

RSC672 Speed Ramping Controls

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1 INTRODUCTION

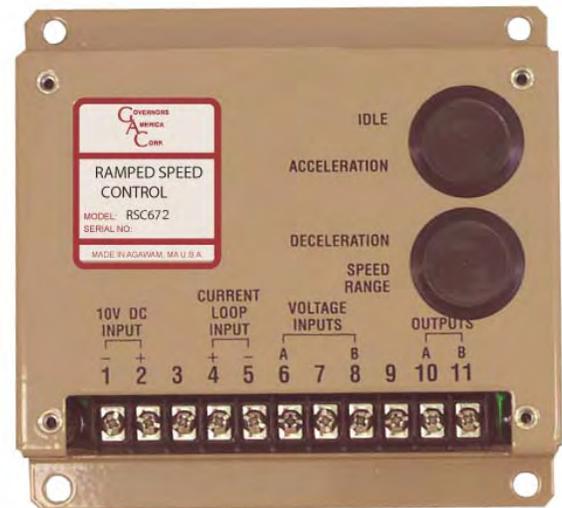
The RSC672 Speed Ramping Control module provides full time, linear fixed speed setting. The module smoothly increases and decreases the speed setting of an electronic speed control unit from idle speed to rated speed with the opening and closing of a switch contact for a fixed speed. Ramping of speed is used to limit smoke and noise associated with a step change in engine speed.

The RSC672 provides adjustments for acceleration and deceleration rate, each independently adjustable, and idle speed. Ramp time, the time it takes to reach the ramp setting, is controlled by acceleration and deceleration adjustments on the RSC672. Acceleration sets the amount of time it takes to get to the next speed setting. Deceleration sets the amount of time to move to the next lower setting.

It is compatible with ESD5100, ESD5200 and ESD5500 Series speed control units from GAC. A potentiometer must be installed to manually set ramp time.

Use the RSC672 to set the idle speed and ramp to the operating speed set at the governor speed control unit. Once the operating speed is reached, the RSC672 has no further influence on the speed control unit until switch S1 is closed.

For variable speed or if using a 4-20 mA process control source, see the GAC [RSC671](#).



2 SPECIFICATIONS

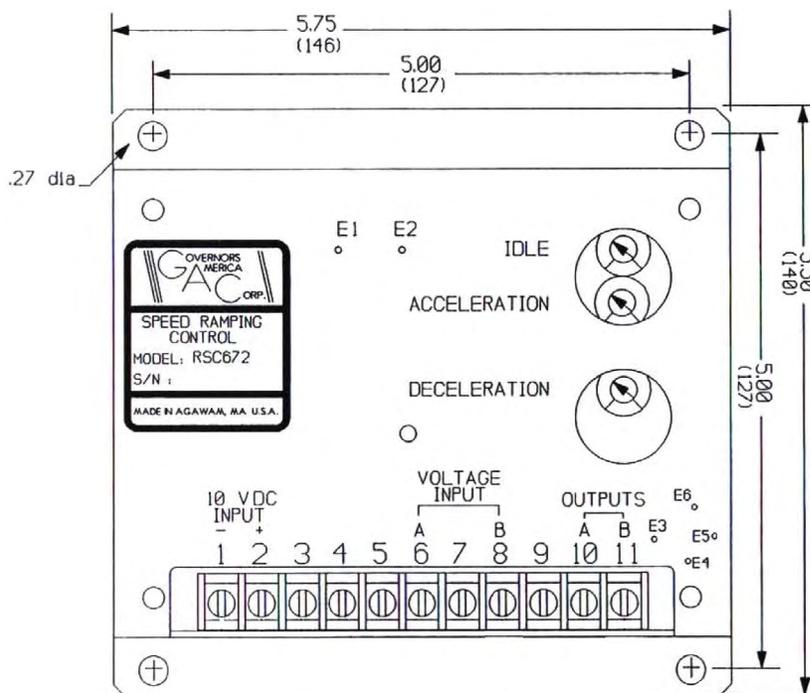
| PARAMETER | SPECIFICATION | |
|--|---------------------------------|-----------------------------|
| Ramp Time | Acceleration | MIN: 0.125 s MAX: 2.40 s |
| | Deceleration | MIN: 0.125 s MAX: 3.60 s |
| Ramp Time with 30 kΩ resistor between E1 to E2 | Acceleration | MIN: 0.15 s MAX: 5.00 s |
| | Deceleration | MIN: 0.125 s MAX: 7.60 s |
| Set Idle Speed | terminal - range | |
| Input Terminals 1 and 2 | 0 - 10 V DC ± 0.1 | |
| Output (Terminal 10) | 2.6 V DC - 7.4 V DC | |
| Output (Terminal 11) | 1.3 V DC - 3.7 V DC | |
| Input Impedance (Terminal 6) | > 10 KΩ | |
| DC supply voltage (Terminal 1) | 10 V DC from speed control unit | |

