TB 9-2855-45
TO 36Y17-5-1-7

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

¾-TON 4 X 4 TRUCK CHASSIS M56 AND M56C, AMBULANCE TRUCK M43, CARGO TRUCK M37, COMMAND TRUCK M42, MAINTENANCE TRUCK M201 (SIGNAL CORPS MODEL V–41/GT), AND PANEL TRUCK M152 (SNL G–741): INSTALLATION OF HOT WATER PERSONNEL HEATER KIT

Departments of the Army and the Air Force, Washington 25, D. C.
19 December 1956

SECTION I
GENERAL

1. Scope. *a.* These instructions apply to those vehicles in the ¾-ton 4 x 4 series vehicles, operated under conditions set forth in this bulletin.

b. The sequence of operations given herein is the result of a trial installation. However, interferences may be encountered due to modi-

fication or damage to a vehicle as outlined in this publication. In such cases, a field expedient may be resorted to by the installing personnel to overcome the interference found on the particular vehicle, and the installation procedure may be altered accordingly.

c. TM 9–2855 provides information on preparation and operation of wheeled and tracked vehicles in arctic conditions of extreme cold (0° to —65° F.), ((1) through (6) below).

(1) Winterization equipment and processing, installation instructions, and methods.
(2) Operation and maintenance in extreme cold.
(3) Preparation of cooling system for low temperatures.
(4) Storage, handling, and use of fuels, lubricants, and antifreeze compounds.
(5) Method of adjusting specific gravity readings of batteries exposed to low temperatures.
(6) Application of insulating compound.

Note. TM 9–2855 is applicable to this vehicle as well as to all other vehicles. This bulletin and TM 9–2855 must be considered as one publication, not merely explanatory supplements to each other.

d. Reference will also be made to publications (1) through (7) below.

(1) TM 9–850, Abrasive, Cleaning, Preserving, Sealing, Adhesive, and Related Materiels Issued for Ordnance Materiel.
(2) TM 9–2835, Lubrication.
(3) TM 9–2857, Storage Batteries, Lead-Acid Type.
(4) TM 9–2858, Cooling Systems: Vehicle and Powered Ground Equipment.
(5) TM 9–8030, ¾-ton 4 x 4 Trucks, SNL G741-series.
(6) FM 31–70, Basic Arctic Manual.
(7) FM 31–71, Operations in the Arctic.

2. Application. *a.* The personnel heater kit is used in areas where the normal ambient temperature is +40° to —20° F. It is installed on vehicles provided with soft- or hard-top closure.

b. The kit is to be installed by Ordnance maintenance units or by troop units under supervision of Ordnance mechanics.

c. The personnel heater is a blower-type hot water heater. It is secured to the top of the left front fender (fig. 4). Heated air is distributed from the heater to vehicle cab and/or windshield defroster by a blower and heat diverter. Heat is controlled by a "diverter" control knob on the instrument panel, which in turn operates a butterfly or damper valve in the heat diverter assembly.

d. A canvas winterfront radiator cover is supplied with the kit to reduce flow of air to engine compartment. An adjustable aperture flap in the cover permits manual regulation of cold air through the

radiator as conditions demand, in accordance with the engine temperature gage.

e. The personnel heater kit is packaged under the title "Kit, Hot Water Personnel Heater," and bears the stock No. G249–5702003, and is composed of the following items:

Name	*Part No.*	*Quantity*
ADAPTER, duct	7700292	1
ADAPTER, hot air outlet	8380648	1
BRACKET, duct protector	8707737	1
BRACKET, heater switch	8710612	1
BREAKER, circuit, 15 amp	8376915	1
BUSHING, pipe, shoulder, ½ x ⅜	144039	2
CABLE, assy	8710631	1
CABLE assy	8710635	1
CABLE, assy	8710638	1
CABLE, assy	8710639	1
CABLE, assy	8710670	1
CLAMP, heater cable	7724765	2
CLAMP, heater duct	7537473	6
CLAMP, hot water hose	502913	4
COCK, shutoff, ⅜ NPTF male inlet, hose, nipple outlet, ⅝ id hose	7524043	2
CONNECTOR, Y, assy	7982404	1
CONTROL, diverter, assy	7700298	1
COVER, heater	8380649	1
COVER, radiator, assy	7387274	1
Composed of:		
1 COVER	7399400	--
2 LOOP, 90 degree	7716428	--
10 LOOP, flat	7717706	--
4 SCREW, TAPPING, THREAD CUTTING: No. 10–16 x ⅜	141592	--
20 SCREW, TAPPING, THREAD CUTTING: pan-hd, sltd-blunt-pt, S, cd- or zn-pltd, No. 10 (0.190)–24NC–2 x ⅜	171716	--
2 SPRING, winterfront, cover, retaining	771706	--
DEFROSTER, assy	7700288	1
DIVERTER, assy	7700289	1
DUCT, hot air (11 in. long)	8711056	1
DUCT, hot air (20 in. long)	7961512	1
DUCT, hot air (38 in. long)	7399962	1
GASKET, thermostat	7702588	1
GROMMET, $\frac{5}{32}$ id, 1–½ x 1–$\frac{1}{16}$, w/groove	8707736	1
GROMMET, 1 id, 1⅜ dia, $\frac{1}{16}$ w	187954	2
HEATER, assy	8380650	1
HOSE, hot water intake	8710561	1
HOSE, hot water return	8710559	1
NUT, PLAIN, HEXAGON: S, cd- or zn-pltd, No. 8 (0.164)–32NC–2B, $\frac{11}{32}$ w, ⅛ thk	120622	2
NUT, PLAIN, HEXAGON: S, cd- or zn-pltd, No. 10 (0.190)–32NF–2B, ⅜ w, ⅛ thk	120614	1

