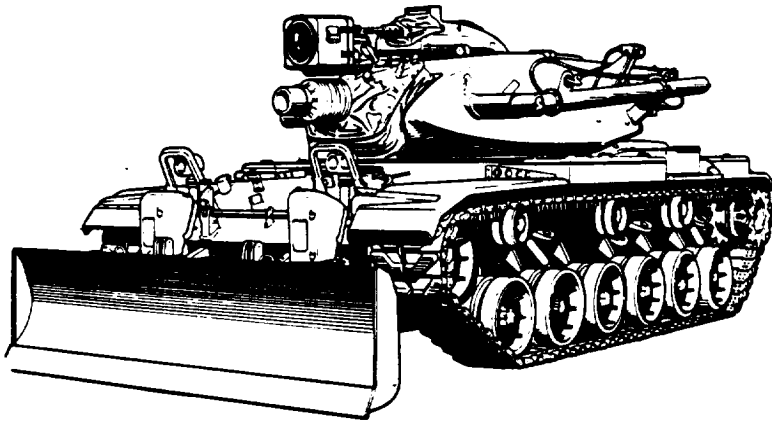

OPERATOR'S MANUAL TROUBLESHOOTING AND MAINTENANCE



**VEHICLE, COMBAT ENGINEER
FULL TRACKED: M728
(2350-00-795-1797)**

**TROUBLESHOOTING
PAGE 3-1**

**MAINTENANCE
PROCEDURES
PAGE 3-59**

**AMMUNITION
PAGE 4-1**

This copy is a reprint which includes
current pages from Changes 1 through 5.

**SUBJECT INDEX
PAGE INDEX 1**

**HEADQUARTERS, DEPARTMENT OF THE ARMY
JANUARY 1981**

TA133252

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., 12 January 1981

**OPERATOR'S MANUAL
TROUBLESHOOTING AND MAINTENANCE
VEHICLE, COMBAT ENGINEER
FULL TRACKED, M728
(2350-00-795-1797)**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, 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 2028-2 located in the back of this manual direct to: Commander, U.S. Army Tank-Automotive Command, Attn: AMSTA-MBC Warren, MI 48397-5000. A reply will be furnished to you.

TABLE OF CONTENTS

VOLUME 1

	Page
	HOW TO USE THIS MANUAL iii
CHAPTER 1	INTRODUCTION 1-1
Section I	General Information 1-1
Section II	Equipment Description 1-3
CHAPTER 2	OPERATING INSTRUCTIONS 2-1
Section I	Description and Use of Operators Controls and Indicators 2-1
Section II	Preventive Maintenance Checks and Services 2-29

VOLUME 2

Section III	operation Under Usual Conditions 2-139
Section IV	Operation Under Unusual Conditions 2-608

*This manual, together with TM 9-2350-222-10-1, 12 January 1981, and TM 9-2350-222-10-2, 12 January 1981, supersedes TM 9-2350-222-10, August 1965 and TM 9-2350-222-ESC, 16 October 1972.

TA249219

TABLE OF CONTENTS - Continued

VOLUME 3

	Page
CHAPTER 3	MAINTENANCE INSTRUCTIONS 3-1
Section I	Lubrication Instructions 3-1
Section II	Troubleshooting 3-1
Section III	Maintenance Procedures 3-59
CHAPTER 4	AMMUNITION 4-1
APPENDIX A.	REFERENCES A-1
APPENDIX B.	COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS B-1
APPENDIX C.	ADDITIONAL AUTHORIZATION LIST C-1
APPENDIX D.	EXPENDABLE SUPPLIES AND MATERIALS LIST D-1
APPENDIX E.	STOWAGE AND SIGN GUIDE E-1
APPENDIX F.	LIST OF ABBREVIATIONS F-1
	SUBJECT INDEX INDEX 1

TA132830

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

Service Intervals — Normal Conditions

For safer, more trouble-free operation, see to it that your vehicle is serviced when it needs it. See LO 9-2350-222-12 for the proper lubricant and service intervals.

