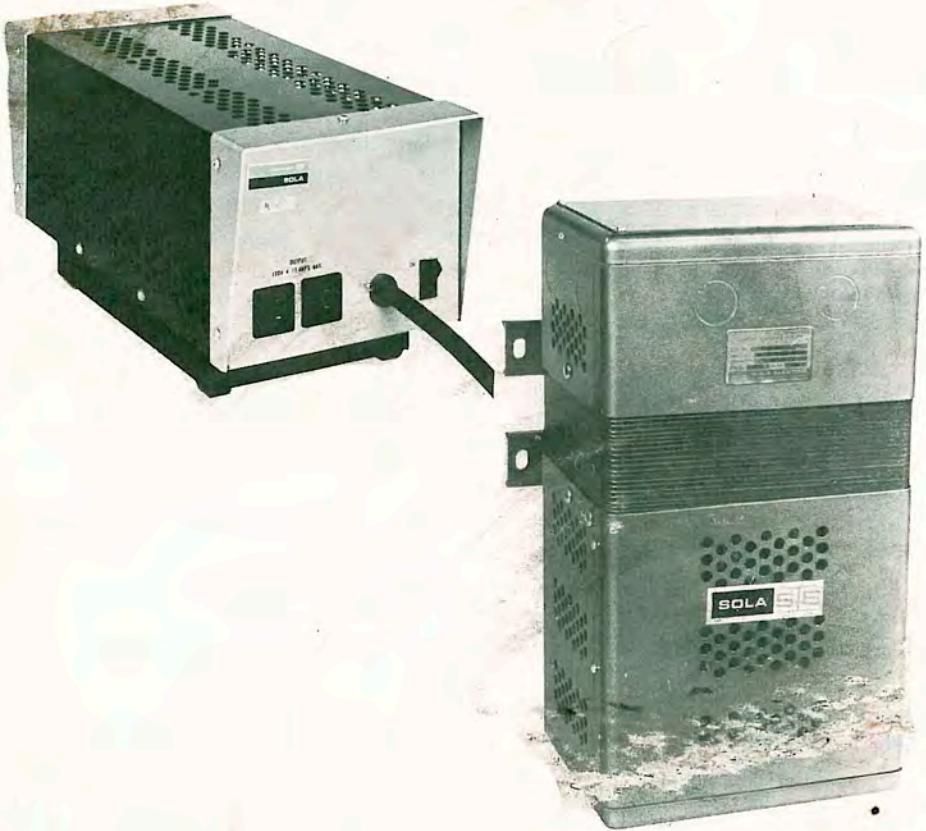
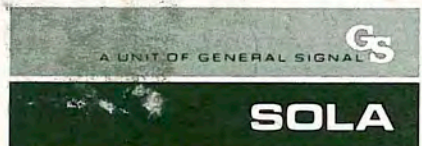


# OPERATING AND SERVICE MANUAL



## SOLA MINICOMPUTER REGULATORS



**OPERATING AND SERVICE INSTRUCTIONS  
FOR SOLA'S MINICOMPUTER REGULATORS  
CATALOG NO. SERIES 63-XX-XXX**

**U.L. WHITE CARD LISTED POWER SUPPLY CLASSIFICATION FOR  
60 HERTZ REGULATORS (50 HERTZ REGULATORS NOT U.L. LISTED)**

## **Installation**

Sola minicomputer regulators 2 KVA & smaller are completely portable, simple to install, quiet and are especially designed for office-type environment. These regulators are below normal office noise levels. Units of 3 KVA and larger are designed to be hard wired and are intended for wall mounting.

All regulators depend on the natural draft air circulation for adequate cooling. It is important that ventilation openings not be obstructed. Mounting in a confined or poorly ventilated space should be avoided unless special provisions have been made for ventilation.

## **CONNECTIONS**

Portable regulators, 2 KVA and smaller, are equipped with one (1) input off-on switch, one (1) 3 wire ground input cord/plug and two (2) or more 3-wire ground output receptacles. No special additional connections are required except for customers' output cables(s).

The neutral side of the output voltage is grounded to the regulator chassis, the input cord and output receptacle ground connections.

Hard-wired regulators, 3 KVA and larger, should be hard-wired to a branch circuit in accordance with the local and national electrical codes.

The output voltage terminal X2 (GND) is grounded to the transformer core and housings.

Each regulator is completely isolated from the power line which has an effective capacitance of less than 3 Pfd. and a common mode noise rejection of 60 db.

