EG1065X

Generator Automatic Voltage Regulator
Operation Manual

Compatible with Barber Colman* Dyn1-1065X series

* Use for reference purpose only and not a genuine Barber Colman product.

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1. SPECIFICATIONS

1.1 Electronic Specifications

Operating Voltage

12 or 24 VDC ±20% Select by DIP Switch

Output Current

Quiescent: 80 mA, Stall: 15 A

Power Input

Voltage	12 or 24 VDC ±20%
Current	Rated above maximum actuator stall current

Temp. Stability

Better than ± 0.5% between -40 ~ 75℃

Speed Band

± 0.25 % at steady state

Dimensions

147mm L * 114mm W * 48.6mm H

Weight

860g ± 2%

Remote Speed Adjustment

1. Connect 5KΩ potentiometer to terminal #9. Adjustable range is approximately 5% at 1800 RPM.

2. Connect 5KΩ potentiometer through resistor R to terminal #8 Reducing the value of R increases the remote adjustable speed range.

Mechanical Vibration

1G @ 18 ~ 30 Hz, 2.5G @ 48 ~ 70 Hz

Relative Humidity

< 95%

Operating Temperature

-40 ~ 85℃

Storage Temperature

-40 ~ 85℃

1.2 Compatible Products

Barber Colman P/N	Speed Input Signal Frequency*
DYN1-10652-000-0-12/24	250 ~ 1200 Hz
DYN1-10653-000-0-12/24	1200 ~ 2500 Hz
DYN1-10654-000-0-12/24	2500 ~ 5000 Hz
DYN1-10656-000-0-12/24	5000 ~ 9500 Hz

*Speed Input Signal Frequency

$$\text{Speed Input Signal Frequency (Hz)} = \frac{\text{Engine RPM} \times \text{Number of Fly Wheel Gear Teeth}}{\text{60 seconds}}$$

Change Switch 4~7 for the correct Speed Input Signal Frequency range generated by the magnetic pickup at the maximum engine operated (RPM) speed.

2. FUNCTIONS

2.1 EG1065X—Electronic Controller

EG1065X is the information processing unit of the governor assembly.

It contains electronic components which process the input signal from the magnetic pickup and control the engine to the desired speed / RPM set into EG1065X.

Electronic adjustments are available on EG1065X for field adjusting the unit as necessary.

The governor system receives its power from a battery or an AC to DC power supply supplying 12 or 24 VDC ±20% to match the governor voltage. The average operating current consumption is 2.5 to 3.5 amperes and the highest consumption is 14.75 amperes during engine start-up or during a large load change.

2.2 Component Location

1. EG1065X, the controller, is off-mounted or installed in the engine control panel or cabinet.
2. The actuator of the governor assembly is mounted on the engine next to the fuel system.
3. The magnetic pickup is normally mounted in the flywheel housing in such a way that it can count the teeth on the starter ring gear.

2.3 Isochronous Operation

Isochronous operation is obtained by setting droop potentiometer fully counterclockwise.

EG1065X is all electric, and it is normally operated in the isochronous mode; i.e., engine RPM is constant (±0.25%) under steady state load conditions, up to the engine's maximum capability, regardless of load on the engine.

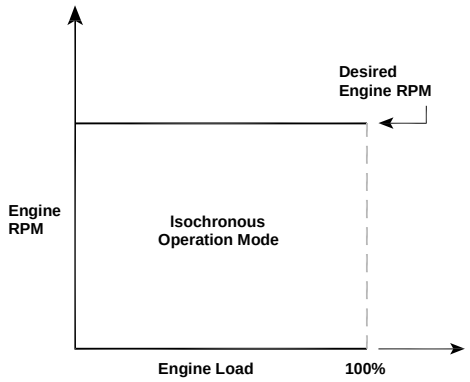


Figure 1

2.4 DROOP Operation

Clockwise increases the droop. Droop operation is obtained by setting the droop potentiometer.

A droop potentiometer setting of 10 o'clock will give about 4% droop, no load to full load when the pickup frequency is 4260 Hz and actuator shaft rotation is approximately 30 degrees from no load to full load. Lower pickup frequency or smaller shaft rotation results in less droop for the system.

The amount of droop for a given setting depends on the magnetic pickup frequency and no load to full load actuator shaft rotation.

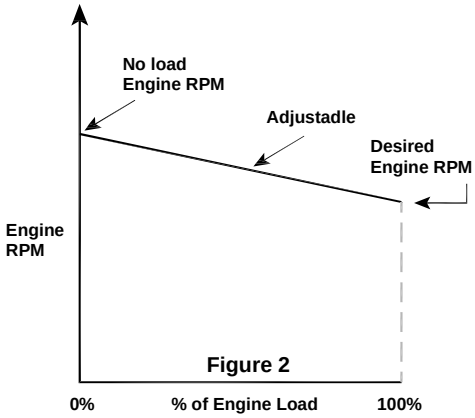


Figure 2

2.5 Remote Speed Adjustment

A suitable remote speed selector can adjust engine RPM from up to 90 meters (300 ft.) from the engine. See Section 5, the potentiometer can be connected for a narrow (fine) or wide speed range control.

