

# CVR Series for 115 Vac or 115/230 Vac Dual Voltage Capacitor Start and Capacitor Start/Capacitor Run Motors

## Basic Operation

Capacitor start/capacitor run motors and capacitor start motors provide continuous voltage sensing information which can be used to extract speed data from the voltage across the motor start winding. By comparing this start winding RPM-sensitive voltage to the main AC input voltage (which serves as a reference voltage), the switch determines when the start circuit should be de-energized. The electronic switch interrupts the start circuit current after the motor has accelerated to the cut out voltage (speed), and reconnects the start circuit whenever the speed sensitive circuit senses the motor voltage (speed) has decreased to a preselected cut in voltage (RPM) level.

Capacitor start/capacitor run motors exhibit current transients and higher voltages across the start switch. These electrical stresses occur due to the switching of the two capacitors (start and run) that are connected in parallel during motor start and may have different voltages at time of restart. These stresses occur at restart with both mechanical and electronic start switches. The CVR switch has additional circuitry to eliminate the effects of these conditions.

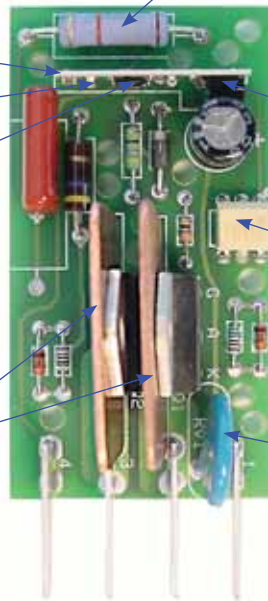


**Universal Design.** 50/60 Hz operation. Will work on 2, 4 or 6 pole motors of any manufacturer. Reduced inventory.

**Line Voltage Compensation.** Operating voltage 90 to 130 Vac.

**Electrically Protected.** Designed to filter out electrical noise, so there is no concern of random switch malfunction.

**Soldered Heat Sink.** High cycling.



**Start Capacitor Discharge Resistor.** Increase start capacitor life.

**Speed Sensitive** (cut in)

**Zero Crossing Logic.** Current spiking due to run capacitor no longer a problem.

**Transient Protection.** Transient protection tested per IEEE C62.41 - 1991 Category A3.

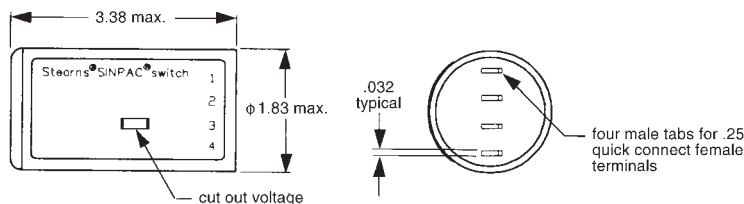
**Environmentally Protected.** Immune to moisture, dust, dirt, shock and vibration.

### ADDITIONAL FEATURES

- **Capacitor Shape.** Allows for easy mounting under a motor doghouse.
- **Environmentally Protected.** Immune to moisture, dust, dirt, shock and vibration.
- **Silent Operation** - no switch noise
- **Completely Solid-State with No Moving Parts.** SINEPAC

Switches have no physical constraints to affect their operation. No wearing parts mean high cycling, no arcing contact. Low warranty.

- **Operating Temperature:** -40°C to 65 °C (-40 °F to 149°F) [for operation between 65°C and 85°C (149°F and 185°F), consult factory.]
- **Operating Voltage:** 115 Vac SINEPAC Switch: 90-130 Vac.



Dimensions are for estimating only. Drawings for customer reference are available upon request.

