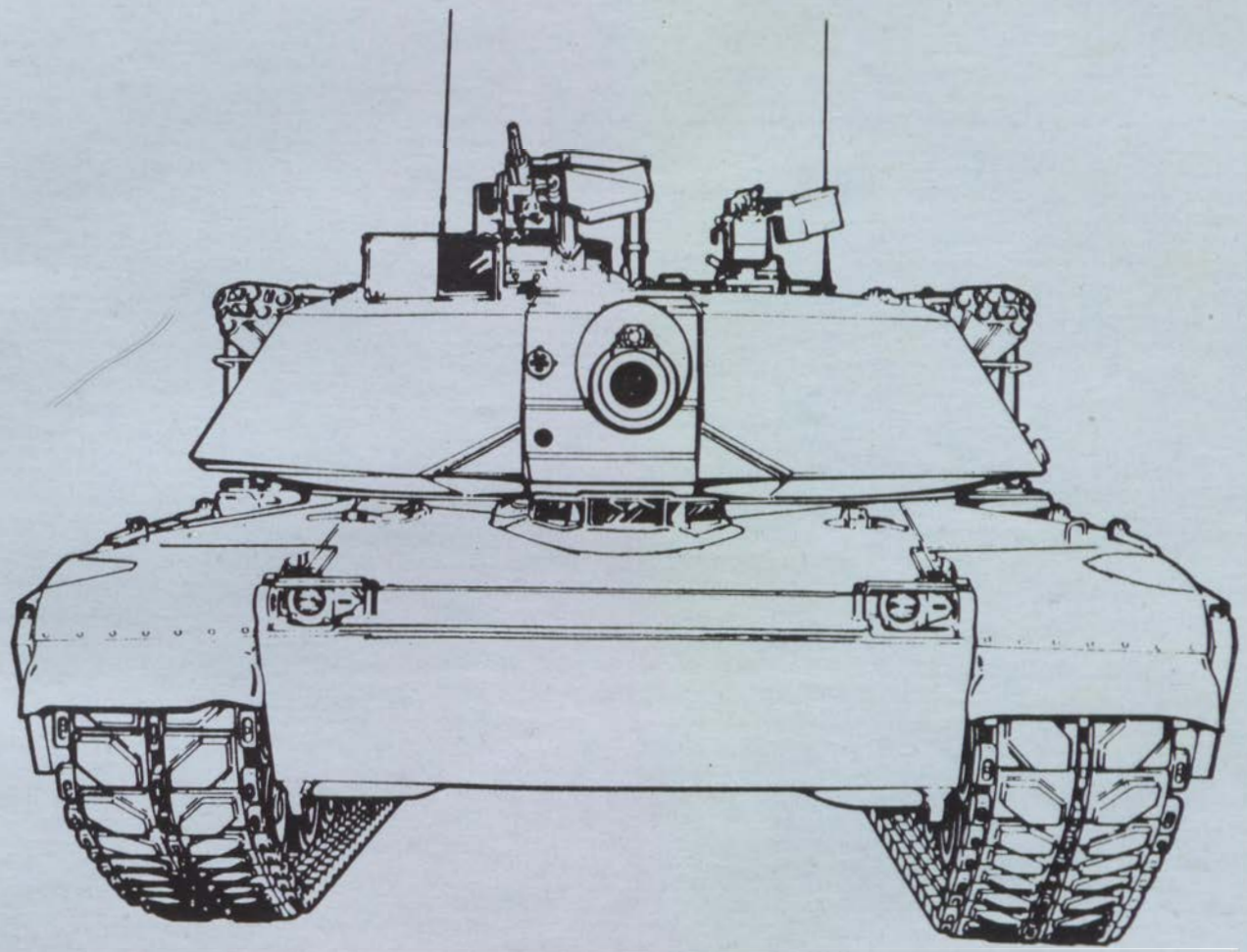
ABRAMS

AB01
-35

M1/IPM1/M1A1 COMPARISON



FIELD OPERATIONS
8 FEBRUARY 1985

GENERAL DYNAMICS
Land Systems Division
P.O. Box 527, Warren, Michigan 48090

TO THE READER:

The purpose of this briefing book is to give the reader a basic understanding on the relationships between the M1, IMP1, and M1A1 tank systems. General Dynamics, Field Operations, has available viewgraph transparencies of the grapic material in the book to support a briefing. This material will be reviewed on a regular basis and, when warranted, will be updated to reflect the latest changes. The updated book will then be distributed.

If you wish to comment on the briefing material as to corrections and changes, the point of contact is Mr. Henry J. Rinna. He may be contacted by phone at (313) 978-5574/75 or by letter at:

General Dynamics Corporation
Land Systems Division
P. O. Box 527
Warren, Michigan 48090

ATTN: H. J. Rinna
Mail Zone: 496-09-33

I hope you will find this beneficial in your orientation on the coming changes to the Abrams System.

Sincerely yours,

J. J. McCuen
Manager
Field Operations

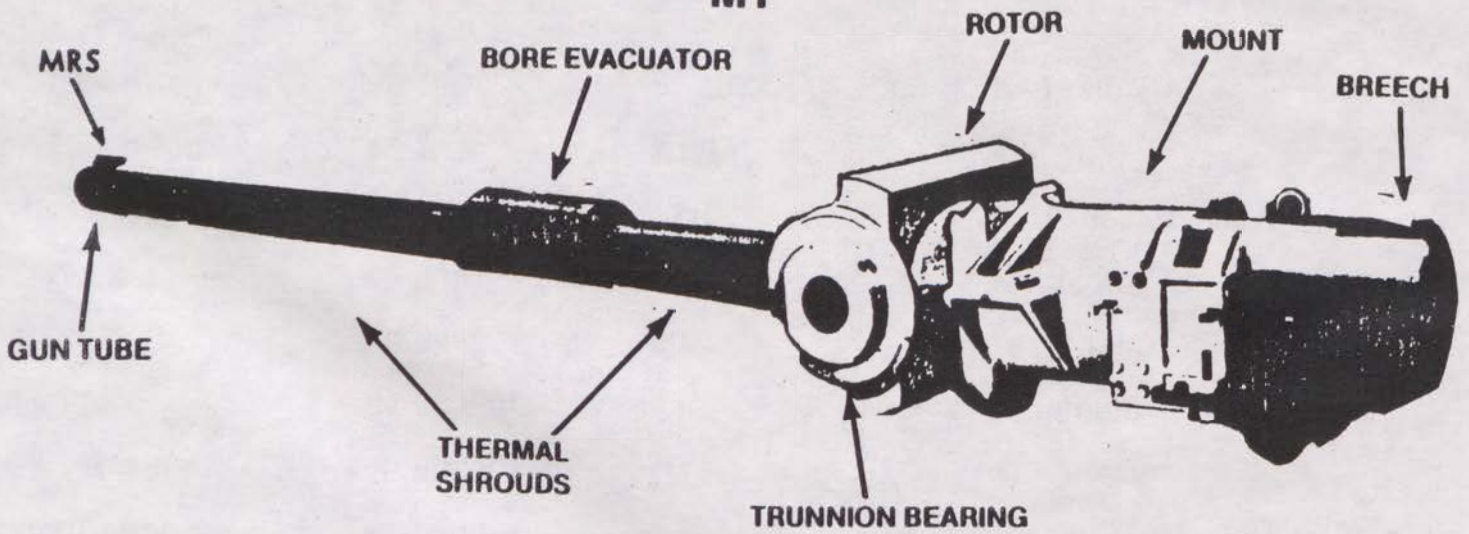
M1/IPM1/M1A1 COMPARISON

GENERAL

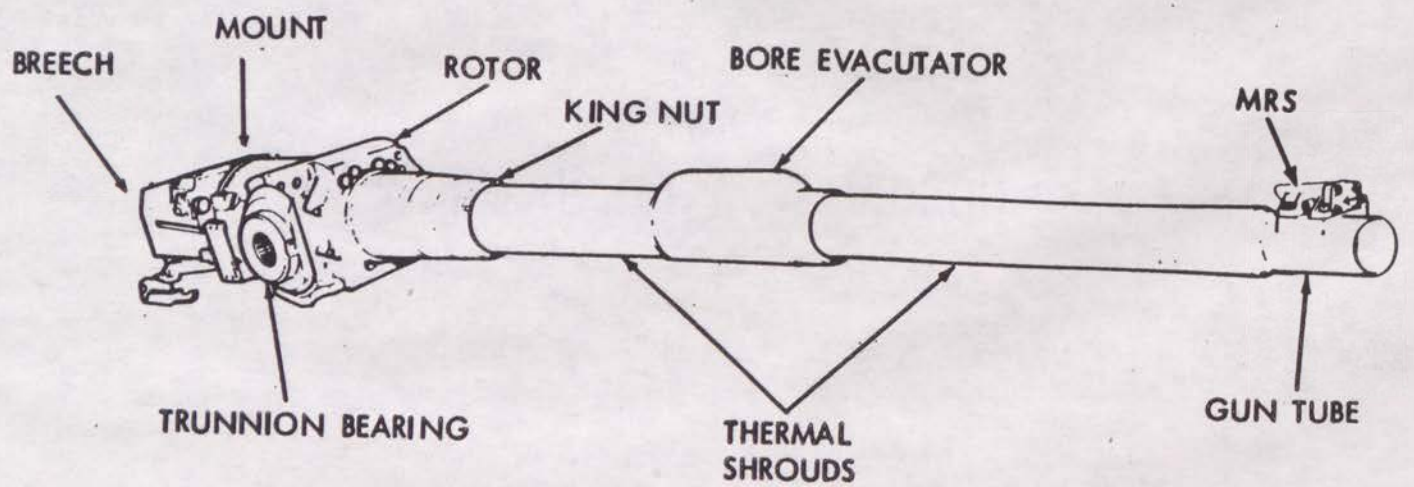
ELEMENT	M1	IPM1	M1A1
• MAIN WEAPON	105MM RIFLED	M1	120 SMOOTH BORE
• AMMUNITION	FULL CASED	M1	COMBUSTIBLE CASE/METAL STUB
• AMMO STOWAGE	55 ROUNDS	M1	40 ROUNDS
– TURRET	44 ROUNDS	M1	34 ROUNDS
– HULL	8 ROUNDS	M1	6 ROUNDS
– BASKET	3 ROUNDS	M1	0 ROUNDS
• BALLISTIC PROTECTION	STANDARD M1	M1A1	EXTENDED TURRET
• TANK TOP SPEED	45 MPH	M1A1	41.5 MPH
• TANK WEIGHT	60 TONS	61 TONS	63 TONS

MAIN WEAPON

M1



M1A1

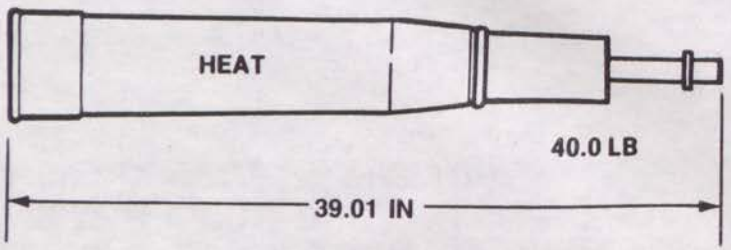


- THE 120MM MAIN WEAPON IS MOUNTED IN A CONCENTRIC HYDROSPRING RECOIL MECHANISM AND HAS A SMOOTH BORE TUBE AND SLIDING WEDGE BREECH. IT IS EQUIPPED WITH A BORE EVACUATOR, THERMAL SHROUDS AND IS ELECTRICALLY FIRED. STUB EJECTION AND BREECH OPERATION IS AUTOMATIC AND IS SUPPLIED FROM THE COUNTER RECOIL ENERGY. THE QUICK CHANGE FEATURE ALLOWS EASY REPLACEMENT OF THE TUBE.

AMMUNITION

105MM

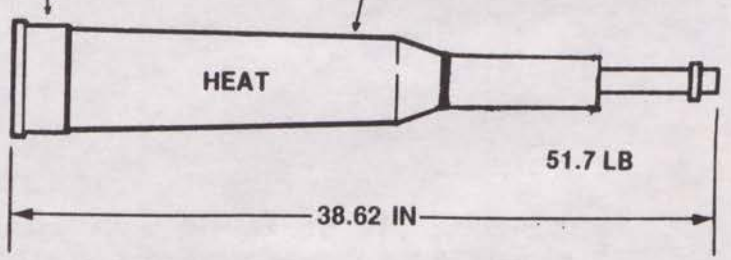
METAL CASE



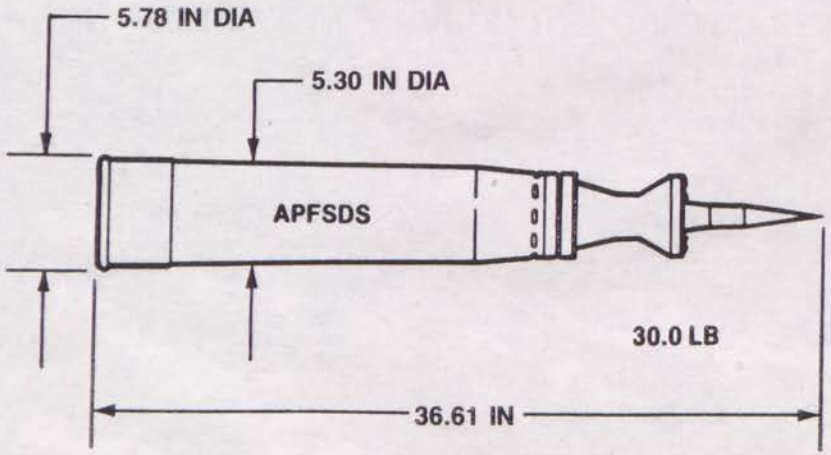
120MM

METAL STUB CASE

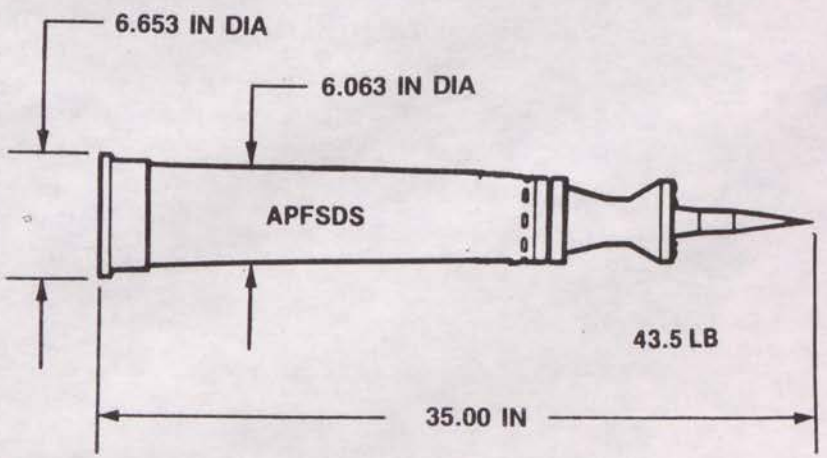
COMBUSTABLE CASE



105MM

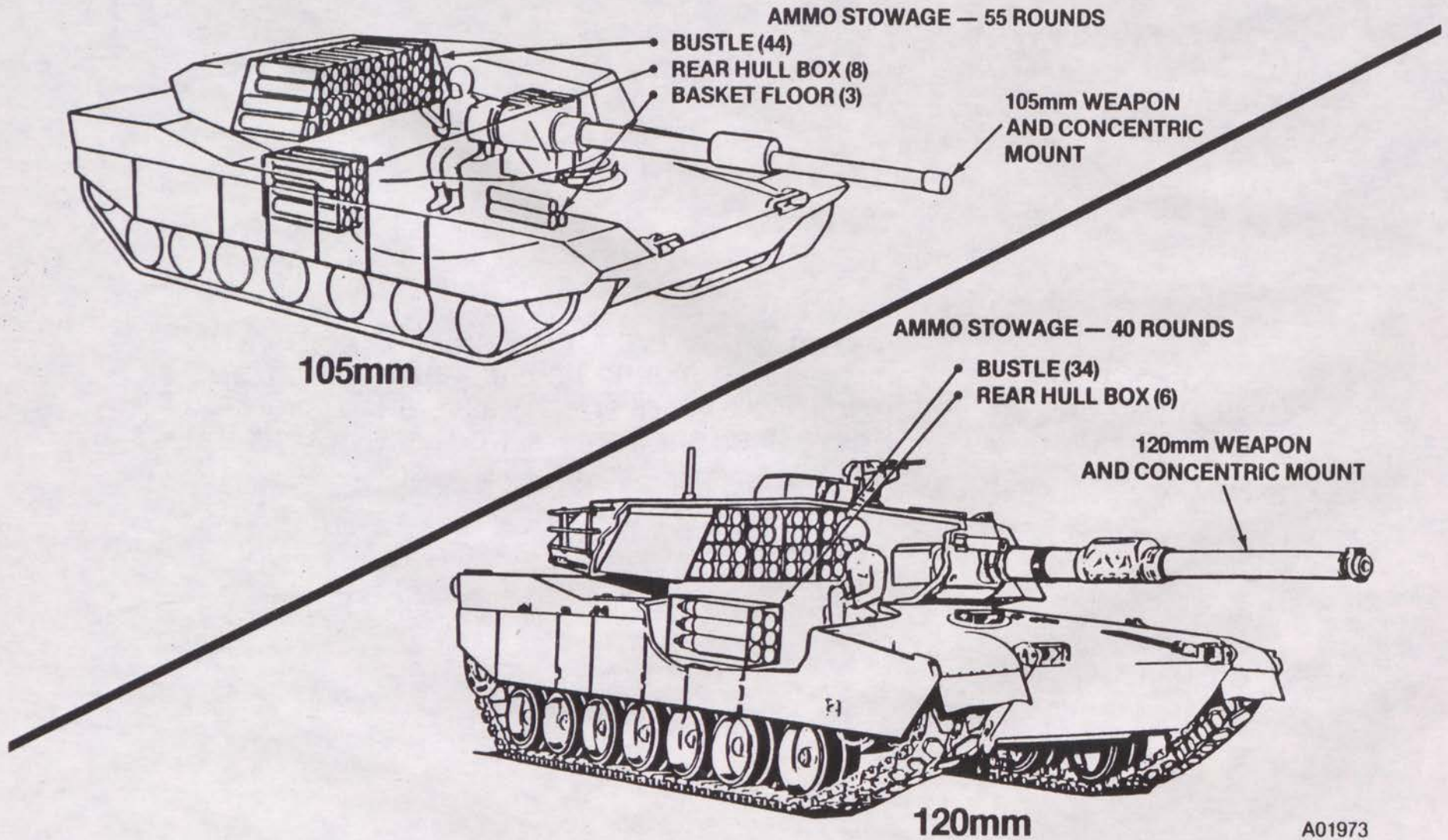


120MM



- THE M1A1 AMMUNITION IS A COMBUSTIBLE CASE TYPE AMMO AND HAS A METAL STUB CASE. THE BASE WEIGHS APPROXIMATELY 10 POUNDS AND IS AUTOMATICALLY EJECTED FROM THE BREECH DURING GUN RECOIL CYCLE. TWO TYPES OF AMMUNITION FOR THE M1A1: HEAT AND SABOT.

AMMO STOWAGE COMPARISON



- STOWAGE OF AMMUNITION DIFFERS VERY LITTLE AS FAR AS COMPARTMENTS. WITH THE 120MM, THERE WAS A SMALL LOSS IN NUMBERS DUE TO THE INCREASED SIZE OF THE AMMUNITION. THE AMMUNITION FLOOR TUBES WERE ELIMINATED THREE ROUNDS WERE LOST.

- THE TURRET BUSTLE AMMUNITION COMPARTMENT HOLDS A TOTAL OF 34 ROUNDS. THERE ARE 17 ROUNDS OF READY AMMUNITION AND 17 ROUNDS OF SEMI-READY AMMUNITION. TO ASSIST THE LOADER, 10 ROUNDS OF THE READY AMMO AND 8 ROUNDS OF THE SEMI-READY ARE IN SWING TUBES. THE SWING TUBE WILL TILT DOWNWARD OR SWING RIGHT OR LEFT TO AID THE LOADER IN THE EXTRACTION OF A ROUND FROM THE AMMUNITION COMPARTMENT.

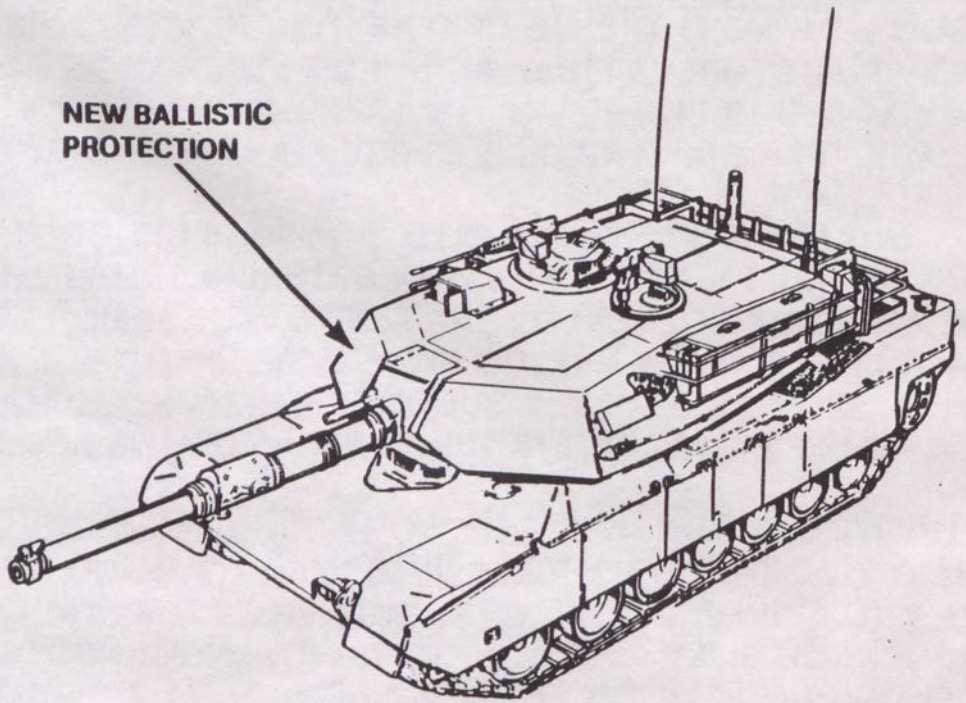
- THE READY AND SEMI-READY AMMUNITION DOOR MOVES FREELY UNTIL THE LAST 1/2 TO 3/4 INCH OF TRAVEL. THE DOORS ARE THEN CAMMED/SEALED INTO POSITION. ON THE SEMI-READY AMMO DOOR A MANUAL LOCKING DEVISE IS USED TO PULL THE DOOR TIGHT AGAINST THE FRAME. TO OPEN BOTH DOORS MANUALLY A PIVOTAL PRY BAR IS INSERTED INTO THE DOOR. A PUSH AGAINST THE BAR RELEASED THE DOORS FROM THE CAMMED/SEALED POSITION.

- THE HULL AMMUNITION DOORS ARE SEALED BY USING A LOCKING BAR. A LATCHING MECHANISM HOOKS INTO THE BAR AND PULLS THE DOORS FORWARD. TO OPEN THE DOORS THE LATCHING MECHANISM IS RELEASED. BY PUSHING AGAINST ONE OF THE DOORS, THE DOOR CAN BE SLID BEHIND THE OTHER DOOR. A SEAL HAS ALSO BEEN ADDED TO THE FRONT SURFACE OF BOTH DOORS TO GIVE ADDED PROTECTION.

- THE AMMUNITION DOOR SEALS ARE DESIGNED TO PREVENT BLAST AND CHEMICAL AND TOXIC FUMES FROM ENTERING THE CREW AREA.

BALLISTIC PROTECTION

M1A1



- NEW BALLISTIC PROTECTION HAS BEEN ADDED TO INCREASE THE CREW'S SURVIVABILITY.

