AIR-COOLED DIESEL TANK ENGINES
# AIR-COOLED DIESEL TANK ENGINES

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POWER
DEPENDABILITY
Since 1902

Teledyne Continental Motors General Products Division is the largest manufacturer of air-cooled tank engines in the free world.

Since 1902, when the first Continental engines were introduced to the new and rapidly expanding automotive marketplace, customers located throughout the world have enjoyed the power dependability provided by Continental engines.

Today, Continental engines are used exclusively to power the U.S. Army's M60 Main Battle Tank and by nations of the free world for powering their tanks and armored vehicles.

Continental engines are manufactured at the Getty Street Plant of Teledyne Continental Motors General Products Division. These modern production facilities are located at Muskegon, Michigan — a major industrial community situated in Western Michigan on the easternly shores of Lake Michigan. The plant encompasses nearly one-million square feet of floor space and is built on 455.6 acres of prime industrial property. A special vehicle test track is used for "field testing" vehicles and power packages. Vehicle obstacle tests are conducted on slopes, grades, water, mud and Belgian Blocks constructed on some 95.2 acres of rough terrain. These obstacles are used routinely to test both tracked and wheeled vehicles.

The plant's modern production facilities include automated and tape-controlled machining equipment, modern heat-treating installations, automated test cells, computers and digital readout test equipment and electron-beam welding machines.

Looking back, the company has come a long way since first providing engines for powering of the original Ford Model "A" truck which was used extensively during World War I.

In 1931, Continental engineers designed the first air-cooled aircraft engine. This lightweight, four-cylinder engine, the Continental A-40, has served as the basic design criterion used in the design and manufacturing of today's aircraft engines. This highly significant "break-through" in reciprocating engine design expertise was also used by the company to develop the world's first air-cooled, radial type tank engine. This new and dependable engine was used to power the U.S. Army's M3 and M4 tanks during World War II.
During World War II, the company was primarily engaged in the production of engines for five military programs. These vital programs included engines used for powering of marine landing craft, trucks, tanks, fighter aircraft, bombers and training type aircraft. Employment during this peak production period exceeded 14,000 people.

During 1939, the company expanded production facilities by constructing a manufacturing plant in Detroit, Michigan. During those peak production years the plant manufactured both aircraft engines and the new air-cooled radial type tank engine.

Since 1934, more than 175,000 tank engines have been manufactured including engines used to power all the U.S. Army’s T-Series and M-Series tanks.

In 1943, the company again expanded its plant facilities for the manufacture of the “Merlin” aircraft engine. This was the powerful Rolls-Royce engine used for powering the famed P-51 Mustang Fighter Plane.

During the late 1940’s the company developed both the AV-1790 and AOS-885 Series gasoline tank engines. These 12-cylinder and six-cylinder, lightweight air-cooled gasoline engines were used to power all the U.S. Army’s tracklaying vehicles including tanks, self-propelled weapons and cargo carriers.

In addition to the manufacture of tank engines, the company built over 91,000 multi-fuel type engines used for powering the U.S. Army’s 2-1/2 and 5-ton trucks.

In 1959, the company introduced the world’s first air-cooled diesel tank engine. It was designated the AVDS-1790 Series engine. Primary engine features are Vee-design, air-cooling, fuel injection, supercharging and capability of underwater operation using a snorkel.

Today, the AVDS-1790 Series engine is used by many nations of the free world for repowering their M47, M48 and Centurion tanks. It is a product improved engine and is available in horsepowers ranging from 750 to 1200 horsepower.
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FIVE DECADES OF EXPERIENCE

Teledyne Continental Motors General Products Division has over five decades of tank engine design, manufacturing experience.

In 1932, the first Continental air-cooled tank engine was introduced in the U.S. Army’s M1 Combat Car. The new Model W670 Tank engine represented a major “break-through” in reciprocating engine design. The 7-cylinder radial type engine produced 250 horsepower at 2400 rpm.

In 1934, the W670 engine was used to power the U.S. Army T2 Light Tank. The T2 had a top speed of 35 mph and weighed some 12,705 pounds unloaded. The W670 engine was used to power all early-day U.S. Army tanks.

Today, the Teledyne Continental AVDS-1790-2C Series engine is used exclusively by the U.S. Army to power the M60 Series Main Battle Tank. The AVDS-1790-2C engine is rated at 750 horsepower. It is air-cooled, turbocharged, diesel fuel injected and also features the 12-cylinder Vee-design. The M60 Series tank weighs 55-tons and has a maximum speed of 30 mph.

Since 1934, the company has manufactured more than 175,000 tank engines. Teledyne Continental Motors General Products Division tank engines have provided and continue to provide power dependability for all T-Series and M-Series U.S. Army tanks through the M60 series.
Military vehicles powered by Teledyne Continental Motors General Products Division diesel engines are operating successfully throughout the free world. These engines are designed to provide reliable and dependable operation in all environmental and temperature extremes. The engines are capable of starting and operating at temperatures ranging from minus 25-degrees to 125-degrees Fahrenheit. Minus 65-degree operation is available with starting aids.

The company has developed and incorporated other special features into its current family of high performance, air-cooled diesel engines.

