

TM 5-5420-204-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TECHNICAL MANUAL
OPERATOR AND ORGANIZATIONAL
MAINTENANCE MANUAL
FOR
TRANSPORTER, MOBILE FLOATING
ASSAULT BRIDGE/FERRY
(FMC CORPORATION, MODEL BF-FMC-1)

FSN 5420-877-8679

COMPONENT OF INTERIOR BAY UNIT

FSN 5420-010-5191

COMPONENT OF END BAY UNIT

FSN 5420-010-5192

HEADQUARTERS, DEPARTMENT OF THE ARMY

OCTOBER 1973

WARNING
DANGEROUS CHEMICALS

are used in this equipment.
SERIOUS INJURY OR DEATH

may result if personnel fail to observe these safety precautions.

Exercise care when servicing batteries, to prevent electrolyte from splashing on skin or clothing. Wash contaminated skin areas with clear water and change clothing to avoid serious burns.

WARNING
FIRE OR EXPLOSION HAZARD
SERIOUS INJURY OR DEATH

may result if personnel fail to observe these safety precautions.

Before connecting cables to batteries be sure all electrical switches are in OFF position.

Damage to wiring, lamps, and voltage regulator can be caused by flash current through electrical system.

Do not fill fuel tank while engine is running.

Provide metallic contact between the fuel container and fuel tank to prevent a static spark from igniting fuel.

Wipe or flush any spillage.

Volatile materials will not be brought aboard;
electrical circuits will not be energized;
fuel tanks will not be topped off;
and engines will not be started before CO₂ fire fighting equipment is available and operative.

Observe NO SMOKING rules when refueling.

Do not work on live circuits. Tag circuit and warn other personnel not to energize the circuit.

Never use a blow torch or other similar means for heating fuel or oil lines.

Do not smoke or use an open flame in the vicinity when servicing batteries as hydrogen gas, an explosive is generated.

Use only distilled water to maintain battery electrolyte level.

WARNING
ASPHYXIATION DANGER
SERIOUS INJURY OR DEATH

may result if personnel fail to observe these safety precautions. Never operate the vehicle or personnel heater in an inclosed area.

Carbon monoxide is a deadly gas in the exhaust fumes of fuel burning heaters and internal combustion engines.

WARNING
GASES OR AIR UNDER PRESSURE
are used in the operation of this equipment.

SERIOUS INJURY OR DEATH

may result if personnel fail to observe these safety precautions.

The shock absorber portion of the suspension cylinder is charged with nitrogen.

Be sure that all pressure is released before removing charging valve from the piston rod.

TECHNICAL MANUAL

NO. 5-5420-204-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 13 October 1973

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

TRANSPORTER, MOBILE FLOATING

ASSAULT BRIDGE / FERRY

(FMC CORPORATION, MODEL BF-FMC-1)

FSN 5420-877-8679

COMPONENT OF INTERIOR BAY UNIT

FSN 5420-010-5191

COMPONENT OF END BAY UNIT

FSN 5420-010-5192

		Paragraph	Page
CHAPTER	1 INTRODUCTION		
Section	I. General	1-1—1-6	1-1
	II. Description and data	1-7—1-10	1-1
CHAPTER	2. OPERATING INSTRUCTIONS		
Section	I. Operating procedures	2-1—2-12	2-1
	II. Operation of auxiliary equipment	2-13—2-18	2-34
	III. Operation under unusual conditions	2-19—2-26	2-37
CHAPTER	3. OPERATOR'S / CREW MAINTENANCE INSTRUCTIONS		
Section	I Lubrication	3-1, 3-2	3-1
	II. Preventive maintenance checks and services	3-3, 3-4	3-1
	III. Troubleshooting	3-5, 3-6	3-4
	IV. Maintenance Procedures	3-7—3-42	3-7
CHAPTER	4. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
Section	I. Service upon receipt of material	4-1—4-4	4-1
	II. Movement to a new worksite	4-5, 4-6	4-8
	III. Repair parts, special tools and equipment	4-7, 4-8	4-9
	IV. Lubrication	4-9, 4-10	4-18
	V. Preventive maintenance checks and services	4-11, 4-12	4-19
	VI. Troubleshooting	4-13, 4-14	4-23
	VII. Radio interference suppression	4-15	4-32
	VIII. Organizational maintenance procedures	4-16	4-33
	IX. Cab and Hull components	4-17—4-38	4-33
	X. Accessories	4-39—4-47	4-51
	XI. Lighting and miscellaneous electrical components	4-48—4-73	4-65
	XII. Controls and instruments	4-74—4-77	4-92
	XIII. Steering system (land and marine)	4-78—4-93	4-113
	XIV. Brake system	4-94—4-106	4-127

*This manual supersedes TM-5-5420-204-12; 13 December 1967 including all changes.

Section XV. Fixed fire extinguisher system	4-107—4-110	4-134
XVI. Engine and transmission electrical system	4-111—4-133	4-137
XVII. Low pressure hydraulic system	4-134—4-144	4-156
XVIII. High pressure hydraulic system	4-145—4-165	4-166
XIX. Wheel well air evacuation system	4-166—4-171	4-189
XX. Pneumatic system	4-172—4-185	4-193
XXI. Engine exhaust system	4-186—4-189	4-201
XXII. Engine cooling system	4-190—4-199	4-206
XXIII. Engine fuel system	4-200—4-214	4-214
XXIV. Engine maintenance	4-215—4-218	4-234
XXV. Engine lubrication	4-219—4-222	4-236
XXVI. (Universal Joint Assembly) propeller drive	4-223—4-225	4-237
XXVII. Marine drive	4-226—4-242	4-242
XXVIII. Transmission maintenance	4-243—4-252	4-255
XXIX. Wheels and tires	4-253—4-255	4-266
XXX. Wheel suspension system	4-256—4-259	4-272

APPENDIX	A REFERENCES	A-1
	B. MAINTENANCE ALLOCATION CHART	B-1
	C. BASIC ISSUE ITEMS LIST, ITEMS TROOP INSTALLED OR AUTHORIZED LIST, AND REPAIR PARTS AND SPECIAL TOOLS LIST	C-1
INDEX	I-1

LIST OF ILLUSTRATIONS

<i>Number</i>	<i>Title</i>	<i>Page</i>
1-1	Transporter, mobile floating assault bridge / ferry, with end bay superstructure installed, right front $\frac{3}{4}$ view, and shipping dimensions	1-2
1-2	Transporter, mobile floating assault bridge / ferry, with interior bay superstructure installed, left front $\frac{3}{4}$ view, and shipping dimensions	1-3
1-3	Transporter, mobile floating assault bridge / ferry, with marine drive installed, left rear $\frac{3}{4}$ view	1-4
1-4	Practical wiring diagram	1-11
2-1	Controls and instruments. (Sheet 1 of 16)	2-2
2-1	Controls and instruments. (Sheet 2 of 16)	2-3
2-1	Controls and instruments. (Sheet 3 of 16)	2-4
2-1	Controls and instruments. (Sheet 4 of 16)	2-4
2-1	Controls and instruments. (Sheet 5 of 16)	2-5
2-1	Controls and instruments. (Sheet 6 of 16)	2-6
2-1	Controls and instruments. (Sheet 7 of 16)	2-7
2-1	Controls and instruments. (Sheet 8 of 16)	2-8
2-1	Controls and instruments. (Sheet 9 of 16)	2-8
2-1	Controls and instruments. (Sheet 10 of 16)	2-9
2-1	Controls and instruments. (Sheet 11 of 16)	2-10
2-1	Controls and instruments. (Sheet 12 of 16)	2-11
2-1	Controls and instruments. (Sheet 13 of 16)	2-11
2-1	Controls and instruments. (Sheet 14 of 16)	2-12
2-1	Controls and instruments. (Sheet 15 of 16)	2-13
2-1	Controls and instruments. (Sheet 16 of 16)	2-14
2-2	Starting the engine	2-16
2-3	Slave receptacle for starting engine and distr. box, installed view	2-16
2-4	Stopping the engine	2-17
2-5	Emergency engine stopping	2-17
2-6	Resetting air inlet housing valve	2-17
2-7	Riding bitt and lifting eye	2-23
2-8	Capstan	2-23
2-9	End bay ramp control, instruction plate installed	2-28
2-10	Quick disconnect hydraulic coupling. (Sheet 1 of 4)	2-30
2-10	Quick disconnect hydraulic coupling. (Sheet 2 of 4)	2-31
2-10	Quick disconnect hydraulic coupling. (Sheet 3 of 4)	2-32
2-10	Quick disconnect hydraulic coupling. (Sheet 4 of 4)	2-33
2-11	Cold weather starting of engine	2-35
2-12	Communications equipment installed	2-36
2-13	Fuel shut-off switch by-pass switch	2-38
2-14	Bilge pump installation (typical)	2-38
3-1	Personnel heater igniter service	3-8
3-2	Brake fluid reservoir service	3-9
3-3	Battery service	3-10
3-4	Hydraulic reservoir service	3-11
3-5	Service to hydraulic fluid filters. (Sheet 1 of 4)	3-12
3-5	Service to hydraulic fluid filters. (Sheet 2 of 4)	3-13
3-5	Service to hydraulic fluid filters. (Sheet 3 of 4)	3-14
3-5	Service to hydraulic fluid filters. (Sheet 4 of 4)	3-15
3-6	Wheel well blower air cleaner service	3-16
3-7	Radiator service	3-17
3-8	Engine air cleaner service. (Sheet 1 of 2)	3-18
3-8	Engine air cleaner service. (Sheet 2 of 2)	3-19
3-9	Air heater service	3-20
3-10	Fuel tank cap, strainer, and breather service (Sheet 1 of 2)	3-21
3-10	Fuel tank cap, strainer, and breather service (Sheet 2 of 2)	3-21
3-11	Engine crank case breather service	3-22
3-12	Outdrive link shear pin replacement	3-23
3-13	Transmission breather service	3-24
3-14	Transmission oil filter service	3-25
3-15	Tubeless tire repair kit and operating instructions. (Sheet 1 of 2)	3-26
3-15	Tubeless tire repair kit and operating instructions. (Sheet 2 of 2)	3-27
3-16	Differential breather and dipstick service	3-29
3-17	Boots, inner and outer, double universal joint, removal and installation. (Sheet 1 of 2)	3-30
3-17	Boots, inner and outer, double universal joint, removal and installation. (Sheet 2 of 2)	3-31
3-18	Boot inspection plug and packing, removal and installation	3-31

4-1	Loading and unloading the transporter	4-4
4-2	Installing superstructure on transporter	4-5
4-3	Hydraulic quick-disconnects and electrical connectors. (Sheet 1 of 2)	4-6
4-3	Hydraulic quick-disconnects and electrical connectors. (Sheet 2 of 2)	4-7
4-4	Special tools. (Sheet 1 of 7)	4-10
4-4	Special tools. (Sheet 2 of 7)	4-11
4-4	Special tools. (Sheet 3 of 7)	4-12
4-4	Special tools. (Sheet 4 of 7)	4-13
4-4	Special tools. (Sheet 5 of 7)	4-14
4-4	Special tools. (Sheet 6 of 7)	4-15
4-4	Special tools. (Sheet 7 of 7)	4-16
4-5	Engine oil filter service. (Sheet 1 of 2)	4-18
4-5	Engine oil filter service. (Sheet 2 of 2)	4-19
4-6	Air horn and mounting bracket, removal and installation	4-34
4-7	Adjusting the air horns	4-34
4-8	Solenoid valve (L24), horn control, test removal and installation	4-34
4-9	Towing eye, removal and installation	4-35
4-10	Wheel well deck, removal and installation	4-35
4-11	Front end rear engine access (center removal decking), removal and installation	4-35
4-12	Cab floor sections, removal and installation	4-36
4-13	Superstructure holding device, removal and installation	4-36
4-14	Boarding ladder, stowed	4-37
4-15	Rear hatch ladder and mounting bracket, removal and installation	4-37
4-16	Grating (catwalk), removal and installation	4-38
4-17	Stern hatch access cover (door), removal and installation	4-38
4-18	Stern hatch access cover, disassembly and reassembly	4-39
4-19	Air cooling intake coaming door, removal and installation	4-40
4-20	Air cooling exhaust grating, removal and installation	4-41
4-21	Cab door, removal, disassembly, reassembly, and installation (Sheet 1 of 2)	4-42
4-21	Cab door, removal, disassembly, reassembly, and installation. (Sheet 2 of 2)	4-43
4-22	Windshield wiper motor blade, and arm, removal and installation. (Sheet 1 of 2)	4-44
4-22	Windshield wiper motor blade, and arm, removal and installation. (Sheet 2 of 2)	4-44
4-23	Windshield, rear, and side cab windows, removal and installation. (Sheet 1 of 2)	4-45
4-23	Windshield, rear, and side cab windows, removal and installation. (Sheet 2 of 2)	4-46
4-24	Driver and passenger seats, removal, disassembly, reassembly, and installation. (Sheet 1 of 4)	4-47
4-24	Driver and passenger seats, removal, disassembly, reassembly, and installation. (Sheet 2 of 4)	4-47
4-24	Driver and passenger seats, removal, disassembly, reassembly, and installation. (Sheet 3 of 4)	4-48
4-24	Driver and passenger seats, removal, disassembly, reassembly, and installation. (Sheet 4 of 4)	4-49
4-25	Stowage box, removal and installation	4-50
4-26	Stowage rack hook, removal and installation	4-50
4-27	Riding bitt, removal and installation	4-50
4-28	Capstan, removal and installation	4-51
4-29	Rear view mirror and mounting brackets, removal and installation ..	4-52
4-30	Personnel heater and components, removal and installation. (Sheet 1 of 3)	4-53
4-30	Personnel heater and components, removal and installation. (Sheet 2 of 3)	4-54
4-30	Personnel heater and components, removal and installation. (Sheet 3 of 3)	4-55
4-31	Personnel heater fuel pump service	4-56
4-32	Personnel heater fuel pump and mounting bracket, removal and installation	4-57
4-33	Personnel heater fuel pump, disassembly and assembly	4-58
4-34	Magnetic compass, mounting bracket, and electrical lead, removal and installation	4-59
4-35	Bilge pump, removal and installation	4-59
4-36	Bilge pump, outlet deck fitting, removal and installation	4-60
4-37	Communications equipment, removal and installation. (Sheet 1 of 2)	4-61
4-37	Communications equipment, removal and installation. (Sheet 2 of 2)	4-62
4-38	Lifebouy ring, anchor and superstructure wrench, removal and installation. (Sheet 1 of 3)	4-63
4-38	Lifebouy ring, anchor and superstructure wrench, removal and installation. (Sheet 2 of 3)	4-64
4-38	Lifebouy ring, anchor and superstructure wrench removal and installation. (Sheet 3 of 3)	4-64
4-39	Circuit breakers, removal, installation and test	4-65
4-40	Signal directional control (box), removal and installation	4-67
4-41	Utility outlet and mounting bracket, removal and installation	4-68
4-42	Distribution box, rifle retainer, slave receptacle, and mounting bracket, removal and installation	4-69
4-43	Front wheel position transmitter (left / right), removal, installation, and by-pass	4-70
4-44	Rear wheel position transmitter (left / right), removal and installation	4-71
4-45	Wheel up / down position	4-72
4-46	Fuel quantity transmitter, removal and installation	4-72
4-47	Headlight, removal and installation	4-73

Number	Title	Page
4-48	Headlight, disassembly and reassembly	4-74
4-49	Taillight, stop and turn, and blackout marker lights, removal and installation	4-75
4-50	Blackout stoplight, disassembly and reassembly	4-76
4-51	Marine navigational running lights, removal and installation	4-77
4-52	Marine navigational running lights, disassembly	4-78
4-53	Hull lights, removal, installation, and lamp replacement	4-79
4-54	Dome light, removal and installation	4-80
4-55	Dome light, disassembly and reassembly	4-81
4-56	Blackout marker, turn, and parking light, removal and installation	4-82
4-57	Blackout marker, turn, and parking light, disassembly and reassembly	4-83
4-58	Blackout headlight, removal and installation	4-84
4-59	Blackout headlight, disassembly and reassembly	4-84
4-60	Beam selecting (dimmer) switch, removal and installation	4-85
4-61	Superstructure elevate unit switch (LS3, LS5, and LS6), removal and installation	4-85
4-62	Superstructure rotate disable limit switch (LS7), removal and installation	4-86
4-63	Transmission neutral limit switch (S42), removal and installation	4-87
4-64	Hydraulic pump engage limit switch (LS2), and fire extinguishing fuel shutoff switch (S41), removal and installation	4-87
4-65	Directional signal control switch (S44) and light (DS50), removal and installation	4-88
4-66	Compass light (DS5), removal and installation	4-88
4-67	Stern navigational light (DS64), removal and installation	4-89
4-68	Stern navigational light (DS64), disassembly and reassembly	4-91
4-69	Main instrument control panel, module removal and installation	4-93
4-70	Instrument panel module A, rear view, for component removal and installation	4-94
4-71	Instrument panel module B, rear view, for component removal and installation	4-97
4-72	Instrument panel module C, rear view, for component removal and installation	4-100
4-73	Instrument panel module D, rear view, for component removal and installation	4-102
4-74	Instrument panel module E, rear view, for component removal and installation	4-103
4-75	Rear control station instrument panel, removal and installation	4-105
4-76	Rear control station instrument panel, front and rear view, for component removal and installation. (Sheet 1 of 2)	4-106
4-76	Rear control station instrument panel, front and rear view for component removal and installation. (Sheet 2 of 2)	4-107
4-77	Hydraulic control console, front installed view	4-110
4-78	Hydraulic control console, hydraulic control panel open	4-111
4-79	Hydraulic and engine control levers and linkage, removal and installation	4-113
4-80	Steering gear adjustment. (Sheet 1 of 3)	4-114
4-80	Steering gear adjustment. (Sheet 2 of 3)	4-114
4-80	Steering gear adjustment. (Sheet 3 of 3)	4-115
4-81	Drag link and boot, removal and installation	4-116
4-82	Rear wheel steering lock pin and cylinder, removal and installation	4-117
4-83	Steering wheel (land), removal and installation	4-117
4-84	Marine drive and rear wheel steering wheel (in cab), removal and installation	4-118
4-85	Marine drive and rear wheel steering wheel (at rear control station) removal and installation	4-118
4-86	Marine drive and rear wheel hydraulic steering pump (in cab), removal and installation	4-119
4-87	Marine drive and rear wheel hydraulic steering pump (rear control station) removal and installation	4-119
4-88	Marine drive rear control station, removal and installation. (Sheet 1 of 2)	4-120
4-88	Marine drive rear control station, removal and installation. (Sheet 2 of 2)	4-121
4-89	Rear control station grounding jumper assemble, removal and installation	4-122
4-90	Front wheel hydraulic steering cylinder, removal and installation	4-123
4-91	Front wheel steering cylinder safety relief valve, removal and installation	4-124
4-92	Rear steering hydraulic cylinder, removal and installation	4-125
4-93	Steering hydraulic shuttle valve, removal and installation	4-126
4-94	Steering system hydraulic lines, hose and fittings, removal and installation	4-126
4-95	Tie rod packing nut adjustment, or packing replacement	4-127
4-96	Hand brake lever and cable adjustment, removal and installation	4-128
4-97	Hand brake cable, and brake drum removal and installation	4-128
4-98	Hand brakeshoe, removal and installation	4-129
4-99	Hydraulic brake master cylinder, removal and installation	4-129
4-100	Hydraulic brake fluid reservoir, removal and installation	4-130
4-101	Multipak (brake air-hydraulic power cylinder), removal and installation	4-131
4-102	Service brake lining inspection	4-132
4-103	Mechanical brake pedal shaft, and spring, removal and installation	4-133
4-104	Brake caliber bleed points	4-134
4-105	Fixed fire extinguisher controls, tubing or fittings, removal and installation	4-135
4-106	CO ₂ cylinders, removal, installation and weight test	4-136

Number	Title	Page
4-107	Time delay accumulator and valve (body), removal and installation	4-136
4-108	Fire extinguisher fuel shut-off relay, (K4), removal and installation	4-137
4-109	Master relay (K3), removal and installation	4-141
4-110	Alternator and alternator drive belts, removal and installation	4-142
4-111	Rectifier, removal and installation	4-143
4-112	Starting motor, removal and installation	4-144
4-113	Testing the starting motor solenoid. (Sheet 1 of 2)	4-145
4-113	Testing the starting motor solenoid. (Sheet 2 of 2)	4-146
4-114	Voltage regulator, removal and installation	4-147
4-115	Battery-alternator isolation relay (K12), removal and installation	4-148
4-116	Battery-alternator isolation auxiliary relay (K13), removal and installation ..	4-148
4-117	Testing the engine fan manual or automatic solenoid (L12)	4-149
4-118	Testing the cylinder control air solenoid	4-149
4-119	Ground straps and battery cables, removal and installation	4-150
4-120	Batteries, removal and installation	4-151
4-121	Engine water temperature warning light switch (S48) and water temperature transmitter, removal and installation	4-152
4-122	Engine fuel oil pressure switch (S43), removal and installation	4-153
4-123	Speedometer transmitter and adapter, removal and installation	4-153
4-124	Tachometer transmitter and adapter, removal and installation	4-154
4-125	Transmission oil temperature transmitter, removal and installation	4-155
4-126	Engine low oil pressure warning light switch (S47) and engine oil pressure transmitter, removal and installation	4-155
4-127	Hydraulic fluid tank (reservoir), removal and installation	4-157
4-128	Hydraulic fluid level gage and guard, removal and installation	4-158
4-129	Low pressure hydraulic fluid filter (suction line), removal and installation ...	4-159
4-130	Low pressure hydraulic fluid filter (supply line), removal and installation	4-160
4-131	Low pressure hydraulic pump removal and installation	4-160
4-132	Wheel well blower motor solenoid control valve (L26), removal and installation	4-161
4-133	Flow control (divider) valve, removal and installation	4-162
4-134	Propeller and steering low pressure solenoid valve (L25), removal and installation	4-162
4-135	Propeller stow / drive, raise / lower, and rear wheel steering lockpin extend / retract solenoid control valve, removal, installation, and solenoid replacement	4-164
4-136	Replacement of packings in control valve solenoid	4-165
4-137	Hydraulic test schematic	4-167
4-138	Installation and operating instructions	4-169
4-139	High pressure hydraulic pump, power take-off and control linkage, removal and installation. (Sheet 1 of 3)	4-172
4-139	High pressure hydraulic pump, power take-off and control linkage, removal and installation. (Sheet 2 of 3)	4-173
4-139	High pressure hydraulic pump, power take-off and control linkage, removal and installation. (Sheet 3 of 3)	4-174
4-140	High pressure hydraulic fluid filter (suction line), removal and installation. (Sheet 1 of 3)	4-175
4-140	High pressure hydraulic fluid filter (suction line), removal and installation. (Sheet 2 of 3)	4-176
4-140	High pressure hydraulic fluid filter (suction line), removal and installation. (Sheet 3 of 3)	4-177
4-141	High pressure (main) safety relief valve, removal and installation	4-178
4-142	High pressure hydraulic discharge line fluid filter, removal and installation	4-179
4-143	Superstructure elevating hydraulic cylinder and quick-disconnect coupling- removal and installation ..	4-180
4-144	Flushing the wheel suspension high pressure safety relief valve	4-181
4-145	Location of safety relief, flow control, check, and solenoid operated control valves for removal and installation	4-182
4-146	Checking operation of superstructure elevation pilot operated check valve	4-184
4-147	Flushing the left pinning circuit double pilot check valve	4-185
4-148	Superstructure control valve (solenoid operated), removal and installation	4-185
4-149	Wheel / ramp (right pinning) control valve (solenoid operated), removal and installation	4-186
4-150	High and low pressure check valve, removal and installation	4-187
4-151	Wheel suspension high pressure flow control valve, removal and installation	4-188
4-152	Capstan hydraulic motor (rear), removal and installation	4-188
4-153	Wheel well blower air cleaner, removal, disassembly, reassembly, and installation	4-190
4-154	Wheel well blower motor, removal and installation	4-190
4-155	Wheel well blower, removal and installation	4-191
4-156	Wheel well air control valves, tubing, and fittings, removal and installation	4-192
4-157	Wheel well blower control levers and linkage, removal, installation, or adjustment	4-193
4-158	Air compressor governor, removal and installation	4-194
4-159	Air compressor drive belts and pulley, removal, installation and adjustment	4-194

<i>Number</i>	<i>Title</i>	<i>Page</i>
4-160	Inlet line, coolant lines, lubricating lines, and fittings, removal and installation	4-195
4-161	Air lines, safety relief valves, pressure reducing air valves, fittings, and draincocks, removal and installation	4-196
4-162	Air reservoir and pressure tank, removal and installation	4-197
4-163	Air compressor, removal and installation	4-198
4-164	Air cylinder, throttle valve control, removal and installation	4-199
4-165	Air cylinder control solenoid valve, removal and installation	4-199
4-166	Engine fan control air solenoid valve, removal and installation	4-200
4-167	Exhaust tubes, insulation, clamps, brackets, and gaskets. (Sheet 1 of 2)	4-202
4-167	Exhaust tubes, insulation, clamps, brackets, and gaskets. (Sheet 2 of 2)	4-203
4-168	Muffler, removal and installation	4-204
4-169	Exhaust pipe end and extension tubes, removal and installation	4-205
4-170	Cooling system draincock locations	4-207
4-171	Engine access door, fan guard, and shroud, removal and installation	4-209
4-172	Radiator, removal and installation	4-210
4-173	Fan flow control thermostat, removal and installation	4-211
4-174	Engine cooling thermostat(s) and housing, removal and installation	4-212
4-175	Coolant hose, removal and installation	4-213
4-176	Fan blade and fan assembly removal and installation	4-213
4-177	Fan drive belt, removal, installation and adjustment	4-213
4-178	Engine air intake hose, adapter, air cleaner hose, air cleaner, air cleaner bracket, removal and installation	4-214
4-179	Air cleaner, disassembly and reassembly	4-215
4-180	Fuel filter and fuel strainer, removal and installation	4-216
4-181	Fuel filter and fuel strainer, disassembly and reassembly	4-216
4-182	Governor controls adjustment. (Sheet 1 of 2)	4-217
4-182	Governor controls adjustment. (Sheet 2 of 2)	4-218
4-183	Throttle and accelerator control linkage, removal or installation	4-219
4-184	Accelerator control linkage, removal and installation	4-220
4-185	Hand throttle control linkage, removal and installation	4-221
4-186	Engine governor and throttle controls, removal and installation. (Sheet 1 of 2)	4-222
4-186	Engine governor and throttle controls, removal and installation. (Sheet 2 of 2)	4-223
4-187	Marine drive throttle control, removal and installation	4-224
4-188	Fuel shut-off solenoid (L3), removal and installation	4-225
4-189	Fuel injector(s), removal and installation. (Sheet 1 of 2)	4-226
4-189	Fuel injector(s), removal and installation. (Sheet 2 of 2)	4-227
4-190	Timing the fuel injectors	4-227
4-191	Fuel tank, lines, hoses, valves, and fittings, removal and installation	4-229
4-192	Hand primer pump, removal and installation	4-230
4-193	Fuel tank filler cap, neck, and strainer, removal and installation	4-230
4-194	Air heater, removal and installation	4-231
4-195	Air heater, disassembly and reassembly	4-232
4-196	Air heater coil, removal and installation	4-233
4-197	Air heater fuel pump and motor, removal and installation	4-233
4-198	Air heater solenoid valve, removal and installation	4-233
4-199	Rocker arm cover and gasket, removal and installation	4-234
4-200	Exhaust valve push rod clearance adjustment	4-235
4-201	Oil level dipstick, removal and installation	4-236
4-202	Crankcase drain valve, external oil lines and fittings, removal and installation	4-237
4-203	Hanger box bearings (pillow blocks), removal and installation	4-238
4-204	Propeller drive shaft at marine drive power take-off, removal and installation	4-238
4-205	Marine drive propeller drive shaft (rear end), removal and installation	4-238
4-206	Marine drive propeller drive shaft, disassembly and reassembly	4-239
4-207	Vehicular propeller drive shaft (at differential), removal and installation	4-240
4-208	Vehicular drive propeller drive shaft, disassembly and reassembly	4-241
4-209	Marine drive power take-off engage solenoid valve (L27), removal and installation	4-242
4-210	Marine drive power take-off, removal and installation	4-243
4-211	Marine drive stow / drive limit switches (LS8 and LS9), removal and installation	4-244
4-212	Marine drive hydraulic stowage cylinder, removal and installation	4-245
4-213	Marine drive, removal and installation, and alignment. (Sheet 1 of 3)	4-246
4-213	Marine drive, removal and installation, and alignment. (Sheet 2 of 3)	4-247
4-213	Marine drive, removal and installation, and alignment. (Sheet 3 of 3)	4-248
4-214	Marine drive cover, removal and installation	4-249
4-215	Hydraulic hose, lines, fittings, and manifold, removal and installation	4-249
4-216	Elevation (depth) transmitter and mount, removal and installation	4-250
4-217	Marine drive hydraulic steering and raise / lower motor, removal and installation	4-250

<i>Number</i>	<i>Title</i>	<i>Page</i>
4-218	Anti-torque fin and propeller duct, removal and installation	4-251
4-219	Propeller, removal and installation	4-251
4-220	Marine drive outdrive link, removal and, disassembly, reassembly, and installation. (Sheet 1 of 2)	4-252
4-220	Marine drive outdrive link, removal and disassembly, reassembly, and installation. (Sheet 2 of 2)	4-253
4-221	Input drive shaft and double joint coupling, removal and installation	4-254
4-222	Double joint coupling, disassembly and reassembly	4-255
4-223	Transmission shift lever and cable and front axle engage lever and cable, removal, disassembly, reassembly and installation. (Sheet 1 of 2)	4-256
4-223	Transmission shift lever and cable and front axle engage lever and cable, removal, disassembly, reassembly and installation. (Sheet 2 of 2)	4-257
4-224	Transmission shift lever cable, removal and installation	4-258
4-225	Front axle engage cable, removal and installation	4-258
4-226	Retarder pedal and cable, removal and installation. (Sheet 1 of 2)	4-259
4-226	Retarder pedal and cable, removal and installation. (Sheet 2 of 2)	4-260
4-227	Transmission liquid level gage (dipstick) removal and installation	4-261
4-228	Throttle valve control cable, removal and installation	4-261
4-229	Transmission oil filter, removal and installation	4-262
4-230	Transmission oil drain valve, external oil lines, and fittings, removal and installation. (Sheet 1 of 2)	4-263
4-230	Transmission oil drain valve, external oil lines, and fittings, removal and installation. (Sheet 2 of 2)	4-264
4-231	Transmission oil filter screen, removal and installation	4-265
4-232	Transmission breather, removal and installation	4-266
4-233	Removal and installation of wheel and tire from wheel well	4-267
4-234	Wheel and tire, removal and installation	4-268
4-235	Tire removal and installation. (Sheet 1 of 4)	4-269
4-235	Tire removal and installation. (Sheet 2 of 4)	4-269
4-235	Tire removal and installation. (Sheet 3 of 4)	4-270
4-235	Tire removal and installation. (Sheet 4 of 4)	4-271
4-236	Breather tubes and lines, removal and installation	4-273
4-237	Double universal joint components, removal and installation. (Sheet 1 of 3)	4-275
4-237	Double universal joint components, removal and installation. (Sheet 2 of 3)	4-276
4-237	Double universal joint components, removal and installation. (Sheet 3 of 3)	4-277
FO-1	Cab practical wiring diagram	Figure FO-1
FO-2	Hull practical wiring diagram	Figure FO-2
FO-3	Electro-hydraulic practical diagram for capstan functions	Figure FO-3
FO-4	Electro-hydraulic practical diagram for wheel suspension functions	Figure FO-4
FO-5	Electro-hydraulic practical diagram for wheel well evacuation functions	Figure FO-5
FO-6	Electro-hydraulic practical diagram for superstructure functions	Figure FO-6
FO-7	Electro-hydraulic practical diagram for land and marine steering functions	Figure FO-7
FO-8	Electro-hydraulic diagram for land and marine steering	Figure FO-8
FO-9	Air-hydraulic practical diagram for brakes	Figure FO-9
FO-10	Pneumatic system practical diagram	Figure FO-10

LIST OF TABLES

Number	Title	Page
2-1	Normal Position of Controls and Instruments for Starting the Transporter	2-15
2-2	Specific Gravity	2-40
3-1	Operator / Crew Preventive Maintenance Checks and Services	3-2
3-2	Operator / Crew Preventive Maintenance Checks and Services	3-3
3-3	Troubleshooting	3-4
4-1	Freezing Points	4-3
4-2	Special Tools	4-17
4-3	Organizational Preventive Maintenance Checks and Services	4-20
4-4	Troubleshooting	4-23
4-5	High Pressure Hydraulic System Functional Pressure Readings	4-109
4-6	Short Code Identification Symbols for Electro-Hydraulic Components	4-137

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

These instructions are published for the use of personnel to whom the Transporter is issued. They provide information on the operation and organizational maintenance of the equipment. Also included are descriptions of main units and their function in relationship to other components. Numbers in parentheses following nomenclature callouts on illustrations indicate quantity, while numbers preceding callouts indicate preferred maintenance sequence.

1-2. Maintenance Forms and Records

Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

1-3. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the

individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U.S. Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120.

1-4. Equipment Serviceability Criteria

Refer to TM 5-5420-204-ESC for serviceability criteria on transporter or superstructure.

1-5. Destruction of Army Material to Prevent Enemy Use

Method and priority of Destruction of Army Equipment to Prevent Enemy Use is covered in TM 750-244-3.

1-6. Administrative Storage of Equipment

When the Transporter must be prepared for administrative storage, comply with instructions contained in TM 740-90-1.

Section II. DESCRIPTION AND DATA

1-7. Description

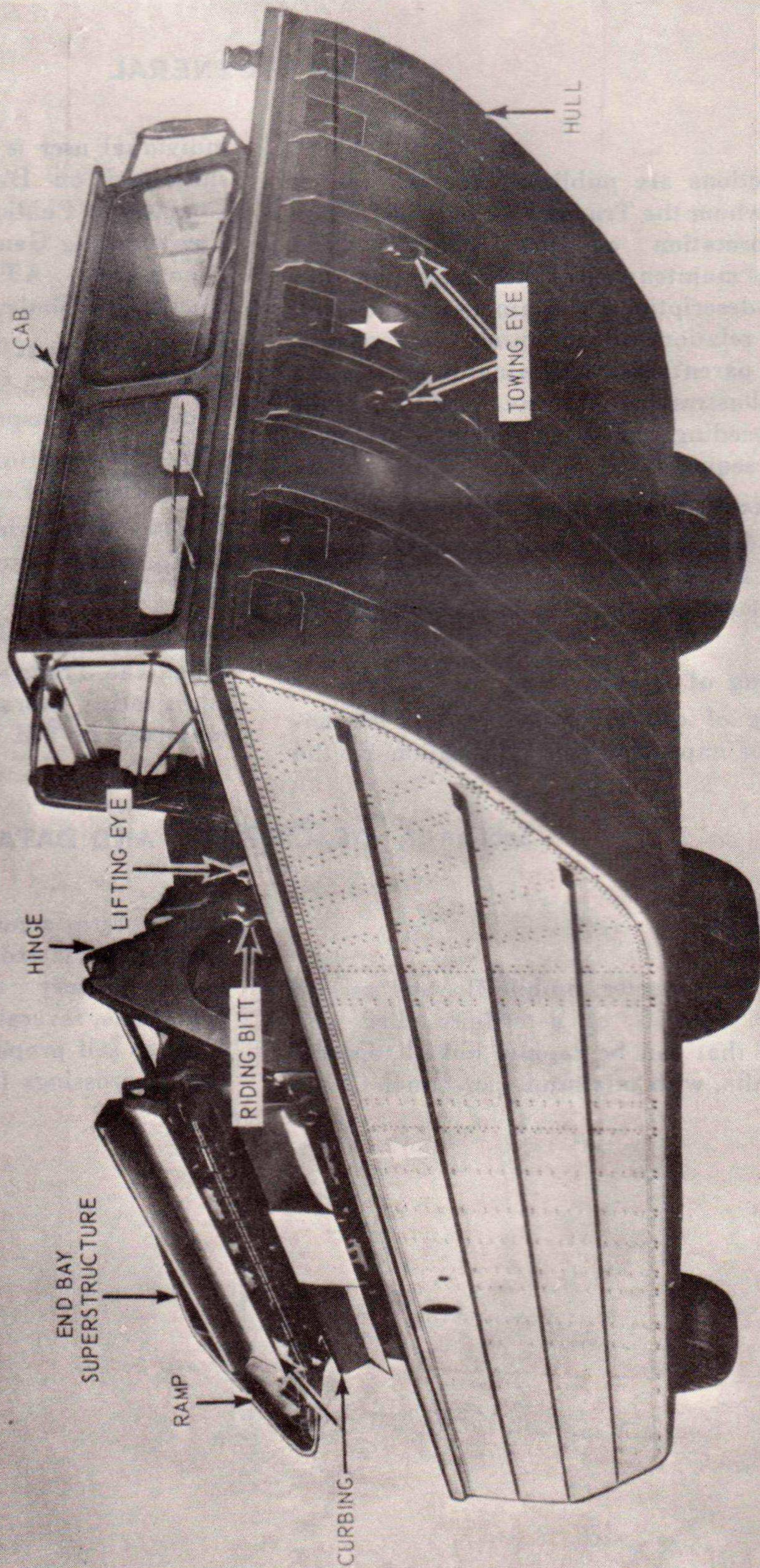
a. General.

(1) The Transporter, mobile floating assault bridge / ferry, consists of a self-propelled amphibious unit that can be rapidly linked together with other units, with minimum personnel (3 per

unit) to form a continuous bridge and permit high volume stream crossing by equipment used in large scale military operations. For small scale operations, several units can be linked together to serve as self propelled ferries for making multiple stream crossings (fig. 1-1, 1-2 and 1-3).

