

3161 GOVERNOR

For Control of Engines and Steam Turbines

APPLICATION

The 3161 governor is designed for speed control of diesel engines, gas engines, or steam turbines. The variety of standard features and available options makes the governor ideal for use in a wide variety of applications which require work capacity of up to 18 ft lbs. Applications include off highway vehicles, industrial, marine, generator set, compressor, or pump drives.

3161 operation can be isochronous for accurate constant speed or frequency control or droop for load sharing. The amount of droop may be changed internally or with an optional external lever.

The governor has its own sump for quick startup response. It can be fitted for engine oil supply to assure maintenance-free operation. Direction of rotation of the governor drive is set at the factory, but can be changed in the field by turning the pump housing.

Torque Rise to limit high speed torque, and Low Idle Offset to provide increased low speed, no load stability and reduce undershoot and stalling are among the many governor options.

DESCRIPTION

The 3161 is a mechanical hydraulic governor capable of droop or isochronous operation. A variety of speed setting, fuel limiting and shutdown options may be added to the cover of the governor, making it extremely versatile for a variety of installations.

The 3161 uses an integral gerotor pump, driven by the governor drive shaft to provide



hydraulic oil pressure. Oil pressure within the governor is maintained by a relief valve accumulator. Governor drive is 5/8" 36 or 5/8" keyed. The 3161 can be equipped with a standard UG8 base and standard UG8 terminal shafts.

A rotating ballhead and pilot valve plunger assembly controls the flow of hydraulic oil that operates the governor power piston and terminal shaft. A springdriven, oil damped ballhead is available to dampen high frequency, low amplitude torsional vibrations.

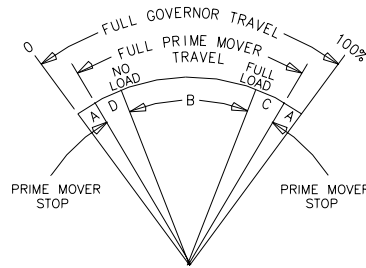
Pressure compensation provides governor stability. Compensation is adjustable with a needle valve to match governor response to the engine. Pilot valve bushing porting and special springs in the compensation system can be specified for particularly difficult installations.

- Isochronous or Droop Control
- Manual, Electric, Pneumatic Speed Setting Options
- Manual, Electric, Hydraulic Shutdown Options
- Fuel Limiting Options
- Torque Rise, Low Idle Offset Options
- Terminal Position Indicator
- Operates with Engine Oil or Self Contained Sump
- Directly Interchangeable with the UG8

SPECIFICATIONS

CONTROL CHARACTERISTICS

Steady State Speed Bandof less than $\pm 0.25\%$ of rated speed.
 Output Travelis 42° maximum. We recommend use of 60% to 70% of the travel from no load to full load.



- 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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WORK CAPACITY

Three work capacities are available:

- 7.5 ft-lb. maximum or 6 ft-lb useful with 100 psi internal operating pressure. Maximum stalled torque is 10 lb-ft.
- 15 ft-lb maximum or 12 ft-lb useful with 200 psi internal operating pressure. Maximum stalled torque is 20 lb-ft.
- 21 ft-lb maximum or 18 ft-lb useful with 200 psi internal operating pressure and larger servo. Maximum stalled torque is 28 lb-ft.

DROOP

Two ranges are available:

- Adjustable for a 0 to 5 rpm decrease in speed setting per degree of terminal shaft travel to increase fuel.
- Adjustable for a 4 to 9 rpm decrease in speed setting per degree of terminal shaft travel to increase fuel.

INSTALLATION AND CONSTRUCTION

Governordesigned for vertical operation, but can be tilted up to 45° from vertical.
 Standard Governor Drive5/8"-36 SAE serrations. 5/8" keyed drive shaft is also available.
 Terminal Shaft (Output Shaft)may be either or both sides. The location is the same as the UG8.
 100 Psi Governors.....have either 0.500"-36 SAE serrated or 0.562" diameter flatted output-shaft design.
 200 Psi Governors.....have either a 0.625"-36 SAE serrated or 0.625" diameter flatted output-shaft design.
 Case and Basecast aluminum. Internal parts are steel.

