

TECHNICAL MANUAL

**OPERATOR'S AND ORGANIZATIONAL
MAINTENANCE MANUAL
WATER PURIFICATION UNIT, VAN TYPE
BODY MOUNTED
ELECTRIC MOTOR DRIVEN, AC, DC, 115, 208 V,
SINGLE AND 3 PHASE, 60 HERTZ,
1/20 to 2 HP; 1500 GPH
MODEL EMC-1500S
NSN 4610-01-037-8746**

**HEADQUARTERS, DEPARTMENT OF THE ARMY
4 JANUARY 1980**

TECHNICAL MANUAL

No. 5-4610-218-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 4 January 1980

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL
WATER PURIFICATION UNIT, VAN TYPE BODY MOUNTED
ELECTRIC MOTOR DRIVEN, AC, DC, 115,208 V,
SINGLE AND 3 PHASE, 80 HERTZ,
1/20 TO 2 HP; 1500 GPH
MODEL EMC-1500S
NSN 4610-01-037-8746

REPORT OF ERRORS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2026.210-cated in the back of this manual direct to: Commander, U. S. Army Troop Support & Aviation Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 (Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you.

TABLE OF CONTENTS

	Page
CHAPTER 1. INTRODUCTION	
Section I. General.....	1-1
II. Description and Data.....	1-4
CHAPTER 2. OPERATING INSTRUCTIONS	
Section I. Operating Procedures.....	2-1
II. Operation of Auxiliary Equipment.....	2-53
III. Operation Under Unusual Conditions.....	2-57
CHAPTER 3. OPERATOR/CREW MAINTENANCE INSTRUCTIONS	
Section I. Lubrication Instructions.....	3-1
II. Preventive Maintenance Checks and Services.....	3-1
III. Troubleshooting.....	3-34
IV. Maintenance Procedures.....	3-40
CHAPTER 4. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS	
Section I. Service Upon Receipt of Material.....	4-1
II. Movement to a New Worksite.....	4-13
III. Repair Parts, Special Tools, and Equipment.....	4-15
IV. Preventive Maintenance Checks and Services.....	4-15
V. Troubleshooting.....	4-44
VI. Radio Interference Suppression.....	4-53
VII. Maintenance of Chemical Feed Equipment.....	4-54
VIII. Maintenance of Receptacle Connectors.....	4-67
IX. Maintenance of Lights, Switches, Circuit Breakers, Motor Starters and Terminal Panel.....	4-70
X. Maintenance of Control Cabinet and Cable Assemblies.....	4-78
XI. Maintenance of Erdlator Components.....	4-80

	Page
Section XII. Maintenance of Erdlator Raw Water Piping Valves, Pressure Gage and Sight Glass	4-87
XIII. Maintenance of Influent Launder, Effluent Launder Connecting Tube, Adjustable Support Rods, and Sludge Concentrator Valves.....	4-100
XIV. Maintenance of Erdlator Waste Water Piping and Valves.....	4-105
XV. Maintenance of Erdlator Coagulated Water Piping, Tubing and Valves	4-111
XVI. Maintenance of Diatomite Filter Gages and Air Release Valve	4-111
XVII. Maintenance of Three-Way Plug Valves and Adjustable Flow Controller	4-117
XVIII. Maintenance of Diatomite Filter Coagulated Water Piping and Valves	4-119
XIX. Maintenance of Waste Water Piping For Filter, Sludge Concentrator Tank and Waste Tank.....	4-119
XX. Maintenance of Filtered Water Piping	4-130
XXI. Maintenance of Diatomite Filter Assembly	4-135
XXII. Maintenance of Chemical Piping and Plastic Tubing	4-142
XXIII. Maintenance of Diatomite Filter Pump and Motor	4-143
XXIV. Maintenance of Effluent Launder and Erdlator Agitator Shaft Assembly	4-145
XXV. Maintenance of the Van Body.....	4-146
XXVI. Maintenance of the Van Body Doors, Roof Hatch, and Windows	4-146
XXVII. Maintenance of Van Body Lights, Reflectors, and Switches	4-159
XXVIII. Maintenance of the Stowage Rack, Leveling Jacks, and Ladder Assembly	4-167
XXIX. Administrative Storage	4-172
XXX. Maintenance of Personnel Heater	4-176
APPENDIX A. REFERENCES	A-1
APPENDIX B. COMPONENTS OF END ITEM LIST	B-1
APPENDIX C. ADDITIONAL AUTHORIZATION LIST	C-1
APPENDIX D. MAINTENANCE ALLOCATION CHART	D-1
APPENDIX E. EXPENDABLE SUPPLIES AND MATERIALS LIST	E-1
INDEX	Index-1

