place the No. 11 terminal of the wiring harness under one of the mounting screws.

5. Connect the two No. 19 wires of the wiring harness to the terminal of the safety valve.

6. Inside the vehicle, connect the wiring harness No. 24 wire into the vehicle's ignition wire No. 85. A blank plug is provided for this connection. Dis-

connect the wire in the plug and insert the No. 24 connection of the wiring harness in its place.

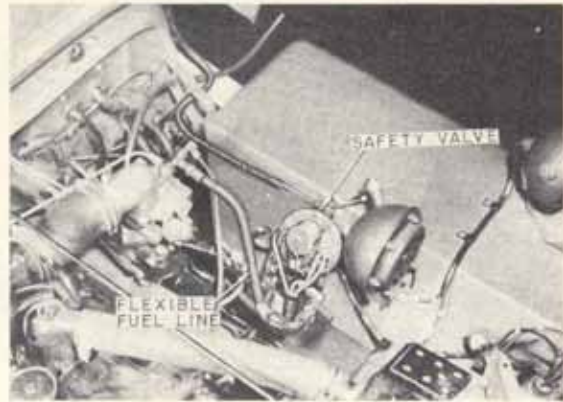


Figure 7

7. Connect the wiring harness HOT wire into the vehicle's No. 11 wire behind the instrument panel cluster. A Douglas "T" fitting is provided to make this connection. Break the No. 11 wire at the plug and insert the "T" connector in the line, then connect the HOT lead to the "T." Access to the above wires may be gained by releasing the dzus fasteners in the instrument panel cluster and pulling it out.