GOVERNOR DRIVE CHARACTERISTICS

Drive Shaft Rotation Directioneither clockwise or counterclockwise according to the orientation of the pump housing on the case.
 Maximum Drive Speed Rangesfrom a minimum of 400 rpm to a maximum of 1600 rpm. Constant speed operating range is from 1000 to 1500 rpm.
 100 Psi Governorrequires 1/4 hp maximum.
 200 Psi Governorrequires 3/8 hp maximum.

OIL SUMP CAPACITY

Governor Sumpholds 1.7 liters. The governor can be self contained or connected to engine oil. SAE 10 to 50 weight oil is recommended for governor operation.
 Viscosityat operating temperature should be from 100 to 300 SUS. In most cases the oil used in the engine is satisfactory for use in the governor.

VIBRATION RESISTANCE

Vibrationtested to tracked vehicle specifications.

WEIGHT

.....about 40 pounds. Exact weight determined by option package.

OPERATING TEMPERATURE

.....-20 °F to 225 °F (with proper viscosity oil).

OPTIONAL FEATURES

Most governor options are installed on the cover of the 3161 governor. The options can extend the overall height of the governor, as measured from the base, to 18.8 inches. The nominal height of the governor, without any options, is 14.33 inches.

SPEED SETTING

- Manual**0.500"-36 SAE serrated Speed Adjusting Shaft. Mechanical attachments typically use 15 to 20 degrees of the shaft's rotary travel for mechanical drive applications.
- Electric**uses a 24 Vdc permanent magnet motor. Polarity is reversed to raise and lower the speed setting. Separate voltage adapters are available to convert 115, 230 Vac and 32, 125, and 250 Vdc to the required 24 Vdc.
- Rate of Speed**setting change is typically 730 governor rpm/minute on a 24 V system.
- Pneumatic**standard pneumatic speed setting ranges are for 69/690 kPa, 34/310 kPa, and 69/413 kPa. 21/105 kPa is also available. The bellows in the pneumatic speed setting option can operate at pressures up to 828 kPa (120 psi). The pneumatic speed setting option can be designed for any pressure under the maximum.

BALLHEAD DAMPING

Solid Ballhead Driveis standard. A spring-driven, oil-damped ballhead is available.

GOVERNOR LIMITING

Manual Load Limiting and an extremely accurate Manifold Air Pressure fuel limiter (straight line schedule only) are available.

Torque Rise Limiters are available with precise dual or triple slopes. Torque Rise is used to limit high rpm torque allowing the engine to develop a broad, flat torque curve.

Low Idle Offset increases engine stability at low idle, no load by increasing droop when these conditions are present. This feature also reduces engine speed undershoot during rapid speed-setting decreases.

GOVERNOR SHUTDOWN

- Manual Shutdown**to initiate a shutdown, the threaded handle can be pushed down or tilted in any direction. It can be used in conjunction with the electric or pressure shutdown.
- Electric Shutdown**uses a 24, 32, or 76 Vdc electric solenoid, either energize to run or energize to shutdown. The electric shutdown can be used in conjunction with the manual or pressure shutdowns.
- Pressure Shutdown**40 psi air or hydraulic pressure causes shutdown. The device resets when pressure drops below 20 psi. It can be used in conjunction with the manual or electric shutdowns.

WOODWARD®

3800 N. Wilson Ave.
P.O. Box 3800
Loveland, CO, U.S.A.
80539-3800
Ph: 1 970-663-3900
Ph: 1 800-835-5182
Fax: 1 970-962-7050

www.woodward.com



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3161 GOVERNOR WITH SPEED SETTING, FUEL LIMITING AND SHUTDOWN FEATURES

For more information contact: