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# WG270 WELDER/GENERATOR

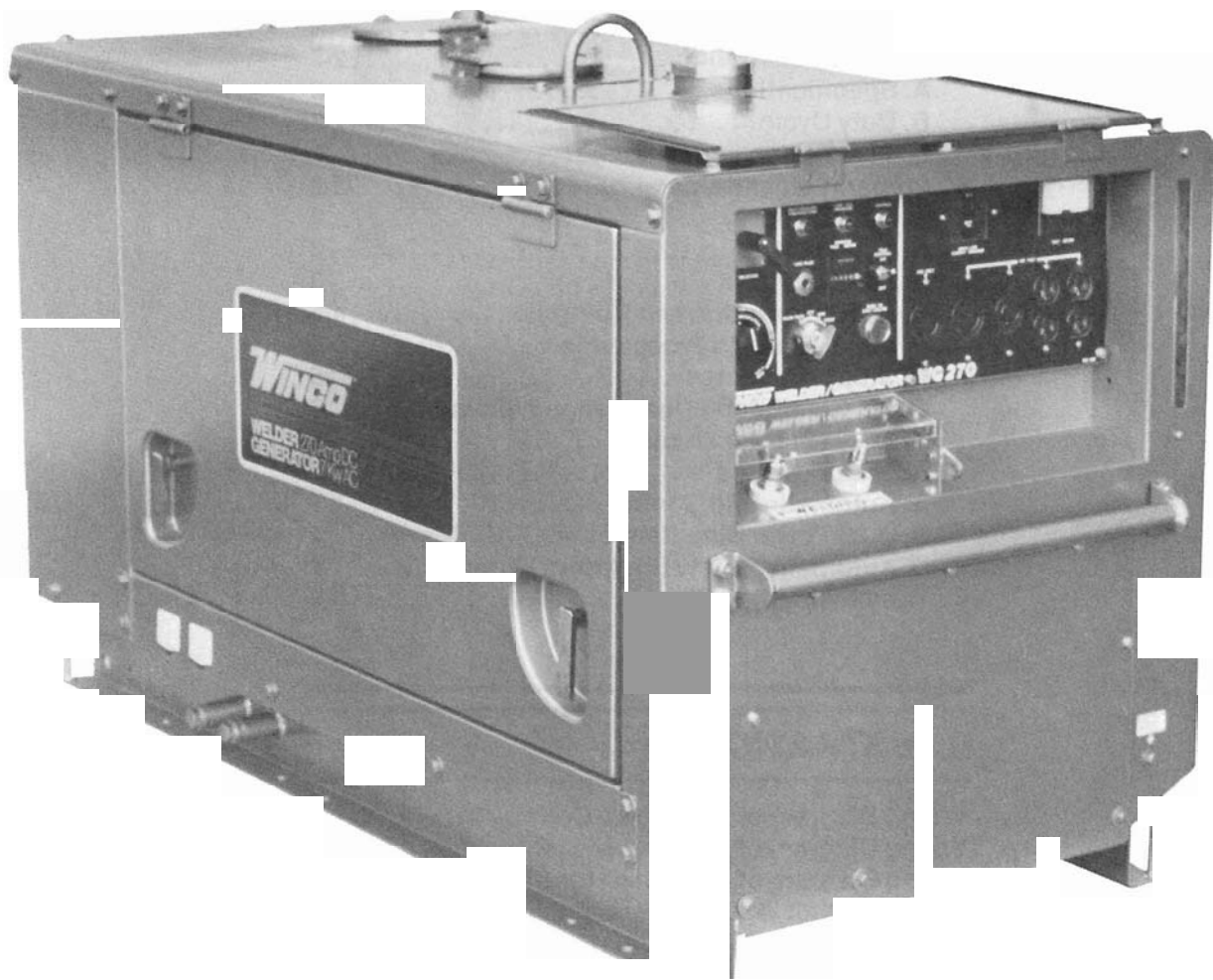
## INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

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## GENERAL INFORMATION

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This manual is designed to provide operation and maintenance instruction for the WINCO WG-270-A welder/generator. Unless otherwise indicated, it covers only the generator and control, not the engine. A separate operator's manual should be consulted for information concerning engine care and operation.

Before generators are shipped from the factory, they are loaded to full capacity, and the voltage, current, and frequency are carefully checked. A test card with each unit's serial number and pertinent data has been filed at the factory. The rated output of the generator is based on factory tests of sample units, and is subject to, and limited by, the temperature, altitude, fuel, and other conditions specified by the manufacturer of the applicable engines.

The engine used in the welder generator is built by a highly reputable manufacturer and world-wide engine service is available. Contact your WINCO dealer for the nearest authorized engine service dealer.

### DEFINITIONS AND SYMBOLS

Notes, Cautions, and Warnings are used throughout this manual with the following definitions and symbols.

**NOTE:** Notes indicate an area or subject of special merit, emphasizing either the product's capabilities or common errors in operation or maintenance.

**CAUTION** Possible damage to equipment  
Caution notes indicate any condition or practice, which if not strictly observed or remedied, could result in damage or destruction of the equipment.



**WARNING: Personal danger**  
Warning notes indicate any condition or practice, which if not strictly observed, could result in personal injury or possible death.

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## CAUTION AND SAFETY PROCEDURES

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Despite the safe design of this welder/generator, operating it imprudently, neglecting its maintenance, or being careless with it can cause serious injury or death. The generator is powerful enough to deliver a fatal electric shock. The following safety information should be read carefully and the suggested precautions implemented.

Ignorance or careless behavior can result in serious injury. Only responsible, trained individuals, alert to all possible dangers, should operate and maintain this machine. Be sure the welding work cable is connected to the work as close to the welding area as practical. Work cables connected to the building framework or other locations some distance from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail. Always keep both side doors of the machine closed during operation.

Normal safety precautions must always be employed. Avoid hazardous welding positions and keep all equipment safety guards, covers and devices in place and in good repair. Keep hands, hair, clothing and tools away from fan belts, fans

and all other moving parts when starting, operating or repairing this equipment. Protect yourself from pieces of molten slag and metal which are constantly falling from the welding arc. Wear oil free protective garments such as leather gloves, a heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses when in a welding area. Use glasses with side shields when near slag chipping operations.

### ELECTRIC SHOCK PRECAUTIONS

This generator produces voltages capable of causing a lethal shock.

**NEVER** • touch live terminals or receptacles.  
• make or break electrical receptacle connections under load.

**ALWAYS** • use only grounded receptacles and extension cords of adequate wire gauge to handle the electrical loads. • ground the work table through an external ground rod. • properly ground the welder/generator. • insulate yourself from the work and ground with dry insulation. • follow welding safety precautions (ANSI Standard Z49.1).

### ARC RAY PROTECTION

Severe eye and skin injuries may occur if these areas are not shielded from the arc rays.

**NEVER** • allow nearby personnel to watch the arc or expose themselves to the arc rays, hot weld spatter or hot weldments.

**ALWAYS** • use a welding shield or mask with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. • use clothing made from durable, flame-resistant material to protect your skin from the arc rays. • provide protection for any assistants. • use welding mask filter lens that conform to ANSI Z87.1 standards.

## WELDING FUME SAFEGUARDS

Vapors and gases from welding can be poisonous.

**NEVER** • breathe fumes and gases produced from welding. • weld in locations near hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The head and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, or other irritating products.

**ALWAYS** • use enough ventilation and/or exhaust at the arc to keep fumes and gases from the breathing zone. • use extreme care when welding galvanized, lead or cadmium plated steel and other metals which produce toxic fumes when welded.

## EXPLOSION AND FIRE PREVENTION

Property damage, injury, and even death from fire and explosion are preventable.

**NEVER** • store bulk fuel near the welder/generator. Gasoline and other fuel vapors in the air in and around the engine welder could cause an explosion. • heat, cut or weld tanks, drums or containers until properly prepared to eliminate any flammable or toxic vapors from substances inside. These can cause an explosion even though they have been "cleaned." For additional information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping that Have Held Hazardous Substances", AWS F4.1-80 from the American Welding Society, Miami, Florida 33135.

**ALWAYS** • keep fire hazards well away from the engine or welding area. If this is not possible, cover hazards in the welding area to prevent the welding sparks from starting a fire. • confine welding sparks to prevent them from going through small cracks and openings into adjacent areas. • use special precautions when compressed gases are to be used at the job site. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating manuals for the equipment being used. • vent hollow castings or containers before heating, cutting or welding to prevent an explosion. • keep a fire extinguisher rated ABC by the NFPA readily available. (Questions concerning the extinguisher rating can be answered by your local fire department.) • keep the extinguisher properly maintained and know how to use it.

## ENGINE SAFETY

Special safety precautions must be taken while troubleshooting, maintaining, or operating the engine.

**NEVER** • add fuel near an open flame or when the engine is running!! The engine must be stopped and allowed to cool. • spill fuel when filling tank. If fuel is spilled, wipe it up PROMPTLY to prevent it from igniting on contact with hot engine parts or electrical sparks. • restart the engine until after all fumes have been eliminated. • remove the radiator pressure cap when the engine is hot.

**ALWAYS** • turn the engine off before troubleshooting and maintenance work unless the maintenance work ABSOLUTELY requires it to be running. • provide adequate ventilation for the engine exhaust gases. Operate ALL internal combustion engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

## REGULAR MAINTENANCE

Only qualified electrical technicians should maintain and service this generator. They should perform regularly scheduled service checks and repair defects in cables and the welder/generator immediately with factory approved repair parts.

