PARTS AND OPERATION MANUAL

MQ POWER
Model DCA-10SPX3
Digital Generator Set
Voice Stream

Revision #0 (07/12/00)

MULTIQUIP INC.
18910 WILMINGTON AVE.
CARSON, CALIFORNIA 90746
310-537-3700
800-421-1244
FAX: 310-537-3927

PARTS DEPARTMENT:
800-427-1244
FAX: 800-672-7877

SERVICE DEPARTMENT:
800-478-1244
FAX: 310-537-4259

E-mail:mq@multiquip.com • www:multiquip.com

WARNING

CALIFORNIA — Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

PARTS DEPARTMENT
800/427-1244 or 310/537-3700
FAX: 800/672-7877 or 310/637-3284

SERVICE DEPARTMENT
800/835-2551 or 310/537-3700
FAX: 310/638-8046

WARRANTY DEPARTMENT
800/835-2551 or 310/537-3700
FAX: 310/638-8046

MAIN
800/421-1244 or 310/537-3700
FAX: 310/537-3927

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DCA-10SPX3 Digital AC Generator

Kubota V2203 Engine

- **Dealer account number**
- **Dealer name and address**
- **Shipping address (if different than billing address)**
- **Return fax number**
- **Applicable model number**
- **Quantity, part number and description of each part**
- **Specify preferred method of shipment:**
  - UPS Ground
  - UPS Second Day or Third Day*
  - UPS Next Day*
  - Federal Express Priority One (please provide us with your Federal Express account number)*
  - Airborne Express*
  - Truck or parcel post

**Normally shipped the same day the order is received, if prior to 2PM west coast time.*

Earn Extra Discounts when you order by FAX!

All parts orders which include complete part numbers and are received by fax qualify for the following extra discounts:

Number of line items ordered	Additional Discount
1-9 items	3%
10+ items**	5%

Extra Fax Discount for Domestic USA Dealers Only

Up to 5% extra savings!

UPS Special
For faxed orders only

Get special freight allowances when you order 10 or more line items via FAX!**

- UPS Ground Service **at no charge for freight**
- PS Third Day Service **at one-half of actual freight cost**

No other allowances on freight shipped by any other carrier.

**Common nuts, bolts and washers (all items under $1.00 list price) do not count towards the 10+ line items.

DISCOUNTS ARE SUBJECT TO CHANGE

Fax order discount and UPS special programs revised June 1, 1995

Now! Direct TOLL-FREE access to our Parts Department!

Toll-free nationwide:

800-421-1244

Toll-free FAX:

800/6-PARTS-7 • 800-672-7877

CAUTION:

Failure to follow instructions in this manual may lead to serious injury or even death! This equipment is to be operated by trained and qualified personnel only! This equipment is for industrial use only.

The following safety guidelines should always be used when operating the DCA-10SPX3 portable generator:

GENERAL SAFETY

■ **DO NOT** operate or service this equipment before reading this entire manual.

■ This equipment should not be operated by persons under 18 years of age.

■ **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, steel-toed boots and other protective devices required by the job.

■ **NEVER** operate this equipment when not feeling well due to fatigue, illness or taking medicine.

■ **NEVER** operate this equipment under the influence or drugs or alcohol.

■ **NEVER** use accessories or attachments, which are not recommended by MQ Power for this equipment. Damage to the equipment and/or injury to user may result.

■ Manufacturer does not assume responsibility for any accident due to equipment modifications.

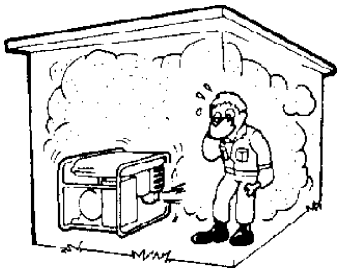
■ Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.

■ Always check the machine for loosened threads or bolts before starting.

■ **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing engine or generator.

■ **High Temperatures** – Allow the engine to cool before adding fuel or performing service and maintenance functions. Contact with *hot* components can cause serious burns.

■ The engine of this generator requires an adequate free flow of cooling air. Never operate the generator in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause serious damage to the generator or engine and may cause injury to people. Remember the generator engine gives off DEADLY carbon monoxide gas.



CAUTION:

■ Always refuel in a well-ventilated area, away from sparks and open flames.

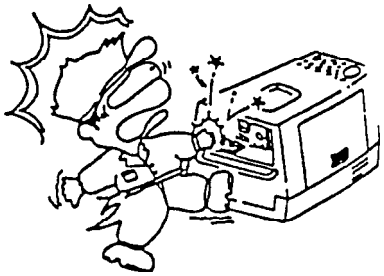
■ Always use extreme caution when working with **flammable** liquids. When refueling, **stop the engine** and allow it to cool.

DO NOT smoke around or near the machine. Fire or explosion could result from fuel vapors, or if fuel is spilled on a hot engine.

■ **NEVER** operate the generator in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe *bodily harm or even death.*

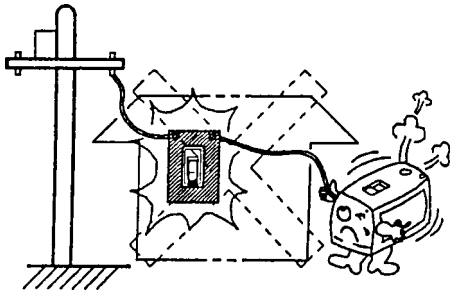
■ Topping-off to filler port is dangerous, as it tends to spill fuel.

CAUTION:



■ **NEVER** touch output terminals during operation. This is extremely dangerous. Always stop the machine when contact with the output terminals is required.

CAUTION:



■ **Never** connect the generator to house wiring. This is illegal and very dangerous. Electrical shock could occur causing damage to the generator and bodily harm even death.

CAUTION:

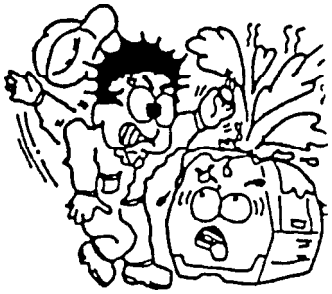
■ **Never** use damaged or worn cables when connecting power tools or equipment to the generator. Make sure power connecting cables are securely connected to the geneartor's output terminals, insufficient tightening of the terminal connections may cause damage to the generator and electrical shock.

CAUTION:

■ **DO NOT** touch or open any of the below mentioned components while the generator is running. Always allow sufficient time for the engine and generator to cool before performing maintenance.

Radiator

1. **Radiator Cap -** Removing the radiator cap while the engine is hot will result in high pressurized, boiling water to gush out of the radiator, therefore causing severe scalding to any persons in the general area of the generator.



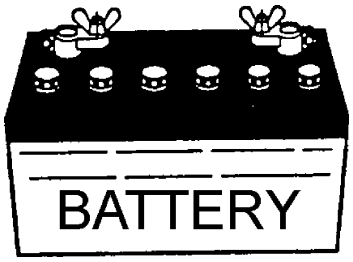
2. **Coolant Drain Plug -** Removing the coolant drain plug while the engine is hot will result in hot coolant to gush out of the coolant drain plug, therefore causing severe scalding to any persons in the general area of the generator.
3. **Engine Oil Drain Plug -** Removing the engine oil drain plug while the engine is hot will result in hot oil to gush out of the oil drain plug, therefore causing severe scalding to any persons in the general area of the generator.

Battery

CAUTION:

- Never over fill the battery with water above the upper limit.

The battery has acids that can cause injury to the eyes and skin. To avoid eye irritation, always wear safety glasses. Use well insulated gloves when picking up the battery. Use the following guidelines when handling the battery:



1. **DO NOT** drop the battery. There is the possibility of risk the battery may explode.
2. **DO NOT** expose the battery to open flames, sparks, cigarettes etc. The battery contains combustible gases and liquids. If these gases and liquids come in contact with a flame or spark, an explosion could occur.
3. Always keep the battery charged. If the battery is not charged, a buildup of combustible gas will occur.
4. Always keep battery charging and booster cables in good working condition. Repair or replace all worn cables.
5. Always recharge the battery in an open air environment, to avoid risk of a dangerous concentration of combustible gases.
6. In case the battery liquid (dilute sulfuric acid) happens to come in contact with ***clothing or skin***, rinse skin or clothing immediately with plenty of water.
7. In case the battery liquid (dilute sulfuric acid) happens to come in contact with your **eyes**, rinse eyes immediately with plenty of water, then contact the nearest doctor or hospital, and seek medical attention.

- **NEVER** Run engine without air filter. Severe engine damage may occur.
- Always service air cleaner frequently to prevent carburetor malfunction.
- Always disconnect the battery before performing service on the generator.
- Always be sure the operator is familiar with proper safety precautions and operations techniques before using generator.
- Always store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children.
- **DO NOT** leave the generator running in the manual mode unattended.
- **DO NOT** allow unauthorized people to operate this equipment.
- Always read, understand, and follow procedures in Operator's Manual before attempting to operate equipment.
- Always be sure the operator is familiar with proper safety precautions and operations techniques before using generator.
- Refer to the ***Kubota Engine Owner's Manual*** for engine technical questions or information.

Loading and Unloading (Crane)

- Before lifting, make sure the generator's lifting hook is secure and that there is no apparent damage to the generator itself (loose screws, nuts and bolts). If any part is loose or damaged, please take corrective action before lifting.
- Always drain fuel prior to lifting.
- Always make sure crane or lifting device has been properly secured to the hook of guard frame on generator.
- **NEVER** lift the machine while the engine is running.
- Use adequate lifting cable (wire or rope) of sufficient strength.
- When lifting the generator, always use the balanced center-point suspension hook and lift straight upwards.
- **NEVER** allow any person or animal to stand underneath the machine while lifting.
- When loading the generator on a truck, be sure to use the front and back frame bars as a means to secure the generator during transport.

Transporting

- Always shutdown engine before transporting.
- Tighten fuel tank cap securely.
- Drain fuel when transporting generator over long distances or bad roads.
- Always tie-down the generator during transportation by securing the generator.
- If generator is mounted on a trailer, make sure trailer complies with all local and state safety transportation laws. See page 34 for basic towing procedures.

Emergencies

- Always know the location of the nearest ***fire extinguisher*** and ***first aid kit*.** Know the location of the nearest telephone. Also know the phone numbers of the nearest ***ambulance***, ***doctor*** and ***fire department***. This information will be invaluable in the case of an emergency.

Maintenance Safety

- **NEVER** lubricate components or attempt service on a running machine.
- Always allow the machine a proper amount of time to cool before servicing.
- Keep the machinery in proper running condition.
- Fix damage to the machine immediately and always replace broken parts.
- Dispose of hazardous waste properly. Examples of potentially hazardous waste are used motor oil, coolant, fuel, and fuel filters.
- **DO NOT** use plastic containers to dispose of hazardous waste.
- **DO NOT** pour waste, oil, coolant or fuel directly onto the ground, down a drain or into any water source.

Machine Safety Decals

The DCA10SPX3 generator is equipped with a number of safety decals. These decals are provided for operator safety and maintenance information. The illustration below and on the preceding page shows the decals as they appear on the machine. Should any of these decals become unreadable, replacements can be obtained from your dealer.

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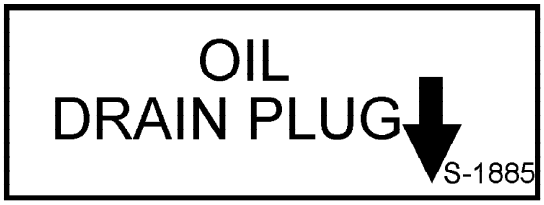

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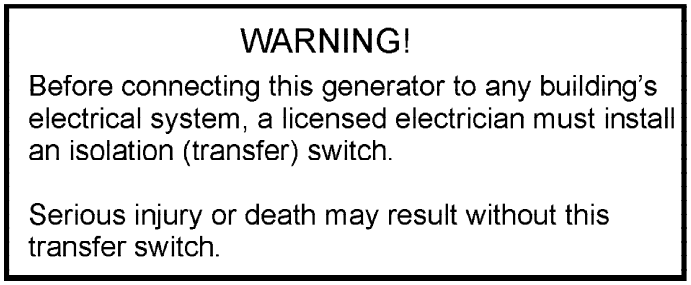

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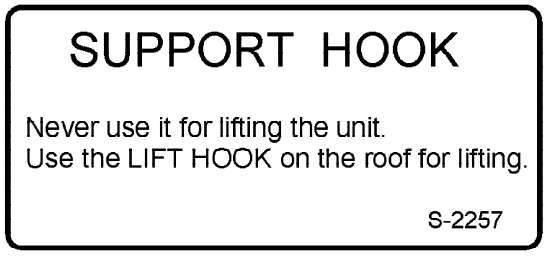

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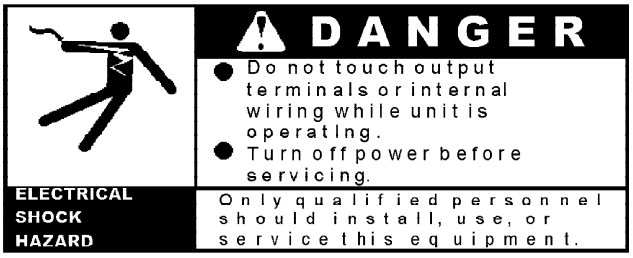

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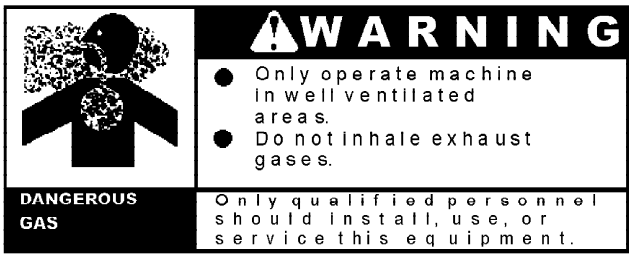

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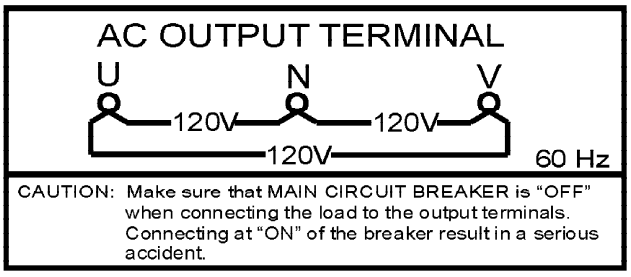

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Machine Safety Decals

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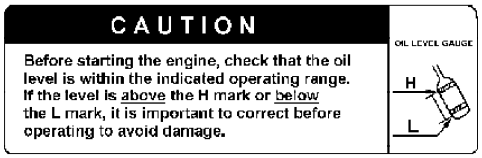