LIST OF ILLUSTRATIONS

Figure	Title	Page
1.1.	Placement of charges for demolition of water purification unit.....	1-3
1-2.	Van body mounted on truck chassis, right side view.....	1-5
1-3.	Open van body with installed equipment, left side	1-6
1-4.	Cross section of the erdlator assembly	1-7
1-5.	Chemical feed equipment, instilled	1-10
1-6.	Data plates for water purification set, van body mounted -1500 GPH	1-11
1-7.	Dimension and clearance	1-19
2-1.	Preliminary positioning of valves.....	2-25
2-2.	Raw water controls, erdlator top view.....	2-26
2-3.	Filter preliminary valve positioning and precoating.....	2-28
2-4.	Flow diagram	2-29
2-5.	Diatomite filter	2-35
2-6.	Ferric chloride solution calibration chart.....	2-36
2-7.	Calcium hypochlorite solution calibration chart	2-37
2-8.	Limestone slurry calibration chart.....	2-38
2-9.	Chemical slurry feeder controls, front view	2-39
2-10.	Chemical slurry feeder controls, side view.....	2-40
2-11.	Electrical control cabinet	2-40
2-12.	Electrical driven raw water or distribution pump.....	2-41
2-13.	Chemical solution feeder controls.....	2-42
2-13.1	Chemical solution feeder controls (raider model only)	2-42.1
2-14.	Agitator drive belt adjusting pints	2-43
2-15.	Raw water flow indicator, installed	2-44
2-16.	Diatomite slurry calibration chart	2-44
2-17.	Filter operation	2-45
2-18.	Filter backwashing instructions	2-46
2-19.	Stopping water treatment section.	2-47
2-20.	ceiling light toggle switch.....	2-50
2-21.	Blackout switch, installed on door frame	2-51
2-22.	Heater controls	2-52
2-23.	Thermostat, instilled	2-52
2-24.	Chlorine comparator in case	2-53
2-25.	Use of chlorine comparator	2-54
2-26.	Electrical control cabinet lower section, with door open	2-56
2-27.	Starting and stopping personnel heater.....	2-57
3-1.	(Deleted)	3-2
3-2.	Chemical equipment fuse, removal and installation.....	3-40
3-3.	Wet well warning light, removal and installation	3-41
3-4.	Raw water sight glass, service	3-42
3-5.	Chain guard, removal and instillation	3-43
3-6.	Slurry feeder drive chain and chain tightener, adjustment	3-44
3-7.	Slurry feeder drive belt, adjustment.....	3-45
3-8.	Filter elements, removal and installation.....	3-47
3-9.	Filter elements, disassembly and assembly	3-48
3-10.	Filter element plastic sleeve, removal.....	3-49
3-11.	Filter element plastic sleeve, installation.....	3-50
4-1.	Installation of lower spreader assembly for rear sling cables	4-2
4-2.	Cable and sling points for removing truck with van.....	4-3
4-3.	Cable and sling points for unloading van body.	4-4

