S 2000 (MILITARISED)

STEYR HIGH SPEED DIESEL ENGINE
S 2000 (MILITARISED) STEYR HIGH SPEED DIESEL ENGINE

1 REQUIREMENT

Many Armies are now adopting a single fuel (Diesel) policy which will make the logistic support of a Petrol (Gasoline) vehicle awkward. Further the Jaguar J60 Petrol engine is now obsolete.

2 PROBLEMS

The venerable old J60 petrol engine suffered from the following problems:

2.1 Short engine life
2.2 Poor high temperature performance / reliability
2.3 Engine now obsolete and many parts are no longer obtainable
2.4 High expense of maintaining J60 engine

3 SOLUTION

Install a Diesel Engine.

Four types of Diesel Engine have been fitted to CVR(T) Scorpion and variant vehicles:

3.1 Perkins T36544 (Now Obsolete)
3.2 Perkins Phaser (Now Obsolete)
3.3 Cummins 6BTAA 5.9 (Now Obsolete)
3.4 S 2000 Militarised Steyr

Therefore, the only currently available proven engine is the S 2000 Militarised Steyr engine.

Further the Steyr is the most simple installation because no gearbox modifications are necessary.

4 FEATURES

4.1 Has passed NATO AEP 5 Endurance testing
4.2 Engine and its Electronic Controls are Militarised by Repaircraft PLC
   The highly vulnerable Electronic Controls, including the ECU are protected in the DIP-ES Unit in the Driver's compartment not the engine bay
4.3 Proven engine for military applications
   Fitted to Alvis Hägglunds Bv206, GAZ and Urovesa Vehicles + 60 Nigerian CVR(T) Scorpions
4.4 Modern Diesel Engine Technology
   Electronically Managed for Maximum Efficiency and Power whilst meeting relevant European EURO II Exhaust Emission Regulations
4.5 High Speed Diesel Engine (650 – 4,750 RPM)  
No need to modify original transmission

4.6 Advanced Cyclonic and Element Air Cleaner Assembly  
Approved by the UK MoD for fitting to all CVR(T) vehicles

4.7 **S 2000** High Flow Louvres  
*High Flow Louvres that retain the original level of ballistic protection*

4.8 Cooler Driver’s Compartment  
The Driver’s Compartment (oven!) is cooler than when fitted with a Jaguar or Cummins engine

4.9 Low Noise  
*Engine Bay and Exhaust very quiet*

4.10 Low Vibration  
*Longer Life of engine ancillaries (no vibration operated hours run meter!)*

4.11 Physically smaller than Jaguar and Cummins engine  
*No complex and Expensive hull modifications*

4.12 Wider power band (650 – 4,750 RPM).  
*Gives better acceleration and manoeuvrability than Cummins or Perkins engines*

4.13 Unit Fuel Injectors  
*If the vehicle runs out of fuel just put more fuel in the tank and turn the key – no old fashioned diesel injection pump*

4.14 **S 2000** HDHD Engine-Gearbox Anti-torsional Vibration drive coupling  
*Longer Clutch/Gearbox life*

4.15 Has the same RPM, Power and Torque outputs as the original Jaguar J60 Petrol Engine  
*This preserves gearbox life*

4.16 The vehicle’s Original Amphibious capability can be retained

4.17 Simple, Low Cost conversion

4.18 Complete engine conversion can be completed in 4 days

4.19 Laptop Tuning and Servicing Diagnosis

4.20 15 minutes to fit replacement cooling fan belt

4.21 48 minute engine change time

5 **PERFORMANCE**

Top Speed:  72 kph / 45 mph (Standard ECU)

Acceleration:  0 - 50 kph (31 mph) in 12 - 18 seconds (depending on ECU Programme)

Fuel Range:  1040 km (650 miles)
6 STANDARD ENGINE CONVERSION KIT SPECIFICATION

6.1 RS 2133 Turbo Engine Pack
6.2 Engine Mount Kit
6.3 Heavy Duty Drive Coupling Kit
6.4 High Efficiency Cyclonic and Element Air Filter Unit and fitting kit
6.5 All air inlet (stainless steel) / turbocharger / intercooler pipework (stainless steel) / flexible pipes / clips etc
6.6 Intercooler Kit
6.7 Radiator Header Tank (stainless steel)
6.8 High Performance Radiator
6.9 All cooling pipework (stainless steel) / flexible pipes / clips etc
6.10 High Performance Gearbox Oil Cooler Conversion Kit
6.11 HTD Belt Fan Pulley Kit
6.12 Exhaust System (stainless steel)
6.13 Fuel Module (Pump/Primer & Separator/Fine Filter) and all pipework/clips etc
6.14 Engine Electrical Harness
6.15 High Flow Ballistic Louvre Kit

7 PRINCIPAL MODIFICATIONS REQUIRED FOR INSTALLATION

7.1 Cut Intercooler pipework holes and Wiring Harness hole in removable front “T” bulkhead
7.2 Re-locate Generator belt tensioner on removable front “T” bulkhead
7.3 Modify Decking to accept Exit Air Louvre Pack

