UG-40 Governor

Lever or Dial Type Speed Setting with Adjustable Droop

Applications

UG-40 governors are used for speed or load control of larger dual fuel, diesel, or gas engines or steam turbines with governor drive speeds of 350 to 1050 or 550 to 1300 rpm.

Governors with lever speed setting are primarily used for propulsion engines. Dial or motor speed setting is primarily used for power-generation installations.

All UG-40 governors have adjustable compensation. A pointer on the governor sets and indicates the amount of compensation. Compensation allows isochronous speed control. Compensation is temporary. A needle valve sets the speed at which compensation is removed from the governor speed setting. Special damped ballheads and spring-driven drives are available for engines with rough governor drives.

Droop is available in UG-40 Governors to allow load sharing between multiple engines or power generation against an infinite bus.

UG-40s have internal, self-contained oil supplies. The governors provide 38° of output shaft travel. Recommended usable rotation is 2/3 of the maximum, or 25°.

Description

Lever Governor
Engine speed on the Lever governor is set with a speed shaft having almost 90° rotation for the full speed range. Droop is adjustable from isochronous to 7.5% over the 38° of output on the high-speed governor and from isochronous to 9.5% over the full output travel of the low-speed governor.

Lever governors are "reversible", allowing use with reversing engines.

Dial Governor
The speed reference is set from a manual dial or with an optional speed-setting motor, mounted on top of the governor.

Droop is adjustable over the complete 38° terminal shaft rotation from 0 to 17.5% on the low-speed governor. Load Limit is set with an indicator dial to limit terminal shaft travel in the increase-fuel direction.

The Dial governor is "reversible", allowing use with reversing engines.

- Isochronous or droop control
- Dashpot compensation
- Adjustable load limit
- Lever, motor, or pneumatic speed settings
- Solid or damped ballhead
- Self contained oil sump
- Over 54 N·m (40 lb-ft of work

Optional Features

A number of special shutdown devices are available for both UG-40 governors. Electric shutdown solenoids are available in either the de-energize or energize type.

Pressure actuated air, oil, or water shutdown units are also available. These units operate with pressures of 69, 138, or 414 kPa (10, 20, or 60 psi).

A booster servomotor can be used to supply pressure oil to the governor at the instant starting air is supplied to the engine, where quick engine starts are required. A booster conserves starting air for the engine. It also improves maneuverability of vessels using direct reversible engines.

Special solid or spring-driven, vibration-damping ballhead assemblies can help match the UG-40 governor to a particular engine. The pilot valve bushing can have special "chopper" porting for slow response

in acceleration. Normal porting is either 2 slotted or 8 round. Contact Woodward to exactly match the bushing and ballhead with the engine being controlled.

Weatherproof cases are available to reduce contamination of the self contained oil sump.

An electric synchronizing motor may be mounted on top of the dial governor for remote speed control to match frequencies of an engine-driven alternator to other units of a system. Motors are available for all common voltages.

Governor speed can be monitored by using a tachometer and a magnetic pickup mounted on the governor. The pickup unit is available in a regular or explosion-proof model.

Reduced compensation is available when the compensation on a standard governor is too large to match the characteristics of the prime mover.

Optional Features Specifications

Speed Setting

Dial Type	Manual speed setting with dial or remote with motor of 12, 24, 32, 48, 64, or 125 Vdc; 115 or 220/250 Vac/Vdc universal.
Lever Type	Speed is set by rotation of speed setting shaft on governor. Lever is normally attached to the speed setting shaft, and rotation is determined by cable to remote speed setting location.

Governor Drive

Drive Shaft	Standard 1.125 inch - 48 SAE serration or optional 0.187 wide x 0.094 deep x 1.500 long keyway on 0.625 diameter shaft to carry gear held by .625-18 castle nut (all dimensions in inches)
Drive Power Requirement	373 W (0.5 hp) at normal speed and temperature
Rotation	Clockwise or counterclockwise

Speed Ranges

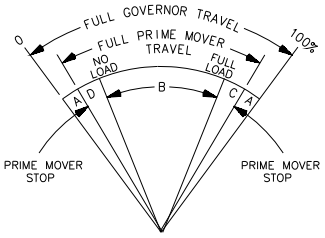
Low Speed Governor	350 to 1050 rpm maximum; recommended constant speed operation 800 to 1050 rpm at rated engine speed
High Speed Governor	550 to 1300 rpm maximum; recommended constant speed operation 950 to 1300 rpm at rated engine speed
Steady State Speed Band	±0.25% of rated speed

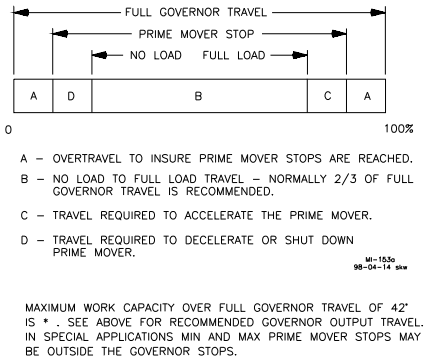
Technical Manual	03039

Specifications

Output

Terminal Shaft	SAE 0.750 inch - 48 serration; may extend from either or both sides of the governor
Linkage	The relationship between engine-torque output and governor terminal-shaft travel should be linear. This is very important for gas or dual-fuel engines.





Pilot Valve

Plunger Movement	Balanced between ballhead centrifugal force and speeder-spring force. Compensation and Load Limit both affect relationship between ballhead force and pilot-valve-plunger location.
Bushing	The pilot-valve bushing is rotated to overcome friction between the bushing and plunger. Porting in the bushing can be designed to match characteristics of particular engines or governor drives.

