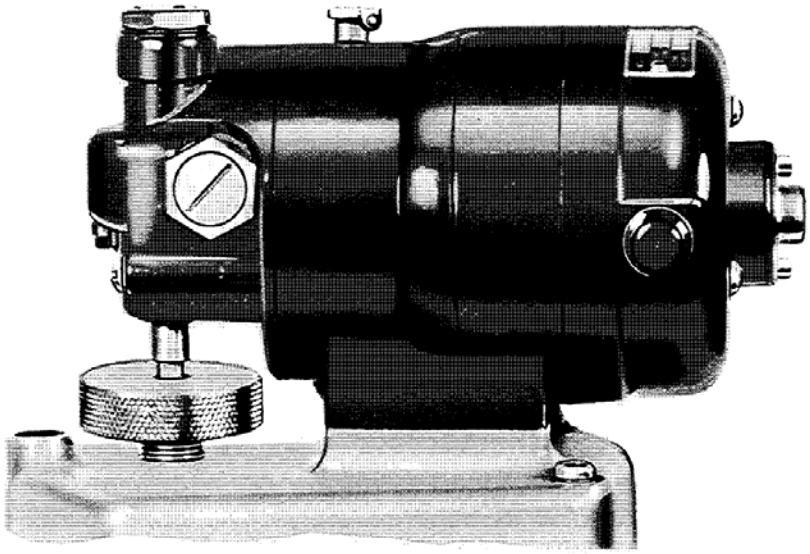
WOODWARD

Product Manual 03505
(Revision D)
Original Instructions



Speed Adjusting (Synchronizing) Motor

Parts Catalog and Lubrication Guide

Operation Manual

IMPORTANT

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DEFINITIONS

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

WARNING

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

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Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

NOTICE

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Speed Adjusting (Synchronizing) Motor

General Information

The motor most often used for speed adjusting or synchronizing purposes on Woodward engine and turbine controls is the Bodine type V10R motor with integral worm gear speed reducer. This manual describes the maintenance of these motors.

Lubricating Instructions

The following instructions apply to this motor model regardless of voltage input or output shaft speed.

Bearings

Use Royal A oil or a good 10 weight oil for bearing lubrication. Under normal, intermittent operation, apply 5 drops of oil to the oil hole and oil cup every year. If the motor is run for long periods of time, apply 5 drops of oil to the oil hole and oil cup every six months.

Speed Reduction Gearbox

The speed reduction gear housing of a new motor is filled with sufficient lubricant to last for two years under normal, intermittent operation. Under extensive use, when the motor is run for long periods of time, the lubricant will last about one year.

To replace grease, remove screws a, b, and c (see Figure 2) and slip off the gear housing, (see Figure 3). Clean out the old grease from the housing, and refill the gear housing 3/4 full with one of the following greases:

- Bodine Grease
- Supermil Grease No. A 72832, by Standard Oil Company
- Dow Corning Grease No. 44, when specified (temperature range is –40 to +400 °F/–40 to +204 °C)

Make sure the ball thrust bearing is reinstalled with the gear box.

Adjustments

Adjustments are unnecessary unless one of the locknuts securing the adjusting screws should loosen, changing the adjustment. In this case there are three adjustments possible with the gear housing removed.

1st Adjustment—At d of Figure 2, turn the screw in until it is hand tight, then back it off one quarter turn and tighten the locknut while holding the adjusting screw stationary. Rotate the bakelite gear (5 in Figure 2) to make sure it turns freely. Check the output shaft for endplay by pulling it in the lengthwise direction while holding the gear housing firmly. When adjusted properly, the output shaft should show no visible movement.

2nd Adjustment—At e of Figure 2 (both sides of the worm shaft), turn the worm adjusting screws to center the worm shaft with the output shaft. Check visually to determine proper alignment of the two gears. The worm adjusting screws should be positioned so each protrudes equally from its locknut when hand-tight. After hand tightening, the worm adjusting screws should be loosened just enough so that the bakelite gear (5 in Figure 2) turns freely and there is no side play in the worm shaft.