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## PRODUCT DESCRIPTION

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### SPECIFICATIONS

The following specifications apply to the WG-270-A.

#### ENGINE

Manufacturer . . . . . Kubota  
Model . . . . . DH-850 B (3 cylinders)  
Displacement . . . . . 52 CID (855 cc)  
Lube Oil Capacity . . . . . 8 quarts of HD diesel grade  
Coolant Capacity—50/50 mix 5 quarts of Antifreeze  
Fuel Consumption . . . . . 0.7 gallons/hour

#### WELDER

Rated Output . . . . . 9,000 watts (9 KW)  
Rated Voltage . . . . . 32.5 volts DC  
Rated Current . . . . . 270 amps DC  
No Load Voltage . . . . . 85 volts DC  
Current Range . . . . . 60 to 270 amps  
Duty Cycle (see below) . . . . . 50%  
Welding Rod Diameter . . . . . 1/16" to 1/4"

### GENERATOR

Rated Output . . . . . 7,000 watts (7 KW)  
Rated Voltage . . . . . 120/240 volts  
Rated Current . . . . . 58.4/29.2 amps  
Phase / P.F. / Hertz . . . . . 1 / 1.0 / 60 Hz

### DUTY CYCLE

The duty cycle implies a load time of 10 minutes in percentage. For example, a duty cycle of 50% represents five minutes of loading (welding) and five minutes of no-load operation (not welding).

The welder is rated at a 50% duty cycle at 270 amps. However, the duty cycle depends upon the welding current. Select the appropriate duty cycle from the table below to prevent overload.

Welder Current	Duty Cycle %
Below 150 Amps	100
Up to 200 Amps	60
Up to 270 Amps	30

## DESCRIPTION AND FEATURES

This multi-purpose generator set is designed to provide QUIET POWER for DC welding and AC electrical loads on construction sites, farms, factories, and recreation areas. Where electrical power is

unavailable or inconvenient, this compact, self-contained WINCO DC/AC welder/generator will provide your repair, maintenance, and power needs. Typical applications are welding repair and construction, temporary lighting and power for small hand tools.

The DC welder current is regulated by an automatic electronic current control. The nominal DC arc voltage is 32.5 volts DC.

The AC generator voltage is maintained at  $\pm 2\frac{1}{2}\%$  no load to full rated load by an electronic voltage regulator. No harm to the welder/generator results if it is run with no load connected.

## PREPARATION AND OPERATION

### UNPACKING

Carefully remove the packing crate. Inspect the set promptly after receiving it. Check to ensure that the entire unit has been delivered and examine the set for damage. Keep all packing materials on hand until you are completely satisfied that the welder/generator has been delivered in good condition. This unit was in good order when it was shipped so if damage is found, notify the transportation company immediately. Ask them to write a description of the damage on the freight bill so that a claim can be filed if necessary.

This unit is shipped with two white bags containing silica gell attached to the engine to absorb moisture while the unit is in storage. These bags should be removed and discarded prior to starting the engine.

Carefully read the entire instruction manual before proceeding with the initial start up. Failure to read and follow the instructions could lead to equipment damage or personal injury!

### ASSEMBLY

This unit comes completely assembled except for the optional installation of the handles on the end of the unit and the door locking tabs. The instruction procedure for installation of the handles is included separately in this literature package. The lock tab for the control panel door must be reversed. This will cause the tab to project through the slot in the door for padlock installation. Some models will also have lock tabs for the side doors. Installation is the same as on the control panel door. Trailer assembly procedure is detailed in the instruction sheet packed with the optional trailer kit.

The battery is shipped dry for storage and safety reasons. When the unit is unpacked, the battery fluid will be found in two (2) plastic containers packed under the side door. Carefully remove the battery and the fluid containers. Pour the battery fluid into the battery cells to the indicated level. Install the cell caps and charge the battery overnight (at a four to six (4 to 6) amp rate) before using.



**The battery fluid is a strong acid and must be handled with extreme care.** It

is easier and much safer to remove the battery prior to filling it with the battery fluid. Be sure to neutralize and wipe any spills from the battery case prior to reinstallation.

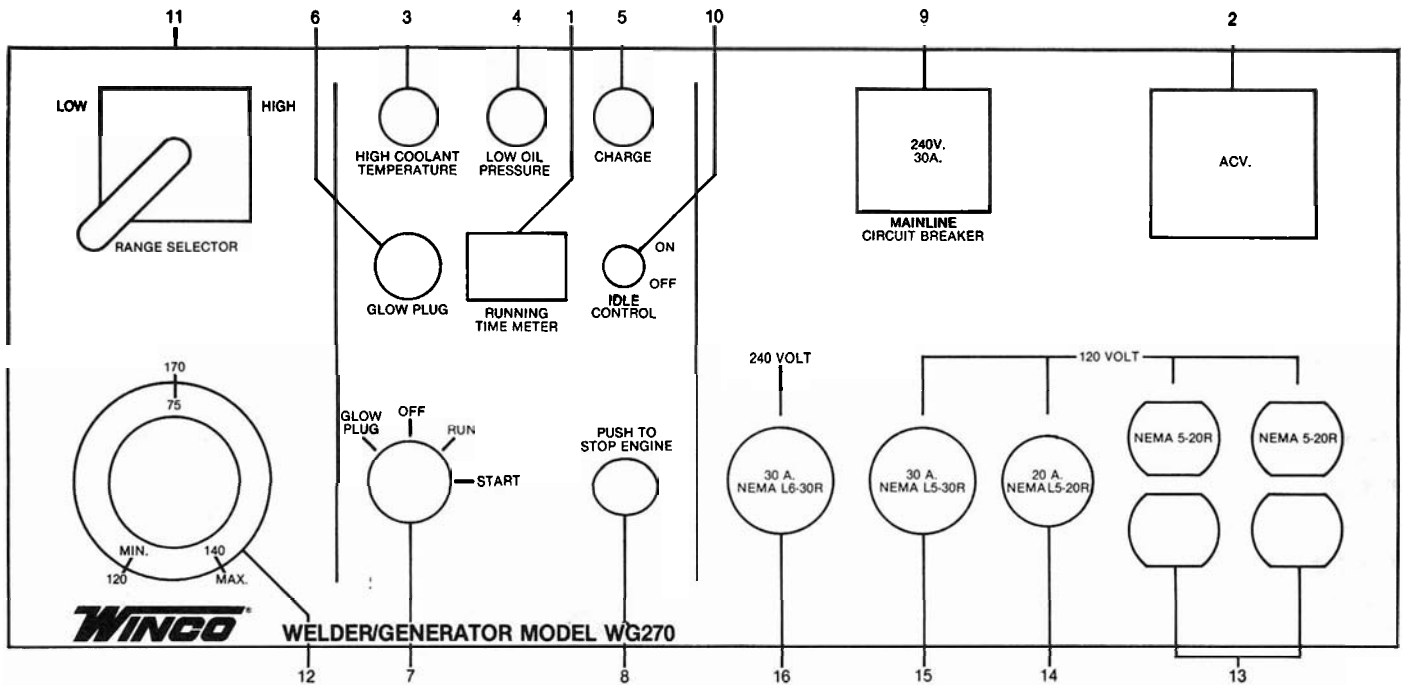
### SITE SELECTION

Careful site selection and proper installation are essential to ensure personal safety and to maintain the welder/generator in peak operating condition. Locate the unit as close to the work station (load) as possible to minimize the voltage drop in the welder and generator power cables. However, as a safety precaution, avoid installing the welder/generator directly under the welding table.

For either permanent or portable installation, select a location that has adequate ventilation yet is protected from the elements and free from excessive moisture, humidity, dust or other abrasive materials. Generally, skid and trailer or vehicle mounted units are outside and ventilation is adequate provided the unit has clearance around the housing cooling inlets and outlets. In a confined area, the units must be provided with adequate, fresh, cool air for engine combustion and cooling, and the engine exhaust must be safely directed away to a well ventilated area. The discharged hot air from the engine radiator and generator must be dissipated to prevent recirculation and engine overheating. The engine exhaust outlet, unless located outside, must be plumbed to a safe and well ventilated area. If external exhaust plumbing is not used, adequate forced ventilation must be employed to clear the area of toxic and hazardous fumes.

Both permanent and portable skid, trailer or vehicle mounted units should be placed to allow sufficient service and repair access on all sides of the set. A stationary unit should be bolted to a flat and firm foundation such as a concrete slab or a substantial structural framework. A portable unit should be set up on an elevated, flat and firm foundation such as a level driveway or parking lot.