## **OPERATING NOTES AND DATA**

### **Safety Notice**

High voltages are present inside the regulator. Do not reach inside the unit while it is energized. To measure voltage, de-energize the unit, connect the meter, and then re-energize the unit.

### **Checking With Voltmeters**

All checks on input and output voltages should be made with a dynamometer-type voltmeter whenever available. A reasonably-close check can also be obtained with those iron-vane types which are rated for "25-500 Hertz" or broader frequency range. Thermocouple types will also give reasonably accurate readings. A certain amount of harmonics in the output may cause other types — particularly rectifier types — to give inaccurate indications.

### **Ratings and Characteristics**

Minicomputer regulators come in various input and output voltages, output VA ratings and frequencies. See name plate attached to each regulator for appropriate data. Including input current ratings.

Unit Operating Range:  $-20^{\circ}$  to  $+50^{\circ}\text{C}$ .

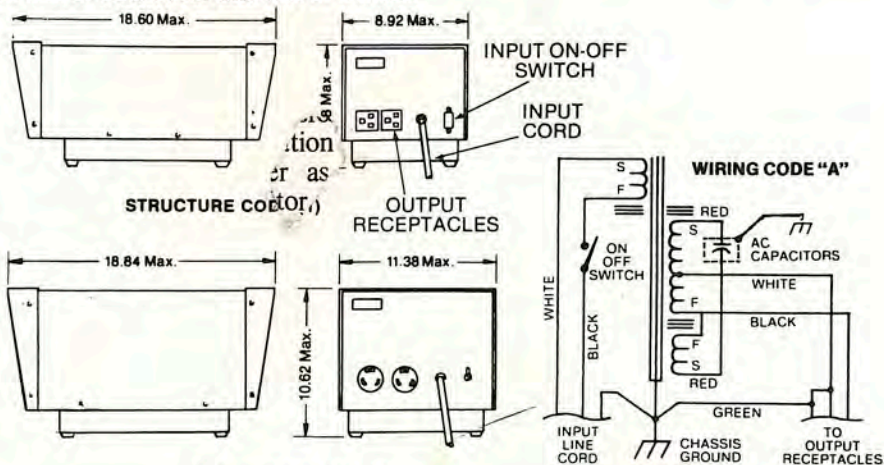
Phase: Single

Output Voltage Regulation:  $\pm 3\%$  of rated nominal output voltage for an input line variation of  $\pm 15\%$ .

Output Harmonic Distortion: Less than 3% total Rms content at full load.

Efficiency: 85% @ full load

No loss of output for line loss of 3 msec.



STRUCTURE CODE (2)

### 60 Hertz Single Phase (Portable)

Maximum Output VA Rating	Nominal Output Voltage	Input Voltage Range	Catalog Number	Approx. Shipping Weight	Structure Code	Wiring Code
140	120	95-130	63-13-114	18	1	A
250	120	95-130	63-13-125	31	2	A
500	120	95-130	63-13-150	47	1	A
750	120	95-130	63-13-175	60	1	A
1000	120	95-130	63-13-210	75	1	A
2000	120	95-130	63-13-220	125	2	A

†For  $\pm 3\%$  output regulation. Unit will operate at lower voltage

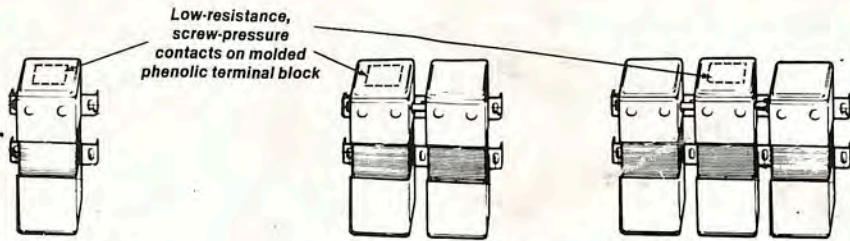
#### Mounting:

Steel bolts used for wall mounting must be a minimum diameter of 5/16 inches and must be used in all provided mounting holes of the regulator.