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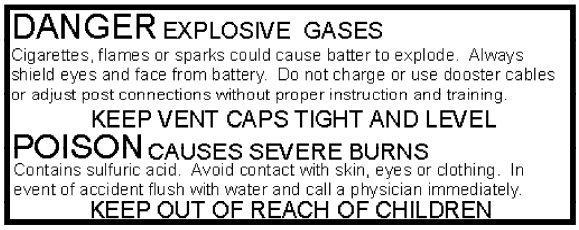

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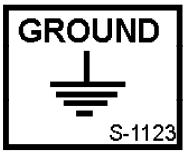

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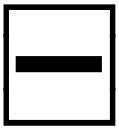

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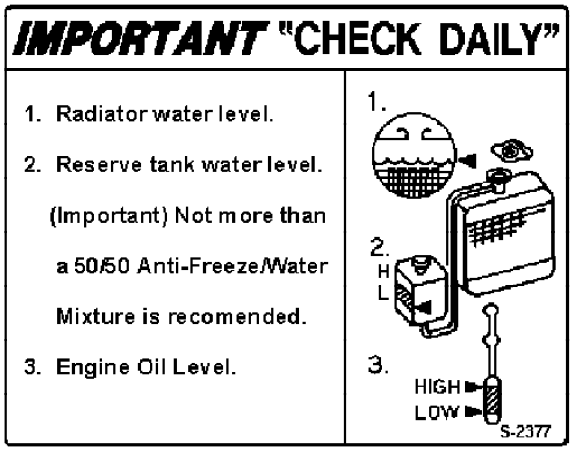

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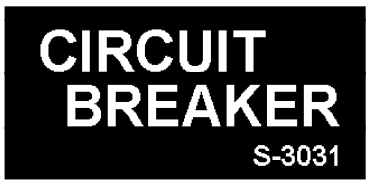

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Table 1. Specifications	
Generator Specifications	
Model	DCA10SPX3 Telecom
Type	Rotating-Field, Protection Type Synchronous Generator
Excitation	Brushless Type (With A.V.R)
Phase	Single Phase
Frequency	60 Hz
Wires	3-Wires (Neutral Grounded)
Max. Rated Output	10.5 kW/16.5 HP @ 1800 rpm
Continious Rated Output	10 kW/16.5 HP @ 1800 rpm
Single Phase Output Voltage	120/240 Volts
Frequency	60 Hz
Power Factor	100%
Rating	Continuous
Engine Specifications	
Model	KUBOTA D1403
Type	Vertical, 3-Cycle
No. of Cylinders	3
Displacement	1393 cu. in.
Bore X Stroke	3.15 in. X 3.64 in. (80 mm X 92.4 mm)
Cooling System	Water-Cooled
Starting System	Electric Start
Cooling Water Capacity	1.4 gal/5.3 liters
Lube Oil Capacity	1.77 gal/6.7 liters
Lubricant (API Class)	Above CC Grade
Battery	12V-70Ah
Fuel	Diesel Fuel Oil No. 2-D
Fuel Consumption	At full load 1.1 gal/hr./ 4.2 liters/hr. At 3/4 load 0.9 gal/hr./ 3.4 liters/hr. At 1/2 load 0.7 gal/hr./ 2.6 liters/hr. At 1/2 load 0.5 gal/hr./ 1.9 liters/hr.
Sound At Full Load	65 dbA (distance = 23 feet)
Dimensions (LxWxH)	56 x 26 x 36 in. (142 x 66 x 91 cm.)
Dry Weight	1123 lbs. (509 kg)

The maximum output of the engine/generator listed above is applicable to supplying electrical power for continuous service at ambient conditions in accordance with SAE Test cord J607. The above ambient conditions are at standard sea level, with a barometric reading of 29.92 inches and a temperature of 60 degrees fahrenheit.

Generally, the engine output power will decrease 3 1/2% for each 1000 feet of altitude above sea level, and 1% for each 10˚ F fahrenheit above the standard temperature of 60˚ F

DCA-10SPX3 NOTES PAGE

DCA-10SPX3 FAMILIARIZATION

Generator

The MQ Power Model DCA-10SPX3 is a 10 kW ***generator*** designed as a portable (requires a trailer for transport) power source for telecom sites, lighting facilities, power tools, submersible pumps and other industrial and construction machinery.

Control Panel

The control panel is provided with the following:

- One GFCI 120 volt receptacle, 20 amp (single-phase)
- 10 kW Output Terminal (UNV)
- Main Circuit Breaker 45 amps
- GFCI Circuit Breaker 20 amps
- ICS-100 DC Digital Control Unit
- ICS-100 AC Digital Control Unit
- Output Voltage Adjustment Knob
- Frequency Adjustment Knob
- Panel Lights
- Ground Terminal
- Lamp Test/ Preheat Switch
- Panel Light Switch

Microprocessor Controlled Alarm System

The DCA-10SPX3 generator is equipped with various alarms and status indicators. These alarms and status indicators add safety to the generator when operating under normal conditions. The DCA-10SPX3 generator is designed to alarm or shutdown in the event of low oil, high coolant temperature, low battery and other operation conditions that may cause severe damage to the generator.

Open Delta Excitation System

The DCA-10PX3 generator is equipped with the state of the art "***Open-Delta***" excitation system. The open delta system consist of an electrically independent winding wound among stationary windings of the AC output section.

There are four Leads: A, B, C and D. During light loads, the power to the ***Automatic Voltage Regulator*** (AVR) is supplied from the leads of B & C, when loads increase, the AVR switches and accepts power from leads A & D. The output of leads A & D increase proportionally with load. This has the effect of adding the voltages of each phase to provide better voltage response during heavy loads.

The connections of the AVR to the AC output windings are for the sole purpose of sensing only. No power is required from these windings.

The open-delta design provides virtually unlimited excitation current due to its independent power supply offering maximum motor starting capabilities. The excitation does not have a "***fixed ceiling***" and responds according the demands of the required load.

Engine

The **DCA-10SPX3** is powered by a 3-cylinder KUBOTA Model D1403 ***diesel*** gasoline engine. This engine is designed to meet every performance requirement for the generator. Reference Table 1, page 13 for engine specifications.

In keeping with MQ Power's policy of constantly improving its products, the specifications quoted herein are subject to change without prior notice.

The basic controls and indicators for the DCA-10SPX3 generator are addressed on the following pages.

Electronic Governor System Option

The electronic governor system replaces the standard mechanical governor system. The frequency regulation improves from ±3.0% regulation with the mechanical governor to ±0.25% regulation with the electronic governor system.

The governor system is made up of three parts: the electronic controller that is mounted on the control panel door; the governor actuator that is mounted on the engine to regulate the pump, and the magnetic pickup used to sense speed. The controller monitors the engine speed of the generator by counting the flywheel teeth with a magnetic pickup. The controller then adjusts the speed of the engine throttle through the actuator to maintain a steady frequency level.

Jacket Water Heater Option

The jacket water heater is a 500-watt heater designed to keep the coolant warm in the engine block for fast starts and load acceptance.. The heater is thermostatically controlled and once an acceptable engine temperature is achieved it will cycle on and off, operating only about 1/3 of the time. This method is more energy efficient than the direct immersion block heater. It is designed to keep the engine coolant between 100 and 120 degrees fahrenheit.

Under normal conditions, 20 to 15 minutes is required to raise the engine temperature of a cold engine to 100 degrees fahrenheit.

NOTE

The Jacket Water Heater is a fully serviceable and is not considered a throw away heater.

The plumbing for the jacket water heater is designed to isolate the heater from the rest of the cooling system should service be required. The coolant does not have to be drained from the engine. There are two ball valves, located one on the cylinder head of the engine, and one at the bottom of the radiator.

CAUTION :

ALWAYS unplug the jacket water heater before servicing or draining the coolant.

There is a bleed screw on the valve on the engine block. After service of either the heater or the cooling system, it may create an air bubble, preventing hot water created by the jacket water heater from circulating. The bleed screw allows for bleeding out the air bubble. When air is in the coolant system, loosen the bleed screw with the radiator cap off until all air escapes.

Battery Charger Option

The 500 watt, 120v battery charger provides automatic charging of lead-acid batteries to help prevent battery failure. The output voltage of the battery charger adjusts to changing input, load, battery, and ambient conditions. It is designed for fast battery charging without overcharging and consequent loss of battery electrolyte.

Overview

The ICS-100 is a microprocessor-based generator set control system. It monitors many functions and may be programmed to monitor virtually any function of the engine-generator set. It uses input from the engine and ancillary monitoring devices to determine and report the status of the engine ancillary systems. All faults are quickly detected and reported to insure reliable operation. The major hardware of the ICS-100 is the AC module and DC Module. The ICS-100 is designed to meet UL and CSA standards.

DC Module

The DC module is located on the control panel of the generator. It contains the vacuum fluorescent display, alarm horn, control buttons, and the LEDs. The back of the DC module contains the J1 connector that monitors the DC section of the generator and the RS232 data port for computer or Internet connection.

The DC module's potted design prevents damage from moisture, vibration, and rapid temperature change.

AC Module

The AC module monitors the output of the generator and reports the data to the DC section. The only electrical connection with the DC section is via a four conductor shielded cable used for data transmission.

The AC module is connected to the generator output (main circuit breaker input), current transformers, main circuit breaker output, and to a 120 VAC or 240 VAC source from the generator output windings. The AC module will monitor any voltage source under 600 VAC.

The AC module monitors AC Voltage (rms), AC current (rms), power factor (pf), kilowatt output (kW), kilovolt-amp output (kVA), and total megawatt hour output (MWh). It should be noted that the last four items are computed from data collected.

The AC module's potted design prevents damage from moisture, vibration, and rapid temperature change. It is enclosed in a compact zinc box to prevent influence from EMI(Electronic Magnetic Influence).

Durability

Extreme Weather Conditions

The ICS-100 has a potted design to endure severe vibration, cold, and heat. The control panel will work in extreme temperatures of -40 degrees Celsius to 85 degrees Celsius. The ICS-100 can be stored in temperatures as low as -50 degrees Celsius.

Vacuum Fluorescent Display

The ICS-100 has a vacuum fluorescent display, which resists blackout in hot weather environments. The display has a lexan shield that helps protect the display from impact damage.

Standard Compliances

The ICS-100 is built to comply with NFPA 110 and UL standards and is rated for 65,000 hours of operation.

Advanced Service Capabilities

Remote Generator Communication

The ICS-100 allows service technicians to analyze warnings and reasons for shutdown prior to traveling to the generator location. The ICS-100 will notify up to five error messages at a time via email or pager.

15 Minute Memory Recall

The ICS-100 stores a constant 15 minutes of data. The software allows for the operator to print the data in a spread sheet format. If the generator shuts down due to a major fault, service technicians can analyze the previous 15 minutes prior to shutdown.

The memory recall feature can be utilized at any time and anywhere via modem.

Service Reminders

The ICS-100 can be programmed to alert service reminders during start up. Service items and the time it is displayed is programmable. The ICS-100 will page up to three phone numbers with the service reminder.

Secured Hour Meter and Mega Watt Hours Security
The hour meter and megawatt-hour is secured to ensure accurate accumulated hours.

ICS-100 Paging and Modem option
The ICS-100 has a versatile paging feature. With the modem installed, the ICS-100 can be programmed to call up to three phone numbers and send emails, with alert warnings or abnormal conditions. The phone numbers and reasons for paging is programmable.

Vacuum Florescent Display
The ICS-100 is equipped with a constant engine/generator parameter display. AC voltage, current, power factor, frequency values, oil pressure, coolant temperature, battery voltage, fuel level, and total hours are displayed using the first twenty four characters of each line of display.

The message center area displays kW, kVA, and MWh information when operating without a fault detected. These values are dropped for fault annuciation. Annuciated faults are of two types: warnings and shutdowns. A warning is a minor fault that threatens the operation of the generator set. A shutdown is a major fault that will prevent the generator set from starting or operating.

Message Center Warning Messages
The DC module contains a Message Center to display warnings and abnormal conditions. The alarm horn will sound when any abnormal conditions occur. The possible warnings and faults displayed are as follows:

Minor Fault Warnings
A warning is a minor fault that threatens the operation of the generator set. The minor fault warning will display in the message center and the minor fault LED will illuminate. *Minor Fault Warning* descriptions are as follows:

Modem Not Connected Warning (optional) - This warning is displayed in the event failure to connect the modem. This may be disabled if the customer does not utilize a modem.

CAUTION:

The optional modem ***must be*** unplugged before servicing. This will eliminate the possiblity of the generator starting from a remote location.

Low Coolant Temperature Warning - This warning indicates the coolant is not warm enough to insure prompt start in the event of a power outage. This warning usually occurs at 105°F and may be changed to meet specific engine requirements. The temperature is detected using the variable resistive values from the temperature sending unit.

Pre-high Coolant Temperature Warning - This warning indicates the engine temperature is approaching the shutdown point. This warning is preset 205°F and may be changed to meet specific engine requirements. The temperature is detected using the variable resistive values received from the temperature sending unit.

Low Fuel Level Warning - This warning is detected from a variable resistance provided by a sending unit. Low fuel level is preset at 25% of fuel capacity remaining. The warning set point may be changed to meet a specific engine or customer's requirement.

Pre-low Oil Pressure Warning - This warning indicates the oil pressure has fallen and is approaching the shut down. This warning is preset at 25 psi. The warning set point may be changed to meet specific engine requirements. The oil pressure is detected using the variable resistive values received from the oil pressure sending unit.

Loss of Commercial Power to Accessories Warning - This warning occurs only when the generator is at rest. It indicates commercial power for the jacket water heater and battery charger is not available.

Rupture Basin Filling Warning - This warning indicates the inner fuel tank is leaking. The outer tank is now providing containment for fuel leaking from the inner tank. This warning only applies to generators that are equipped with double wall fuel cells.

Low Battery Voltage Warning - This warning indicates the battery level is low due to battery failure or an under charged condition. This warning may also indicate a battery charger failure. The value may be changed to accommodate various voltages, batteries, and chargers.

High Battery Voltage Warning - This warning indicates the battery is being overcharged by the battery charger. The warning set point may be changed to accommodate various voltages, batteries, and chargers.

Low Power Factor Warning - This warning indicates the phase angle between AC output voltage and current is causing the power factor to fall below 0.8.

Major Faults Shutdowns
Major faults stop the generator or prevent it from starting. The major fault LED will illuminate. The "OFF" button must be pressed to clear major faults.

Controls Not In Auto - This major fault occurs if the controls are not left in automatic and is indicated by a red flashing LED. This major fault will not prevent the unit from starting or operating.