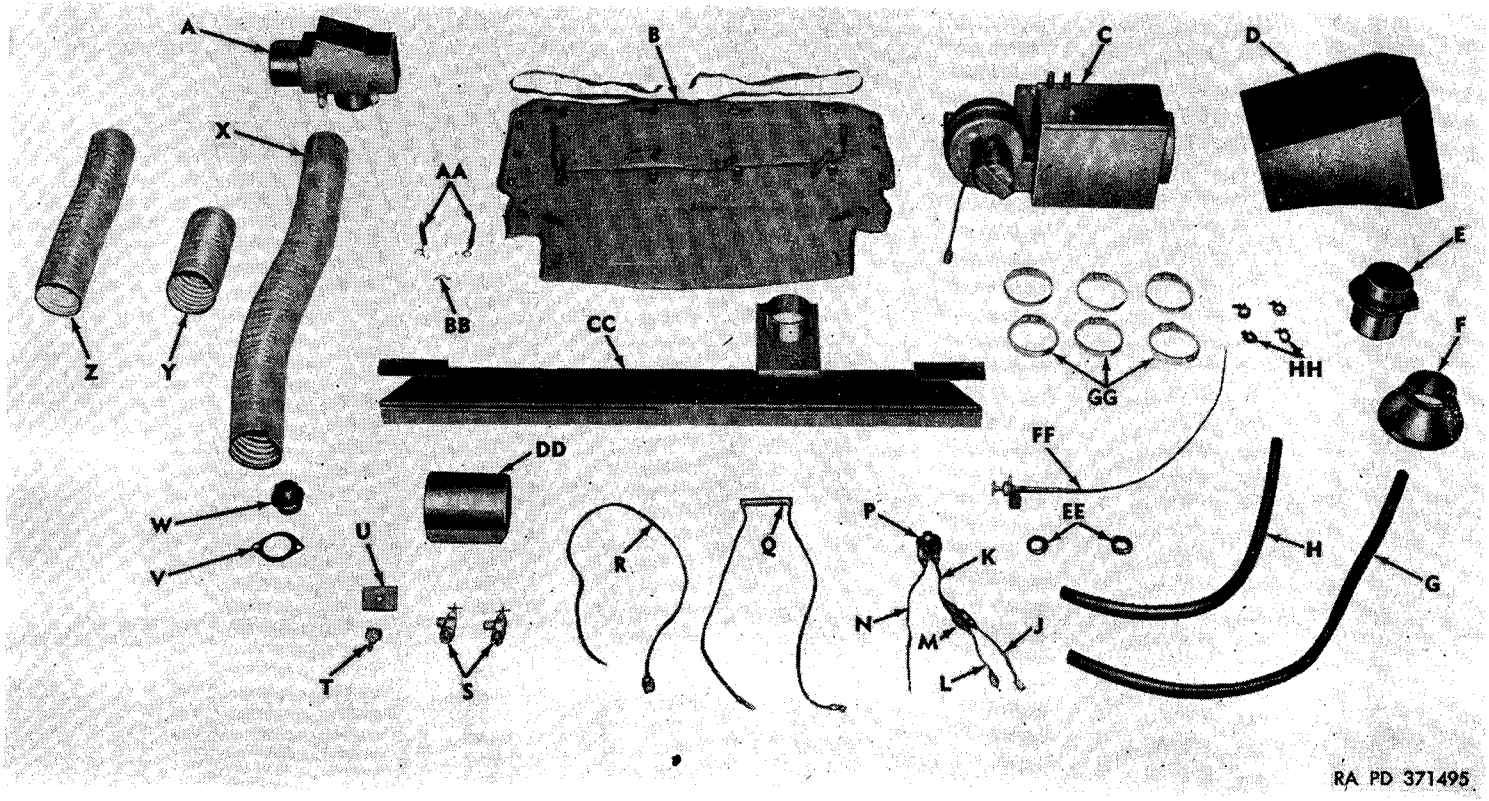

Figure 1. Hot-water personnel heater kit.

A—Diverter assembly 7700289
B—Radiator cover 7399400
C—Heater assembly 8380650
D—Heater cover 8380649
E—Duct adapter 7700292
F—Hot-air outlet adapter 8380648
G—Hot-water intake hose 8710561
H—Hot-water return hose 8710559
J—Cable assembly 8710638
K—Cable assembly 8710635
L—Cable assembly 8710639
M—"Y" Connector assembly 7982404
N—Cable assembly 8710670
P—15-Amp circuit breaker 8376915
Q—5-Ohm blower motor resistor 8710856
R—Cable assembly 8710631
S—Shutoff cock 7524043
T—Heater switch 502676
U—Heater switch bracket 8710612
V—Thermostat gasket 7702588
W—180° Thermostat 7531811
X—38-in. Duct 7399962
Y—11-in. Duct 8711056
Z—20-in. Duct 7961512
AA—Radiator cover retaining spring 7717066
BB—Flat loop 7717706
CC—Defroster assembly 7700288
DD—Duct protector 8710566
EE—Grommet 187954
FF—Diverter control assembly 7700298
GG—Duct clamp 7537473
HH—Hose clamp 502913

Figure 1—Continued.