3 INSTALLATION

The RSC series is ruggedly built. Install as close as possible to its paired speed control unit.

The unit is best mounted vertically to allow moisture to drain. Most installations are within a local cabinet, not engine mounted and within close proximity to corresponding controller.

The RSC672 is compatible with GAC ESD51XX, ESD52XX and ESD55XX Series speed control units.



in
(mm)

4 WIRING

Wiring between the RSC Series and an ESD speed controller is detailed in this section. The following general wiring applies.

1. The required 10 V DC power to the RSC is supplied by the speed control unit.
2. Speed setting signals to the RSC must be provided by either a 10 V DC input (provided by speed control unit), or a potentiometer.
3. Wiring over 3 ft [1 m] requires increased wire size to minimize voltage drops.
4. Speed range is available from Terminal 10 or Terminal 11. Terminal 10 offers twice the speed range of Terminal 11.
5. To cut the ramp speed range and further smooth ramping, add a jumper between Terminals 8 and 9 to narrow the voltage range.
6. Review your speed controllers wiring diagrams before starting this installation.

VOLTAGE INPUT WIRING ESD51xx, ESD52xx, ESD5500 to RSC672

Wiring voltage input between the **RSC672** and an **ESD51xx, ESD52xx, ESD5500** requires the following connections:

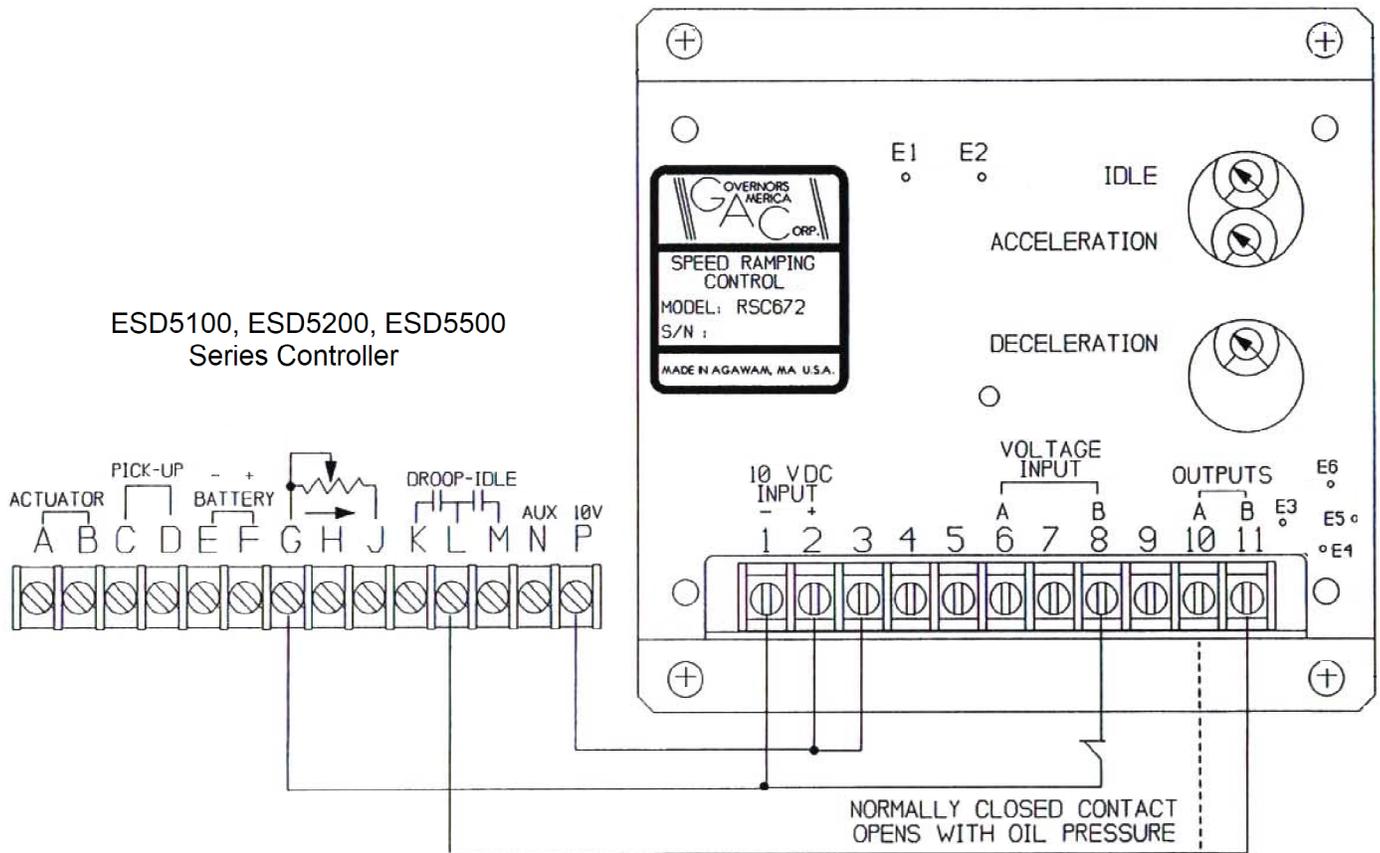
1. Supply power to the RSC672 by connecting RSC672 Terminal 2 (+) to the ESD 10 V Terminal P and RSC Terminal 1 (–) to the ESD Terminal G.
