

# **DYNA Power Control Manual For 8 Ft. Lb. and 16 Ft. Lb. Systems**

**General Information  
Installation  
Calibration and Adjustments  
Maintenance  
Troubleshooting  
Product Information  
and  
Wiring Diagrams**



**Barber-Colman Company**  
DYNA PRODUCTS

## GENERAL INFORMATION

**1. SCOPE.** This manual provides information for the installation, calibration, operation, and maintenance of the DYNA system. One +8 or +16 actuator, one electronic control box and an amplifier module comprise the DYNA system.

This system is manufactured by the Precision Dynamics Division of the Barber-Colman Company which is headquartered at 1300 Rock Street, Rockford, Illinois 61101.

**2. INTRODUCTION.** This manual describes the basic operation and installation of the DYNA plus 8 and plus 16 all-electric governor systems. The basic governor assembly consists of an actuator, amplifier module and controller. The units are electrically coupled together to make a complete governor system offering optimum engine control.

A typical system would also have an on-off switch, a magnetic pickup and a remote speed potentiometer. The magnetic pickup detects engine speed (RPM) from gear teeth on the prime mover. This signal along with the remote speed signal and the D.C. power are brought into the controller and amplifier module for processing to allow for optimum engine control.

No special mounting requirements are needed for the DYNA actuator mounted on the engine and it can be located at any convenient position since there are no requirements for a mechanical drive or oil connections.

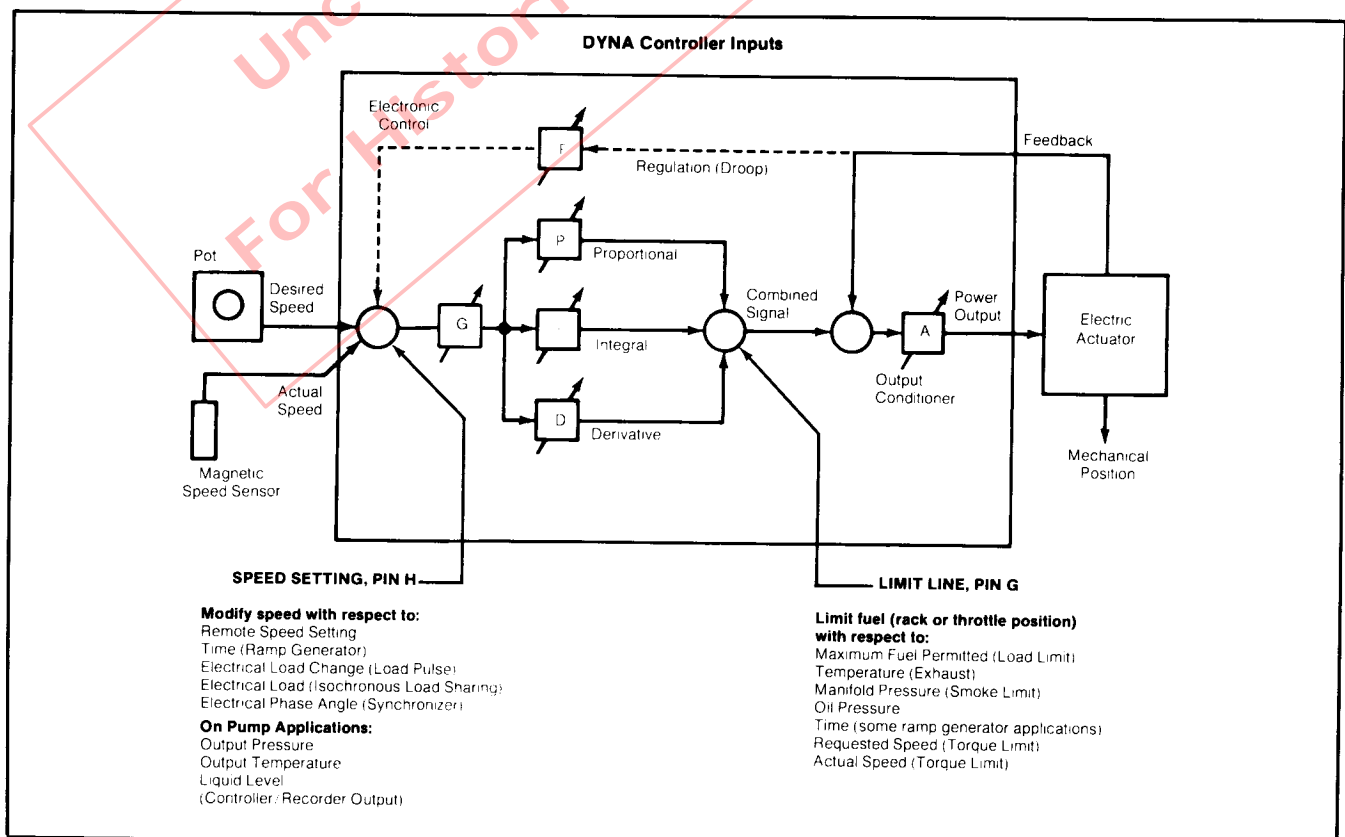
**3. ELECTRONIC CONTROL BOX AND AMPLIFIER MODULE.** The electronic control box is a rugged container which houses the electrical components used in controlling the actuator output and finally the engine. The components and container are designed to withstand 20 G's of mechanical vibration through 500 Hz. This control box is mounted directly on the amplifier module and is electrically connected to the amplifier module through a 5 pin connector.

The electronic control box receives electrical input signals from both the magnetic speed sensor and the reference speed pot. These signals are processed and compared, resulting in an error signal that is amplified and sent to the actuator in a proportional, integral and derivative summation. When the actuator receives the desired output shaft electrical signal, the output shaft rotates and a feedback is sent back and compared to the desired signal and any difference is transmitted to the power amplifier which sends corrective action to the output shaft position.

**4. JUNCTION BOX.** An optional junction box can be used to house the reference speed potentiometer and the power switch. It is mounted so that it can be conveniently connected to the electronic control box, power source, and magnetic speed sensor.

**5. MAGNETIC SPEED SENSOR.** The magnetic speed sensor is mounted in a convenient location, i.e.: flywheel housing, such as to generate electrical pulses proportional to speed by sensing magnetic material, i.e.: teeth on the engine ring gear passing the sensor.

**6. ACTUATORS.** The actuators are electrically connected to the electronic control box and their mechanical output is connected to the engine's fuel system. Actuators are electrically powered and have output work capacities of 8 and 16 ft.-lbs. The actuators convert an electrical input to an angular mechanical output at the output shaft which has a maximum rotation of 45°.



## INSTALLATION INFORMATION

**1. ACTUATOR AND ELECTRONIC ASSEMBLY.** The actuator and electronic assembly can be installed in any position by using a simple steel bracket or mounting pad. Be sure that the mechanical linkage has sufficient physical clearance to freely move from minimum to maximum fuel. The length of this linkage rod connecting the actuator output shaft to the engine fuel control should not be excessively long. Use 4" to 10" except in special cases.