Name	*Part No.*	*Quantity*
NUT, PLAIN, HEXAGON: S, cd- or zn-pltd, ¼–20UNC–2B, $\frac{7}{16}$ w, $\frac{7}{32}$ thk	120375	4
NUT, PLAIN, HEXAGON: S, cd- or zn-pltd, $\frac{5}{16}$–18UNC–2B, ½ w, $\frac{17}{64}$ thk	120376	5
PLATE, name, switch position	7986147	1
PROTECTOR, hot air duct	8710566	1
RESISTOR, blower motor, 5 ohm	8710856	1
SCREW, CAP, HEXAGON HEAD: dld-f/lkg wire, low-carb-S, plain fin., ¼–20UNC–2A x ½	120706	2
SCREW, CAP, HEXAGON HEAD: low-carb, S, cd- or zn-pltd, ¼–20UNC–2A x ¾	121887	2
SCREW, CAP, HEXAGON HEAD: low-carb-S, cd- or zn-pltd, $\frac{5}{16}$–18UNC–2A x ¾	122007	5
SCREW, CAP, HEXAGON HEAD: med-carb-S, cd- or zn-pltd, ¼–20UNC–2A x ¾	180020	2
SCREW, MACHINE: fil-hd, S, cd- or zn-pltd, No. 6 (0.138)–32NC–2A x $\frac{5}{16}$	583213	4
SCREW, MACHINE: fil-hd, S, cd- or zn-pltd, No. 10 (0.190)–32NF–2A x ¾	132124	1
SCREW, MACHINE: rd-hd, S, cd- or zn-pltd, No. 8 (0.164)–32NC–2A x ⅞	132772	2
SCREW, $\frac{5}{16}$–18NC–2 x ⅝	421033	2
SCREW, TAPPING, THREAD CUTTING: slotted pan head, No. 10 (0.190)–32NF–2 x ½	171732	4
SCREW, TAPPING, THREAD FORMING: rd-hd, gimlet-pt, sh-met-thd, S, cd- or zn-pltd, No. 14 (0.251) x ⅜	131299	1

Name	Part No.	Quantity
SCREW, TAPPING, THREAD FORMING: rd-hd, gimlet-pt, sh-met-thd, S, cd- or zn-pltd, No. 14 (0.251) x ½	144728	1
SWITCH, heater toggle, single pole, double throw ST40E	502676	1
THERMOSTAT, 180°	7531811	1
WASHER, LOCK: int-ext-teeth, S, cd- or zn-pltd, No. 10 screw size x 0.610 od	178378	1
WASHER, LOCK: int-ext-teeth, S, cd- or zn-pltd, $\frac{5}{16}$ bolt size x 0.985 od	178537	5
WASHER, LOCK: int-teeth, S, cd- or zn-pltd, No. 8	138530	2
WASHER,LOCK: No. 8 x 0.610 (0.580 to 0.610 od)	178364	4
WASHER, LOCK: split, lt, S, cd- or zn-pltd, ¼ bolt size	121637	4

f. In case of conflict between data in this bulletin and earlier publications, including manufacturer's instruction manual, the data in this publication will govern.

Note. Before starting heater kit installation, refer to figure 1 which will provide identification of the parts referred to in installaton procedure.

SECTION II
INSTALLATION INSTRUCTIONS

Note. The key letters shown in parentheses in paragraph 3 refer to figure 1.

3. Personnel Heater. *a.* Raise hood and lock in open position.

b. Drain radiator (TM 9–8030).

c. Disconnect battery cables at battery.

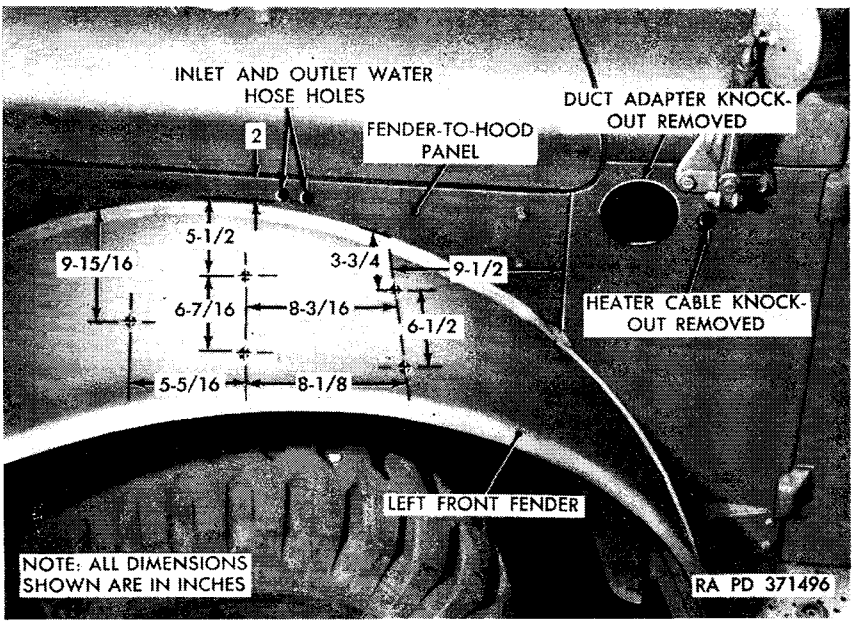

Figure 2. Dimensions for locating heater mounting holes on left front fender.

d. Locate, mark, and drill five $^{21}/_{64}$-inch holes in left front fender as illustrated on figure 2.

e. Install hot air outlet adapter (F) on outlet of heater unit and secure with four No. 8–32 x $^{5}/_{16}$ machine screws and lockwashers.

f. Position heater over five drilled holes in left front fender. Locate and mark position of two holes on fender-to-hood panel for inlet and outlet hot water hose (fig. 2).

g. Remove heater and drill two 1¼-inch holes in fender-to-hood panel.

h. Remove duct adapter and heater cable knockouts from left side cowl panel (fig. 2).

i. Position duct adapter (E) in cowl panel, mark location of holes for four screws.

j. Remove duct adapter and drill four $^{5}/_{32}$-inch holes in cowl panel.

k. Install duct adapter in cowl panel and secure with four No. 10 x ½ tapping screws.

l. Install grommets (EE) in the heater hot water hose inlet and outlet holes in the fender-to-hood panel (fig. 3).

m. Install grommet for heater cable in the hole in cowl panel (fig. 3).

