

# TM 10-3930-675-20-1

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TECHNICAL MANUAL

## ORGANIZATIONAL MAINTENANCE MANUAL

FOR

**ROUGH TERRAIN CONTAINER HANDLER (RTCH):  
RT 240; 53,000 LB CAPACITY; 4 X 4  
(NSN 3930-01-473-3998)**



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**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**JULY 2001**

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ORGANIZATIONAL MAINTENANCE MANUAL

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ROUGH TERRAIN CONTAINER HANDLER (RTCH)  
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**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

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**Table of Contents**

**Page  
Number**

**VOLUME 1**

Warning Summary .....	a
How To Use This Manual .....	vii

**CHAPTER 1 INTRODUCTORY INFORMATION WITH THEORY OF OPERATION**

WP 0001 00 General Information .....	0001 00-1
WP 0002 00 Equipment Description and Data .....	0002 00-1
WP 0003 00 Theory of Operation .....	0003 00-1

**CHAPTER 2 TROUBLESHOOTING PROCEDURES**

WP 0004 00 Troubleshooting Introduction .....	0004 00-1
WP 0005 00 Troubleshooting Symptom Index .....	0005 00-1
WP 0006 00 Troubleshooting Procedures (Non-Error Code) .....	0006 00-1
WP 0007 00 Engine Fuel Injector Circuits Troubleshooting .....	0007 00-1
WP 0008 00 Engine TPS and Idle Validation Switch Troubleshooting .....	0008 00-1
WP 0009 00 Cooling Fan Operation and Fan Control Troubleshooting .....	0009 00-1
WP 0010 00 Overload Protection Troubleshooting .....	0010 00-1

## Table of Contents - Continued

	<b>Page Number</b>
WP 0011 00 Tophandler Electronic Control Unit (ECU) (791) Troubleshooting . . . . .	0011 00-1
WP 0012 00 Electronic Control Unit (ECU) Input Voltage Troubleshooting . . . . .	0012 00-1
WP 0013 00 ECU-to-ECU Communications Troubleshooting . . . . .	0013 00-1
WP 0014 00 Steering ECU (792), Transmission ECU (793), and Engine ECU (794) Troubleshooting . . . . .	0014 00-1
WP 0015 00 Electronic Control Unit (ECU) Supply Voltage Troubleshooting . . . . .	0015 00-1
WP 0016 00 Input and Output Signals for Steering ECU (792) Troubleshooting . . . . .	0016 00-1
WP 0017 00 Engine Electronic Control Unit (ECU) (791) Troubleshooting . . . . .	0017 00-1
WP 0018 00 Engine Position Sensor Circuits Troubleshooting . . . . .	0018 00-1
WP 0019 00 Oil Pressure Sensor Troubleshooting . . . . .	0019 00-1
WP 0020 00 Engine Temperature Sensors and Circuits Troubleshooting . . . . .	0020 00-1
WP 0021 00 Engine Ambient Air Pressure Sensor and Circuits Troubleshooting . . . . .	0021 00-1
WP 0022 00 Engine Pressure Sensor Troubleshooting . . . . .	0022 00-1
WP 0023 00 Engine Fuel Pressure Sensors and Circuits Troubleshooting . . . . .	0023 00-1
WP 0024 00 Fuel Inlet Restriction Sensor Circuit Failure Troubleshooting . . . . .	0024 00-1
WP 0025 00 Engine Battery Voltage Circuits Troubleshooting . . . . .	0025 00-1
WP 0026 00 Transmission Temperature Troubleshooting . . . . .	0026 00-1
WP 0027 00 Transmission Speed Sensors Troubleshooting . . . . .	0027 00-1
WP 0028 00 Transmission Clutch Circuit Troubleshooting . . . . .	0028 00-1
WP 0029 00 Miscellaneous Transmission Failure Troubleshooting . . . . .	0029 00-1
WP 0030 00 Internal Transmission Clutch Slippage Failure Troubleshooting . . . . .	0030 00-1
WP 0031 00 Brake System Troubleshooting . . . . .	0031 00-1
WP 0032 00 Axle Brake Cooling System Troubleshooting . . . . .	0032 00-1
WP 0033 00 Steering Valve Circuit Troubleshooting . . . . .	0033 00-1
WP 0034 00 Mechanical or Hydraulic Steering Failure Troubleshooting . . . . .	0034 00-1
WP 0035 00 Steering Sensor Troubleshooting . . . . .	0035 00-1
WP 0036 00 Hydraulic Servo System Electronic Control Unit (ECU) (790) Troubleshooting . . . . .	0036 00-1
WP 0037 00 Auxiliary Pump Troubleshooting . . . . .	0037 00-1
WP 0038 00 Hydraulic Piston Pump Cut-Off Troubleshooting . . . . .	0038 00-1
WP 0039 00 Hydraulic Filters Indicators Troubleshooting . . . . .	0039 00-1
WP 0040 00 Boom Lifting/Lowering Troubleshooting . . . . .	0040 00-1
WP 0041 00 Boom In/Out Troubleshooting . . . . .	0041 00-1
WP 0042 00 Tophandler Slewing Troubleshooting . . . . .	0042 00-1
WP 0043 00 Tophandler Tilt Troubleshooting . . . . .	0043 00-1
WP 0044 00 Tophandler Leveling Troubleshooting . . . . .	0044 00-1
WP 0045 00 Tophandler Sideshift Troubleshooting . . . . .	0045 00-1
WP 0046 00 Tophandler Spreader Troubleshooting . . . . .	0046 00-1
WP 0047 00 Tophandler Twistlocks and Forklift Sensor Troubleshooting . . . . .	0047 00-1

### VOLUME 2

#### CHAPTER 3 ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

WP 0048 00 Service Upon Receipt . . . . .	0048 00-1
WP 0049 00 Preventive Maintenance Checks and Services (PMCS) Introduction . . . . .	0049 00-1
WP 0050 00 Preventive Maintenance Checks and Services (PMCS) . . . . .	0050 00-1
WP 0051 00 Rocker Arm Cover and Gasket Replacement . . . . .	0051 00-1
WP 0052 00 Engine Oil and Oil Filter Replacement . . . . .	0052 00-1

## Table of Contents - Continued

	<b>Page Number</b>
WP 0053 00 Engine Oil Dipstick Hose and Oil Fill Hose Replacement . . . . .	0053 00-1
WP 0054 00 Oil Sampling Valves and Hoses Replacement . . . . .	0054 00-1
WP 0055 00 Fuel Solenoid Shutoff Valve Replacement . . . . .	0055 00-1
WP 0056 00 Engine Air Cleaner Maintenance . . . . .	0056 00-1
WP 0057 00 Engine Air Intake Hoses and Tubes Replacement . . . . .	0057 00-1
WP 0058 00 Fuel Filter/Water Separator Replacement . . . . .	0058 00-1
WP 0059 00 Fuel Hoses, Lines, and Fittings Replacement . . . . .	0059 00-1
WP 0060 00 Ether Cold Start System Maintenance . . . . .	0060 00-1
WP 0061 00 Throttle Position Sensor (Accelerator Pedal) Replacement . . . . .	0061 00-1
WP 0062 00 Muffler and Exhaust Pipe Replacement . . . . .	0062 00-1
WP 0063 00 Draining and Filling Radiator Assembly . . . . .	0063 00-1
WP 0064 00 Cooling System Hoses Replacement . . . . .	0064 00-1
WP 0065 00 Cooling System Expansion Tank Maintenance . . . . .	0065 00-1
WP 0066 00 Thermostat Replacement . . . . .	0066 00-1
WP 0067 00 Water Pump Replacement . . . . .	0067 00-1
WP 0068 00 Coolant Filter Replacement . . . . .	0068 00-1
WP 0069 00 Alternator Replacement . . . . .	0069 00-1
WP 0070 00 Alternator Drive Belt Maintenance . . . . .	0070 00-1
WP 0071 00 Starter Replacement . . . . .	0071 00-1
WP 0072 00 Instrument Panel Switches, Gages, and Panel Lamps Replacement . . . . .	0072 00-1
WP 0073 00 Circuit Breakers and Relays Replacement . . . . .	0073 00-1
WP 0074 00 Tophandler Proximity Switches Replacement . . . . .	0074 00-1
WP 0075 00 Cab Position Proximity Switches Replacement . . . . .	0075 00-1
WP 0076 00 Tophandler Junction Box Maintenance . . . . .	0076 00-1
WP 0077 00 Tophandler Proximity Switch Junction Boxes Replacement . . . . .	0077 00-1
WP 0078 00 Engine Electronic Control Module (ECM) Replacement . . . . .	0078 00-1
WP 0079 00 Electronic Control Units (ECU) Replacement . . . . .	0079 00-1
WP 0080 00 ECS Display Screen Replacement . . . . .	0080 00-1
WP 0081 00 Electronic Joystick Assembly Replacement . . . . .	0081 00-1
WP 0082 00 Electronic Joystick Assembly Wiring Harness Replacement . . . . .	0082 00-1
WP 0083 00 Headlight Maintenance . . . . .	0083 00-1
WP 0084 00 Backup Light and Work Light Maintenance . . . . .	0084 00-1
WP 0085 00 Directional and Side Marker Light Maintenance . . . . .	0085 00-1
WP 0086 00 Blackout Light Maintenance . . . . .	0086 00-1
WP 0087 00 Twistlock Indicator Lights Maintenance . . . . .	0087 00-1
WP 0088 00 Cab Interior Light Maintenance . . . . .	0088 00-1
WP 0089 00 Infrared Lights Replacement . . . . .	0089 00-1
WP 0090 00 Forcing Water Level Sensor Replacement . . . . .	0090 00-1
WP 0091 00 Ambient Temperature Sensor Replacement . . . . .	0091 00-1
WP 0092 00 Wheel Temperature Sensor Replacement . . . . .	0092 00-1
WP 0093 00 Engine Sensors Replacement . . . . .	0093 00-1
WP 0094 00 Fuel Level Sending Unit Replacement . . . . .	0094 00-1
WP 0095 00 Transmission Sensors Replacement . . . . .	0095 00-1
WP 0096 00 Brake Inching Switch Replacement . . . . .	0096 00-1
WP 0097 00 Brake Light and Pressure Switches Replacement . . . . .	0097 00-1
WP 0098 00 Boom Angle Sensor Replacement . . . . .	0098 00-1
WP 0099 00 Boom Extension Sensor Replacement . . . . .	0099 00-1
WP 0100 00 Tophandler Angle Sensor Replacement . . . . .	0100 00-1