Service Intervals - Unusual Conditions

Your vehicle will require extra service and care when you operate under unusual conditions. High or low temperatures, long periods of hard use, in sand, water, mud, or snow, will break down the lubricant. Then you have to add or change lubricant more often. But during long periods when the vehicle isn't used, the service intervals can be less often. ■

Section II. TROUBLESHOOTING

Troubleshooting Procedure

1. Before attempting to locate the cause of malfunctions, make sure that all steps required for proper operation of equipment have been performed AS THEY ARE LISTED IN THE OPERATING INSTRUCTIONS.
2. 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 the listed corrective actions, notify your supervisor.
3. Whenever the corrective action indicates "NOTIFY ORGANIZATIONAL MAINTENANCE", or when the malfunction that you observe is not listed in the Symptom Index (page 3-3), list the MALFUNCTION on your DA Form 2404 (Equipment Inspection and Maintenance Worksheet) and give the DA Form 2404 to your supervisor.

TA252933

Change 1 3-1

TROUBLESHOOTING - Continued

4. Troubleshooting lists the common malfunctions which you may find during the operation or maintenance of the vehicle or its components. You should perform the tests/inspections (steps) and corrective actions in the order listed.
5. Machine gun interface problems between the gun and vehicle are listed within the troubleshooting procedure. Troubleshoot other machine gun problems from the applicable manual, e.g., TM 9-1005-313-10 for the M240 7.62-mm machine gun, and TM 9-1005-231-10 for the caliber .50 machine gun.

TROUBLESHOOTING SYMPTOM INDEX

Troubleshooting
Procedure
Page

AUXILIARY SYSTEMS AND CONTROLS

Driver cannot see clearly through M24 IR periscope - pink light background-no clear image (picture)	3-42
Driver cannot see through M24 IR periscope - no pink light background	3-44
Lack of air, gas particulate filter unit	3-45
Searchlight (AN/VSS-3A) fails to operate or does not operate properly	3-44.4
Driver's AN/VVS-2 night vision viewer will not operate or image (picture) is not clear.	3-44.1

BOOM

Boom does not move when boom control valve lever is placed in erect position	3-56
Boom does not move when winch control lever is placed in raise position to stow the boom	3-58

BRAKE

Parking brake does not release	3-19
--	------

ENGINE

Dark or black smoke blowing through rear grill doors (after warmup)	3-10
Engine cranks but does not start.	3-8
Engine does not crank when starter switch is pressed	3-7
Engine runs rough, or does not idle properly (after warmup)	3-12
Powerplant warning light comes on while engine is running above 750-800 rpm.	3-18

TA252934

Change 1 3-3

TROUBLESHOOTING SYMPTOM INDEX (Continued)

Troubleshooting
Procedure
Page

FIRE CONTROL

Azimuth indicator scales are not light.	3-42
Commander's M36 or M36E1 periscope reticle does not move smoothly in elevation	3-39
Commander's M36 or M36E1 periscope image is not sharp or clear	3-39
Commander's M36 periscope daylight or IR body reticles are not visible	3-40
Commander's M36E1 periscope daylight or passive body reticles are not visible	3-40
Commander's M36 or M36E1 periscope has no night vision or night vision is foggy while operating IR body or passive elbow on vehicle power	3-40.1
Commander's M36 or M36E1 periscope has no night vision or night vision is foggy through IR body or passive elbow when on battery power	3-41
Gunner's telescope image is not sharp and clear.	3-39
Gunner's telescope has weak or no reticle light	3-39
Gunner's M32CE1 periscope does not move smoothly in elevation	3-36.2
Gunner's M32CE1 periscope vision is not sharp	3-36.2
Gunner's M32CE1 periscope has weak or no reticle light	3-37
Gunner's M32CE1 periscope has no night vision or night vision is foggy while operating passive elbow on vehicle power	3-37
Gunner's M32CE1 periscope has no night vision or night vision is foggy while operating passive elbow on battery power	3-38

