

Topaz® T1
Ultra-Isolator
Noise Suppressor
User's Manual
125 VA to 7.5 kVA
Single Phase

M G E
UPS SYSTEMS

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS -- This manual contains important instructions for the Topaz T1 Ultra-Isolator that must be followed during installation, operation, and maintenance.

WARNING

OPENING ENCLOSURE EXPOSES HAZARDOUS VOLTAGES. REFER SERVICE TO QUALIFIED PERSONNEL ONLY.

NOTE

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

WARRANTY

MGE UPS Systems warranty to distributors and other commercial customers: MGE UPS Systems warrants Ultra-Isolator Noise Suppressors manufactured by MGE UPS Systems to be free from defects in materials and workmanship for a period of six years from date of manufacture. If within such period purchaser discovers such item was not as warranted above and promptly notifies the company in writing, MGE UPS Systems shall repair or replace the item at the Company's option.

This warranty shall not apply:

- (a) to equipment repaired or altered by others than MGE UPS Systems,
- (b) to equipment subjected to negligence, accident, or damage by circumstances beyond MGE UPS Systems' control, or to improper operation, maintenance, or storage, or to other than normal use or service.

With respect to equipment not manufactured by MGE UPS Systems, the warranty obligations of MGE UPS Systems shall in all respects conform, and warranties do not cover reimbursement for labor, transportation, removal, installation, or other expenses which may be incurred in connection with repair or replacement.

Except as may be expressly provided in an authorized writing by MGE UPS Systems, MGE UPS Systems shall not be subject to any other obligations or liabilities whatsoever with respect to equipment manufactured by MGE UPS Systems or services rendered by MGE UPS Systems.

DISCLAIMER

The Topaz T1 Ultra-Isolator product is not designed, intended, or authorized for use in systems intended to support or sustain life, or for any other application in which the failure of the Topaz product could create a situation where personal injury or death may occur. Should the buyer purchase or use this Topaz product for any such unintended or unauthorized application, buyer shall indemnify and hold MGE UPS Systems and its officers, employees, and distributors harmless against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that MGE UPS Systems was negligent regarding the design or manufacture of the part.

Service and factory repair - call 1-800-523-0142

Direct questions about the operation, repair, or servicing of this equipment to MGE UPS Systems Customer Support Services. Include the model number, assembly number, and serial number of the unit in any correspondence. Should you require factory service for your equipment, contact MGE UPS Systems Customer Support Services at the above telephone number.

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Introduction

GENERAL DESCRIPTION

The Topaz T1 Ultra-Isolator protects sensitive electronic equipment from the voltage transients, spikes, and electrical "noise" appearing on most power lines. A unique shielding technique eliminates this interference while providing complete electrical isolation of the load from the power line.

Power line noise exists in two forms: *Common-Mode* which appears between both sides of the power line and ground (A and B in Figure 1) and *Normal-Mode* (also called *Transverse Mode*), which appears from line to line (C in Figure 1). The Ultra-Isolator is effective in removing both types of noise.

The Topaz T1 Ultra-Isolator is available in 60 Hz line cord/receptacle models rated from 125 VA to 2.4 kVA. Terminal style (field-wired) models are available for 50/60 Hz application in power ratings from 125 VA to

7.5 kVA. (see Description of Models table).

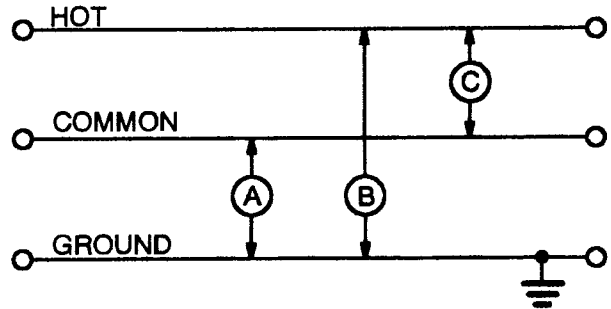


FIGURE 1. Power Line Noise

SCOPE

These instructions explain how to install and operate the Topaz T1 Ultra-Isolator. Instructions regarding installation, however, do not supplant national, state, or local electrical codes. Check the applicable electrical codes to insure compliance with all regulations.

Installation and Operation

INSTALLATION

Installation to be performed by qualified Personnel only.

