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Installation of the Barber-Colman 8000 Electric Governor DYNC-11021 on the Cummins "C" range diesel. The linkage connects to the *stop lever* of the R.S.V. mechanical governor.

This bulletin contains the following:

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

Prior to installation, review the attached Layout drawing and complete steps 1 - 3 on the layout drawing.

I. Installation Instructions

- 1) Obtain from the parts kit, Item 10 new stop lever. Install this lever on the stop shaft as shown in the layout drawing. This lever is also identified as Lever "D". Use original washer and screw.
- 2) Next, install the Item 3 mounting bracket using screws and lock washers, Items 4 and 5.
- 3) Install the actuator lever, Item 9, as shown in the layout drawing. Observe that the lever is at 25 degrees below a horizontal reference line.
- 4) Install the actuator, Item 1, on the mounting bracket using four each of Items 13, 14 and 8.
- 5) Install one rod end bearing, Item 12, on the Item 10 stop lever using two flat washer, Item 15, screw, Item 13, lock washer, Item 8 and one nut, Item 14.
- 6) Install the other rod end bearing, Item 12, with a jam nut, Item 14, on one end of the threaded rod, Item 11.
- 7) Install one Item 14 nut on the other end of the threaded rod. Set the linkage rod aside for later use.
- 3) Recover the linkage rod that was set aside. In the lower right view in the layout drawing, observe that there is a nut and flat washer between the rod end bearing and the actuator lever. Obtain one Item 13 screw, two Item 15 flat washers and one Item 14 nut. Install these in the rod end bearing that is on the threaded linkage rod.
- 4) Turn the free end of the threaded rod into the rod end bearing that is on the *stop lever* and tighten the rod jam nut, Item 14, against the bearing.
- 5) Move the stop lever, Item 10, to the "OFF" position that was marked. Adjust the length of the rod as necessary, in or out of the bearings until the screw at the actuator lever lines up with the second (outermost hole) in the actuator lever. Install a lock washer, Item 8, and a nut, Item 14, on the screw at the actuator lever. Tighten the jam nuts on the threaded rod. Check to be sure all linkage nuts are tight.

A. Fuel Pump Lever

- 1) Start the engine and control speed by moving the mechanical governor throttle lever. Move the throttle lever, increasing engine speed, until the engine speed is 10% above normal desired speed. Lock the throttle lever in this position.

- 2) Next, manually operate the inboard, Item 10 stop lever. Slowly move the lever toward the rear of the engine (decreasing engine speed) until the engine stops. Mark the position the lever is in. The lever should be in this position when the linkage is installed.

B. Magnetic Pickup

- 1) Observe that in the engine bell housing, a 3/4-16 hole has been drilled and threaded for the Item 16 magnetic pickup.

C. Controller

- 1) The Item 2 controller should be panel mounted. The control is not potted and **should not be** engine mounted.

D. Wiring

- 1) D.C. power leads and actuator leads should be 14 gauge minimum. If leads exceed 15 ft., use 12 gauge wire. It is recommended that the leads be twisted pairs.

2) D.C. supply leads to terminals 1 and 2 of the controller can be connected to where the large battery cables connect to the engine.

3) The positive lead can be wired through a normally open relay contact, rated to 10 amperes or more. The coil of the relay is then connected to the engine **fault circuit**.

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-11021	1
2	Controller	DYN1-10654	1

B. Table 2. Installation Kit

B-C Part Number DYNK-10287

Item	Description	Barber-Colman Part Number	Qty.
3	Actuator mounting bracket	DYNK-138-22	1
4	Bracket to block screws M10 x 1.5 x 20	S3-54	3
5	M10 Lock Washers	W1-4	3
6	— Intentionally blank —		
7	— Intentionally blank —		
8	Lock Washers 1/4"	CYRD-558	6
9	Actuator Lever	DYNC-182-2	1
10	Fuel pump stop lever *	DYNK-138-23	1
11	Linkage Rod 1/4 - 28 x 6"	GYRF-42-16	1
12	Rod end bearings 1/4 - 18 Thread	DYNZ-47-1	2
13	Hex head screws 1/4 - 28 x 1-1/4	BYRF-3050	6
14	Nuts 1/4 - 28 Hex	DYRF-110	9
15	Flat washers 1/4" **	CYRD-59	10
16	Magnetic pickup 3/4 - 16 (6 ft. leads)	DYNT-19200	1

