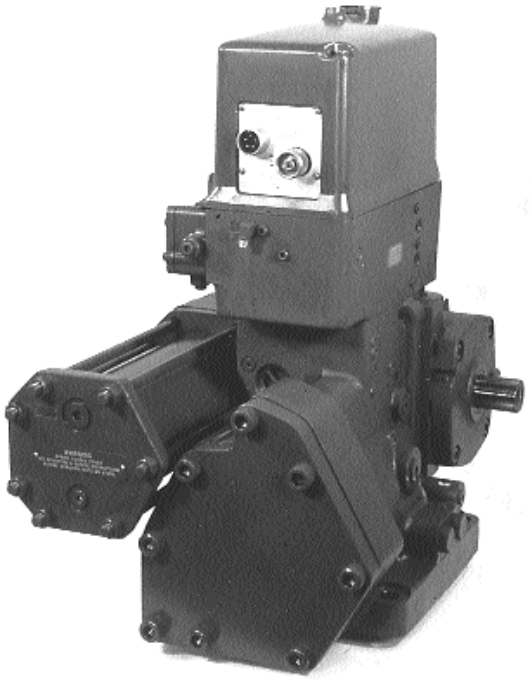
PG-500 Governor

Applications

The PG-500 Governor is designed to control engine speed and provide auxiliary functions for very large engines or steam turbines.



Description

The basic PG-500 is an assembly of a case, accumulator, and hydraulic amplification unit. It is designed to accept a PGA, PGL, PG-PL, PGD, PG-EG, or PGG column assembly to provide high work output and diverse auxiliary features.

A drive-shaft-driven, eccentric-gear oil pump and an accumulator supply the power-output section of the PG-500 with oil at 1931 kPa (280 psi). Pressure oil to or from the power cylinder is regulated by an internal relay valve to position the governor output. Excess oil from the accumulator is bypassed to sump through a pressurizer valve. This valve permits a heat exchanger to be added without modification to the PG-500.

A pressure-reducing valve supplies 690 kPa (100 psi) oil to the actual governing section of the PG-500. Standard PG governor parts are used in the governing section. A centrifugal ballhead and pilot-valve assembly regulates oil flow to and from the relay piston which positions the relay valve.

Governor stability is provided by an adjustable needle valve and buffer compensation system.

Optional Features

Governor Heat Exchanger
A remote heat exchanger is required to lower governor oil temperatures in applications where governor oil temperature will exceed 93 °C (200 °F) maximum.

Booster Servomotor
A booster servomotor may be used with the governor to help the prime mover start quickly by rapidly moving the PG-500 output toward the maximum fuel position at start-up.

Vibration-tolerant Accumulator
A vibration-tolerant accumulator is available to replace the standard accumulator on installations which suffer extreme vibration or shock. The special accumulator does not change the operation of the governor system. The special accumulator also makes disassembly and assembly of the accumulator safer.

Safety Shutdown and Alarms
All engine oil pressure and engine coolant safety shutdown features are available for use with the PG-500.

- 648 N·m (478 lb-ft) maximum work capacity
- All PG auxiliary features available
- Pressure compensation
- Self-contained oil supply
- Droop or isochronous operation

Specifications

Construction

Case and Base	Cast iron, internal parts are mild and case-hardened steels.
Weight	About 227 kg (500 lb). The weight of a unit depends on the PG governor and options selected.

Governor Drive

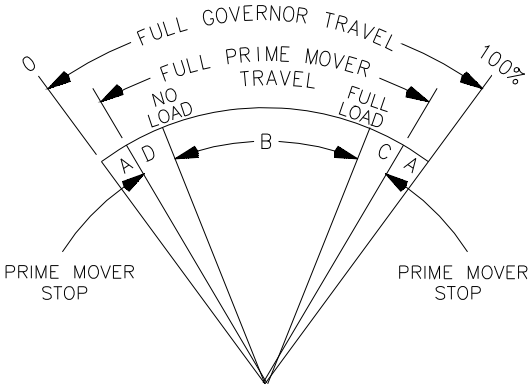
Drive Shaft	1.125-48 serration is standard. Splined or keyed shafts are optional. All drive shafts are solid case-hardened steel. See outline drawing for dimensions.
Rotation	Fixed clockwise, fixed counterclockwise, or reversible. Maximum speed range of 300 to 1600 rpm. Recommended speed range is 400 to 1000 rpm. Oil coolers may be required for governor operation at speeds in excess of 1000 rpm. (All speeds are governor drive speeds, not engine speeds.)
Drive Shaft Power	Required 2760 W (3.7 hp) at maximum speed and 27 °C (80 °F) operating temperature. 2052 W (2.75 hp) is required at 1400 rpm and 82 °C (180 °F) operating temperature.