- Waterproof and submersible for fording.
- Operable on compound slopes and grades by use of a specially designed oil system.
- Low voltage protection for starter.
- Dust detector for protection against clogged filters causing power loss and engine damage.
- Fuel filter with water separator for protection against impure or contaminated fuel.
- All gear drive to eliminate problems with broken or slipping belts.
- Smoke generator integrated with engine to provide obscuration without extra fuel mixtures or separate equipment.
- Capability to operate separately outside the tank engine compartment (ground-hop) for final inspection or adjustment.
- Protective guards located to prevent damage to external components during installation or removal.
- Air-cooled to eliminate maintenance required for liquid-cooled engines and provide an engine with minimum bulk and weight.
COMBAT VEHICLES
in use today powered
with the AVDS-1790
Series Diesel Tank Engine.

LIST OF COMBAT VEHICLES
POWERED BY TELEDYNE
AIR-COOLED
DIESEL ENGINES

<table>
<thead>
<tr>
<th>Model</th>
<th>Equipment</th>
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<tbody>
<tr>
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<td>Original</td>
<td>M47, M48</td>
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<tr>
<td></td>
<td>M60 &amp; M60A1</td>
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<td>M60 AVL B</td>
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<td>M728 CEV (165mm)</td>
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Combat vehicles currently powered with the AVDS-1790 Series air-cooled diesel tank engine.
ORIGINAL SERIES

The Original Series engine is rated at 750 horsepower. It is used as the primary equipment in the U.S. Army's M60 Series Main Battle Tank. The AVDS-1790-2AR engine is a modified AVDS-1790-2A engine used for retrofitting the M88 Recovery Vehicle. The AVDS-1790-2AC also is a modified AVDS-1790-2A engine and is used for repowering the Centurion Mark Series Main Battle Tanks.

PRODUCT IMPROVED CURRENT SERIES

The Product Improved Current Series engines represent the second generation of the AVDS-1790 Series diesel engine family. There are two Product Improved engine models — The AVDS-1790-2C engine which is equipped with a 650 ampere oil-cooled alternator and the AVDS-1790-2D engine which is configured with the 300 ampere generator. The AVDS-1790-2DR engine is configured specifically for the U.S. Army's M88 Recovery Vehicle, and the AVDS-1790-2CC and AVDS-1790-2DC Series engines are used to retrofit Centurion Tanks.

HIGHER HORSEPOWER SERIES

The Higher Horsepower Series engines are based on the Product Improved Current Engine Series. The 908 horsepower engine is similar to the 750 horsepower engines with the exception that increased cooling has been provided. Both the 1050 and 1200 horsepower engines are increased horsepower versions of the Product Improved Current Series engines. These Higher Horsepower Series engines have a fixed low-compression ratio, increased cooling, induction air and a modified fuel injection system.
POWER PACKS

TYPICAL M60 MAIN BATTLE TANK POWER PACK

Teledyne Continental Motors General Products Division has available engine and transmission power packs ready for vehicle installation.

Each individual power pack is "mated" and performance tested at the factory prior to shipment.

A typical power pack for the M60 Series Main Battle Tank consists of an AVDS-1790-2C Series (RISE) engine "mated" to the General Motors Allison Division Model CD-850-6A transmission.

The AVDS-1790-2C (RISE) engine is a product improved power plant. It is rated at 750-horsepower. Special features include air-cooling, fuel injection, 12-cylinder turbocharging and modular construction. The AVDS-1790-2C diesel engine is used exclusively to power the U.S. Army's M60 Series tanks.

The Allison CD-850-6A transmission is a "full-torque" shifting transmission. It delivers power to both the right and left sprocket drive shafts of tracked vehicles.

The CD-850-6A transmission features fully automatic operation with driver over-control, torque converter with lockup clutch and triple differential steering.
NEW HIGH PERFORMANCE POWER PACK

The new High Performance Power Packs are designed to power both medium and heavy tracked vehicles.

The AVDS-1790-5A (908 Horsepower) and AVDS-1790-8A (1050 Horsepower) engines may be coupled with the RENK Model RK-304 transmission.

The AVDS-1790-9A (1200 Horsepower) engine may be coupled either with the RENK Model RK-304 or RENK HSWL 284 transmissions.

These High Horsepower Series engines may also be coupled with either the Zed F LSG-3000 or the Allison X1100 (XT-1410) transmissions.

Both the AVDS-1790-8A and the AVDS-1790-9A Series engines feature fixed low compression ratio, increasing cooling capabilities, induction air and modified fuel injection. Engine components are interchangeable with the lower horsepower engines and the exteriors are similar. These benefits provide superior performance and power dependability in a compact installation package.

The RENK Model RK-304 transmission is a hydro-mechanical power shift unit. It features hydro-mechanical power shifting, with integrated reversing and steering. The RK-304 is especially designed for medium and heavy tracked vehicles requiring a gross engine power rating of up to 1200-horsepower.

The RK-304 transmission uses a torque converter with a lockup clutch. The torque converter is directly coupled to the engine crankshaft and eliminates the requirement of an engine flywheel. The RK-304 allows pivot steering in neutral, with two rotational speeds available. It has four forward and two reverse gear ranges and the vehicle may either be towed or push started.

The RK-304 transmission has both manual and fully automatic electric shift controls.

