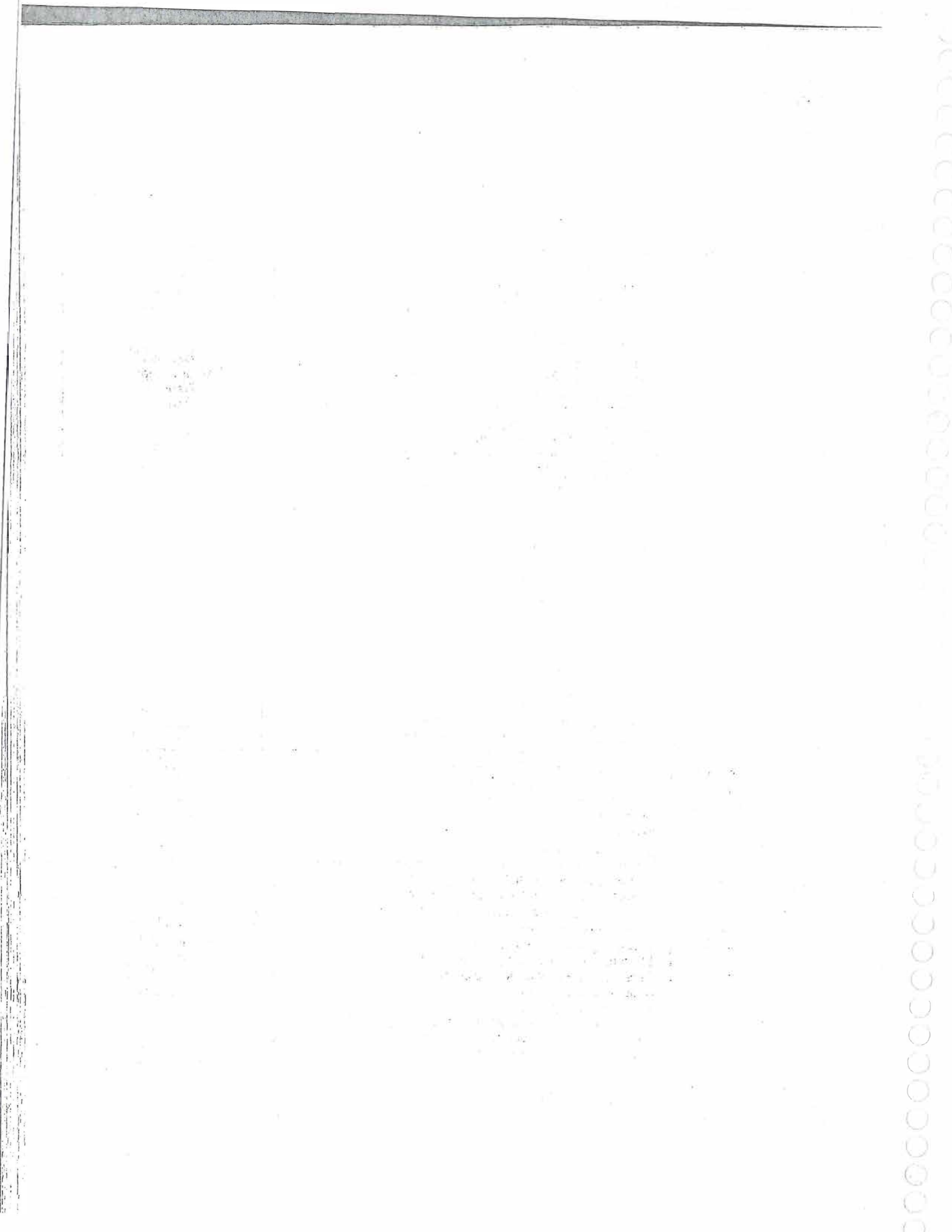


### TROUBLESHOOTING GUIDE

Problems	Possible causes	Remedy
The starter motor does not rotate, or the rotation speed is not sufficient to start the engine.	<p>Causes related to battery and power wiring</p> <ul style="list-style-type: none"> <li>* Battery connections loose or dirty</li> <li>* Bad ground (-) to frame.</li> <li>* Bad battery positive (+) cable.</li> <li>* Discharged (low) battery</li> <li>* Low voltage due to defective battery</li> </ul> <p>Causes related to control wiring</p> <ul style="list-style-type: none"> <li>* Key switch defective</li> <li>* Voltage drop in key switch wiring or connectors</li> <li>* Starter relay defective.</li> <li>* Starter solenoid coil defective.</li> </ul> <p>Causes related to starter solenoid</p> <ul style="list-style-type: none"> <li>* Broken wire in pull-in coil in starter solenoid</li> <li>* Defective contact of contact plate in starter solenoid</li> <li>* Broken wire in holding coil in starter solenoid</li> </ul> <p>Causes related to starter motor</p> <ul style="list-style-type: none"> <li>* Defective brushes</li> <li>* Weak brush springs</li> <li>* Defective field coil</li> <li>* Defective field coil connections</li> <li>* Defective commutator</li> <li>* Defective armature</li> </ul>	<p>Clean and tighten Clean and repair Clean and repair Charge Replace</p> <p>Replace Repair or replace Replace Replace</p> <p>Replace Replace Replace</p> <p>Replace Replace Replace Repair Repair or replace Replace</p>