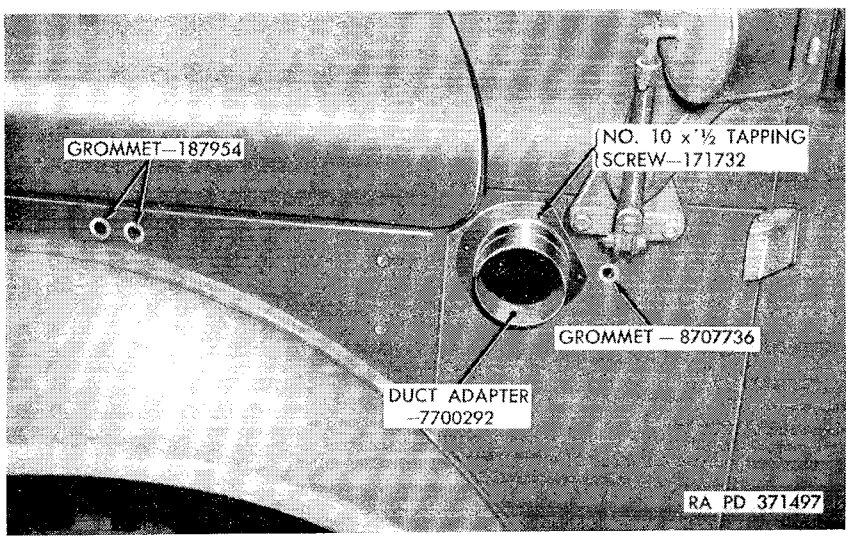

Figure 3. Heater hose and heater cable assembly grommets installed.

n. Install heater asembly (C) on left front fender and secure with five $^{5}/_{16}$ x ¾ cap screws, lockwashers, and nuts.

o. Install 11-inch duct (Y) from the hot air outlet on the heater to the adapter on the cowl panel (fig. 4) securing each end with duct clamps (GG).

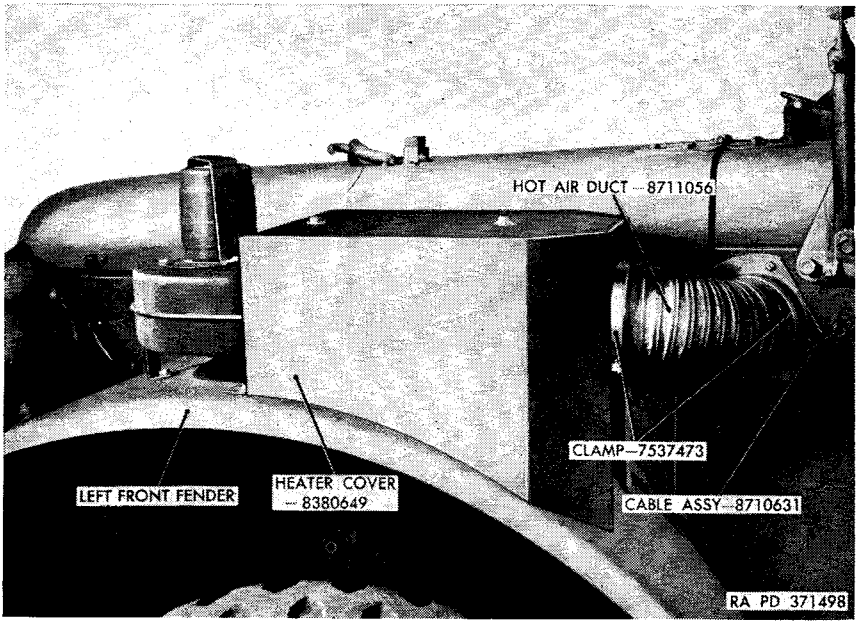

Figure 4. Heater installed on fender.

Note. The key letters shown in parentheses in paragraph 4 refer to figure 1.

4. Thermostat Replacement. *a.* Remove the mounting screws from the engine water outlet and bypass elbows (TM 9–8030).

b. Lift the water outlet and bypass elbows from the engine, and remove the thermostat and thermostat gasket from the water outlet elbow.

c. Install new 180° F. thermostat (W) and thermostat gasket (V) in the water outlet elbow.

d. Install water outlet and bypass elbow and secure with screws removed in *a* above.

Note. The key letters shown in parentheses in paragraph 5 refer to figure 1.

5. Water Hose Installation. *a.* Remove the two pipe plugs located in the cylinder head behind the No. 6 spark plug and at the top of the bypass elbow.

b. Install ½ x ⅜ bushing and shutoff cock (S) in each hole (fig. 5).

c. Install hose clamp (HH) on hot water intake hose (G). Install hot-water intake hose on water shutoff cock at rear of No. 6 cylinder. Tighten clamp screws. Route water intake hose over engine and through rear grommet in left hood-to-fender panel. Install hose clamp on hose and install hose on heater inlet opening, and tighten clamp screw.

d. Install hose clamp on hot water return hose (H), install hose on water shutoff cock at the bypass elbow. Tighten clamp screw. Route water return hose over engine and through front grommet in left hood-to-fender panel, install hose clamp on hose. Install hose on heater outlet opening and tighten clamp screw (fig. 5).

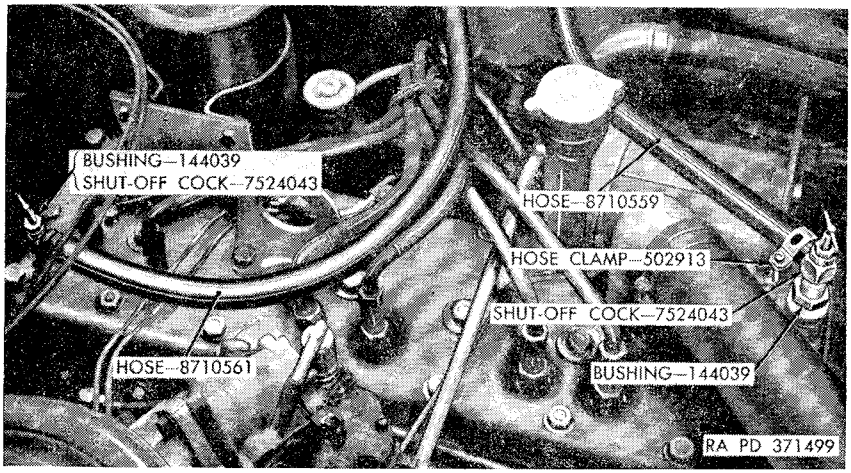

Figure 5. Water shutoff cocks and heater hose installed.

