



**NOTE:** The kit DYNK-10343 can NOT be used on oil cooled engines (engines with an "M" in the model number), without modification to the cooling system.

**BULLETIN NO. 241**

**Application:**

Installation of the Barber-Colman 1/4 ft-lb Linear Governor on a KHD FL 1011 Deutz engine.

**Description:**

This bulletin gives detailed instructions on attaching the 1/4 ft-lb linear governor and DYNK-10343 parts kit to the engine. The stop solenoid is removed and the actuator and control linkage mounts in its place. The actuator positions the fuel rack to maintain an isochronous speed through varying loads. It is necessary to adjust the no load mechanical governor to 15% above the desired operating speed.

**Enclosures:**

- Instructions
- Parts List
- Layout Drawing
- Basic Wiring Diagram
- Troubleshooting

**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.

Application: Installation of the Barber-Colman 1/4 ft-lb linear governor on the Deutz FL 1011 series engine. The stop solenoid is removed and the actuator mounts in its place. The actuator positions the fuel rack to maintain an isochronous speed and will shut down the engine when power is removed from the governor.

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

A. Instructions

1. To set the mechanical governor 15% above operating speed, remove both adjusting rods from the throttle lever and discard the rods. Keep one jam nut to be placed on the new rod.

Obtain from the parts kit one threaded adjusting rod — Item 13, and install the M6 jam nut on the rod. Place it in the upper slot. Adjust the rod so that the mechanical governor is set 15% above desired operating speed.

2. Disconnect the 12 or 24 volt battery
3. Remove the fan guard and fan belt and discard them. Remove the belt tensioner and bracket.

**Note:** A new fan belt must be used, not supplied by Barber-Colman. New belt part number is AVX 10 X 1215 LA CONTI-SF.

4. Remove the pulley and the bushing from the bracket and discard the bracket. The pulley and the bushing will be mounted on the new mounting bracket — Item 3.
5. Obtain from the parts kit one mounting bracket, one spacer, one M8 -1.25 X 65.0 threaded rod, one M8 eyebolt, one M8 hex nut, two M8 self-lock hex nuts, two M6 x 25mm low head screws — Item 3, 5, 19, 15, 21, 10 and 20.
6. Mount the spacer — Item 5, to the bracket with two M6 X 25mm low head screws — Item 20. Place the eyebolt — Item 15, through the spacer and install an M8 hex nut — Item 23. Next, install the pulley and the bushing on the mounting bracket with one M8 x 65 mm threaded rod — Item 19, and one M8 hex nut — Item 21 against backside of pulley bracket. Place a self-locking nut— item 10 on the end of the threaded rod. Place the eyebolt on the M8 x 65mm threaded rod and install an M8 hex nut — Item 10.

**Note:** Do not tighten the M8 nuts down at this time. This will be used to tighten the fan belt later.

7. Remove the stop solenoid and discard the solenoid. The actuator and linkage will mount in its place.

B. Actuator and Linkage Assembly

1. Obtain from the parts kit one actuator, one lever, one clevis assembly, one ball joint, two Teflon washers, one snap ring and one M6 jam nut — Items 1, 7, 8, 9, 12, 14 and 23.
2. Install the M6 jam nut — Item 23, onto the ball joint — Item 9. Attach the clevis — Item 8, to the ball joint by turning it 6 turns onto the ball joint and tighten the M6 jam nut.

Attach the clevis and ball joint to the actuator — Item 1, by turning it 6 turns onto the actuator and tighten the M6 jam nut.

3. Connect the lever — Item 7, to the clevis — Item 8, with the clip retainer. Install two Teflon washers — Item 12, one on each side of the lever and in between the clevis forks. **See layout drawing.**
4. Obtain from the parts kit one housing, one adapter, one o-ring, three M4 x 20mm screws, two M10 x 25mm screws, four M6 x 16mm screws and two M6 x 20mm screws — Items 4, 6, 11, 16, 17, 18 and 22.
5. Fasten the adapter — Item 6, to the housing — Item 4, with three M6 x 20mm screws — Item 16. Place the o-ring — Item 11 on the adapter.
6. Connect the mounting bracket — Item 3, to the actuator with one of the four M6 x 16mm screws. Do not tighten screws at this time.

