



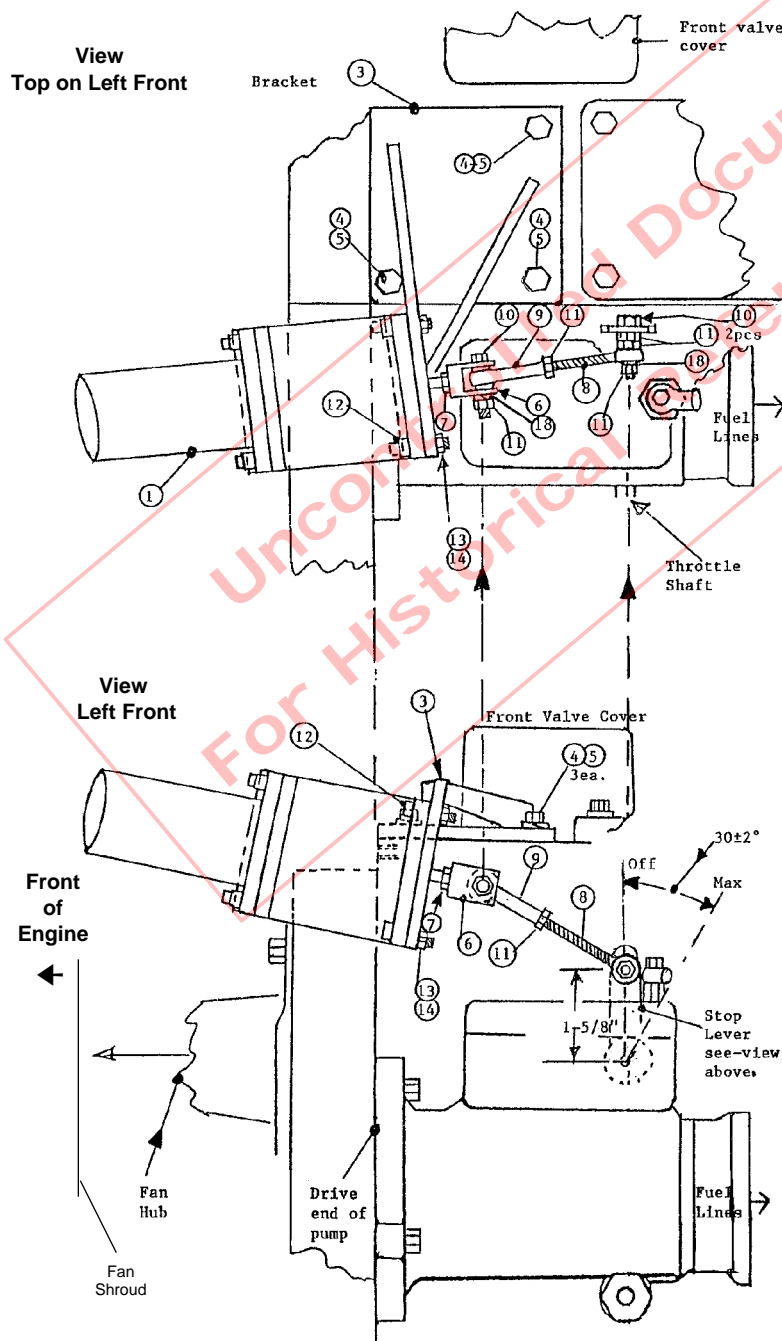
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**Installation of the Barber-Colman Linear Isochronous Electric Governor on the Cummins "B" Series diesel engine. DYNC-10202 actuator operates the stop lever of the Stanadyne fuel pump. The engine flywheel has 159 teeth. The bracket, Item 3 of the parts list, mounts on the top left front of the engine.**

Operate the engine by moving the fuel pump throttle lever towards "increasing fuel" until the engine speed is 10% above normal operating speed. Lock the throttle lever in this position. Move the fuel pump stop lever (inboard lever) slowly, decreasing fuel until the engine stops. The stop lever must be in this position when the linkage is connected. Note: The linkage consists of a male and female rod end bearing, and one 10-32 jam nut.