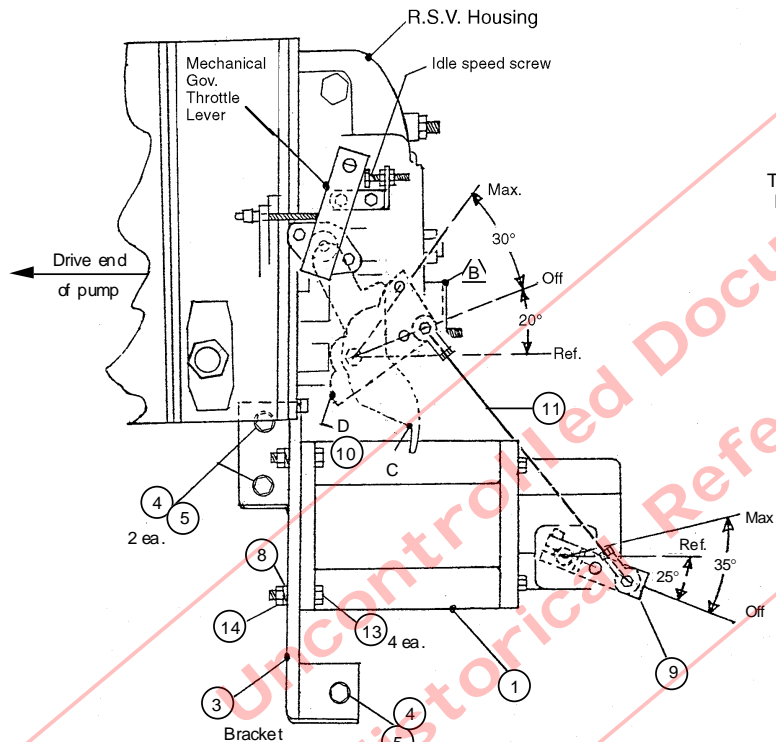
* The hole in this lever with the longest radius is for use in a different parts kit.

** Use six; three under each idle plate screw between the plate and the pump housing. See Note 3 on the Layout Drawing.

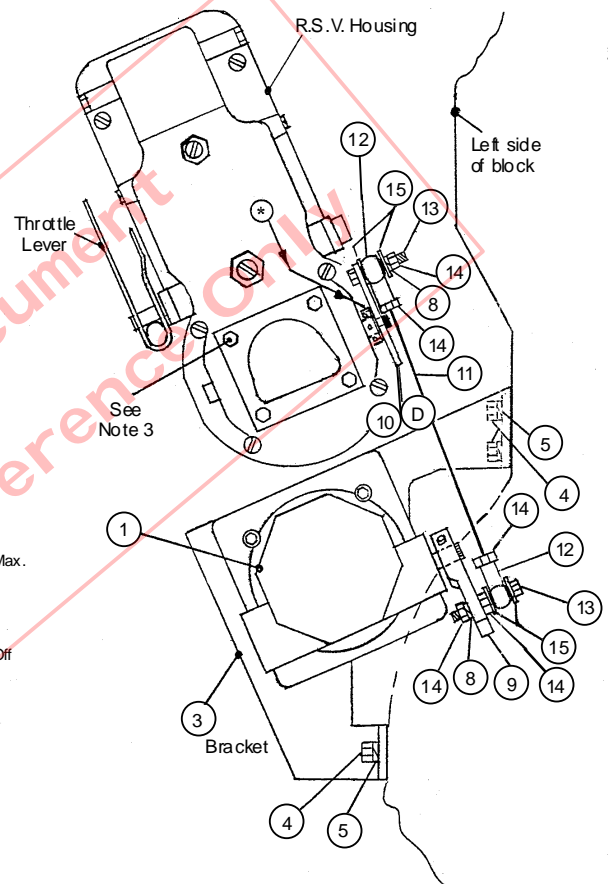
III. Layout Drawing

Installation of the Barber-Colman 8000 series electric governor on the Cummins "C" diesel engine. The electric governor linkage connects to a new stop lever — Item 10, of the parts list. (Identified as lever "D" in the layout below) The G-drive engine flywheel has 127 teeth. The mechanical governor throttle lever must be set and locked to operate the engine at 10% above nominal speed to avoid limiting fuel by the mechanical governor under full load. In the drawing at the left, the fuel pump stop shaft is on the backside pointing toward the engine block. Refer to all instructions.

VIEW: Left side 30° below horizontal line.



VIEW: Rear left side.



* Cap over helical spring. Remove spring and discard.

Notes:

1. Plate "B" has a screw that is an adjustable stop for lever "C" operated by a solenoid.
2. Remove and discard plate "B", lever "C", and the stop solenoid. Note: When lever "C" is removed, observe that the stop shaft has a round dust cap. Remove the cap; then remove the helical spring. Discard the spring and replace the round dust cap.
3. Replace the two upper cover screws using 3 of Item 15 — flat washers, on each screw.
4. Refer to the Item numbers on this layout drawing and the instructions to install the electric governor.

