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Research Product 82-09

M1 ABRAMS TANK PROCEDURE GUIDES

ARI Field Unit at Fort Knox, Kentucky
Training Research Laboratory

July 1982

U.S. ARMY RESEARCH INSTITUTE for the BEHAVIORAL and SOCIAL SCIENCES

U. S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

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M1 Procedure Guides are research products developed to aid M1 Tank crewmen in performance of procedural tasks required to prepare the tank for operations and to power down crew stations after operations. The Procedure Guides are designed to supplement the User's Technical Manual (TM). The Procedure Guides have advantages over the TM for day-to-day operational use in that there is one guide for each crew position: Tank Commander, Gunner, Driver, and Loader. Each guide has only tasks specific to the position. Each guide is therefore less bulky, easier to access, and more available than (Continued)

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the TM. The Procedure Guides follow the TM to the extent possible. They use flow-chart-like symbols to identify procedural steps where decisions have to be made or recursive operations begin. The M1 Procedure Guides will be distributed to tank crews in plastic binders that will protect each page from the dirt and grease of the armor work environment.

Research Product 82-09

M1 ABRAMS TANK PROCEDURE GUIDES

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Education and Training

FOREWORD

The Army Research Institute-Ft Knox Field Unit has been working toward solution of training and performance problems that result from the Army's acquisition of sophisticated new weapons systems. The research has focused on the development and fielding of the M1 Abrams Tank. Problems in personnel selection and assignment, individual and crew training, and training and performance in units are being investigated by the Weapons System Training Team at Fort Knox.

The M1 "Abrams" Tank requires crewmen to perform a number of long procedural tasks to prepare for and secure after combat operations. The primary document for information on performance of these tasks is the tank operator's technical manual, TM-9-2350-255-10. The TM is to be used in training and as an aid in performing tasks in operational units. In operational testing of the M1 it was observed that many preoperational tasks were not being performed correctly and the TM was frequently not being used. Features of the TM, such as its large size, its being designed for novice performers, and its detailed task descriptions could have contributed causing these problems. Also since there is only one TM per tank it cannot be used by crewmen who must simultaneously power up their stations.

This research product, M1 Procedure Guides, was designed to provide M1 crewmen with a job aid that they could use to perform the procedural tasks necessary to prepare for and secure from combat operations. The Procedure Guides present sufficient information for Armor crewmen who have been previously trained to perform M1 tasks. They are grouped by duty station and use a flow chart format to handle decision making and recursive operations. In operational settings the procedures guides are each packaged in plastic binders to protect them from the dirt and grease of the tank work environment. Each page is inserted in a plastic cover to allow for pages to be replaced as changes are made.

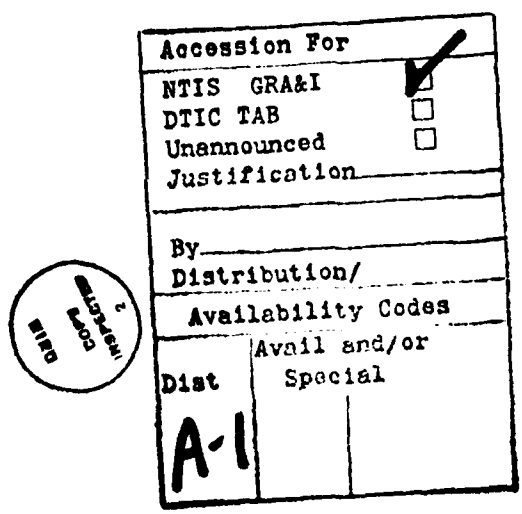
Pending the outcome of tests of the effectiveness of the guides, plans are to distribute them when soldiers go through M1, 19K One Station Unit Training and to each M1 battalion as it undergoes transition training. Use of job aids such as the Procedure Guides should impact on the effectiveness and availability of the M1 weapons system.

JOSEPH ZEIDNER
Technical Director

M1 ABRAMS TANK PROCEDURE GUIDES

CONTENTS

LIST OF TABLES



INTRODUCTION

The Army Research Institute has developed a set of M1 Procedure Guides to meet a perceived need by M1 tank crewmen for detailed procedural task information in a form that would be readily available to them, complete, and usable in the tank work environment. The procedure guides were designed to aid in performance of the noncombat tasks that are required to prepare the M1 tank for combat and power it down after operations. The guides provide each crewmember a convenient, accurate, and comprehensive document which identifies the tasks at his station and the tasks' procedures.

The M1 Procedure Guides were designed to overcome problems that seem to exist with using the tank's operator's manual, TM 9-2350-255-10, as a day to day job aid for performing procedural tasks. The operator's manual is formatted using Skill Performance Aid (SPA) guidelines. Tasks are highly proceduralized. Each task in the manual is described by an extensive verbal description of task steps and a series of illustrations. The task detailing is designed to allow novice performers to complete tasks; this level of detail is probably inappropriate for the needs of experienced M1 crewmen. Also, the use of elaborate task detailing has resulted in a large manual (three inches thick). Although it is divided in three sections, the sections must be kept together because the index for the entire manual is located only in the last section. Because of its size the manual is cumbersome to use. It is difficult to keep open on crewmen's laps.

The most serious problem with using the operator's manual to perform procedural tasks is that there is only one issued per tank. Since each crewman has pre and post operations tasks to perform, at least three soldiers will have to do the tasks without the aid of the manual. Unavailability of adequate task information forces soldiers to rely on their memories to recall task steps. Past research has shown that tasks that are as long and complicated, as are many that

must be performed on the M1 tank, cannot be performed accurately for very long after training based solely on soldier's recall.[1, 2]

M1 Procedure Guides are designed to serve as job aids for experienced crewmen to use in performance of the M1's noncombat procedural tasks. Since many of the M1's tasks are fairly complicated and require crewmen to decide between alternative behaviors, a checklist format which simply lists task steps was not appropriate. For example, the procedure for zeroing the main gun contains 16 potential decision points within more than 100 procedural steps. To overcome this problem, an "algorithmic" type checklist was developed to incorporate those decisions. A set of algorithmic characteristics (guidelines) were established to ensure uniformity in the task descriptions. These characteristics are as follows:

- Algorithms present clear and concise procedures required for successful task performance.

- Information included in the procedures is restricted to only that which is necessary to perform the task.

- Language used in the procedure steps is unambiguous and at a level appropriate for the users.

- Algorithms make use of symbology when possible. Original symbology new to system operators will be defined prior to presentation in the procedure.

- Notes/cautions/warnings which impact task performance, safety, or system integrity are identified at appropriate places within the procedures.

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[1] Goldberg, S.L., Drillings, M., and Dressel, J.D. Mastery Training: Effects on Skill Retention. US Army Research Institute, Technical Report 513, Alexandria, VA, March 1981.

[2] Shields, J.L., Goldberg, S.L., and Dressel, J.D. Retention of Basic Soldiering Skills. US Army Research Institute, Research Report 1225, Alexandria, VA, Sep 1979.

- All decision points occurring during task performance are identified. At these decision points the user is asked a question. Based upon the user's answer (formulated internally) the appropriate succeeding steps will be identified. This branching technique requires that:

  - All decision points occurring in the procedure must be identified.

  - All possible alternative actions/procedures be identified and detailed.

- Each algorithm is presented independently of others -- that is, each will begin on a separate page in the procedure guides.

- Each algorithm possesses obvious start and finish points.

- Duplication of any "common" subprocedures is to be avoided. For those subprocedures found in a task, a separate algorithm is developed for that subprocedure. This avoids unnecessarily lengthy and repetitive procedures.

- Necessary pictures or illustrations are included in each procedure guide.

- Each procedure guide contains a table of contents which allows the user to rapidly locate the desired procedure (task).

- The physical dimensions of the procedure guides should be tailored to their intended use and environment. That is, procedure guide size should take into account space required and available for use, storage requirements, and frequency of anticipated or required use.

The algorithms that were produced account for most (if not all) of the unique occurrences within tasks. A procedure guide booklet has been produced for each M1 tank crew position. A total of sixty-four tasks are presented across the four guides. Tables 1 through 4 list all tasks included in the Driver, Loader, Gunner, and Tank Commander Procedure Guides. In addition, before, during, and after operations preventive maintenance checks and services (PMCS) activities are

Table 1. Tank Commander Procedure Guides

ACTIVITIES

Prepare Station

Enter Station

Power Up Station/Turret

Install Weapon - Cal .50

Install Weapon - M240

Prepare to Fire Checks

Boresight the Cal .50

Zero the Cal .50

Secure Station

Remove Weapon - Cal .50

Remove Weapon - M240

Secure Station and Turret

Power Down Station and Turret

Clear the Cal .50

Set Headspace and Timing - Cal .50

Clear the M240

Operate/Secure Gas Particulate Filter

Before Operations PMCS

Master Check-Off List - Before Operations PMCS

Master Check-Off List - During Operations PMCS

Master Check-Off List - After Operations PMCS

Table 2. Gunner Procedure Guides

ACTIVITIES

Prepare Station
Enter Station
Install Coaxial Machinegun
Power Up Station
Perform GPS Functional Check
Perform GPS Adjustments
Perform Computer Data Check
Perform TIS Checkout
Perform GAS Adjustments
Perform Computer Self Test
Test Fire Control System
Perform Lead System Check
Perform Firing Circuits Check
Perform Crosswind Circuits Check
Prepare to Fire Checks
Update Muzzle Reference Sensor
Manual Inputs to Automatic Fire Control Data
Manual Inputs to Fire Control Data
Zero Coaxial Machinegun
Boresight the Main Gun
Zero the Main Gun
Secure Station
Remove Coaxial Machinegun
Power Down Station
Clear Coaxial Machinegun
Operate/Secure Gas Particulate Filter
Before Operations PMCS
After Operations PMCS

Table 3. Driver Procedure Guides

ACTIVITIES

Prepare Station
Enter Station
Power Up Hull Systems
Start Engine
After Start Checks
Secure Station
Shut Down Engine
Power Down Hull Systems
Exit Tank
Operate/Secure Gas Particulate Filter
Before Operations PMCS
During Operations PMCS
After Operations PMCS

Table 4. Loader Procedure Guides

ACTIVITIES

Prepare Station
Install Weapon
Enter Station
Power Up Station
Secure Station
Power Down Station
Remove the M240 Machinegun
Unload (Clear) Main Gun
Manually Extract a Main Gun Round
Clear the M240 Machinegun
Operate/Secure Gas Particulate Filter
Before Operations PMCS
After Operations PMCS

identified in each crew member's guide for the PMCS checks at his station. The tank commander's guide also contains a master list of PMCS checks for each crew station. The tank commander can use this list to supervise and keep track of the conduct of PMCS. The guides are packaged in plastic binders to protect them from the grease and grime of the tank work environment. Each page is inserted in a plastic cover. This has the advantage of protecting the page and allows for easy substitution of pages as changes in procedures are posted.

The M1 Procedure Guides are designed to be supplements to, not replacements for, the M1's operator's manual. Procedures in the guides follow the operator's manual's procedures as closely as possible. If a soldier does encounter a situation not covered by the guide, he should refer back to the operator's manual for complete information on the task. Furthermore, the operator's manual should be used for initial task training. Only after the soldier is familiar with the location of equipment and task terminology should he begin to use the procedure guide to perform a given task.

Soldiers will require training on use of the procedures guides. The "algorithmic" style of task formatting and certain abbreviations will be unfamiliar to many soldiers. Learning to use the guides properly and command emphasis on their continued use should result in more careful and accurate performance of pre and post operations tasks.

Many of the training hours on the M1 tank or any other tank are spent learning procedures. The unavailability of the TM in most situations and no adequate job aids has required crewmen to memorize most procedures. The use of effective job aids would preclude the need to spend as much training time as is presently spent on procedural tasks. Soldiers would be able to go from task to task after ensuring that they knew the locations of various task referenced equipment and had

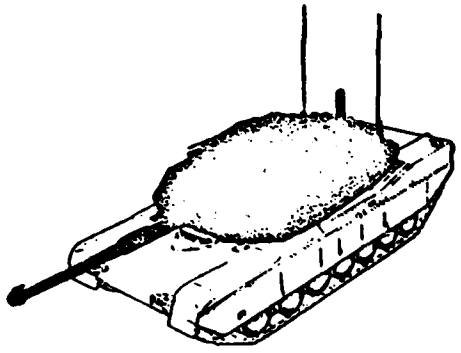
gone through the steps using the procedures guide. Effective use of job aids or procedure guides could conceivably free up considerable training time that could then be used to train on skilled performance tasks.

The M1 tank is a complex weapon system that incorporates many technological improvements within its mechanical and fire control systems. Many of the combat functions that depended on human performance accuracy in earlier tanks are performed by the M1's automated systems. The importance of proper operation of these systems is such that the tank's overall capability and firepower can be significantly affected by system failure or improper use. Continued use of job aids such as the procedure guides that follow should contribute to maintaining the M1 tank and ensure its effectiveness on the battlefield.

TANK COMMANDER

PROCEDURE GUIDES

M1 TANK



JULY 1981

PREPARED BY THE U.S. ARMY RESEARCH INSTITUTE
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GENERAL INFORMATION

This booklet contains M1 tank commander procedure guides. Each guide is for a single pre-operation, post-operation, or during operation activity. Each guide is matched to TM-9-2350-255-10 (Operator's Manual for Tank, Combat, Full-Tracked, 105 MM, M1).

PURPOSE OF PROCEDURE GUIDES

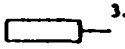
The guides in this booklet will not take the place of the M1 TM or M1 training materials. The guides will aid you in remembering long or difficult sets of procedures. In short, the guides will help to "jog your memory."

USE OF THIS BOOKLET

The Table of Contents (on the next page) lists the procedure guides in this booklet. Each guide gives you a step-by-step outline for completing an activity. The following will help you to better use each guide.

1. Some steps within a procedure guide are followed by a page number. On that page you will find a detailed breakdown of the step.

2. Some of the procedure guides include a question(s). Each question is stated inside a diamond shape. *Your "yes" or "no"* to the question will show you which path to follow.



3. Some steps within a procedure guide are followed by a box. In the box you will find more information on the step or a caution/warning.

4. Certain steps within a procedure guide require that a knob or switch be turned to a certain position. In some cases, that position might be written like the symbol to the left. The symbol means that a light should also come on.

5. Master check-off lists of all before, during, and after operations PMCS performed by crewmembers are included as an aid in your supervision of these activities.

6. Pictures of selected panels/equipment can be found at the end of this booklet.

TABLE OF CONTENTS

PREPARE STATION

1. TC . . . . . Racer station (page 2)
2. Station/turret . . Power up (page 3)
3. Downlight. . . . . Adjust
4. Intercom . . . . . Adjust
5. Seat/footrest. . . Adjust
6. Hatch. . . . . Adjust
7. Platforms. . . . . Adjust
8. Weapon . . . . . Install (page 5)
9. Knee guard . . . . Adjust
10. GPS extension. . . Adjust

ENTER STATION

1. Loader's hatch . . Unlock/open
2. TC . . . . . Enter tank
3. GUN/TURRET DRIVE . —MANUAL—
4. Turret traverse lock . . . . . Locked
5. Ejection guard . . Forward
6. TC . . . . . Enter station
7. CHS elevation crank safety . . . SAFE

POWER UP STATION/TURRET

1. VEHICLE MASTER POWER. . . . . —ON—
   or
   TURRET POWER . . . —ON—
2. ENGINE FIRE light. . . . . Off
3. CKT BREAKER OPEN light . . . . Off
4. FIRE CONTROL MALF light . . . . Off
5. LOW BAT CHG light. . . . . Off
6. IS ENGINE RUNNING ? — NO → AUX HYD PWR . . . . . —ON— → GO TO 8
   YES
7. AUX HYD PWR. . . . OFF

8. PANEL LIGHTS test button. . . . Press — All TC and loader panel lights on

9. Panel lights . . . Adjust brightness

INSTALL WEAPON - CAL.50

1. Weapon . . . . . Clear (page 20)
2. CHE elevation crank safety . . . SAFE
3. Hatch. . . . . Full open
4. Mount. . . . . Level
5. Mount. . . . . Lock
6. Cal.50 mounting pins . . . . . Remove
7. Receiver . . . . . In mount
8. Butterfly trigger. . . . . Under mount firing lever
9. Receiver holes . . Lined up with mount holes
10. Cal.50 mounting pins . . . . . Insert
11. Barrel . . . . . Install
12. Headspace/timing . Set (page 22)

13. DOES WEAPON ELEVATE/DEPRESS SMOOTHLY?

NO →

13a. Weapon. . . . . Maximum depression

13b. Locking lever . . Align

13c. Equilibrator lock nut. . . . . Unlock

13d. Equilibrator adjusting bolt. . Adjust — Until weapon elevates/depresses smoothly

