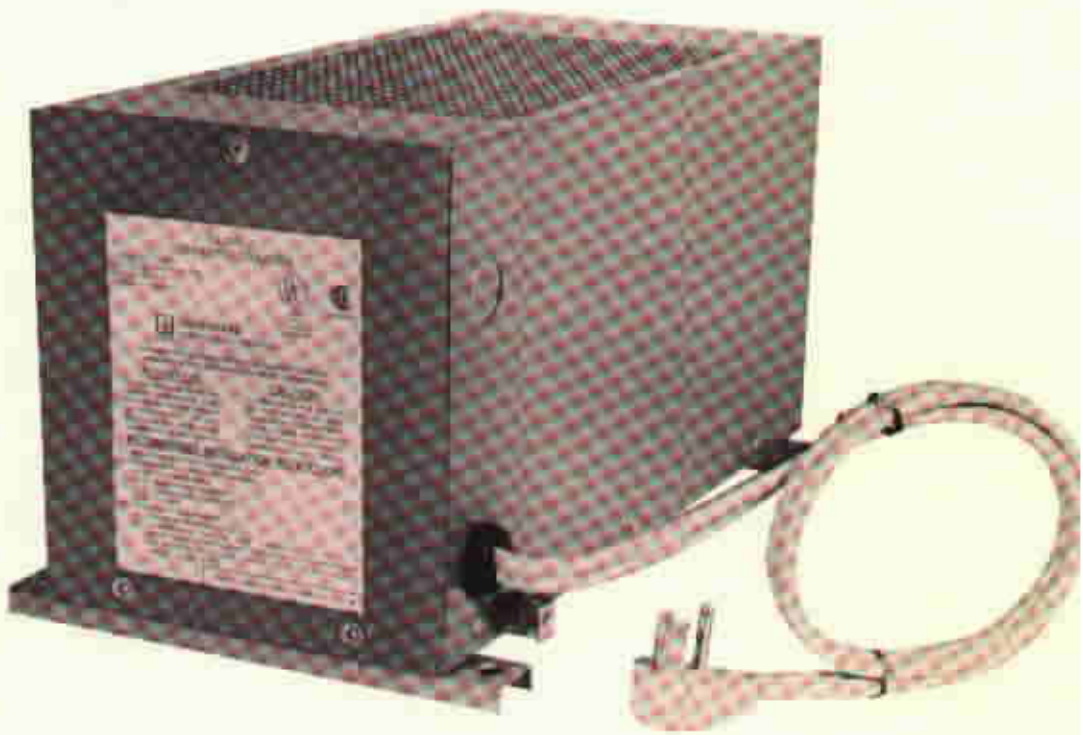
20 amp 30 amp 40 amp 50 amp 70 amp

CONVERTER BATTERY CHARGERS

For More Charging Power



- For Land Mobile and Marine Use
- Reliable Ferroresonant Regulated In/Output
- Full Output Charge Rate

Optional Fuse Panels for Updating Your R.V. Charging System

TRIAD-UTRAD
Litton Distributor Services
305 North Briant Street, Huntington, Indiana 46750
219-356-6500

20 amp 30 amp 40 amp 50 amp 70 amp

Litton **TRIAD-UTRAD** Distributor Services

Converter/B

33 years of transformer design and manufacturing experience have provided the basis for a truly trouble free converter/battery charger. The general use and engineering observations compiled in the last seven years of manufacturing and field service of converter/battery chargers have led to the present concept and design.

The Triad-Utrad converter/charger is made with a constant voltage, current limiting, ferro-resonant transformer. This transformer cannot be damaged by overloads and is designed to operate, indefinitely, shorted out. For example, the model TU-540 (40 amp rating) has a current limit of about 50 amps and any current in excess of 50 amps would come directly out of the battery. This condition cannot damage the converter/charger would resume charging when the excess l removed.

Our converter/chargers are designed to op with an input voltage from 90 to 130 volts A.C. out any noticeable change in output voltage by preventing damages to lights, motors, an pliances due to low or high line conditions.