2. Connect output from the RSC Terminal 11 to ESD Terminal L.
 - For a broader speed range, use RSC Terminal 10 with a jumper between Terminals 2 and 3.
 - To narrow the voltage range jumper RSC672 Terminals 8 and 9.
 - To increase ramp time, add a resistor between posts E1 and E2 as detailed in Section 5, [Increasing Ramp Time](#).
3. Connect RSC672 Terminal 6 to a potentiometer or other speed input source such as a foot pedal. Terminal 6 is the voltage input for speed control.



The ground potential (GP) of current input (ESD Terminal E and RSC672 Terminal 5) must equal ESD BATTERY–, Terminal E.

If using a 12 V DC power supply, add a jumper between Terminal G and H.

4 WIRING (CONTINUED)



5 INITIAL START AND ADJUSTMENTS

Before integrating the RSC into your engine, optimize engine performance. See your speed controllers documentation for details. Let the engine warm up to operating temperature.

- Depending on the controller settings (gain and reset time) response time will be faster or slower to control errors.
- A clockwise adjustment DECREASES ramp time.
- **ACCELERATION** sets the time required for the control to ramp the engine speed from idle speed to rated speed. The time is set from 0 to 500 seconds.
- **DECCELERATION** sets the time required for the control to ramp the engine speed from rated speed to idle speed.
- Ramp time from rated to idle is always less than 1 second, regardless of the setting on the connected ramp potentiometer.

