

PGA Governor

Pressure Compensated Mechanical Governor

Applications

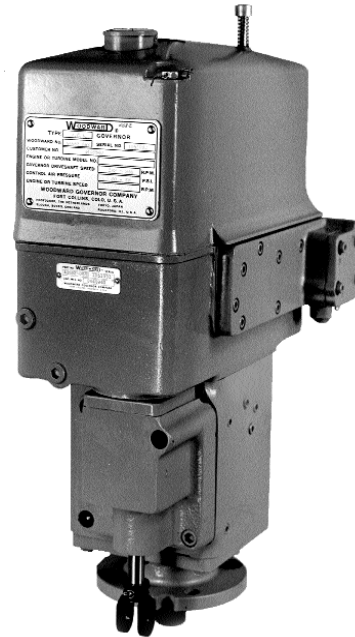
The PGA Governor controls speed or power output of prime movers used for propulsion, power generators, and propeller pitch on marine applications, locomotives, and off-road vehicles.

A wide variety of limiters and other accessories makes the PGA governor extremely versatile. The pneumatic speed reference setting makes the governor economical to install and easy to maintain.

The self-contained hydraulic oil supply makes the governor easily maintained in almost any installation environment.

Pneumatic Speed Setting

Standard system uses a 690 kPa (100 psi) system. A 1379 kPa (200 psi) system is optional.



- Isochronous or droop control
- 16 to 678 J (12 to 500 ft-lb) output capacities
- Rotary or linear output
- Integral power servos
- Pneumatic or manual speed setting
- Self-contained sump

Bellows Selection

Bellows	400 mm ² (0.62 in ²)	194 mm ² (0.3 in ²)	77 mm ² (0.12 in ²)
Max signal pressure kPa (psig)	138 (20)	138–345 (20–50)	345–827 (50–120)
Min signal pressure kPa (psig)	21 (3)	48 (7)	69 (10)

Description

The PGA is a pressure compensated, hydraulic governor that uses an air signal to establish the engine speed setting of the governor.

An internal oil pump, relief-valve, and accumulator system controls governor operating pressure. A self-contained sump stores oil and reduces the possibility of contamination from outside sources.

Oil flow to and from the governor power cylinder assembly is controlled by a centrifugal flyweight and pilot-valve assembly. The power cylinder (servomotor) positions the fuel racks, fuel valve or steam valve of the engine or turbine.

A pneumatic signal operates a bellows (direct or reverse) to change the engine speed setting of the governor. Manual speed adjustment may be made with a knob on the governor. An adjustable compensation system provides stability.

Optional Features

Optional features are used to adapt the PGA governor to most operating conditions and to control loads according to operating conditions.

Heat Exchanger

A heat exchanger helps maintain governor temperature below 200 °F. Governor temperature depends on ambient temperature, governor drive speed, operating internal pressure, etc.

Shutdown Devices

Lubricating oil pressure failure shutdown devices and air, oil, or water shutdown devices (either high or low pressure) can provide engine protection. An energize or de-energize solenoid shutdown device is also available.

Booster Servomotor

A booster servomotor, mounted externally, uses start air to supply immediate oil pressure to the governor as an aid for quick starts.

Starting Fuel Limiter

A starting fuel limiter limits fuel flow to the engine during starting.

Air Pressure Fuel Limiter

A manifold air pressure bias fuel limiter for turbocharged engines limits engine fuel during acceleration as a function of manifold air pressure. It reduces smoke and improves efficiency during acceleration.