The design has been upgraded to compe for the added power requirements of the "li trend of the R.V. user. This was done by incre the output voltage at rated load without cha the output voltage at no load. This allows the to draw more current without excessive b discharge.

Special Note

The Triad-Utrad Converter/Charger must have as close to *60 cycles* as possible to work correctly. Most R.V. A.C. generators will change in frequency with different RPM settings. It is important that the RPMs that will give you 60 to 63 cycles be when using the 115 volts from the generat battery charging. Voltage being not as impo as frequency.

Converter/Battery Charger Specifications

Triad Part No.	Conv. Rating	Input Volts	Input Amps	Output Volts	Output Amps	Automatic Reset Thermal Cutout	Approvals	Wei
TU-323	20 amps (Dual 10)	90 to 130 VAC 60 Hz	3.3 amps	12 VDC min. full load 14.1 VDC max. no load	20 amps	No	None	28
TU-430-2T	30 amps	90 to 130 VAC 60 Hz	5.0 amps	12 VDC min. full load 14.1 VDC max. no load	30 amps	Yes	U.L.	19
TU-540-2	40 amps	90 to 130 VAC 60 Hz	6.4 amps	12 VDC min. full load 14.1 VDC max. no load	40 amps	Yes	U.L. & CSA	32
TU-550-2	50 amps	90 to 130 VAC 60 Hz	7.7 amps	12 VDC min. full load 14.1 VDC max. no load	50 amps	Yes	U.L.	36
TU-570-2	70 amps	90 to 130 VAC 60 Hz	11.0 amps	11.5 VDC min. full load 14.1 VDC max. no load	70 amps	Yes	U.L. & CSA	40
TU-500-2	40 amps	200 to 240 VAC 50 Hz	3.0 amps	12 VDC min. full load 14.1 VDC max. no load	40 amps	No	No	32

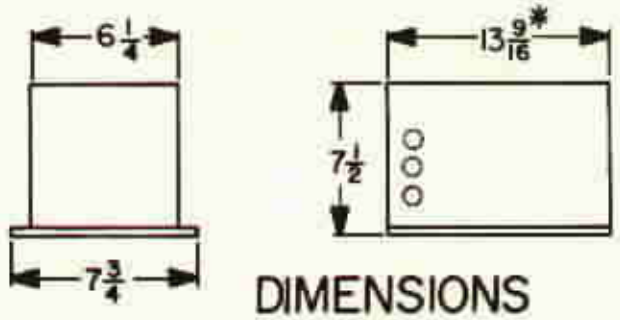
Fuse Panel Specifications

Triad P/N	Description	Width	Length
FB-532P	6 Circuit AGU 50 Battery Fuse, 1 SFE 30, 4 SFE 20. Plastic Case	4½"	5¼"
FB-315P	5 Circuit SFE 30 Battery Fuse; 4 AGC 15. Plastic Case	4½"	5¼"
FB-431P	6 Circuit AGU 40 Battery Fuse, 1 SFE 30, 4 AGC 15, Plastic Case	4½"	5¼"
FB-8532M	9 Circuit AGU 50 Battery Fuse, 1 SFE 30, 7 SFE 20. Metal Case	5¾"	8½"
FB-8315M	8 Circuit SFE 30, Battery Fuse; 7 AGC 15, Metal Case	5¾"	8½"
FB-8532CM	9 Circuit same as FB-8532M except has closed ends to meet CSA	5¾"	8½"