13e. Equilibrator lock nut. . . . . Seat against mount

GO TO 14

YES ↓

14. M240 mounting pins . . . . . Remove

15. M240 mounting pins . . . . . Insert in stowage slot

16. Weapon safety. . . F

17. Charging handle. . Pull down/rear/ then let go

18. CWS elevation crank safety . . . FIRE

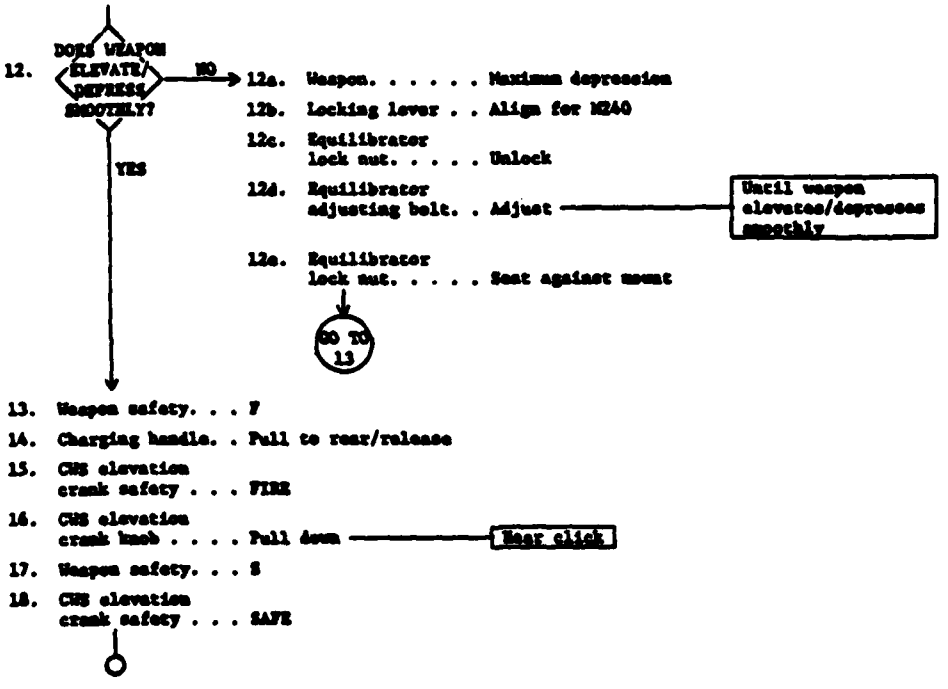
19. CWS elevation crank knob . . . . Pull down — Should hear click

20. CWS elevation crank safety . . . SAFE

21. Weapon safety. . . S

INSTALL WEAPON - M240

1. Weapon . . . . . Clear (page 26)
2. CHS elevation crank safety . . . SAFE
3. M240 mounting pins . . . . . Remove
4. Weapon . . . . . Put in mount
5. Front/rear receiver holes . . Lined up with mount holes
6. M240 mounting pins . . . . . Install
7. Trigger cable bight. . . . . Remove from stowage
8. Trigger cable bight. . . . . Connect — Around weapon charger guide/ over trigger
9. Trigger cable wing nut . . . . . Loosen
10. Trigger cable. . . Tight around trigger — Do not depress trigger
11. Trigger cable wing nut . . . . . Tighten



PREPARE TO FIRE CHECKS

1.	Weapon	Check mounting/ammunition stowage/operation
2.	Cal.50	Boresight (page 11)
3.	Cal.50	Zero (page 13)

BORESIGHT THE CAL.50

1.	Tank position. . .	Level
2.	Boresight target .	Right angle/500 meters
3.	Weapon	Clear (page 20)
4.	Rear mounting pin.	Remove
5.	Rear of weapon . .	Lift above firing lever
6.	Bolt	Forward
7.	Weapon cover . . .	Open
8.	Backplate.	Remove
9.	Bolt group	Remove
10.	Rear of weapon . .	Lower
11.	Rear mounting pin.	Insert
12.	Center of barrel .	Align on upper left target corner
13.	CWS/weapon	Do not move
14.	Boresight cross. .	Align on upper left target corner
15.	CWS elevation crank.	Elevate/depress gun

16. Center of barrel . Align on upper left target corner

17. Boresight cross. . Assure on upper left target corner

18. Rear mounting pin. . . . . Remove

19. Rear of weapon . . Lift above firing lever

20. Bolt group . . . . Install

21. Backplate. . . . . Install

22. Weapon cover . . . Close

23. Headspace and timing . . . . . Check/adjust (page 22)

ZERO THE CAL.50

1. Weapon . . . . . Boresight (page 11)

2. Weapon . . . . . Load

3. Butterfly trigger safety . . F

4. TC . . . . . Announce "Cal.50"

5. CHS elevation crank safety . . . FIRE

6. Sight/500 meter aiming point . . . Center of target/ 500 meters — Use manual controls

7. CHS elevation crank knob . . . . Pull down/fire — 10-20 round bursts

8. Target beaten zone . . . . . Compare to sight reticle aiming point

9. IS AIMING POINT CENTERED ON BEATEN ZONE? NO → Vertical/horizontal sight controls. . . . . Adjust — Aiming point centered on beaten zone

NO → GO TO 6

YES → GO TO 10

10. CWS elevation crank safety . . . SAFE
11. Butterfly trigger safety . . S
12. Weapon . . . . . Clear (page 20)

SECURE STATION

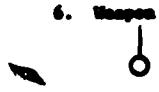
1. Weapon . . . . . Remove (page 16)
2. Station/turret . . Secure (page 18)
3. Station/turret . . Power down (page 19)
4. TC . . . . . Exit tank

REMOVE WEAPON - CAL.50

1. Weapon . . . . . Clear (page 20)
2. Charging handle. . Pull rear/hold — Locking spring lug should be seen
3. Barrel . . . . . Unscrew/remove
4. Charging handle. . Release
5. Mounting pins. . . Remove
6. Receiver . . . . . Lift from mount
7. Mounting pins. . . Insert

REMOVE WEAPON - M240

1. Weapon . . . . . Clear (page 26)
2. Weapon/mount . . . Maximum depression
3. Trigger cable bight. . . . . Disconnect
4. Trigger cable. . . Connect in stowage position
5. Front/rear mounting pins. . . Remove
6. Weapon . . . . . Lift from mount



SECURE STATION AND TURRET

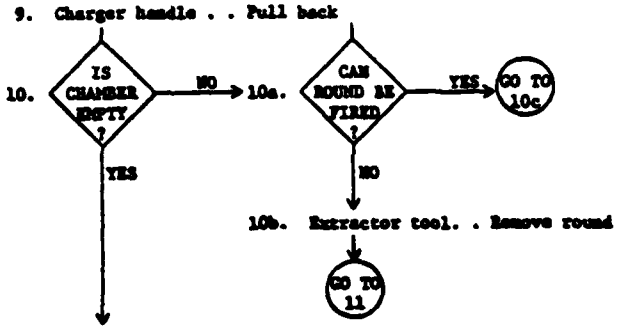
1. Gunner/loader stations . . . . . Powered down
2. CWS MANUAL/ POWER lever. . . . POWER
3. Loader's panel MANUAL light . . . On
4. GPS MANUAL light . On
5. Elevation travel lock . . . . . Lock
6. Ejection guard . . Forward — MAIN GUN STATUS SAFE light on
7. Turret traverse lock . . . . . Lock
8. CVC helmet . . . . Remove/disconnect
9. TC hatch . . . . . Close

POWER DOWN STATION AND TURRET

1. Domelight. . . . . OFF
2. AUX HYD POWER light. . . . . OFF
3. Engine . . . . . Assure not running
4. Driver master panel switches . . Assure properly set
5. VEHICLE MASTER POWER switch . . . Hold OFF
6. IS VEHICLE MASTER POWER LIGHT OFF? — NO → VEHICLE MASTER POWER switch. . . . . Continue to hold OFF; GO TO 6
   YES
7. VEHICLE MASTER POWER switch . . . Release

CLEAR THE CAL.50

1. Weapon . . . . . Point down range
2. CMS elevation crank safety . . . SAFE
3. Weapon safety. . . S
4. Receiver cover . . Open
5. Extractor. . . . . Lift from ammo belt
6. Ammo belt. . . . . Remove from receiver
7. Ammo belt. . . . . Put in ammo box
8. M10 charger bolt locking latch. . . Engage
9. Charger handle . . Pull back

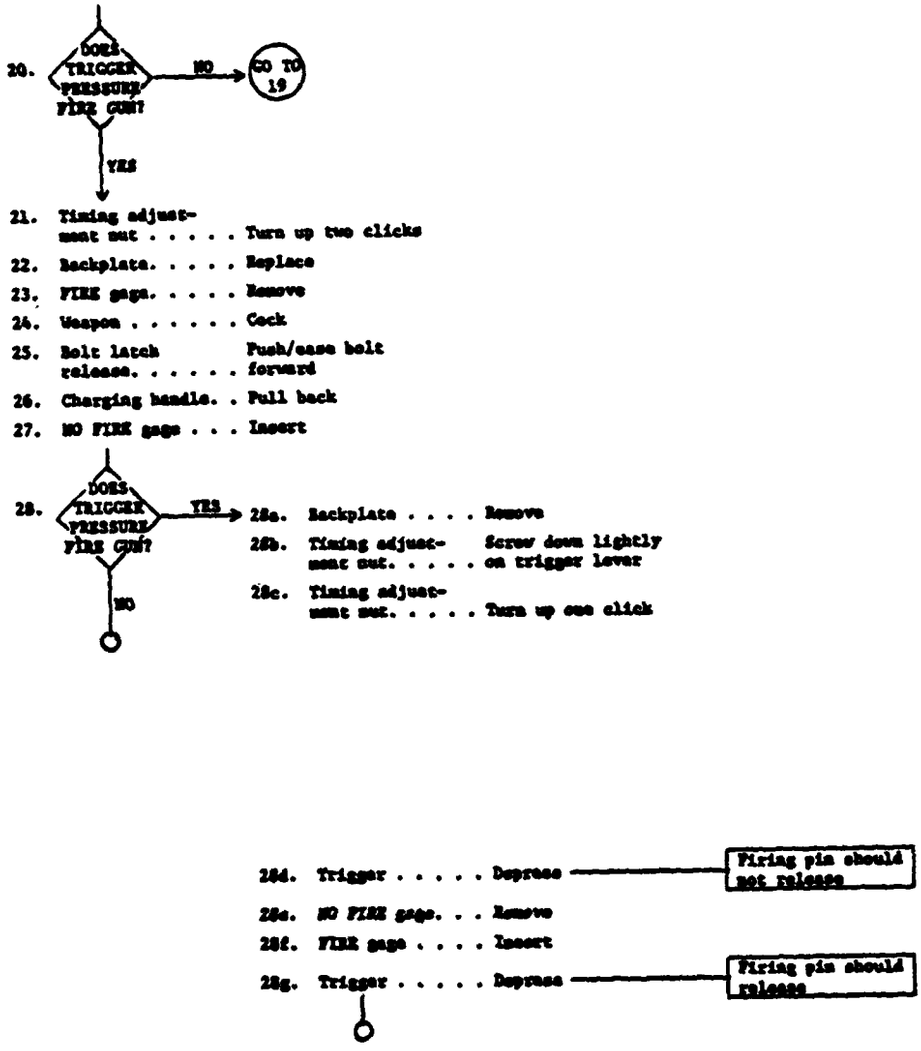


10c. Receiver cover. . Down/latch
10d. M10 charger bolt locking latch . . Release
10e. Charger bolt. . . Let go
10f. Weapon safety . . F
10g. Butterfly trigger . . . . . Fire round
10h. Weapon safety . . SAFE
10i. Receiving cover . Open

11. M10 charger bolt locking latch. . . Disengage
12. Charger handle . . Let go
13. Weapon safety. . . F
14. Receiver cover . . Close/latch
15. Butterfly trigger. . . . . Press ——— To release firing pin
16. Weapon safety. . . S

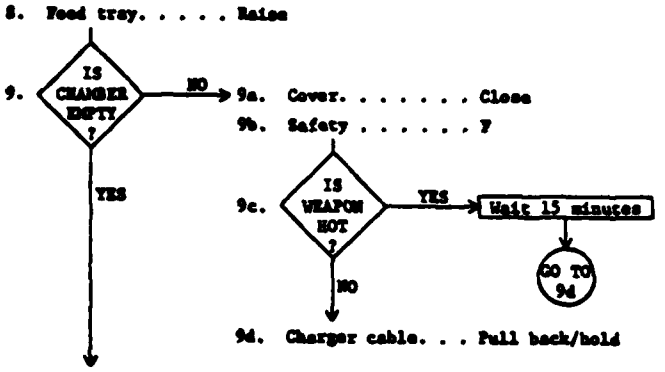
SET HEADSPACE AND TIMING - CAL.50

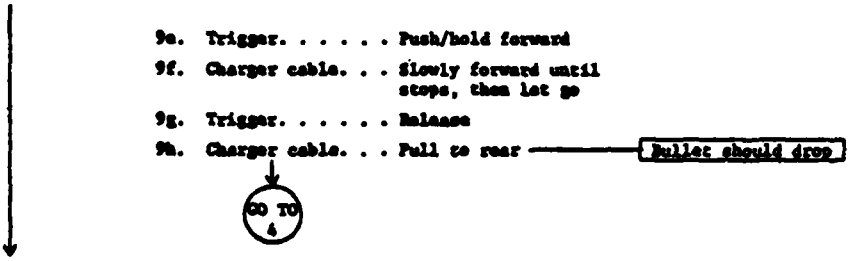
1. Weapon cover . . . Raise
2. Recoiling parts. . Retract
3. Barrel . . . . . Screw all the way into extension
4. Barrel . . . . . Loosen two notches
5. Charging handle. . Pull rear/hold
6. Bolt latch release. . . . . Press
7. Charging handle. . Release slowly — Do not depress trigger
8. Charging handle. . Pull back — Until extension is 1/16 inch from trunnion block
9. Headspace gage/ GO end . . . . . Insert in T slot
10. DOES GO END ENTER FREELY? — NO → Barrel. . . . . Unscrew one notch → GO TO 9
    YES
11. DOES NO-GO END ENTER? — YES → Barrel. . . . . Screw in one notch → GO TO 9
    NO
12. Weapon . . . . . Cock
13. Charging handle. . Pull back
14. FIRE gage. . . . . Beveled edge against barrel notches
15. Charging handle. . Release
16. Backplate. . . . . Remove
17. Timing adjustment nut . . . . . Screw down lightly on trigger lever
18. Trigger. . . . . Strong pressure — Gun should not fire
19. Timing adjustment nut . . . . . Turn up one click


20.
DOES TRIGGER PRESSURE FIRE GUN?
NO
GO TO 19
YES
21. Timing adjustment nut . . . . . Turn up two clicks
22. Backplate. . . . . Replace
23. FIRE gage. . . . . Remove
24. Weapon . . . . . Cock
25. Bolt latch release. . . . . Push/ease bolt forward
26. Charging handle. . Pull back
27. NO FIRE gage . . . Insert
28.
DOES TRIGGER PRESSURE FIRE GUN?
YES
NO
28a. Backplate . . . . Remove
28b. Timing adjustment nut. . . . . Screw down lightly on trigger lever
28c. Timing adjustment nut. . . . . Turn up one click
28d. Trigger . . . . . Depress
Firing pin should not release
28e. NO FIRE gage. . . Remove
28f. FIRE gage . . . . Insert
28g. Trigger . . . . . Depress
Firing pin should release

CLEAR THE M240

1. Weapon . . . . . Point down range
2. Safety . . . . . F
3. Charger cable. . . Pull to rear
4. Safety . . . . . S
5. Latches. . . . . Push in
6. Cover. . . . . Pull straight up
7. Belt . . . . . Off feed tray
8. Feed tray. . . . . Raise



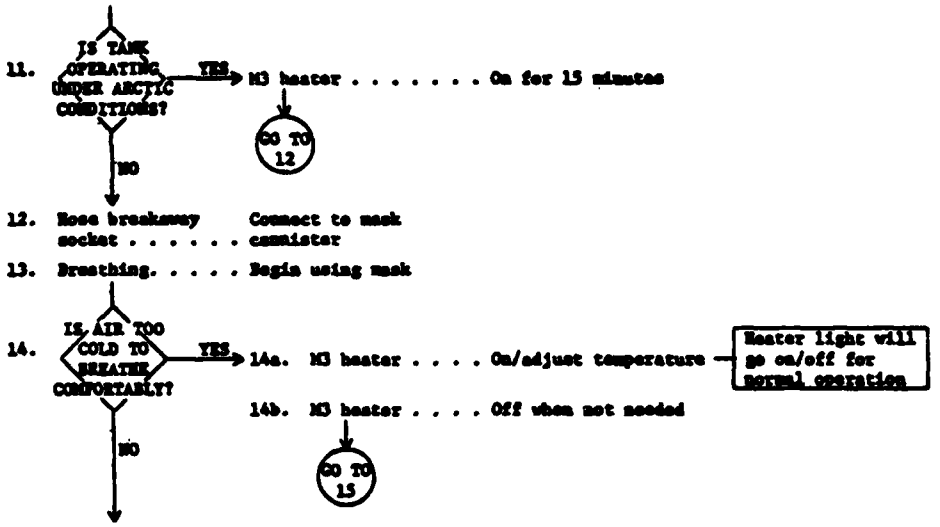


10. Cover. . . . . Close
11. Safety . . . . . F
12. Charger cable. . . Pull back/hold
13. Trigger. . . . . Push/hold forward
14. Charger cable. . . Slowly forward until stops, then let go
15. Trigger. . . . . Release
16. Safety . . . . . S