The AVDS-1790 high performance power packs are designed for easy adaptation to existing vehicles.
THE AIR-COOLED DIESEL TANK ENGINE

The air-cooled diesel tank engine has eliminated the maintenance and service burden required by engines using liquid type cooling systems. Air-cooled engines are very easy to service and repair since the hardware and plumbing required of liquid cooled units has been eliminated. In addition, air cooling provides the following power plant advantages.

• Engine bulk is reduced with the elimination of water jackets and plumbing.

• Weight reduction savings is achieved with the elimination of water jackets and liquid cooling hardware.

• Increased engine power-to-weight ratio is possible with the weight savings.

• Engine power loss is reduced with the elimination of water pumps and liquid circulatory systems.

• Operating temperature limitations are reduced with the elimination of antifreeze and coolant requirements.

• Logistic and maintenance problems are reduced with the elimination of liquid type coolant hardware.
In the air-cooled design, the cooling air is forced directly to the cooling fins of the cylinders by two engine driven cooling fans. The engine heat is dissipated directly into the air and not through the water jacket as required by liquid cooling systems. This permits a higher differential between the cooling air and the metal temperatures than is permissible in water-cooled engines. Thus, a higher performance output is possible from each cylinder.

Air cooling is provided by two engine driven fans mounted in the center of the engine Vee. These fans are used to provide total cooling for the cylinders, engine and transmission oil and also to provide ventilation of the engine compartment. The air-cooled engine design permits the transmission and engine oil coolers to be mounted on the exterior of the engine. This design reduces power pack installation area and adds additional fuel storage space. It also permits easier disconnect and removal.

**AIR-COOLED**

**335°F DIFFERENTIAL**

**LIQUID COOLED**

**95°F DIFFERENTIAL**

**NOTE:** ENGINE OIL COOLING ON EITHER AIR OR LIQUID COOLED ENGINES ARE ESSENTIALLY EQUIVALENT.

Liquid cooled engines require a double-heat exchange process. In this process, heat is transferred to the coolant flowing through the engine cylinder jackets. To support this process, the installation and use of water pumps, plumbing, hoses, clamps and gasketed joints is required to carry the coolant to the radiator for dissipation into the air. The temperature limitations of antifreeze and water also restrict the differential between coolant temperature and air. This restraint seriously limits the output of liquid cooled engines.
MODULAR CONSTRUCTION

Modular construction is a major design feature of all 1790 Series diesel engines. It permits the use of weight saving aluminum components throughout the engine. These aluminum components facilitate cooling, provide a high power-to-weight ratio and easy accessibility to engine parts.

The one-piece cast aluminum crankcase is ribbed and reinforced at points of greatest stress for maximum durability.

The cylinders are arranged in two banks with each containing six individually mounted Unisteel Cylinder assemblies. This arrangement provides for easy replacement and minimum teardown.

Two engine driven fans are mounted in the center Vee of the engine. They provide air cooling of the engine and lubrication system. This unique air cooling design eliminates engine bulk, water jacket requirements and the inherent problems of conventional liquid cooling systems.

Modular construction also permits easy access to engine assemblies requiring routine maintenance. The ninety-degree Vee engine design provides for easy accessibility to cooling fans, fuel injection system, turbocharger, fuel and oil filter assemblies.
PRODUCT IMPROVEMENT PROGRAM

In 1972, Teledyne Continental Motors General Products Division embarked on an ambitious program for the product improvement of the AVDS-1790-2A Series engine. This program was designed to upgrade and improve the reliability of the engine.

This new product improved engine is frequently referred to as the RISE engine. It was developed as part of the U.S. Army's Reliability Improvement of Selected Equipment (RISE) Program. All major component parts were improved with the basic engine and horsepower remaining the same.

Two product improved engine models have evolved from the RISE Program. The AVDS-1790-2C Series engine features an oil cooled alternator and the AVDS-1790-2D Series engine is equipped with an air-cooled generator. Thus, the basic product improved engine is configurated to service two different vehicle electrical systems.

In addition, the original AVDS-1790-2A engine can easily be converted to the new product improved engine by using an appropriate RISE Kit during overhaul. The U.S. Army has converted virtually all its operational tanks to the RISE engine configuration at depots located both in this country and overseas. The improved components of the RISE engine are:

A. Generator Assembly and Drive
B. Starter Low Voltage Protection
C. Oil Pressure Switch and Temperature Transmitters
D. Exhaust Manifold
E. Manifold Flame Heater System
F. Turbosupercharger
G. Fuel Filter System and Automatic Water Drain
H. Transmission Oil Cooler
I. Engine Oil Cooler
J. Oil Pan and Oil Pump
K. Damper Housing and Oil Filter System
L. Oil Cooled Alternator
M. Front Protective Guard
N. Top-Side Electrical Quick Disconnects

INTERNAL IMPROVEMENTS
- Fuel Injection System
- Cylinders
- Pistons and Rings
- Piston Cooling Jets
- Oil Filter Elements
- Piston Rings
All Teledyne Continental Motors General Products Division engines are designed and manufactured to meet rigorous U.S. Government specifications. The engines are carefully assembled by skilled craftsmen and are performance tested to ensure dependable operation in all types of extreme temperatures.

Tilt testing of engines is conducted to ascertain that all operational performance design limits are achieved. The tests are designed to simulate side-slope operation of up to forty percent and up to sixty percent for fore and aft tilt positions.