FB-532P Fuse Panel

FB-8532M Fuse Panel

Optional Fuse Panels for Updating Your R.V. Charging System

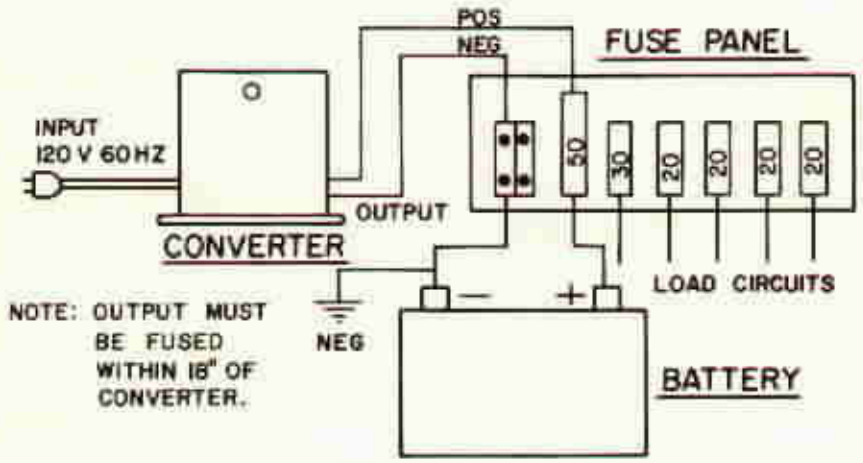


DIMENSIONS

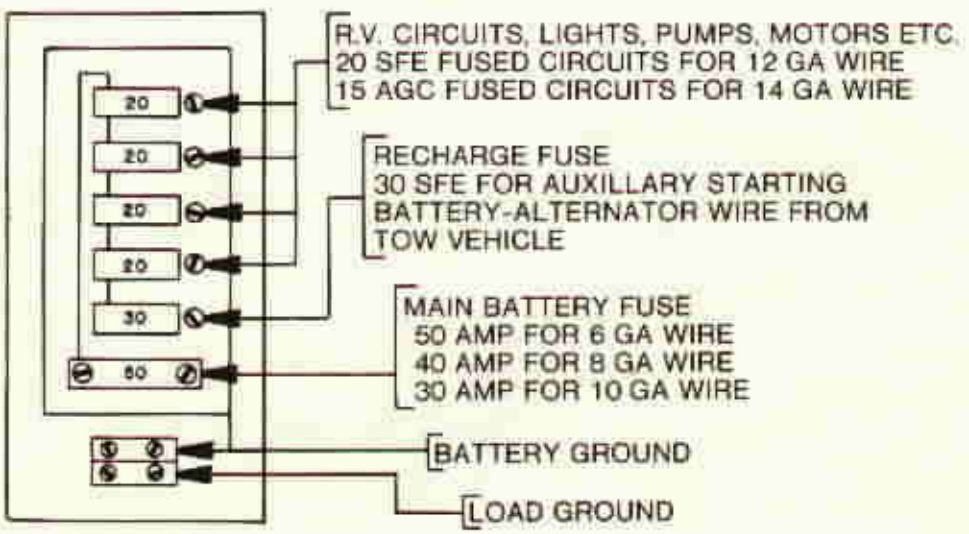
* TU-430-2T IS 9 5/16" IN LENGTH

Converter output power line must be fused within 18" of converter. All models have a 2½ foot long AC power cord and minimum 18" output leads.

TYPICAL CONNECTION DIAGRAM



FUSE PANEL SELECTION



FUSE PANEL

TYPICAL QUESTIONS AND ANSWERS ABOUT TRIAD-UTRAD CONVERTER/BATTERY CHARGERS

1. **Q. Why use the converter/charger instead of a converter?**

   A. A converter/charger is first a converter then a battery charger. It converts the normal 120V AC line voltage found in homes and trailer park hook-ups down to 12 volts DC to operate the wide range of appliances available in most recreational vehicles. The converter/chargers will perform the same basic function as the converter, with the extra convenience of recharging the battery when 115V is available. It also provides for filtered DC operation, meaning longer life for all motor, lights, and other 12 volt appliances. In addition, it is possible to use a lower output current rated supply, with the excess drain by short duration pump motors etc., being supplied by the battery. The converter/charger would then replace this drain automatically as soon as the load is relieved.

