



DYNA Controllers

GENERAL

The controllers for the DYNA governor series are all solid state design that measures three parameters to provide precise engine control. Separate circuits measure the proportional (amount of offspeed), integral (time of offspeed) and derivative (rate of change of offspeed) values. These three circuits provide control that results in fast, stable engine response to offspeed changes and precise speed regulation.

To provide a governing system, these controllers must be used with one of the following DYNA actuators. The actuator specification can be obtained from the product information sheet.

Plus 1 or Plus 4	F-18080
Plus 6 (Standard and Explosion-proof)	F-18081
Plus 8 or Plus 16	F-18082

SPEED SENSING

The DYNA all-electric governor requires a frequency signal to read engine speed. Typically, a hole is drilled and tapped in the flywheel housing perpendicular to the crankshaft, and a magnetic pickup is inserted into it so it senses the teeth on the flywheel. Many other techniques may be used to obtain a speed reference signal.

SPEED CONTROL RANGE

The governed speed control range for the DYNA I Controller can be as much as 10 to 1. The actual range attainable depends upon the type of engine, controller and load.

REMOTE SPEED ADJUSTMENT

A remote speed adjustment can be added to any DYNA controller by simply connecting a remote speed potentiometer to the three electrical wires provided in the Barber-Colman standard wiring harness. The Barber-Colman part number for the remote speed potentiometer is DYNS-10000.

FAILSAFE

The DYNA Governor has two failsafe modes: 1) If d-c power to the governor is interrupted, the armature spring automatically moves the output shaft to the "minimum fuel" position. 2) If the speed reference signal is lost, a failsafe circuit in the control instantly removes d-c power from the governor actuator, returning the output shaft to the "minimum fuel" position.



TYPICAL APPLICATIONS

Speed governing
Tandem engine governing
No-break engine governing
Propulsion engine governing
Tandem propulsion governing
Wide speed range governing
Tailshaft governing

STANDARD CONTROLLER FEATURES

All-electric
All engine compatibility
Mounts in any position
Engine mounted or can be off mounted
High reliability
No special maintenance
Temperature stable

ALL-ENGINE COMPATIBILITY

Since the DYNA all-electric governor requires no mechanical drive or oil supply, it can be used on any engine, even if the engine never had a precision governor before or, for that matter, never had a governor at all. Newly-built engines may be ordered without a governor drive for a substantial savings.

DIRECT ENGINE INSTALLATION

The DYNA governor and control mount directly on the engine, usually with a simple bracket, and withstand the temperatures usually common to this environment. Since no mechanical drive or hydraulic oil lines are needed, simple electrical wiring permits mounting the governor in any location in any position convenient to connect to the fuel control linkage.

SPECIFICATIONS

Available Operating Voltages 12, 24 or 32 volts, +20%.
Other voltages on special request.

Input Signal Frequency

$$\text{Input Signal Frequency In Hertz} = \frac{\text{Engine RPM} \times \text{Number of Gear Teeth on Flywheel}}{60 \text{ Seconds}}$$

Select your controller for the correct input signal frequency range generated by the magnetic pickup at the maximum engine operated (RPM) speed.

Steady State Speed Band +0.2 percent, isochronous control.

Ambient Operating Temperature

-65°F (-55°C) to +200°F (+95°C).

Temperature Stability Better than +0.5 percent over a temperature range of -55 to 95°C (-65° to 200°F)

Speed Regulation (Droop) Adjustable from 0 to 15 percent. Remote adjustment optional.

Mechanical Vibration Tested 5 to 500 Hz @ 25 G's (peak level on the governor).

Output Signal Pulse width modulated current to DYNA actuator. Maximum output current is 14 amperes.

Circuit Boards Boards are covered with a heavy conformal coating for moisture and vibration protection.

Enclosure Aluminum extrusion.

Weight 635 grams (1.4 lbs.)

SPEED GOVERNING

DYNA controllers are available for engine governing for speed and power control of piston and gas turbine engines where the fuel is controlled by the governor's output shaft. The controllers are also applicable for controlling steam and water turbines.

TANDEM ENGINE GOVERNING

DYNA controllers are available for tandem engine operation. The controller provides the precise positioning required for accurate tracking of two governor actuators used for controlling tandem-coupled engines.