The starter motor rotates but the engine does not start	<ul style="list-style-type: none"> <li>* Discharged (low) battery</li> </ul> <p>Causes related to air heater system (when cold)</p> <ul style="list-style-type: none"> <li>* Defective air heater control unit</li> <li>* Defective air heater relay</li> <li>* Defective air heater</li> <li>* Defective water temperature sensor</li> <li>* Defective wiring for air heater system</li> </ul>	<p>Charge</p> <p>Replace Replace Replace Replace Repair or replace</p>
The starter motor turns but the pinion does not engage properly with the ring gear.	<ul style="list-style-type: none"> <li>* Worn over-running clutch pinion end</li> <li>* Fatigued over-running clutch drive spring</li> <li>* Slipping over-running clutch</li> <li>* Binding spline</li> <li>* Worn bushing</li> <li>* Worn ring gear</li> </ul>	<p>Replace Replace Replace Repair or replace Replace Replace</p>
The starter motor does not stop running	<ul style="list-style-type: none"> <li>* Starter solenoid contacts welded closed</li> <li>* Solenoid coil shorted to battery positive (+)</li> <li>* Defective key switch (stuck or shorted in the start position)</li> </ul>	<p>Replace Repair or replace Replace</p>
Discharging of the battery	<ul style="list-style-type: none"> <li>* Loose alternator drive belt</li> <li>* Short circuit or broken wire in the stator coil</li> <li>* Defective brush and slip ring contact</li> <li>* Defective rectifier</li> <li>* Defective IC regulator</li> <li>* Insufficient or improper battery fluid</li> <li>* Faulty battery electrode (internally short circuited)</li> <li>* Battery connections loose or dirty</li> <li>* Excessive electrical load</li> </ul>	<p>Adjustment Replace Clean or replace Replace Replace Adjustment Replace Clean and tighten Inspect each electrical part</p>
Overcharged battery	Defective IC regulator	Replace

