

# **LINE TAMER**

**POWER LINE CONDITIONER**

**HARDWIRED SERIES**

**CLT 140VA - 15KVA**

**SINGLE PHASE**

## **Owner's Manual**

**SHAPE LLC**

2105 CORPORATE DRIVE  
ADDISON, IL 60101

For Technical Assistance Call  
1-800-367-5811

## **NOW, YOUR PREPARED. . .**

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**Purchasing a Power Conditioner is a smart move toward protecting the performance of your computer system or other sensitive equipment.**

**Its ferroresonant constant voltage transformer technology provides complete protection from all voltage and noise problems, short of a total blackout. Since blackouts are just 1/2 of 1% of all power line problems, your Power Conditioner is the most cost-effective power line conditioner you can buy. It gives you:**

- **Protection from noise, voltage spikes, and transients.**
- **Continuous line regulation to compensate for both brownouts and overvoltages.**
- **Instant response, with no moving parts.**
- **Reliable and maintenance-free operation, with no failure-prone semiconductors.**
- **Complete isolation from the AC line, for enhanced safety.**

**Please take a few moments to read this Owner's Manual. It will give you the important information you need to make sure you're getting all the performance built into this unit.**

**The Installation and Operation sections which follow will get you up and running as quickly as possible. The subsequent sections provide useful background and technical information.**

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## INSTALLATION

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In order to insure the optimum performance of your Power Conditioner, it is recommended that a qualified electrician install this product.

This unit must be connected in strict accordance with all national and local electrical codes.

Proper care should be taken when installing the Power Conditioner. It should be located in a dry area and mounted to prevent casual contact. At least twelve (12) inches of space around the unit is necessary to maintain proper cooling. When wall mounting the unit, the terminal area should face up.

Locate the model number of the Power Conditioner in Table 1. Select the input voltage that will be provided to the conditioner and determine the branch protection required (Table 1) and the wire gauge. The gauge of wire is dependent on the branch protection rating. The hook up wire should be rated 90°C. Connect wiring as detailed in Figures 1 or 2.

## OPERATION

Once all connections have been made, proceed as follows: First, turn the line conditioner's power switch/circuit breaker to ON. Then, one at a time, switch ON the power switches of all the loads connected. That's all! Your equipment is now protected from power line problems.

Under operation, the line conditioner may produce some audible hum. Also, the unit may run quite warm. Both conditions are completely normal.

**NOTE:** The line conditioner will not operate properly if it is overloaded. The total VA or KVA ratings of all equipment connected to your line conditioner must not exceed the line conditioner's VA or KVA rating. (1,000 VA = 1 KVA).

Example:

