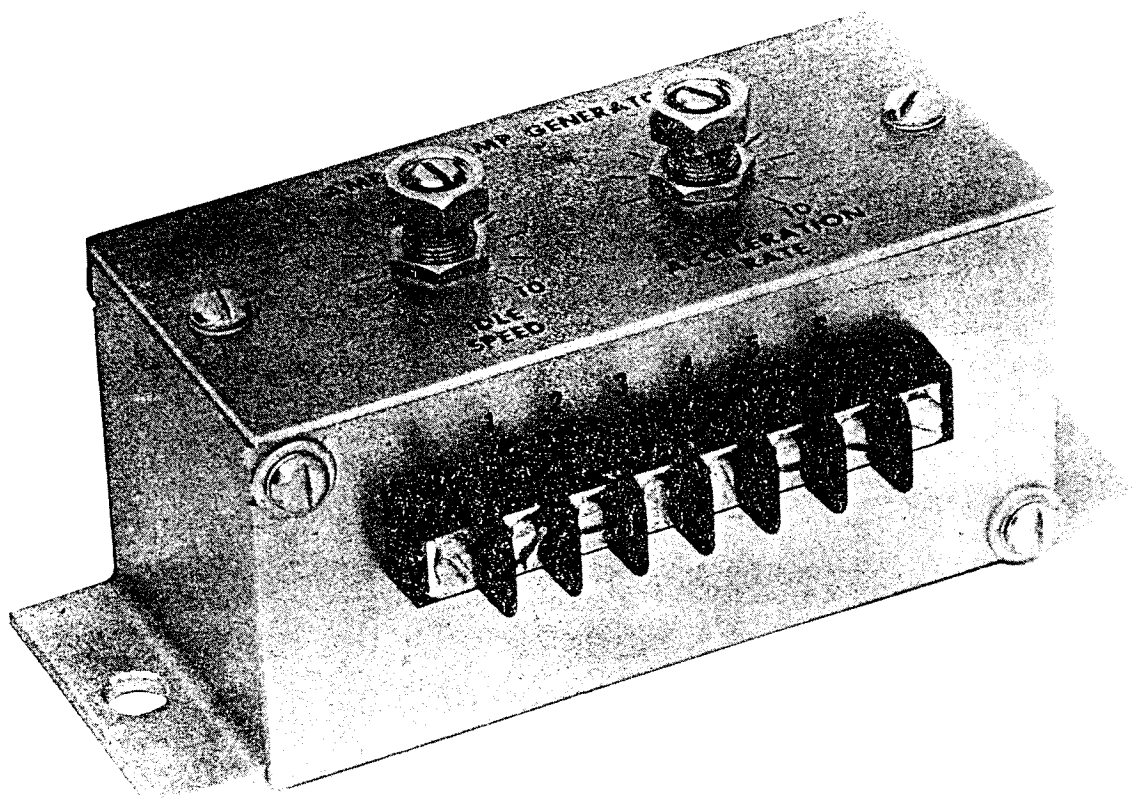


RAMP GENERATOR RGC 671



INTRODUCTION

The RGC 671 ramp generator is a continuous ramp control which ramps up and down at separately adjustable rates and can stop at any speed between its separately adjustable end points of idle and maximum running speed. It is intended for applications where smooth engine speed response is required to minimize smoke, engine noise, and rapid accelerations normally associated with fast speed changes.

It is used in conjunction with any "C" series speed control unit which has been modified for external variable speed operation (CU 671C-17 or CU 673C-17). Refer to "Modifying the Speed Control Unit" on page 4. For other speed control units see specific publication or contact factory for information.

The RGC 671 ramp generator is intended to be used on variable speed applications which require changes in operating speed on a continuous basis, for applications such as generator sets which run at fixed speeds, the CU 6713A is better suited since it does not require an external control to set the running speed. Typical applications for RGC 671 would be:

- A) Engines driving fixed displacement pumps where the GPM must be varied by changing engine speed.
- B) Engines driving mixers where engine speed must vary with the composition of the mix.
- C) Engines driving conveyers which vary in travel rate according to the conveyed materials.
- D) Engines driving tow lines where fast speed changes could dump loads.

SPECIFICATIONS

RGC 671 RAMP GENERATOR

PERFORMANCE

- Idle Speed Range 300 to 2900 Hz (approximately 150 to 1050 rpm)
- Acceleration Rate (adjustable) Slowest: 3 sec/1000 Hz*
(113-184 rpm/sec)
Fastest: 1 sec/6000 Hz
(Faster than 2140-3500 rpm/sec)
- Deceleration Rate (adjustable) Slowest: 1 sec/1000 Hz*
(340-554 rpm/sec)
Fastest: 1 sec/6000 Hz
(Faster than 6420-10,500 rpm/sec)

Usually limited by closed throttle deceleration rate of system inertia.