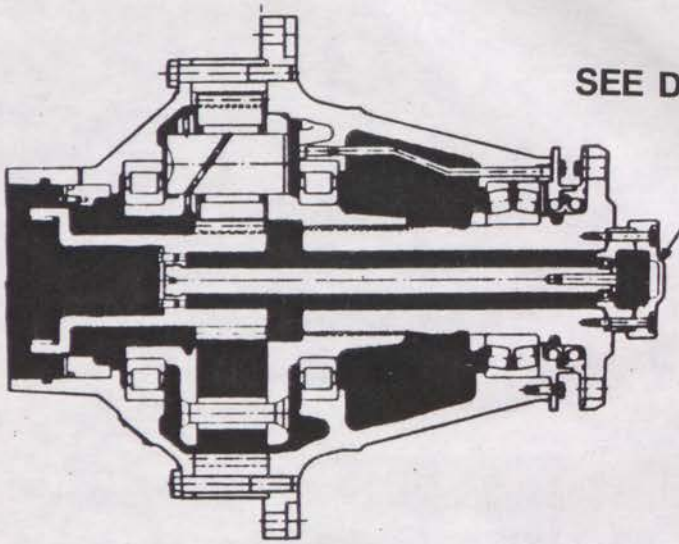
M1/IPM1/M1A1 COMPARISON

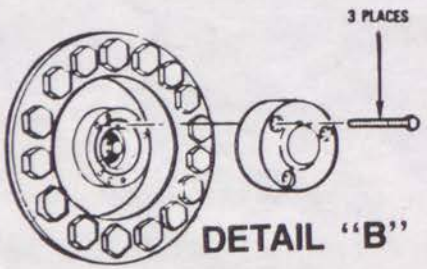
AUTOMOTIVE

ELEMENT	M1	IPM1	M1A1
• FINAL DRIVE	– STANDARD M1	M1A1	– INCREASED THRUST BEARING CAPACITY
	– GEAR RATIO 4.30 TO 1		–GEAR RATIO 4.67 TO 1
			– IMPROVED SEALING
			– IMPROVED DISCONNECT
• TRANSMISSION	STANDARD M1	M1 FIRST; THEN M1A1	– TORQUE THRUST BEARING
			– IMPROVED TURBINE TRANSFER BEARING
			– RETAINER
			– INCREASED CAPACITY C4 CLUTCH
			– LOWER LOCK-UP SHIFT POINTS
			– DUAL STAGE FILTER
• ENGINE	STANDARD M1	M1	– BLEED PORT FOR NBC SYSTEM
			–MODIFIED ECU FOR NBC PRIORITZATION

FINAL DRIVE

M1

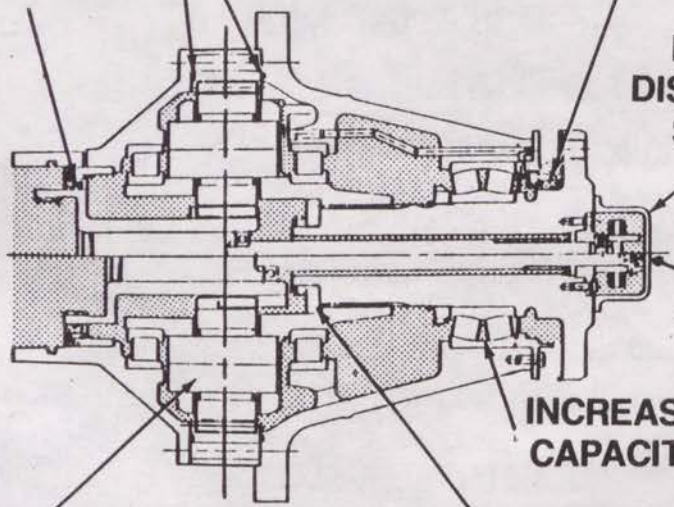


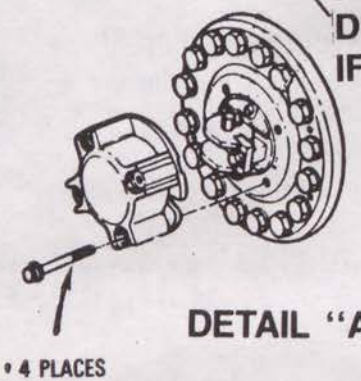


DETAIL "B"

A01849

M1A1





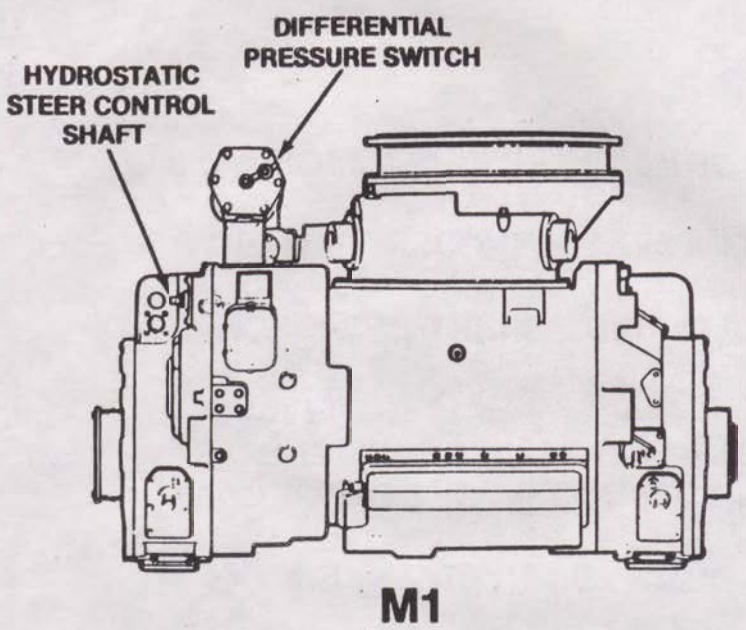
DETAIL "A"

A01850

AT A GLANCE, THE M1 AND M1A1 FINAL DRIVES LOOK THE SAME HOWEVER THEY ARE NOT. THE FOLLOWING CHANGES HAVE BEEN MADE:

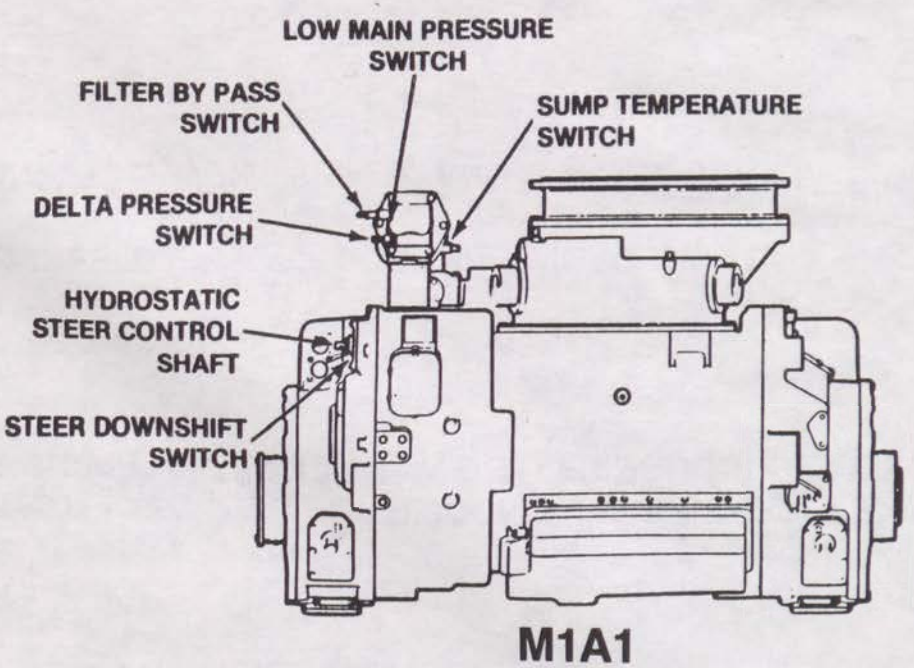
- PLANETARY GEAR SET RATIO CHANGE - 4.30:1 TO 4.67:1
- IMPROVED THE DISCONNECT SYSTEM TO PREVENT DISCONNECT IF BEARING FAILS. IF THE FINAL DRIVES FAIL THE DRIVER WILL STILL HAVE STEERING AND BRAKING CAPABILITIES.
- INCREASED THRUST CAPACITY OF BEARING.
- REVISED DISCONNECT PROCEDURES TO INSURE POSITIVE ENGAGEMENT.
- IMPROVED SEALING - AT THE INPUT, OUTPUT SEALS, AND O-RINGS SEALS.

TRANSMISSION EXTERNAL



M1

A01846



M1A1

A01847

EXTERNAL IMPROVEMENT TO THE X1100-3B TRANSMISSION ARE:

- IMPROVED FILTER AND WARNING SYSTEM TO PREVENT LOSS OF TRANSMISSION FUNCTION WHEN FILTER ELEMENT CLOGS. THIS INCLUDES:

- DELTA PRESSURE SWITCH MEASURES OIL PRESSURE BETWEEN THE INLET AND OUTLET OF THE PRIMARY FILTER AND ACTIVATES THE OIL FILTER CLOGGED AMBER CAUTION LIGHT ON THE MAINTENANCE MONITOR OF THE DRIVER'S INSTURMENT PANEL.

- PRIMARY FILTER BYPASS VALVE - ACTIVATES WHEN THE PRIMARY FILTER IS CLOGGED AND TRANSFERS OIL TO SECONDARY FILTER CONCURRENT WITH DELTA PRESSURE SWITCH ACTIVATION.

- PRIMARY AND SECONDARY FILTERS - OIL IS FILTERED THROUGH THE SECONDARY FILTER AFTER THE PRIMARY FILTER BECOMES CLOGGED.

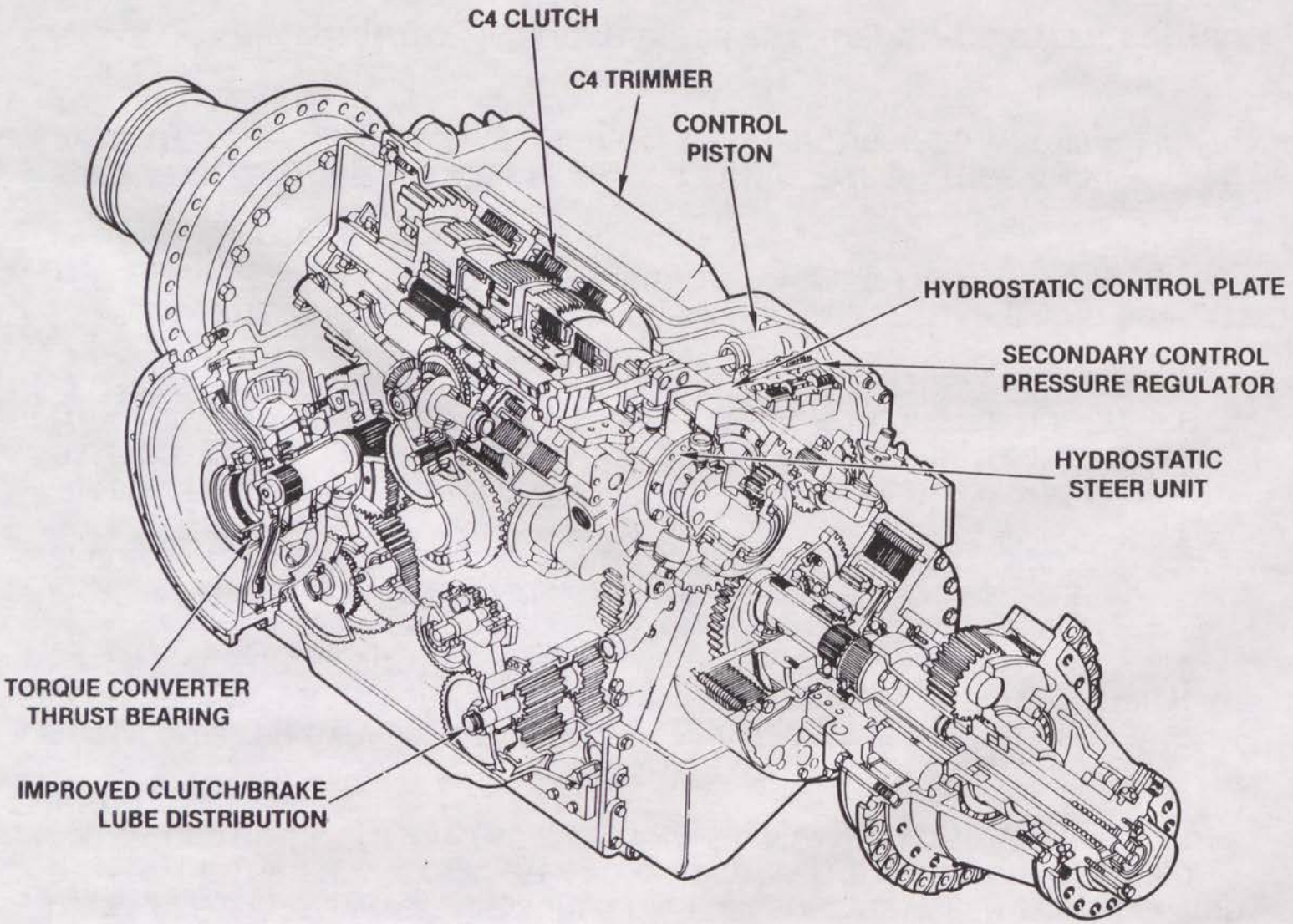
- FILTER SYSTEM BYPASS VALVE AND SWITCH - ACTIVATES THE TRANSMISSION DAMAGE INSPECT RED WARNING LIGHT ON THE DRIVER'S INSTRUMENT PANEL WHEN BOTH PRIMARY AND SECONDARY FILTER ARE CLOGGED. UNFILTERED OIL IS USED FOR TRANSMISSION OPERATION.

- LOW MAIN PRESSURE SWITCH - MONITORS MAIN PUMP PRESSURE AND ACTIVATES THE TRANSMISSION LOW OIL PRESSURE RED WARNING LIGHT ON THE DRIVER'S INSTRUMENT PANEL.

- SUMP TEMPERATURE SWITCH - MONITORS SUMP TEMPERATURE AND ACTIVATES THE TRANSMISSION HIGH OIL TEMPERATURE RED WARNING LIGHT ON THE DRIVER'S INSTRUMENT PANEL.

- STEER DOWNSHIFT SWITCH IS LOCATED AT THE HYDROSTATIC STEER CONTROL SHAFT.

TRANSMISSION INTERNAL



A01254

INTERNAL IMPROVEMENTS TO THE X1100-B TRANSMISSION ARE:

- IMPROVED CLUTCH/BRAKE LUBE DISTRIBUTION - PRIMARY BRAKE COOLANT VALVE HAS BEEN REPLACED BY A LUBE PRIORITY VALVE AND SIGNAL VALVE. THIS PROVIDES ADDITIONAL LUBRICANT TO THE RANGE PACK DURING BRAKE APPLY.

- STEER DOWNSHIFT SWITCH - REMOVED FROM INSIDE THE TRANSMISSION AND MOUNTED EXTERNALLY TO INCREASE MAINTAINABILITY.

- SECONDARY CONTROL PRESSURE REGULATOR VALVE - ELIMINATED TO INCREASE RELIABILITY.

- C-4 TRIMMER - REPLACED BY A NEW VALVE THAT REDUCES SHIFT SHOCK WHEN THE TRANSMISSION AUTOMATICALLY SHIFTS INTO SECOND RANGE.

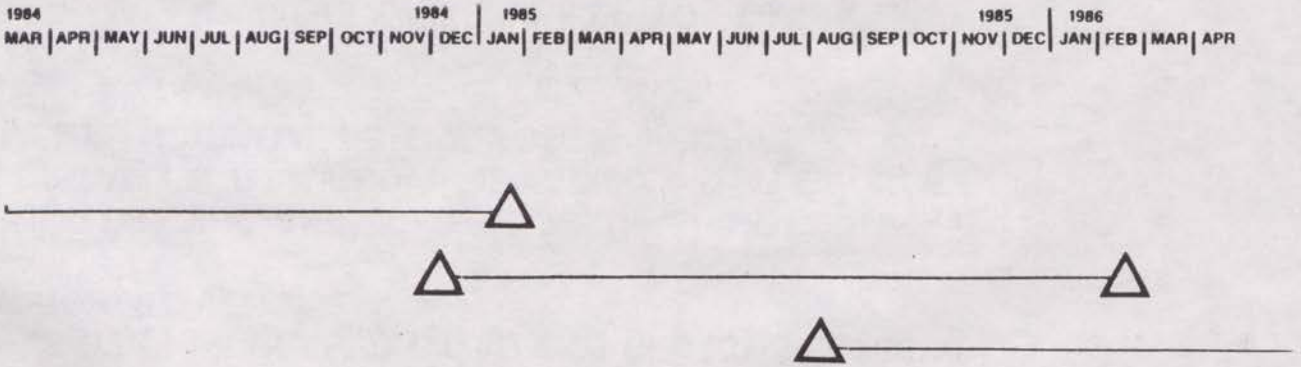
- C-4 CLUTCH - CAPACITY HAS BEEN INCREASED BY ADDING CLUTCH PLATES TO REDUCE DISTRESS IN UPWEIGHTED VEHICLE.

- TORQUE CONVERTER/THRUST BEARING AND LOWER LOCKUP SHIFT POINTS - A NEW BEARING HAS BEEN INSTALLED TO IMPROVE RELIABILITY THAT REDUCES TIME BETWEEN REPLACEMENT AND PROVIDES THE MOST EFFECTIVE LOCKUP SHIFT POINTS TO IMPROVE FUEL ECONOMY.

- HIGH MAIN PRESSURE RELIEF VALVE - VALVE WAS MODIFIED TO ELIMINATE TRANSMISSION DAMAGE DURING STARTUP AT LOW TEMPERATURES.

- STEERING CENTERING - MODIFIED TO REDUCE DRIFT - AND COST.

PRODUCTION BREAK-IN SCHEDULE
TRANSMISSION & RELATED HARDWARE



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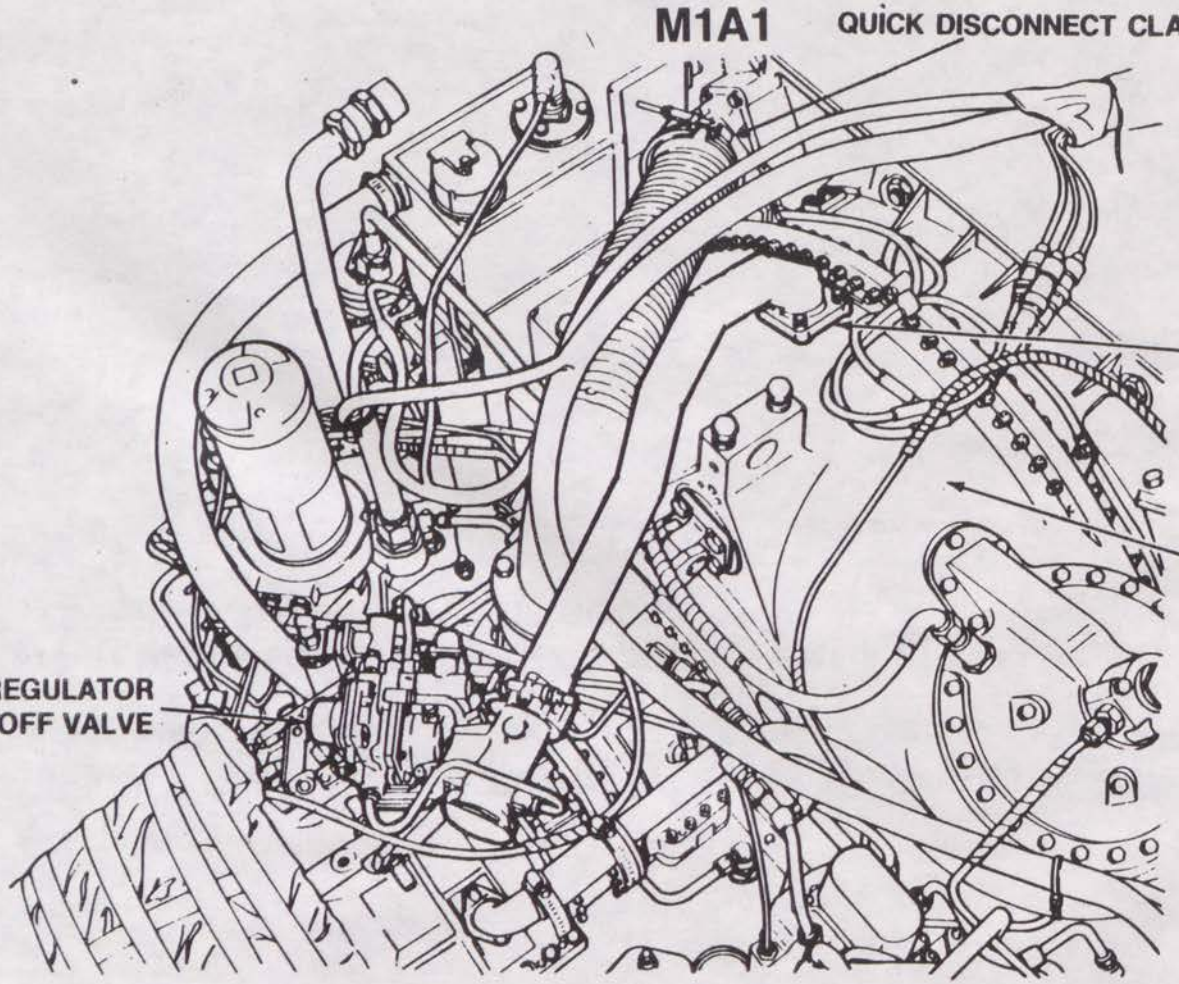
- SCHEDULE INDICATES THE CUT IN DATES OF THE TRANSMISSION AND RELATED HARDWARE.

- CUT IN DATES FOR THE DRIVER'S INSTRUMENT PANEL ARE DISCUSSED IN THE ELECTRICAL SECTION OF THIS BOOK.

ENGINE

M1A1



A01844

- WITH A FULL UP SYSTEM WITH THE NBC SYSTEM ON, IT WAS POSSIBLE THAT WHEN THE TURRET WAS PLACED IN A FULL SLEW AN ENGINE OVER LOADING CONDITION COULD OCCUR. THIS COULD RESULT IN A ENGINE STALL. THE ECU WAS MODIFIED TO REDUCE THE AIR FLOW MOMENTARILY BY REDUCING BLEEDING PRESSURE FROM 44 PSIG TO 16 PSIG, THUS ELIMINATING AN ENGINE OVER LOAD AND A POSSIBLE ENGINE STALL.

- AN OPENING CALLED THE BLEED PORT HAS BEEN DRILLED IN THE AIR DIFFUSER OF THE AGT 1500 ENGINE FOR THE AIR BLEED TUBE USED WITH THE NBC REGULATOR AND SHUT OFF VALVE.

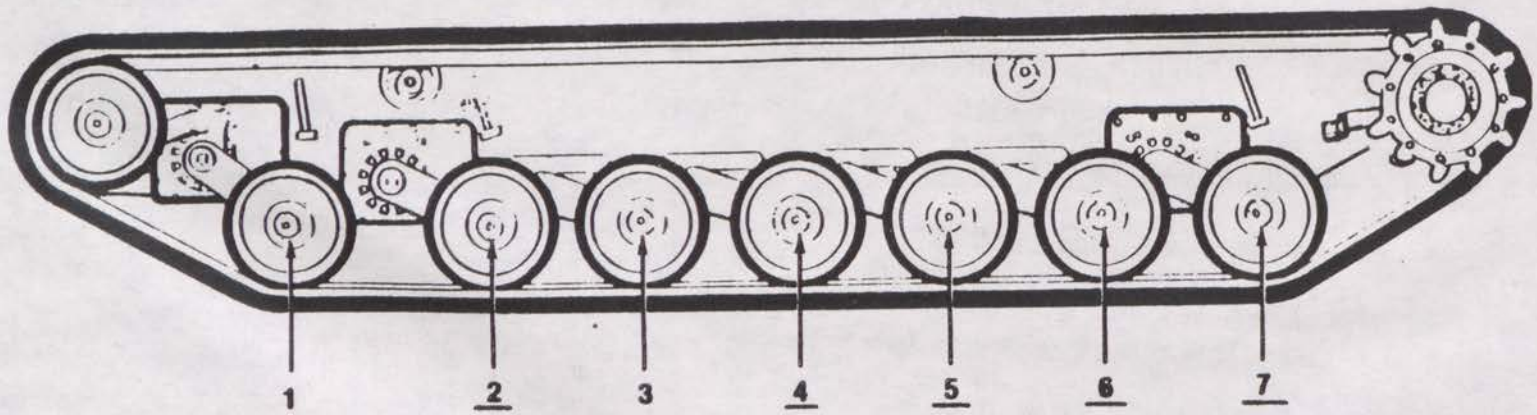
- WHEN REMOVING THE ENGINE, A QUICK DISCONNECT CLAMP IS PROVIDED TO DISCONNECT THE AIR DUCT BETWEEN AIR CYCLE SYSTEM AND THE BLEED AIR SHUTOFF VALVE.

M1/IPM1/M1A1 COMPARISON

AUTOMOTIVE

ELEMENT	M1	IPM1	M1A1
• SUSPENSION			
– TORSION BARS	STANDARD M1	M1A1	RE-INDEXED
– ROTARY SHOCK ABSORBERS	STANDARD M1 (3000 PSI SHOCKS)	M1A1	INCREASED DAMPING 3500 PSI SHOCKS WITH IMPROVEMENTS
– ROADWHEELS	STANDARD M1	M1	– NON-RIBBED ROADWHEEL – THINNER RUBBER (1/2") CROSS SECTION – OVERALL DIAMETER UNCHANGED
– COMPENSATING IDLER ARM	M1	M1A1	STRONGER ARM (LARGER FILET RADIUS)
– FINAL DRIVE SPROCKET	M1	M1A1	NEW PROFILE

TORSION BAR RE-INDEXED



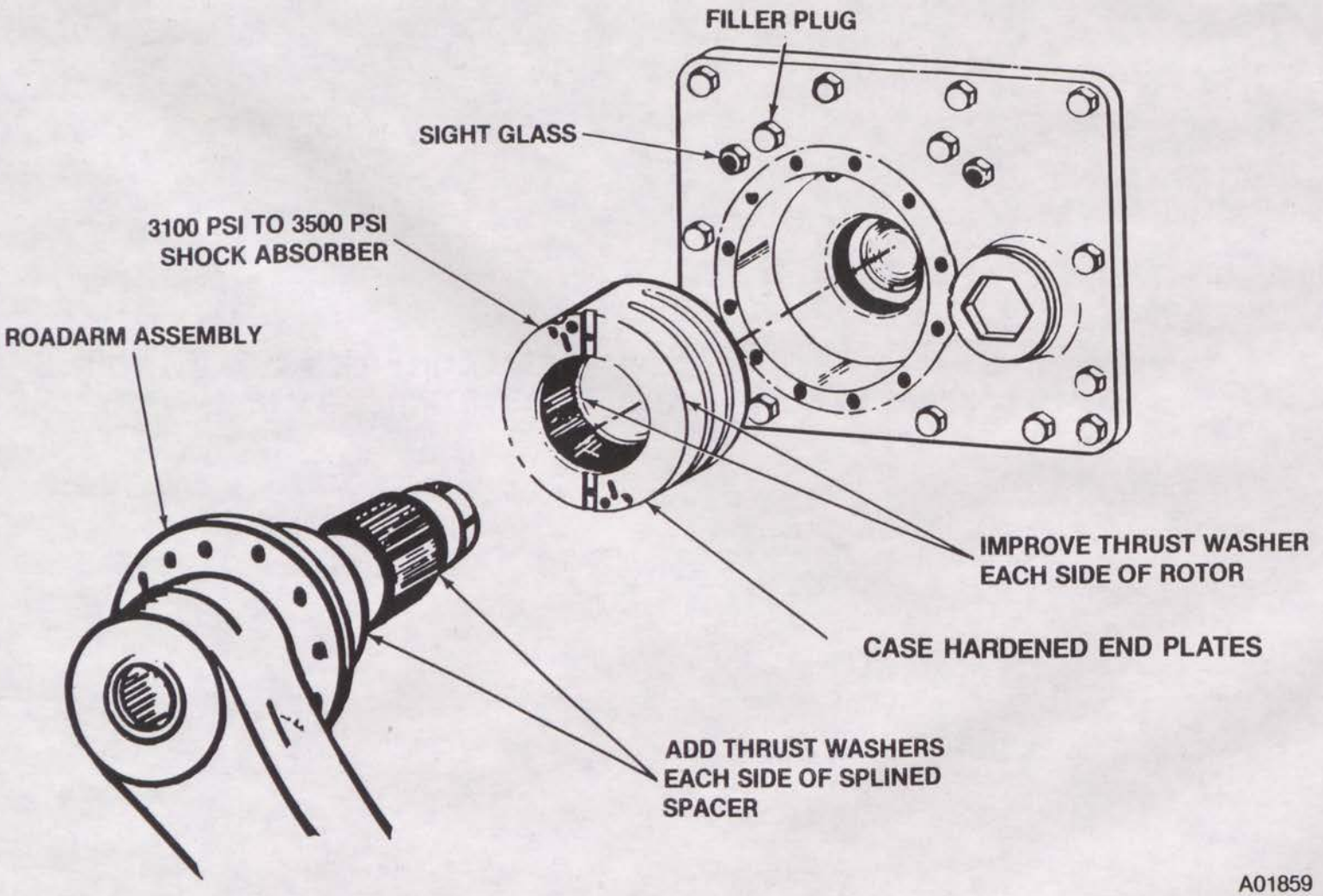
CONFIGURATION	POSITION	INDEX ANGLE DEGREES	WHEEL LOAD POUNDS	GROUND CLEARANCE INCHES
M1	1	56	8,981	17.2
	2	45	9,798	
	3	45	11,806	
	4	34	7,364	
	5	34	7,486	
	6	34	7,608	
	7	52	7,088	

CONFIGURATION	POSITION	INDEX ANGLE DEGREES	WHEEL LOAD POUNDS	GROUND CLEARANCE INCHES
M1A1	1	56	8,936	17.2
	2	50	11,885	
	3	45	11,801	
	4	35	7,767	
	5	35	7,898	
	6	35	8,028	
	7	50	6,296	

TO MAINTAIN A GROUND CLEARANCE OF 17.2 IN, THE INDEX ANGLE OF ROADARMS 2, 4, 5, 6 AND 7 WERE CHANGED

ROTARY SHOCK ABSORBERS

M1A1

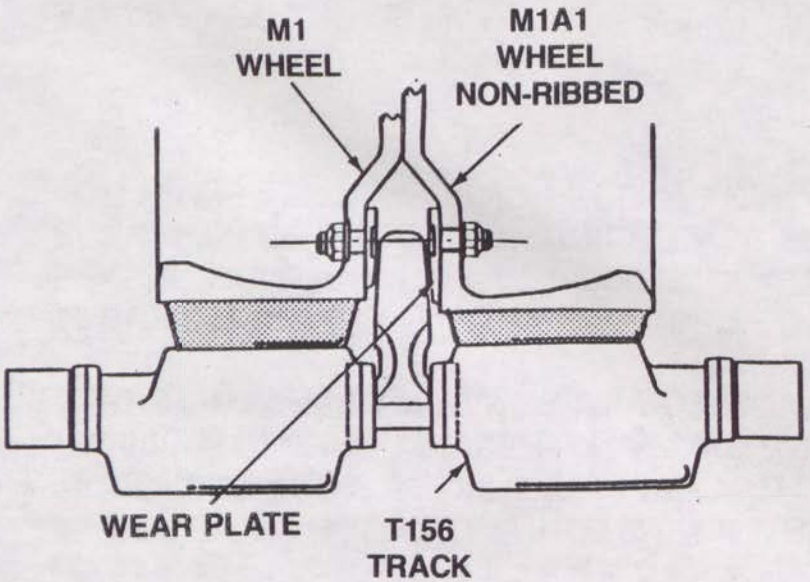


A01859

- CHANGES INCORPORATED ON THE M1A1 TANK SUSPENSION WERE DONE TO ACCOMMODATE THE ADDITIONAL WEIGHT.