The submersion test is used to functional test production engines while submerged underwater. Test procedures include the starting, stopping and operation of the powerplant while it is in a simulated "fording" environment.

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<tr>
<th>TEMPERATURE</th>
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<tbody>
<tr>
<td></td>
<td>−25°F (COLD, WITHOUT AIDS)</td>
</tr>
<tr>
<td></td>
<td>−65°F (COLD, WITH AIDS)</td>
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<tr>
<td>SLOPE</td>
<td>60% (FORE AND AFT)</td>
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<td></td>
<td>40% (LATITUDINAL)</td>
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<tr>
<td>SUBMERGENCE</td>
<td>UNDERWATER</td>
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<tr>
<td>(WITH SNORKEL FOR INDUCTION AIR)</td>
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<tr>
<td>ALTITUDE</td>
<td>8,000 FT.</td>
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<td></td>
<td>(AT NOT LESS THAN 75% OF RATED POWER)</td>
</tr>
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</table>
The UNISTEEL Cylinder

The Unisteel Cylinder was developed under the Reliability Improvement Selected Equipment (RISE) Program for the AVDS-1790-2C Series diesel engine.

The Unisteel Cylinder is composed of an all-steel cylinder barrel and head structure with an aluminum muff and cooling fins cast to the exterior of the two parts. These two cylinder pieces are then welded together by the Electron-Beam Welding technique. The Unisteel Cylinder is designed to carry the combustion pressure and thermal loads.

Sample of the Electron-Beam Welding "bead" is photographically enlarged showing the technique used to join the cylinder barrel and head assemblies of the Unisteel Cylinder.
MODEL CD-850-6A TRANSMISSION

SPECIFICATIONS

INPUT
Maximum Engine Power ........................................ 650 HP
Maximum Engine Torque ....................................... 1685 FT/LBS
Maximum Engine Speed ....................................... 2400 RPM

TORQUE CONVERTER, TYPE ............................. Single Stage, Multi-Phase
Maximum Torque Multiplication ............................... 3.6:1

RANGES .................................................. Two Forward, One Reverse

RANGE CONTROL ........................................ Manual

GEAR RATIOS
Engine-to-Converter Step-up .................................. 0.66:1
Low Range .................................................. 3.50:1
High Range ............................................... 1.28:1
Reverse Range ............................................ 4.90:1

TOTAL RATIO COVERAGE .................................. 10:1

STEERING ........................................... Triple Differential
Regenerative Pivot Steering Neutral
Turning Radius ............................................... Pivot to Infinity
Steering Control ................................................ Mechanical

BRAKES ................................................. Multiple Wet Plate, Service & Parking

WEIGHT
Dry ....................................................... 3025 LBS

OIL FILL .................................................. 23 Gals.

SHIFT AND STEER CONTROL
External .................................................. Mechanical
Internal ................................................... Hydraulic

The Allison Model CD-850-6A transmission is a cross-drive design. It delivers power to both the right and left sprocket drive shafts. Engine oil is used in the transmission. It has triple differential steering with full pivot steer in neutral. It has two speeds forward and one reverse. The transmission is hydro-mechanically controlled with mechanically linked operator controls. It has three-point suspension. A power takeoff is provided through an internal spline. The CD-850-6A transmission and the AVDS-1790 Series diesel engine are used exclusively to power the U.S. Army's M60 Main Battle Tank.

INSTALLATION DIMENSIONS (Inches)
The RENK RK-304 is a hydro-mechanical power shift transmission with integrated reversing and steering unit for medium and heavy tracked vehicles with a gross engine power rating up to 1200 HP. The transmission can be attached to the engine directly or via an intermediate structure. The torque converter, which is directly coupled to the engine crankshaft, also serves as the engine flywheel.

The service and parking brakes are arranged on the transmission output shafts, which are positioned transversely to the input. The connection to the output shafts can be made via disconnectable gear-type couplings or via universal joints. Two mounting points are provided on the transmission for a three-point support of the power pack.

### SPECIFICATIONS

#### INPUT
- Maximum Engine Power: 1200 HP
- Maximum Engine Torque: 2434 FT/LBS
- Engine Speed: 2600 RPM

#### TORQUE CONVERTER
- Two Stage Turbine with Lock-Up Torque Ratio: 2.4 to 2.7

#### POWER-SHIFT UNIT
- Planetary Transmission

#### GEAR RATIOS

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<th>Gear Ratio</th>
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<th>Reverse</th>
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<td>2nd Gear</td>
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<tr>
<td>3rd Gear</td>
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<td>4th Gear</td>
<td>0.95</td>
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#### STEERING
- Geared Steer with Two Defined Radii for each Gear Range
- Stabilized to Ensure Equal Speeds Straight Ahead
  - Small Radius ± 185 RPM
  - Large Radius ± 60 RPM

### BRAKES
- Disc Brakes—Both Hydraulically and Mechanically Applied: 8851 FT/LBS

### RETARDER
- Maximum Braking Power: 300 HP

### AUXILIARY DRIVE
- Output: 150 HP
- Speed Ratio: 3.1 Step Up

### WEIGHT
- Dry: 3850 LBS

### OIL FILL
- 24 Gals.

### CONTROL VOLTAGE
- 24-28 Volts

### INSTALLATION DIMENSIONS (MM)

![Diagram of Transmission Dimensions](image_url)

The diagram shows the output drive center, transmission block mountings, and center input drive dimensions.
SMOKE
GENERATOR SYSTEM
FOR TRACKED VEHICLES

PRIMARY FEATURES

- DESIGNED FOR DIESEL ENGINES
- USES MILITARY OFF-THE-SHELF COMPONENTS
- ADAPTABLE TO ALL TRACKED DIESEL VEHICLES
- EASILY RETROFITTED
- FAIL SAFE
- PERMANENT INSTALLATION

SMOKE GENERATOR FOR TRACKED VEHICLES

The Diesel Smoke Generator System is designed to reduce the effectiveness of enemy antitank weapons systems and protect our tanks from long-range visual observation.