2. **Q. What happens if you leave the converter/charger on for long periods of time, unattended?**

   A. The converter/charger is designed to function as an integral part of the battery system. The output voltage of the unit is designed to fully charge the battery without going high enough to overcharge even if the converter/charger is left on indefinitely. The ideal situation for prolonged life of the battery, would be to leave the converter/charger plugged in even when the recreational vehicle is not in use. Periodically check the battery water level at least once a month. Battery failure is most often caused by leaving the battery in a discharged or partially discharged state. Even a completely charged battery will discharge itself if it is not used and kept charged.

3. **Q. What happens when the battery is not used?**

   A. If, at some time, it becomes necessary to remove the battery from the recreational vehicle, the system would still function with no noticeable change except the lights would be slightly dimmer. The condition for short circuit and overload protection described in the following paragraphs would be the same with or without the battery.

4. **Q. What happens when you leave the converter/charger fully loaded for long periods of time?**

   A. At full load, the output voltage of the converter/charger will be approximately 12.3 volts. If the system were loaded to full converter rating, the battery would supply part of the current to the load until the battery terminal voltage was the same as the converter voltage. At this time, the battery would simply be floating and acting as a filter to the system. The converter/charger would then be supplying the total current to the recreational vehicle. At this time, the battery would be in a slightly discharged condition and should return to full charge when the load was decreased. In this type of system, the battery would help absorb sudden changes in output voltage due to sudden changed in load current.

5. **Q. What happens when the system is overloaded?**

   A. It is not possible to damage a converter/charger by indefinite overloads up to and including a dead short. The output voltage, at rated load, is approximately 12.3 volts. This voltage is high enough to maintain a high level of charge on the battery even if the rated current is maintained indefinitely. If there is a demand in excess of rated current, the voltage would decrease slightly, causing a portion of the excess to come directly from the battery. This would continue until the load goes beyond the current limit of the converter/charger. At this point, the current would remain basically the same and the voltage would drop drastically. When this condition exists, the input current will decrease thus preventing an overload on the A.C. line. Also when this condition exists, the battery would supply all the current above the current limit of the converter/charger until either the battery was discharged or part of the load was relieved. When part or all of the load was relieved, the converter/charger would then start to replace the current drawn from the battery. This concept of floating the battery eliminated the sometimes damaging ripple caused by all rectifiers and also helps to prevent sudden changes in voltage to lights, pumps, etc. caused by turning other loads on or off.

6. **Q. What happens with variations in input line voltages?**

   A. One of the major problems in most continuous operation battery charger systems is changes in output voltages due to changes in input voltage. Battery manufacturers say the output voltage of a "floating battery" system should be 2.35 volts per cell, (14.1 volts for a 12 volt battery), in order to bring the battery to a full charge without overcharging. If the output voltage is too far below the value, the battery will not receive a full charge. If the output voltage is above this value, it could cause dangerous gassing and evaporation of the battery water. The output of the Triad-Utrad converter/charger is set in the design of the transformer at 14.1 volts and cannot change by more than .2 volts when operating from 95 volts to 130 volts input. The converter/charger will function with input voltages as low as 60 volts although the output can change as much as .5 volts under this condition. This feature is also important when the converter/charger is under full load operation. DC motors and fluorescent ballasts will overheat when the voltage drops too low as well as when the voltage goes too high. Under full load condition, the voltage can change by .3 V maximum with a 95 volt to 130 volt change in input voltage. For example: if our converter/charger was under full load with an input voltage of 120 V and an output voltage of 12.3 volts, and the AC input voltage suddenly dropped to 95 volts, the output voltage would not drop below 12 volts.

TRIAD-UTRAD
Litton Distributor Services
305 North Briant Street, Huntington, Indiana 46750
219-356-6500

TRIAD-UTRAD CONVERTER - CHARGER

WHAT IS IT? WHAT CAN IT DO?

1. A converter-charger is first a converter then a battery charger. It converts the normal 120V AC line voltage found in homes and trailer park hook-ups down to 12 volts DC to operate the wide range of appliances available in most Recreational Vehicles.