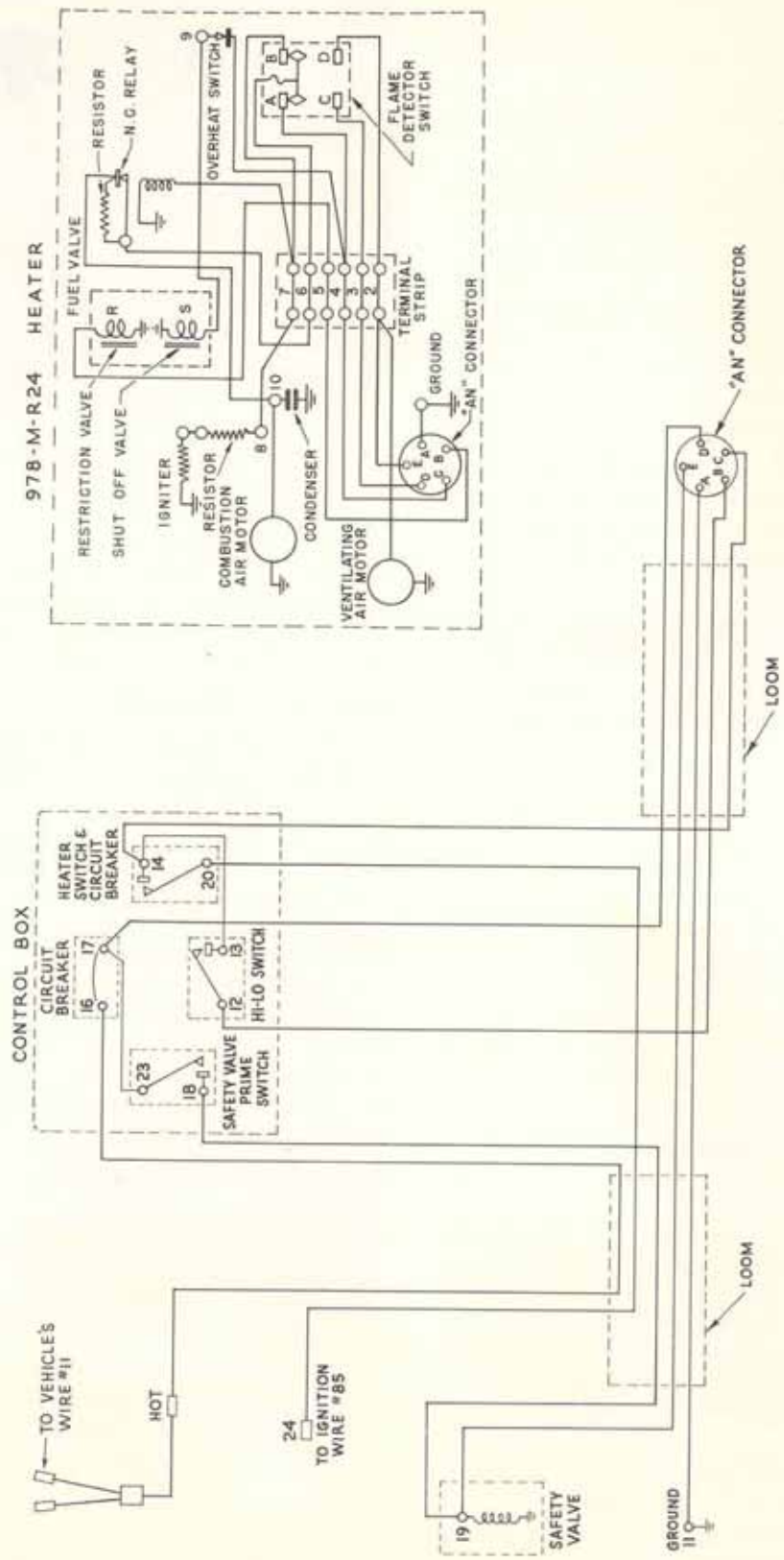
FUEL LINE CONNECTIONS

1. Connect the flexible fuel line, which is attached to the base of the heater box, to the inlet of the heater fuel control valve (Figure 3).

2. Connect the loom-covered copper tubing to the flare fitting at the end of the flexible fuel line underneath the heater box and to the elbow in the outlet of the heater safety valve. On a soft-top vehicle, it will be necessary to drill a $\frac{7}{8}$ -inch hole in the side of the body located on the same level and $1\frac{1}{2}$ inches forward from the hole for the vehicle's windshield wiper hose just below the heater. On the hard-top vehicle, the windshield wiper hose is located in a different position and the hole already drilled in the body for the hose may be used for the fuel line, eliminating the need to drill a new hole. The fuel line is equipped with a grommet which must be fitted into the hole to prevent chafing (see Figure 3).

3. Disconnect the engine fuel line from the inlet of the vehicle's carburetor and remove the fitting from the inlet. Install the $\frac{1}{8}$ N.P.T. service tee supplied with the heater fuel line in the carburetor and then reinstall the fitting previously removed and reconnect the engine fuel line to the end of the tee. Turn the tee so that the side outlet faces forward.

4. Install the threaded end of the flexible heater fuel line in the side of the tee and connect the flared end of the line to the elbow which is already installed in the shut off cock at the inlet of the heater fuel filter (see Figure 7). Tighten all fittings securely to prevent fuel leakage.



INSTALLING HEATER EXHAUST TUBE

1. Installation of the heater exhaust tube is slightly different for the hard-top and soft-top vehicles. To install the tube on the soft-top vehicle, proceed as follows:

- Fit the exhaust elbow onto the tube which extends from the heater box. Adjust this elbow with the vertical exhaust tube held in position so that a proper fit will be obtained (Figure 3).
- Using the dimensions shown in Figure 9, drill two $9/32$ diameter holes in the frame of the windshield for the exhaust tube mount-

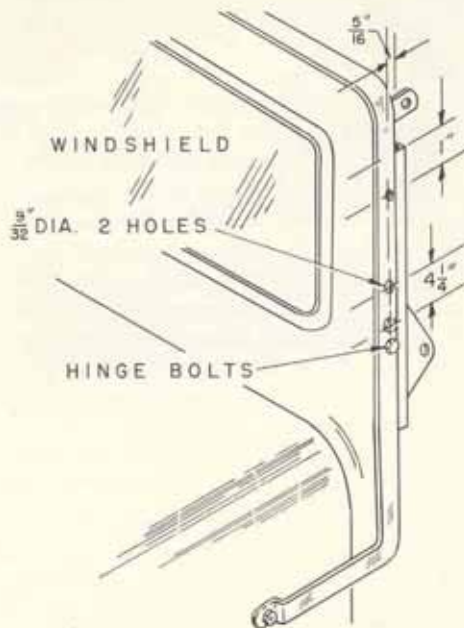


Figure 9

- Fit the exhaust tube into the elbow and secure it to the windshield with the two clamps and $1/4$ -20 x $1 1/2$ screws, lockwashers and nuts provided (Figures 1 and 3).