SHIPPING DIMENSIONS	
END BAY INSTALLED	
LENGTH	507.5 INCHES
WIDTH	144 INCHES
HEIGHT	140.8 INCHES
WEIGHT	53,950 POUNDS

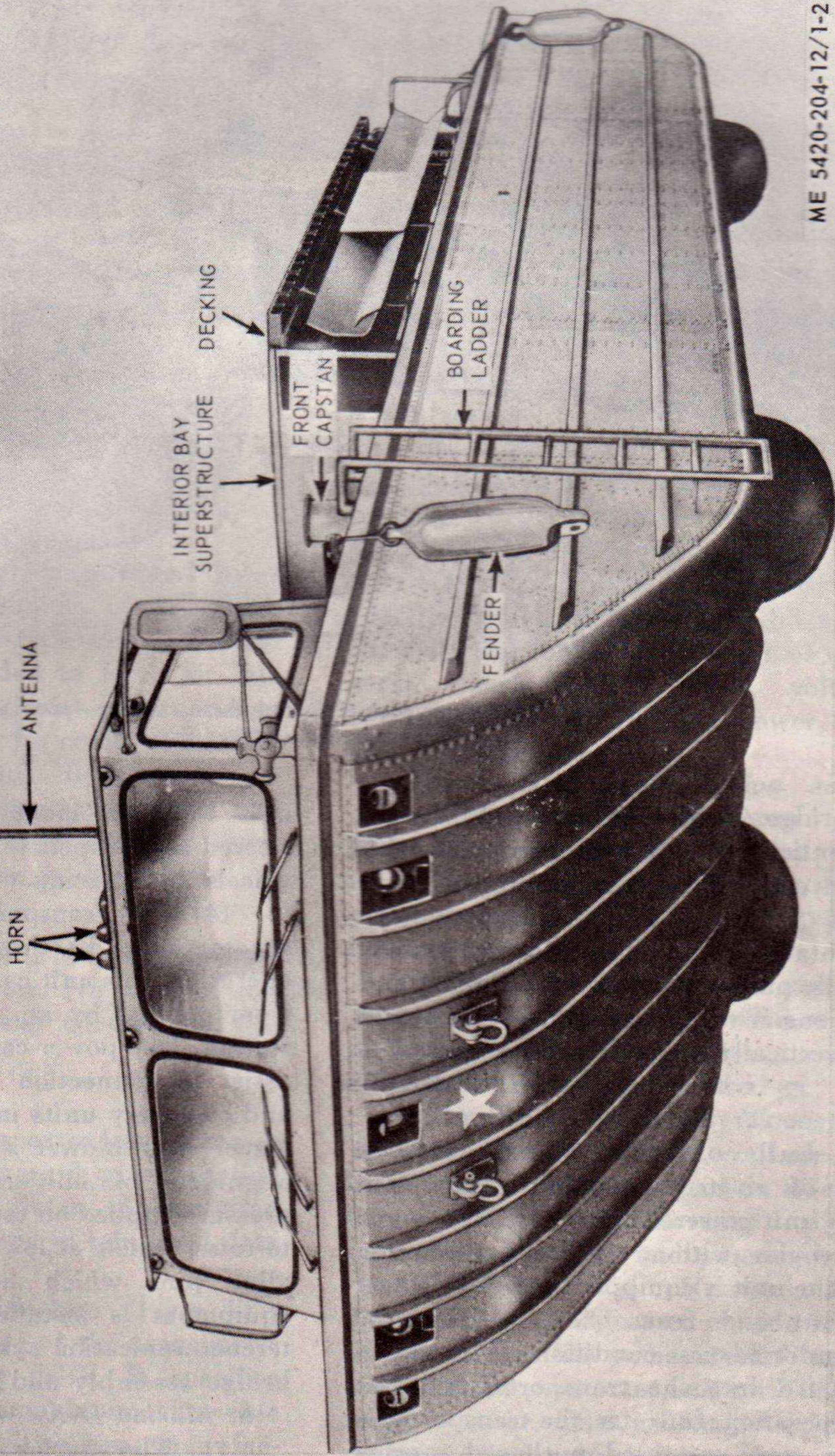
SHIPPING DIMENSIONS	
TRANSPORTER ONLY	
LENGTH	507.5 INCHES
WIDTH	144 INCHES
HEIGHT	126 INCHES
WEIGHT	34,350 POUNDS



ME 5420-204-12/1-1

Figure 1-1. Transporter, mobile floating assault bridge / ferry, with end bay superstructure installed, right front $\frac{3}{4}$ view, and shipping dimensions.

SHIPPING DIMENSIONS	
INTERIOR BAY INSTALLED	
LENGTH	507.5 INCHES
WIDTH	144 INCHES
HEIGHT	126 INCHES
WEIGHT	48,400 POUNDS



ME 5420-204-12/1-2

Figure 1-2. Transporter, mobile floating assault bridge / ferry with interior bay superstructure installed, left front $\frac{3}{4}$ view, and shipping dimensions.

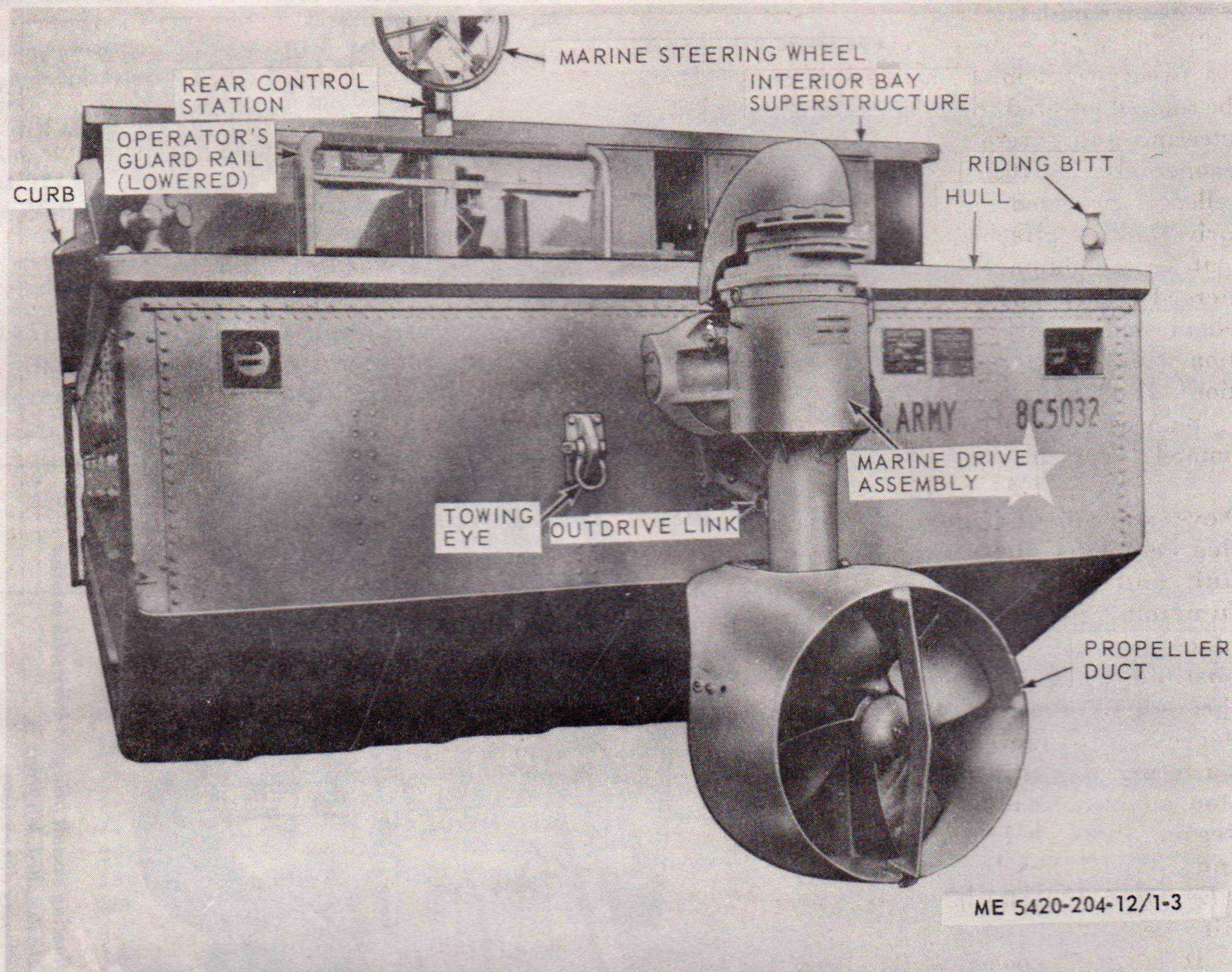


Figure 1-3. Transporter, mobile floating assault bridge—ferry, with marine drive installed, left rear $\frac{3}{4}$ view.

(2) The bridge / ferries are constructed of a number of identical transporters equipped with interior bay, or end bay superstructures (TM 5-5420-205-15). The superstructures are hydraulically rotated 90° on the transporter deck and hydraulically pinned together for bridging and ferrying operations. The folded ramp section of end bay units are vertically adjustable by means of a holding valve in conjunction with hydraulic cylinders, to meet varying shore conditions.

(3) The hull of the transporter is predominantly of riveted aluminum alloy construction. Each unit powered by a 335 HP (horse power) diesel engine with a six speed automatic transmission. The unit is equipped with four wheel drive, and front and rear wheel steering for maneuvering under adverse conditions. The wheels are fully retracted into the transporter hull for normal water operation. In water, the transporter is propelled by a stern mounted outboard marine drive unit (fig. 1-3), connected to the diesel engine by a mechanical drive line. When the marine drive

unit becomes inoperative, transporter may be steered and propelled at reduced speed by lowering wheels and placing vehicle in four wheel drive.

(4) The transporter cab is wide enough to accommodate its three man crew. During water operation, this unit can be controlled by the driver from cab, or by an operator at the rear control station. Two power capstans are located on deck to assist in connection of transporters into bridge and / or ferry units in the water. In addition, the wheel well blower system aids in the vertical alignment of unit corners for connection. Air pressure applied on top of water in wheel wells acts to raise vehicle at low corner, enough to level and align pins which hold units together. Radio equipment is installed in the cab, and an intercommunication system is provided to facilitate bridge assembly and / or ferry operation.

b. Marine Drive Assembly.

(1) The marine drive assembly, (fig. 1-3) is mounted at rear center of transporter and is used

for marine operation. It may be controlled from the drivers compartment or rear control station.

(2) The marine drive assembly is equipped with a twenty-eight inch, shrouded propeller that can be rotated (steered) three hundred sixty degrees for steering and reversing. For shallow or deep water operation, a sixteen inch vertical travel of the propeller is provided. A kick up safety device (outdrive link) is attached to the marine drive to prevent serious damage should the unit strike a submerged object during operation. For highway travel, the marine drive is moved to an elevated position (stow) and propeller is placed in reverse position (180° on propeller position indicator). This reduces overall length of vehicle approximately one foot.

CAUTION

Never steer the marine unit through 720 degrees. This may damage the marine unit and the position indicator may function incorrectly. The operator must place the unit in the forward drive position by going from 180 degrees, through 135 degrees, 90 degrees and 45 degrees to 0 degrees on the indicator. To return the unit to the raised reverse stow position he must come back from 0 degrees through 45 degrees, 90 degrees, and 135 degrees to 180 degrees.

c. *Engine.* The transporter is powered by a Detroit Diesel V-71 series engine, model 7083-7299. It is liquid cooled, V-type and has eight cylinders. A blower is provided to force air into cylinders for expulsion of exhaust gases and to supply cylinders with fresh air for combustion. The engine is directly connected to a fly-wheel torque converter, six speed automatic transmission and power divider assembly, which is used to lessen load shock and provide torque multiplication.

1-8. Difference in Models

This manual covers only the FMC Corporation Model BF-FMC-1 Transporter. No known unit differences exist for the model covered by this manual.

1-9. Tabulated Data

a. *Identification.* The transporter has 16 major identification plates. This paragraph gives location and description of these plates. Information contained on plates will be found in tabulated data b below.

(1) *Transporter Identification Plate.* This plate is located on stern (rear) of the transporter hull to right of the marine drive. It specifies nomenclature, serial number, maximum allowable speed, tire inflation pressure, tire size, manufacturer, and contract number.

(2) *Transporter Transportation Data Plate.* This plate is located on stern of the transporter hull to right of the marine drive. It specifies nomenclature, axle load, center of gravity, overall height, overall width, shipping cubage, shipping weight, shipping tonnage, and directions for reducing overall height.

(3) *Marine Drive Identification Plate.* This plate is located on propeller drive housing. It specifies federal stock number, nomenclature, manufacturer, contract number, serial number, date manufactured, end item used on nomenclature, federal stock number of end item, model of end item, and end item manufacturer.

(4) *Engine Identification Plate.* The engine identification plate is located on right valve cover. It specifies manufacturer, model number, unit number, maximum rpm (revolutions per minute)-no load, rated horsepower, continuous horsepower, and a listing of optional equipment by nomenclature and type number.

(5) *Engine Governor Identification Plate.* The engine governor identification plate is located on left side of the engine governor. It specifies manufacturer, type, and idle range.

(6) *Transmission Identification Plate.* This plate is located on left rear side of the transmission housing. It specifies model number, serial number, part number, and manufacturer.

(7) *Bilge Pump Identification Plate.* This plate is located on top of each bilge pump next to the electrical connector. It specifies model number, serial number, duty, type, volts, amperage, revolutions per minute, horsepower, order number, and manufacturer.

(8) *Capstan Identification and Instruction Plate.* This plate is located on top of each capstan. It specifies the direction of rotation, serial number, manufacturer, nomenclature, starting rope pull, running rope pull, oil capacity, type of oil, and lubrication intervals.

(9) *Wheel Well Air Blower Identification Plate.* This plate is located on end of the wheel well air blower housing. It specifies manufacturer, size, displacements, and serial number.

(10) *Wheel Well Air Blower Motor Identification Plate.* The wheel well air blower motor identification plate is located on side of the motor. It specifies manufacturer, part number, displacement, speed, and pressure rating.

(11) *Personnel Heater Identification Plate.* This plate is located on side of the personnel heater. It specifies nomenclature, model number, stock number, customer number, contract number, serial number, volts, starting amperage, running amperage and manufacturer.

(12) *Air Heater Pump Identification Plate.* The air heater pump identification plate is located on rear or non-driven end of the pump. It specifies manufacturer and type number.

(13) *Air Heater Pump Motor Identification Plate.* The air heater pump motor identification plate is located on side of motor. It specifies manufacturer, horsepower, amperes, voltage, speed, and part number.

(14) *Air Compressor Identification Plate.* This plate is located on side of the air compressor. It specifies model number, serial number, and manufacturer.

(15) *Main Hydraulic Pump Identification Plate.* This plate is located on side of the pump. It specifies manufacturer, part number, model number, direction of rotation, and serial number.

(16) *Wheel Suspension Cylinder Identification Plate.* This plate is located on the cylinder in the wheel well. It specifies federal stock number, nomenclature, manufacturer, contract number, serial number, inspected, date manufactured, end item used on nomenclature, federal stock number of end item, model of end item, and end item manufacturer.

(17) For the location and description of the interior bay and end bay superstructure identification plates refer to TM 5-5420-205-15.

b. Tabulated Data.

(1) *Transporter, Mobile Floating Assault Bridge / Ferry.*

Manufacturer	FMC Corporation, San Jose, California
Federal stock number	5420-877-8679
Contract number	DA 11-184-AMC-737 (T)
Date manufactured	1966
Maximum allowable speed:	
Highway	35 mph (miles per hour)
Off road	10 mph
In water:	
Individual units	10.5 mph
Four unit ferry (60 ten load)	8 mph
Tire inflation pressure:	
Highway	50 psi (pounds per square inch)
Off road	25 psi minimum
Tire size	18:00 x 25
Axle load, transporter only:	
Front	18,000 lbs (pounds)
Rear	16,350 lbs
Axle load with interior bay superstructure:	
Front	25,310 lbs
Rear	23,090 lbs
Axle load with end bay superstructure:	
Front	27,410 lbs
Rear	26,540 lbs
Center of gravity, transporter only	245.5 in. (inches) from bow of transporter and 65.7 in. from ground.

Center of gravity with interior bay superstructure installed 250.3 in. from bow of transporter and 79.1 in. from ground.

Center of gravity with end bay superstructure 251.3 in. from bow of transporter and 85.2 in. from ground.

(2) *Engine.*

Manufacturer	Detroit Diesel Engine Division, General Motors Corp., Detroit, Michigan
Model	8 V-71 (7083-7299)
Type	Diesel
Revolutions per minute (rpm) no load	2,450
Number of cylinders	8
Firing order	1L, 3R, 3L, 4R, 4L, 2R, 2L, 1R
Bore	4 1/4 in.
Stroke	5 in.
Total displacement	567.5 cu in. (cubic inches)

(3) *Engine Accessories.*

(a) *Engine Oil Filter.*

Manufacturer	AC Spark Plug, Division General Motors Corporation
Type	Ful flow
Model	PM-13-5
Element type	PF 132

(b) *Fuel Filter.*

Manufacturer	AC Spark Plug, Division General Motors Corporation
Model	T-65
Element type	TP 540X

(c) *Fuel Strainer.*

Manufacturer	AC Spark Plug, Division General Motors Corporation
Model	T-67
Element type	T 552

(d) *Engine Governor.*

Manufacturer	Detroit Diesel, Division General Motors Corporation
Type	DW-LS
Idle range	400-450 rpm

(e) *Air Heater Pump.*

Manufacturer	John Barnes Corporation
Type	GC-1507BA5

(f) *Air Heater Pump Motor.*

Manufacturer	Robbins and Meyers, Inc.
Horsepower	1/2
Amperes	5.1
Volts dc	28
Speed	2,000 rpm

(g) Air Compressor.

Manufacturer Bendix Westinghouse
Model TU-FLO-500
Number of cylinders 2
Piston displacement at
1,250 rpm 12 CFM (cubic feet per
minute)
Minimum oil pressure
required at idle speed 5 psi
Minimum oil pressure
required at governed
speed 15 psi

(h) Voltage Regulator.

Manufacturer Leece Neville Co.,
Cleveland, Ohio
Type R0013392RP
Ordnance number 8699744
Military standard number MS 51311-1
Volts 28
Amperes 100

(i) Alternator.

Manufacturer Leece Neville Co.,
Cleveland, Ohio
Type number A0015300GP
Ordnance number 7954720
Volts 28
Amperes 100
Rotation Reversible

(j) Air Cleaner.

Manufacturer Donaldson Corporation
Model SBG 16-0331
Type Dry
Maximum air flow 900 CFM
Weight 67 lbs

(k) Starting Motor.

Manufacturer Delco Remy Division
General Motor Cor-
poration
Model 1113847
Volts 24

(l) Rectifier.

Manufacturer Fanstell Metalurgical Corp.
Model 28V-100A DC
Ordnance number 10906314

(m) Air Compressor Governor.

Manufacturer Bendix Westinghouse
Model D-2

(n) Fuel Pressure Switch By-Pass Switch.

Type Military Standard
Model number 60
Drawing number MS25089

(4) Transmission.

Manufacturer Allison Division General
Motors Corporation
Model number HT-70
Number of power take
offs 2
Maximum input speed 2,300 rpm
Net flywheel input
torque 700 ft-lb (foot-pounds)

(5) Transmission Oil Filter.

Manufacturer AC Spark Plug Division
General Motors Cor-
poration
Type Full Flow, PM-13-5
Element type PF132
Working pressure 60 psi

(6) Batteries.

Model 6 TN
Voltage 12
20 hr rate at 80° F.
(fahrenheit) 100 amp hr
Specific gravity of
electrolyte 1.285 corrected to 80° F.
Cranking ability 300 amps at -40° for 1.25
minutes

(7) Bilge Pump.

Manufacturer Piqua Machine and
Manufacturing Company
Volts 27.5
Model L-32-266
Amperage 20
Type Submersible
RPM 6,500
Series 32-17
Horsepower 1 / 3
Output capacity 46 gpm (gallons per
minute) 6 ft head

(8) Capstans.

Manufacturer Link Belt Company
Model WD2104-18-A
Nomenclature Car spotter
Starting rope pull 6,000 lbs
Running rope pull 3,000 lbs
Oil capacity 5 qts (approximately)
Type of oil:

Ambient temperatures AGMA Lubricants
0° to 40° F. No. 5
41° to 90° F. No. 7 comp.
91° to 120° F. No. 8 comp.

Lubrication intervals After first 150 hours, then
every 2,500 hours or 6
months of normal service.
For service of severe
nature, change oil every 1
to 3 months.

**(9) Service Brake Air Hydraulic Power
Cylinder (Multipak).**

Manufacturer Bendix Westinghouse

(10) Brake Master Cylinder.

Manufacturer Minnesota Automotive,
Incorporated

(11) Brake Calipers.

Manufacturer B. F. Goodrich Company
Model 2-926

(12) Wheel Well Air Blower.

Manufacturer Sutorbilt Corporation
Size 3 LS
Displacement104

(13) *Wheel Well Air Blower Motor.*

Manufacturer Vickers, Incorporated
Cu in. per revolution 0.310
Continuous speed 3860 RPM
Maximum operating pressure
for continuous duty 3,000 psi

(14) *Personnel Heater.*

Manufacturer Stewart Warner Corporation, Southwind Division, Indianapolis, Indiana
Model 8430-P-24
Voltage 24
Amperage: Above 30° F Below 30° F.
Start 17 20.5
Run 8 11.5
Heat output:
High heat 30,000 BTU (British Thermal Units Per Hour)
Low heat 14,000 BTU
Fuel consumption rate:
High heat 0.042 ± .005 lb / min (pound per minute)
Low heat 0.026 ± .005 lb / min

(15) *Pump High Pressure Hydraulic Controlled Variable Displacement.*

Manufacturer The Weatherhead Company, Cleveland, Ohio
Model number 408-00915-1
Maximum continuous operating pressure 3,000 psi
Operating speeds 600 to 3,200 rpm
Maximum continuous operating speed 2,000 rpm
Maximum intermittent operating speed 3,200 rpm
Pump rating variable displacement 0-35 gpm
Weight (dry) 62 lbs

(16) *High Pressure Hydraulic Pump Power Take-Off.*

Manufacturer Chelsa Products
Model BF 2442
Assembly number HY82CD-38H-170

(17) *Low Pressure Hydraulic Pump.*

Manufacturer Vickers Incorporated, Detroit, Michigan
Series V2230-6-5
Model S214
Part number 3CC-J6-20
Output pressure 2,250 psi

(18) *Wheel Suspension Cylinder.*

Manufacturer National Waterlift Division, Pneumo Dynamics
Model 1860
Operating pressure 3,000 psi
Order number 13207E1978

(19) *Marine Drive.*

Manufacturer FMC Corporation, Northern Ordnance Division
Model 3,000
Maximum propeller rpm 994

(20) *Fixed Fire Extinguisher.*

Manufacturer Walter Kidde and Company, Incorporated
Model 1CC3AA1800
Fire extinguisher agent Carbon dioxide

(21) *Portable Fire Extinguisher.*

Manufacturer Walter Kidde and Company, Incorporated
Model FSN 4210-270-4512
Fire extinguisher agent Carbon dioxide

(22) *Differentials.*

Manufacturer Rockwell Standards Corporation Transmission and Axle Division, Detroit, Michigan
Type High traction
Reduction ratio 4.111 to 1.000

(23) *Thermostatic Fan Drive.*

Manufacturer Schwitzer Corporation
Drive assembly L-138473-PM144643
Bracket number A 139182

(24) *Marine Drive Power Take-Off.*

Manufacturer Chelsa Products, 140 Buchanan Street, Chelsa, Michigan
Model 85CM-44B-148
Lubricant MIL-L-2104, grade 80

(25) *Flow Control Thermostat.*

Manufacturer Kysor Industrial
Model D16000-190

(26) *Tires.*

Manufacturer Goodyear Tire and Rubber Company
Type Tubeless
Size 18:00 x 25
Ply 16

(27) *Front Hydraulic Steering Cylinder.*

Manufacturer Vickers Incorporated Division, Sperry Rand Corp.
Model number SC22-12B1BX11
Maximum operating pressure .. 2,000 psi

(28) *Rear Hydraulic Steering Cylinder.*

Manufacturer Vickers Incorporated Division, Sperry Rand Corporation
Model number S20B22-4AAZBX12B-11
Maximum operating pressure .. 2,000 psi

(29) *Hydraulic Elevating Cylinder.*

Manufacturer FMC Corporation
Maximum operating pressure .. 3,000 psi

(30) *Marine Drive Hydraulic Stowage Cylinder.*

Manufacturer Lionel Pacific Incorporated
Model 7-3159

(31) *Hydraulic Rear Steering Actuating Cylinder.*

Manufacturer FMC Corporation
Working pressure 2,000 psi

(32) *Low Pressure Hydraulic Fluid Filter.*

Manufacturer Gresen Manufacturing Company
Model GFB-215 with No. 1571 spring
Working pressure 100 psi maximum

(33) *High Pressure Hydraulic Fluid Filter.*

Manufacturer Waterman Hydraulics
Rated pressure 3,000 psi
Relief valve opens at: 75 to 80 psi
Type Full flow
Flow capacity 30 gpm

(34) *Windshield Wiper Motor.*

Manufacturer Sprague Devices Incorporated
Air consumption065 CFM at 80 psi

(35) *Marine Drive Hydraulic Steering Motor.*

Manufacturer Vickers Incorporated
Model MF-9-3911-30Z4C
Maximum operating pressure at continuous duty 3,000 psi

(36) *Marine Drive Hydraulic Elevating Motor.*

Manufacturer Vickers Incorporated
Model MF-36-3909-25Z-2
Maximum operating pressure .. 3,000 psi

(37) *Air Pressure Reducing Valve.*

Manufacturer Wagner Electric
Factory setting 75 psi
Valve range 40 to 100 psi

(38) *3-Way Solenoid Valve.*

Manufacturer A. Schraders and Son Division of Scovill
Model 972E
Electrical connector number ... MS3102E10S-2P
Flow capacity 60 CFM of air at 100 psi inlet pressure maximum
Volts dc 24
Amperes operating 1.25

(39) *Plug Valve (Wheel Well Air).*

Manufacturer Republic Manufacturing Company
Model 9-463-26

(40) *Hydraulic Flow Control Valve.*

Manufacturer Brand Hydraulics
Model BGR56 Modified
Total capacity 20 gpm
Proof pressure 4,000 psi

(41) *Solenoid Valve Assembly.*

Manufacturer Waterman Hydraulics
Model 16362-LE-JT-6-24 Modified
Operating pressure 3,000 psi
Voltage, dc 24
Flow capacity 6 gpm

(42) *Shuttle Steering Valve Assembly.*

Manufacturer Thompson Rand, Ross Gear Div.
Model V 1006
Normal flow rate 3 gpm
Maximum flow rate 6 gpm
Working pressure 2,000 psi
Proof pressure 3,500 psi

(43) *Dimensions and Weights (fig. 1-1).*

(a) *Transporter.*

Length 507.5 in.
Width 144 in.
Height:
Less superstructure 126 in.
With end bay superstructure 140.8 in.
With interior bay superstructure 126 in.
With cab and superstructure removed and wheels retracted 91.1 in.
Weight:
Less superstructure 34,350 lbs
With end bay superstructure 53,950 lbs
With interior bay superstructure 48,400 lbs

(b) *End Bay Superstructure. Refer to TM 5-5420-205-15.*

(c) *Interior Bay Superstructure. Refer to TM 5-5420-205-15.*

(d) *Marine Drive.*

Length 68.06 in.
Width 34.5 in.
Height 89.6 in.
Weight (wet) 1,554 lbs.

(44) *Capacities.*

Fuel tanks (2) 50 gal ea (each)
Engine crankcase 17 qts (quarts)
Oil filters (2) 2 qts ea
Oil cooler 5 qts
Air compressor crankcase 1.53 qts
Transmission:
Initial fill 8.75 gal (35 qts)
Refill 6.5 gal (26 qts)
Marine drive 11 qts
Front axle differential 14 qts
Rear axle differential 14 qts
Steering gear box 3 pts (pints)
Radiator 17½ gal

Hydraulic reservoir Fill to high on sight gage (approximately 54 gal)
 Hydraulic system 61½ gal
 Wheel hub (planetary system) 5 qts (ea wheel)
 Wheel well air blower housing 1 pt
 Capstan (2) 5 qts ea
 Marine drive shaft 1 qt. or fill to plug level when in stowed position
 Wheel and suspension universal joints 0.5 oz (ounce) (each joint)

(45) Nut and Bolt Torque Data.

(a) General Torque Specifications-Bolts and Screws.

Size	Threads per inch	Standard heat-treated bolts and screws torque value	Special heat-treated bolts, screws, allen-head screws, and self-locking capscrews torque value
1 / 4	20	6—8	9—11
	28	8—10	10—12
5 / 16	18	15—18	17—20
	24	17—20	19—23
3 / 8	16	26—32	36—43
	24	33—40	41—49
7 / 16	14	42—50	54—65
	20	50—60	64—77
1 / 2	13	67—80	81—97
	20	83—100	96—115
9 / 16	12	85—100	103—123
	18	100—120	122—146
5 / 8	11	117—140	164—192
	18	134—160	193—225
3 / 4	10	180—210	284—325
	16	215—250	337—385
7 / 8	9	315—360	490—550
	14	372—425	575—650
1	8	445—500	685—770
	14	535—600	830—925

NOTE

All torque values are given in foot-pounds.

(b) Specific Torque Specifications.

Stub yoke capscrew 300 ft-lbs
 Double universal joint bearing cap machine screws 90—100 ft-lbs
 Wheel lug nuts 320—350 ft-lbs.
 Adapter for low pressure hydraulic pump to engine nuts 15—20 ft-lbs.
 High pressure hydraulic pump to transmission nut 15—20 ft-lbs.
 Marine drive unit to hull capscrews 190 ft-lbs.

(46) Adjustment Data.

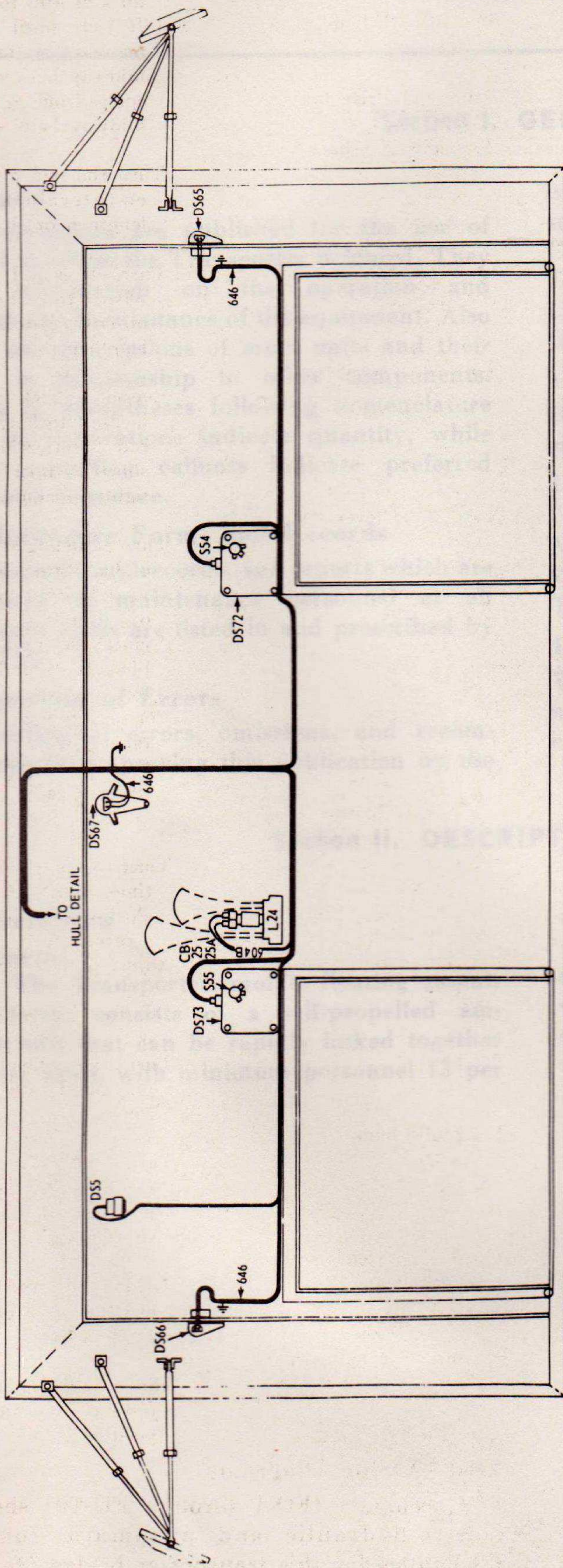
Intake and exhaust valve clearance Adjust hot engine to 0.013 and 0.015.

Governor controls Adjust idle speed or linkage as desired to sustain load.
 Throttle and accelerator controls Adjust idle screw so engine idles at 400 to 500 rpm.
 Fan drive V-belts Lift hub until belts will depress 3/8 to 1/2 inch midway between pulleys.
 Alternator drive belts Depress from 3/8 to 1/2 inch midway between pulleys.
 Transmission shaft lever cable Turn rod end clockwise or counterclockwise to lengthen or shorten.
 Axle engage lever and cable Turn clevis rod end clockwise to shorten or counterclockwise to lengthen.
 Throttle valve control cable Loosen or back off rod end locknut to lengthen, turn rod counterclockwise to shorten, turn clockwise, tighten locknut.
 Handbrake lever and linkage Turn adjusting knob on end of handbrake lever.
 Steering gear Loosen locknut on back side of housing and turn clockwise until a slight bind exists and back off for proper adjustment.
 Drivers seat For drivers with short legs, turn pedestal 180° so that pedestal post is near front of cab.
 Wheel well blower control levers and linkage Turn rod end 1/2 turn at a time, counterclockwise or clockwise to lengthen or shorten rod.
 Air compressor governor Adjust to 100 psi.
 Air compressor drive belts Depress from 1/2 to 3/4 inch midway between pulleys.
 Air horn Turn the adjusting screw pm the horns to adjust sound.
 Hydraulic pump control linkage Turn rod end 1/2 turn counterclockwise to lengthen or clockwise to shorten.
 Marine drive elevation (depth) transmitter Adjust till indicator is exactly on full UP / DOWN mark.
 Marine drive azimuth (Steering) transmitter Adjust till aligned and indicates null (O) position.

1-10. Wiring Diagrams

a. Foldouts (FO-1 through FO-10) shows the electro-hydraulic and pneumatic functional schematics for this transporter bridge / ferry unit and can be found at the rear of this manual.

b. Figure 1-4 is the practical wiring diagram.



LEGEND

25A	WIRE LEAD	DS5	MAGNETIC COMPASS	DS67	MARINE NAVIGATIONAL LIGHT (BOW)	L24	HORN SOLENOID
646	WIRE LEAD	DS65	MARINE NAVIGATIONAL LIGHT (STARBOARD)	DS72	DOMELIGHT	S54	DOMELIGHT SWITCH
CB25	LIGHTING SWITCH CIRCUIT BREAKER	DS66	MARINE NAVIGATIONAL LIGHT (PORT)	DS73	DOMELIGHT	S55	DOMELIGHT SWITCH
						⊥	GROUND

ME 5420-204-12/1-4

Figure 1-4. Practical wiring diagram.

CHAPTER 2

OPERATING INSTRUCTIONS

WARNING

If equipment fails to operate, refer to troubleshooting procedures in Chapter 3.

Section I. OPERATING PROCEDURES

2-1. General

a. This section describes, locates, illustrates, and furnishes the operator / crew sufficient information about various controls and instruments for proper operation of transporter. Instructions are published for information and guidance of personnel responsible for operation of the transporter.

b. The operator must know how to perform every operation of which the transporter is capable. This section gives instructions on starting and stopping the transporter, operation of the transporter, and on co-ordinating basic motions to perform specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

c. The transporter crew check list (para 2-6), lists the various checks and inspections that must be accomplished, the basic operational instructions

for operator and crew. More coverage is contained in paragraphs 2-3 through 2-25 of this manual. Other instructions are contained in TM 5-210 (Military Floating Bridge Equipment) and FM 31-60 (River-Crossing Operations).

CAUTION

Avoid unnecessary engine idling. Prolonged idling will result in temperature of engine coolant falling below specified operating range of 165° F to 185° F. Low operating temperatures causes development of several conditions detrimental to engine operation and life.

2-2. Controls and Instruments

The purpose of controls and instruments and their normal and maximum reading are illustrated in figure 2-1.