### NOTE

Actuators have through output shafts that rotate CW or CCW to increase fuel. The direction of rotation is determined when the output shaft is pointed toward the observer. The minimum fuel position is obtained when power is not applied to the actuator coil.

**2. MOUNTING THE ACTUATOR AND LINKAGE.** Adjust the linkage rod to allow at least  $37^\circ$  rotation of the actuator output shaft for full travel of the fuel control. Use lock nuts on the linkage rod. See Figure 1 for typical linkage arrangements.

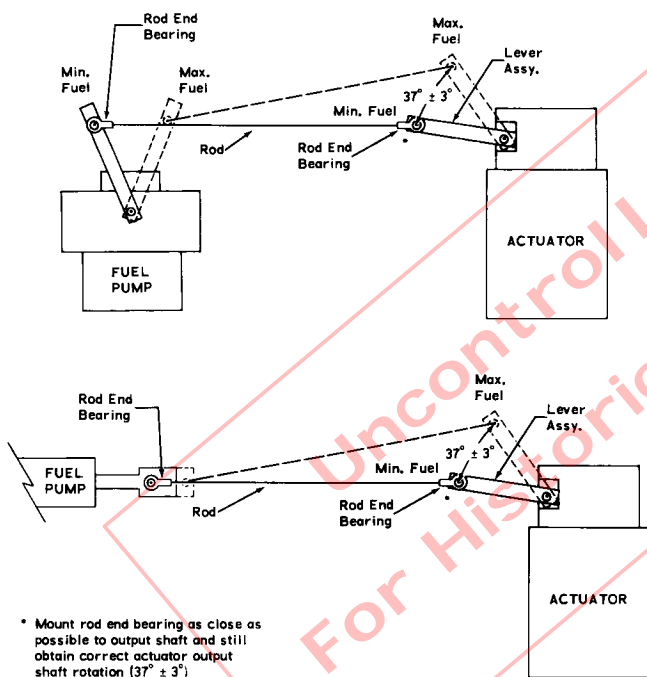


FIGURE 1 Typical Non-Linear Linkage Arrangements

**3. INSTALLATION OF SPEED SENSOR (MAGNETIC PICKUP).** Remove the inspection cover over the ring gear teeth. The teeth should be free of burrs, excessive grease or dirt.

The magnetic pickup should not be installed in inspection covers. Inspect the ring gear housing and pick a location where a  $37/64$ " hole can be drilled such that the ring gear teeth will pass in front of the pickup pole face. After the  $37/64$ " hole is drilled, use a 5/8-18 starting tap to cut threads for the magnetic pickup, then run a bottom tap through the hole.

### NOTE

The tap hole should be drilled as nearly perpendicular as possible over the ring gear teeth, as illustrated in Figure 2.

Manually rotate the ring gear until a tooth face is directly in the center of the tapped hole. Gently turn the magnetic pickup clockwise into the hole until it bottoms on the tooth, and back off  $1/4$  turn. Tighten the jam nut firmly.

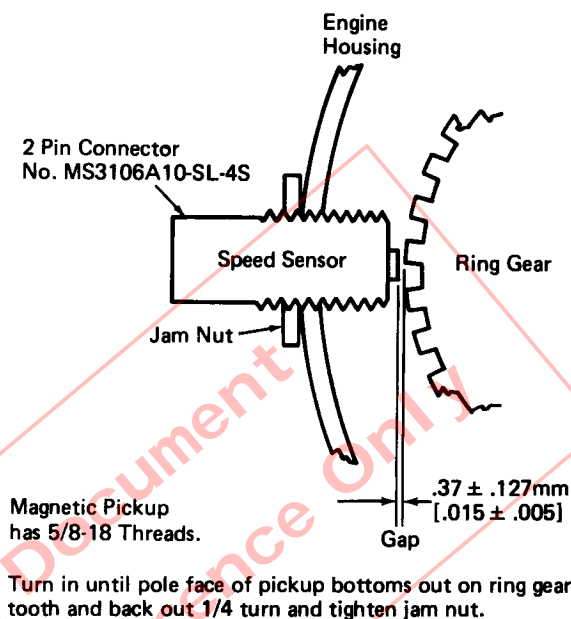


FIGURE 2 Installation of Magnetic Pickup

**4. INSTALLATION AND WIRING.** Barber-Colman has installation kits available for many engines. These include the mounting bracket and wiring harness. (Consult the Barber-Colman DYNA distributor or dealer for installation kit information.)

See the typical wiring for +8 or +16 DYNA governor systems shown on page 12 and 13 of this manual.

Important things to follow when making an installation.

- a. Do not connect the control box connector to the wiring until proper voltage and polarity have been established.
- b. Wiring.
  - (1) Use the recommended wiring cables shown in this manual. (See page 12 and 13.)
  - (2) Make sure the wire insulation will withstand the temperatures around the engine.
  - (3) Twist power leads.
  - (4) Make sure the end of shield not used is taped to prevent touching other components.
- c. Ground Shield Installation Precautions.
  - (1) Engines with positive ground systems. With positive ground systems the shield lead on the two- and three-lead shielded cables must not be allowed to touch the engine frame or any part of the power system which is at the same potential as the engine frame. *Allowing the shield lead to touch any of these exposed parts will cause a short across the D-C supply and could damage the control.*

(2) Engines with negative ground systems. With negative ground systems the shield of the two- and three-lead shielded cables must not touch the engine frame. Letting the shield touch the engine frame or associated parts will not damage the control, but it may generate undesirable electrical signals that may cause unstable engine performance.

**d.** Observe the proper power supply polarity. The proper polarity to Pins A and C of the controller connector must be observed or the unit will not operate. Pin A must be connected to the positive terminal and Pin C to the negative terminal of the battery or power supply.

#### NOTE

125 VDC systems do not have connection on Pins A and C to power supply.

### 5. CHECKING OUT WIRING INSTALLATION.

**a.** After the wiring is mounted on the engine, connect the power wires; the red wire to the positive terminal, and the black wire to the negative terminal. (Do not connect power wiring to the engine frame — connect directly to the battery terminals.)

**b.** A voltmeter must be used at this time to check voltage at the electronic control box connector. Turn the power switch "ON" at the junction box. Connect the meter leads to Pins A and C of the connector. Pin A must be positive and Pin C negative. The meter should read rated battery voltage.

