POWER KING
MODEL V
MANUAL

OPERATION BY CERTIFIED OPERATORS ONLY

DO NOT OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING THE OPERATING AND INSTALLATION PROCEDURES OUTLINED IN THE MANUAL FOR THE POWER KING RECTIFIER MODEL V

A M G Smyrna TN

POWER KING WARRANTY

AMG & ASSOCIATES guarantees the Power King to be free from defective material and workmanship for three (3) years from delivery to customer, with the exception of paint, wheels and Power cords.

The warranty does not apply to deficiencies caused by improper use, handling, operation or maintenance. Modifications are considered improper use. Warranty does not apply to any damage due to operation in which AMG & ASSOCIATES instructions are not followed.

AMG & ASSOCIATES must be notified prior to return of any item.

Defective equipment, under warranty, should be sent to AMG & ASSOCIATES. All freight charges are the responsibility of the customer.

DESCRIPTION:

The AMG & Associates series of ground power units are intended to provide nominal 28 volts DC to power aircraft systems during maintenance and standby conditions. And, to relieve the aircraft battery from the stresses involved in providing high current during engine starting.

SPECIFICATIONS:

SIZE:	Standard container - 22W x 27L x 20H Over handle, wheels, etc. - 30W x 36L x 36H
WEIGHT:	Approximately 500 pounds
STANDARD AC INPUT CABLE:	50 ft. long, 8/4 s/o ga., 4 conductor (one netural) with neopreme covering
STANDARD DC:	20 ft. long, 2/0 ga., with neopreme covering
DC OUTPUT CONNECTOR:	Standard 3 pin aircraft plug for 28V output per MS-25488

MODEL V - POWER KING:

INPUT VOLTAGE:	208 to 600 volts, 50 or 60 HZ
AC INPUT SERVICE REQUIRED:	From 80 amps minimum at 208V to 50 amps minimum at 600, 3 phase3
OUTPUT VOLTAGE:	28 volts DC nominal, adjustable in 7 steps
OUTPUT CURRENT:	60 HZ 2000 amps for 15 seconds 1000 amps continuous 50 HZ 1500 amps for 15 seconds 600 amps continuous
RIPPLE VOLTAGE:	0.08 volts peak to peak at 400 amps output current, 60 HZ input

SOFT START

This is a limiter that can be either added into the power cart during manufacturing or at a later date. It limits the output current of the unit and will allow the voltage to automatically decrease as more current is drawn from the unit. Its purpose is to "soften" the inrush of current when the starter of a turbine engine is first engaged to protect the starter form being over torqued and the solenoid contacts from arcing. Starting current will be limited to approximately 1000 amps when using the " soft start".

On aircraft such as the Cessna Ciation, the soft start is a must for the unit to remain connected to the aircraft. On inrush, the soft start drops the voltage as needed to limit the current to around 1000 amps in order to stay connected. As the ingine spools up, the voltage will return to 28 volts. On some aircraft, the battery must be turned on in order to be able to inject external power into the start system. In this type of arrangement the aircraft batteries and power cart are in parallel. On a start, the engine draws power from both the batteries and the power cart. If the soft start is switched on the batteries will furnish about 80% of the power and the power cart about 20%. With the soft start switched in "normal" position, or out of the circuit, the reverse is true, 80% will come from the power cart and 20% from the aircraft batteries as it should. On aircraft where the start can be supplied from external, the power cart will supply 100% of the power

REVERSE CURRENT DIODES

If the power cart is turned off while the unit is plugged into an aircraft, turning on the batteries of the aircraft will cause them to discharge into the output load resistor of the power cart. The reverse current diodes are designed to prevent this from occuring.

SERVICE OUTLET TRANSFORMER - OPTION on 440 or 460

When the power cart is used on 440 or 460 volts AC lines, the service outlet transformer will reduce the line voltage to 115 volts and provide up to 5 amps for service equipment and drop lights.

14/28V OUTPUT RETRO-FIT- 0PTION

This converts existing power cart to 14 or 28V output. (600 amp peak output on 14V range, limited to units operating from 208 to 240V input.)

WEATHERPROOF - OPTION

This option gives protection for front panel controls and meters from moisture when storing outside or being used in rainy weather.

INSTALLATION

Phase rotation is not important. It maybe connected in any manner as long as green is to ground.