OPERATE/SECURE GAS PARTICULATE FILTER

Operate

1. VEHICLE MASTER POWER. . . . . Assure ON
2. Station. . . . . Power up
3. Turret . . . . . Power up
4. GAS PARTIC FILTER . . . . . ON (driver)
5. Mask . . . . . On
6. Mask . . . . . Clear and seal
7. Mike lead. . . . . Disconnect from connector
8. Mask mike lead . . Hook up to connector
9. Spring clip. . . . Remove from intake opening (loader)
10. Hose breakaway socket . . . . . Remove from mount



Secure

15. Hose breakaway socket . . . . . Disconnect from mask canister
16. Hose breakaway socket . . . . . Connect to mount

17. Mask mike lead . . Disconnect from connector
18. Mike lead. . . . . Connect to connector
19. Mask . . . . . Off/stow
20. GAS PARTIC FILTER . . . . . OFF (driver)
21. Spring clip. . . . Install (loader)

BEFORE OPERATIONS PMCS

Tank Commander's Station

1. GAS PARTIC FILTER . . . . . On (driver)
2. Spring clip. . . . Remove from intake opening (loader)
3. Filtered air hose . . . . . Remove from connector
4. Airflow. . . . . Should be felt
5. Heater . . . . . On — Heater lamp lights and heater are working
6. Heater . . . . . Off
7. Mask . . . . . Check operation
8. Mike . . . . . Check operation

TANK COMMANDER MASTER CHECK-OFF L'ST
BEFORE OPERATIONS PMCS

Location	System	Equipment	CHECK: Clean/Clear	Damage/Tampering	In place	Leaks	Level	Missing Parts	Operation	Position	Pressure	Secure	Status	Tension
Exterior	Vehicle	General		X				X						
	Track	Track												X
	Hull Access Plates	Hull Access Plates			X							X		
	Rear Grille Doors	Rear Grille Doors								X		X		
	Muzzle Reference Sensor	Muzzle Reference Sensor		X								X		
		Lenses	X	X										
Hull	Fuel Tanks	Filler Covers			X							X		
		Brackets		X	X									
	Batteries	Condition Indicator			X								X	
	Precleaner	Sponson Air Intake Grille	X											
		Top and Seal Assembly	X	X										
	Transmission Oil	Transmission Oil				X	X							
	Engine Oil	Engine Oil				X	X							
	Fire Extinguisher Sensor Lenses	Sensor Lenses	X	X										

Location	System	Equipment	CHECK: Clean/Clear	Damage/Tampering	In Place	Leaks	Level	Missing Parts	Operation	Position	Pressure	Secure	Status	Tension
Loader's Station	Fire Extinguisher System	Bottle Pressure Gage									X			
		Bottles										X		
		Sensor Lenses	X											
	Hydraulic System	Oil Reservoir				X	X							
		Filter Bypass Buttons								X				
	Communication System	Radio/Intercom							X					
	GAS Particulate Filter	Airflow							X					
		Heater							X					
		Mask/Mike							X					
Gunner's Station	Main Accumulator	Main Accumulator				X			X		X			
	AUX HYD Pump	AUX HYD Pump							X		X			
	Gun/Turret	Power Controls							X					
		Manual Controls							X					
		AZ Filter Servo Button								X				
		EL Filter Servo Button								X				
		Hydraulic Lines				X								
		Hydraulic Pressure Gage									X			
	GAS Particulate Filter	Airflow							X					
		Heater							X					
		Mask/Mike							X					

Location	System	Equipment	CHECK: Clean/Clear	Damage/Tampering	In Place	Leaks	Level	Missing Parts	Operation	Position	Pressure	Secure	Status	Tension
Driver's Station	Fire Extinguisher System	Bottle Pressure Gage									X			
		Bottles										X		
		Sensor Lenses	X											
	Parking Brake System	Hydraulic Pressure Gage									X			
	Engine (During and After Start)	Lights/Instruments											X	
		Air Scavenge Blower							X					
	Lights	Domelight		X					X					
		Lenses/Cables		X										
		Exterior							X					
	Compartment	Hatch							X					
		Hatch Seal		X										
		Periscopes	X											
		Seat		X					X					
	GAS Particulate Filter	Airflow							X					
		Heater							X					
		Mask/Mike							X					

TANK COMMANDER MASTER CHECK-OFF LIST
DURING OPERATIONS PMCS

Location	System	Equipment	CHECK: Alignment	Chunking/Separation	Damage/Tampering	Heat	In Place	Leaks	Level	Missing Parts	Operation	Presence of Water	Seated	Secure	Tension
Exterior	Track	Track													X
	Roadwheel/ Compensating Idler Wheel Assemblies	Hubs				X		X							
		Hub Oil							X			X			
		Hub Plugs								X					
		Arms			X			X							
		Wheels			X					X					
		Wheel Rubber		X											
		Wearplates			X					X				X	
		Mounting Nuts/Bolts												X	
	Shock Absorber	Sight Gage						X	X			X			
		Housing				X									
	Torsion Bars	Bars			X					X					X
	Track Assembly	Shoes	X												
		Centerguides			X					X				X	
		Wedges								X			X	X	
		End Connector Bolts								X				X	

Location	System	Equipment	CHECK: Alignment	Chunking/Separation	Damage/Tampering	Heat	In Place	Leaks	Level	Missing Parts	Operation	Presence of Water	Seated	Secure	Tension
Exterior (Cont'd)	Support Roller Assembly	Hubs				X									
		Wheels			X										
		Spindle Supports								X				X	
		Support Roller Hub Caps			X			X						X	
	Hub and Sprocket Assembly	Sprocket			X					X			X	X	
		Hub			X					X				X	
		Track Retainer			X					X				X	
Hull	Fuel Tanks	Filler Covers					X							X	
		Brackets			X		X								
Driver's Station	Controls/ Instruments	Steer Control									X				
		Throttle Control									X				
		Service Brakes									X				
		Parking Brake									X				
	Compartment	Seat			X						X				

TANK COMMANDER MASTER CHECK-OFF LIST
AFTER OPERATIONS PMCS

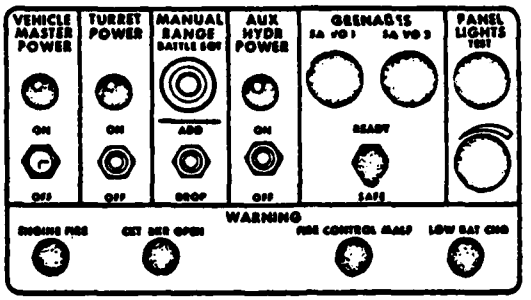
Location	System	Equipment	CHECK: Alignment	Chunking/Separation	Clean/Clear	Damage/Tampering	Heat	In Place	Leaks	Level	Missing Parts	Operation	Position	Presence of Water	Pressure	Seated	Secure	Tension	Wear
Exterior	Vehicle	General				X					X								
		Drain Valves							X				X						
		Tank			X														
		Tarpaulin						X											
	Track	Track															X		
	Adjusting Link Assembly	Hardware/ Fittings									X					X			
		Lock Bolts									X					X			
		Relief Valve							X										
	Roadwheel/ Compensating Idler Wheel Assemblies	Hubs					X		X										
		Hub Oil								X				X					
		Hub Plugs									X								
		Arms				X			X										
		Wheels				X					X								
		Wheel Rubber		X															
		Wearplates				X					X						X		

Location	System	Equipment	CHECK: Alignment	Chunking/Separation	Clean/Clear	Damage/Tampering	Heat	In Place	Leaks	Level	Missing Parts	Operation	Position	Presence of Water	Pressure	Seated	Secure	Tension	Wear
Exterior (Cont'd)	Roadwheel/etc. (Cont'd)	Mounting Nuts/Bolts															X		
	Shock Absorber	Sight Gage							X	X				X					
		Housing					X												
	Torsion Bars	Bars				X					X							X	
	Track Assembly	Shoes	X																
		Centerguides				X					X						X		
		Wedges									X					X	X		
		End Connector Bolts									X						X		
	Support Roller Assembly	Hubs					X												
		Wheels				X													X
		Spindle Supports									X						X		
		Support Roller Hub Caps				X			X								X		
	Hub and Sprocket Assembly	Sprocket				X					X					X	X		
		Hub				X					X						X		
		Track Retainer				X					X						X		

Location	System	Equipment	CHECK: Alignment	Chunking/Separation	Clean/Clear	Damage/Tampering	Heat	In Place	Leaks	Level	Missing Parts	Operation	Position	Presence of Water	Pressure	Seated	Secure	Tension	Wear
Exterior (Cont'd)	Skirt Panels, Fenders, and Mud Guards	Hinges, Latches, and Support Struts				X											X		
		Skirts, Fenders, and Mud Guards				X					X								
	Hull Access Plates	Hull Access Plates						X									X		
	Rear Grille Doors	Rear Grille Doors												X		•			
	Muzzle Reference Sensor	Muzzle Reference Sensor				X											X		
		Lenses			X	X													
Hull	Precleaner	Sponson Air Intake Grille			X														
		Top and Seal Assembly			X	X													
	Transmission Oil	Transmission Oil								X	X								

Location	System	Equipment	CHECK: Alignment	Chunking/Separation	Clean/Clear	Damage/Tampering	Heat	In Place	Leaks	Level	Missing Parts	Operation	Position	Presence of Water	Pressure	Seated	Secure	Tension	Wear
Hull (Cont'd)	Engine Oil	Engine Oil							X	X									
	Fire Extinguisher Sensor Lenses	Sensor Lenses			X	X													
	Engine Hydraulics and Heat Exchanger	Engine Hydraulics							X								X		
		Heat Exchanger			X				X								X		
	Hydraulic System	Oil Reservoir							X	X									
		Filter Bypass Buttons											X						
Loader's Station	Loader's Panel	Panel										X							
Gunner's Station	Gun/Turret	Power Controls										X							
		Manual Controls										X							
		AZ Filter Servo Button											X						

Location	System	Equipment	CHECK: Alignment	Chunking/Separation	Clean/Clear	Damage/Tampering	Heat	In Place	Leaks	Level	Missing Parts	Operation	Position	Presence of Water	Pressure	Seated	Secure	Tension	Wear
Gunner's Station (Cont'd)	Gun/Turret (Cont'd)	EL Filter Servo Button											X						
		Hydraulic Lines							X										
		Hydraulic Pressure Gage													X				
Driver's Station	Lights	Domelight				X						X							
		Lenses/Cables				X													
		Exterior										X							
	Compartment	Hatch										X							
		Hatch Seal				X													
		Periscopes			X														
		Seat				X						X							

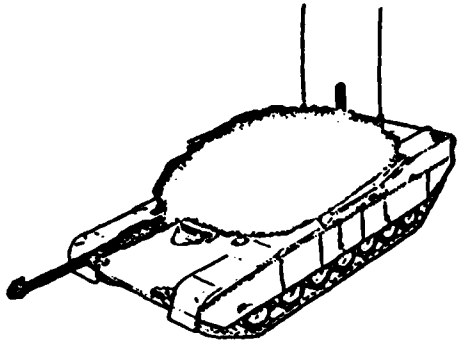


COMMANDER'S PANEL

GUNNER

PROCEDURE GUIDES

M1 TANK



JULY 1981

PREPARED BY THE U.S. ARMY RESEARCH INSTITUTE
FOR THE
BEHAVIORAL AND SOCIAL SCIENCES

GENERAL INFORMATION

This booklet contains M1 gunner procedure guides. Each guide is for a single pre-operation, post-operation, or during operation activity. Each guide is matched to TM-9-2350-255-10 (Operator's Manual for Tank, Combat, Full-Tracked, 105 MM, M1).

PURPOSE OF PROCEDURE GUIDES

The guides in this booklet will not take the place of the M1 TM or M1 training materials. The guides will aid you in remembering long or difficult sets of procedures. In short, the guides will help to "jog your memory."

USE OF THIS BOOKLET

The Table of Contents (on the next page) lists the procedure guides in this booklet. Each guide gives you a step-by-step outline for completing an activity. The following will help you to better use each guide.

1. Some steps within a procedure guide are followed by a page number. On that page you will find a detailed breakdown of the step.

2. Some of the procedure guides include a question(s). Each question is stated inside a diamond shape. Your "yes" or "no" to the question will show you which path to follow.

3. Some steps within a procedure guide are followed by a box. In the box you will find more information on the step or a caution/warning.

4. Certain steps within a procedure guide require that a knob or switch be turned to a certain position. In some cases, that position might be written like the symbol to the left. The symbol means that a light should also come on.

5. Pictures of selected panels/equipment can be found at the end of this booklet.

TABLE OF CONTENTS

PREPARE STATION

1. Gunner . . . . . Enter station (page 3)
2. GUN/TURRET DRIVE . MANUAL
3. Turret traverse lock . . . . . Lock
4. Turret power . . . ON
5. Seat . . . . . Adjust
6. Domelight. . . . . Adjust
7. Weapon . . . . . Install (page 4)
8. Intercom . . . . . Adjust
9. Chestrest. . . . . Position for firing
10. Brovpads . . . . . Adjust
11. Station. . . . . Power up (page 5)
12. GPS functional check. . . . . Perform (page 7)
13. GPS adjustments. . Perform (page 9)
14. Computer self test . . . . . Perform (page 18)
15. Computer data check. . . . . Perform (page 10)
16. TIS checkout . . . Perform (page 13)

17. GAS adjustments. . Perform (page 17)

18. Fire control system . . . . . Test (page 21)

ENTER STATION

1. Loader's hatch . . Unlock/open

2. GUN/TURRET DRIVE . —MANUAL—

3. Turret traverse lock . . . . . Lock

4. Ejection guard . . Forward ——— MAIN GUN STATUS SAFE light on

5. Gunner . . . . . Enter station

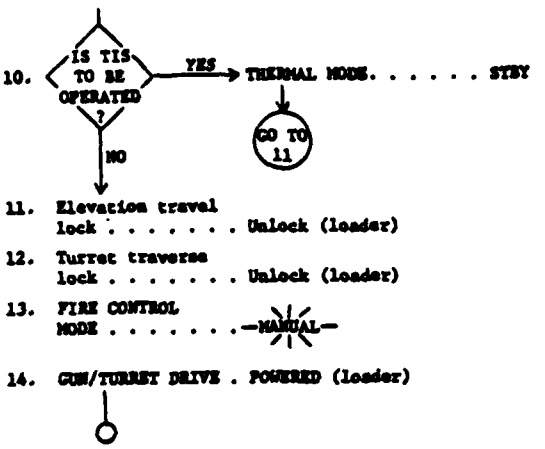
INSTALL COAXIAL MACHINEGUN

1. Weapon . . . . . Clear (page 61)
2. GPS FIRE CONTROL MODE . . . . . —MANUAL—
3. Elevation travel lock . . . . . Unlock
4. Main gun . . . . . Elevate manually
5. Smoke box doors. . Open
6. Quick release pins . . . . . Remove
7. Muzzle of barrel . Insert into smoke box
8. Weapon . . . . . Align receiver holes with mount holes
9. Trigger. . . . . Meets operating level roller with no pressure on trigger
10. Quick release pins . . . . . Insert
11. Smoke box doors. . Close
12. Spent case collection box . . Assure correct mounting

POWER UP STATION

IF LOUD, HIGH-PITCHED SQUEALING NOISE IS HEARD, OR IF HYDRAULIC PRESSURE DROPS SUDDENLY TO BELOW 500 PSI, SHUT OFF TURRET POWER AND SHUT DOWN ENGINE

1. Turret power . . . Assure ON
2. Electrical system gage. . . . Assure minimum 18 volts
3. Engine or AUX HYD PWR. . . . Running or ON (TC)
4. PANEL LIGHTS TEST button. . . . Press — All lights on GPS upper and lower panels and TIS panel on
5. PANEL LIGHTS . . . Adjust
6. Hydraulic pressure gage. . . 1500-1700 PSI
7. CCP power. . . . . —ON—
8. CCP TEST button. . Press/check lights
9. CCP cover. . . . . Close/latch



PERFORM GPS FUNCTIONAL CHECK

MAIN GUN MAY MOVE ABRUPTLY DURING THIS ACTIVITY

1. DEFROSTER. . . . . —ON—
2. DEFROSTER. . . . . Off
3. GUN/TURRET DRIVE . —POWERED— (loader)
4. FIRE CONTROL MODE . . . . . —NORMAL—
5. FIRE CONTROL MODE . . . . . —EMERGENCY—
6. FIRE CONTROL MODE . . . . . —MANUAL—
7. GUN SELECT . . . . —COAX— ——— Turret blower operating
8. GUN SELECT . . . . —TRIGGER SAFE—

9. GUN SELECT . . . . —MAIN—

10. AMMO SELECT. . . . Check lights for all positions

11. GPS ballistic doors. . . . . Open

12. FLTR/CLEAR/SHTR. . CLEAR — See clear view in GPS eyepiece

13. Magnification lever. . . . . 10X to 3X to 10X — Eyepiece shows magnification changes

14. FLTR/CLEAR/SHTR. . FLTR — See filter present in GPS eyepiece

15. FLTR/CLEAR/SHTR. . SHTR — Daylight view blocked out of GPS eyepiece

16. FLTR/CLEAR/SHTR. . CLEAR — See clear view in GPS eyepiece

PERFORM GPS ADJUSTMENTS

MAIN GUN MAY MOVE ABRUPTLY DURING THIS ACTIVITY

1. Reticle brightness . . . . Adjust

2. FIRE CONTROL MODE . . . . . —NORMAL— — Stay clear of gun

3. GPS reticle. . . . On distant target — Using power control handle

4. GPS eyepiece . . . Focus

5. Reference pointer setting. . Note

6. Palm switches. . . Squeeze

7. IS THERE MORE THAN 1 MIL DRIFT IN 20 SECONDS? YES
   - 7a. AZ knob. . . . . Turn to stop drift
   - 7b. EL knob. . . . . Turn to stop drift

   NO → GO TO 8

8. Palm switches. . . Release

PERFORM COMPUTER DATA CHECK

The box (to the right) contains the common data "CHECK" sequence. When a step in this procedure requires you to "check" a data entry, use this common sequence. Then, go to the next step in the procedure.