#### NOTE

125 VDC systems do not have connection on Pins A and C to power supply.

**c.** Place the power switch in the "OFF" position and connect the connector to the control box.

**d.** Remove top cover from control box.

**e.** Place a jumper between TP1 and TP2 (this overrides the failsafe feature).

**f.** Place the power switch in the "ON" position. The actuator should move to the full fuel position.

**g.** Remove jumper between TP1 and TP2. (Actuator must return to minimum fuel position.)

**h.** Engine is ready to start.

#### 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.

### 6. REQUIRED TOOLS.

**a.** Drill Bit — 37/64" diameter for magnetic pickup.

**b.** Thread Tap — 5/8-18 starting tap for magnetic pick-up.

**c.** Thread Tap — 5/8-18 bottom tap for magnetic pick-up.

**d.** Soldering Iron — 50 Watt and Rosin Core Solder.

**e.** Various — pliers, wrenches, screwdrivers, wire strippers.

## CALIBRATION AND ADJUSTMENTS FOR DYN1 10002, DYN1 10003, DYN1 10004, DYN1 10006 CONTROLLERS

### NOTE 1

See Figure 3 for a Reference Guide before making any adjustments of "A", "D", "DROOP", "GAIN", "I" or "L" potentiometers.



**POTENTIOMETER SHOWN IN THE  
9 O'CLOCK POSITION**

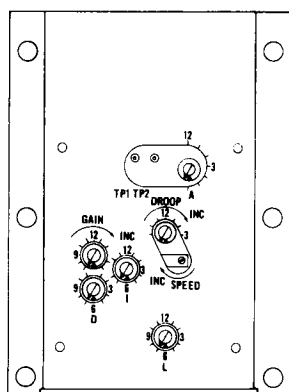


FIGURE 3 Electronic Control Box Adjustments

1. Power "OFF" — Engine not operating.
  - a. Easier adjusting is possible by connecting an extension cable (Part No. DYNZ-126) between control box and actuator.
  - b. Remove top cover from control box.

### 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.

2. Set potentiometers as indicated below:
  - a. Set "A" at 3 o'clock.
  - b. Set "GAIN" at 9 o'clock.
  - c. Set "D" at 10 o'clock.
  - d. Set "I" at 8 o'clock.
  - e. "L" is factory adjusted and should be about 10 o'clock. (See NOTE 4.)
3. For Isochronous Operation, set "DROOP" pot fully counterclockwise (zero droop) and proceed to Step 4. For Droop Operation, set "DROOP" pot to desired droop. Refer to NOTE 2.

### NOTE 2

The amount of droop for a given setting depends on pick-up frequency and no load to full load actuator shaft rotation. A "DROOP" pot setting of 9 o'clock will give about 3% droop, no load to full load, when the pick-up frequency is 4260 Hz and actuator shaft rotation 13° from no load to full load. Lower pick-up frequency or smaller shaft rotation results in less droop.

4. If a remote speed potentiometer is used, set it to mid-range.

5. Start engine. Then adjust controller "SPEED" pot until engine is operating at the desired speed (RPM). (Clockwise increases engine speed.)

6. Adjust the "A" pot with engine running unloaded.
  - a. Turn the "A" pot *slowly clockwise* until the actuator lever oscillates (jiggles) rapidly. Turn the "A" pot *slowly counterclockwise* until the rapid oscillation just stops.
  - b. Upset governor by tapping actuator lever. If the actuator lever oscillates rapidly, turn the "A" pot *slowly counterclockwise* until the rapid oscillation just stops.

7. If governor is unstable (hunting), turn "GAIN" pot *slowly counterclockwise* until it is stable. (Moving actuator lever and constant engine speed means unit is governing and not hunting.) If governor is stable, turn "GAIN" pot *slowly clockwise* until governor starts to hunt, then turn "GAIN" *slowly counterclockwise* until governor is stable. Upset governor by tapping actuator lever. Engine should return quickly to its commanded speed without hunting.

8. Turn "D" pot *clockwise* until actuator lever begins to hunt. One may have to upset governor by tapping actuator lever, then turn "D" *slowly counterclockwise* until engine is stable. ("D" setting may be fully clockwise on some engines which have large mass in the linkage.)

### NOTE 3

Step 9 must be done when engine is unloaded.

9. After "GAIN", "A" and "D" pots are set, turn power switch "OFF". Let engine speed slow down to about half-speed, and then turn power switch "ON". Watch or listen to engine speed. If engine speed overshoots commanded speed, turn "I" pot a *small amount* counterclockwise. Keep repeating above until engine no longer overshoots its commanded speed. (If "L" pot is set too far clockwise, engine may also overshoot commanded speed.)

10. Changing the adjustments "A", "D", "DROOP" and "GAIN" may cause a slight engine speed change which will require resetting the "SPEED" adjustment.

11. *Changing Droop Pot Setting.* Adjustment of the "DROOP" pot after the controller is calibrated ("A" and "GAIN" settings set) may result in some instability when *large loads* are shed. Therefore, turning the "DROOP" pot (clockwise) from a previous setting may cause system instability which can be improved (regained) by turning "A" pot (counterclockwise) slightly and turning "GAIN" pot (clockwise) slightly.

12. Place cover back onto controller to keep out dirt and moisture.

13. Field Adjustment of "L".

### NOTE 4

"L" is factory adjusted and is sufficient for most installations. The following method can be used for setting the "L" pot to match the governor to the linkage on installations where the engine can be fully loaded (100%).

I. After "A", "GAIN", "D" and "I" are adjusted, load engine to 100% (full load).

a. While observing frequency or RPM meter, turn "L" pot *slowly counterclockwise* until the frequency or RPM starts to decrease.

b. Turn "L" pot slowly clockwise until the frequency or RPM returns to the original value before "L" was adjusted in Step (a) above.

**TABLE 1**  
**CALIBRATION AND ADJUSTMENT TIPS**

If any of the following adjustments are tried and they are not successful, the potentiometer should be reset to its original position before going on with the calibration.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Actuator lever oscillating (jiggling) at a 10 to 15 Hz rate.	"A" pot set too far clockwise.	Turn "A" <i>slowly</i> counterclockwise.
Actuator lever oscillating (hunting) at a 4 to 10 Hz rate.	"D" pot set too far clockwise.	Turn "D" <i>slowly</i> counterclockwise.
Actuator lever oscillating (hunting) at a 2 to 3 Hz rate.	"GAIN" pot set too far clockwise.	Turn "GAIN" <i>slowly</i> counterclockwise.
Actuator lever has a small amplitude oscillation of less than 1 Hz rate with no quick changes in position.	"I" pot set too far clockwise.	Turn "I" <i>slowly</i> counterclockwise.

## MAINTENANCE

### PREVENTATIVE

#### 1. GENERAL.

a. A regularly scheduled maintenance program dependent upon the environment and frequency of operation should be established.

b. Visual inspection of housings, cable connectors, mounting bolts, and linkages should be made frequently to maintain the units free of abrasive materials and extraneous oils.

c. Frequent checks should be made to ensure free movement of actuator and control linkages. The linkages should be kept clean and well lubricated.

## MAINTENANCE

### TROUBLESHOOTING

1. **GENERAL.** If the system does not operate, proceed as follows:

a. Check battery output at Pins A and C of the control box connector. With the junction box power switch ON, Pins A and C should read battery voltage — Pin A positive and Pin C negative. If power does not exist, check connection to battery.

