

UG MAS Governor

(UG-8/UG-40 with milliamp speed setting)

Applications

The UG MAS (UG with milliamp speed setting) controls the speed or power of prime movers used for propulsion, locomotives, pumps, and compressors.

The UG MAS speed-setting governor is a generic module. It can be used on most engines with a UG drive.

The UG MAS consists of a standard UG Dial governor equipped with a special cover assembly and a separate electronic driver box.

Standard Features

The UG MAS is a pressure compensated, hydraulic governor designed to accept a standard 4–20 mA electrical current signal to set the speed of the governor.

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

Oil flow to and from the governor power cylinder assembly is controlled by a ballhead and pilot-valve assembly. The power cylinder positions the fuel rack, fuel valve, or steam valve of the engine or turbine. Governor stability is provided by an adjustable needle valve and a spring-loaded buffer compensation system.

A separate UG MAS electronic driver box receives the 4–20 mA speed signal. This input signal is set to correspond to the required speed range using two potentiometers. The driver actuates a stepper motor that moves the speeder rod. The position of the speeder rod determines the compression of the speeder spring, which determines the speed set point.

The position of the stepper motor and the speeder rod is fed back to the driver by a position sensor coupled to the motor.

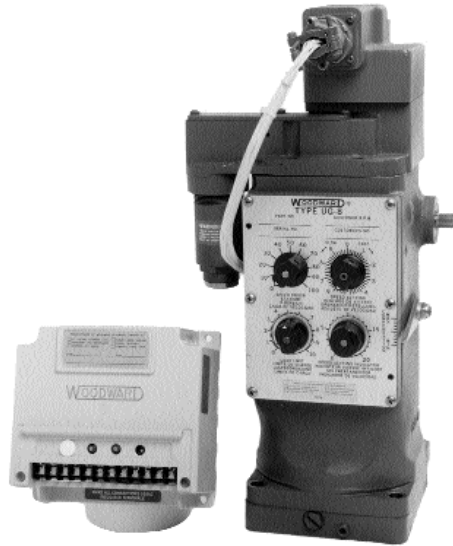
Two potentiometers on the driver box separately set the ramp-up and ramp-down rates of the speed-setting actuator.

A knob on the governor provides a means of manual speed setting. During electrical operation, this manual speed setting follows the electrical speed setting. On loss of electric power, the governor speed remains at the last speed setting. This set point can be changed with the manual speed setting.

Speed Droop permits load division and balancing among prime movers operating in parallel to drive a common shaft. Speed droop can be set with a knob on the front panel.

A Minor Alarm contact on the driver box can be used to limit the maximum speed setting (for example, in case of low lube oil pressure or high cooling temperature). This reduced speed setting is adjustable with a potentiometer in the driver.

Mechanical end stops for the minimum and maximum speed are easily adjustable.



- Speed setting with standard 4–20 mA signal
- Manual speed setting
- Isochronous or droop control
- Minor alarm contact limits max speed in case of emergency
- Easily adjustable end stops

Optional Features

For quick starts, a booster servo motor is available to supply immediate oil pressure to the governor. This conserves engine starting air.

Various base assemblies are available to conform to the engine or turbine manufacturer's specifications.

An energize or de-energize solenoid shutdown device is available for engine protection. Air, oil, or water shutdown devices are not compatible with this speed setting mechanism.

Specifications

Electronic Driver Box

Power Supply	24 Vdc nominal (18–32 Vdc)
Current Signal	4–20 mA into 250 Ω
	At 24 Vdc, current is approximately 0.8 A when the motor is stationary and approximately 2.0 A when changing the motor position. The peaks at the moment the motor starts are slightly higher than 2 A.
	At 18 Vdc, fuse at 4 to 5 A
Connection	13-contact terminal strip
Accuracy	Within 2% of speed range
Linearity	Within 2% of speed range
Temperature	–30 to +70 °C (–22 to +158 °F)

Governor

Speed Range	375–1500 rpm; adjustable between 350 and 1000 rpm
Ramp-up Rate	Adjustable from 0.2 s/100 rpm to 1.5 s/100 rpm
	A control knob on the governor provides manual speed setting.