POWER INPUT

- Supply 10 VDC from "C" series speed control unit terminal K
11-40 VDC from battery
- Polarity Any, case isolated
- Power Consumption Less than 20 milliwatts

ENVIRONMENTAL

- Temperature Range -40° to + 85°C (-40° to + 185°F)
- Relative Humidity Up to 100%
- Case Fungus proof and corrosion resistant

PHYSICAL

- Dimensions See Figure 1

*Can be doubled. See note on page 5.

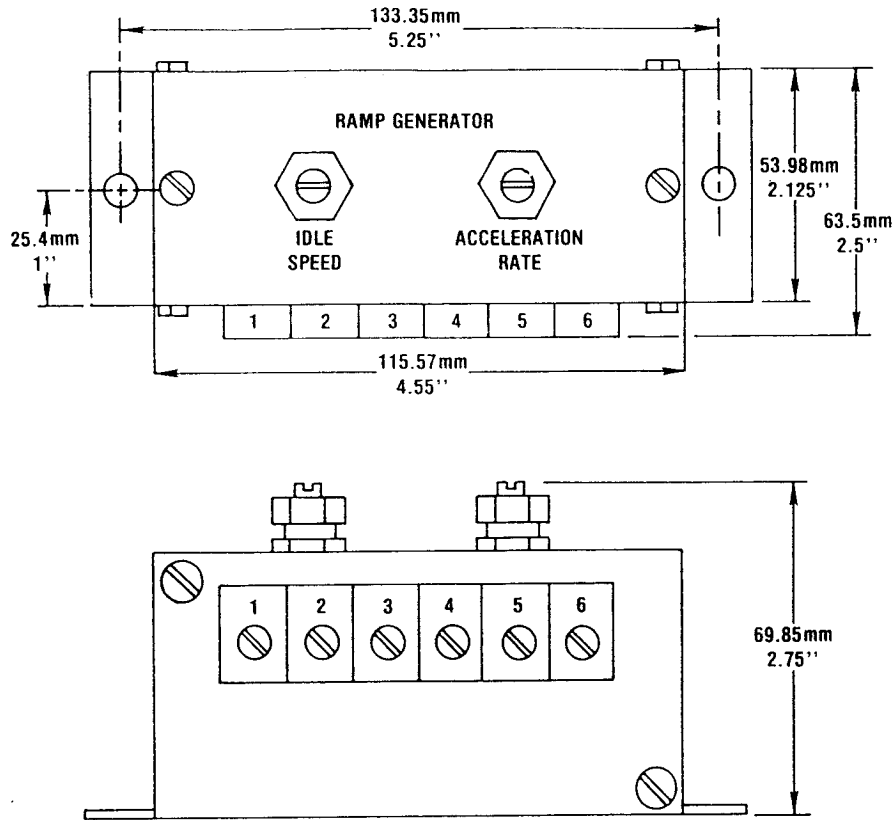


Figure 1. RGC 671 Ramp generator dimensions

DESCRIPTION

The ramp generator RGC 671 is a linear integrator which when connected to a governor's speed reference circuit will control the engine smoothly to any desired operating speed which is set by either a control such as an MVS control (CU 6721A), a foot pedal operated control (VFC 671), or a joy stick throttle (MSC 671).

Two external adjustments are provided on the unit: the idle speed adjustment and the acceleration rate adjustment. The idle speed adjustment is used to select the lowest speed at which the engine will be run. CW adjustment increases idle speed. The acceleration rate adjustment is used to control

the length of time it takes for the engine to reach set speed. (CW adjustment increases the acceleration rate, making time to accelerate shorter.) The deceleration rate adjustment is located under a dot plug on the back side of the unit. It is used to adjust the rate at which the engine decelerates. CW adjustment decreases the rate at which the engine slows down thereby lengthening the time the engine takes to slow down.

NOTE: The speed will not slow down any faster than the closed throttle deceleration of the engine.

INSTALLATION

Use any convenient size wire. Shielded wire will be required on terminal "3" if longer than 1 meter (3 ft.). See Figure 2.

See Table A for other wiring connections when using speed control units other than the "C" series types.