2. Installation of the exhaust tube on the hard-top vehicle is similar to the above, except that the windshield hinge bolts are used to hold the exhaust tube

clamp and the screws provided for this purpose are discarded.

INSTALLING DEFROSTER

1. The instrument panel of this vehicle has a plate upon which are mounted the vehicle instruction plates. This plate must be removed and discarded. After removing the mounting plate, remove all the instruction plates by drilling out the rivets and discard the mounting plate. Removal of the mounting plate uncovers an opening in the instrument panel which is used as the warm air outlet of the heater installation.

2. Remount six of the instruction plates on the face of the defroster assembly, using the holes already drilled in the defroster. Fit the instruction plates to the holes and attach them with the twenty-four #6 x $1/4$ rd. hd. sheet metal screws provided. The remaining instruction plate must be mounted on the face of the heater plenum chamber in a similar manner after the heater installation is complete (see Figure 10).

3. Fit the heat distributor, duct elbow and adapter assembly up against the instrument panel so that the adapter fits over the round hole in the instrument panel and the distributor assembly at the top fits up against the heat inlet adapter previously installed under the windshield. These three parts are assembled at the factory. The distributor assembly has two cut outs and two holes which fit around the ends of the screws which secure the air inlet cover. These screws will serve to accurately locate this part on the panel (Figure 10).

4. Mark through the four holes in the distributor assembly and the six holes in the adapter at the bottom to locate mounting screw holes.

5. Drill four $9/32$ -inch holes for mounting the distributor assembly and six $1/8$ -inch holes at the bottom for the adapter. Mount the entire assembly, using four $1/4$ -20 x $3/8$ hex hd. cap screws, lockwashers and nuts at the top and six #10-32 x $1/2$ pan hd. thread-cutting screws at the bottom.

6. After the distributor assembly is installed, place the defroster in position as shown in Figure 10, with



Figure 10

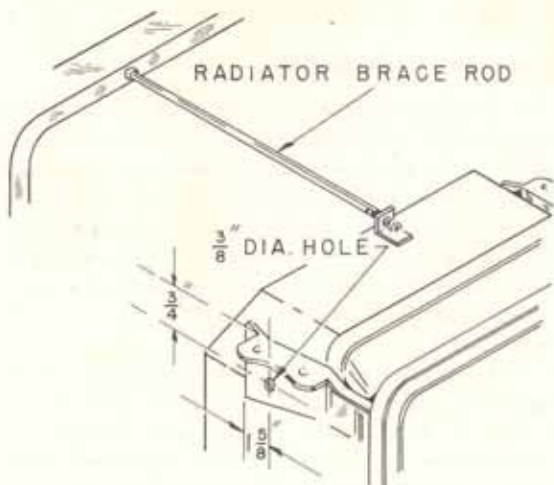


Figure 11

the defroster inlet fitted over the outlet of the distributor assembly and mark through the defroster mounting brackets. Drill four 9/32-inch holes and mount the defroster with the four 1/4-20 x 1/2 hex hd. cap screws, lockwashers and nuts provided.

7. Install the short section of 4-inch ducting between the outlet adapter of the heater and the inlet adapter of the heat distributor assembly (Figure 1).

If the vehicle has a soft top, use all the ducting supplied. If it has a hard top, the duct will be too long and it will be necessary to cut three inches off the end before installation. Secure the duct at both ends with the duct clamps provided.

8. Place the lid on the heater box.

INSTALLING ENGINE COVER PROP

1. After installation of the personnel heater kit, it will be impossible to lift the engine cover and lean it back against the windshield as was done before heater installation, therefore, a prop must be provided to hold the cover in an open position when it is desired to service the engine. This prop is included with the personnel heater kit.

2. To install the engine cover prop, drill a 3/8-inch hole in the right radiator bracket, using the dimensions in Figure 11. Remove the cotter pin from the end of the prop and remove one flat washer and the spring. Insert the end of the brace through the radiator bracket from the inside and reinstall the spring, flat washer and cotter pin. Two holes are already drilled in the rib down the center of the engine cover. While the cover is raised, the end of the brace is inserted into one of the holes to act as a support. When not in use, lay the brace over the radiator brace rod above the engine.