3. INSTALLATION

3.1 Mount EG1065X in the control panel.

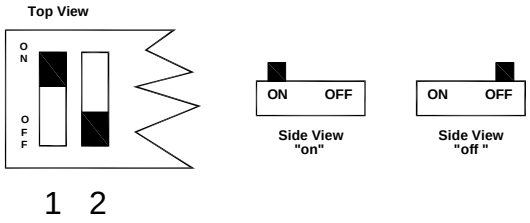
3.2 Connect the wiring as shown in Section 5 or according to other particular wiring diagram.

3.3 Proper Procedures for Setting Switches SW1 and SW2.

EG1065X has two response ranges for matching either the diesel or gas engine dynamics.

- Set SW1 to the OFF position for diesel engine applications.
- Set SW1 to the ON position for gas/gasoline engine applications.
- Set SW2 to OFF, this level is nominally 6.3 amperes for actuators with lower current level.

- Set SW2 to ON, this level is nominally 7.3 amperes for actuators with lower current level.



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.

SW1 in the above drawing is in “ON” position, and SW2 in the above drawing is in “OFF” position.

CAUTION!!

As a safety measure, the engine should be equipped with and independent overspeed shutdown device in the event of failure which may render the governor inoperative.

NOTE：

For some diesel engines, better operation may be obtained by placing SW1 in “ON” position. If difficulty experience in “OFF” position, try SW1 ON and recalibrate.

4. CALIBRATION OF DYN1-1065X

4.1 Connection Information

1. When using an ILS unit, the remote speed potentiometer may be left connected to the controller as shown in Section 5.
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 EG1065X only. Other end of drain shield wire is to be cut off and taped.

4.2 Calibrations and Adjustments

1. See Section 5 for a reference guide before making any adjustments of the potentiometers, DROOP, I, GAIN and SPEED.
2. Power OFF - engine not operating.
3. Initial potentiometer settings:

- Set the “I” adjustment three divisions from zero and the GAIN at the second division from zero.
- For isochronous operation, set DROOP counterclockwise to minimum position as shown in paragraphs 3.5 and 3.6.
- 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.

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.
5. Start the engine.

- Adjust the controller speed potentiometer until the engine is operating at the desired engine RPM. Clockwise increases engine RPM.
- If the governor system is unstable, slightly reduce the GAIN setting.

NOTE：

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

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

(1) Turn the GAIN adjustment clockwise slowly until the actuator lever oscillates. (One may need to disturb the actuator lever to cause oscillation.)

(2) Reduce the GAIN adjustment slowly counterclockwise until the lever is stable. Upset the lever by hand..

(3) If the lever oscillates 3 to 5 diminishing oscillations and stops, the setting is correct