NO-BREAK ENGINE GOVERNING

DYNA controllers are available for no-break operation. The controller is designed to provide dual-mode operation. The controller functions with fixed gain when the engine is de-clutched and with an adjustable high gain when the engine is coupled to the load.

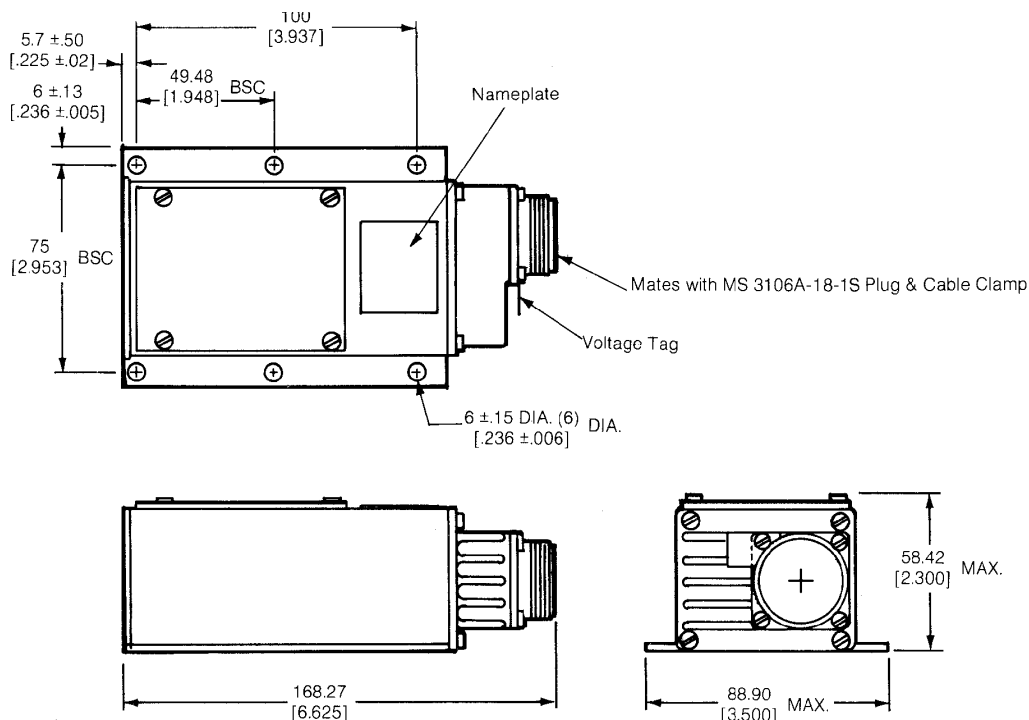
PROPULSION GOVERNING

DYNA controllers are available for engine governing of propulsion engine applications. The control has an adjustable low limit feature which is required to maintain correct engine operation due to the loading characteristics of the propeller. The same controller should be used on tandem-coupled propulsion engine applications.

WIDE SPEED RANGE GOVERNING

DYNA controllers are available for wide speed range governing for speed and power control of piston and gas turbine engines where the fuel is controlled by the governor's output shaft. The controller is designed to provide improved governor performance and control over a wider speed range than the standard speed governor.

DIMENSIONS



Dimensions in mm
Inches in Brackets []

AVAILABLE DYNA CONTROLLER PART NUMBERS

Specify voltage 12,24 or 32 volt d-c when ordering.

Speed Controllers

Part Number

DYN1 10002-2

DYN1 10003-2

DYN1 10004-2

DYN1 10006-2

Configuration A

Input Signal Frequency

250 to 1200 Hz

1200 to 2500 Hz

2500 to 5000 Hz

5000 to 9500 Hz

Adjustments available: A, Gain, D, I, L, Droop and Speed (under controller cover).

Tandem Controller

Part Number

DYN1 10008-2

Configuration A

Input Signal Frequency

2500 to 5000 Hz

No-Break Controller

Part Number

DYN1 10010

Configuration A

Input Signal Frequency

2500 to 5000 Hz

Propulsion Controllers

Part Number

DYN1 10024-2

DYN1 10025-2

DYN1 10026-2

Configuration B

Input Signal Frequency

250 to 1200 Hz

1200 to 2500 Hz

2500 to 5000 Hz

Adjustments available: A, Gain, D, I, Droop, High Limit, Low Limit and Speed (under controller cover).