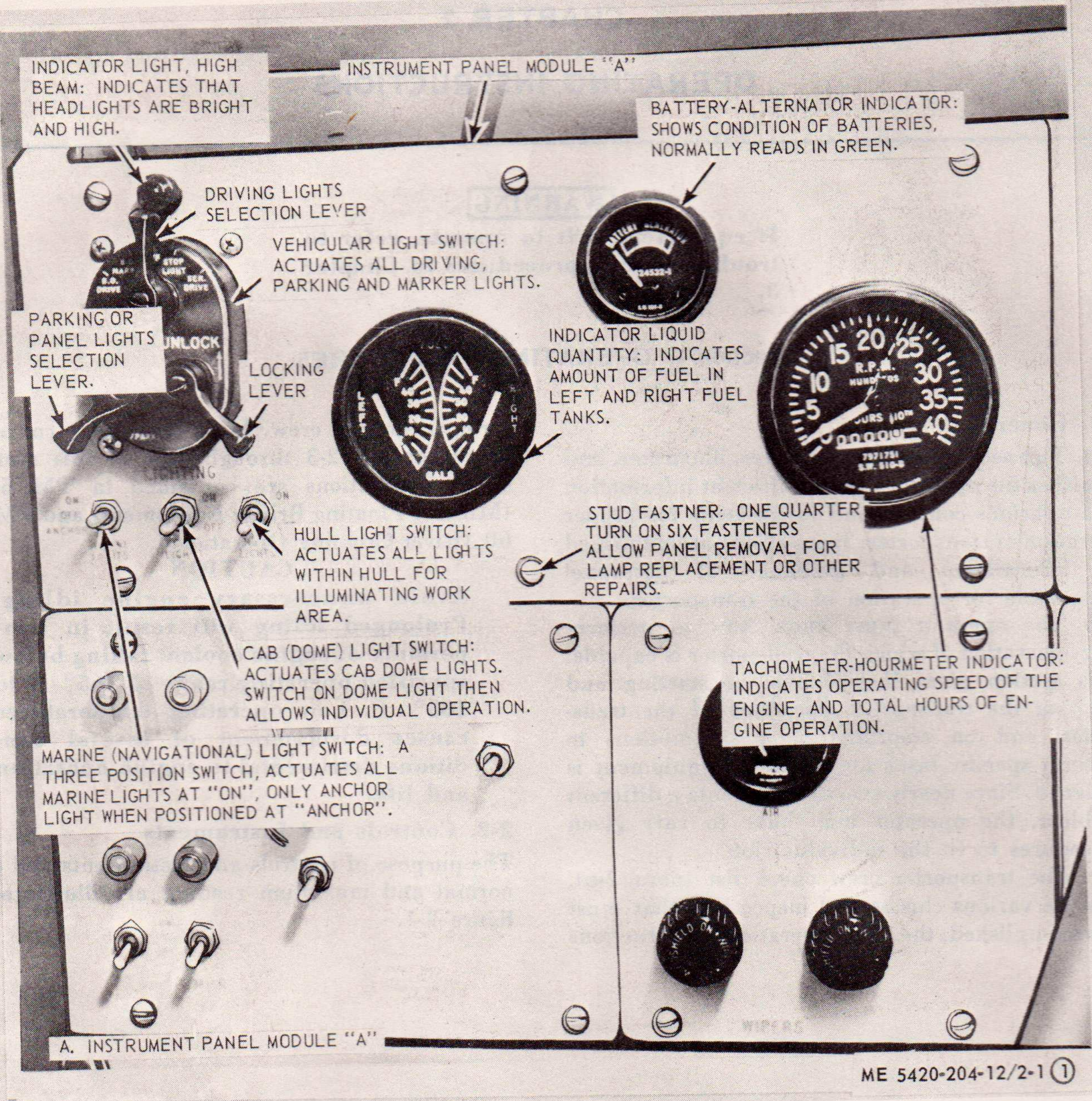
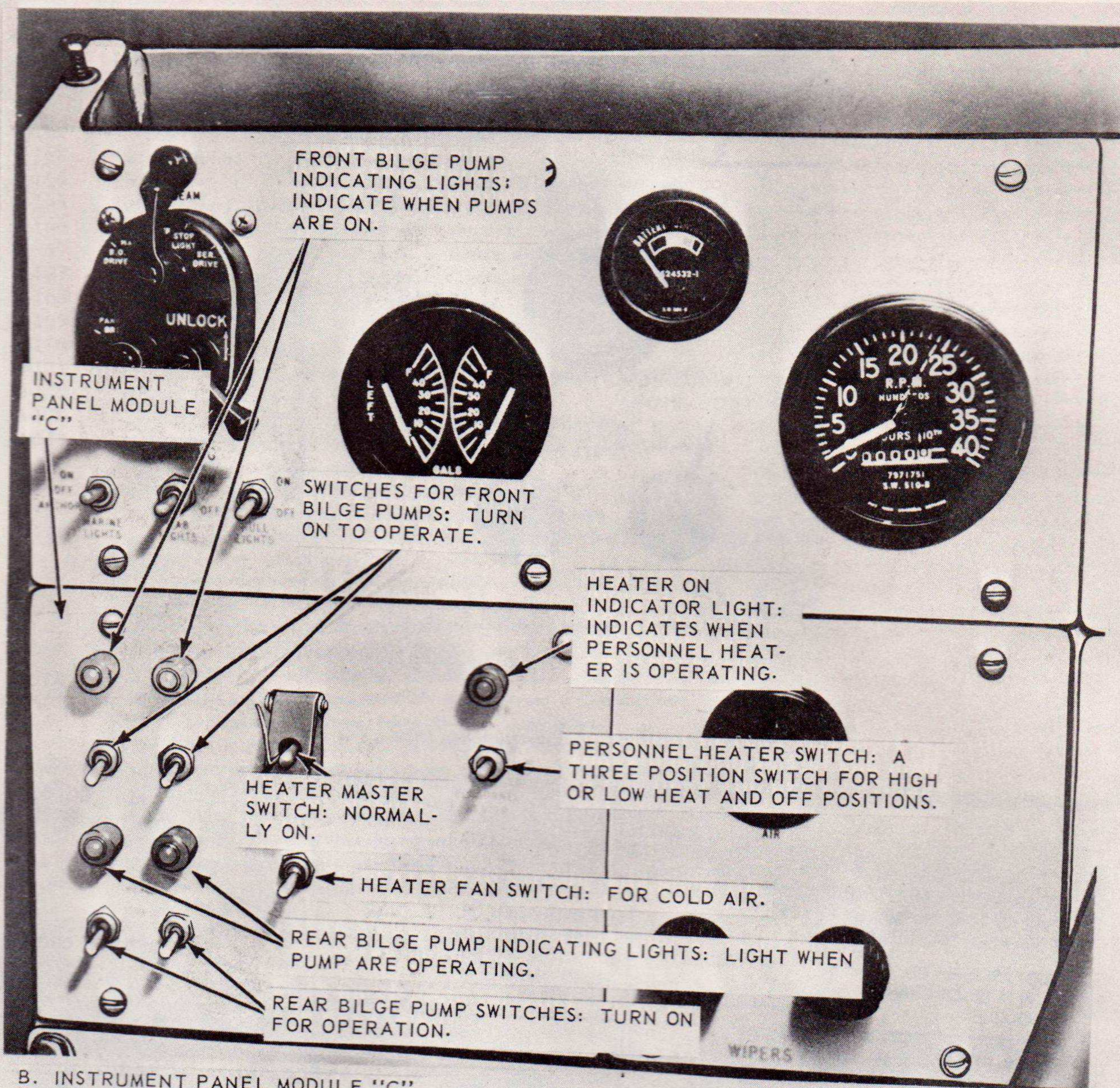


Figure 2-1. Controls and instruments. (Sheet 1 of 16)



B. INSTRUMENT PANEL MODULE "C"

ME 5420-204-12/2-1 (2)

Figure 2-1. Controls and instruments. (Sheet 2 of 16)

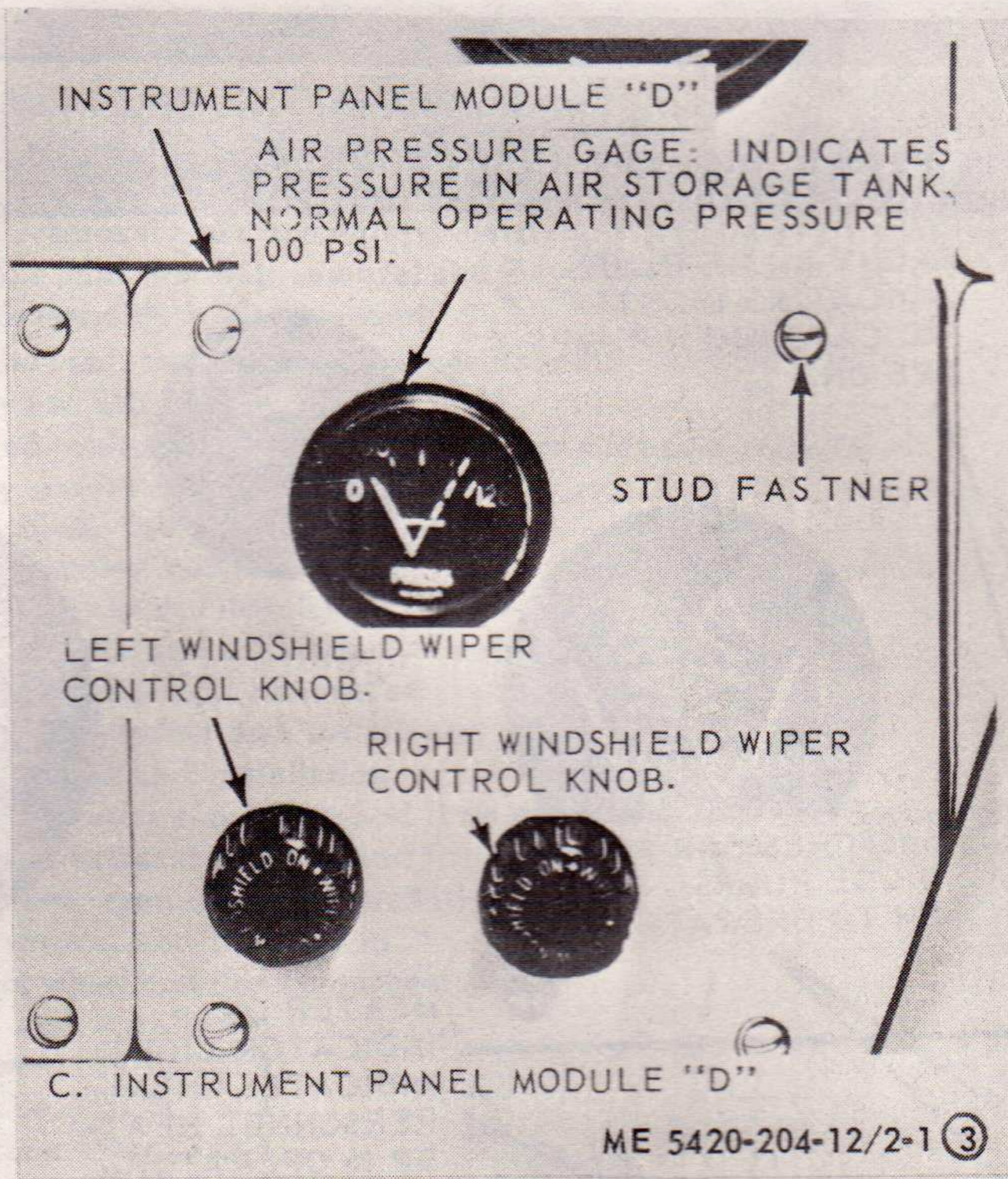


Figure 2-1. Controls and instruments. (Sheet 3 of 16)

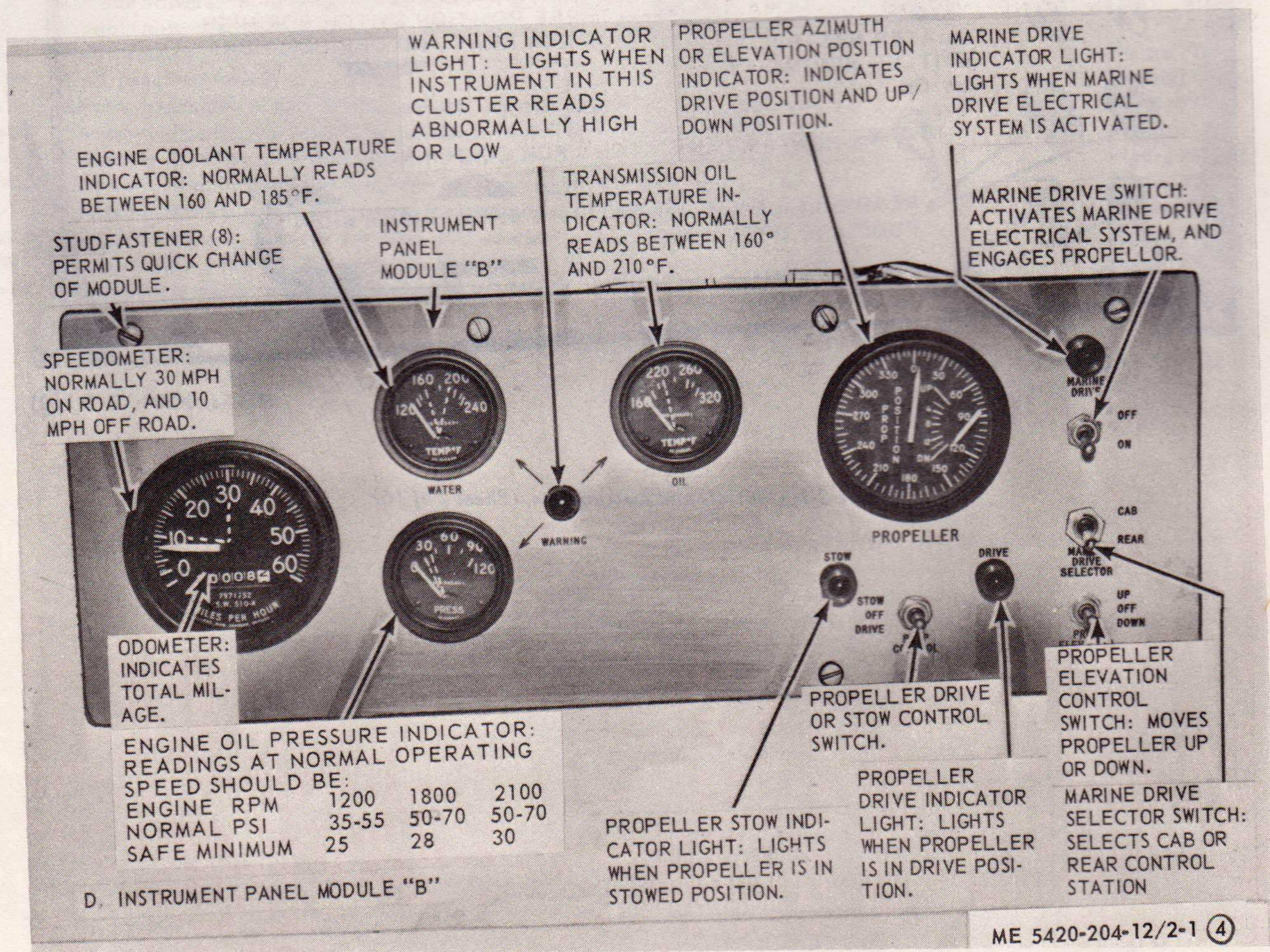


Figure 2-1. Controls and instruments. (Sheet 4 of 16)

SUPERSTRUCTURE BOLT DOWN OVERRIDE SWITCH: FOR EMERGENCY USE ONLY, WHEN BOLTS ARE KNOWN TO HAVE BEEN REMOVED, YET DEFECTIVE LIMIT SWITCH FAILS TO INDICATE REMOVAL.

STARTER SWITCH: PUSH IN TO START ENGINE.

ENGINE FUEL SHUT-OFF SWITCH: PRESS DOWN AND HOLD. STOPS ENGINE.

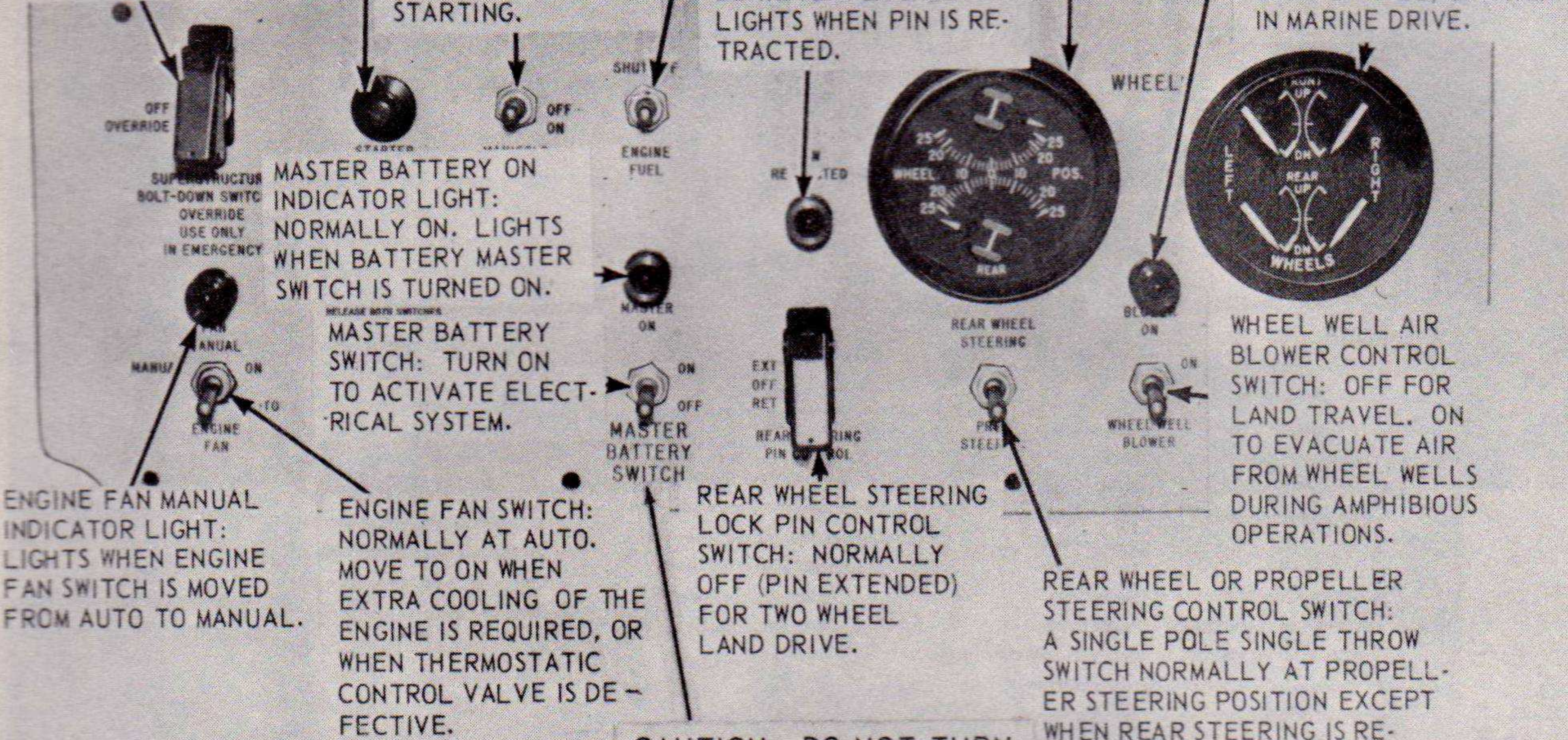
FRONT AND REAR WHEEL POSITION INDICATOR: POINTERS ARE AT ZERO FOR FORWARD TRAVEL.

WHEEL WELL AIR BLOWER INDICATOR LIGHT: ON WHEN BLOWER IS USED TO TRIM TRANSPORTER DURING WATER TRAVEL.

MANIFOLD AIR HEATER SWITCH; FOR COLD WEATHER STARTING.

REAR WHEEL STEERING LOCK PIN RETRACTED INDICATOR LIGHT: LIGHTS WHEN PIN IS RETRACTED.

WHEELS UP/DOWN POSITION INDICATOR: POINTERS AT DOWN FOR LAND TRAVEL, UP WHEN IN MARINE DRIVE.

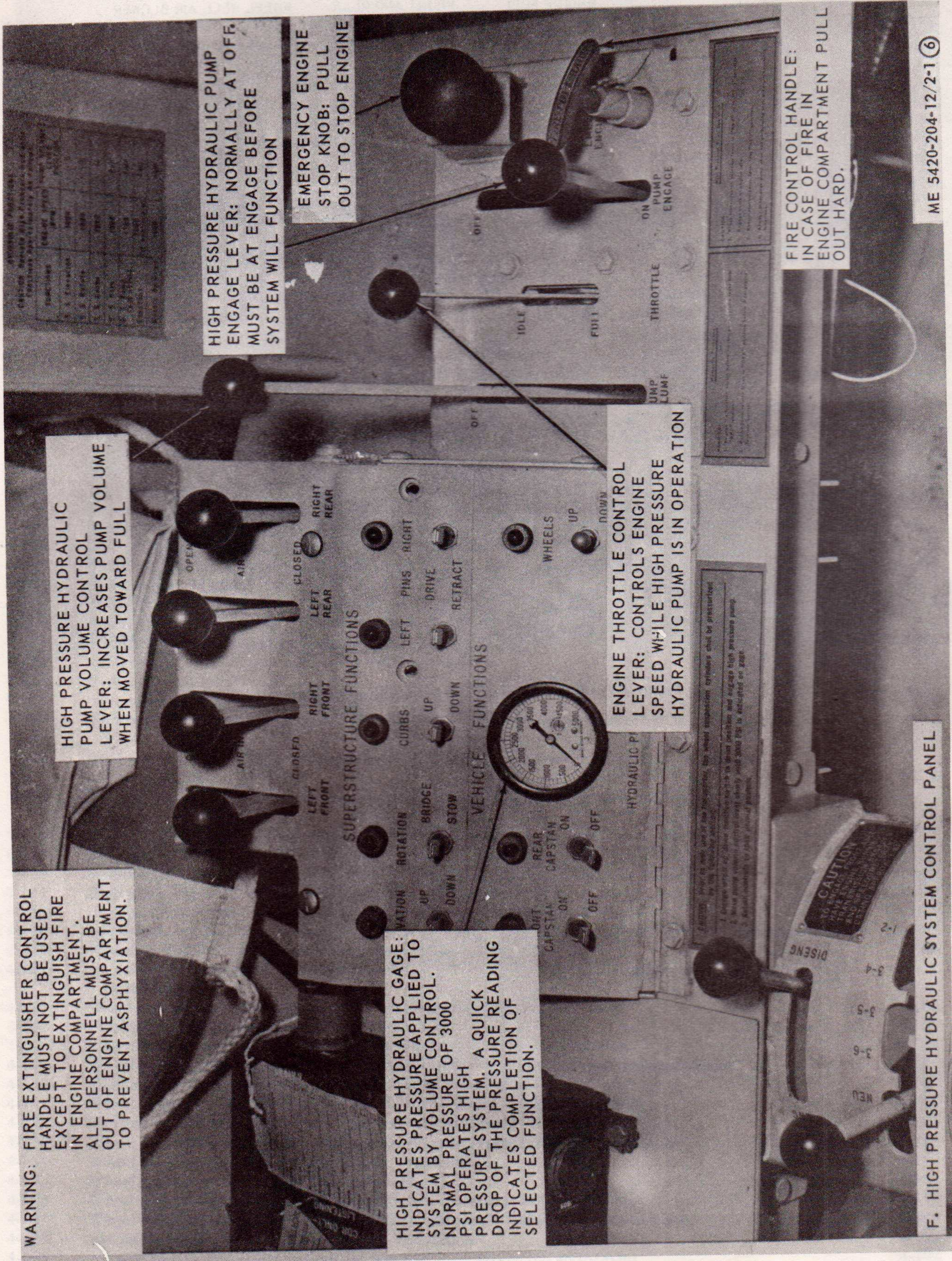


E. INSTRUMENT PANEL MODULE "E"

CAUTION: DO NOT TURN MASTER SWITCH OFF WHILE ENGINE IS RUNNING.

ME 5420-204-12/2-1 (5)

Figure 2-1. Controls and instruments. (Sheet 5 of 16)



WARNING: FIRE EXTINGUISHER CONTROL HANDLE MUST NOT BE USED EXCEPT TO EXTINGUISH FIRE IN ENGINE COMPARTMENT. ALL PERSONNEL MUST BE OUT OF ENGINE COMPARTMENT TO PREVENT ASPHYXIATION.

HIGH PRESSURE HYDRAULIC PUMP VOLUME CONTROL LEVER: INCREASES PUMP VOLUME WHEN MOVED TOWARD FULL

HIGH PRESSURE HYDRAULIC PUMP ENGAGE LEVER: NORMALLY AT OFF, MUST BE AT ENGAGE BEFORE SYSTEM WILL FUNCTION

EMERGENCY ENGINE STOP KNOB: PULL OUT TO STOP ENGINE

HIGH PRESSURE HYDRAULIC GAGE: INDICATES PRESSURE APPLIED TO SYSTEM BY VOLUME CONTROL. NORMAL PRESSURE OF 3000 PSI OPERATES HIGH PRESSURE SYSTEM. A QUICK DROP OF THE PRESSURE READING INDICATES COMPLETION OF SELECTED FUNCTION.

ENGINE THROTTLE CONTROL LEVER: CONTROLS ENGINE SPEED WHILE HIGH PRESSURE HYDRAULIC PUMP IS IN OPERATION

FIRE CONTROL HANDLE: IN CASE OF FIRE IN ENGINE COMPARTMENT PULL OUT HARD.

F. HIGH PRESSURE HYDRAULIC SYSTEM CONTROL PANEL

ME 5420-204-12/2-1 (6)

Figure 2-1. Controls and instruments. (Sheet 6 of 16)

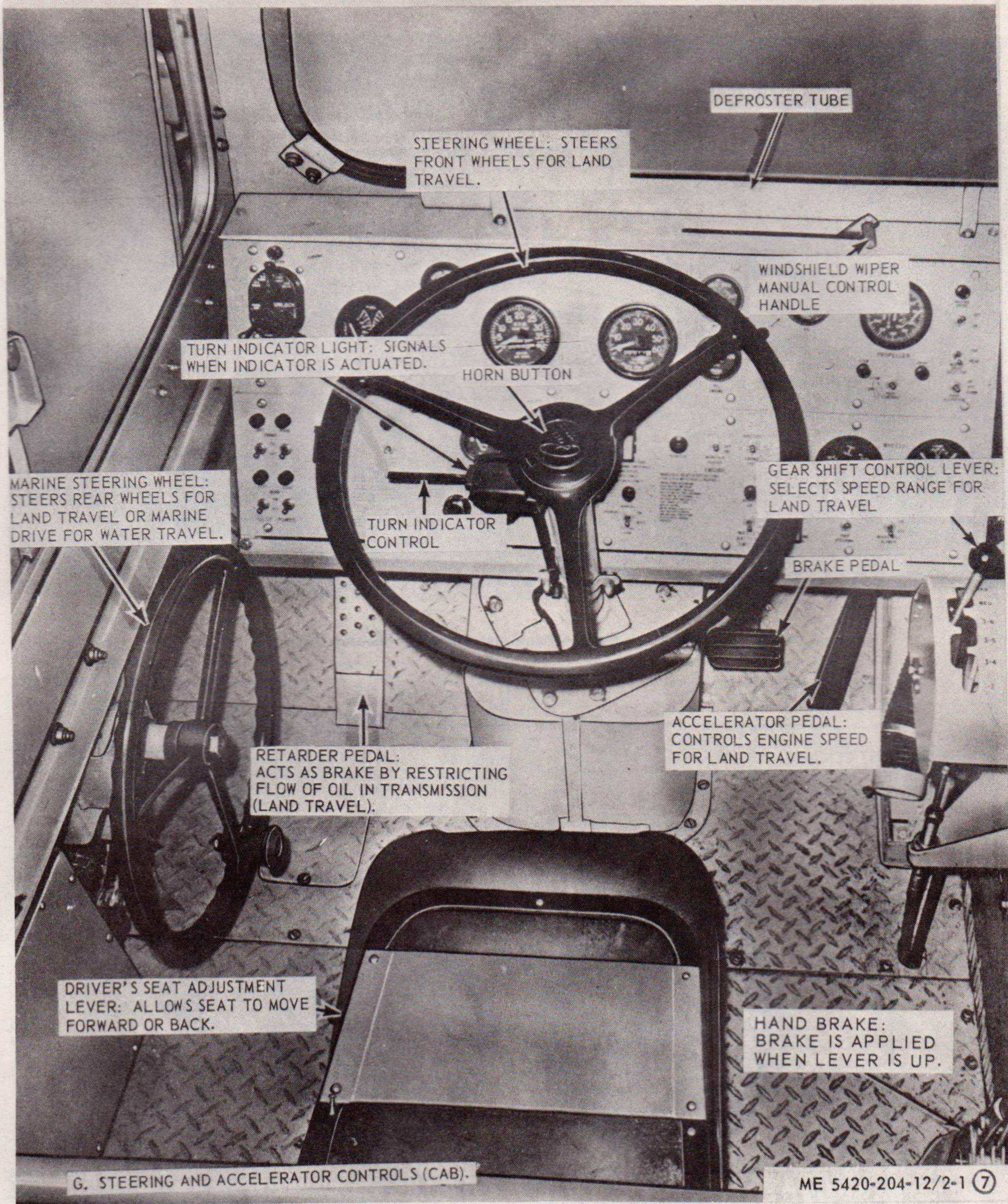


Figure 2-1. Controls and instruments. (Sheet 7 of 16)

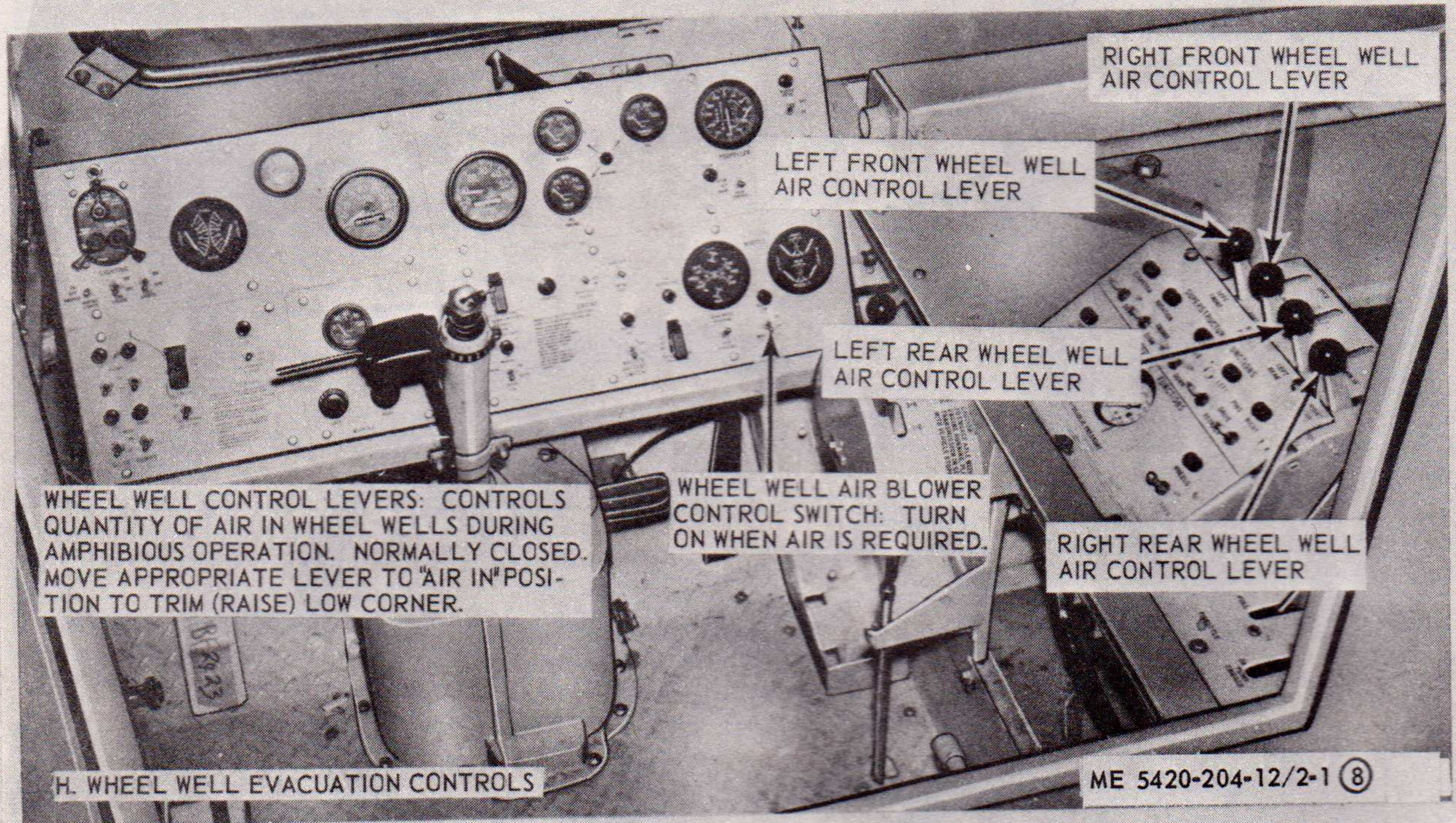


Figure 2-1. Controls and instruments. (Sheet 8 of 16)

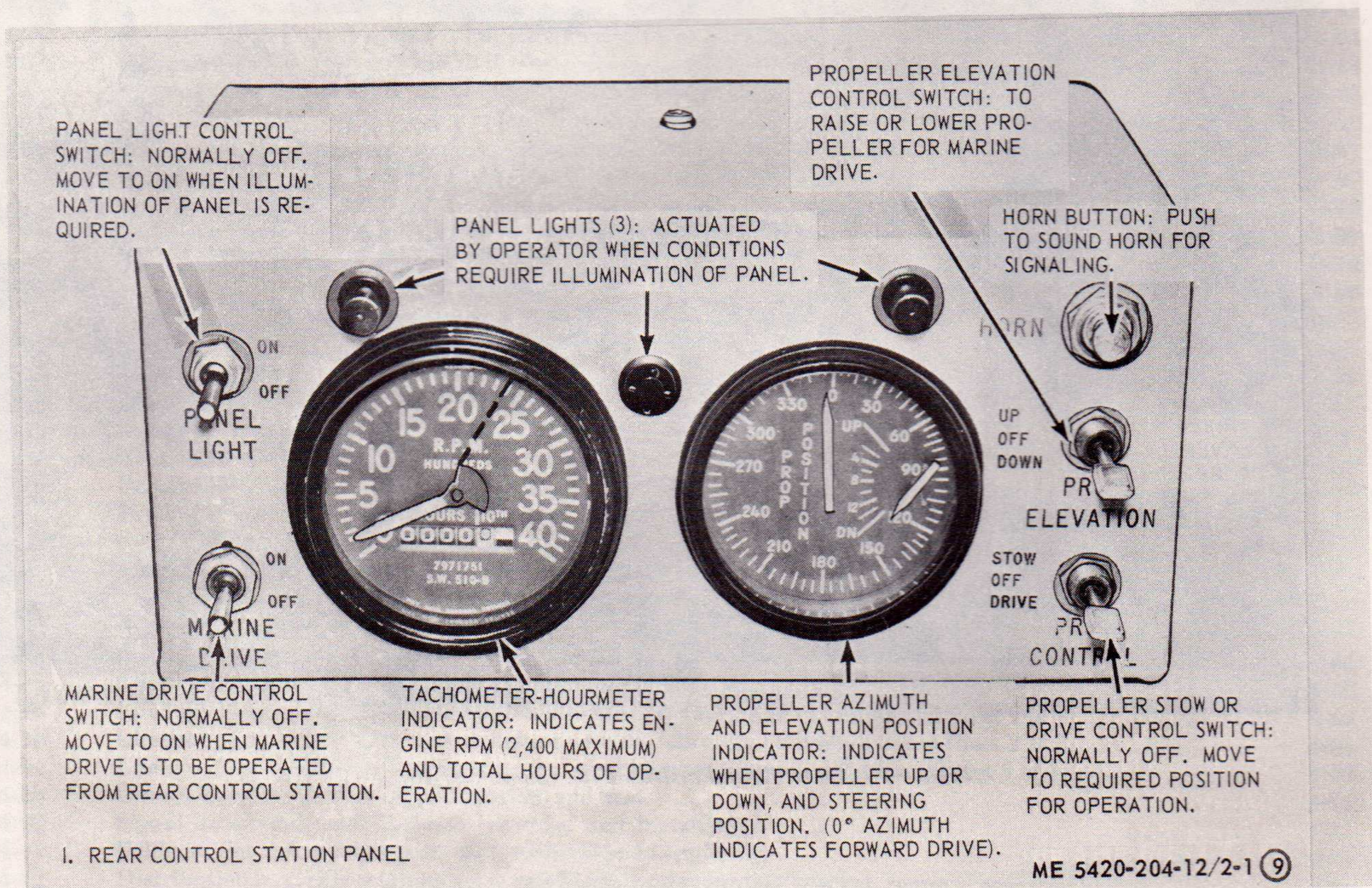


Figure 2-1. Controls and instruments. (Sheet 9 of 16)

MARINE STEERING PUMP: TEN REVOLUTIONS OF THIS PUMP WILL CAUSE MARINE DRIVE UNIT TO TURN THROUGH 360°. FOR REAR WHEEL STEERING, 11 TURNS ARE REQUIRED TO MOVE FROM LOCK-TO-LOCK ON A RIGHT TURN. SLIGHTLY LESS THAN 10 TURNS ARE REQUIRED FOR A LEFT TURN.

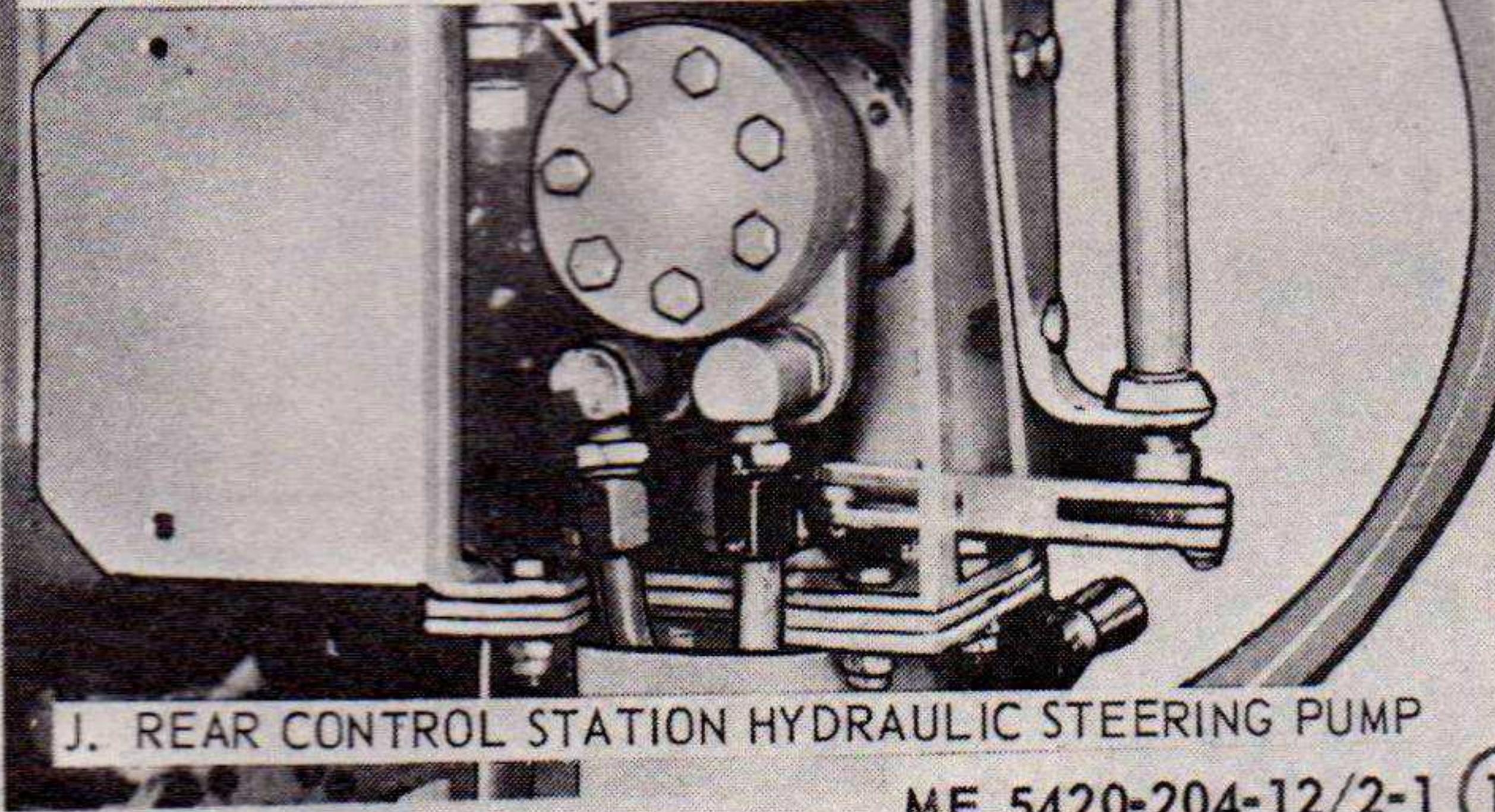
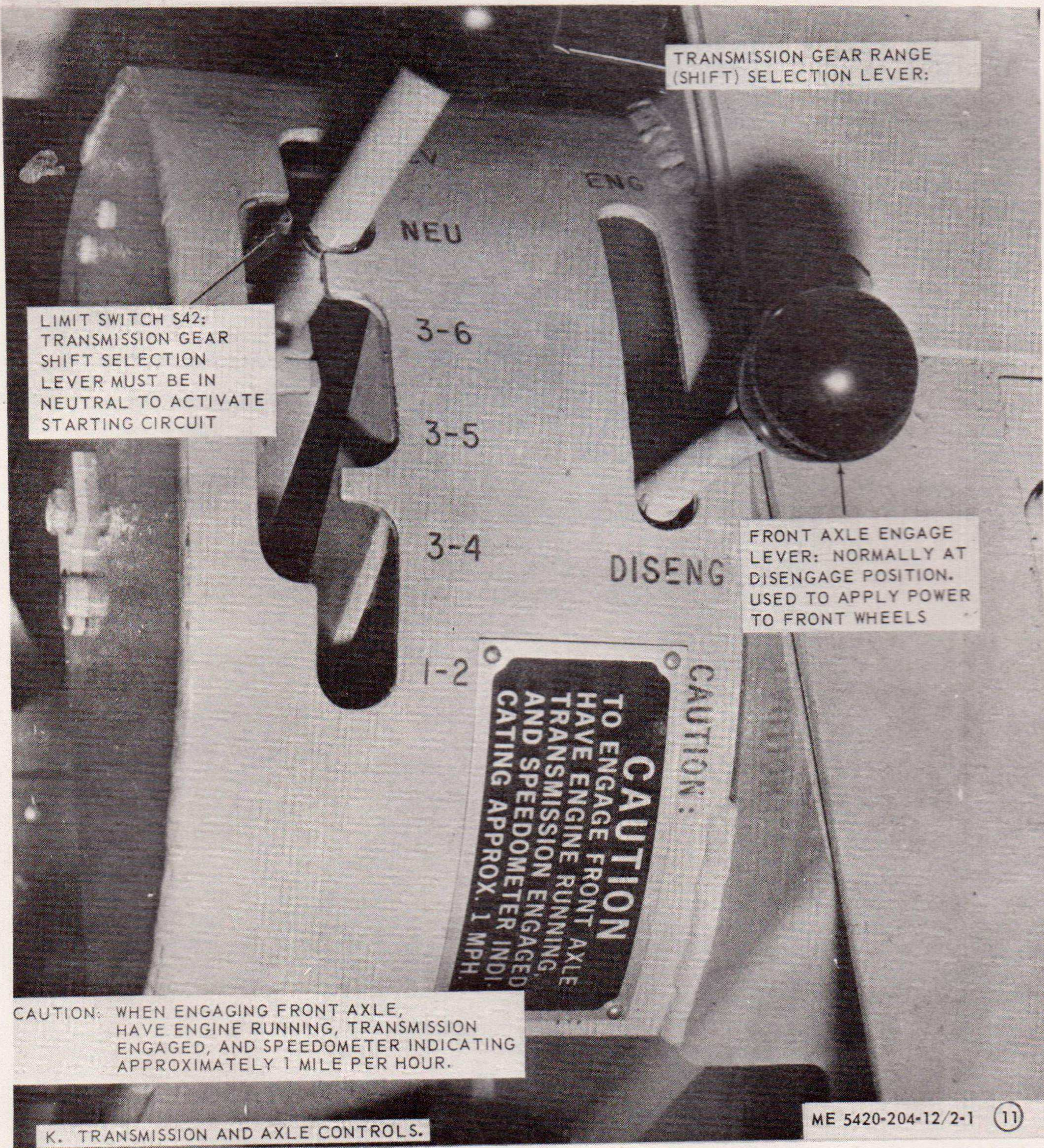


Figure 2-1. Controls and instruments. (Sheet 10 of 16)



TRANSMISSION GEAR RANGE (SHIFT) SELECTION LEVER:

LIMIT SWITCH S42: TRANSMISSION GEAR SHIFT SELECTION LEVER MUST BE IN NEUTRAL TO ACTIVATE STARTING CIRCUIT

FRONT AXLE ENGAGE LEVER: NORMALLY AT DISENGAGE POSITION. USED TO APPLY POWER TO FRONT WHEELS

CAUTION:
 TO ENGAGE FRONT AXLE
 HAVE ENGINE RUNNING,
 TRANSMISSION ENGAGED,
 AND SPEEDOMETER INDICATING
 APPROX. 1 MPH.