- AT POSITIONS 1, 2 AND 7, THE SHOCK ABSORBER OPERATNG PRESSURE HAS BEEN INCREASED FROM 3100 TO 3500 PSI WITH A DAMPING TORQUE @ 1 RAD/SEC FROM 125,000 TO 137,000 LBS/INCH. THE TWO END PLATES HAVE BEEN SURFACE HARDENED, THRUST WASHER BEARINGS IMPROVED, AND SPLINES MODIFIED.

- THRUST WASHERS HAVE BEEN ADDED TO EACH SIDE OF THE MODIFIED SPLINED SPACER OF ROADARMS AT POSITIONS 1, 2 AND 7. THE THRUST WASHERS WILL PREVENT THE SHOCK ABSORBER RACE FROM PITTING, INCREASE THE THRUST LOAD FOR HIGHER STRESS, AND REDUCE LEAKAGE.



M1A1 ROADWHEEL

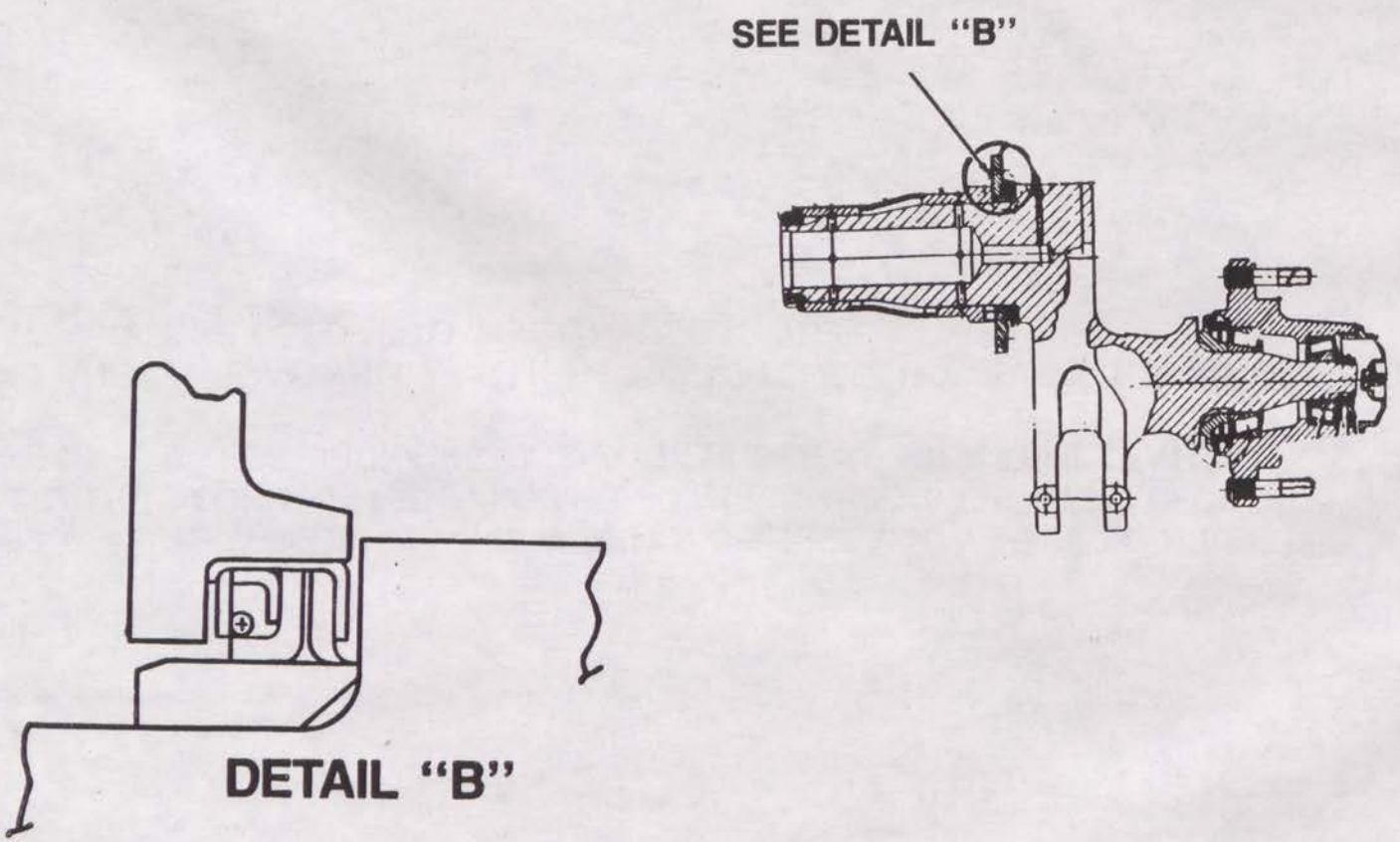
- ROADWHEELS WITH REDUCED RUBBER THICKNESS
- ACCUMULATED 7000 MILES
- TRACK MISGUIDE REDUCED
- RUBBER HAD LESS CHUNKING DUE TO REDUCED RUBBER TEMPERATURE
- M1 AND M1A1 MIX MATCHED

- DURING TESTS, THE M1A1 IMPROVED ROADWHEEL WITH REDUCED RUBBER THICKNESS ACCUMULATED 7,000 MILES, TRACK MISGUIDES WERE REDUCED, AND RUBBER HAD LESS CHUNKING DUE TO REDUCED RUBBER TEMPERATURE.

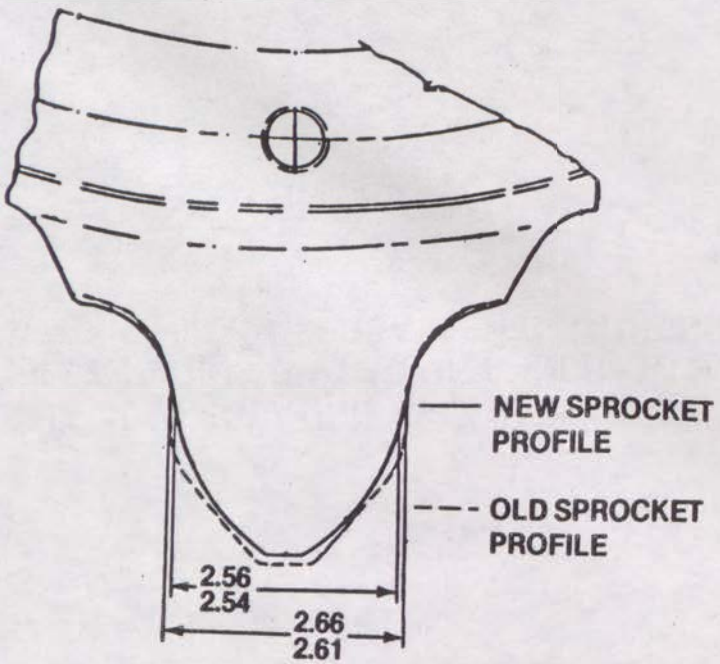
- M1A1 AND M1 ROADWHEELS CAN BE MIX MATCHED. HOWEVER, THE M1A1 WEAR PLATE MUST BE USED WITH THE M1A1 ROADWHEEL.

COMPENSATING IDLER ARM

M1A1



- THE COMPENSATING IDLER ARM HAS BEEN MADE STRONGER BY INCREASING THE FILET RADIUS BY 1/16 OF A INCH. THIS HELPS TO REDUCE THE STRESS IN THIS AREA, WHICH DECREASES FRACTURING.



M1A1 SPROCKET

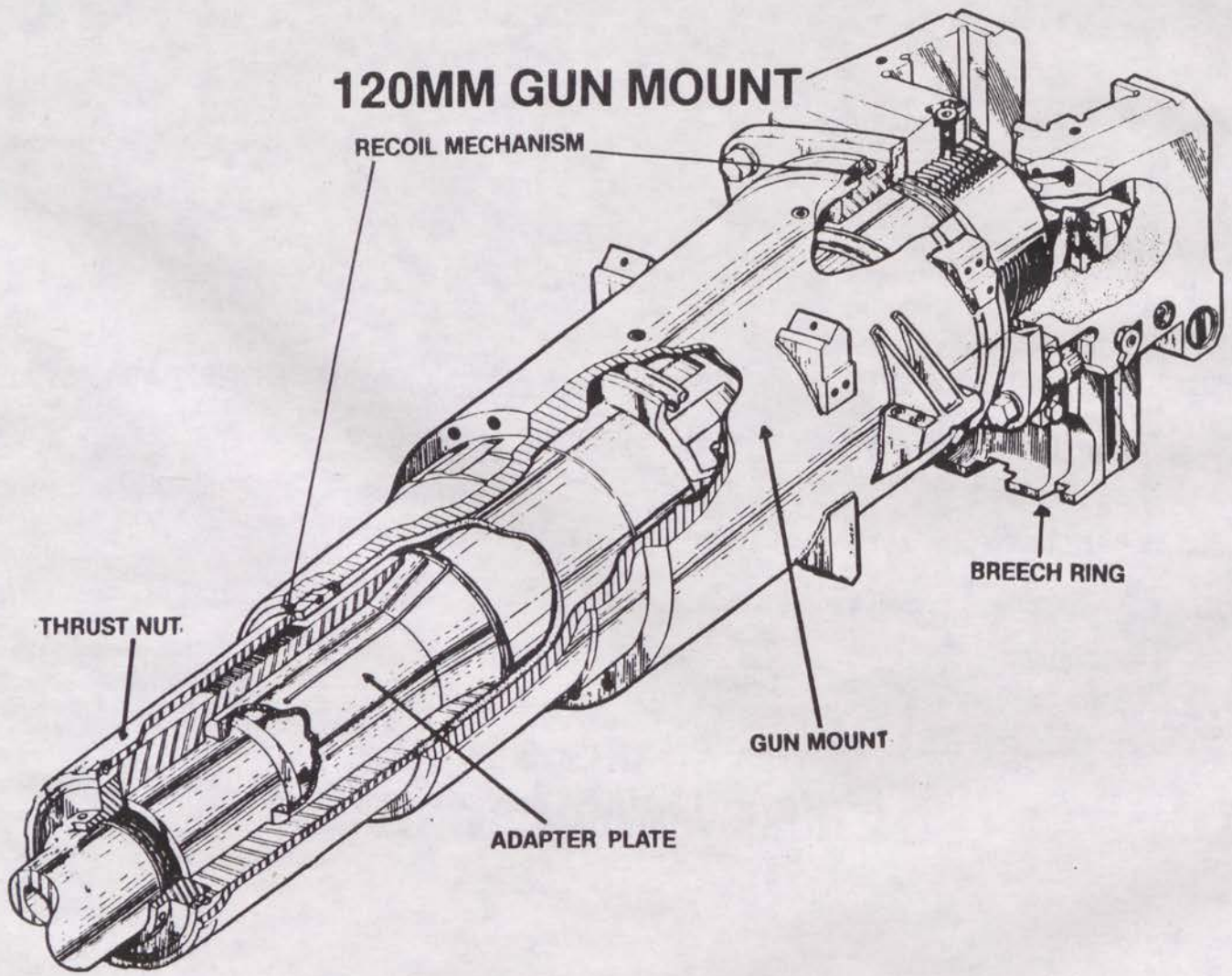
- OLDER DESIGN SPROCKETS WERE UNDERPITCHED
- TRACK HAD TENDENCY TO FOLLOW SPROCKET AS IT TURNED WITH OLD DESIGN SPROCKET
- NEW SPROCKET WEAR MARKS REDESIGNED
- REVERSED OR REPLACED ACCORDING TO WEAR, NOT MILEAGE
- BETTER WEAR AND LESS NOISE

- OLDER DESIGN SPROCKETS WERE UNDERPITCHED, CAUSING EXCESSIVE WEAR. THE TRACK HAD A TENDENCY TO FOLLOW THE SPROCKET AS IT TURNED. THE PROFILE OF THE NEW SPROCKET WAS CHANGED AND WEAR MARKS REDESIGNED. SPROCKETS WILL BE REPLACED OR REVERSED ACCORDING TO WEAR MARKS INSTEAD OF MILEAGE. THE PROFILE/PITCH CHANGE INCREASED LIFE AND REDUCED NOISE.

M1/IPM1/M1A1 COMPARISON

ARMAMENT

ELEMENT	M1	IPM1	M1A1
• GUN MOUNT	105MM	105MM	120MM
• ROTOR	SLAB, FRONT-MOUNTED RESOLVER	M1A1	CAST, REAR-MOUNTED RESOLVER
• COAX WEAPON	4800 (READY ROUNDS)	M1	3400 (READY ROUNDS)
• CARTRIDGE CASE CONTAINMENT	NONE	M1	STUB CASE DEFLECTOR/CATCHER

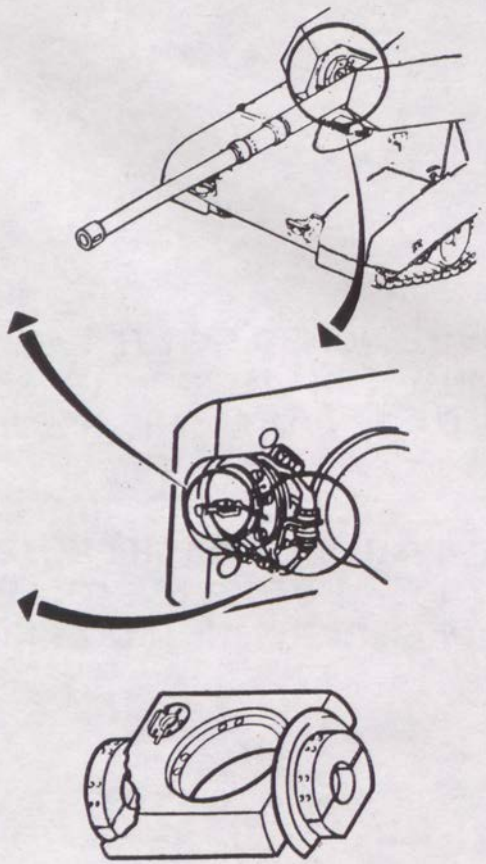

120MM GUN MOUNT
RECOIL MECHANISM
BREECH RING
THRUST NUT
GUN MOUNT
ADAPTER PLATE

- THE GUN MOUNT INTERFACES WITH THE TURRET BY ATTACHMENT TO A ROTOR WHICH PIVOTS IN ELEVATION ON TURRET TRUNNION BEARINGS. THE GUN MOUNT AND ROTOR PROVIDE APERTURES AND A MOUNTING SURFACE FOR THE COAXIAL MACHINEGUN, GUNNER'S TELESCOPE AND THE MAIN GUN FIRING CIRCUITRY.

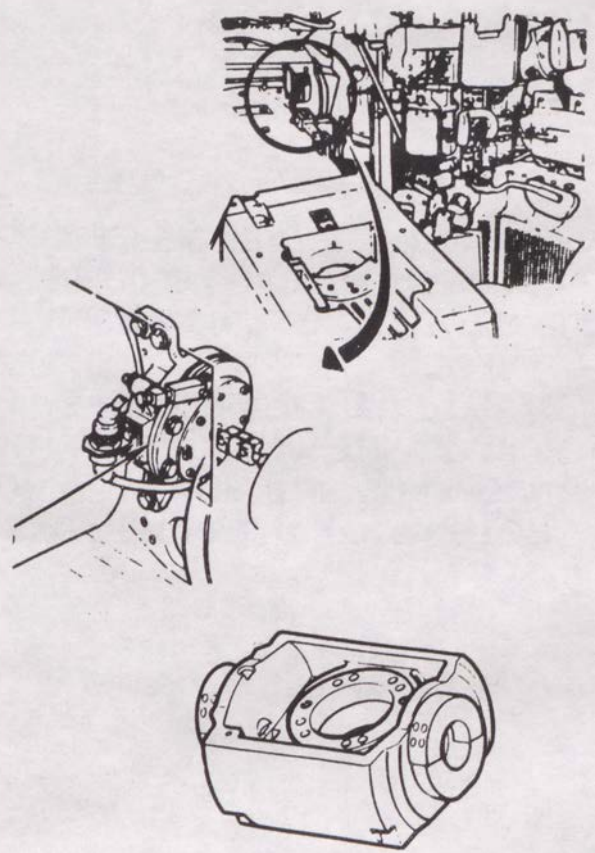
- THE BREECH RING IS JOINED TO THE RECOIL MECHANISM USING AN ADAPTER PLATE AND THRUST NUT. THE NUT, WHICH TRANSMITS THE FIRING LOAD TO THE RECOIL MECHANISM, IT HAS DEMONSTRATED A SAFE SERVICE LIFE GREATER THAN 10,000 ROUNDS.

ROTOR ASSEMBLY

M1



M1A1

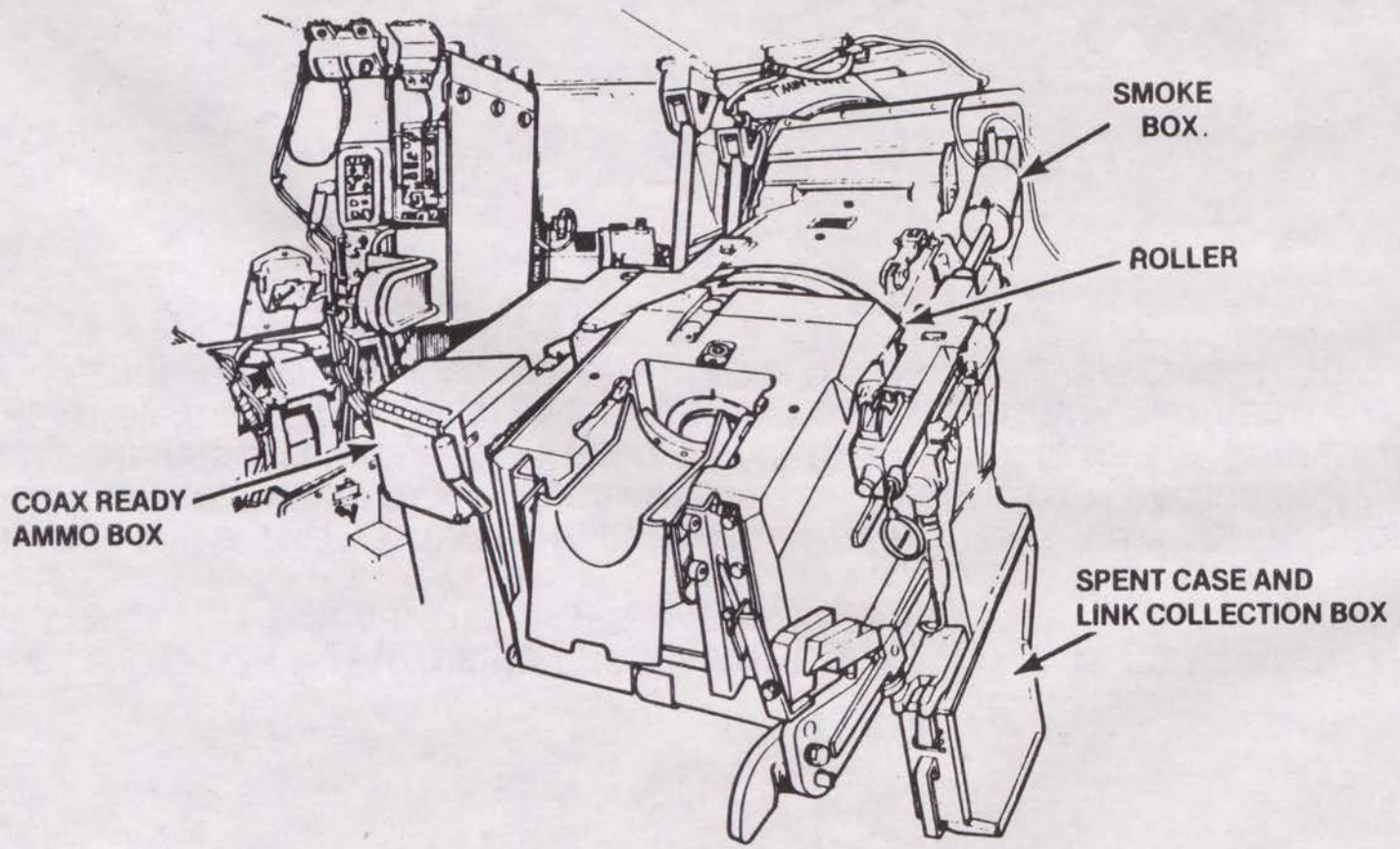


- TO SIMPLIFY THE MANUFACTURING PROCESS, THE M1A1 ROTOR IS FABRICATED FROM A CAST NOT A SLAB. THIS SAVES MACHINING TIME.

- THE LOCATION OF THE RESOLVER HAS BEEN CHANGED. THE M1 RESOLVER IS UNDER THE GUN SHIELD. THIS REQUIRED REMOVAL OF THE GUN SHIELD TO ADJUST OR REMOVE THE RESOLVER. THE M1A1 RESOLVER IS ON THE INSIDE OF THE TURRET ON THE REAR OF THE ROTOR. THIS MAKES IT EASY FOR ADJUSTMENT AND REMOVAL OF THE RESOLVER WITH ADDED BENEFIT IN MAINTENANCE TIME SAVINGS, ALSO IMPROVES SURVIVABILITY.

COAX WEAPON

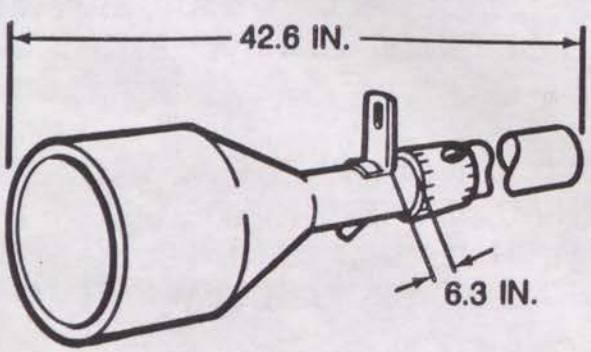
M1A1



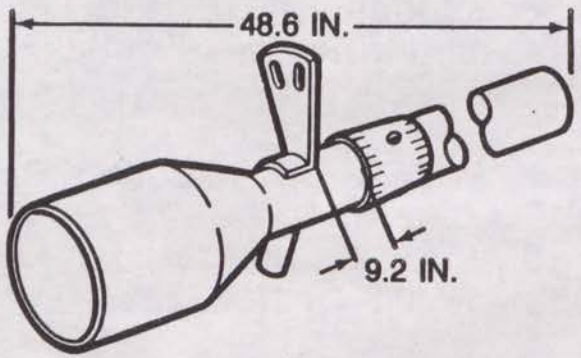
A01926

- COAXIAL WEAPON SYSTEM CHANGES ARE AS FOLLOWS:
- THE WEAPON MOUNT WAS ADAPTED TO THE 120MM GUN CRADLE ELIMINATING THE 17º CANT.
- THE NUMBER OF ROUNDS IN THE READY AMMUNITION BOX WAS REDUCED FROM 4,800 TO 3400.
- THE READY BOX WAS REDESIGNED BY REMOVING A PARTITION TO ALLOW THE INNER ROW OF AMMO TO CLEAR THE WIDER PRIMARY WEAPON BREECH AND INTERIOR WELDS ELIMINATED IMPROVING AMMO FEED. A SPRING LOADED PLATE HAS BEEN ADED TO THE BUTTON OF THE BOX TO ASSIST IN THE FEEDING OF THE AMMUNITION.
- THE FEED CHUTE WAS RE-ROUTED TO CLEAR THE PRIMARY WEAPON BREECH AND A ROLLER WAS ADDED TO IMPROVE AMMO BELT ALIGNMENT AND REDUCE AMMO BELT DRAG.
- THE EJECTION CHUTE WAS REDESIGNED TO FIT ON THE COAX MACHINEGUN WITH NO CANT AND LENGTHENED TO ALLOW THE SPENT CASE AND LINK COLLECTION BOX TO BE ATTACHED AND CLEAR THE PRIMARY WEAPON.
- THE SPENT CASE BOX CAPACITY WAS REDUCED FROM 750 TO 540. THE DROP BOX IS NOW CLAMPED TO THE EJECTION CHUTE. THE SLIDING MOUNT WAS ELIMINATED.