Installation of AC power plug is to be installed by a certified electrician or qualified personnel. If not grounded properly, it may cause an electrical shock to the operator.

AMG & ASSOCIATES IS NOT RESPONSIBLE FOR INJURIES THAT OCCUR FROM THE AC POWER PLUG NOT BEING GROUNDED PROPERLY.

Frayed, cut or worn cables, if not replaced, may cause a shock hazard.

INSTALLATION (continued)

Upon installating new AC or DC cables, all grounds must be in stalled by a certified electrician or qualified personnel. Electrical shock hazard is possible.

All electrical cables must be inspected before each operation. Particular attention should be directed where cables exit cabinet.

DANGER

ELECTRICAL HAZARD

AUTHORIZED

PERSONNEL ONLY

INSTALLATION (continued)

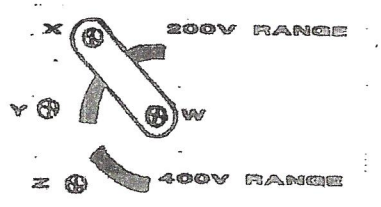
Wall receptical installation must be installed or checked by a certified electrician or by qualified personnel before operating the Power King, Model V. If not grounded properly at wall, the receptical may cause servere shock.

Measure the voltage between two of the phases at the walloutlet where thepower cart is ot be plugged in and set the input voltage selector straps according to the figure on this page. Also, measure between each phase and the neutral to make sure there is a good ground on the neutral line. At least two of the phases should measure between 110 and 120 volts to neutral or case ground for 208 or 245 volts service.

After making proper strap adjustments, plug the power cart into the wall outlet and without plugging into an aircraft, turn the unit on and note the output voltage onthe meter on the unit. Changing the setting of the voltage-selector switch should cause the output to go above and below 28 volts. With an AC volt meter, measure the voltage at the service outlet. If it is above 135 volts, change the service outlet strap located under the removable cover on the front of the unit.

SAFETY PRECAUTION:

Unplug unit at wall receptacle before attempting re-strapping process.



SERVICE OUTLET VOLTAGE SELECTOR

SERVICE OUTLET VOLTAGE SELECTOR

If the power cart is strapped for input line voltage in the 208 to 245 volt range, connecting W to X will normally give the correct service outlet voltage. If not, change the connection so that W and Y are together and re-measeure the voltage. Select the connection which is closest to 115 volts. Check unit at other AC outlets in hangar to be sure each outlet is wired the same. When the power cart is used on line voltage in the 380-480 volt range connect W to Z. If the optional service outlet transformer is not installed the service outlet will be disabled, preventing damage to equipment designed for 115V operation. All versions of the power cart have a terminal strap located on the inside of the unit, near the power switch, to allow selection of service outlet voltages.

OPERATION NOTES

An internal jumper is installed inside the power cart to provide an aircraft ground to the AC power neutral cable and power cart case. The jumper is tagged "ground wire" and can be found by removing case cover and looking near negative cable wire going to case. If this strap is not desired, removal of wire will not effect power cart operation. It is placed there for your safety.

It is not recommended that the aircraft batteries be charged from the power cart unless care is taken not to allow too much current to flow and heat the battery. Charging should be done on the service bench where charge rate and gassing can be controlled.

Do not adjust power cart voltage above 28 to 29 volts. Some aircraft have over-volt sensors that will disconnect the external power at 29.5 volts. A short inrush of 40 to 50 amps for 5 to 10 minutes at 28 to 29 volts into the aircraft when first connected would be a normal condition and should not cause battery problems. This should decrease to zero after a short time. If not, check batteries and see if they are warming too much. If so, disconnect them and get them serviced. Of course, any aircraft electronic loads will indicate on the ammeter and be normal indication.

TROUBLE SHOOTING:

SYMPTOM: UNIT TRIPS POWER SWITCH

1. Visually inspect the power cart for bare wires touching metal and for damage to connectors of cables. Inside the unit check for burnt wiring or damage to components.

NOTE: STEPS 2 & 3 FOR POWER KING MODEL V, ONLY

2. Take off the removable plate on the front of the power cart. Remove the input voltage straps and with the power switch on, measure the voltage between lug pairs A-E, A-C and C-E. The voltage should be equal to what is measured at the wall outlet. If not, measure the voltage at the wires at the top of the power switch. If the voltage is equal to the wall voltage, the power switch or the wiring to the lugs is bad. Test the power switch by measuring from input to output. There should be less than 2 volts drop from input to output.