## Table of Contents - Continued

	<b>Page Number</b>
WP 0101 00 Hydraulic Reservoir and Lift Cylinder Sensors Replacement .....	0101 00-1
WP 0102 00 Hydraulic Filter Indicator Sensors Replacement .....	0102 00-1
WP 0103 00 Steering System Wheel Sensor Replacement .....	0103 00-1
WP 0104 00 Electric Horn Replacement .....	0104 00-1
WP 0105 00 Backup Alarm Replacement .....	0105 00-1
WP 0106 00 Seat Warning Buzzer Replacement .....	0106 00-1
WP 0107 00 Battery Maintenance .....	0107 00-1
WP 0108 00 Battery Cables Replacement .....	0108 00-1
WP 0109 00 Master Battery Switch Replacement .....	0109 00-1
WP 0110 00 Slave Starting Receptacle Replacement .....	0110 00-1
WP 0111 00 Electrical General Maintenance Instructions .....	0111 00-1
WP 0112 00 Transmission and Accessory Control Levers Replacement .....	0112 00-1
WP 0113 00 Transmission Oil Filter and Oil Cooler Hoses and Fittings Replacement .....	0113 00-1
WP 0114 00 Transmission Assembly Hydraulic Hoses and Pipes Replacement .....	0114 00-1
WP 0115 00 Transmission Oil, Oil Filters, and Oil Filter Head Replacement .....	0115 00-1
WP 0116 00 Transmission Oil Dipstick Hose and Pipe Replacement .....	0116 00-1
WP 0117 00 Transmission and Front and Rear Axle Vent Hoses Replacement .....	0117 00-1
WP 0118 00 Front and Rear Propeller Shafts Replacement .....	0118 00-1
WP 0119 00 Propeller Shaft Universal Joint Replacement .....	0119 00-1
WP 0120 00 Parking Brake Pads Maintenance .....	0120 00-1
WP 0121 00 Caging and Uncaging Parking Brake .....	0121 00-1
WP 0122 00 Parking Brake Control Valve Replacement .....	0122 00-1
WP 0123 00 Parking Brake System Hydraulic Hoses and Fittings Replacement .....	0123 00-1
WP 0124 00 Service Brake Control Valve Replacement .....	0124 00-1
WP 0125 00 Service Brake System Hydraulic Hoses and Fittings Replacement .....	0125 00-1
WP 0126 00 Brake Cooling Filter and Filter Head Replacement .....	0126 00-1
WP 0127 00 Brake System Charging Valve Pressure Adjustment .....	0127 00-1
WP 0128 00 Dolly Wheel Maintenance .....	0128 00-1
WP 0129 00 Steering Wheel Replacement .....	0129 00-1
WP 0130 00 Steering Column Base and Brake Pedal Maintenance .....	0130 00-1
WP 0131 00 Steering Column Replacement .....	0131 00-1
WP 0132 00 Steering System Hydraulic Hoses and Fittings Replacement .....	0132 00-1
WP 0133 00 Front and Rear Axle Steering Cylinders Replacement .....	0133 00-1
WP 0134 00 Steering Column Sensor Replacement .....	0134 00-1
WP 0135 00 Transmission Skid Plate and Access Covers Replacement .....	0135 00-1
WP 0136 00 Radiator Splash Shield Replacement .....	0136 00-1
WP 0137 00 Radiator Top Grating Replacement .....	0137 00-1
WP 0138 00 Radiator Fill Cover Plate Replacement .....	0138 00-1
WP 0139 00 Boom Assembly Wear Plates Replacement .....	0139 00-1
WP 0140 00 Tophandler Wear Plates Replacement .....	0140 00-1
WP 0141 00 Tow Pintle Replacement .....	0141 00-1
WP 0142 00 Cab Transport Lift Maintenance .....	0142 00-1
WP 0143 00 Engine Cover Maintenance .....	0143 00-1
WP 0144 00 Right-Side Step Assembly Replacement .....	0144 00-1
WP 0145 00 Left-Side Stair Assembly Maintenance .....	0145 00-1
WP 0146 00 Fender Assembly Replacement .....	0146 00-1
WP 0147 00 Mudguard Replacement .....	0147 00-1
WP 0148 00 Boom-to-Boom Extension Flexible Conveyor Maintenance .....	0148 00-1