#### NOTE

125 VDC systems do not have connection on Pins A and C to power supply.

b. Operate the engine manually and check the output of the magnetic pickup at Pins I and J at the control box connector. The voltage should read 3 to 80 VAC. If voltage does not exist, check wiring connections and gap of pickup. This voltage may also be checked during starter operation. It should read 1-1/2 to 2V minimum on the AC scale of the voltmeter.

c. Recheck all solder connections on connectors as well as connections in the junction box and power switch.

d. If the preceding checks verify that the proper voltages exist, be sure the connectors are fully seated and threaded on properly.

e. If the trouble is sluggish actuator response, check to see that the linkage is not binding and moves freely.

2. **SPECIFIC.** See troubleshooting table which follows.



**GENERAL  
DYNA GOVERNOR TROUBLESHOOTING**

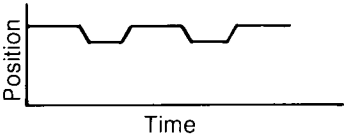
EVIDENCE OF FAILURE	POSSIBLE CAUSES	MEANS OF DETECTION	CORRECTIVE ACTION
I. System appears completely dead. (Actuator lever remains at minimum fuel position.)	1. No DC power.	1. Measure battery or power supply voltage.  2. Disconnect 10 Pin connector from controller and measure DC voltage between Pin A and Pin C on cable connector with power switch "ON". One should read battery voltage. (Pin A is positive with respect to Pin C.)  (Not applicable on 125 VDC system.)	1. Charge battery or replace power supply.  1. Check wiring. a. Open lead to Pin A. b. Open lead to Pin C. c. Faulty power switch. d. Power leads not connected to power supply.
		3. Disconnect 4 Pin connection from actuator and measure DC voltage between Pin B and D on cable connector with Power Switch "ON".	1. Check wiring. a. Open lead to Pin A. b. Open lead to Pin B.
	2. Sticking linkage.	1. Manually operate linkage to make sure it is not sticking.	1. Free up linkage.
	3. Inadequate power supply voltage.	1. Remove cover from the controller. Place a jumper between TP1 and TP2. Turn power switch "ON" and measure the DC voltage between Pins B and D on the actuator 4 Pin connector. Voltage should be 80% of nominal supply voltage for correct operation.  <i>Examples:</i>  24 VDC SYSTEM: $24V \times 0.80 = 19.2V$  125 VDC SYSTEM: $125V \times 0.80 = 100V$	1. Larger supply. 2. Larger leads from supply to controller. 3. Check for poor or loose supply connections.
	4. No signal or a weak signal from magnetic pickup.	1. Disconnect 10 Pin connector from controller. Measure the AC voltage between Pins I and J on cable connector while cranking engine. Meter must read 1.5 volts or greater during cranking.  (AC input impedance of meter must be 5000 $\Omega/v$ or greater.)	1. Check leads "I" and "J" from 10 Pin cable connector to magnetic pickup for continuity.  (See Step 5 below for a short "C" to "J" on the 10 Pin connector that will cause loss of pickup signal.)

**GENERAL**  
**DYNA GOVERNOR TROUBLESHOOTING (Cont.)**

EVIDENCE OF FAILURE	POSSIBLE CAUSES	MEANS OF DETECTION	CORRECTIVE ACTION
			2. Check for correct installation of magnetic pickup. 3. Replace magnetic pickup if unable to obtain an output signal from unit.
	5. Short in either male or female member (10 Pin connector) between Pins: C to D C to E C to G C to H C to J	1. Turn "OFF" power switch. Disconnect 10 Pin connector. a. Check cable connector for short(s) between C&D, C&E, C&G, C&H and C&J.	1. Check connector and leads for cause of short(s). Repair or replace.
		b. Check box connector for short(s) between C&D, C&E, C&G, C&H and C&J.	1. Replace controller.
	6. Actuator failure.       (CONTROLLER SHOULD BE CHECKED AT THIS TIME BECAUSE IT IS DISCONNECTED FROM ACTUATOR.)	1. Try different actuator.	1. Replace actuator.
		2.	1. If a short or resistance path is indicated, replace actuator.
		a. Measure resistance between actuator case and pins on the actuator connectors. These measurements will all indicate an open circuit on a good actuator.	
		b. Measure the resistance between Pins A and D on actuator connector. If an open circuit is indicated, it means the actuator coil is open and the unit has failed.	1. Replace actuator.
		c. Measure for shorts between Pins E to C or B to C on Actuator 6 Pin connector. (A good actuator should not indicate a short circuit E to C or B to C.)	1. Replace actuator.
		d. Measure for shorts between Pins A to C or B to C on the controller 5 Pin connector. (A good controller should not indicate a short circuit A to C or B to C.)	1. Replace controller.
	7. Controller failure.	1. With power switch "ON", measure DC voltage between Pin C (-) and Pin D (+) at the controller 10 Pin connector. This voltage should be +8.0V $\pm$ 0.5 volts.	1. Replace controller.
		2. Remove cover from controller and place a jumper between TP1 and TP2. Make sure correct power is available to controller. If controller is good and correct voltage is available, the actuator output lever will go to full fuel position and remain there until jumper TP1 to TP2 is removed.	1. Replace controller if actuator checked O.K. in Step 6.



**GENERAL**  
**DYNA GOVERNOR TROUBLESHOOTING (Cont.)**

EVIDENCE OF FAILURE	POSSIBLE CAUSES	MEANS OF DETECTION	CORRECTIVE ACTION
II. Actuator lever goes to full fuel position each time power switch is turned "ON". (Engine not operating.)	1. Magnetic pickup leads not properly shielded.	1. Check for open shield lead on magnetic pickup.	1. Correct the wiring. The magnetic pickup shield must be tied to the controller Pin C or Pin I. The other end of shield must not be tied to anything.
	2. Short between Pins B&C or C&F in either male or female member (10 Pin connector).	1. Turn "OFF" power switch. Disconnect 10 Pin connector. a. Check cable connector for short(s) between C&B or C&F.	1. Check connector and leads for cause of short(s). Repair or replace.
		b. Check box connector for short(s) between C&B or C&F.	1. Replace controller.
	3. Actuator failure.	1. Try another actuator.	1. Replace actuator.
	4. Controller failure.	1. Try another controller.	1. Replace controller.
	5. Amplifier module failure.	1. Try another amplifier module.	1. Replace amplifier module.
III. Erratic governor operation.	1. Poor electrical connection between supply voltage and controller. (Not applicable on 125 VDC systems.)	1. Measure voltage Pin A and C on the 10 Pin connector while engine is operational. One should read nominal battery voltage.	1. Correct wiring.
	2. Poor electrical connection between amplifier module and the actuator.	1. Check all cables for faults.	1. Correct wiring.
	3. Low battery supply voltage at controller.	1. Same as above.	1. Charge battery.
	4. Electrical noise (RFI) pickup due to poor shielding	1. Observe output shaft (lever) on actuator. It will make a quick correction of fuel throttle position without a change in load.	1. Check for correct shielding.
	5. Electrical noise (RFI) fed through power supply.	1. Observe output shaft (lever) on actuator. It will make a quick correction of fuel throttle position without a change in load.	1. Check all wiring connections in system.
IV. Slow small amplitude hunting.	1. Sticking linkage or very loose linkage.	1. Fairly regular but quick changes in position of fuel rack and then it rests and moves back to original position. 	1. Correct linkage arrangement.
	2. Sticking injector(s) in fuel system (pump).	1. Same as 1 above.	1. Correct fuel system.
	3. DYNA actuator (internal) problem.	1. Change actuator.	1. Replace the actuator.