2. When a converter is intended to also serve as a battery charger, several considerations need to be observed. Most battery failure is caused by over or under charging or by non-use rather than by age in proper use. Battery manufacturers recommend a "Tricle Charge" voltage of 2.35 volts per cell, maximum, be used to maintain a battery at full charge for an indefinite period of time. They also recommend that a decreasing current charge is preferable due to the fact a discharged battery can accept more current, without damage, than a partially discharged battery.

3. The general use and engineering observations compiled in the last five years of manufacturing and field service, have led to the present concept and design of the Triad-Utrad Converter/Battery Charger.

4. All of our units operate on the same principal. Elecrical simplicity is our main consideration. As in all electronic engineering, the more components involved, the more chances for a failure. All three of our individual components (Transformer, capacitor, and diodes) are overrated to prevent accidental and age type failures. The transformer itself is a ferro-resonant, constant voltage, current limiting device which is virtually indestructible in itself.

5. It is not possible to damage a converter-charger by indefinite overloads up to and including a dead short. The output voltage, at rated load, is approximately 12.5 volts. This voltage is high enough to maintain a high level of charge on the battery even if the rated current is maintained indefinitely. If there is a demand in excess of rated current, the voltage would decrease slightly, causing a portion of the excess to come directly from the battery. This would continue until the load goes beyond the current limit of the converter-charger. At this point, the current would remain basically the same and the voltage would drop drastically. When this condition exists, the input current will decrease thus preventing an overload on the A.C. line.

Also when this condition exists, the battery would supply all the current above the current limit of the converter-charger until either the battery was discharged or part of the load was relieved. When part or all of the load was relieved, the converter-charger would then start to replace the current drawn from the battery. This concept of floating the battery eliminated the sometimes damaging ripple caused by all rectifiers and also helps to prevent sudden changes in voltage to lights, pumps, etc. caused by turning other loads on or off.

6. As for line voltage conditions, the converter-charger is designed to operate from 90 volts to 130 volts A.C. without a noticeable change in output voltage, (at any current from no load to rated output). The converter-charger will not be damaged at voltages up to 140 volts and would still charge the battery at voltages down to 40 volts input.

7. Most line voltages in the U.S. and Canada are generally considered to be somewhere between 110 volts and 120 volts. This is not always the case in outlying trailer parks. Due to the great distances between power source and park, the voltage will often range from 130 volts down to 90 volts and sometimes lower.

8. The battery charging capabilities, we feel, are themost important in normal operation. Since the battery is the most perfect form of 12 Volt DC Power (if it would never discharge), then it stands to reason that the charger should be as close to the natural characteristics of the battery as possible. The voltage is set, inside the transformer, at the factory at 14.00 volts to 14.15 volts at no load (tricle charge on a fully charged battery). Since there is no electronic regulating circuit, this voltage can not be changed except in the event of unit failure. In this case, there would be no output voltage. A voltage of 14.1 volts is not required to maintain a battery at full charge, but much lower than 14.00 volts would result in a prolonged time delay from discharge to full charge. A voltage of more than 14.15 volts, could result in needless gassing and loss of battery water.

9. Our design has been upgraded to help compensate for the added power requirement and the trend towards almost "live in" conditions of the R.V. user. This was done by increasing the output voltage at rated load without changing the output voltage at no load. This is to allow the user to draw more current without any discharge of the battery. This charge has not affected the reliability of the converter-charger in anyway. We believe the reliability of our unit is unprecendented in the industry. This statement is based on the number of field returns in the past five years.

10. It is important to note that some R.V. owners use generators to run the converter/charger to charge up their batteries. The Triad-Utrad Converter/Charger must have as close to 60 cycles as possible to work correctly. Most generators will change in frequency with different RPM settings so it is important that the RPMs that will give you 60 to 63 cycles be used. Voltage being not as important as frequency.

If further information is desired, please contact any office of Triad-Utrad.