# INSTRUMENTATION AND CONTROLS



1. **Running Time Meter**—This instrument indicates the total time the generator has been run. It is provided to assist you in planning the scheduled maintenance of the engine and electrical end.
2. **AC Voltmeter**—The needle pointer indicates the output voltage of the welder/generator. Check and always maintain the rated voltage on the voltmeter.
3. **High Coolant Temperature Lamp**—This lamp will light to indicate that the engine was automatically shut down because of an abnormally high coolant temperature (above 215°F). The automatic shutdown sensor protects the engine and the light is provided to pinpoint the cause of the shutdown.
4. **Low Lubricating Oil Pressure Lamp**—This lamp will light when the engine has automatically shut down due to the lubricating oil pressure going below 7 PSI. The safety shutdown prevents engine damage and the light indicates the low oil pressure.
5. **Charge Lamp**—If any failure occurs in the charging circuit during operation, this lamp will be lighted as a warning. If this lamp lights up occasionally or steadily during operation, check the charging circuit and make the necessary correction. Battery charging circuit failure is NOT a cause for automatic shutdown.
6. **Glow Plug Indicator**—This welder/generator uses a pre-chamber combustion diesel engine. This type of engine design uses glow plugs. The glow plug indicator is used to “time” the pre-heating. When the glow plugs are properly pre-heated, the glow indicator is bright red. The glow plugs and indicator are controlled by the key start switch (see no. 7).
7. **Key Start Switch**—This is the main engine control switch. The key is removable to prevent unauthorized use of the unit. The normal switch position is OFF or RUN. From the OFF position, turning the key counterclockwise energizes the GLOW PLUG pre-heating circuit. Rotating the key clockwise from the OFF position to the first step operates the RUN circuits. The second position clockwise from OFF operates the START circuit. The GLOW PLUG and START positions are momentary; spring loaded to return to the OFF or RUN position when released. This switch provides convenient, simple, centralized control of the engine.
8. **Emergency Stop Button**—This button is used in emergencies to shut down the engine. This latching push button switch operates the STOP solenoid. The STOP solenoid turns off the fuel control on the fuel injection pump, stopping the engine.
9. **Main Line Circuit Breaker**—The main line circuit breaker (MLCB) serves as a switch to feed power to load and also provides overcurrent or short circuit protection for the welder/generator. When the MLCB trips, correct the overload condition, then turn the MLCB to the OFF position before trying to turn it to ON.
10. **Idle Control Switch**—This switch controls the automatic idle circuit for idling the engine when not welding or using the AC power. Set the idle control switch to the ON position whenever you plan to weld intermittently. Only set the switch to the OFF position when you do not want the engine to idle during short breaks in electrical use.
11. **Welding Current Range Selector Switch**—This switch is used to select the range of welding current—either LOW range (60A-140A max.) or HIGH range (120A-270A max.).
12. **Ampere Regulator**—This infinitely variable welder current control is used to adjust the welding current to regulate the ‘Arc Heat’. The precise setting of this control will allow the welding of different types and thicknesses of

materials. First, select and set either the HIGH or LOW range on the welding current range selector. Then adjust the ampere regulator for proper current.

13. **AC Receptacles\***—Two (2) duplex NEMA 5-20R (120 volt / 15 or 20 amp.)
14. **AC Receptacle\***—One (1) twist-lock NEMA L5-20R (120 volt / 20 amp.)
15. **AC Receptacle\***—One (1) twist-lock NEMA L5-30R (120 volt / 30 amp.)
16. **AC Receptacle\***—One (1) twist-lock NEMA L6-30R (240 volt / 30 amp.)

\*Receptacles are provided for single phase, 120 and 240 volt electrical loads such as lighting or electric tools.

## START-UP PROCEDURES

To ensure safety and best performance, always check the following points before starting each day's operation. Refer to the engine manual for reference and assistance in locating and making engine related checks.

**Fuel**—Be sure the fuel tank is filled with the proper grade of clean, fresh fuel. When refueling, avoid getting dirt or moisture into the tank. Open the drain valve occasionally to remove condensed water from the tank. After a long period of shutdown, or after the fuel has run out, the fuel system should be carefully bled to remove trapped air from the lines before attempting to re-start the engine. Refer to the engine operator's manual for the proper procedure.

**NOTE:** Use only fresh, high quality diesel fuel classified ASTM Class No. 2-D or the equivalent. For winter use, operating in temperatures below 30°F, use No. 2-D mixed 50/50 with No. 1-D (kerosene).

**Lubricating Oil**—Check the lube oil level before you start the engine, both at the initial start-up and at each refueling. Be sure to change oil contaminated by dirt or grit.

The table below indicates recommended engine oil according to the ambient temperature.

Lube Oil Table	
Temperature	Lube Oil Grade and Spec.
50°F or above	D30 or D10W30
Below 50°F* (For all season use)	D10W30

\*Be sure to use D10W30 in cold weather

**Coolant**—Fill the radiator with a clean 50/50 mixture of antifreeze. Fill and maintain the overflow coolant tank at the indicated level. Under normal conditions, it should not be necessary to open the radiator cap.

**CAUTION** Operating with insufficient coolant may cause overheating. Be sure to check and maintain the coolant level in the overflow tank.



Never remove the radiator cap when the engine is running or immediately after shutdown when the engine is hot. The pressurized radiator will spray hot steam and coolant which could severely burn you.

**Fan Belt Tension**—Check and maintain proper tension on the engine fan belt. Periodically examine the belt for oil, grease, or damage. If two belts are used as a set, be sure to replace them as a set.

**Battery**—Check and maintain the electrolyte at the specified level. Always use the proper safety equipment (apron, gloves, and goggles) when handling the battery.



Never remove the battery from the unit while the engine is running. The battery is constantly under charge, giving off explosive hydrogen gas. Disconnecting the cables under these conditions will produce a spark that could explode the battery and spray battery acid on you.

## INITIAL START-UP PROCEDURES

**Step 1**—Make sure that load switches are OFF and that the main line circuit breaker (MLCB) is turned to the OFF position to disconnect the entire AC load.

**Step 2**—Set the idle control switch to the ON position.

**Step 3**—Open the manual fuel valve.

**Step 4**—Insert the key into the start switch. Turn the key counterclockwise to the GLOW-PLUG position until the wire element in the glow indicator becomes a bright red—indicating glow plugs are properly preheated.

**Step 5**—After preheating, turn the start key to the START position.

**Step 6**—After the engine starts, allow it to warm up for about five (5) minutes.

**NOTE:** During the warm-up operation and again while actually operating the unit, check for any evidence of malfunction.

**During warm-up** of this unit, check for • abnormal noise, vibration, and odor. • abnormal exhaust emission color. • oil, water, or fuel leaks.

During operation of this unit check • fuel leakage and fuel level. • lubricating oil circulation. • air cleaner in place, hoses and element sealed. • volt-meter reading. • coolant recovery bottle level. • abnormal noise. • color of exhaust gases. • vibration.

**NOTE:** You must STOP and DISABLE the engine for repair, inspection, service, or oiling.

## STOP PROCEDURES

Follow the procedure below to stop the engine.

**Step 1**—Discontinue welding operations.

**Step 2**—Turn off the AC main line circuit breaker (MLCB).

**Step 3**—Turn on the idle control switch (if not already on).

**Step 4**—The engine will begin to idle in approximately 10 seconds. Run the engine at IDLE speed with no load for about five minutes.

**Step 5**—Turn the starter key switch to OFF.

## DC GENERATOR—DUAL RANGE WELDING

All welding cables should be terminated in soldered or crimped lugs. Check these terminals periodically to ensure reliable operation and maximum performance. In the interest of safety, never make direct connections to the welder terminals with bare wire.

Choose the proper welding polarity according to the type of material to be worked and the rod manufacturers' recommendations. Generally, normal polarity is used for deep penetration—welding heavy steel and steel alloy. Reverse polarity is used for light penetration—welding thin metal, stainless steel, or built-up welding.

Always use the shortest cable possible to ensure the best performance. The cable resistance increases as its length increases. The resistance also increases with smaller diameter wire. Higher cable resistance will result in excessive voltage drop in the cable and in extreme cases this can lead to heat deterioration of the cable. The table below shows the relationship between cable length, current and the required cable wire gauge (diameter) and it is calculated to allow no more than a 3 volt drop. Always check the cable chart when using the welder/generator to ensure that the correct size of welder cable is selected for the job.

Welding Current	Cable Length—Multi-Strand Copper (Feet)						
	25	50	100	150	200	250	300
60 AMP	#4 Ga	#4 Ga	#3 Ga	#2 Ga	#2 Ga	#2 Ga	#1 Ga
100 AMP	#4 Ga	#3 Ga	#3 Ga	#2 Ga	#1 Ga	#1/0	#2/0
150 AMP	#4 Ga	#3 Ga	#2 Ga	#1/0	#2/0	#3/0	#3/0
200 AMP	#3 Ga	#1 Ga	#1/0	#2/0	#3/0	#4/0	250MCM
270 AMP	#2 Ga	#1 Ga	#1/0	#3/0	#4/0	250MCM	300MCM

**CAUTION** Make sure the engine is running at full speed whenever welding.

**NOTE:** If the engine stops and the alarm lamps for lubricating oil pressure or coolant temperature light up, check the engine immediately for the cause of failure and correct it. It is normal for the indicator lamps to light for a few seconds while starting the engine. This is an inherent characteristic of the safety shut-down circuit and should be ignored unless the light remains on for more than 30 seconds.

The following table lists the amperages of the low and high range settings of the welder and the corresponding electrode diameters to be used with each.

Welder Current "Heat" Ranges	Electrode Diameter
LOW Range 60 A to 140 A	1/16" to 5/32"
HIGH Range 120A to 270A	1/8" to 1/4"

## AC GENERATOR LOADS

The AC output receptacles are located on the right side of the control panel. Two (2) 120 volt, 15/20 amp duplex receptacles (NEMA 5-20R) are for normal 120 volt electrical loads such as tools and lights. In addition, three (3) twist-lock receptacles have been provided to allow longer cords to be used without being pulled out. All AC loads are protected by a main line circuit breaker (MLCB) that can also serve as a load disconnect switch.