Emergency Stop Shutdown - This major fault occurs when the emergency stop switch has been depressed. Emergency stop interrupts the power source to any fuel solenoids and the ignition system if so equipped. The emergency stop system meets NFPA requirements.

Magnetic Pickup Signal Not Detected Major Fault - This fault occurs when the magnetic pickup signal is not detected during the cranking cycle. The signal that is used for determining the engine speed is not sufficient in amplitude.
Loss of Magnetic Pickup Signal Shutdown - This major fault occurs when the signal that is used for determining the engine speed is not sufficient in amplitude.

Overcrank Shutdown - This major fault indicates the unit has attempted to start the programmed number of times and has failed to start. The number of cycles and their duration are programmable. It is preset at 3 cranking cycles for 10 seconds each.

Engine Stall - This major fault indicates the unit has failed to run after it has started. The cause may not be related to any of the items monitored. The generator set will try to restart. A zero speed monitor insures the starter will not try to engage while the engine is still turning. The unit will continue to start until is shuts down due to overcrank. Both engine stall and overcrank messages will be displayed on the Message Center.

Failure to Start - This major fault indicates the unit has failed to start for a reason not related to any items monitored. Both failure to start and overcrank messages will be displayed on the message center.

Low Oil Pressure Shutdown - This major fault indicates the oil pressure has fallen below 15 psi. The oil pressure is detected using the variable resistive values received from the oil pressure sending unit.

Low Coolant Level Shutdown - This major fault will shutdown and prevent the generator from restarting until the coolant level is replenished.

Critical Low Fuel Level Shutdown - This major fault occurs just prior to the unit running out of fuel. This prevents damage to the injection system and the necessity of bleeding the system. The generator will restart once the fuel tank is refilled.

Mainline Circuit Breaker Tripped Shutdown (optional) - This major fault occurs whenever the circuit breaker is tripped. The unit will shut down and not restart until the breaker is reset.

Main Breaker Open Shutdown (optional) - This major fault occurs whenever the circuit breaker is open or in the "OFF" position. The unit will shutdown and not restart until the breaker is placed in the "ON" position.

Over Voltage Shutdown - This major fault occurs when the output AC Voltage exceeds above the preset value. This shutdown also trips the mainline circuit breaker. The voltage and associated time delay values are adjustable. The mainline breaker will trip to prevent the high voltage from damaging equipment being powered.

Under Voltage Shutdown - This major fault occurs when the output voltage falls and preset value. This shutdown also trips the mainline circuit breaker. The voltage and associated time delay values are adjustable. The mainline breaker will trip to help prevent the low voltage from damaging the equipment being powered.

Over Current Shutdown - This major fault occurs when the current flow exceeds the capabilities of the generator. This shutdown also trips the mainline circuit breaker. The current and associated time delay values are adjustable.

Over Frequency Shutdown - This major fault occurs when the frequency of the AC output exceeds the preset value. This shutdown also trips the mainline circuit breaker to prevent high frequency from damaging the equipment being powered. The frequency and associated time delay values are adjustable.

Under Frequency Shutdown - This major fault occurs when the frequency of the AC output falls the preset value. This shutdown also trips the mainline circuit breaker to prevent low frequency from damaging the equipment being powered. The frequency and associated time delay values are adjustable.

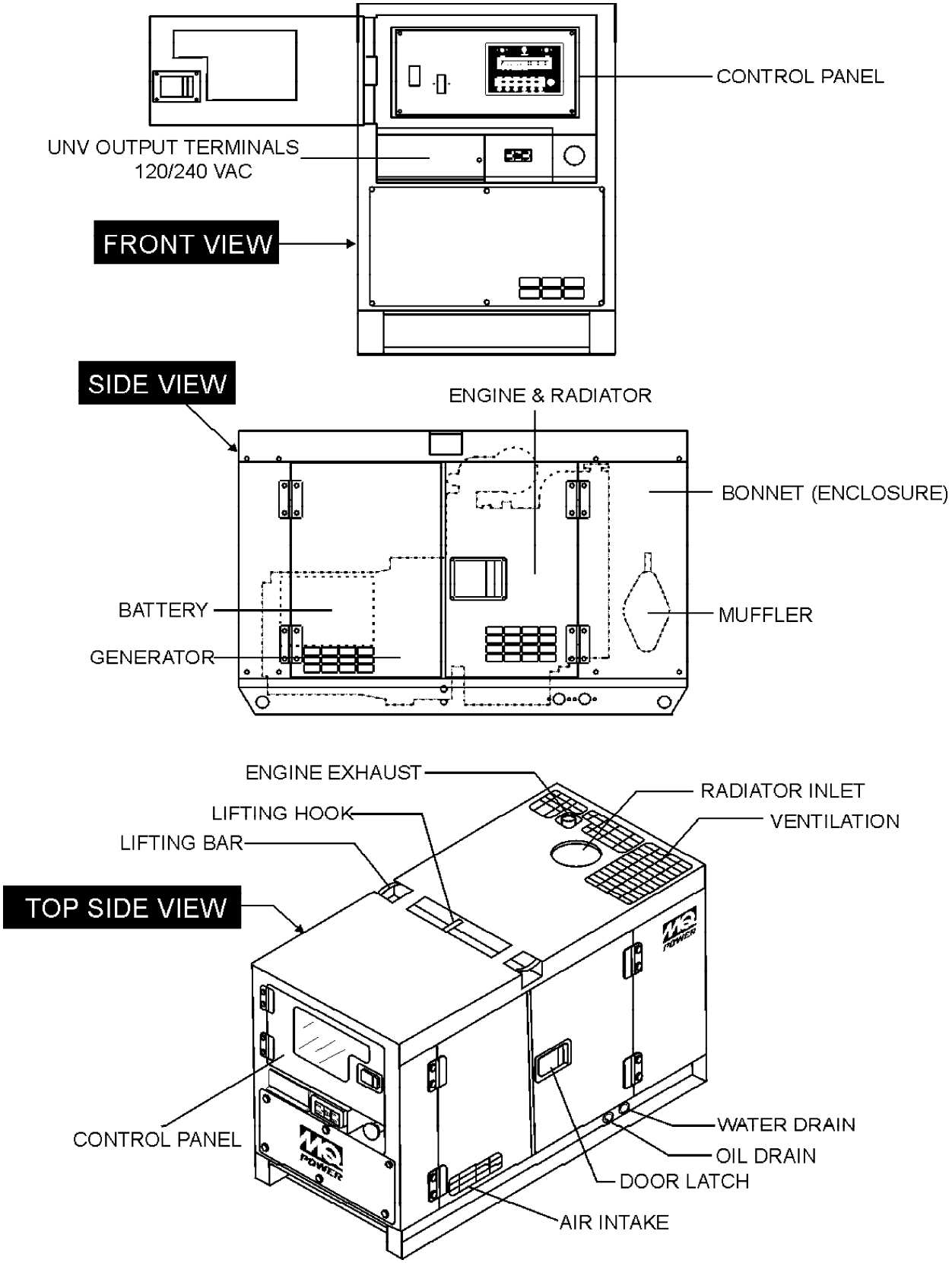
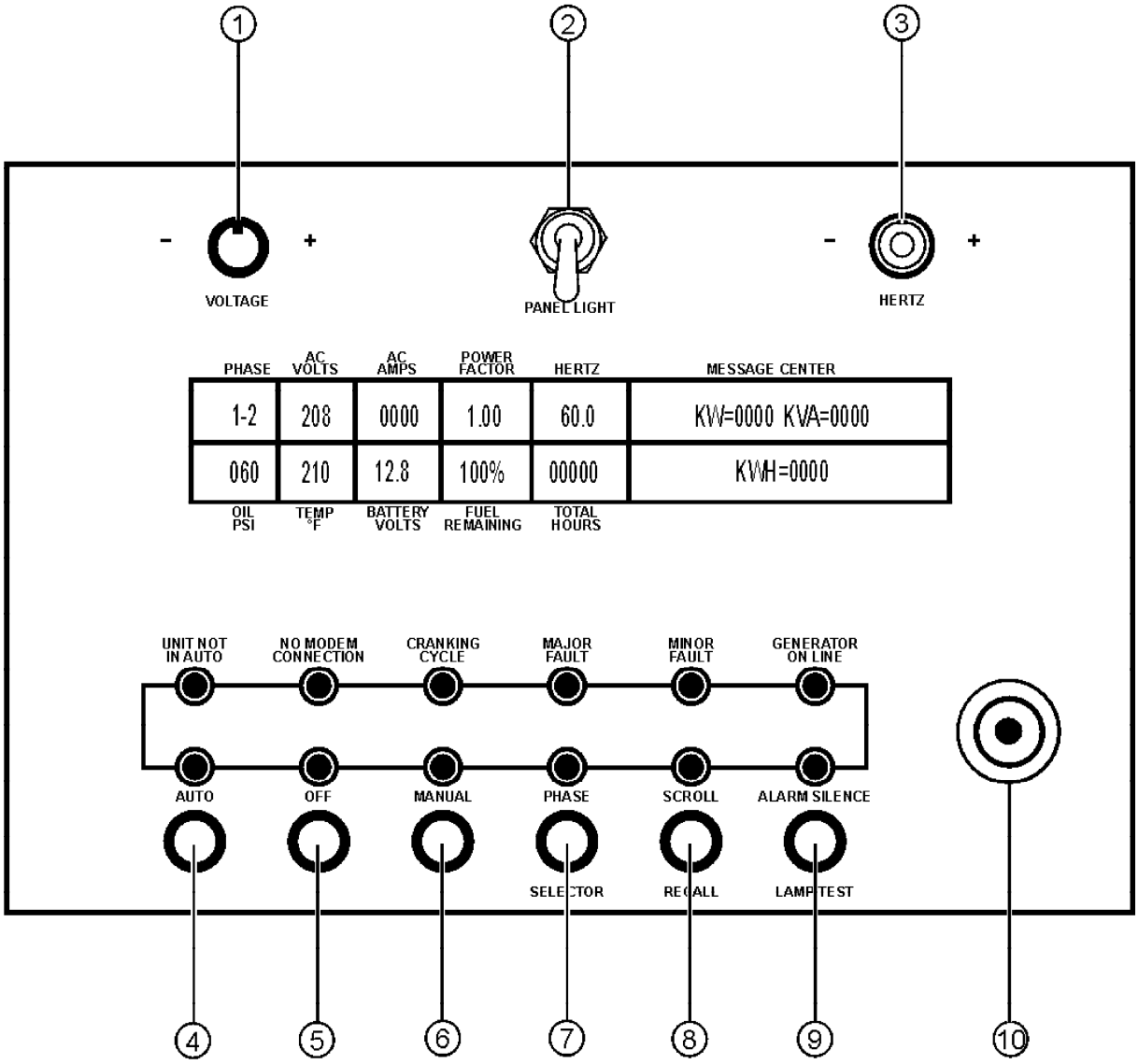


Figure 1. DCA-10SPX3 Generator Major Components

DCA-10SPX3 NOTES PAGE

ICS100 OPERATING CONTROLS



ITEM	DESCRIPTION
1	Voltage Adjust Control Knob
2	Panel Light Switch
3	Hertz Adjust Control Knob
4	Auto Button
5	Off Button
6	Manual Button
7	Phase Selector Button
8	Scroll/Recall Button
9	Alarm Silence/Lamp Test Button
10	Emergency Alarm Horn

Figure 2. Control Panel Operating Controls

DCA-10SPX3 — CONTROL PANEL OPERATING CONTROLS

The definitons below describe the controls and functions of the control panel operating controls (Figure 2).

1. **Voltage Adjust Control Knob** - For adjusting the generator's single phase output voltage at the UNV output terminals. This control knob is to be used in conjunction with the AC volts digital reading.

2. **Panel Light Switch** - Used for dark areas or at night time. When activated, the panel lights illuminate.

3. **Hertz Adjust Control Knob** - Controls the generators output frequency. This control knob is used in conjunction with the digital hertz reading.

4. **Auto Button** - Sets generator controls in auto. In this position, the generator will monitor the AC line output from the building's power source and starts when it receives a contact closure.

   If the building's power source falls below a predetermined voltage, the generator will start-up automatically and begin supplying the building with emergency power. When the building's power returns to an acceptable voltage level, the generator will shutdown and resume monitoring the buildings power source.

5. **Off Button** - Sets the controls to the "OFF" position. All functions of the controls are disabled.

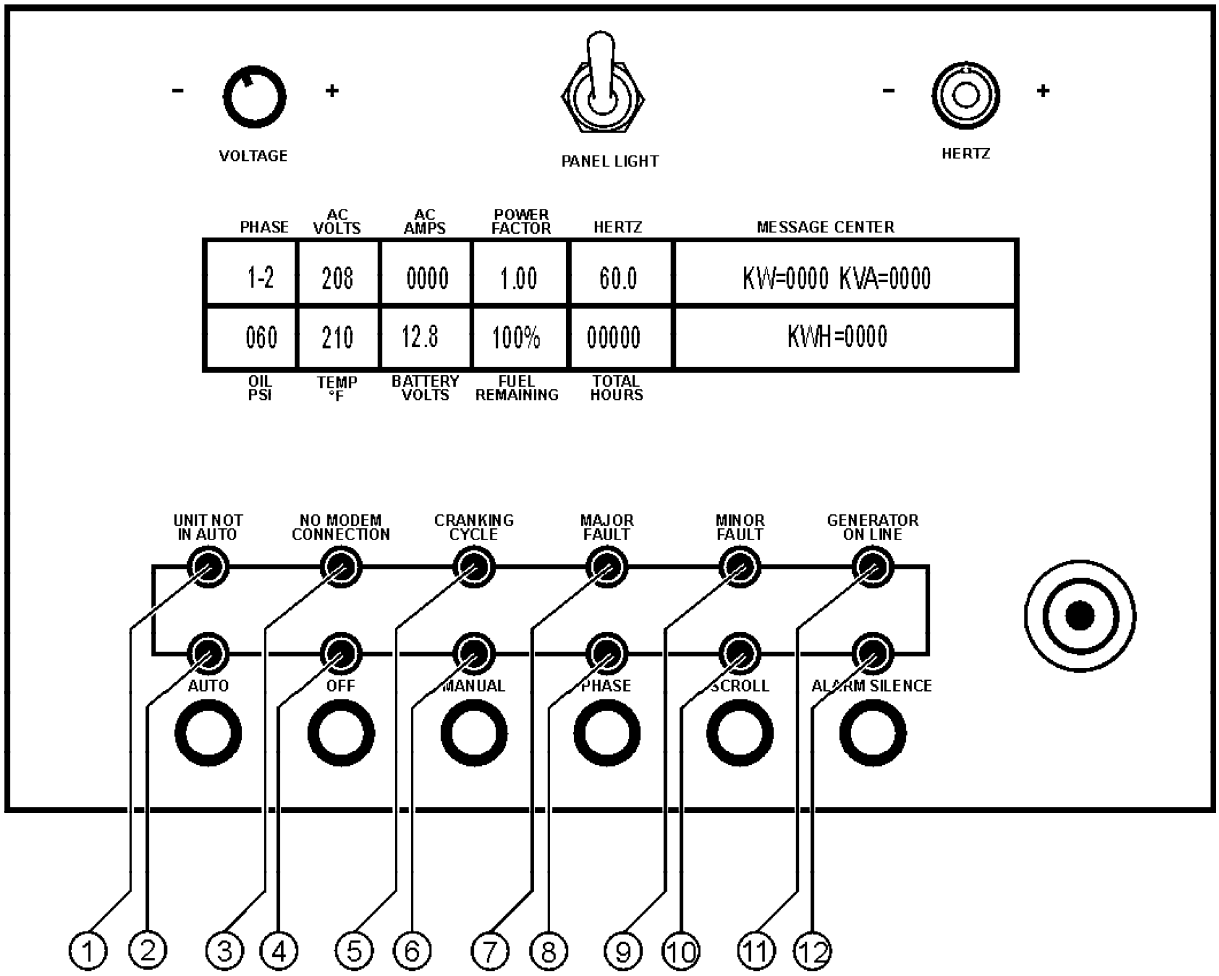
6. **Manual Button** - Sets the controls in the manual position. The unit will start and run whenever the controls are placed in manual.