LIFTING INSTRUCTIONS

The following instructions cover the recommended lifting means for all Ultra-Isolator Noise Suppressors weighing over 70 pounds.

Use a lifting sling and crane rated for a minimum of 460 pounds. Place the sling under each endbell as shown in Figure 2. Secure the top of the sling over the crane hook and lift the unit straight up. The Ultra-Isolator may now be moved into place and lowered.

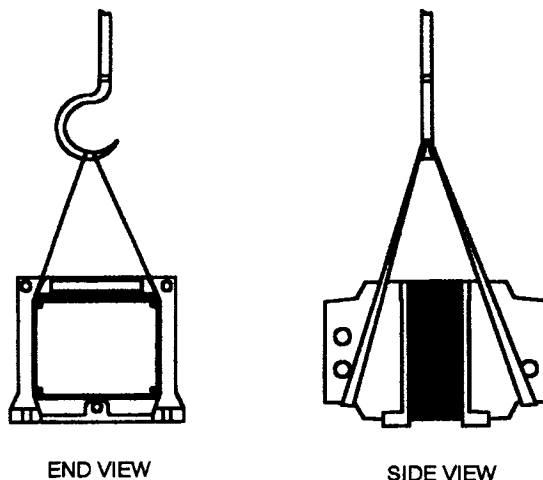


FIGURE 2. Lifting Instructions

LOCATION

The Ultra-Isolator Noise Suppressor is designed for installation in a protected environment. Factors to consider in locating the Ultra-Isolator are ventilation and environmental conditions.

- The Ultra-Isolator is cooled by radiation and natural convection. Allow at least six inches between the unit and nearby walls or equipment.
- The Ultra-Isolator should be installed in locations free from excessive dust and chemical fumes.
- The highest degree of noise suppression will be obtained by locating the Ultra-Isolator as near to the load as possible.

PRIMARY CIRCUIT PROTECTION

Ultra-Isolator Noise Suppressors rated 1 kVA and less are protected by an integral primary fuse. Terminal style units in this range have dual input voltage rating of either 120 or 240 Vac. The nominal input voltage depends on the primary jumper link connections (see Figure 3). Individual units are shipped with the links connected for 120 Vac, and with the corresponding fuse rating installed. The fuse for 240 Vac is shipped separately in a plastic bag. If you change the input connection links to operate at 240 Vac, be sure to change the fuse also so that the unit is adequately protected against overcurrent. Table 2 shows fuse ratings for the two input voltages at various power ratings.

Ultra-Isolators rated above 1 kVA depend upon the primary branch circuit protection. Table 1 shows the maximum branch circuit fuse or circuit breaker rating for adequate protection. When installing the Ultra-

Isolator, verify that the proper branch circuit protection is in place.

CONNECTION

Make certain that the input and output voltage and power ratings of the Ultra-Isolator match the available line voltage and phasing, and the load voltage and power requirements before making any connections.

Line Cord/Receptacle Models

If for some reason you wish to operate with the output neutral ungrounded, you may remove the wire that bonds the neutral terminal of the output receptacles to the ground terminal. Note, however, that this will significantly reduce the common-mode noise attenuation of the Ultra-Isolator.

Plug the input line cord of the Ultra-Isolator into a suitable AC power receptacle. Plug the input cord(s) of the load into the output receptacles(s) of the Ultra-Isolator.

Terminal Style Models

If you desire to have the output neutral ungrounded, the bonding jumper connector between output terminal X4 and ground may be removed. Note, however, that this will significantly reduce the Common-Mode noise attenuation of the Ultra-Isolator.

These Ultra-Isolator Noise Suppressors have dual primary and secondary windings that permit connection in any combination of the listed input and output voltages by moving jumper links on the input and output terminal blocks. The connections are shown in Figure 3.

1. Remove the input and output end plates by removing the four screws holding each one.

2. Use a hammer and punch to open the appropriate input and output entrance holes (knockouts).
3. If conduit is to be used for input or output cables, route the conduit to the knockout holes. If conduit is not used, install a UL recognized cable strain relief in the knockout hole.
4. Connect the jumper links at the input and output terminal blocks in accordance with input AC line voltage and desired output (load) voltage. See Figure 3.
5. Input and output cables must be large enough to handle the currents listed in Table 4. Use cable rated for at least 90°C. For units rated 750 VA or less, use wire no larger than 14 AWG.
6. Connect input and output cables as shown in Figure 3.
7. Replace the input and output end plates.