3. Reconnect the voltage straps for the voltage measured in step 2.

4. Disconnect the large wires on the output of the transformer which go to the rectifier diodes. There will be 6 wires for the model V and 4 wires for the model VI. Position the wires so they do not touch anything.

5. Using on ohmmeter, touch one lead to the large lead of one of the rectifier diodes where the transformer wires were connected. Touch the other lead to the hex part to the base of the diode and note the meter reading. Now reverse the position, the meter should measure greater than 100,000 ohms and in the other position a much lower reading (usually less than 50 ohms) should be noted. If not, the diode is bad and must be replaced. Do this test on each diode. If the reading is near the same in both directions, the diode is shorted and must be replaced. Note that the polarity of the diodes on the + plate is reversed from those on the - plate.

TROUBLE SHOOTING - UNIT TRIPS POWER SWITCH (continued)

6. Set the voltage selector switch on the front of the power cart to the center position and turn on the power switch. If the power switch does not trip, rotate the voltage selector through all positions and if the power switch still does not trip, skip to step 8.

7. If the power switch trips, remove the wires which go to the transformer from each of the sections of the voltage selector switch. Measure the voltage between each terminal of the selector switch where a wire was removed and the input wire to one of the other switch sections. Each position of the voltage selector switch should put voltage on only one terminal of the switch section. Measure all switch sections this way. If more than one terminal shows voltage, replace the selector switch. If the switch is okay, replace the transformer.

8. If there were six wires disconnected in step 4, identify which three are connected to the upper part of the side of the transformer and which are on the lower part. Measure the voltage between each wire of a group and the other wires in the same group, both upper and lower groups. If there are only three wires, make the measurements on them. There should be 21 to 23 volts between any two wires of a group when the voltage selector switch is in the center position. Be sure to measure all combinations of wires and if any voltages are not correct, turn power off, disconnect from wall plug and replace the transformer.

SMYPTON: INCORRECT OUTPUT VOLTAGE

1. Determine the power cart input voltage by measuring between lug pairs A-E, A-C and C-E, located under the removable plate on the front of the unit. Make sure the voltage straps are set for the measured voltage.

TROUBLE SHOOTING - INCORRECT OUTPUT VOLTAGE(continued)

2. Visually inspect the one (1) ohm load resistor located under the bracket running across the top of the power cart. Check for loose connections or broken wires. Also, inspect the large cylindrical filter capacitors mounted on the bottom of the unit and check all other connections for tightness and good electrical contact.

3. There are six large wires going to the rectifier diodes from the side of the transformer which faces away from the controls of the power cart. Disconnect the wires and position them so they do not touch anything. Identify which three are connected to the uper part of the side and which are on the lower part. Measure the voltage between each wire of a group and the other wires in the group for both upper an dlower groups. There should be about 22 volts AC between any two wires of a group and all measurements should be within 0.5 volts of each other. Be sure to measure all wires.

4. While measuring the voltages between wires, rotate the voltage selector switch and check that the voltage goes up and down in equal steps and follows the switch in the proper manner. When the switch is rotated clockwise the voltage should go up.

5. Turn off the unit and disconnect it from the wall. Using an ohmmeter, touch one lead to the large wire coming from one of the rectifier diodes where the transformer wire was connected. Touch the other lead to the hex part of the base of the diode and note the meter reading. Now, reverse the position of the ohmmeter leads and again note the meter reading. With the leads in one position, the meter should measure greater than 100,000 ohms and in the other position a much lower reading should be noted. If not, the diode is bad and must be replaced. Do this test on each diode.