8 OPTIONS

8.1 Driver Training ECU Engine Programme
   Limits speed for Learner Drivers
8.2 J60 Performance ECU Engine Programme
   Same RPM, Power and Torque as original Jaguar J60 Engine to maximise gearbox life
8.3 High Power 2133 ECU Engine Performance
   Approximately 15% more Torque (But not Horsepower/KW) for maximum performance
   (Note: Gearbox and Engine Life Reduced unless a TN15DE Gearbox Upgrade fitted)
# S 2000 (Militarised) Steyr Diesel Engine Data

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DATA</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturers</td>
<td>Commercial engine manufactured by Steyr Austria but then Militarised by Repaircraft PLC</td>
<td>See S 2000 Militarisation Data Pack</td>
</tr>
<tr>
<td>Displacement (cc)</td>
<td>3,200</td>
<td></td>
</tr>
<tr>
<td>Bore / Stroke (mm)</td>
<td>85/94</td>
<td></td>
</tr>
<tr>
<td>Compression Ratio</td>
<td>19:1</td>
<td></td>
</tr>
<tr>
<td>Induction System</td>
<td>Turbocharged and Intercooled</td>
<td></td>
</tr>
<tr>
<td>Maximum Speed (RPM)</td>
<td>4750</td>
<td>Can be connected to the Original TN15x Gearbox with no modifications</td>
</tr>
<tr>
<td>Dry Weight (kg)</td>
<td>225</td>
<td>Approximately 250 Kg lighter than the Cummins engine</td>
</tr>
<tr>
<td>Minimum Fuel Consumption (g/kWh)</td>
<td>215</td>
<td></td>
</tr>
<tr>
<td>Maximum Fuel Consumption (g/kWh)</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Exhaust Emissions</td>
<td>88/77 EWG EURO II</td>
<td></td>
</tr>
<tr>
<td>Max. Torque (Nm)</td>
<td>346 @2,300 RPM</td>
<td>With J60 Performance ECU Fitted. The Torque can be increased by fitting a 2133 High Performance ECU but Gearbox Life is Reduced</td>
</tr>
<tr>
<td>Max. Power (kW)</td>
<td>145 @ 4,000 RPM (194 HP @ 4,000 RPM)</td>
<td>194 HP can not be increased to 235 HP like the Cummins due to reliability and emissions problems</td>
</tr>
<tr>
<td>Standard Altitude Capability (M)</td>
<td>2,100</td>
<td>Will operate at up to 4,000</td>
</tr>
<tr>
<td>Rejection to Coolant (kW)</td>
<td>54 @ Max Torque and 90 @ Max Power</td>
<td></td>
</tr>
<tr>
<td>Maximum Allowed Coolant Temperature (°C)</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Maximum Allowed Oil Temperature (°C)</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>Recommended Coolant / Water (%)</td>
<td>50%/50%</td>
<td></td>
</tr>
<tr>
<td>Engine Oil Grade</td>
<td>API:CF4 or Higher Synthetic</td>
<td>E.G. Shell Helix or Mobil 1</td>
</tr>
<tr>
<td>Durability Test</td>
<td>NATO AEP5 Part II</td>
<td></td>
</tr>
<tr>
<td>EMC Protection</td>
<td>Militarised by Repaircraft PLC</td>
<td>See S 2000 Militarisation Data Pack</td>
</tr>
<tr>
<td>Vehicle Maximum Speed (Kph)</td>
<td>72</td>
<td>With Standard Engine Control Unit (ECU) Computer</td>
</tr>
<tr>
<td>Vehicle Gradient Climbing Ability</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Vehicle Side Slope Capability</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>Vehicle Maximum Range (Km)</td>
<td>1050</td>
<td>Depends upon Battlefield Duty Cycle</td>
</tr>
</tbody>
</table>
**S 2000 J60 ENGINE PERFORMANCE ENGINE CONTROL UNIT (ECU)**

(This ECU is programmed to replicate almost exactly the performance of the Original J 60 Engine to maximise Gearbox life)

![Graph of torque vs. engine speed](image1)

![Graph of power vs. engine speed](image2)
S 2000 HIGH EFFICIENCY CYCLONIC AND ELEMENT AIR FILTER UNIT
(This unit is now mandatory on British Army vehicles)

HEAVY DUTY DRIVE SHAFT WITH INTEGRAL TORSIONAL VIBRATION DAMPER
(Preserves Clutch and Gearbox Life)
S 2000 HIGH EFFICIENCY GEARBOX OIL COOLER

INTERCOOLER QUICK RELEASE COUPLINGS
(15 Second Intercooler Removal/Installation Time)
HIGH FLOW BALLISTIC LOUVRES
(Retain the original level of ballistic protection)

LAPTOP COMPUTER SET UP / DIAGNOSTIC PROGRAMME FACILITY
CHANGE THE COOLING FAN BELT IN 15 MINUTES

S 2000 TURBO PACK READY FOR ACTION!
FASTEST TANK IN THE WORLD!

(Guinness Book of World Records 26/2/02)

See also: www.steyr-motors.com/news/media_scorpion.htm