CAUTION: WHEN ENGAGING FRONT AXLE, HAVE ENGINE RUNNING, TRANSMISSION ENGAGED, AND SPEEDOMETER INDICATING APPROXIMATELY 1 MILE PER HOUR.

K. TRANSMISSION AND AXLE CONTROLS.

ME 5420-204-12/2-1 (11)

Figure 2-1. Controls and instruments. (Sheet 11 of 16)

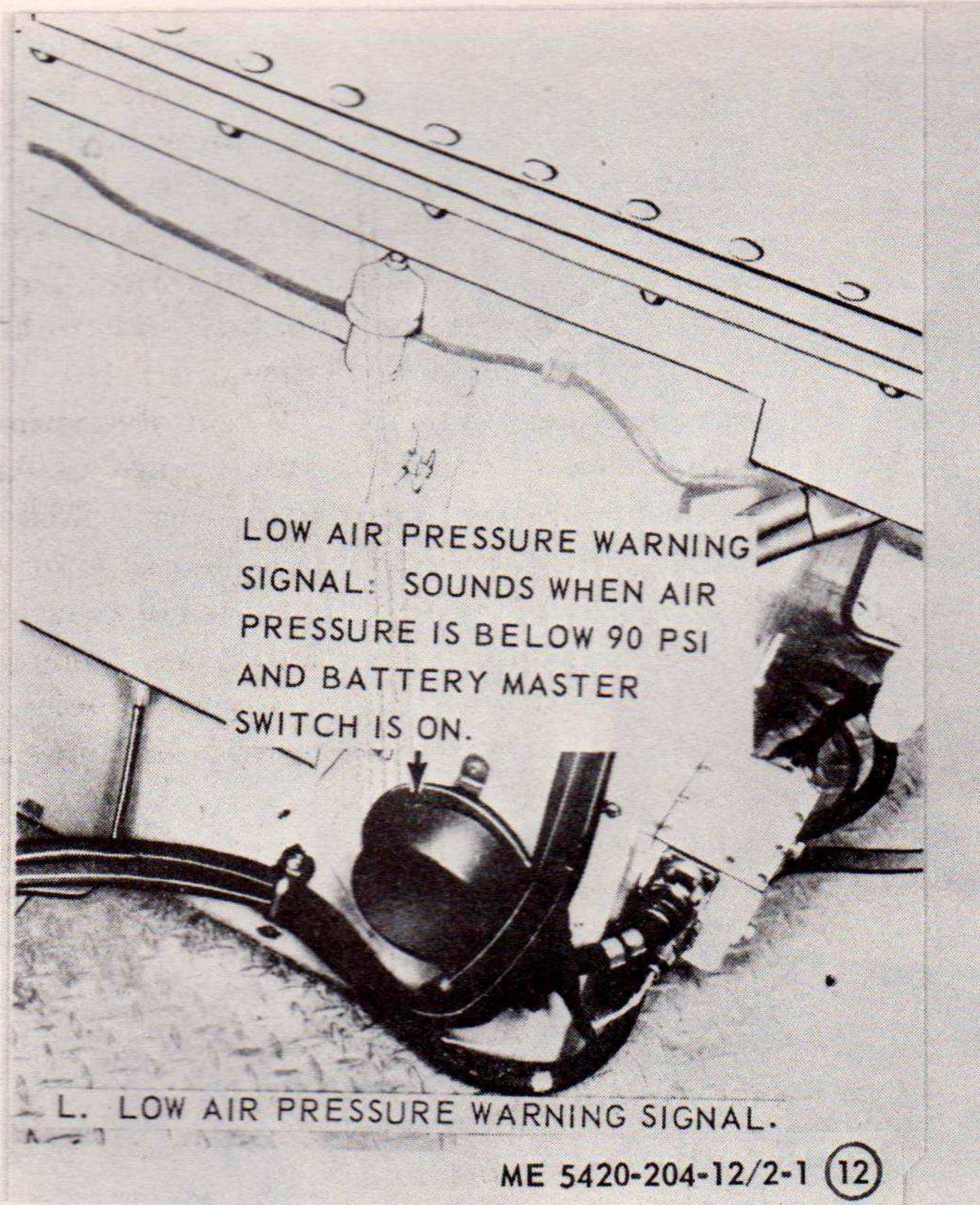


Figure 2-1. Controls and instruments. (Sheet 12 of 16)

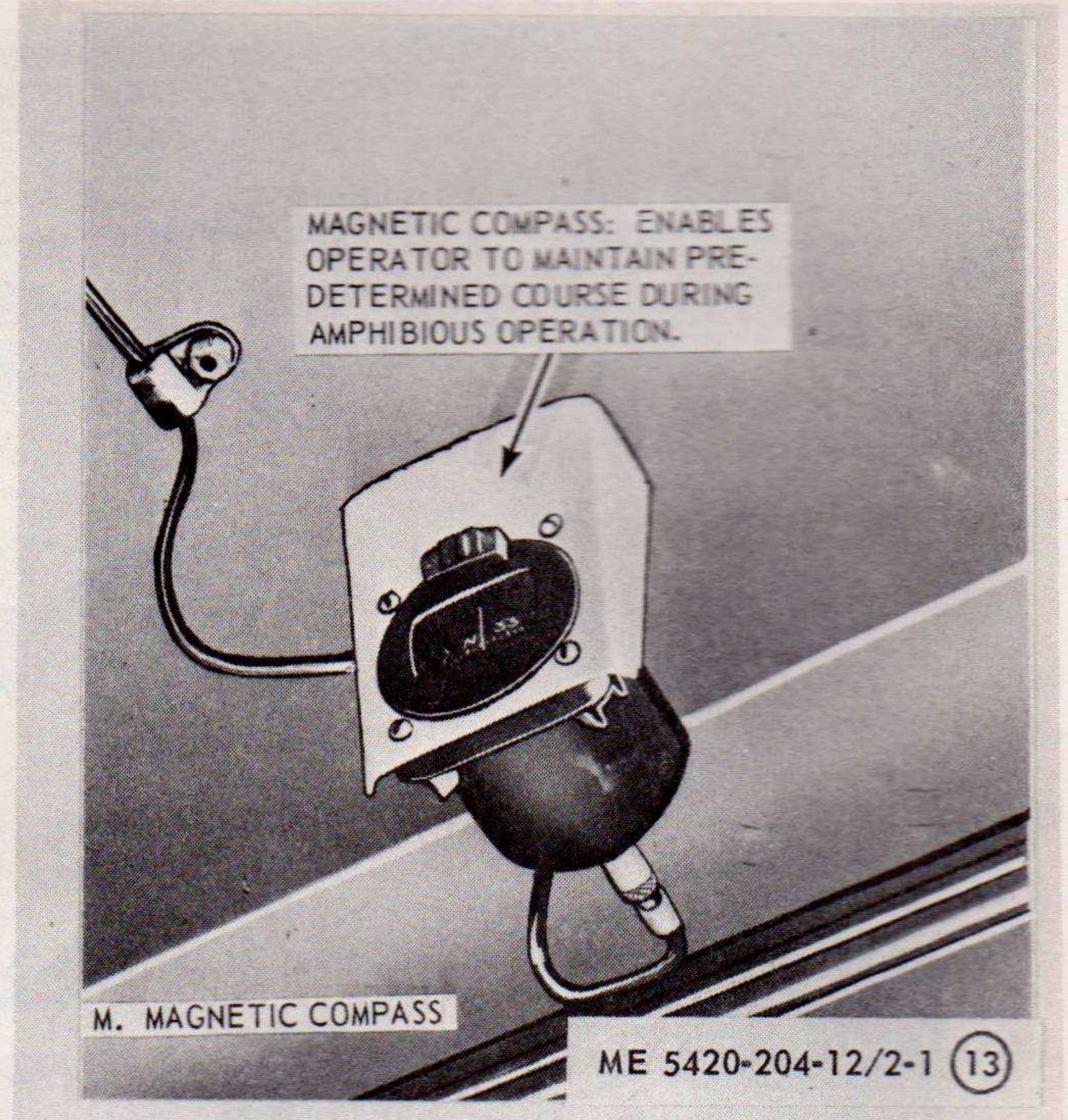


Figure 2-1. Controls and instruments. (Sheet 13 of 16)

REAR CONTROL STATION INSTRUMENT PANEL: CONTAINS INSTRUMENTS NECESSARY FOR MARINE OPERATION.

THROTTLE LEVER: CONTROLS ENGINE SPEED FROM REAR CONTROL STATION.

MARINE STEERING WHEEL: CONTROLS MARINE DRIVE STEERING DURING AMPHIBIOUS OPERATION, OR REAR WHEEL STEERING FUNCTION ON LAND OR WATER. ENABLES SECOND OPERATOR TO ASSIST IN MANEUVERING TRANSPORTER IN OR OUT OF CLOSE AREAS.

REAR CONTROL STATION PEDESTAL: NORMALLY STOWED BELOW DECK. RAISED FOR MARINE OPERATION.

WHEEL, PEDESTAL LOCKING: RELEASES PEDESTAL FOR STOWAGE BELOW DECK.

REAR CONTROL STATION OPERATORS GUARD RAIL (LOWERED): RAISE AND LOCK TO PROTECT OPERATOR DURING AMPHIBIOUS OPERATION.

REAR CONTROL STATION STOWAGE DOOR: UNLATCH AND RAISE BEFORE ATTEMPTING TO STOW REAR CONTROL STATION.

N. REAR CONTROL STATION

ME 5420-204-12/2-1 (14)

Figure 2-1. Controls and instruments. (Sheet 14 of 16)

SUPERSTRUCTURE ELEVATION AND ROTATION INDICATOR LIGHTS: ON WHEN SUPERSTRUCTURE IS MOVING.

CURBING INDICATOR LIGHT: ON WHEN CURBING IS MOVING.

LEFT AND RIGHT PIN INDICATOR LIGHTS: ON WHEN PINS ARE MOVING.

LEFT AND RIGHT PIN CONTROL SWITCH: SPRING LOADED NORMALLY OFF. MOVE TO DRIVE OR RETRACT. RELEASE WHEN FUNCTION IS COMPLETED

CURBING CONTROL SWITCH: SPRING LOADED, NORMALLY OFF. MOVE TO UP OR DOWN AND HOLD UNTIL FUNCTION IS COMPLETED, THEN RELEASE.

SUPERSTRUCTURE ROTATION CONTROL SWITCH: SPRING LOADED, NORMALLY OFF. MOVE TO BRIDGE OR STOW AND HOLD UNTIL FUNCTION IS COMPLETED, THEN RELEASE.

SUPERSTRUCTURE ELEVATION CONTROL SWITCH: SPRING LOADED, NORMALLY OFF. MOVE TO UP OR DOWN AND HOLD UNTIL FUNCTION IS COMPLETED, THEN RELEASE.

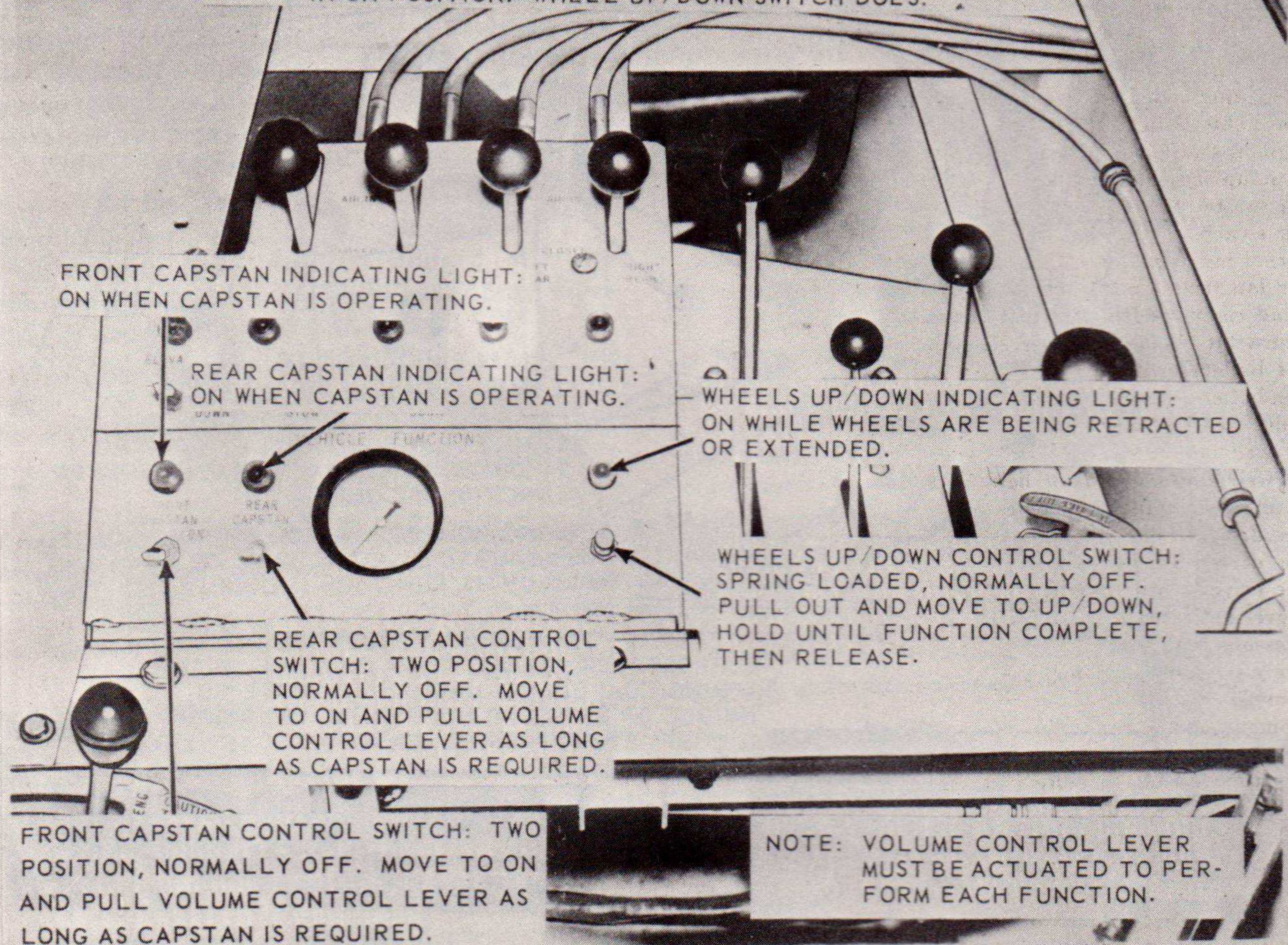
NOTE: HYDRAULIC PUMP MUST BE ENGAGED BEFORE BEGINNING HYDRAULIC OPERATIONS. ALL HYDRAULIC FUNCTIONS ARE COMPLETED ONE AT A TIME. MOVE CONTROL SWITCH TO FUNCTION REQUIRED AND HOLD IN POSITION WHILE PULLING VOLUME CONTROL LEVER TOWARD "FULL". WHEN FUNCTION IS COMPLETED AS INDICATED BY A QUICK DROP OF PRESSURE READING ON GAGE, MOVE VOLUME CONTROL LEVER TO OFF, THEN RELEASE FUNCTION CONTROL SWITCH.

O. SUPERSTRUCTURE HYDRAULIC FUNCTION CONTROLS (INTERIOR BAY).

ME 5420-204-12/2-1 (15)

Figure 2-1. Controls and instruments. (Sheet 15 of 16)

NOTE: CAPSTAN CONTROL SWITCHES DO NOT REQUIRE HOLDING IN ON POSITION. WHEEL UP/DOWN SWITCH DOES.



FRONT CAPSTAN INDICATING LIGHT: ON WHEN CAPSTAN IS OPERATING.

REAR CAPSTAN INDICATING LIGHT: ON WHEN CAPSTAN IS OPERATING.

WHEELS UP/DOWN INDICATING LIGHT: ON WHILE WHEELS ARE BEING RETRACTED OR EXTENDED.

WHEELS UP/DOWN CONTROL SWITCH: SPRING-LOADED, NORMALLY OFF. PULL OUT AND MOVE TO UP/DOWN, HOLD UNTIL FUNCTION COMPLETE, THEN RELEASE.

REAR CAPSTAN CONTROL SWITCH: TWO POSITION, NORMALLY OFF. MOVE TO ON AND PULL VOLUME CONTROL LEVER AS LONG AS CAPSTAN IS REQUIRED.

FRONT CAPSTAN CONTROL SWITCH: TWO POSITION, NORMALLY OFF. MOVE TO ON AND PULL VOLUME CONTROL LEVER AS LONG AS CAPSTAN IS REQUIRED.

NOTE: VOLUME CONTROL LEVER MUST BE ACTUATED TO PERFORM EACH FUNCTION.

- CAUTION: PRIOR TO USE OF TRANSPORTER, WHEEL SUSPENSION CYLINDERS SHALL BE PRESSURIZED AS FOLLOWS:
1. ENGAGE HYDRAULIC PUMP.
 2. MOVE WHEELS UP/DOWN CONTROL SWITCH TO DOWN POSITION.
 3. MOVE PUMP VOLUME CONTROL LEVER TOWARD FULL SLOWLY, UNTIL 3,000 PSI IS INDICATED ON PRESSURE GAGE. HOLD IN FULL POSITION FOR APPROXIMATELY 30 SECONDS, THEN MOVE CONTROL LEVER TO OFF.
 4. RELEASE WHEEL CONTROL SWITCH
 5. DISENGAGE HIGH PRESSURE HYDRAULIC PUMP.

P. VEHICLE HIGH PRESSURE HYDRAULIC FUNCTION CONTROLS.

ME 5420-204-12/2-1 (16)

Figure 2-1. Controls and instruments. (Sheet 16 of 16)

2-3. Starting

a. Preparation for Starting.

- (1) Refer to paragraph 3-3 and perform preventive maintenance checks and services.
- (2) Lubricate Bridge Ferry Unit in accordance with current Lubrication Order (para 3-2).
- (3) Refer to Table 2-1 for normal position of controls and instruments. Position all controls as indicated in Table 2-1 prior to starting engine.

WARNING

Be sure that all controls are properly positioned before any attempt is made to start the unit. Refer unusual conditions to the proper authority for resolution. Failure to observe this warning may result in serious injury or death to personnel, or in damage to the unit.

Table 2-1. Normal Position of Controls and Instruments
for Starting the Transporter

Nomenclature	Normal position	Location
Main lighting switch	All OFF and Locked	figure 2-1
Marine lights switch	OFF	figure 2-1
Bilge pumps off-on switches	OFF	figure 2-1
Bilge pump indicator lights	OFF	figure 2-1
Heater master switch	ON	figure 2-1
Heater switch	OFF	figure 2-1
Heater-on indicator light	OFF	figure 2-1
Heater fan (cold air) switch	OFF	figure 2-1
Left and right windshield wiper control knobs	OFF	figure 2-1
Superstructure bolt-down override switch	OFF	figure 2-1
Master battery switch	ON	figure 2-1
Master battery switch indicator light	ON	figure 2-1
Propeller steering rear wheel steering switch	PROP STEERING	figure 2-1
Wheel well blower switch	OFF	figure 2-1
Wheel well blower indicator light	OFF	figure 2-1
Front and rear capstan switches	OFF	figure 2-1
Marine drive off-on switch	CAB	figure 2-1
Marine drive off-on switch	OFF	figure 2-1
Marine drive indicator light	OFF	figure 2-1
Fuel level indicator	"F" (full)	figure 2-1
Air pressure indicator	0 to 100	figure 2-1
Battery alternator indicator	Yellow or green	figure 2-1
Tachometer-hourmeter	Zero rpm	figure 2-1
Speedometer-odometer	Zero rpm	figure 2-1
Water temperature indicator	120° F	figure 2-1
Transmission oil temperature indicator	160° F—210° F	figure 2-1
Warning indicator light	ON	figure 2-1
Propeller position indicator (on main control panel)	UP and 180 degrees	figure 2-1
Wheels position indicator	Front wheels depend on position. Rear wheels, zero	figure 2-1
Engine fan manual override switch	AUTO	figure 2-1
Engine fan manual indicator light	OFF	figure 2-1
Wheels up-down indicator	ALL DOWN	figure 2-1
Marine drive off-on switch	OFF	figure 2-1
Panel light switch (rear control station panel)	OFF	figure 2-1
Propeller position indicator (on rear control panel)	UP and 180 degrees	figure 2-1
Accelerator pedal	Idle	figure 2-1
Transmission shift lever	NEU	figure 2-1
Main hydraulic pump engage lever	OFF (disengaged)	figure 2-1
Superstructure elevation control switch	Centered (between UP and DOWN)	figure 2-1
Wheels up-down switch	Centered (between UP and DOWN)	figure 2-1
Right pinning control switch (interior bay panel only)	Centered (between DRIVE and RETRACT)	figure 2-1
Left pinning control switch	Centered (between DRIVE and RETRACT)	figure 2-1
Ramp control switch (end bay unit only)	Centered (between FOLD and UNFOLD)	figure 2-1
Superstructure rotation control switch	Centered (between BRIDGE and STOW)	figure 2-1
Curbing control switch	Centered (between UP and DOWN)	figure 2-1
Hydraulic pump volume control lever	OFF	figure 2-1
Axle shift lever	DISENGAGED	figure 2-1
Hand brake lever	APPLIED	figure 2-1

b. *Normal Starting.* Refer to figure 2-2 and start engine.

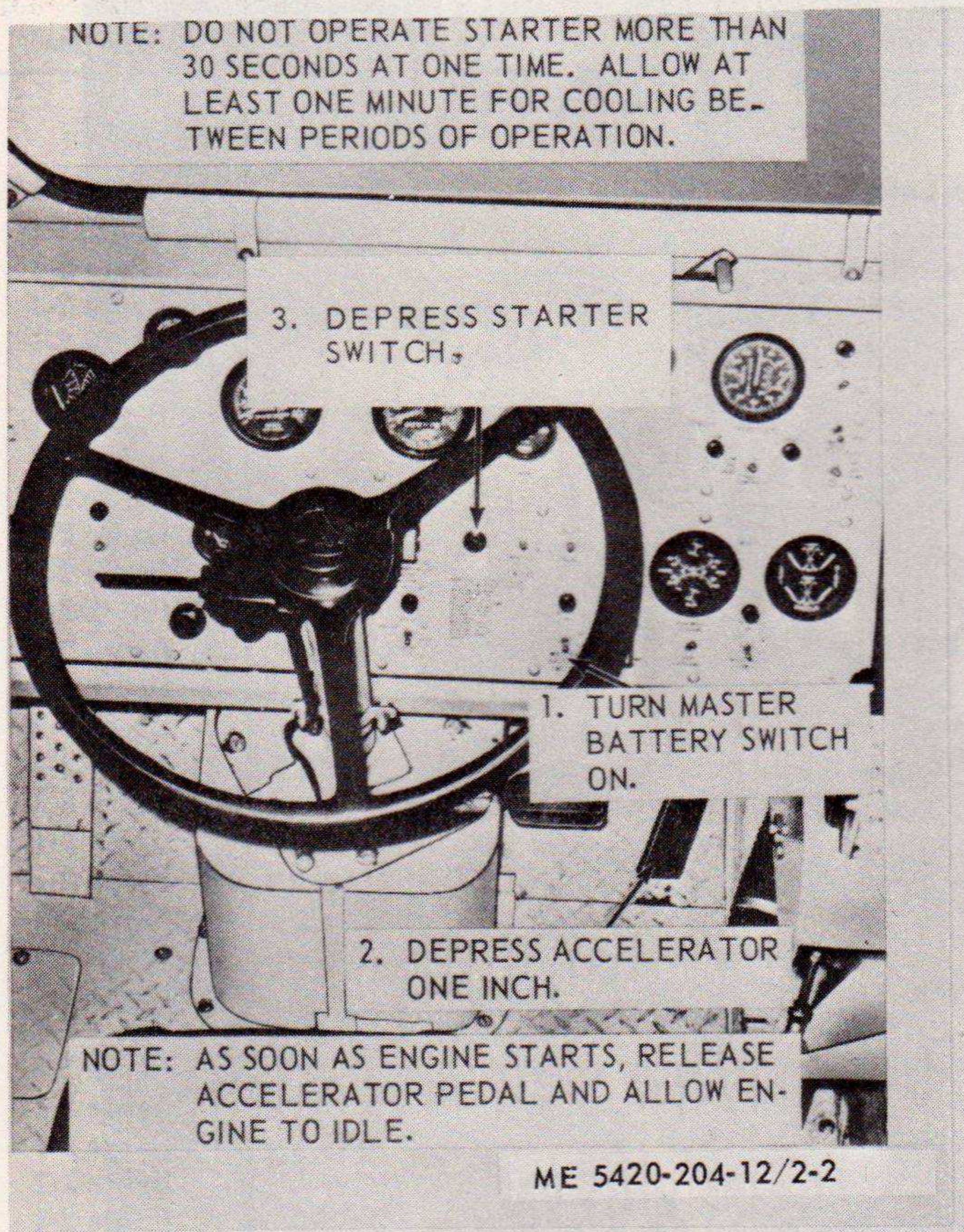


Figure 2-2. Starting the engine.

c. *Starting Engine by Slaving.*

- (1) Refer to figure 2-3 for location of electrical connector receptacle.
- (2) Turn master switch OFF on vehicle to be slaved.
- (3) Connect slave cable to slaving vehicle, then to vehicle being slaved.
- (4) Start engine as described in figure 2-2.

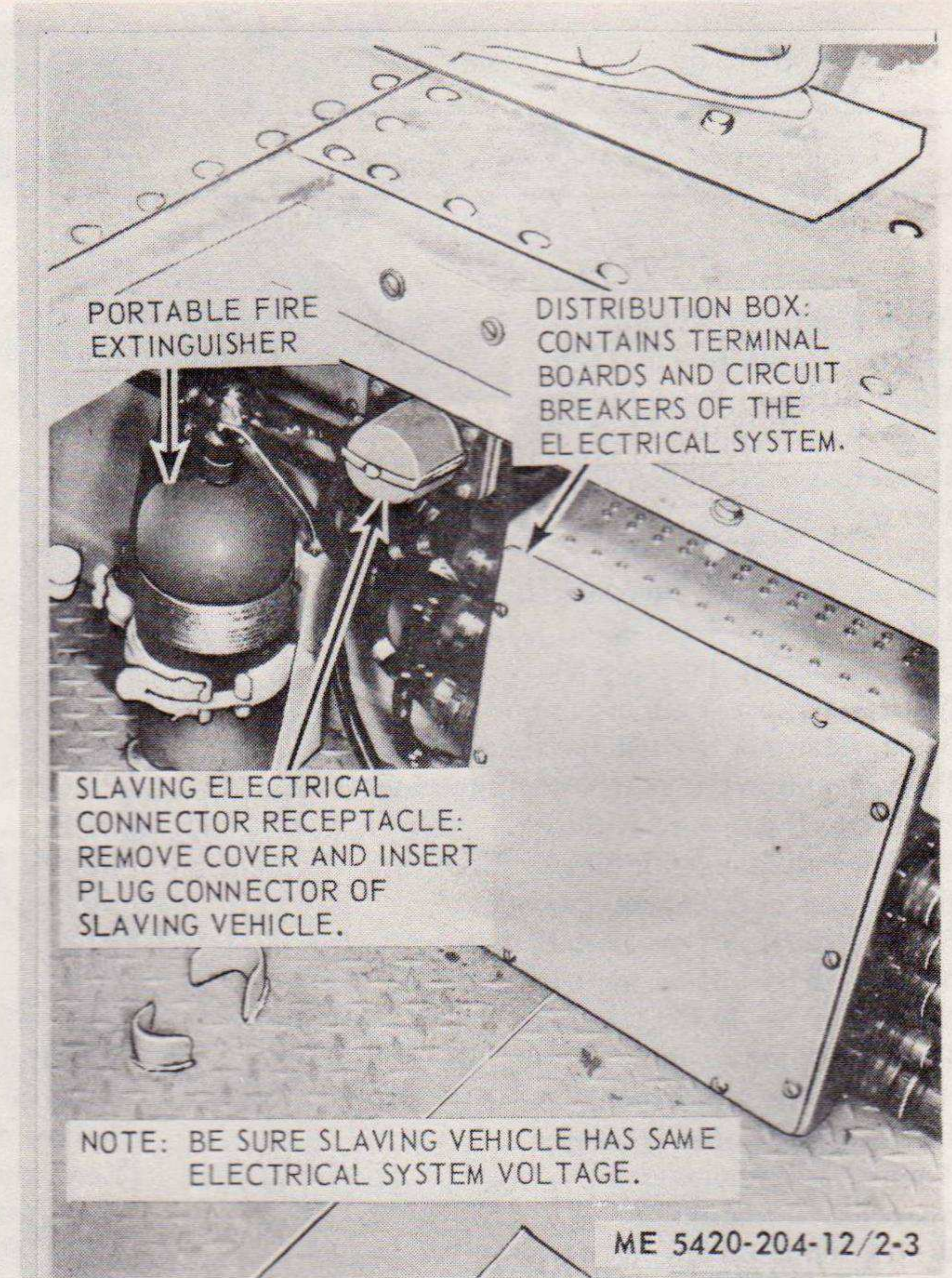


Figure 2-3. Slave receptacle for starting engine, and distribution box, installed view.

d. *Cold Weather Starting.* Refer to paragraph 2-19 for cold weather operating and starting instructions.

2-4. Stopping the Engine

a. *Normal Stopping.* Refer to figure 2-4 for normal stopping of engine procedure.

NOTE: RUN ENGINE AT 1,000 RPM
WITHOUT LOAD FOR 3 MINUTES.

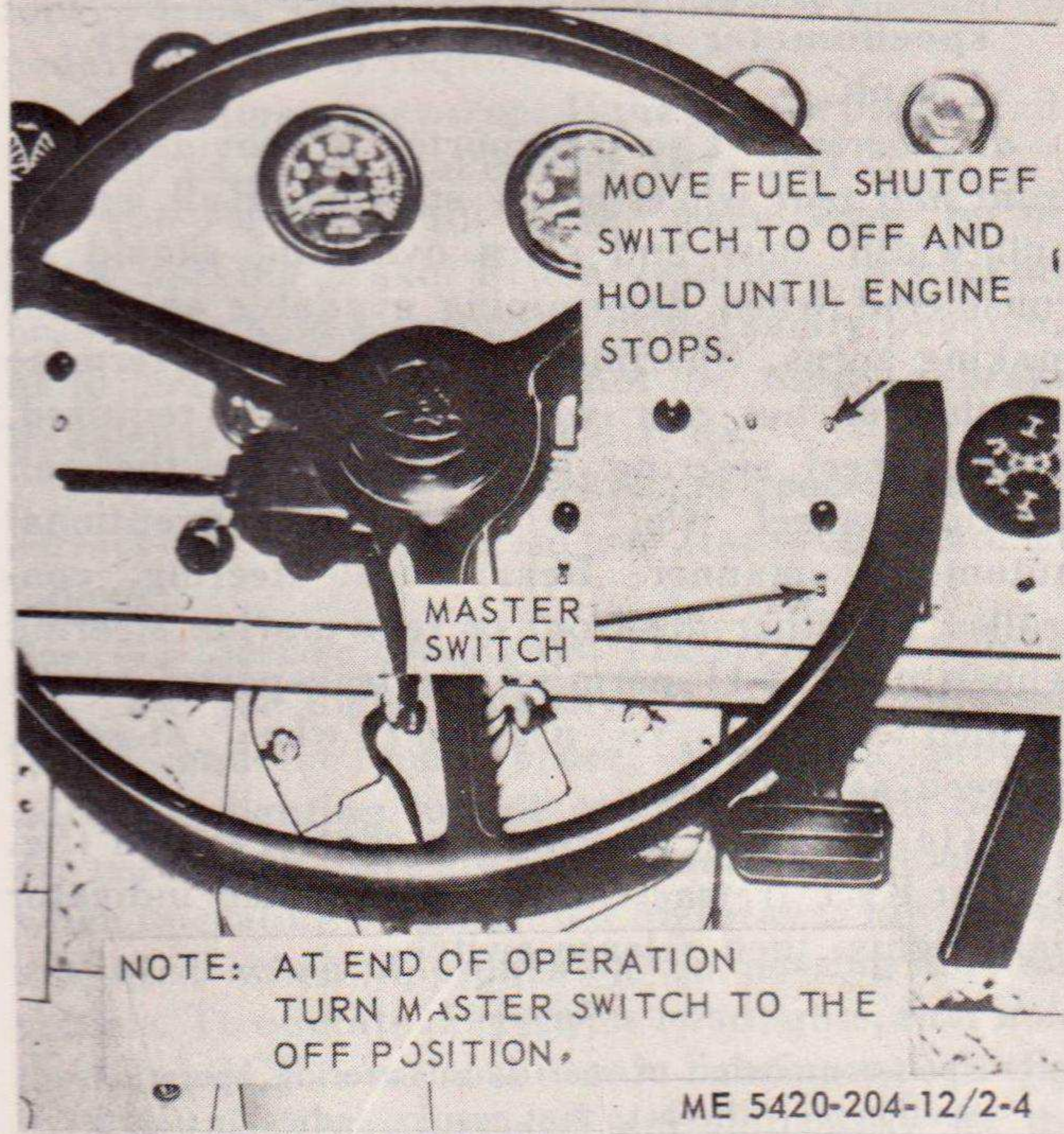


Figure 2-4. Stopping the engine.

b. Emergency Engine Stopping.

(1) Refer to figure 2-5 for emergency stopping instructions.

(2) After engine has been stopped by emergency procedure, the air inlet housing valve must be reset by hand. Refer to figure 2-6 for reset procedure.

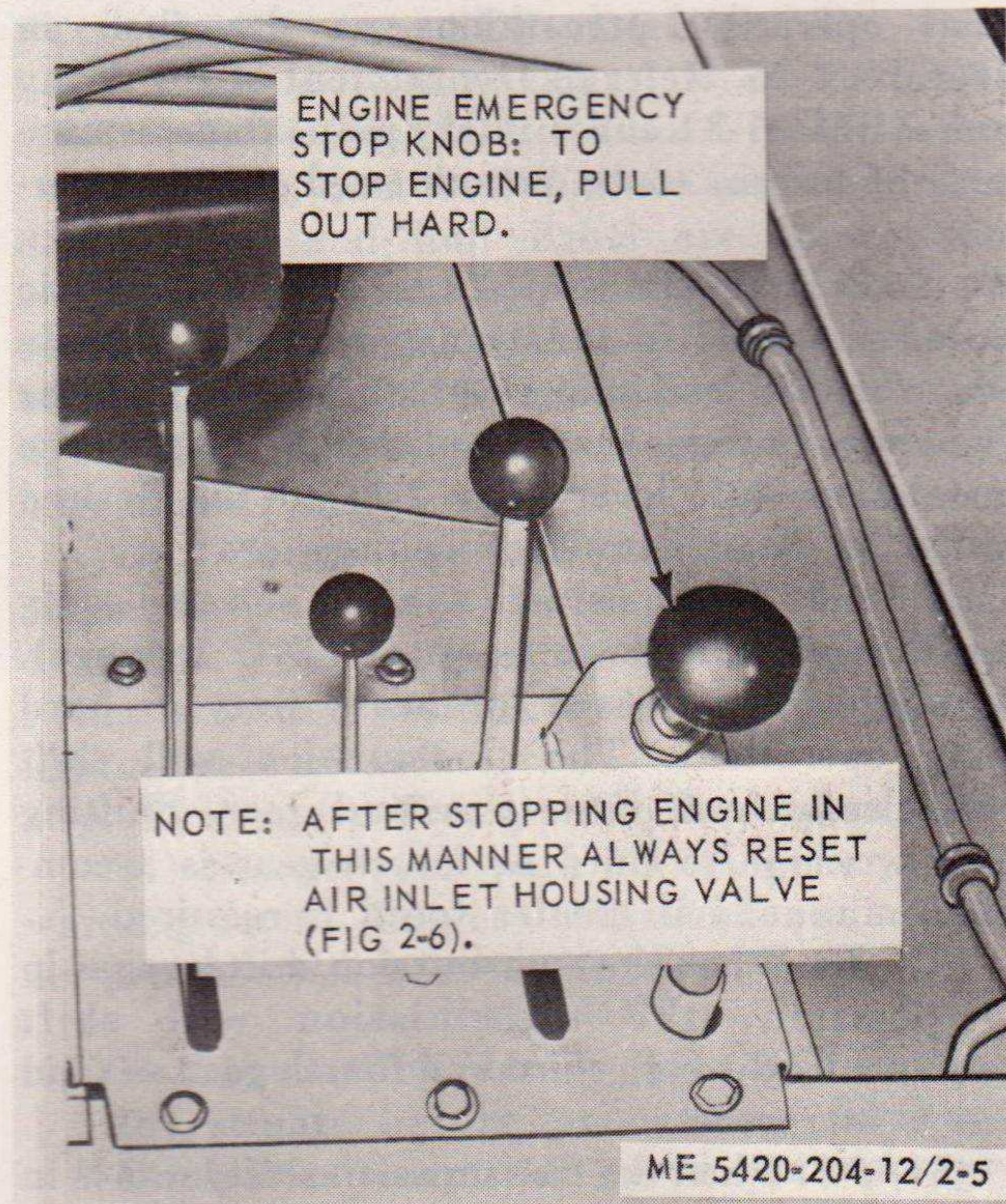


Figure 2-5. Emergency engine stopping.