3rd Adjustment—With the gear housing reassembled on the motor, hold the motor firmly and shake it in a lengthwise direction. If a faint clicking sound is heard inside the motor, then an adjustment should be made. At f of Figure 3, with the locknut loosened, turn the screw in just enough to take the play out of the armature shaft. Adjust the screw so that the clicking sound is absent, then back the screw up a few degrees. Check by shaking the motor again. If the clicking sound is there again, adjust the screw forward approximately one-half the number of degrees it was reversed and tighten the locknut while holding the adjusting screw stationary. Check again, and with the absence of the clicking sound, this should be the approximate adjustment.

IMPORTANT

Do not bind the armature.

3rd Adjustment on Optional Bodine Motor Friction Loading Kit—This adjustment can be made only on V10R motors equipped with Bodine Motor Friction Loading Kits. This is shown in Figure 4. To take play out of the armature shaft, start with the adjustment screw loose and tighten until the motor slows. Then back up the screw until normal speed is just regained. Tighten the locknut while holding adjusting screw stationary.

⚠WARNING

This adjustment is not to be used to slow the speed of the motor. It is only used to take end play out of the armature shaft and to stop possible armature rotation caused by vibration from the engine when the motor is not powered.

Principal Replacement Parts

When requesting information concerning V10R Bodine Motors, or when ordering repair parts, it is essential that the following information accompany the request:

- Serial number of governor and motor type
- Voltage of motor
- Part number, name of part, or description of part
- Manual number (this is manual 03505)

Ref. No.	Part Name	Quantity
03505-1	Motor Brush	2
03505-2	Brush Spring	2
03505-3	Brush and Spring Assy.	2
03505-4	Worm Shaft	1
03505-5	Bakelite Gear	1
03505-6	Brushholder Cap Screw	2
03505-7	Brushholder	2
03505-8	Bronze Gear	1
03505-9	End Shield, Front	1
03505-10	Gear Housing Assy.	1
03505-11	Field Frame Assy. Complete	1
03505-12	Armature Wound Complete	1
03505-13	Output Shaft	1
03505-14	Ball Thrust Washer	1
03505-15	Spring	1
03505-16	Screw	1

