

### **STEP 1 – Review Installation Procedure**

Review online install videos by searching for, “*Remove Replace Install Valvetronic Motor Actuator Eccentric Shaft BMW N20 N55 S55 N54 Torque Specs*” to familiarize yourself with procedure and required tools.

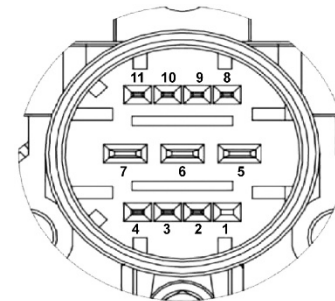


### **STEP 2 – Verify System Voltage**

Confirm that vehicle battery is above 12V. When installing and learning/matching the actuator, it is best to connect an external auxiliary DC power supply to battery to ensure consistent voltage.

### **STEP 3 – Check Voltages at Connector**

Confirm that the voltages at the actuator connector are normal. Refer to diagram for allowable ranges. If the voltage of any connector pin socket is insufficient or exceeds the specified voltage, the computer board must be tested and repaired.



- **Battery:**  
12.5 - 13.5V
- **Pins 2/3/4/8/9:**  
4.5 - 5V
- **Pin 10:**  
0V
- **Pin 11:**  
+5V

### **STEP 4 – Check for Fault Code 2DE1**

Prior to installation, connect new actuator to vehicle wiring harness. When vehicle is powered on, the actuator worm gear will rotate. Due to lack of engagement with the teeth on the eccentric shaft, the actuator will exceed its normal range, triggering a fault code. Ignore this code. Instead, check for fault code **2DE1**, which means “*signal unreliable*” or “*signal sensor short circuit or open circuit*”. If new actuator has good signal (code 2DE1 is not present), proceed with installation per factory repair manual.

### **STEP 5 – Evaluate Eccentric Shaft Gear Wear**

Ensure that the oil squirter is not clogged and oil can flow freely. If necessary, replace a worn or sticking eccentric shaft assembly per the factory repair manual. An *Intermediate Lever Spring Tool* will be required; do not use zip ties to restrain springs. If the eccentric shaft is not installed properly, the following issues may appear when installing the tile cover locking screw: deformation of the tile cover, non-concentricity of the eccentric shaft, and/or damage to the bearings.

Do not polish or grind the limit block screws, or install washers if the eccentric shaft gear angle exceeds the limit. Because the servo motor is a three-phase brushless motor, these modifications may result in excessive motor current and damage to the vehicle’s DME computer board.

### **STEP 6 – Actuator Gear Mesh**

The actuator worm gear must mesh with the eccentric shaft fan teeth during installation. Use the #4 hexagonal rotation motor shaft top hole to rotate the teeth of the eccentric shaft as needed. Ensure that the actuator worm gear and fan teeth rotate smoothly and without any obstruction or stickiness.



Installation by a professional technician is recommended. Refer to the factory repair manual for vehicle-specific service procedures for this part. Tighten all hardware to factory torque specifications and observe all repair manual cautions and warnings. Use safety stands whenever beneath a vehicle and always wear protective eyewear.

Confirm that the eccentric shaft limit pin is intact, is not bent or deformed, and has not been modified in height. Any deviation from factory specification will affect the learning and matching of the actuator.

### **STEP 7 – Actuator Learning and Matching**

After installation of the actuator, connect wiring connector and perform actuator learning and matching per factory repair manual, which includes learning stop limits.

If the position limit learning fails:

- For older vehicles (especially pre-2013), use diagnostic tool to check the software version of the computer board. If earlier than version 10-09-511, update software module for the servo motor.
- Check the condition of the wiring connector to ensure good electrical contact between the wiring harness and pins in the actuator socket. If necessary, the pins inside the actuator socket can be pulled out and clamped to ensure good contact with the pins inside the motor interface.
- If stop limit learning is not successful, the gear teeth between the actuator and the eccentric shaft may experience continuous tapping/rattling during extreme learning, or fault codes **2D42** and **2DD6** may appear.

Perform the following steps to resolve tapping/rattling/codes during learning:

- Lubricate the worm gear and fan teeth with engine oil. Run-in the gear and fan teeth (manually or electrically) is to make the meshing of the gear and teeth smoother and meet the accuracy requirements of the computer board.
- After completing 100-150 break-in cycles, retry learning extreme positions.
- If the learning still cannot be passed after running-in gears for 300-500 cycles, please contact URO Tech Support regarding replacing the actuator with another new unit.

Note: If there appears to be a problem with the actuator, do not immediately consider it defective. The Valvetronic system requires a high level of precision, and must be adjusted according to the mechanical and electronic software requirements of the entire system.

### **STEP 8**

After successful actuator installation and learning/matching, reinstall valve cover and associated components per factory repair manual.



Installation by a professional technician is recommended. Refer to the factory repair manual for vehicle-specific service procedures for this part. Tighten all hardware to factory torque specifications and observe all repair manual cautions and warnings. Use safety stands whenever beneath a vehicle and always wear protective eyewear.