## Table of Contents - Continued

	<b>Page Number</b>
WP 0149 00 Seat Belt Replacement . . . . .	0149 00-1
WP 0150 00 Seat Assembly Maintenance . . . . .	0150 00-1
WP 0151 00 Cab Door Weatherseal Replacement . . . . .	0151 00-1
WP 0152 00 Storage Compartment Doors and Latches Replacement . . . . .	0152 00-1
WP 0153 00 Battery and Dolly Wheels Storage Compartment Replacement . . . . .	0153 00-1
WP 0154 00 Remote Hydraulic Control Compartment Replacement . . . . .	0154 00-1
WP 0155 00 Rearview Mirrors Replacement . . . . .	0155 00-1
WP 0156 00 Windshield Wiper Maintenance . . . . .	0156 00-1
WP 0157 00 Windshield Washer Reservoir and Pump Replacement . . . . .	0157 00-1
WP 0158 00 Heater Hoses Replacement . . . . .	0158 00-1
WP 0159 00 Cab Heater/Air Conditioning Blower Motor and Fan Replacement . . . . .	0159 00-1
WP 0160 00 Cab Air Filters Replacement . . . . .	0160 00-1
WP 0161 00 Cab Auxiliary Fan Replacement . . . . .	0161 00-1
WP 0162 00 Data Plate Replacement . . . . .	0162 00-1
WP 0163 00 Fire Extinguisher Bracket Replacement . . . . .	0163 00-1
WP 0164 00 Relieving Hydraulic System Pressure . . . . .	0164 00-1
WP 0165 00 Auxiliary Pump Replacement . . . . .	0165 00-1
WP 0166 00 Tophandler Hydraulic Slewing Motors Replacement . . . . .	0166 00-1
WP 0167 00 Tophandler Hydraulic Spreader Motor Replacement . . . . .	0167 00-1
WP 0168 00 Cab Transport Control Valve Replacement . . . . .	0168 00-1
WP 0169 00 Control Valve Solenoids Replacement . . . . .	0169 00-1
WP 0170 00 Boom Folding Control Valve Replacement . . . . .	0170 00-1
WP 0171 00 Cab Lifting Cylinder Replacement . . . . .	0171 00-1
WP 0172 00 Cab Sliding Cylinder Replacement . . . . .	0172 00-1
WP 0173 00 Tophandler Twistlock Cylinder Replacement . . . . .	0173 00-1
WP 0174 00 Hydraulic System Cooling Hoses and Fittings Replacement . . . . .	0174 00-1
WP 0175 00 Cab Parking and Service Brake Hydraulic Hoses and Fittings Replacement . . . . .	0175 00-1
WP 0176 00 Main Hydraulic System Hoses and Fittings Replacement . . . . .	0176 00-1
WP 0177 00 Hydraulic Servo System Hoses and Fittings Replacement . . . . .	0177 00-1
WP 0178 00 Hydraulic System Test Point Hoses and Fittings Replacement . . . . .	0178 00-1
WP 0179 00 Cab Transport Hydraulic Hoses and Fittings Replacement . . . . .	0179 00-1
WP 0180 00 Boom Hydraulic System Hoses and Fittings Replacement . . . . .	0180 00-1
WP 0181 00 Tophandler Hydraulic System Hoses and Fittings Replacement . . . . .	0181 00-1
WP 0182 00 Forklift Kit Hydraulic Hoses and Fittings Replacement . . . . .	0182 00-1
WP 0183 00 Hydraulic System Oil Filters Replacement . . . . .	0183 00-1
WP 0184 00 Draining and Filling Hydraulic Reservoir . . . . .	0184 00-1
WP 0185 00 Hydraulic Reservoir Sight Gage Replacement . . . . .	0185 00-1
WP 0186 00 Hydraulic System Test Point Procedures . . . . .	0186 00-1
WP 0187 00 Rifle Mounting Bracket Replacement . . . . .	0187 00-1
WP 0188 00 Air Conditioner Leak Test . . . . .	0188 00-1
WP 0189 00 Air Conditioning Compressor Drive Belts Replacement . . . . .	0189 00-1
WP 0190 00 Air Conditioner Fans Maintenance . . . . .	0190 00-1
WP 0191 00 Tophandler Replacement . . . . .	0191 00-1
WP 0192 00 Preparation for Arctic Operation . . . . .	0192 00-1
WP 0193 00 Preparation for Storage or Shipment . . . . .	0193 00-1
WP 0194 00 General Maintenance Instructions . . . . .	0194 00-1
WP 0195 00 Transmission Calibration . . . . .	0195 00-1
WP 0196 00 Steering Calibration . . . . .	0196 00-1

