

GENERAL DATA

	M109A2/A3/A4/A5	M109A6
Alternative Designations	N/A	Paladin
Country of Origin	USA	
Role	Armored combat fire support vehicle	
Date Of Introduction	1963, original M109	1993
Crew	6 (chief of section, driver, two cannoneers, gunner, assistant gunner)	4 (chief of section, driver, cannoneer, gunner)
Combat Weight	27.5 tons (24.95 mt)	31.8 tons (28.849 mt)
Ground Pressure	?	
Length, Overall	29.92 ft (9.12 m), M109A5: 30.08 ft (9.17 m)	32.17 ft (9.8 m)
Width, Overall	10.33 (3.15 m)	10.33 ft (3.15 m)
Height, Overall	10.76 ft (3.28 m)	10.62 ft (3.24 m)
Ground Clearance	18 in (457 mm)	

PERFORMANCE

	M109A2/A3/A4/A5	M109A6
Engine	405 or 440 hp (302 or 328 kw) 8V71T turbocharged diesel	440 hp (328 kw) 8V71T turbocharged diesel
Range	217 miles (349 km)	186 miles (299 km)

Fuel Capacity	135 gal (511 l) - diesel	133 gal (503 l) - diesel	
Road Speed	35 mph (56 km/h)	38 mph (61 km/h)	
Cross Country Speed	12 mph (20 km/h)	17 mph (28 km/h)	
Swim Speed	N/A		
Fording Depth	3.5 ft (1.07 m)		
Grade	60%		
Trench Crossing	6 ft (1.83 m)		
Vertical Wall Climb	1.75 ft (0.53 m)		
Emplacement/Displacement Time	?	3/2 minutes	
PROTECTION			
	M109/A2/A3/A4/A5	M109A6	
Armor	?	Adds composite spall liners and supplemental armor	
Applique Armor	N/A		
Explosive Reactive Armor	N/A		
Active Protective System	N/A		
NBC Protection System	On M109A4/A5/A6		
Smoke Equipment	N/A		
ARMAMENT			
	Type	Mount	Typical Ammo Load
M109	155mm M126 cannon	Turret - M127 mount; double baffle muzzle brake	28
M109A1	155mm M126E1/M126A1 cannon	Turret - double baffle muzzle brake	28
M109A2/A3/A4	155mm M185 cannon	Turret - M178 mount; double baffle muzzle brake	34
M109A5	155mm, 39 caliber barrel	Turret - M182 mount; double	34

M109A6	155mm, 39 caliber barrel length, M284 cannon	Turret - M182A1 mount; double baffle muzzle brake; advanced bore evacuator	39
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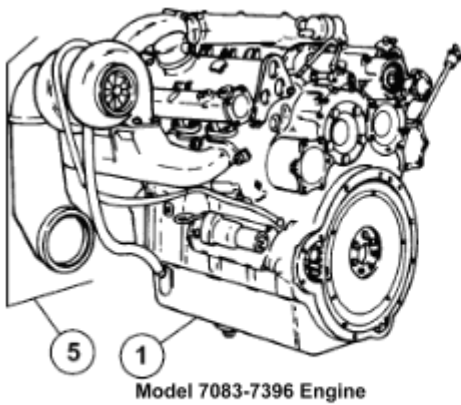
NOTES

The M109-series medium, self-propelled howitzer is a full-tracked, armored combat support, internally loaded, air transportable, vehicle powered by an eight cylinder, diesel engine. The system is capable of both direct (line of sight) and indirect (out of the line of sight) firing.

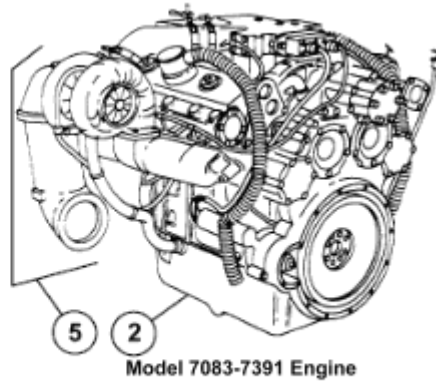
The hull and cab assemblies protect the crew and equipment against small arms fire. The vehicle is divided into three sections: driver's compartment, engine compartment, and fighting compartment.

The [M992 Field Artillery Ammunition Support Vehicle \(FAASV\)](#) is the companion vehicle to the M109 howitzer. It serves as an area from which to service the weapon as well as a storage area for ammunition.