IV. Calibration & Basic Wiring Diagram

Part Number	Input Signal Frequency Maximum	Part Number	Input Signal Frequency Maximum
DYN1-10652-000-0-12] DYN1-10652-000-0-24]	250 to 1200 Hz	DYN1-10654-000-0-12] DYN1-10654-000-0-24]	2500 to 5000 Hz
DYN1-10653-000-0-12] DYN1-10653-000-0-24]	1200 to 2500 Hz	DYN1-10656-000-0-12] DYN1-10656-000-0-24]	5000 to 9000 Hz

NOTE

See Step 3.0 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 Connection Information

1.1 When using an ILS unit, the remote speed potentiometer may be left connected to terminal 9 of the controller as shown, or connected to the ILS.

1.2 When an ILS unit is used, connect 3-wire shielded cable to terminals 6, 7 and 8. Connect drain shield wire to terminal 10 at the controller only. Other end of drain shield wire is to be cut off and taped.

2.0 Calibration And Adjustments

2.1 See *Figure 2* for a reference guide before making any adjustments of the potentiometers, DROOP, I, GAIN and SPEED.

2.2 Power OFF — engine not operating.

2.3 Initial potentiometer settings:

2.3.1 Set the I adjustment three divisions from zero and the GAIN at the second division from zero.

2.3.2 For isochronous operation, set DROOP counterclockwise to minimum position as shown in *Figure 2*.

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

— NOTE —

If the full 35° rotation of the actuator shaft is used and the linkage adjusted to use only the active fuel range, the maximum obtainable DROOP would be approximately 12% at full load.

2.3.4 See step 3.0 for setting switches S1 and S2.

2.4 If a remote speed potentiometer is used for narrow range, set it to mid-range. If the remote speed potentiometer is connected to terminals 6, 7 and 9, a resistor "R" in the wiper is not needed. This will provide approximately a ±5% adjustable speed range.

2.5 Start the engine.

2.5.1 Adjust the controller speed potentiometer until the engine is operating at the desired engine RPM. Clockwise increases engine RPM.

2.5.2 If the governor system is unstable, reduce the GAIN setting until stable.

— NOTE —

Except for the speed adjustment, the potentiometers have internal stops at the 0 and 100% positions.

2.6 With the engine unloaded, finalize the settings, I and GAIN adjustments as follows:

2.6.1 Turn the GAIN adjustment clockwise slowly until the actuator lever oscillates. (One may need to disturb actuator lever to cause oscillation.) Reduce the GAIN adjustment slowly counterclockwise until the lever is stable. Upset the lever by hand. If the lever oscillates 3 to 5 diminishing oscillations and stops, the setting is correct.

If system performance to load changes is satisfactory, omit step 2.6.2.

2.6.2 Reduce the GAIN setting counterclockwise one division. Next, turn the I adjustment fully clockwise while observing the actuator lever. If the lever does not become unstable, upset it by hand. When the lever slowly oscillates, turn the adjustment counterclockwise slowly until the lever is stable. Upset the lever again; it should oscillate 3 to 5 times and then become stable for optimum response.

— NOTE —

Use the settings of step 2.6.1 or step 2.6.2, whichever provides the best performance.