SPECIAL NOISE PROBLEMS

Ground Noise

In cases where the power line ground is excessively noisy, it may be advantageous to eliminate the power line ground to the Ultra-Isolator input and run a separate "clean" ground to the Ultra-Isolator frame and to the load.

For optimum results, the separate ground point should be as close as possible to the Ultra-Isolator Noise Suppressor.

The actual ground point itself may be a suitable ground rod, the nearest available effectively grounded structural member of the building, or the nearest available effectively grounded metal water pipe (National Electrical Code, Article 250-26).

Specifications

Specifications subject to revision without notice

Common-mode Noise Attenuation

146 dB minimum

Transverse-mode Noise Attenuation

65 dB

Overload Capacity

600% for one cycle
300% for 30 seconds
200% for 30 minutes

Operating Frequency

57-63 Hz for 60 Hz models
47-63 Hz for 50/60 Hz models

Efficiency

Typically 95%

Input Voltage Range

±10% of nominal rated voltage

Load Regulation

3.5% or less from no load to full load at 1.0 p.f.

Insulation Resistance

100 megohms minimum from windings to core, mea-

sured at 50 Vdc

Primary Surge Protection

Complies with IEEE 587- Cat A and B

Secondary Power Line Protection

Complies with NEC Article 280 and ANSI/IEEE C62-41 - 1980

Electromagnetic Interference

0.1 gauss maximum, measured at 18 inches

Audible Noise

Less than 45 dB, measured at 3 feet

Ambient Temperature

Operating: 0°C to 50°C
Storage: -40°C to 85°C

Operating Altitude

12,000 feet maximum
(Full load power rating should be decreased approximately 3.3% for each 1000 ft of altitude)

Operating Humidity

95% relative (non-condensing)