Figure	Title	Page
4-4.	Cable and sling points for unloading trailer.....	4-4
4-5.	Water purification and supporting equipment in operating position.....	4-7
4-6.	Electrical driven raw water or distribution pump.....	4-9
4-7.	Electrical cables, installed.....	4-11
4-8.	Diatomite filter assembly, removal and installation.....	4-12
4-9.	Radio interference suppression component locations, removal and installation ..	4-53
4-10.	Chemical solution feeder, removal and installation.....	4-54
4-11.	Chemical solution feeder diaphragm pump, disassembly and reassembly ..	4-55
4-11.1	Chemical solution feeder, removal and installation (raider model only)	4-56
4-11.2	Chemical solution feeder diaphragm pump and motor, removal and disassembly (raider model only)	4-56.2
4-12.	Chemical solution tanks, removal and instillation	4-56.3
4-13.	Chemical slurry feeder chain guard, chain, and chain tightener, removal and instillation	4-58
4-14.	Chain tightener assembly, disassembly and reassembly	4-58
4-15.	Slurry feeder slip clutch, removal and installation.....	4-59
4-16.	Slurry feeder slip clutch, disassembly and reassembly	4-60
4-17.	Slurry feeder slip clutch, adjustment	4-61
4-18.	Chemical slurry feeder diatomite dilution tank, removal and installation	4-62
4-19.	Diatomite dilution tank, disassembly and reassembly	4-63
4-20.	Slurry feeder drive motor, speed reducer and belt, removal, installation, and adjustment	4-64
4-21.	Slurry feeder drive motor electrical box, with cover removed	4-65
4-22.	Slurry feeder drive motor, disassembly and reassembly.....	4-66
4-23.	Duplex receptacle connector, removal and installation	4-68
4-24.	Duplex receptacle connector, with cover removed, removal and installation.....	4-68
4-25.	Twist lock receptacle connector, removal and instillation	4-69
4-26.	Twist lock receptacle connector, with cover removed, removal and installation	4-70
4-27.	Low water level warning light, removal and installation	4-71
4-28.	Low water level warning light, disassembly and reassembly	4-72
4-29.	Low water level sensitive switch, removal and installation.....	4-73
4-30.	Low water level sensitive switch, with cover removed	4-73
4-31.	Warning light and buzzer toggle switch, removal and installation	4-74
4-32.	Start and stop control switches, removal and instillation	4-75
4-33.	Heater and van body circuit breakers, removal and installation	4-76
4-34.	Motor starter and overload heater relay, removal and installation	4-77
4-35.	Terminal panel, removal and installation.....	4-78
4-36.	Control cabinet, instilled	4-79
4-37.	Erdlator agitator drive motor wiring and belt removal points, removal and instillation	4-81
4-38.	Erdlator agitator drive motor, removal and installation.....	4-82
4-39.	Erdlator agitator drive motor, disassembly and reassembly	4-83
4-40.	Agitator motor base, disassembly and reassembly	4-84
4-41.	Erdlator agitator drive shaft and speed reducer assembly, removal and installation.....	4-85
4-42.	Erdlator agitator drive shaft assembly, disassembly and reassembly.....	4-86
4-43.	Slurry feeder raw water piping, removal and installation	4-88
4-44.	Limestone slurry ejector, disassembly and reassembly	4-89
4-45.	Raw water flow indicator and piping, removal and instillation	4-90
4-46.	Raw water pressure gage, removal and instillation	4-91
4-47.	Raw water piping between inlet hose and top of erdlator, removal and installation..	4-92
4-48.	Raw water piping between inlet hose and top of erdlator, disassembly and reassembly	4-93
4-49.	Raw water sight glass assembly, disassembly and reassembly	4-94
4-50.	Aspirator manifold assembly, removal and instillation	4-95
4-51.	Aspirator manifold assembly, disassembly and reassembly	4-96
4-52.	Low water level alarm float assembly and valves, removal and installation	4-97