CHECK STEPS

(To be used for all data checks)

A. Data key . . . . . Press/release

B. DOES DISPLAY SHOW CORRECT READING? — NO → C. Number keys or toggle switch . . . Enter correct data

D. ENTER key . . . . . Press/release → GO TO A

YES

E. ENTER key. . . . . Press/release

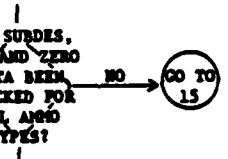
1. GUN SELECT . . . . —MAIN—
2. CCP power. . . . . —ON—
3. AMMO TEMP data . . "Check" (use number keys)
4. BARO PRESS data. . "Check" (use number keys) — *If not known, use 29.92*
5. AIR TEMP data. . . "Check" (use number keys) — If not known, use AMMO TEMP
6. MRS lever. . . . . IN — MRS key light on
7. BORESIGHT data . . "Check" (use toggle switch)
8. MRS lever. . . . . OUT
9. BORESIGHT data . . "Check" (use number keys)
10. GUN SELECT . . . . —COAX—
11. AMMO BURSTS data . "Check" (use number keys)
12. BS range data. . . "Check" (use number keys)
13. ZERO data. . . . . "Check" (use number keys)
14. GUN SELECT . . . . —MAIN—

15. AMMO SELECT. . . . SABOT or HEP or HE or HEAT

16. AMMO SUBDES data . "Check" (use number keys)

17. BS range data. . . "Check" (use number keys)

18. ZERO data. . . . . "Check" (use number keys or toggle switch)



20. TUBE WEAR data . . "Check" (use number keys)

21. Key cover. . . . . Close

22. CCP door . . . . . Close/latch

PERFORM TIS CHECKOUT

1. THERMAL MODE . . . STBY
2. FLTR/CLEAR/SHTR. . SHTR
3. POLARITY . . . . . WHITE HOT
4. THERMAL MAGNIFICATION. . . 3X
5. UNIT TEST PATTERN. . . . . PCU
6. Fault light. . . . On less than 5 seconds
7. GPS image. . . . . See range, possible ▭, possible F
8. UNIT TEST PATTERN. . . . . ICU
9. Fault light. . . . On less than 5 seconds
10. GPS image. . . . . See test pattern, dark upper right corner, possible ▭
11. UNIT TEST PATTERN. . . . . EU
12. Fault light. . . . On less than 5 seconds

13. THERMAL MODE . . . ON

14. GPS image. . . . . See corner symbols, all bottom symbols, range 8888, possible ▭

15. THERMAL MAGNIFICATION. . . 10X

16. GPS image. . . . . See moving TIS reticle, range 8888

17. TRU READY light. . Assure on

18. UNIT TEST PATTERN. . . . . TRU

19. Fault light. . . . On less than 5 seconds

20. GPS image. . . . . See reticle centered, vertical bar left of reticle, range at bottom, possible ▭ possible F

21. CONTRAST . . . . . Adjust

22. SENSITIVITY. . . . Adjust

23. RETICLE. . . . . Adjust brightness

24. POLARITY . . . . . BLACK HOT

25. GPS image. . . . . See dark bar on green background

26. POLARITY . . . . . WHITE HOT

27. GPS image. . . . . See light bar on dark background

28. UNIT TEST PATTERN. . . . . OFF

29. THERMAL ballistic door . . Open

30. GPS reticle. . . . On 1000 meter target

31. CONTRAST . . . . . Adjust

32. SENSITIVITY. . . . Adjust

33. FOCUS. . . . . Adjust

34. Computer . . . . . Enter 2680 range

35. SYMBOL knob. . . . Clockwise all the way

36. GPS image. . . . . See range symbol reads 2680, no F

37. SYMBOL knob. . . . Adjust

38. GPS image. . . . . Range symbol should not interfere with target image

39. THERMAL MAGNIFICATION. . . 3X

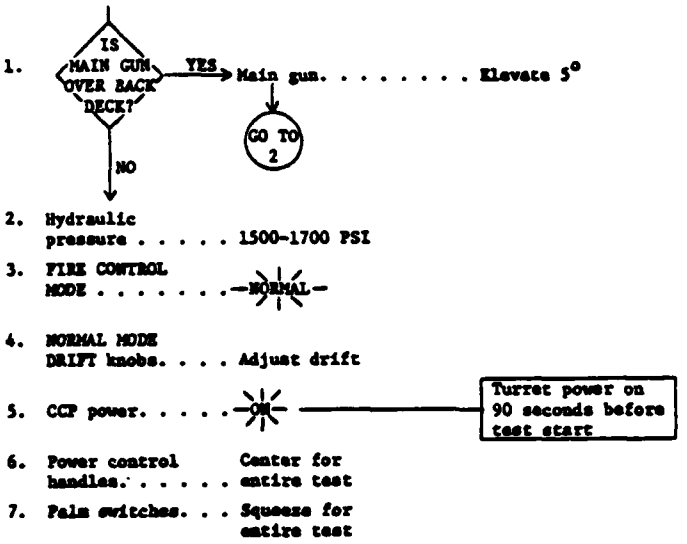
40. THERMAL MODES. . . ON, STBY, or OFF — If set to STBY or OFF, set FLTR/ CLEAR/SHTR to CLEAR

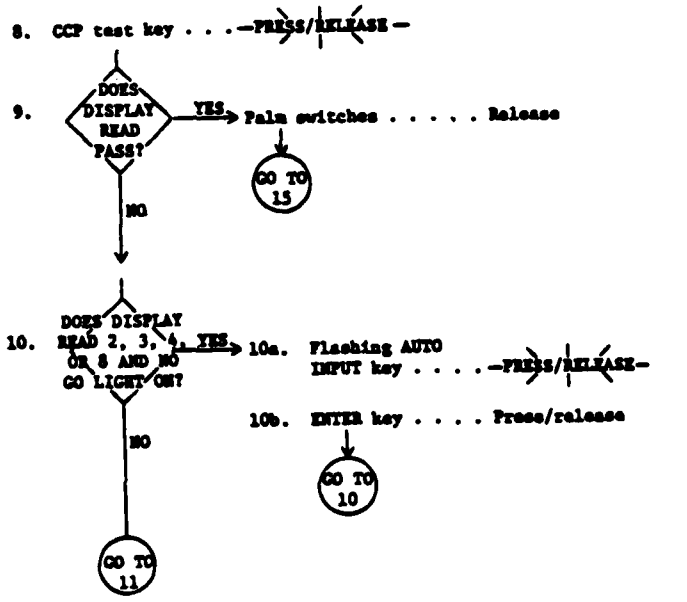
41. THERMAL ballistic door . . Close — If TIS not used immediately

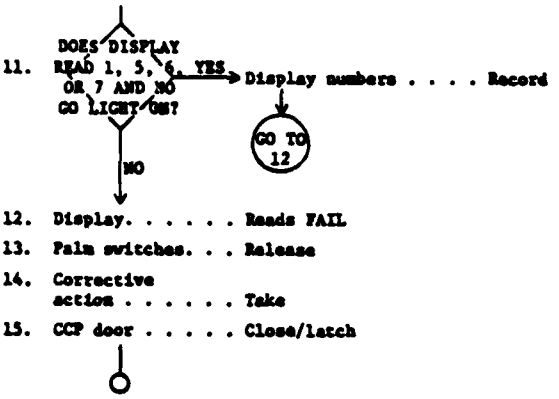
PERFORM GAS ADJUSTMENTS

1. Reticle brightness knob. . . . . On — If used during night/reduced visibility
2. GAS reticle. . . . On distant target
3. Reticle brightness . . . . Adjust
4. GAS focusing ring . . . . . Adjust to focus reticle
5. GAS filter knob. . Adjust
6. RETICLE select . . SABOT/HEP
7. GAS image. . . . . See HEP-T and APFSDS-T legends above reticle
8. RETICLE select . . HEAT
9. GAS image. . . . . See HEAT legend above reticle
10. Reticle brightness knob. . . . . OFF if daylight

PERFORM COMPUTER SELF TEST







11. DOES DISPLAY READ 1, 5, 6, OR 7 AND NO GO LIGHT ON? YES → Display numbers . . . . Record → GO TO 12
    NO
12. Display. . . . . Reads FAIL
13. Palm switches. . . Release
14. Corrective action . . . . . Take
15. CCP door . . . . . Close/latch

TEST FIRE CONTROL SYSTEM

1. Lead system check. . . . . Perform (page 22)
2. Firing circuits check. . . . . Perform (page 24)
3. Crosswind sensor check. . . . . Perform (page 28)

PERFORM LEAD SYSTEM CHECK

1. Computer self test . . . . . Perform (page 18)
2. GPS day ballistic door . . Open
3. FIRE CONTROL MODE . . . . . —NORMAL—
4. GUN SELECT . . . . —MAIN—
5. AMMO SELECT. . . . —HEAT—
6. MAGNIFICATION. . . 10X
7. FLTR/CLEAR/SHTR. . CLEAR
8. Power control handles. . . . . Center
9. Palm switches. . . Squeeze/hold
10. Computer . . . . . Enter 2000 meter range
11. GPS image. . . . . Observe
12. Power control handles. . . . . Slowly move left/right/center
13. GPS reticle. . . . Follows power handles
14. Power control handles. . . . . Rotate in one direction, then quickly center — Gunner feel turret motion
15. Palm switches. . . Release
16. GPS day ballistic door . . Close

PERFORM FIRING CIRCUITS CHECK

BE SURE ALL WEAPONS ARE CLEAR

1. GUN/TURRET DRIVE . —MANUAL— (loader)
2. Main gun tube/ turret/breech. . . Clear
3. Breech block . . . Close (loader)
4. Tester . . . . . Between gun tube and breech block
5. Ejection guard . . Rear (loader) ——— ARMED light on
6. Turret networks box circuit breakers CB19, CB20, CB29 . . . . ON (loader)
7. GUN SELECT . . . . —MAIN—
8. Blasting Machine . Operate ——— Tester should flash
9. Manual elevation crank handle palm switch. . . . Squeeze
10. Manual elevation crank handle trigger. . . . . Press repeatedly ——— Tester should flash each time trigger is pressed
11. Gun tube/ turret/breech. . . Clear

GUN AND/OR TURRET MAY MOVE ABRUPTLY DURING FOLLOWING STEPS

12. GUN/TURRET DRIVE . —POWERED— (loader)
13. FIRE CONTROL MODE . . . . . —NORMAL—
14. Palm switches. . . Squeeze
15. Left trigger . . . Squeeze/release ——— Tester should flash
16. Right trigger. . . Squeeze/release ——— Tester should flash
17. Palm switches. . . Release
18. Turret traverse lock . . . . . Lock (loader)
19. Both palm switches . . . . . Squeeze
20. Power control handles. . . . . Rotate left
21. Left trigger . . . Squeeze/release ——— Tester should not flash

22. Right trigger. . . Squeeze/release — Tester should not flash

23. Power control handles. . . . . Rotate right

24. Left trigger . . . Squeeze/release — Tester should not flash

25. Right trigger. . . Squeeze/release — Tester should not flash

26. Both palm switches . . . . . Release

27. Turret traverse lock . . . . . Unlock (loader)

28. Elevation travel lock . . . . . Lock

29. Power control handles. . . . . Pull back trying to elevate weapons

30. Both palm switches . . . . . Squeeze

31. Left trigger . . . Squeeze/release — Tester should not flash

32. Right trigger. . . Squeeze/release — Tester should not flash

33. Both palm switches . . . . . Release

34. Elevation travel lock . . . . . Unlock

35. GUN SELECT . . . . —TRIGGER SAFE—

36. Both palm switches . . . . . Squeeze

37. Left trigger . . . Squeeze/release — Tester should not flash

38. Right trigger. . . Squeeze/release — Tester should not flash

39. Both palm switches . . . . . Release

40. GUN SELECT . . . . —MAIN—

41. GUN/TURRET DRIVE .—MANUAL— (loader)

42. Both palm switches . . . . . Squeeze

43. Left trigger . . . Squeeze/release — Tester should flash

44. Right trigger. . . Squeeze/release — Tester should flash

45. Both palm switches . . . . . Release

46. Tester . . . . . Remove/stow

47. Ejection guard . . Forward — MAIN GUN STATUS SAFE light on

PERFORM CROSSWIND SENSOR CHECK

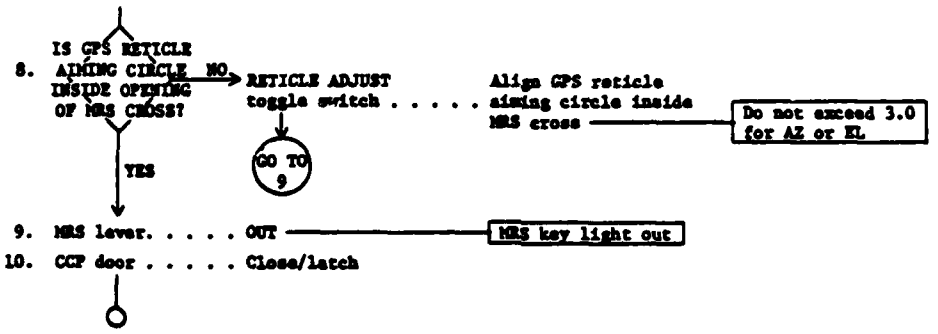
1. Crosswind sensor . Erect (loader)
2. Computer self test . . . . . Perform (page 18)
3. Crosswind sensor top. . . . . Cover (loader) — Cover 1 minute before continuing
4. Cant . . . . . Manually enter 5°
5. CROSSWIND key. . . Press/release
6. DOES DISPLAY READ 3MPH OR LESS? — NO → Crosswind sensor. . . . Clean → GO TO 4
   YES
7. CCP door . . . . . Close/latch
8. Crosswind sensor top. . . . . Uncover

PREPARE TO FIRE CHECKS

1. Coaxial machinegun . . . . Check — Mounting/operation of electrical solenoid, manual trigger, manual safety
2. Muzzle reference sensor . . . . . Update (page 30)
3. Muzzle reference sensor . . . . . Check — Missing or damaged hardware/scratches/moisture/dirt
4. Manual inputs to auto fire control data . . . Input (page 32)
5. Manual inputs to fire control data . . . . . Input (page 34)
6. Coaxial machinegun . . . . Zero (page 37)
7. Main gun . . . . . Boresight (page 41)
8. Main gun . . . . . Zero (page 46)

UPDATE MUZZLE REFERENCE SENSOR

1. GPS day ballistic door . . Open
2. FIRE CONTROL MODE . . . . . —NORMAL—
3. CCP power. . . . . —ON—
4. MAGNIFICATION lever. 10X
5. MRS lever. . . . . IN — MRS key lit
6. Power control handle palm switches . . . . . Squeeze — Gun will move to 0 elevation
7. Power control handle palm switches . . . . . Release