Triad-Utrad Distributor Services

TYPICAL QUESTIONS AND ANSWERS

Q. Why use a converter?

A. The use of the converter, to the trailer manufacturer, means no more need for dual wiring systems, (no more 115V wiring), no more dual lighting fixtures, or dual voltage motors and pumps. The use of the converter to the recreational vehicle owner means total convenience with or without 115 V available. It also means safer operation of the recreational vehicle.

Q. Why use the converter/charger instead of a converter?

A. The converter/charger will perform the same basic function as the converter, with the extra convenience of recharging the battery when it has become necessary to use the recreational vehicle without 115V available. It also provides for filtered DC operation, meaning longer life for all motor, lights, and other 12 volt appliances. In addition, it is possible to use a lower output current rated supply, with the excess drain by short duration pump motors etc, being supplied by the battery. The converter/charger would then replace this drain automatically as soon as the load is relieved.

Q. What happens if you leave the converter/charger on for long periods of time, unattended?

A. The converter/charger is designed to function as an integral part of the battery system. The output voltage of the unit is designed to fully charge the battery without going high enough to overcharge even if the converter/charger is left on indefinitely. The ideal situation for prolonged life of the battery, would be to leave the converter/charger plugged in even when the recreational vehicle is not is use. Battery failure is most often caused by leaving the battery in a discharged or partially discharged state. Even a completely charged battery will discharge itself if it is not used and kept charged.

Q. What happens when the battery is not used?

A. If, at sometime, it becomes necessary to remove the battery from the recreational vehicle, the system would still function with no noticeable change except the lights would be slightly dimmer. The condition for short circuit and overload protection described in the following paragraphs would be the same with or without the battery.

TYPICAL QUESTIONS AND ANSWERS (continued)

Q. What happens when you leave the converter/charger fully loaded for long periods of time?

A. At full load, the output voltage of the converter/charger will be approximately 12.3 volts. If the system were loaded to full converter rating, the battery would supply part of the current to the load until the battery terminal voltage was the same as the converter voltage. At this time, the battery would simply be floating and acting as a filter to the system. The converter/charger would then be supplying the total current to the recreational vehicle. At this time, the battery would be in a slightly discharged condition and would return to full charge when the load was decreased. In this type of system, the battery would help absorb sudden changes in output voltage due to sudden changes in load current.

Q. What happens when the system is overloaded?

A. The TRIAD-UTRAD converter/charger uses a ferro-resonant transformer. This transformer cannot be damaged by overloads, and is designed to operate, indefinitely, shorted out. For an example, the Model No. TU-740, (40 amp rating) has a current limit of approximately 50 amps and any current in excess of 50 amps would come directly out of the battery. This condition cannot damage the converter/charger and the battery would return to full charge when the excess load is removed.

Q. What happens with variations in input line voltages?

A. One of the major problems in most continuous operation battery charger systems is changes in output voltages due to changes in input voltage. Battery manufacturers say the output voltage of a "floating battery" system should be 2.35 volts per cell, (14.1 volts for a 12 volt battery), in order to bring the battery to a full charge without overcharging. If the output voltage is too far below the value, the battery will not receive a full charge. If the output voltage is above this value, it could cause dangerous gassing and evaporation of the battery water. The output of the TRIAD-UTRAD converter/charger is set in the design of the transformer at 14.1 volts and cannot change by more than .2 volts when operating from 95 volts to 130 volts input. The converter/charger will function with input voltages as low as 60 volts although the output can change as much as .5 volts under this condition.

This feature is also important when the converter/charger is under full load operation. DC motors and fluorescent ballasts will overheat when the voltage drops too low as well as when the voltage goes too high. Under full load condition, the voltage can change by .3V maximum with a 95 volt to 130 volt change in input voltage. For example: If the converter/charger was under full load with an input voltage of 120V and an output voltage of 12.3 volts, and the AC input voltage suddenly dropped to 95 volts, the output voltage would not drop below 12 volts.