Install the linkage through the housing — Item 4, and fit the housing into the bracket. Place the lever on the pin (on the adapter) and fasten the snap ring — Item 14, to the pin. **See layout drawing.**

7. Mount the actuator and linkage assembly to the engine. Hold the mechanical stop lever (left side of engine) in the stop position. This allows more room for the lever to fit in the hole and make good contact with the fuel rack.

The housing and adapter will fit where the stop solenoid went with the lever fitting in the hole. Fasten the housing to the engine with two M6 x 20mm screws — Item 18, while holding the actuator and mounting bracket. (Release the mechanical stop lever.)

Remove the M6 x 16mm screw and twist the actuator slightly to install the two M10 x 25mm screws, which mounts the bracket to the engine. Install all four of the M6 x 16mm screws and tighten the actuator to the bracket.

8. Install the new fan belt using the idle pulley to tighten the belt by adjusting the eyebolt. Once the belt is tight, secure the pulley and eyebolt by tightening the three M8 hex nuts.

#### C. Magnetic Pickup Installation

1. Remove the inspection plate on the lower front of the flywheel housing. Measure from a reference line to the center of the ring gear tooth.  
**Note this measurement.**
2. Locate the reference line on the side of the flywheel housing opposite the starter. Measure and center punch at the above noted measurement.
3. Drill a 1/8" pilot hole into the flywheel housing, aligning the drill bit to the center of the flywheel. Drill and tap the pilot hole to a 3/8-24 thread.

**Note:** Use a bottoming tap to ensure the hole is completely threaded.

4. Rotate the engine to align a ring tooth in the center of the hole.
5. Screw the magnetic pickup — Item 15, into the housing until it bottoms onto the tooth.
6. Back the pickup out 1/2 to 3/4 of a turn and tighten the jam nut.

Table 1. Governor Assembly  
Specify voltage when ordering Items 1 and 2.

<b>Item</b>	<b>Description</b>	<b>Barber-Colman Part Number</b>	<b>Qty.</b>
1	Governor Actuator	DYNC-10202	1
2	Control	DYN1-10704	1