**CAUTION** Be sure that the combined AC and welding load does not exceed the power capacity of your unit. Check the dual power table to insure proper load balance. Plug in the cords and tools only after having checked to ensure a satisfactory balanced operation.



## SPECIAL FEATURES

### AUTOMATIC IDLE CONTROL

The idle control circuit automatically reduces the engine speed whenever BOTH the welding is interrupted and the AC load is turned off. This idle control circuit automatically restores the engine to rated speed when either the welding is resumed or the AC load or tool is turned on. When you interrupt the load (DC or AC), the welder/generator automatically waits ten seconds before energizing the idle solenoid. This delay feature is of primary benefit when welding.

### DUAL-POWER SIMULTANEOUS DC/AC POWER

You can use the WINCO WG-270-A as welder and a generator at the same time. The WG-270-A supplies electric power to the AC electrical loads such as electric lights and tools while the welding continues unaffected.

**CAUTION** When using the AC power at the same time as welding, be sure to consult the dual power table to ensure that the engine will not be overloaded.

Dual Power Table			
DC Welder (Welder Current) Amps DC	AC Generator Output		
	(AC Current @) 240V or 120V*		(Total AC Power) Watts
60A	29.2A	58.4A	7000 W
130A	25.0A	50.0A	6000 W
160A	18.8A	37.5A	4500 W
200A	12.5A	25.0A	3000 W
230A	6.3A	12.5A	1500 W
270A	Light loads (less than 500 watts)		

\*240 volt or 120 volt load current. Combinations of current not to exceed the total AC load power (watts).

### USING THE DUAL POWER TABLE

To arrive at the number of watts, use the following equation:

$$\text{volts} \times \text{amps} = \text{watts}$$

*Example:*

$$240 \text{ volts} \times 12.5 \text{ amps} = 3000 \text{ watts}$$

$$120 \text{ volts} \times 25.0 \text{ amps} = 3000 \text{ watts}$$

Even though the multipliers are different in the two equations above, the totals are equal.

Always multiply the volts and amps for each voltage separately and then ADD the total watts together to determine the total load.

*Example:*

$$\text{Drill nameplate data } 120 \text{ V AC @ } 1.7 \text{ A}$$

$$\text{Compressor Data } 240 \text{ V AC @ } 5.4 \text{ A}$$

Calculate the AC Load (watts):

$$\text{volts} \times \text{amps} = \text{watts}$$

$$120 \text{ volts} \times 1.7 \text{ amps} = 204 \text{ watts}$$

$$240 \text{ volts} \times 5.4 \text{ amps} = 1296 \text{ watts}$$

$$\underline{1500 \text{ watts total}}$$

### AUTOMATIC SAFETY SHUTDOWN CIRCUIT

This unit has a unique automatic shutdown circuit. In the event of either cooling system or lubricating system malfunction, the engine will stop automatically and the appropriate (HCT or LOP) failure light will be latched on to indicate the cause of failure.

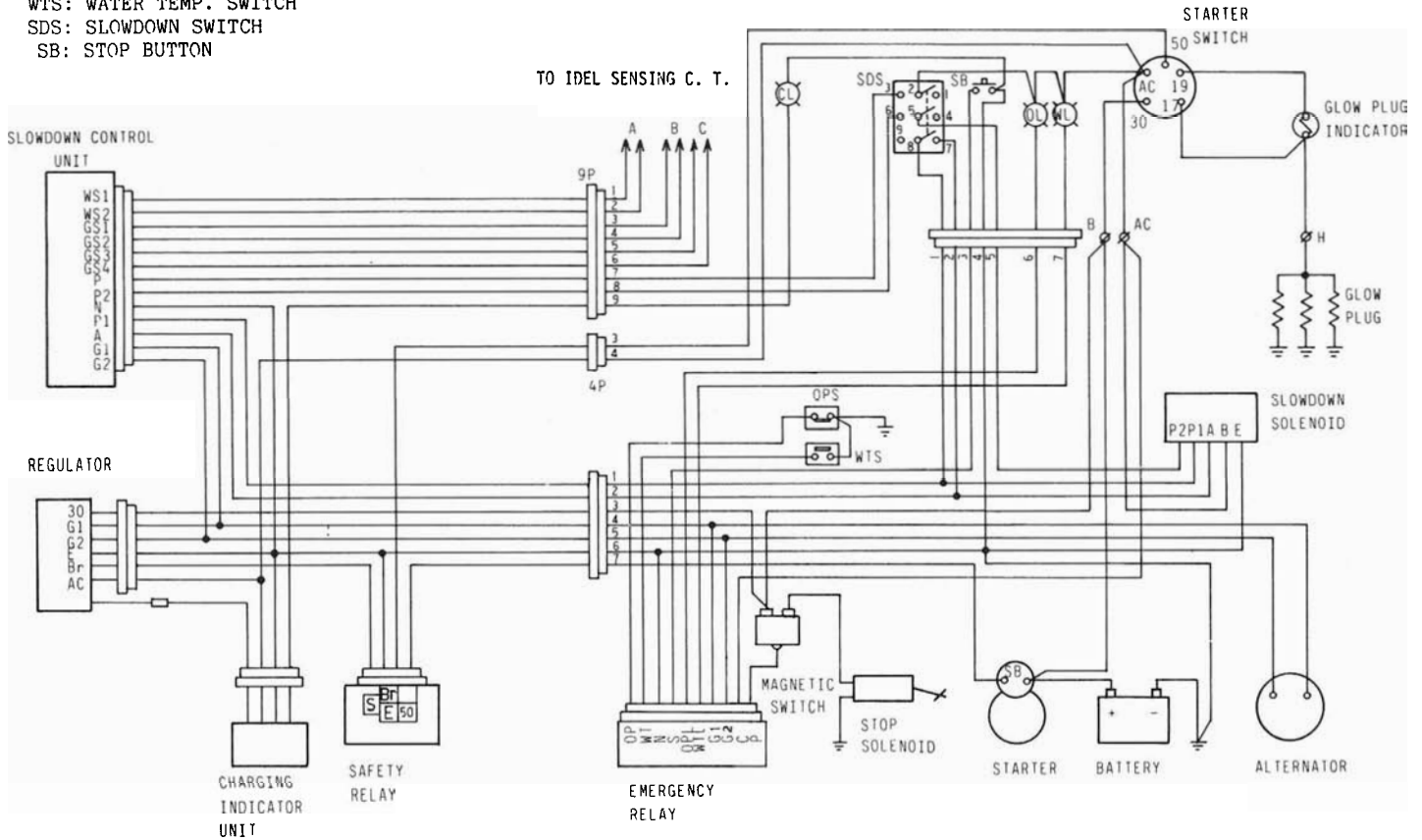
## TROUBLESHOOTING TABLE

Symptom	Possible Cause	Remedy
No power generated in AC generator	Stator coil open or shortcircuited	Replace
	Field coil open or shortcircuited	Replace
	Poor brush contact / worn brush	Replace brush
	Dirty slip rings	Polish with sandpaper
	Worn slip rings	Turn in lathe
	Field/armature core abrasion	Replace bearings
No power generated in controls	Broken field coil lead wire	Repair and connect
	Defective voltage regulator	Replace
	Open wiring to voltage regulator	Replace and connect
	Loose connections	Fasten, repair, connect