7. **Phase Selector Button** - The phase selector switch allows the operator to scroll through and view each phase to neutral and phase to phase AC value.

8. **Scroll/Recall Button** - The scroll/recall button allows the operator to scroll and view each fault in the event of multiple faults. The data collected at the time of each fault occurred is also displayed.

9. **Alarm Silence/Lamp Test Button** - The alarm silence/ lamp test button silences the alarm horn but does not clear any faults. In the absence of faults this switch test the warning horn and LEDs.

ICS100 LEDs



ITEM	DESCRIPTION
1	Unit Not In Auto LED (red)
2	Auto LED (Green)
3	No Modem Connection LED (red)
4	Off LED (amber)
5	Cranking Cycle LED (amber)
6	Manaul LED (amber)
7	Major Fault LED (red)
8	Phase Selector LED (green)
9	Minor Fault LED (amber)
10	Scroll/Recall LED (green)
11	Generator On Line LED (green)
12	Alarm Silence/Lamp Test LED (green)

Figure 3. Control Panel LEDs

DCA-10SPX3 — CONTROL PANEL LEDs

The control Panel LEDs (Figure 3) indicates the following conditions of the DCA-10SPX3 generator:

1. **Unit Not In Auto LED (Red)** - Indicates the unit is not set in automatic mode. The unit will not start from a remote contact closure.

2. **Auto LED (Green)** - Indicates that the auto switch located immediately below the LED has been pressed and the controls are in auto. The unit will start when it receives a signal from a remote contract closure.

3. **No Modem Connection LED (Red)** - Indicates the modem has been disconnected. This feature is disabled if the control panel is not equipped with a modem.

4. **Off LED (Amber)** - Indicates that the off switch located immediately below the LED has been pressed and the controls are in the "OFF" position. All functions of the controls are disabled.

5. **Cranking Cycle LED (Amber)** - This LED warns the operator the generator is in a programmed cranking cycle and may start at any time. This LED will remain lit unit the generator starts or has shutdown on overcrank.

6. **Manual LED (Amber)** - Indicates that the button located immediately below the LED has been pressed and the controls are in the manual position. The generator will run if the controls are in manual.

7. **Major Fault LED (Red)** - Indicates that a major fault (shutdown item) exists. This is accompanied with the closure (or opening) of a 10 amp, form C, dry contact (K7) for local analog annuciation.

8. **Phase selector LED (Green)** - This LED is lit whenever the phase selector switch located immediately below is pressed letting the operator know that it has, in fact, operated.

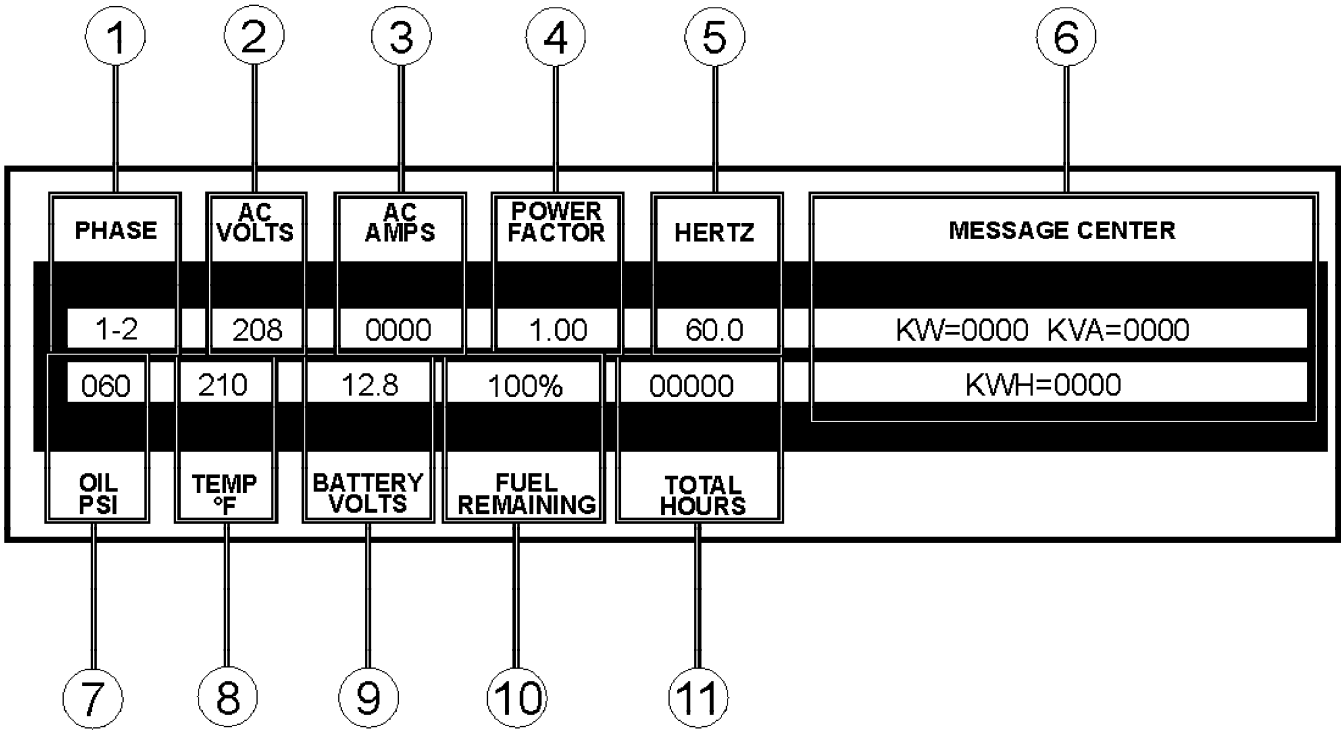
9. **Minor Fault LED (Amber)** - Indicates that a minor fault (warning item) exists. This is accompanied with the closure (opening) of a 10 amp, form C, dry contact (K8) for local analog annuciation.

10. **Scroll/Recall LED (Green)** - This LED is lit whenever the scroll/recall switch located immediately below is pressed letting the operator know that the switch, in fact, has operated.

11. **Generator On Line LED (Green)** - Indicates the unit is functioning properly and is supplying power to the load.

12. **Alarm Silence/Lamp Test LED (Green)** - This LED is lit whenever the alarm silence/lamp test switch located immediately below is pressed.

VACUUM FLOURESCENT DISPLAY



ITEM	DESCRIPTION
1	Phase
2	AC Volts
3	AC Amps
4	Power Factor
5	Hertz
6	Message Center
7	Oil psi
8	Temperature
9	Battery Volts
10	Fuel Remaining
11	Total Hours

Figure 4. Control Panel Display

The vacuum florescent display indicates the following conditions of the DCA-45SSIU2 generator (Figure 4):

1. **Phase** - Indicates the reading between phase to neutral or phase to phase AC Value.

2. **AC Volts** - Indicates the single phase output.

3. **AC Amps** - Indicates the amount of current the load is drawing from the generator.

4. **Power Factor** - Indicates the phase angle between AC output voltage and current.

5. **Hertz** - Indicates the output frequency in hertz (Hz).

6. **Message Center** - Indicates kW, kVA, and MWh information when operating without a fault detected. Indicates faults and abnormal conditions. Indicates start-up messages and programmed service reminders after unit goes into crank cycle.

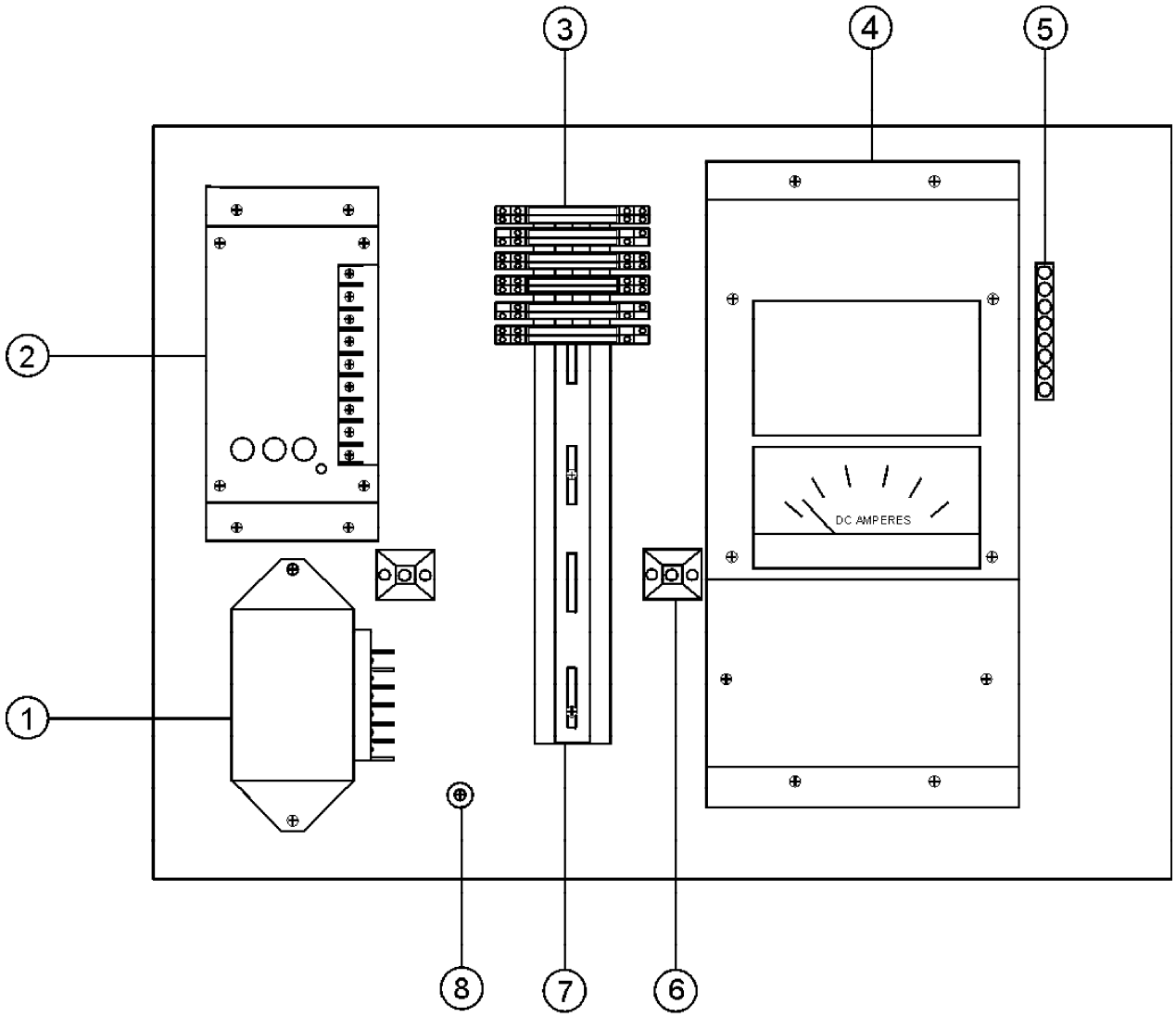
7. **Oil PSI** - Indicates engine oil pressure in pounds per square inch (lbs/sq^2). See engine owner's operating manual for operating pressure.

8. **Temperature** - Indicates engine water temperature in degrees Fahrenheit.

9. **Battery Volts** - Indicates the battery output voltage.

10. **Fuel Remaining** - Indicates the percent value of fuel remaining in the fuel tank.

11. **Total Hours** - Indicates the amount of hours the generator has been in operation.