Note. The key letters shown in parentheses in paragraph 6 refer to figure 1.

6. Diverter and Defroster Installation. *a.* Remove two hexagon-head cap screws from left and right windshield support frame clamps (fig. 6).

b. Remove cover plate at center of instrument panel and two ½-inch knockouts in metal plate located in center of firewall (fig. 7).

c. Install defroster assembly (CC) temporarily, inserting cylindrical part of defroster assembly into large hole in center of instrument panel. Mark location of screw hole at bottom of assembly on instrument panel (fig. 8).

d. Remove defroster assembly and drill ¼-inch hole in instrument panel.

e. Install defroster assembly and secure upper part with hexagon-head cap screws removed in *a* above. Install 10–32 x ¾ screw, lockwasher, and nut, at bottom of assembly (fig. 8).

f. Install diverter assembly (A) by centering bracket holes over mounting holes in firewall, and securing with two ¼ x ¾ hexagon-head cap screws, lockwashers, and nuts (fig. 8).

g. Install 20-inch duct (Z) from top of diverter assembly to defroster intake, securing each end with duct clamp (GG).

h. Install one end of 38-inch duct (X) to duct adapter in left cowl panel, securing it with clamp duct (GG). Route other end of duct

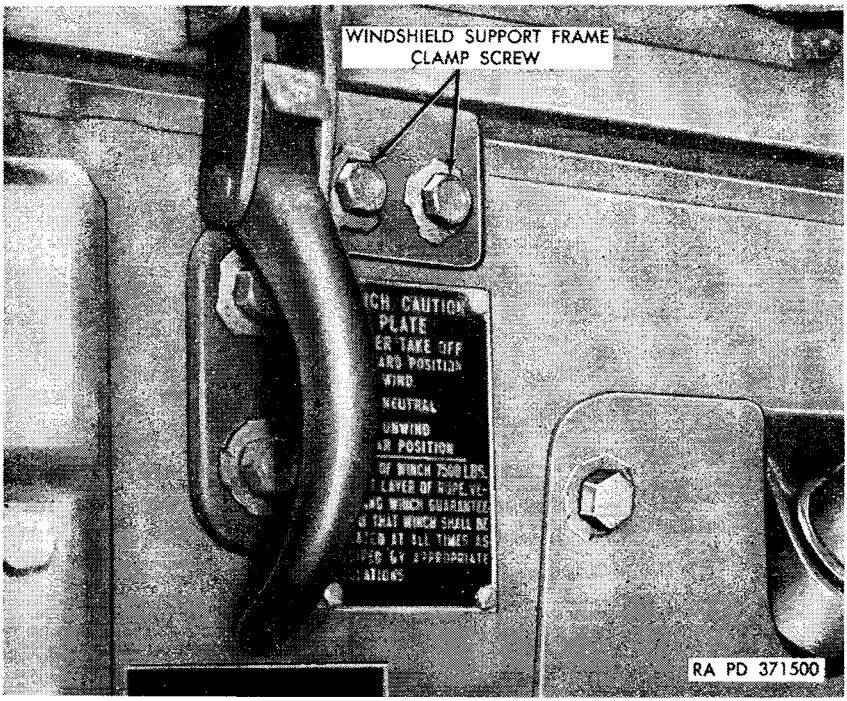

Figure 6. Windshield support frame clamp.

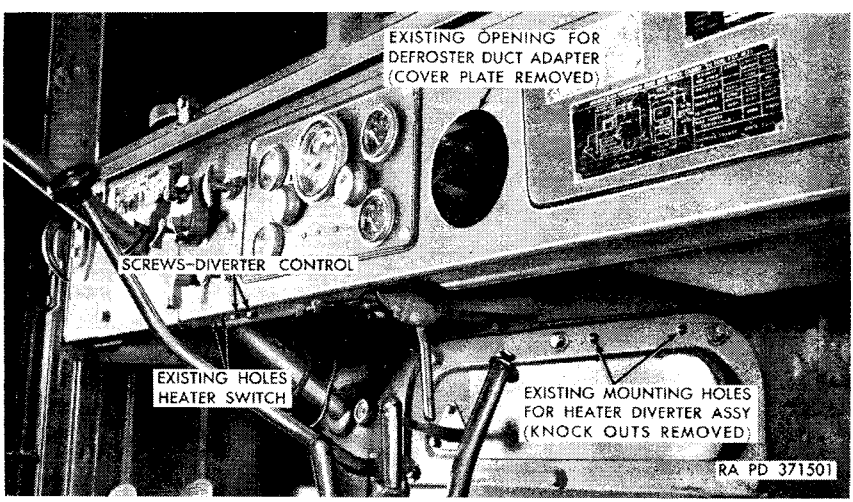

Figure 7. Instrument panel and firewall.