MANUAL INPUTS TO AUTOMATIC FIRE CONTROL DATA

1. CCP power. . . . . Assure —ON—

2. Desired auto input key. . . . . —PRESS/RELEASE—

3. Number/symbol keys . . . . . Input data

4. DOES DISPLAY SHOW CORRECT INPUT DATA? — NO → 4a. CLEAR key. . . . Press/release → GO TO 3

   YES ↓

5. ENTER key. . . . . —PRESS/RELEASE—

6. DOES AUTO INPUT KEY LIGHT REMAIN ON? — NO → GO TO 4a

   YES ↓

7. ALL MANUAL INPUTS COMPLETED? — NO → GO TO 2

   YES ↓

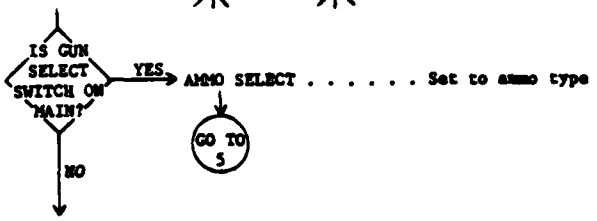
8. CCP door . . . . . Close/latch

MANUAL INPUTS TO FIRE CONTROL DATA

1. CCP power. . . . . Assure -ON-

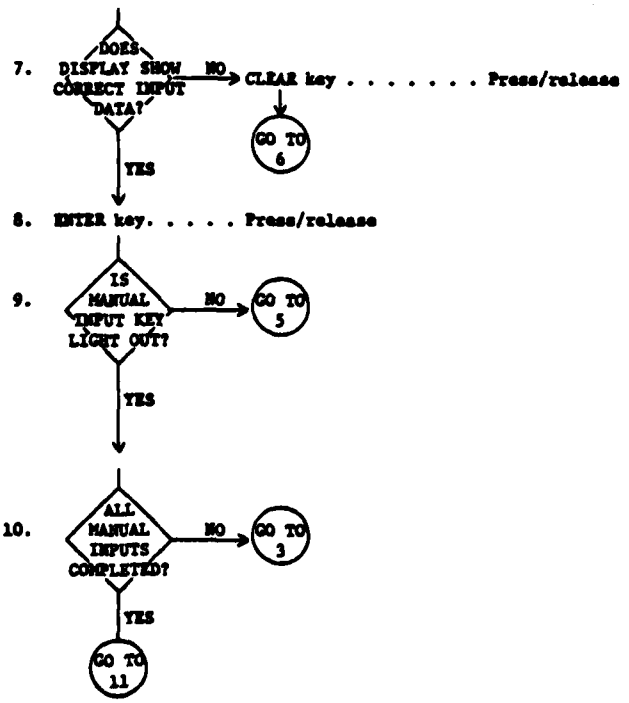
2. Key cover. . . . . Open

3. GUN SELECT . . . . -MAIN- or -COAX-



5. Desired manual input key. . . . . -PRESS/RELEASE-

6. Number keys. . . . Input data



11. Key cover. . . . . Close
12. CCP door . . . . . Close/latch

ZERO COAXIAL MACHINEGUN

Prepare to Zero

1. Tank . . . . . Level
2. Target . . . . . 800 meters
3. Weapon . . . . . Install
4. Gunner's station . Power up
5. Coax . . . . . Load ——— 50 rounds
6. Day ballistic door . . . . . Open
7. GUN/TURRET DRIVE . POWERED
8. GPS GUN SELECT . . -COAX-
9. Turret blower. . . Assure on
10. GPS FIRE CONTROL MODE . . . -NORMAL-
11. GPS MAGNIFICATION lever 10X

Fire for Zero

12. Main/exterior gun. . . . . Clear/aim downrange

13. GPS reticle. . . . Aiming point on target

14. Target . . . . . Lase/input 800 meters

15. Weapon . . . . . Fire ——— 20-25 rounds

16. Lay of gun/ reticle. . . . . Do not change

17. Power control handles. . . . . Release

18. CCP power. . . . . ON

19. ZERO key . . . . . PRESS/RELEASE

20. IS AIMING POINT AT CENTER OF BULLET STRIKE AREA? — NO

- 20a. RETICLE ADJUST toggle switch . . Place reticle aiming point on strike area
- 20b. Zero setting. . . Record
- 20c. ENTER key . . . . Press/release ——— ZERO light will go off
- 20d. GPS reticle . . . Aiming point on target

YES

- 20e. Lay of gun/ reticle . . . . . Do not change
- 20f. Weapon. . . . . Fire ——— 20-25 rounds
- 20g. Power control handles . . . . . Release

20h. IS AIMING POINT AT CENTER OF BULLET STRIKE AREA? — YES → GO TO 21

NO

20i. ZERO key. . . . . PRESS/RELEASE

GO TO 20a

21. Zero setting . . . Record

22. ENTER key. . . . . Press/release ——— ZERO light will go off

23. CCP power. . . . . OFF

24. CCP door . . . . . Close/latch

25. Weapon . . . . . Clear (page 61)

BORESIGHT THE MAIN GUN

Prepare to Boresight

1. Tank . . . . . Level
2. Target . . . . . 1200 meters
3. Gun. . . . . Front of tank
4. Hydraulic pressure gage. . . 1500-1700 PSI
5. GUN SELECT . . . . ~~MAIN~~
6. MAGNIFICATION lever. 10X
7. FLT/CLEAR/SMTR . . CLEAR
8. Day ballistic door . . . . . Open
9. CAN LASER RANGE FINDER BE USED? NO → Range . . . . . Enter manually → GO TO 14
   YES → GO TO 10

10. FIRE CONTROL MODE . . . . . —EMERGENCY—

11. GPS reticle. . . . On target center

12. Target . . . . . Lase

13. FIRE CONTROL MODE . . . . . —MANUAL—

14. Muzzle plug. . . . Remove/stow

15. Pye-Watson . . . . Insert ——— Then do not touch gun or device

16. Pye-Watson aiming dot . . . . Upper left target corner ——— Use manual controls/G pattern/no overshoot - return

17. Pye-Watson . . . . Rotate 180°

18. Pye-Watson aiming dot . . . . Assure upper left target corner

Boresight GAS

19. IS IT DARK OR OVERCAST? YES → GAS power . . . . . On → GO TO 20
NO ↓

20. Reticle switch . . SABOT/HEP

21. GAS boresight cross. . . . . Upper left target corner ——— Use AZ and EL knobs

22. AZ knob. . . . . Hold/turn scale 0 to index

23. EL knob. . . . . Hold/turn scale 0 to index

24. IS GAS BORESIGHT CROSS OR UPPER LEFT TARGET CORNER? NO → GO TO 21
YES ↓

Boresight GPS

25. FIRE CONTROL MODE . . . . . —EMERGENCY—

26. CCP power. . . . . —ON—

27. BORESIGHT key. . . Press/release

28. GPS reticle circle . . . . . Upper left target corner ——— Use toggle switch

29. GPS, GAS, Pye-Watson . . . . Observe view

30. ARE GPS RETICLE, GAS BORESIGHT CROSS, AND PYE-WATSON AIMING DOT ALL ON UPPER LEFT TARGET CORNER? — NO →
    - 30a. Pye-Watson aiming dot. . . . Upper left target corner
    - 30b. GAS . . . . . Boresight
    - Repeat steps 19-24
    - 30c. GPS reticle . . . Upper left target corner
    - GO TO 29

    YES ↓

31. AZ/EL values . . . Record
32. ENTER key. . . . . Press/release
33. Pye-Watson . . . . Remove/stow
34. FIRE CONTROL MODE . . . . . NORMAL
35. MRS lever. . . . . IN
36. BORESIGHT key. . . Press/release

37. Power control palm switches. . . Squeeze until gun at 0° elevation — 5 seconds
38. RETICLE ADJUST toggle switch. . . GPS reticle circle in MRS reticle
39. AZ/EL values . . . Record
40. MRS lever. . . . . OUT
41. CCP door . . . . . Close/latch

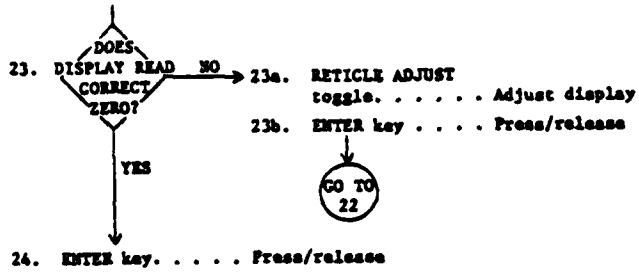
ZERO THE MAIN GUN

Prepare for Zero

1. Gun. . . . . Boresight (page 41)
2. Crosswind sensor . Erect
3. CCP power. . . . . ON
4. AMMO TEMP. . . . . Enter data
5. BARO PRESS . . . . Enter data
6. AIR TEMP . . . . . Enter data
7. TUBE WEAR. . . . . Enter data
8. MAGNIFICATION lever. 10X
9. Day ballistic door . . . . . Open
10. Zero target. . . . Select
11. Gun. . . . . Front of tank
12. GUN SELECT . . . . MAIN
13. THERMAL MODE . . . STBY
14. FLT/CLEAR/SETR . . CLEAR

Fire for Zero

15. Key cover. . . . . Open
16. AMMO SELECT. . . . SELECT — HEP/APERS/HEAT/SABOT in order
17. FIRE CONTROL MODE . . . . . EMERGENCY
18. AMMO SUBDES key. . Press/release
19. DOES DISPLAY READ CORRECT AMMO SUBDES? — NO → 19a. Number key. . . . Input SUBDES; 19b. ENTER key . . . . Press/release → GO TO 18
    YES
20. ENTER key. . . . . Press/release
21. Turret drift . . . Nulled out
22. ZERO key . . . . . Press/release



24. ENTER key. . . . . Press/release

25. FIRE CONTROL MODE . . . . . —NORMAL—

26. Gun. . . . . Load — With selected ammo

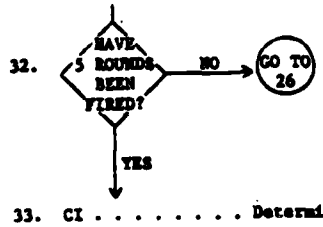
27. MRS. . . . . Update (page 30)

28. GPS reticle. . . . Center of target — Use power control handles

29. Target . . . . . Lase

30. Ready to fire symbol/range . . . Appear below reticle

31. Gun. . . . . Fire one round



33. CI . . . . . Determine

34. GPS reticle. . . . Center of target — Use power control handles

35. Power control handles. . . . . Release

36. FIRE CONTROL MODE . . . . . —EMERGENCY—

37. GPS reticle. . . . Refine on target — Use manual controls

38. ZERO key . . . . . Press/release

39. RETICLE ADJUST toggle . . . . . Move reticle aiming point to CI

40. ENTER key. . . . . Press/release

41. FIRE CONTROL MODE . . . . . —NORMAL—

Fire for Confirmation

42. Gun. . . . . Load — With selected ammo

43. MRS. . . . . Update (page 30)

44. GPS reticle. . . . Center of target — Use power control handles

45. Ready to fire symbol/range . . . Appear below reticle

46. Gun. . . . . Fire one round

47. HAVE 3 ROUNDS BEEN FIRED? — NO → GO TO 42

YES

48. CI . . . . . Determine

49. IS CI WITHIN 25 MILS OF AIMING POINT? — NO → 49a. GAS reticle correct range line. . . . . On target aiming point

YES

49b. IS ORIGINAL 3 ROUND CI CORRECT? — NO → GO TO 49d

YES

49c. IS GPS RETICLE LAID ON ORIGINAL CI? — YES → GO TO 42

NO

49d. FIRE CONTROL MODE. . . . . ~~EMERGENCY~~

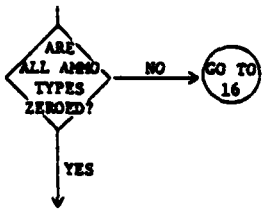
GO TO 38 and fire two more rounds

50. FIRE CONTROL MODE . . . . . ~~EMERGENCY~~

51. ZERO key . . . . . Press/release

52. AZ/EL values . . . Record

53. ENTER key. . . . . Press/release



55. Key cover. . . . . Close

56. CCP door . . . . . Close/latch

Zero TIS

57. TRU READY light. . On

58. THERMAL MODE . . . On

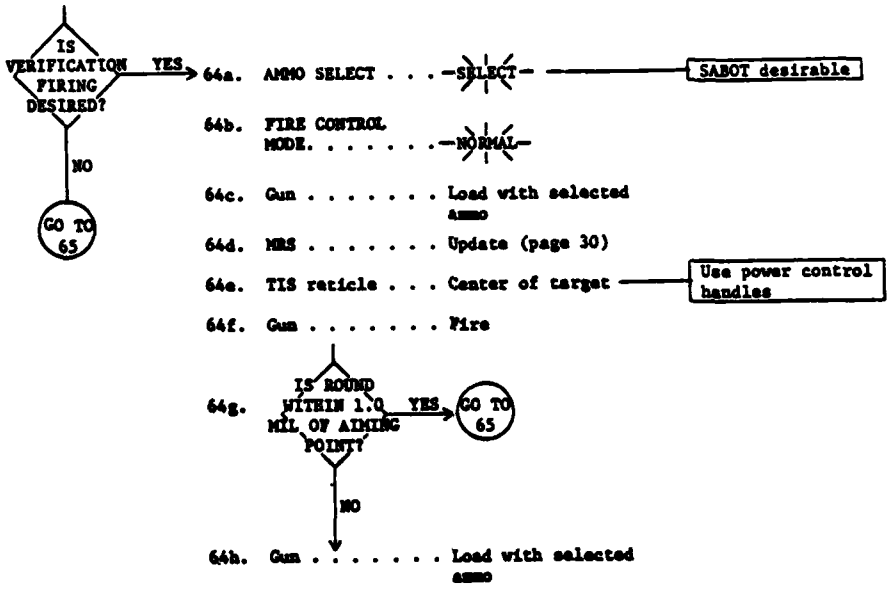
59. GPS reticle. . . . Upper left target corner — Use power control handles

60. FLT/CLEAR/SHTR . . SHTR

61. THERMAL ballistic door . . Open

62. THERMAL MAGNIFICATION lever . . . 10X

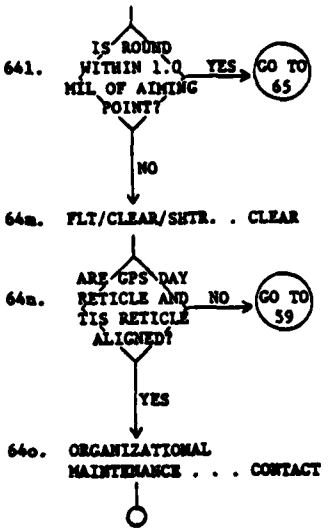
63. TIS reticle. . . . Upper left target corner — Use AZ and EL knobs



64i. MRS . . . . . Update

64j. TIS reticle . . . Center of target — Use power control handles

64k. Gun . . . . . Fire



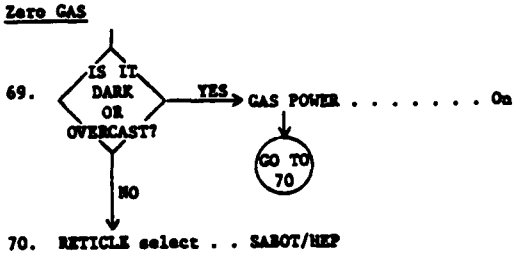
65. AZ and EL values . Record

66. THERMAL MODE . . . OFF

67. FLT/CLEAR/SHTR . . CLEAR

68. THERMAL ballistic door . . Close

Zero GAS



70. RETICLE select . . SABOT/HEP

71. AMMO SELECT. . . . —SABOT—

72. FIRE CONTROL MODE . . . . . —NORMAL—

73. GPS reticle. . . . Upper left target corner — Range 1200 meters/ use power control handles

74. Power control handles. . . . . Release

75. GPS reticle. . . . Refine on target — Use manual controls

76. GAS reticle. . . . 1200 meter aiming circle on upper left target corner — Use AZ and EL knobs

77. IS CONFIRMATION FIRING DESIRED? YES

77a. FIRE CONTROL MODE. . . . . MANUAL

77b. SABOT round . . . Load

77c. GAS reticle . . . 1200 meter aiming circle on upper left target corner — Use manual controls

77d. Gun . . . . . Fire — Use manual controls

77e. IS ROUND WITHIN OR TOUCHING TARGET 24" CIRCLE? YES → GO TO 78

NO

77f. SABOT round . . . Load

77g. GAS reticle . . . 1200 meter aiming circle on target center — Use manual controls

77h. Gun . . . . . Fire — Use manual controls

77i. HAVE 2 ROUNDS BEEN FIRED? NO → GO TO 77f

YES

77j. CI. . . . . Measure or estimate

77k. GAS reticle . . . On CI — Use AZ and EL knobs

GO TO 77

78. AZ and EL values . Record

SECURE STATION

1. Coaxial Machinegun . . . . Remove (page 59)
2. Station. . . . . Power down (page 60)
3. Gunner . . . . . Exit tank

REMOVE COAXIAL MACHINEGUN

1. Main gun . . . . . Clear (loader)
2. Weapon . . . . . Clear (page 61)
3. Main gun . . . . . Elevate
4. FIRE CONTROL MODE . . . . . —MANUAL—
5. Smoke box doors. . Open
6. Quick release pins . . . . . Remove
7. Weapon . . . . . Slide to rear
8. Weapon . . . . . Lift until barrel is out of smoke box
9. Quick release pins . . . . . Insert
10. Smoke box doors. . Close

POWER DOWN STATION

1. CCP door . . . . . Close/latch
2. THERMAL MODE . . . OFF
3. GUN SELECT . . . . TRIGGER SAFE
4. Laser RANGE. . . . SAFE
5. GPS ballistic doors. . . . . Close
6. GAS POWER. . . . . OFF
7. Chestrest. . . . . Stowed position
8. Elevation travel lock . . . . . Lock
9. Turret . . . . . Traverse so driver can exit
10. Turret traverse lock . . . . . Lock (loader)
11. CVC helmet . . . . Remove/disconnect
12. Domelight. . . . . OFF

CLEAR COAXIAL MACHINEGUN

1. Ejection guard . . FORWARD (loader) — MAIN GUN STATUS SAFE light on
2. GUN/TURRET DRIVE . EL UNCPL (loader) — GUN SELECT TRIGGER SAFE light on
3. Main gun . . . . . Fully elevate
4. Safety . . . . . F
5. Charger cable. . . Pull to rear, then let go
6. Safety . . . . . S
7. Latches. . . . . Push in
8. Cover. . . . . Pull straight up
9. Belt . . . . . Off feed tray
10. Feed tray. . . . . Raise
11. IS CHAMBER EMPTY ?
    - NO →
      - 11a. Cover . . . . . Down
      - 11b. Safety. . . . . F
      - 11c. Weapon hot. . . . Wait 15 minutes
      - 11d. Charger cable . . Pull back/hold
      - 11e. Trigger . . . . . Pull back/hold
    - YES → GO TO 12