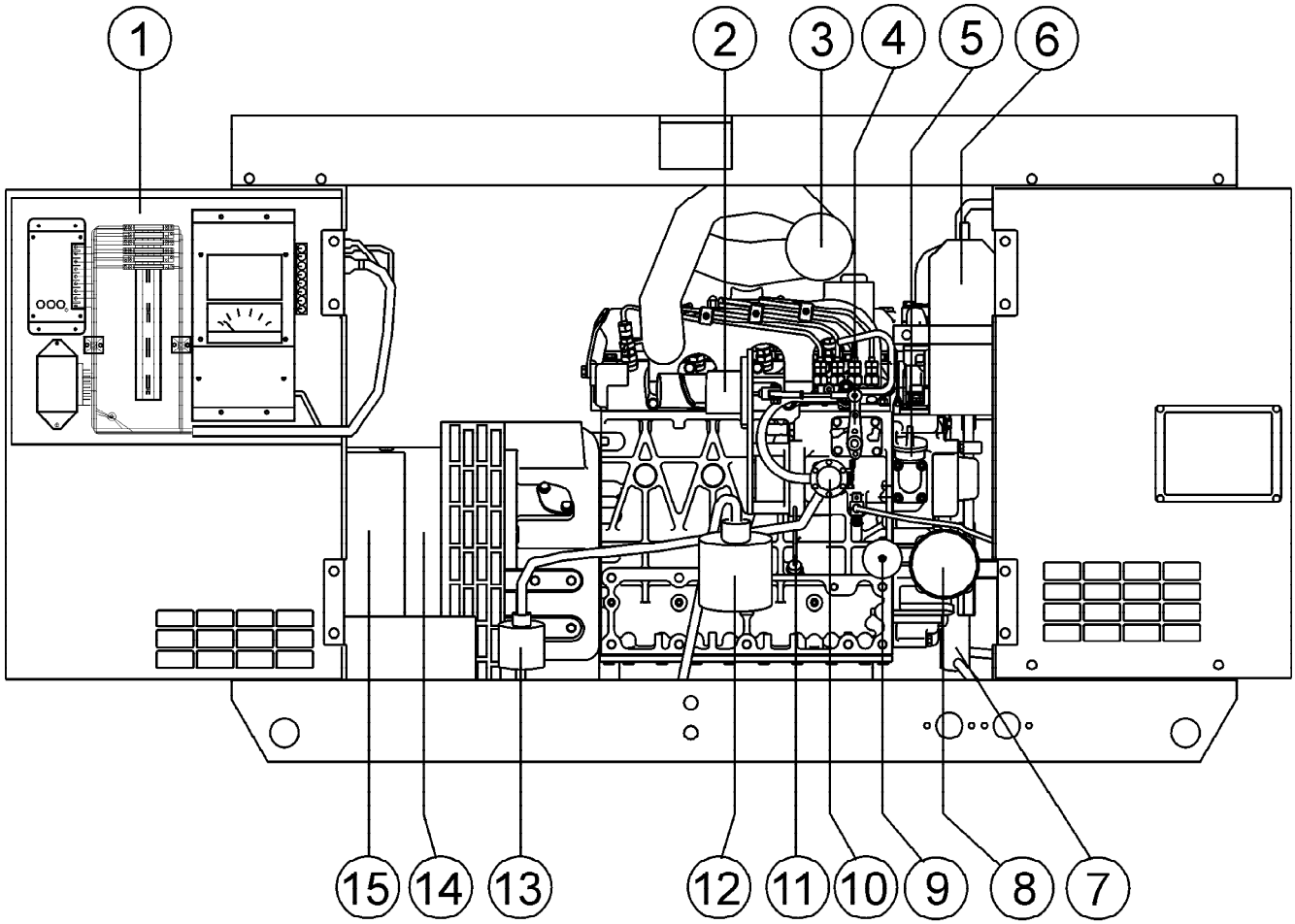
NO.	DESCRIPTION
1	LOW COOLANT LEVEL MODULE (OPTIONAL)
2	GOVERNOR CONTROLLER (OPTIONAL)
3	CONTROL RELAYS (OPTIONAL)
4	BATTERY CHARGER (OPTIONAL)
5	TERMINAL BLOCK
6	TIE-WRAP HOLDER
7	DIN CONNECTOR RAIL
8	GROUND STUD

Figure 5. Inner Door Control Panel

DCA-10SPX3 — INNER DOOR CONTROLS AND INDICATORS

The definitions below describe the controls and functions of the DCA-10SPX3 "***Inner Door Control Panel***" (Figure 5).

1. **Low Coolant Level Module –** This module monitors the level of coolant in the radiator.
2. **Governor Controller –** This module electronically regulates the speed of the engine.
3. **Control Relays –** Control relays for engine start, governor power, AVR power, and accessory power.
4. **Battery Charger –** This unit charges the battery when the generator is in an dormant state (OFF).
5. **Terminal Block (TB-1) –** Provides the interface wiring between the control panel's J1 and J2 bulkhead connectors and the inner door.
6. **Tie Wrap Holder –** Used to secure wires and cable assemblies.
7. **DIN Connector Rail –** Relays K1 through K5 are mounted into this connector block.
8. **Ground Lug –** Provides grounding required between the control panel and the inner door is required use this ground lug.



NO.	DESCRIPTION
1	INNER DOOR CONTROL PANEL
2	GOVERNOR ACTUATOR
3	AIR CLEANER
4	THROTTLE CONTROL
5	OIL FILL
6	COOLANT RESERVE TANK
7	JACKET WATER HEATER
8	OIL FILTER CARTRIDGE
9	OIL PRESSURE SENDING UNIT
10	MECHANICAL FUEL PUMP
11	ENGINE OIL CHECK DIP STICK
12	FUEL FILTER
13	ELECTRIC FUEL PUMP
14	AC GENERATOR
15	BATTERY

Figure 6. Engine Compartment

The definitions below describe the basic functions of the generator's engine compartment (Figure 6):

1. **Inner Door Compartment –** Contains the battery charger, power relays, governor controller and low coolant module.
2. **Governor Actuator –** Mechanical controller for the electronic governor system. This actuator is controlled by the governor controller which is located on Inner Door Panel.
3. **Air Cleaner –** Prevents dirt and foreign debris from entering the fuel system. See Kubota Engine Manual for recommended replacement intervals.
4. **Throttle Control –** Adjusts the engine's speed (RPM).
5. **Oil Fill –** Remove cap to add engine oil. See Kubota Engine Manual for recommended oil and replacement intervals.
6. **Coolant Reserve Tank –** For radiator when coolant level is low. Refer to Table 4 for radiator and reserve tank coolant capacities.
7. **Jacket Water Heater –** The jacket water heater heats the coolant before circulating it through the engine block.

   The jacket water heater prevents the coolant from freezing in cold weather. The heating unit is a 500 watt thermosiphon pre-heater with a thermostat. This water heater requires a 120 VAC power source to operate.
8. **Oil Filter Cartridge –** Filters the oil from debris and contaminants. Replace with manufacture's suggested oil filter cartridge.
9. **Oil Pressure Sending Unit –** Monitors and measures the amount of oil in the engine crankcase. The measurement is sent as a resistance signal to the MPEC for evaluation.
10. **Mechanical Fuel Pump –** Transfers fuel from the fuel tank to the electronic fuel pump.
11. **Oil Check Dipstick –** Measures amount oil in the engine crankcase. Always maintain proper oil level when running the engine. See Figure 9 for proper oil level.
12. **Fuel Filter –** Prevents dirt and other foreign debris from entering the fuel system, Replace with manufacture's suggested fuel filter.
13. **Electric Fuel Pump –** Receives fuel from the mechanical fuel pump and transfers it to the engine injectors.
14. **AC Generator –** Provides single phase 120/240 VAC power @16.5 kW.
15. **Battery –** Provides 12 VDC power for the generator's electrical system and starting the engine.

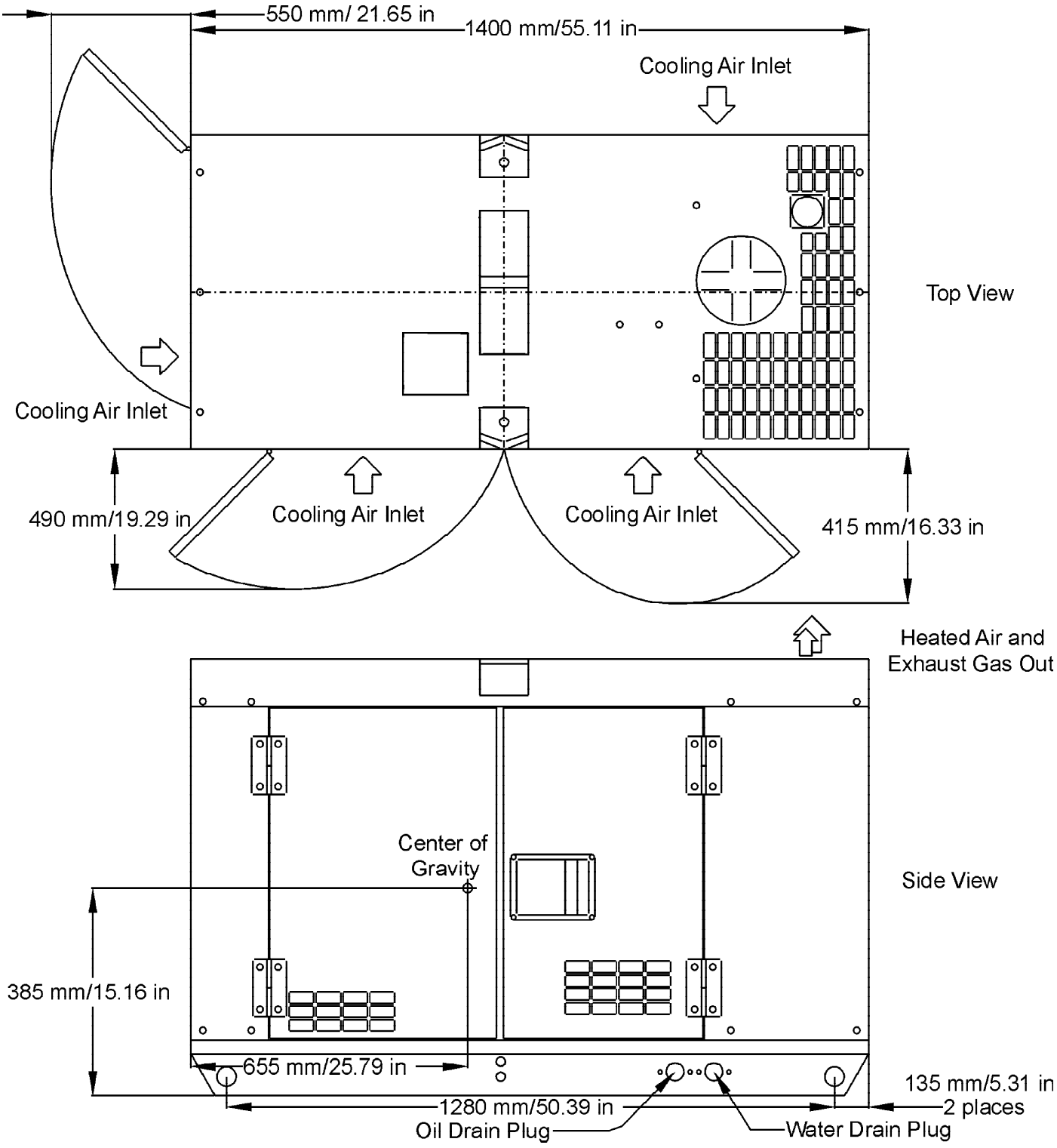


Figure 7A. Dimensional Views (Top & Side)

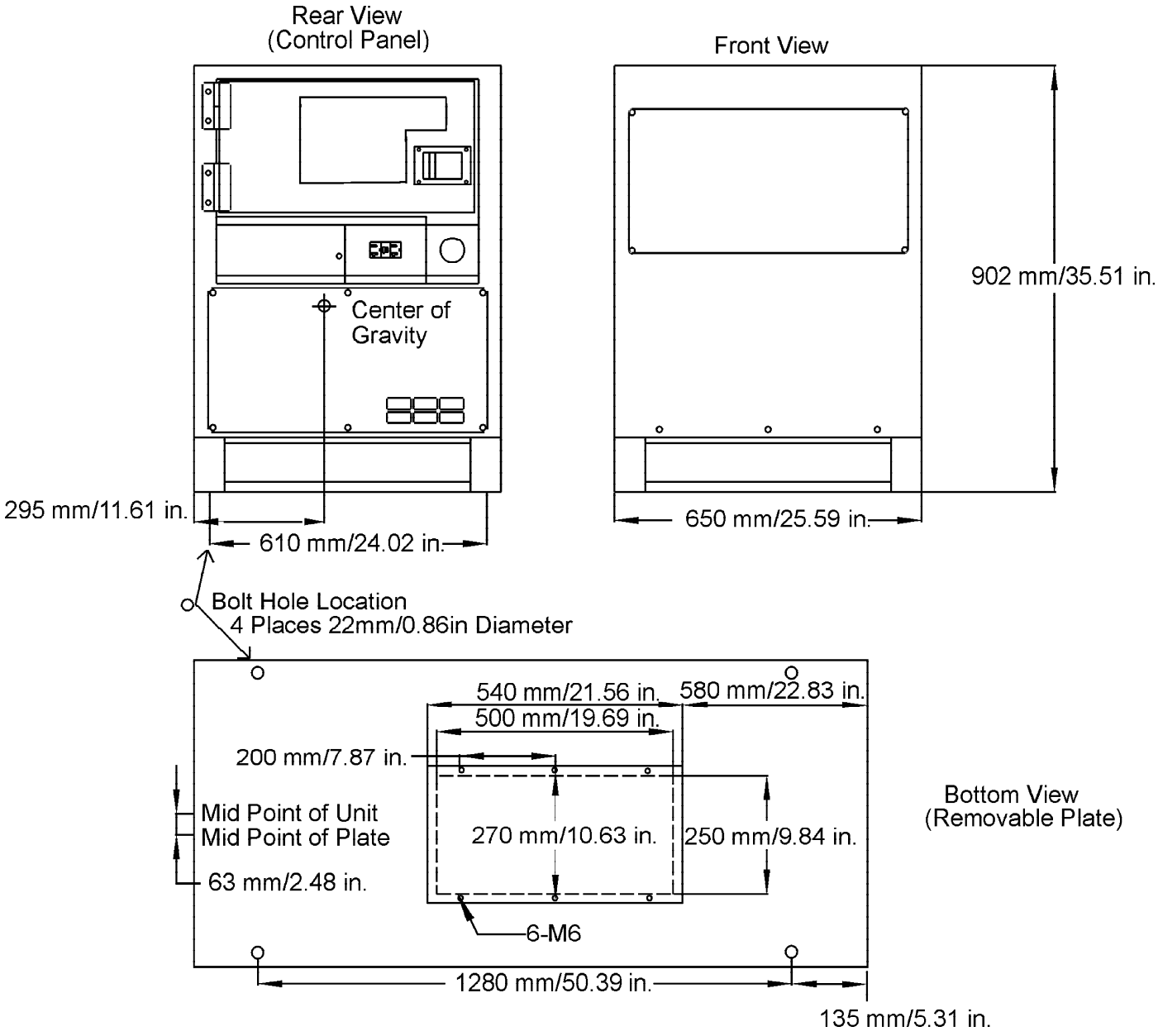


Figure 7B. Dimensional Views (Front, Rear & Bottom)

Towing Safety Precautions

CAUTION :

- Check with your county or state safety towing regulations department before towing your generator. Vehicle towing codes and regulations can vary from state to state.

To reduce the possibility of an accident while transporting the generator on public roads, always make sure the trailer that supports the generator and the towing vehicle are in good operating condition and both units are mechanically sound.