Table 2. Installation Kit  
Barber-Colman Part Number DYNK-10343

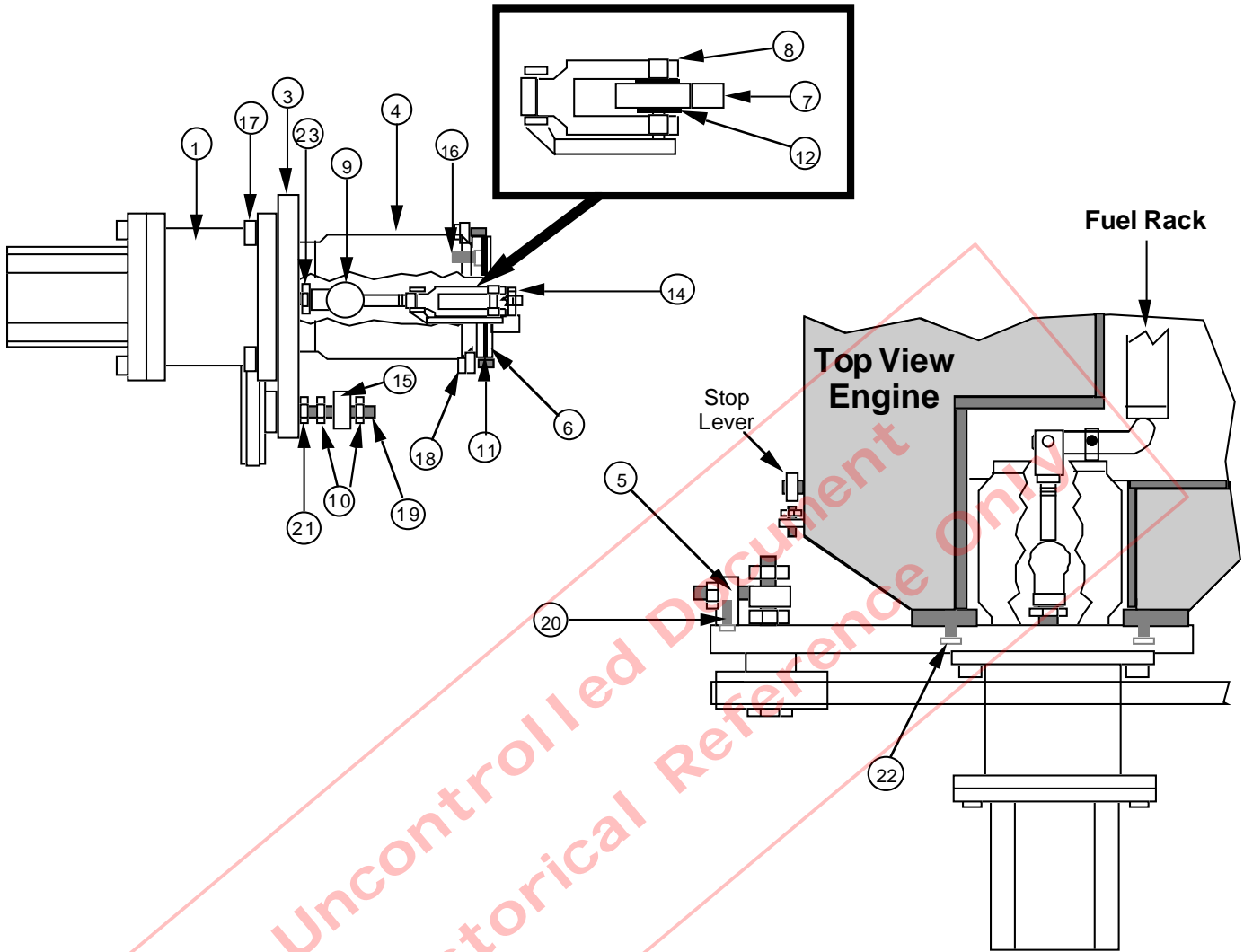
<b>Item</b>	<b>Description</b>	<b>Barber-Colman Part Number</b>	<b>Qty.</b>
3	Actuator mounting bracket	DYNK-89-14	1
4	Housing	DYNK-89-15	1
5	Spacer	DYNK-89-16	1
6	Adapter	DYNK-89-18	1
7	Lever	DYNK-89-17	1
8	Clevis Assembly	DYNK-89-20	1
9	Ball Joint	DYNK-89-22	1
10	M8 -1.25 Selflocking hex nut	DYNC 3021-1	2
11	O-ring 44 x 3.15 NBR 1-60	L5-165	1
12	Washer - Teflon	CYRD-426	2
13	Threaded Rod M6 x 3-1/4"	S5-1-5	1
14	Snap Ring	H4-97	1
15	Eyebolt	DYNK-89-19	1

16	M4 x 20mm	DYNC 351	3
17	M6 x 16mm	S4-3	4
18	M6 x 20mm	S4-4	2
19	M8 -1.25 X 65.0 [2.56] Threaded Rod	DYNC 3079	1
20	M6 x 25mm Low Head	S4-184	2
21	M8 Hex Nut	N1-19	1
22	M10 x 25mm Low head	S4-185	2
23	M6 Hex Nut	DYNC-3030-2	1
24	Magnetic Pickup	DYNT-17200	1

Table 3. Optional Control Components.