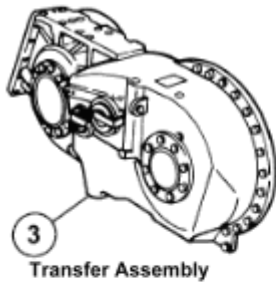
POWERPLANT



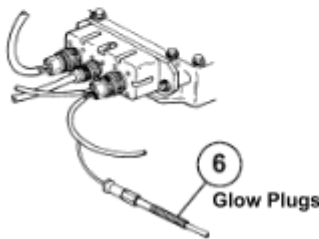
Model 7083-7396 Engine



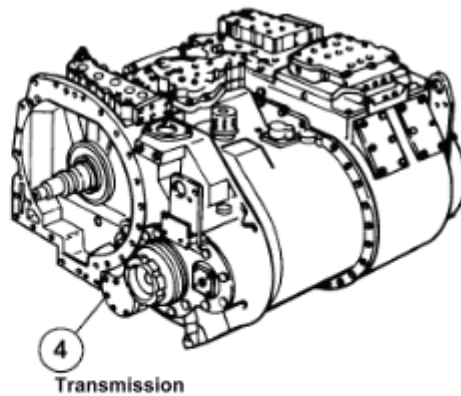
Model 7083-7391 Engine



Transfer Assembly



Glow Plugs



Transmission

The powerplant can be removed from the vehicle as a complete unit that consists of an engine Model 7083-7396 or LHR engine Model 7083-7391, transfer assembly, and transmission.

1. Engine Model 7083-7396 is a liquid-cooled, two-stroke cycle, diesel-type, model 8V71T equipped with an exhaust-driven turbocharger (5). The engine develops 405 horsepower at 2300 rpm and delivers power to the transfer assembly (3).
2. LHR Engine Model 7083-7391 is a liquid-cooled, two-stroke cycle, low heat rejection, diesel-type, model 8V71T equipped with an exhaust-driven turbocharger (5). The engine develops 440 horsepower at 2300 rpm, delivers power to the transfer assembly (3), and uses glow plugs (6).
3. The transfer assembly receives power from the engine (1 or 2) and transfers that power to the transmission (4).
4. The transmission is oil cooled and mechanically and hydraulically operated. It receives power from the engine (1 or 2) through a geared power transfer assembly (3). The transmission has seven gears - four forward, one neutral, and two reverse - and delivers

power to the left and right drive sprockets through the output shaft, universal joints, and final drives. It also functions as the steering and braking mechanism.

The power pack in the M109A6 Paladin incorporates the new Low Heat Rejection (LHR) engine. The LHR engine is less dependent on the cooling system. This means that more of the engine's heat is rejected through the exhaust and less through the cooling system. This is accomplished by insulating the exhaust ports and exhaust manifolds. The new LHR engine also incorporates a new higher efficient turbocharger. These changes provide a cooler running and more efficient engine. Engine horsepower increase is also a by-product of these changes (440 horsepower at 2300 rpm).

VARIANTS

Earlier versions of the howitzer have double rear hull doors, later versions have single doors.

T196, T196E1

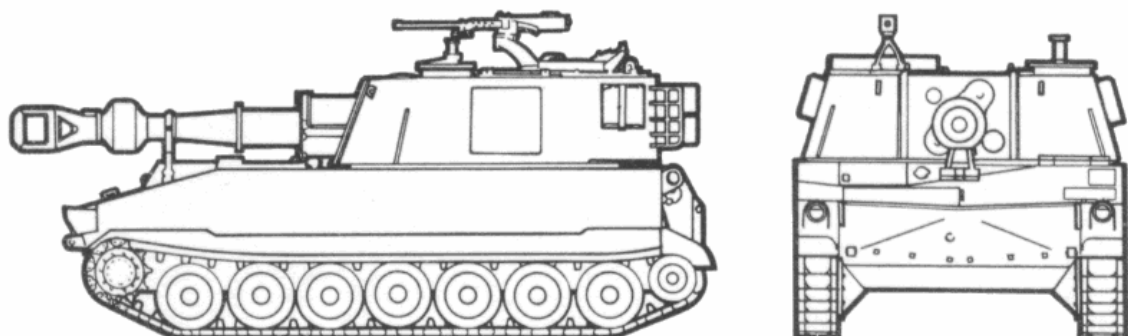
M109 prototypes. Modifications for the T196E1 included diesel-powered engines. The T196E1 was redesignated as the M109.

M109 (NSN 2350-00-440-8811)

1963. Original production model. Used extensively in the Vietnam war. Replaced the M44 155mm self-propelled howitzer. Armed with 155mm M126 gun mounted in a M127 howitzer mount.

Recognition features:

- Distinctive short gun tube with double baffle muzzle brake.
- 7 evenly spaced road wheels with low front sprocket and idler wheel.
- Large boxy turret mounted rear of center.