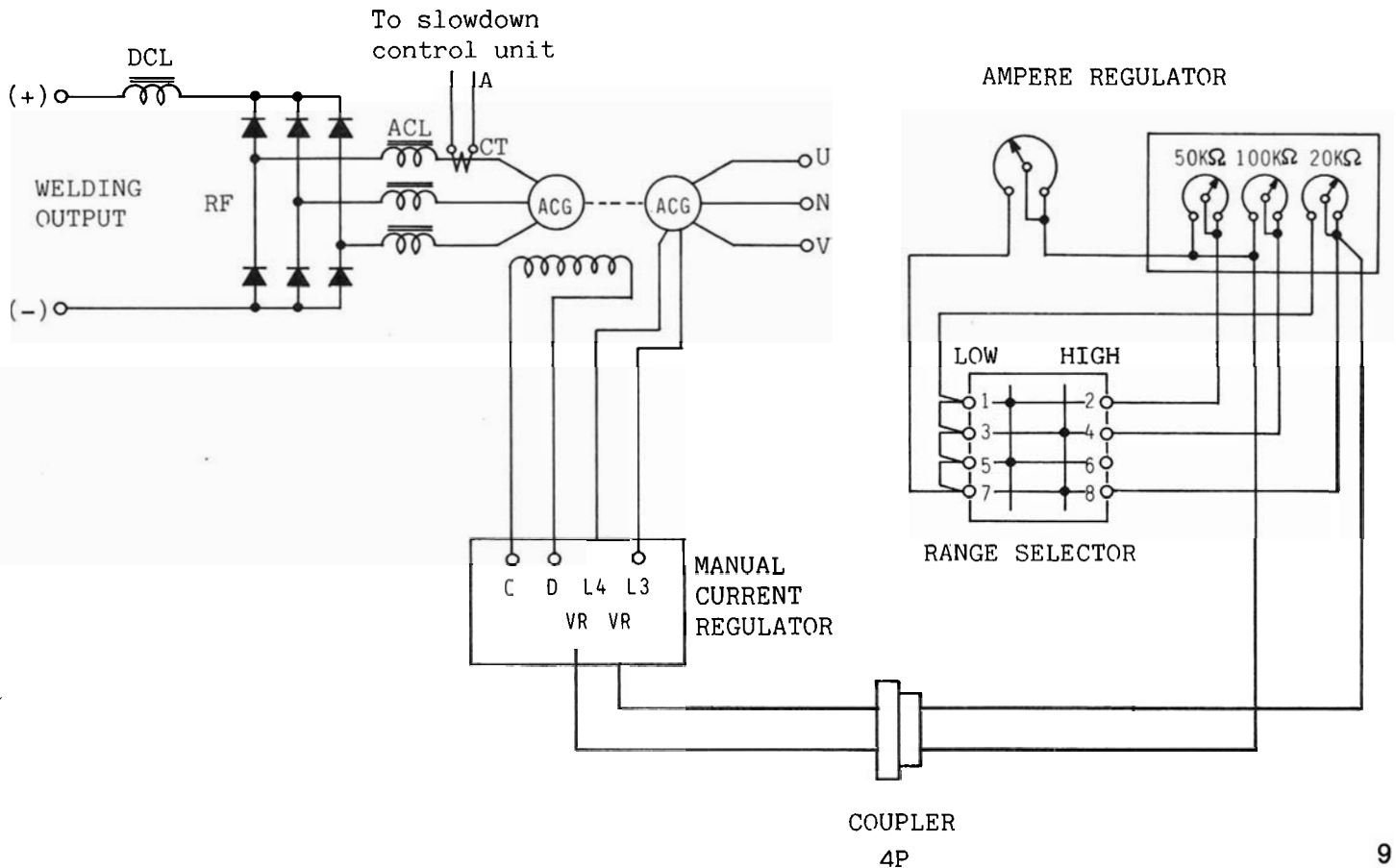
Symptom	Possible Cause	Remedy
No DC welding	Low output or rotation	Reset speed lever set screw to the designated position; check and replace worn or defective parts
	Overloading engine	Use smaller welding rod
	Too long and wider size cable	Replace with heavier cable
	Imperfect ground contact	Clean rust and paint
	Change in voltage regulator adjustment	Adjust
	Field coil partial shortcircuit	Repair or replace
Starting failure—starting motor not turning	Discharged battery	Recharge or replace
	Defective start solenoid	Replace
	Defective starting motor	Replace
	Broken leads	Repair
Starting failure—starting motor turns	Defective fuel stop solenoid	Replace
	Defective preheat circuit	Replace or repair
	Empty fuel tank	Refuel
	Other problems	Repair engine
Engine starts but remains at low speed	Idle control switch is ON	Turn it OFF
	Defective idle control circuit	Repair
	Air in fuel line	Draw it out
	Clogged fuel strainer	Clean strainer
	Clogged air cleaner	Clean elements
No DC welding possible; no power	Broken leads	Replace
Poor welding; low AC voltage	Defective AVR	Replace or repair
	Insufficient engine RPM	Adjust or repair engine
	Short in excitor winding	Replace
	Short in generator's AC stator	Replace
Welding possible but weak arc; AC power source usable	Poorly adjusted current regulator	Re-adjust
	Improper cable length and size	Change to proper one
	Defective rectifiers (RF)	Replace
	Broken leads	Replace
Welding possible; AC power not available	Power contact in carbon brush	Replace or repair
	Defective circuit breaker	Replace
	Broken leads	Repair
Battery discharges	Defective alternator or voltage regulator	Replace
	Broken lead wires	Replace
Engine exhibits overload condition	Short in generator stator leads	Repair
	Short in rectifiers (RF)	Replace
	Defective generator bearing	Replace
Excessive vibration	Engine malfunction shock mount failure	
Abnormal noise	Noise from engine	Repair
	Defective bearing in generator	Replace
	Loose bolts in generator	Retighten
	Noise from protective cover	Repair
Idle control switch ON but no drop in RPM	Defective idle control	Replace
	Defective solenoid	Replace
	Broken lead wires	Repair
With idle control switch ON, weld arc starts but no rise in RPM	Defective idle control	Replace
	Adjustment of idle control solenoid switch defective	Adjust
	Broken lead wires	Repair
With idle control switch ON, 100 watt or larger load is connected, but no rise in RPM	Defective idle control switch	Replace
	Defective current transformer (CT)	Replace
	Broken lead wires	Repair

## Wiring Diagram of DC Engine Control Circuit

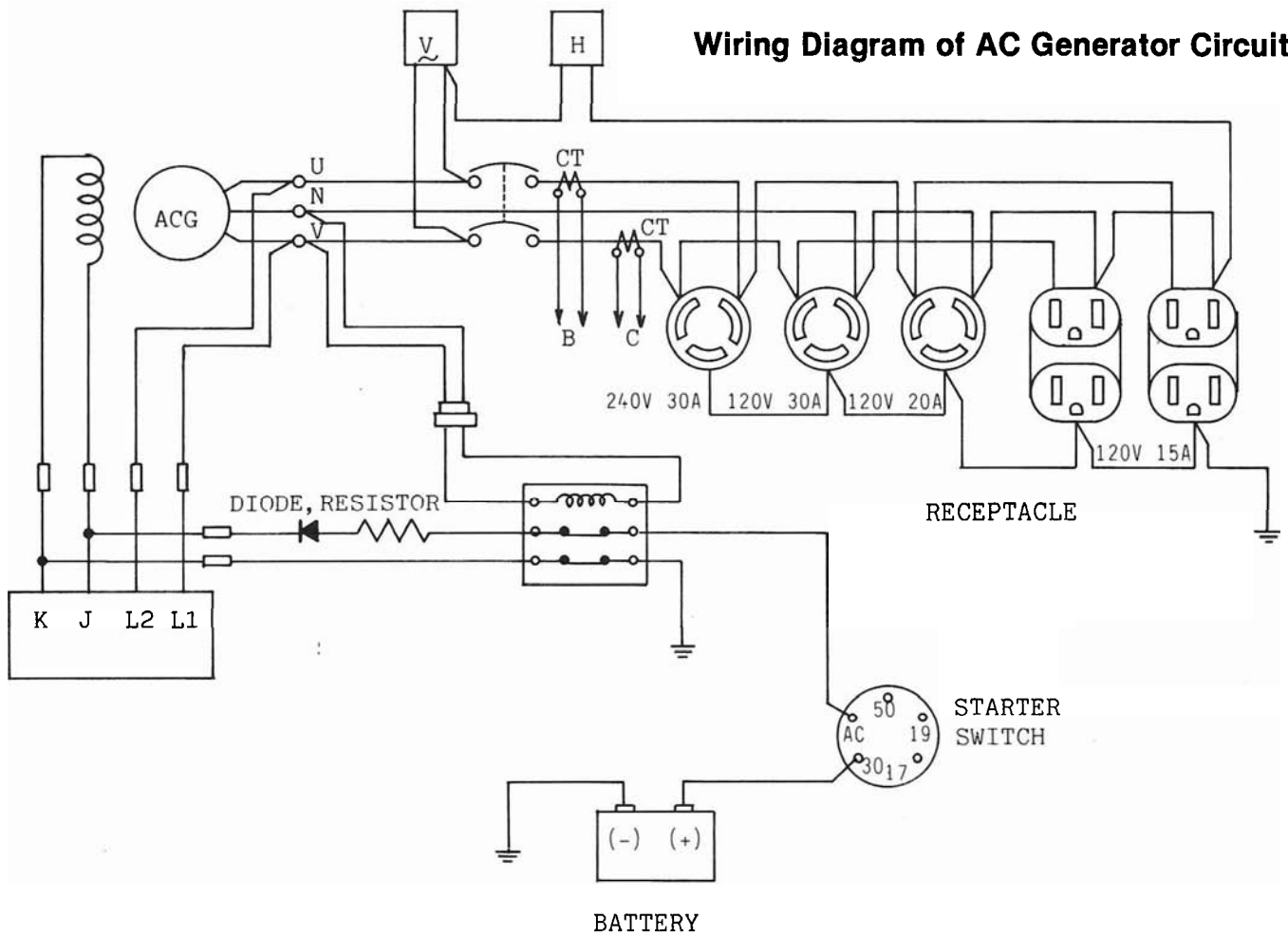
- CL: CHARGE LAMP
- OL: ALARM LAMP FOR LOW OIL PRESSURE
- WL: ALARM LAMP FOR HIGH COOLANT TEMPERATURE
- OPS: LUB. OIL PRESS. SWITCH
- WTS: WATER TEMP. SWITCH
- SDS: SLOWDOWN SWITCH
- SB: STOP BUTTON