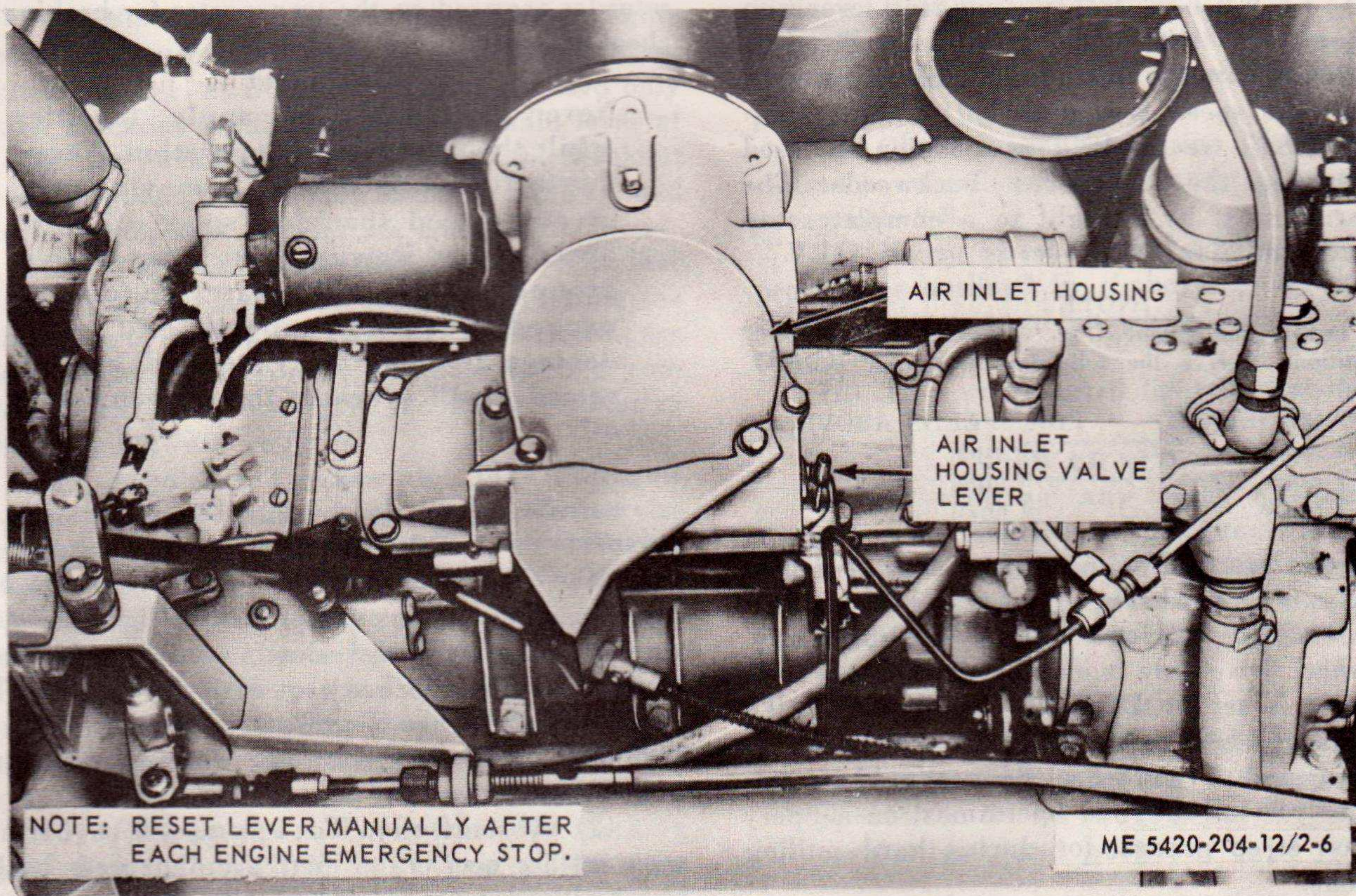


Figure 2-6. Resetting air inlet housing valve.

2-5. Operation of Equipment on Land

a. *General.* Methods employed to operate the transporter on highways and normal terrain are similar to those used in operating a conventional 4 x 4 truck; operation on sand, mud, or coral requires special operating precautions as described in paragraph 2-25. Refer to Department of the Army Manual FM 21-31 and military maps to determine nature of terrain to be encountered during operation.

b. *Transmission Shifting.* The automatic transmission used in the transporter provides six speeds forward and one reverse. Selection of the various speed ranges is accomplished by moving the transmission shift lever (fig. 2-1) to the desired position on quadrant. The positions are:

(1) 1-2. This position can be selected only when the axle shift lever is set at ENG (engage). The 1-2 position is used for heavy duty or hard pulling operations. The transmission will shift automatically from first to second gear. Shifting from low range to third or fourth gear is accomplished manually if greater speed is required.

(2) 3-4. When the transmission shift lever is in this position, the transmission will shift automatically through third and fourth gear as road speed is increased.

(3) 3-5. When the transmission shift lever is in this position, the transmission will shift automatically through third, fourth, and fifth gears as road speed is increased.

(4) 3-6. When the transmission shift lever is in this position, the transmission will shift automatically through third, fourth, fifth, and sixth gears as road speed is increased.

(5) REV. (reverse). This position is used when driving the transporter backwards. The transporter must be brought to a complete stop before transmission shift lever is set at "REV"

NOTE

To protect the engine from a forced overspeed condition, observe the following maximum shift speeds:

DO NOT SELECT	FOR SPEEDS ABOVE
3-5 range.....	27 mph
3-4 range.....	19 mph
1-2 range.....	9 mph

c. *Axle Shifting.* The transporter may be driven by front and rear wheels, or by rear wheels only; the front wheels cannot be driven independently. Rear wheel drive only is employed when the axle shift lever is set at DISENG (disengaged). To employ front wheel drive, move axle shift lever to ENG (engage). Front wheel drive should be employed only in off-the-road operations, on slippery roads, on steep grades, for during hard pulling operations.

CAUTION

To engage front axle, have engine running, transmission engaged and speedometer indicating approximately 1 mph.

d. *Steering.* The transporter is provided with front and rear wheel power steering. Hull length, hull width, bow and stern overhand should be considered when determining available space for making turns. Sharpness of turn will determine whether or not rear wheel steering is required. Front wheel steering is controlled by the cab steering wheel (fig. 2-1) in the conventional automotive manner. Rear wheel steering, controlled by either the front or rear marine steering wheels (fig. 2-1) permits the transporter to be pivoted sharply. To use rear wheel steering, proceed as follows:

(1) Hold rear steering pin control switch (fig. 2-1) at RET (retract) until pin retracted indicator light lights, then release switch.

NOTE

Upon completion of rear wheel steering operation, position rear wheels so that position indicator (fig. 2-1, sheet 5) reads ZERO, hold rear steering pin control switch at EXT position until rear wheels are locked, then release switch and guard.

(2) Set propeller steering-rear wheel steering switch (fig. 2-1) at REAR WHEEL STEERING.

e. *Braking.* A parking brake (hand brake), hydraulic service brakes (foot brakes), and a retarder are used on the transporter for braking or checking speed.

CAUTION

Never downshift, or apply throttle, while the retarder is in operation. Never downshift while vehicle is moving at a greater speed than top speed of next lower range. Downshifting at excessive ground speed will cause engine to exceed governed speed and may damage the engine. Extended use of retarder will overheat the transmission oil.

NOTE

Retarder may be applied in any range, but is more effective in the lower ranges.

(1) *Checking speed and down hill braking.* Release accelerator pedal (fig. 2-1) and depress retarder pedal slowly and evenly until transporter is checked to desired speed. The retarder pedal when depressed, acts as a brake to help slow vehicle to the lowest speed in the selected gear range.

(2) *Normal stop.* To accomplish a normal stop release accelerator pedal and depress brake

pedal (fig. 2-1) slowly and evenly until transporter is stopped. The hydraulic service brakes apply to all four wheels; therefore, only a normal amount of pedal pressure is required.

(3) *Emergency stop.* If the service brakes fail, pull up on hand brake lever (fig. 2-1).

(4) *Parking.* Pull hand brake lever up to apply parking brake. Primary purpose of parking brake is to hold transporter in stationary position; hand brake lever should not be used to brake transporter during normal driving.

f. Use of Lights. The operating procedures and correct use of lights used on transporter are as follows:

(1) *Service headlights.* The service headlights are used for night visibility. When properly adjusted and in good order, they will provide adequate lighting for all conditions. High beams are used when there are no approaching vehicles, or when operating on unlighted highways; low beams are used when approaching or passing another vehicle. To operate the service headlights, first hold the UNLOCK lever of the main lighting switch (fig. 2-1) in raised position and simultaneously set the main lever at SER DRIVE, then set the auxiliary lever at PANEL BRT or DIM. Lock levers by lowering UNLOCK lever. With the main lever set at SER DRIVE, the service taillight and service stoplight circuits are energized. High and low beams are controlled by depressing the dimmer switch (fig. 2-1).

(2) *Blackout driving lights.* These lights operate by setting the main lever of the lighting switch (fig. 2-1) at BO DRIVE, and are used only under blackout conditions. With the main lever of the lighting switch set at BO DRIVE, the blackout headlight, blackout marker, blackout taillight, and blackout stoplight circuits are energized.

(3) *Blackout marker lights.* Front and rear blackout marker lights are operated by setting the main lever of the lighting switch at BO MARK, are used during night convoy blackout driving conditions. Use of these lights facilitates estimating distances between vehicles.

(4) *Stoptlights.* To operate the stoptlights during normal daylight driving when the service headlights, blackout driving lights, or blackout marker light are not being used, hold the UNLOCK lever of the lighting switch in a raised position and simultaneously position the main lever at STOP-LIGHT to energize the service stop-light circuit. Relock UNLOCK lever. When the brake pedal is depressed, the service stoptlights will light as a warning indication to rear-ward vehicles.

(5) *Parking lights.* To operate the parking lights, first hold the UNLOCK lever of the main lighting switch (fig. 2-1) in raised position and simultaneously set the main lever at SER DRIVE;

then set the auxiliary lever at PARK. Relock UNLOCK lever.

(6) *Panel lights.* To operate instrument panel lights, unlock UNLOCK lever and place lighting switch main lever to BO DRIVE, BO MARK, STOPLIGHT, or SER DRIVE. To control brightness, position auxiliary lever at PANEL BRT or DIM (fig. 2-1). Relock UNLOCK lever.

(7) *Cab and hull lights.* Operation of cab dome lights and hull lights are controlled by switches on instrument panel (fig. 2-1). Turn these switches to ON position, then cab dome lights may be further controlled by individual switch on each light. Hull lights remain on until turned off at instrument panel.

(8) *Marine navigational lights.* To operate marine lights, position marine lights switch (fig. 2-1) at ON. This energizes all marine light. Placing switch at anchor position energizes only the anchor light at rear of deck.

g. Driving the Transporter. Proceed as follows:

(1) Start engine (para 2-3). Low air pressure warning device (buzzer) will sound until required air pressure has been attained.

CAUTION

If the warning device does not sound, investigate before proceeding further. Do not attempt to move transporter until proper air pressure (90-100 psi) has been attained.

(2) Insure that all engine and transmission indicator readings are normal.

(3) Insure that superstructure is properly stowed in accordance with instructions outlined in paragraph 2-10.

(4) Check to see that marine drive is properly stowed in accordance with instructions outlined in paragraph 2-8.

(5) If rear wheel steering is to be used, follow procedures outlined in *d* above. Wheel positions should be monitored on wheel position indicator (fig. 2-1).

(6) Turn on required lights as described in *f* above.

WARNING

Before starting any road operations when the service headlights; blackout driving lights; or blackout marker lights are not being used, make certain that service stoplight circuit is energized.

CAUTION

Insure that cab doors are fully open, or fully closed during transporter operation. Doors must never be left in vertically folded position.

(7) Set transmission shift lever (fig. 2-1) in position for desired speed range as described in *b* above.

(8) Release hand brake (fig. 2-1).

(9) Depress accelerator pedal slowly and evenly until transporter attains desired speed.

(10) Steer transporter as described in *d* above.

(11) Stop transporter as described in *c* above.

Set transmission shift lever at NEU (neutral), apply hand brake and stop engine in accordance with procedures outlined in paragraph 2-4.

CAUTION

If warning indicator light (fig. 2-1) lights at any time during operation of transporter, observe associated indicators to determine cause of trouble, and stop engine as quickly as convenient. Do not operate any marine function switches while transporter is in motion on land. Do not operate rear steering pin control switch while transporter is in motion.

2-6. Transporter Crew Check List

a. Before Operation Check for Land Operation.

(1) *Driver.*

(a) Check with crewman and insure transporter has been lubricated in accordance with current lubrication order (para. 3-2).

(b) Insure that all preventive maintenance checks and services (para. 3-4) have been performed.

(c) Check the following items for proper operation:

- Engine
- Brakes
- Steering
- Lights
- Windshield Wipers
- Horn
- Radio

(d) With engine running, check all gages for proper reading (fig. 2-1).

(e) Visually inspect drivers compartment for loose, missing, or broken equipment.

(f) Refer to paragraphs 2-19 through 2-26 for before operational checks when transporter is to be operated under unusual conditions.

(2) *Assistant Driver.*

(a) Visually inspect and insure that anchor, lifering, lines, fenders, and portable fire extinguishers are secure and undamaged.

(b) Inspect outside and inside of hull for damage, hydraulic system leaks, and missing or defective parts. Insure that engine compartment door is closed when operating transporter.

(c) Insure that safety stands and wheel chock blocks have all been removed from under hull.

(d) Remove canvas covers from front and rear hatch grilles, and properly stow.

(e) Stow the boarding ladder (para 4-24).

(3) *Crewman Check (Organizational).*

(a) Lubricate transporter in accordance with current lubrication order (para 3-2).

(b) Refer to paragraph 3-4 and perform all preventive maintenance checks and services.

CAUTION

Always block transporter at jack point while performing maintenance in wheel wells or underneath the hull.

(c) Visually inspect in wheel wells for damaged boots, seals, position transmitter electrical lead, breather hose, loose wheel lug nuts, suspension system, tires, etc. Remove any debris that may have lodged in the suspension system.

b. Before Operation Check Before Entering Water.

(1) *Driver.*

(a) Perform land operation checks in *a* above.

CAUTION

The marine drive switch is not to be repositioned when engine speed exceeds 800 rpm, as unnecessary wear and damage will result.

(b) Test marine drive controls from the cab.

NOTE

Make sure propeller steering/rear wheel steering switch is PROP STEERING, position.

(c) Move marine drive control switch (in cab) to REAR position.

(d) Engage front wheels to provide four wheel drive by use of axle shift lever (para 2-5-c).

NOTE

Insure that front-wheel drive is engaged prior to entering water. Leave engaged throughout amphibious operation and upon exiting water. It can be extremely difficult to engage front-wheel drive while transporter is in the water.

(2) *Assistant Driver.*

(a) Raise and secure the rear control station guard rail.

(b) Raise rear control station pedestal and secure the hatch cover.

(c) Install headset and microphone in rear control station intercommunication control panel.

(d) Check marine drive for proper operation in the following manner:

1. Move propeller control switch to DRIVE position.

2. Operate the prop elevation switch to lower and raise the propeller.

3. Refer to the caution in paragraph 1-7 *b* (2), then steer propeller through 360 degrees. Return to 0 degrees reading on position indicator by reversing steer direction.

CAUTION

Never operate marine drive in excess of five minutes during check procedures.

4. Operate engine at idle speed and leave marine drive switch in ON position.

5. Stow propeller.

6. Position marine drive switch at OFF position.

(3) *Crewman (Organizational)*. Secure all drain plugs.

NOTE

Hull drain plugs are equipped with a stainless steel heli-coil insert to provide a non galling and non-corrosive thread for the drain plugs. Do not remove heli-coil inserts unless they are defective.

WARNING

Always wear a life jacket for water operations. Water operation is inherently hazardous and failure to comply with this warning could result in injury or death to personnel. Remove life jacket before entering hull or engine room, to prevent it snagging on frame or moving mechanical parts.

c. Amphibious Operation Connect Up.

(1) *Driver.*

(a) Apply hand brakes (fig. 2-1, Sheet 7)

(b) Place transmission shift lever in 3-5 range or reverse.

(c) Place main hydraulic pump engage lever at ENGAGE position to engage main hydraulic pump power takeoff.

(d) Place transmission shift lever in NEUT (neutral) position.

(e) Position the four air control valve levers (fig. 2-1, sheet 8) in the OPEN position, and wheel well blower switch at OFF position.

CAUTION

Do not pull hydraulic pump volume control lever toward FULL before activating electrical functional switch for desired hydraulic function. Further, the pump volume control lever must be moved to the OFF position before electrical function switch is released. Failure to comply will cause serious damage to the equipment.

(f) Hold superstructure elevation control switch in UP position, pull hydraulic pump volume control lever (fig. 2-1, sheet 6) toward FULL until superstructure is completely raised (on signal, when assured holddown bolts have been loosened). Move volume control lever to OFF, and release elevation control switch.

(g) With superstructure in raised position, hold superstructure rotation control switch in BRIDGE position, and pull pump volume control lever toward FULL until superstructure has been

correctly rotated (on signal). Move volume control lever to OFF, and release rotation control switch.

(h) Hold superstructure elevation control switch in DOWN position, and pull pump volume control lever toward FULL until superstructure has lowered to rest on holding devices (on signal). Move pump volume control lever to OFF then release elevation control switch.

(i) Place front and / or rear capstan switch(es) in ON position. On signal, pull hydraulic pump volume control lever toward FULL as long as use of capstan(s) is required.

(j) When connecting to left side of the unit, perform the following operations:

1. Hold left pinning control switch in RETRACT position and pull pump volume control lever toward FULL until pins are retracted as indicated by 3,000 psi reading on high pressure hydraulic gage. Move volume control lever to OFF and release left pinning control switch.

NOTE

Trim vessel by use of wheel well air blower when necessary, as described in (m) below.

2. When connecting bridge beams are matched, hold left pinning control switch in DRIVE position (on signal) and pull pump volume control lever toward FULL until pinning has been completed as indicated by 3,000 psi reading on hydraulic high pressure gage. Move volume control lever to OFF and release left pinning control switch.

NOTE

This subparagraph for interior bay unit only.

(k) When connecting to right side of the unit perform the following operations:

1. Hold right pinning control switch in RETRACT position and pull volume control lever toward FULL until pins are retracted as indicated by a reading of 3,000 psi on hydraulic high pressure gage. Move volume control lever to OFF and release right pinning control switch.

2. When connecting bridge beams are matched, hold right pinning control switch in DRIVE position (on signal) and pull volume control lever toward FULL until pinning has been completed as indicated by a reading of 3,000 psi on hydraulic high pressure gage. Move volume control lever to OFF and release right pinning control switch.

(l) Place front and / or rear capstan control switch(es) in OFF position (on signal).

CAUTION

Never turn wheel well air blower motor ON, unless at least one control lever is at AIR IN, or OPEN. Insure that wheel well air control valves are returned to

the **CLOSED** position except when using blower.

(m) For assistance in connecting units (raising or lowering a corner) move the proper wheel well air control valve lever to AIR IN (fig. 2-1, sheet 8) position and place wheel well air blower motor switch at ON. The wheel well air blower indicating light will be energized when switch is ON. Trim the transporter as required, move air valve lever to CLOSED, then move air blower motor control switch to OFF. When corner is high (air trapped in wheel well) move valve control lever to OPEN slowly, closing it when corner is level.

NOTE

This subparagraph for end bay only.

WARNING

Do not unfold ramp until end bay unit is securely pinned to at least one other unit, to avoid capsizing.

(n) When operating an end bay unit, all procedures are similar to steps (a) through (j) above, step (l and m) above, and (o) through (r) below. This step operates ramp section as follows:

1. Hold ramp control switch in UP (unfold) position (on signal) and pull volume control lever toward FULL until ramp is completely unfolded.

2. Move volume control lever to OFF then release ramp control switch.

(o) Check wheel position indicator (left / right) (fig. 2-1, sheet 5) and insure that both indicators point at zero. Use steering wheel to correct as required, then hold wheels up / down switch in UP position and pull hydraulic pump volume control lever toward FULL until wheels are retracted as indicated by a reading of 3,000 psi on hydraulic high pressure gage. Continue to hold that pressure for about 30 seconds, then move volume control lever to OFF and release wheels up / down switch.

(p) Hold curbing control switch in UP position (on signal, after crewman has connected intercom to adjacent unit), and pull hydraulic volume control lever toward FULL until curbing is in UP position as indicated by a reading of 1,000

psi on hydraulic high pressure gage. Move volume control lever to OFF and release curbing control switch.

(q) Move main hydraulic pump engage lever to OFF and disengage the main hydraulic pump power take-off.

(r) Assure that wheel well air control valve levers are in CLOSED position, and blower motor control switch if OFF, except when blower is used to put air in wheel wells.

(2) Assistant Driver Check.

(a) Insure that marine drive OFF-ON switch located in cab has been moved to ON position.

(b) Insure that marine drive selector switch located in cab has been moved to REAR position.

(c) Place propeller control switch in DRIVE position.

(d) When sufficient water depth has been obtained, and grounding conditions are not suspected, hold propeller elevation control switch in DOWN position until indicator reads 8—12 inches of extension range, then release switch. When grounding conditions are suspected, a position indicator reading of 1-2 inches extension range is permissible.

CAUTION

Reduce engine RPM to idle prior to engaging marine drive.

(e) Place marine drive OFF-ON switch located on rear control station at ON position.

(f) Assume command of transporter by operating rear steering wheel and throttle control lever.

(g) Signal driver (with horn) when pins are seated.

(3) Crewman.

(a) Use the superstructure wrench and release the four superstructure holddown bolts.

(b) After superstructure rotation, secure the four holddown bolts, then stow superstructure wrench.

(c) Check pins to assure they are retracted.

(d) Secure line to riding bitt (fig. 2-7). Stand by to cast line to connecting unit.

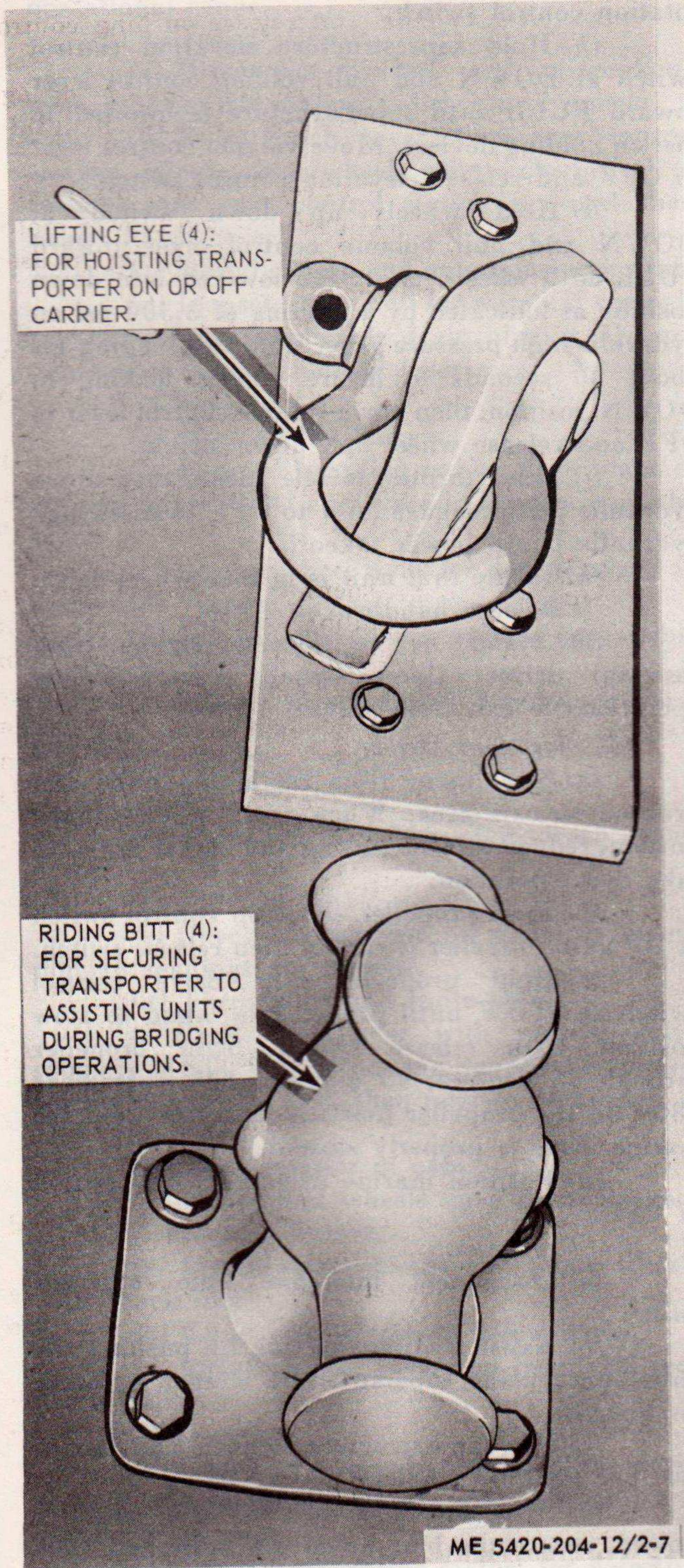


Figure 2-7. Riding bitt and lifting eye.

(e) Receive line from connecting unit and make four wraps (counterclockwise) around capstan (figure 2-8) being careful not to overlap the line.

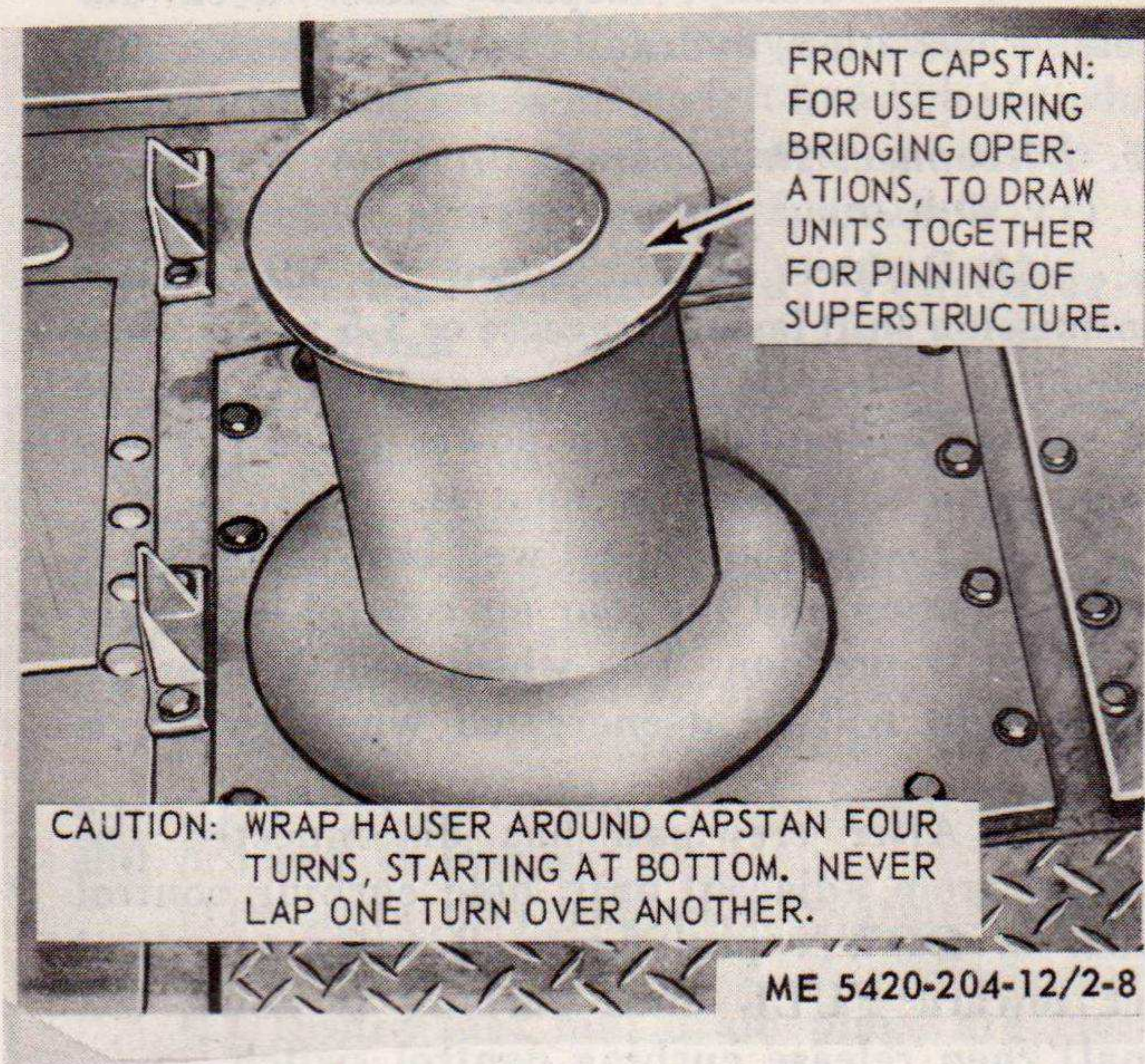


Figure 2-8. Capstan.

(f) Release line from capstan after pins are driven. Stow line attached to riding bitt.

(g) Connect intercom to the adjacent unit.

(h) Stand by to receive the next unit.

d. *During Operational Checks.*

(1) *Driver.*

(a) Check all instrument readings.

CAUTION

Do not use bilge pumps unless water has accumulated in the hull.

(b) Periodically, place bilge pump control switches (fig. 2-1, Sheet 2) at ON position to keep hull free of water. The four bilge pump indicator lights are energized when switches are ON.

(2) *Assistant Driver.*

(a) Upon orders from transporter commander, operate the unit.

(b) When approaching shore and the water is shallow, hold propeller elevation control switch in UP position until propeller is raised, then release switch.

CAUTION

Never steer the marine unit through 720 degrees in same direction with propeller in a completely retracted or extended position. Marine drive may be damaged, and position indicator may fail to function correctly.

(3) *Crewman.*

(a) Check superstructure holddown bolts to insure tightness

(b) Check connecting pins to assure they are not creeping.

(c) Periodically, inspect below deck for excessive vibration, hydraulic leaks, air leaks, and etc.

e. Disconnect Procedure.

(1) *Driver.*

(a) Reduce engine speed to idle, place transmission shift lever in reverse or 3-5 range, then move main hydraulic pump engage lever to engage and engage hydraulic pump power takeoff. Place transmission shift lever in neutral.

(b) Insure that wheel well blower switch is in OFF position and the four air control levers are in CLOSED position. The wheel well blower indicator light will be deenergized when switch is OFF.

(c) After crewman has disconnected the intercom from adjacent unit, hold curbing control switch in DOWN position, pull volume control lever toward FULL until curbing is down (on signal) then release curbing control switch.

NOTE

This subparagraph for interior bay only.

(d) Hold the left pinning control switch at RETRACT and pull volume control lever toward FULL until pins are retracted as indicated by a reading of 3,000 psi on hydraulic high pressure gage (on signal). Move volume control lever to OFF, then release left pinning control switch. Repeat this procedure for right pins, using the right pinning control switch.

NOTE

This subparagraph for end bay only.

CAUTION

Never unpin from an interior bay unit until ramp is completely DOWN (folded) to avoid capsizing.

(e) Hold ramp control switch at DOWN (fold) and pull hydraulic pump volume control lever toward FULL until ramp is completely DOWN (folded). Move volume control lever to OFF and release ramp control switch. Hold left pinning control switch at RETRACT and pull volume control lever toward FULL until pins are retracted as indicated by a reading of 3,000 psi on hydraulic high pressure gage. Move volume control lever to OFF and release left pinning control switch.

(f) Hold superstructure elevation control switch in UP position and pull volume control lever toward FULL until superstructure is completely raised (on signal, after the four holddown bolts have been released). Move volume control lever to OFF and release elevation control switch.

(g) With superstructure in raised position, hold rotation control switch at STOW, then pull volume control lever toward FULL until superstructure has been correctly rotated (on signal).

Move volume control lever to OFF and release rotation control switch.

(h) Hold superstructure elevation control switch at DOWN and pull volume control lever toward FULL until superstructure is lowered to rest on holding devices. Move volume control lever to OFF and release elevation control switch.

(i) Hold wheels up/down switch at DOWN and pull volume control lever toward FULL until wheels have been lowered into down position as indicated by a reading of 3,300 psi on hydraulic high pressure gage. Hold this reading for about 30 seconds to insure wheels locking in DOWN position, then move volume control lever to OFF and release wheel up/down switch.

(j) Move throttle to idle speed, then move hydraulic pump engage lever to OFF to disengage hydraulic pump power takeoff.

(k) Insure that unit is in four wheel drive.

(l) Release handbrake.

(m) Stand by to receive signal from assistant driver. Upon signal, resume driver operations to exit from water.

(2) *Assistant Driver.*

(a) Steer away from remaining units and proceed to exit area. When front wheels touch bottom, reduce throttle setting and signal driver to take over operation.

(b) Hold propeller elevation control switch at UP until propeller is raised, then release switch.

(c) Hold propeller stow/drive control switch at STOW until propeller is raised to stow position, then release switch. Steer propeller through 45 degrees, 90 degrees, 135 degrees to 180° on the propeller position indicator, and the marine drive is properly stowed.

(d) Position marine drive OFF-ON switch at OFF.

(3) *Crewman.*

(a) Disconnect intercom from adjacent unit.

(b) Assist in disconnecting by pushing the units apart, using superstructure wrench or other implement.

(c) Use superstructure wrench and loosen the four holddown bolts.

(d) After superstructure has been properly stowed, secure the four holddown bolts and stow the superstructure wrench.

f. After Water Operation Checks.

(1) *Driver.*

(a) Place transmission shift lever in 1-2 forward range.

(b) Insure that front axle is engaged in four-wheel drive.

(c) When firm ground has been reached, disengage the front axle from four-wheel drive.

(d) Move transmission shift lever to proper operational range.

(2) *Assistant Driver.*

(a) Disconnect headset and microphone from rear control station radio control panel.

(b) Raise hatch cover, turn rear control station release handwheel counterclockwise to release, stow rear control station pedestal then secure hatch cover.

(c) Stow headset and microphone in cab.

(d) Inspect inside hull for water. If water is present, remove applicable drain plug(s). Do not damage or remove helicoil insert.

(3) *Crewman.*

(a) Stow all life jackets.

(b) Remove boarding ladder from place of stowage (para 4-24) and place in bracket over the side.

(c) Inspect wheel wells for debris lodged in suspension system.

(d) Inspect suspension system for visible damage.

(e) Inspect tires for cuts, breaks, or other damage.

g. *After Operation Check.*

(1) *Driver.*

(a) With aid from the crew, wash transporter.

(b) Fill fuel tanks.

(c) Check instruments on panel to insure that all readings are normal.

(d) Turn lights and radio OFF.

(e) Park transporter with marine drive properly in STOW position, and handbrake applied (except in extreme cold, then refer to paragraph 2-19 d (2) (c) 1).

(f) Clean interior of cab.

(g) Insure that wheels have been blocked.

(2) *Assistant Driver.*

(a) Install safety stands and block wheels with chock blocks.

(b) Clean compartments below deck.

(c) Install canvas covers on front and rear hatch grilles.

(3) *Crewman.*

(a) Check oil level in hydraulic oil reservoir, engine, transmission, wheel well blower, and marine drive unit.

(b) Inspect suspension system for defective boots and seals, and for water in boots.

(c) Lubricate suspension system after everyday of water operation.

(d) Complete the performance of preventive maintenance checks and services.

(e) Inspect hull, including skids, for damage.

2-7. Converting End Bay from Right Hand to Left Hand Unit

When converting the transporter from a right hand to a left hand end bay unit, move rotation cylinder from right hand clevis to the left hand clevis, which is located forward of the center post, on the superstructure girder member (para 4-4).

2-8. Entering Water and Vehicular-to-Amphibian Changeover

a. *General.* Operation of the transporter when entering water covers two important phases; approach and entering water, and changing to marine drive. Approach and entering water generally entails operating over sand, mud, rock, or coral as described in paragraph 2-25.

b. *Preliminary Operations.* Prior to entering water, perform the on-land checks in paragraph 2-6 and proceed as follows:

(1) Insure that engine is warmed up and operating smoothly.

(2) Insure that hull drain plugs are closed.

NOTE

Do not start bilge pumps until necessary to remove water from hull.

(3) Turn rear control station cover fasteners aside, swing cover open and lift rear control station pedestal in upright position; assembly should lock in upright position.

(4) Insure that sufficient room exists for swinging propeller to the operation position.

WARNING

Before performing step (5), insure that all personnel are clear of the propeller.

(5) Move marine drive into operating position. This is accomplished by holding prop control switch (fig. 2-1) in DRIVE position. If this operation is done from cab, do not release switch lever until green propeller drive indicator light lights.

(6) To insure that marine drive is functioning properly, move marine drive OFF-ON switch on rear control station to ON position. Propeller blade should rotate. Allow propeller to rotate at idle speed for five minutes to permit lubricating oil to circulate through unit.

(7) Move marine drive OFF-ON switch to OFF position.

(8) Rotate marine drive to forward drive position and insure that propeller position indicator shows zero degrees.

(9) Return marine drive to stow position by moving propeller control switch to STOW (be sure propeller is at reverse position, 180° on position indicator).

(10) Deflate tires for operation on anticipated terrain as described in paragraph 2-25.

(11) Engage front wheel drive.

c. Approach and Entering Water.

(1) If sand, mud, or coral conditions are prevalent, refer to paragraph 2-25.

NOTE

Engage four-wheel drive. Do not disengage until unit has exited the water.

(2) Entry into the water will normally be made bow first and in straight ahead position. Speed should not exceed 5 mph and shift lever will be in 1-2 range.

(3) Swing marine drive from STOW to DRIVE position.

(4) Engage marine drive.

(5) Idle engine and engage high pressure hydraulic pump.

(6) Check for leakage.

WARNING

If excessive leakage is indicated by an abnormal amount of water, start bilge pumps and return to land as quickly as possible.

(7) Steer unit into water deep enough to gain full flotation and raise all wheels (steps (8) and (9) below).

(8) Move transmission shift lever to NEU (neutral) position to disengage vehicular drive, and apply hand brake.

NOTE

To activate wheels up/down switch, the wheel position indicator (fig. 2-1, sheet 5) must read zero degrees \pm 4 degrees.

(9) Disengage marine drive momentarily, and raise wheels by moving wheels up/down switch to up and hold while moving volume control lever to full and holding it there until wheels are up as indicated by a reading of 3,300 psi on high pressure hydraulic gage. Hold switch on while making a long count to 30. This prevents unexpected collapse by insuring that wheels are locked in position.

(10) Engage marine drive.

d. Trimming the Unit.

(1) Move air control lever of low corner to AIR IN, or high corner to OPEN.

(2) Position wheel well blower switch (fig. 2-1) in ON position.

(3) Trim the Unit as required. Normal position for the levers is marked CLOSED. Moving a lever to AIR IN position will raise that corner of transporter. When high corner requires trim, moving lever to OPEN position will lower that corner of the transporter, by allowing trapped air to escape.

CAUTION

Never turn wheel well air blower switch ON, unless at least one air control lever is at AIR IN or OPEN. Never leave control lever at AIR IN except while

trimming low corner in actual operation, or short test of valve.

2-9. Operating Transporter in Water

a. *Piloting from Cab Controls, Interior Bay Unit.* Proceed toward assembly site, using compass (fig. 2-1) for heading and propeller position indicator for direction of propeller thrust, steering the transporter with marine steering wheel located to left of driver. As assembly site is approached, head transporter upstream, as this will facilitate maneuvering into position for mating superstructures. Refer to c below for operating during mating procedures.

b. *Operating from Cab Controls, End Bay Unit.* Prior to entering water with an end bay unit, it must be prepared for either a right or a left hand end bay unit (para 4-4). All other operating procedures are the same as for an interior bay unit with the exception that the control switch that was used for superstructure right pinning will have a cover over it labeled RAMP, UP (unfold) DOWN (fold) (fig. 2-6). This switch is used to unfold the ramp after all transporters have been pinned together.

WARNING

Do not attempt to unfold ramp unless end bay unit is pinned to another unit.

c. *Operating from Rear Control Station.* The operator at rear control station has full control of marine drive unit by which he can energize the marine power take off. Raise and lower propeller, and place marine drive in either STOW or DRIVE positions. All of these functions are accomplished in the same manner as in operating from the cab control panel. The operator also has steering and throttle controls. Propeller movements are displayed on propeller position indicator which is identical to the one in cab. Operating should be accomplished from rear control station during mating procedures.

d. *Water Hazards.* As the transporter is being propelled through water under its own power, an object may be struck by the propeller. Should the force be great enough, shear pin in outdrive link will shear. When this occurs, a new shear pin in the outdrive link is required (para 3-30). In the event of shear pin failure, transporter can be propelled at low speeds, in both forward and reverse directions by lowering wheels and engaging fourwheel drive.

2-10. Superstructure Operations

a. Interior Bay Unit.

(1) While in water proceeding toward assembly site, elevate, rotate, lower and bolt-down superstructure.