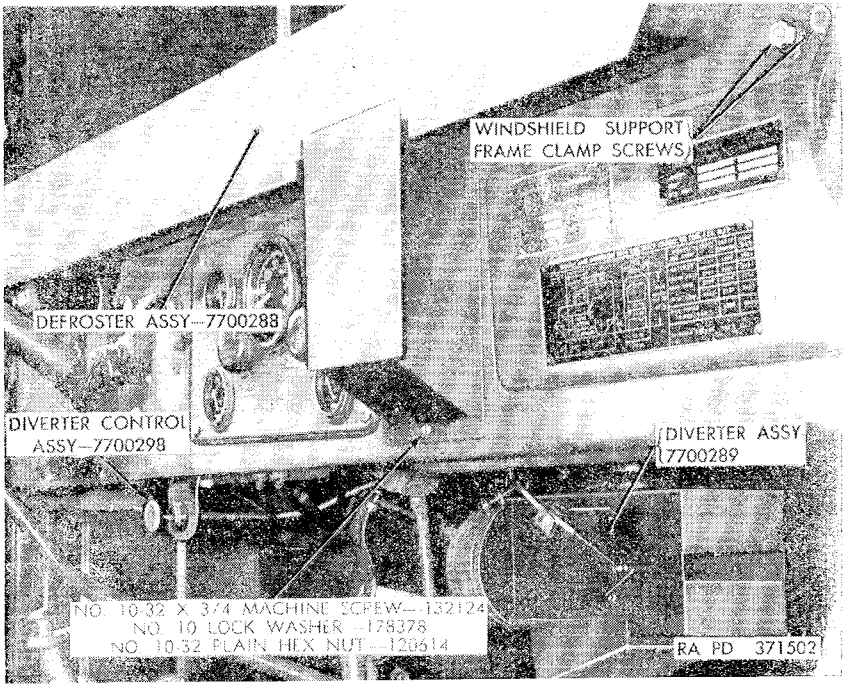

Figure 8. Heater diverter and defroster installed.

above steering column and starter button and install on diverter assembly (fig. 9), securing it with duct clamp (GG).

i. Install duct protector (DD), securing it with two ¼ x ¾ hexagon-head cap screws, lockwashers, and nuts (fig. 9).

j. Remove top nut from starter button bracket and install duct protector bracket (fig. 9) and replace nut.

k. Remove two cap screws from bottom of instrument panel (fig. 7). Install diverter control assembly (FF) and replace cap screws (fig. 9). Connect control to diverter.

Note. The key letters shown in parentheses in paragraph 7 refer to figure 1.

7. **Electrical Installation.** *a.* Install heater switch bracket (U) to the instrument panel beside the diverter control, utilizing existing holes. Secure with two ¼ x ½ hexagon-head cap screws, lockwashers, and nuts.

b. Install heater switch (T) and nameplate on heater switch bracket.

c. Remove electrical control cluster from instrument panel (fig. 10).

d. Install 15-ampere circuit breaker (P) on instrument panel (fig. 10), secure with two No. 8 x ⅞ machine screws, lockwashers, and nuts.

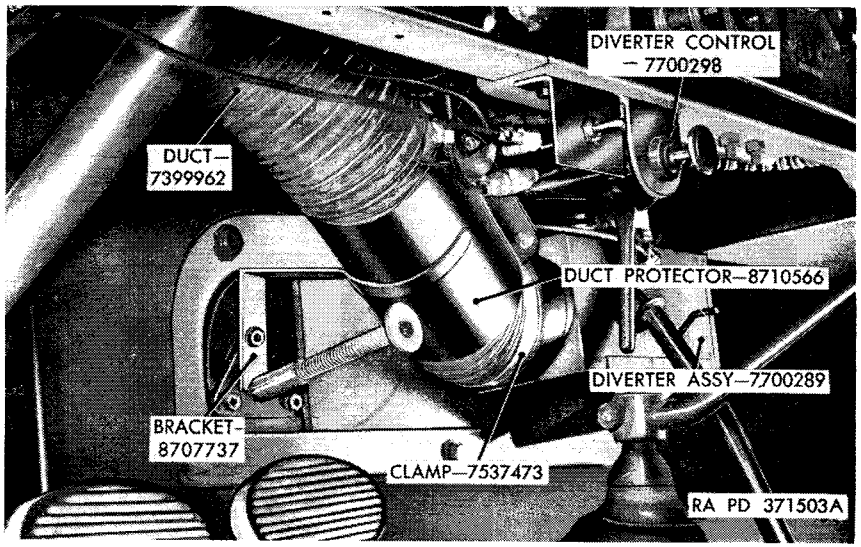

Figure 9. Installation of heater duct and duct protector.

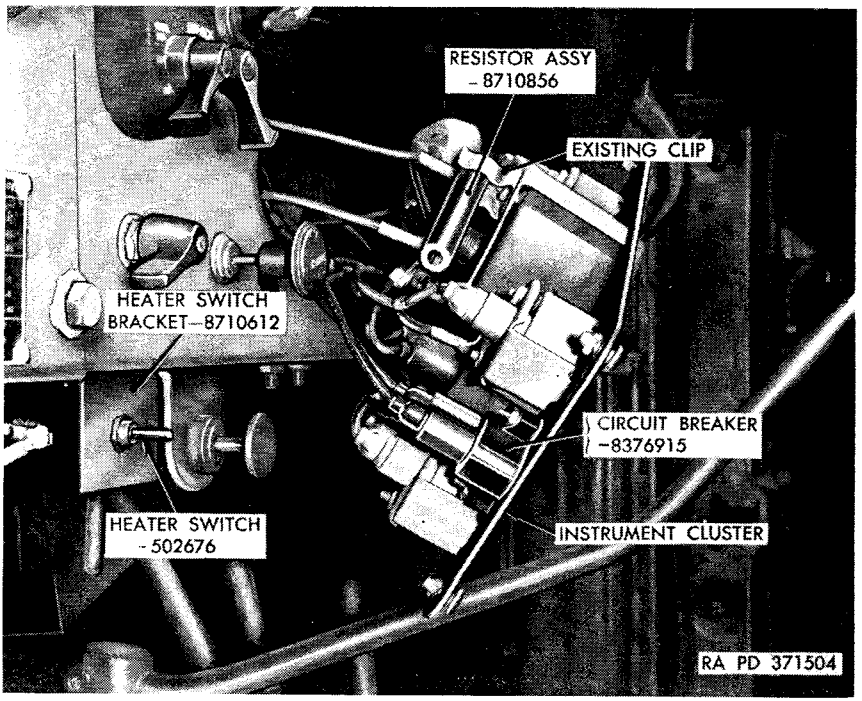

Figure 10. Electrical control cluster removed.

e. Assemble cable assemblies (J, K, and L) to Y connector assembly (M). Connect cable assembly (K) to circuit breaker.

f. Disconnect the connector of No. 11 circuit (hot), and connect cable assemblies (J and L) to their respective connectors.

g. Connect cable assembly (N) to circuit breaker and to center pole of heater switch (fig. 11).

h. Install 5-ohm blower motor resistor (Q) on instrument panel (fig. 10), connect two cables from the resistor to the HIGH and LOW positions of the heater switch (fig. 11).

i. Insert cable assembly (R) through grommet in left cowl panel (fig. 4), connect cable to heater and to HIGH position on heater switch (fig. 11).