## Wiring Diagram of DC Welder Circuit



## Wiring Diagram of AC Generator Circuit



## Complete Unit Wiring Diagram

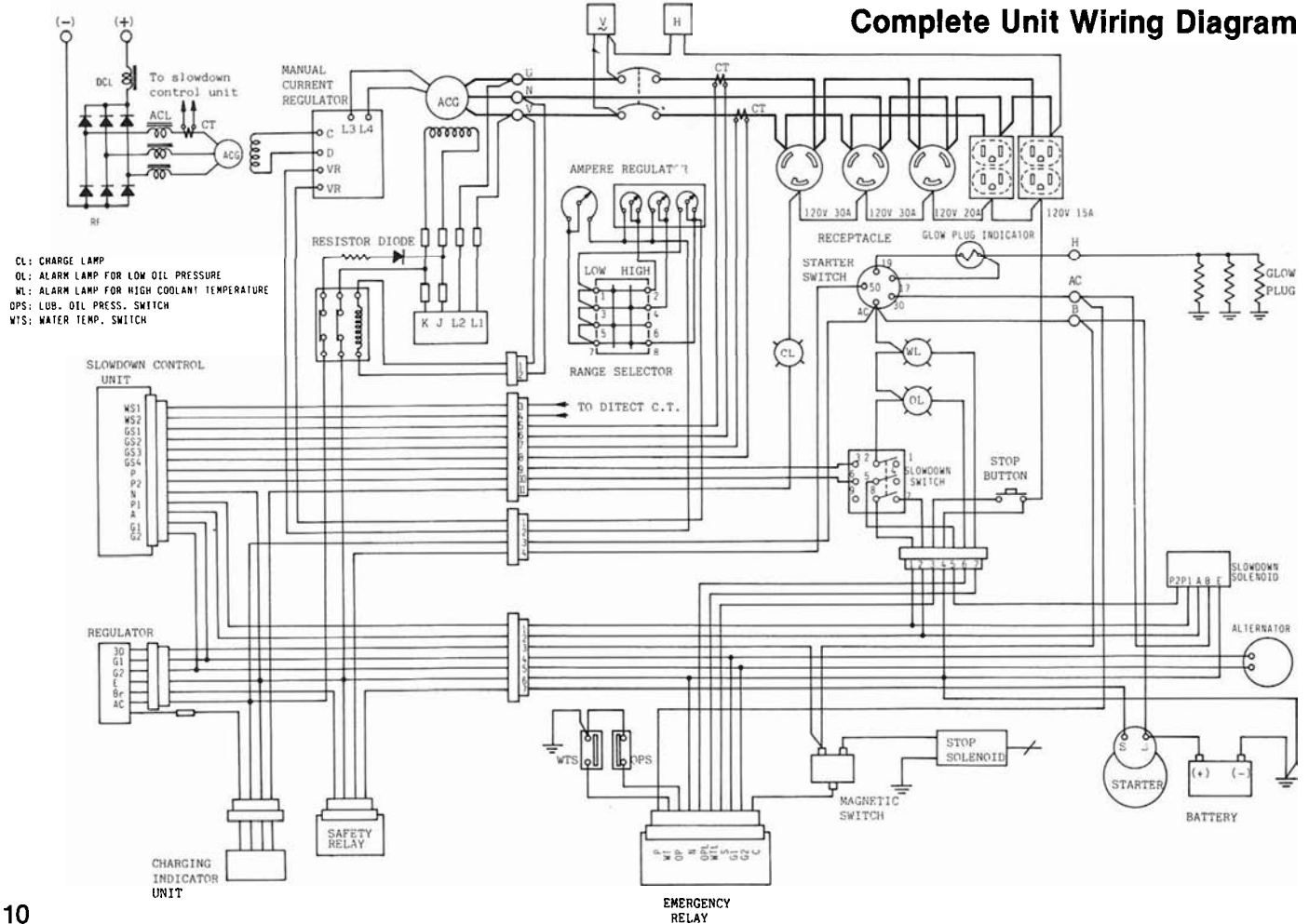
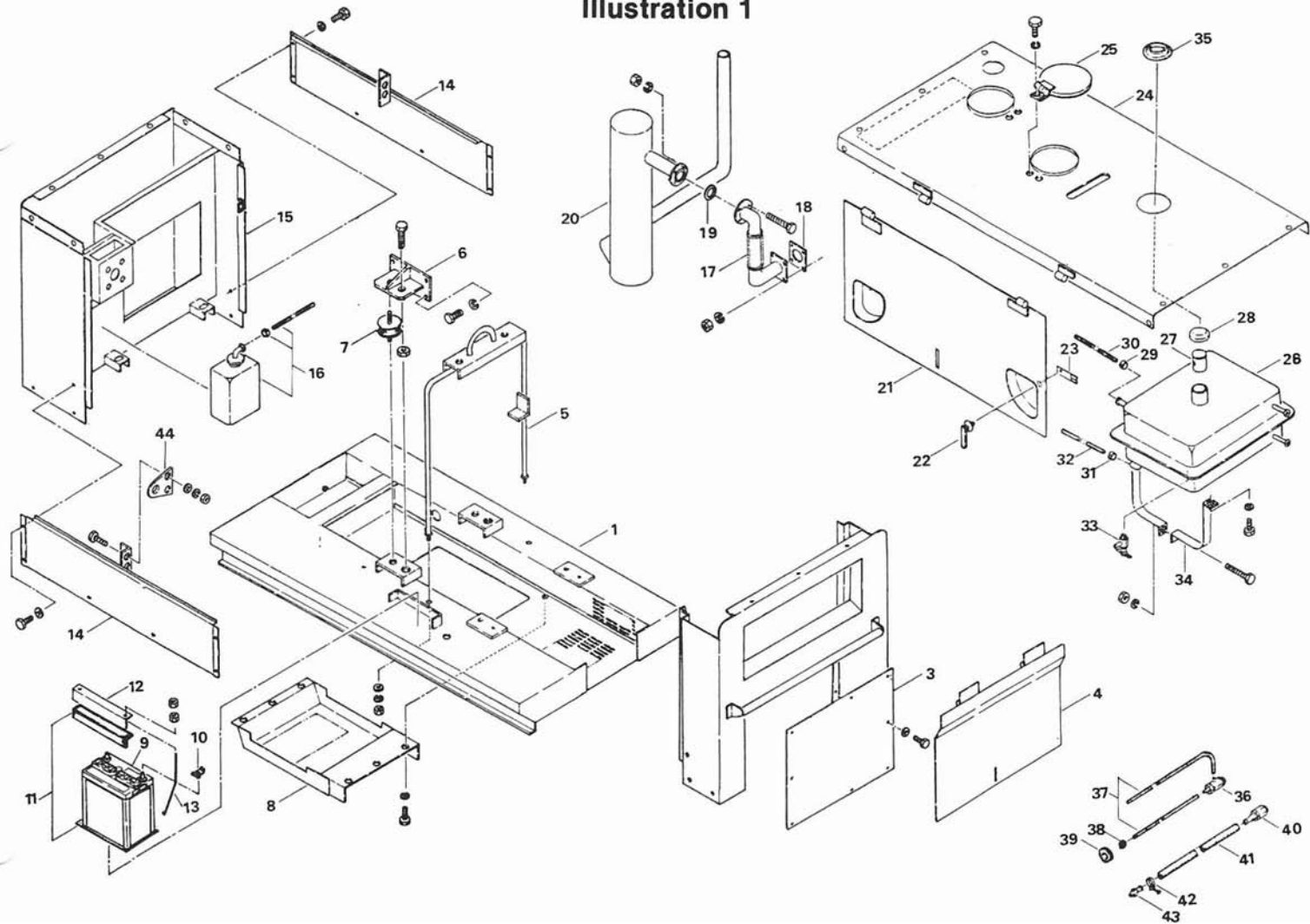


