TM 5-5043

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FLOODLIGHT UNIT

PORTABLE
GASOLINE-DRIVEN
TRAILER-MOUNTED
2-WHEEL
PNEUMATIC TIRES, 5 KW

WINPOWER NITE HAWK
MODEL NH5-W

DEPARTMENT OF THE ARMY • MAY 1953

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *22 May 1953*

TM 5–5043 is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF THE ARMY:

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Chief of Staff, United States Army

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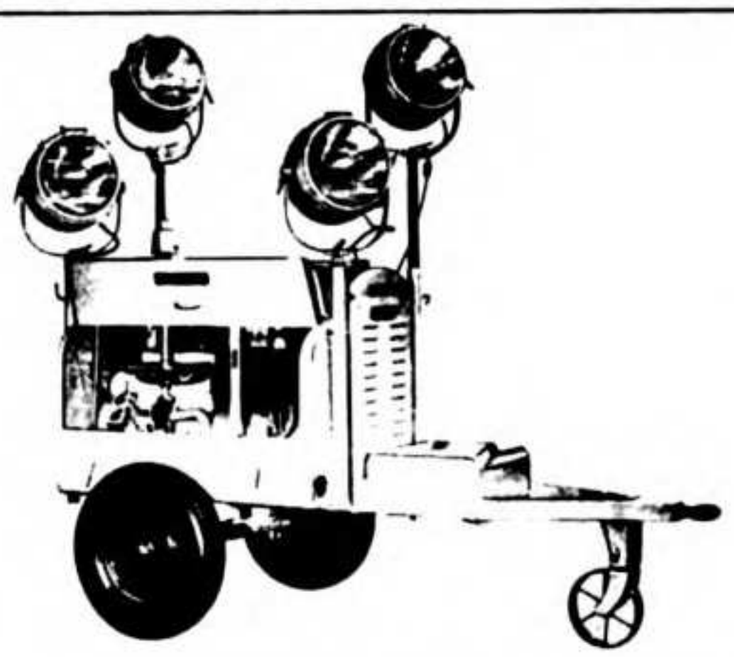
SPECIFICATION SHEET

WIND POWER FLOODLIGHT AND SEARCHLIGHT PLANTS



MODEL NH-5-WI FLOODLIGHT PLANT

FOUR CROUSE HINDS, 80,000 CANDLEPOWER FLOODLIGHTS ARE MOUNTED ON STEEL STANDARDS THAT MAY BE RAISED TO 8-1/2 FEET AND SWUNG A FULL 360° HORIZONTALLY WITH A WIDE VERTICAL ARC. EACH FLOODLIGHT IS FUSED AND IS CONTROLLED BY A SEPARATE TOGGLE SWITCH. TWO PLUG-IN DUPLEX RECEPTACLES ON PANEL MAKES POSSIBLE THE USE OF ELECTRIC POWER TOOLS OR AUXILIARY LIGHTS. GENERATOR 5000 WATT, 115 VOLT, 60 CYCLE, 1800 R.P.M., SINGLE PHASE, A.C. NET WEIGHT 1775 POUNDS. LENGTH 9'4", WIDTH 5'0", HEIGHT 7'1".

MODEL 24S-NH5-WI SEARCHLIGHT PLANT

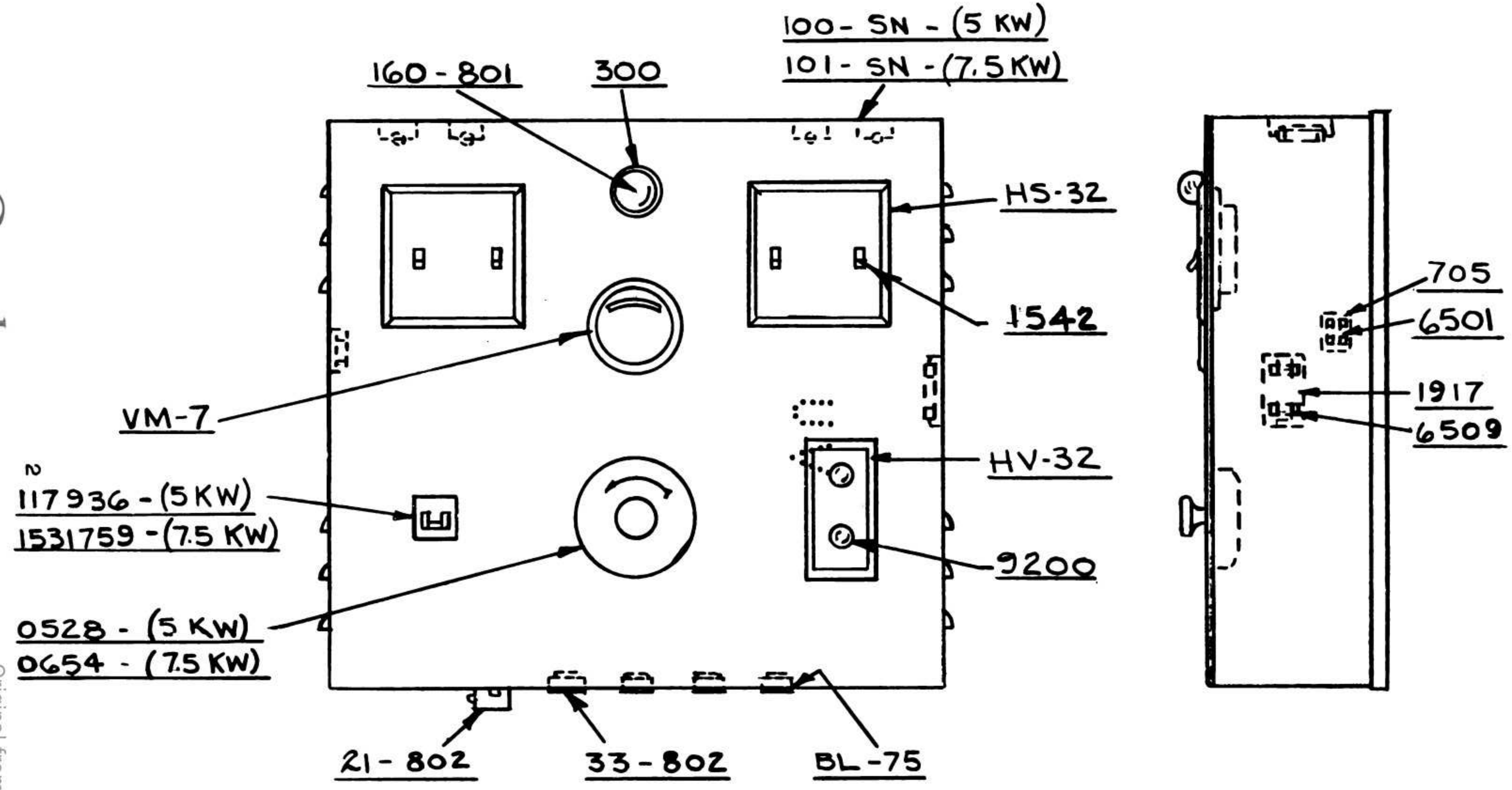
ONE CROUSE HINDS 7.000,000 CANDLEPOWER SEARCHLIGHT AND TWO 80,000 CANDLEPOWER FLOODLIGHTS MOUNTED ON STEEL STANDARDS THAT CAN BE RAISED TO 8-1/2 FEET AND SWUNG 360° HORIZONTALLY WITH A WIDE VERTICAL ARC. EFFECTIVE SEARCHLIGHT LIGHTING RANGE ONE MILE. PLUG IN DUPLEX RECEPTACLES ON PANEL MAKES POSSIBLE THE USE OF ELECTRIC POWER TOOLS OR AUXILIARY LIGHTS. GENERATOR 5000 WATT, 115 VOLT, 60 CY., 1800 R.P.M., SINGLE PHASE A.C. NET WEIGHT 1975 POUNDS. LENGTH 9'4", WIDTH 5'0", HEIGHT 8'7".

