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Installation of the Barber-Colman 8000 Electric Governor on the 6 Cylinder Hercules (Top Turbo) GT 3400 natural gas engine, having an Impco CA200 carburetor. The ring gear has 126 teeth.

This bulletin contains the following:

- I. Installation Instructions
- II. Layout Drawing
- III. Parts List
- IV. Calibration & Basic Wiring Diagram

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

I. Installation Instructions

- 1) To use this kit of parts the carburetor lever is between the throttle body and engine block. The Impco CA200 carburetor is separate from the throttle. The turbo charger is high on the right side of the engine. The radius of the carburetor lever must be one inch.
- 2) If the engine has a mechanical governor, remove the linkage connected to the carburetor lever. **Read all the instructions. Review the installation layout drawing before proceeding.**
- 3) Obtain one Item 5 actuator mounting screw from the kit of parts. Refer to the top view of the layout drawing and install the screw in the hole marked "A" from the underside of the Item 3 mounting plate.
- 4) Install the Item 3 plate on the two right front head studs. Re-torque the head stud nuts for the 140 to 160 lb-ft. The plate will be on top of the front lifting eye.
- 5) Install the Item 1 actuator using the remaining Item 5 screws, Item 6 lock washer and Item 7 nuts.
Note: Install the Item 4 support brace as shown in the layout drawing. The upper end makes use of one of the actuator mounting screws.
- 6) Reposition the carburetor lever as shown in the "off" position in the layout drawing with the butterfly throttle valve closed.
- 7) Install the Item 10 lever on the actuator at 25 degrees from the horizontal reference line as shown in the lower drawing.
- 8) Assemble the linkage rod - Item 9 - using the rod bearings - Item 8, and two Item 12 nuts as jam nuts on the threaded rod.
- 9) Install one end of the rod assembly on the carburetor lever as shown in the top view of the layout drawing.
- 10) Rotate the carburetor throttle lever to the full "off" position. The carburetor lever should now be in a position that is 30 degrees toward the rear of the engine with respect to a vertical reference line through the carburetor body.
- 11) Adjust the length of the bearings on the linkage rod until the hole in the actuator rod bearing lines up with outermost hole (2-7/16" radius) in the Item 10 actuator lever.
- 12) Obtain an Item 11 screw, two flat washers - Item 13, one lock washer and nut - Items 12 and 14, and connect the linkage to the actuator lever.
- 13) **Note:** In an actual application at the customer's site, verify the following:
 - a. The total electrical load for the gen set **may be much less** than the maximum capability of engine generator set.
 - b. If the throttle butterfly is only half open for full load at the site, a shorter lever radius at the actuator lever can be used to match the actuator rotation to the real active fuel of the carburetor.
- 14) The controller — Item 2, is to be panel mounted. The actuator and D.C. power leads should be tightly twisted pairs of 14 gauge wire. See wiring diagram included.
- 15) The negative D.C. power lead of the controller should be connected to the negative battery terminal or to where the large battery negative cable connects to the engine block. This is recommended because this is an ignition type engine.
- 16) Install the Item 15 magnetic pickup in the existing 5/8 - 18 hole located on the left side of the bell housing.
- 17) Nominal Item 2 controller adjustments are:

I	40%
D	12%
GAIN	10%

Refer to the calibration sheet included.

III. 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-11026-300	1
2	Controller	DYN1-10684	1

B. Table 2. Installation Kit

B-C Part Number DYNK-10317

Item	Description	Barber-Colman Part Number	Qty.
3	Actuator mounting plate Note: Install using two head studs	DYNK-32-26	1*
4	Support brace - uses existing screws to install	DYNK-32-27	1
5	Actuator mounting screws 5/16 - 18 x 3 Hex Hd.	BYRF-1357	4
6	Lock washers 5/16	CYRD-559	4
7	Nuts 5/16 - 18	DYRF-9	4
8	Rod end bearings	DYNZ-47-1	2
9	Threaded rod 1/4 - 28 x 4.625"	GYRF-42-1	1
10	Actuator lever 2-7/16" radius	DYNC-182-3	1
11	Rod end brg. screws 1/4 - 28 x 1" Hex.	BYRF-3133	2
12	Nuts 1/4 - 28 Hex.	DYRF-293	4
13	Flat washers 1/4	JYRD-55-10	4
14	Lock washers 1/4	W1-30	2
15	Magnetic pickup	DYNT-10100	1
16	Magnetic pickup cable	DYNK-44-1	1

* Re-torque head stud nuts to 140 to 160 lbs-ft after installing plate. Front lifting eye is to be under the plate.

C. Table 3. Optional Parts

Item	Description	Barber-Colman Part Number	Qty.
17	Controller for remote spd. and/or parallel operation	DYN1-10754	1
18	Remote speed pot, 5K, 10 turn	DYNS-10000	1
19	3 Wire foil shielded cable	E26-22	*
20	D.C. power switch, toggle type	CYZP-11-1	1
21	Electronic overspeed switch	DYNZ-60010	1

* Specify length

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.

IV. Calibration Procedure for DYNA 8000 Series Controllers

Part Number	Input Signal Frequency Maximum	Part Number	Input Signal Frequency Maximum
DYN1-10682-000-0-12] DYN1-10682-000-0-24]	250 to 1200 Hz	DYN1-10684-000-0-12] DYN1-10684-000-0-24]	2500 to 5000 Hz
DYN1-10683-000-0-12] DYN1-10683-000-0-24]	1200 to 2500 Hz	DYN1-10686-000-0-12] DYN1-10686-000-0-24]	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 DYNA 8000 or in the "ON" position for DYNA 8200 and 8400.