FIGURE 3. Connection Diagrams for Field Wired Models

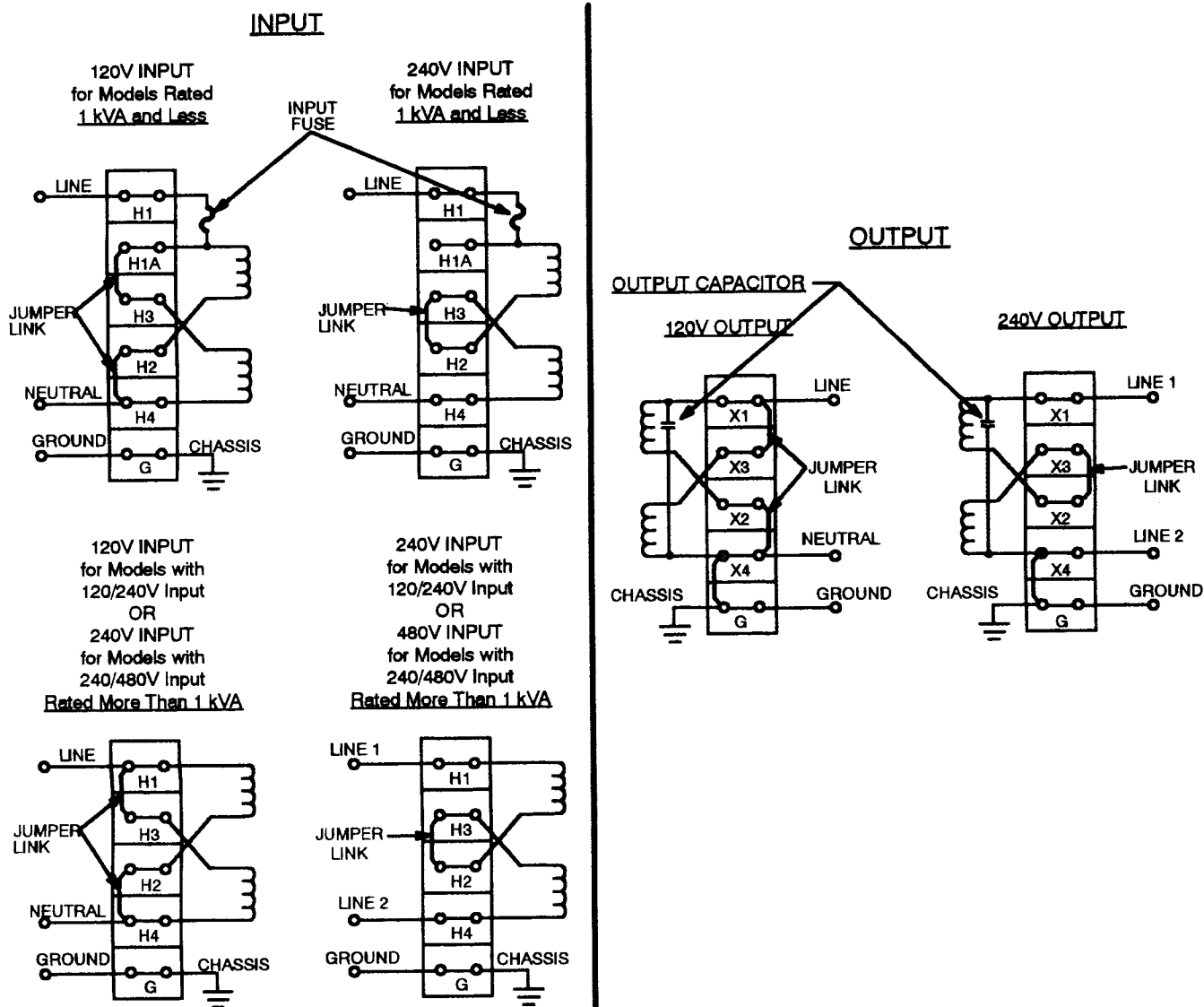


TABLE 1. Primary Branch Circuit Protection

Power Rating	Maximum Branch Circuit Fuse or Circuit Breaker Rating at Voltage of		
	120V	240V	480V
1.8 kVA	20	10	--
2.5 kVA	25	15	--
5 kVA	50	25	15
7.5 kVA	70	40	20

TABLE 2. Integral Primary Fuse Rating (Terminal Style Models 1 kVA and Below)

Power Rating	Integral Primary Fuse Rating at Voltage of	
	120V	240V
125 VA	1.25A	0.75A
250 VA	2.5A	1.25A
500 VA	5A	2.5A
750 VA	8A	4A
1 kVA	10A	5A

TABLE 3. Ultra-Isolator Noise Suppressor List of Models

Model Number	Power Rating	Input Voltage	Output Voltage	Frequency	Full Load Heat Dissipation	Connector Code
Line Cord/Receptacle Models						
91091-32T	125 VA	120 Vac	120 Vac	60 Hz	38.6 BTU/Hr	1
91092-32T	250 VA	120 Vac	120 Vac	60 Hz	63.0 BTU/Hr	1
91095-32T	500 VA	120 Vac	120 Vac	60 Hz	102.2 BTU/Hr	1
91097-32T	750 VA	120 Vac	120 Vac	60 Hz	145.1 BTU/Hr	1
91001-32T	1 kVA	120 Vac	120 Vac	60 Hz	169.3 BTU/Hr	1
91018-32T	1.8 kVA	120 Vac	120 Vac	60 Hz	293.6 BTU/Hr	2
91002-32T	2.4 kVA	120 Vac	120 Vac	60 Hz	344.8 BTU/Hr	3
Terminal Style Models						
91091-31T	125 VA	120/240 Vac	120/240 Vac	50/60 Hz	36.2 BTU/Hr	4
91092-31T	250 VA	120/240 Vac	120/240 Vac	50/60 Hz	60.1 BTU/Hr	4
91095-31T	500 VA	120/240 Vac	120/240 Vac	50/60 Hz	97.0 BTU/Hr	4
91097-31T	750 VA	120/240 Vac	120/240 Vac	50/60 Hz	154.1 BTU/Hr	4
91001-31T	1 kVA	120/240 Vac	120/240 Vac	50/60 Hz	160.4 BTU/Hr	4
91018-31T	1.8 kVA	120/240 Vac	120/240 Vac	50/60 Hz	295.5 BTU/Hr	4
91002-31T	2.5 kVA	120/240 Vac	120/240 Vac	50/60 Hz	378.0 BTU/Hr	4
91005-31T	5 kVA	120/240 Vac	120/240 Vac	50/60 Hz	634.8 BTU/Hr	4
91105-31T	5 kVA	240/480 Vac	120/240 Vac	50/60 Hz	599.0 BTU/Hr	4
91007-31T	7.5 kVA	120/240 Vac	120/240 Vac	50/60 Hz	796.1 BTU/Hr	4
91107-31T	7.5 kVA	240/480 Vac	120/240 Vac	50/60 Hz	821.7 BTU/Hr	4