COAX SMOKE TUBE ASSEMBLY



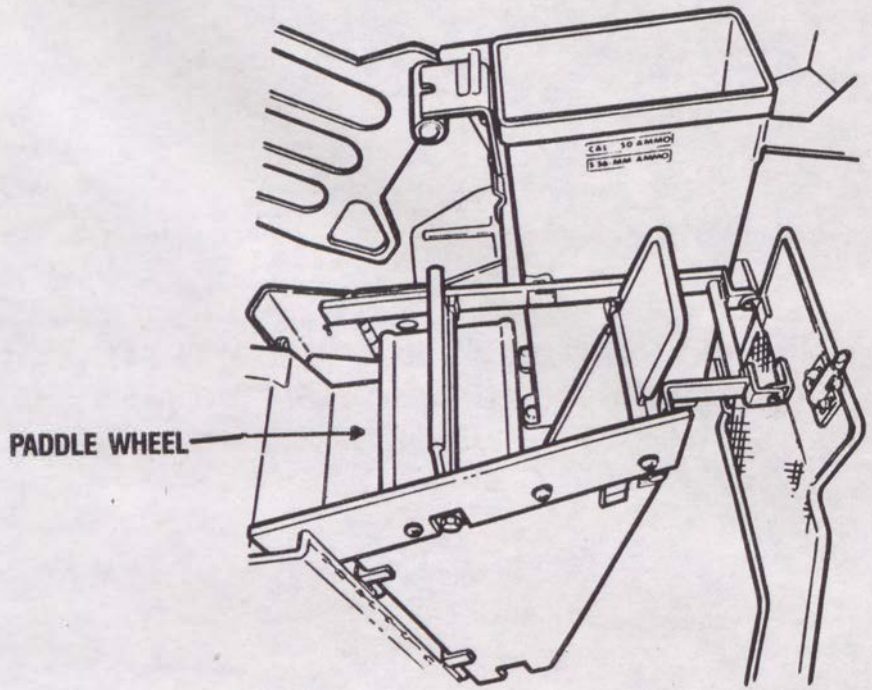
M1



M1A1

- BECAUSE OF THE NEW BALLISTIC PROTECTION PACKAGE AND ROTOR, THE OVERALL LENGTH OF THE COAX MACHINE GUN SMOKE ENCLOSURE TUBE HAS BEEN INCREASED BY SIX INCHES.

SPENT AMMUNITION CONTAINMENT



A02578

- A SPENT STUB DEFLECTOR, WHICH IS POSITIONED AUTOMATICALLY WHEN THE MAIN GUN IS FIRED, DIRECTS SPENT STUBS INTO A CARTRIDGE CASE BOX. THIS BOX IS FIXED TO THE FLOOR BETWEEN THE LOADER'S AND COMMANDER'S STATION. THIS BOX ALSO SERVES AS GUARD TO PREVENT THE KE STUBS (700^{0}) FROM HITTING THE LOADER.

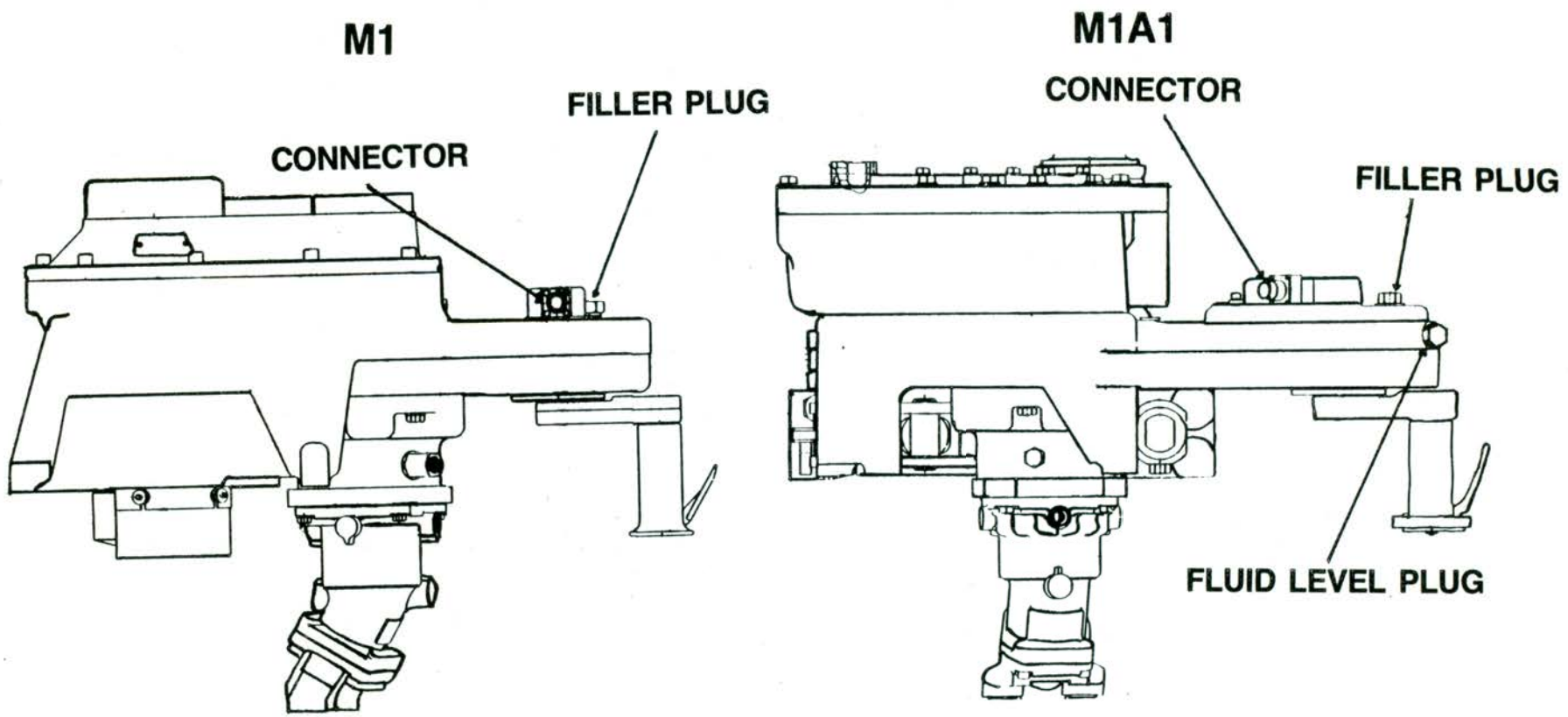
- THE PADDLE WHEEL ON THE BOX PREVENTS THE EXPENDED STUB CASE FROM COMING INTO CONTACT WITH A LIVE ROUND IF, THE LOADER ACCIDENTLY DROPS A LIVE ROUND.

M1/IPM1/M1A1 COMPARISON

FIRE CONTROL

ELEMENT	M1	IPM1	M1A1
• GUN TURRET DRIVE (GTD)	– SPLIT PINION GEAR BOX – SINGLE SPEED MANUAL DRIVE	M1	– JAM GEAR BOX – INCREASED AZIMUTH TORQUE – TWO-SPEED MANUAL DRIVE
• COMPUTER	105MM BALLISTICS	M1	– 120MM BALLISTICS – POINT-MASS TRAJECTORY
• GUNNER'S AUX. SIGHT • MUZZLE REF. SENSOR • ELECTRONICS RACK • GUNNER'S PRIMARY SIGHT	STANDARD M1	M1	120MM RETICLE NEW MOUNTING REPACKAGING CHANGE IN AMMO SELECT SWITCH

GUN TURRET DRIVE



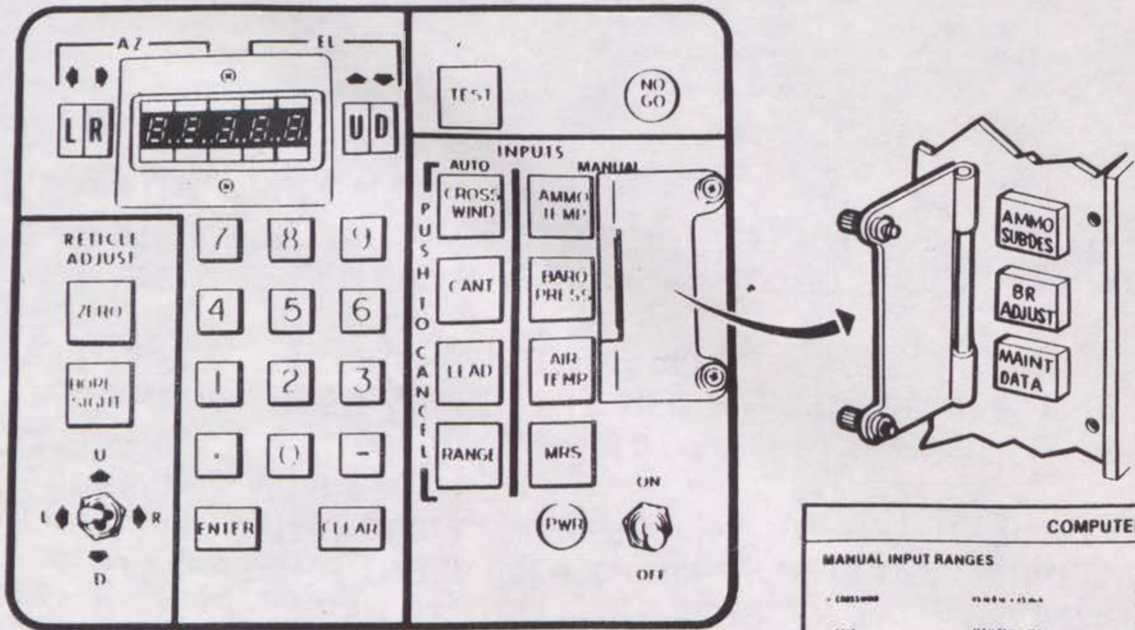
- THE TURRET TRAVERSING MECHANISM ASSEMBLY MANUAL DRIVE WAS CHANGED TO A TWO SPEED SYSTEM. THIS REDUCES THE AMOUNT OF EFFORT REQUIRED TO TRAVERSE THE TURRET WHEN THE TANK IS ON AN UNLEVEL SURFACE. THE HIGH SPEED POSITION WILL TRAVERSE THE TURRET 10 MILS PER TURN AND, AT LOW SPEED, 5 MILS PER TURN.

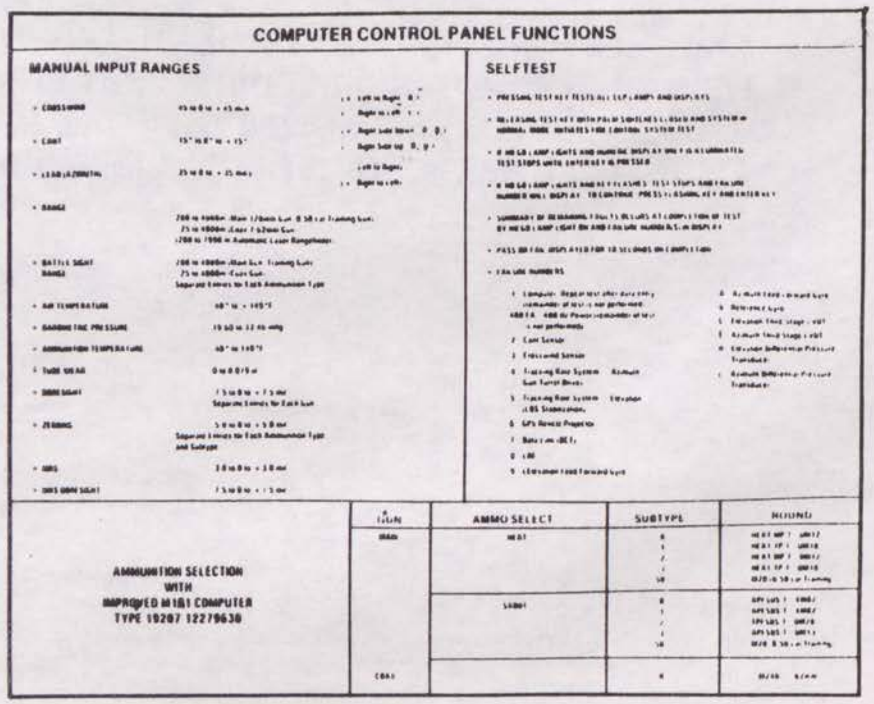
- PLUG HAS BEEN ADDED. THE MECHANIC CAN CHECK FLUID LEVEL BY REMOVING THE PLUG AND INSERTING THE SMALL FINGER.

- THE FILLER PLUG HAS ALSO BEEN MOVED FOR BETTER ACCESS. THE ELECTRICAL CONNECTOR HAS BEEN REORIENTATED. THIS ALLOWS FOR EASIER CONNECTION OF THE HARNESS.

COMPUTER CONTROL PANEL

M1A1





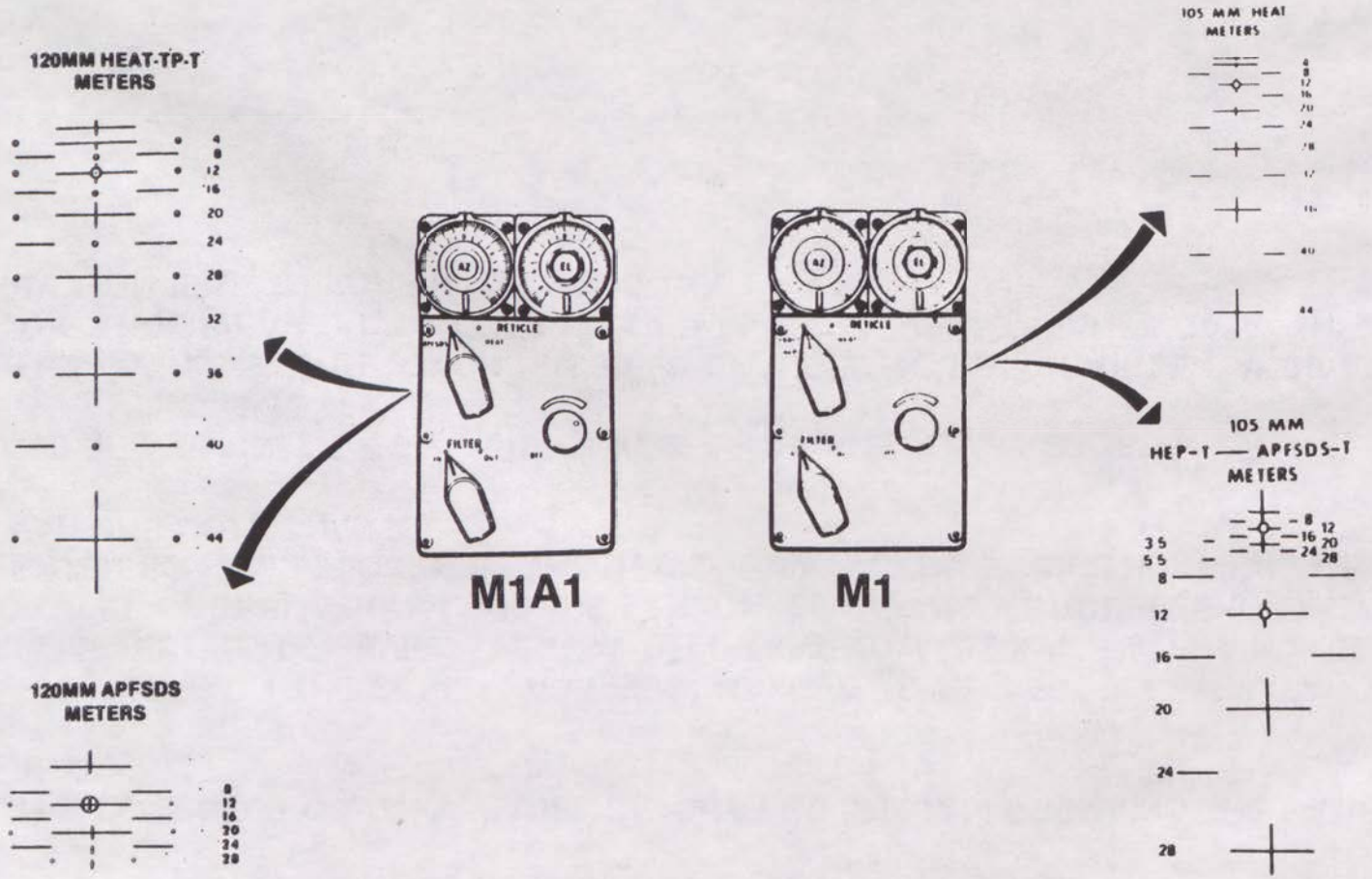
- THE COMPUTER CONTROL PANEL LAYOUT FOR THE M1A1 REMAINS THE SAME PHYSICALLY.

- THE DECAL ON THE COVER HAS BEEN CHANGED TO REFLECT A NEW EXPANDED SELF TEST TO DS LEVEL. THE NEW SELF TEST NOW DISPLAYS ALPHA/NUMERIC CODES. ORGANIZATIONAL AND DS PERSONNEL CAN NOW TROUBLESHOOT BY ENTERING NUMBERIC CODES WHICH WILL GIVE VOLTAGE NULL READINGS OF THE VARIOUS COMPONENTS.

- THERE ARE ONLY TWO AMMUNITION SELECTION SUBTYPE CODES.

- THE BATTLE SIGHT BUTTON HAS BEEN CHANGED TO READ BATTLE RANGE AND THE TUBE WEAR BUTTON HAS BEEN CHANGED TO MAINTENANCE DATA. THIS BUTTON IS USED FOR TROUBLESHOOTING.

GUNNER'S AUX SIGHT

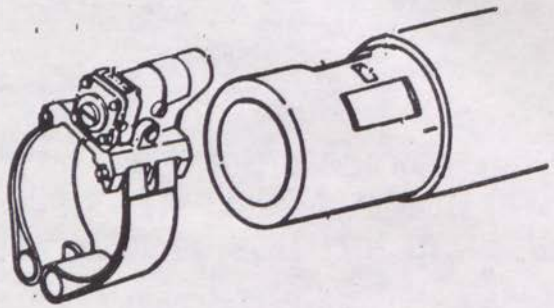


A01971

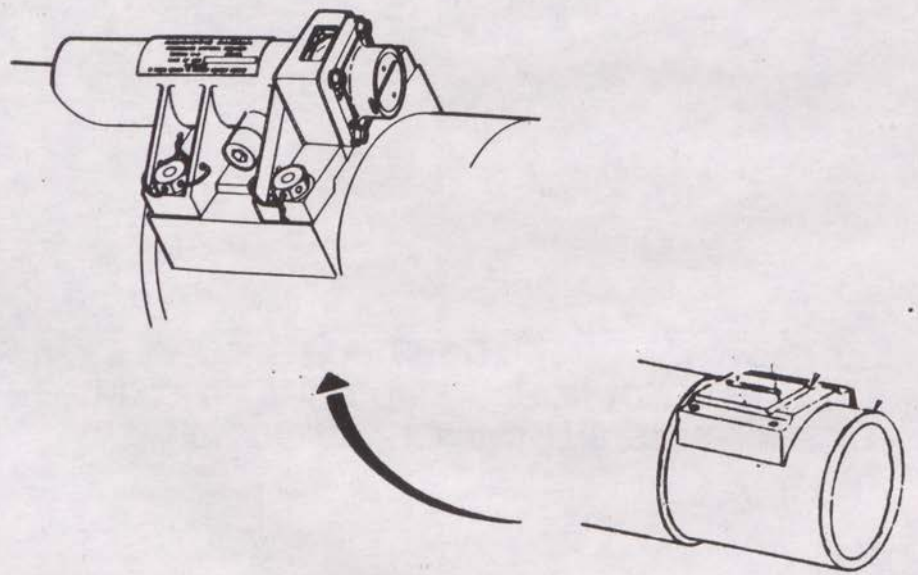
- THE CONTROLS FOR THE GUNNER'S AUXILIARY SIGHT (GAS) REMAIN THE SAME. THE RETICLES ARE CHANGED FOR AMMO TYPE AND SIZE. THE COMBINATION HEP/SABOT RETICLE HAS BEEN REPLACED WITH A SINGLE RETICLE FOR SABOT.

MUZZLE REF. SENSOR

M1



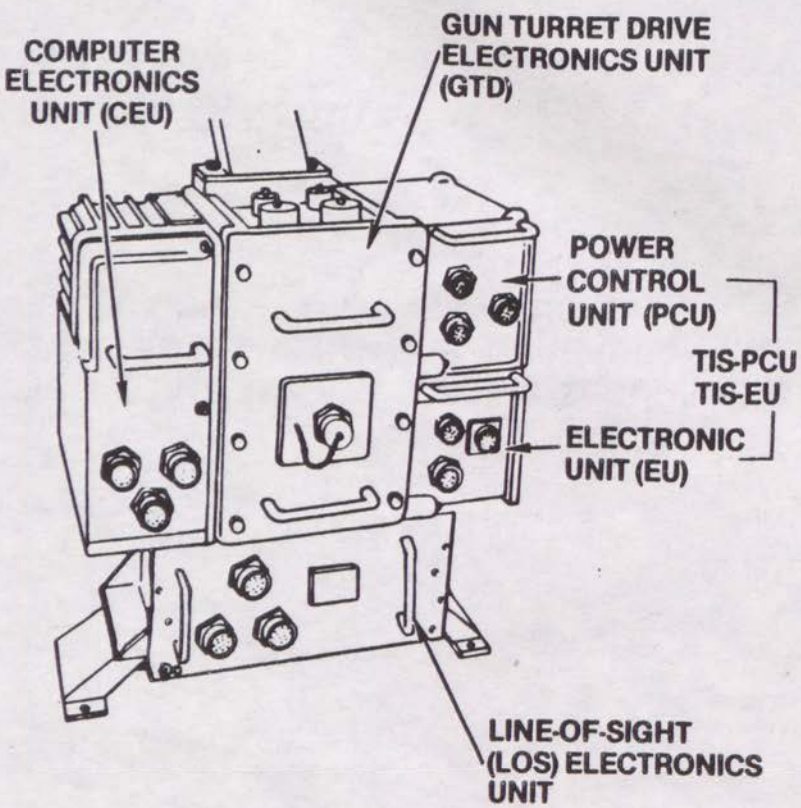
M1A1



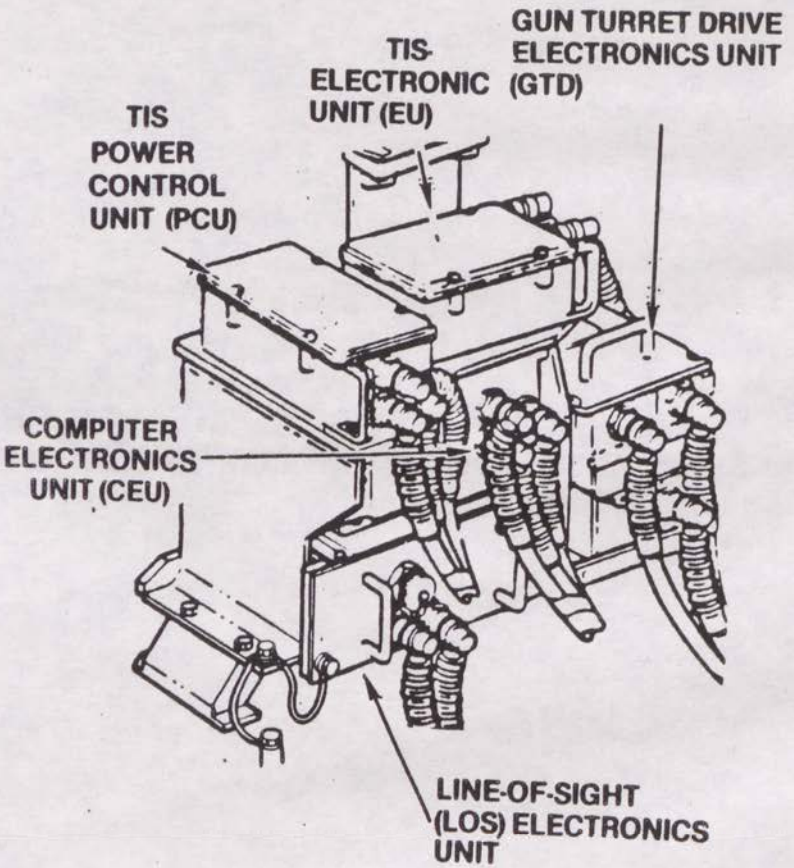
- THE COLLIMATOR (MRS) IS SECURED TO THE GUN MUZZLE WITH LOCKING SCREWS, ITS FOCAL LENGTH IS INCREASED, AND THE LENS AND CELL ASSEMBLY LOCKING METHOD IS CHANGED.