Speed Controllers

Part Number

DYN1 10112-0

DYN1 10113-0

DYN1 10114-0

DYN1 10116-0

(Obsolete)

Configuration C

Input Signal Frequency

250 to 1500 Hz

1200 to 3000 Hz

2500 to 6000 Hz

5000 to 10000 Hz

Adjustments available: I, Droop and Speed (under controller cover); Stability and Speed Trim (on side of controller).

Speed Controllers

Part Number

DYN1 10212-0

DYN1 10213-0

DYN1 10214-0

DYN1 10216-0

(Obsolete)

Configuration D

Input Signal Frequency

250 to 1500 Hz

1200 to 3000 Hz

2500 to 6000 Hz

5000 to 10000 Hz

Adjustments available: Gain, I, Droop and Speed (under controller cover).

Wide Speed Range Controllers Configuration E

Part Number

DYN1 10312-0

DYN1 10313-0

DYN1 10314-0

DYN1 10316-0

(Obsolete)

Input Signal Frequency

250 to 1500 Hz

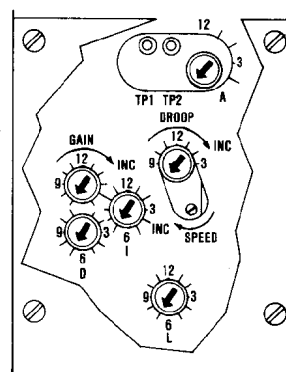
500 to 3000 Hz

1000 to 6000 Hz

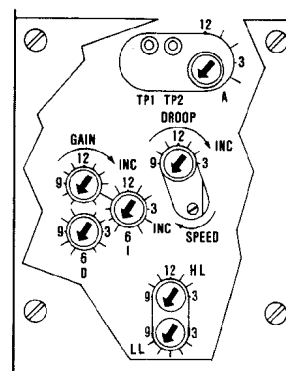
2000 to 12000 Hz

Adjustments available: Gain, D, I, Droop and Speed (under controller cover).