MODEL NH6-WI AEROSTARTER PLANT

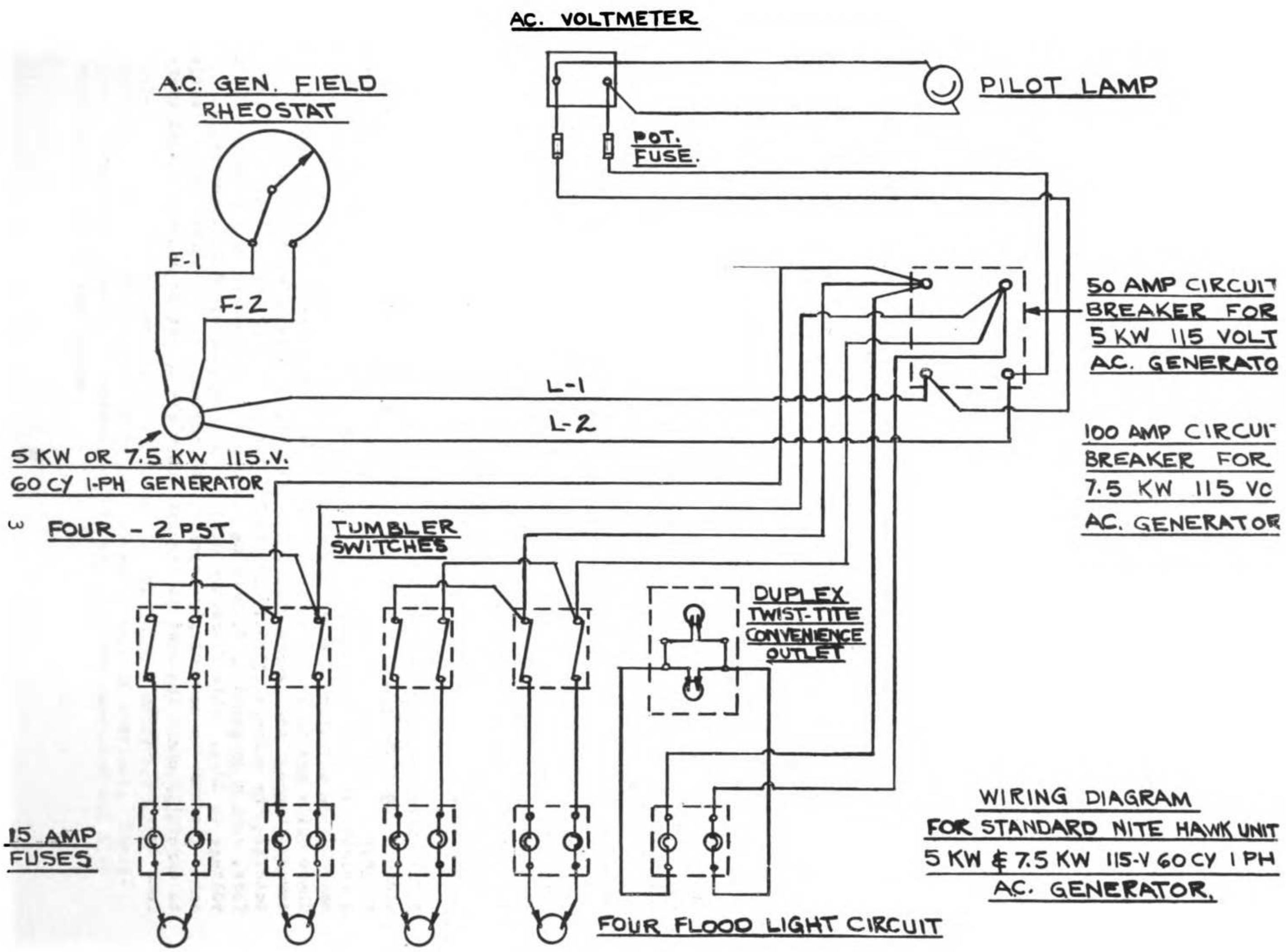
A SELF REGULATING, MARINE TYPE, 500 AMPERE 12/24 VOLT, 1800 D.C. BALL BEARING GENERATOR DESIGNED TO HANDLE STARTING LOADS OF AIRCRAFT ENGINES USING 12 OR 24 VOLT STARTING SYSTEMS. TWO CROUSE HINDS 20,000 CANDLEPOWER FLOODLIGHTS MOUNTED ON STEEL STANDARDS FOR FULL HORIZONTAL OR VERTICAL MOVEMENT. REVERSE CURRENT RELAYS PROTECTS EQUIPMENT FROM POLARITY REVERSAL. RHEOSTAT ON CONTROL PANEL TO REGULATE VOLTAGE. NET WEIGHT 1690 POUNDS. LENGTH 9' 4", WIDTH 5'0", HEIGHT 7'1".

GENERAL SPECIFICATIONS ALL MODELS:

ENGINE: WISCONSIN MODEL VF4. AIR COOLED, 4 CYLINDER 22 H.P., 1800 R.P.M.
STARTING: ELECTRIC STARTING COMPLETE WITH STANDARD STARTER, GENERATOR AND BATTERY.
CONTROL PANEL: LARGE ELECTRICALLY LIGHTED STEEL PANEL COMPLETE WITH RHEOSTAT, VOLTMETER; AMMETER, CIRCUIT BREAKER, TWIST TIGHT DUPLEX RECEPTACLES, WITH SEPARATE SWITCH FOR EACH LIGHT.
MOUNTING: HEAVY STRUCTURAL STEEL FRAME ATTACHED TO HEAVY MULTIPLE LEAF SPRINGS. ALLOY STEEL AXLE WITH TAPER ROLLER BEARINGS AND STANDARD 6.00x16 AUTOMOBILE WHEELS AND TIRES. RETRACTABLE PNEUMATIC CASTER WHEEL PROVIDES SUPPORT FOR TOWING AND WHEN PARKED.
HOUSING: WATERPROOF, HEAVY STEEL HOUSING WITH FOLDING DOORS. PAINTED "HIGHWAY YELLOW". 2 SIDE MOUNTED LOCKABLE TOOL BOXES.



STANDARD NITE HAWK PANEL ASSY.
FOR 5 KW & 7.5 KW 115-V. 60 CY. 1-PH. GEN.



WIRING DIAGRAM
FOR STANDARD NITE HAWK UNIT
5 KW & 7.5 KW 115-V 60 CY 1 PH
AC. GENERATOR.

GENERATOR AND ELECTRICAL INFORMATION

An electrical generator is a machine so constructed that when its rotor is revolved a voltage is built up, which causes current to flow. Generators are divided into two classes: Direct current, in which the current always flows in the same direction, and Alternating Current, in which the current reverses its direction 60 times a second in a 60 cycle generator or 50 times a second in a 50 cycle generator, etc.

Voltage is the force or pressure which causes a flow of current through the conductor. Voltage can be compared to pressure in a pipe of water system.

Amperage is a measure of the rate of current flow through the conductor. It can be compared to the number of gallons per minute in a water system.

An ohm is a measure of the resistance in a conductor to the flow of current. If one volt can cause one ampere to flow through a conductor the resistance of the conductor is one ohm. This can be compared to the manner in which the resistance of a water pipe limits the flow of water at a given pressure.