LIGHTS

Service drive headlight, IR service drive headlight, blackout drive light, or blackout marker light does not work	3-22
Service drive taillight, service stoplight, or blackout marker light does not work	3-23

TROUBLESHOOTING
SYMPTOM INDEX (Continued)

Troubleshooting
Procedure
Page

MACHINE GUNS

Caliber .50 machine gun does not fire electrically	3-35
Caliber .50 machine gun ready lamp does not light	3-36
7.62-mm machine gun (coax) will not fire electrically	3-33

MAIN GUN

Excessive burned powder gas comes out of breech after firing	3-33
165-mm gun cannot be loaded - breech does not close	3-31
165-mm gun does not return to battery or recoils slowly	3-32
165-mm gun returns to battery (recoils) with excessive shock	3-32

MOLDBOARD

Bulldozer moldboard will not lower from lock "travel" position	3-46
Bulldozer moldboard does not lift	3-47
Bulldozer blade will not dig into ground with directional control valve lever in lower position	3-49
Moldboard fails to raise high enough to engage carrying hooks	3-50

TROUBLESHOOTING**SYMPTOM INDEX (Continued)**

Troubleshooting
Procedure
Page

PERSONNEL HEATER

Personnel heater starts, runs short time, stops 3-25

STEERING

Vehicle leads to right or left on flat road 3-24

TURRET

Hydraulic power pack motor cycles (runs) too often or too
long 3-31

Turret does not traverse smoothly in power or does not
operate in power 3-27

165-mm gun does not elevate or depress smoothly in power or
does not operate in power 3-28

165-mm gun does not elevate or depress smoothly or does not
operate manually 3-30

VOLTAGE REGULATOR

Battery/generator indicator pointer is in yellow or left red
when engine is running 3-20

Battery/generator indicator pointer is in right red when
engine is running 3-21

WINCH

Winch cable does not move when winch control valve lever is
placed in raise or lower position 3-52

Winch will not raise load 3-54

TA132844

TROUBLESHOOTING - Continued

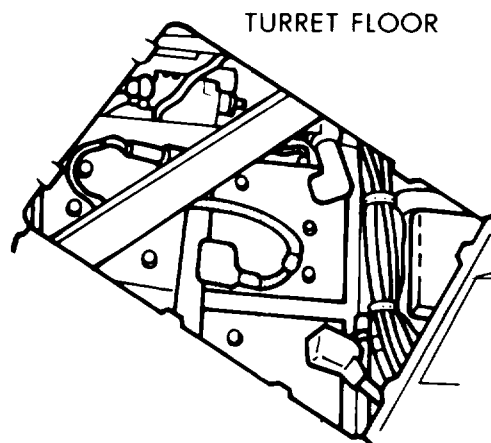
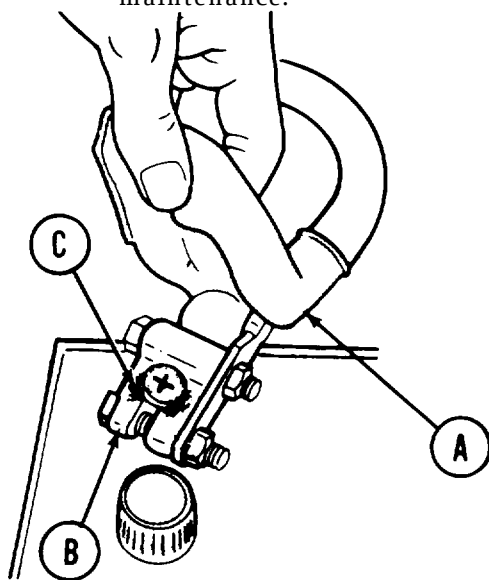
MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION****ENGINE****1. ENGINE DOES NOT CRANK WHEN STARTER SWITCH IS PRESSED**

Step 1. Move shifting control lever from park to reverse and back to park.
Attempt to start vehicle, if vehicle does not start go to step 2.