*Connector Code

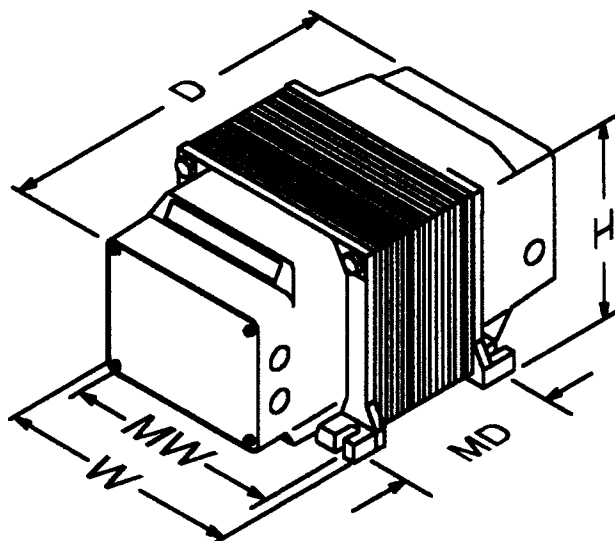
- 1 6-foot power cord with NEMA 5-15P input plug; one duplex NEMA 5-15R output receptacle
- 2 6-foot power cord with NEMA L5-20P twist-lock input plug; one duplex NEMA 5-20R output receptacle
- 3 6-foot power cord with NEMA L5-30P twist-lock input plug; one duplex NEMA 5-20R output receptacle
- 4 Input and output terminal blocks for field wiring

TABLE 4. Full Load Currents at Various Voltages

Power Rating	Input Current			Output Current	
	at 480V	at 240V	at 120V	at 240V	at 120V
125 VA	--	0.5A	1.1A	0.5A	1.0A
250 VA	--	1.1A	2.2A	1.0A	2.1A
500 VA	--	2.2A	4.4A	2.1A	4.2A
750 VA	--	3.3A	6.6A	3.1A	6.2A
1 kVA	--	4.4A	8.8A	4.2A	8.3A
1.8 kVA	--	7.9A	15.8A	7.5A	15.0A
2.5 kVA	--	11.0A	21.9A	10.4A	20.1A
5 kVA	11.0A	21.9A	43.9A	20.8A	41.7A
7.5 kVA	16.4A	32.9A	65.8A	31.2A	62.5A

TABLE 5. Dimensions and Weights

Model Number	Height (H) (in)	Width (W) (in)	Depth (D) (in)	Mtg Width (MW) (in)	Mtg Depth (MD) (in)	Weight (lb)
Line Cord/Receptacle Models						
91091-32T	4.8	7.4	7.6	6.3	2.9	13
91092-32T	4.8	7.4	8.0	6.3	3.3	15
91095-32T	4.8	7.4	9.0	6.3	4.2	21
91097-32T	4.8	7.4	9.7	6.3	4.9	25
91001-32T	6.6	8.4	9.7	7.3	3.5	32
91018-32T	6.6	8.4	10.5	7.3	4.3	42
91002-32T	6.6	8.4	10.9	7.3	4.6	48
Terminal Style Models						
91091-31T	4.8	7.4	7.9	6.3	3.1	14
91092-31T	4.8	7.4	8.3	6.3	3.5	16
91095-31T	4.8	7.4	9.4	6.3	4.6	23
91097-31T	4.8	7.4	10.2	6.3	5.5	27
91001-31T	6.6	8.4	10.0	7.3	3.8	36
91018-31T	6.6	8.4	11.0	7.3	4.8	46
91002-31T	6.6	8.4	11.8	7.3	5.5	55
91005-31T	6.6	8.4	15.0	7.3	8.8	93
91105-31T	6.6	8.4	15.0	7.3	8.8	94
91007-31T	6.6	8.4	17.5	7.3	11.3	126
91107-31T	6.6	8.4	18.0	7.3	11.8	130

**Figure 4. Ultra-Isolator Dimensions**