DIRECT CURRENT GENERATORS

In a direct current generator the current always flows in the same direction. This is accomplished by means of the commutator and brushes which act to keep the current flowing in a constant direction. The commutator and brushes act as a group of double throw switches, reversing a coil's connection to the line just as it is starting to pass under a field pole of opposite polarity.

The commutator and brushes of a D.C. machine carry all of the current generated within the machine. These are subject, therefore, to all overloads. If overload continues to exist, the generator may become damaged. The commutator becomes hot and when arcing develops, which, in turn, continues to ruin the commutator. Therefore, never subject a D.C. generator to overload as it shortens the life of the unit.

D.C. Generators are also divided into two types, namely, shunt and compound wound. The shunt wound type has only the shunt field coils. Therefore, the voltage of this type of machine will drop as load is increased. The shund wound generator is used most often for battery charging plants. The compound wound machine, in addition to shunt field coils, also has the series field coils. These coils are in series with the load. As the load increases, so does the current through the series coils, automatically supplying excitation and either boosting the voltage slightly or maintaining it more or less constant. Therefore, with a compound D. C. machine you can overload excessively without causing voltage to drop. This characteristic of the compound wound D.C. generator makes iteasier to unknowingly overload the engine. It is, therefore, advisable to carefully check the load at regular intervals to gather assurance that overload does not exist.

GENERATOR TROUBLES - D.C.

The most common source of D.C. generator trouble is overloading. Overloading, in turn, causes commutator and brush troubles which can be very bothersome and costly. Overloading a machine beyond its rated capacity results in sparking or arcing brushes, accompained possibly by heating and discoloration of the commutator due to the excessive current which they are carrying. This sparking is of such a nature as to damage both the brushes and commutator whose surface will be burned and discolored due to overheating, especially if the overload is allowed to continue. A healthy commutator will acquire a good polish and chocolate brown color. Black deposits on the commutator often indicate bad commutation.

Another source of commutator trouble is oil and grease. If oil or grease gets on the commutator, the mica insulation of the commutator will become oil soaked, resulting eventually in ruined commutator. Ring fire is a visible symptom of this condition; there fore, never lubricate the commutator, and also see to it that over-greasing of the bearings does not cause the lubricant to reach the commutator.

Arcing brushes may also be caused by improper adjustment of the brush ring, thus placing all the brushes in wrong position with respect to the field poles. Brush rings are adjustable. It is, of course, first necessary to loosen the set screw. Then adjust the brush ring to a position where least sparking exists. In the case of some D.C. generators, individual adjustment of each brush may reduce arcing. Brushes should be equally spaced around the commutator. This spacing should not vary more than 1/32 inch.

Brush troubles which continually persist due to atmospheric conditions can usually be solved by some local electrical expert. However, should the services of such an expert not be available, it is possible that the dealer, through suggestions received from the factory, can correct the trouble.

Consistent overload, which overheats the insulation, exposure to oily or moist atmosphere, and a number of other causes will eventually ruin the insulation of the machine's windings. This will cause short circuits and grounds to appear. These conditions must be eliminated as faults of this type in an electrical machine are accumulative.

When the commutator of a generator shows bad condition from wear and improper operation, it should immediately be repaired. It never pays to wait. By having the commutator machined and brushes replaced at the first signs of improper condition, considerable service costs can be avoided.

Sanding the commutator with a fine grade of sandpaper (never use emery cloth) will often stop sparking and ring fire, if the damage is not already too great. Sometimes a dirty commutator is the primary source of sparking, and the removal of the blackening by sandpaper will cure the trouble. Therefore, inspect the generator about once or twice a week and considerable trouble and expense will be avoided.

An exceptional hot commutator will throw solder, and therefore connection between commutator bar and coil is broken. Should such a condition ever develop within the machine, it could be a direct result of overload. Therefore, never overload a D. C. generator. It may ruin the generator and also shorten the life of the engine.

ALTERNATING CURRENT GENERATORS

A.C. generators, commonly called alternators, are built to generate a voltage which periodically varies from a given positive to the same negative value. This in turn will cause the current to reverse its direction at the same frequency as the voltage change. The number of these alternations or cycles depends upon the speed of the machine and the number of poles. A sixty cycle alternator, having a speed of the 1800 R.P.M., is a 4-pole machine, while an alternator of the same frequency operating at 1200 R.P.M. is a 6-pole machine.

A self-excited generator has the D.C. exciter winding on the same armature with the A.C. winding. The D.C. and A.C. windings are, of course, fully insulated from each other. The D.C. current generated in the exciter windings supplies the current for the field poles. This current in the field poles builds up a magnetic flux, which causes voltage to be generated by the A.C. winding. The amount of current flowing through the field may be controlled by a rheostat. More or less current in the field circuit causes the A.C. voltage to rise or drop. Variation in either the field resistance (rheostat) or speed of the machine will cause a voltage drop. Reactance in the load circuit causes a lagging current. This current must come from the generator but this lagging current tends to oppose the magnetic field thus reducing the output voltage of the generator.

Lagging current is a subject that is rather difficult to conceive by the average user of small power plants. It is, however, something that must be considered. It should be remembered that lagging current is due entirely to electrical equipment of the induction type, such as induction motors, transformers, neon sign transformers, radio equipment, etc.

The most common sign of a lagging current is a condition where the engine does not seem to be overloaded (engine does not smoke or slow down, injection pump control rod is not in wide open position), but the ammeter shows a high current reading and the voltmeter shows less than rated voltage.

Another point to be considered is that of starting an electric motor. The reactance of an electric motor is bad while starting and if the motor is of old construction, it may stall, due to the voltage drop caused by excessive starting current of the motor.

The user should carefully read the above paragraphs and should he have any reason to believe that the capacity of his plant is being reduced by the reactance of his motors, should immediately communicate with the dealer. Correcting capacitors are available at reasonable cost and this installation will in many cases prove to be an ideal solution. Prices on capacitors may be obtained through your dealer or from the factory.

A capacitor affects an alternating current circuit in just the opposite manner that reactance does. A capacitor tends to make the current "lead" the voltage rather than make it "lag". Therefore, if enough capacitors are installed they will neutralize the bad effects of lagging current. Remember, it is the reactance of the load (not the alternator, which has its own exciter) that is being corrected. Old and underloaded motors and transformers are the main cause of reactance.

GENERATOR TROUBLES - A.C.

Most A.C. generator troubles are confined to the exciter, which, as stated previously, is a direct current generator with commutator and brushes. Brush and commutator troubles are caused by any number of conditions, such as dusty and sandy air, oily or moist atmosphere, grease getting on commutator, improper brush spring tension, brushes of improper composition, excessive vibration of the machine, running the machine too fast, etc.

Brush troubles which continually persist due to atmospheric conditions can usually be solved by some local electrical expert. However, should the services of such an expert not be available, it is possible that the dealer, through suggestions received from the factory, can correct the trouble.

Consistent overload, which overheats the insulation, exposure to oily or moist atmosphere, and a number of other causes, will eventually ruin the insulation of the machine's windings. This will cause short circuits and grounds to appear. These conditions must be eliminated as faults of this type an electrical machine are accumulative.

GENERATOR SERVICE

The most common cause of a generator failing to produce current is an external short somewhere on the main line. If it is suspected that this is the cause of failure, the main line circuit should be disconnected by throwing the main line switch, and a test lamp placed across the output of the generator. If the plant fails to generate with the A.C. main line disconnected from the plant, then the trouble lies in the generator. With the trouble traced to the generator, the following tests will indicate whether or not the difficulty is due to a short or a grounded field or armature.