Illustration 1

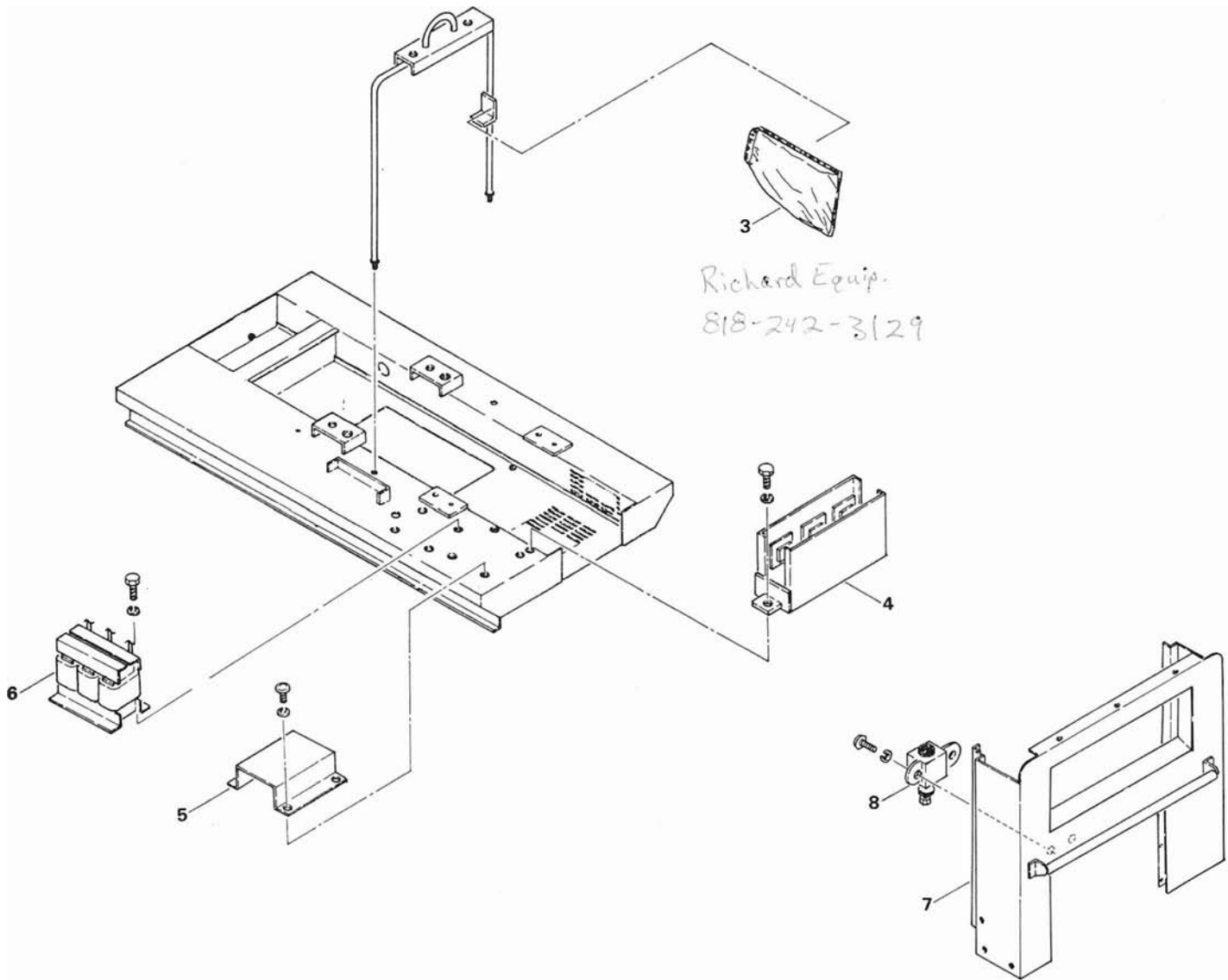


Ref.	Description	Part No.	Qty.
01	31380040 Frame	82376-101	1
03	31390100 Cover	82376-103	1
04	31390110 Cover	82376-104	1
05	31130180 Lift Yoke	82376-105	1
06l	21021020 Eng Foot—L	82376-106	1
06r	21071030 Eng Foot—R	82376-156	1
07	02220036 Shock Assy.	82376-107	4
08	31390120 Cover	82376-108	1
09	91010030 Battery	82376-109	1
10	92040020 Terminal	82376-110	2
11	22050030 Pad Kit	82376-111	1
12	21130030 Retainer	82376-112	1
13	22020150 Bolt	82376-113	2
14	31190660 Side Panel	82376-114	1
15	31190670 Side Panel	82376-115	1
16	1537772401 Tank	82376-116	1
17	31081070 Flex Pipe	82376-117	1
18	31090280 Gasket	82376-118	1
19	31090290 Gasket	82376-119	1
20	31070910 Muffler	82376-120	1
21	31210330 Access Door	82376-121	2
22	31020070 Handle	82376-122	4
23	31280150 Handle Stop	82376-123	4
24	31180130 Roof	82376-124	1
25	31390130 Cover	82376-125	2

Ref.	Description	Part No.	Qty.
26	92010610 Fuel Tank	82376-126	1
27	91070010 Strainer	82376-127	1
28	91060010 Cap	82376-128	1
29	91040010 Hose Clamp	82376-129	1
30	32050160 Hose (rtn)	82376-130	1
31	91040010 Hose Clamp	82376-131	1
32	32050150 Hose (Sup)	82376-132	1
33	91050120 Drain Cock	82376-133	1
34	91130210 Tank Strap	82376-134	4
35	31310020 Rubber Cap	82376-135	1
36	91050010 C.W. Drain	82376-136	1
37	32050190 Hose	82376-137	1
38	91040020 Hose Band	82376-138	1
39	91020030 Grommet	82376-139	1
40	91050020 Oil Drain	82376-140	1
41	32050180 Hose	82376-141	1
42	91040030 Hose Band	82376-142	1
43	91050030 Union Plug	82376-143	1
44	91130220 Lock Stay	82376-144	2
NI*	159372065 Radiator	82376-145	1
NI*	1554511012 Air Cleaner	82376-146	1

\* Not Illustrated.

## Illustration 2



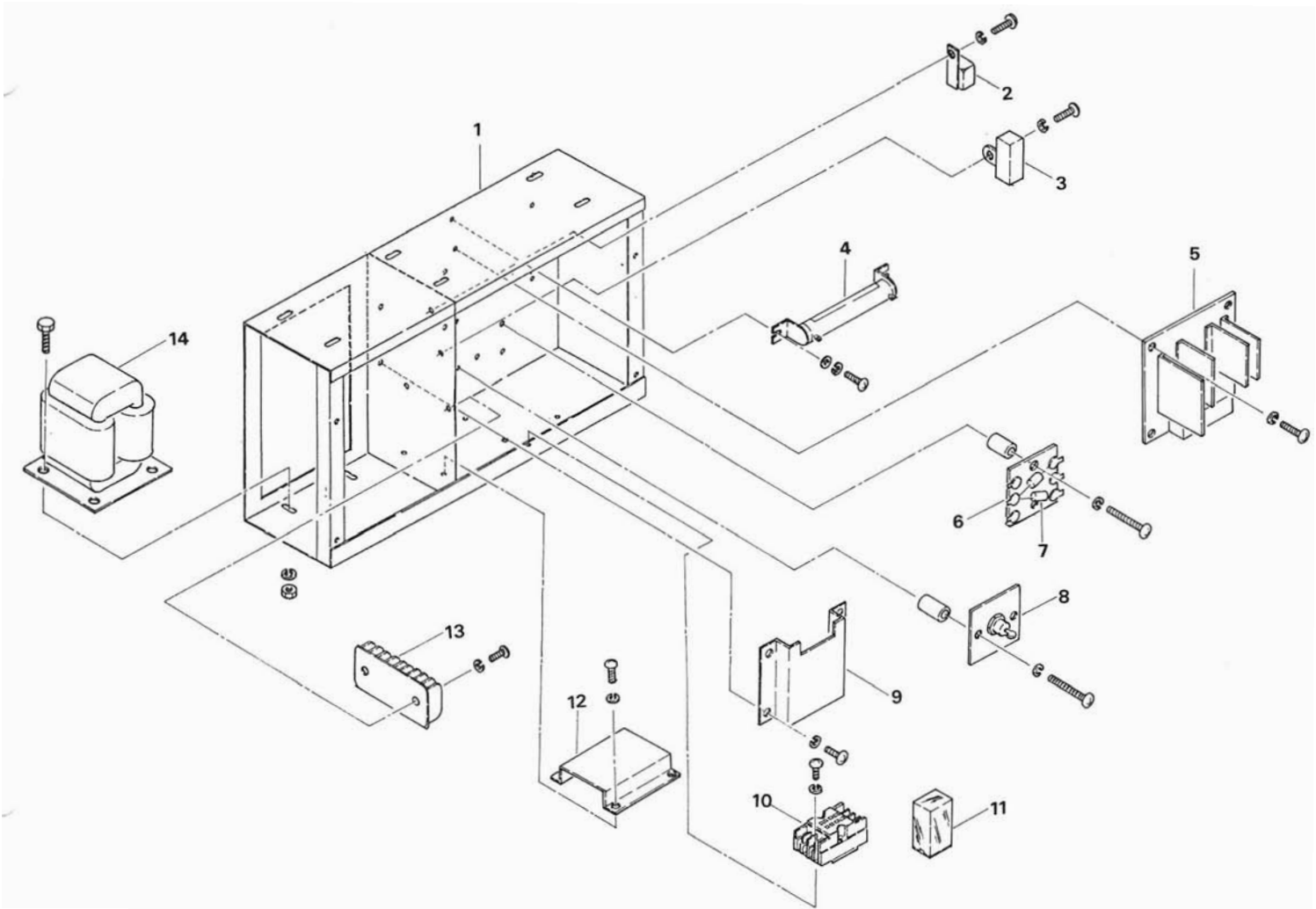
Ref.	Description	Part No.	Qty.
03	52190010 Idle Sol.	82376-203	1
04S	51210470 Diode Kit	82376-204	3
04R	51210480 Diode Kit	82376-214	3
05	51500020 Relay, SLR	82376-205	1
06	51740030 AC Reactor	82376-206	1
07	31190010 Side Panel	82376-207	1
08	51270010 Magnet Sw.	82376-208	1
NI*	1547160010 Fuel Stop Solenoid	82376-209	1

*we can make*

\* Not illustrated.