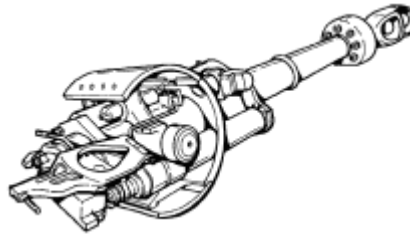




M109
610x355, 38K, GIF



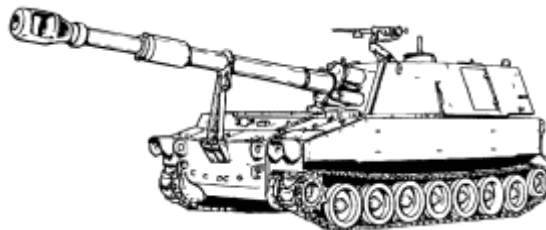
M109
600x450, 27K, GIF



M109 Cannon
650x370, 15K, GIF

M109A1 (NSN 2350-00-485-9662)

1973. Replaced the M109. Used in the Vietnam war. Has a longer gun barrel (M126A1 gun in M127 mount) for increased range.



M109A1
830x350, 21K, GIF

M109A1B

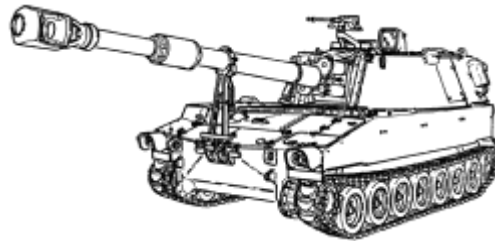
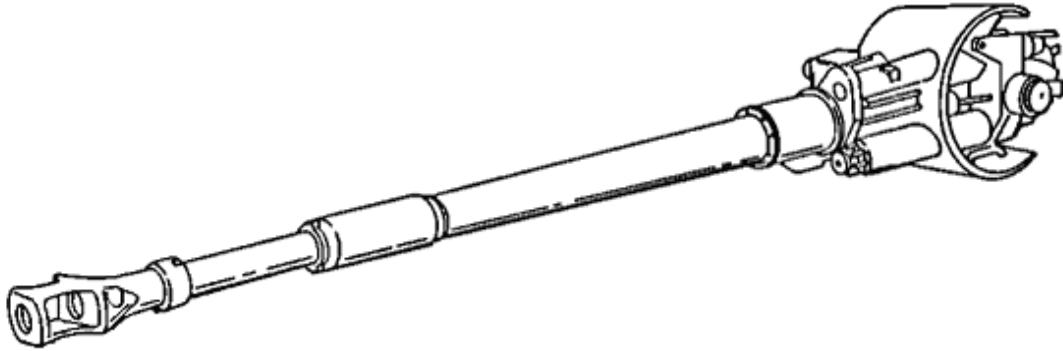
Manufactured specifically for foreign sales. This model was a new production M109A1 with all recent modifications.

M109A2 (NSN 2350-01-031-0586)

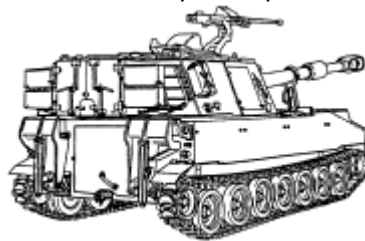
1979. The M109A2 is a new production weapon which incorporated 27 mid-life improvements to the M109A1. The improvements provide for increased Reliability, Availability, and Maintainability (RAM) and safety characteristics as well as enhanced operational capabilities.

The M109A2 has the long tube M185 cannon installed in the M178 gun mount. The cab has a rear bustle rack which provides an increased

ammunition stowage capacity. It has an all weather ballistic shield mounted over the panoramic telescope; counterbalanced travel lock and provisions for mounting the M140 alignment device.



M109A2
730x350, 30K, GIF



M109A2
620x400, 37K, GIF

M109A3 (NSN 2350-01-031-8851)

1979. The M109A3 is a depot converted M109A1 incorporating the 27 mid-life improvements. The operational characteristics of the M109A3 are virtually identical to the M109A2. Some M109A3s have three contact arm assemblies: all M109A2s have five contact arm assemblies.



M109A3
585x385, 39K, GIF

M109A4 (NSN 2350-01-277-5770)

1989. The M109A4 is a M109A2/A3 with modifications which include the addition of Nuclear, Biological, and Chemical/ Reliability, Availability, and Maintainability (NBC/RAM) product improvement kits. The driver and cannoneer number 2 have an air purifier and two heaters mounted in the

hull. An air purifier and four heaters are mounted in the cab for the rest of the crew. NBC Mission Oriented Protective Posture (MOPP) gear is stored in the new cannoner seats and stowage boxes.