2.6.3 Unit is now calibrated.

3.0 All Controllers With Revision J And Above Have Switches S1 And S2

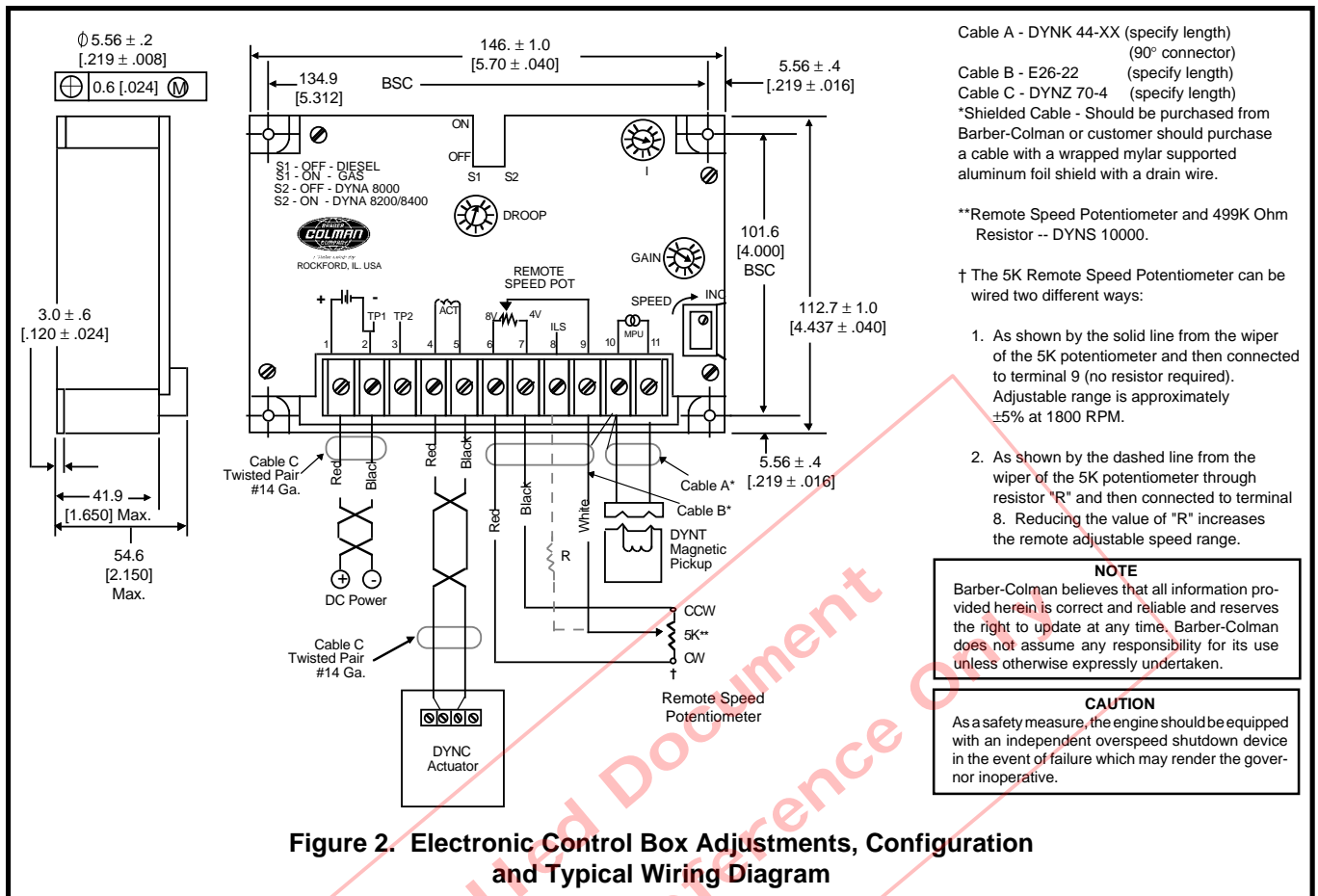
These units have two new features now added to the DYN1 1065X series controllers. They are:

3.1 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.

3.2 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.



Cable A - DYNK 44-XX (specify length) (90° connector)
 Cable B - E26-22 (specify length)
 Cable C - DYNZ 70-4 (specify length)
 *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.

**Remote Speed Potentiometer and 499K Ohm Resistor -- DYNZ 10000.

† The 5K Remote Speed Potentiometer can be wired two different ways:

1. As shown by the solid line from the wiper of the 5K potentiometer and then connected to terminal 9 (no resistor required). Adjustable range is approximately $\pm 5\%$ at 1800 RPM.
2. As shown by the dashed line from the wiper of the 5K potentiometer through resistor "R" and then connected to terminal 8. Reducing the value of "R" increases the remote adjustable speed range.

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.

Figure 2. Electronic Control Box Adjustments, Configuration and Typical Wiring Diagram

4.0 General Information On S1 & 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 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

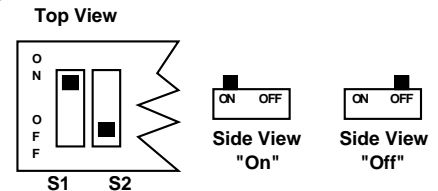
These actuators do not have a potentiometer feedback transducer.

— NOTE —

For some diesel engines, better operation may be obtained by placing SW1 in "ON" position. If difficulty is experienced in "OFF" position, try SW1 "ON" and recalibrate.

5.0 Proper Procedures For Setting Switches S1 & 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.

Barber-Colman Company

AEROSPACE & POWER CONTROLS DIVISION

DYNA Product Group

1354 Clifford Avenue
 P.O. Box 2940
 Loves Park, IL U.S.A. 61132-2940

Phone: (815) 637-3000
 Fax: (815) 877-0150

In Europe contact: Barber-Colman GmbH
 Am neuen Rheinhafen 4, D-6720 Speyer, West Germany
 Tel: 06232-1203, Fax: 06232-12155, Telex: 467 627

In Japan contact: Ranco Japan Ltd.
 Shiozaki Bldg. 7-1, 2-chome, Hirakawa-Cho, Chiyoda-Ku
 Tokyo 102, Japan
 Tel: 3261-4293, Fax: 3264-4691, Telex: 0232-2087