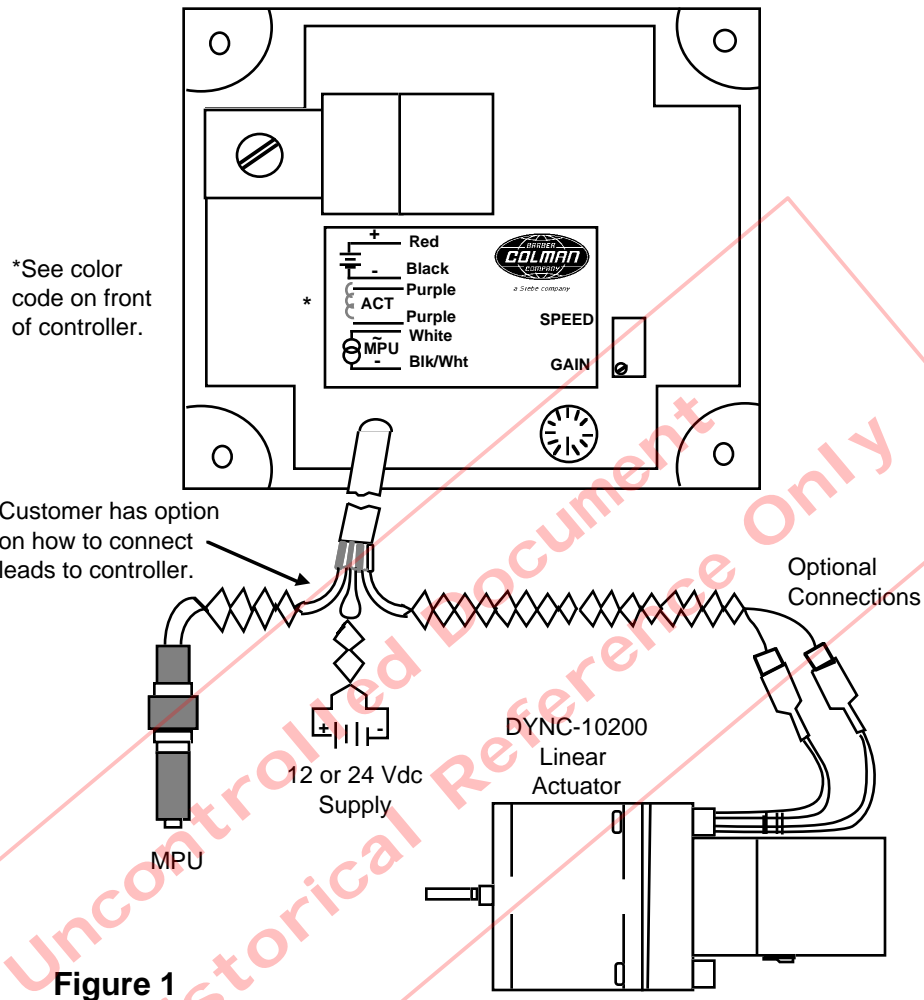
Item	Description	Barber-Colman Part Number	Qty.
	<b>Not supplied by Barber-Colman</b>		
	<b>Fan Belt P/N AUX 10 x 1215 LA CONTI-SF</b>		
	<b>Belt Size: 10 x 1215</b>		

# LAYOUT DRAWING



## TYPICAL WIRING DIAGRAM

General information, wiring and calibration procedure for the DYN1-10704, 10714, 10724 and 10734 controllers for the linear governor system.



### CALIBRATION

1. With no power to the governor, adjust the GAIN to 9:00 o'clock.
2. Start the engine and adjust the speed by turning the SPEED pot clockwise to desired speed.

#### NOTE

Controllers are factory adjusted to minimum RPM. However, for safety, one should be capable of disabling the engine if an overspeed should exist.

3. At no load, turn the GAIN potentiometer clockwise until the engine begins to hunt. If the engine does not hunt, physically upset the governor linkage.
4. Turn the GAIN potentiometer counterclockwise until stable.

### WIRING

All four controllers are wired as shown in Figure 1 Wiring Diagram.