**Read all instructions and review the layout drawing before attempting this installation.**

### I. Installation Instructions



1. Install the actuator — Item 1, on the Item 3 bracket, using following hardware: Four (4) each of Items 12, 13 and 14.
2. Install the assembly on the engine using three (3) each of Items 4 and 5.
3. Obtain from the parts kit, the male and female rod end bearings — Items 8 and 9, and one Item 11 nut. Install the nut on the male bearing. Thread the male bearing into the female bearing 5 turns and tighten the jam nut.
4. Install one Item 10 screw in the fuel pump stop lever from the engine side. Use two (2) Item 11 nuts on the screw and tighten.
5. Install the ball end of the male rod end bearing on the screw. Install one (1) Item 18 lock washer, then one (1) Item 11 nut. Tighten the nut.
6. Install the M6 — Item 7 — jam nut on the shaft of the actuator. Install the clevis — Item 6 — loosely on the shaft.
7. Rotate the stop lever to the established "Off" position. Turn the clevis on the actuator shaft until the hole in the rod end bearing lines up with the hole in the clevis. Install the last Item 10 screw, using lock washer and nut — Items 18 and 11.
8. Tighten the clevis jam nut — Item 11.
9. Refer to the wiring diagram on page 3.
10. Use twisted pairs of 14ga wire for power & actuator leads. Solder the controller leads or use a terminal block. To install the magnetic pickup, install the Item 16 bushing first.

## II. Parts List

### A. Table 1. Governor Assembly

Specify voltage when ordering Items 1 and 2

Item	Description	Barber-Colman Part Number	Qty.
1	Governor actuator	DYNC-10202	1
2	Controller	DYN1-10704*	1

\* For remote speed and/or parallel operation, order DYN1-10754 controller listed in Table 3, Optional Parts.

### B. Table 2. Installation Kit

B-C Part Number DYNK-10360

Item	Description	Barber-Colman Part Number	Qty.
3	Actuator mounting bracket	DYNK-138-26	1
4	Bracket screws M10 x 1.5 x 25mm Hex	S4-159	3
5	M10 lock washers	W1-4	3
6	Actuator shaft clevis M6 th	DYNK-218-2	1
7	Clevis - Jam nut, brass M6 th	DYNC-3030-2	1
8	Rod end bearing - Male, 10-32 th	AKKH-175	1
9	Rod end bearing - Female, 10-32 th	P1-135	1
10	Screws 10-32 x 1" Hex	BYRF-2308	2
11	Nuts 10-32	DYRF-29	5
12	Actuator to bracket mounting screws		
12	1/4 - 28 x 1.00 Socket hd.	BYRF-1461	4
13	Lock washers 1/4	CYRD-558	4
14	Nuts 1/4 - 28 Hex	DYRF-293	4
15	Magnetic pickup 3/4 - 16	DYNT-13200	1
16	— Intentional Blank —		
17	Wire lugs, 14 ga. Mate with lugs on actuator	E24-866-1	2
18	Lock washers, No. 10 for Item 10	CYRD-198	2