### 50 Hertz Single Phase<sup>††</sup> (Portable)

500	220	180-260	63-13-650	53	1	A
1000	220	180-260	63-13-710	85	1	A
2000	220	180-260	63-13-720	140	2	A

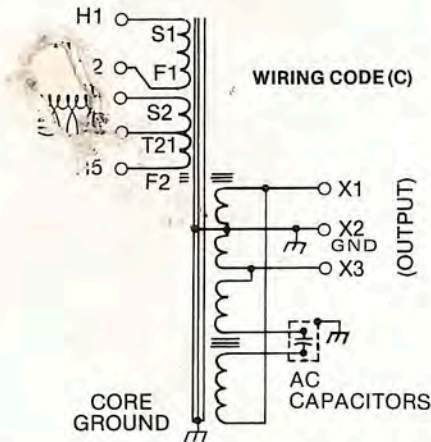
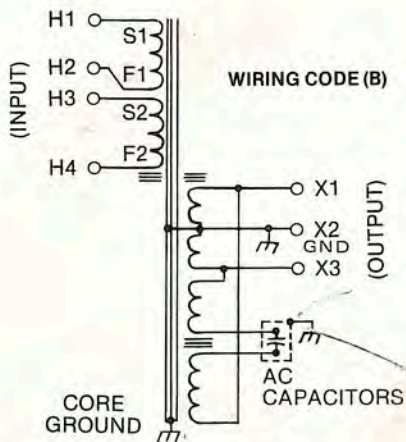
††50 Hertz units not U.L. Listed.



STRUCTURE CODE (3)

STRUCTURE CODE (4)

STRUCTURE CODE (5)



MULTIPLE PRIMARY CONNECTIONS		
Input Voltage	Apply Voltage To Terminals	Jumper Terminals
190-260 VAC	H1 & H4	H1 TO H3 AND H2 TO H4
360 VAC	H1 & H4	H2 TO H3

MULTIPLE PRIMARY CONNECTIONS		
Input Voltage	Apply Voltage To Terminals	Jumper Terminals
95-130 VAC	H1 & H5	H1 TO H3 AND H2 TO H5
175-235 VAC	H1 & H4	H2 TO H3
190-260 VAC	H1 & H5	H2 TO H3

SECONDARY CONNECTIONS	
Output Voltage	Output Terminals
120 VAC	X1 TO X2
120 VAC	X2 TO X3
240 VAC	X1 TO X3

Wiring diagrams are typical wiring of one transformer. Multiple assemblies (4) & (5) are wired in parallel.

### 60 Hertz Single Phase (Hard-Wired)

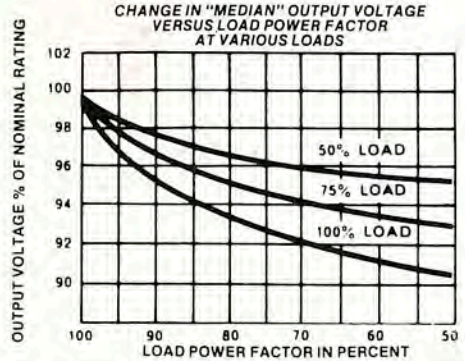
Regulated Output	Voltage Rating		VA	Catalog Number	App. Ship. Wt. (Lbs.)	Structure Code	Wiring Code
	Input Range						
120x240	95-130x175-235x190-260		3000	63-25-230-3	194	3	C
	190-260x380-520		3000	63-26-230	196	3	B
	95-130x175-235x190-260		5000	63-25-250	335	4	C
	190-260x380-520		5000	63-26-250	342	4	B
			7500	63-28-275	502	5	B

## Load Regulation

Changes in output voltage resulting from changes in resistive loads from no load to full load (100% P.F.) are approximately four percent.

## Effect of Load Power Factor

"Median" value of output voltage will vary from nameplate rating if the load has a power factor other than that for which the transformer was designed. Load regulation will also be relatively greater as the inductive load power factor is decreased (see following chart of average values). However, the resulting median values of output voltage will be regulated against supply line changes at any reasonable load or load power factor.



## Effect of Frequency

Changes in the frequency of the supply voltage will be directly reflected in the output voltage. A change of about 1.8% in output voltage will occur for every 1% change in input frequency, and in the same direction as the frequency change.

## Response Time

An important advantage of the Sola principle of static magnetic regulation is its exceedingly fast response time, compared with other types of AC regulators. Transient changes in supply voltage are usually corrected by a Sola within 1 1/2 cycles or less; the output voltage will not fluctuate more than a few percent, even during this interval.

## Input Characteristics

Since the Sola CV Transformer includes a resonant circuit which is energized whether it is serving load or not the input current at no load or light load may run 50% or more of the full load primary current. (As a result, the temperature of the unit may rise to substantially full-load level, even at light or no load.) Input power factor will average 90-100% at full load, but may drop to about 75% at half load and 25% at no load. In any case it is always leading.

