

Knowledge Domain: Motors

Unit: Lovejoy

Skill: Sheared Key

Tools and Parts Required:

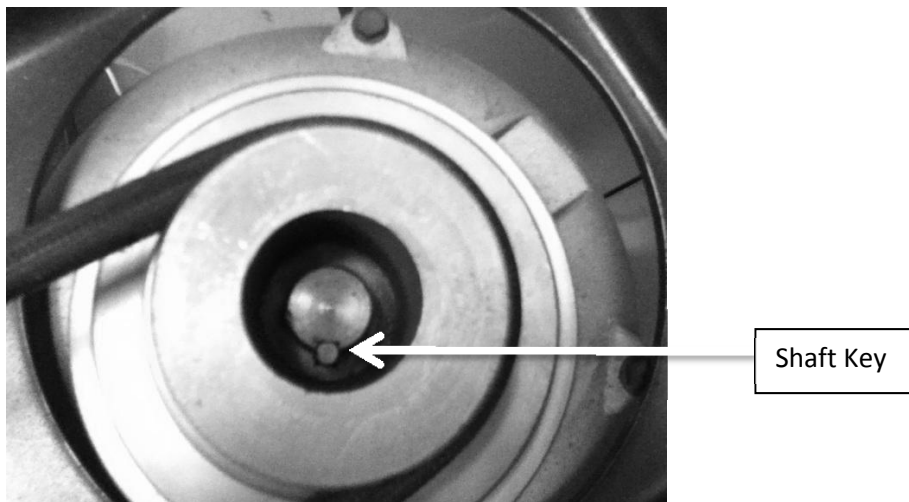
- 1) The motor to be inspected**
- 2) Screw driver**
- 3) Power supply**
- 4) Work gloves**

Introduction

The key is a small metal part connecting a rotor/pulley to the shaft of a motor. The key transmits force (torque) between the shaft of a motor and the rotor/pulley. The key prevents relative motion between the shaft of a motor and the rotor/pulley. The key is generally manufactured from mild steel. Keys can be identified by dimensions. Keys are available in a variety of imperial and metric sizes.

Example

The key is located at the end of the motor shaft where the rotor/pulley connects to the shaft of the motor. The picture below shows a shaft key.



Identification and Diagnosis

A sheared key is a frequent problem for motors. Shear force cuts through a material. Shear forces from the torque of the motor and friction from the load cause a sheared key. A sheared key effectively becomes two keys. Neither of these key parts is big enough to fill the key slot.

A sheared key can result due to:

- Fatigue or over-load

- Key material too soft (improper repair or replacement)
- Incorrect key size

A motor with a sheared key can show a wide range of symptoms. You should inspect motors to identify such symptoms. Some symptoms are listed in the Procedure section.

Procedure

Wear work gloves.

- 1) Run the motor with proper power supply and no load on motor.
- 2) Check for the following symptoms of a sheared key.
 - Motor not starting
 - Noisy operation of motor
 - Motor shaft wobbling
 - Lower output (low speed of motor shaft)
 - Overheated motor
 - Motor shaft rotating but rotor/pulley not rotating
 Shaft and pulley do not rotate in synchronization
- 3) If you find any of the symptoms of a sheared key, disconnect the motor from power supply.
- 4) Remove the casing of the motor by removing screws in casing with screw driver.
- 5) Observe the shaft of the motor.
- 6) Locate the key at the end of the shaft.
- 7) Determine whether the key is sheared or bent.
- 8) If the key is proper, there may be a different problem with the motor.

Exercise

Your instructor will give you a motor to be inspected. Follow the procedure above to determine whether the key has been sheared or bent.

Your instructor must verify your work before you proceed.

Take your findings to your instructor to know the severity of damage. Assess the mechanical condition of the key slot and the key. Then take your findings to a shop to find the proper replacement. Replacing a broken key with the wrong size may damage the key slot.

Preventative Maintenance and Calibration

In order to prevent shearing of the motor shaft key: Do not overload the electric motor. Do not subject the motor to sudden loads. Do not overheat the motor.

Always calibrate every medical device before returning it to use.