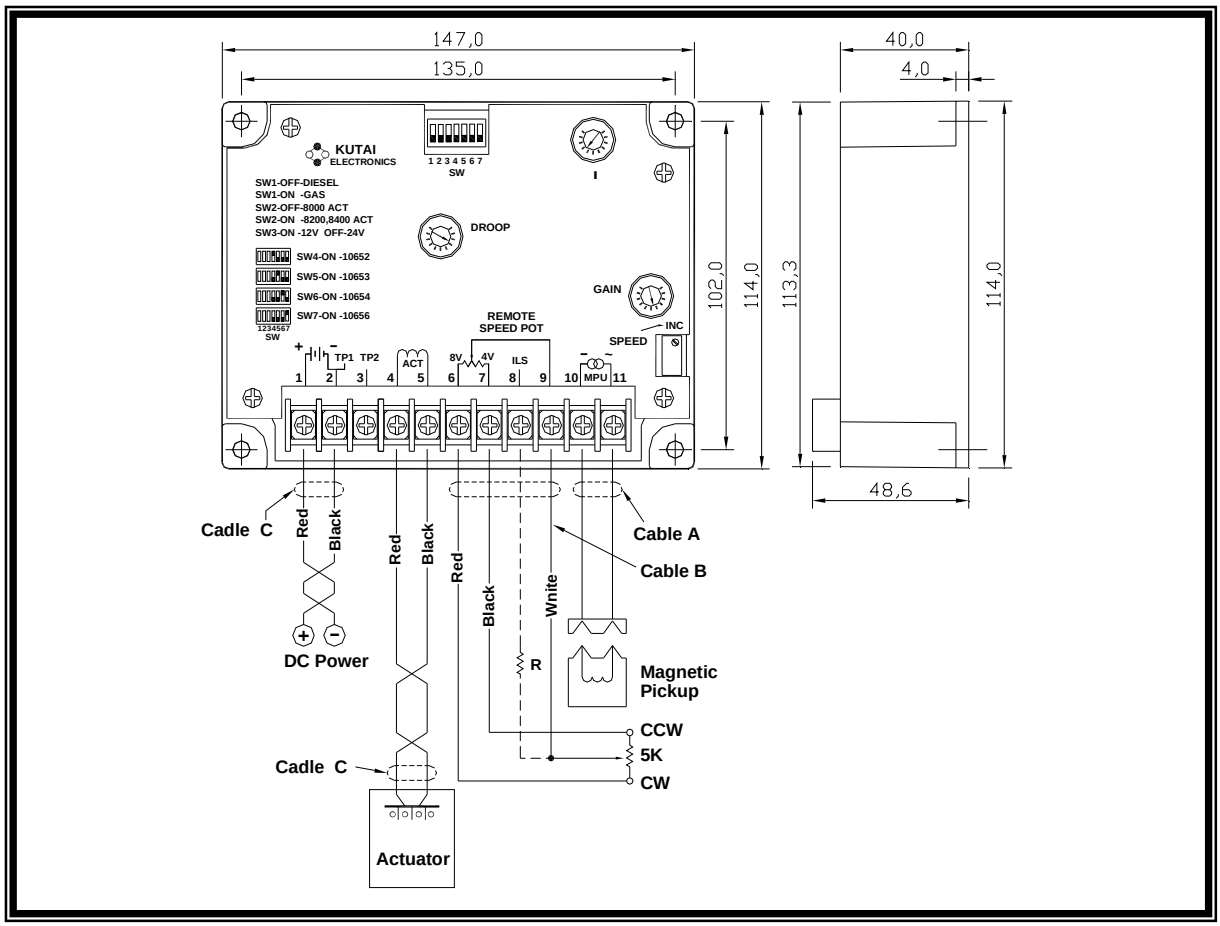
(4) If system performance to load changes is satisfactory, omit step (5), (6) & (7)

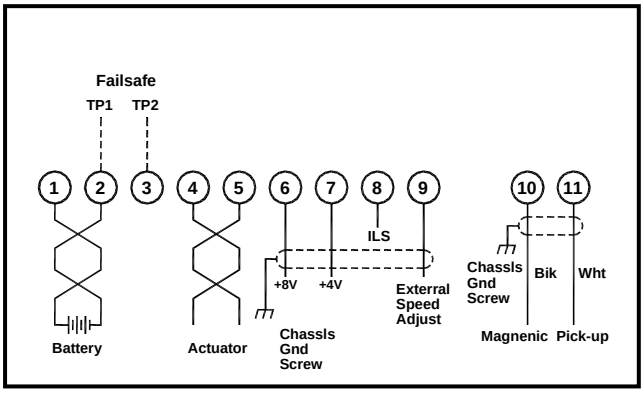
(5) Reduce the GAIN setting counterclockwise one division. Next, turn the “I” adjustment fully clockwise while observing the actuator lever.

(6) 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.

(7) Upset the lever again; it should oscillate 3 to 5 times and then become stable for optimum response.

5. TYPICAL WIRING DIAGRAM & CONTROLLER INSTALLATION DIMENSIONS





*The 5K remote speed potentiometer can be wired two different ways:

1. Connect 5KΩ potentiometer to terminal #9. Adjustable range is approximately 5% at 1800 RPM.
2. Connect 5KΩ potentiometer through resistor R to terminal #8 Reducing the value of R increases the remote adjustable speed range.

**Cable A, B, C -- should purchase a cable with a wrapped mylar supported aluminum foil shield with a drain wire.

DIP Switch Description	
SW1	OFF for Diesel Engine ON for Gas Engine
SW2	OFF for DYNA8000 actuator
	ON for DYNA8200 / 8400 actuator
SW3	OFF for 24V I/O, ON for 12V I/O
SW4	ON* compatible with DYN1-10652
SW5	ON* compatible with DYN1-10653
SW6	ON* compatible with DYN1-10654
SW7	ON* compatible with DYN1-10656

*When one of the SW4~7 is ON, set others of SW4~7 OFF

Governor Controls	
DROOP	Droop rate Adjustment
GAIN	MPU Output Gain Adjustment
I	Engine Stability Adjustment
SPEED	Engine Speed Adjustment

*** Remote speed potentiometer and 499K ohm resistor is B-C P/N (DYNS-10000)

6. TROUBLESHOOTING

6.1 Problem: Governor Is Completely Dead And Actuator Lever Stays At Minimum Position When Power Is Applied To Governor.

Means of Detection
Corrective Action

6.1.1 Check battery voltage at terminals 1 and 2 on controller. Terminal 1 is positive.

Check battery connections and contacts for turning power ON to the controller.