Section II

OPERATIONAL CHECK

A. INITIAL STARTING OF HEATER

1. After heater installation is complete, start the heater as follows:

- a. Start engine.
- b. Hold safety valve reset switch in closed position for about 30 seconds.
- c. Turn the HI-LO switch to high position.
- d. Turn heater switch ON.

2. Within two minutes the ventilating air fan of the heater should start and warm air should be felt at the duct outlet.

3. After the heater has been in full operation for

three or four minutes, turn the heater switch off. Burning in the heater should stop within 45 seconds, but the fans should continue to run for about two minutes to cool and purge the heater.

4. If the heater fails to start after the above procedure, turn the heater off, push the circuit breaker reset button, and repeat the steps in Paragraph 1.

B. OPERATION OF HEATER

1. After the heater has been started and checked the first time, as described above, it is only necessary to start the engine and turn the heater switch on to start the heater in normal usage. If the heater fails to start in this manner, repeat the initial starting procedure.

Section III

INSTALLING RADIATOR COVER

1. Place the radiator cover over the front of the radiator grille. Using the grommets in the cover as templates, mark locations of tie-down clips. Drill with a #27 drill and attach the clips to the front of the grille with the sheet-metal screws provided. (See Figure 12.)



Figure 12

2. After the tie-down clips are in place, lace the tie strips through the clips and fasten securely.

3. Fold the bottom of the cover back under the radiator and pull the flaps up at the sides. Drill a 1/8-inch hole at a convenient location and secure the bottom flap at both sides with the spring and hook assemblies provided. (See Figure 14.)

4. Fold the side flaps back and drill two holes at each side, then secure the side flaps with the spring and hook assemblies provided (Figure 13).