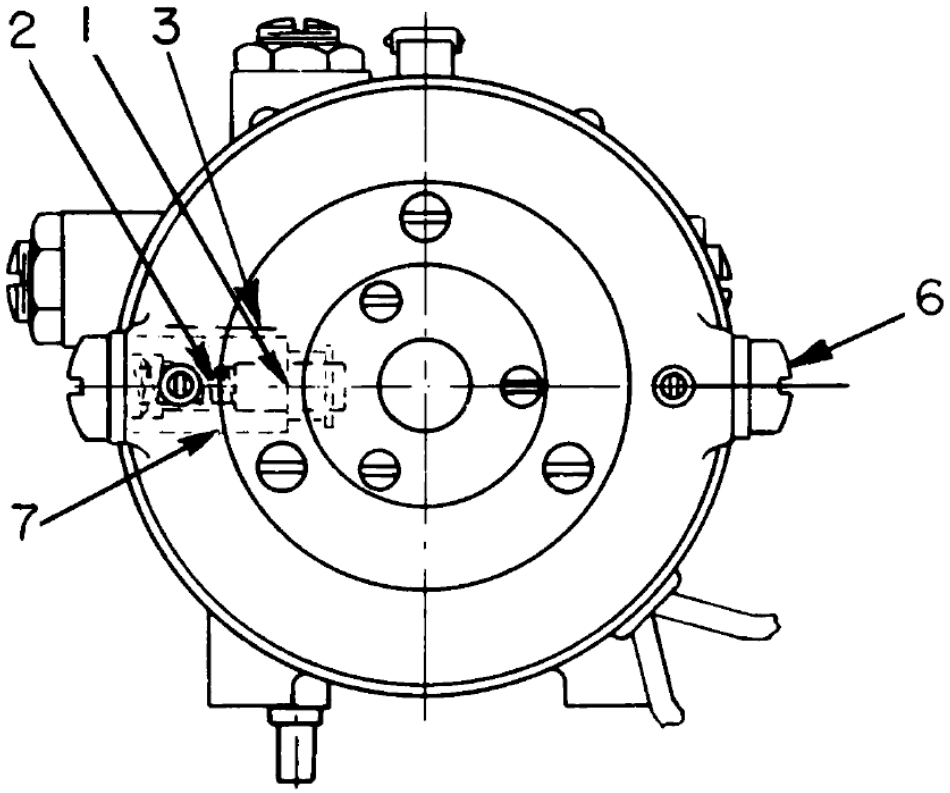

Figure 1

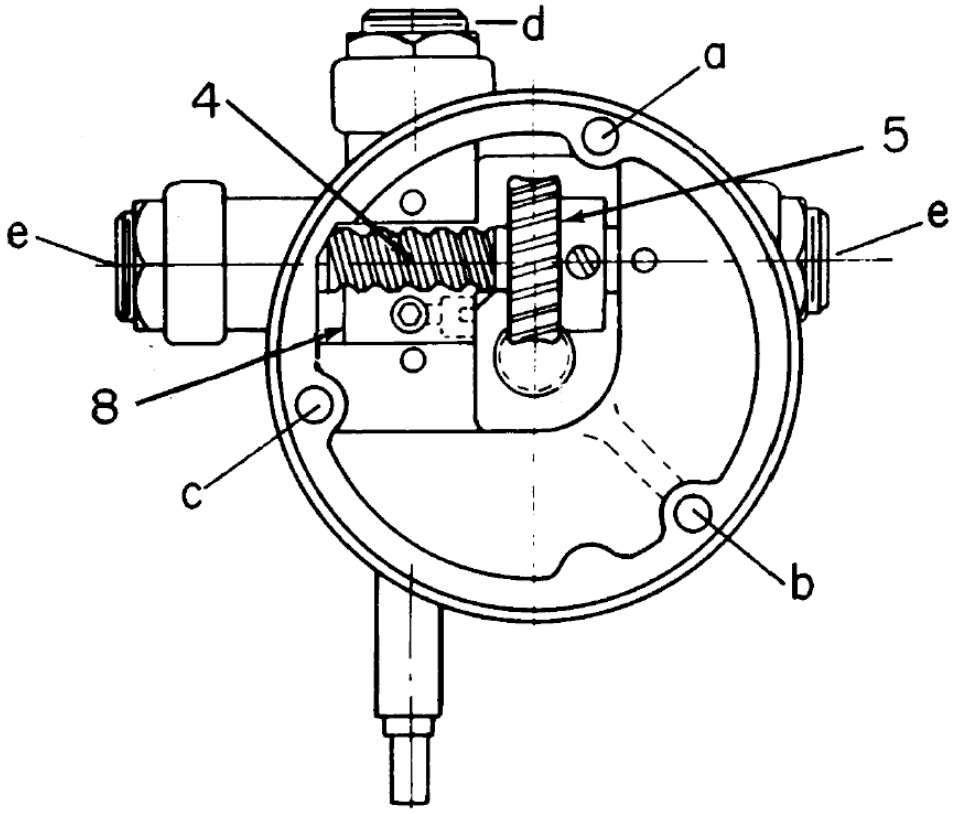

Figure 2

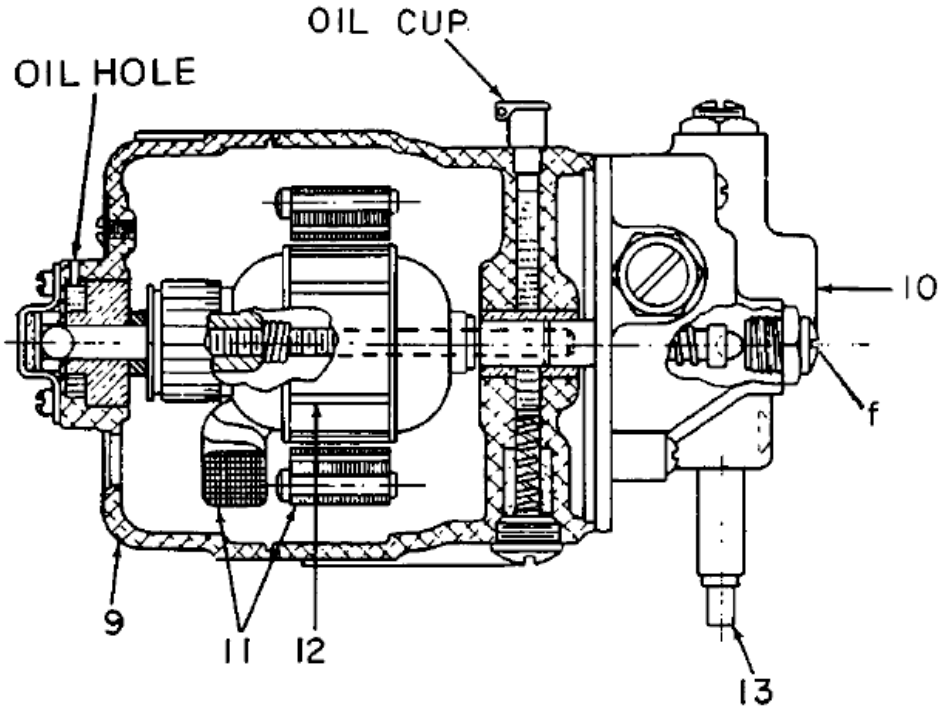

Figure 3