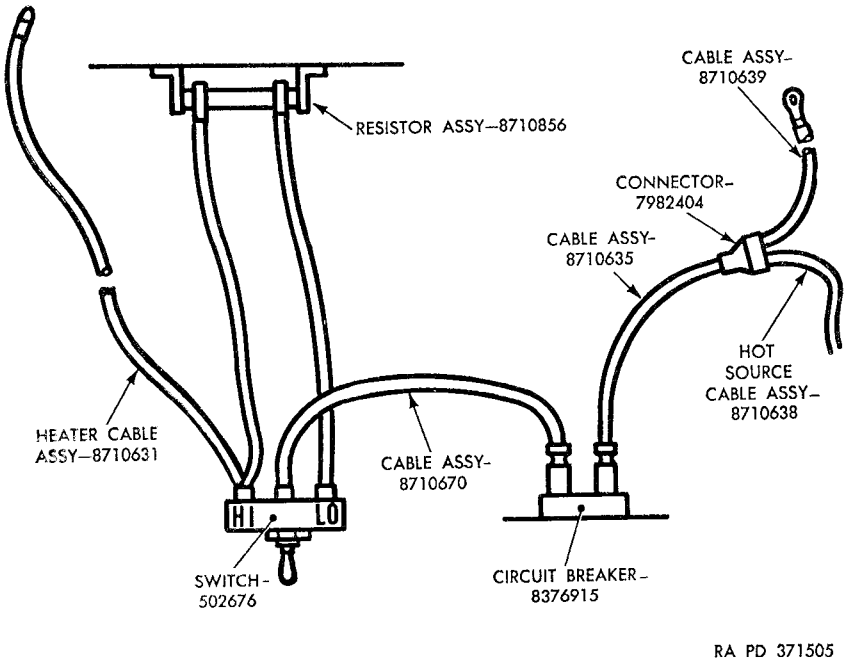

Figure 11. Wiring diagram.

j. Install heater cover (D) over heater and secure with two No. 10 x 3/8 screws and washers (fig. 4).

k. Locate on heater cover, next to engine compartment, an accessible position for a heater cable clamp. Install clamp over cable and secure with a No. 14 x 3/8 tapping screw.

l. Locate on left cowl panel, a suitable position for a heater cable clamp. Install clamp over cable and secure with a No. 14 x 1/2 tapping screw.

m. Install electrical control cluster in instrument panel.

Note. The key letters shown in parentheses in paragraph 8 refer to figure 1.

8. Radiator Cover Installation. *a.* Position radiator cover (B) as a template against the front of radiator grille and mark the location of the ten brass slotted grommets of the radiator cover on the radiator grille.

b. Remove the radiator cover and using a flat loop (BB) as a template, position the loop as illustrated in figure 12 and mark the loop holes on the radiator grille for each of the upper ten grommet positions.

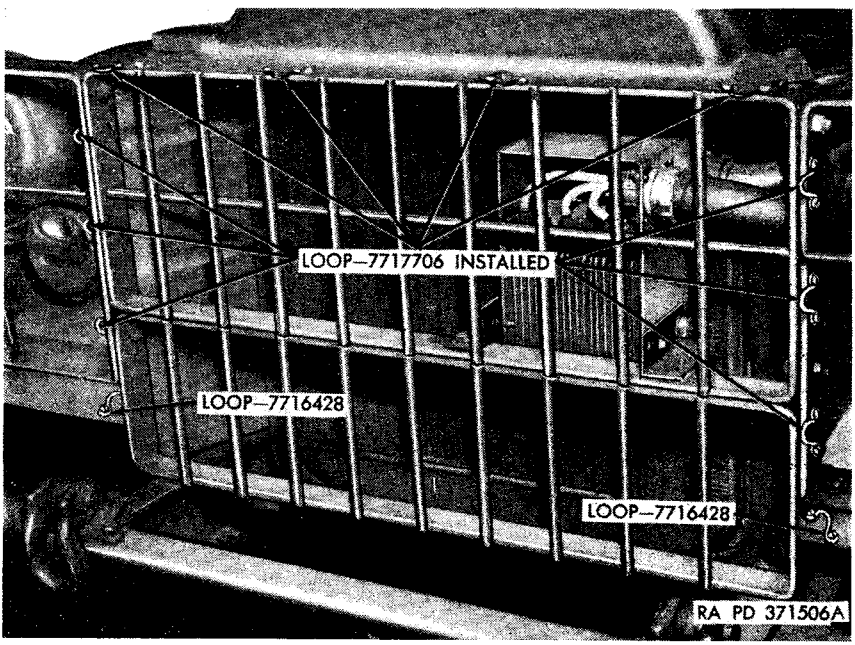

Figure 12. Radiator cover loops installed.

c. Drill the 20 holes using a 1/8-inch drill.

d. Install and secure the ten flat loops with two No. 10 x 3/8 tapping screws for each loop.

e. Install radiator cover temporarily and mark the position on the radiator grille of the two lower front grommets.

f. Remove the cover and using 90° loop 7716428 as a template, mark the loop holes.

g. Drill the four holes using a 1/8-inch drill.

h. Install and secure the two loops with two No. 10 x 3/8 tapping screws for each loop.

i. Install radiator cover on loops. Fold the bottom flaps of cover under radiator and install radiator cover retaining springs (AA) as illustrated in figure 13.