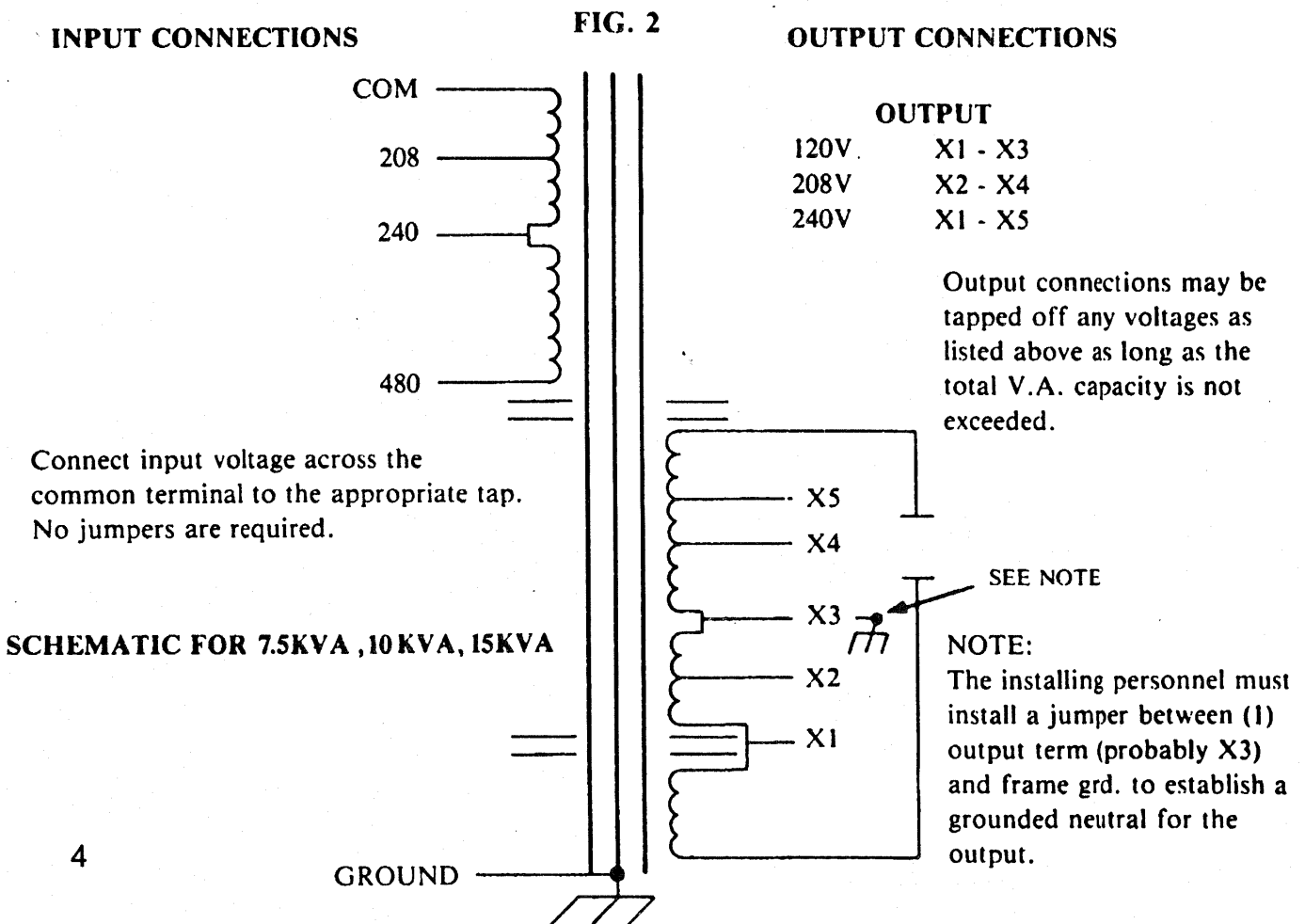
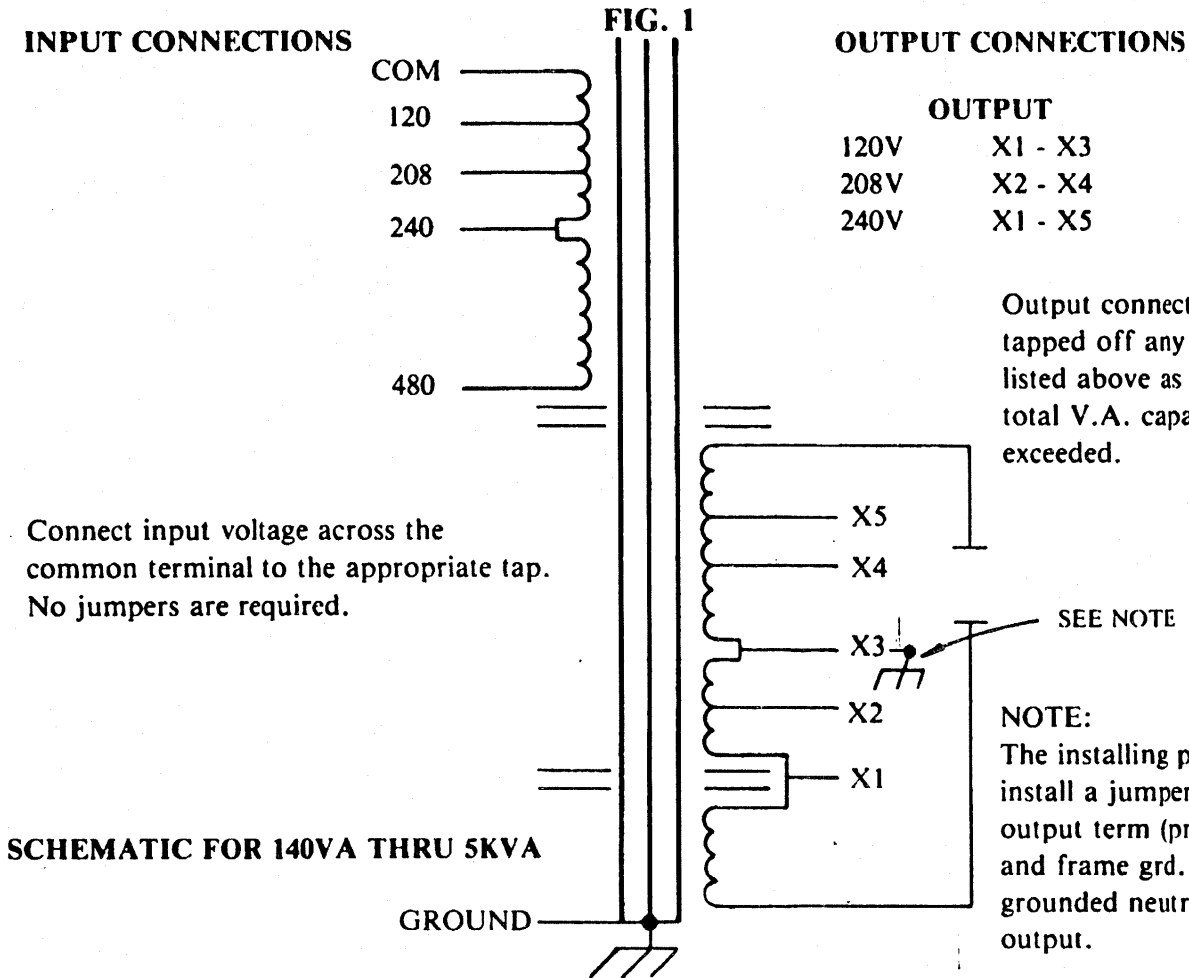
Computer system unit	250 VA
Printer	100 VA
Monitor	150 VA
<b>TOTAL</b>	<hr/> 500 VA