Figure 13

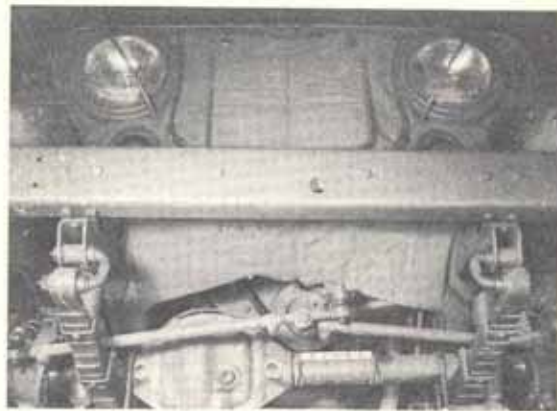


Figure 14

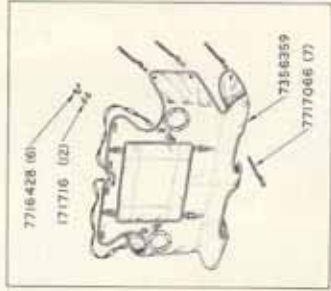
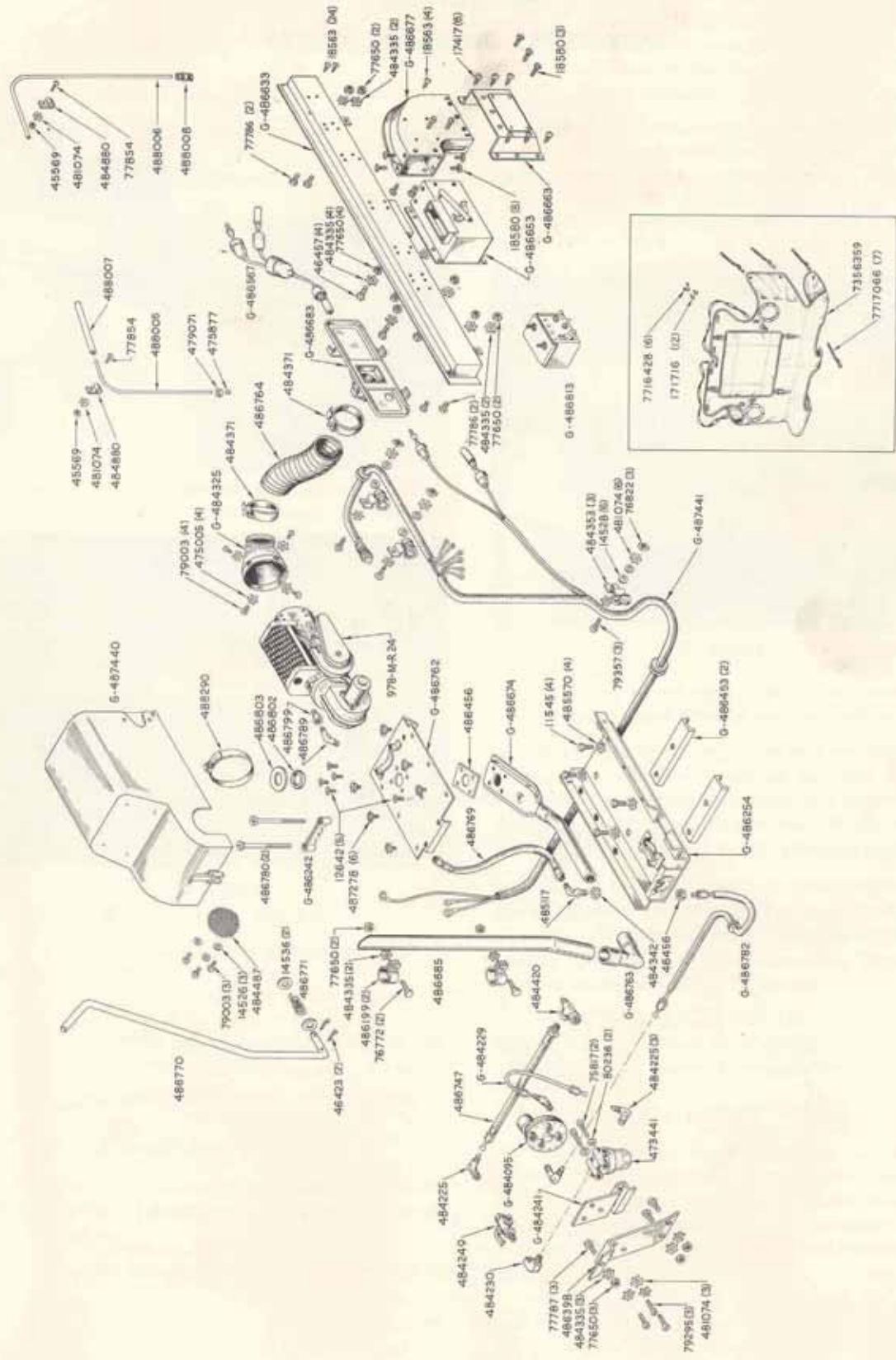