The following list of suggestions should be used when towing your generator:

- Make sure the hitch and coupling of the towing vehicle are rated equal to, or greater than the trailer "gross vehicle weight rating" (GVWR).
- **ALWAYS** inspect the hitch and coupling for wear. **NEVER** tow a trailer with defective hitches, couplings, chains etc.
- Check the tire air pressure on both the towing vehicle and the trailer. Also check the tire tread wear on both vehicles.
- **ALWAYS** make sure the trailer is equipped with a "**Safety Chain**".
- **ALWAYS** attach trailer's safety chain to bumper of towing vehicle.
- **ALWAYS** make sure the vehicle and trailer directional, backup, brake, and trailer lights are connected and are working properly.
- The maximum speed unless otherwise posted for highway towing is **45 MPH**. Recommended off-road towing is not to exceed **10 MPH** or less, depending on type of terrain.
- Place *chocked blocks* underneath wheel to prevent ***rolling***, while parked.
- Place *support blocks* underneath the trailer's bumper to prevent ***tipping***, while parked.
- Use the trailer's hand winch to adjust the height of the trailer, then insert locking pin to lock wheel stand in place, while parked.
- Avoid sudden stops and starts. This can cause skidding or jackknifing. Smooth, gradual starts and stops will improve gas milage.
- Avoid sharp turns to prevent rolling.
- Remove wheel stand when transporting.
- **DO NOT** transport generator with fuel in tank.

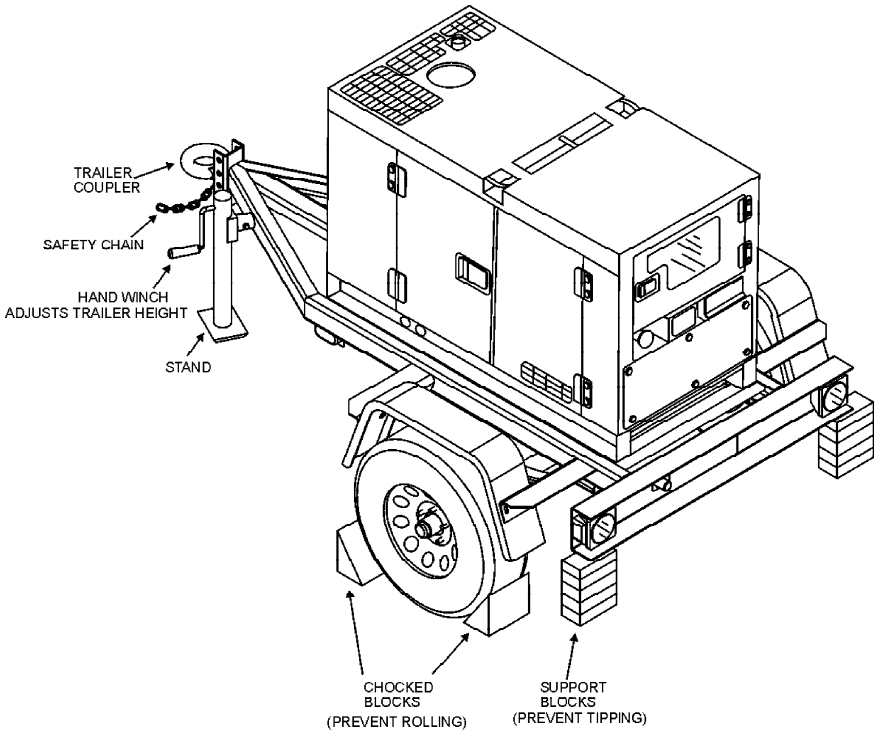


Figure 8. DCA-10SPX3 and Towing Trailer

DCA-10SPX3 NOTES PAGE

Outdoor Installation

Install the generator in a location where it will is not exposed to rain or sunshine. Make sure the generator is on secure level ground so it cannot slide or shift. Also install the generator so the exhaust will not discharge in the direction of nearby homes.

The installation site must be away from excessive moisture and dust. All electrical equipment must be protected from excessive moisture. Failure to do will result in deterioration of the insulation and will result in short circuits and grounding.

Foreign materials such as dust, sand, lint and abrasive materials cause excessive wear, to the engine parts, and the alternator parts.

CAUTION :

Pay close attention to ventilation when operating the generator inside tunnels and caves. The engine exhaust contains noxious elements. Engine exhaust **must** be routed to a ventilated area.

Indoor Installation

Exhaust gases from diesel engines are extremely poisonous. Whenever an engine is installed indoors the exhaust fumes must be vented to the outside. The engine should be installed at least two feet from any outside wall. Using an exhaust pipe which is too long or too small can cause excessive back pressure which will cause the engine to heat.

Eliminate the danger of deadly carbon monoxide gas. Remember that exhaust fumes from any diesel engine are very poisonous if discharged in a closed room, but harmless if allowed to mix with the outside air. If the generator is installed indoors, you must make provisions for venting the engine exhaust to the outside of the building.

DO NOT cover ventilation areas on the enclosure. Covering the ventilation grids will cause the engine to over heat.

CAUTION :

An electric shock may happen when vibrators are used. Pay close attention to handling when operating vibrators and always use rubber boots and gloves to protect body from electrical shock.

Generator Grounding

To prevent electrical shock and possible damage to the equipment, it is important to provide a good EARTH ground.

Article 250 (Grounding) of the National Electrical Code (NEC) provides guide lines for proper grounding and specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical.

NEC articles 250-91a and 250-95 set the following grounding requirements:

1. Use one of the following wire types to connect the generator to earth ground.
   a. Copper - 10 AWG (5.3 mm^2) or larger.
   b. Aluminum - 8 AWG (8.4 mm^2) or larger.
2. When grounding the generator (Figure 9) connect the ground cable between the lock washer and the nut on the generator and tighten the nut fully. Connect the other end of the ground cable to earth ground.
3. NEC article 250-83c specifies that the earth ground rod should be buried a minimum of 8 ft. into the ground.

NOTE

When connecting the generator to any buildings electrical system **ALWAYS** consult with a licensed electrician.

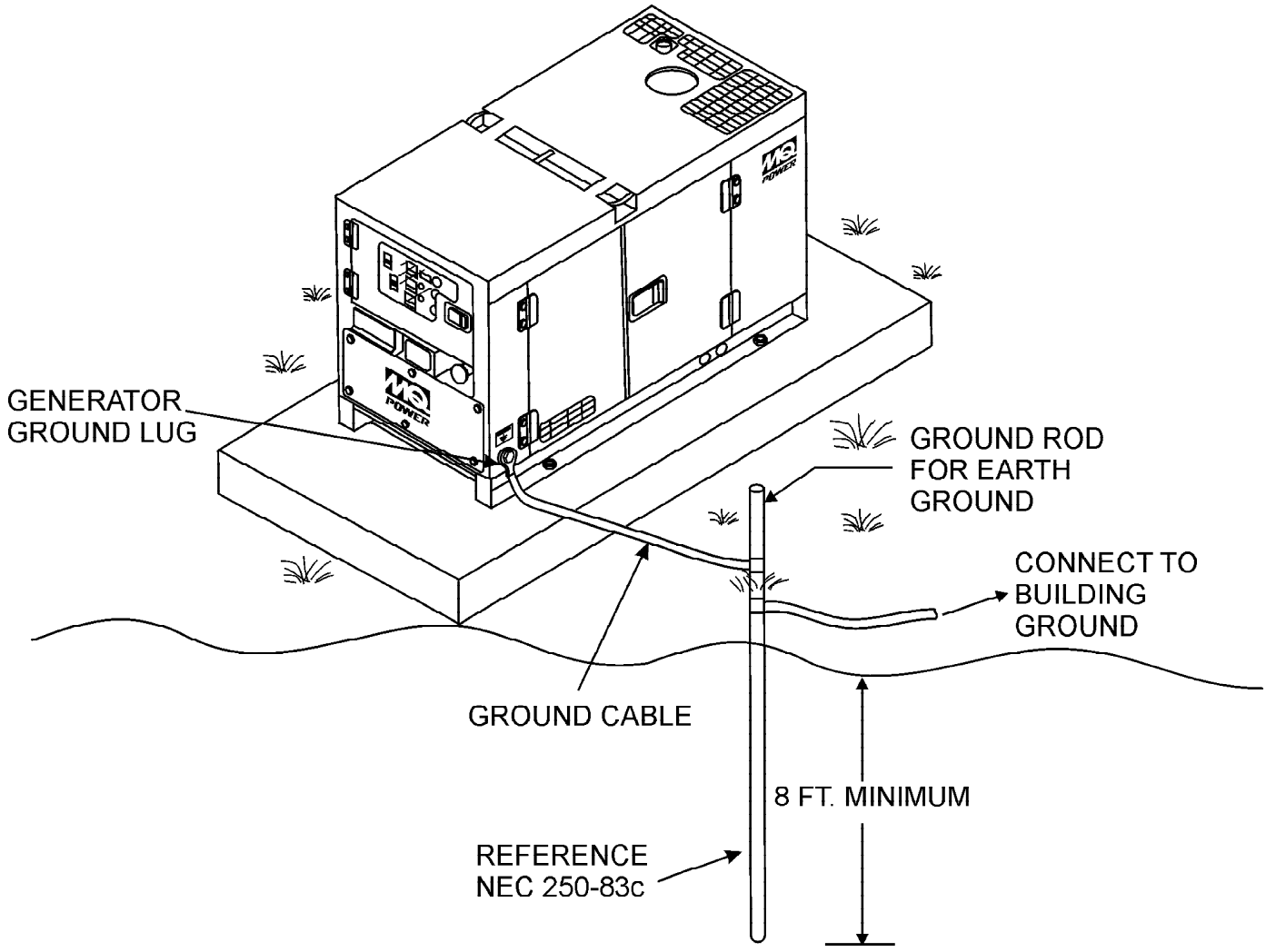


Figure 9. Typical Generator Grounding Application

CAUTION :

Always check local codes for proper grounding codes and laws.

General Inspection Prior to Operation

The DCA-10SPX3 generator has been thoroughly inspected and accepted prior to shipment from the factory. However, be sure to check for damaged parts or components, or loose nuts and bolts, which could have occurred in transit.

Extension Cable

When electric power is connected to a load (i.e. power tools) from a distance of the generator, extension cables are normally used. Cables should be sized to allow for distance in length and amperage so that the voltage drop between the generator and point of use (load) is held to a minimum. Use Table 2 (cable selection guide) as a guide for selecting proper cable size.

Circuit Breaker

To protect the generator from an overload, a 3-pole, 45 amp, ***main*** circuit breaker is provided to protect the UNV output from overload. In addition a 2-pole, 20 amp ***GFCI*** circuit breaker is provided to protect the GFCI receptacle from overload. Make sure to switch both circuit breakers to the "OFF" position prior to starting the engine.

NOTE

ALWAYS consult with a licensed electrician for correct extension cord wire size.

Table 2. Cable Selection (60 Hz, Single Phase Operation)

Current in Amperes	Load In Watts		Maximum Allowable Cable Length			
	At 120 Volts	At 240 Volts	#10 Wire	#12 Wire	#14 Wire	#16 Wire
2.5	300	600	1000 ft.	600 ft.	375 ft.	250 ft.
5	600	1200	500 ft.	300 ft.	200 ft.	125 ft.
7.5	900	1800	350 ft.	200 ft.	125 ft.	100 ft.
10	1200	2400	250 ft.	150 ft.	100 ft.	
15	1800	3600	150 ft.	100 ft.	65 ft.	
20	2400	4800	125 ft.	75 ft.	50 ft.	
CAUTION: Equipment damage can result from low voltage.						

Lubrication Oil

Fill the engine crankcase with lubricating oil through the filler hole, but do not overfill. Make sure the generator is level. With the dipstick inserted all the way, but without being screw into the filler hole, verify that the oil level is maintained between the two notches (Figure 10) on the dipstick. See Table 3 for proper selection of engine oil.

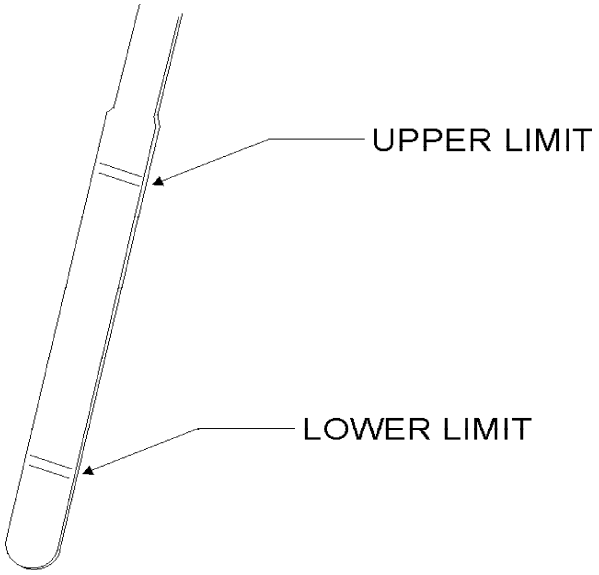


Figure 10. Engine Oil Dipstick

When checking the engine oil, be sure to check if the oil is clean and viscous. If the oil is not clean, drain the oil by removing the oil drain plug, and refill with the specified amount of oil as outlined in the **Kubota Engine Owner's Manual**.

Fuel

Fill the fuel tank with clean and fresh ***diesel fuel***. **DO NOT** fill the tank beyond capacity.

Pay attention to the fuel tank capacity when replenishing fuel. Refer to the fuel tank capacity listed on page 12 Specification Table.

The fuel tank cap must be closed tightly after filling. Handle fuel in a safety container. If the container does not have a spout, use a funnel. Wipe up any spilled fuel immediately.

CAUTION :

Never fill the fuel tank while the engine is running or in the dark. Diesel fuel spillage on a hot engine can cause a fire or explosion. If fuel spillage occurs, wipe up the spilled diesel fuel completely to prevent fire hazards.

Coolant

Use only drinkable tap water. If hard water or water with many impurities is used, the inside of the engine and radiator may become coated with deposits and cooling efficiency will be reduced.

An anticorrosion additive added to the water will help prevent deposits and corrosion in the cooling system. See the engine manual for further details.

Table 3. Recommended Motor Oil

Temperature Range	Type Oil
104° F ~ 23° F (40° C ~ -5°C)	SAE 30
23° F ~ 5° F (-5° C ~ -15°C)	SAE 20 or SAE 10W-30
Below 5° C (-15°)	SAE 10W or SAE 10W-30

CAUTION :

When adding coolant or antifreeze to the radiator, do not remove the radiator cap until the unit has completely cooled.

Day-to-day addition of coolant is done from the reserve tank. when adding coolant to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. See Table 4. for engine, radiator, and reserve tank coolant capacities. Make sure the coolant level in the reserve tank is always between the "H" and the "L" markings.

Table 4. Coolant Capacity	
Engine and Radiator	0.66 Gal.
Reserve Tank	0.27 Gal.

Operation in Freezing Weather
When operating in freezing weather, be certain the proper amount of antifreeze (Table 5) has been added.

Table 5. Anti-Freeze Operating Temperatures				
Vol % Anti-Freeze	Freezing Point		Boiling Point	
	°C	°F	°C	°F
40	-24	-12	106	222
50	-37	-34	108	226

NOTE

When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50%.