COMMUTATOR: Mica is used for insulation between the commutator bars. After the armature is machined, the mica is cut away from 1/32" below the surface of the bars. The surface of the bars will wear down to the level of the mica eventually. Mica is harder than copper and it forms ridges which cause the brushes to jump and make poor contact. High mica should be under-cut carefully, and the commutator turned and cleaned. Loose brush wires can cause failure of the generator to produce current. Brushes in which the leads have become loosened should be replaced.

TESTING D.C. WINDING OR ARMATURE FOR GROUNDS: First, disconnect battery and A.C. line wires from plant. RAISE ALL BRUSHES FROM COMMUTATOR AND COLLECTOR RINGS. Place one end of test lamp wire on commutator. Touch other end of test lamp wire on clean surface of armature shaft. If test lamp burns, the commutator or D.C. winding is grounded. NOTE: A shorted or grounded D. C. armature circuit will generally be indicated by overheating of the armature or burned windings. The plant will run, but no current will be generated.

TESTING A.C. WINDING OR ARMATURE FOR OPEN CIRCUITS: First, disconnect battery and A.C. line wires from plant. RAISE ALL BRUSHES FROM COMMUTATOR AND COLLECTOR RINGS. If the generator is single phase, 2 or 3 ring, place one test lamp wire on the center ring then touch the other wire to each other ring. The lamp should burn when any two rings are touched. If test lamp does not burn an open circuit is indicated.

On a 4-ring single phase generator the lamp should burn when ring No. 1 and ring No. 2, or when ring No. 3 and #4 are touched. With any other combination, the lamp should not burn.

On a 3-phase, 4-ring generator with one test lamp wire on ring N, lamp should burn when touching any other ring. Check all rings.

On a 3-phase, 3-ring generator touching any combination of two rings should cause the lamp to burn. If lamp fails to burn in any of these cases an open circuit has developed. Check all combinations. Note: an open circuit in the A.C. armature winding will result in the plant failing to generate voltage.

Placing one end of test lamp wire on shaft, the lamp should not burn when other end of test lamp wire is placed on any collector ring. If light burns, it indicates a ground in A.C. winding. Any short or ground in the armature means that it must be rewound.

TESTING FIELDS FOR OPEN CIRCUITS: Disconnect battery and A.C. line wires from plant. Raise all brushes from commutator and collector rings. Disconnect D.C. field wires. Connect one test lamp wire to field wire leading to brush holder. Connect other test lamp wire to wire in outlet box leading direct to field coil. If test lamp does not burn, D.C. field circuit is open. NOTE: Broken wires or loose connections between generator field and control panel should be checked first. An open circuit in the field winding would prevent the plant from generating.

SERVICE DIAGNOSIS

POOR COMMUTATION: Indication of poor commutation is excessive sparking and/or overheating of commutator, blackened or pitted commutator bars.

CAUSES OF POOR COMMUTATION:

1. The brushes not set correctly in respect to the field poles.
2. Brushes may not be fitted to the surface of the commutator.
3. Brushes binding in the holders.
4. Brushes may not be equally spaced around the commutator.
5. Brushes may have reached their limit of wear, with the result that there will be an insufficient amount of brush spring tension.
6. Some brushes may have excessive pressure, thereby taking more than their share of the current.
7. The carbon brushes, if replaced, may be of an unsuitable grade. Metal graphite brushes generally are not used on D.C. voltages higher than 30 to 40 volts. Great care must be taken to be sure that the proper grade is being used on the generator when replacements are made.
8. Some commutator bars may be loose or projecting above the other.
9. High mica, this prevents a proper contacting surface between the brush and the commutator.
10. A variation in the air gap of the machine or strength of the field poles. This will also cause severe sparking at the commutator.

FAILURE OF GENERATOR TO BUILD UP VOLTAGE:

1. The speed of the set may be below normal.
2. Field coils not connected in proper sequence. This could only occur if the wiring has been changed since leaving the factory.

3. A reversed shunt field. Switch wires leading to D.C. brush holders.
4. Brushes incorrectly spaced, and not located on a neutral position.
5. An external short circuit.
6. An open circuit in the shunt field.
7. Loss of residual magnetism. The process of building up voltage in all types of generators requires that there be a small amount of residual magnetism in the iron parts of the field exciter structure when the machine is standing still. This residual magnetism produces the initial voltages in the armature coils as soon as the armature is rotated, which are built up until the full mangetic field is developed, and the machine delivers full voltage. All generators leave the factory with sufficient residual magnetism to build up when started. However, through long periods of storage, and sometimes due to rough handling in transit, an occasional generator will lose all or part of its residual magnetism, and so fail to build up voltage. The following procedures will usually correct the trouble:

(a) Carefully check that all brushes are free in the brush holders, and are seated on the commutator, and that no objectionable film has collected on the commutator. See that brush shunts are not binding on adjacent parts or shorted to ground.

(b) With the generator running, apply light pressure to the top of one or two D.C. brushes with a wooden stick, to polish the commutator and break through commutator film. Often this will permit the generator to build up when the residual field is weak.

(c) If the machine still refuses to build up, the residual magnetism can be restored by applying direct current to the fields. Lift all the brushes clear of the commutator. With the generator at standstill, connect the positive terminal of a 6-volt storage battery or "Hot Shot" dry battery to a positive brush holder. In generators where one brushholder is grounded this will be the grounded commutator brush. Touch the negative connection from the battery to the adjacent commutator brush holder. This will be a negative brush. Hold the connection a few seconds. Remove battery connections, lower brushes and start generator.

(d) Should the generator build up with reversed polarity, that is, should the positive connection become negative, or in an A.C. machine still fail to produce current, this can be overcome by reversing the connections between the battery used to build up the residual magnetism and repeating the process described above.

In electrically cranked plants, where the generator serves as the starting motor, residual magnetism is automatically restored when the starting winding is energized.

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NOISES IN THE BRUSHES:

Noise in brushes is generally due to a rough or out-of-round commutator, caused by high and low bars. This difficulty may only be corrected by machining the commutator in a lathe.

COMMUTATOR: Mica is used for insulation between the commutator bars. After the armature is machined, the mica is cut away about 1/32" below the surface of the bars. The surface of the bars will wear down to the level of the mica eventually. The mica is harder than the copper, and it forms ridges which cause the brushes to jump and make poor contact. High mica should be under cut carefully, and the commutator re-machined and polished.

The commutator should maintain a polished surface. Blackening of all the bars indicates incorrect brush postions. Blackening of groups of bars at regular intervals indicates rough, eccentric commutator. A slight, even discoloration of the commutator is a normal condition.

A severely burned bar or number of bars, indicates an open circuit in the armature, which will also be noted by excessive flashing when the machine is operating with load. This type of difficulty can only be corrected by competent armature repair service men.

Ordinarily the commutator will require only an occasional wiping with a non-linting cloth, but if blackening appears and grows worse, the cause must be determined and corrected.

Use no lubricant on the commutator. The use of any lubricant will only cause sparking and increase the commutation difficulties.

BRUSHES: See that the brushes move freely in the holders and at the same time make firm even contact with the commutator. The brushes should all have the same spring tension to prevent one from carrying more than its share of the load. An extra set of brushes should always be kept on hand.

See that both the interior and the exterior of the machine are kept free from metal dust, dirt of any description, or water.

GENERATOR HEATING: May be due to one of the following causes:

1. Overload on the line.
2. Short circuit of a coil or number of coils in the winding.
3. Grounds in the armature winding or commutator.
4. Poor commutation.
5. Overheating of the entire unit, may be caused by;
   (a) Unequal air gap.
   (b) A Shorted out or grounded field winding.
   (c) A reversed field coil winding.