**GENERAL**  
**DYNA GOVERNOR TROUBLESHOOTING (Cont.)**

<b>EVIDENCE OF FAILURE</b>	<b>POSSIBLE CAUSES</b>	<b>MEANS OF DETECTION</b>	<b>CORRECTIVE ACTION</b>
V. Actuator lever oscillating (hunting). (If any of these adjustments are tried and they are not successful, reset the potentiometer to its original position before going on with the troubleshooting.)	1. "A" pot set too far clockwise.	1. Actuator lever oscillating (jiggling) at a 10 to 15 Hz rate.	1. Turn "A" slowly counterclockwise.
	2. "D" pot set too far clockwise.	1. Actuator lever oscillating (hunting) at a 4 to 10 Hz rate.	1. Turn "D" slowly counterclockwise.
	3. "GAIN" pot set too far clockwise.	1. Actuator lever oscillating (hunting) at a 2 to 3 Hz rate.	1. Turn "GAIN" slowly counterclockwise.
	4. "I" pot set too far clockwise.	1. Actuator lever has a small amplitude oscillation of approximately 1 Hz with no quick changes in position.	1. Turn "I" slowly counterclockwise.
VI. Remote potentiometer adjustment has no effect on setting engine RPM.	1. Open circuit to Pins D, F or H in either male or female member of controller's 10 Pin connector.	1. Turn "OFF" power switch. Disconnect 10 Pin connector. a. Check cable connector for open circuit between Pin D and F, Pin D and H. Pin F and H.	1. Check connector, remote potentiometer and leads for cause of open circuit(s). Repair or replace faulty components.
		b. If external wiring and remote potentiometer checks out correctly, change controller.	1. Replace controller.
VII. Engine operates above set speed. (May overspeed.)	1. Faulty actuator.	1. Remove controller from actuator.	1. Replace actuator.
	a. Short between Pins C and B of the 6 Pin actuator connector.  b. Open lead to Pin E of 6 Pin connector on actuator.	a. Measure for short(s) between Pin C and B on the actuator 6 Pin connector.  b. Measure for open circuit by measuring between Pin B and E on the 6 Pin connector.	1. Replace actuator.
VIII. Engine won't start. (Actuator lever goes to full fuel position each time engine is cranked.)	1. Fuel not getting to engine.	1. Try to operate engine manually.	1. Check fuel line. 2. Check safety shutdowns.

## Plus 8 and Plus 16 Actuators

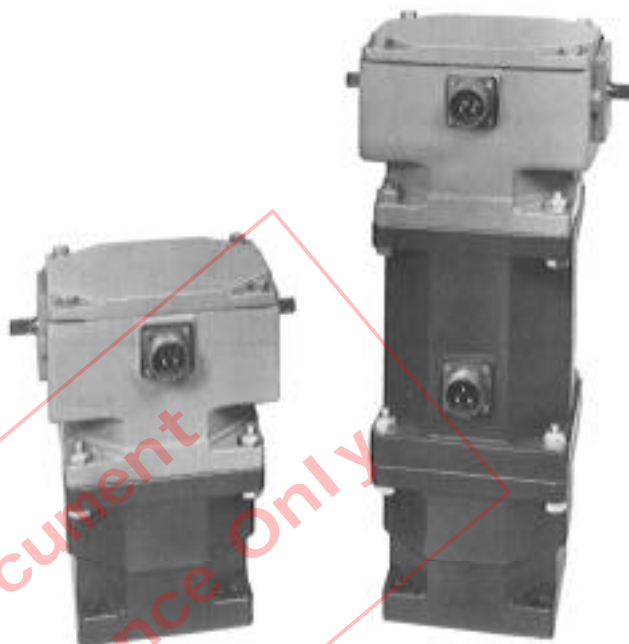
### GENERAL

The DYNA Plus 8 or Plus 16 Actuator can be operated with any of the DYNA controllers to provide an engine governor for speed and power control. The actuators can also be used in remote positioning and load control systems.

The Plus 8 and Plus 16 Actuators require an amplifier module for power amplification.

The governor is basically a simple, proportional electric solenoid having a sliding armature whose magnetic force is proportional to input coil current. Balanced between the force of its return spring and the magnetic force, the armature glides on anti-friction bearings, providing a hysteresis-free linear movement. Linear motion is converted to an output shaft rotation by a bell crank.

A feedback transducer returns an actuator shaft position feedback signal to the power amplifier section of the control. The design of the armature and return springs, combined with the feedback transducer and control electronics, causes the armature to take a known, positive position for each value of position control voltage. Using this feedback loop, the actuator can deliver full input power and, therefore, high output torque at any offspeed condition.



Plus 8 Actuator

Plus 16 Actuator

### SPECIFICATIONS

- Operating voltage: 24 or 125 VDC  $\pm 20\%$ .
- Ambient operating temperature:  $-65^{\circ}\text{F}$  ( $-55^{\circ}\text{C}$ ) to  $+255^{\circ}\text{F}$  ( $+125^{\circ}\text{C}$ ).
- Mechanical vibration: Tested 5 to 500 Hz at 25 G's.
- Sealing: Unit is oil, water and dust tight.

ACTUATOR		Plus 8	Plus 16
Work	Joules	10.8	21.6
	Foot-pounds	8.1	16.2
Torque	Newton-Meters	11.2	22.5
	Pound-feet	8.3	16.6
Output	Rotary	45°	45°
Weight	Kilograms	22.2	38.6
	Pounds	49	85
Current @ 24 VDC	Maximum Amperes@Stall	30	60
	Nominal Steady State Amperes	5	10
Current @ 125 VDC	Maximum Amperes@Stall	4.5	9.0
	Nominal Steady State Amperes	1.0	2.0
Nominal Response Time for 63% of Stroke (Seconds)		0.102	0.108

### TYPICAL APPLICATION

- Speed governing
- Tandem engine governing
- No-break engine governing
- Fuel, smoke, torque limiting
- Tailshaft governing
- Remote throttle control
- Test stand throttle control
- Remote valve control
- Remote damper control
- Remote propeller pitch control

### STANDARD ACTUATOR FEATURES

- All-electric
- All engine compatibility
- Mounts in any position
- Engine mounted
- High reliability due to few moving parts
- Proportional actuator
- No hydraulic or oil line
- No special maintenance
- Spring returns output shaft to minimum position on removal of power or loss of magnetic pickup signal
- Precise repeatability
- Through output shaft