Q. Why use the TRIAD-UTRAD converter/charger?

A. We at TRIAD-UTRAD, feel reliability is one of the most important points to give the customer. We feel the customer should not have to calculate the current he is about to use for fear of burning up his power source. With the converter/charger, there are no electronic circuits to burn up, change values with age, or adjust. The converter/charger will provide years of absolute trouble free operation whenever AC power is available.

Q. What is available in converter/chargers?

A. TRIAD-UTRAD has a wide range of converter/chargers to fit most all Recreational Vehicle Trailers and Motor Homes. A list of them appears below:

TU-730	30ADC at 12VDC
TU-740	40ADC at 12VDC
TU-750	50ADC at 12VDC — 50
TU-570	70ADC at 11.5VDC

TU 750-2 (GMC GL) 315.35 less 25%

Thomas Rufner
Converter Engineer

TR/dw
August 25, 1983

GMC MOTOR HOME SERVICE

Dealer Service Information Bulletin

GMC TRUCK & COACH DIVISION GENERAL MOTORS CORPORATION

GMT 1402

NUMBER: 75-IM-1

GROUP: 24-Misc.-1

DATE: December, 1974

IMPORTANT—All Service Personnel Should Read and Initial

SUBJECT: Triad-Utrad Converters

MODELS: All Motor Homes

Several dealers and customers have commented on the ability of the Triad-Utrad converter to charge the motor home batteries. Through this feedback it has been found that there are several misconceptions about the correct functioning of the system. This bulletin is intended to clear up these misconceptions.

First of all the Triad-Utrad converter is not, strictly speaking, a battery charger. Depending on temperature, a battery requires at least 14 volts to charge at an appreciable rate. While the converter will put out slightly over 14 volts at no load, this voltage begins dropping as soon as a load is applied until it reaches 12 volts when 45 amperes are being drawn (this is full rated load condition). This means that if there is no other load on the converter it will charge the battery slowly, this charge rate falls off however, as other loads are added, and eventually the voltage goes low enough that it will not charge the battery at all.

Secondly on 1973 and 1974 models the converter will not put any charge whatsoever in the motor generator battery or the vehicle battery. The converter is connected into the living area electrical system only and will charge only the living area battery. The exceptions to this rule are as follows:

1. If the third wire modification has been made to parallel the motor generator battery to the living area system, the M/G battery will charge along with the living area battery. If this modification has not been made, the M/G battery is charged only by the small DC alternator built into the motor generator.

2. If the battery boost switch is put in the boost position and there is enough power available in the vehicle battery to energize the boost magnetic switch, the vehicle battery will be charged by the converter. Otherwise the vehicle battery is only charged by the 80 amp. alternator mounted on the engine.

In some cases the performance of the Triad-Utrad converter can be improved by attaching the converter's ground wire directly to the hat section channel that runs along the belt line of the vehicle.

GMC MOTOR HOME SERVICE

Dealer Service Information Bulletin

GMC TRUCK & COACH DIVISION GENERAL MOTORS CORPORATION

#T 1492

IMPORTANT—All Service Personnel Should Read and Initial

NUMBER: 76-IM-2
GROUP: 24-Misc.-2
DATE: November, 1975

SUBJECT: Testing Triad-Utrad Converters

MODELS: All Motor Homes

Many Triad-Utrad converters returned to us for warranty credit, when tested, have proven to be in good operating condition. Before a converter is replaced, it should be tested in the following manner:

1. Check the motor generator frequency setting. It should be 63 cycles at 120 volts no load. The converter is sensitive to frequency and will not function properly below 60 cycles. If you plan to bench test the unit, make sure the wall socket is producing 60 cycles. This can also be checked with your frequency meter.

2. Disconnect the converter leads from the motor home. This assures that only the converter is being checked.

3. Connect the leads to a good, fully charged, battery and plug in the converter (Figure 1).

4. Using a good calibrated voltmeter, read output voltage across the battery. It should be between 13 to 15 volts.

Converter humming is not considered to be a failure. Humming should be corrected by installing mounting pads as described in Dealer Service Technical Bulletin 75-TM-14 dated March, 1975.