NOTE

The superstructure cannot be rotated unless it has been elevated high enough to actuate the rotate disable limit switch. If for some reason superstructure will not raise when control switches are moved, determine cause. If fault is that one or more of the four superstructure elevate limit switches (para 4-65) is inoperative and all holddown bolts are known to be withdrawn, the superstructure bolt-down override switch (fig. 2-1) can be moved to the OVERRIDE position; this will allow superstructure to be raised.

(2) Move interior bay unit transporter into position along side the transporter with which it is to be mated.

NOTE

Prepared lines of manilla rope are used to draw units together. The lines are 1¼ inch in diameter and approximately 50 feet in length with one end having a fixed loop. The units to be joined will be considered left and right using forward end as reference. There are two capstan switches (fig. 2-1) mounted on lower portion of hydraulic control panel. The capstans (fig. 2-1) are energized by placing applicable switch at ON position. Attach fixed loop one line on right front riding bitt (fig. 2-7) of the left hand unit and fixed loop of other line on left rear riding bitt of the right hand unit. Wrap loose ends of lines three or four turns around the forward and aft capstans of the opposing units in a counterclockwise direction starting at the bottom of capstan and working upward. Do not allow turns to overlap. These lines are used as guides for final positioning and for powering the units while joining superstructure girders together. When maneuvering units into position with the propeller, keep capstan lines under control by alternately tightening and loosening lines to enable the girders to be mated.

(3) When transporters are close enough together, throw lines from one vehicle to the other. These lines are to be turned around capstans and used as guide lines for final positioning of the units and for powering units while joining superstructure girders together.

(4) Maneuver transporter into position with propeller steering, and at the same time, keep lines

under control, alternately tightening and loosening lines to enable girders to be mated. As soon as girders have slipped into position, pull tightly on capstan lines to bring girders together for pinning.

(5) Hold left pinning control switch and / or right pinning control switch (fig. 2-1) in DRIVE position, and pull on hydraulic pump volume control lever until girders are pinned together as indicated by a reading of 3,300 psi on high pressure hydraulic gage.

(6) Connect the intercommunication cable. The female connector is normally stowed in a dummy male receptacle; pull female connector out of dummy receptacle and engage it with mating receptacle on superstructure.

(7) Hold curbing control switch in UP position and pull volume control lever toward FULL until curbing is raised as indicated by a reading of 1,000 psi on hydraulic high pressure gage. Move volume control lever to OFF and release curbing control switch.

b. End Bay Unit. With the exception of ramp unfolding procedures, (where ramp curbing cannot be extended until ramp is partially unfolded), the bridging operations for the end bay unit are the same as those given in *a* above, for the interior bay unit. Ramp UP (unfolding) procedures are as follows:

WARNING

Ramp must not be unfolded unless end bay is attached to at least one other transporter. Failure to comply will result in unit overturning.

(1) Position ramp control switch (fig. 2-9) in UP (unfold) position and pull the hydraulic pump volume control lever. Ramp will unfold to its extended position in approximately one minute.

(2) Position curbing control switch in UP position.

(3) Inspect inside of hull for oil, water and / or air leaks.

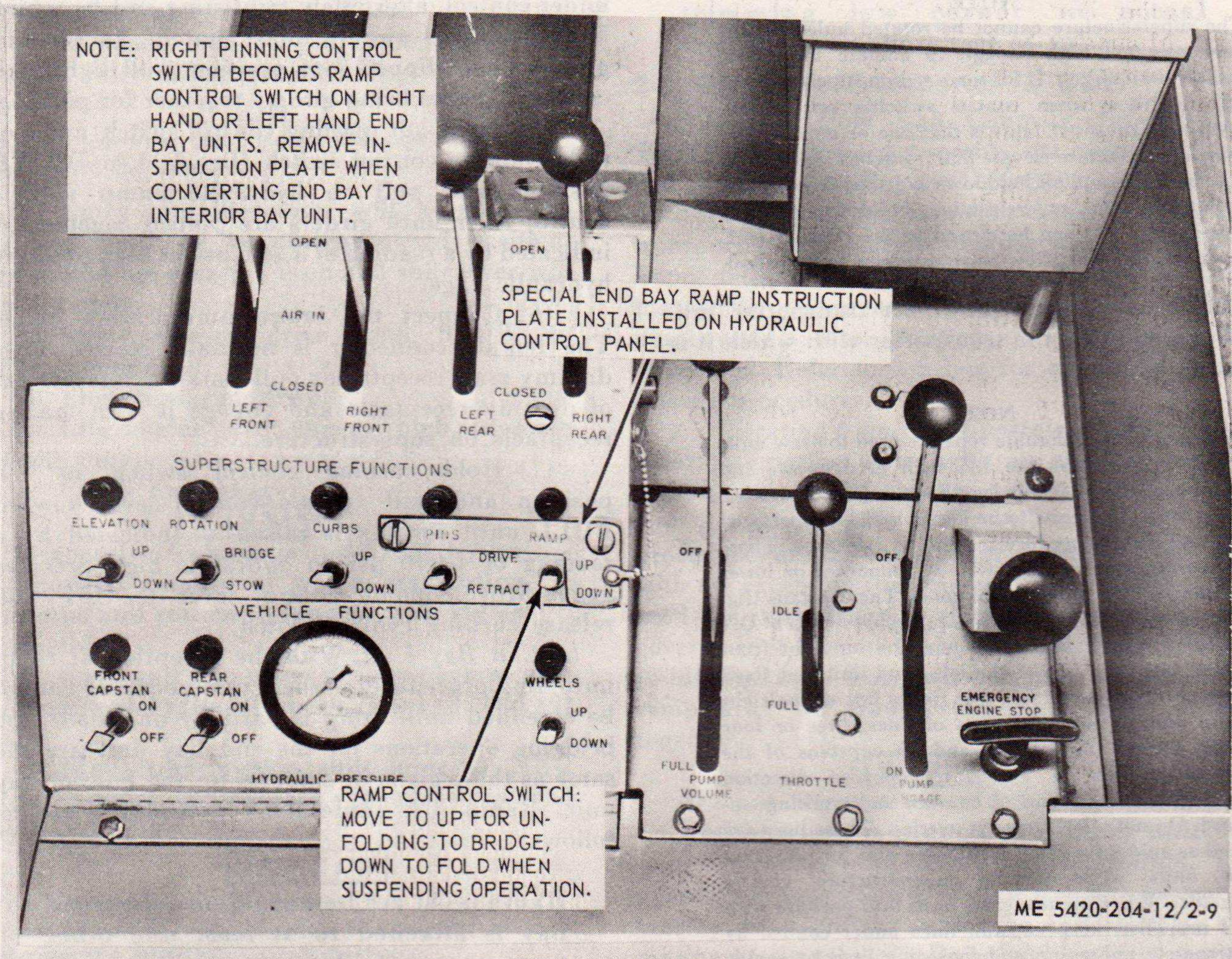


Figure 2-9. End bay ramp control instruction plate installed.

c. *Disconnecting Interior Bay Superstructure.* Disconnect intercommunication cable and stow female connector in dummy receptacle. Hold curbing control switch in DOWN position and pull hydraulic pump volume control lever to lower curbing. Hold right or left pinning switch in RETRACT position and allow superstructure to be parted. Repeat for the opposite side. Loosen the four hold-down bolts completely and hold superstructure elevation control switch at UP position and pull hydraulic pump volume control lever until superstructure is raised. Hold superstructure rotation control switch in STOW position and pull hydraulic pump volume control lever to rotate superstructure. Hold superstructure elevation control switch in DOWN position and pull hydraulic pump valve control lever and lower superstructure. Tighten the four hold-down bolts.

WARNING

If interior bay is connected to an end bay unit, do not unpin until ramp has been folded.

d. *Disconnecting End Bay Superstructure.* Disconnect the intercommunication cable and stow the female connector in the dummy receptacle. Hold curbing control switch (fig. 2-1) in the DOWN position and pull hydraulic pump volume control lever to lower curbing. Hold ramp switch in DOWN (fold) position and pull hydraulic volume pump control lever until ramp is DOWN (folded). Hold left pinning switch in RETRACT position and pull hydraulic pump volume control lever to remove pins and allow superstructures to be parted. Loosen the four hold-down bolts completely and raise superstructure. Rotate to STOW position. Place superstructure elevation control switch in DOWN position and lower to the hold-down castings. Tighten the four hold-down bolts.

2-11. Leaving Water and Amphibian to Vehicular Change-over

a. *General.* When transporter is fairly close to shore and preparing to leave water, perform the procedures listed in b and c below.

b. Leaving Water Under Normal Condition.

(1) Momentarily disengage marine drive.

(2) Lower and lock wheels in the drive position, the wheels up-down indicator (fig. 2-1) should indicate position wheels.

CAUTION

Be certain that all wheels are down and locked. For assurance of wheels in down position, continue to pull the hydraulic pump volume control lever for 30 seconds after the high pressure gage registers maximum reading (3,000) psi, then move volume control lever to OFF, and release wheels up/down switch.

(3) Disengage main hydraulic pump engage lever.

(4) Engage marine drive and steer unit into position for leaving water with the propeller. As vehicle approaches shallow water, move prop elevation control switch to UP and raise propeller. Select forward range (1-2). Insure front wheel drive

is engaged and release hand brake. When wheels have made contact with shore and vehicle is under front wheel control, move marine drive control switch to OFF.

(5) Move prop control switch from DRIVE to STOW and stow marine drive.

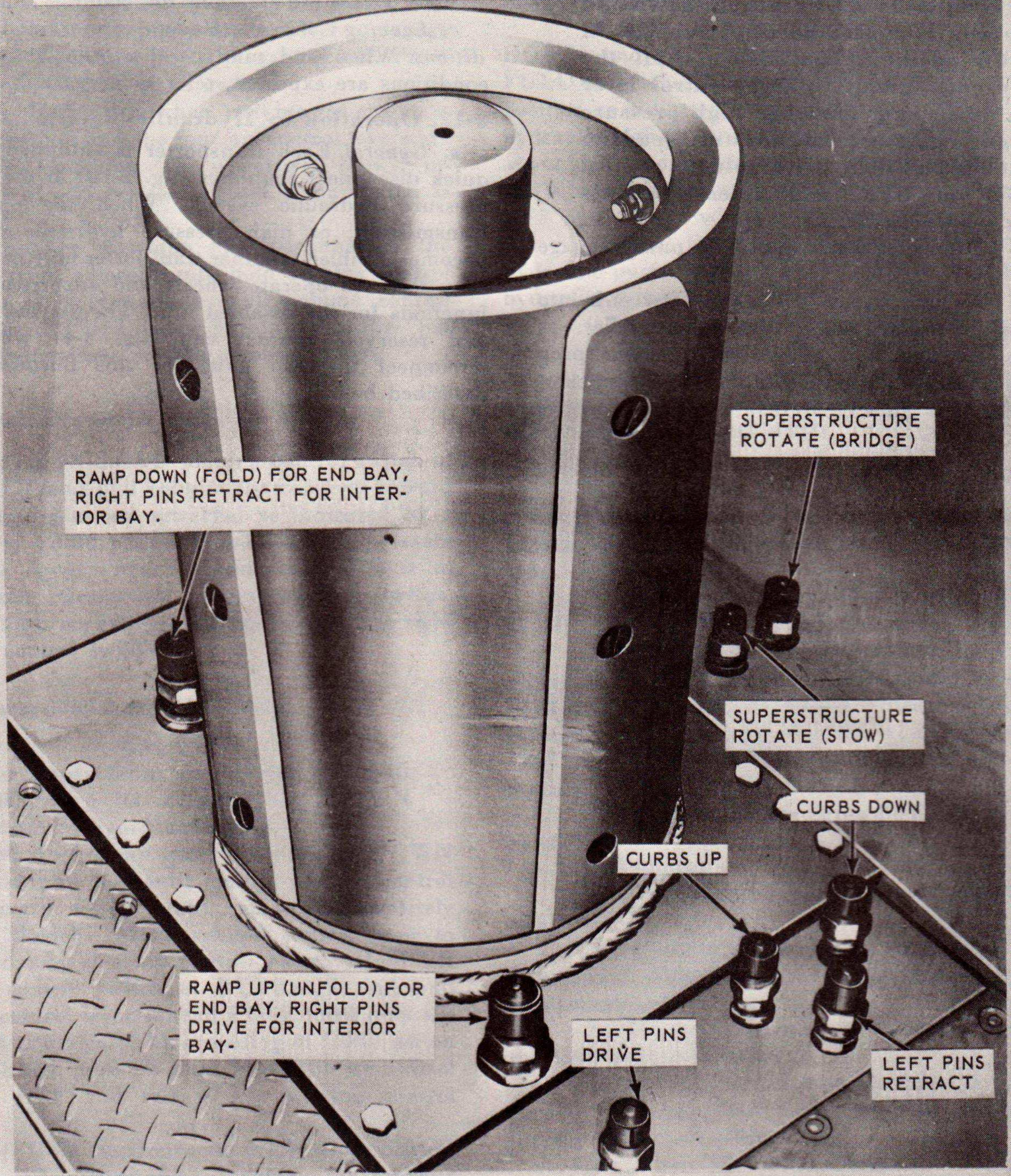
(6) Drive vehicle from the water.

c. Leaving Water Under Abnormal Conditions. When sand, mud, coral or other abnormal conditions are expected, refer to paragraph 2-25.

2-12. Operation by Hydraulic Slaving

a. General. Each transporter is equipped with quick disconnect couplings (fig. 2-10) in the high pressure hydraulic system. When the engine, transmission, or high pressure hydraulic pump becomes disabled, another transporter may be used as a slave to operate wheels and superstructure functions for the disabled unit. The slaving hose and reservoir adapter cap (fig. 4-4) will interconnect the two units for this purpose, as described below.

NOTE: HYDRAULIC SLAVING FUNCTIONS CAUSE FLUCTUATION IN FLUID LEVEL. CHECK SIGHT GAGE BEFORE AND AFTER EACH SLAVING OPERATION. ADJUST FLUID LEVEL WHEN NECESSARY.



A. ABOVE DECK COUPLING POINTS.

ME 5420-204-12/2-10 ①

Figure 2-10. Quick disconnect hydraulic couplings. (Sheet 1 of 4)

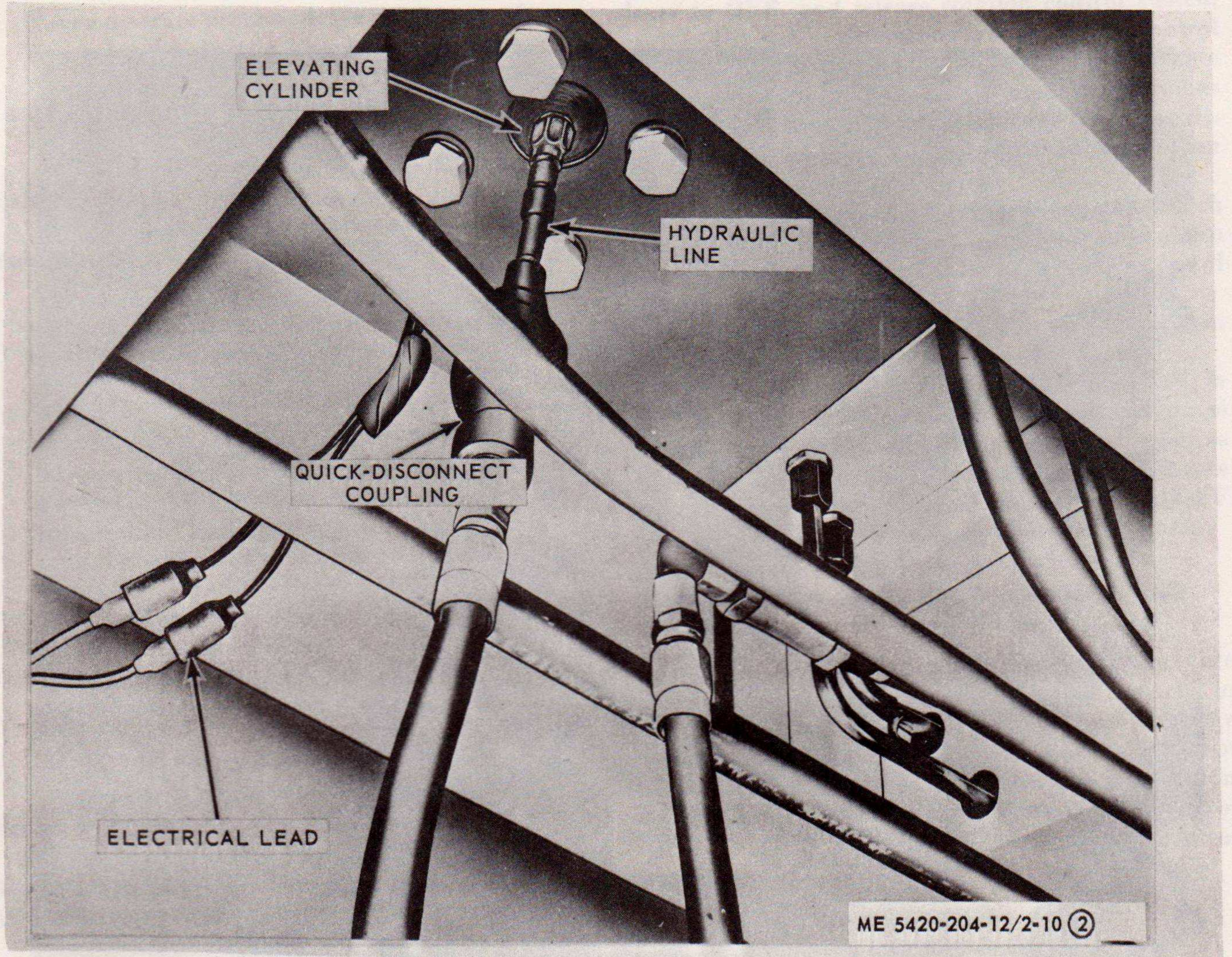
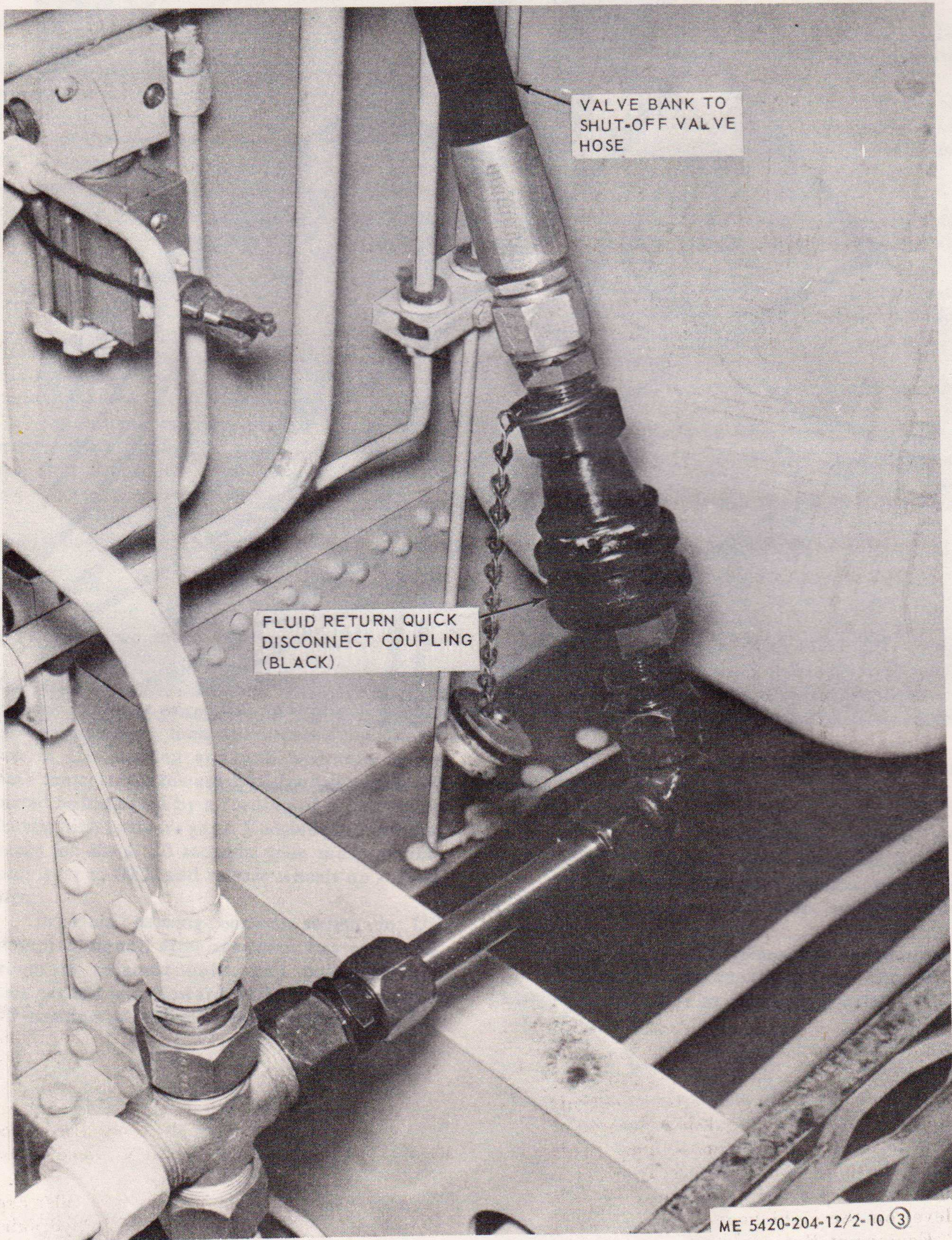


Figure 2-10. Quick disconnect hydraulic couplings. (Sheet 2 of 4)



ME 5420-204-12/2-10 ③

Figure 2-10. Quick disconnect hydraulic couplings. (Sheet 3 of 4)

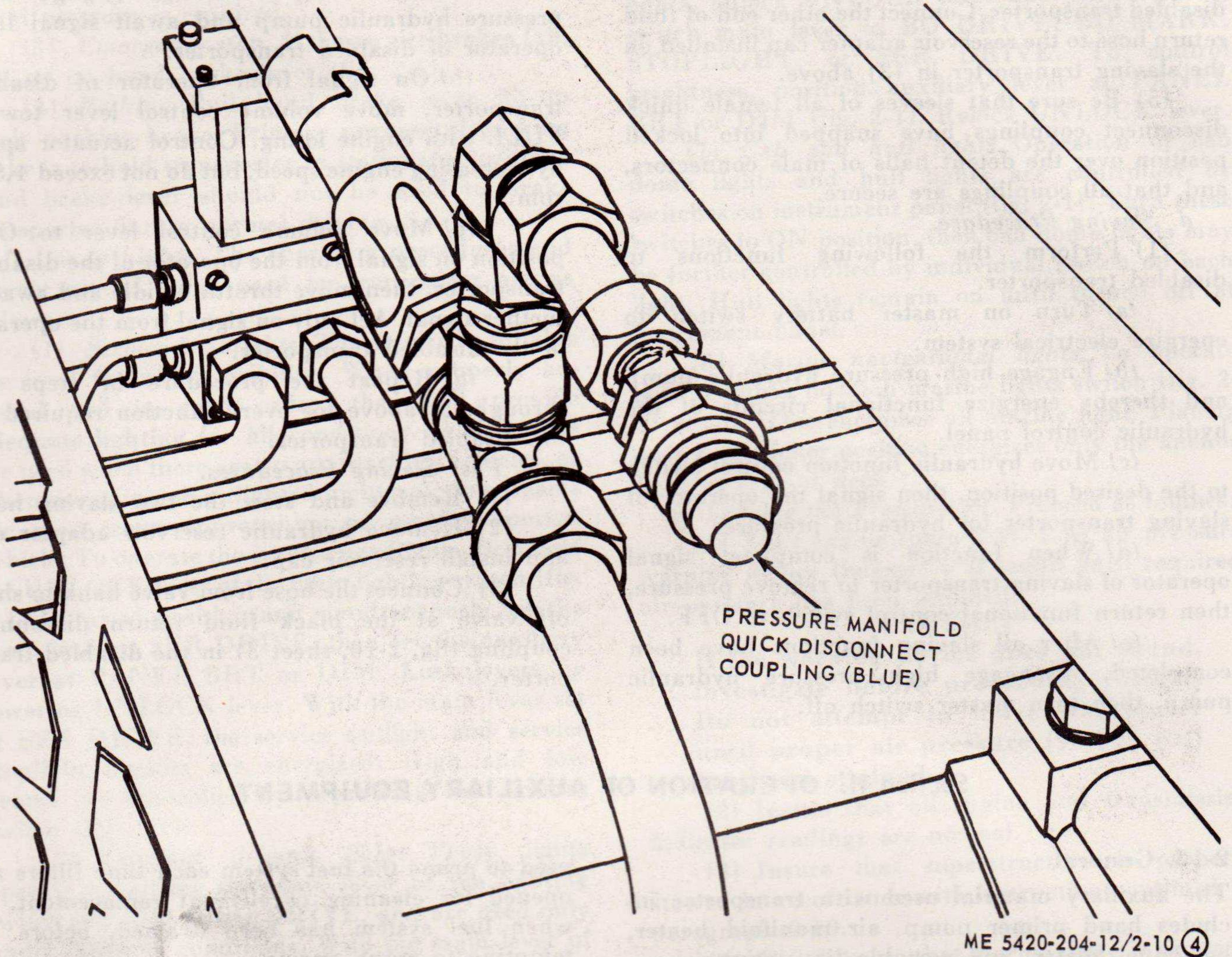


Figure 2-10. Quick disconnect hydraulic couplings. (Sheet 4 of 4)

WARNING

Before, during, and after operation of each hydraulic function by slaving, adjust the oil level in the hydraulic oil reservoir of the slaving transporter. Do not delete the oil supply, nor allow the reservoir to overflow. When the reservoir oil level reaches a dangerously low level on the sight gage, stop the operation and add hydraulic oil. When the reservoir begins to overflow, signal the operator of the disabled transporter to turn on his rear capstan. Operate the rear capstan until the reservoir oil drops to a safe level on the sight gage.

b. Equipment Required.

(1) Pressure hose (fig. 4-4, Sheet 2) 68 feet long, with blue fittings on both ends.

(2) Fluid return hose, 50 feet long, with unpainted or black fittings on both ends.

(3) Hydraulic reservoir adapter cap with male quick disconnect coupling.

c. Connection Procedure.

(1) Connect the 68 foot pressure hose (with blue fittings) to the pressure manifold quick disconnect coupling (fig. 2-10, sheet 4) in both the slaving and disabled transporters.

(2) Disconnect the hose from valve bank to shutoff valve at the black fluid return disconnect coupling (fig. 2-10, sheet 3) in the disabled transporter.

(3) Remove the hydraulic reservoir filler cap (fig. 3-9) from the slaving transporter hydraulic reservoir and install the reservoir adapter cap (fig. 4-4, sheet 2).

(4) Connect one end of the fluid return hose (fig. 4-4, sheet 2) to the black fluid return quick disconnect male coupling (fig. 2-10, sheet 3) in the disabled transporter. Connect the other end of fluid return hose to the reservoir adapter cap installed on the slaving transporter in (3) above.

(5) Be sure that sleeves of all female quick disconnect couplings have snapped into locked position over the detent balls of male connectors, and that all couplings are secure.

d. Slaving Procedure.

(1) Perform the following functions to disabled transporter.

(a) Turn on master battery switch to energize electrical system.

(b) Engage high pressure hydraulic pump and thereby energize functional circuits of the hydraulic control panel.

(c) Move hydraulic function control switch to the desired position, then signal the operator of slaving transporter for hydraulic pressure.

(d) When function is complete, signal operator of slaving transporter to remove pressure, then return functional control switch to OFF.

(e) After all slaving functions have been completed, disengage high pressure hydraulic pump, then turn master switch off.

(2) The slaving transporter operator will perform the following functions.

(a) With engine idling, engage high pressure hydraulic pump and await signal from operator of disabled transporter.

(b) On signal from operator of disabled transporter, move volume control lever toward FULL with engine idling. Control actuator speed by increasing engine speed, but do not exceed 1,500 rpm.

(c) Move volume control lever to OFF position on signal from the operator of the disabled transporter, then move throttle to idle and await a further signal. Act only on signal from the operator of the disabled transporter.

(d) Repeat the procedure in steps (a) through (c) above for every function required by the disabled transporter.

e. Post Slaving Procedures.

(1) Remove and stow the two slaving hose.

(2) Remove hydraulic reservoir adapter cap and install reservoir cap.

(3) Connect the hose from valve bank to shut-off valve at the black fluid return disconnect coupling (fig. 2-10, sheet 3) in the disabled transporter.

Section II. OPERATION OF AUXILIARY EQUIPMENT

2-13. General

The auxiliary material used with transporter includes hand primer pump, air manifold heater, personnel heater, and portable fire extinguishers. Operation of this equipment is described in the paragraphs below. Reference is made to maintenance manuals as applicable.

2-14. Portable Fire Extinguishers (Carbon Dioxide Type)

a. Description. The portable carbon dioxide fire extinguisher is suitable for electrical and flammable liquid fires. Two carbon dioxide type, 5-pound, portable extinguishers are installed on transporter.

b. Operation. Remove fire extinguisher from its location; break seal; operate control valve, and direct stream at base of flame.

c. Maintenance. For maintenance of the fire extinguisher, refer to TM 5-687.

2-15. Hand Primer Pump Operation

a. General. The hand primer pump is installed in a by-pass fuel line just back of the radiator by the right front engine mounting bracket, and must be

used to prime the fuel system each time filters are opened for cleaning or element replacement, or when fuel system has been drained, before attempting to crank engine.

b. Operation.

(1) Loosen pipe plug in filter cover.

(2) Turn knob of primer handle to release pin from detent.

(3) Operate primer handle with smooth strokes up and down until fuel flows from around pipe plug in filter cover, then tighten plug.

(4) Turn knob of primer handle until pin snaps into detent, securing handle in the closed position.

2-16. Air Heater Operation

a. General. When temperature is below freezing (+32° F) the air heater is used as an aid in starting the engine.

b. Operation. Refer to figure 2-11 and operate the air heater.

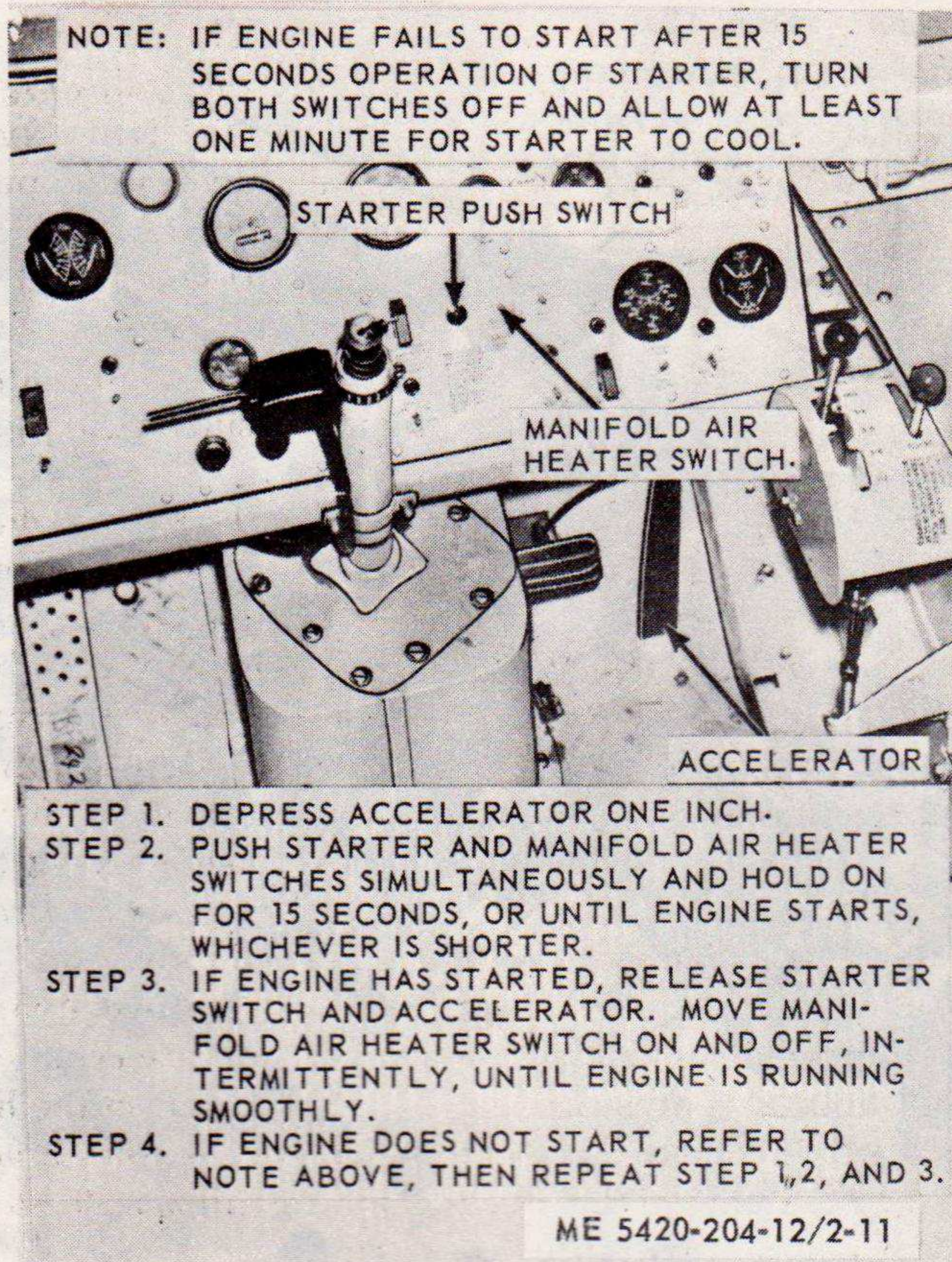


Figure 2-11. Cold weather starting of engine.

2-17. Personnel Heater Operation

a. *General.* The personnel heater is a combustion type heater operating independently on fuel drawn from regular transporter supply by a fuel pump that is controlled by a solenoid valve. Its heat is distributed thru a plenum to defroster tube and other outlets in cab.

b. *Operation.*

NOTE

Personnel heater switch is used to control normal operation of personnel heater.

CAUTION

Do not turn heater switch ON if hi-lo switch is OFF and indicator light is energized.

(1) *To start.* Move hi-lo switch (fig. 2-1, sheet 2) from OFF to lo or hi.

CAUTION

Turn hi-lo switch OFF if indicator light is not energized within five minutes.

(2) *To stop.* Move hi-lo switch to OFF position. The indicator light will remain energized until heater is purged of fuel.

CAUTION

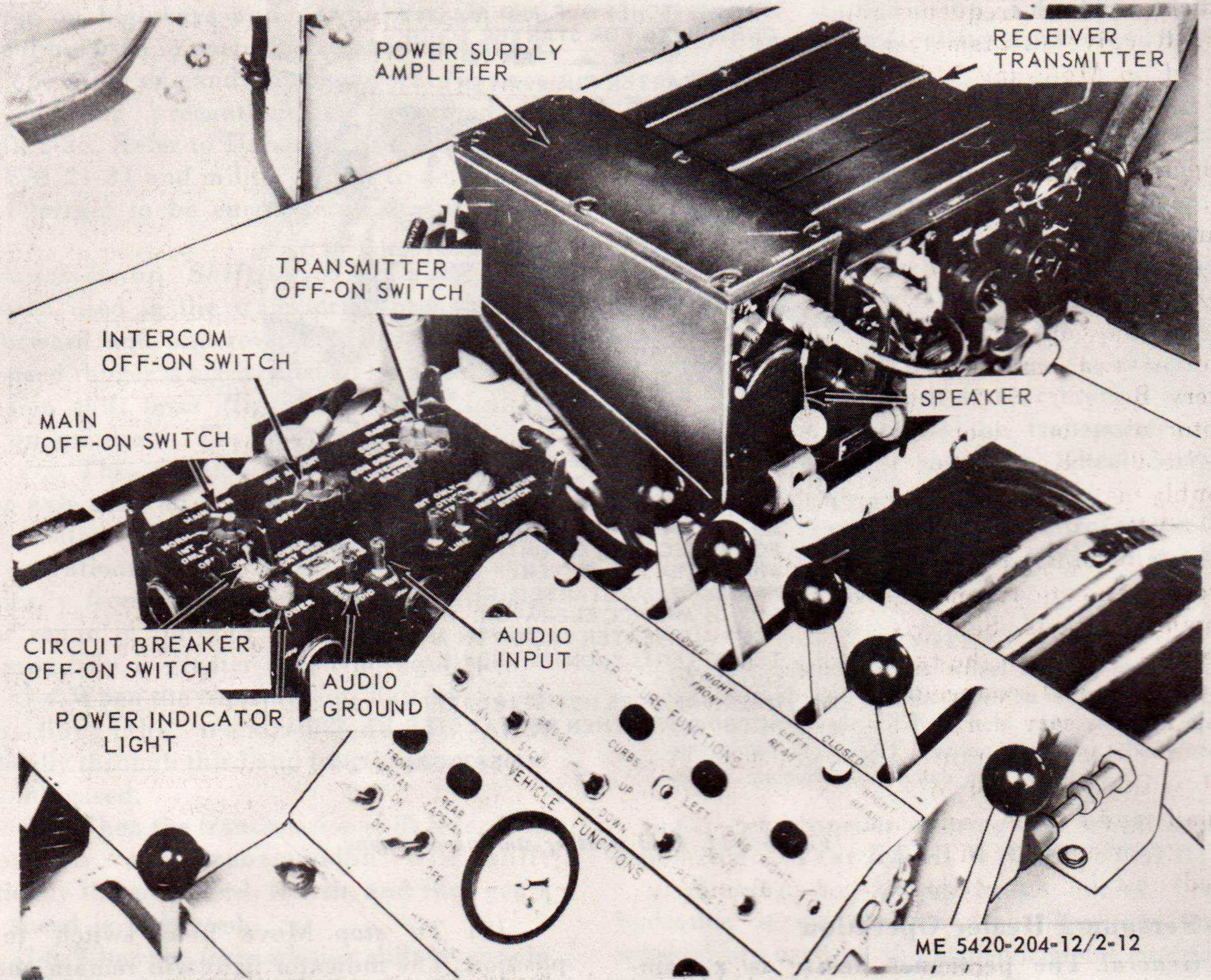
Leave heater master switch ON. Do not use for normal operation of personnel heater. Raise guard to turn switch OFF in case of an emergency.

WARNING

Failure to use the heater master switch for its intended purpose (Emergency Situation) will cause heater to emit excessive smoke and harmful exhaust fumes.

2-18. Communication System

a. Description, location, cording diagrams. Installation and removal procedures for the communications equipment installed in the transporter (fig. 2-12).



ME 5420-204-12/2-12

Figure 2-12. Communications equipment installed.

(1) Transporters are equipped with Radio Sets AN / VRC-46, AN / VRC-53 or AN / GRC-125 and Intercommunications Set AN / VIC-1 (V).

Radio Set	Basic Unit	Installation Unit
AN / VRC-46	5820-892-0871	5820-082-4007
AN / VRC-53	5820-086-7586	5820-082-4007
AN / GRC-125	5820-086-7536	5820-082-4077
AN / VIC-1	5830-856-3273	5830-738-6548

(2) The principal components of Radio Sets AN / VRC-46, AN / VRC-53 or AN / GRC-125 are listed as follows:

Principal Components	AN / VRC-46	AN / VRC-53	AN / GRC-125
Receiver-Transmitter RT-524 / VRC	1	—	—
Mounting MT-1029 / VRC	1	1	1
Receiver-Transmitter RT-505 / PRC-25	—	1	1
Amplifier-Power Supply AM-2060 / VR	1	1	1
Battery Box CY-2562 / PRC-25	—	1	1

(a) Radio Set AN/VRC-46, provides frequency modulated radio-telephone communication in the frequency range of 30 to 75.95 mcs. Receiver-transmitter RT-524/VRC is secured on Mounting MT-1029/VRC.