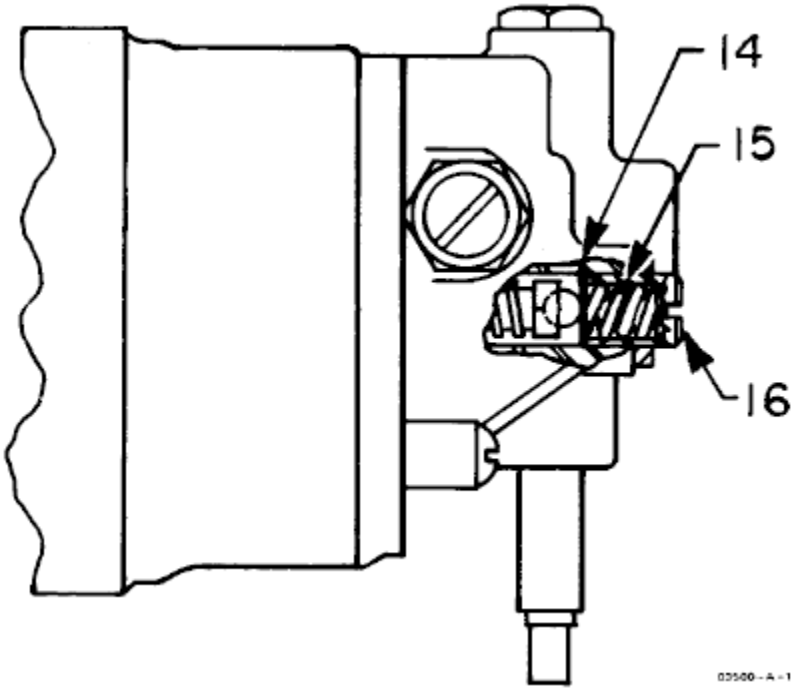

Figure 4

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 03505D.

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