Cleaning the Radiator
The engine may overheat if the radiator fins become overloaded with dust or debris. Periodically clean the radiator fins with compressed air. Cleaning inside the machine is dangerous, so clean only with the engine turned off and the battery disconnected.

Air Cleaner
Periodic cleaning/replacement is necessary. Inspect it in accordance with the **Kubota Engine Owner's Manual**.

Fan Belt Tension
A slack fan belt may contribute to overheating, or to insufficient charging of the battery. Inspect the fan belt for damage and wear and adjust it in accordance with the **Kubota Engine Owner's Manual**.

The fan belt tension is proper if the fan belt bends 10 to 15 mm (Figure 11) when depressed with the thumb as shown below. Never place hands near the belts or fan while the generator is running.

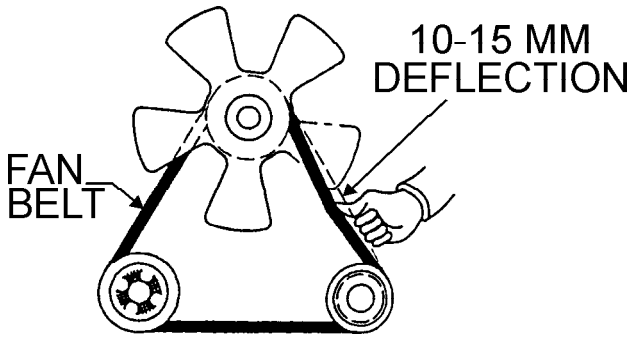


Figure 11. Fan Belt Tension

CAUTION :

NEVER place hands or other body parts near the belts or fan while the generator is running.

Battery

This unit is of negative ground. **DO NOT** connect in reverse. Always maintain battery fluid level between the specified marks. Battery life will be shortened, if the fluid level is not properly maintained. Add only distilled water when replenishment is necessary. DO NOT over fill.

The battery is sufficiently charged if the specific gravity of the battery fluid is 1.28 (at 68° F). If the specific gravity should fall to 1.245 or lower, it indicates that the battery is dead and needs to be recharged or replaced.

Check to see whether the battery cables are loose. Poor contact may result in poor starting or malfunctions. Always keep the terminals firmly tightened. Coating the terminals with a thin film of grease will help to inhibit corrosion.

The battery gradually deteriorates over time. The actual life span will vary according to operating conditions, but generally a battery two years or older should be replaced.

Battery Cable Installation

ALWAYS be sure that the battery cables (Figure 11) are properly connected to the battery terminals as shown below. The ***RED*** cable is connected to the positive terminal of the battery, and the **BLACK** cable is connected to the negative terminal of the battery.

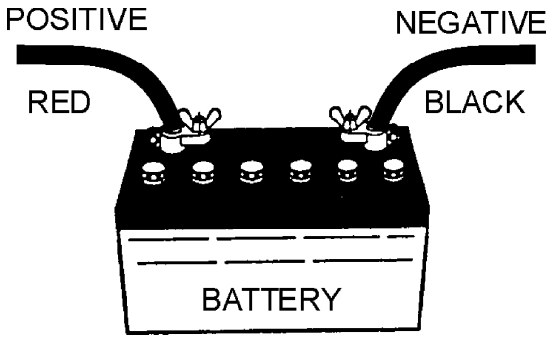


Figure 12. Battery Connections

CAUTION :

If the battery cable is connected incorrecty, damage to the generator will occur. Pay close attention to the polarity of the battery when connecting the battery.

When connecting battery do the following:

1. **DO NOT** connect the battery cables to the battery terminals when the ***ICS-100 Control*** is in either the manual or auto position (ON). **ALWAYS** make sure that the ***ICS-100 Control*** is in the OFF position when connecting the battery.
2. Place a small amount of grease around both battery terminals. This will ensure a good connection and will help prevent corrosion around the battery terminals.

CAUTION :

Inadequate battery connections may cause poor starting of the generator, and create other malfunctions.

CAUTION :

ALWAYS disconnect the battery negative before servicing the engine or generator.

Wiring

Inspect the entire generator for bad or worn electrical wiring or connections. If any wiring or connections are exposed (insulation missing) replace wiring immediately.

Piping and Hose Connection

Inspect all piping, oil hose, and fuel hose connections for wear and tightness. Tighten all hose clamps and check hoses for leaks.

If any hose (fuel or oil) lines are defective replace them immediately.

Single Phase Load

Always be sure to check the nameplate on the generator and equipment to insure the wattage, amperage and frequency requirements are satisfactorily supplied by the generator for operating the equipment.

Generally, the wattage listed on the nameplate of the equipment is its rated output. Equipment may require 130—150% more wattage than the rating on the nameplate, as the wattage is influenced by the efficiency, power factor and starting system of the equipment.

> **NOTE**
>
> If wattage is not given on the equipment's name plate, approximate wattage may be determined by multiplying nameplate voltage by the nameplate amperage.
>
> WATTS = VOLTAGE x AMPERAGE

The power factor of this generator is 1.0. See Table 6. below when connecting loads.

Table 6. Power Factor By Load

Type Of Load	Power Factor
Single-phase induction motors	0.4 - 0.75
Electric heaters, incandescent lamps	1.0
Fluorescent lamps, mecury lamps	0.4 - 0.9
Electronic devices, communication equipment	1.0

CAUTION:

Motors and motor-driven equipment draw much greater current for starting than during operation.

An inadequate size connecting cable which cannot carry the required load can cause a voltage drop which can burn out the appliance or tool and overheat the cable.

- When connecting a resistance load such as an incandescent lamp or electric heater, a capacity of up to the generating set's rated output (kW) can be used.
- When connecting a fluorescent or mercury lamp, a capacity of up to the generating set's rated output (kW) multiplied by 0.6 can be used.
- When connecting an electric drill or other power tools, pay close attention to the required starting current capacity.

When connecting ordinary power tools, a capacity of up to the generating set's rated output (kW) multiplied by 0.8 can be used.

CAUTION:

Before connecting this generator to any building's electrical system, a licensed electrician must install an isolation (transfer) switch. Serious injury or death may result without this transfer switch.

WARNING:

- The engine's exhaust contains harmful emissions. ***ALWAYS*** ventilate the exhaust when operating inside tunnels, excavations or buildings. Direct exhaust away from nearby personnel.

Before Starting

Engine

1. Check the lubricating oil level prior to starting the engine. Make sure the generator is level. The oil level must be maintained between two notches on the dipstick.
2. When there is not enough lubricating oil, fill the crankcase with high grade motor oil. Use a high quality detergent oil classified CC or higher (See Table 3 on page 39).
3. Check the coolant level in the radiator and subtank. Replenish with antifreeze as necessary. Always maintain the coolant level between the **FULL** and **LOW** markings on the coolant container. Be sure that the radiator cap is fastened securely.
3. Check the fuel level on the fuel gauge. If fuel is low, fill the fuel tank with clean fresh unleaded automotive diesel fuel. If fuel spillage occurs, completely wipe up the spilled diesel fuel immediately.

Before Starting

Generator and Control Panel

CAUTION:

- **NEVER** start the engine with the ***main*** or ***GFCI*** circuit breakers in the **ON** position.

1. Be sure to disconnect the electrical load and switch the ***main*** and ***G.F.C.I.*** circuit breakers (Figure 13) to the "OFF" position prior to starting the engine.

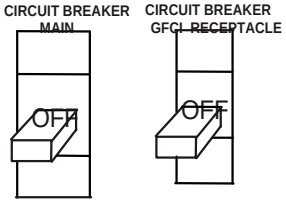


Figure 13. Main and GFCI Circuit Breakers

Accessory 120 VAC Output Receptacle and Power Cable

This generator is equipped with an 120 VAC, 15 amp duplex output receptacle located inside the engine compartment just below the control panel (Figure 14).

The purpose of this receptacle is to provide power via commercial power to the jacket water heater and internal battery charger. It can also be used for power tools or lighting when servicing of the engine is required.

Remember that this receptacle will **ONLY** function when commercial power has been supplied to it (Figure 14). To apply commercial power to this accessory receptacle a 60 ft. power cord has been provided.

When using the generator in ***hot*** climates there is no reason to apply power to jacket water heater. However, if the generator will be used in ***cold*** climates it is always a good idea to apply power to the jacket water heater at all times. To apply power to the jacket water heater simply plug in the jacket water heater power cable into the 120 VAC accessory output receptacle.

If the generator will be used daily, the battery should normally not require charging. If the generator will be idle (not used) for long periods of time, plug in the battery charger power cable into the 120 VAC accessory output receptacle.

When connecting the generator to a isolation (transfer) switch, **ALWAYS** have power applied to the generator's internal battery charger. This will ensure that the engine will not fail due to a discharged battery.

CAUTION:

ALWAYS have power applied to the generator's internal battery charger when connecting the generator to a isolation (transfer) switch. Remember before connecting this generator to any buildings electrical system, have a ***licensed*** electrician perform the installation of the transfer switch.

NOTE

The alarm horn can be silenced at any time by pressing the "Alarm Silence" button on the control panel. (Figure 2, Item 9, page 22)

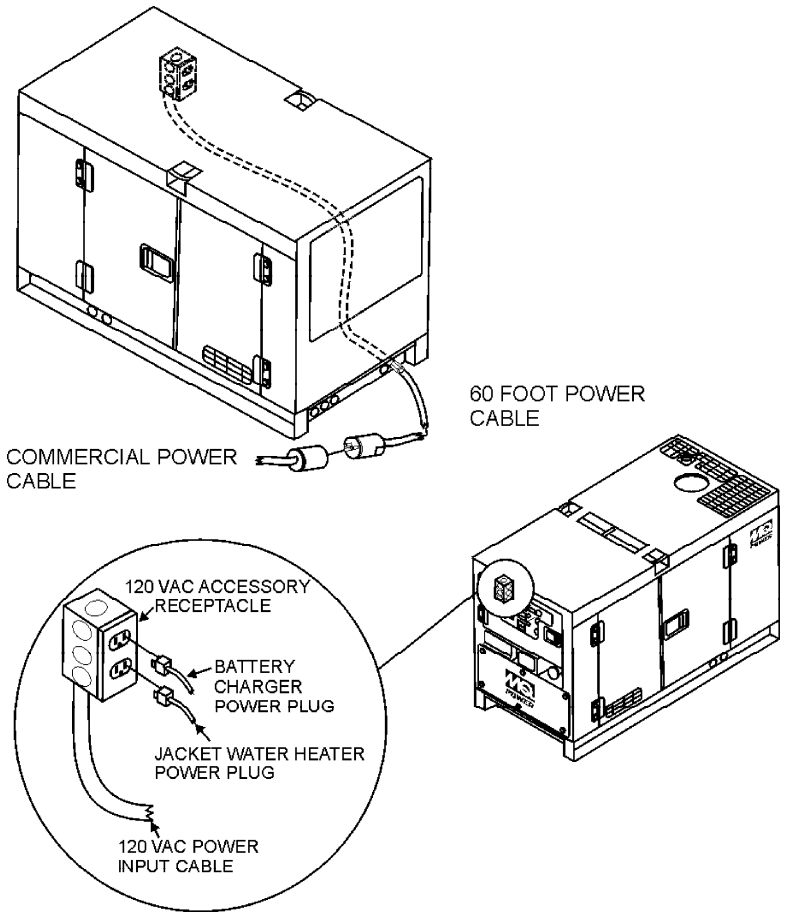


Figure 14. 120 VAC Accessory Receptacle/Cable

2. Once it is determined if commercial power is required, connect the load to the UNV terminals as shown in Figure 15. These terminals can be found on the front of the generator by lifting the UNV lug cover. It may be necessary to remove the retaining lug that secures the cover. Make sure to tighten terminal nuts securely to prevent load wires from slipping out.

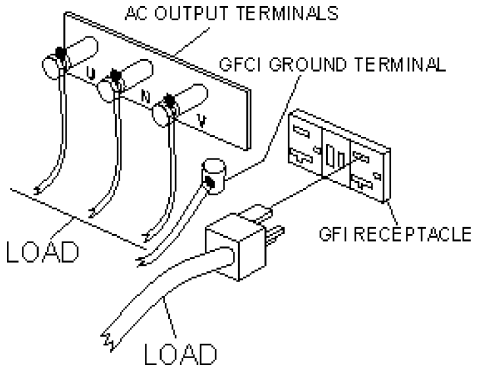


Figure 15. UNV Terminal Lugs (Load)

3. After attaching the load wires to the AC output terminals, secure the UNV cover by inserting the retaining screw (Figure 16) back into the cover.

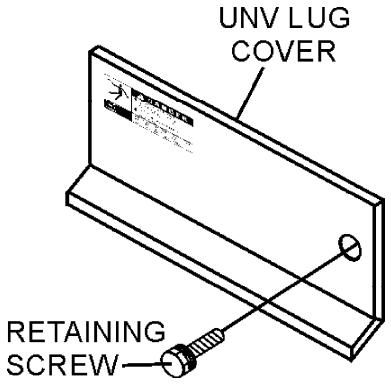


Figure 16. UNV Lug Cover

4. Connect the negative battery cable (BLACK) to the negative post on the battery (Figure 17).

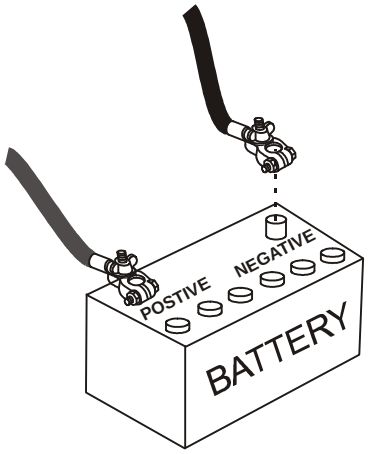


Figure 17. Battery Connections

5. Close all engine enclosure doors (Figure 18).

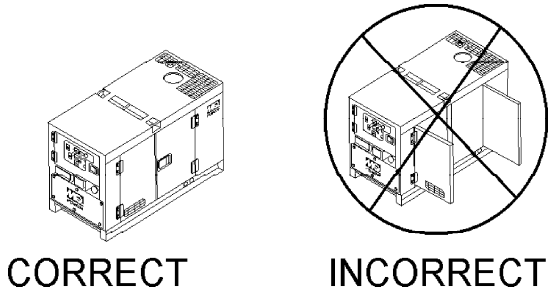


Figure 18. Engine Enclosure Doors

6. Check the "**Message Center**" (Figure 19) for any abnormal conditions.

Figure 19. Message Center Display

7. Make sure the "**Emergency Stop Switch**" (Figure 20) is **pulled out** (not engaged).

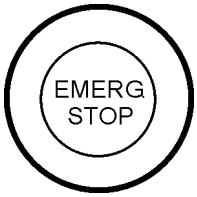


Figure 20. Emergency Stop Switch

8. Press the manual button. Observe that the engine begins to crank. (Figure 21)

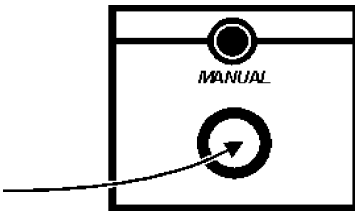


Figure 21. Manual Switch and Manual LED

9. After engine starts, verify that the "**Manual**" status LED (Figure 22) on the ICS-100 display is "ON" (lit).

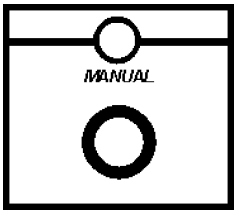


Figure 22. Off Switch and Illuminated Manual LED

10. Verify that the "**Not In Auto**" status LED indicator (Figure 23) is lit while the generator is in the manual mode.

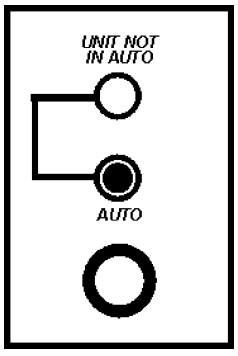


Figure 23. Not In Auto Status LED

11. The "Low Coolant" warning (Figure 24) may be ON momentarily until the jacket water heater heats the coolant. After the coolant reaches the specified temperature, the Low Coolant Warning should turn OFF.