WARNING		
	● Before performing step 2 set MASTER BATTERY switch to OFF (to prevent accidental traversing of turret).	
	● Remove all rings, jewelry and other metal objects before checking batteries. Conducting electrical charge through metal objects can cause serious injury to personnel.	

Step 2. Lift battery terminal covers (A). Visually check to see if battery terminals (B) and cables are corroded (C) or damaged.

- a. Clean terminals by wiping with a clean damp cloth.
- b. Apply a coating of grease (item 24, Appendix D), to terminals to retard corrosion and then tighten terminals.
- c. If cables or terminals are damaged, notify organizational maintenance.



TA252937

Change 1 3-7

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION****1. ENGINE DOES NOT CRANK WHEN STARTER SWITCH IS PRESSED - Continued**

Step 3. Check to see if battery water level is above top of plates (page 2-85).

If water level is low, add distilled water (or clear water if distilled unavailable) (page 3-109).

NOTE

Make sure FUEL PUMPS switch is ON.

Step 4. Slave start vehicle (page 2-609).

a. Allow engine to run 15 minutes to charge batteries

b. If engine does not start or batteries do not charge, notify organizational maintenance.

2. ENGINE CRANKS BUT DOES NOT START**CAUTION**

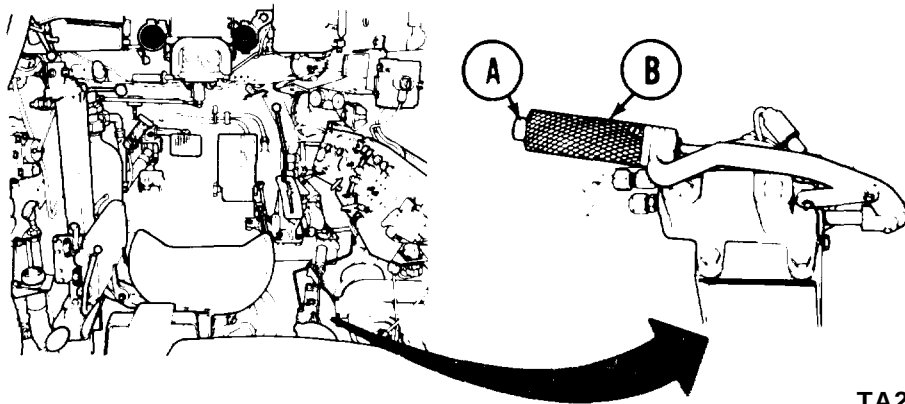
Do not push manifold heater switch (A) while operating purge pump handle (B) in step 1. This will damage the intake manifold.

Step 1. Pump purge handle (B) until you feel back pressure.

Air will be purged from fuel lines.

Step 2. Start engine (page 2-205).

If engine does not start, go to step 3.



TA252938

TROUBLESHOOTING - Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. ENGINE CRANKS BUT DOES NOT START - Continued

CAUTION

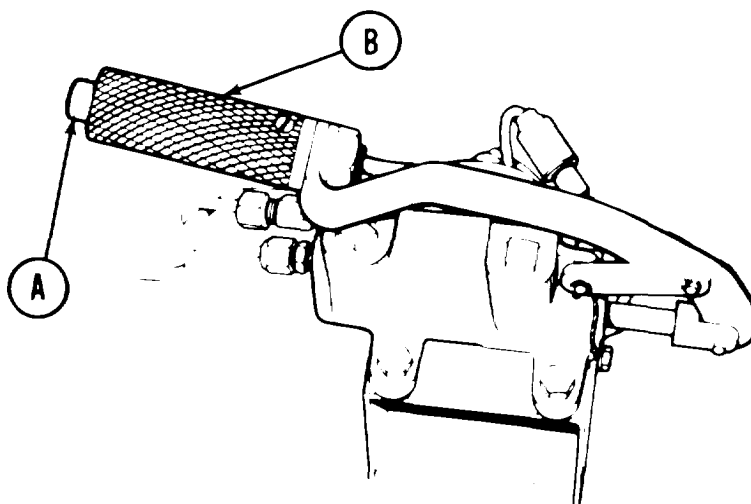
Do not hold manifold heater switch (A) longer than 15 seconds. Holding manifold heater switch more than 15 seconds can damage manifold heaters.