### AVAILABLE ACTUATOR MODELS

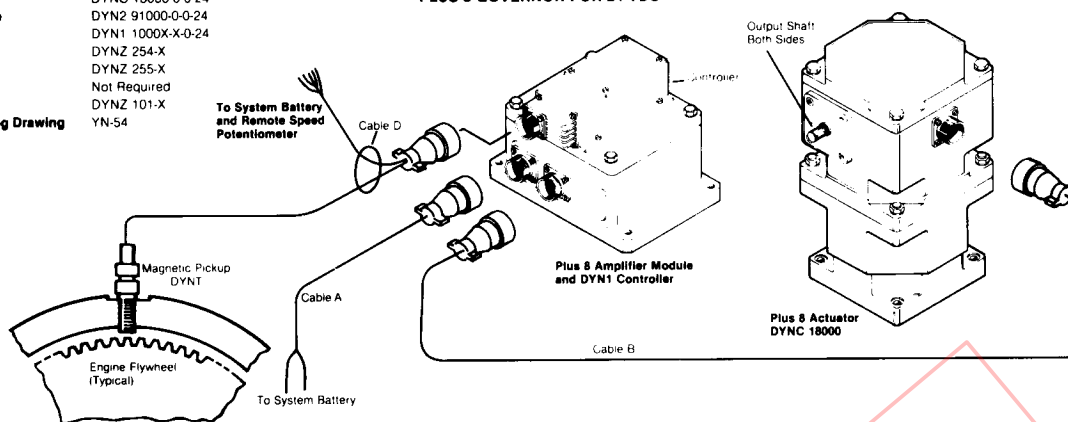
- DYNC-18000 Plus 8
- DYNC-25000 Plus 16

### CAUTION

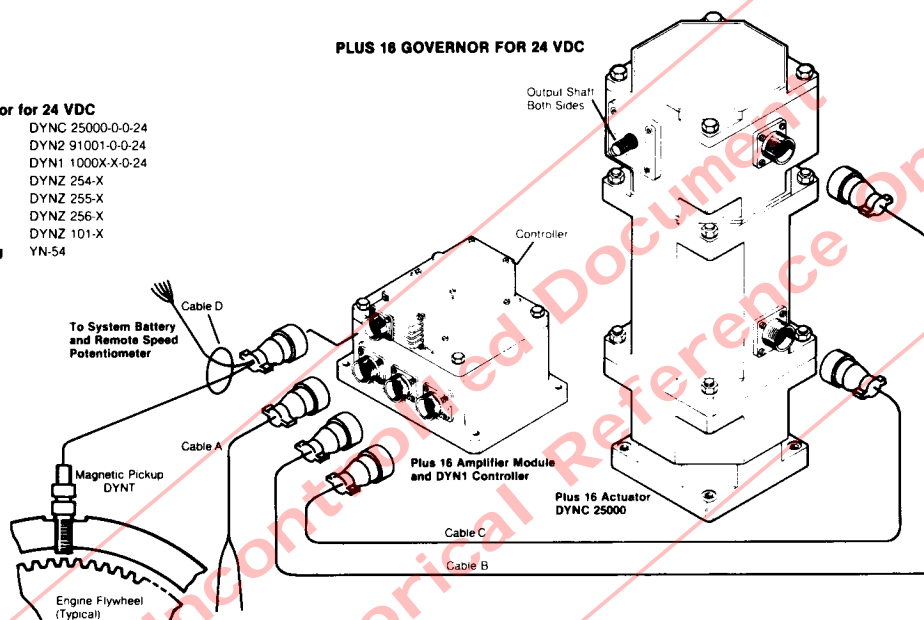
As a safety measure, Barber-Colman Company recommends that all engines and turbines be equipped with an independent overspeed shutdown device.

**Plus 8 Governor for 24 VDC**

**Actuator** DYNC 18000-0-0-24  
**Amplifier Module** DYN2 91000-0-0-24  
**Controller** DYN1 1000X-X-0-24  
**Cable "A"** DYNZ 254-X  
**Cable "B"** DYNZ 255-X  
**Cable "C"** Not Required  
**Cable "D"** DYNZ 101-X  
**Installation Wiring Drawing** YN-54

**Plus 16 Governor for 24 VDC**

**Actuator** DYNC 25000-0-0-24  
**Amplifier Module** DYN2 91001-0-0-24  
**Controller** DYN1 1000X-X-0-24  
**Cable "A"** DYNZ 254-X  
**Cable "B"** DYNZ 255-X  
**Cable "C"** DYNZ 256-X  
**Cable "D"** DYNZ 101-X  
**Installation Wiring Drawing** YN-54

**Typical Wiring for +8 or +16 DYNA Governor System Using 24 VDC**

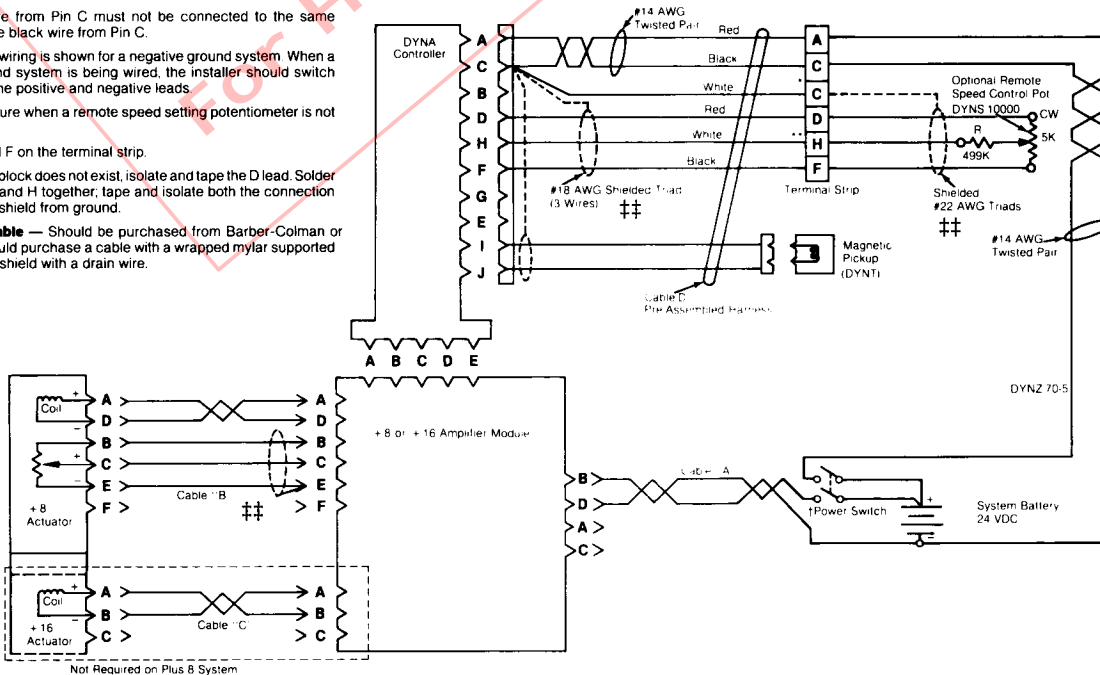
\*The white wire from Pin C must not be connected to the same terminal as the black wire from Pin C.