NOTE: Any of these troubles cause a large circulating current in the exciter armature windings of the commutator, the brushes and brush connections, which will cause artificial overloading of the armature. The air gap should not vary over a few percent either way from the average value. All field coils of the shunt type should have within 10% of the same resistance, a higher value than this indicates shorted turns in the winding.

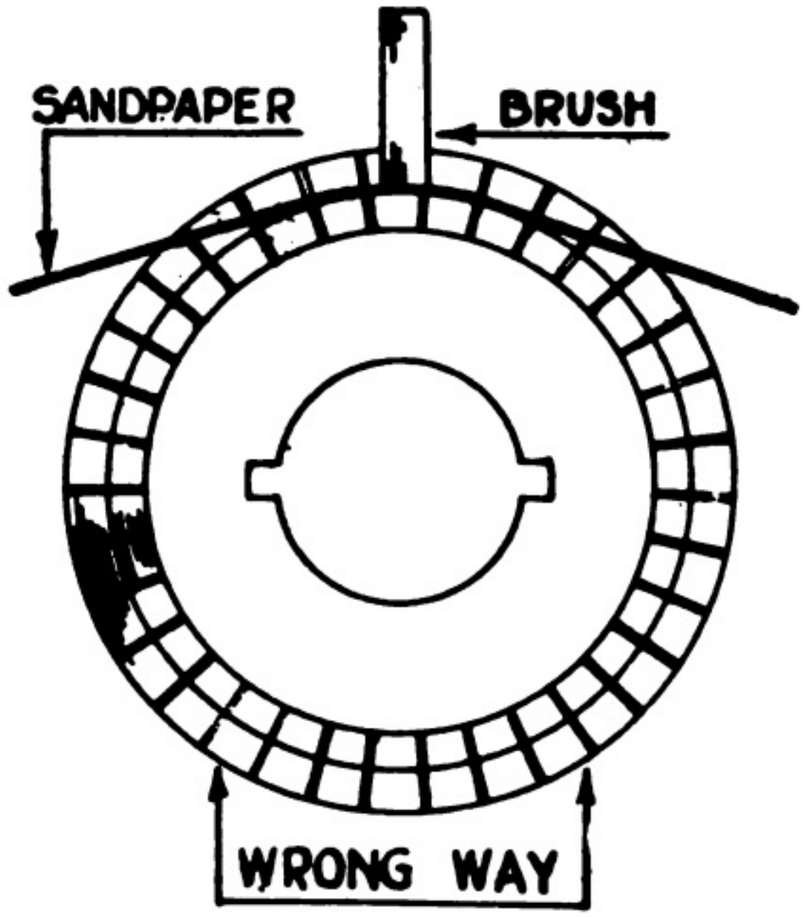
FIELD COIL HEATING:

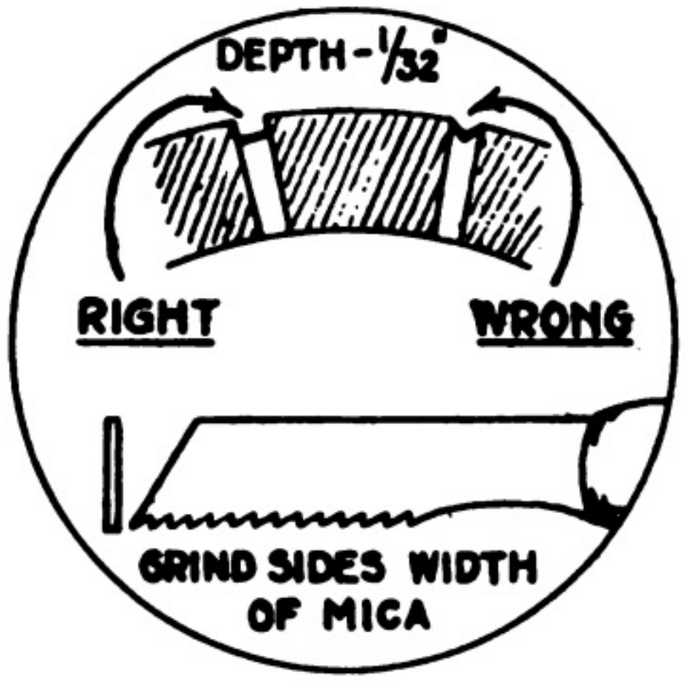
1. Too high an operating speed of the plant, with a resultant high output voltage.
2. A partial short circuit of one coil.

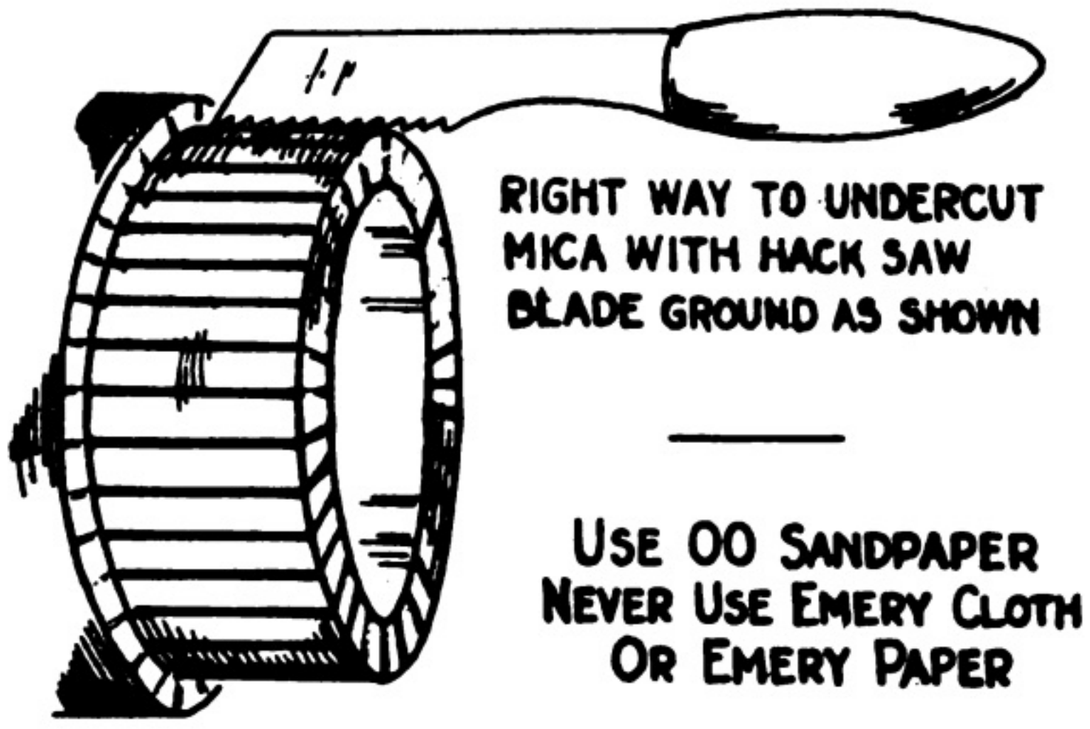
MAINTENANCE

All Generators are equipped with ball bearings. These bearings will last for many years. It is very important to keep the generator clean and free from accumulations of dirt and grease. It is not necessary to take the generator apart to clean it, as in most cases the dust accumulations can be readily blown out with an air hose and the rings and commutator be wiped with a clean cloth. The grooves between the commutator bars should be occasionally cleaned out and kept free from accumulations of carbon, dust or other foreign matter. This can best be done with a very thin hack saw blade ground to a hook shape or a large needle or hat pin.