ELECTRONICS RACK

M1

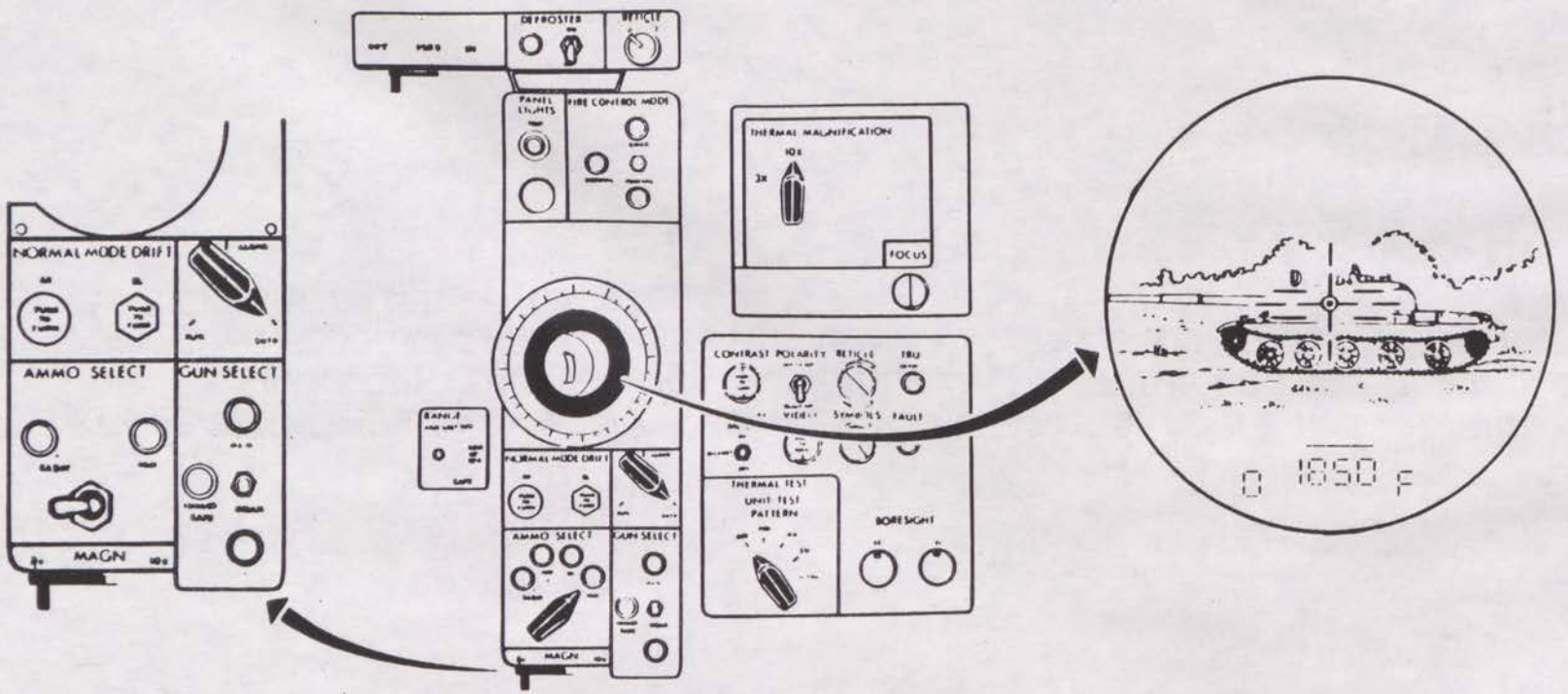


M1A1



- THE ELECTRONICS RACK WAS REDESIGNED TO ACCOMMODATE THE INSTALLATION OF THE 120MM GUN. THIS WAS JUST A REPOSITIONING OF THE EQUIPMENT TO PROVIDE NEEDED CLEARANCE FOR THE ARMAMENT. THE CEU LOCATED IN THE RACK HAS BEEN UPDATED TO 12K STORAGE.

GUNNER'S PRIMARY SIGHT



M1A1 M1

A01970

- THE PRIMARY CHANGES TO THE GUNNER'S STATION INCLUDE THE AMMO SELECT SWITCH ON THE GPS.

- THE AMMO SELECT SWITCH ON THE GPS PANEL IS CHANGED TO INDICATE THE TWO TYPES OF AMMUNITON THAT ARE PECULIAR TO THE 120MM MAIN GUN. THESE TWO TYPES OF AMMUNITION ARE SABOT AND HEAT.

M1/IPM1/M1A1 COMPARISON

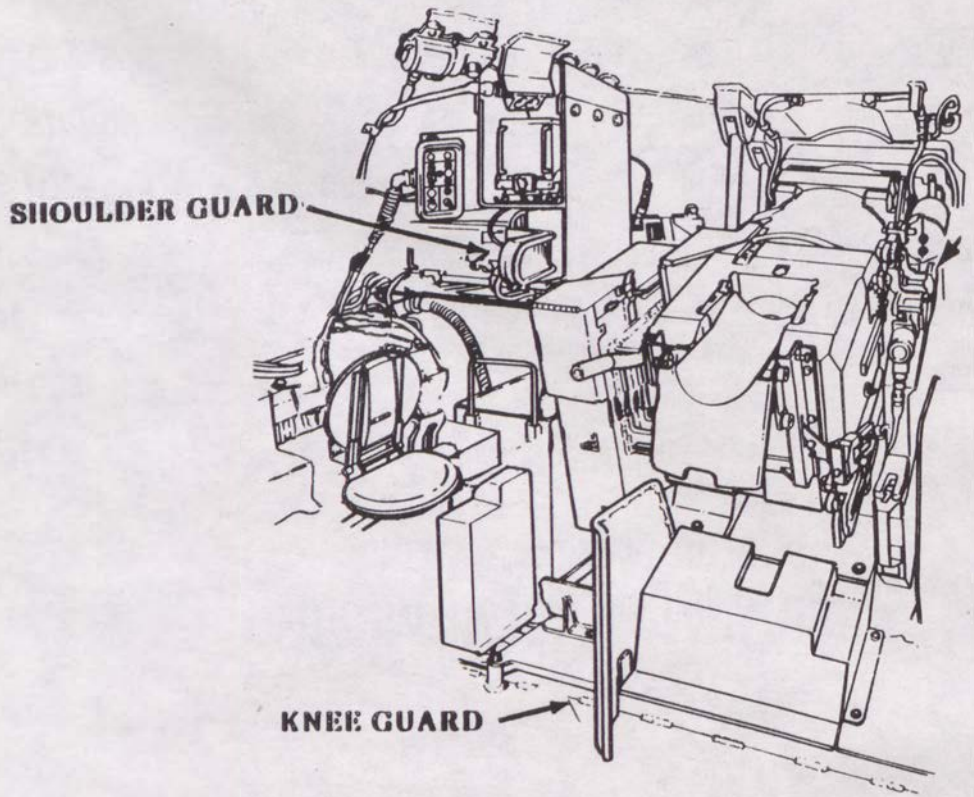
CREW ACCOMMODATIONS

ELEMENT	M1	IPM1	M1A1
• CREW GUARDS	STANDARD M1	M1	RECONFIGURED
• OEM STOWAGE			INCREASED CAPACITY
• CARGO RACK			MODIFIED
• REAR BUSTLE RACK	NONE	M1A1*	FOLD-UP AND DETACHABLE
• LOADER'S STATION	STANDARD M1	M1	REDESIGNED
• COMMANDER'S SEAT	STANDARD M1	M1	MODIFIED

*RUNNING CHANGE

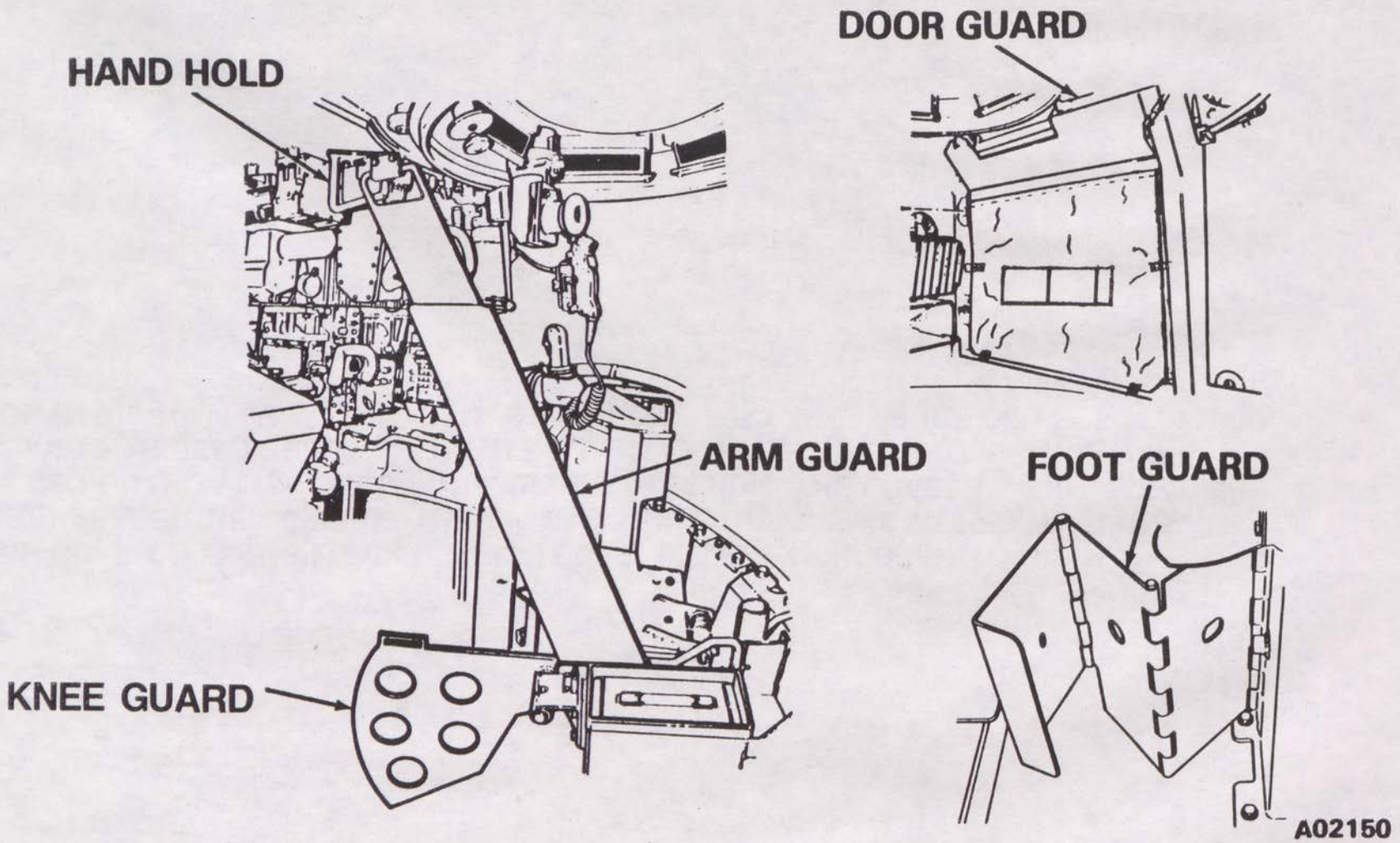
M1A1

LOADER'S STATION CREW GUARDS



- THE GUARD FOR THE LOADER'S RIGHT LEG HAS BEEN CHANGED TO A SOLID METAL SHEET. BECAUSE OF THE 120 GUN AND STUB CASE CATCHER, THIS ONE PIECED GUARD WAS ADDED FOR MORE PROTECTION. THE LOADER'S SHOULDER GUARD HAS BEEN REDESIGNED. THE GUARD CAN BE SWUNG OUT OF THE WAY FOR STORAGE; THE M1 GUARD MUST BE REMOVED FROM ITS HOLDER FOR STORAGE.

M1A1
COMMANDER'S GUARDS

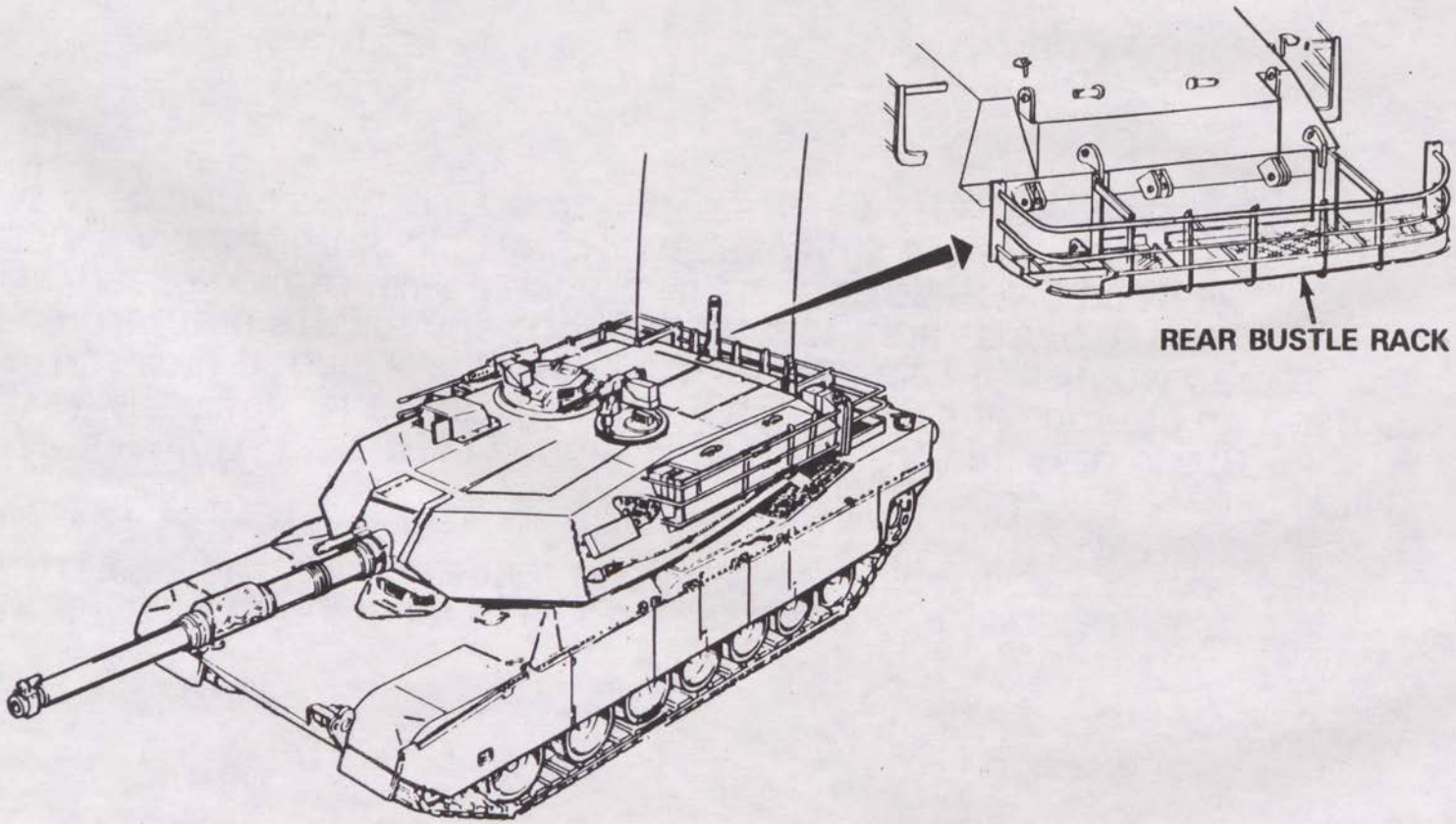


- ONE ARM GUARD AND ONE FOOT GUARD WERE ADDED TO THE COMMANDER'S STATION TO KEEP THE COMMANDER OUT OF THE RECOIL PATH OF THE MAIN GUN AND THE STUB CASE CATCHER.

- THE DOOR GUARD FOR THE M1A1 IS NOW MADE OUT OF FABRICATED CLOTH INSTEAD OF ALUMINUM. THE CURTAIN IS ATTACHED TO A TUBE LOCATED AT THE TOP ON THE AMMO DOORS. HOOKS ARE USED TO SECURE THE BOTTOM OF THE CURTAIN. ADJUSTING STRAPS ARE LOCATED ON EACH SIDE TO TAUTEN THE CURTAIN. THREE POCKETS HAVE BEEN ATTACHED TO STORE THE NBC MASK, BINOCULAR'S AND LENS TISSUE. THE CHANGE REDUCES WEIGHT, ELIMINATES WARPING ASSOCIATED WITH ALUMINUM, AND SOLVES A STORAGE PROBLEM.

CARGO RACK/REAR BUSTLE RACK

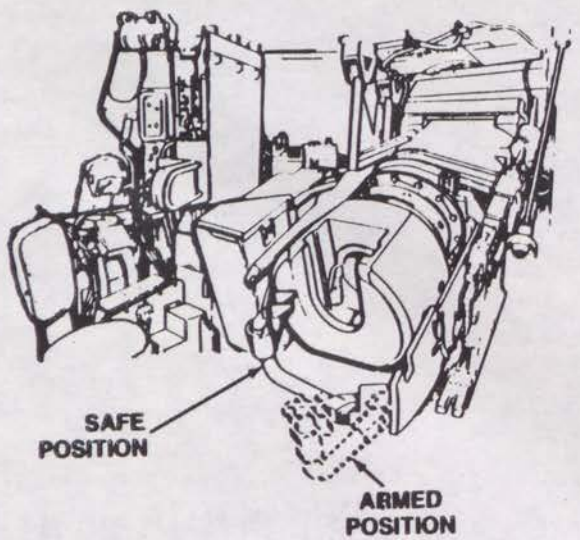
M1A1



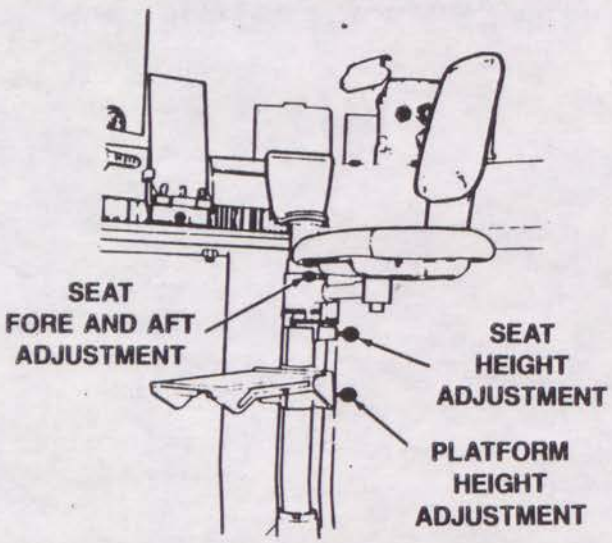
- A REAR BUSTLE RACK HAS BEEN ADDED TO THE REAR OF THE TURRET. THIS BUSTLE RACK CAN BE FOLDED UP OR CAN BE REMOVED FROM THE TURRET. THE RACK WILL BE USED TO STOW THE CREWS' TA50.

LOADER'S STATION

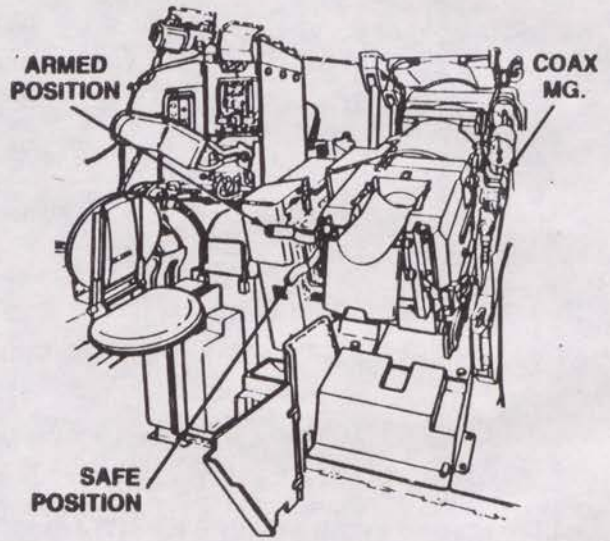
M1

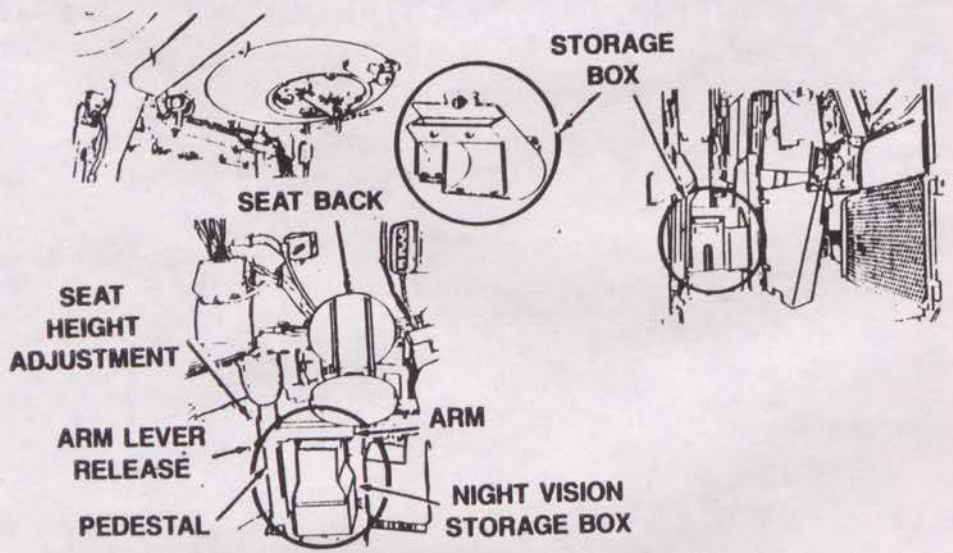


A02581



M1A1





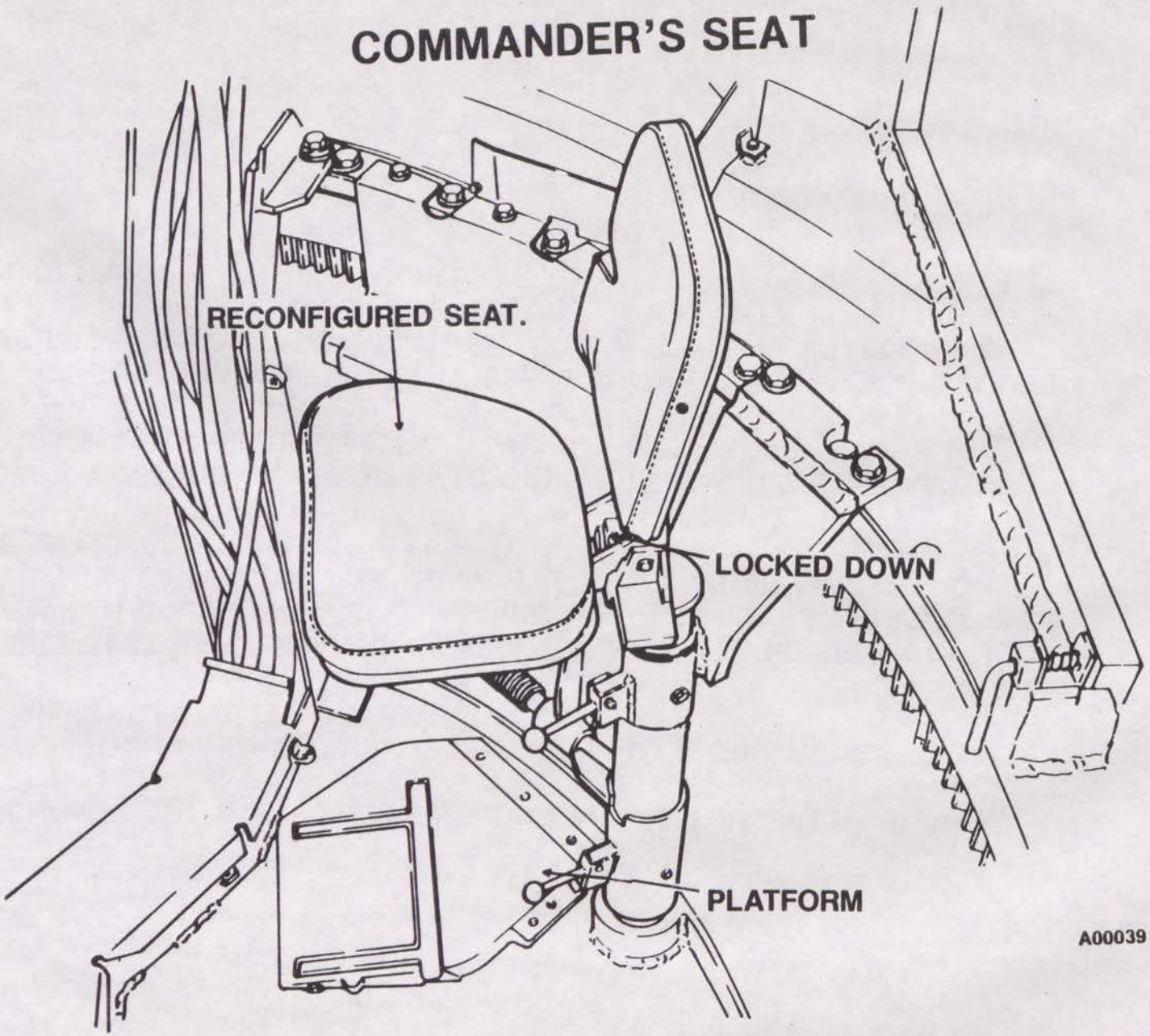
THE MAJOR CHANGES TO THE LOADER'S STATION ARE AS FOLLOWS:

- A SAFE/ARM SWITCH HANDLE IS USED TO ARM THE MAIN GUN VERSUS THE M1 MAIN GUN SPEND CASE EJECTION GUARD.

- THE LOADER'S SEAT HAS BEEN REDESIGNED. THE BACK OF THE SEAT CAN BE FOLDED DOWN. THE SEAT IS FIXED TO AN ARM, AND THE ARM IS ATTACHED TO A PEDESTAL. BY RELEASING THE ARM LEVER, THE SEAT CAN BE SWUNG AROUND THE BACK OF THE SEAT FOLDED DOWN.

- THE LOADER CAN STAND ON THE SEAT TO OBSERVE OR MAN THE MACHINEGUN. THE SEAT HEIGHT CAN BE ADJUSTED.

- THE STOWAGE BOX THAT WAS UNDER THE SEAT OF THE M1 HAS BEEN REPLACED WITH A NIGHT VISION STORAGE BOX. THE STOWAGE BOX IS NOW ABOVE THE SEAT AND HAS BEEN REDESIGNED. A STOWAGE BOX HAS BEEN ADDED WHERE THE 3 ROUND READY RACK WAS LOCATED.


COMMANDER'S SEAT
RECONFIGURED SEAT.
LOCKED DOWN
PLATFORM
A00039

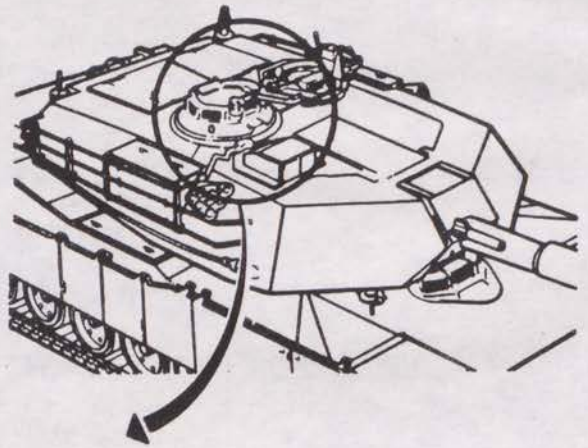
- THE COMMANDER'S SEAT FEATURES A RECONFIGURED SEAT. THE SEAT IS NARROWER TO COMPENSATE FOR THE INCREASED BREECH WIDTH AND RECOIL TRAVEL. THE BACK OF THE SEAT CAN BE LOCKED DOWN TO FACILITATE THE REMOVAL OF ROUNDS FROM THE SEMI AMMO READY RACK. THE PLATFORM WAS REDESIGNED TO ALLOW CLEARANCE AND EASE OF STOWAGE.