### C. Table 3. Optional Parts

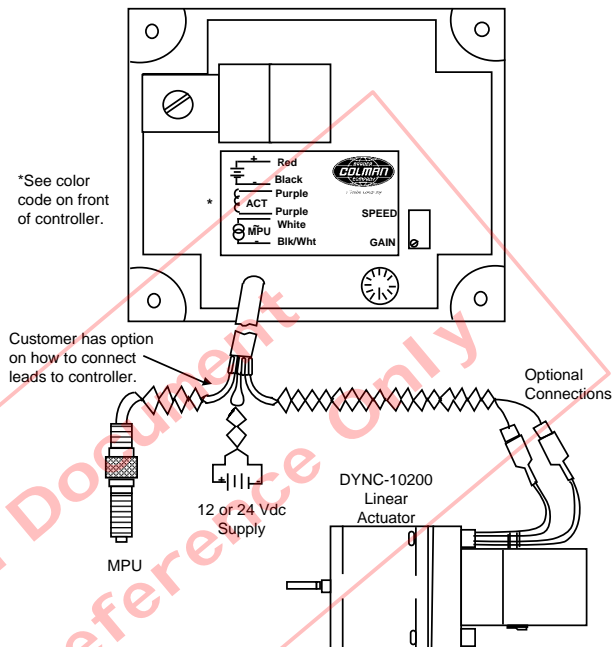
Item	Description	Barber-Colman Part Number	Qty.
19	Controller	DYN1-10754	1
20	Remote speed potentiometer, 5k	DYNS-10000	1
21	3 Wire foil shielded cable	E26-22	*
22	D.C. Power switch, toggle type	CYZP-11-1	1

\* Specify length

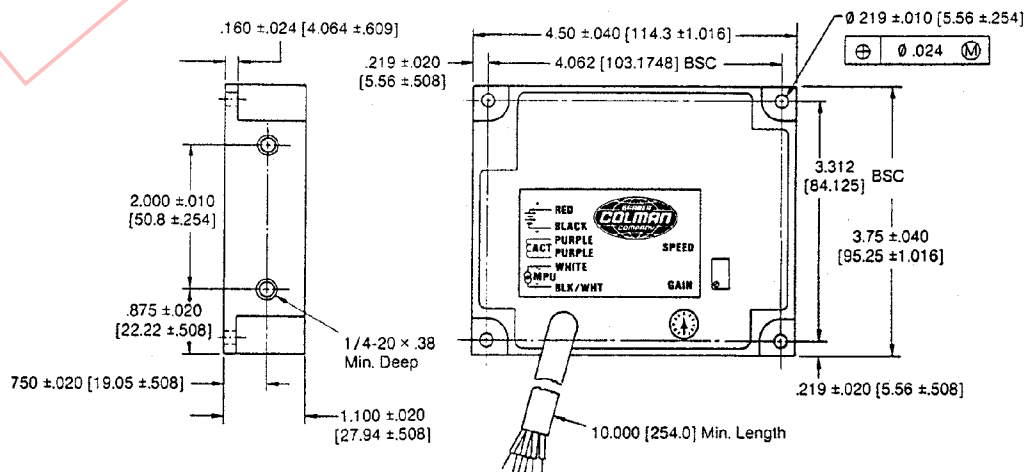
## III. Typical Wiring Diagram

### Note:

The bare shield drain wire of the magnetic pickup leads should be connected to the black minus power lead to the controller.



## IV. Controller Installation Dimensions DYN1-10704



## V. Calibration & Basic Wiring Diagram

Part Number	Input Signal Frequency Maximum	Part Number	Input Signal Frequency Maximum
DYN1-10752-000-0-12 ] DYN1-10752-000-0-24 ]	250 to 1200 Hz	DYN1-10754-000-0-12 ] DYN1-10754-000-0-24 ]	2500 to 5000 Hz
DYN1-10753-000-0-12 ] DYN1-10753-000-0-24 ]	1200 to 2500 Hz	DYN1-10756-000-0-12 ] DYN1-10756-000-0-24 ]	5000 to 9000 Hz

### NOTE

See Step 4.0 for proper procedures for setting switches S1 and S2 if you have a controller that has the two switches located on top of the controller.

### 1.0 CALIBRATION PROCEDURE

**1.1** Observe that potentiometer settings are adjustable from zero to 100%. Each small division is 10%. The speed potentiometer is 10K, 20 turn.