## Table of Contents - Continued

**Page  
Number**

WP 0197 00	Boom and Tophandler Calibration .....	0197 00-1
WP 0198 00	Torque Limits .....	0198 00-1
WP 0199 00	Diagrams .....	0199 00-1

### CHAPTER 4 SUPPORTING INFORMATION

WP 0200 00	References .....	0200 00-1
WP 0201 00	Maintenance Allocation Chart (MAC) Introduction .....	0201 00-1
WP 0202 00	Maintenance Allocation Chart (MAC) .....	0202 00-1
WP 0203 00	Expendable and Durable Items List .....	0203 00-1
WP 0204 00	Tool Identification List .....	0204 00-1
WP 0205 00	Error Codes .....	0205 00-1
	Index .....	Index-1
	Foldouts .....	FO-1

# HOW TO USE THIS MANUAL

## INTRODUCTION

1. This manual is designed to help you perform Organizational Maintenance and Troubleshooting on the RT 240 Rough Terrain Container Handler (RTCH).
2. The *Repair Parts and Special Tools List (RPSTL)*, TM 10-3930-675-24P, is to be used in conjunction with this manual, to locate and obtain the repair parts and special tools needed to maintain this equipment.
3. This manual is written in Work Package format:
  - a. Chapters divide the manual into major categories of information (e.g., *Introductory Information with Theory of Operation, Troubleshooting Procedures, Organizational Maintenance Instructions, and Supporting Information*).
  - b. Each Chapter is divided into Work Packages, which are identified by a 6-digit number (e.g. 0001 00, 0002 00, etc.) located on the upper right-hand corner of each page. The Work Package page number (e.g. 0001 00-1, 0001 00-2, etc.) is located centered at the bottom of each page.
  - c. If a Change Package is issued to this manual, added Work Packages use the 5<sup>th</sup> and 6<sup>th</sup> digits of their number to indicate new material. For instance, Work Packages inserted between WP 0001 00 and WP 0002 00 are numbered WP 0001 01, WP 0001 02, etc.
4. This manual is published in two volumes: Volume I covers Chapters 1 and 2, Work Packages 0001 00 thru WP 0047 00 and includes all troubleshooting. Volume II includes Chapters 3 and 4, WP 0048 00 thru 0205 00.
5. Scan thru this manual to become familiar with its organization and contents before attempting to maintain the equipment.