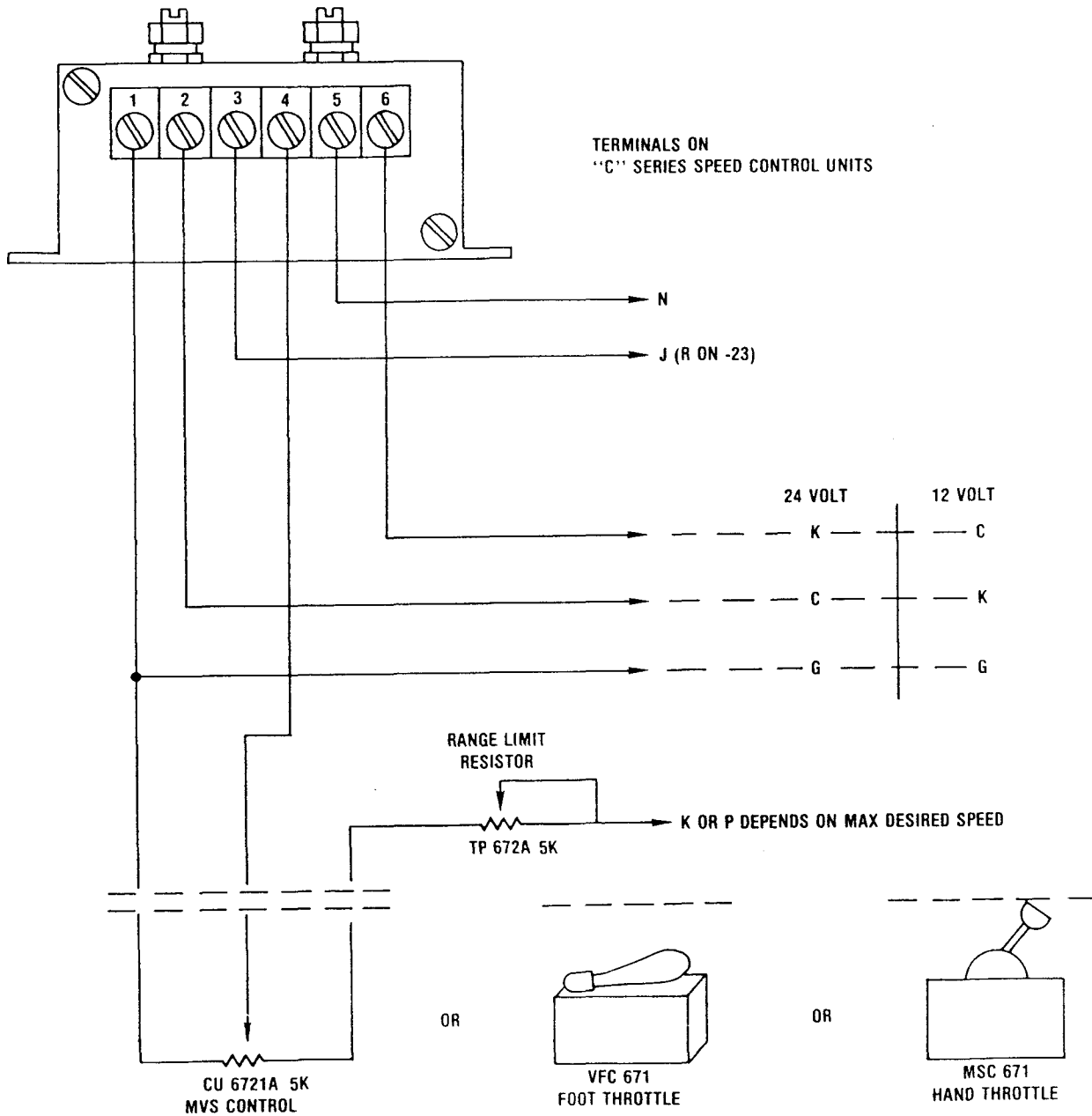


Figure 2. Wiring to RGC 671 ramp generator

RGC 671 RAMP GENERATOR	SPEED CONTROL UNITS							
	CU 671C and CU 673C		ECJ-1000 Series		**ECQ-Series		***ECQ Series	
	For 12 VDC operation	For 24 VDC operation	For 12 VDC operation	For 24 VDC operation	For 12 VDC operation	For 24 VDC operation	For 12 VDC operation	For 24 VDC operation
	Use Terminal	Use Terminal	Use Terminal	Use Terminal	Use Terminal	Use Terminal	Use Terminal	Use Terminal
2	K	C	*	1	*	3	4	3
6	C	K	*	15	*	4	3	4
Use listed resistor between terminals 1 and 2	-	-	*	-	*	-	150Ω	-
Use listed resistor between terminals 1 and 6	-	-	*	300Ω	*	200Ω	-	370Ω