6. Disconnect reverse current diodes and do the tests described in step 5, on each individual diode.

POWER KING

PARTS LIST

PART NUMBER	PART	QUANTITY
SAAC96	AC CABLE	50 FT.
SAPG84	AC PLUG	PER CUST.
SABR51	BALANCE RESISTOR	1
SACT48	FILTER CAPACITOR	2
SACR60	DC CAPACITOR	12
SAB13	CASE / BACK	1
SAC11	CASE / COVER	1
SAFR10	CASE / FRAME	1
SAFT12	CASE / FRONT	1
SAH16	CASE / HANDLE	1
SAP14	CASE / PLATE	1
SAWFCR17	FRONT CABLE RACK	1
SACA25	CASTERS	2
SACB85	CIRCUIT BREAKER - 90 AMP	1
SACBR90	CIRCUIT BREAKER - 15 AMP	1
SACSS67	COPPER STRAPS	SET
SADC95	DC CABLE	20 FT.
SADC96	DC CABLE	50 FT.
SAD62	DIODES + (POSITIVE)	6
SAD63	DIODES - (NEGATIVE)	6
SARD52	REVERSE DIODE	3
SAFM54	FAN MOTOR	1
SAFB53	FAN BLADE	1

POWER KING PARTS LIST (continued)

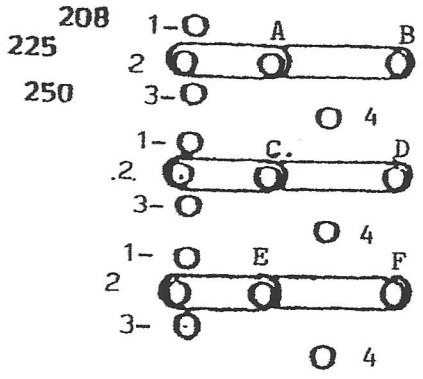
PART NUMBER	PART	QUANTITY
SALPC100	LABEL - POWER CART	3
SAL47	LIGHT (GREEN)	1
SAMA31	METER (AMP)	1
SAMD30	METER (DC)	1
SAST46	METER SHUNT	1
SASSR57	SOFT START RESISTOR	1
SASSS81	SOFT START SWITCH	1
SAS22	SPACERS & CABLES	2
SATSW55	TAP SWITCH	1
SATSK89	TAP SWITCH KNOB	1
	(DIAL PLATE FOR ABOVE)	1
SAT45	TRANSFORMER	1
SAC	CHOKE COIL	1
SAW23	WHEELS	2
SAWRR21	WHEEL RETAINING RINGS	2
SADUAL	DC PLUG ASSEMBLY	1
SAAC8/4	EXTRA LENGTH AC CABLE - 8/4	
SAAC6/4	EXTRA LENGTH AC CABLE - 6/4	
SADC0/0	EXTRA LENGTH DC CABLE - 0/0	
SAVDC	14/28 VDC MODE CONTROL	
SASHCR	SHIPPING CRATE	

POWER KING PARTS LIST (continued)

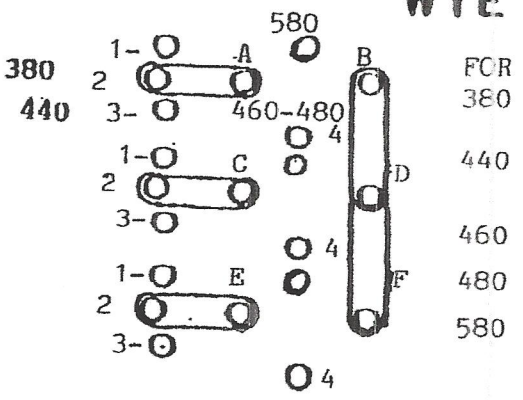
PART NUMBER	PART	QUANITY
SALPC100	LABEL-POWER CART	3
SAL47	LIGHT (GREEN)	1
SAMA31	METER (AMP)	1
SAMD30	METER (DC)	1
SAST46	METER SHUNT	1
SASSR57	SOFT START RESISTOR	1
SASSS81	SOFT START SWITCH	1
SAS22	SPACERS & CABLES	2
SATSW55	TAP SWITCH	1
SATSK89	TAP SWITCH KNOB	1
SAT45	TRANSFORMER	1
SAC	CHOKE COIL	1
SAW23	WHEELS	2
SAWRR21	WHEELS RETAINING RINGS	2
SADUAL	DC PLUG ASSEMBLY	1
SAAC8/4	EXTRA LENGTH AC CABLE-8/4	
SAAC6/4	EXTRA LENGTH AC CABLE-6/4	
SADC0/0	EXTRA LENGTH DC CABLE-0/0	
SAVDC	14/28 VDC MODE CONTROL	
SASHCR	SHIPPING CRATE	1