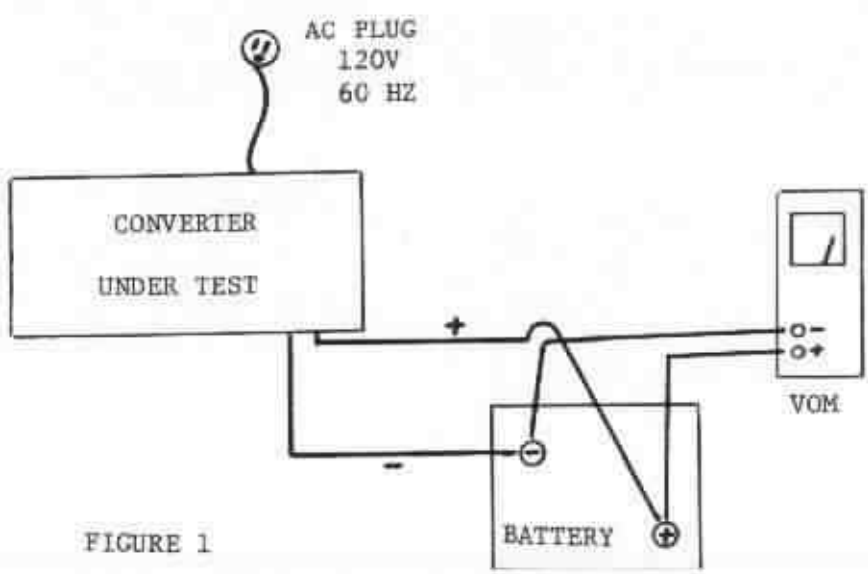


FIGURE 1

GMC MOTOR HOME SERVICE

Dealer Service Technical Bulletin

GMC TRUCK & COACH DIVISION GENERAL MOTORS CORPORATION

GMT 1401

NUMBER: 75-TM-14
GROUP: 24-MISC.-
DATE: March, 197

IMPORTANT—All Service Personnel Should Read and Initial

SUBJECT: Triad-Utrad Voltage Converter Hum

MODELS: All 1973 and 1974 Motor Homes

Many owners have complained of an annoying buzzing sound being made by the Triad-Utrad converter. This noise can be greatly reduced by mounting the converter on special rubber mounts to isolate it from the vehicle.

PARTS INFORMATION

The following parts are necessary to make this modification:

Qty/Vehicle	Part Number	Description
2	792176	Mount
2	792175	Mount
1	790181	Spacer
1	790182	Spacer

The following parts should be procured locally:

Qty/Vehicle	Part Number	Description
2	NPN	3/8-16 x 1-1/4 Bolt
2	NPN	1/4-20 x 1-1/2 Bolt
16	NPN	No. 10-16 x 3/8 Wood Screw

INSTALLATION INSTRUCTIONS

1. Disconnect and remove the voltage converter.
2. Temporarily attach two mounts, part #792176, to spacer, part #790182, using two 3/8-16 x 1-1/4" bolts.
3. In similar manner, attach two mounts, part #792175, to spacer, part #790181, using two 1/4-20 x 1-1/2" bolts.

4. In the same position as the voltage converter was originally mounted, locate the two mount and spacer assemblies with the large mounts toward the back of the compartment and the small mounts in front. Space the mounts 12" apart center to center and be sure the two assemblies are square to each other.

5. Mark the location of the mount attaching holes. Using an 1/8" drill bit, drill the holes for the screws in the compartment floor.

6. Remove the mounts from the spacers and attach them to the floor of the compartment using 10-16 x 3/8" wood screws.

7. Attach the converter to the mounts and spacers with the transformer end (heavy end) over the large mounts. (NOTE: It is necessary to drill out the holes in the converter for the 3/8" bolts.) Reconnect the converter to the electrical system.

WARRANTY INFORMATION

When the repairs are within the published warranty use:

Labor Operation	Time Allowance	Trouble Code
T025103	.6 Hr.	92