CARE OF COMMUTATOR AND BRUSHES

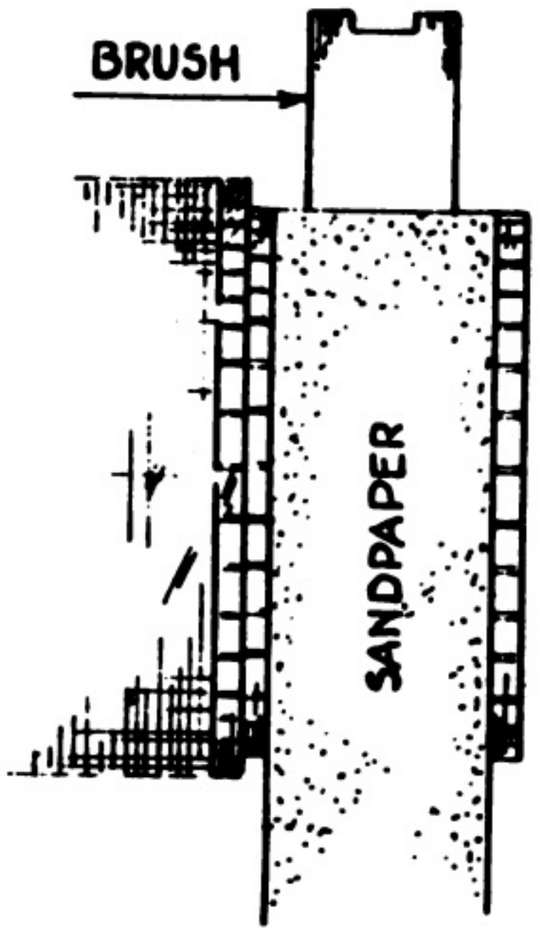


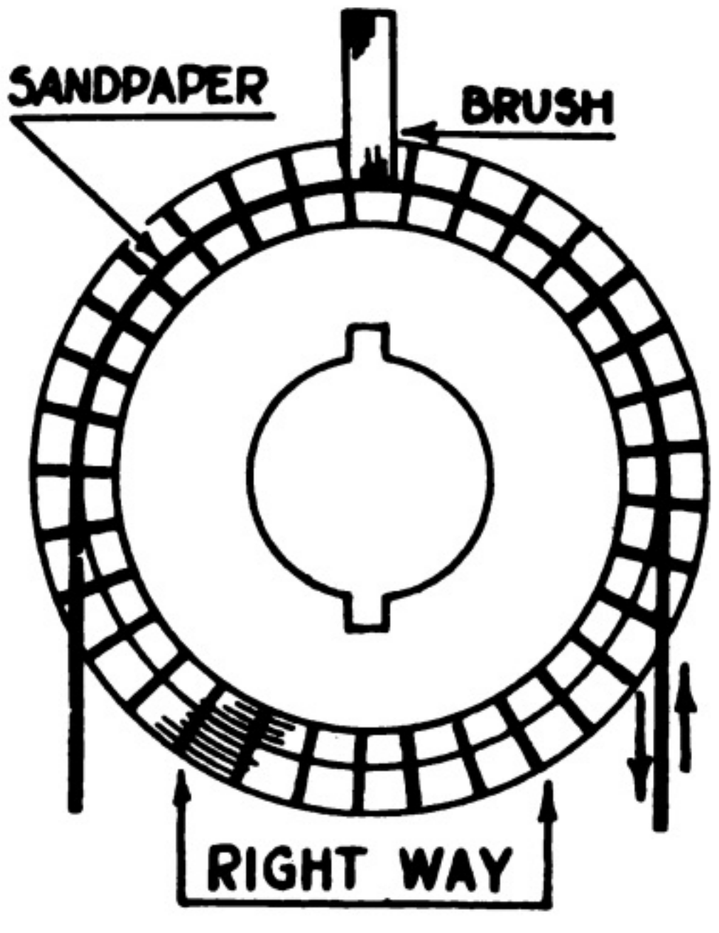




RIGHT WAY TO UNDERCUT MICA WITH HACK SAW BLADE GROUND AS SHOWN

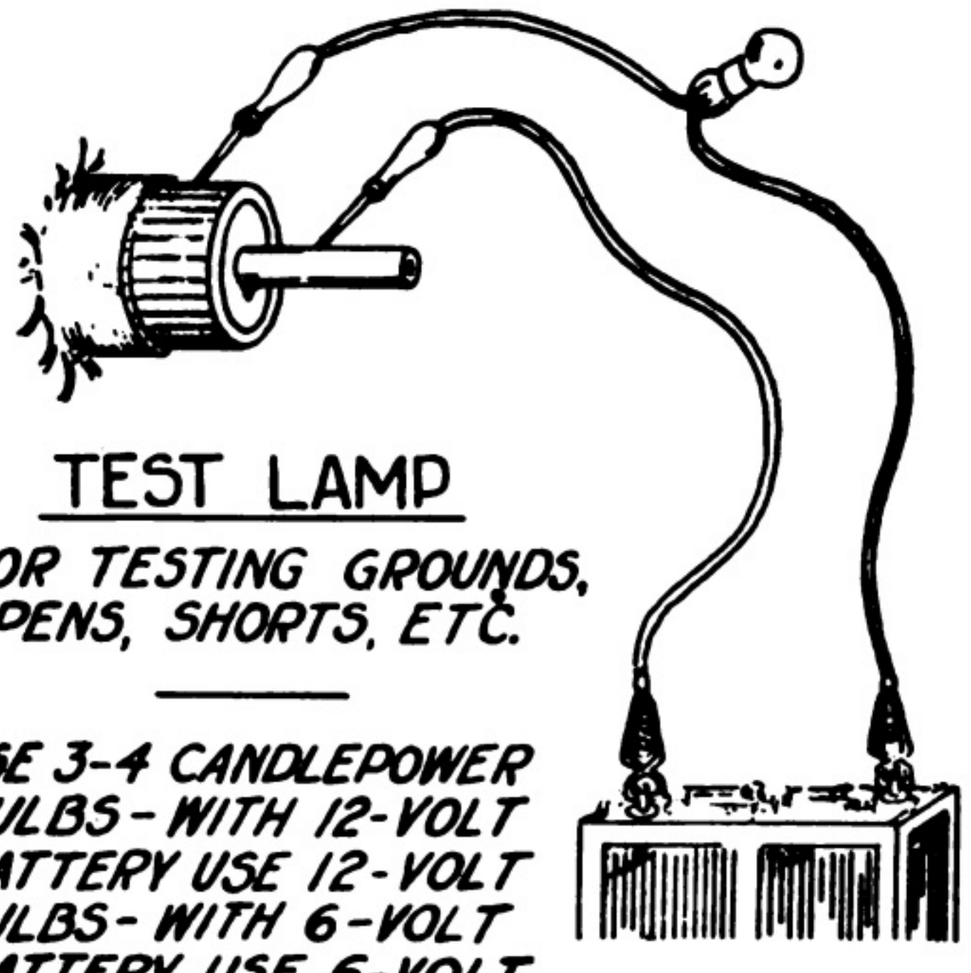
USE 00 SANDPAPER
NEVER USE EMERY CLOTH
OR EMERY PAPER





CAUTION-WHEN FITTING BRUSHES USE SANDPAPER WIDER THAN BRUSH

REPLACE ANY BRUSHES WORN TO 3/4 INCH OR LESS.



TEST LAMP

FOR TESTING GROUNDS, OPENS, SHORTS, ETC.