*Not recommend for 12 VDC operation with RGC 671 ramp generator
 **With a 6.2 voltage reference on Terminal 4 of ECQ-Series
 ***With a 10.0 voltage reference on Terminal 4 of ECQ-Series

Table A
Wiring chart for various speed control units

ADJUSTMENTS

CAUTION:
 THE ENGINE SHOULD BE EQUIPPED WITH AN
 INDEPENDENT OVERSPEED SHUTDOWN
 MECHANISM TO PREVENT RUNAWAY WHICH CAN
 CAUSE EQUIPMENT DAMAGE OR PERSONNEL
 INJURY

To adjust the Range Limit resistor, first calculate the desired maximum speed in pulses per second from the magnetic speed sensor. For instance, if the flywheel has 118 teeth and you wish to run at 1800 rpm:

$$\frac{118 \text{ teeth}}{\text{rev}} \times \frac{1800 \text{ rev}}{\text{min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = 3540 \text{ Hz}$$

3450 Hz is less than half the control range of a "C" series speed control unit (300 - 10 K Hz), therefore, less than half of the 10 volts from "K" will be used. In this case connect the range resistor to "P" which is a 5 volt supply and should allow control up to approximately 5000 Hz.

Next, with the range limit resistor at maximum resistance, start the engine. Set the throttle at idle. Adjust the idle speed via the idle adjust on the cover. Set the throttle control to maximum speed which will be around 2500 Hz. Now, adjust the range limit resistor until the maximum desired speed of 1800 rpm (3540 Hz) is reached and lock the range limit resistor.

The speed adjustment control will now control the speed from idle to maximum speed and to any point in between.

Range Limit Adjustment Control

When connected to 10 volt supply from "K" of "C" series speed control units, the speed setting control has a wide range of speed capability which must be limited by adding a range limit resistor in series with the speed adjustment control (see diagram, Figure 2). If the range is not limited in this manner, speed setting will be very coarse and engine overspeed may result.

Modifying the Speed Control Unit

Modification of standard "C" series speed control units for external variable speed operation is as follows:

1. Remove the rear cover, the cover stamped "FREQUENCY ADJUST."
2. Locate the three lugs identified in the illustration as lugs "A", "B" and "C". See Figure 3.

3. Cut the jumper between lugs "B" and "C" and replace the jumper with a 2K ohm, 1%, temperature stable, resistor. This resistor is supplied with each ramp generator.
4. *Connect lugs "A" and "C" with a jumper.
5. Replace the end cover.

*Connection of lugs "A" and "C" is the only modification procedure needed with (-23) speed control units.

NOTE: If longer ramp times are desired, addition of a 50K ohm resistor across two posts provided on the RGC 671 printed circuit board, which can be reached by removal of the top cover, this will approximately double the ramp time.

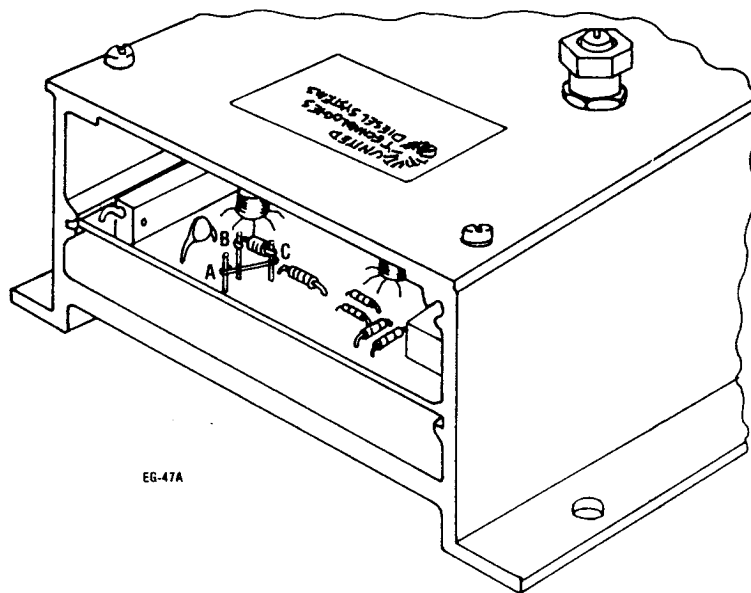


Figure 3. Location of posts "A", "B", and "C"