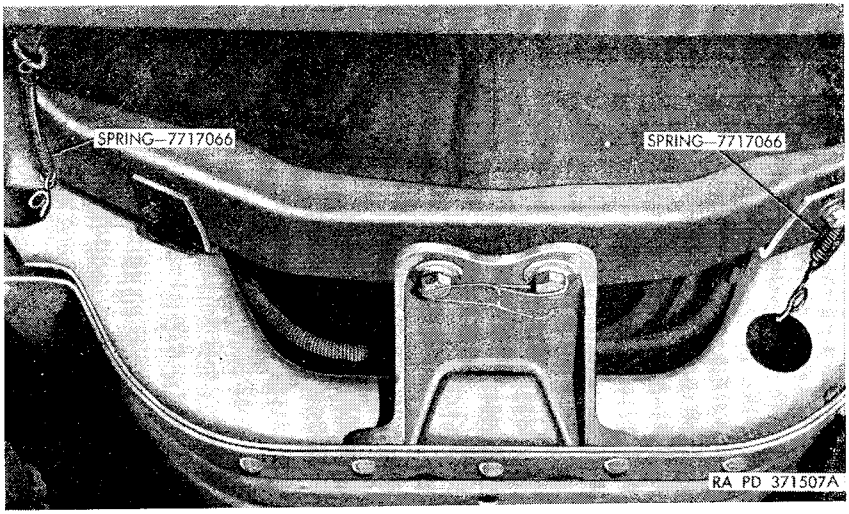

Figure 13. Radiator cover retaining springs installed.

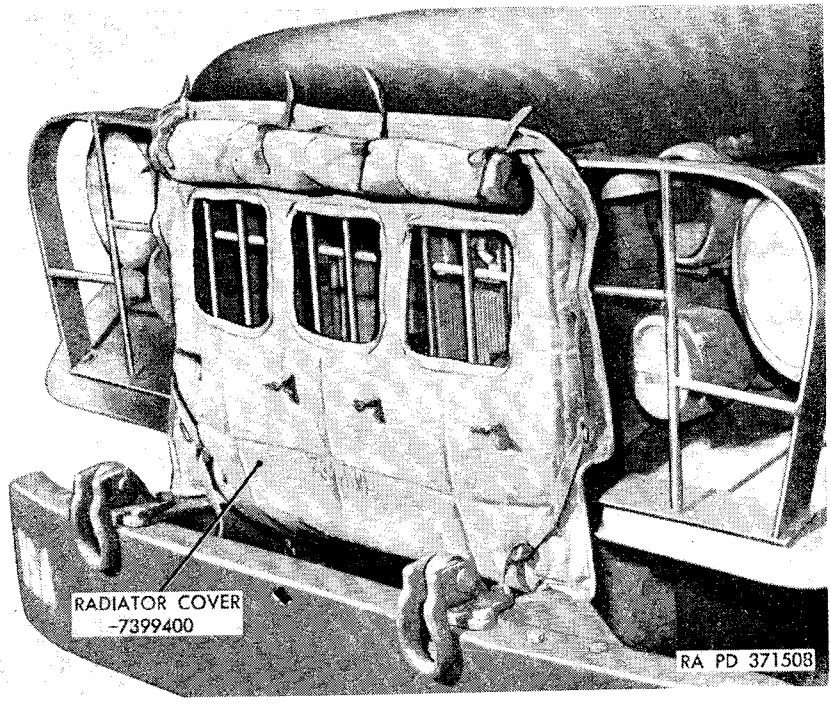

Figure 14. Winterfront installed.

j. Lace the holddown straps through the loops and secure as illustrated in figure 14.

k. Close cooling system drain cocks and replace coolant in vehicle radiator.

l. Connect battery cables.

m. Close hood and lock.

SECTION III
OPERATING INSTRUCTIONS

9. Heater Controls. *a.* The heater blower is controlled by a single-pole double-throw toggle switch; it has an OFF, LOW, and HIGH position.

b. A damper, within the heat diverter, is operated by pulling out the knob of the heater cable control defroster. With the defroster knob pulled all the way out, the damper closes completely the heat outlet to the cab and directs the heated air onto the windshield. When the knob is pushed all the way in, the heat outlet to the cab is opened and the heated air flows directly into the cab. Intermediate positions of the knob will distribute the heated air through the windshield air chamber for defrosting the windshield and also to the cab in varying proportions, as desired.

Caution: When the windshield is heavily coated with frost, ice, or snow, and the temperature is near 0° F., direct the heat from the heat diverter assembly into the body of cab in greater proportion than onto the windshield. This is necessary to avoid damage to the cold glass from the sudden extremely uneven temperature changes.

10. Radiator Cover Adjustments. *a.* During standby periods, the radiator cover should be completely closed.

b. During vehicle operation, the driver should note the reading on the engine temperature gage. To perform the work for which it is designed in an efficient and economical manner, the engine must operate at a temperature of 180° F. Extreme cold will adversely affect engine performance by preventing the coolant from attaining the desired temperature.

c. Keep the radiator cover closed until the engine temperature reaches 180° F.

d. If temperature exceeds 180° F., raise the aperture flap on winterfront and strap in position. If temperature continues to increase after flap is fully open, remove cover completely to prevent overheating.

e. When radiator cover is removed, it must be stowed carefully in the vehicle for further use. The retaining springs must be securely attached to the flaps.

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

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OS Sup Agencies (1)
Ord PG (10)
Ord Arsenals (5) except Raritan Arsenal (103) Benicia Arsenal (20) Frankford Arsenal (15)
Mil Dist (1)
Ord Proc Dist (10)
MAAG (1)
Mil Msn (1)
JBUSMC (2)
JUSMAG (Greece) (2)
Fld Comd, AFSWP (1)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see SR 320–50–1.

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