In this example, be sure your line conditioner has a VA rating of **at least 500 VA**.

**SPECIFICATIONS****TABLE I**

<b>MODEL</b>	<b>NOM INPUT VOLTS</b>	<b>INPUT VOLTAGE RANGE</b>	<b>REQUIRED CIRCUIT PROTECTION</b>	<b>OUTPUT VOLTAGE &amp; AMPS</b>	<b>SCHEMATIC FIGURE</b>
CLT-0140-GTB	120	96-132	2*	120/208/240 1.1/.67/.55	1
	208	166-229	1*		
	240	192-264	1*		
	480	384-528	0.5		
CLT-0250-GTB	120	96-132	4*	120/208/240 2.08/1.2/1.05	1
	208	166-229	2*		
	240	192-264	2*		
	480	384-528	1		
CLT-0500-GTB	120	96-132	7*	120/208/240 4.16/2.4/2.08	1
	208	166-229	4*		
	240	192-264	4*		
	480	384-528	2		
CLT-0750-GTB	120	96-132	10*	120/208/240 6.3/3.6/3.1	1
	208	166-229	5*		
	240	192-264	5*		
	480	384-528	3		
CLT-1000-GTB	120	96-132	15	120/208/240 8.3/4.8/4.1	1
	208	166-229	10*		
	240	192-264	5*		
	480	384-528	3		
CLT-1500-GTB	120	96-132	20	120/208/240 12.5/7.2/6.3	1
	208	166-229	10*		
	240	192-264	10*		
	480	384-528	5		
CLT-2000-GTB	120	96-132	25	120/208/240 16.6/9.6/8.3	1
	208	166-229	15		
	240	192-264	15		
	480	384-528	10		
CLT-3000-GTB	120	96-132	40	120/208/240 25/14.4/12.5	1
	208	166-229	25		
	240	192-264	20		
	480	384-528	10		
CLT-5000-GTW/ CLT-5000-GTO	120	96-132	70	120/208/240 41.6/24.0/20.8	1
	208	166-229	40		
	240	192-264	30		
	480	384-528	15		
CLT-7500-RTW/ CLT-7500-RTO	208	166-229	60	120/208/240 63/36/31.5	2
	240	192-264	50		
	480	384-528	25		
CLT-1001-RTW/ CLT-1001-RTO	208	166-229	80	120/208/240 83.3/48/41.6	2
	240	192-264	70		
	480	384-528	35		
CLT-1501-RTW/ CLT-1501-RTO	208	166-229	110	120/208/240 125/72.1/62.5	2
	240	192-264	100		
	480	384-528	50		

**\*MAY BE OPERATED FROM 15A BRANCH**



## **MAINTENANCE AND ADJUSTMENTS**

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Your line conditioner is an elegantly simple device which requires little maintenance and no adjustments. No regular, periodic service is recommended or required.