11f. Charger cable . . Slowly forward until stops, then let go

11g. Trigger . . . . . Release

11h. Charger cable . . Pull back

11i. Bullet. . . . . Should drop

12. Cover. . . . . Down

13. Safety . . . . . F

14. Charger cable. . . Pull back/hold

15. Trigger. . . . . Pull back/hold

16. Charger cable. . . Slowly forward until stops, then let go

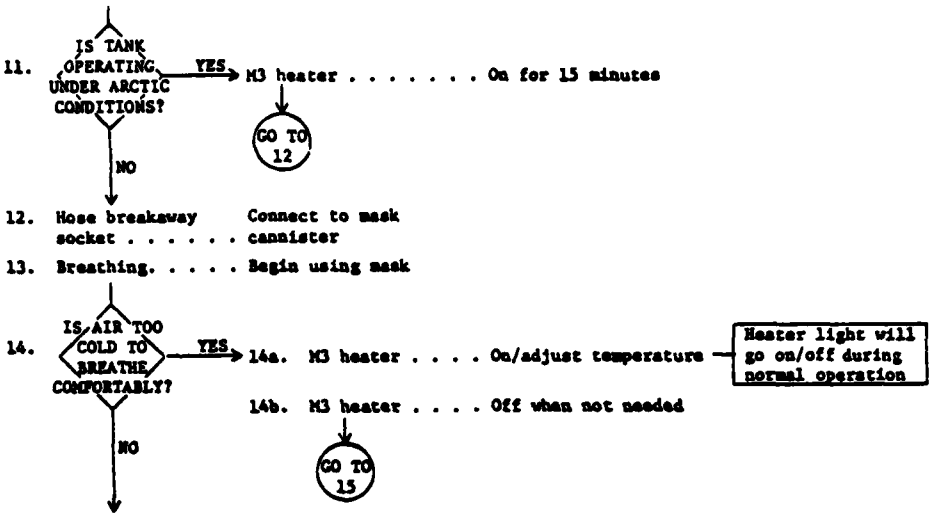
17. Trigger. . . . . Release

18. Safety . . . . . S

OPERATE/SECURE GAS PARTICULATE FILTER

Operate

1. VEHICLE MASTER POWER. . . . . Assure ON
2. Station. . . . . Power up
3. Turret . . . . . Power up
4. GAS PARTIC FILTER . . . . . ON (driver)
5. Mask . . . . . On
6. Mask . . . . . Clear and seal
7. Mike lead. . . . . Disconnect from connector
8. Mask mike lead . . Hook up to connector
9. Spring clip. . . . Remove from intake opening (loader)
10. Hose breakaway socket . . . . . Remove from mount



16. Hose breakaway socket . . . . . Connect to mount
17. Mask mike lead . . Disconnect from connector
18. Mike lead. . . . . Connect to connector
19. Mask . . . . . Off/stow
20. GAS PARTIC FILTER . . . . . OFF (driver)
21. Spring clip. . . . Install (loader)

Gunner's Station

1.	AUX HYD PWR. . . .	OFF (TC panel)	Engine off/turret power on
2.	Power control handle	Elevate/depress main gun slowly	
3.	Hydraulic pressure gage.	Pressure should drop rapidly after reaching 700-750 PSI	Large hydraulic leak could be present if high-pitched, squealing noise heard or sudden pressure drop to 500 PSI
4.	AUX HYD PWR. . . .	ON (TC panel)	Engine off/turret power on
5.	Auxiliary hydraulic pump . .	Listen for operation	Pump will not operate until hydraulic pressure drops below 1150 PSI
6.	Hydraulic pressure gage.	Observe	Pump should shut off at 1550-1650 PSI
7.	Power gun/ turret control . .	Check operation	
8.	Turret traverse lock	Unlock (loader)	
9.	Elevation lock . .	Unlock	
10.	Manual elevation crank handle . . .	Elevate/depress main gun	
11.	Manual traverse crank handle . . .	Traverse turret left/right	
12.	Manual traverse palm lever	Depress	
13.	Power control handles.	Move	Power controls should have no effect
14.	Manual traverse palm lever	Release	
15.	AZ filter servo button	In place	If popped out, push button in once
16.	EL filter servo button	In place (driver)	If popped out, push button in once (driver)
17.	Turret	Traverse	
18.	Gun.	Elevate	
19.	AZ/EL buttons. . .	In place	
20.	Hydraulic lines. .	Check for leaks	

21. Hydraulic pressure . . . . . Check — Gage should read 1550-1650 PSI with engine running or 1150-1650 PSI with AUX HYD pump operating

22. GAS PARTIC FILTER . . . . . On (driver)

23. Spring clip. . . . Remove (loader)

24. Filtered air hose . . . . . Remove from connector

25. Airflow. . . . . Should be felt

26. Heater . . . . . On — Heater lamp lights and heater are working

27. Heater . . . . . Off

28. Mask . . . . . Check operation

29. Mike . . . . . Check operation

AFTER OPERATIONS PMCS

Gunner's Station

1. Power gun/ turret control . . Check operation

2. Turret traverse lock . . . . . Unlock (loader)

3. Elevation lock . . Unlock

4. Manual elevation crank handle . . . Elevate/depress main gun

5. Manual traverse crank handle . . . Traverse turret left/right

6. Manual traverse palm lever . . . . Depress

7. Power control handles. . . . . Move — Power controls should have no effect

8. Manual traverse palm lever . . . . Release

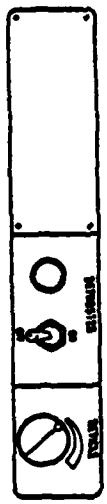
9. AZ filter servo button . . . . . In place — If popped out, push button in once

10. EL filter servo button . . . . . In place (driver) — If popped out, push button in once

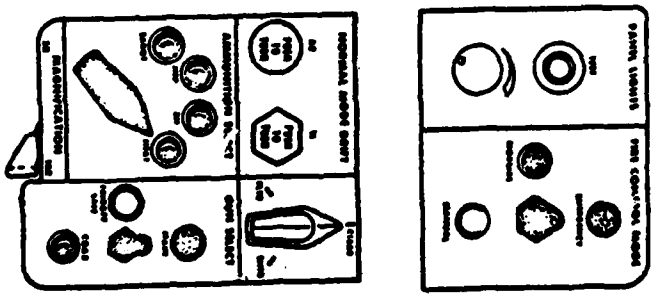
11. Turret . . . . . Traverse
12. Gun. . . . . Elevate
13. AZ/EL buttons. . . In place
14. Hydraulic lines. . Check for leaks
15. Hydraulic pressure . . . . . Check

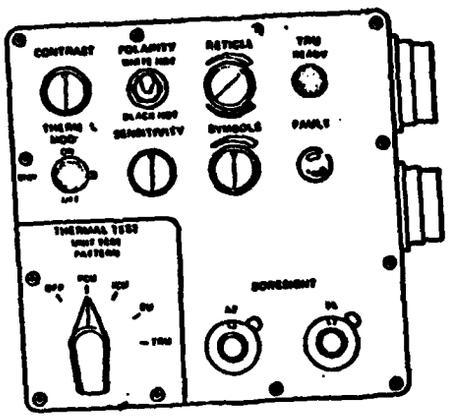
Gage should read 1550-1650 PSI with engine running or 1150-1650 PSI with AUX HYD pump operating

GUNNER'S PRIMARY SIGHT PANEL (UPPER)

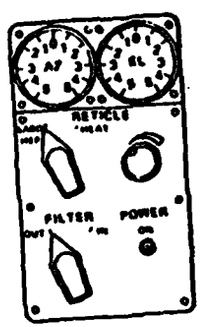


GUNNER'S PRIMARY SIGHT PANELS (LOWER)

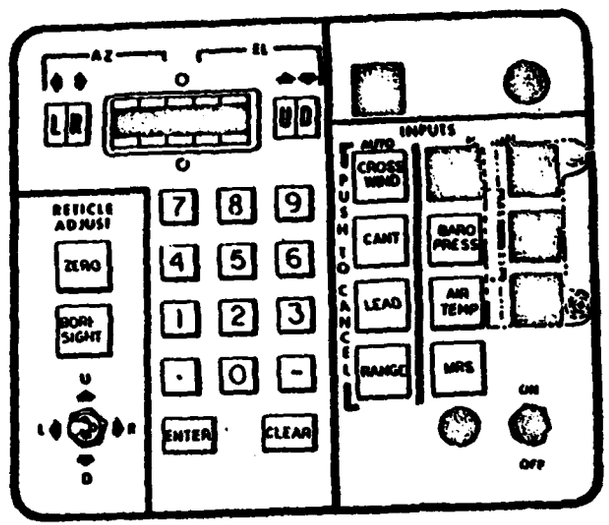




GUNNER'S THERMAL IMAGING SIGHT PANEL



GUNNER'S AUXILIARY SIGHT PANEL

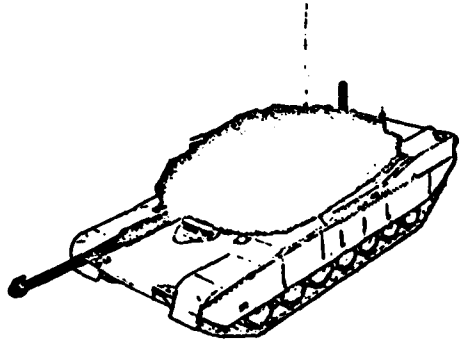


COMPUTER CONTROL PANEL

DRIVER

PROCEDURE GUIDES

M1 TANK



JULY 1981

PREPARED BY THE U.S. ARMY RESEARCH INSTITUTE
FOR THE
BEHAVIORAL AND SOCIAL SCIENCES

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GENERAL INFORMATION

This booklet contains M1 driver procedure guides. Each guide is for a single pre-operation, post-operation, or during operation activity. Each guide is matched to TM-9-2350-255-10 (Operator's Manual for Tank, Combat, Full-Tracked, 105 MM, M1).

PURPOSE OF PROCEDURE GUIDES

The guides in this booklet will not take the place of the M1 TM or M1 training materials. The guides will aid you in remembering long or difficult sets of procedures. In short, the guides will help to "jog your memory."

USE OF THIS BOOKLET

The Table of Contents (on the next page) lists the procedure guides in this booklet. Each guide gives you a step-by-step outline for completing an activity. The following will help you to better use each guide.

1. Some steps within a procedure guide are followed by a page number. On that page you will find a detailed breakdown of the step.

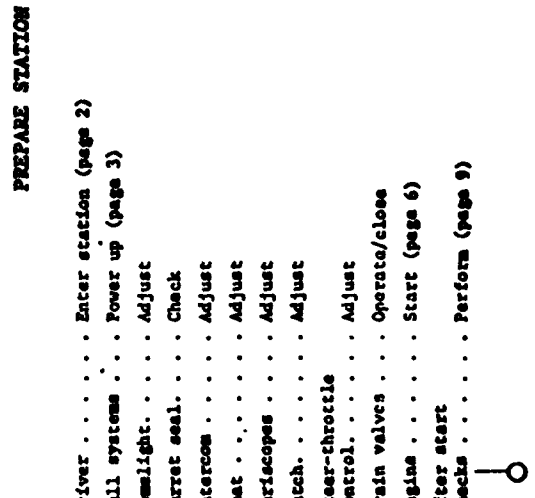
2. Some of the procedure guides include a question(s). Each question is stated inside a diamond shape. Your "yes" or "no" to the question will show you which path to follow.

3. Some steps within a procedure guide are followed by a box. In the box you will find more information on the step or a caution/warning.

4. Certain steps within a procedure guide require that a knob or switch be turned to a certain position. In some cases, that position might be written like the symbol to the left. The symbol means that a light should also come on.

5. Pictures of selected panels/equipment can be found at the end of this booklet.

TABLE OF CONTENTS



ENTER STATION

1. Loader's hatch . . Unlock/open
2. GUN/TURRET DRIVE . –MANUAL–
3. Turret traverse lock . . . . . Locked
4. Loader's toe guard. . . . . Against ammo storage box
5. Headrest . . . . . Up
6. Seat back. . . . . Down
7. Driver . . . . . Enter station
8. Parking brake. . . Set
9. CREW FIRE extinguisher handle . . Seated
10. ENGINE FIRE extinguisher handle . . Seated

POWER UP HULL SYSTEMS

1. PERSONNEL HEATER . OFF
2. NIGHT PERISCOPE. . OFF
3. GAS PARTIC FILTER . . . . . OFF
4. BILGE PUMP . . . . OFF
5. SMOKE GENERATOR. . OFF
6. LIGHTS . . . . . OFF
7. HI BEAM. . . . . OFF
8. TACTICAL IDLE. . . OFF
9. TANK SELECTOR. . . REAR
10. FIRE EXTINGUISHER 2nd SHOT switch cover. . . . . Close
11. All gages. . . . . Lowest position
12. Domelight. . . . . OFF
13. VEHICLE MASTER POWER switch . . . Hold ON

14. IS VEHICLE MASTER POWER LIGHT ON? — NO → GO TO 13

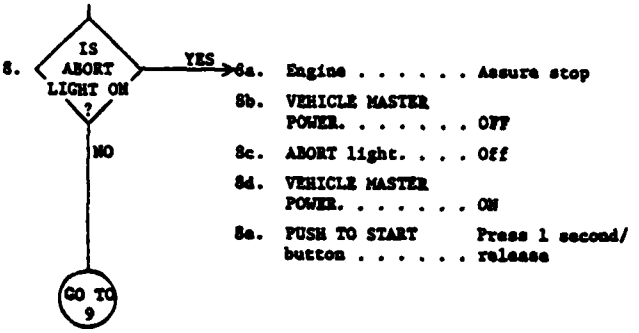
YES ↓

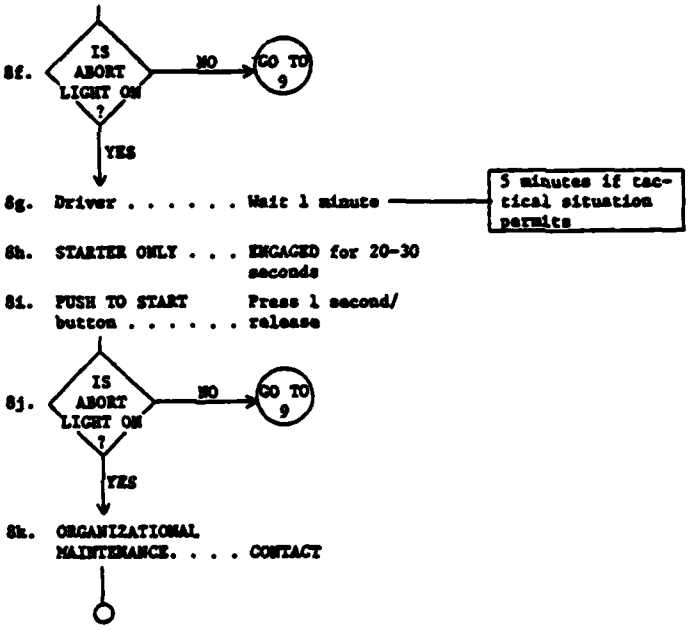
15. VEHICLE MASTER POWER switch . . . Release
16. Hull networks box circuit breakers . . . . . ON
17. Hull networks box cover. . . . . Close
18. Hull power distribution box circuit breakers . ON
19. Hull distribution box cover . . Close
20. PERSONNEL HEATER light. . . . . Off
21. NIGHT PERISCOPE light. . . . . Off
22. GAS PARTIC FILTER light . . . Off
23. BILGE PUMP light . Off

24. SMOKE GENERATOR light. . . . . Off
25. HI BEAM light. . . Off
26. FIRE light . . . . Off
27. PARKING/SERVICE BRAKES light . . . On
28. PANEL LIGHTS TEST button. . . . Press/hold — All master instrument/alert panel lights on
29. Alert panel lights . . . . . Adjust brightness
30. Master instrument panel lights . . . Adjust brightness
31. Electrical system gage. . . . 23-29 volts
32. CABLE DISCONNECTED light . . . Off
33. CIRCUIT BREAKER OPEN light . . . . Off
34. Fuel tanks . . . . Check fuel levels
35. Parking brake system hydraulic pressure gage. . . Check for bleed off

START ENGINE

1. Driver . . . . . Obtain TC clearance
2. Transmission control. . . . . Neutral (N)
3. Steer-throttle control. . . . . Center
4. Parking brake. . . Set
5. TC TURRET POWER. . OFF
6. Radio. . . . . Off (loader)
7. PUSH TO START button . . . . . Press 1 second/ release





9. STARTED light. . . On within 25-60 seconds — Remains on 10 seconds

10. Radio. . . . . On (loader)

11. After start checks . . . . . Perform

AFTER START CHECKS

1. TACTICAL IDLE. . . OFF
2. RPM gage . . . . . 870-950 (after 1 minute - engine operation)
3. TACTICAL IDLE. . . ON
4. RPM gage 1250-1350
5. TACTICAL IDLE. . . OFF
6. RPM gage 870-950
7. ELECTRICAL SYSTEM gage. . . . 27.5-28.5 volts
8. MASTER WARNING light. . . . . On
9. PARKING/SERVICE BRAKES lights. . . On
10. ENGINE warning lights . . . . . Off
11. TRANSMISSION warning lights . . Off
12. FIRE light . . . . Off
13. MASTER CAUTION light. . . . . Off