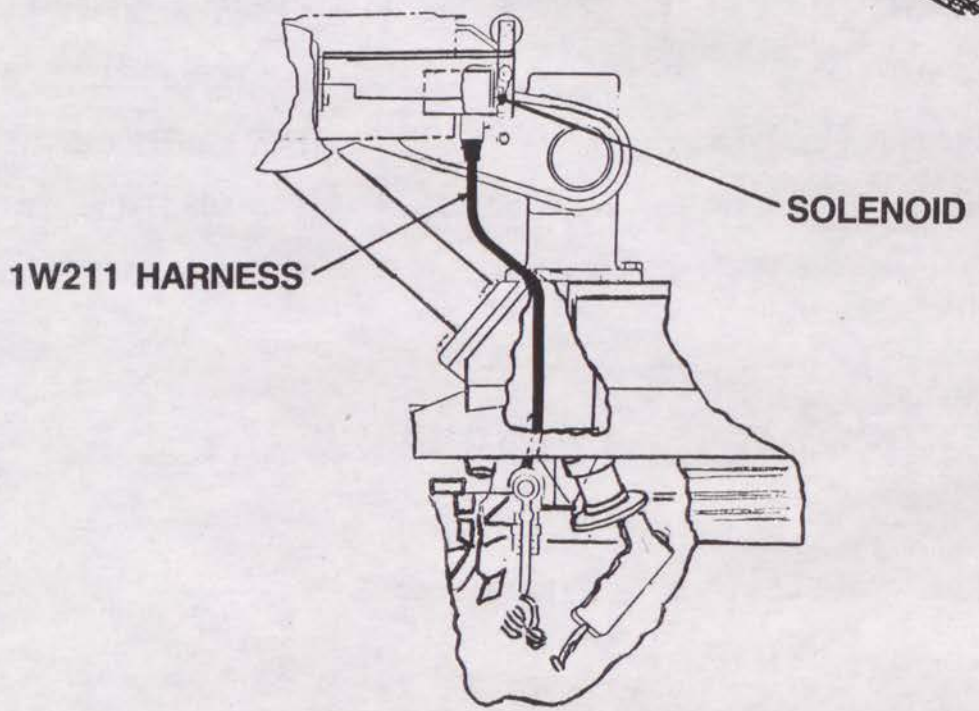
M1/IPM1/M1A1 COMPARISON

ELECTRICAL

ELEMENT	M1	IPM1	M1A1
• ELECTRICAL HARNESSES	STANDARD M1	M1	LENGTH CHANGED, HARNESS ADDED
• DRIVER'S INSTRUMENT PANEL		M1A1	UPGRADED
• DRIVER'S MASTER PANEL			UPGRADED
• TANK COMMANDER'S PANEL	STANDARD M1		MODIFIED FOR NBC CONTROLS
• LOADER'S PANEL		M1	MODIFIED
• HULL NETWORKS BOX			MODIFIED
• TURRET NETWORKS BOX			MODIFIED
• SLIP RING			MODIFIED FOR NBC

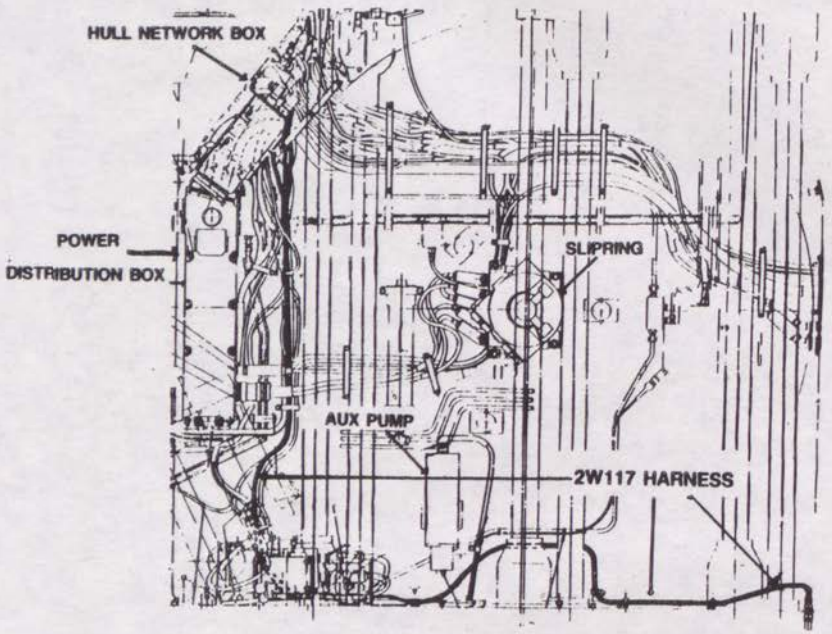
COMMANDERS WEAPON STATION HARNESS

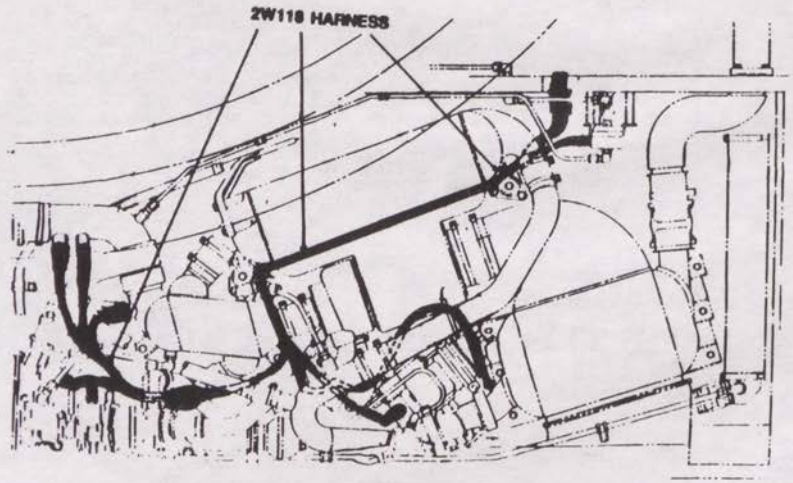




- THE 1W211 HARNESS HAS BEEN ADDED TO THE CWS FOR POWER TO THE ELECTRICAL SOLENOID FOR THE COMMANDER'S WEAPON.

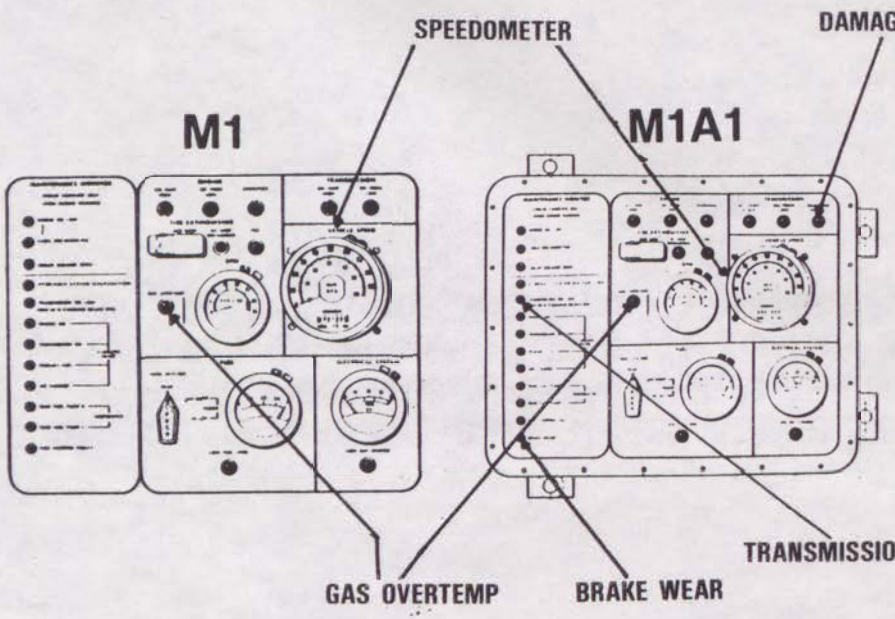
NBC HARNESS


HULL NETWORK BOX
POWER
DISTRIBUTION BOX
SLIPRING
AUX PUMP
2W117 HARNESS


2W118 HARNESS

- THE 2W117 AND 2W118 HAVE BEEN ADDED BECAUSE OF THE NBC SYSTEM. HARNESS 2W117 PROVIDES THE INTERFACE BETWEEN HULL ELECTRICAL AND THE NBC SYSTEM. THIS HARNESS CONNECTS TO THE J5 CONNECTOR ON THE HULL NETWORK BOX AND THE 2W105 AND 2W109. HARNESS 2W118 IS LOCATED IN THE LEFT NBC SPONSON COMPARTMENT.

DRIVER'S INSTRUMENT PANEL



- ADDED NEW INDICATOR LIGHT FOR NEW TRANSMISSION
- ADDED NEW SPEEDOMETER FOR NEW FINAL DRIVE
- THREE SPARE LIGHTS

DIP - ADDED/CHANGED CIRCUITRY FOR THE IMPROVED X1100-3B TRANSMISSION AND NEW FINAL DRIVE.

- ADDED DAMAGED INSPECT INDICATOR LIGHT. THIS LIGHT WILL COME ON AUTOMATICALLY WHEN BOTH PRIMARY AND SECONDARY FILTERS ARE CLOGGED. THIS ALERTS THE DRIVER THAT A TRANSMISSION FAILURE IS PENDING AND IMMEDIATE ACTION MUST BE TAKEN.

- ADDED NEW SPEEDOMETER BECAUSE OF THE CHANGE IN THE PLANETARY GEAR SET RATIO CHANGE. WITHOUT THIS CHANGE THE SPEEDOMETER WOULD READ 8% HIGHER THAN ACTUAL SPEED.

- ELIMINATED THE GAS OVERTEMP CIRCUITRY AND LIGHT, BECAUSE THE OVERTEMPERATURE LIGHT ON THE M1A1 MAY NOT INDICATE AN ACTUAL OVERTEMPERATURE CONDITION THERE ARE BUILT-IN ENGINE CONTROL SAFEGUARDS WHICH RENDER THE M1A1 ENGINE OVERTEMP LIGHT UNNECESSARY THIS LIGHT WILL BE MARKED SPARE ON EARLIER PRODUCTION DIP'S AND ELIMINATED LATER.

- DURING RAM-D I PROGRAM AND OTHER SUBSEQUENT TEST AT DDAD IT WAS DEMONSTRATED THAT THE BRAKE WEAR LIGHT WAS NEITHER COST EFFECTIVE OR TECHNICALLY ADVANTAGEOUS. THEREFORE, IT HAS BEEN DELETED SINCE THE M1A1 DIP ALREADY HAD THIS LIGHT AND WAS IN PRODUCTION FOR THE IPM1, IT WAS DECIDED TO MAKE THIS A SPARE AND TO ELIMINATE THE LIGHT LATER.

- ELIMINATED THE TRANSMISSION LOW OIL LIGHT. SINCE THE OIL LEVEL IS CHECKED DURING PMCS AND IF DURING OPERATION THE LOW OIL PRESSURE LIGHT COMES ON THE DRIVER WOULD STOP THE VEHICLE AND CHECK THE OIL LEVER. BECAUSE OF THIS THE LIGHT WAS CONSIDERED TO BE REDUNDANT. THE LIGHT WILL BE MARKED "NOT USED."

DRIVER'S INSTRUMENT PANEL

YEAR	VEH.	ENGINE	F/D	XMSN	OIL TUBE	SENSOR	HARNESS 3W104	HARNESS 3W104P	HARNESS ADAPTER	DIP CONF.	DIP *FUNCT.	DUAL CONF.
5TH EARLY	M1	M1	M1	M1	OLD/NEW	IN	X			M1	M1	X
LATE	M1	M1	M1A1	M1	OLD/NEW	IN	X			M1A1	(1)	X
LATE	IPM1	M1	M1A1	M1	OLD/NEW	IN	X			M1A1	(1)	X
6TH EARLY	IPM1	M1	M1A1	M1 (420)	OLD/NEW	IN	X			M1A1	(1)	X
LATE	IPM1	M1	M1A1	M1A1	NEW	OUT		X	X	M1A1	(2)	
LATE	M1A1	M1A1	M1A1	M1A1	NEW	OUT		X		M1A1	(2)	
7TH EARLY	M1A1	M1A1	M1A1	M1A1	NEW	OUT		X		M1A1	(2)	
LATE	M1A1	M1A1	M1A1	M1A1	NEW	OUT		X		M1A1	(2)	

*DIP FUNCTIONS:

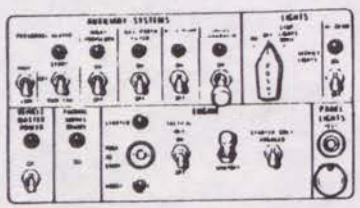
(1) FILTER BYPASS (RED) LIGHT DOES NOT FUNCTION. IF TRANSMISSION FILTER CLOGS, FILTER CLOG (AMBER) AND LOW OIL PRESSURE (RED) LIGHTS COME. (FILTER CLOG ACTION IS SAME AS OCCURS ON M1 TANKS WITH M1 DIP.)

(2) FILTER BYPASS (RED) LIGHT FUNCTIONS. FILTER CLOG (AMBER) LIGHT FUNCTIONS AND LOW OIL PRESSURE (RED) LIGHT IS NOT ACTIVATED UNLESS OIL PRESSURE ALSO DROPS.

- THIS CHART SHOWS THE CUT-IN DATES OF DRIVER'S INSTURMENT PANEL. AS YOU READ, LEFT TO RIGHT, THERE IS A MIX BETWEEN M1 AND M1A1 COMPONENTS. THE COLUMN UNDER DIP WILL TELL YOU THE DIP FUNCTION BY A NUMBERICAL ENTRY.

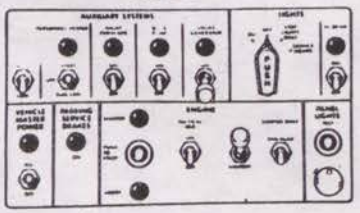
DRIVER'S MASTER PANEL

M1



A01854

M1A1



A01855

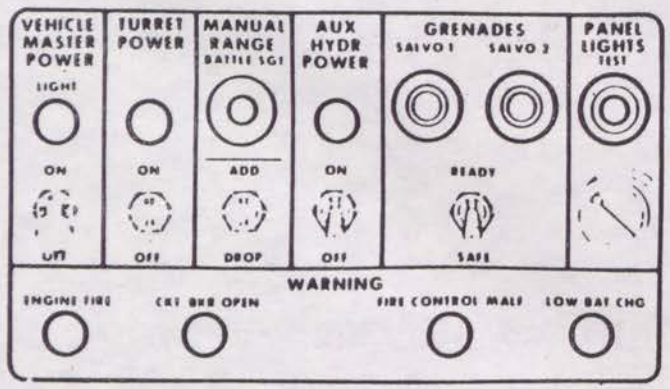
- CHANGED CIRCUITRY FOR THE IMPROVED NBC SYSTEM
- GAS PARTICULATE SWITCH AND INDICATOR LIGHT REMOVED

DMP - CHANGED CIRCUITRY TO ACCOMMODATE IMPROVED NBC SYSTEM.

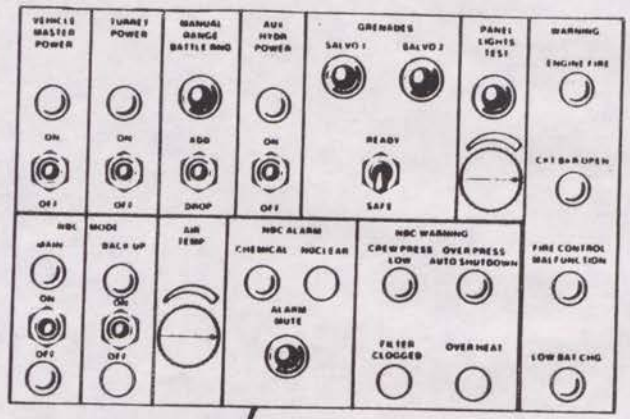
- GAS PARTICULATE SWITCH AND INDICATOR LIGHT REMOVED.

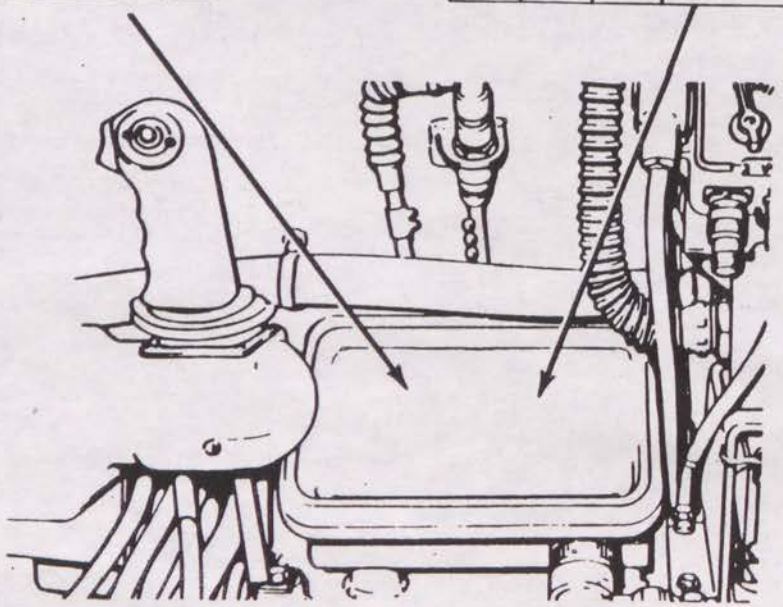
TANK COMMANDER'S PANEL

M1



M1A1

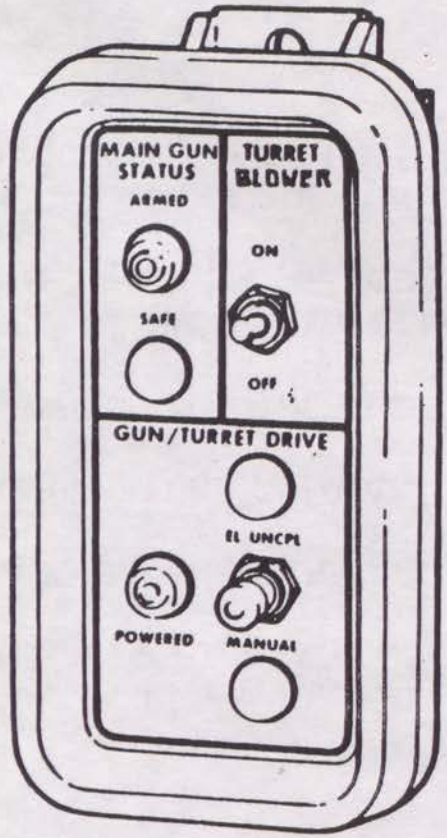




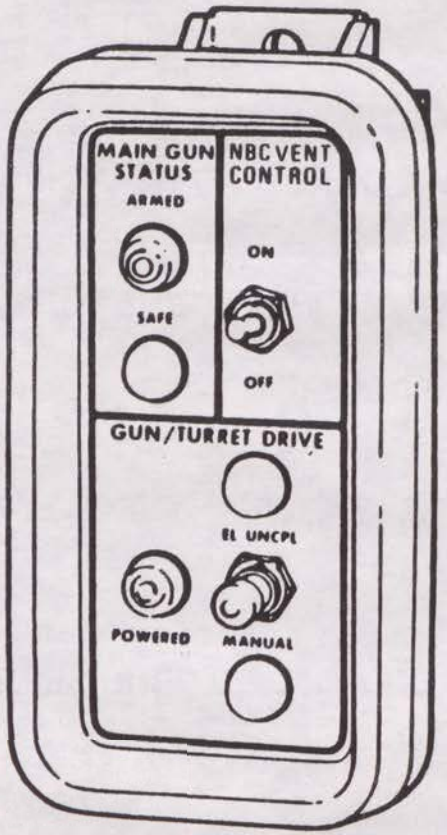
- THE COMMANDER'S CONTROL PANEL HAS BEEN REDESIGNED TO INCLUDE CONTROLS FOR THE NEW NBC SYSTEM.
- MAIN AND BACK-UP OPERATION MODE
- AIR TEMPERATURE CONTROL
- MUTE SWITCH FOR THE NBC ALARM
- THE NBC ALARM HAS WARNING LIGHTS IN ADDITION TO THE AUDIBLE SIGNAL TO INDICATE WHETHER THE ALARM WAS FROM A CHEMICAL OR NUCLEAR SOURCE.
- THE NBC WARNING PORTION OF THE PANEL HAS INDICATOR LIGHTS TO WARN OF LOW PRESSURE, OVER PRESSURE, CLOGGED FILTER AND OVERHEATING.

LOADER'S CONTROL PANEL

M1

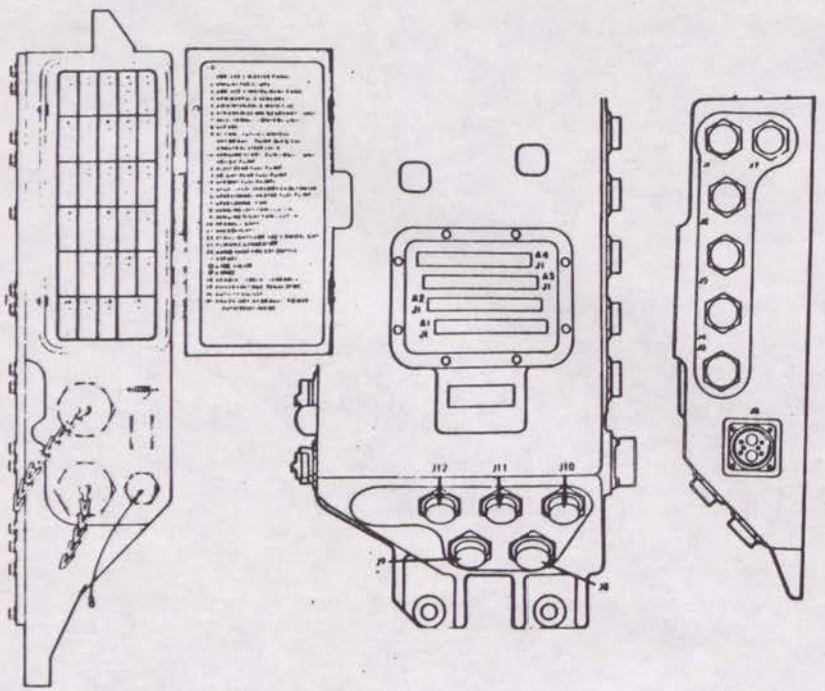


M1A1



- THE ONLY DIFFERENCE IS THAT THE M1A1 HAS NBC VENT CONTROL VERSUS A TURRET BLOWER SWITCH. THE NBC SYSTEM AUTOMATICALLY COMES ON WHEN THE ENGINE STARTS. NBC MAIN SYSTEM CAN BE TURNED ON USING NBC SWITCH ON THE PANEL, AT ANY TIME WHEN ENGINE IS RUNNING.

HULL NETWORK BOX
M1A1



LEFT SIDE

RIGHT SIDE

A01852

- CIRCUIT BREAKER NUMBER 26 CHANGED FROM CBR BLOWER TO NBC VALVES
- CIRCUIT BREAKER NUMBER 27 CHANGED FROM CBR HEATER TO SPARE
- RECEPTACLE J5 ADDED TO RIGHT SIDE OF HNB

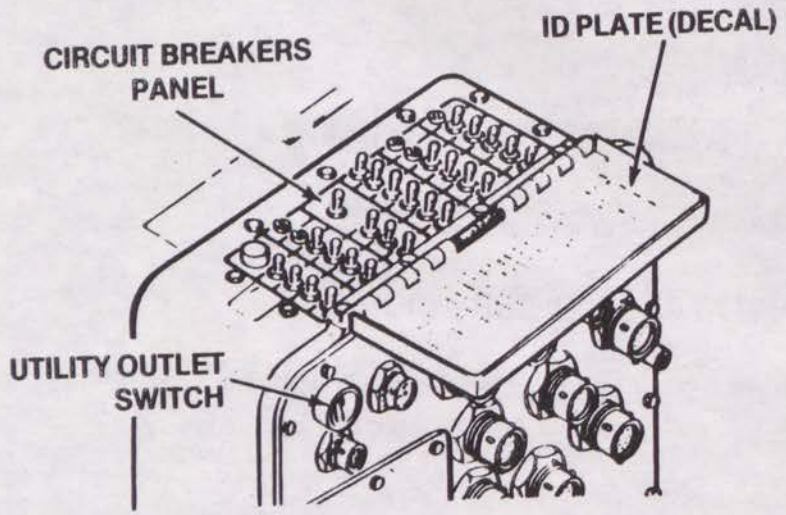
A01853

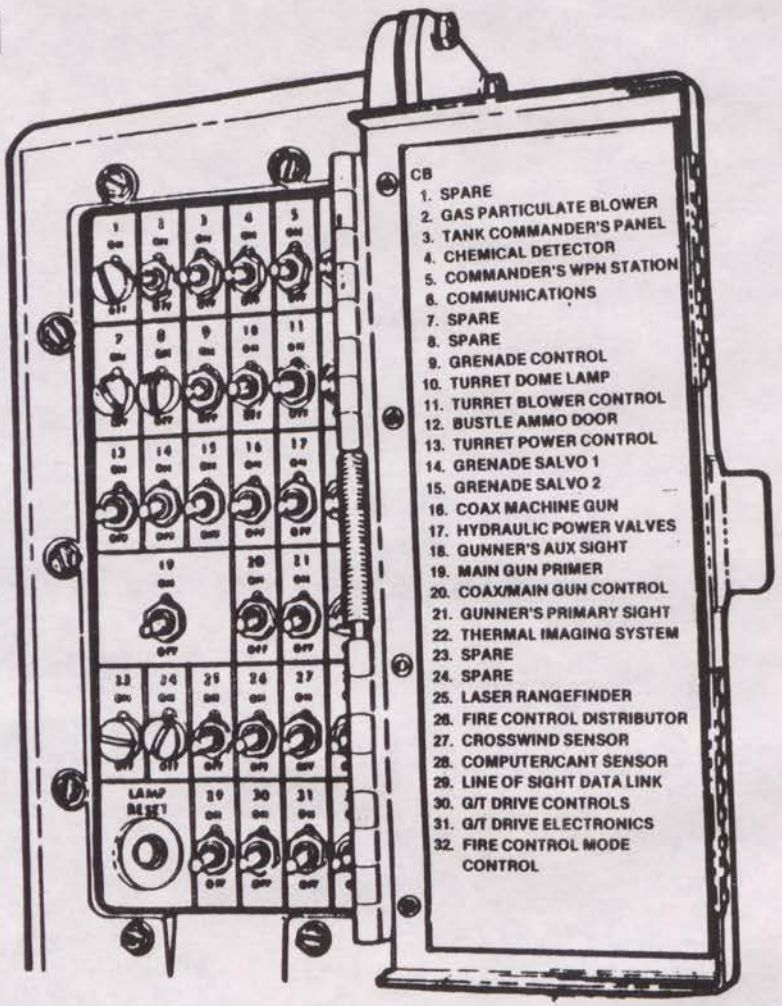
HNB - ADDED/CHANGED CIRCUITRY FOR THE IMPROVED NBC SYSTEM.