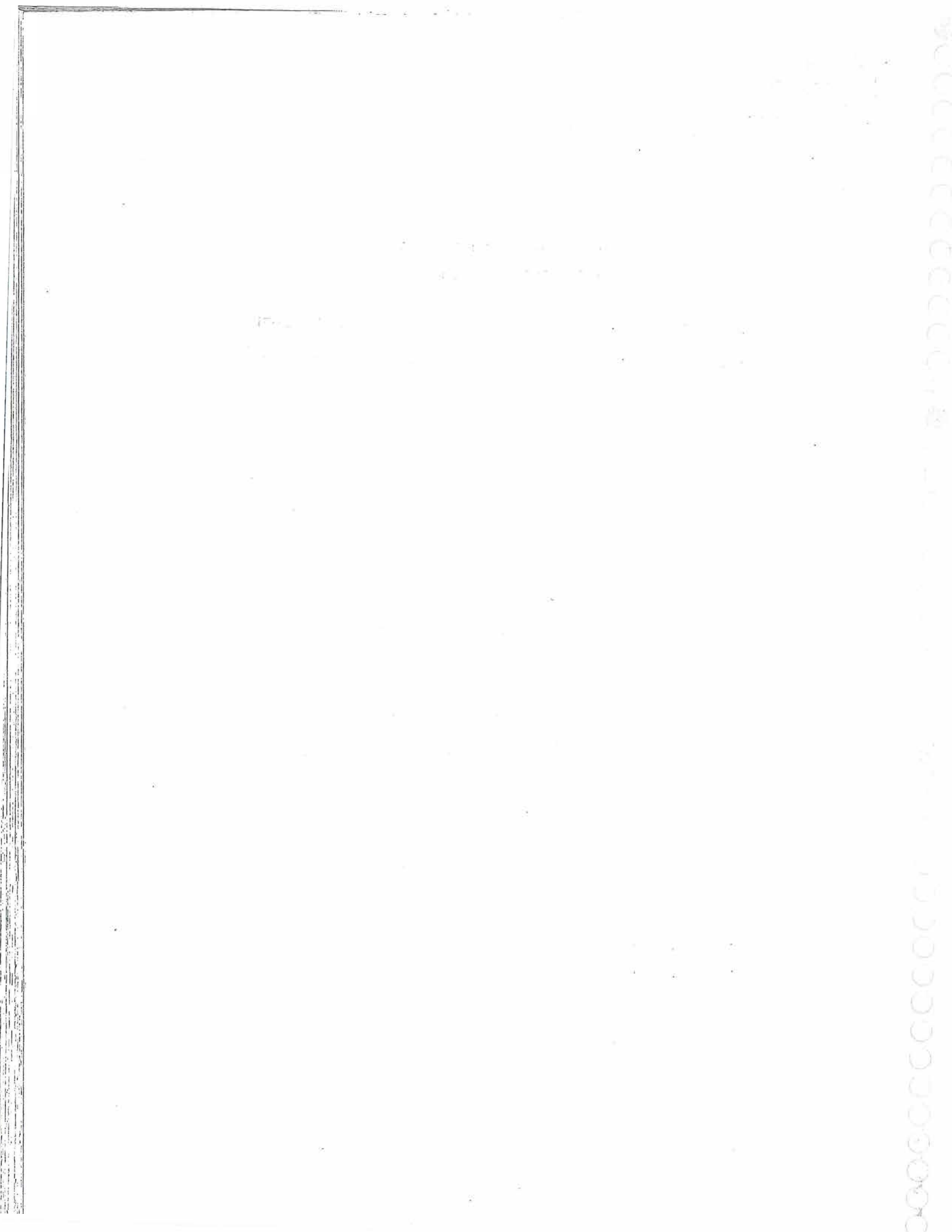




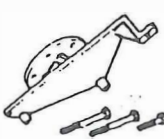
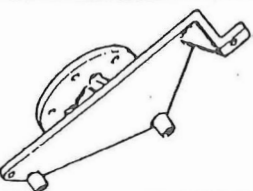