## Current Limitation

When the load is increased beyond the transformer's rated value, a point is reached where the output voltage suddenly collapses and will not regain its normal value until the load is partially released. Under direct short circuit, the load current is limited to approximately 150-200% of the rated full load value, the input watts to less than 10% of normal. A constant voltage transformer will protect both itself and its load against damage from excessive fault currents. Fusing of load circuits is not necessary.

## Operation on Motor Loads

Because of the current-limiting effect described above, special attention should be given to motor applications. In general, the CV transformer must have a load rating nearly equal to the maximum power drawn during the starting cycle. This may run from two to eight times the normal (running) rating of the motor. In doubtful cases, it is advisable to measure the actual starting current.

## Operating Temperature

Standard units are designed to operate in ambient temperatures of minus 20°C to plus 50°C. In operation, a temperature rise will occur whether or not the transformer is serving load. Normally, this rise may fall anywhere in the range of 45°C to 110°C, depending on the type and rating. In any case, the maximum operating temperature at an ambient of 50°C is always within safe operating limits for the class of insulating material used.

## Effect of Temperature

The output voltage will show a small change as the unit warms up to stable operating temperatures at a constant ambient temperature. This change may be about one or two percent, depending on the unit's VA rating. At a stable operating temperature, the output voltage will change slightly with varying ambient temperature. This shift is approximately one percent for each 40°C of temperature change.

# SERVICING

## No Routine Maintenance Necessary

Since the Sola regulator is a simple rugged device without moving parts or manual adjustments, no "servicing" or "maintenance" is needed in the ordinary sense; and the percentage of possible poor performance or failure is exceedingly low. In any case of apparent poor performance, the user is urged to check the following points immediately:

### Checklist on Factors Affecting Performance

#### A. Nominal Voltage "Too High"

1. The load may be considerably less than full rating. (See note on "Load Regulation".)
2. The load may have a leading power factor.

#### B. Nominal Voltage "Too Low"

1. Load power factor may be lagging.
2. Unit may be slightly overloaded. (See note on "Current Limitation".)

#### C. "Does Not Regulate Closely"

1. Unit may be slightly overloaded. (See note on "Current Limitation".)
2. Actual line voltage swings may be outside the rated coverage of unit, particularly on low side.

3. On varying loads, a certain amount of load regulation may be mixed with the line voltage regulating action. (See note on "Load Regulation".)

#### D. Output Voltage "Very Low" (20-60V)

1. Unsuspected or unplanned overloads of substantial size may occur intermittently (motor-starting currents, solenoid inrush currents, etc.). (See note on "Current Limitation".)
2. One or more capacitor units in the regulator may be defective.

#### E. "No Output Voltage At All"

1. Check power supply and input switch.
2. Check primary fuses if any.
3. Check continuity between input terminals, and also between output terminals.

#### F. Transformer Operating Temperature

1. These transformers are designed to operate at high flux density, and hence, relatively high temperatures.

After connection to line for a half hour or so, the transformer core structure will be too hot to touch with bare hand, but this is normal and need give no concern.

**NOTE: In case regulator is operating but does not appear to have correct output, IT IS VERY HELPFUL TO APPLY THE FOLLOWING TEST:**

1. Disconnect the working load.
2. Connect a dummy load of lamps, heaters, or other resistive load substantially equal to the full load rating of regulator, directly across its output terminals.
3. Measure the output voltage of the regulator using a dynamometer type voltmeter directly across its output terminals.

This test will usually establish whether the apparent poor performance is due to a fault in the regulator or to some peculiarity of the working load.

#### Field Replacement of Capacitors

Capacitors used in all regulators are the highest commercial grade available. Each one is given a rigid acceptance test upon receipt. Nevertheless, as with all capacitors, there is a certain small percentage of failure. Sola's guarantee includes free replacement at the factory of any capacitor unit which fails within one year of sale. Older units can be replaced at moderate charge.

Where competent technical help is available, it may be possible to test and identify defective capacitors in the field, and to make field replacement with new capacitors shipped from the factory. In all such cases, factory advice and cooperation should be requested in advance (otherwise Sola cannot be responsible for costs or results.)



### **Guarantee**

Sola Minicomputer Regulators are guaranteed against failure due to faulty materials or workmanship for a period of one year from date of sale. See instructions about adjustments in preceding pages.