

The variable vane turbocharger, fitted to the exhaust manifold, makes it possible to vary the exhaust gas flow of the turbine, dependent on engine operation. This improves the power transfer to the turbine wheel and compressor, particularly at low engine speeds, thus increasing the boost pressure. The guide vanes are opened progressively as the engine speed increases so that the power transfer always remains in balance with the required charger speed and the required boost pressure level. Variable vanes facilitate better use of the exhaust gas energy so as to further improve the efficiency of the turbocharger and thus of the engine, compared to the more conventional 'wastegate control'.

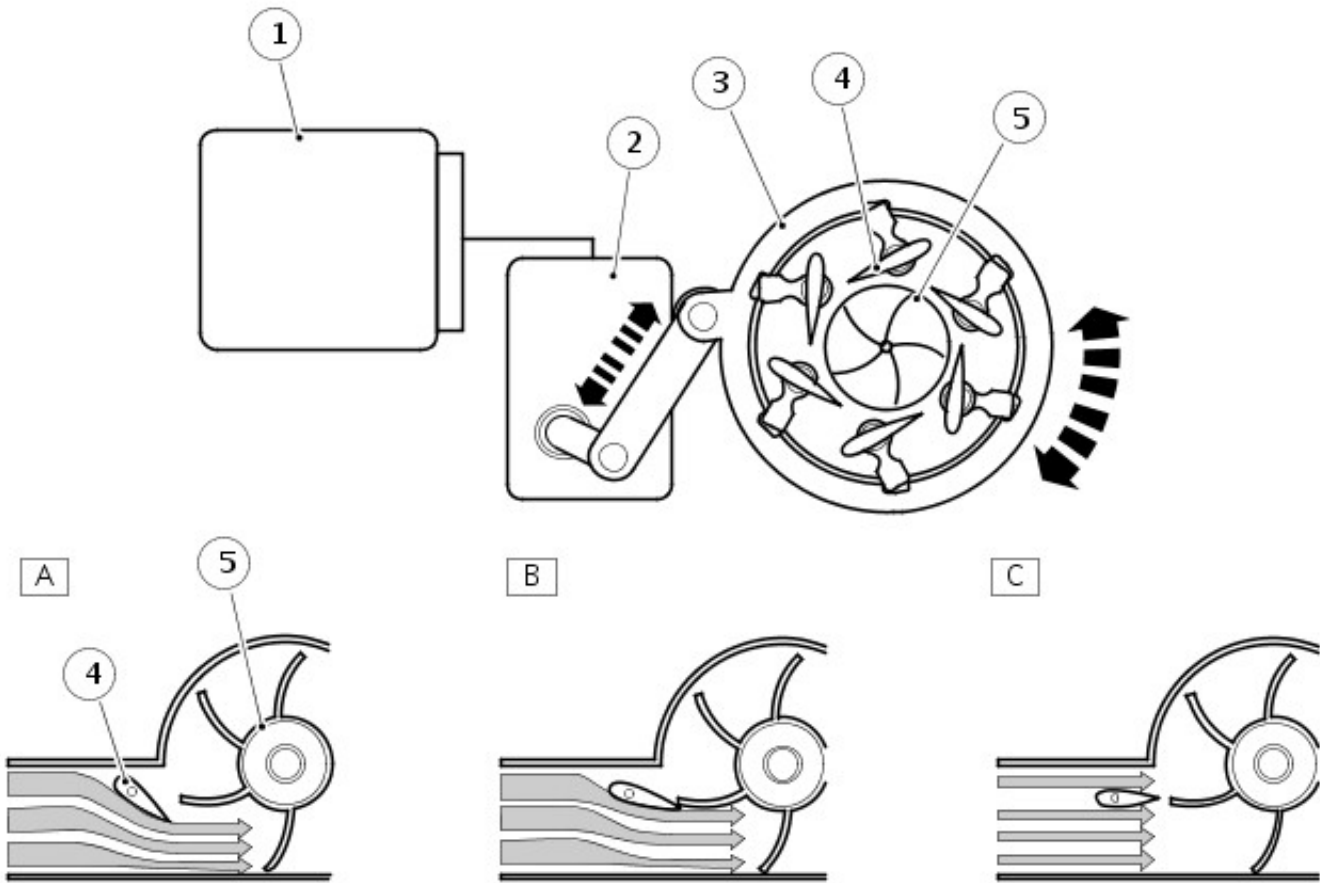
Advantages:

- High torque at both high and low engine speeds
- Continuous and optimum adjustment for all engine speeds
- No wastegate valve required, exhaust energy is better utilised, less back-pressure in conjunction with same compressor work
- Low thermal and mechanical load improves engine power output
- Lower emissions
- Optimised fuel consumption over the entire engine speed range

A Direct Current (DC) rotary actuator motor operates a drive shaft. The drive shaft is connected to the vanes by an actuating lever. Adjustment of the vanes is achieved by moving the actuating lever. When the drive shaft is turned, a signal is created at the end of the drive shaft; this feedback signal is used to determine the angular position of the vanes. This information is transmitted to the Engine Control Module (ECM).

The turbocharger is designed for fail safe operation. If a fault occurs regarding the control of the unit, the vanes default to the fully open position so as to produce minimum boost. The ECM detects any malfunctions in the stepper motor and generates Diagnostic Trouble Codes (DTC).

PRINCIPLES OF OPERATION



E80503

| Item | Part Number | Description |
|------|-------------|-----------------------|
| A | - | Low engine speed |
| B | - | Moderate engine speed |
| C | - | Maximum engine speed |
| 1 | - | ECM |
| 2 | - | Actuator motor |
| 3 | - | Adjusting ring |
| 4 | - | Vanes |