14. Parking brake system hydraulic pressure gage. . . 1200–1600 PSI

15. Driver . . . . . Announce brake check

16. Service brake pedal. . . . . Press/hold — Feels solid, not touching hull

BRAKES CHECK MUST BE COMPLETED WITHIN 2 MINUTES AFTER PRESSING SERVICE BRAKE

PARKING/SERVICE BRAKES LIGHT WILL GO ON IF SERVICE BRAKE HAS BEEN PRESSED FOR MORE THAN 2 MINUTES WITH ENGINE RUNNING

17. PARKING BRAKE RELEASE handle . . Pull/push back

18. IS PARKING/SERVICE BRAKE LIGHT ON ? — YES

18a. Parking brake pedal . . . . . Press/let go

18b. Service brake pedal . . . . . Let go

18c. IS PARKING/SERVICE BRAKE LIGHT ON ? — NO → GO TO 19; YES

NO

18d. FIRST TIME THROUGH CHECK ? — YES → GO TO 15

NO

18e. SHUTOFF switch. . SHUTOFF

18f. ORGANIZATIONAL MAINTENANCE . . . CONTACT

19. Transmission control. . . . . D — While holding service brake

20. Throttle controls . . . . . Twist slowly until 1450–1550 rpm

21. DOES TANK CREEP FORWARD ? — YES

21a. Throttle control . . . . . Twist forward as far as they will go

21b. Parking brake pedal . . . . . Press

21c. Transmission control . . . . . N

NO → GO TO 22

21d. Service brake pedal . . . . . Press/hold

21e. Parking and service brake pedals. . . . . Let go

21f. SHUTOFF switch. . SHUTOFF

21g. ORGANIZATIONAL MAINTENANCE . . . CONTACT

22. Throttle controls . . . . . Twist forward as far as they will go

23. Transmission control. . . . . N

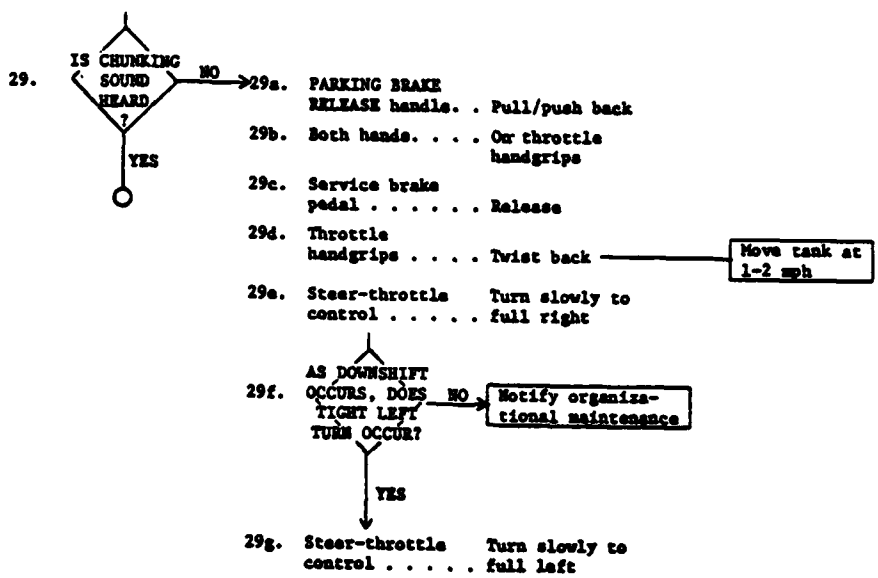
24. Parking brake pedal. . . . . Press/let go

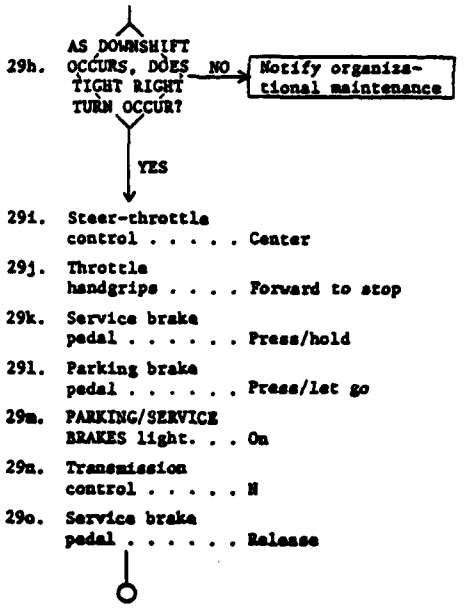
25. Driver . . . . . Announce brake check finished

26. Service brake pedal. . . . . Press/hold

27. Transmission control. . . . . D

28. Steer-throttle control. . . . . Turn all the way right





SECURE STATION

1. Engine . . . . . Shut down (page 16)
2. Hull systems . . . Power down (page 18)
3. Hatch. . . . . Close
4. Driver . . . . . Exit tank (page 19)

SHUT DOWN ENGINE

1. Throttle handgrips. . . . . Forward (idle)
2. Service brake pedal. . . . . Press/hold — Stop tank
3. Transmission control. . . . . N
4. Hydraulic pressure gage. . . Steady (1200-1600 PSI)
5. Parking brake pedal. . . . . Press/let go
6. Service brake pedal. . . . . Release
7. MASTER WARNING light. . . . . On
8. PARKING/SERVICE BRAKES light . . . On
9. TACTICAL IDLE. . . Off
10. BILGE PUMP/light . OFF
11. SMOKE GENERATOR/ light. . . . . OFF
12. Unused AUXILIARY SYSTEMS. . . . . OFF

13. ENGINE WARNING light. . . . . Off
14. TRANSMISSION light. . . . . Off
15. FIRE light . . . . Off
16. MASTER CAUTION light. . . . . Off
17. Engine . . . . . Idle for 2 minutes
18. ENGINE SHUTOFF switch . . . . . SHUTOFF — Engine coast to stop in 30-60 seconds

POWER DOWN HULL SYSTEMS

1. PERSONNEL HEATER . OFF
2. NIGHT PERISCOPE. . OFF
3. GAS PARTIC FILTER . . . . . OFF
4. BILGE PUMP . . . . OFF
5. SMOKE GENERATOR. . OFF
6. LIGHTS . . . . . OFF
7. HI BEAM. . . . . OFF
8. TACTICAL IDLE. . . OFF
9. TANK SELECTOR. . . REAR
10. Drain valve handles. . . . . Open
11. VEHICLE MASTER POWER. . . . . Hold OFF 1 second/let go — When directed by TC
12. MASTER POWER . . . Off
13. MASTER POWER light. . . . . Off — 30 seconds after engine shut down cycle complete

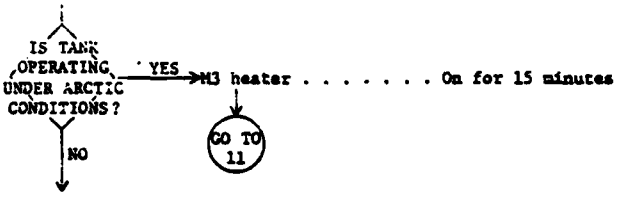
EXIT TANK

1. Hatch. . . . . Close/lock
2. Turret traverse lock . . . . . Locked (loader)
3. CVC helmet . . . . Remove/disconnect
4. Seat back. . . . . Lower
5. Headrest . . . . . Raise
6. Loader's toe guard. . . . . Against ammo storage box
7. Driver . . . . . Exit station
8. Driver . . . . . Exit tank
9. Loader's hatch . . Close/lock

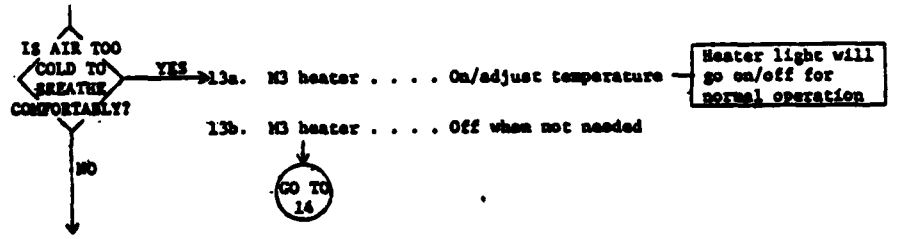
OPERATE/SECURE GAS PARTICULATE FILTER

Operate

1. VEHICLE MASTER POWER . . . . . Assure ON
2. Station. . . . . Power up
3. GAS PARTIC FILTER . . . . . ON
4. Mask . . . . . On
5. Mask . . . . . Clear and seal
6. Mike lead. . . . . Disconnect from connector
7. Mask mike lead . . Hook up to connector
8. Spring clip. . . . Remove from intake opening (loader)
9. Hose breakaway socket . . . . . Remove from mount



11. Hose breakaway socket . . . . . Connect to mask canister
12. Breathing. . . . . Begin using mask



Secure

14. Hose breakaway socket . . . . . Disconnect from mask canister
15. Hose breakaway socket . . . . . Connect to mount
16. Mask mike lead . . Disconnect from connector
17. Mike lead. . . . . Connect to connector
18. Mask . . . . . Off/stow

19. GAS PARTIC FILTER . . . . . OFF

20. Spring clip. . . . Install (loader)

BEFORE OPERATIONS PMCS

Vehicle Exterior

1.	Vehicle.	Check for leaks
2.	Vehicle.	Check for tampering
3.	Vehicle.	Check for damage
4.	Vehicle.	Check for missing parts
5.	Vehicle.	Check for puddles of engine/transmission oil
6.	Track tension. . .	Adjusting link not more than 1/8 inch from lock nut
7.	Hull access. . . .	In place/secure
8.	Rear grille doors.	Closed/bolts tight
9.	Muzzle reference sensor	Check for cracks/ damage
10.	Muzzle reference sensor	Check for loose fit
11.	Sensor lenses. . .	Check for gouges/ scratches
12.	Sensor lenses. . .	Check for tightness

Hull

13. Fuel tank filler covers . . . . . In place/secure
14. Filler cover brackets . . . . . Check for cracks
15. Filler cover brackers . . . . . Not missing
16. Battery condition indicators . . . . Not missing
17. Sponson air intake grille. . . Clear of dirt/leaves/other material
18. Precleaner top and seal assembly . . . . . Check for cracks/dents
19. Precleaner top . . Clear of leaves/twigs/dirt/other debris
20. Transmission oil . Check for leaks — Can operate equipment with minor leaks (Class I or II)
21. Transmission oil level. . . . . Correct level
22. Engine oil . . . . Check for leaks — Can operate equipment with minor leaks (Class I or II)
23. Engine oil level . Correct level
24. Fire extinguisher sensor lenses. . . Clean
25. Fire extinguisher sensor lenses. . . Not missing
26. Fire extinguisher sensor lenses. . . Check for damage

Driver's Station

27. Fire bottle pressure gage. . . Pressure above minimum for ambient temperature
28. Bottle . . . . . Secure in mount
29. Sensor lenses. . . Clean
30. Engine/vehicle master power . . . Off
31. Parking brake. . . Apply repeatedly
32. Hydraulic pressure . . . . . Decrease slowly to 600-800 PSI, then drop rapidly to zero
33. Engine . . . . . Start
34. Lights/instruments. . . . . Normal during start/run
35. Left rear grille door. . . . Check for scavenge blower air (crewmember)

36.	Instruments. . . .	Monitor during operation	
37.	Master panel lights switch. . .	Check through complete operation	Have crewmember assist
38.	HI BEAM switch . .	Check operation	
39.	Domelights	Check operation (crewmember)	
40.	Lens	Check for breaks/ cracks	
41.	Cables	Check for damage	
42.	Driver's hatch . .	Check operation/ locking	
43.	Periscopes	Clean/clear	
44.	Hatch seal	Check for rips/ separation	
45.	Open/closed hatch lever. . . .	Check operation	
46.	Upper seat back lever.	Check operation	
47.	Lumbar support knob	Check operation	
48.	Height adjustment	Check operation	
49.	Headrest	Move to up/down positions	
50.	Headrest position lock.	Holds headrest secure	
51.	Seat cushions. . .	Check for rips/tears	
52.	GAS PARTIC FILTER	ON	
53.	Spring clip. . . .	Remove (loader)	
54.	Filtered air hose	Remove	
55.	Airflow.	Should be felt	
56.	Heater	On	Heater lamp lights and heater are working
57.	Heater	Off	
58.	Mask	Check operation	
59.	Mike	Check operation	
60.	GAS PARTIC FILTER	OFF	After crewmembers have made checkout

Vehicle Exterior

1.	Track tension. . .	Adjusting link not more than 1/8 inch from lock nut
2.	Roadwheel/Idler wheel hubs	Check for leaks
3.	Hubs	Touch-test for heat
4.	Hub oil level. . .	Correct level
5.	Hub oil.	No water present
6.	Rubber plugs . . .	In place
7.	Arm housings . . .	Check for leaks
8.	Arms	Check for bends/ gouges
9.	Roadwheels/ Idler wheels . . .	Not missing/bent/ broken
10.	Wearplates	Not missing/secure
11.	Wearplates	Check for cracks/ gouges
12.	Wheel rubber . . .	Not more than 50% of rubber chunked/ separated
13.	Mounting nuts/ bolts.	Secure
14.	Centerguides . . .	Check for bends/ breaks
15.	Shock absorber sight gages. . . .	Correct level — Indicator ball between middle and top of gage
16.	Shock absorbers. .	Check for leaks
17.	Shock absorber housing.	Touch-test
18.	Roadwheel arms 2 through 6. . . .	Pry up with crowbar — If roadwheels cannot be lifted, torsion bar is good
19.	Roadwheel arms 1 and 7.	Tank not tilted, roadwheel/track on ground
20.	Torsion bars . . .	Not missing/broken
21.	Skirt panels . . .	Open (as needed)
22.	Shoe assemblies. .	Check for missing/ bent/broken center-guides
23.	Shoe assemblies. .	Check for missing nuts
24.	End connector wedges	In place/tight/ properly seated
25.	End connector bolts.	In place/tight/ properly seated

26.	Track shoes. . . .	Not out of line/dead
27.	Skirt panels . . .	Close all except 2 and 6
28.	Lube fittings. . .	In place
29.	Lube fittings. . .	Check for leaks/ damage
30.	Wheel.	Check for cracks/ unusual wear
31.	Spindle support retaining pin. . .	In place/secure
32.	Support roller hub cap.	Check for cracks/ damage/leaks
33.	Support roller hub caps	Secure
34.	Hubs	Touch-test for heat
35.	Inner/outer sprocket	Check for cracks and worn/gouged teeth
36.	Sprocket bolts . .	In place/secure
37.	Sprocket assembly hubs. . .	Check for cracks/ gouges
38.	Mounting bolts . .	In place/secure
39.	Track retainer . .	Check for bends/ cracks
40.	Track retainer bolts.	In place/not damaged

Hull

41.	Fuel tank filler covers. . .	In place/secure
42.	Filler cover brackets	Check for cracks
43.	Filler cover brackets	Not missing

Driver's Station

44.	Steer-throttle control.	Check for freedom-of-movement
45.	Control.	Returns to center under spring tension
46.	Throttle grips . .	Twist rearward/ release
47.	Grips.	Return to idle position under spring tension
48.	Steer-throttle control.	Check adjustment
49.	Service brakes . .	Press — Tank stops without pulling to side
50.	Parking brake. . .	Press
51.	Transmission shift selector . .	D
52.	Engine	1450-1550 rpm

53.	Tank	Does not move
54.	Brakes	Release
55.	Open/closed hatch lever. . . .	Check operation
56.	Upper seat back lever.	Check operation
57.	Lumbar support knob	Check operation
58.	Height adjustment	Check operation
59.	Headrest	Move to up/down positions
60.	Headrest position lock.	Holds headrest secure
61.	Seat cushions. . .	Check for rips/tears

AFTER OPERATIONS PMCS

Vehicle Exterior

1.	Tank	Check for missing parts
2.	Drain valves . . .	Open
3.	Tank	Check for leaks
4.	Tank	Clean
5.	Tarpaulin.	In place/secure
6.	Track tension. . .	Adjusting link not more than 1/8 inch from lock nut
7.	Adjusting link assembly hardware/lube fittings.	In place/secure
8.	Lock bolt.	In place/secure
9.	Relief valve . . .	No grease leaks
10.	Roadwheel/Idler wheel hubs	Check for leaks
11.	Hubs	Touch-test for heat
12.	Hub oil level. . .	Correct level
13.	Hub oil.	No water present
14.	Rubber plugs . . .	In place

15.	Arm housing. . . .	Check for leaks
16.	Arms	Check for bends/ gouges
17.	Roadwheels/Idler wheels	Not missing/bent/ broken
18.	Wearplates	In place/secure
19.	Wearplates	Check for cracks/ gouges
20.	Wheel rubber . . .	Not more than 50% of rubber chunked/ separated
21.	Mounting nuts/ bolts.	Secure
22.	Center guides. . .	Check for bends/ breaks
23.	Shock absorber sight gages. . . .	Correct level — Indicator ball between middle and top of gage
24.	Shock absorber . .	Check for leaks
25.	Shock absorber housing.	Touch-test
26.	Roadwheel arms 2 through 6. . . .	Pry up with crowbar — If roadwheels cannot be lifted, torsion bar is good