(b) Radio Set AN/VRC-53 or AN/GRC-125 (a vehicular AN/PRC-25), and FM portable set operating in the frequency range of 30 to 75.95 mcs, when installed in a vehicle uses same mounting (MT-1029/VRC) and Antenna (AT-912/VRC or AS-1729/VRC) as Radio Set AN/VRC-46. The AN/VRC-53 or AN/GRC-125 is adapted for vehicular use by securing Receiver-Transmitter RT-505/PRC-25, with Battery Box CY-2562/PRC-25 attached, to an adaptor plate on which Amplifier-Power Supply AM-2060/VR is mounted. The complete assembly is then secured on Mounting MT-1029/VRC.

(c) Control boxes, audio accessories and intercommunication components are part of Intercommunications Set AN/VIC-1. All cable assemblies used with the radio sets are terminated in pin-and-socket connectors; thus, no internal wiring is necessary during installation.

(d) Receiver-Transmitter RT-124/VRC (used with Radio Set AN/VRC-46) is tuned manually and houses a self-contained loud-speaker.

(e) Mounting MT-1029/VRC is a steel framed unit for supporting Receiver-Transmitter

RT-524/VRC. Two (2) thumb screws engage two (2) clamps to two (2) hold-down tabs on the receiver-transmitter to secure it in position. A terminal box at the left rear of the mounting contains the power and control receptacles for cable connections.

(f) Receiver-Transmitter RT-505/PRC-25 in a manually tuned lightweight unit. Battery Box CY-2562/PRC-25 is attached to the RT-505/PRC-25. This with AM-2060/VR, which houses a self-contained speaker, lends itself to installation on Mounting MT-1029/VRC for vehicular installation.

b. The Audio Frequency-Amplifier AM-1780/VRC and Control Boxes C-2298/VRC provide intercommunication facilities between crew members and adjacent vehicles when docked together. The AM-1780/VRC has facilities for external field telephone.

c. All units are removable by disconnecting the interconnecting cables and the screws that secure them to their mounting brackets.

d. For installation, refer to installation instructions for Radio Sets AN/VRC-46, AN/VRC-53 or AN/GRC-125 per FSN: 7610-965-2401, and Intercommunications Set AN/VIC-1 (V) per FSN: 7610-965-2402.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

2-19. Operation in Extreme Cold

a. *Special Cold Weather Precautions.* In addition to operating instructions detailed in paragraphs 2-5 through 2-12, special cold weather precautions must be observed when starting and operating transporter during freezing temperatures.

(1) *Cold weather starting aid.* An air heater is provided for starting in temperatures as low as

—24° F. Refer to figure 2-11 for starting the engine. If the engine has been cranking and suddenly stops, one crew member will push the fuel shut-off switch by-pass switch (fig. 2-13) and hold the button down, while the operator engages the starter switch until the engine starts.

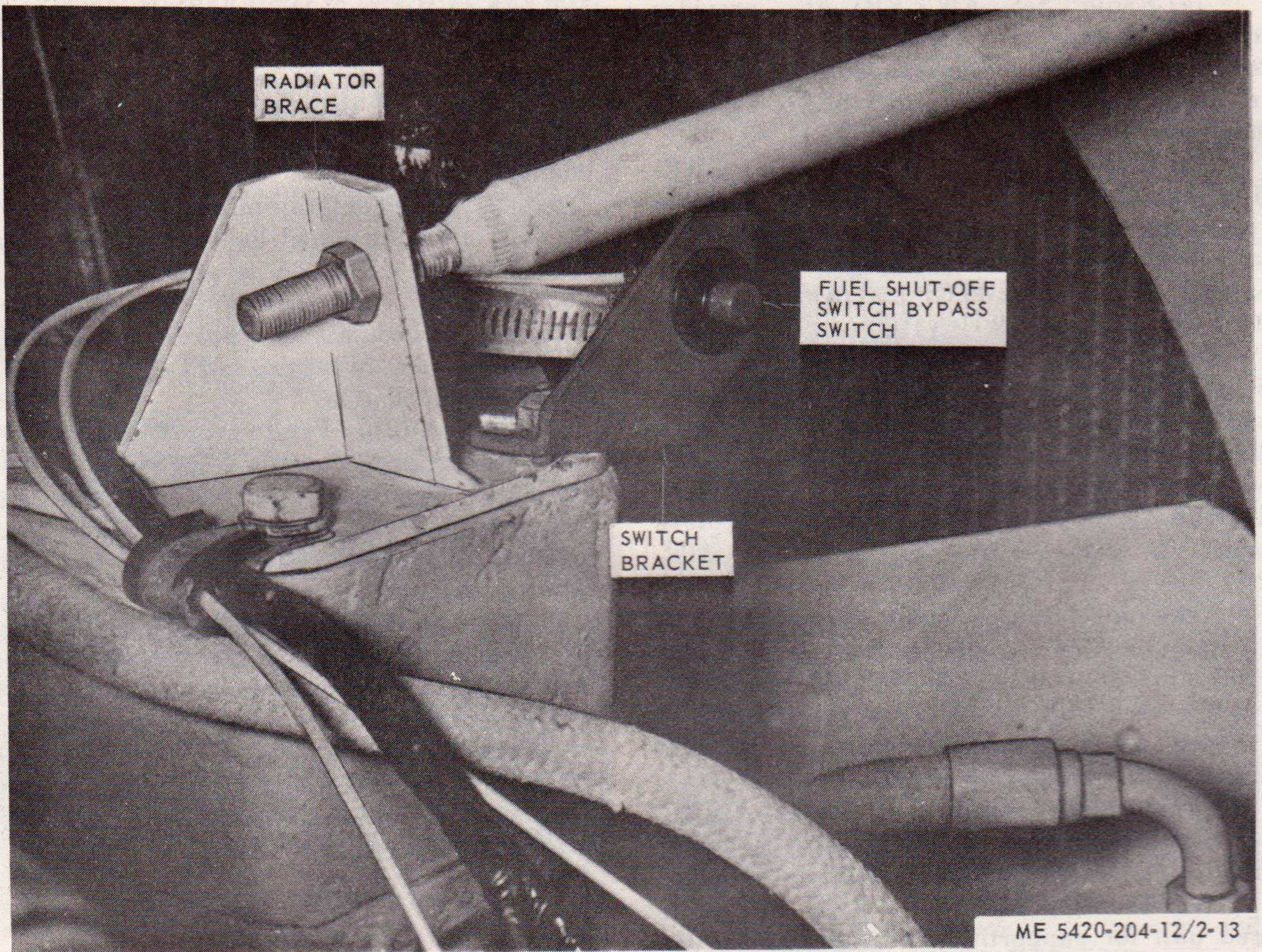


Figure 2-13. Fuel shut off switch by-pass switch.

(2) *Bilge Pump System.* If vehicle stands in freezing temperatures, any accumulation of water or moisture in pump system will quickly freeze. If pumps are not thawed prior to water operation, considerable damage might occur. To thaw bilge pumps and marine drive, first, open rear drain of front wheel well; then start and operate engine with all hatches closed, until thawing is completed. Be certain that all bilge pump inlet screens (fig. 2-14) are free and clean. Be certain all drains are open.

NOTE

Hot water can be used to expedite thawing process.

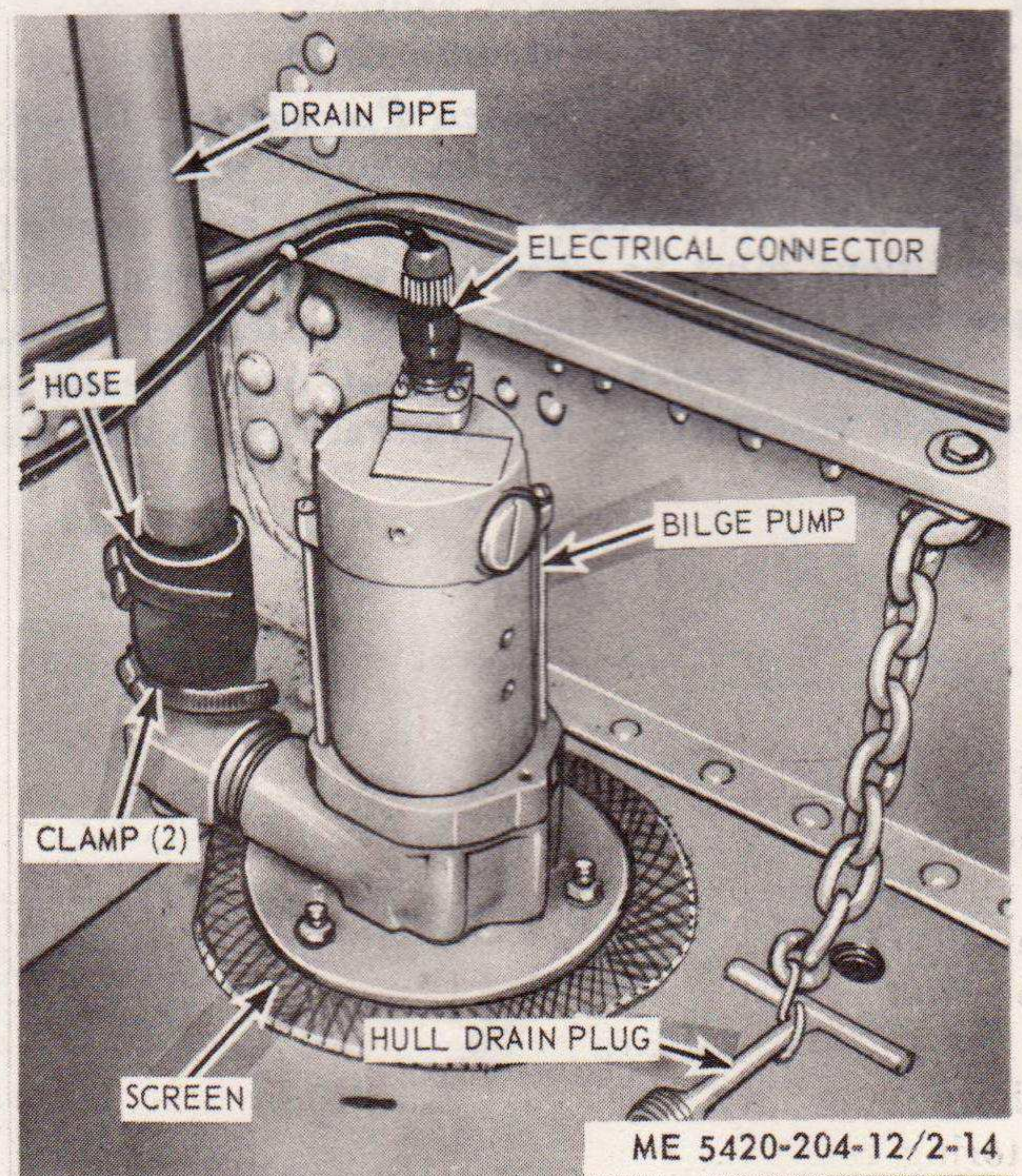


Figure 2-14. Bilge pump installation (typical).

(3) *After water operation precautions.*

(a) Pump bilge as dry as possible. Make sure all drains are open.

(b) Drain hull by removing all drain plugs. There are eight drain plugs, two near each wheel well, one forward and one at rear. Then reinstall all drain plugs, and wipe bilge dry with sponge or rags.

(c) Drain moisture from air reservoirs (para 4-176).

(d) Secure canvas covers over front and rear hatch grilles on deck to prevent entry of water, snow, or ice.

(4) *Before water operation precautions.* Do not attempt to operate vehicle until the following operations are accomplished:

(a) Visually inspect bilge pumps for ice formation.

(b) Insure that all ice formations in bilge and on marine drive have thawed. To that bilge and marine drive, refer to (2) above.

(c) Insure that the eight drain plugs on the bottom of the hull, front and rear of each wheel well, operate freely and are installed.

b. Cold Weather Fuel and Lubricants.

(1) *Fuel for low temperatures.*

(a) *Types.* Diesel fuel oils are graded and DF-2 (Regular), DF-1 (Winter), and DF-A (Arctic). For temperature ranges of -25° F to 20° F, use DF-1. For temperature ranges of -25° F to 65° F, use DF-A. Any commercial fuel oil in the above designated categories may be used providing they conform to Federal Specification VV-F-800. During cold weather engine operation, the cloud point (temperature at which wax crystals begin to form in fuel oil), must be below the lowest expected fuel temperature to prevent clogging of the fuel filter by wax crystals. For efficient combustion, winter grade fuel oil (DF-1) must meet the following requirements:

Ambient Air Temp	90 percent Boiling Point (Max)	Final Boiling Point (Max)	Cetane Number (Min)	Sulfur Content (Max)
Above -20° F	575° F	625° F	45	0.50%

(b) *Storage and handling.* Due to condensation of moisture from the air, water will accumulate in tanks, drums, or containers. At extremely low temperatures, such water will form ice crystals and clog fuel lines unless the following precautions are taken:

1. Be sure that all containers are thoroughly clean, dry, and free from rust, before storing fuel in them.

2. If possible, after filling or moving a container, allow it to stand and settle for 24 hours before servicing vehicle fuel tank from it.

3. Keep all closures of containers tight to prevent snow, ice, dirt and other foreign matter from entering.

4. Wipe all snow or ice from dispensing equipment and from around fuel tank filler cap before removing cap to refuel vehicle. After filling tank, replace cap securely.

5. Drain fuel filter more frequently during cold weather to remove water and prevent freezing. Keep fuel tanks as full as possible and keep condensation at a minimum.

(2) *Lubricants.* Refer to current Lubrication Order for type of lubricant specified for cold weather operations.

(3) *Keeping crankcase oil fluid.*

(a) Several methods for keeping crankcase oil sufficiently fluid for proper lubrication are listed below. Preference should be given to the different methods in the order listed, according to the facilities available.

1. Keep vehicle in a heated enclosure when it is not being operated.

2. When engine is stopped, drain crankcase oil while it is still hot and store in a warm place until vehicle is to be operated again. If warm storage is not available, heat oil before refilling crankcase.

CAUTION

Tag vehicle in a conspicuous place in driver's compartment to warn personnel that crankcase is empty.

Do not get oil too hot; heat only to point where barehand can be inserted without burning.

3. If vehicle is to be kept out doors, and if crankcase cannot be drained, shelter the engine compartment with a tarpaulin. About 3 hours before engine is to be started, outside heat must be applied to crankcase.

c. Protection of Cooling System.

(1) Cooling system must be protected with antifreeze compound for operation below $+32^{\circ}$ F. The following instructions apply to use of antifreeze compound.

(2) Before adding antifreeze compound, it is necessary that cooling system be clean and completely free from rust. If cooling system has been cleaned recently, it may be necessary only to drain, refill with clean water, and again drain.

(3) All hoses must be inspected and replaced if deteriorated. Hose clamps, plugs, and draincocks are to be inspected and tightened if necessary.

(4) When cooling system is clean and tight, fill system with water to about one-third capacity; then add antifreeze compound, using proportions indicated in table 4-1. Ethylene glycol is the recommended antifreeze compound. Use denatured alcohol, grade 3 for emergencies. The system must be protected to at least 10° F below the lowest temperature expected.

(5) After adding antifreeze compound, fill with water to prescribed level; then start and warm up engine to normal operating temperature.

(6) Engine must then be stopped and the solution checked with a hydrometer, adding more antifreeze compound if required.

(7) Coolant must be inspected weekly for strength and color. Rusty solution should be drained, cooling system thoroughly cleaned, and new solution of the required strength added.

NOTE

It is essential that antifreeze solutions be kept clean. Use only containers and water that are free from dirt, rust, and oil.

d. Maintenance During Cold Weather.

(1) *General.* In preparing a vehicle for operation at subzero temperatures, special attention to details of electrical and mechanical maintenance will reduce difficulties encountered. Special attention to these details should be continued in scheduled maintenance throughout period of sub-zero operation.

(2) Batteries.

(a) Efficiency of batteries decrease sharply with decreasing temperatures, and becomes practically inoperative at -40° F. When batteries have been chilled to a temperature below -30° F, they should, preferably, be heated before attempting an engine start, unless warm slave batteries are available. See that batteries are always fully charged with a hydrometer reading between 1.245 and 1.255. A fully charged battery will not freeze at temperatures likely to be encountered even in arctic climates, but a fully discharged battery will freeze and rupture at -5° F.

(b) Do not add water to a battery when it has been, or will be, exposed to sub-zero temperatures unless battery is to be charged immediately. If water is added and battery is not put on charge, the water will stay on top and freeze before it has a chance to mix with the electrolyte.

(c) Table 2-2 lists the freezing temperature of electrolyte at various specific gravities.

Table 2-2. Specific Gravity

Specific gravity at 60° F	Freezing temp degrees F.	Specific gravity at 60° F	Freezing temp degrees F
1.100	+18	1.220	-31
1.120	+14	1.240	-51
1.140	+8	1.260	-75
1.160	-2	1.280	-92
1.180	-6	1.300	-95
1.200	-17		

(3) Other chassis points.

(a) *Water pumps.* Prior to advent of cold weather, inspect water pumps and service if required.

(b) *Fuel system.* Drain fuel pump; drain and clean filters weekly, or more often according to conditions to remove water and dirt. Clean air heater electrode weekly, or more often depending upon conditions, making sure all corrosion is removed (para 4-210).

NOTE

After cleaning or draining filters, refer to paragraph 2-15 and prime fuel system before cranking engine.

(c) Chassis.

1. Brakes have a tendency to stick or bind when vehicles are parked at sub-zero temperatures. A blow torch may be used to warm these parts if they bind when attempting to move vehicle. Parking vehicle with brakes released will eliminate binding. Precautions must be taken, under these circumstances, to block wheels or otherwise prevent movement of vehicle.

2. Inspect vehicle frequently. Shock resistance of metals, or resistance against breaking, is greatly reduced at extremely low temperatures. Operation of vehicle on hard, frozen ground causes strain and jolting which will result in screws breaking or nuts jarring loose.

2-20. Operation in Extreme Heat

a. *General.* Operation of the vehicle during high temperature requires regular maintenance at shorter intervals, of cooling system units, filtering devices, air cleaners, electrical units, and air circulation ducts.

b. Cooling System Maintenance.

(1) *Cooling liquid.* Formation of scale and rust in cooling system occurs more often during operation in extremely high temperatures;

therefore, rust preventatives should always be added to cooling liquids. Use clean water only. Avoid use of water that contains alkali or other substances which may cause scale and rust to form.

(2) *Cleaning cooling system.* Cooling system should be thoroughly cleaned and flushed at frequent intervals (para 4-190) when operating in extremely high temperatures.

(3) *Fan belt and water pump.* Fan belt should be inspected at regular intervals and adjusted when necessary (para 4-198). Water pump must be kept in good operating condition.

(4) *Hose connections.* Check connections frequently for leaks.

c. Battery Water Level. In torrid zone, cell water level should be checked daily and replenished when necessary with pure distilled water. If this is not available, drinking water may be used. However, continuous use of water with high mineral content will eventually cause damage to battery and should be avoided.

2-21. Operation in Dusty or Sandy Areas

a. General. Take all necessary precautions to keep equipment clean and free of dust. Dust and sand, will cause an abrasive action on lubricated areas. Wash or wipe dust from equipment frequently.

b. Protection. Provide maximum protection for the equipment at all times. Take advantage of natural barriers whenever possible.

c. Air Cleaner. Air cleaner should be cleaned daily. Air cleaners should be cleaned immediately after any dust storm.

d. Lubrication. Lubricate transporter in accordance with instructions contained in current Lubrication Order.

2-22. Operation in Rainy or Humid Conditions

a. General. Take all necessary precautions to keep equipment clean and dry. Remove any accumulated rust or corrosion. Coat exposed areas with a suitable preservative and report condition to organizational maintenance.

b. Lubrication. Lubricate transporter in accordance with instructions contained in current Lubrication Order.

c. Electrical System. Keep all electrical wiring clean and dry. Inspect for loose or corroded contact surfaces. Clean contact surfaces as necessary and tighten loose connections.

2-23. Operation in Salt Water Areas

a. Operation in salt water requires special precautions to prevent deterioration of transporter and accessories. Rust and corrosion are greatly accelerated under salt water conditions. Wash transporter exterior after each exposure or operation in salt water.

b. Engine. After each operation, wipe exterior of engine dry. Keep engine compartment as dry as possible.

c. Hull. Examine hull frequently for signs of corrosion. Corrosion is most likely to occur at the engine exhaust outlet, bilge discharge openings, points subject to scraping and chafing and areas where foot traffic is greatest. Coat breaks in paint with a suitable preservative and repaint at earliest opportunity.

d. Deck Hardware. Examine all deck and superstructure couplings, handles, and all exposed components for signs of rust or corrosion. Keep all parts clean, painted, or lubricated as required.

e. Accessories. Examine the navigational running lights, bilge pumps, fire extinguishers, blower systems, pinning devices, and electrical connections for signs of corrosion or accumulation of salt deposits. Wipe accessories clean at frequent intervals and repaint or lubricate items as required for protection from salt water exposure.

2-24. Operation in Snow

NOTE

Reduce tire pressure to 25 psi.

a. To operate in snow, the operator must start forward in the highest gear range possible, and use only enough throttle to keep from stalling the engine. He must avoid spinning the wheels, for friction will melt snow and form ice. Once ice is formed under wheels it is difficult to move vehicle without "rocking" it back and forth to enlarge track and gain traction.

b. Once in motion, operator should avoid stopping on slopes, sharp turns, or application of excessive power.

c. Placing vehicle in four wheel drive and rear wheel steering, will enable operator to "oblique" out of some otherwise impossible positions.

2-25. Operating in Sand, Mud, or on Coral

a. General. Procedures for operating transporter in sand, mud, or on coral are similar to those given for operating on highways and normal terrain. General precautions to be observed while operating in sand, mud, or on coral are outlined in the following subparagraphs.

b. Sand. Observe the following precautions when operating transporter on sand:

(1) *Tire deflation.* Necessary tire deflation depends upon consistency of the sand. When driving on hard sand, tire pressure should be approximately 40 psi. When driving on soft sand, tire pressure should be approximately 30 psi.

NOTE

Minimum tire pressure for off-highway use is 25 psi.

(2) *Front wheel drive.* Employ front drive as described in paragraph 2-5 when operating in soft sand.

(3) *Shifting.* Maximum power of the transmission 1-2 speed range should be used if sand is extremely soft.

(4) *Driving across.* With tires properly deflated, travel over sand with full power and speed to avoid digging tires into the sand. When possible, avoid stopping and starting.

(5) *Digging in.* If wheels are permitted to spin, they will dig in. When progress is impaired to the point where spinning may occur, release accelerator; do not wait until wheels spin before releasing accelerator. Back up far enough to permit a good forward run, and go forward again, faster. It may be necessary to repeat this procedure several times.

(6) *Upgrades.* Travel upgrade on sand with the front wheels straight; never approach sand grades at an angle. When traveling over sharply rising sand dunes where there is a possibility of bottoming, keep the vehicle moving fast. Avoid straddling on crest of hills.

(7) *Turning.* Select smoothest available terrain for necessary turns and make as wide as possible. When front wheels are turned, much of the forward driving action is lost. There is also added resistance caused by all wheels making separate tracks.

(8) *Following.* When driving in convoy, the leading driver should pick the best available path. Other vehicles in convoy should follow in leader's tracks whenever possible; no attempt should be made to pull out or make another track unless vehicles ahead have made path impassable. Do not follow too close, as vehicle ahead may have to back up to make another attempt forward.

c. Soft Mud and Marshes. When determining routing, avoid soft sticky mud, marshes, and swamps; refer to Department of the Army Manual FM 21-31 and military maps. The transporter can pull out of any mud ordinarily traveled over by a truck; however, under water, mud has a gripping characteristic that can mire down a wheeled vehicle. Use front and rear drive with transmission in 1-2 speed range.

d. Coral and Rocks. Deflate tires to 30 psi. Engage front wheel drive and select 1-2 transmission range, and travel slowly. Maintain vigilance for sharp protruding rocks or coral heads.

2-26. Operation at High Altitudes

The efficiency of all internal combustion engines decrease as altitude is increased. This is a natural condition, but top efficiency may be maintained by more frequent service to air cleaner (para 4-200).

OPERATOR'S / CREW MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION

3-1. Lubrication Instructions

This section contains lubrication instructions which are supplemental to, and not specifically covered in the lubrication order. For current lubrication order refer to DA Pamphlet 310-4.

3-2. Detailed Lubrication Information

a. General. Keep all lubricants in closed containers and store in a clean, dry place away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready to use.

b. Cleaning. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment wipe all lubrication points after lubricating to prevent accumulation of foreign matter.

c. Points of Lubrication. Service the lubrication points at proper intervals (LO 5-5420-204-12-1 through LO 5-5420-204-12-5).

d. OES Oil.

(1) The crankcase oil level must be checked frequently, as oil consumption may increase.

(2) The oil may require changing more frequently than usual because contamination by dilution and sludge formation will increase under cold weather operating conditions.

e. Operation After Lubrication. Operate the transporter immediately after lubrication. Inspect oil filters and oil lines for evidence of leakage. When crankcase oil is changed, operate engine for at least five minutes, then check oil level. Add oil when necessary to maintain proper level.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-3. General

To insure that the transporter is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed and described in paragraph 3-4. The item numbers indicate the sequence of inspection requirements which can be performed with a minimum of time and motion on the part of the operator / crew. Defects discovered during operation of the transporter shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation that would damage the equipment if operation were continued. All deficiencies and short comings will be recorded,

together with the corrective action, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest opportunity.

3-4. Preventive Maintenance Checks and Services

This paragraph contains a brief tabular listing of preventive maintenance checks and services which must be performed by operator / crew. The item numbers are listed in a logical numerical sequence prescribing a minimum of inspection requirements on the part of the individual. Begin the maintenance inspection by starting in the cab, continuing down through the front hatch and through the hull, out the rear hatch, and then around the transporter. Refer to table 3-1 and table 3-2 for the preventive maintenance checks and services.

Table 3-1. Operator / Crew Preventive Maintenance Checks and Services

B—Before Operation

A—After Operation

D—During Operation

Time required: 4.3 Man-Hrs.

Time required: .3 Man-Hrs.

Interval and Sequence No.			ITEM TO BE INSPECTED PROCEDURE	Work Time (M / H)
B	D	A		
1	32		LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER NOTE Visually inspect for evidence of lubricant and fuel leaks concurrently with the daily service checks.	0.1
2	28		CONTROLS AND INSTRUMENTS Inspect for visible damage and loose mountings. With unit operating, check for proper operation of gages and switches. Normal operating reading for instruments are shown in figure 2-1.	0.2
3			FIRE EXTINGUISHERS Inspect for broken seals. Refer to paragraph 2-14.	0.1
4			WINDSHIELD AND WINDOW GLASS Visually inspect for cracked glass or deteriorated seal. Report defects to organizational maintenance.	0.1
5			WINDSHIELD WIPER Inspect blades for contact and serviceability (by using hand operating lever).	0.3
6			LIGHTS Test switches for proper operation. Refer to paragraph 2-5 f.	0.1
7			PERSONNEL HEATER Visually inspect for signs of damage or leaking fuel. Refer to paragraph 3-10.	0.1
8			HAND BRAKE Test handle for proper adjustment by release and reapplication to see that it snaps over center with a firm pressure. Move the adjustment knob if necessary. Refer to paragraph 3-13.	0.1
9			BRAKE FLUID RESERVOIR Check level. Add fluid when necessary. Refer to paragraph 3-15.	0.1
10			MAIN HYDRAULIC RESERVOIR Check oil level gage. Add oil when necessary. (Fill to high mark.) Refer to paragraph 3-17.	0.5
11			BRAKE MASTER CYLINDER Visually inspect for insecure mounting or leaks and test by foot pressure for proper operation. Report defects to organizational maintenance. Refer to paragraph 3-14.	0.3
12			AIR-HYDRAULIC POWER CYLINDER (MULTIPAK) Visually inspect for leakage or insecure mounting. Report defects to organizational maintenance.	0.1
13	29		BILGE PUMPS Visually inspect for loose electrical leads mounting hardware, or clogged screens. Clean screen. Report other defects to organizational maintenance.	0.1
14			AIR RECEIVER AND STORAGE TANK Open draincocks on bottom and drain all condensate.	0.1
15			FUEL TANKS (2) Open valve and drain water or sediment. Add fuel as required. Inspect for leaks. Report defects to organizational maintenance. Refer to paragraph 3-25.	0.1
16			TRANSMISSION OIL LEVEL Check oil level and add oil when necessary. Check oil level with engine running. (Change filter when oil is dirty). See lubrication order. Refer to paragraph 3-34.	0.4
17	30		ENGINE OIL LEVEL Check oil level dipstick and add oil when indicated low. See lubrication order.	0.3
18			ENGINE CRANKCASE BREATHER Service engine crankcase breather. Refer to paragraph 3-29.	0.1

Interval and Sequence No.			ITEM TO BE INSPECTED PROCEDURE	Work Time (M / H)
B	D	A		
19			TRANSMISSION BREATHER Service transmission breather. Refer to paragraph 3-33.	0.1
20			HYDRAULIC FLUID FILTERS Check gages of line filters. When in red, change filter element. Refer to paragraph 3-18.	0.5
		33	DRIVE LINE UNIVERSAL JOINTS Visually inspect for missing hardware, leaking joints. Tighten loose bolts. Service as required per Lubrication Order.	0.1
21			AIR COMPRESSOR AND GOVERNOR Visually inspect for loose mounting, leaking air, oil, or coolant lines.	0.1
22			RADIATOR Check coolant level. Proper level is 2 inches below filler cap. Visually inspect for clogged air passages, cracked, or frayed hose. Refer to paragraph 3-20.	0.1
23			HULL Inspect hull for loose, missing or corroded rivets, ruptured skin, open seams, or bent frame members.	0.2
24			FUEL TANK FILLER NECK CAP, STRAINER, GASKET AND BREATHER VENT Inspect caps, gaskets, and strainer. Replace defective gasket. Clean breather vent screen.	0.3
25	31		REAR CONTROL STATION Visually inspect controls and instruments for damage or defect. (Report all defects to organizational maintenance).	0.1
26			SUPERSTRUCTURE Refer to TM 5-5420-205-15 for Preventive Maintenance instructions on Superstructure items.	
27		34	MARINE DRIVE Visually inspect for signs of damage, leaking hydraulic lines or loose or damaged electrical connectors. Inspect sheer pin for security of installation. Inspect propeller and dust for visible damage. Report all damaged items to organizational maintenance.	0.1
		35	WHEEL SUSPENSION DOUBLE UNIVERSAL JOINT Remove check plug in boots and check for water. Report defective boot to organizational maintenance. Refer to paragraph 3-42.	0.1

Table 3-2. Operator / Crew Preventive Maintenance Checks and Services

D / Daily

W—Weekly

Time required: 0

Time required: 2.1 Hrs.

Interval and sequence No.		Item to be inspected procedure	Work time (M / H)
D	W		
1		LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER	0.5
2		BATTERIES Tighten loose cables and mountings. Remove corrosion. Inspect for cracks and leaks. Remove caps and fill cells to 3/8 inch above plates. Clean vent holes in caps before re-installing. In freezing weather, run engine at least one hour after adding water. Replace a cracked or defective battery. Refer to paragraph 3-16.	0.3
3		ENGINE AIR CLEANER Remove cup and filter weekly for cleaning except when operating in extremely dusty or sandy areas, then clean daily, or more often if required. Refer to paragraph 3-21.	0.7
4		DRIVE BELTS Inspect adjustment. Proper adjustment is 1/2 to 3/4 inch deflection midway between pulleys. Report frayed belt to organizational maintenance.	0.1
5		DIFFERENTIAL Check breather and oil level! Refer to paragraph 3-38.	0.1

Interval and sequence No.		Item to be inspected procedure	Work time (M / H)
D	W		
	6	WHEEL WELL AIR BLOWER AIR CLEANER Check air cleaner filter (weekly, except when operating in dusty or sandy areas, then daily).	0.3
	7	AIR HEATER Remove filter, clean and replace. Refer to paragraph 3-22.	0.1

Section III. TROUBLESHOOTING

3-5. General

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the transporter. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine the probable causes and corrective actions to take. You should perform the tests / inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

3-6. Troubleshooting

Refer to table 3-3. This table provides troubleshooting instructions at the operator / crew maintenance personnel level.

Table 3-3. Troubleshooting

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

ENGINE

1. ENGINE FAILS TO CRANK.

Step 1. Check to see if master switch is *OFF*.

Turn master switch *ON* (fig. 2-1).

Step 2. Check for loose starter motor and battery electrical connections.

Tighten loose connections.

Step 3. Check for empty fuel tanks.

Refill tanks if empty or low. Prime fuel system (para 2-15) before cranking engine.

2. ENGINE IS HARD TO START OR FAILS TO START.

Step 1. Check air cleaner for dirt.

Service air cleaner (para 3-21).

Step 2. Check to see if emergency shutoff valve is closed.

Reset emergency shutoff valve to open position (para 2-4) (fig. 2-6).

3. ENGINE LACKS POWER.

Step 1. Check air cleaner for dirt.

Service air cleaner (para 3-21).

Step 2. Check for air leaks in fuel supply line.

Tighten line.

Step 3. Check to see if exhaust tubes or muffler is clogged.

Clear obstructions.

Step 4. Check for improper grade fuel oil in tanks.

Drain improper fuel. Service with correct grade (para 2-19b). Prime fuel system before cranking engine (para 2-15).

4. ENGINE CRANKCASE PRESSURE EXCESSIVE.

Step 1. Check to see if crankcase breather is clogged.

Service breather (para 3-29).

5. ENGINE LUBRICATING OIL CONSUMPTION EXCESSIVE.

Step 1. Check for leaks or loose oil lines.

Tighten loose connections.

6. ENGINE LUBRICATING OIL PRESSURE INDICATED LOW.

Step 1. Check to see if engine oil level is low.

Refer to current lubrication order and fill crankcase (para 3-2).

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

7. **ENGINE WATER TEMPERATURE HIGH**
Step 1. Check water level.
If water level is low, fill radiator (para 3-20).
Step 2. Check to see if cooling system is clogged.
Flush system (para 3-20).
8. **ENGINE FAILS TO STOP AFTER FIRE EXTINGUISHER LIMIT SWITCH ACTUATION.**
Step 1. Inspect limit switch to see if defective.
Use emergency stop knob to stop engine.
9. **ENGINE STOPS SUDDENLY.**
Step 1. Check to see if fuel shutoff valve is closed.
Open valve (para 4-206 and para 4-208).
- TRANSMISSION**
10. **TRANSMISSION OIL TEMPERATURE TOO HIGH.**
Step 1. Check to see if oil level is low.
Refer to current lubrication order and fill with proper oil (para 3-2).
Step 2. Check to see if oil level is too high.
Drain oil to proper level. (See LO, para 3-2).
Step 3. Check to see if coolant system is low.
Fill with water (para 3-20).
Step 4. Check to see if selected gear speed is running too slow.
Downshift to increase gear speed.
11. **TRANSMISSION WILL NOT SHIFT.**
Step 1. Check to see if oil level is low.
Refer to current lubrication order and service (para 3-2).
12. **TRANSMISSION SLIPS.**
Step 1. Check to see if oil level is low.
Refer to current lubrication order and service (para 3-2).
Step 2. Check to see if oil is foaming, improper oil, or is contaminated.
Refer to current lubrication order and service (para 3-2).
13. **BATTERIES DISCHARGE RAPIDLY OR OVERHEAT.**
Step 1. Check to see if electrolyte is low.
Refer to para 3-16 and service.
Step 2. Inspect to see if batteries are selfdischarging. Clean dust, dirt and electrolyte from top of batteries (para 3-16).
14. **INSTRUMENTS INACCURATE OR INOPERATIVE.**
Step 1. Check to see if master battery switch is *OFF*.
Turn switch *ON* (fig. 2-1).
Step 2. Check to see if instrument or transmitter ground is lost.
Refer to applicable system practical diagram (fig. 1-4 through 1-6), trace lead and insure that ground is made.
Step 3. Check for loose connector or broken electrical lead.
Tighten loose connection.
15. **BATTERY ALTERNATOR INDICATOR FAILS TO INDICATE VOLTAGE WHEN ENGINE IS STOPPED, OR BATTERY CHARGING VOLTAGE WHEN ENGINE IS RUNNING.**
Step 1. Check for loose wire lead, loose cable or defective lead or cable.
Tighten loose connections.
Step 2. Check for defective batteries.
Report defective batteries to organizational maintenance for replacement.
16. **ELECTRICAL COMPONENT FAILS TO FUNCTION WHEN SWITCH IS ACTUATED.**
Step 1. Check master battery switch to see if it is *OFF*.
Turn switch *ON*.
Step 2. Check for loose connector or wire lead.
Tighten loose connection.
- CAUTION**
- Leakage of hydraulic oil is a danger signal and immediate action must be taken to locate and correct condition. Complete loss of vehicle is possible, under certain conditions, when leakage is not eliminated.
17. **HYDRAULIC OIL LEAKS INTO HULL FROM SUPERSTRUCTURE.**
Step 1. Check for leak in line, hose, fitting or other component.
Locate source of leakage. Tighten loose connections, fittings, hose, line or other component.

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

18. **LOW AIR PRESSURE SIGNAL CONTINUES TO SOUND AFTER ENGINE HAS RUN SHORT TIME.**
Step 1. Check to see if air compressor has not run long enough to build up pressure.
Run engine for 45 seconds. If pressure is not up then, check for loose belts.
Step 2. Check for leaks in tubing and fittings.
Tighten connections.
19. **AIR PRESSURE INSUFFICIENT OR FAILS TO BUILD UP.**
Step 1. Check if draincocks are open.
Close draincocks on reservoir and storage tank.
Step 2. Check to see if air cleaner is dirty.
Service air cleaner (para. 3-21).
20. **WINDSHIELD WIPER MOTORS DO NOT OPERATE.**
Step 1. Check for leaks, air line or fittings.
Tighten lines or fittings.
Step 2. Check for air pressure, if no pressure.
Check out trouble using 19 above.
21. **ENGINE FAN DOES NOT OPERATE WHEN TEMPERATURE INDICATOR READS ABOVE 180° F. AND ENGINE FAN SWITCH IS AT AUTO.**
Step 1. Check for loose electrical connector.
Tighten loose connector.
Step 2. Check for air pressure, if no pressure.
Check out trouble using 19.
22. **HORN DOES NOT SOUND.**
Step 1. Check for loose electrical connector.
Tighten loose connector.
Step 2. Check for loss in air pressure.
Check out trouble using 19.
23. **ENGINE OVERSPEEDS WHEN HIGH PRESSURE HYDRAULIC PUMP IS ENGAGED.**
Step 1. Check for loose connector.
Tighten connector.
Step 2. Check for loss of air pressure.
Check out trouble using 19.
24. **AIR HEATER INOPERATIVE.**
Step 1. Check to see if fuel filter is dirty or clogged with wax caused by use of improper grade fuel oil.
Service filter (para. 3-22). Service with proper fuel (para. 2-19-b).
Step 2. Check electrical lead to see if loose or defective.
Tighten loose lead.
25. **VEHICLE BRAKES FAIL TO RELEASE.**
Step 1. Check to see if pedal linkage is binding.
Free linkage.
26. **BRAKE PEDAL TRAVEL EXCESSIVE OR SPONGY.**
Step 1. Check to see if air pressure is low.
Operate engine 45 seconds to build up air pressure.
Step 2. Check for leaks in hydraulic lines or fittings.
Tighten loose lines or fittings.
27. **VEHICLE BRAKE PEDAL HARD.**
Step 1. Check for low pressure (more travel than normal).
Operate engine 45 seconds and build up pressure.
Step 2. Check to see if brake pedal linkage is binding.
Free linkage.
28. **LOSS OF PEDAL AFTER APPLICATION**
Step 1. Inspect to see if brakes are too hot.
Allow brakes to cool then recheck pedal.
29. **BRAKES GRAB.**
Step 1. Check to see if brake pedal linkage is binding.
Free linkage.
30. **REAR WHEEL POSITION INDICATOR WANDERS FROM SIDE-TO-SIDE WHEN VEHICLE IS DRIVEN AND REAR WHEEL STEERING IS NOT IN USE.**
Step 1. Check to see if rear wheel steering lock pin is not extended.
Position rear wheels forward, then move rear steering pin control switch (S23) (fig. 2-1) to EXTEND.
31. **WHEEL SUSPENSION SYSTEM FAILS TO FUNCTION (WHEELS WILL NOT RETRACT).**
Step 1. Check to see if wheel position is not straight ahead ($\pm 4^\circ$).
Align wheel position until indicator shows them straight ahead.