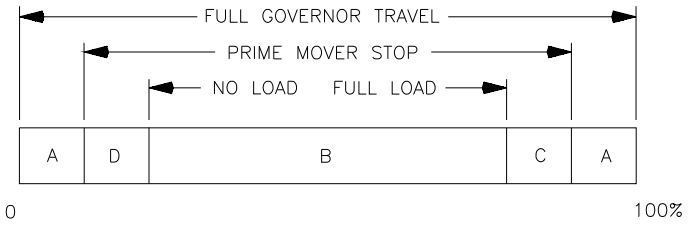
Hydraulic Supply

Oil Requirements	SAE 10 to 50, depending on operating temperature. 100 to 200 SUS viscosity at operating temperature. Self-contained sump holds about 6.6 L (7 qt). Most units operate with the same weight and grade of oil used in the engine being controlled.
Operating Temperature	Continuous operating temperature is between 60 and 93 °C (140 and 200 °F). Contact Woodward for operation beyond these limits. Hydraulic-fluid pour point must be below the lowest expected starting temperature. Ambient temperature –29 to +99 °C (–20 to +210 °F). Oil coolers may be required at upper ambient temperature limits.

Installation

Mounting Base	See outline drawing for dimensions. Installation must be vertical. See Woodward manual 36693, *PG Base Assemblies*.
Terminal Shaft	1.500 inch (38 mm) diameter, 60 serration terminal shaft on both sides.





A – OVERTRAVEL TO INSURE PRIME MOVER STOPS ARE REACHED.

B – NO LOAD TO FULL LOAD TRAVEL – NORMALLY 2/3 OF FULL GOVERNOR TRAVEL IS RECOMMENDED.

C – TRAVEL REQUIRED TO ACCELERATE THE PRIME MOVER.

D – TRAVEL REQUIRED TO DECELERATE OR SHUT DOWN PRIME MOVER.

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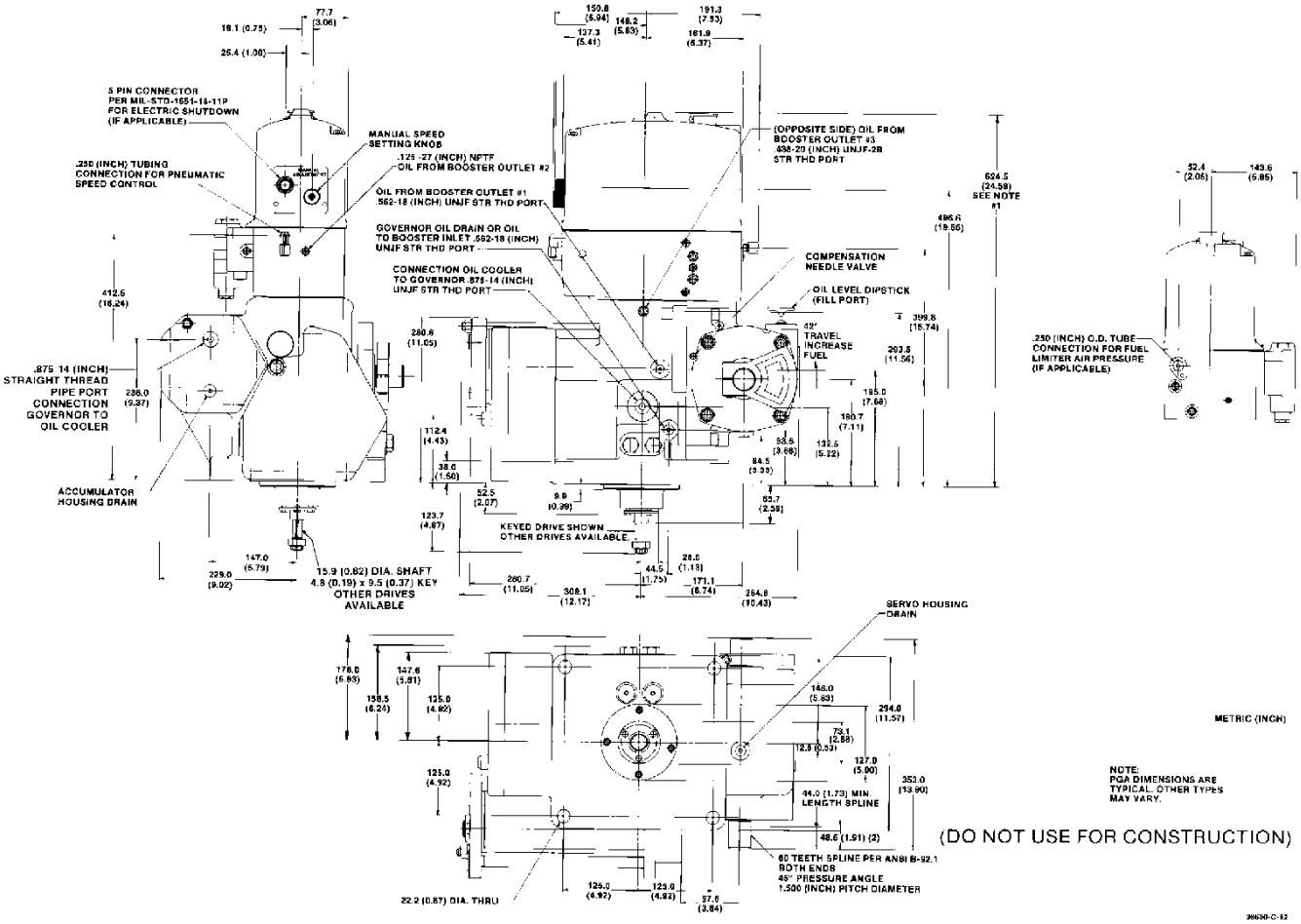
MAXIMUM WORK CAPACITY OVER FULL GOVERNOR TRAVEL OF 42° IS * . SEE ABOVE FOR RECOMMENDED GOVERNOR OUTPUT TRAVEL. IN SPECIAL APPLICATIONS MIN AND MAX PRIME MOVER STOPS MAY BE OUTSIDE THE GOVERNOR STOPS.