27.	Roadwheel arms 1 and 7.	Tank not tilted, roadwheel/track on ground
28.	Torsion bars . . .	Not missing/broken
29.	Skirt panels . . .	Open (as needed)
30.	Shoe assemblies. .	Check for missing/ bent/broken center-guides
31.	Shoe assemblies. .	Check for missing nuts
32.	End connector wedges	In place/tight/ properly seated
33.	End connector bolts.	In place/tight/ properly seated
34.	Track shoes. . . .	Not out of line/dead
35.	Skirt panels . . .	Close all except 2 and 6
36.	Lube fittings. . .	In place
37.	Lube fittings. . .	Check for leaks/ damage
38.	Wheel.	Check for cracks/ unusual wear
39.	Spindle support retaining pin. . .	In place/secure
40.	Support roller hub cap.	Check for cracks/ damage/leaks

41. Support roller hub caps . . . . . Secure
42. Hubs . . . . . Touch-test for heat
43. Inner/outer sprocket . . . . . Check for cracks and worn/gouged teeth
44. Sprocket bolts . . In place/secure
45. Sprocket assembly hubs. . . Check for cracks/ gouges
46. Mounting bolts . . In place/secure
47. Track retainer . . Check for bends/ cracks
48. Track retainer bolts. . . . . In place/not damaged
49. Skirt panels . . . Open
50. Hinges . . . . . Check for damage
51. Latches. . . . . Check for damage
52. Support struts . . Check for damage
53. Pins . . . . . Straight/secure
54. Skirts . . . . . Check for damage
55. Fenders. . . . . Check for damage
56. Mud guards . . . . Check for damage
57. Skirt panels . . . Close
58. Hull access plates . . . . . In place/secure

59. Rear grille doors. . . . . Closed/bolts tight
60. Muzzle reference sensor . . . . . Check for loose fit
61. Sensor lenses. . . Check for gouges/ scratches
62. Sensor lenses. . . Check for tightness
63. Sponson air intake grille. . . Clear of dirt/ leaves/other material

Hull

64. Precleaner top and seal assembly . . . . . Check for cracks/ dents
65. Precleaner top . . Clear of leaves/ twigs/dirt/other debris
66. Transmission oil . Check for leaks — Can operate equipment with minor leaks (Class I or II)
67. Transmission oil level. . . . . Correct level
68. Engine oil . . . . Check for leaks — Can operate equipment with minor leaks (Class I or II)

69. Engine oil level . Correct level

70. Fire extinguisher sensor lenses. . . Clean

71. Fire extinguisher sensor lenses. . . Not missing

72. Fire extinguisher sensor lenses. . . Check for damage

73. Engine hydraulics . . . . Inspect

74. Heat exchanger . . Inspect

Driver's Station

75. Master panel lights switch. . . Check through complete operation — Have crewmember assist

76. HI BEAM switch . . Check operation

77. Domelights . . . . Check operation (crewmember)

78. Lens . . . . . Check for breaks/ cracks

79. Cables . . . . . Check for damage

80. Driver's hatch . . Check operation/ locking

81. Periscopes . . . . Clean/clear

82. Hatch seal . . . . Check for rips/ separation

83. Open/closed hatch lever. . . . Check operation

84. Upper seat back lever. . . . . Check operation

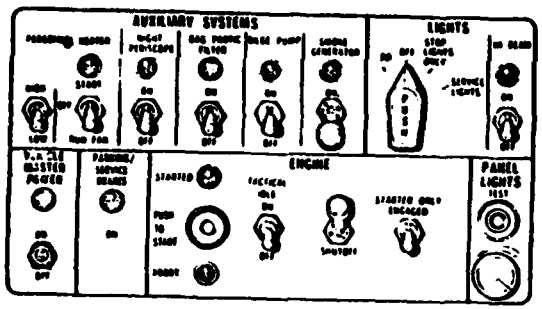
85. Lumbar support knob . . . . . Check operation

86. Height adjustment . . . . . Check operation

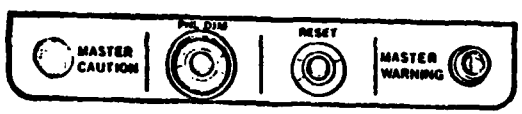
87. Headrest . . . . . Move to up/down positions

88. Headrest position lock. . . . . Holds headrest secure

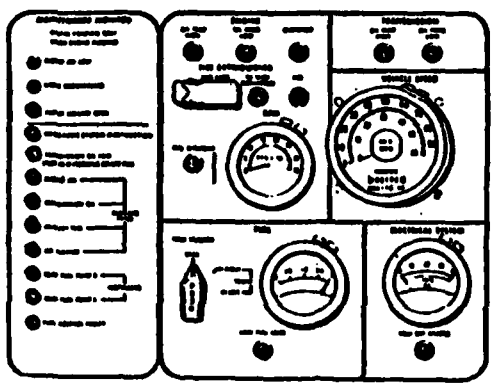
89. Seat cushions. . . Check for rips/tears



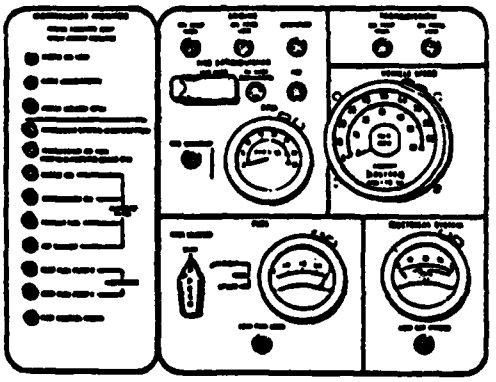
DRIVER'S MASTER PANEL



DRIVER'S ALERT PANEL



DRIVER'S INSTRUMENT PANEL

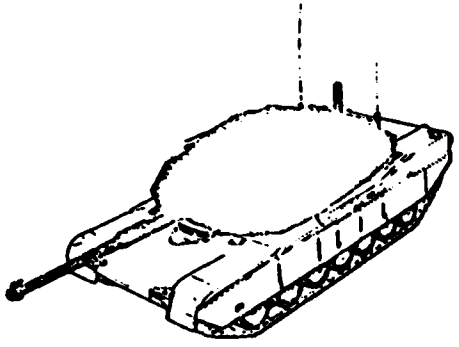


DRIVER'S INSTRUMENT PANEL

LOADER

PROCEDURE GUIDES

M1 TANK



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FOR THE
BEHAVIORAL AND SOCIAL SCIENCES

GENERAL INFORMATION

This booklet contains M1 loader procedure guides. Each guide is for a single pre-operation, post-operation, or during operation activity. Each guide is matched to TM-9-2350-255-10 (Operator's Manual for Tank, Combat, Full-Tracked, 105 MM, M1).

PURPOSE OF PROCEDURE GUIDES

The guides in this booklet will not take the place of the M1 TM or M1 training materials. The guides will aid you in remembering long or difficult sets of procedures. In short, the guides will help to "jog your memory."

USE OF THIS BOOKLET

The Table of Contents (on the next page) lists the procedure guides in this booklet. Each guide gives you a step-by-step outline for completing an activity. The following will help you to better use each guide.

1. Some steps within a procedure guide are followed by a page number. On that page you will find a detailed breakdown of the step.

2. Some of the procedure guides include a question(s). Each question is stated inside a diamond shape. Your "yes" or "no" to the question will show you which path to follow.

3. Some steps within a procedure guide are followed by a box. In the box you will find more information on the step or a caution/warning.

4. Certain steps within a procedure guide require that a knob or switch be turned to a certain position. In some cases, that position might be written like the symbol to the left. The symbol means that a light should also come on.

5. Pictures of selected panels/equipment can be found at the end of this booklet.

TABLE OF CONTENTS

PREPARE STATION

1. Hatch . . . . . Open/lock
2. Crosswind sensor . Erect
3. Weapon . . . . . Install (page 2)
4. Loader . . . . . Enter station (page 3)
5. Domelight. . . . . Adjust
6. Station. . . . . Power up (page 4)
7. Intercom . . . . . Adjust
8. Seat/platform. . . Adjust
9. Hatch. . . . . Adjust
10. Night vision viewer . . . . . Install
11. Guards . . . . . Firing position

INSTALL WEAPON

1. Skate lock . . . . Lock
2. Azimuth lock . . . Lock
3. Elevation lock . . Lock
4. Weapon . . . . . Clear (page 13)
5. Mounting pins. . . Remove
6. Weapon . . . . . Put into mount
7. Receiver/cradle mounting holes . . Line up
8. Mounting pins. . . Insert

ENTER STATION

1. Loader . . . . . Enter station
2. Ammo door knee switch . . . . . Up
3. Ammo door track. . Clear of objects
4. Ejection guard . . Forward
5. Breech . . . . . Close
6. Turret traverse lock . . . . . Unlock — After crew members in stations
7. Elevation lock . . Unlock (gunner)

POWER UP STATION

1. Turret power green light. . . . Assure on
2. MAIN GUN STATUS SAFE light . . . . Assure on
3. TURRET BLOWER. . . OFF
4. GUN/TURRET DRIVE . —MANUAL—
5. Antenna. . . . . Install
6. Amplifier MAIN PWR . . . . . NORMAL
7. Amplifier POWER CKT BKR. . . . . —ON—
8. Amplifier INT ACCENT . . . . ON
9. Amplifier RADIO TRANS. . . . CDR & CREW

SECURE STATION

1. Guards . . . . . Stow
2. Night vision viewer . . . . . Remove
3. Station. . . . . Power down (page 6)
4. Weapon . . . . . Remove (page 8)
5. Crosswind sensor . Stow
6. Antenna. . . . . Remove
7. Loader . . . . . Exit tank

POWER DOWN STATION

1. Ready ammo door. . Close
2. Ammo door knee switch . . . . . Stow
3. Hull ammo door . . Close
4. Turret . . . . . Traverse (gunner) — For driver's exit
5. Turret traverse lock . . . . . Lock
6. Driver . . . . . Exit tank
7. Main gun . . . . . Clear (page 9)
8. Ejection guard . . Forward — MAIN GUN STATUS SAFE light on
9. Breech . . . . . Close
10. GUN/TURRET DRIVE . — MANUAL —
11. TURRET BLOWER. . . OFF
12. Semi-ready ammo door . . . . . Close
13. Coax ammo belt . . Stow
14. Amplifier MAIN PWR . . . . . OFF

15. CVC helmet . . . . Remove/disconnect
16. Domelight. . . . . OFF

REMOVE THE M240 MACHINEGUN

1. Weapon . . . . . Clear (page 13)
2. Mounting pins. . . Remove
3. Front of weapon. . Lift up
4. Weapon . . . . . Slide back off mount
5. Mounting pins. . . Insert
6. Weapon . . . . . Stow

UNLOAD (CLEAR) MAIN GUN

1. GPS GUN SELECT . . —TRIGGER SAFE— (gunner)
2. Ejection guard . . Forward ——— MAIN GUN STATUS SAFE light on

MAIN GUN MAY MOVE QUICKLY DURING NEXT STEP

3. GUN/TURRET DRIVE . —EL UNCPL—
4. Breech . . . . . Open slowly
5. IS ROUND STUCK ? — YES → See "Manually Extract Round" (page 11)
   NO ↓
6. Breech handle. . . Upright
7. Round. . . . . Grasp/pull from breech
8. Round. . . . . Stow/remove from tank

9. Chamber. . . . . Clear
10. Gun tube . . . . . Clear
11. Breech . . . . . Close

MANUALLY EXTRACT A MAIN GUN ROUND

DO NOT HAMMER ROUND OUT OF BREECH - ROUND CAN FIRE

1. Breech handle. . . All the way down (another crewmember)
2. Extracting tool head . . . . . Between breech block and round
3. Extractor tool . . Grasp/both hands
4. Extractor tool . . Lift up/pull
5. CAN CASE BE REMOVED ? — NO → GO TO 6a
   YES
6. IS PROJECTILE SEPARATED FROM CASE ? — YES →
   6a. Breech handle. . . Up
   6b. Rammer-staff . . . Assemble
   6c. Bell housing . . . Attach to rammer-staff
   6d. Gun. . . . . Depress
   NO → GO TO 7

6e. Breech handle. . . All the way down

6f. Rammer-staff . . . In muzzle/bell housing against round

6g. Round. . . . . Push out

7. Round. . . . . Grasp/pull from breech

8. Round. . . . . Stow/remove from tank

9. Breech handle. . . Up

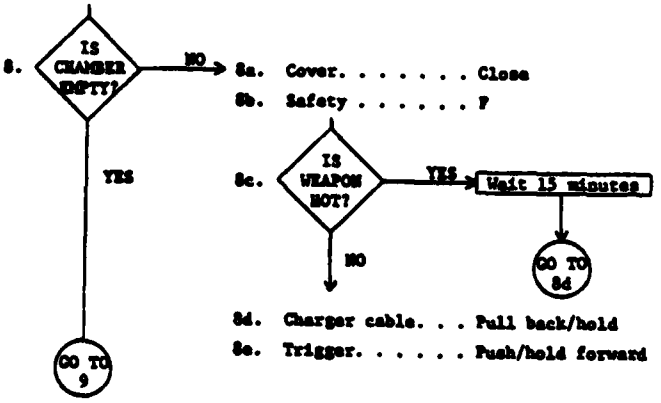
10. Chamber. . . . . Clear

11. Gun tube . . . . . Clear

12. Breech . . . . . Close

CLEAR THE M240 MACHINEGUN

1. Safety . . . . . F
2. Charger cable. . . Pull to rear
3. Safety . . . . . S
4. Latches. . . . . Push in
5. Cover. . . . . Pull straight up
6. Belt . . . . . Off feed tray
7. Feed tray. . . . . Raise



8f. Charger cable. . . Slowly forward until stops, then let go

8g. Trigger. . . . . Release

8h. Charger cable. . . Pull to rear ——— Bullet should drop

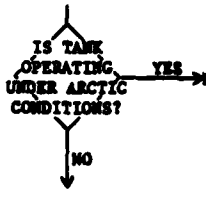
9. Trigger. . . . . Release

10. Safety . . . . . S

OPERATE/SECURE GAS PARTICULATE FILTER

Operate

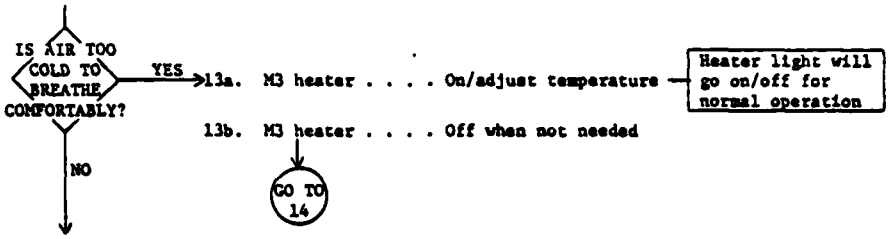
1. VEHICLE MASTER POWER. . . . . Assure ON
2. Station. . . . . Power up
3. GAS PARTIC FILTER . . . . . ON (driver)
4. Mask . . . . . On
5. Mask . . . . . Clear and seal
6. Mike lead. . . . . Disconnect from connector
7. Mask mike lead . . Hook up to connector
8. Spring clip. . . . Remove from intake opening
9. Hose breakaway socket . . . . . Remove from mount



10. M3 heater . . . . . On for 15 minutes

11. Hose breakaway socket . . . . . Connect to mask cannister

12. Breathing. . . . . Begin using mask



Secure

14. Hose breakaway socket . . . . . Disconnect from mask cannister

15. Hose breakaway socket . . . . . Connect to mount

16. Mask mike lead . . Disconnect from connector

17. Mike lead. . . . . Connect to connector

18. Mask . . . . . Off/stow

19. GAS PARTIC FILTER . . . . . OFF (driver)

20. Spring clip. . . . Install

Loader's Station

1.	Fire bottle pressure gage. . .	Pressure above minimum for ambient temperature
2.	Bottle	Secure in mount
3.	Turret sensor lenses	Clean
4.	Hydraulic system oil	Check for leaks — Can operate equipment with minor leaks (Class I or II)
5.	Reservoir oil level.	Add oil if indicator is below ADD 1 GAL mark
6.	Filter bypass buttons.	In place
7.	Radio.	Check operation — Remote switches and radios working
8.	Intercom	All crew stations can be heard
9.	GAS PARTIC FILTER	On (driver)
10.	Spring clip. . . .	Remove from intake opening

11.	Filtered air hose	Remove from connector
12.	Airflow.	Should be felt
13.	Heater	On — Heater lamp lights and heater are working
14.	Heater	Off
15.	Mask	Check operation
16.	Mike	Check operation
17.	Spring clip. . . .	Replace

Loader's Station

1.	Hydraulic system oil	Check for leaks	Can operate equipment with minor leaks (Class I or II)
2.	Reservoir oil level.	Add oil if indicator is below ADD 1 GAL mark	
3.	Filter bypass buttons.	In place	

LOADER'S PANEL