Typical Maximum Motor hp	Typical Full Load Motor Nameplate Current Rating (amps)		Switch Rating and Permissible Maximum Start Capacitor Current (amps)	Start Circuit Voltage	Catalog Number	Part Number	Cut Out Voltage Typical	Cut In Voltage Typical	Package Style
	115 Volts	230 Volts							
3-5	50	—	80	115	CVR-80-130	4-7-41080-15-NA1	130	50	15
3-5	50	—	80	115	CVR-80-147	4-7-41080-15-NB1	147	45	15
3-5	50	—	80	115	CVR-80-165	4-7-41080-15-N01	165	50	15

### Selection

Motor hp ratings are typical. For an accurate selection procedure, measure start capacitor current during a normal start or at locked rotor and select a SINPAC Switch with higher maximum current rating than that measured.

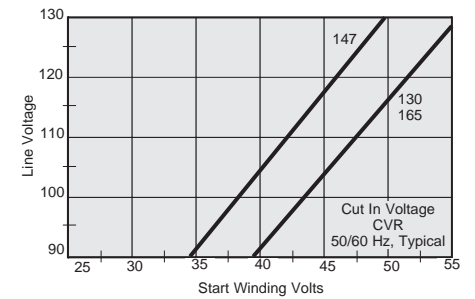
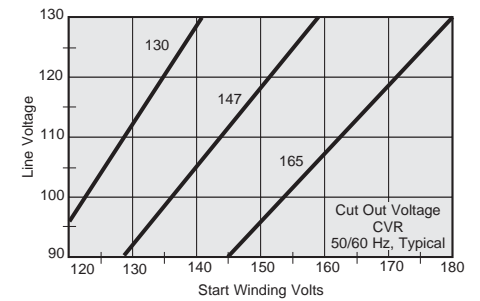
1. Be sure switch series matches motor type.
2. Be sure switch voltage rating matches auxiliary (start) winding voltage rating.
3. Selection can be based on actual measurement of start capacitor current or two times the motor nameplate FLA rating.
4. Switch current rating must match or exceed the motor start capacitor current requirements. Always select a SINPAC Switch with the next higher current rating for:
  - a) High cycling applications.
  - b) Long acceleration time.
  - c) High ambients: Greater than 55° C.
5. To assure proper motor operation, the voltage across the start winding must reach the SINPAC Switch cut out reference voltage between 70% to 85% of motors synchronous speed.

**Caution:** SINPAC Switches are line voltage compensated. Changes in the line voltage will not effect system operation unless an overload condition causes reduced running speed, along with reduced voltage across the start winding.

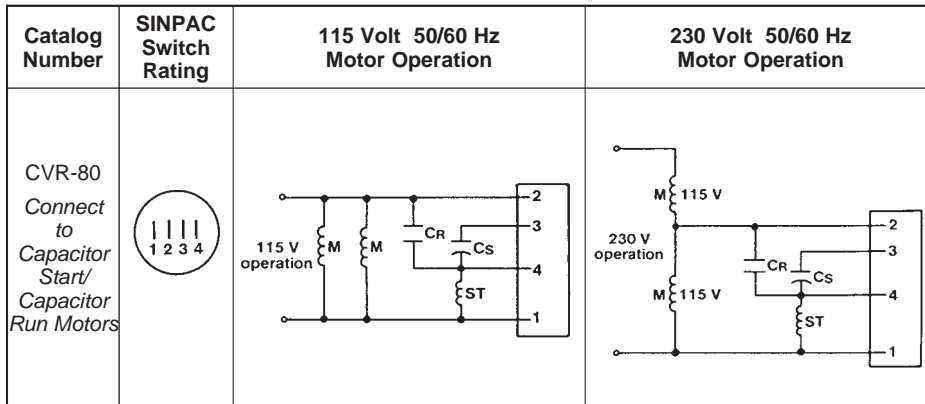
6. Higher current switches can be used in place of lower rated switches of the same series.

### Line Voltage Compensation Charts

Induced voltage across the start winding is directly proportional to motor speed and line voltage. All SINPAC Switches use this voltage to switch the start capacitor out of the circuit. Your motor with a SINPAC Switch must generate a voltage greater than the switch cut out voltage to assure cut out of the start capacitor. Refer to charts below.



### Wiring Diagram



CS – Start capacitor, M – Motor main winding, CR – Run capacitor, ST – Motor start winding