## CONTENTS OF THIS MANUAL

1. A *Warning Summary* is located at the beginning of each volume of the manual. Become familiar with these warnings before operating or performing troubleshooting or maintenance on the vehicle.
2. A *Table of Contents* in Volume I lists the contents of Volumes I and II. The *Table of Contents* in Volume II lists the contents of Volume II only.
  - a. The Table of Contents also provides *Reporting Errors and Recommending Improvements* information and DA Form 2028 addresses, for the submittal of corrections to the manual.
  - b. If you cannot find what you are looking for in the Table of Contents, refer to the alphabetical *Index* at the back of the manual. The alphabetical Index for each volume lists only those Work Packages found in that volume.
3. Chapter 1, *Introductory Information with Theory of Information*, provides general information on the manual and the equipment.
4. Chapter 2, *Troubleshooting Procedures*, contains all applicable troubleshooting.
  - a. Before attempting to perform troubleshooting, carefully read the information in WP 0004 00, *Troubleshooting Introduction*. It explains how to perform both non-error code and error code-driven troubleshooting. Included at the end of this Work Package are locator diagrams of all electrical and hydraulic components that may be hard to locate.
  - b. The *Troubleshooting Symptom Index* in WP 0005 00 is divided into three sections. The first is an alphabetical listing, by system, of non error code-driven malfunctions. The second is a "Numerical Error Code Symptom Index". The third is an "Alphabetical Error Code Symptom Index".
  - c. The corrective action for certain malfunctions is to notify "SRA". Refer to Table 3 in the MAC (WP 0202 00) for further information about the Specialized Repair Activity for the RTCH.
5. Chapter 3 covers all *Organizational Maintenance Instructions*. Work Packages are organized in the same Functional Group Code (FGC) sequence as the Maintenance Allocation Chart (MAC) found in TM 10-3930-675-20-2.
6. Chapter 4 includes *Supporting Information: References, Expendable and Durable Items List, Tool Identification List* and a complete listing of *Error Codes* resident on the RTCH.
7. Following the alphabetical *Index* are *Foldouts* of the RTCH hydraulic systems.



## FEATURES OF THIS MANUAL

1. WARNINGS, CAUTIONS, NOTES, subject headings, and other important information are highlighted in **BOLD** print as a visual aid.

### **WARNING**

A WARNING indicates a hazard which may result in death or serious injury.

### **CAUTION**

A CAUTION is a reminder of safety practices or directs attention to usage practices that may result in damage to equipment.

### **NOTE**

A NOTE is a statement containing information that will make the procedures easier to perform.

2. Statements and words of particular interest may be printed in CAPITAL LETTERS to create emphasis.
3. Within a procedural step, reference may be made to another Work Package in this manual or to another manual. These references indicate where you should look for more complete information.
  - a. If you are told: "Replace engine ECU (WP 0078 00)", go to the first page of Work Package 0078 00 in Volume II of this manual for instructions on replacing the engine ECU. Be sure to read the "Initial Setup" on page 1 of the Work Package, to determine contents of Work Package as well as information regarding tools and equipment, spare parts, and personnel required, etc.
  - b. If you are told: "Check coolant level (TM 10-3930-675-10)", go to TM 10-3930-675-10 for complete instructions on checking the coolant level. Use the *Table of Contents* or alphabetical *Index* in TM 10-3930-675-10 to find procedure.
4. Illustrations are placed after, and as close to, the procedural steps to which they apply. Callouts placed on the art may be text or numbers, or both; whichever method is easier for the soldier.
5. Numbers located at lower right corner of art (e.g. 350-001; 350-002, etc.) are art control numbers and are used for tracking purposes. Disregard these numbers.
6. Dashed leader lines used in illustrations indicate that called out items are not visible in the view depicted (i.e. they are located within or behind the structure).
7. Technical instructions include metric units as well as standard units. For your reference, a *Metric Conversion Chart* is located on the inside back cover of the manual.

### **NOTE**

If at any time you are unsure how to use this manual or you cannot locate the information you need, notify your supervisor.

**CHAPTER 1**  
**INTRODUCTORY INFORMATION WITH**  
**THEORY OF OPERATION**

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**GENERAL INFORMATION**

---

0001 00

**SCOPE**

1. **Type of Manual.** This manual is for use in performing Organizational Maintenance and Troubleshooting on the Rough Terrain Container Handler (RTCH), RT 240.
2. **Equipment Name and Model Number.** Rough Terrain Container Handler (RTCH): RT 240, 53,000 lb capacity, 4 X 4.
3. **Purpose of Equipment.** The RTCH-RT 240 is designed to lift and stack 20 and 40 ft International Standard Organization (ISO) containers, loaded to a gross weight of 53,000 lb (24,062 kg).