SIMPLICITY AND LOW COST

It is designed specifically for diesel engines, and can easily be adapted to all current military tracked diesel powered vehicles. Designed to use off-the-shelf components, the system is one of simplicity and low cost. It is an add-on type unit and is fail-safe in operation.

READILY INSTALLED

It is easy to install. Special design features allow field modifications and depot retrofits to require less than 8-man-hours for installation. Also, it is not necessary to remove either the power pack or the turret to install, or maintain the Diesel Smoke Generator System in the M60 Tank.

INCREASED SURVIVABILITY

In terms of tank warfare at the lowest unit or vehicle levels, the Diesel Smoke Generator System used in conjunction with the M239 Grenade System, will increase the survivability of our tank and mechanized forces.

COST EFFECTIVE

The system is cost effective. It is dependable and simple to operate and maintain. These outstanding features are unmatched by current technology. Teledyne Continental Motors General Products Division has aggressively responded to the demands of battlefield commanders for a new dependable countermeasures weapons system.

CONTINUOUSLY ON-LINE

Since the Diesel Smoke Generator System is permanently mounted on the vehicle's engine and uses standard diesel fuel to create smoke, the system is always available to produce smoke any time the engine is running. Smoke can be produced by the simple flick of a toggle switch.
Model
AVDS-1790-2AC Series Diesel Engine

FEATURES
- 750 Horsepower
- 12-Cylinder Turbocharged
- Air-Cooled Aluminum Components
- 300 Ampere Generator
- Compact Design — Reduced Width
- High Power-to-Weight Ratio

DESCRIPTION

The Continental AVDS-1790-2AC Series engine is a special model of the AVDS-1790-2A Series engine configured for use in the Centurion Tank. It is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine, rated at 750 gross horsepower at 2400 rpm. Air cooling is provided by two engine-driven fans, producing an airflow of 20,000 cfm at 2400 engine rpm. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2AC engine includes individual and easily replaceable cylinders. Overhead valves are used, with an overhead camshaft in each cylinder bank. For rapid service, all scheduled maintenance items are easily accessible from the top of the engine. Air cooling eliminates the maintenance burden of liquid cooling systems.

The AVDS-1790-2AC Series engine is capable of starting and operating at temperatures from —25° to +125°F (—65° with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

The AVDS-1790-2AC is extensively used to convert the Centurion Tank from gasoline to diesel power. Many of these engines have been successfully retrofitted into the Centurion Tank. The AVDS-1790-2A Series engines have been produced for the use in the U.S. Army M60 Tank, AVL Bridge Launcher, M728 Combat Engineer Vehicle and to convert M47 and M48 tanks from gasoline to diesel power.
SPECIFICATIONS

PERFORMANCE

Displacement: 1790 cu. in.  
Weight: Lbs. dry (with accessories): 4700  
Horsepower, gross (at rated rpm): 750  
Horsepower, net (at rated rpm): 642  
Speed:  
- Governed (full load): 2400 rpm  
- Governed (no load): 2640 rpm  
- Low idle: 700 rpm  
Cylinders:  
- Number: 12  
- Arrangement: 90 degree, V.  
- Bore: 5.75 inch  
- Stroke: 5.75 inch  
- Compression ratio: 16:1  
Camshafts:  
- Number: 2  
- Arrangement: Overhead  
Ignition: Compression  
Air System: Induction Turbocharged
- Airflow (at rated power and speed): 2075 cfm  
Fuel Type: DF-A, DF-1, DF-2  
Fuel Consumption: At (2400 rpm): 296 lbs/hr  
Lubrication: Capacity for dry engine: 21 gal.  
- Capacity for oil change: 18 gal.  
Normal oil temperature: 180°F at 60°F Ambient  
Maximum oil temperature: 260°F at 115°F Ambient

AVDS-1790-2AC SERIES

ENGINE INSTALLATION DIMENSIONS

[Diagram showing engine dimensions]
Model
AVDS-1790-2C Series
Diesel Engine

FEATURES
- 750 Horsepower
- 12-Cylinder Turbocharged
- 650 Ampere Alternator (oil cooled)
- High Power-to-Weight Ratio

DESCRIPTION

The Continental AVDS-1790-2C Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine—rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2C engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily accessible from the top of the engine to facilitate rapid service. Air cooling eliminates the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from $-25^\circ$ to $+125^\circ$F ($-65^\circ$ with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

The AVDS-1790-2C Series engine is an improved version of the Continental AVDS-1790-2A Series diesel engine. It is specifically designed to accept an oil cooled 28V alternator—rated at 650 amps.
SPECIFICATIONS