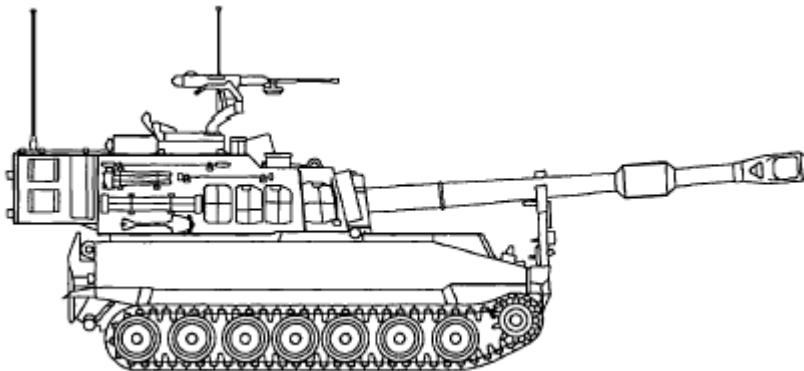
The traversing mechanism operates with a hydraulic clutch in the M109A4 instead of using an electric clutch as in the traversing mechanism of the M109A2/A3 Howitzer. A clutch valve, with a manual override, provides for power traverse in the event of an electrical failure to the clutch valve solenoid. The M109A4 has two hydraulic filters mounted outside of the power pack. The M109A2/A3s have one internal hydraulic power pack filter.

The M109A4 has a starter protection circuit with a combat override switch, to allow for emergency starting. The slave start receptacle has been moved from the battery compartment to the driver's compartment. The M109A2/A3 100 amp alternator has been replaced by a 180 amp alternator. Crew compartment subfloor drains have been added to provide for the drainage of DS2 used in the NBC decontamination process and provide for the drainage of excess water.

M109A5 (NSN 2350-01-281-1719)

1990. The M109A5 is a modified M109A4 with two major improvements: a new M284 Cannon and a new M182 Gun Mount. These improvements provide the M109A5 with greater range and allow for sustained fire for prolonged periods of time.

M109A6 Paladin (NSN 2350-01-305-0028)



1993. The M109A6 Paladin howitzer is the latest product improvement to the original M109 155-millimeter self-propelled (SP) howitzer. The Paladin features improvements in the areas of survivability; reliability, availability, and maintainability (RAM); responsiveness; and terminal effects. Features include an on-board ballistic computer, secure communications, enhanced position and navigation system, an integrated muzzle velocity system (MVS), new turret, improved cannon and mount, improved ballistic and nuclear, chemical, and biological protection, automotive improvements, built-in test equipment (BITE), and driver's night vision capability.

Survivability improvements include:

- Hull and turret structure with composite spall suppression liners and supplemental armor.
- Remote travel lock allows crew to emplace or displace without dismounting from the howitzer.
- Relocated projectiles.
- Segregated hydraulic components.
- Microclimate conditioning system provides filtered and conditioned air to crew's protective masks and vests.
- A fixed carbon dioxide fire suppression system for the engine compartment and portable units for the crew and driver's compartments.

RAM improvements include:

- Engine cooling package.
- Sealed starter and protective circuitry.
- New alternator.
- Final drive quick disconnects.
- Upgraded suspension, hydraulic, and electrical systems.
- Added the prognostic/diagnostic interface unit (PDIU), a maintenance diagnostic and limited prognostic testing unit.

Armament improvements to the cannon include:

- Redesigned interior profile of the gun tube assembly.
- Improved breech and recoil system designed to enhance component life.
- Strengthened muzzle brake.
- An advanced bore evacuator.

The major differences from earlier models, which can be seen, are:

- Stowage baskets.
- Rocket launcher stowage boxes - Provides stowage for three AT4 rocket launchers.
- Bustle extending the entire width of cab.
- Grenade stowage boxes.
- External power receptacle on right rear of hull. NOT TO BE USED FOR ENGINE STARTUP.
- Different BII (tool) stowage.
- Right side escape hatch missing.
- Commander's cupola is higher.
- A bigger travel lock.
- A completely different cab structure with a roof slope.
- M93 Chronograph Antenna with Mount and Terminator.

- Gun mount ballistics shield - Provides protection for variable recoil and recuperator from small arms fire and shrapnel.
- M140 alignment device bracket.
- A large access door on left front side of cab (hydraulic compartment).
- A box shaped compartment on the top where the Microclimate Conditioning System (MSC) is housed.
- Radio antennas.
- PLGR (Precision Lightweight Global Positioning System Receiver) antenna - used to support the Satellite Signals Navigation Set (AN/PSN-11).

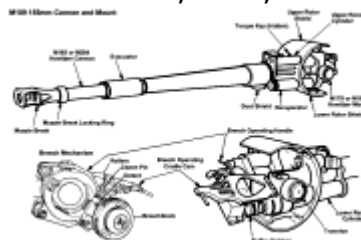
More M109 Art - Click on image sample to see full size image.



M109A3/A4/A5
730x340, 36K, GIF



M109A2/A3/A4/A5
760x360, 37K, GIF



M109A2/A3/A4/A5 Cannon
800x525, 27K, GIF