Hydraulic System

Governor Oil	Self-contained sump, 5.7 L (6 qt) capacity. SAE 10 to SAE 50 is recommended with a viscosity of 100 to 300 SUS at operating temperature.
Pressure	1724 kPa (250 psi) maintained by relief valve in the accumulator system.

Droop and Compensation

Droop	Droop is adjustable. All percentages are based on total speed change between no load and full load across 38° of terminal-shaft travel. Actual droop will be less since full travel is not recommended.
Dial Governor	0 to 14.0% at 1000 rpm (high-speed governor) 0 to 17.5% at 800 rpm (low-speed governor)
Lever Governor (optional)	0 to 7.5% at 1000 rpm (high-speed governor) 0 to 9.5% at 800 rpm (low-speed governor)
Compensating Adjustment	Exterior adjustment can be used while governor is controlling engine operation. Adjustment determines amount of offspeed which occurs with load changes.
Needle Valve Adjustment	Effective needle valve opening of up to 3 turns is made in conjunction with compensating adjustment. Adjustment of the needle valve determines the duration of offspeeds which occur with load changes.

Operating Temperature

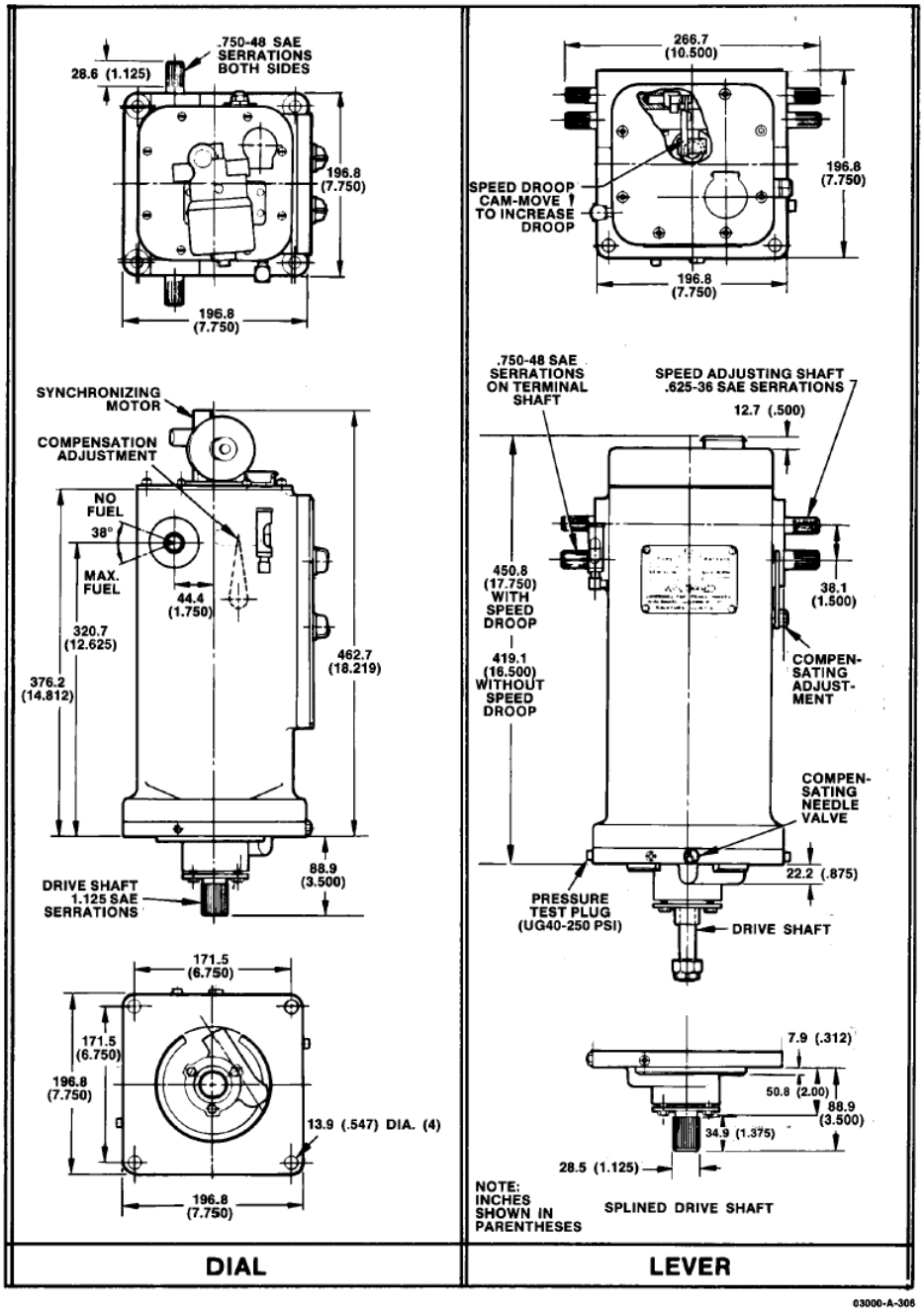
–29 to +99 °C (–20 to +210 °F). Oil must be matched with operating temperatures. The selection of the proper oil to match governor operating conditions is important. Manual 03039, *UG 40 Dial and Lever Governors*, has extensive information on the selection and maintenance of the oil used in the governor.

Governor Construction

Case, Base, and Cover	Cast iron. Interior parts are made of stainless steel, steel, and case-hardened steel as needed to provide the longest-lasting construction.
Weight and Installation	Dial Type: 45 kg (100 pounds), 46 kg (102 pounds) with synchronizing motor. Lever Type: 43 kg (95 pounds). Selection of options can affect weight.

Installation

Configuration	Vertical to 45° (servo down).
Studs	12.70 mm (0.500 inch) diameter (4), not furnished.



UG-40 Governors
(Do not use for construction)

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