Figure 15—Exploded Parts View

Section IV

PARTS LIST

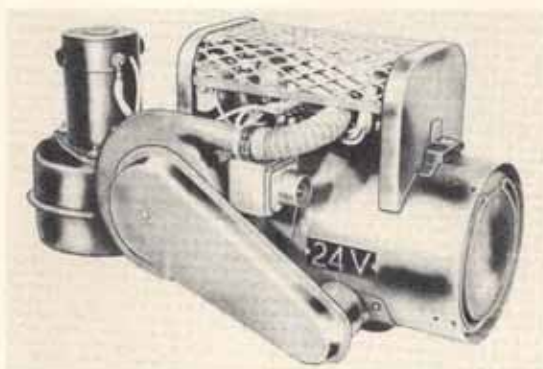


Figure 16—Model 978-M-R24 Heater

Part No.	Description	Quantity Per Kit
978-M-R24	Personnel Heater	1
11545	Screw, 5/16-18 x 1 Hex. Hd. Cap.	4
12642	Screw, No. 10-32 x 3/8 St. Side Bind. Hd. Mach.	5
14526	Washer, Plain Flat.	3
14528	Washer, No. 10 Flat.	6
14536	Washer	2
17417	Screw, No. 10-32 x 1/2 Pan Hd. Thd. Cutting	6
18563	Screw, No. 6 x 1/4 Pan Hd. (Type "A")	28
18580	Screw, No. 8 x 1/2 Pan Hd. Type "A"	11
45569	Nut, No. 10-32 Hex.	2
46423	Pin, Cotter	2
46456	Nut, 3/8-24 Hex.	1
46457	Screw, 1/4-20 x 5/8 Fil. Hd. Mach.	4
75817	Screw, No. 10-32 x 1 1/2 Fil. Hd. Mach.	2
77786	Screw, 1/4-20 x 1/2 Hex. Hd. Cap.	4
76772	Screw, 1/4-20 x 1 1/2 Hex. Hd. Cap.	2
76822	Nut, No. 10-32 sq.	3
77650	Nut, 1/4-20 Hex.	13
77787	Screw, 1/4-20 x 5/8 Hex. Hd. Cap.	3
77854	Screw, No. 10-32 x 1/2 Rd. Hd. Mach.	2
79003	Screw, No. 8-32 x 5/16 Fil. Hd. Mach.	7
79295	Screw, No. 10-32 x 1/2 Fil. Hd. Mach.	3
79357	Screw, No. 10-32 x 1 Fil. Hd.	3
80236	Lockwasher, No. 10 Int.	2
473441	Filter, Gasoline	1
475005	Lockwasher, No. 8 Int.-Ext.	4
475877	Sleeve, 1/4 in. Tube Comp.	1
479071	Nut, 1/4 in. Tube Comp.	1
481074	Lockwasher, No. 10 Int.-Ext.	11
484225	Elbow, 1/8 Pipe to 3/16 Tube	4
484230	Street Elbow 1/8 NPT.	1
484249	Cock, Shut Off.	1
484335	Lockwasher, 1/4 Int.-Ext.	14
484353	Clamp, Harness	3
484371	Clamp, 4" O. D. Hose	2

Part No.	Description	Quantity Per Kit
484342	Lockwasher, 3/8 Int.-Ext. Tooth	1
484420	Tee, 1/8 NPT.	1
484487	Screen, Air Inlet	1
484880	Clamp	2
485117	Elbow, 90° Bulkhead	1
485570	Lockwasher, 5/16 Int.-Ext.	4
486199	Clamp, Exhaust	2
486398	Bracket, Valve Mtg.	1
486456	Gasket, Exhaust	1
486685	Stack, Exhaust	1
486747	Tube, Fuel	1
486764	Duct, 4" I. D. Flex. (8" Long)	1
486769	Tube, Flexible Fuel	1
486770	Brace, Hood	1
486771	Spring, Hood Brace	1
486780	Screw, 5/16-18 x 6 3/4 Sl. Hex. Hd. Cap	2
486789	Elbow, 3/16 Tube, 1/8 NPT 45°	1
486799	Adapter, 1/8 NPT.	1
486802	"O" Ring	1
486803	Washer, Exhaust	1
487278	Screw, No. 10-32 x 1/2 Pan Hd. "Sems"	6
488005	Tube, 1/4 O.D. x 20 1/2	1
488006	Tube, 1/4 O.D. x 25 1/2	1
488007	Hose, Rubber (12 in. lg.)	1
488008	Union, 1/4 Tube to 1/4 Tube	1
488290	Clamp, Hose, 6" Dia.	1
G-484095	Valve Assem. Safety (24V)	1
G-484229	Tube Assembly	1
G-484241	Bracket Assembly	1
G-484325	Adapter Assy. 45° Outlet	1
G-486242	Clamp Assembly—Hold Down	1
G-486254	Base Assembly	1
G-486453	Bracket Assy.—Mtg. Support	2
G-486567	Wire Assy.	1
G-486633	Defroster Assy.	1
G-486653	Diverter Assy.—Vent Air	1
G-486663	Adapter Assembly, Vent Air	1
G-486674	Adapter Assy.—Exhaust	1
G-486677	Elbow Assy.—Vent Air	1
G-486683	Ventilator Assy.	1
G-486762	Plate Assy.—Heater Mtg.	1
G-486763	Elbow—Exhaust	1
G-486782	Fuel Line Assembly	1
G-486813	Box Assy.—Control (24V)	1
G-487440	Cover Assembly	1
G-487441	Harness Assy.—Wiring	1
G-486307	STRAP ASSY	1
RADIATOR COVER ASSEMBLY		
*171716	Screw, Self-Tapping	12
*7356359	Cover Assembly	1
*7716428	Loop	6
*7717066	Spring Assembly	7

*Ordnance Numbers

SUPPLEMENT TO
INSTALLATION INSTRUCTIONS
FOR PERSONNEL HEATER
KIT ORD. NO. 7387261
FOR TRUCK, $\frac{1}{2}$ TON, 4 x 4 UTILITY M-38

The parts list in this installation booklet (PM-6939) should be corrected as follows to agree with kit components. Installation of the kit is not affected.

1. Delete Part No. 488290 Clamp Hose. Also change number in exploded view Figure 15. This part is now a strap assembly which fits onto a hook on the heater mounting plate.
2. Add Part No. G-486307 Strap Assembly to parts list.
3. Add Part No. 486664 Screw, 5/16 - 18 x 4 Quan. 1. This screw is used to secure the strap above.

DEFROSTER

Photo edited by Wes Knettle

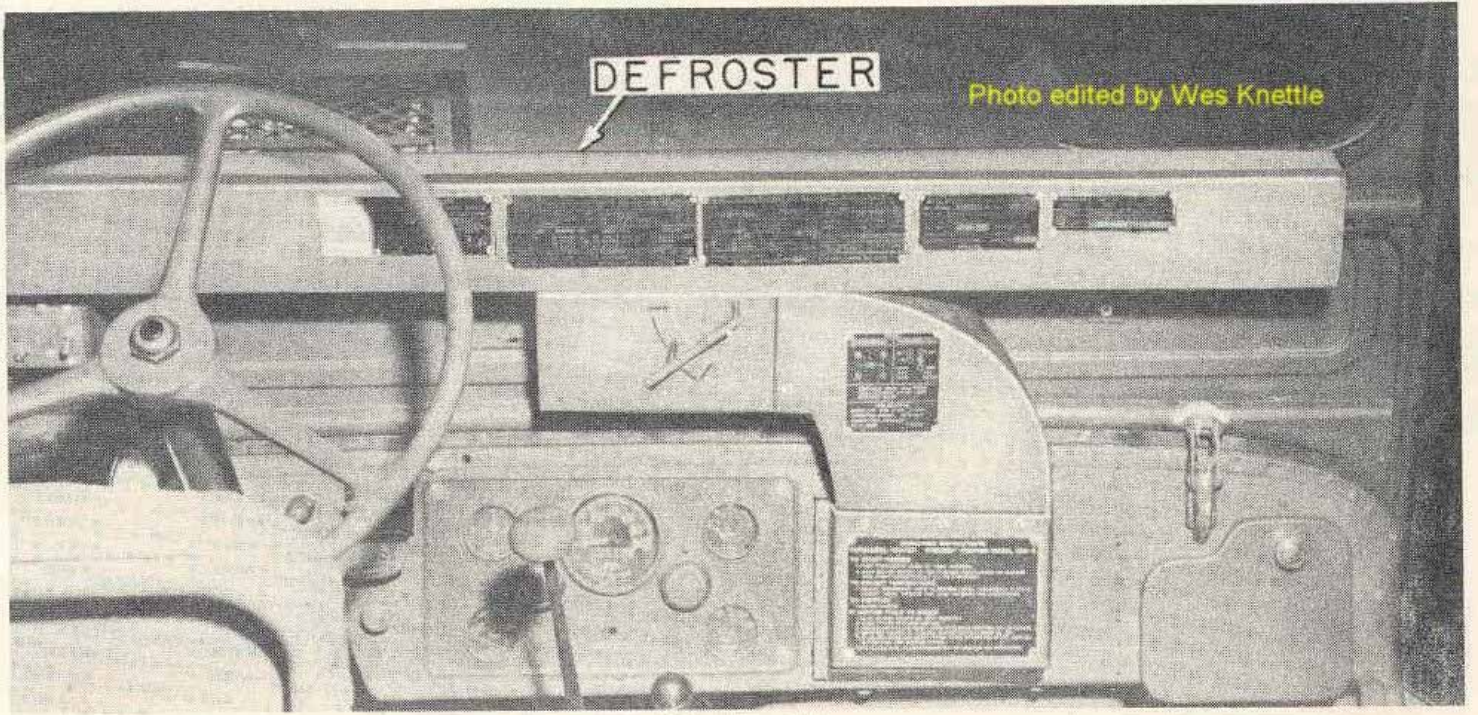


FIG. 10



TB 9-2855-2

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

INSTRUCTIONS FOR THE INSTALLATION OF PERSONNEL HEATER KIT FOR ¼-TON 4 X 4 UTILITY TRUCK M38 (WILLYS MC) (24V) (G-740)