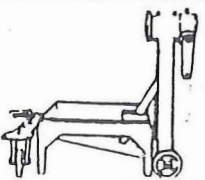
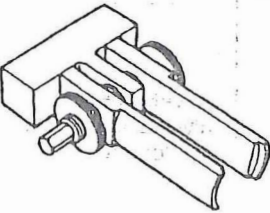
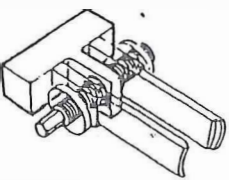
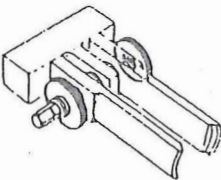
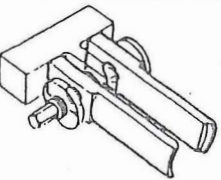
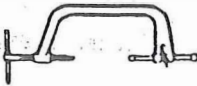
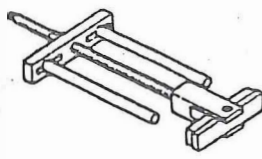
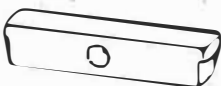

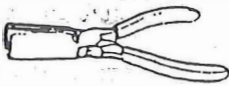

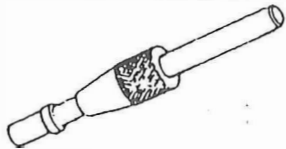
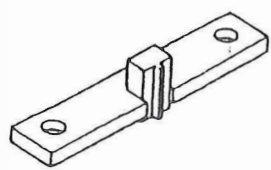


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**USER SUPPORT INFORMATION**

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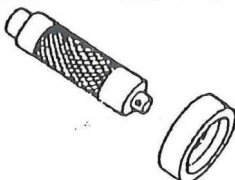
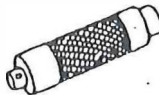

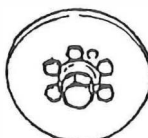
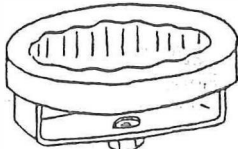
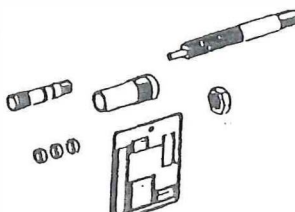
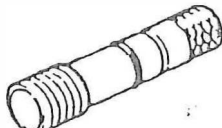

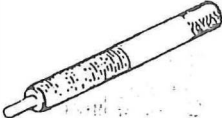



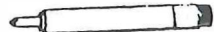
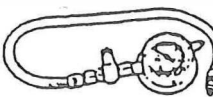
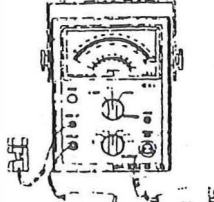


## SPECIAL TOOL LIST

Tool Part Number / Description	Illustration	Tool Part Number / Description	Illustration
9225423-01 Engine stand hanger		9225423-02 Body (component of 9225423-01)	
9225423-03 Bolt (component of 9225423-01)		9125483-05 Engine stand	
9225423-04 Pivot		9225423-05 Body (component of 9225423-04)	
9225423-06 Foot (component of 9225423-04)		9225423-05 Lock nut (component of 9225423-04)	
9125483-59 Valve spring lifter arm		9225423-08 Cylinder liner remover set	
9225423-09 Attachment		9225423-10 Coupling flange holder	
9225423-11 Valve seal remover		9225423-11 Valve guide installer	
9225423-13 Clutch disk centering tool		9225423-14 Ring gear brake	



## SPECIAL TOOL LIST

Tool Part Number / Description	Illustration	Tool Part Number / Description	Illustration
9225423-15 Oil seal installer		9225423-16 Handle (component of 9225423-15)	
9225423-17 Oil seal installer (component of 9225423-15)		9225423-18 Pulley puller	
9224473-00 Wrench oil filter bypass		9125483-56 Valve seal and valve guide installer set	
9125483-81 Installer (component of 9125483-56)		9125483-82 Body (component of 9125483-56)	
9125483-83 Installer (valve guide) (component of 9125483-56)		9125483-84 Nut (component of 9125483-56)	
9125483-87 Spacer (component of 9125483-56)		9125483-40 Piston pin installer	
9225423-19 Compression gauge adapter		9125483-40 Oil pressure gauge	
9125483-58 Tacho dwell tester			



## NOTES