The unit uses specially-selected capacitors which are of the highest commercial grade available. These capacitors have a typical operating life of 7 years, and should be replaced thereafter by the factory.

### **IN CASE OF DIFFICULTY**

Because of its simple design, it is very unlikely that your line conditioner will experience problems. If it does, however, the most likely cause is overloading. Using the **Example** in the **Operation** section of this manual as a guide, please make sure that the sum total of the VA ratings of all equipment connected to the line conditioner does not exceed its VA rating.

If a problem persists, please consult the information which follows.

**WARNING:** Lethal voltages are present within this unit. This line conditioner does not contain any user-serviceable parts. Any unauthorized repairs or changes will void your warranty, and may result in unsafe electrical conditions which may also be in violation of electrical codes.

#### **No output voltage**

1. Make sure the power switch/breaker for the line conditioner **and** the equipment being protected have been switched ON.
2. Check fuses or circuit breakers, if any.
3. Check all power cords to make sure they're OK.

#### **Output voltage varies — regulation is poor**

1. The line conditioner may be slightly overloaded. Be sure the total VA or KVA rating of all equipment plugged into your line conditioner does not exceed its VA or KVA rating.
2. The line voltage coming from the power company may have voltage swings which exceed the rated range of the line conditioner. Check the line voltage with a voltmeter to determine.
3. For loads which have a varying power consumption, a small degree of output variation is normal.

## **IN CASE OF DIFFICULTY**

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### **Unit hums**

1. This is normal. No action is required.

### **Unit runs hot**

1. This is normal. No action is required. Your line conditioner has been carefully designed and manufactured using high-temperature materials which are rated for safe use at temperatures well beyond those which they will ever experience.

The unit is designed for operation in room temperatures as high as 104°F (40°C).

### **Output voltage is too low**

If your line conditioner is operating, but you suspect that the output voltage is not correct, it is helpful to perform the following test:

- A. Switch OFF all power to **all** equipment.
- B. Connect a load of incandescent lamps (light bulbs) to the line conditioner. The total wattage of all the lamps should be equal to, or slightly less than the VA of the line conditioner.
- C. Turn ON the line conditioner. Then turn ON the lamps. Wait several seconds. The brightness and color of the lamps give an excellent indication of the voltage.

If the lamps look too dim, or yellowish, to your eye then the line conditioner may be malfunctioning. **DO NOT ATTEMPT ANY REPAIRS YOURSELF.** Please call the factory for assistance, using the telephone number printed on the back cover of this manual.

If the lamps look “normal” to your eye, then the line conditioner is operating correctly. This means that the problem is in the equipment connected to the line conditioner. Continue troubleshooting as follows:



## **IN CASE OF DIFFICULTY**

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### **Output voltage is too low**

1. The line conditioner may be overloaded. Add up the VA or KVA ratings of **all** equipment plugged into the unit. This number must not be greater than the rating of the unit. (1 KVA = 1000 VA).
2. Certain equipment draws considerable power for brief periods of time — especially when being started. This includes motors, blowers, air conditioners, and solenoids. If any of these loads are connected to your line conditioner, try removing them. (The motors used in computer cooling fans, disk drives, and printers are too small to cause this problem.)
3. If you are unable to resolve the problem, please call us. We are here to help you. When you call, please have the model number of the line conditioner, and be ready to tell us what equipment (and their VA ratings) are connected to the unit.

## **TECHNICAL BACKGROUND INFORMATION**

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This section is written for those interested in knowing more about the theory and operating principles of the line conditioner. Knowledge of this information is **not required** for the proper use of the unit.

Your line conditioner uses the electronic storage capabilities of a magnetic field and electronic capacitors to control the voltage at the output. The energy in the magnetic field and the capacitors resonate at the frequency of the AC line (60 Hz).

This is a technology — ferroresonant constant voltage transformer technology — which has been highly refined over many years. It is an extremely reliable and cost-effective method for protecting against **all** power line problems except long-duration total power failures (blackouts).