ADJUST INITIAL SETTINGS

1. After wiring the RSC672 per Outline Diagram, start the engine with switch S1 open. Set the rated engine speed with the SPEED adjustment on the speed control unit.
2. Set the engine idle speed by closing switch S1 and adjusting the IDLE on the RSC672.
3. S1 can be a normally closed oil pressure switch on the engine. When the engine starts, it will remain at idle speed until oil pressure is sensed, then be accelerated to the operating speed. An orifice in the oil pressure switch can act as a simple time delay,
4. Ramp time is controlled by the ACCELERATION and DECCELERATION adjustments of the RSC672. Adjust each for the desired ramp times. A clockwise adjustment decreases the ramp time.
5. If a longer ramp time is required, a 30K resistor may be connected between posts E1 and E2 of the RSC672 to double the ramp time as detailed in Section 5, [Increasing Ramp Time](#).

5 INITIAL START AND ADJUSTMENTS (CONTINUED)

FURTHER ADJUSTMENTS

1. Disconnect RSC672 Terminal 10 or 11.
2. On the ESD:
 - Set the SPEED potentiometer to approx 80% of rated speed. The ESD controllers use a 25-turn potentiometer and may require several turns to adjust.
 - Set Speed Ramp to fully CCW (0) and Start Fuel to fully CW (100%).
 - Set Idle on ESD to MAX.
3. Make sure the input on speed controller (0-5 V DC or 0-10 V DC) is at the lowest value.
4. Reconnect RSC672 Terminal 10 or 11.
5. Set potentiometers on RSC672 to the following to start:
 - IDLE to 100%
 - ACCELERATION to 50%
 - DECELERATION to 50%
6. Start the engine. Increase the ESD5xxx SPEED potentiometer CW until the engine runs at high idle with no load.
7. Match the idle speed of the ESD to the idle setting on the RSC672 (5 V DC or 10 V DC)
8. Adjust ramp time using ACCELERATION and DECELERATION. To decrease ramp time turn the DECELERATION potentiometer clockwise.
8. Recheck idle speed and rated speed settings by setting the input of the RSC672 to minimum setting (potentiometer at 0 setting) and recheck the settings. You may need to increase SPEED on the ESD and recheck several times to create the desired ramp results.

ADJUSTING IDLE SPEED

The range of the idle speed with the standard RSC672 may be lower than desired.

1. Set idle speed by applying 0 volts to Terminal 6 (Speed) and adjusting IDLE on the RSC672 to the rated speed. A voltage change to Terminal 6 will increase voltage at either Terminals 10 or 11.
2. Apply input voltage corresponding to maximum speed and adjust SPEED RANGE until the rated speed is reached.
3. Readjust idle as needed. Recheck rated speed.
4. Continue to adjust rated speed and idle until satisfied with results.

INCREASING RAMP TIME

If additional ramp time is required, connect a 30 k Ω resistor between posts E1 and E2 of the RSC to double the ramp time. Remove the screws that hold the circuit board in the case to access posts E1 and E2.

Ramp acceleration and deceleration capabilities can be increased by adding a 30 k Ω resistor (30K) to the RSC672 board. This procedure must be performed following electro static discharge (ESD) procedures, by someone experienced in hand soldering, and take place in a clean area.

1. To add the resistor:
 - a. Following local electrostatic discharge guidelines, and taking care to not drop the PC board, carefully remove the 4 screws and star washers holding the insulator cover on the rear of RSC672. Save all hardware.
 - b. Remove the insulator cover. Remove PC board from casing, placing it on a clean work surface, terminal side up.
 - c. Install the 30 k Ω resistor between posts E1 and E2. Ensure the resistor lies well below the RSC cover to prevent shorting.
 - d. Replace the board in the casing.
 - e. Replace the screws, tightening only enough to secure the board (10 -14 in-lbs [1.129 - 1.58 N·m]). Do not over tighten.