Department of the Army, Washington 25, D. C. 23 Dec. 1952

This bulletin is correct to 21 October 1952

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RESTRICTED

RESTRICTED—Security Information

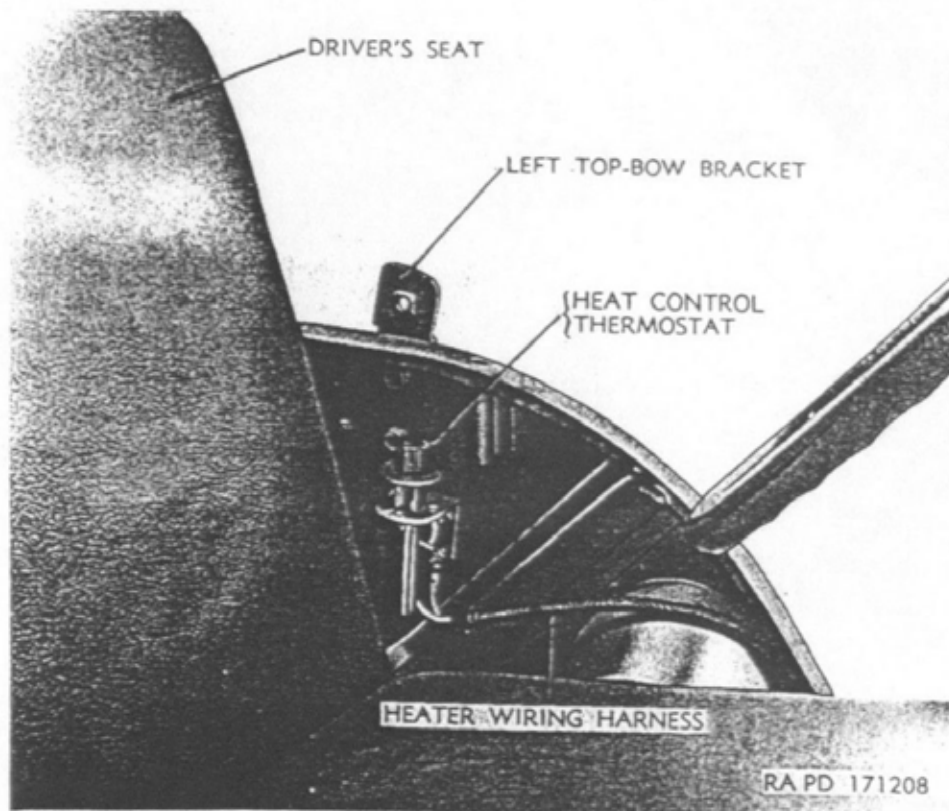


Figure 23. Heat control thermostat installed.

m. Heat control thermostat. Hold the heat control thermostat in a vertical position against the inside of the vehicle body, alongside of the driver's back rest, just forward of the left front top-bow bracket (fig. 23). Scribe through the two screw holes and drill through the body, using a $\frac{1}{4}$ -inch drill. Mount the thermostat, using two No. 10-32 x $\frac{1}{2}$ machine screws, lock washers, and nuts provided with the thermostat. Heads of screws should be outside of vehicle.

n. Hood brace. Due to the fact that the personnel heater installation prevents the engine hood from being fully opened, a brace is provided in the kit to prop the hood open when required. Drill a $\frac{3}{8}$ -inch hole through the right radiator bracket as shown in figure 24. Install the brace in the hole and mount the spring, two plain washers, and cotter pins provided with the brace. To use the brace, raise the hood and brace until the free end of brace can enter a hole already drilled in rib of hood. Brace stows naturally when not in use.

o. Fuel safety valve and filter. The fuel safety valve and fuel filter are mounted on a bracket when received. Place the assembly on the inner face of the left front fender splash shield, with safety valve uppermost, so that the bracket is one-half inch to rear of horn base and