1. Red to battery positive.
2. Black to battery negative.
3. Purple to the actuator, no polarity.
4. White to one side of the magnetic pickup.
5. Black and white to the other side of the magnetic pickup connected with the shield drain wire.

# LINEAR TROUBLESHOOTING CHART

Problem	Detection	Corrective Action
<p>I. System appears dead. (Actuator fails to move to full fuel)</p>	<p>1. CHECK BATTERY VOLTAGE AT CONTROLLER with power switch "ON". Measure DC battery voltage between the Red (+) and Black (-) leads. Battery voltage should be present.</p>	<p>Check connections to battery.</p>
	<p>2. CHECK LINKAGE. Manually operate linkage to see that it is not sticking or binding.</p>	<p>Free linkage.</p>
	<p>3. NO SIGNAL OR WEAK SIGNAL FROM MAGNETIC PICKUP. Measure AC voltage between the White and Black/White leads on controller while cranking engine. Voltage should be 2.5 volts RMS or greater. (AC input impedance of meter must be 5000 ohms/volt or greater.)</p>	<p>Check for damage to or improper adjustment of magnetic pickup. Replace or re-adjust.</p>
	<p>4. CHECK ACTUATOR with power "ON" to controller. Measure following terminals on control box with respect to the Black lead. All points should read BATTERY VOLTAGE. (+0.00/-0.75 VDC)</p> <ul style="list-style-type: none"> <li>a. Purple lead to Black lead on controller.</li> <li>b. Second Purple lead to Black lead on controller. (Continue this test only if battery voltage is not present.)</li> <li>c. Following checks are terminals on the actuator and the Black lead on controller.                             <ul style="list-style-type: none"> <li>1) Low voltage (1.0-2.0 VDC) at either actuator connector.</li> <li>2) Battery voltage at both actuator connectors.</li> <li>3) Battery voltage at one actuator lead but not at the other.</li> </ul> </li> </ul>	<p>Replace controller if battery voltage is not present at both Purple leads.</p> <p>Broken actuator lead.</p> <p>Broken actuator lead.</p> <p>Replace actuator.</p>
<p>II. Actuator lever goes to full fuel whenever the power is turned "ON" and engine is not running.</p>	<p>1. CHECK CONTROLLER by removing actuator lead to Purple lead and turning power "ON" to controller.</p> <ul style="list-style-type: none"> <li>a. Actuator goes to full fuel.</li> <li>b. Actuator does not go to full fuel.</li> </ul> <p><b>Note:</b> Turn off power and reconnect Purple lead.</p>	<p>Check for shorted actuator lead.</p> <p>Replace Controller because it should not cause actuator lever to go to full fuel with engine not running.</p>
<p>III. Actuator hunts during operation.</p>	<p>1. Linkage or rod end bearings sticking or binding.</p>	<p>Lubricate or replace.</p>
	<p>2. Improper linkage arrangement. (Stroke too short or improper non-linear linkage used)</p>	<p>See installation information.</p>
	<p>3. Improper governor adjustment.</p>	<p>Readjust calibration.</p>
	<p>4. Inadequate power supply voltage.</p> <ul style="list-style-type: none"> <li>a. Turn power switch "OFF".</li> <li>b. Connect a DC voltmeter to Red and Black leads at control box.</li> <li>c. Disconnect both leads to actuator at Purple leads of control box.</li> <li>d. Connect one actuator lead to the Red lead and one actuator lead to the Black lead of the control box.</li> <li>e. Momentarily turn "ON" the DC power. The actuator should go to full fuel and the DC voltage must be greater than 80% of supply.</li> </ul> <p style="text-align: center;">24 VDC @ 80% = 19.2 VDC 12 VDC @ 80% = 9.6 VDC</p> <p><b>Note:</b> Reconnect actuator leads properly after completing this test.</p>	<p>If actuator doesn't get to full fuel, then check actuator leads. If voltage is less than specified, check for loose or poor connections to battery, or get larger supply leads or larger power supply.</p>

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**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.

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