**MAINTENANCE FORMS, RECORDS, AND REPORTS**

Department of the Army forms and procedures used for the equipment will be those prescribed by DA Pam 738-750, *Functional User's Manual for the Army Maintenance Management System (TAMMS)*, as contained in the Maintenance Management Update.

**REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRS)**

If your truck needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF Form 368 (*Product Quality Deficiency Report*). Mail it to us at: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, Illinois 61299-7630. We'll send you a reply.

**CORROSION PREVENTION AND CONTROL (CPC)**

1. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.
2. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem. If a corrosion problem is identified, it can be reported using SF Form 368 (*Product Quality Deficiency Report*). Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA Pam 738-750.

**OZONE DEPLETING SUBSTANCES**

Listing to be provided by requiring activity.

**DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE**

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-6.

**PREPARATION FOR STORAGE OR SHIPMENT**

For preparation for storage or shipment procedures, refer to WP 0193 00.

**WARRANTY INFORMATION**

The vehicles are warranted by Kalmar RT in accordance with TB 10-3930-675-14. Warranty starts on the date found in block 23, DA Form 2408-9 in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your Organizational Maintenance shop.

**LIST OF ABBREVIATIONS/ACRONYMS**

**NOTE**

Refer to ASME Y14.38-1999 for standard abbreviations.

<b>ABBREVIATION/ACRONYMS</b>	<b>DEFINITION</b>
AAL.....	Additional Authorization List
AOAP.....	Army Oil Analysis Program
BII.....	Basic Issue Items
C.....	Centigrade or Celsius
CAN-BUS.....	Controller Area Network-BUS
CID.....	Cubic Inch Displacement
cm.....	Centimeter
COEI.....	Components of End Item
ECM.....	Electronic Control Module
ECS.....	Electronic Control System
GCWR.....	Gross Combination Weight Rating
GVWR.....	Gross Vehicle Weight Rating
IETM.....	Interactive Electronic Technical Manual
ISO.....	International Organization for Standardization
kg.....	Kilogram
km.....	Kilometer
kPa.....	Kilopascal
kph.....	Kilometers per Hour
kW.....	Kilowatt
l.....	Liter
lb-ft.....	Pound Foot
lph.....	Liters per Hour
mm.....	Millimeter
NATO.....	North Atlantic Treaty Organization
Nm.....	Newton Meter
OEM.....	Original Equipment Manufacturer
PMCS.....	Preventive Maintenance Checks and Services
RTCH.....	Rough Terrain Container Handler
SOP.....	Standard Operating Procedure
SPORT.....	Soldier's Portable On-System Repair Tool
SRA.....	Specialized Repair Activity
ULLS-G.....	Unit Level Logistics System - Ground

**EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES**1. **Characteristics.**

- a. The Rough Terrain Container Handler (RTCH) RT 240 is designed to lift, move, stack or unstack 20 and 40 ft by 8 ft wide ISO containers.
- b. The RTCH-RT 240 has a lift capacity of 53,000 lb (24,062 kg) and operates on hard and/or unimproved surfaces, to include beach operations.
- c. The RTCH-RT 240 can be utilized as a forklift with an operator-installed forklift kit.

2. **Capabilities and Features.**a. **Capabilities.**

- (1) Container handling capabilities:
  - Stack or unstack 8 ft high ISO containers stacked three (3) high with a gross weight of 53,000 lb (24,062 kg) in the first row.
  - Stack or unstack 8 ft high ISO containers stacked three (3) high with a gross weight of 27,500 lb (12,485 kg) in the second row.
  - Stack or unstack 4.3 ft high ISO containers stacked seven (7) high.
  - Container tophandler adjusts to 20 ft or 40 ft ISO container lengths.
  - Container tophandler oscillates 7° left and right.
  - Container tophandler rotates 195° clockwise and 105° counterclockwise.
  - Container tophandler tilts 8° forward and 12° to the rear.
  - Container tophandler side shifts ± 15 in (± 400 mm) from the center.
- (2) Forklift kit is operator-installed and attaches to the tophandler. The forklifts are adjustable from 24 in (61 cm) center-to-center to 81.5 in (207 cm) center-to-center. Lift capacity is 44,000 lb (19,976 kg).
- (3) Maximum speed of RTCH is 23 mph (37 kph) on level ground with NO LOAD; maximum speed on level ground LOADED is 15 mph (24 kph).
- (4) Maximum fording depth is 60 in (1.52 m).
- (5) Operation in temperatures from -25°F (-32°C) to +125°F (+52°C), and to -40°F (-40°C) with arctic kit installed.