SELECTOR SWITCH POSITION	DELTA STRAPPING TAP				WYE STRAPPING TAP			
	1	2	3	4	2	3	4	4
	208	230	240	250	380	440	460	480
1	25.8	27.0	25.5	24.3	26.0	27.7	25.0	26.2
2	26.8	28.0	26.5	25.0	27.0	28.6	25.8	26.9
3	27.8	29.0	27.4	25.7	28.0	29.6	26.5	27.8
4	29.0	30.0	28.3	26.6	29.0	30.7	27.3	28.6
5	30.0	31.0	29.4	27.4	30.0	31.8	28.2	29.5
6	32.0	32.2	30.4	28.4	31.5	33.0	29.1	30.5
7	33.0	33.8	31.7	29.3	33.0	34.4	30.1	31.5

DELTA



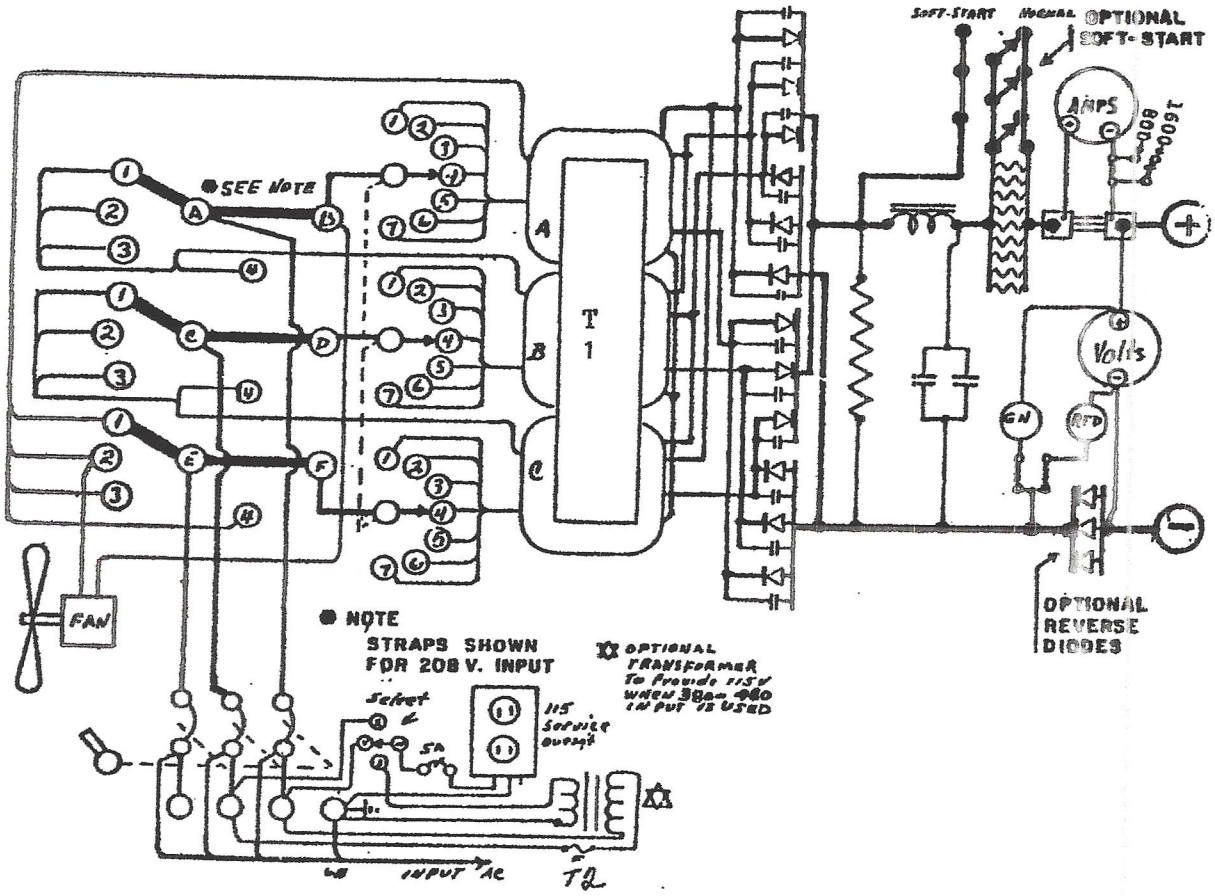
WYE



INPUT STRAPPING

CAUTION

115 VOLT – INOPERABLE ON 440 VOLT



POWER KING
MODEL V