Governor Drive

Input Shaft	Keyed or 5/8–36 serrated for UG8
	Keyed or 1.125–48 serrated for UG40
Rotation	Clockwise or counterclockwise
Drive Shaft Power	(see table below)

Work Output

Terminal Shaft and Work Capacity	(see table below)
Work Capacity	When making connection to the engine or turbine linkage, use 2/3 of the available governor terminal shaft travel between no load and full load. Split overtravel at each end to ensure that the governor can shut down and give maximum fuel.

Hydraulic System

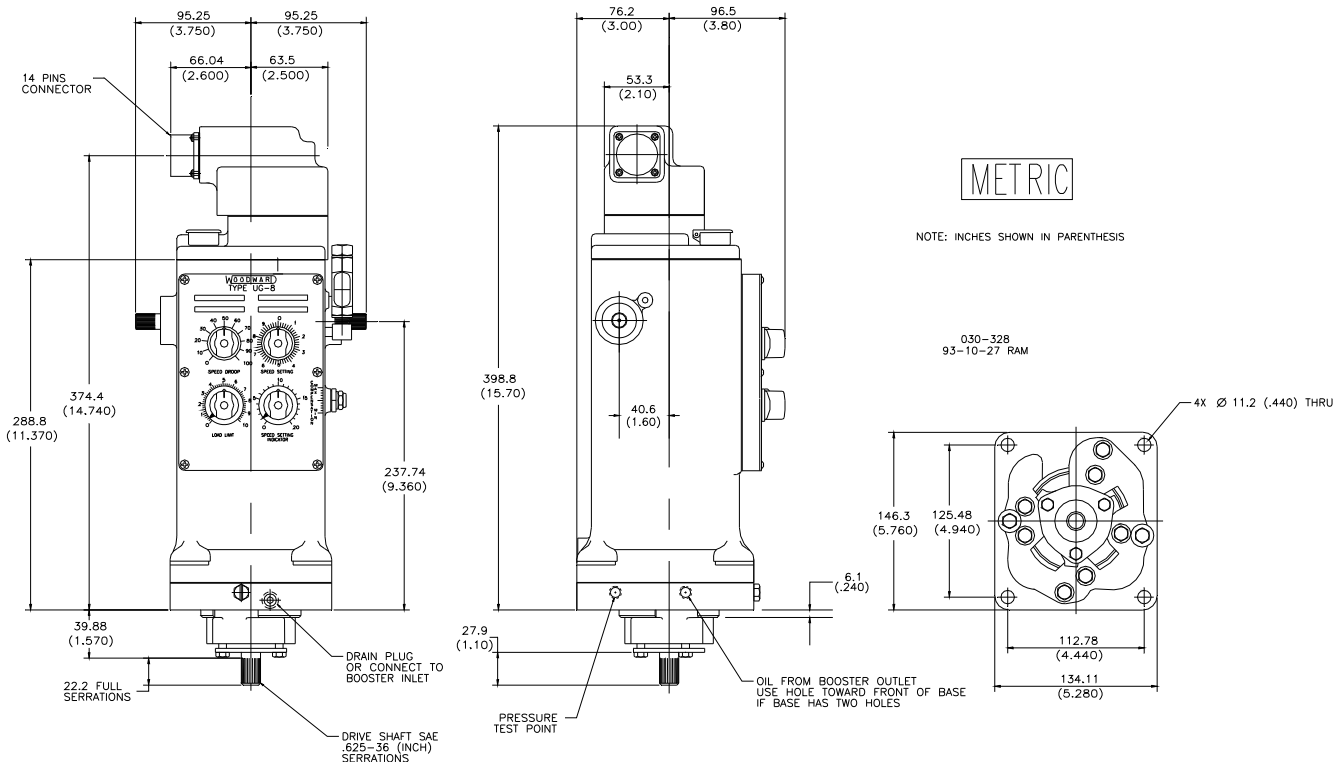
Oil	Self-contained sump (2 qt/1.9 L for UG8 and 6 qt/5.7 L for UG40 capacity). SAE 10 to 50 weight is recommended with a viscosity of 100 to 300 SSU, 15 to 70 CTS.
Operating Temperature	Continuous operating temperature is 60 to 93 °C (140 to 200 °F). Consult Woodward when operating beyond these limits.
Pressure	(see table below)