Load Control

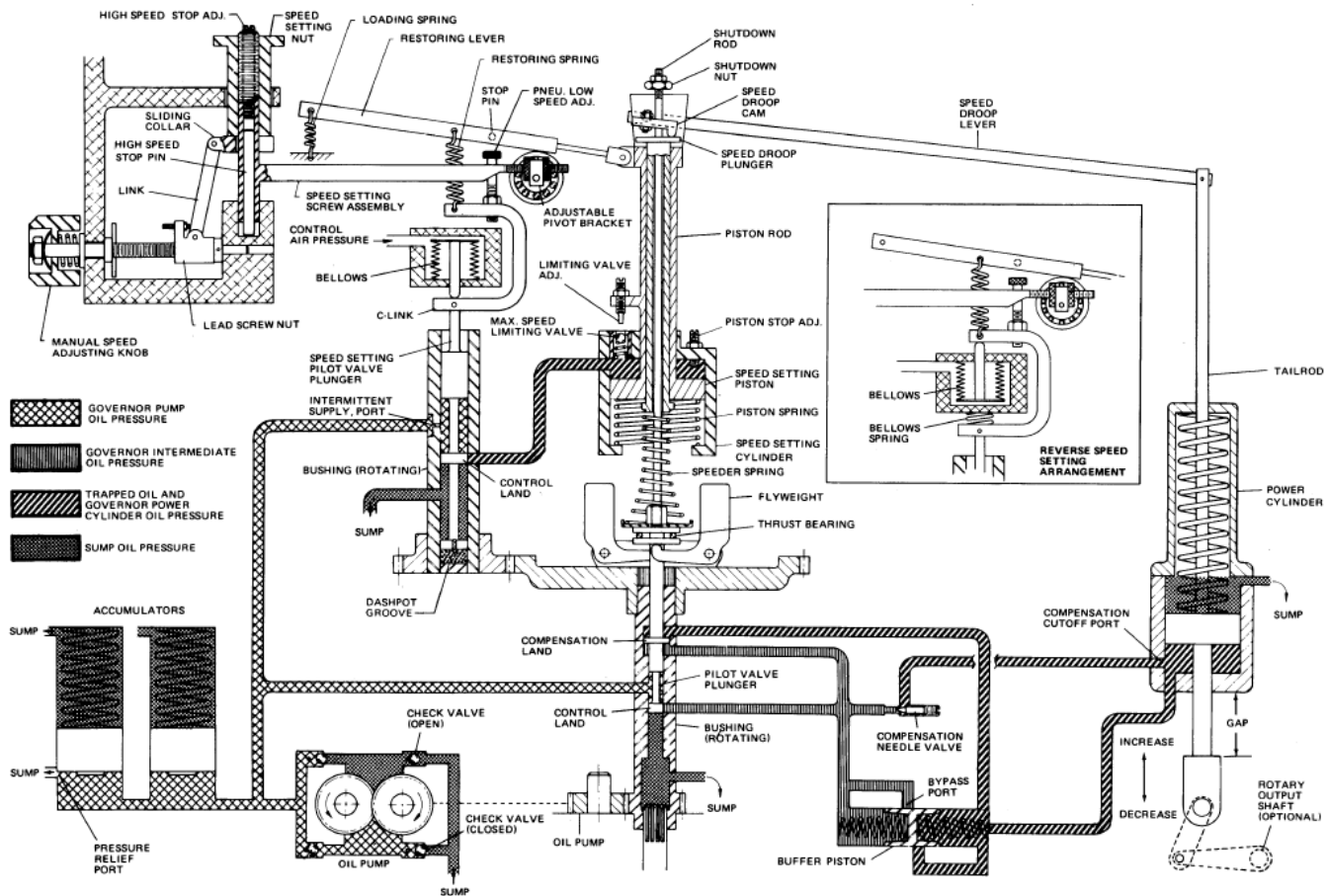
A load control system provides a definite fuel or governor output position for each specific governor speed setting and in turn controls the engine power output. Used in many marine applications.

Speed Setting Fuel Limiter

A speed setting fuel limiter linkage limits the maximum fuel setting to the engine as a function of governor speed setting.

Torque Limit Control

Torque limit control limits fuel as a function of engine speed. Available in standard and vibration resistant designs.



36600-B-11

PGA Governor Schematic Diagram

Specifications

Speed Setting

Manual	Control knob on governor
Pneumatic	Available in direct or reverse type. 21 kPa (3 psi) minimum and 690 kPa (100 psi) maximum control air pressure. Ratio of high to low air control signal to be greater than 2.5 to 1 but less than 10 to 1. Typical ranges are 21 to 103 kPa (3 to 15 psi) and 69 to 414 kPa (10 to 60 psi).
Speed Band	Steady state speed control at 0.25% of rated under normal operating conditions.

Governor Drive

Recommended Speed Range	1.125"-18 serrated or keyed 250 to 1000 drive rpm. Maximum speed range is 200 to 1600 rpm. Speeds in excess of 1000 rpm require single direction rotation. Oil coolers may be required.
Power	Drive power for different types of PG governors will vary depending upon speed, internal pump pressure, pump volumetric displacement, pump efficiency, and oil viscosity. Contact Woodward if further information is required.
Direction of Rotation	Fixed clockwise, fixed counterclockwise, or reversible

Output

Governor	Output can be located in most configurations
Linear	Output of 1 inch (25 mm) maximum, push or pull to minimum fuel
Rotary	Output 30° maximum travel. Use 2/3 of the available governor travel between no load and full load.
Work Capacity	Rotary output available from 16 to 678 N·m (12 to 500 lb-ft). 271, 407, and 678 N·m (200, 300, and 500 lb-ft) units have different governor outlines. Linear output available in 16 and 38 J (12 and 28 ft-lb) output only.