b. **Features.**

- (1) Electronically-controlled 400 hp, six-cylinder turbocharged engine.
- (2) Electronic semi-automatic shift controlled transmission with 4 ranges forward and 3 reverse. Operator selects range and ECM controls shift points.
- (3) The drive axles provide traction for two- or four-wheel drive.
- (4) Limited slip differentials and multi-disc-wet brakes are an integral part of the axle assemblies. Multi-disc-wet brakes are hydraulically cooled to prevent overheating. Accumulators store energy for the emergency braking system.
- (5) The steering system is capable of two-wheel, four-wheel, crab, and emergency modes of operation.
- (6) The parking brake is hydraulically released and spring-applied by disc brake assemblies mounted on the front and rear differentials.
- (7) The operator's cab has a fully adjustable operator's seat, fresh air (filtered) ventilation system, and heater/defroster/air conditioning systems.

***EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES - CONTINUED***

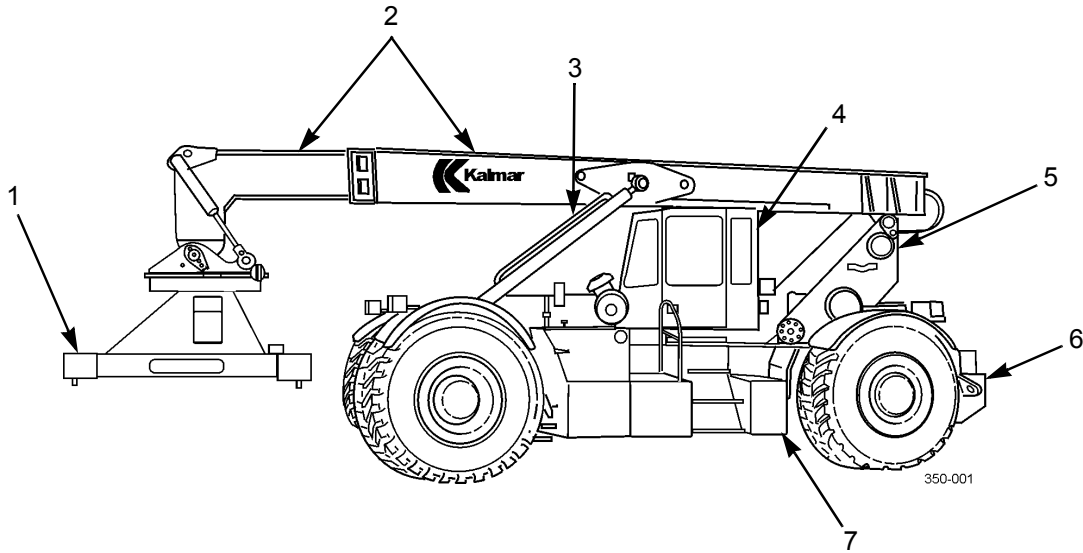
- (8) Operator's controls include: adjustable steering wheel; accelerator and brake pedals; transmission range selector; steering mode selection rocker switches; and a single joystick control for all boom, tophandler, and forklift operations.
- c. **Transport Modes.**

**NOTE**

Refer to TM 10-3930-675-10 for detailed instructions to prepare the RTCH for transport.

- Self Deployment
- Highway Transport
- Rail Transport
- Marine Transport
- Air Transport

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



KEY	COMPONENT	DESCRIPTION
1	Tophandler	Electro-hydraulically operated 20-40 ft tophandler. Capable of sideshifting, rotation, forward/rear tilting, left/right tilting, and load position leveling and locking. Also interfaces with forklift attachment.
2	Boom Assembly	Electro-hydraulically operated heavy duty steel boom designed for moving, lifting, and stacking 20-40 ft ISO containers.
3	Boom Lift Cylinders	Electro-hydraulically operated cylinders raise, lower, and support the boom assembly.
4	Operator's Cab	Contains all driving and container handling controls as well as heating, air conditioning, and filtered ventilation system controls. During air transport operations the cab is moved to the left side of the chassis, then lowered and secured in place.
5	Boom Support	Rear support and pivot point for the boom to include an unlocking device that allows the boom assembly to be lowered into the transport position.
6	Frame	A heavy-duty steel construction with tie-downs, towing lugs, and pintle hook.
7	Remote Hydraulic Control Compartment	Location of selected hydraulic remote controls. Also access to hydraulic system test and AOAP sampling ports.