PERFORMANCE

Displacement ............................................ 1790 cu in
Weight: Lbs. dry (with accessories) ............... 4900
Horsepower, gross (at rated rpm) ................. 750
Horsepower, net (at rated rpm) ..................... 642
Speed: Governed (full load) ......................... 2400 rpm
      Governed (no load) .......................... 2640 rpm
      Low Idle ..................................... 700 rpm
Cylinders: Number .................................. 12
          Arrangement .............................. 90 degree, V
          Bore ..................................... 5.75 inch
          Stroke ................................... 5.75 inch
          Compression ratio ...................... 16:1
Camshafts: Number ................................ 2
           Arrangement ........................... Overhead
Ignition: ............................................. Compression
Air System: Induction Turbocharged
Airflow (at rated power and speed) ............. 2075 cfm
Fuel Type .............................................. DF-A, DF-1, DF-2
Fuel Consumption: At (2400 rpm) ................. 296 lbs/hr
Lubrication: Capacity for dry engine .......... 21 gal.
            Capacity for oil change ............. 19 gal.
Normal oil temperature ......................... 180°F at 60°F Ambient
Maximum oil temperature .................... 250°F at 115°F Ambient

PERFORMANCE AT 29.92 IN. HG AND 60°F WITH DF-2 FUEL AT 60°F

GBSFC LBS/BHP-HR. GROSS HORSEPOWER TORQUE LB-FT.

ENGINE SPEED · RPM

AVDS-1790-2C SERIES
ENGINE INSTALLATION DIMENSIONS

73.52  68.59  43.70
Model
AVDS-1790-2D Series
Diesel Engine

FEATURES
- 750 Horsepower
- 12-Cylinder Turbocharged
- 300 Ampere Generator
- High Power-to-Weight Ratio

DESCRIPTION

The Continental AVDS-1790-2D Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine — rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2D engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily accessible from the top of the engine to facilitate rapid service. Air cooling eliminates the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from -25° to +125°F (-65° with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

The AVDS-1790-2D Series engine is an improved version of the Continental AVDS-1790-2A Series diesel engine. It is specifically designed to accept an air-cooled generator — rated at 300 amps.
SPECIFICATIONS

PERFORMANCE

Displacement.......................... 1790 cu. in.
Weight: Lbs. dry (with accessories)........ 4880
Horsepower, gross (at rated rpm)........ 750
Horsepower, net (at rated rpm).......... 642
Speed:
  Governed (full load)............ 2400 rpm
  Governed (no load)............. 2640 rpm
  Low Idle.......................... 700 rpm
Cylinders:
  Number.................. 12
  Arrangement................. 90 degree, V.
  Bore........................ 5.75 inch
  Stroke........................ 5.75 inch
  Compression ratio......... 16:1
Camshafts:
  Number.................. 2
  Arrangement................. Overhead
Ignition:
  Type........................... Compression
Generator:
  Type......................... 28VDC, 300 amps
Air System:
  Type........................... Induction Turbocharged
  Airflow (at rated power and speed)........ 2075 cfm
Fuel Type.......................... DF-A, DF-1, DF-2
Fuel Consumption: At (2400 rpm)........ 296 lbs/hr
Lubrication:
  Capacity for dry engine........ 21 gal.
  Capacity for oil change........ 18 gal.
Normal oil temperature.............. 180°F at 60°F Ambient
Maximum oil temperature........... 260°F at 115°F Ambient

PERFORMANCE AT 29.92 IN. HG AND 60°F WITH DF-2 FUEL AT 60°F

AVDS-1790-2D SERIES
ENGINE INSTALLATION DIMENSIONS

Dimensions:
- Height: 43.70
- Width: 73.52
- Depth: 70.60
The Continental AVDS-1790-2CC Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine—rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2CC engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily accessible from the top of the engine to facilitate rapid service. Air cooling eliminates the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from $-25^\circ$ to $+125^\circ F (-35^\circ$ with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

The AVDS-1790-2CC Series engine is an improved version of the Continental AVDS-1790-2AC Series diesel engine. It is specifically designed to accept an oil-cooled 28V alternator—rated at 650 amps. It is narrower in width than the AVDS-1790-2C engine and is designed to fit in the Centurion Tank in order to convert the tank from gasoline to diesel power.
**SPECIFICATIONS**

**PERFORMANCE**

- **Displacement**: 1790 cu in
- **Weight**: Lbs. dry (with accessories) 4876
- **Horsepower, gross (at rated rpm)**: 750
- **Horsepower, net (at rated rpm)**: 842
- **Speed**:
  - Governed (full load): 2400 rpm
  - Governed (no load): 2640 rpm
  - Low idle: 700 rpm
- **Cylinders**:
  - Number: 12
  - Arrangement: 90 degree, V
  - Bore: 5.75 inch
  - Stroke: 5.75 inch
  - Compression ratio: 16:1
- **Camshafts**:
  - Number: 2
  - Arrangement: Overhead
- **Ignition**: Compression
- **Air System**: Induction Turbocharged
  - Airflow (at rated power and speed): 2075 cfm
- **Fuel Type**: DF-A, DF-1, DF-2
- **Fuel Consumption**: At (2400 rpm): 296 lbs/hr
- **Lubrication**: Capacity for dry engine: 21 gal.
  - Capacity for oil change: 18 gal.
- **Normal oil temperature**: 180°F at 60°F Ambient
- **Maximum oil temperature**: 260°F at 115°F Ambient