Hydraulic System

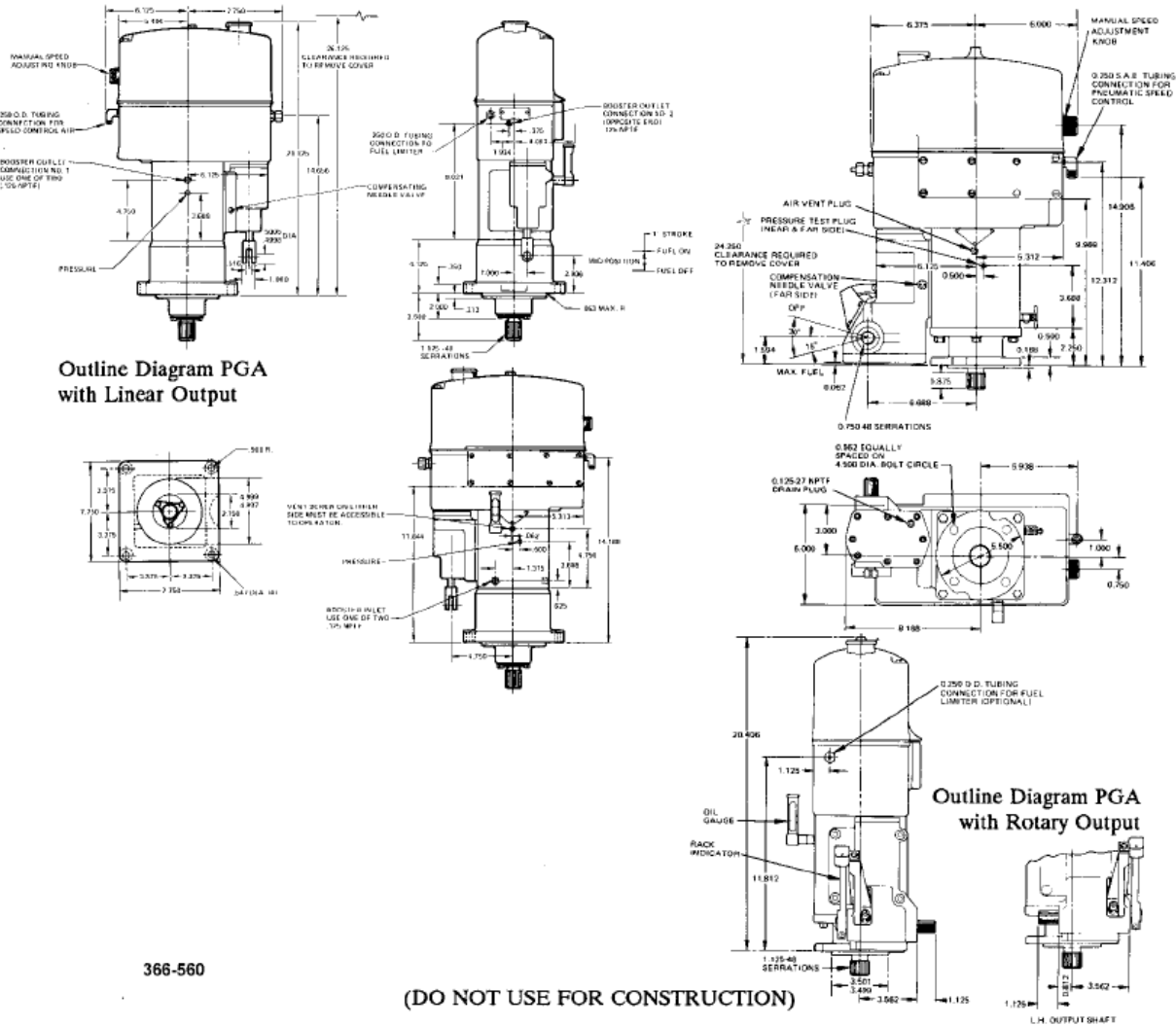
Sump Capacity	about 1.4 L (1.5 qt). Uses SAE 10 to 50 oil, depending on operating temperature. 100 to 200 SUS recommended under normal operating conditions.
Operating Pressure	690 kPa (100 psi) normal, 1379 kPa (200 psi) optional

Construction

Weight	39 to 54 kg (85 to 120 lb) for standard PGA governors, depending on optional features.
Case and Base	Cast iron, column is aluminum. Special pilot valve porting is available for difficult control conditions.

References

Publication	Title
36604	<i>PGA Governor</i> manual
36010	<i>PG Governor</i> product specification
36619	<i>PG 200 Governor</i> product specification
36634	<i>PG 500 Governor</i> product specification



Outline Diagram of PGA Governor with Rotary Output
(Do not use for construction)



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