†Power switch wiring is shown for a negative ground system. When a positive ground system is being wired, the installer should switch (break) both the positive and negative leads.

\*\*Wiring procedure when a remote speed setting potentiometer is not used.

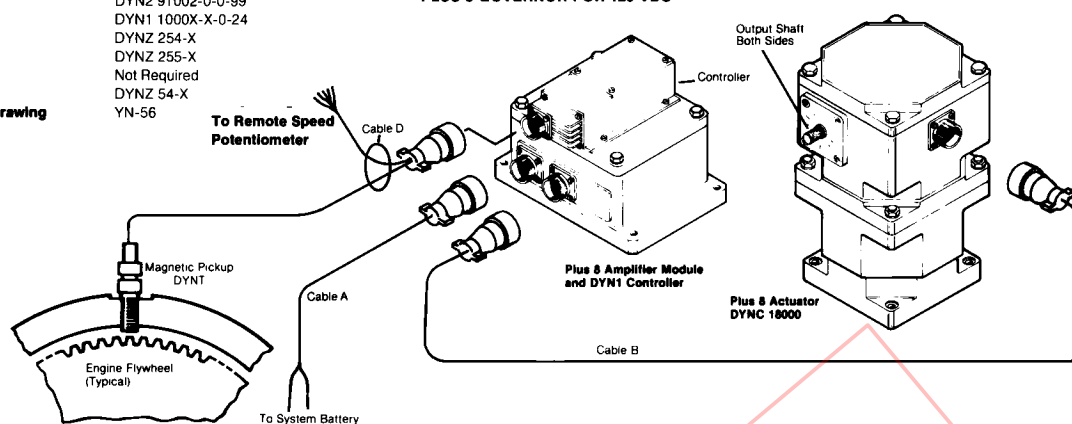
- 1) Jumper H and F on the terminal strip.
- 2) If the terminal block does not exist, isolate and tape the D lead. Solder the ends of F and H together, tape and isolate both the connection and the drain shield from ground.

‡ **Shielded Cable** — Should be purchased from Barber-Colman or customer should purchase a cable with a wrapped mylar supported aluminum foil shield with a drain wire.

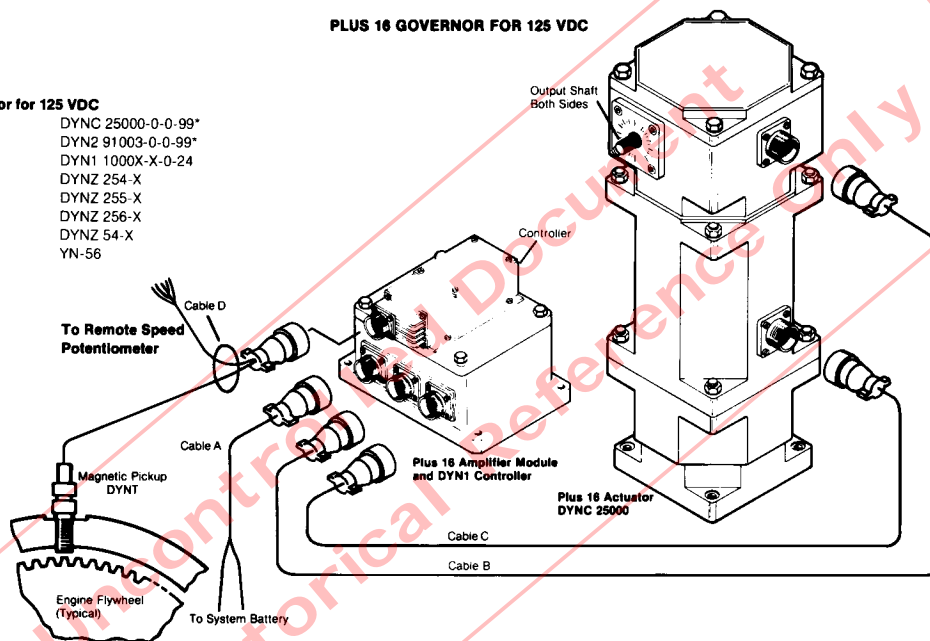


**Plus 8 Governor for 125 VDC**

**Actuator** DYNC 18000-0-0-99\*  
**Amplifier Module** DYN2 91002-0-0-99\*  
**Controller** DYN1 1000X-X-0-24  
**Cable "A"** DYNZ 254-X  
**Cable "B"** DYNZ 255-X  
**Cable "C"** Not Required  
**Cable "D"** DYNZ 54-X  
**Installation Wiring Drawing** YN-56

**PLUS 8 GOVERNOR FOR 125 VDC****PLUS 16 GOVERNOR FOR 125 VDC**

**Plus 16 Governor for 125 VDC**  
**Actuator** DYNC 25000-0-0-99\*  
**Amplifier Module** DYN2 91003-0-0-99\*  
**Controller** DYN1 1000X-X-0-24  
**Cable "A"** DYNZ 254-X  
**Cable "B"** DYNZ 255-X  
**Cable "C"** DYNZ 256-X  
**Cable "D"** DYNZ 54-X  
**Installation Wiring Drawing** YN-56

**Typical Wiring for +8 or +16 DYNA Governor System Using 125 VDC**

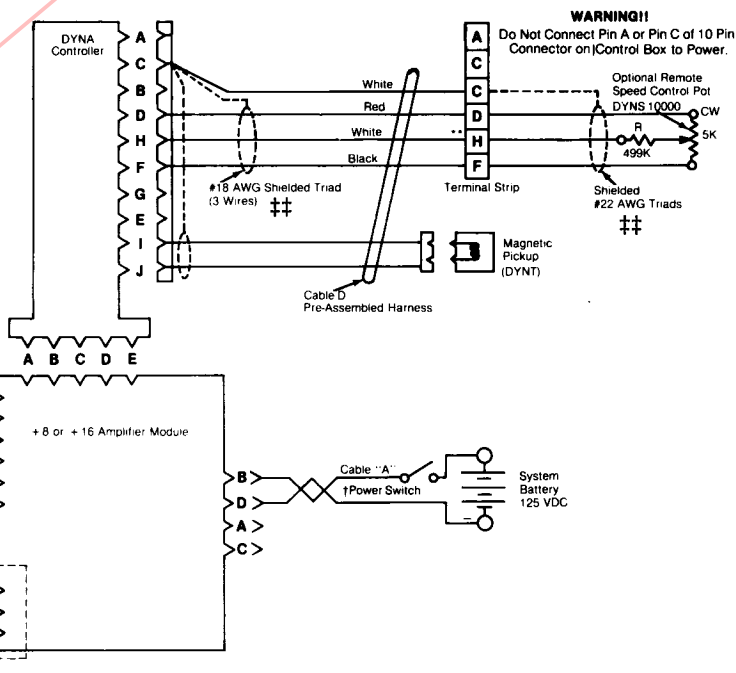
\*The white wire from Pin C must not be connected to the same terminal as the black wire from Pin C.