- CIRCUIT BREAKER 26 CHANGED FROM CBR BLOWER TO NBC VALVES.
- CIRCUIT BREAKER 27 CHANGED FROM CBR HEATER TO SPARE.
- RECEPTABLE J5 ADDED TO THE RIGHT OF THE HNB.

TURRET NETWORKS BOX

M1A1

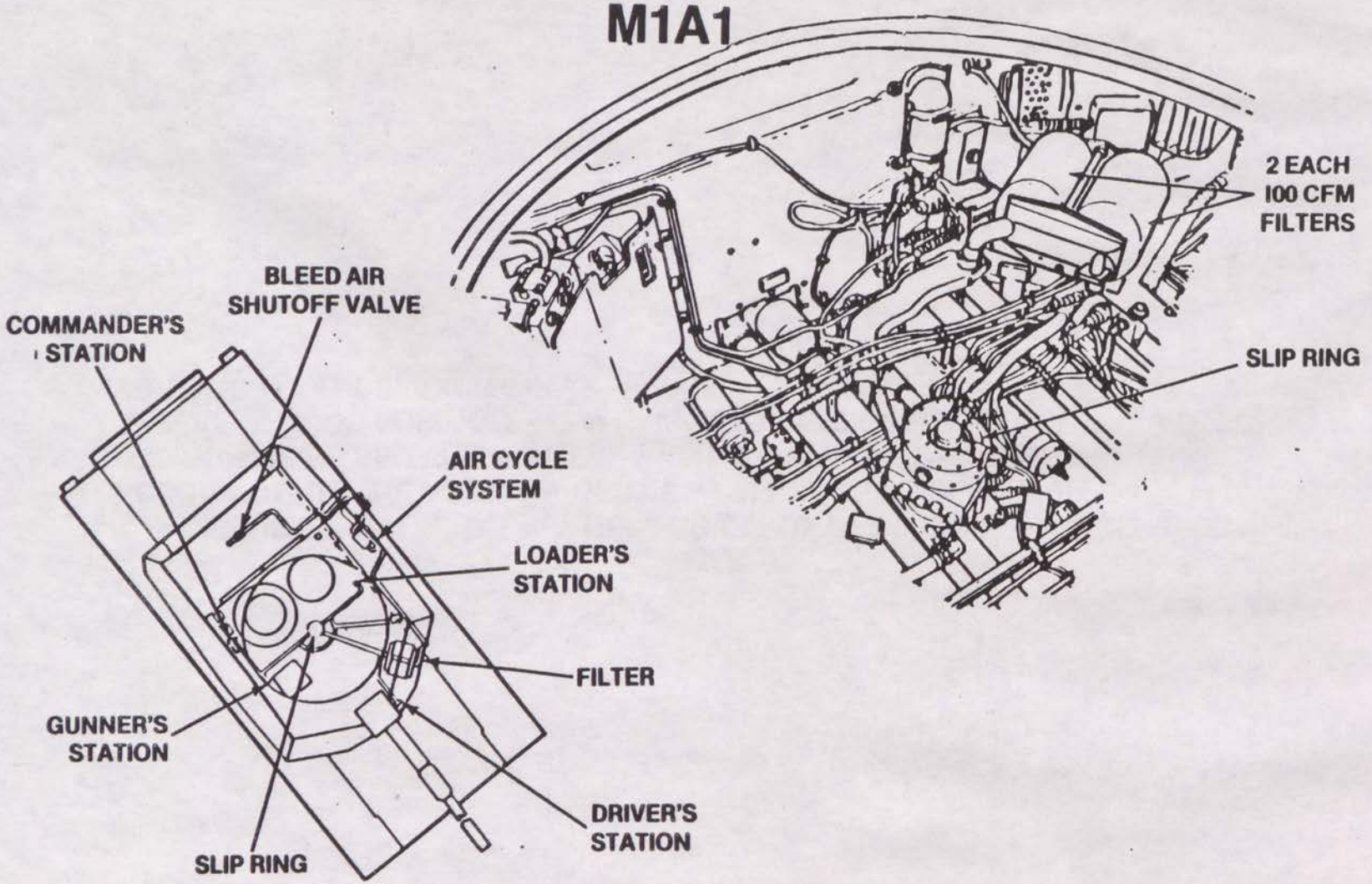




A02583

- THE CIRCUITRY OF THE TURRET NETWORKS BOX (TNB) HAS BEEN MODIFIED TO ACCOMMODATE THE ADDITION OF THE NEW NBC SYSTEM AND THE GTD/COMPUTER SELF TEST. THERE WAS NO OUTWARD CHANGES IN APPEARANCE OR POSITION. NEW CIRCUIT IDENTIFICATION DECAL WAS ADDED TO THE CIRCUIT BREAKER COVER.

SLIP RING
M1A1



- TWO 100 CFM FILTERS ARE LOCATED ON THE FORWARD BULKHEAD IN HULL AREA BEHIND AND TO THE LEFT OF THE DRIVER. 60 CFM OF AIR IS VENTED THROUGH A DUCT TO THE SLIPRING AND FROM THE TURRET SIDE OF THE SLIPRING TO EACH CREW MEMBERS STATION.

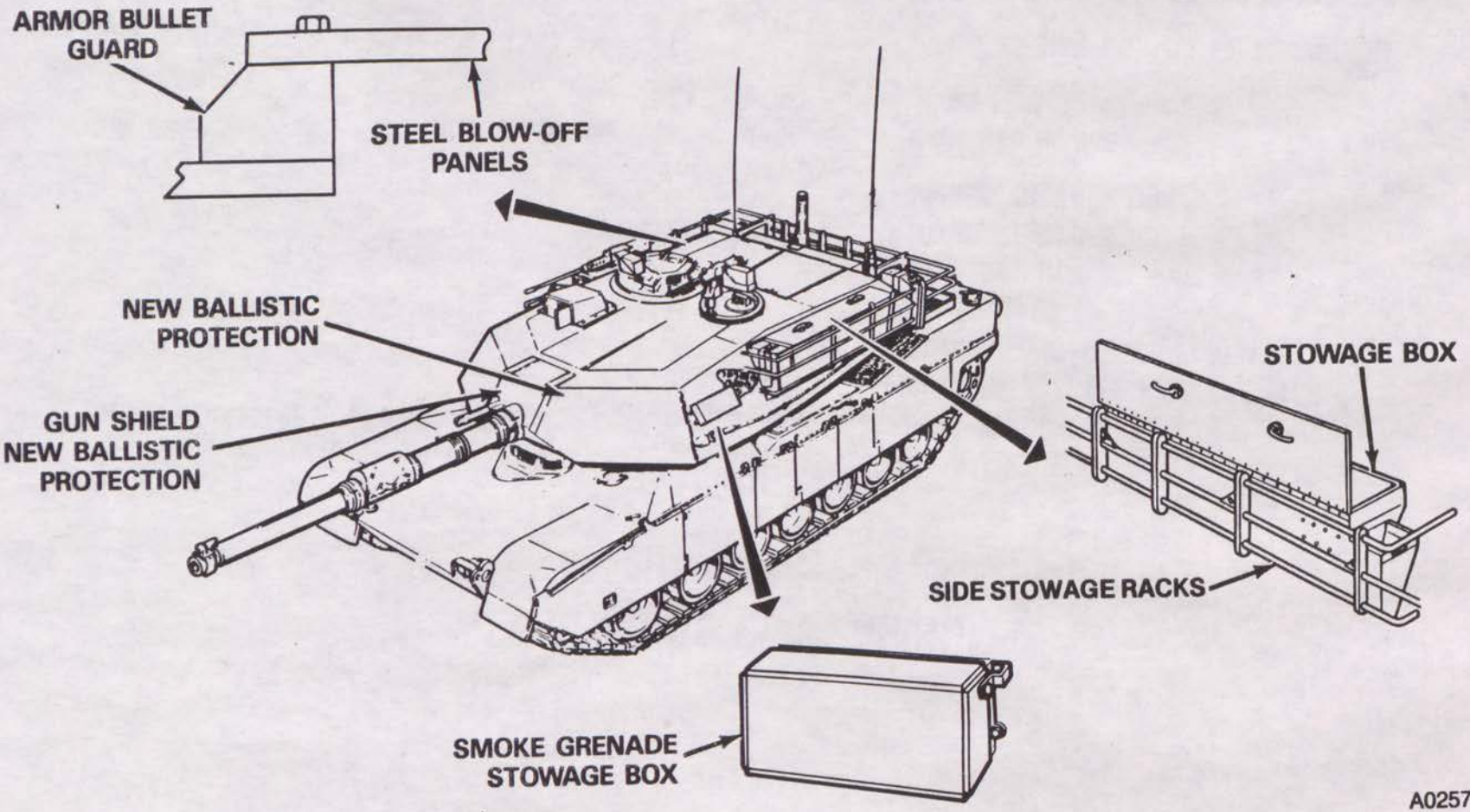
- THE SLIPRING WAS MODIFIED TO ACCOMMODATE NBC SYSTEM CHANGES.

M1/IPM1/M1A1 COMPARISON

STRUCTURE

ELEMENT	M1	IPM1	M1A1
• TURRET STRUCTURE	STANDARD M1	IMP. ARMOR, EXT. FRONT	– IPM1 STRUCTURE – BLOW-OFF PANELS RAISED 2 INCHES – REVISED BUSTLE COMPARTMENT FOR AMMO RACKS – STOWAGE BOX – STOWAGE RACKS – SMOKE GRENADE BOX
• GUN SHIELD	STANDARD 105MM	IMP. ARMOR, EXT. FRONT	– IPM1 STRUCTURE – 120MM HOLE
• HULL STRUCTURE	STANDARD M1	M1	ARMORED NBC BOX ON LEFT SPONSON
• AMMO RACKS	FIXED RACKS	M1	VIBRATION-ISOLATED RACKS

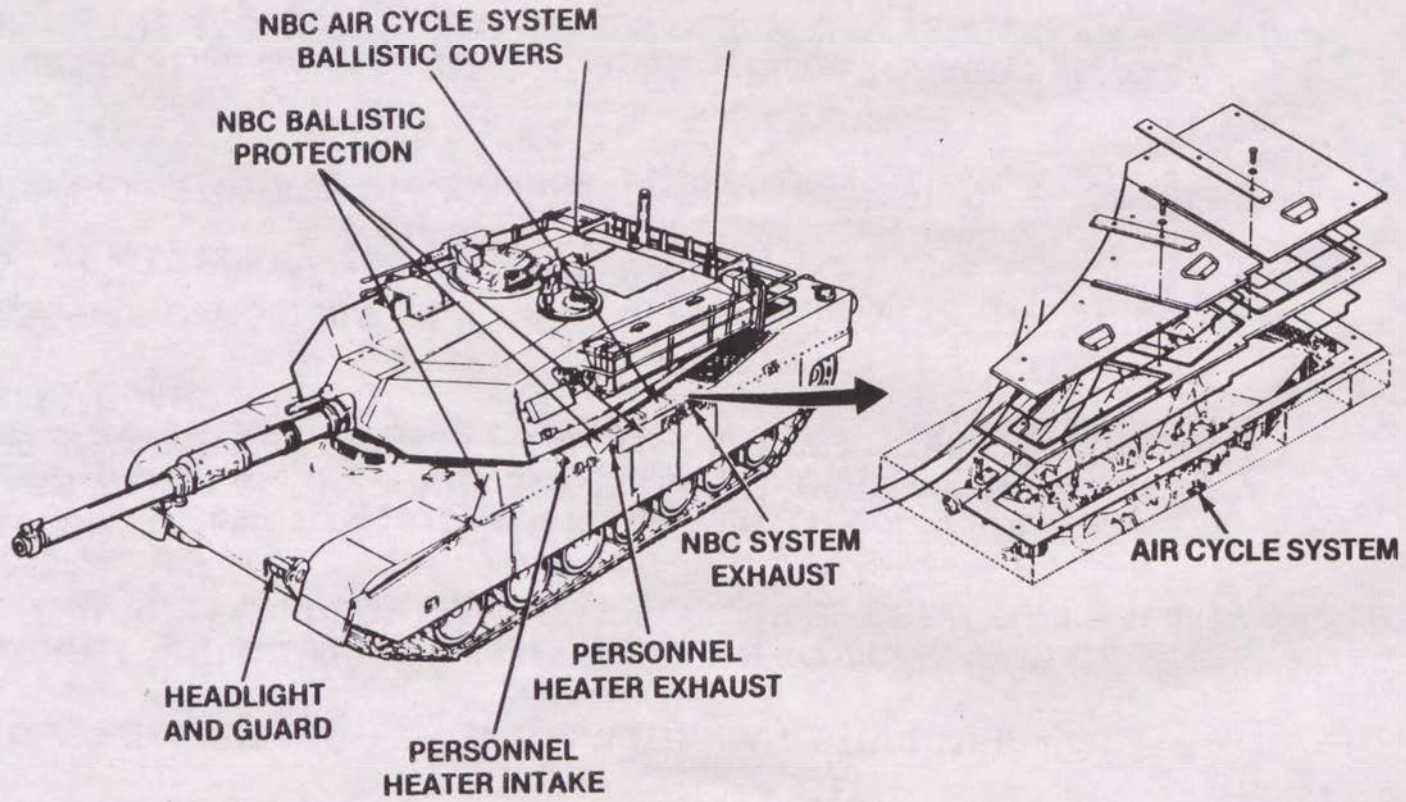
TURRET STRUCTURE/GUN SHIELD
M1A1



EXTERNAL FEATURE IMPROVEMENTS ON THE M1A1 TURRET STRUCTURE ARE:

- FRONT OF TURRET AND GUN SHIELD WERE MODIFIED TO ACCOMMODATE ADDITIONAL ARMOR. THIS ADDITIONAL ARMOR ENHANCES CREW SURVIVABILITY.
- THE BUSTLE COMPARTMENT HEIGHT WAS RAISED TWO INCHES. AN ARMOR BULLET GUARD WAS PLACED AROUND THE BLOW-OFF PANEL OPENING ON TOP OF THE TURRET AND STEEL BLOW-OFF PANELS WERE MOUNTED ON TOP OF THE ARMOR BULLET GUARD.
- THE STOWAGE RACKS NOW RUN ALL THE WAY TO THE REAR OF THE TURRET. THE END BUTTS UP AGAINST THE REAR BUSTLE RACK.
- A SMOKE GRENADE STOWAGE BOX HAS BEEN ADDED TO BOTH SIDES OF THE TURRET.
- WHEN THE NBC SYSTEM WAS PLACED IN THE LEFT OEM STORAGE SPONSON COMPARTMENT, THE STOWAGE BOXES WERE INCREASED IN LENGTH.

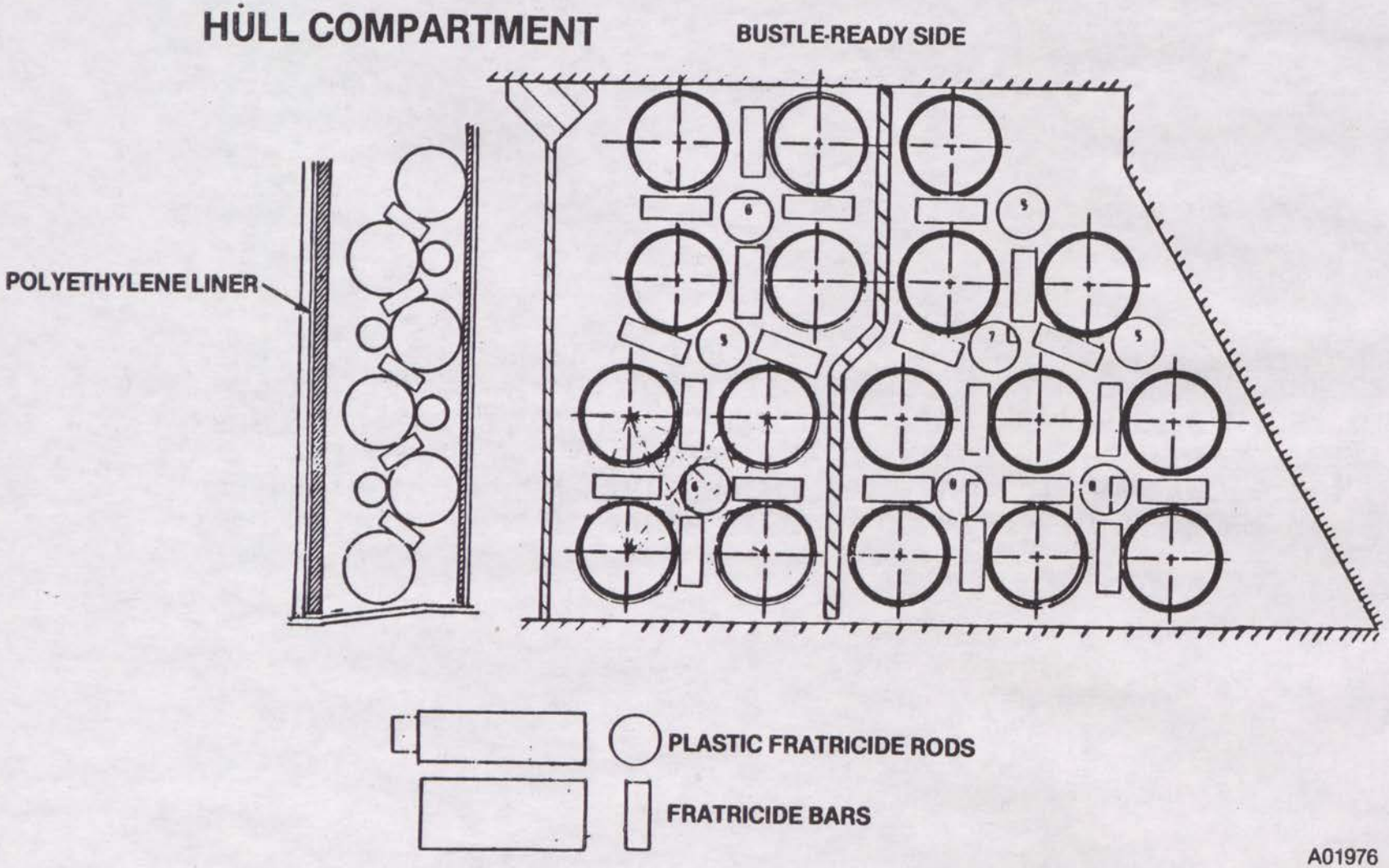
HULL STRUCTURE
M1A1



A02589

- THE ON VEHICLE EQUIPMENT (OVE) STORAGE COMPARTMENT HAS BEEN RESTRUCTURED TO HOUSE THE AIR CYCLE SYSTEM OF THE NBC PROTECTION SYSTEM. THE EASY WAY TO IDENTIFY THIS CHANGE IS BY THE THREE COVERS, PERSONNEL HEATER EXHAUST, AIR INTAKE AND THE NBC SYSTEM EXHAUST. THE HEADLIGHT GUARDS HAVE BEEN REDESIGNED TO ELIMINATE THE INTERFERENCE WITH THE 120MM BORE EVACUATOR.

AMMO RACKS
M1A1



- BOTH AMMO COMPARTMENTS HAVE ANTI-FRATRICIDE SYSTEMS INSTALLED. THIS SYSTEM CONSISTS OF PLASTIC RODS AND BARS POSITIONED TO ISOLATE EACH ROUND IN THE AMMO RACK. THE HULL COMPARTMENT ALSO HAS A POLYETHYLENE LINER. IN THE EVENT THAT ONE ROUND SHOULD DETONATE, THIS SYSTEM WOULD PREVENT A CHAIN REACTION TYPE EXPLOSION.

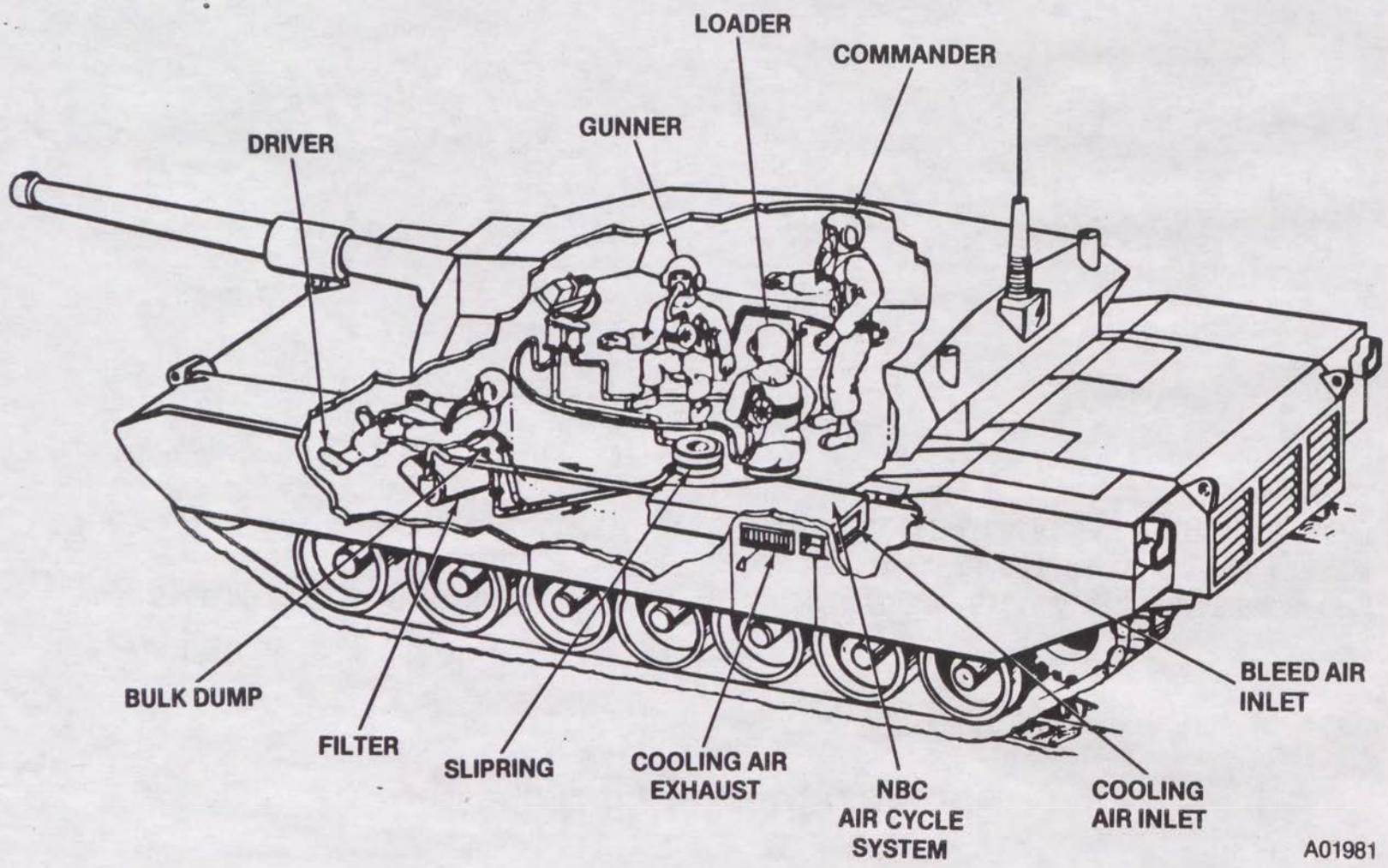
- THERE ARE SIX ROUNDS OF AMMO STORED IN THE HULL AMMO COMPARTMENT. ALL TUBES IN THE HULL COMPARTMENT ARE OF RIGID CONSTRUCTION. SWING TUBES ARE NOT EMPLOYED. ONE IMPROVEMENT TO THE HULL AMMO COMPARTMENT WAS THE ADDITION OF A DOOR HANDLE FOR OPENING AND CLOSING. THIS WILL ELIMINATE THE PROBLEM OF PINCHED FINGERS WHEN USING THE HULL STORED AMMO.