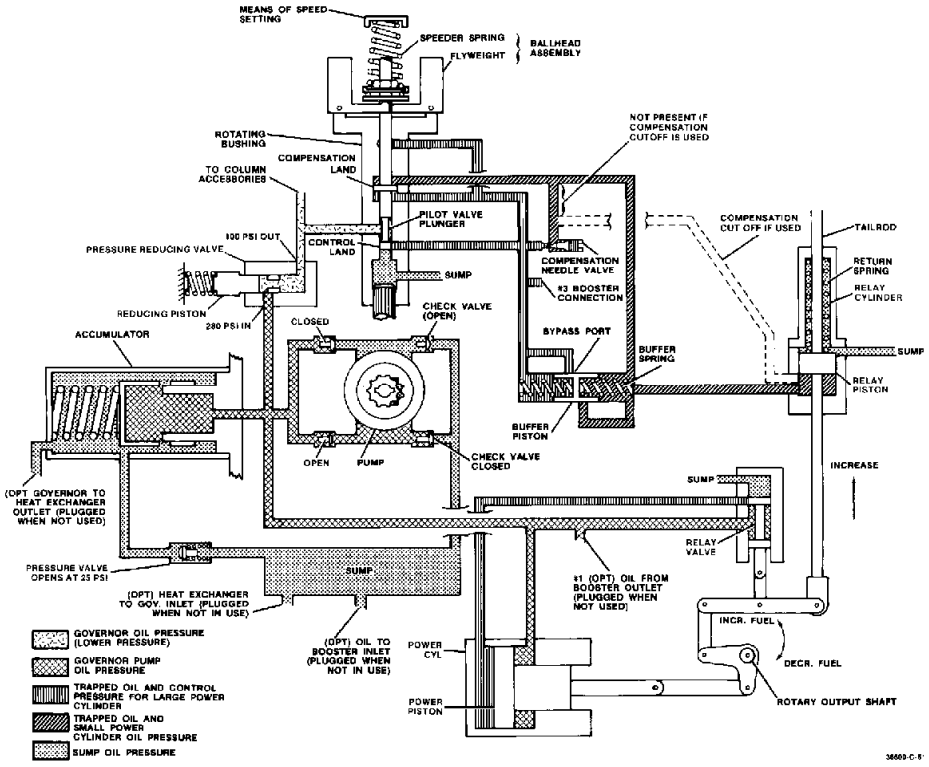
References

Pub. #

36036 *Starting Fuel Limiter for PG Governors*
36052 *Magnetic Speed Pickups*
36601 *Absolute Manifold Pressure Bias Load Control/Fuel Limiter*
36604 *PGA Governor*
36614 *PG Governor Dial Type Speed Setting*
36615 *PG Governor Lever Type Speed Setting*
36621 *PG Governor Speed Droop Linkage*
36630 *Basic Load Control System for PG Governors*
36640 *Extensible Tailrod for PG Governors*
36641 *Governor Oil Heat Exchanger*
36650 *Solenoid Operated Shutdown Assembly*
36651 *Pressure Actuated Shutdown Assembly*
36652 *Automatic Safety Shutdown and Alarms*
36653 *Pressure Actuated Shutdown for PGD and PGL Governors*
36661 *Manifold Gauge Pressure Fuel Limiter*
36662 *Torque Limit Control with Speed Droop*
36684 *Booster Servomotor*
36685 *PG Shutdown Solenoid*
36686 *Pneumatic Load Balance System for PGA Governors*
36694 *PG-PL Governors*
36695 *Manifold Air Pressure Bias Fuel Limiter*



Outline Drawing of PG-500 with PGA Column Assembly
(Do not use for construction)



Schematic Diagram of PG-500

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