**PERFORMANCE AT 29.92 IN. HG AND 60°F WITH DF-2 FUEL AT 60°F**

**ENGINE INSTALLATION DIMENSIONS**

- **AVDS-1790-2CC SERIES**
- **Dimensions**:
  - Width: 68.59 in
  - Depth: 43.70 in
  - Height: 70.08 in
Model
AVDS-1790-2DC Series Diesel Engine

FEATURES
- 750 Horsepower
- 12-Cylinder Turbocharged
- 300 Ampere Generator
- Compact Design — Reduced Width
- High Power-to-Weight Ratio

DESCRIPTION
The Continental AVDS-1790-2DC Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine—rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2DC engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily accessible from the top of the engine to facilitate rapid service. Air cooling eliminates the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from $-25^\circ$ to $+125^\circ$F ($-65^\circ$ with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

The AVDS-1790-2DC Series engine is an improved version of the Continental AVDS-1790-2AC Series diesel engine. It is specifically designed to accept an air-cooled generator—rated at 300 amps. It is narrower in width than the AVDS-1790-2C engine and is designed to fit in the Centurion Tank in order to convert the tank from gasoline to diesel power.
SPECIFICATIONS

PERFORMANCE

Displacement: 1790 cu.in.
Weight: Lbs. dry (with accessories): 4860
Horsepower, gross (at rated rpm): 750
Horsepower, net (at rated rpm): 642
Speed:
  Governed (full load): 2400 rpm
  Governed (no load): 2640 rpm
  Low Idle: 700 rpm
Cylinders: Number: 12
  Arrangement: 90 degree, V
  Bore: 5.75 inch
  Stroke: 5.75 inch
  Compression ratio: 16:1
Camshafts: Number: 2
  Arrangement: Overhead
Ignition: Compression
Air System: Induction Turbocharged
  Airflow (at rated power and speed): 2076 cfm
Fuel Type: DF-A, DF-1, DF-2
Fuel Consumption: At (2400 rpm): 296 lbs/ hr
Lubrication:
  Capacity for dry engine: 21 gal.
  Capacity for oil change: 18 gal.
Normal oil temperature: 180°F at 60°F Ambient
Maximum oil temperature: 200°F at 115°F Ambient

PERFORMANCE AT 29.92 IN. HG AND 60°F WITH DF-2 FUEL AT 60°F

AVDS-1790-2DC SERIES
ENGINE INSTALLATION DIMENSIONS

70.08

43.70

70.60

32
Model
AVDS-1790-5A Series Diesel Engine

FEATURES
- Power Increased to 908 Horsepower
- 12-Cylinder Turbocharged
- 650 Ampere Alternator (oil cooled)
- Compact Design — Reduced Width
- High Power-to-Weight Ratio

DESCRIPTION

The Continental AVDS-1790-5A Series engine is an air-cooled 90° upright Vee design, 12-cylinder turbocharged diesel engine rated at 908 gross horsepower at 2400 rpm. Air cooling is provided by two engine-driven fans that provide the required cooling air for the engine cylinders, engine and transmission oil. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-5A engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. For rapid service, all scheduled maintenance items are easily accessible from the top of the engine. Air cooling eliminates the maintenance burden of liquid cooling systems.

The AVDS-1790-5A Series engine has been designed and developed for use in the combat environment. It is completely waterproof and can be totally submerged with only the addition of combustion snorkels. Cold starting has been simplified by the addition of an automatic intake flame heater. The cooling system has been designed for successful operation at ambient temperatures up to 125°F.

The AVDS-1790-5A Engine is an up powered version of the AVDS-1790-2C engine with over 80 percent commonality of parts between the two diesel powered engines.
SPECIFICATIONS

PERFORMANCE

Displacement ........................................ 1790 cu.in.
Weight: Lbs. dry (with accessories) .............. 4900
Horsepower, gross (at 2400 rpm) ................. 908
Horsepower, Net (at 2400 rpm) ...................... 775
Speed: Governed (full load) ...................... 2400 rpm
Governed (no load) ................................ 2040 rpm
Low idle ............................................. 700 rpm
Cylinders: Number ...................................... 12
Arrangement ........................................ 90 degree, V.
Bore .................................................. 5.75 inch
Pistons: Stroke ........................................ 5.75 inch
Compression ratio ................................... 14.5:1
Camshafts: Number .................................... 2
Arrangement ........................................... Overhead
Ignition: .............................................. Compression
Air System: Induction Turbocharged
Airflow (at rated power and speed) ............. 2200 cfm
Fuel Type ........................................... DF-A, DF-1, DF-2
Fuel Consumption: At (2400 rpm) ................. 380 lbs/hr
Lubrication: Capacity for dry engine .......... 21 gal.
Capacity for oil change ............................ 18 gal.
Normal oil temperature ......................... 180°F at 60°F Ambient
Maximum oil temperature ....................... 260°F at 115°F Ambient