**1.2** Set the small dip switch, S1, for the correct engine. (See paragraph 4) Set switch S2 in the "OFF" position for actuator DYNC 10200 and DYNC 10202 or in the "ON" position for DYNC 10500 and DYNC 10502

**1.3** If a remote speed potentiometer is used for narrow range, set to mid range.

### 2.0 INITIAL POTENTIOMETER SETTINGS

GAIN	20%
I	20%
D	30%
DROOP	Zero

**2.1** For isochronous operation, set DROOP counterclockwise to minimum position as shown in Figure 1.

**2.2** For DROOP operation, set DROOP potentiometer clockwise to obtain desired amount of DROOP from no-load to full load. Turning potentiometer clockwise increases DROOP.

### 3.0 START ENGINE (NO LOAD)

**3.1** Adjust the controller speed potentiometer for desired engine speed.

### NOTE

A warm engine is normally more stable than a cold one. If the governor is adjusted on a warm engine, turn the adjustment potentiometers counterclockwise 5% (1/2 div.) to ensure a stable engine when started cold.

**3.2** Adjust the GAIN potentiometer clockwise until the engine begins to hunt. (If the engine remains stable at 100% GAIN, physically disrupt the actuator linkage by hand.) With the engine hunting, turn the GAIN potentiometer counterclockwise until stable.

**3.3** Repeat step 3.2 for the "D" setting.

**3.4** Repeat step 3.2 for the "I" setting.

**3.5** After calibration, it may be necessary to readjust the speed.

**3.6** If the engine is a diesel, following the above calibration, conduct the following test. With the engine operating at rated speed, turn the electric governor off. When engine speed slows to approximately half of rated speed, turn the electric governor back on. Observe the overshoot. If the overshoot is too great, turn the "I" potentiometer clockwise to lessen the overshoot. If there is a small hunt at steady state, slightly turn the "I" potentiometer counterclockwise until stable. In some cases, 2 to 5 Hz overshoot may be acceptable.

**3.7** If the engine is an ignition type using compressed fuel such as natural gas or LP, stop the engine and restart in the normal manner to check overshoot.