Control Characteristics

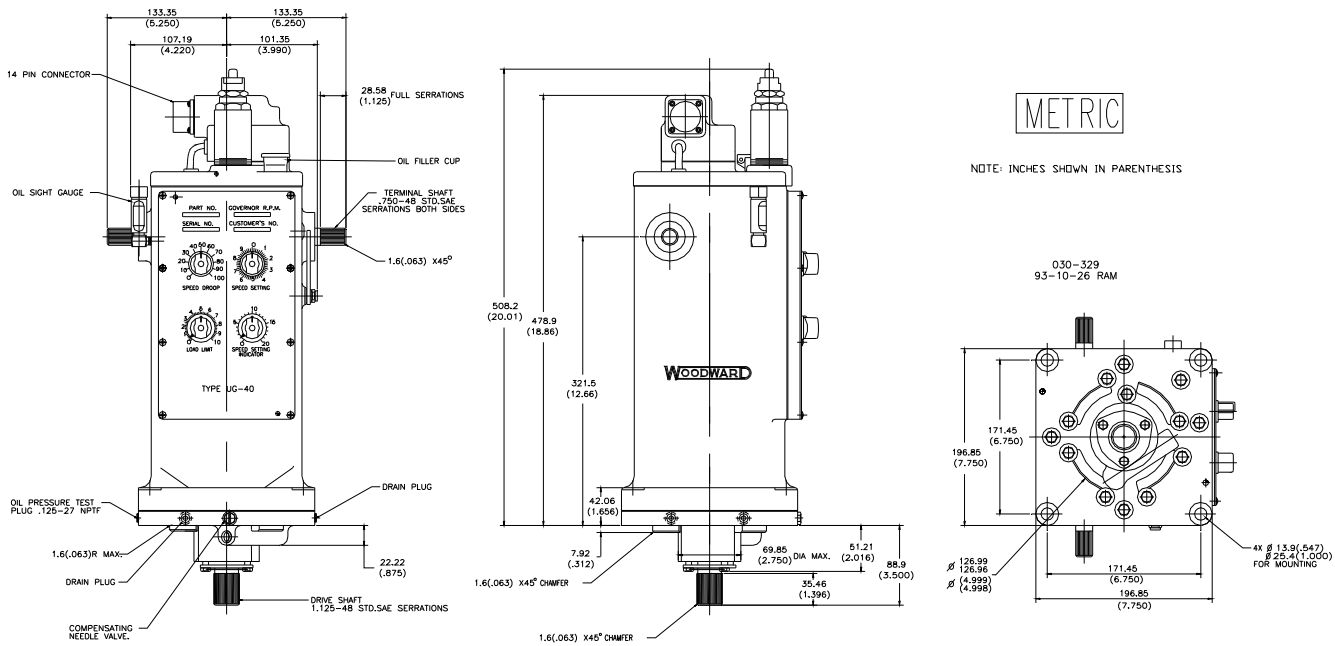
Steady State Speed Band	$\pm 0.25\%$ of rated speed (under normal operating conditions)
Ballhead Assemblies	Spring-driven vibration-damping type. Available in undamped natural frequencies of 50, 70, 100, or 150 cpm
Pilot Valve Porting	8 round or 2 slotted
Pilot Valve Bushing	Rotating integrally with governor drive
Technical Manual	36063