PERFORMANCE AT 29.92 IN. HG AND 60°F WITH DF-2 AT 60°F

GROSS TORQUE LB-FT

GROSS HORSEPOWER

ENGINE SPEED - RPM

AVDS-1790-5A SERIES
ENGINE INSTALLATION DIMENSIONS

[Dimensions shown in the image]
Model
AVDS-1790-8A Series
Diesel Engine

FEATURES
- Power Increased to 1050 Horsepower
- 12-Cylinder Turbocharged with Aftercooling
- 650 Ampere Alternator (oil cooled)
- Compact Design — Same Size as 750 Horsepower Engine
- High Power-to-Weight Ratio

DESCRIPTION
The Continental AVDS-1790-8A Series engine is an air-cooled 90° upright Vee design, 12-cylinder turbocharged diesel engine — rated at 1050 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as the engine and transmission oil coolers and induction air aftercoolers, mounted rearward of the engine oil coolers, is provided by two engine-driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The AVDS-1790-8A is a high horsepower engine. It is an open-chamber engine incorporating air cooling which eliminates the maintenance burden of liquid cooling systems.

The AVDS-1790-8A Series engine has been designed and developed for use in the combat environment. It is completely waterproof and can be totally submerged with only the addition of combustion snorkels. Cold starting has been simplified by the addition of an automatic intake flame heater. The cooling system has been designed for successful operation at ambient temperatures up to 125°F.

The AVDS-1790-8A engine is an up powered version of the AVDS-1790-2C engine with over 80 percent commonality of parts between the two diesel powered engines.
SPECIFICATIONS

PERFORMANCE

Displacement ........................................... 1790 cu. in.
Weight: Lbs. dry (with accessories) ............... 5100
Horsepower, gross (at rated rpm) .................. 1050
Horsepower, net (at rated rpm) .................... 892
Speed
Governing (full load) ................................. 2400 rpm
Governing (no load) .................................. 2640 rpm
Low idle .................................................. 700 rpm
Cylinders:
Number .................................................. 12
Arrangement ............................................. 90 degrees, V.
Bore ...................................................... 5.75 inch
Stroke ..................................................... 5.75 inch
Camshafts:
Number .................................................. 2
Arrangement ............................................. Overhead
Ignition .................................................. Compression
Air System: Induction Airflow
(at rated power and speed) ......................... 2450 cfm
Fuel type ............................................... DF-A, DF-1, DF-2
Fuel Consumption: A1 (2400 rpm) ................. 430 lbs/hr.
Lubrication: Capacity for dry engine .............. 21 gal.
Capacity for oil change ............................. 18 gal.
Normal oil temperature ............................. 180°F at 60°F Ambient
Maximum oil temperature ......................... 260°F at 115°F Ambient
Cooling System: Includes Transmission Coolers

AVDS-1790-8A SERIES
MAJOR ENGINE DIMENSIONS

PERFORMANCE AT 29.92 IN. HG AND
60°F WITH DF-2 FUEL AT 60°F
Model
AVDS-1790-9A Series
Diesel Engine

FEATURES
- Power Increased to 1200 Horsepower
- 12-Cylinder Turbocharged with Aftercooling
- 850 Ampere Alternator
- Compact Design — Same Size as 750 Horsepower Engines
- High Power-to-Weight Ratio

DESCRIPTION
The Continental AVDS-1790-9A Series engine is an air-cooled 90° upright Vee design, 12-cylinder turbocharged diesel engine-rated at 1200 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as the engine and transmission oil coolers and induction air aftercoolers, mounted rearward of the engine oil coolers, is provided by two engine-driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The AVDS-1790-9A Series engine has been designed and developed for use in the combat environment. It is completely waterproof and can be totally submerged with only the addition of combustion snorkeles. Cold starting has been simplified by the addition of an automatic intake flame heater. The cooling system has been designed for successful operation at ambient temperatures up to 125°F.

The AVDS-1790-9A engine is an up powered version of the AVDS-1790-2G engine with over 70 percent commonality of parts between the two diesel powered engines.

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SPECIFICATIONS

PERFORMANCE

Displacement.....................................1790 cu. in.
Weight: Lbs. dry (with accessories)............5100
Horsepower, gross (at rated rpm)..............1200
Horsepower, net (at rated rpm)................1000
Speed: Governed (full load)....................2400 rpm
Governed (no load).............................2640 rpm
Low Idle........................................700 rpm
Cylinders: Number..................................12
Arrangement.....................................90 degrees, V.
Bore...............................................5.75 inch
Stroke............................................5.75 inch
Camshafts: Number...............................2
Arrangement.....................................Overhead
Ignition..........................................Compression
Air System: Induction Turbocharged
airflow (at rated power
and speed).......................................2800 cfm
Fuel type........................................DF-A, DF-1, DF-2
Fuel Consumption: A1 (2400 rpm)..............480 lbs/hr.
Lubrication: Capacity for dry engine...........21 gal.
Capacity for oil change.........................19 gal.
Normal oil temperature.........................180°F at 60°F Ambient
Maximum oil temperature.......................240°F at 115°F Ambient

Cooling System: Includes Transmission Coolers

PERFORMANCE AT 29.92 IN. HG AND
60°F WITH DF-2 FUEL AT 60°F

AVDS-1790-9A SERIES
MAJOR ENGINE DIMENSIONS

73.52

43.70

68.59