

## 1. Starter

| Trouble                                      |                                                           | Probable cause                                                      |
|----------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------|
| Starter does not start.                      | Magnet switch does not operate.<br>(no clicks are heard.) | Magnet switch poor contact or discontinuity of pull-in coil circuit |
|                                              |                                                           | Improper sliding of magnet switch plunger                           |
|                                              | Magnet switch operates.<br>(clicks are issued.)           | Poor contact of magnet switch's main contact point                  |
|                                              |                                                           | Layer short of armature                                             |
|                                              |                                                           | Contaminants on armature commutator                                 |
|                                              |                                                           | High armature mica                                                  |
|                                              |                                                           | Improper grounding of yoke field coil                               |
|                                              |                                                           | Insufficient carbon brush length                                    |
|                                              |                                                           | Insufficient brush spring pressure                                  |
| Starter starts but does not crank engine.    | Failure of pinion gear to engage ring gear                | Worn pinion teeth                                                   |
|                                              |                                                           | Improper sliding of overrunning clutch                              |
|                                              |                                                           | Improper adjustment of stud bolt                                    |
|                                              | Clutch slippage                                           | Faulty clutch roller spring                                         |
| Starter starts but engine cranks too slowly. |                                                           | Poor contact of magnet switch's main contact point                  |
|                                              |                                                           | Layer short of armature                                             |
|                                              |                                                           | Discontinuity, burning or wear of armature commutator               |
|                                              |                                                           | Poor grounding of yoke field coil                                   |
|                                              |                                                           | Insufficient brush length                                           |
|                                              |                                                           | Insufficient brush spring pressure                                  |
| Starter overruns.                            |                                                           | Abnormal brush wear                                                 |
|                                              |                                                           | Magnet switch coil is a layer short.                                |