Because energy is stored, the line conditioner can actually provide full output for up to 3ms (.003 sec) even when the input power has been completely interrupted. However, the line conditioner is not an uninterruptable power source (UPS), and cannot continue to provide power in the presence of a long-term blackout. It contains no batteries or power-inversion circuitry. The frequency of the output voltage of the line conditioner is completely a function of the frequency of the input voltage supplied by the power company.

### **REGULATION**

The regulation of the output voltage is affected by several factors: load, frequency, and power factor.

With resistive loads, the change in regulation from no load to full load is approximately 2%. A change in input voltage frequency of 1% will result in a change in output voltage of 1.1%. Power factor is a measure of the phase difference in the voltage and current drawn by a load. Your line conditioner's technical specifications were determined for loads having a power factor of 1.0. Under worst-case conditions — full load and 0.5 power factor, the output voltage from the line conditioner may change by 2%.

## TEMPERATURE CHARACTERISTICS

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This unit uses a resonant circuit which is energized under all load conditions. The maximum operating temperature of the unit, even when operating at the maximum rated ambient temperature of 104°F (40°C), will always be well within the temperature rating of all components in the unit.

As the line conditioner warms up (assuming a constant ambient temperature), the output voltage will change approximately 1 — 2%. For each 40°C change in transformer temperature, the output voltage will change approximately 1%.

## OVERLOAD PROTECTION

The line conditioner is fully protected from overloads and short circuits. If the load on the unit exceeds its rated capacity, the output voltage will suddenly collapse. It will stay low until the load current is reduced to below the unit's rated capacity.

Under short-circuit conditions, the output voltage will be approximately zero, and the output current will be limited to approximately 200% of the unit's rated value. No damage will occur to the line conditioner.

If using the line conditioner for motor applications, the rating of the conditioner must be equal to the **starting inrush power** of the motor. This value must be determined through actual measurement of the starting current of the motor.

# SHAPE LLC

Custom magnetic transformers,  
inductors, and power supplies

## Limited Warranty

Shape LLC, (the "Company"), Addison, Illinois, warrants to the first end user purchaser of power conditioning equipment manufactured by the Company that such equipment, if new, unused and in original unopened cartons at the time of purchase, will be free from defects in material and workmanship under normal use and service for a period of three years (CLC, CLT, and PCLC Power Conditioners and IT series Isolation Transformers), or for a period of two years (PVR & REG series Voltage Regulators), or for a period of one year (ILT series Power Conditioners and any Custom Power Conditioning Products) from the date of purchase. A twenty percent (20%) restocking fee will be applied to all returns that are the result of a customer overstock or disorder.

**The Company's obligation under these warranties shall be strictly and exclusively limited to repairing or replacing, at the Company's option, any such equipment which an authorized representative of the Company finds to be defective in material or workmanship under normal use and service within such a period. These warranties do not apply to any equipment which has been tampered with or altered in any way, which has been improperly installed or which has been subject to misuse, neglect or accident.**

**THE FOREGOING WARRANTIES ARE IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, and of any other obligations or liabilities on the part of the Company; and no person is authorized to assume for the Company any other liability with respect to the equipment. THE COMPANY SHALL HAVE NO LIABILITY WHATSOEVER IN ANY EVENT FOR PAYMENT OF ANY INCIDENTAL OR CONSEQUENTIAL DAMAGE, INCLUDING, WITHOUT LIMITATIONS, DAMAGES FOR INJURY TO ANY PERSON OR PROPERTY OR FOR ANY EXPENSES INCURRED IN THE INSTALLATION, REMOVAL OR REINSTALLATION OF THE EQUIPMENT.**

If for any reason any of the foregoing provisions shall be ineffective, the Company's liability for damages arising out of its manufacture or sale of the equipment, or use thereof, whether such liability is based on warranty, contract, negligence, strict liability in tort or otherwise, shall not in any event exceed the full purchase price of such equipment, as the case may be.

Any action against the Company based upon liability or obligation arising thereunder or under any law applicable to the sale of the equipment, or the use thereof, must be commenced within one year after the cause of such action arises.

The buyer shall notify the Company immediately upon receipt of any defective goods. The Company will be given a reasonable opportunity to inspect the goods prior to return. No product may be returned until after receipt of written shipping instructions and a Return Authorization Number (RA#).

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ADDISON, IL 60101

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