Kabota Parts  
have long Numbers

Illustration 3



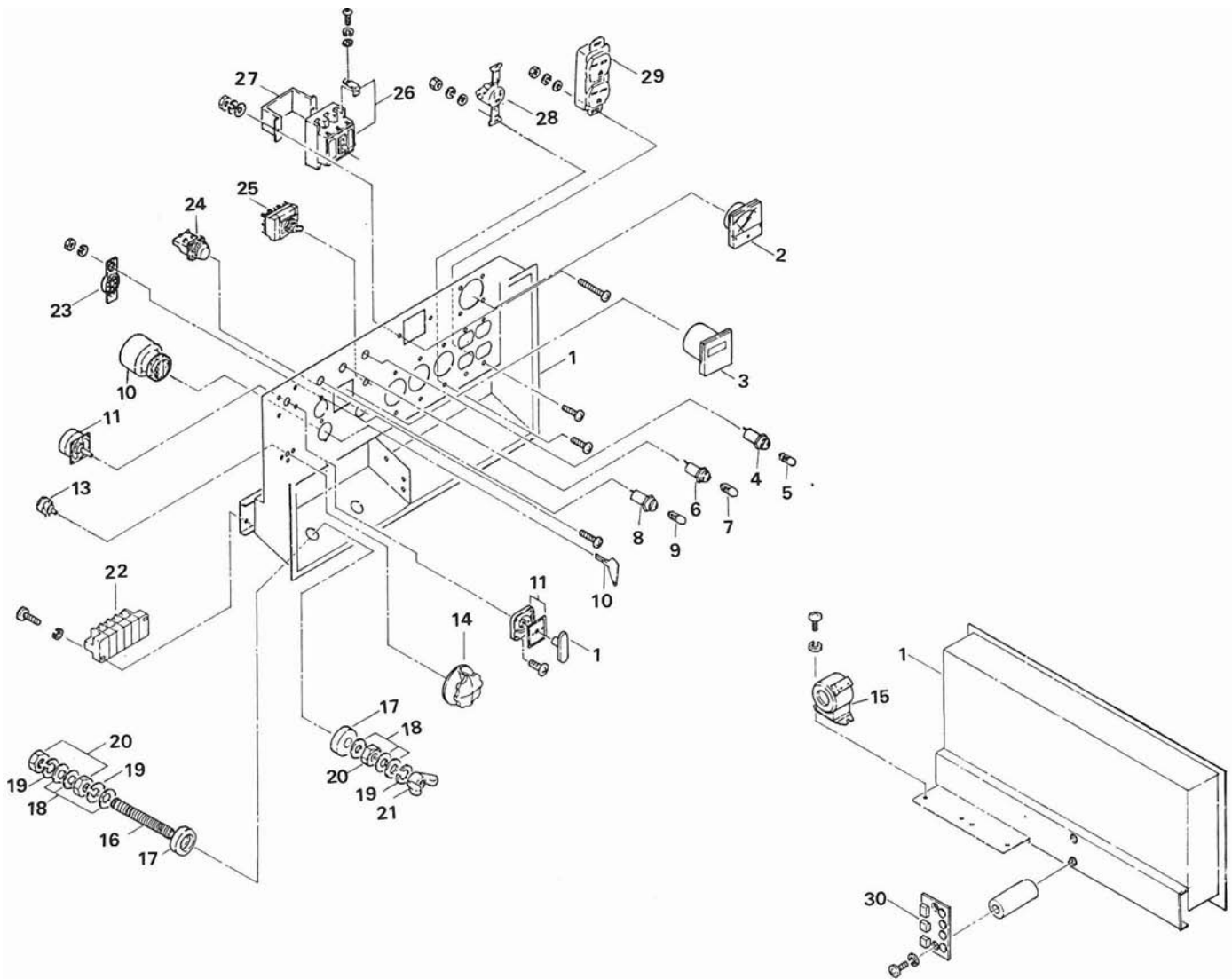
Ref.	Description	Part No.	Qty.
01	51840020 Inst. Plate	82376-301	1
02	1518160221 Relay	82376-302	1
03	1518160191 Chg Ind.	82376-303	1
04	51110080 Resistor	82376-304	1
05	52020560 Amp. Reg.	82376-305	1
06	61850030 Ckt Bd—Bare	82376-306	1
07	51210260 Diode	82376-307	2
08	51210220 Diode	82376-308	1
09	52140010 Idle Cntrl	82376-309	1
10	51290080 Socket	82376-310	1
11	51280450 Relay <small>Stages 30</small>	82376-311	1
12	52021070 A Volt Reg.	82376-312	1
13	1518164601 Alt Reg.	82376-313	1
14	51740040 DC Reactor	82376-314	1

-Get from Kabota

same as 82441-226

-Get from Kabota (Bat. Reg.)

### Illustration 4



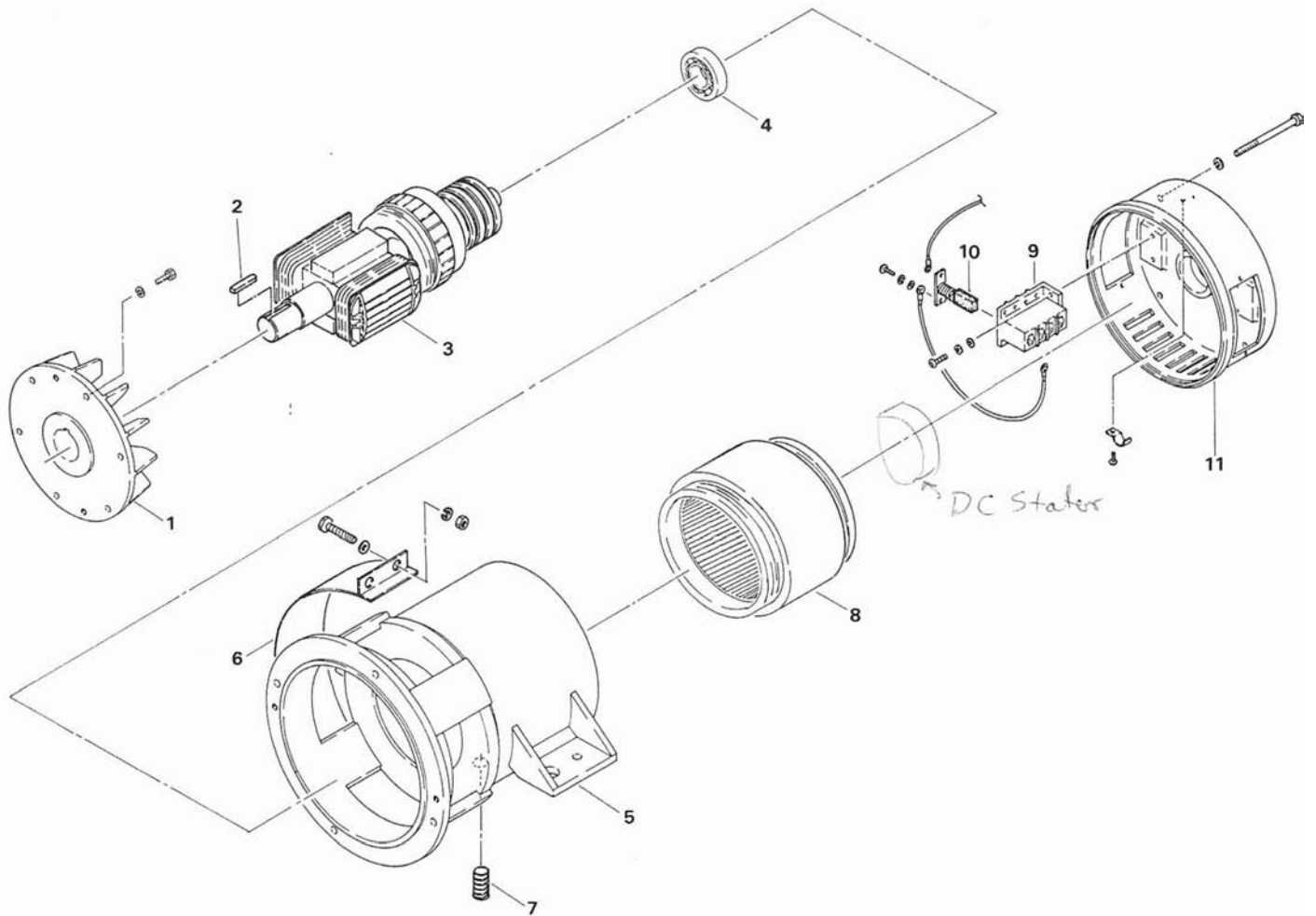
Ref.	Description	Part No.	Qty.
01	51020550 Panel—Bare	82376-401	1
02	51050440 Voltmeter	82376-402	1
03	51650070 E. Time Mtr	82376-403	1
04	51160050 Charge Lamp	82376-404	1
05	51170160 Bulb	82376-405	1
06	51160040 Oil Lamp	82376-406	1
07	51170160 Bulb	82376-407	1
08	51160050 Temp. Lamp	82376-408	1
09	51170160 Bulb	82376-409	1
10	1537763612 Start Sw.	82376-410	1
11	51350370 Range Sel.	82376-411	1
12	51190170 Knob	82376-412	1
13	51100240 Amp. Reg.	82376-413	1
14	51190090 Knob	82376-414	1
15	51140470 Transformer	82376-415	2

Ref.	Description	Part No.	Qty.
16	61040289 Stad Bolt	82376-416	2
17	52030050 Bush. Kit	82376-417	2
18	01090013 Washer	82376-418	12
19	01100040 Spr. Washer	82376-419	6
20	01070013 Nut	82376-420	6
21	01240002 Wing Nut	82376-421	2
22	51150100 Ter. Block	82376-422	1
23	1553165951 Glow Plug	82376-423	1
24	51230060 Stop Button	82376-424	1
25	51420170 Id Ctl Sw.	82376-425	1
26	51240670 Circ. Brkr.	82376-426	1
27	51260120 Brkr. Ret.	82376-427	1
28a	L5-20 TLR 120V/20A	56270-000	1
28b	L5-30 TLR 120V/30A	56359-000	1
28c	L6-30 TLR 240V/30A	57324-000	1
29	5-20 DPR 120V/20A	50766-000	2
30	52070030 Resist Unit	82376-430	1

Kabota



**Illustration 5**



Ref.	Description	Part No.	Qty.
01	11061600 Coupling	82376-551	1
02	01161519 Key	82376-552	1
03	12331260 Rotor Kit	82376-553	1
04	01200008 Ball Bear.	82376-554	1
05	11011820 Yoke	82376-555	1
06	11201570 Cover	82376-556	1
07	01030170 Set Screw	82376-557	2
08	12062230 Stator	82376-558	1
09	11140051 Brush Holder	82376-559	2
10	11130020 Carb Brush	82376-560	8
11	11022000 Bracket	82376-561	1

DC weld stator

- 568

\$459

457 AC