†Power switch wiring is shown for a negative ground system. When a positive ground system is being wired, the installer should switch (break) both the positive and negative leads.

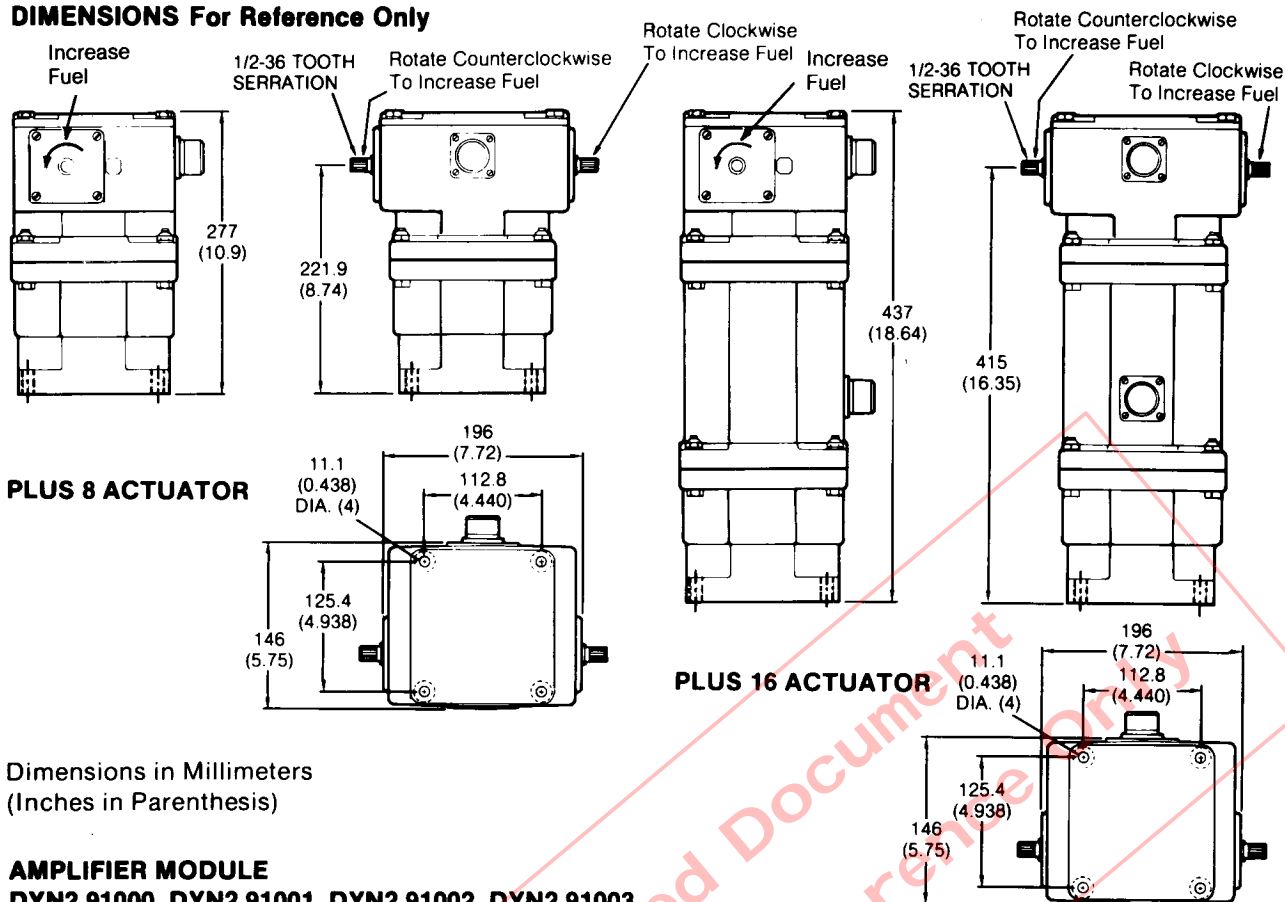
\*\*Wiring procedure when a remote speed setting potentiometer is not used.

- 1) Jumper H and F on the terminal strip.
- 2) If the terminal block does not exist, isolate and tape the D lead. Solder the ends of F and H together; tape and isolate both the connection and the drain shield from ground.

‡‡ **Shielded Cable** — Should be purchased from Barber-Colman or customer should purchase a cable with a wrapped mylar supported aluminum foil shield with a drain wire.



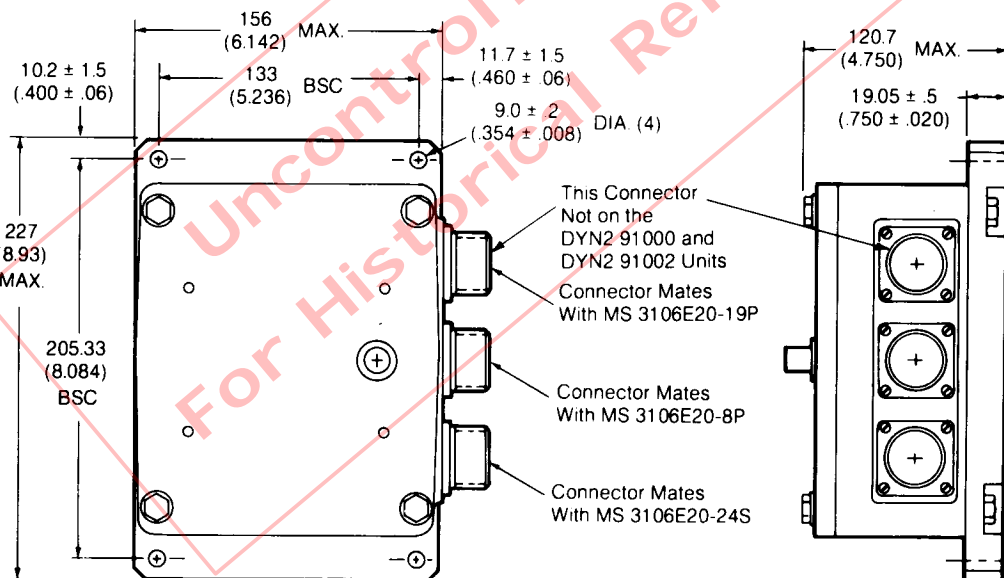
## DIMENSIONS For Reference Only



Dimensions in Millimeters  
(Inches in Parenthesis)

## AMPLIFIER MODULE

DYN2 91000, DYN2 91001, DYN2 91002, DYN2 91003



## 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.

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