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 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 3 Hz overshoot may be acceptable.

WARNING

For gas engines, make certain that method used does not put gas in exhaust which might result in an explosion.

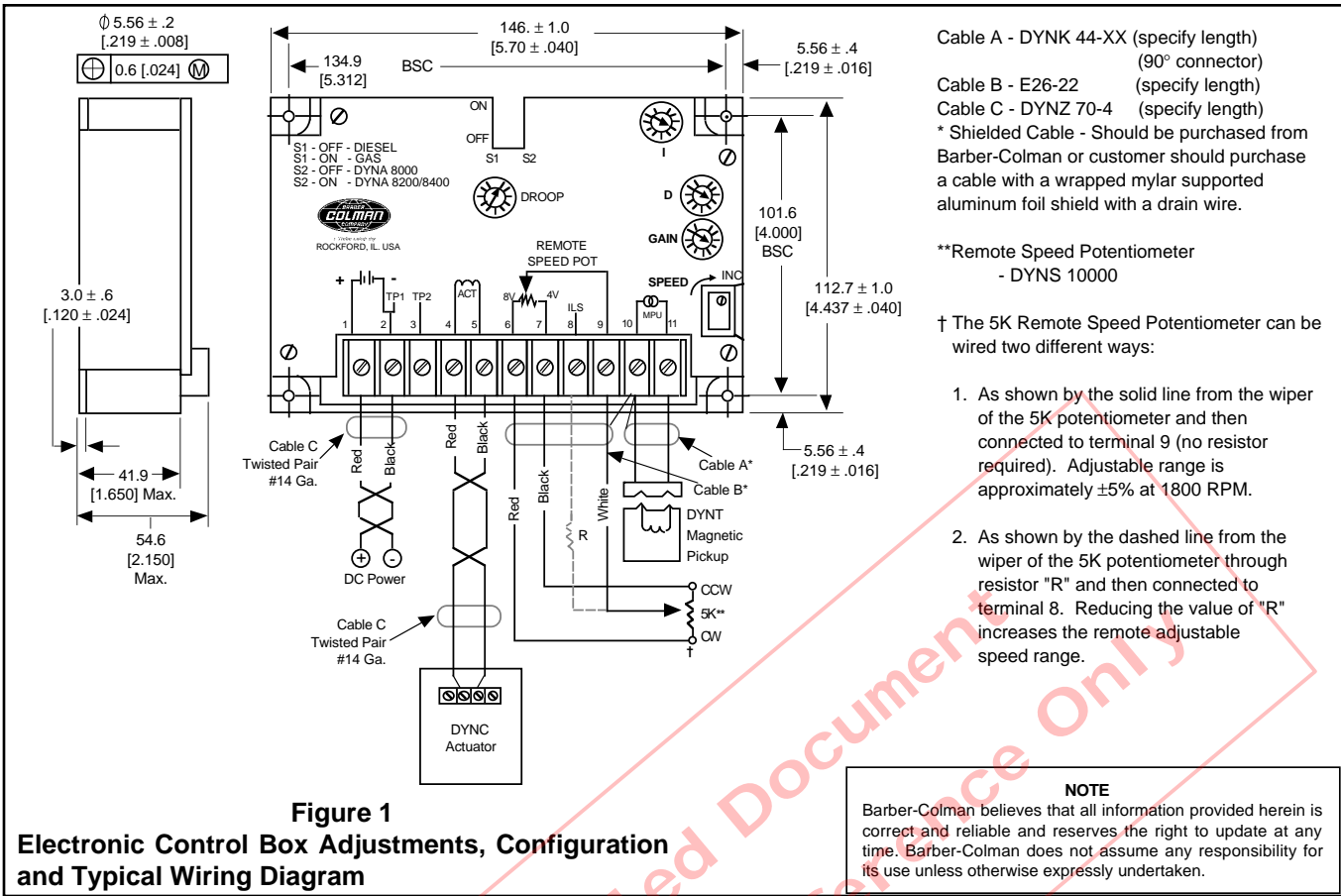
If possible, operate the unit through various load ranges up to 100% to ensure stability.

4.0 CONTROLLERS HAVE SWITCHES S1 AND S2

These units have two features now added to the DYN1 1068X 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 8000, DYNA 8200 or DYNA 8400 actuator.*

- Set S2 to the OFF position when using a DYNA 8000 actuator.
- Set S2 to the ON position when using a DYNA 8200 or DYNA 8400 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 is nominally 6.3 amperes for the DYNA 8000 and 7.3 amperes for the DYNA 8200 and 8400 actuator.

* DYNA 8000 — DYNC 11020 Series
 DYNA 8200 — DYNC 12000 Series
 DYNA 8400 — DYNC 14800 Series

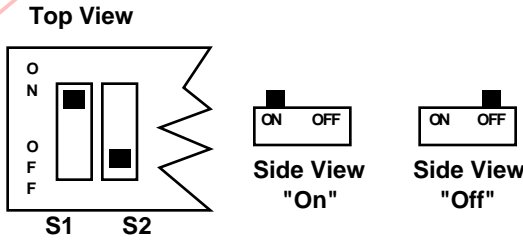
These actuators do not have a potentiometer feedback transducer.

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?



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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