USE 3-4 CANDLEPOWER BULBS - WITH 12-VOLT BATTERY USE 12-VOLT BULBS - WITH 6-VOLT BATTERY. USE 6-VOLT

PARTS LIST NITE-HAWK FLOODLIGHT MODEL NH5-W1

PART NO.	DESCRIPTION	NO. PER UNIT
78-801	Muffler 1-1/4" Thread	1
013-7A	Reducer Bushing 1" to 1-1/4"	2
X-170	Ext. Pipe-1" Std. Pipe x13½" lg. Threaded both ends	1
182-801	Connector 1/4" 90° Weatherhead	2
X-169	Gas Line - 1/4" Copper Tubing - 60" lg.	1
NHC-19	Gas Tank - with Cap 69-801	1
1144	Washer 3/8" Kantlink	4
4612	Nut 3/8-16 Hex Steel	4
013-602	Pipe Tee 1/4"	1
E-7496	Weatherhead Nuts 1/4"	2
83-806	Tubing Clips - For 1/4" Tubing	2
7497	Rubber Covers	4
7477	Connector Twistlock Male	4
7496	Rubber Covers	4
7506	Connector Twistlock Female	4
10086	Cable - #14 Rubber covered - 2 wire, 9 ft. lg.	2
10087	Cable - #14 Rubber Covered - 2 wire - 10 ft. lg.	1
10088	Cable - #14 Rubber Covered - 2 wire - 11 ft. lg.	1
10089	Cable - #14 Rubber Covered - 2 wire - 13 ft. lg.	1
31889	Terminal AMP #14 wire	8
NHC-11	Base Rail - 3"x1.410 Channel - 21" lg.	1
3670	Screw 1/2-13 x 2" Hex Cap	1
1146	Washer 1/2" Kantlink	1
1166	Washer 1/2" flat Steel	1
3678	Screw 1/2-13 x 3" Hex Cap	2
4616	Nut 1/2-13 Hex Steel	2
1146	Washer 1/2" Kantlink	2
1166	Washer 1/2" Flat Steel	2
NHC-12	Rear Support for Motor-Steel 1"x2" H.R. Flat 20" Lg.	1
3680	Screw 1/2-13 x 3-1/4" Hex Cap	4
24-801	Spring-Axle	2
NHC-13	Spring Shackle Bracket-Steel 1/4 x 1-3/4" H.R. Flat 8-1/4" lg.	2
NHE-6	Bushing 19/32" ID x .812 OD x 1-3/4" lg.	2
3666	Screw 1/2-13 x 1-1/2" Hex Cap	4
NHE-7	Spring Shackle-Steel 1/4 x 1-1/4" H.R. Flat 4-3/4" lg.	4
NHE-8	Shackle Bolt-Steel Shafting 7/8" dia. -3-9/16" lg.	6
5011	Nut 9/16-18 N.F. Castellated Steel	6
8025	Cotter Key 1/8 x 1"	6
1610	Zerk Fitting 1/8" Straight	6

PARTS LIST NITE-HAWK FLOODLIGHT MODEL NH5-W1

PART NO	DESCRIPTION	NO. PER UNIT
NHE-9	Spring Spacer-Steel 1/4 x 2-1/2" H.R. Flat -6" lg.	2
NHC-14	Axle Bracket-Steel 3/8 x 3-1/2" Flat 9-11/32" lg.	2
NHE-10	U-Bolt-Shafting 1/2" Dia. C.R. -8-11/16" lg.	4
4618	Nut 1/2-20 N.F. Hex Steel	8
1146	Washer 1/2" Kantlink	8
NHC-15	Spring Bracket-Steel 1/4 x 5" H.R. 5-17/32" lg.	2
NHE-11	Drawbar	1
NHE-12	Drawbar Coil Spring	2
5020	Nut 1-1/8" -7 N.C. Castellated Steel	1
8020	Cotter Key 1/4 x 1-3/4"	1
3683	Screw 3/8-18 N. F. x 1" Hex Cap	4
4622	Nut 3/8-18 N.F. Hex Steel	4
1148	Washer 5/8" Kantlink	4
NHF-10	Third Wheel Assembly	1
NHF-11	Third Wheel Support Malleable Iron	1
NHF-12	Yoke for Third Wheel Malleable Iron	1
NHC-16	Third Wheel 10 x 2.75 Puncture Proof	1
NHE-13	Snap Ring #951 Eaton	1
NHE-14	Pin for Castor Wheel-Shafting 5/8" dia.-10-1/4" lg.	1
8017	Cotter Key 1/4 x 1"	1
NHE-15	Castor Wheel Pivot Pin-Shafting 5/8" Dia. 7-5/8" lg.	1
8025	Cotter Key 1/8 x 1"	2
NHE-16	Stud Shaft for Third Wheel-Shafting 5/8" Dia. -7-1/8" lg.	1
NHE-17	Bearing Cone-Tubing .625 ID x 1-1/8" OD x 1" lg.	2
NHE-18	Nut 5/8-18 N.F. Hex Steel Flexlox	2
3578	Screw 3/8-16 x 1" Hex. Cap	12
4612	Nut 3/8-16 Hex Steel	12
1144	Washer 3/8" Kantlink	12
1164	Washer 3/8" Flat Steel	6
3542	Screw 5/16-18 x 3/4" Hex Cap	34
4610	Nut 5/16-18 Hex Steel	18
1143	Washer 5/16" Kantlink	34
1163	Washer 5/16" Flat Steel	18
E-15T	Battery Diller-Heavy Duty 120 Amp. Hr.	1
61-804	Battery Cable - 20" Long	1
61-801	Battery Cable - 10-1/2" Long	1
NHF-13	Battery Cover Top Plate-Sheet Steel 12 ga. x 5-9/16" x 22"	1
NHF-14	Battery Brackets-Sheet Steel 12 Gax 2" x 7-5/8"	2
NHE-19	Clamping Stud-Shafting 1/2" Dia - 12" lg.	2
5216	Wing Nut 1/2-13 Steel	2
4616	Nut 1/2-13 Hex Steel	4
1146	Washer 1/2" Kantlink	4

PARTS LIST NITE - HAWK FLOODLIGHT MODEL NH5-W1

PART NO.	DESCRIPTION	NO. PER UNIT
3578	Screw 3/8-16 x 1" Hex Cap	1
4612	Nut 3/8-16 Hex Steel	1
1144	Washer 3/8" Kantlink	1
1164	Washer 3/8" Flat Steel	1
NHF-15	Light Support-Base Section-Pipe 2" Std. 37" lg.	4
4616	Nut 1/2-13 Hex Steel	4
NHC-17	Light Support-Adj. Section - Pipe 1-1/2" Std. 40" lg.	4
NHL-20	Locking Handle for Light Support	4
NHC-18	Clamp-Sheet Steel 12 ga. x 3-3/8" x 3-5/8"	4
NHE-22	U-Bolt Shafting 1/4" Dia. H.R. - 8-9/16" lg.	4
4608	Nut 1/4-20 Hex Steel	8
1142	Washer 1/4" Kantlink	8
199-802	Reflectors	4
2625	Drive Screws Type "Z" #4 x 1/4"	8
ADE-14	Floodlamp Assembly	
KL-681	Gasket Between door & Hsg.	1
KL-525	Door Frame	1
HL-3090	50% Spread Lens	1
KL-673	Wide Beam Reflector	1
KL-676	Base with Slip Fitter Mtg.	1
HL-9301	Wing Nut for Door & Hsg. Clamp	4
HL-9012	Lens Cement	1 Lb.
HL-2757	Gasket Between Lens & Clamp	8
HL-5858	Gland Nut for Wire Outlet	1
G-40	Floodlight Bulbs - 1000 Watt	4
A-130-803	Axle Assembly	1
22282KH	Wheels W/hub caps, hubs, bearing, seals & Caps	2
	Tires W/tubes 600 x 16 4-Ply Rib Implement	2
NHF-16	Switch Board Bracket - Angle 3/16 x 1-1/2" x 2" x 29-3/4" lg.	1
NHF-17	Switchboard Bracket - Angle 3/16 x 1½" x 2" x 29-3/4" lg.	1
3580	Screw 3/8-16 x 1-1/4" Hex Cap	2
4612	Nut 3/8-16 Hex Steel	2
1144	Washer 3/8" Kantlink	2
3547	Screw 5/16-18 x 1-1/4" Hex Cap	2
4610	Nut 5/16-18 Hex Steel	2
1143	Washer 5/16" Kantlink	2
3524	Screw 1/4-20 x 3/4" Hex Cap	4
4608	Nut 1/4-20 Hex Steel	4
1142	Washer 1/4" Kantlink	4
55-801-A	Conduit 3/4" Flexible - 12" lg.	1
188-808	Conduit Connectors 3/4"-90°	2
178-801	Padlock with 2 Keys W/chain	2
2087	Screw 10-24 x 3/4" R.H.S. Mach.	2
4604	Nut 10-24 Hex Steel	2