Figure	Title	Page
4-53.	Low water level alarm float and linkage, disassembly and reassembly	4-98
4-54.	Raw water float valve by-pass piping, disassembly and reassembly.. . . .	4-99
4-55.	Aspirator manifold assembly and influent launder, removal and installation	4-101
4-56.	Effluent launder connecting tube and adjustable support rods, removal and instillation	4-102
4-57.	Sludge concentrator valves and piping, removal and installation	4-103
4-58.	Sludge concentrator valves and piping, disassembly and reassembly	4-104
4-59.	Waste water piping between bottom of erdlator tank and outlet in van, removal and i n s t i l l a t i o n	4-106
4-60.	Waste water piping between bottom of erdlator tank and outlet in van, disassembly and reassembly	4-107
4-61.	Waste water piping between wet well and erdlator tank outlet piping, removal and instillation	4-108
4-62.	Waste water piping connected to wet well, removal and installation.	4-109
4-63.	Waste water piping between wet well and erdlator tank outlet piping, disassembly and reassembly	4-110
4-64.	Erdlator coagulated water tubing between erdlator tank and diatomite dilution tank, removal and installation	4-112
4-65.	Coagulated water piping between erdlator weir box and sludge concentrator, removal and installation	4-113
4-66.	Coagulated water piping between erdlator weir box and sludge concentrator, disas- sembly and reassembly	4-114
4-67.	Air release valve, removal and installation	4-115
4-68.	Filter gages, plug valve, and flow controller, removal and installation	4-116
4-69.	Influent plug valve, removal and installation	4-118
4-70.	Three-way plug valve, disassembly and reassembly	4-118
4-71.	Coagulated water piping from wet well to quick acting valve, removal and installation	4-120
4-72.	Coagulated water piping from quick acting valve to filter pump and filter, removal and instillation	4-121
4-73.	Coagulated water piping from wet well to filter pump, disassembly and reassembly.	4-122
4-74.	Coagulated water piping from filter pump to filter, disassembly and reassembly	4-123
4-75.	Section of coagulated water recirculation piping between wet well and filter, removal and instillation	4-124
4-76.	Section of coagulated water recirculation piping, showing removal points	4-125
4-77.	Coagulated water piping from filter plug valve to wet well, disassembly and reassembly	4-126
4-78.	Waste water piping between waste tank, sludge concentrator tank, and union, re- moval and installation	4-127
4-79.	Waste water piping between waste tank, sludge concentrator tank, and outlet in van body, disassembly and reassembly.,	4-128
4-80.	Waste water piping from union to outlet in van body, removal and installation	4-129
4-81.	Waste water piping and valve at bottom of filter, removal and installation	4-130
4-82.	Piping between main filtered water lines and slurry feeder, removal and installation	4-131
4-83.	Filtered water piping to slurry feeder, disassembly and reassembly.....,.....,	4-132
4-84.	Filtered water piping from plug valves to outlet in van body, removal and installation	4-133
4-85.	Filtered water piping from plug valve to outlet in van body, disassembly and reassembly	4-134
4-86.	Filtered water piping from filter to plug valve, removal and installation	4-136
4-87.	Filtered water piping from filter to plug valve, disassembly and reassembly,	4-137
4-88.	Diatomite filter assembly, removal and instllation.	4-138
4-89.	Filter housing cover, disassembly and reassembly	4-139
4-90.	Filter housing, disassembly and reassembly	4-140

Figure	Title	Page
4-91.	Diatomite filter element, disassembly and reassembly	4-141
4-92.	Diatomite filter pump and motor, removal and instillation	4-144
4-93.	Diatomite filter pump, disassembly and reassembly	4-145
4-94.	Bridge rail assembly, influent and effluent launder, agitator shaft assembly, and downcomer tube, removal and installation	4-147
4-95.	Partial view of left top side door and counter-balance assembly, removal and installation	4-149
4-96.	Partial view of left top side door, instilled	4-150
4-97.	Door hinge and seals, disassembly and reassembly	4-151
4-98.	Left side door counter-balance assembly, disassembly and reassembly	4-152
4-99.	Partial view of left bottom side door and counter-balance assembly, removal and installation	4-153
4-100.	Partial view of left bottom side door hinge, instilled	4-154
4-101.	Van body door and door check assembly, installed	4-155
4-102.	Van body right side or rear door and door check assembly, disassembly and reassembly	4-156
4-103.	Van body bonnet door, instilled	4-157
4-104.	Van body roof hatch, removal and instillation	4-158
4-105.	Ventilating window, outside view, removal and installation	4-160
4-106.	Ventilating window, inside view, removal and instillation	4-160
4-107.	Ventilating window, disassembly and reassembly	4-161
4-108.	Stationary window, outside view, removal and instillation	4-162
4-109.	Stationary window, inside view, removal and installation	4-162
4-110.	Stationary window, disassembly and reassembly	4-163
4-111.	Van clearance lights, one with door removed, removal and installation	4-164
4-112.	Van clearance lights, disassembly and reassembly	4-165
4-113.	Van body reflector, removal and instillation	4-166
4-114.	Van body ceiling light, removal and instillation	4-166
4-115.	Door blackout switch, removal, installation, and adjustment	4-168
4-116.	Van ceiling light toggle switch, removal and installation	4-169
4-117.	Stowage box, removal and instillation	4-170
4-118.	Stowage box frame, removal and instillation	4-170
4-119.	Leveling jack stowage rack, removal and installation	4-171
4-120.	Leveling jack, disassembly and reassembly	4-171
4-121.	Ladder assembly, removal and installation	4-173
4-122.	Van body cable outlet assembly, removal and installation	4-174
4-123.	Heater fuel filter, service	4-177
4-124.	Heater fuel pump, service	4-177
4-125.	Heater lamp, replacement	4-178
4-126.	Heater fuse, replacement	4-178
4-127.	Heater fuel adjustment	4-179
F. O. 1.	Wiring identification plate, van body	
F. O. 2.	Wiring identification plate, water purification unit	