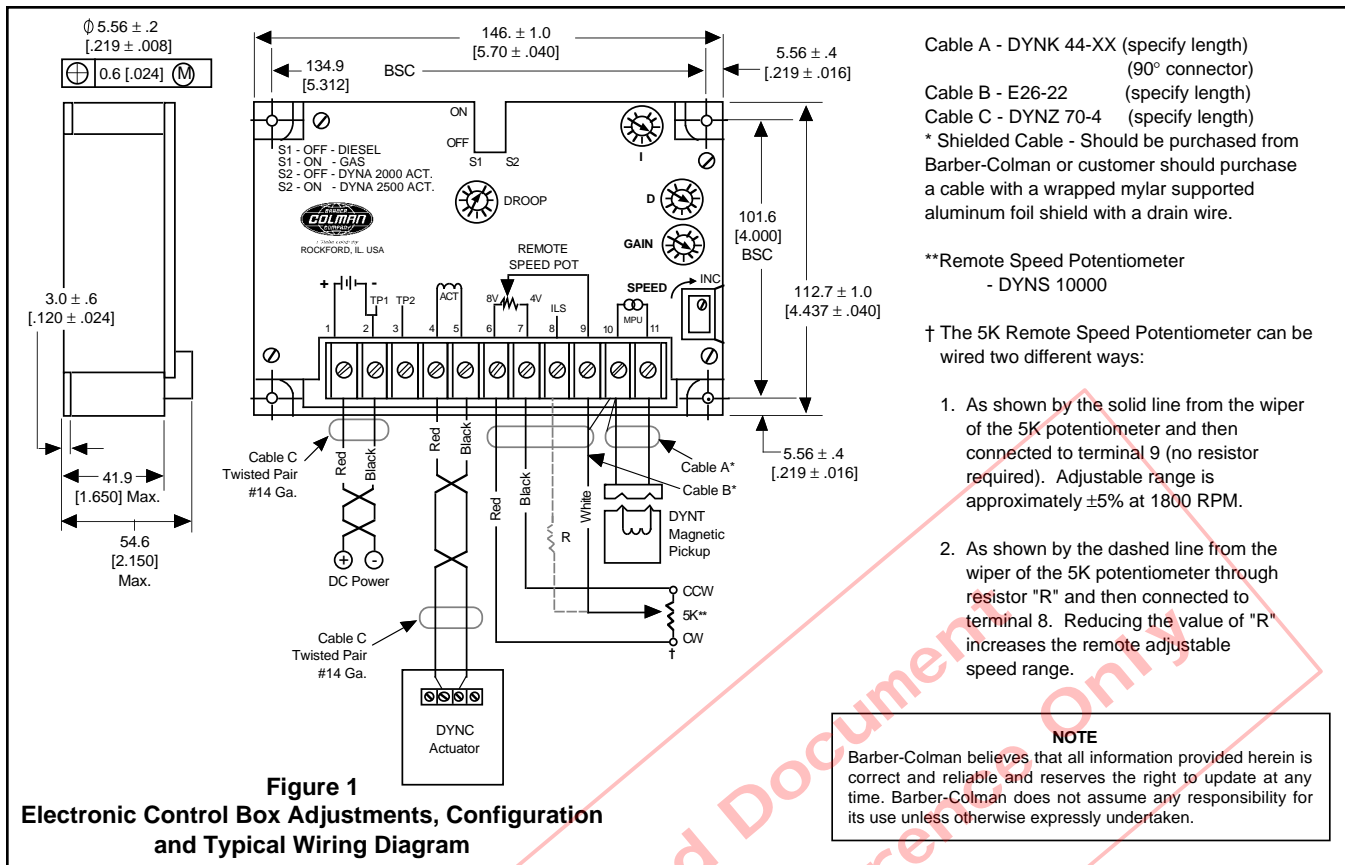
If possible, operate the unit through various load ranges up to 100% to ensure stability.

### 4.0 CONTROLLERS HAVE SWITCHES S1 AND S2

These units have two features now added to the DYN1 1075X series controllers. They are:

**4.1** Two response ranges for matching either the diesel or gas engine dynamics.

- Set S1 to the OFF position for diesel engine applications.
- Set S1 to the ON position for gas/gasoline engine applications.



4.2 Two actuator selections, so the same controller can be used on the DYNA 2000 or DYNA 2500 actuator.\*

- Set S2 to the OFF position when using a DYNA 2000 actuator.
- Set S2 to the ON position when using a DYNA 2500 actuator.

### 5.0 GENERAL INFORMATION ON S1 AND S2

- Switch S1 selects one of two integrating rate ranges. The diesel version integrates at twice the rate of the gas version.
- Switch S2 selects the point at which actuator coil current level causes the integrator limit to be actuated. This level varies for 12 and 24 volt as shown below.

	12 Volt	24 Volt
DYNA 2000 — S2 OFF	5.1A	2.3A
DYNA 2500 — S2 ON	7.2A	3.4A

\* DYNA 2000 — DYNC 10200 and DYNC 10202  
 DYNA 2500 — DYNC 10500 and DYNC 10502

These actuators do not have a potentiometer feedback transducer.

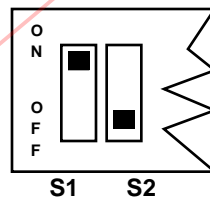
### CAUTION

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.

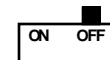
### 6.0 PROPER PROCEDURES FOR SETTING SWITCHES S1 AND S2

**Question:** How do I know if the switches in the dual-in-line packages are correctly set as far as being in the OFF position or the ON position?

Top View



Side View "On"



Side View "Off"

**Answer:** The drawings above should clarify any confusion about switch settings. The easiest way to set the switches is to apply pressure with a small pointed object until the switch clicks into position.

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