UG MAS Specifications

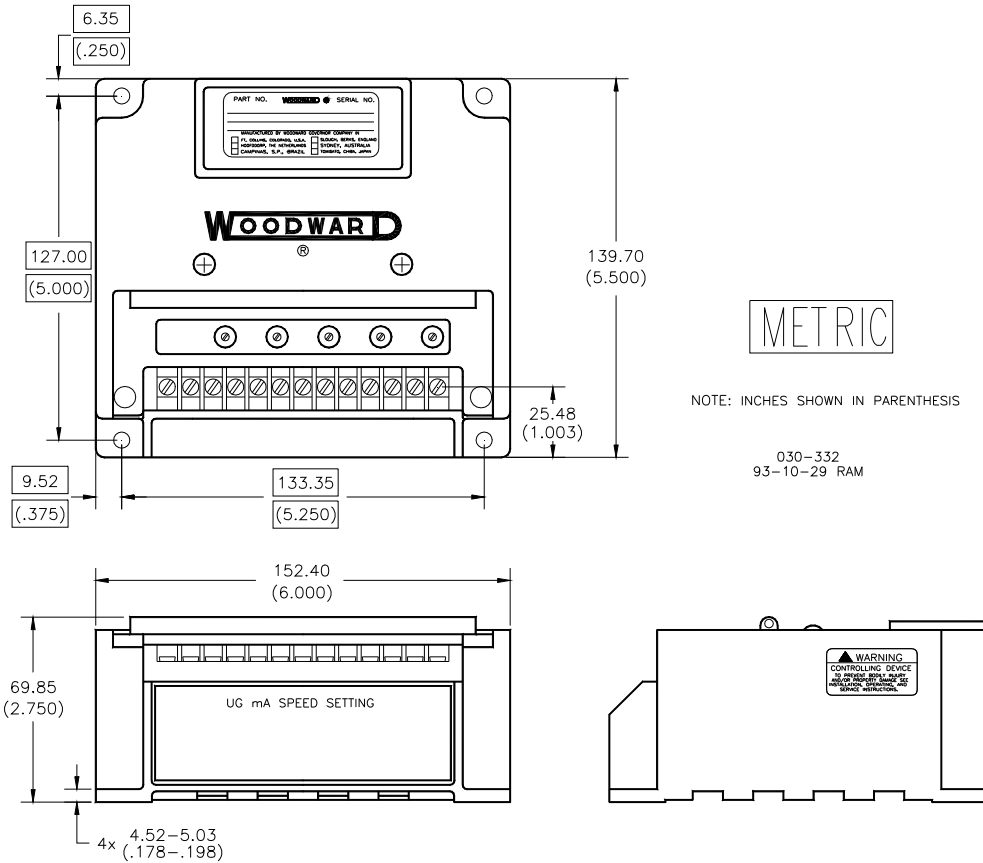
Type	5.7	8	12.8	40
Work Capacity [N·m (lb-ft)]	7.1 (5.2)	13.2 (9.7)	15.9 (11.7)	78.0 (57.5)
Internal Hydraulic Pressure [kPa (psi)]	827 (120)	827 (120)	1034 (150)	1724 (250)
Drive Power Requirement [kW (hp)]	0.25 (0.33)	0.25 (0.33)	0.25 (0.33)	0.37 (0.5)
Weight [kg (lbs)]	22.7 (50)	22.7 (50)	22.7 (50)	46.3 (100)
Output	42° rotary	42° rotary	42° rotary	38° rotary
Terminal Shaft Dimension	0.500-36 serration	0.500-36 serration	0.500-36 serration	0.750-48 serration



UG8D MAS Governor Dimensions
(Do not use for construction)



UG40D MAS Governor Dimensions
(Do not use for construction)



UG MAS Driver Box
(Do not use for construction)



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