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

32. WHEEL WELL BLOWER SYSTEM FAILS TO OPERATE.
Step 1. Check for oil leaks in motor, service line, tube or coupling.
Tighten loose tube or coupling.
33. MARINE DRIVE WILL NOT FUNCTION.
Step 1. Check circuit breaker CB4.
Test circuit breaker.
Step 2. Check for loose electrical lead or connector.
Tighten loose connections.
34. MARINE DRIVE SELECTOR INOPERATIVE.
Step 1. Check for loose electrical lead or connector.
Tighten loose connections.
35. PERSONNEL HEATER OVERHEATS AND STOPS BURNING.
Step 1. Check for clogged exhaust vent.
Clear vent.
36. HEAT OUTPUT TOO LOW.
Step 1. Check switch to see if on LO heat.
Turn switch to HI heat.
37. BLOWER RUNS BUT HEATER FAILS TO IGNITE AT LOW AMBIENT TEMPERATURE.
Step 1. Check for lack of fuel to heater.
Check fuel tank.
Step 2. Check for defective igniter.
Refer to para 3-10 for service.
Step 3. Check voltage to see if its too low.
If speed of blower motor is running slow, check battery voltage.
38. HEATER DOES NOT OPERATE WHEN CONTROL SWITCH IS TURNED ON.
Step 1. Check for loose electrical lead.
Tighten loose electrical connection.
Step 2. Check to see if heater smokes excessively and / or "bangs" upon starting.
When starting, always turn switch on LO heat.

Section IV. MAINTENANCE PROCEDURES**3-7. General**

The instructions in this section are published for the information and guidance of operator / crew in maintaining the transporter.

3-8. Cab Assembly

Refer to the lubrication orders and service as required.

3-9. Identification Plates Inspection

Refer to paragraph 1-9 for inspection of the identification plates.

3-10. Personnel Heater Igniter Service

Refer to figure 3-1 and service the personnel heater igniter.

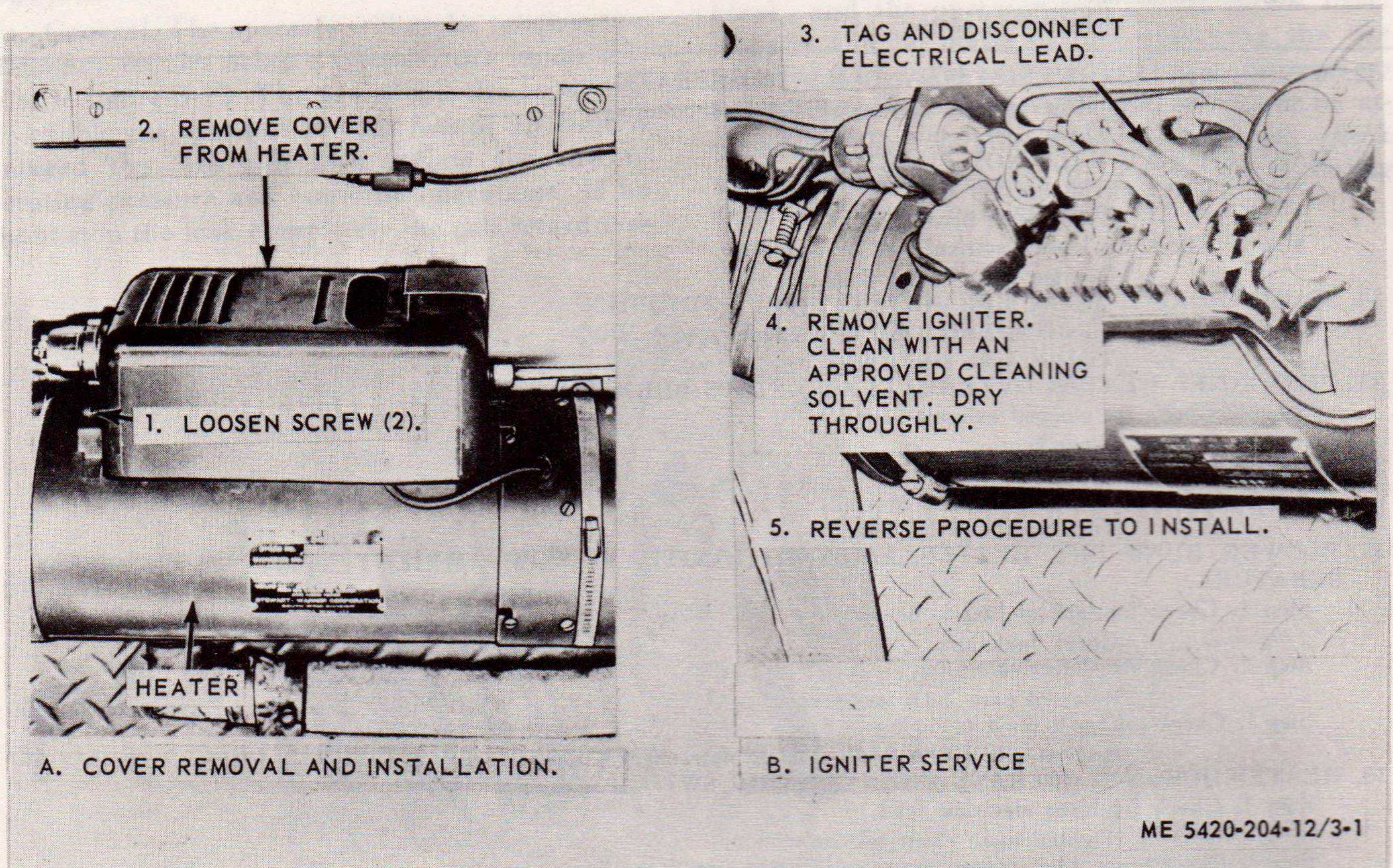


Figure 3-1. Personnel heater igniter service.

3-11. Splined Post Service

Refer to the lubrication orders and service as required.

3-12. Capstan Service

Refer to the lubrication orders and service as required.

3-13. Hand (Parking) Brake Service

Operator will make minor adjustment of hand brake (fig. 2-1) by turning knob on end of lever clockwise until moderate pressure is required to lift lever and lever snaps over center when applied, holding transporter immobile on a slope or against torque of transmission. When lever will not snap over center, backoff knob in a counterclockwise direction until adjustment will allow moderate lifting pressure to raise lever and snap it over center.

3-14. Hydraulic Brake System Test

a. Apply and release pressure on brake pedal three times. This will set adjustment mechanism in brake caliper, then with pressure released, check that brake discs (at differential) run free.

b. Apply and hold pressure on brake pedal for five minutes. While pressure is applied, check system for hydraulic fluid leaks.

c. Release pressure from pedal. After five minutes, check system for fluid leaks.

3-15. Hydraulic Brake Fluid Reservoir Service

Refer to figure 3-2 and service the brake fluid reservoir.

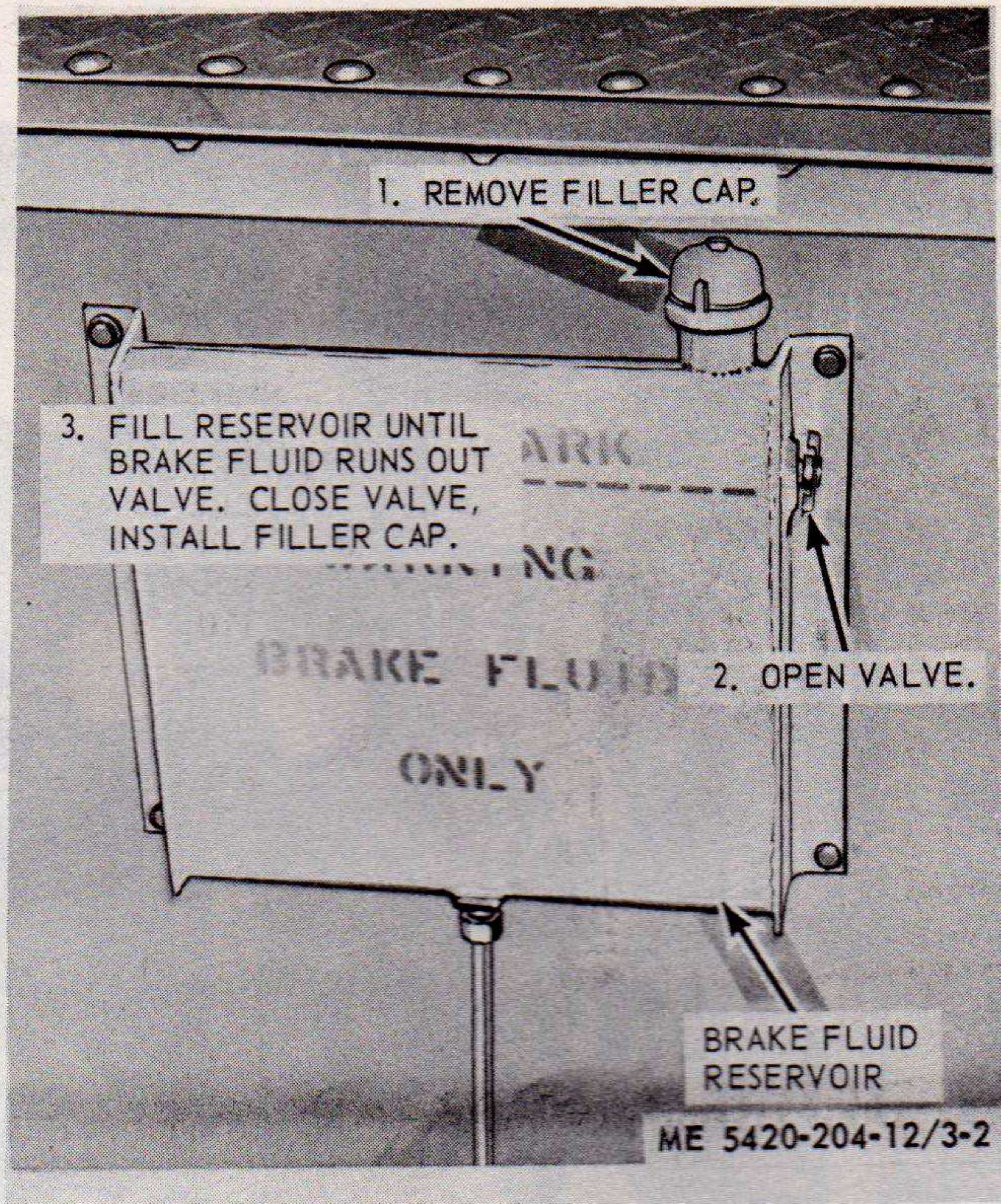


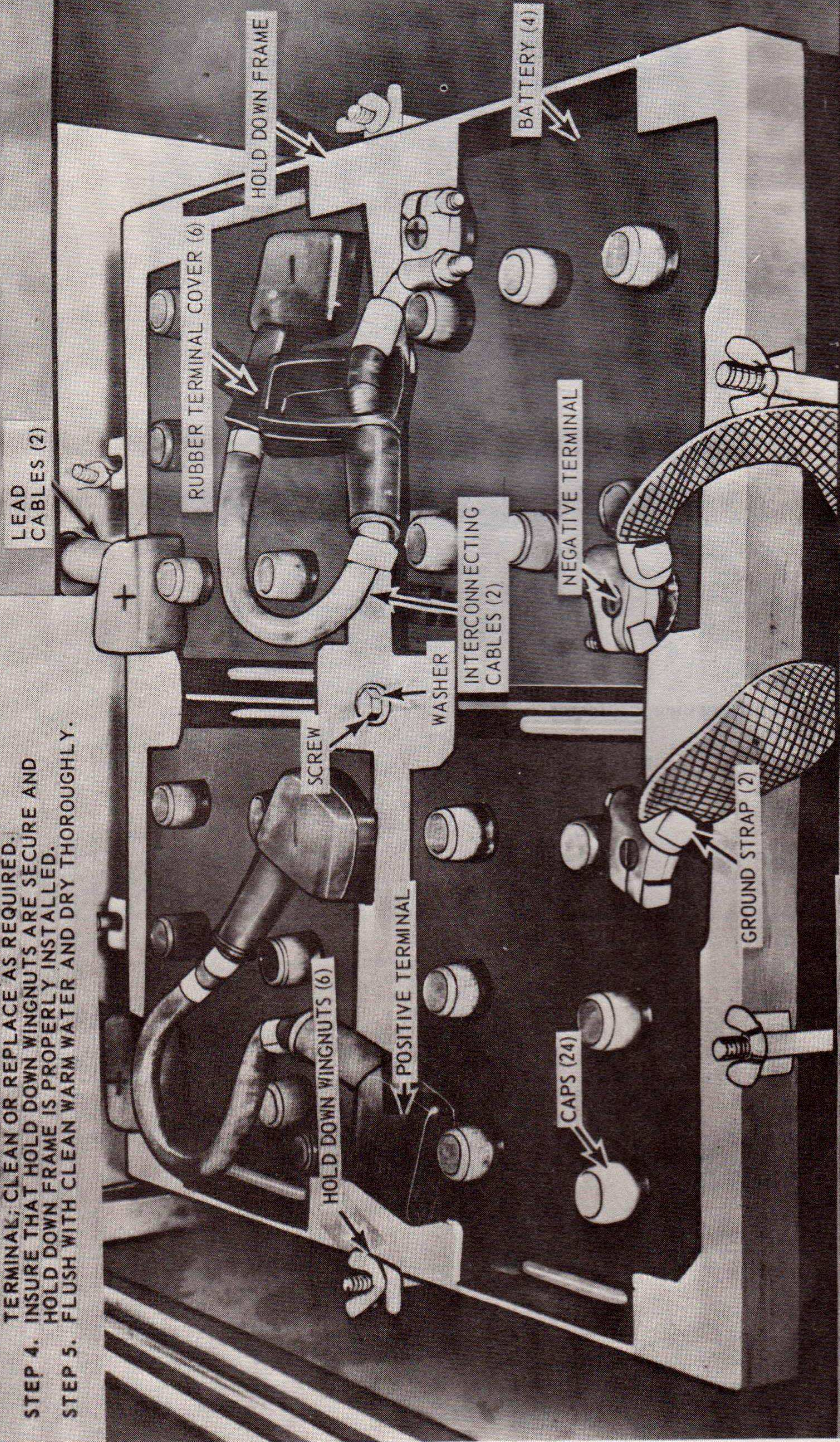
Figure 3-2. Brake fluid reservoir service.

3-16. Battery Service

Refer to figure 3-3 and service batteries.

- STEP 1. REMOVE CAPS AND FILL CELLS UNTIL WATER STANDS 3/8 INCH ABOVE PLATES.
- STEP 2. CLEAN VENT HOLE IN CAPS BEFORE REINSTALLATION.
- STEP 3. REMOVE TERMINAL COVERS AND TERMINAL LUG AND TERMINAL; CLEAN OR REPLACE AS REQUIRED.
- STEP 4. INSURE THAT HOLD DOWN WINGNUTS ARE SECURE AND HOLD DOWN FRAME IS PROPERLY INSTALLED.
- STEP 5. FLUSH WITH CLEAN WARM WATER AND DRY THOROUGHLY.

NOTE: RUN ENGINE FOR AT LEAST ONE HOUR AFTER ADDING WATER DURING COLD WEATHER OPERATION.



CAUTION: BEFORE CLEANING TERMINALS, REMOVE GROUND STRAPS TO PREVENT ARCING AND POSSIBLE ENSUING EXPLOSION.

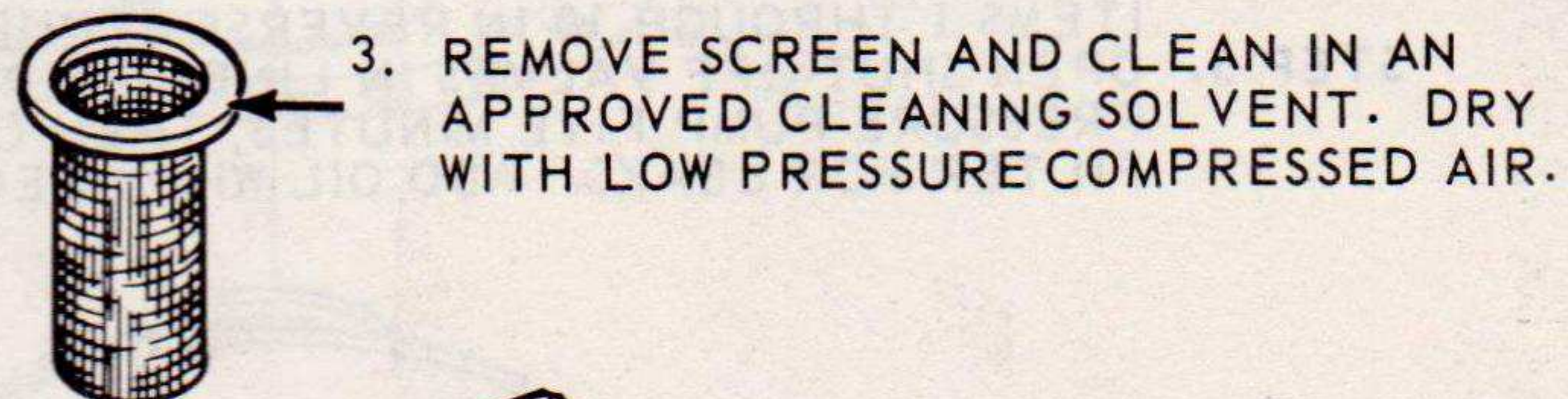
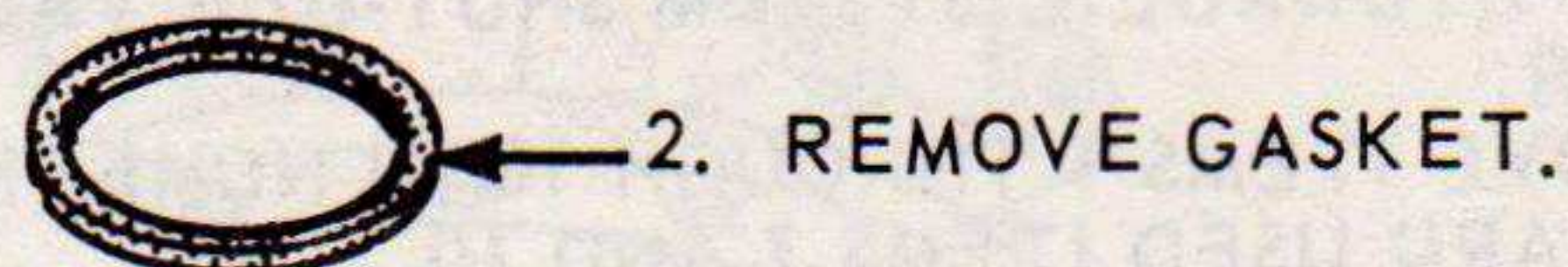
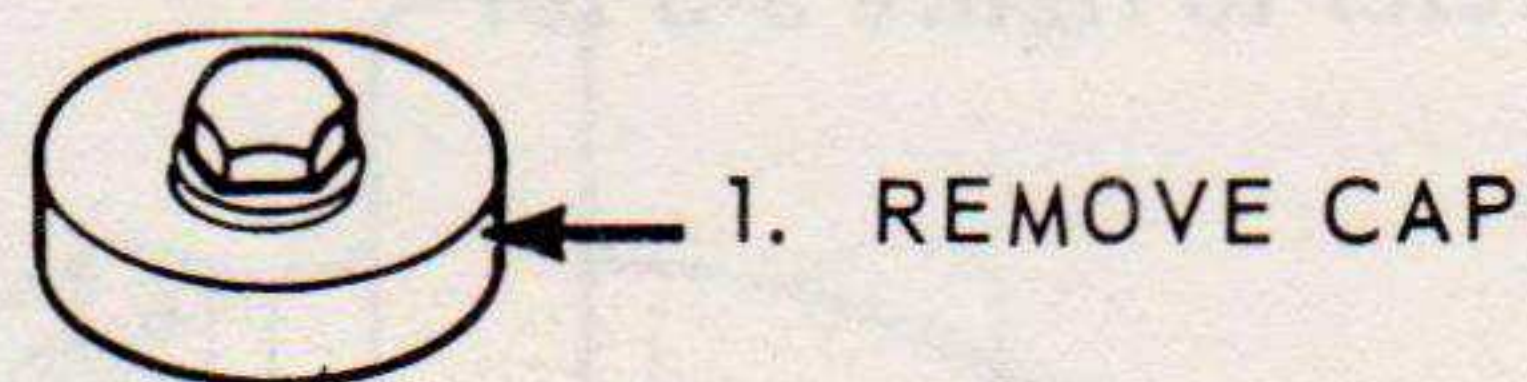
ME 5420-204-12/3-3

Figure 3-3. Battery service.

3-17. Hydraulic (Tank) Reservoir Service

Refer to figure 3-4 and service hydraulic reservoir.

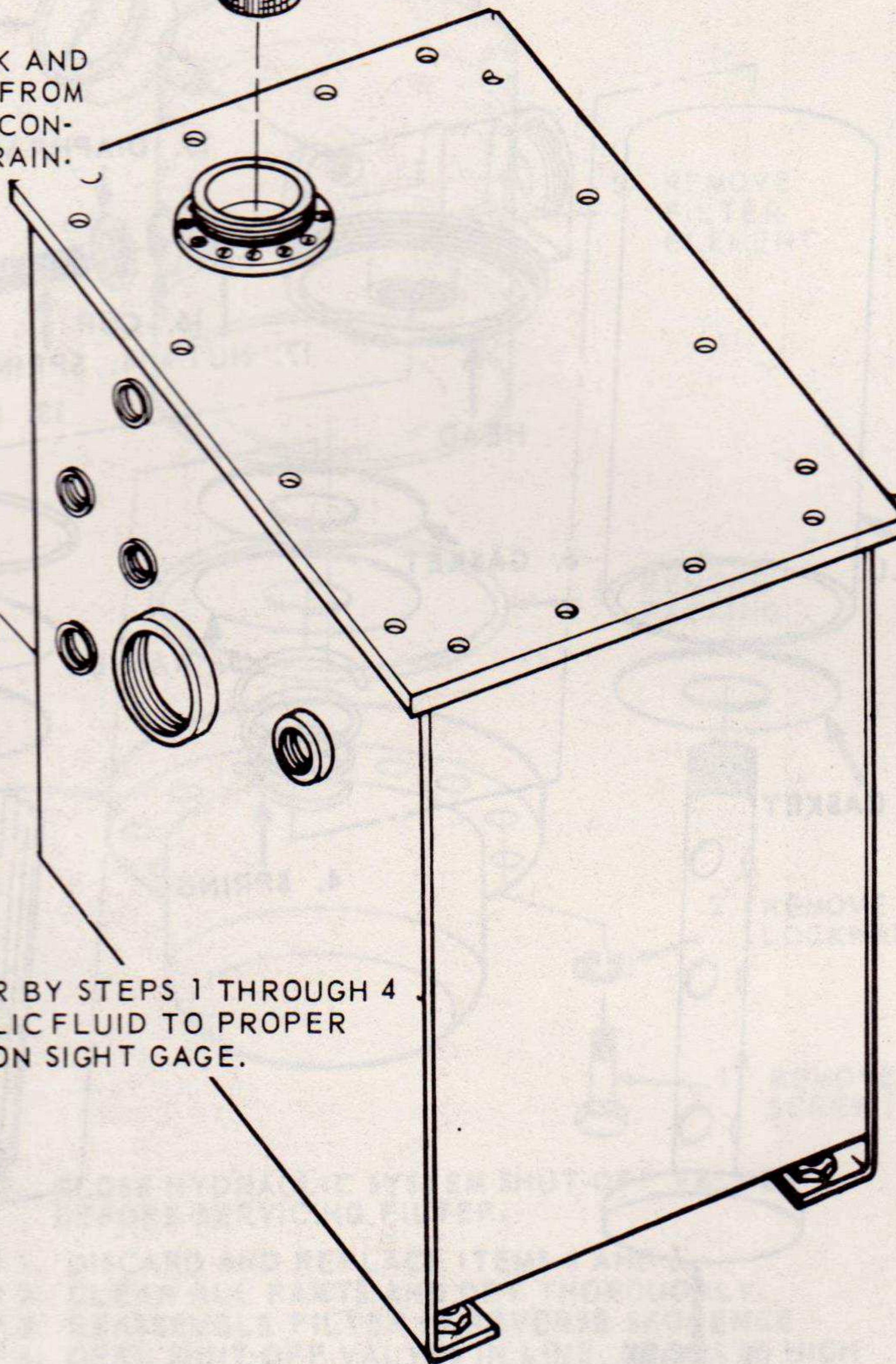
NOTE: BE SURE HYDRAULIC PUMP IS
DISENGAGED AND ENGINE IS
STOPPED BEFORE SERVICING
HYDRAULIC RESERVOIR



4. OPEN DRAIN COCK AND
DRAIN SEDIMENT FROM
RESERVOIR INTO CON-
TAINER. CLOSE DRAIN.



5. SERVICE RESERVOIR BY STEPS 1 THROUGH 4
THEN ADD HYDRAULIC FLUID TO PROPER
LEVEL INDICATED ON SIGHT GAGE.



ME 5420-204-12/3-4

Figure 3-4. Hydraulic reservoir service.

3-18. Hydraulic Fluid Filters Service

When gage pointer is in the red, service the applicable hydraulic fluid filter. Refer to figure 3-5 for maintenance.

NOTE: CLOSE HYDRAULIC SYSTEM SHUT-OFF VALVES BEFORE SERVICE OF FILTER.

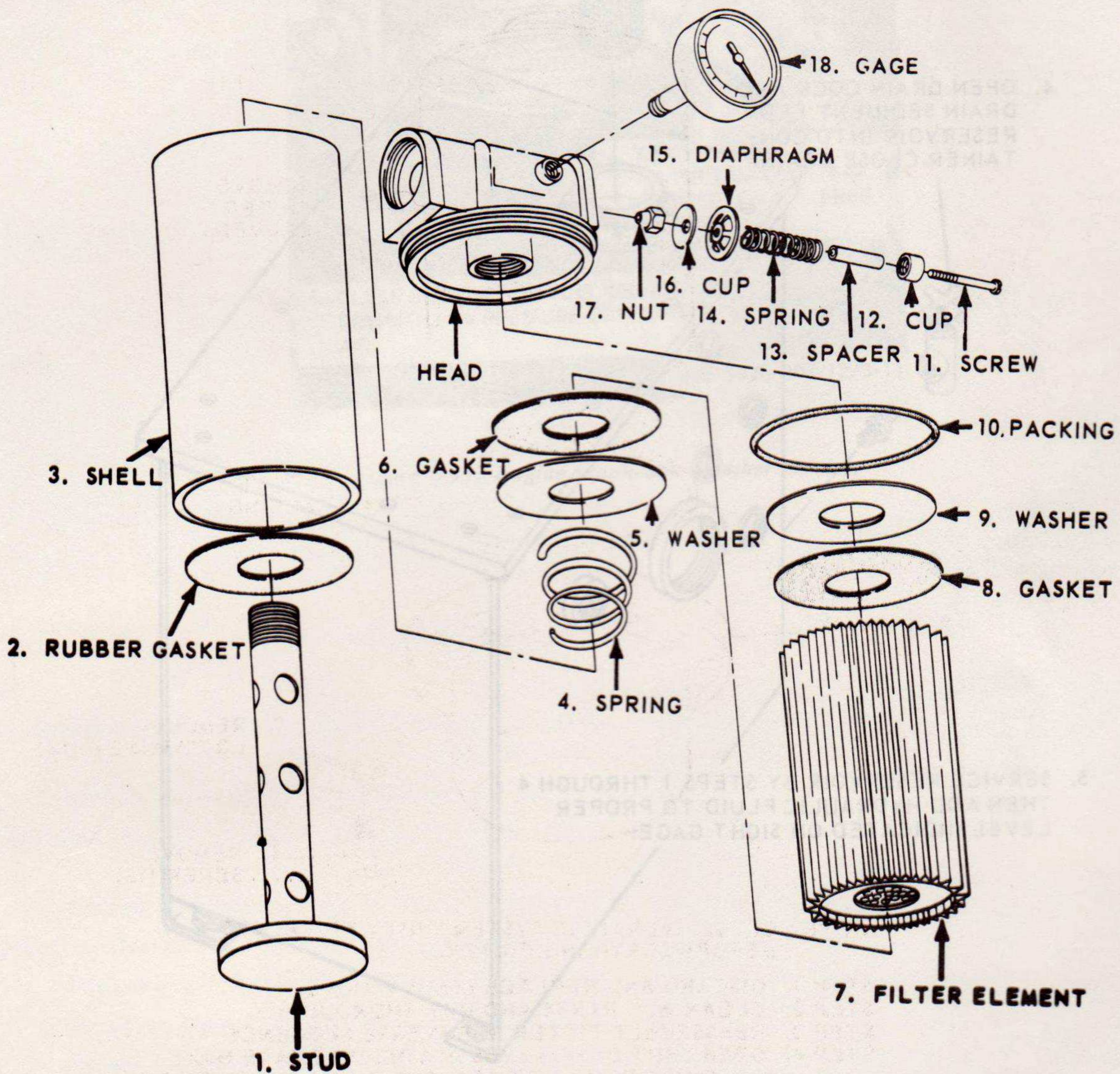
STEP 1. REMOVE ITEMS 1 THROUGH 10 IN NUMERICAL SEQUENCE.

STEP 2. DISCARD USED ITEMS 7 AND 10.

STEP 3. CLEAN REMAINING ITEMS AND DRY THOROUGHLY.

STEP 4. REPLACE ITEMS 7 AND 10 WITH NEW, THEN INSTALL ITEMS 1 THROUGH 10 IN REVERSE SEQUENCE.

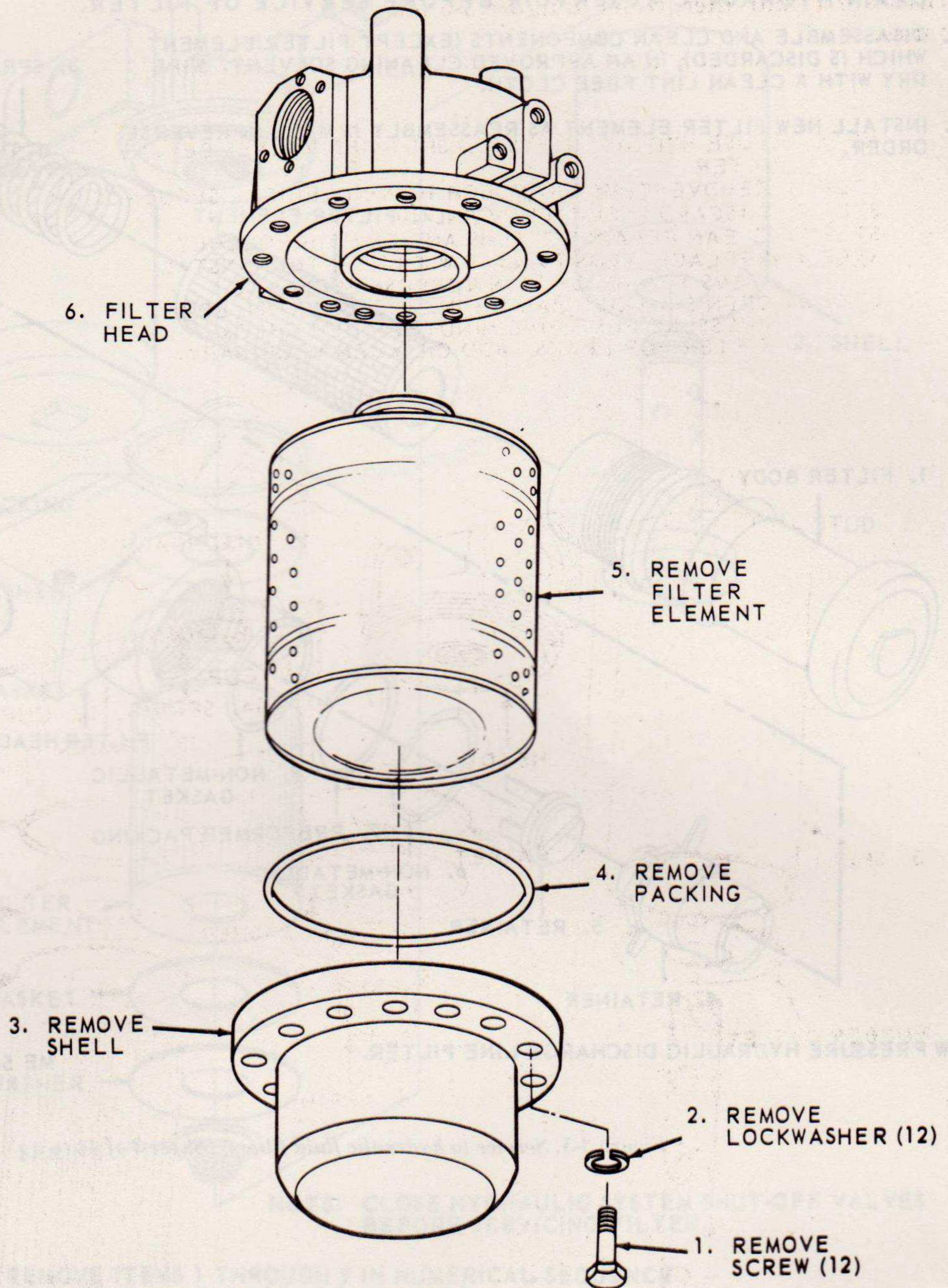
STEP 5. OPEN SHUT-OFF VALVES IN LINE, OPERATE LOW PRESSURE PUMP FIVE MINUTES, THEN CHECK FILTER FOR LEAKS. ADD OIL WHEN NECESSARY.



A. LOW PRESSURE HYDRAULIC SUCTION LINE FILTER.

ME 5420-204-12/3-5 (1)

Figure 3-5. Service to hydraulic fluid filters. (Sheet 1 of 4)



NOTE: CLOSE HYDRAULIC SYSTEM SHUT-OFF VALVES BEFORE SERVICING FILTER.

- STEP 1.** DISCARD AND REPLACE ITEMS 4 AND 5.
- STEP 2.** CLEAN ALL PARTS AND DRY THOROUGHLY.
- STEP 3.** REASSEMBLE FILTER IN REVERSE SEQUENCE
- STEP 4.** OPEN SHUT-OFF VALVES IN LINE, OPERATE HIGH PRESSURE PUMP FIVE MINUTES, THEN CHECK FILTER FOR LEAKS. ADD OIL WHEN NECESSARY.

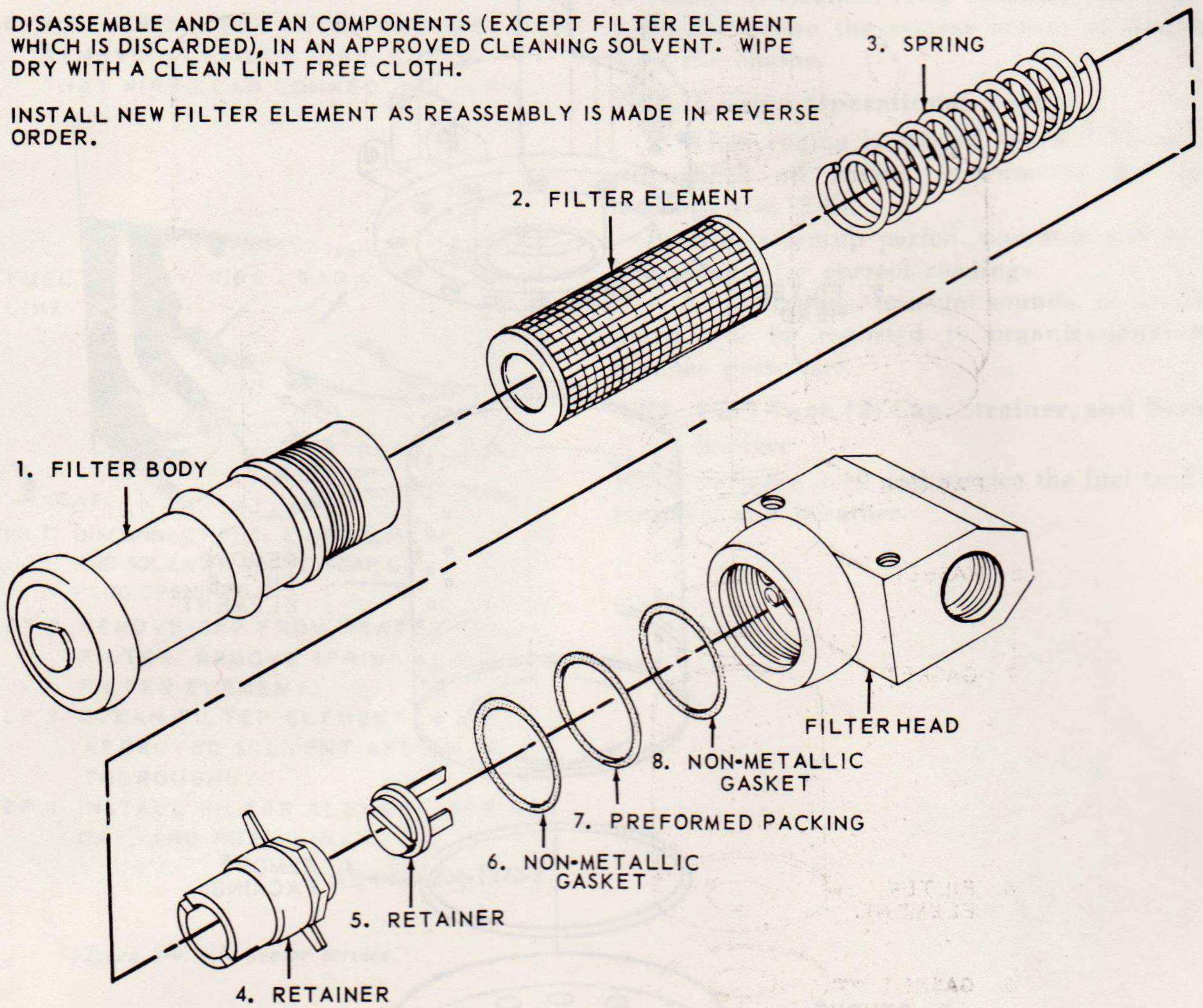
B. HIGH PRESSURE HYDRAULIC DISCHARGE LINE FILTER. ME 5420-204-12/3-5 (2)

Figure 3-5. Service to hydraulic fluid filters. (Sheet 2 of 4)

NOTE: DRAIN HYDRAULIC RESERVOIR BEFORE SERVICE OF FILTER.

STEP 1. DISASSEMBLE AND CLEAN COMPONENTS (EXCEPT FILTER ELEMENT WHICH IS DISCARDED), IN AN APPROVED CLEANING SOLVENT. WIPE DRY WITH A CLEAN LINT FREE CLOTH.

STEP 2. INSTALL NEW FILTER ELEMENT AS REASSEMBLY IS MADE IN REVERSE ORDER.



C. LOW PRESSURE HYDRAULIC DISCHARGE LINE FILTER.

ME 5420-204-12/3-5 (3)

Figure 3-5. Service to hydraulic fluid filters. (Sheet 3 of 4)