PARTS LIST NITE-HAWK FLOODLIGHT MODEL NH-W1

PART NO.	DESCRIPTION	NO. PER UNIT
1140	Washer #10 Kantlink	2
1161	Washer #10 Flat Steel	2
87-801	Lock Pins	4
3522	Screw 1/4-20 x 1/2" Hex Cap	16
4608	Nut 1/4-20 Hex Steel	16
1142	Washer 1/4" Kantlink	16
83-804	Hasps	2
NHF-1	**Frame Assembly**	
NHC-8	**Towing Tongue Assembly**	
NHC-9	Towing Tongue - Steel 3/8 x 3" H.R. Flat 82" lg.	1
	Housing Assembly	
NHF-4	Left Side Tool Box 119-802	1
NHF-5	Right Side Tool Box 119-801	1
NHF-6	Rear Hood End 68-802	1
NHF-7	Front Hood End 68-801	1
NHF-8	Hood Side 68-804	2
NHF-9	Hood Top 68-803	1
NHC-20	**Panel Box Assembly Complete**	
100-SN	Panel Box 6" x 14" x 15 "	1
VM-7	Voltmeter 0-150AC Burlington Flush Type, Round Face	1
0528	Rheostat Model "L" 5.48 AMP. 50hm, 150 Watt	1
300	Pilot Lamp Base 600 Watt, 250 Volt	1
160-801	Pilot Lamp 7.5 Watt	1
117936	Circuit Breaker 50 Amp. 2 Pole 120/240 Volt, A.C.	1
8902-11-5	Tumbler Switches G.E. 10 Amp. 250 V. 2-pole 20 Amp. 125 Volt	4
HS-32	Tumbler Plates - Bakelite	2
9200	Duplex Twist-Tite Convenience Outlet, Hubbell, 10 AMP. 250 Volt, 20 Amp. 125 Volt	1
HV-32	Duplex Plate - Bakelite	1
G-2965	Fuse Block 30 Amp. 2 Pole Cartridge	5
139-801	Cartridge Fuses 15 Amp.	10
705	Fuse Block 3 Amp. 250 Volt 2-pole	1
6501	Fuse, 3 Amp. 250 Volt	2
33-802	Conduit Nipples 3/4 x 1/2	4
21-802	Conduit Bushing 3/4"	1
G-1499	**Generator Assembly**	
I-331-C-	Drive End Bell	1
3588	Screw 3/8-16 x 2-1/4" Hex Cap	4
1144	Washer 3/8" Kantlink	4
V-133	Guard-Expanded Metal 18 ga. x 1-7/8" x 38"	1
V-133	Bracket-Sheet Steel 19 ga. x 1-7/8" x 1-1/2"	2

PARTS LIST NITE-HAWK FLOODLIGHT MODEL NH5-W1

PART NO.	DESCRIPTION	NO. PER UNIT
2197	Screw 1/4-20 x 2" R.H.S. Machine	1
1114	Washer #1214 Shakeproof	1
I-372	Commutator End Bell	1
3580	Screw 3/8-16 x 1-1/4" Hex Cap	4
1144	Washer 3/8" Kantlink	4
I-392	Commutator End Hood	1
2189	Screw 1/4-20 x 1" R.H.S. Mach	2
1114	Washer #1214 Shakeproof	2
I-332	Engine Adapter	1
3547	Screw 5/16-18 x 1-1/4" Hex Cap	8
1143	Washer 5/16" Kantlink	8
4610	Nut 5/16-18 Hex Steel	8
W-43	Bearing Retainer	1
3541	Screw 5/16-18 x 5/8" Hex Cap	4
1115	Washer "1218 Shakeproof	4
W-44	Bearing Retainer	1
2185	Screw 1/4-20 x 1/2" R.H.S. Mach.	4
1114	Washer #1214 Shakeproof	4
S-3506	Bearings - Norma Hoffman	2
I-334	Fan & Coupling	1
809	Key #809 Woodruff	1
I-333	Engine Coupling	1
P-15-A	Coupling Pins	8
1091	Washer #1118 Shakeproof	8
4762	Nut 3/8-16 Hex Steel Jam	8
W-40	Rubber Bushing	8
Z-21	Winpower Nameplate	1
2641	Screw #6-32 x 3/8 Drive	4
G-1500	Field Frame Assembly Complete with Coils & Poles	
S-36	Field Frame 12-1/4" OD x 10-1/2" ID x 8-1/4" Wide	1
G-100	Field Pole	4
3584	Screw 3/8-16 x 1-3/4" Hex Cap	16
1144	Washer 3/8" Kantlink	16
	Fibre Bushing 3/4" ID x 1" OD x 1" lg.	1
J-51	Coil Shields .015 x 4-1/2" x 8-1/2"	4
H-7	Field Coils (Set of Four)	
G-1501	Armature Assembly - Complete	
G-18	Commutator 33 Bar	1
G-27-A	Collector Ring Assembly	
G-1502	Brush Spider Assembly Complete with Brushes	
I-402	Brush Spider	1
B-457	A. C. Brush Holder Pin-Brass Rod 1/2" dia. x 2-5/8" lg.	1
B-456	A. C. Brush Holder Pin-Brass Rod 1/2" dia. x 1-15/16" lg.	1

PARTS LIST NITE-HAWK FLOODLIGHT MODEL NH5-W1

PART NO.	DESCRIPTION	NO. PER UNIT
O-30	D.C. Brush Holder Pin-Brass Rod 1/2" dia. x 4-1/2" lg.	2
G-30	D.C. Brush Holder	2
B-458	A.C. Brush Holder	2
Y-3	A.C. Brushes 1" x 3/4" x 3/8" Grade #671	2
Y-3	D.C. Brushes 1-1/8" x 3/4" x 3/8" Grade E-28	2
J-56	Fibre Bushings 11/16" OD x 1/2" ID x 3/4" lg.	4
2187	Screw 1/4-20 x 3/4" R.H.S. Mach.	5
1114	Washer #1214 Shakeproof	5
2139	Screw 10-24 x 3/4" R.H.B. Mach.	2
4704	Nut 10-24 Hex Brass	4
1112	Washer #1210 Shakeproof	4
B-436	Terminal Lug	2
2232	Screw 1/4-20 x 3/4 R.H.B. Mach.	2
4608	Nut 1/4-20 Hex Steel	4
1114	Washer #1214 Shakeproof	4
W-91	Spring	2
1033	Washer .040 x .260ID x 9/16" OD Flat Brass	2

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