NOTE

If temperature is less than 40°F (4° C), go to Step 3. If temperature is above 40°F (4° C), go to Step 4.

Step 3. While pressing starter switch, press and hold manifold heater switch (A) and pump purge handle (B) for 15 seconds.

If engine does not start, go to step 4.



TA252939

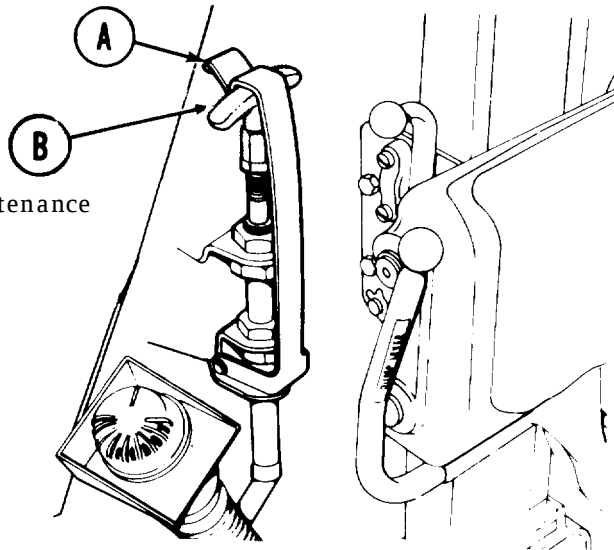
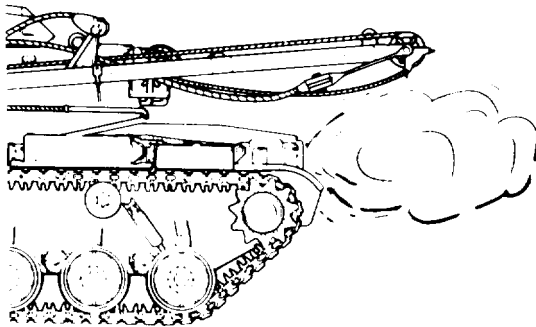
Change 1 3-9

TROUBLESHOOTING - Continued

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION****2. ENGINE CRANKS BUT DOES NOT START - Continued**

Step 4. Release fuel shutoff handle locking latch (A) if so equipped, Operate fuel shutoff handle (B) three times. Push fuel shutoff handle down and secure locking latch (A) if so equipped. Start engine.

If engine does not start
notify organizational maintenance

**3. DARK OR BLACK SMOKE BLOWING THROUGH REAR GRILLE DOORS (AFTER WARMUP)****CAUTION**

If engine oil pressure indicator shows in red, stop engine. Continued operation may cause engine damage.

TA252940

TROUBLESHOOTING - Continued

MALFUNCTION

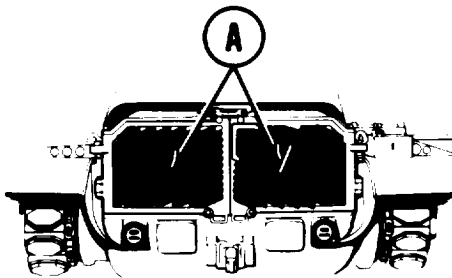
TEST OR INSPECTION

CORRECTIVE ACTION

**3. DARK OR BLACK SMOKE BLOWING THROUGH REAR GRILLE DOORS
(AFTER WARMUP) - Continued**

Step 1. Feel rear grille doors (A) to check for oil.

If oil is present, notify organizational maintenance.



Step 2. Check engine oil level (page 2-74).

- a. If engine oil level is too high (overfull), notify organizational maintenance.
- b. If engine oil level is correct, perform steps 2,3, and 4 of Malfunction 4, (Engine Runs Rough or Does Not Idle Properly After Warmup).
- c. If smoke appears after performing steps 2,3, and 4 of Malfunction 4, notify organizational maintenance.

TA132838