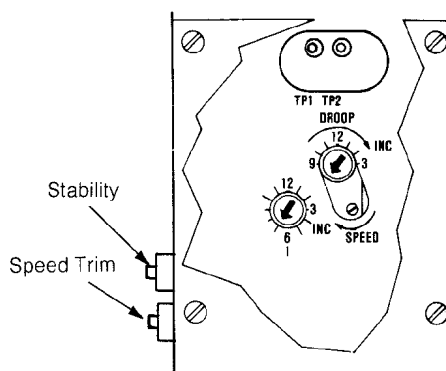
ADJUSTMENT CONFIGURATIONS



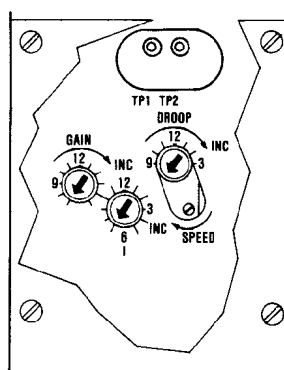
Configuration A



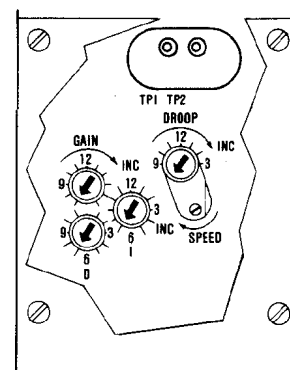
Configuration B



Configuration C

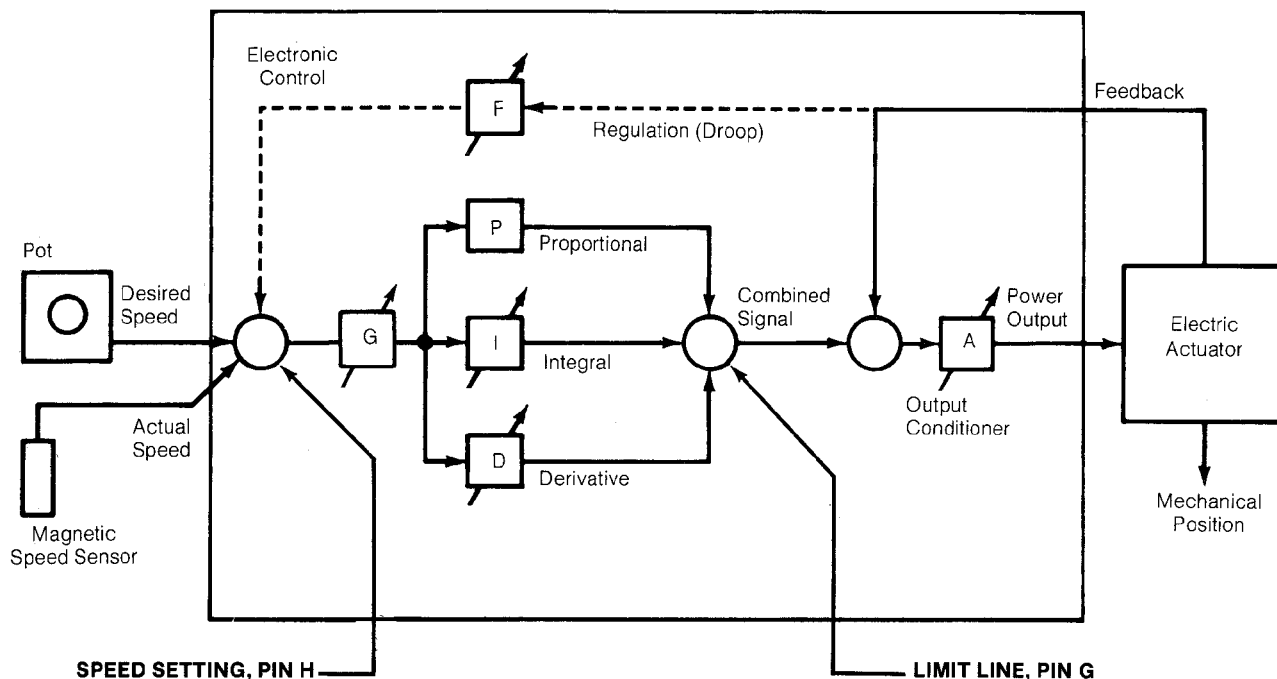


Configuration D



Configuration E

DYNA Controller Inputs



Modify speed with respect to:

- Remote Speed Setting
- Time (Ramp Generator)
- Electrical Load Change (Load Pulse)
- Electrical Load (Isochronous Load Sharing)
- Electrical Phase Angle (Synchronizer)

On Pump Applications:

- Output Pressure
- Output Temperature
- Liquid Level
- (Controller/Recorder Output)

FEATURES ARE EASY TO ADD

It is easy to add features to the electric governor to provide benefits the customer needs. Remote speed setting, isochronous load sharing, automatic synchronizing, ramp generator, single phase load pulse and KW limits can be added at the time of initial governor installation or, just as easily, added later when the need arises. No modification to the basic governor is required when these features are added. In fact, if the prewired harness is used, the wires necessary to add these features are often already provided, so it is indeed easy to add features.

— NOTE —

Barber-Colman believes that all information provided herein is correct and reliable and reserves the right to update at any time. Barber-Colman does not assume any responsibility for its use unless otherwise expressly undertaken.

— CAUTION —

As a safety measure, the engine should be equipped with an independent overspeed shutdown device in the event of failure which may render the governor inoperative.

Limit fuel (rack or throttle position) with respect to:

- Maximum Fuel Permitted (Load Limit)
- Temperature (Exhaust)
- Manifold Pressure (Smoke Limit)
- Oil Pressure
- Time (some ramp generator applications)
- Requested Speed (Torque Limit)
- Actual Speed (Torque Limit)

AUXILIARY CONTROL MODULES

Four auxiliary control modules are available: Isochronous Load Sharing Control, Auto-Synchronizer, Ramp Generator, and Single Phase Load Pulse Control. These and other auxiliary functions can be installed at the time of the initial governor installation or, just as easily, added later when the need arises. No modification is required to the basic governor when these modules are added.

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