LIST OF TABLES		
Number	Title	Page
		2-2
2-1	Valves and Draincocks.....	2-18
2-2	Pressure Flow and Feed Indicators.....	2-21
2-3	Manually Operated Electrical Controls.....	2-24
2-4	Sight Glass and Sensitive Switch.....	3-4
3-1	Operator/Crew Preventive Maintenance Checks and Services.....	3-35
3-2	Troubleshooting.....	4-16
4-1	Organizational Preventive Maintenance Checks and Services.....	4-45
4-2	Troubleshooting.....	

CHAPTER 1

INTRODUCTION

Section L GENERAL

1-1. Scope. This manual is for your use in operating and maintaining the EMC Industries Model 1500S Water Purification Unit. It contains information on the operation and organizational maintenance of the equipment. This manual also provides information on shipment, limited storage, and demolition.

1-1.1. Differences in Models.

The Raider Model 72-PVC-Duplex chemical solution feeder replaces existing chemical solution feeders in all retrofit water purification units covered by this manual. Identification of retrofit units must be accomplished by visual inspection before operating the equipment. Procedures and illustrations applicable only to the Raider Model 72-PVC Duplex chemical solution feeder are identified by the designation "(Raider Model only)".

1-2. Maintenance Forms and Records. Equipment maintenance forms and procedures for their use are contained in DA Pam 738-750, The Army Maintenance Management System (TAMMS).

1-2.1. Hand Receipt. Hand receipts for Components of End Item (COEI), Basic Issue Items (BII) and Additional Authorization List (AAL) and published in a Hand Receipt manual, TM 5-4610 -218-12-HR. This manual is published to aid in property accountability and are available through:

Commander,
US Army Adjutant General Publication
Center
ATTN: AGDL-OD
1655 Woodson Road
St. Louis, MO 63114

1-3. Administrative Storage. Refer to TM 750-90-1.

1-4. Destruction of Army Material to Prevent Enemy Use.

a. General. When capture of the water purification unit by an enemy or abandonment of it to the enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or render it inoperative. Based on this decision, orders are issued which cover the de-

sired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the vital parts of the water purification unit and all corresponding repair parts.

b. Demolition to Render Equipment Inoperative.

(1) Mechanical Means. Use sledge hammers, crowbars, picks, axes, or other heavy tools which may be available, together with the tools normally included with the water purification unit to demolish the following vital parts in the order of priority listed. Completion of the first steps will render the unit inoperative. Completion of the additional steps listed will completely destroy the equipment.

- (a) Erdlator tank and filters.
- (b) Instruments, controls, and valves.
- (c) Truck and generator engine and accessories.
- (d) Puncture the fuel tanks.
- (e) Slash the tires, hoses, and fabric tanks.

NOTE

The above steps are the minimum requirement for this method.

- (f) Pumps and electrical motors.
- (g) Wiring and piping.
- (h) Filter heads and filter elements.
- (i) Chemical feed equipment.
- (j) Cut all accessible cables, fuel, hydraulic, and coolant lines.
- (k) Chemical containers.
- (l) Van body.

(2) Misuse. Perform the steps listed below to make the unit inoperative.

- (a) Drain the lubricant and coolant from the engine.
- (b) Put sand, pulverized limestone, or ferric chloride into the truck engine and the gasoline driven pump engines.
- (c) Start the engine and operate at full throttle.