6.1.2 Check for proper linkage setup.

Correct and free linkage.

6.1.3 Magnetic pickup signal absent or too low.

Measure AC voltage across terminals 10 and 11 while cranking the engine. Voltage should be min. 2.5 VAC.

NOTE：

The voltmeter should have an impedance of 5000 ohms/volts or higher. Check pole tip gap over gear tooth. Should be 0.037 mm / 0.127 mm (0.015" / 0.005").

6.1.4 Measure the resistance of the magnetic pickup coil. This should be above 150 ohms.

If there is an open or shorted coil, replace the magnetic pickup.

6.1.5 Measure the resistance of each pin to the metal case of the magnetic pickup. No continuity should be evident.

If there is continuity to case, replace the magnetic pickup.

6.1.6 DC SUPPLY OFF. Place an insulated jumper between terminals 2 and 3 (TP1 & TP2). With DC ON, the actuator should go to full stroke. DC voltage at terminals 4 and 5 should be within 3volts of the supply.

If the actuator still does not move to full stroke, continue with steps below.

6.1.7 Measure actuator coil resistance:

If actuator coil is open or shorted to case, replace actuator.

If governor still does not operate, continue with steps below.

6.1.8 Measuring the resistance of each coil lead to the actuator case should indicate an open circuit on a low scale of the ohm meter.

If continuity is detected, replace the actuator.

6.1.9 With the DC to the governor ON and the engine OFF, measure the DC voltage from terminal 6 (+) to terminal 2 (–). This should be approx. 8 VDC.

If 8 VDC is not present, replace the controller.

6.1.10 Between terminal 7 (+) to terminal 2 (–), the voltage should be approx. 4 VDC.

If 4 VDC is not present, replace the controller.

6.2 Problem: Actuator Goes To Full Stroke When Dc Power Is Turned On (Engine Is Not Operating).

Means of Detection
Corrective Action

6.2.1 Check magnetic pickup leads for proper shielded wire or open shield.

Verify and correct wiring as necessary.

6.2.2 Be sure there is no jumper between terminals 2 and 3.

Verify and correct wiring as necessary.

6.2.3 Failsafe circuit in the controller may be damaged or defective.

Replace EG1065X.

6.2.4 With DC power OFF remove leads at actuator. Check continuity of each terminal to case. There should be no continuity between any terminal and case of EG1065X.

If continuity is detected, replace the controller.

6.2.5 If remote speed potentiometer has been connected to terminals 6, 7 and 9 of the controller, DISCONNECT THESE LEADS.

Turn DC power ON to the governor if the actuator is now normal. Proceed to step 6.3.1

6.3 Problem: Improper Operation From Remote Speed Potentiometer

Means of Detection
Corrective Action

6.3.1 Investigate wiring to remote speed potentiometer for open or shorted circuits.

Check wiring.

6.3.2 If the leads at terminals 6 and 7 to the remote speed potentiometer are reversed, speed control by the remote speed potentiometer will be reversed.

Correct wiring.

6.3.3 Lead wire to remote speed setting potentiometer should be 3-wire shielded cable.

Verify that the drain shield wire is isolated from ground at the potentiometer.

6.3.4 If terminal 7 lead to the remote speed potentiometer is open, engine speed will go high.

Correct the wiring.

6.3.5 If lead 9 (wiper lead to remote potentiometer) is open, there will be no control by the remote speed potentiometer.

Verify and correct wiring.

6.3.6 If lead 6 to the clockwise terminal of the remote speed potentiometer is open, speed will remain at the value set in EG1065X.

6.4 Problem: Erratic Governor Operation

Means of Detection
Corrective Action

6.4.1 Measure DC voltage at 1 and 2 on controller terminal strip. Normal battery voltage should be indicated.

If nominal voltage is present, wiring is correct.

6.4.2 Low battery voltage 20% below rated can cause erratic operation.

Check battery and charging system.

6.4.3 RFI noise due to incorrect shielding.

Correct wiring.

6.4.4 RFI noise fed through power supply leads.

Connect power leads directly to the battery.

6.5 Problem: Slow, Small Amplitude Hunting Of Speed Or Frequency

Means of Detection
Corrective Action

6.5.1 Sticking or very loose linkage.

Correct Linkage.

6.6 Problem: Fast Oscillation Of Governor Linkage

Means of Detection
Corrective Action

6.6.1 Verify calibration settings of the controller.

Readjust settings as necessary.

6.7 Problem: Engine Will Not Start -- Actuator Goes To Full Fuel During Cranking

Means of Detection
Corrective Action

6.7.1 Make sure fuel is available.

Check fuel to engine. Check for correct wiring to the automatic shutdown circuits.

6.7.2 Air may be trapped in fuel line.

Check fuel lines for leaks.

6.7.3 Try to operate engine manually.