M1/IPM1/M1A1 COMPARISON

NBC

ELEMENT	M1	IPM1	M1A1
• NBC SYSTEM	M13A1 GAS PARTICULATE FILTER UNIT	M1	INTEGRATED NBC SYSTEM: OVER-PRESSURE CREW COMPARTMENT, MICRO-CLIMATE CONTROL (AIR VESTS FOR CREW, M13A1 GAS PARTICULATE FILTER UNIT)
• RACE RING SEAL	STANDARD M1	M1	ADDED SEAL
• CWS			ADDED SEAL
• VENT BLOWER			ELIMINATED
• HEATER			DUAL AIR SOURCE HEATER

NBC SYSTEM
M1A1

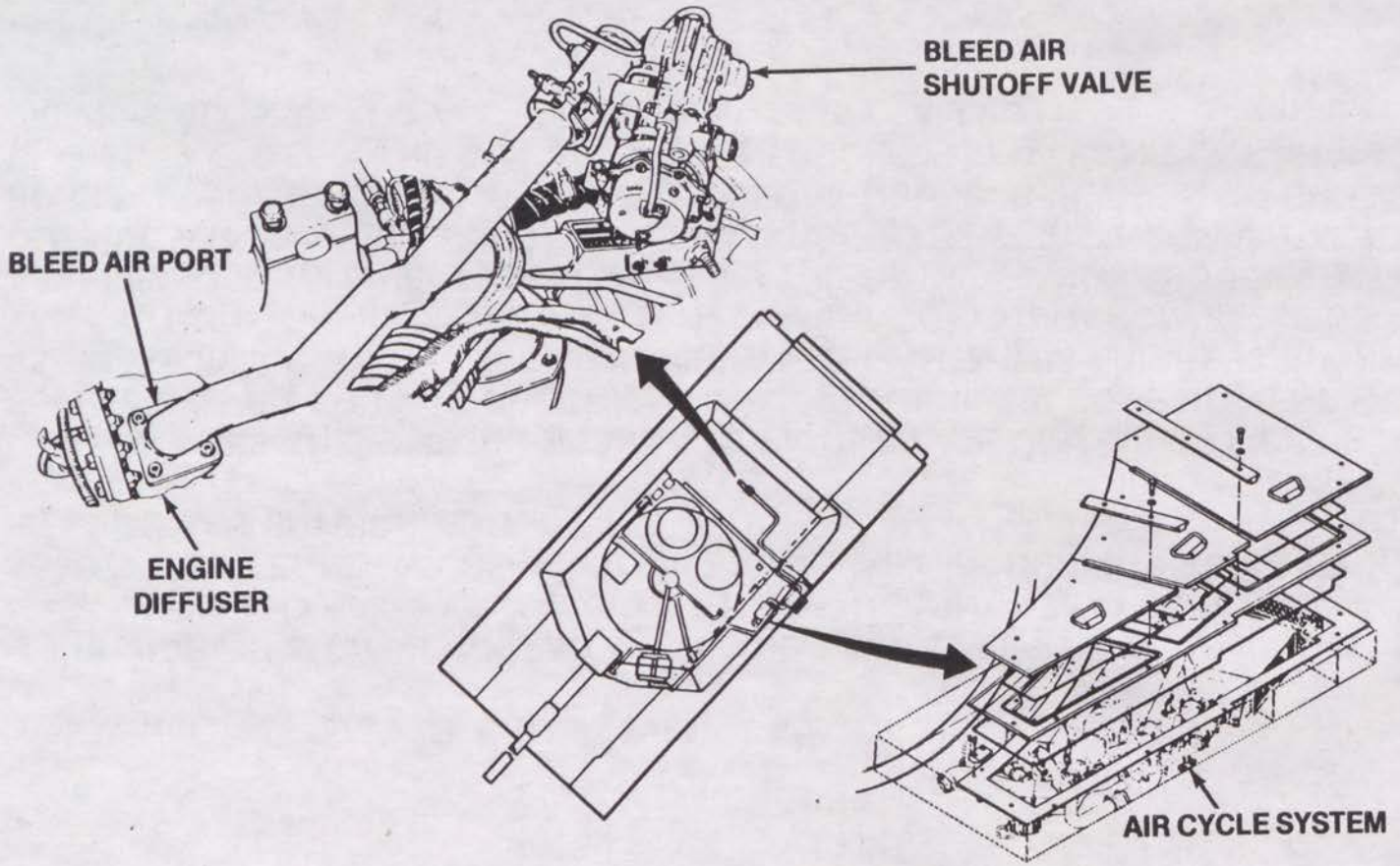


THE NEW NBC SYSTEM PERFORMS SEVERAL FUNCTIONS:

- IT PROVIDES THE CREW COMPARTMENT AND EACH CREW MEMBERS AN M25A1 MASK AND AIR COOLED VEST (ACV) WITH CLEAN, CONTAMINATED FREE, ADJUSTABLE TEMPERATURE AIR TO AID SURVIVABILITY DURING NBC OR HIGH HEAT STRESS ENVIRONMENT.

- IT INTEGRATES THE EXISTING M13A1 GAS PARTICULATE UNIT AS A BACK-UP AIR SUPPLY SYSTEM FOR EACH CREWMAN'S MASK. THE CREW COMPARTMENT WILL BE PRESSURIZED BY THE NBC MAIN AIR SYSTEM WHEN THE ENGINE IS RUNNING, THE SYSTIM IS ON, AND THE TANK IS IN COMBAT CONFIGURATION. THIS POSITIVE AIR PRESSURE WILL VENT GUN SMOKE TO THE OUTSIDE AND ALSO PREVENT OUTSIDE AIR FROM ENTERING. PRESSURIZATION OF THE CREW COMPARTMENT IS POSSIBLE WHEN ALL HATCHES ARE CLOSED, A ROUND IS IN THE MAIN GUN, BREECH IS CLOSED, THE COAXIAL MACHINEGUN IS INSTALLED, FRONT DRAIN VALVE IS CLOSED, AND ALL PERISCOPES ARE INSTALLED.

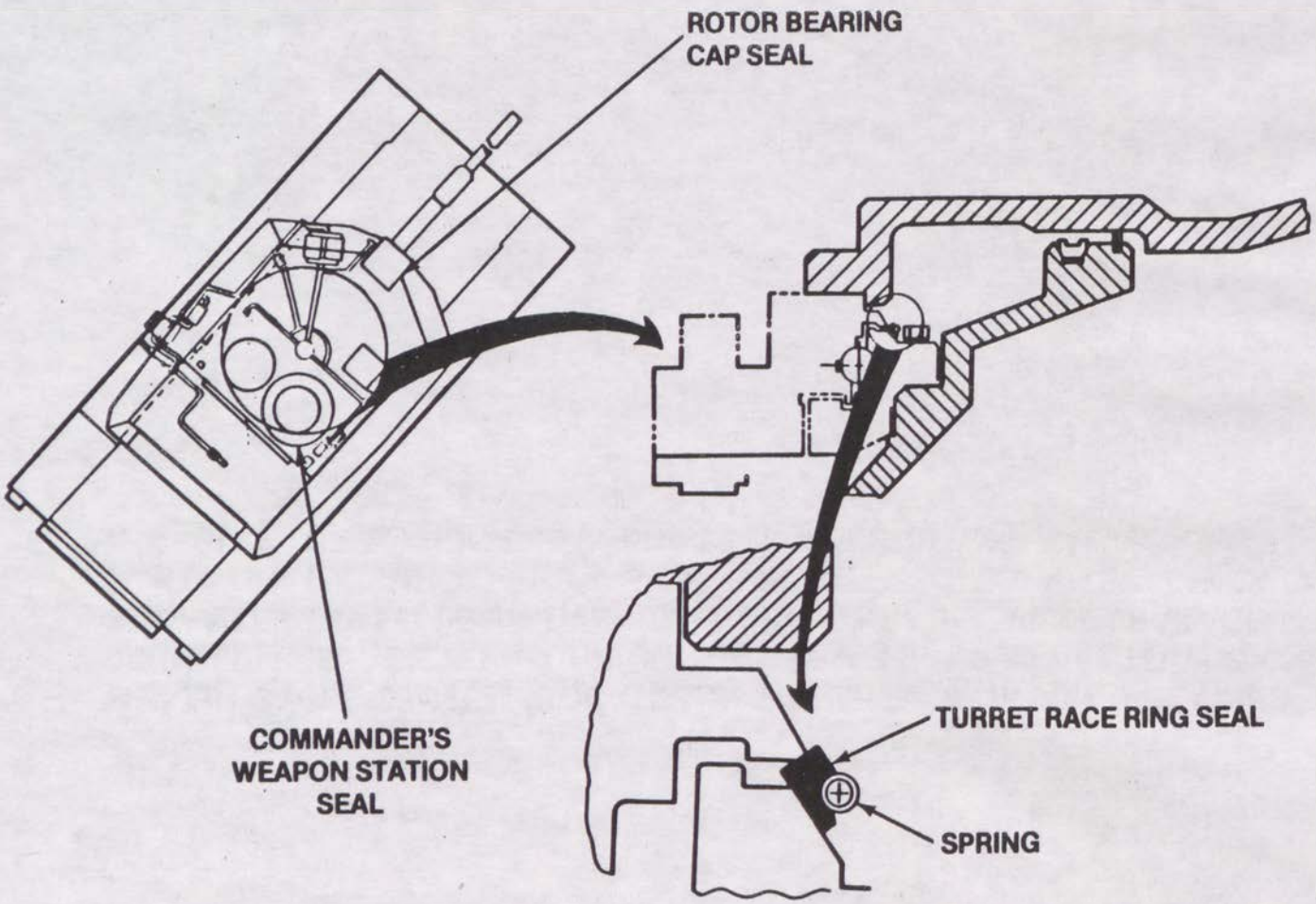
BLEED AIR SHUTOFF VALVE



A02590

- THE AIR CYCLE SYSTEM, LOCATED IN THE LEFT SPONSON, PROVIDES DEHUMIDIFIED, TEMPERATURE CONTROLLED, FILTERED AIR TO THE CREW COMPARTMENT FOR POSITIVE PRESSURIZATION (PREVENT LEAKAGE OF CONTAMINATED AIR TO THE INSIDE). THE AIR CYCLE SYSTEM TAKES COMPRESSED AIR FROM THE ENGINE DIFFUSER/BLEED AIR SHUTOFF VALVE.

RACE RING SEAL/CWS
M1A1

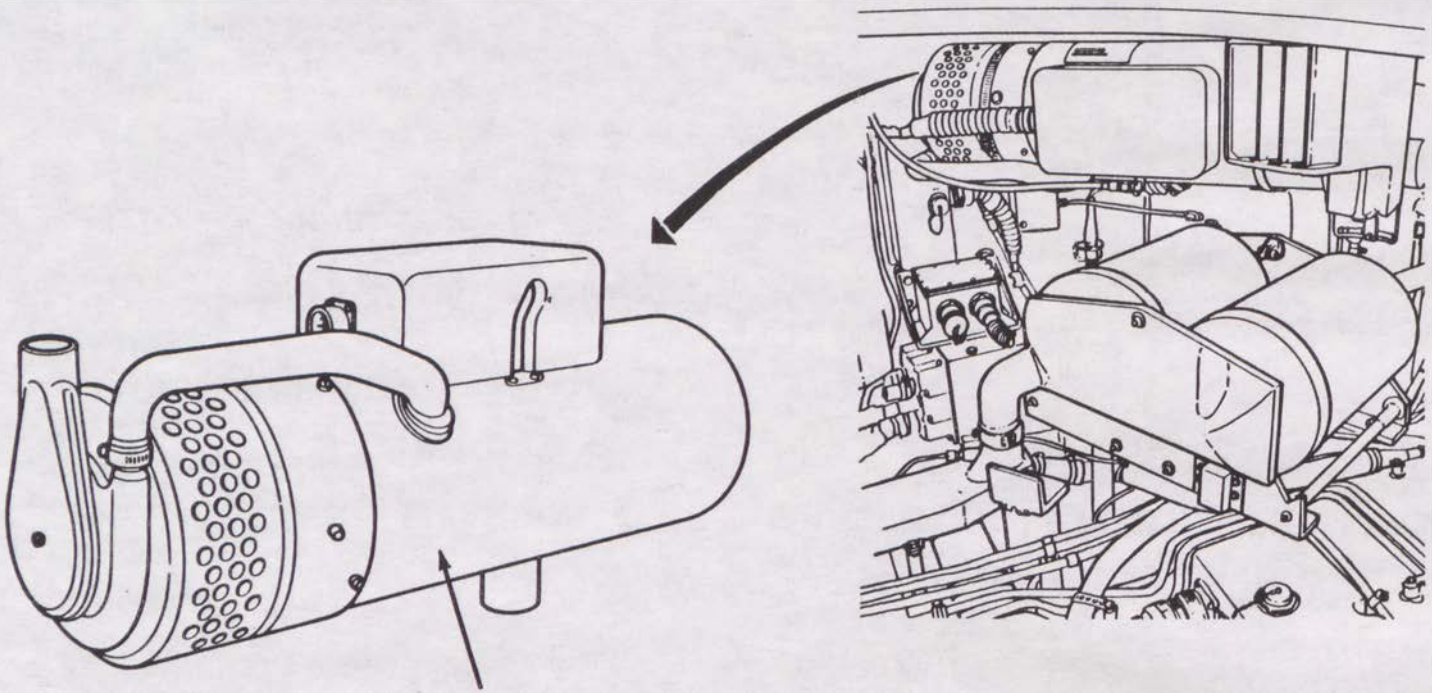


A01984

THREE SEALS HAVE BEEN ADDED TO THE TURRET TO INSURE POSITIVE PRESSURIZATION OF THE CREW AREA.

- RACE RING SEAL
- COMMANDER'S WEAPON STATION SEAL
- ROTOR BEARING CAP SEAL

HEATER
M1A1



DUAL AIR SOURCE HEATER

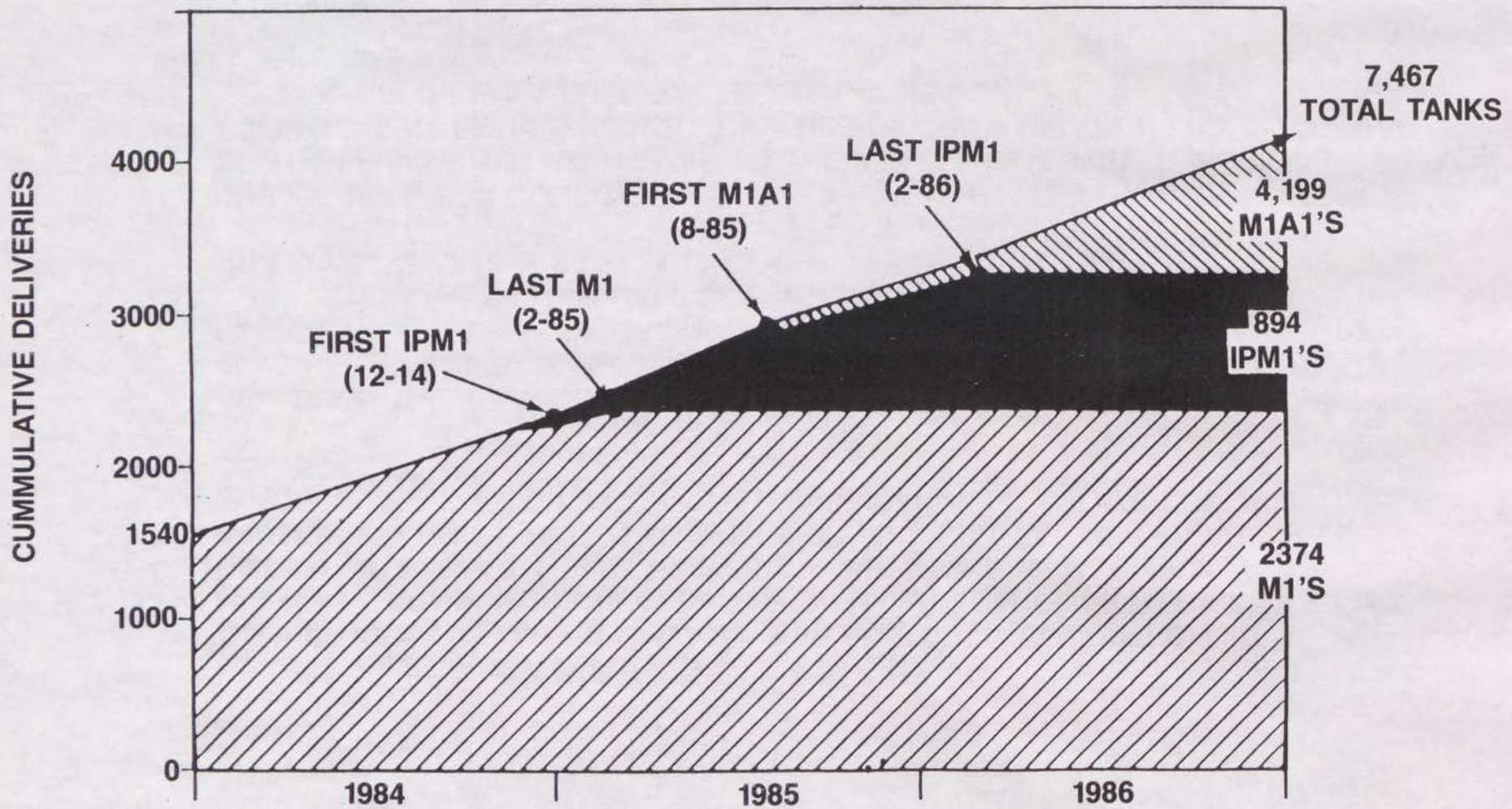
A01986

- THE NEW DUAL AIR SOURCE HEATER ARE ELECTRICALLY CONTROLLED MULTIFUEL COMBUSTION HEATER. THE DUAL AIR SOURCE HEATER HAS A RATED OUTPUT OF 60,000 BTU. THE HEATER CONSISTS OF A HEATED WICK IGNITION SYSTEM, TWO-FAN BLOWER, BURNER, HEAT EXCHANGER AND FUEL CONTROL VALVE WHICH INCORPORATES "HI" AND "LO" HEATER OUTPUT CONTROL.

- ALTHOUGH THE VENTILATING AIR BLOWERS AND COMBUSTION AIR BLOWERS ARE POWERED BY THE SAME MOTOR, THERE ARE INDIVIDUAL INLETS AND OUTLETS FOR EACH BLOWER SYSTEM. SINCE THE VENTILATING AIR SYSTEMS AND THE COMBUSTION AIR SYSTEMS ARE NOT INTERCONNECTED, CREW COMPARTMENT NBC PRESSURIZATION CANNOT LEAK OUT THE HEATER EXHAUST.

- THE AIR NEED FOR COMBUSTION IS PIPED TO THE HEATER FROM THE EXTERIOR OF THE VEHICLE AND EXHAUSTED TO THE VEHICLE EXTERIOR. THE CREW COMPARTMENT IS THEN HEATED AND FREE OF CONTAMINATION FROM INCOMING OUTSIDE AIR OR EXHAUST ODORS FROM THE HEATER.

ABRAMS TANK PRODUCTION



- THIS CHART PROVIDES THE DELIVERY SCHEDULE AND NUMBER OF ABRAMS VEHICLES.

M1/IPM1/M1A1 TECHNICAL CHARACTERISTICS SUMMARY

TECHNICAL CHARACTERISTICS SUMMARY

Physical Characteristics	M1	IPM1	M1A1
Weight, Combat Loaded (less kits)	60 Tons	61	63 Tons
Ground Clearance (center portion of hull structure)	19	NC	NC
Ground Clearance (other portion of hull structure)	17	NC	NC
Height (ground to turret roof)	93.5 in.	M1	96.00 in.
Maximum Vehicle Height (overall)	113.6 in.	NC	NC
Maximum Vehicle Height (reducible overall)	103.5 in.	NC	NC
Length (overall main weapon forward)	384.94 in.	M1	386.94 in.
Length (overall main weapon rearward)	353.2 in.	M1	355.64 in.
Width (overall)	143.75 ± .54	M1	144 in.
Width (reducible)	136 in.	M1	137 in.
Vehicle Center of Gravity			
(X) Longitudinal (forward of final drive centerline)	124.00 in.	125.5 in.	126.01 in.
(Y) Lateral (positive, right of vehicle centerline)	1.84 in.	1.8 in.	1.82 in.
(Z) Vertical (above ground line)	52.23 in.	52.1 in.	53.04 in.
Vehicle Frontal Area	75.9 ft.^{2}	M1A1	78 ft.^{2}
Vehicle Side Area	162 ft.^{2}	M1A1	164 ft.^{2}
Vehicle Top area	311 ft.^{2}	M1A1	321 ft.^{2}

NC = No Change

TECHNICAL CHARACTERISTICS SUMMARY

Performance	M1	IPM1	M1A1
Gross Horse-to-Weight Ratio (combat loaded tank)	25 hp/ton	24.6 hp/ton	23.8 hp/ton*
Maximum Forward Speed (paved level surface)	45 mph	41.5 mph	41.5 mph*
Sustained Speed (60 percent grade)	4.5 mph	4.3 mph	4.1 mph*
Cross-Country Speed	up to 30 mph	NC	NC
Acceleration Forward Direction (from 0 to 20 mph, dry level surface)	7.0 sec.	M1	7.2 sec.*
Range (constant speed of 29 mph on dry and level paved roads, without refueling)	310 Miles	295 Miles	289 Miles*
Fording Depth			
• Without kit	48 in.	NC	NC
• With kit	Turret Roof (including bow wave)	NC	NC
Braking			
• Deceleration from speeds between 30 mph to maximum speeds on dry and level hard surface	14 ft/sec.^{2}	M1	13 ft/sec.^{2}
• Deviation from straight line path (equal to or less than)	6 ft. in 50 ft.	NC	NC
Obstacles			
• Vertical step (forward direction)	42 in.	NC	NC
• Trench crossing (forward direction)	9 ft. width	M1	NC

*NBC OFF
NC = No Change

TECHNICAL CHARACTERISTICS SUMMARY

Engine	M1	IPM1	M1A1
Type (two spool gasifier/free-shaft power turbine with recuperator)	AGT-1500	NC	NC
Gross Horsepower	1500 hp at 3000 rpm	NC	NC*
Gross Torque	2626 lb ft at 3000 rpm	NC	NC*
Maximum Torque	3940 lb ft at 1500 rpm	M1A1	3940 lb ft at 1500
Engine Output Speed at Maximum Tank Speed	3100 rpm	NC	NC
Fuel Capacity (usable)	495 gals	NC	NC
Oil Capacity (including oil cooler and lines)	6.25 gals	M1	6.25 gals
Transmission			
Type (hydrokinetic-fully automatic)	X1100-3B	NC	NC
Torque Converter (TC-897)	3 Element	NC	NC
Transmission Ranges	4 Forward and 2 Reverse	NC	NC
Steering (integral steer/trottle T-Bar control)	Hydrostatic	NC	NC
Turning Radius	Pivot to Infinitely Variable	NC	NC
Braking (two independent systems)	Hydraulic and Mechanical	NC	NC
Oil Capacity (including oil coolers and lines)	45 gals	NC	NC
Final Drive			
Type	Coaxial Planetary Gear Drive	NC	NC
Gear Reduction Ratio (final drive input to sprocket drive output)	4.30 to 1	M1A1	4.67 to 1

*NBC OFF
NC = No Change

TECHNICAL CHARACTERISTICS SUMMARY

Suspension	M1	IPM1	M1A1
Type	Hydro-Mechanical	NC	NC
Roadwheel Stations	7 per side	NC	NC
Torsion Bars	7 per side	NC	NC
Shock Absorbers (modular rotary)	3 per side	NC	NC
Track	Double Pin-Rubber	NC	NC
Electrical System			
Electrical Power (6 batteries, 12 volts)	24 vdc	NC	NC
Electrical Capacity (battery only)	300 amp hours	NC	NC
Alternator (charging system)	650 amp	NC	NC
Voltage Regulator	Solid State	NC	NC
Communications			
Intercom	AN/VIC-1	NC	NC
Radio Set	AN/VRC-12 or -64	NC	NC
Security System	T-SEC/KY-57 (2 units per vechicle)	NC	NC

NC = No Change

TECHNICAL CHARACTERISTICS SUMMARY

Turret	M1	IPM1	M1A1
Main Gun/Coaxial Weapon			
• Elevation limit-forward (110 degrees right and left of tank centerline)	-10 deg to +20 deg	NC	NC
• Elevation limit-rearward (70 degrees right and left of tank centerline)	0 deg to +20 deg	NC	NC
• Traverse capability (in either direction)	360 deg	NC	NC
• Elevation tracking rate (powered)	0.25 mils/sec to 25 mils/sec	NC	NC
• Elevation tracking rate (manual)	8 mils/crank rev	M1	5 mils/crank rev
• Traverse tracking rate (powered)	0.25 mils/sec to 75 mils/sec	NC	NC
• Traverse tracking rate (manual-two speed)	10 mils/crank rev	M1	5-10 mils/crank rev
• Elevation maximum slew rate (control handles)	400 mils/sec	NC	NC
• Elevation maximum slew rate (stabilization commands)	750 mils/sec	NC	NC
• Traverse maximum slew rate (control handles and stabilization commands)	750 mils/sec	NC	NC
• Traverse tracking rate (silent watch control)	up to 30 mils/sec	NC	NC
• Elevation tracking rate (silent watch control)	up to 16 mils/sec	NC	NC
• Slew rates for 1500 mil duration (silent watch control)	up to 300 mils/sec	NC	NC

NC = No Change

TECHNICAL CHARACTERISTICS SUMMARY

Armament	M1	IPM1	M1A1
Main Weapon	105mm, M68E1	M68A1	120mm, XM256
Coaxial Machinegun	7.62mm, M240	NC	NC
Commander's Machinegun	.50 cal. M2	NC	NC
Commander's Alternate Machinegun	7.62mm, M240	NC	NC
Loader's Machinegun	7.62mm, M240	NC	NC
Rifle	5.56mm, M16A1	NC	NC
Smoke Grenade Launcher	M250	NC	NC
Ammunition Stowage			
Main Weapon (120mm)	55 rounds	M1	40 rounds
Coaxial Machinegun (7.62mm)	10,000 rounds	NC	NC
Commander's Machinegun (.50 cal)	1,000 rounds	NC	NC
Loader's Machinegun (7.62mm)	1,400 rounds	NC	NC
Crew Weapon (5.56mm, rifle)	210 rounds	NC	NC
Hand Grenades (M67)	8 rounds	NC	NC
Grenades (M250, smoke grenade launcher)	24 rounds	NC	NC

NC = No Change

TECHNICAL CHARACTERISTICS SUMMARY

Fire Control and Surveillance	M1	IPM1	M1A1
Gunner's Primary Sight (GPS)			
• Dual optics (narrow field of view)	6.2° at 9.8X	M1	6.0° at 9.5X
• Dual day optics (wide field of view)	17° at 3X	M1	16° at 3X
• Close-in surveillance (unity field of view)	18° at 1X	NC	NC
• Night vision optics (narrow field of view)	2.58° by 5° at 9.8X	M1	4.9° at 9.8X
• Night vision optics (wide field of view)	8.6° by 16.67° at 3X	M1	15.0° at 3X
• Sight stabilization	Elevation	NC	NC
• Laser rangefinder ranging capability	200 to 7,990 meters	NC	NC
Gunner's Auxiliary Sight	8° at 8X	NC	NC
Emergency Firing Device	Standard M60A2-Type	NC	NC
Ballistic Computer	Digital Self-Checking	NC	NC
Gun/Turret Drive and Stabilization	Elevation and Azimuth	NC	NC
Commander's Primary Weapon Sight	Optical Extension of GPS	NC	NC
Commander's Weapon Sight	21° at 3X	NC	NC
Commander's Day Vision Periscope	6 per tank, 360° at 1X	NC	NC
Loader's Day Vision Periscope	360° at 1X	NC	NC
Driver's Day Vision Periscopes	3 per tank, 120° at 1X	NC	NC
Driver's Night Vision Periscope (image intensifier)	35° by 45° at 1X	NC	NC

NC = No Change

TECHNICAL CHARACTERISTICS SUMMARY

	M1	IPM1	M1A1
Commander's Weapon			
Elevation limit	-10 deg to +65 deg	NC	NC
Traverse capability (in either direction)	360 deg	NC	NC
Traverse tracking rate (powered)	Varriable up to 400 mils/sec	NC	NC
Traverse tracking rate (manual)	178 mils/sec	NC	NC
Elevation tracking rate (manual)	110 mils/sec	NC	NC
Loader's Weapon			
Elevation limit (skate mounted on turret roof)	-35 deg to +65 deg	NC	NC
Firepower coverage (loader's sector of responsibility to left of turret)	265 deg	NC	NC