Figure 24. Low Coolant Temperature Warning on Message Center

12. The generator's frequency display (Figure 25) displays the 60 cycle output frequency in **HERTZ**. If the frequency is not within the specified frequency tolerance, use the hertz adjustment control knob to bring the frequency within range.

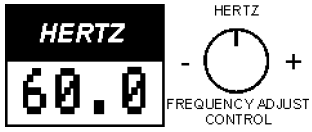


Figure 25. Frequency Display/ Adjustment Control Knob

13. The generator's voltage meter (Figure 26) displays the 120 VAC in **VOLTS**. If the voltage is not within the specified frequency tolerance, use the voltage adjustment control knob to bring the voltage within range.

FIGURE 26. Voltage Display/ Adjustment Control Knob

14. The amp display (Figure 27) will indicate zero amps with no load applied. When a load is applied, this display will indicate the amount of current that the load is drawing from the generator.

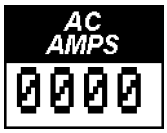


Figure 27. Amp Display (No Load)

15. The engine oil pressure display (Figure 28) will indicate the oil pressure (kg/ cm^2) of the engine. Under normal operating conditions the oil pressure should be approximately 25 psi.

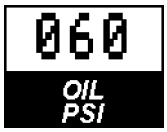


Figure 28. Oil Pressure Display

16. The water temperature display (Figure 29) will indicate the coolant temperature. Under normal operating conditions the coolant temperature should be between 105 and 215 degrees fahrenheit.

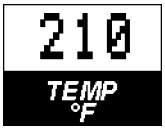


Figure 29. Coolant Temperature Display

17. The battery voltage display (Figure 30) will indicate the voltage of the battery when the generator is operating. Under normal operating conditions this voltage should be between 11.2 and 15.2 volts.

Figure 30. Battery Voltage Display

18. After the engine has been running for a few minutes, observe the **"Message Center"** (Figure 19) and check it for any abnormal conditions. If any abnormal conditions exist, shut down the engine and take corrective action to solve the problem.
19. If there are no abnormal problems shown on the "Alarm Annunicator" LED display, turn both the MAIN and GFCI circuit breakers to their ON position (Figure 31).

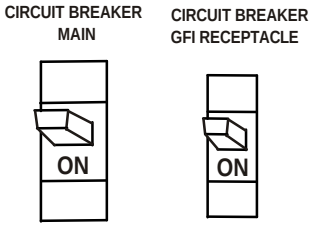


Figure 31. Main and GFCI Circuit Breakers

20. Look at the generator's amp display (Figure 32) and verify that it reads the anticipated amount of current with respect to the load. Remember the amp display will only display a current reading if the load is in use.

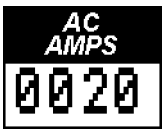


Figure 32. AC Amps Display

21. The generator will run until manually stopped or an abnormal condition occurs.

Engine Shutdown

To shut-down the generator use the following procedure:

1. Place both the **MAIN** and **GFCI** circuit breakers to the "OFF position"
2. Remove the load from the UNV terminal strip (Figure 15).
3. Let the engine cool by running 3-5 minutes with no load applied.
4. Press the "Off" button to stop engine (Figure 33).

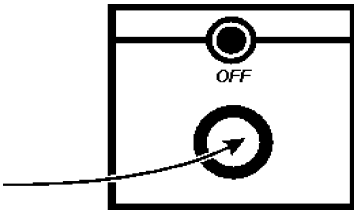


Figure 33. Off Switch

5. Verify the "Off" status LED (Figure 34) on the ICS-100 display is illuminated.

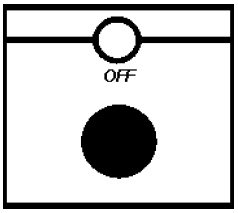


Figure 34. OFF Status LED

Emergency Stop

NEVER stop the engine suddenly except in an emergency. **DO NOT** use the emergency stop switch a as method of shutting down the engine. This switch is **ONLY** to be used in the event of an emergency.

1. To stop the engine in the event of an emergency, **PUSH** the emergency stop button (Figure 35) inward. This button is located on the generator's control panel.

Figure 35. Emergency Stop Button (Switch) and Message Center Warning

2. To dis-engage the emergency stop switch, **PULL** the emergency stop outward. When the switch is in this position (not active) the engine will resume its previous setting of Manual, Auto, or Off.

CAUTION:

Before connecting this generator to any building's electrical system, a **licensed electrician** must install an isolation (transfer) switch. Serious ***injury*** or ***death*** may result without this transfer switch.

CAUTION:

When connecting the generator to a isolation (transfer) switch, **ALWAYS** have power applied to the generator's interal battery charger. This will ensure that the engine will not fail due to a dead battey.

Starting the generator in the "**AUTO**" mode is similar to starting the generator in the "**MANUAL"** mode, with a few exceptions.

CAUTION:

When running the generator in the **AUTO** mode, remember the generator can start up at any time without warning. **NEVER** attempt to perform any maintenance when the generator is in the auto mode.

When starting generator in Auto mode use the "Manual Start-up" procedure except where noted (see below).

1. Perform steps 1 through 6 (Before Starting, page 43-45) as outlined in the manual starting procedure.
2. Apply commercial power to the generator via the supplied 60 ft. cable.See Figure 14.
3. Plug the battery charger and jacket water heater AC plugs into the 120 VAC accessory receptacle located inside the engine compartment just below the control panel.
4. Press the Auto switch (Figure 36). Observe that the Auto LED Illuminates (Figure 37).

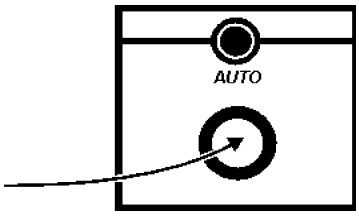


Figure 36. Auto Switch (Button)

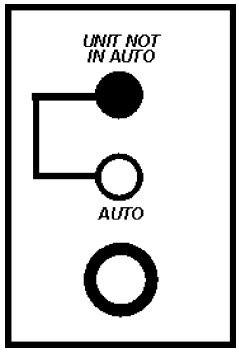


Figure 37. Auto Switch LED (AUTO)

5. Verify that the "**Unit Not In Auto**" status LED indicator is OFF (not lit).
6. Continue to follow the steps outline in the manual start-up procedure (start at step 11, page 46).

General Inspection

Prior to each use, the generator should be cleaned and inspected for deficiencies. Check for loose, missing or damaged nuts, bolts or other fasteners. Also check for fuel, oil, and coolant leaks.

Engine Side (Refer to the Engine Instruction Manual)

Air Cleaner

Every 50 hours: Remove air cleaner element and clean heavy duty paper with kerosene or foam element with liquid detergent and hot water. Wrap foam element in a cloth and squeeze dry. For heavy duty paper element, wipe excess kerosene with a dry towl.

Fuel Addition

Add diesel fuel (the grade may vary according to season and locations). Always pour through the mesh filter.

Removing Water from the Tank

After prolonged use, water and other impurities accumulate in the bottom of the tank. Occasionally remove the drain cock and drain the contents. During cold weather, the more empty volume inside the tank, the easier it is for water to condense. This can be reduced by always keeping the tank as full as possible.

Air Removal

If air enters the fuel injection system of a diesel engine, starting becomes impossible. After running out of fuel, or after disassembling the fuel system, bleed the system according to the following procedure.

To restart after running out of fuel, turn the switch to the “ON” position for 15-30 seconds. Try again, if needed. This unit is equipped with an automatic air bleeding system.

Service Daily

If the engine is operating in very dusty or dry grass conditions, a clogged air cleaner will result. this can lead to a loss of power, excessive carbon buildup in the combustion chamber in high fuel consumption.

Cleaning the Fuel Strainer

Clean the fuel strainer if it contains dust or water. Remove dust or water in the strainer cap and wash it in diesel fuel. Securely fasten the fuel strainer cap so that fuel will not leak. Check the fuel strainer every 200 hours of operation or once a month.

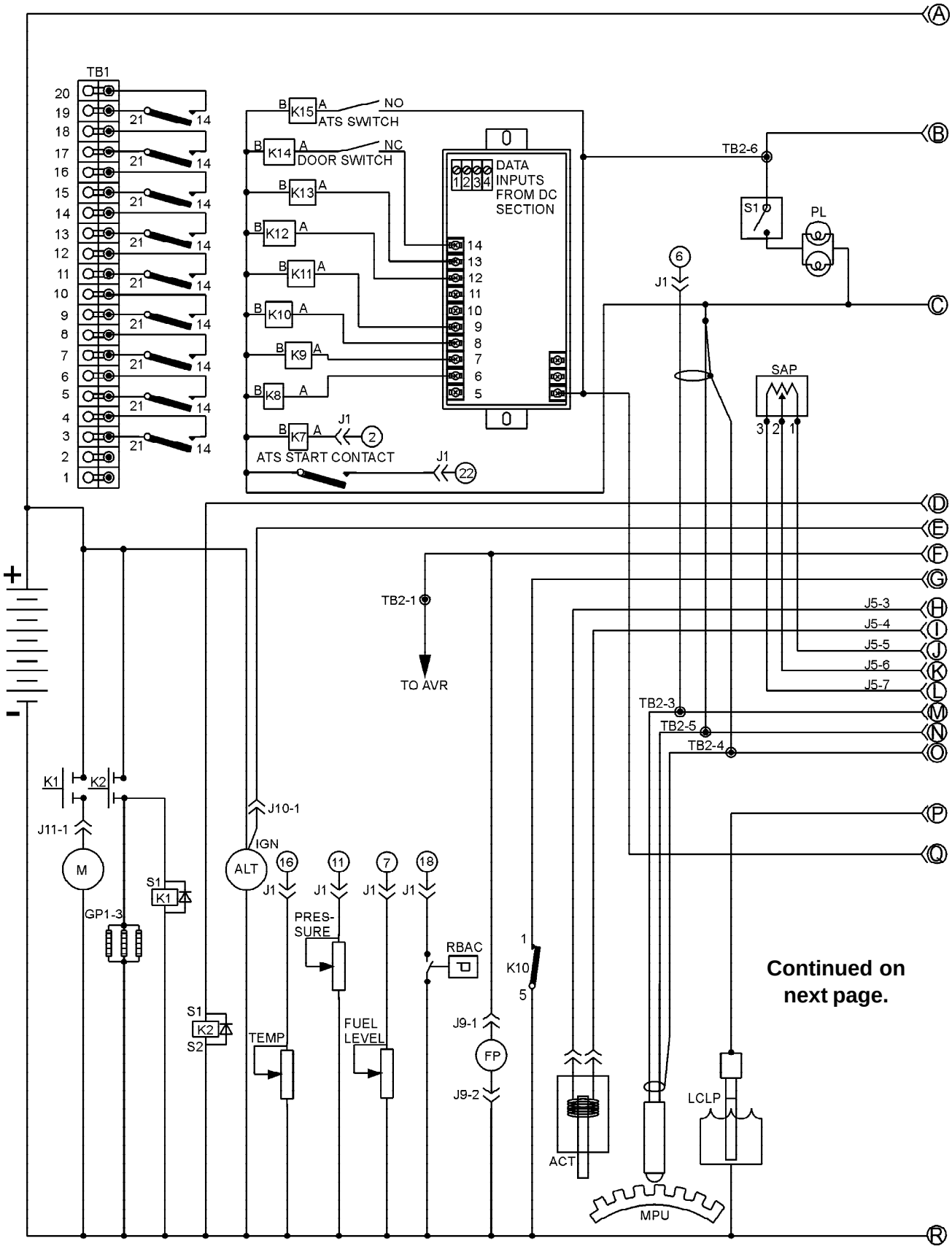
Check Oil Level

Check the crankcase oil level prior to each use, or when the fuel tank is filled. Insufficient oil may cause severe damage to the engine. Make sure the generator is level. The oil level must be between the two notches on the dipstick as shown in Figure 9.

Generator Storage

If the generator is stored for more than 30 days, the following is required prior to storage:

- Drain the fuel tank completely.
- Completely drain the oil from the crankcase and refill with fresh oil.
- Clean all external parts of the generator with a cloth.
- Cover the generator and store in a clean, dry place.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19
18
17
16
15
14
13
12
11
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2
1
21
14
B K15 A NO
ATS SWITCH
B K14 A NC
DOOR SWITCH
B K13 A
B K12 A
B K11 A
B K10 A
B K9 A
B K8 A
B K7 A J1 2
ATS START CONTACT
J1 22
0
DATA INPUTS FROM DC SECTION
1 2 3 4
14 13 12 11 10 9 8 7 6 5
TB2-6
S1
PL
6 J1
SAP
3 2 1
TO AVR
TB2-1
J5-3
J5-4
J5-5
J5-6
J5-7
TB2-3
TB2-5
TB2-4
K1
K2
J11-1
M
S1
K1
GP1-3
J10-1
IGN
ALT
16
11
7
18
J1
PRES-SURE
RBAC
1
K10
5
S1
K2
S2
TEMP
FUEL LEVEL
J9-1
FP
J9-2
ACT
LCLP
MPU
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A
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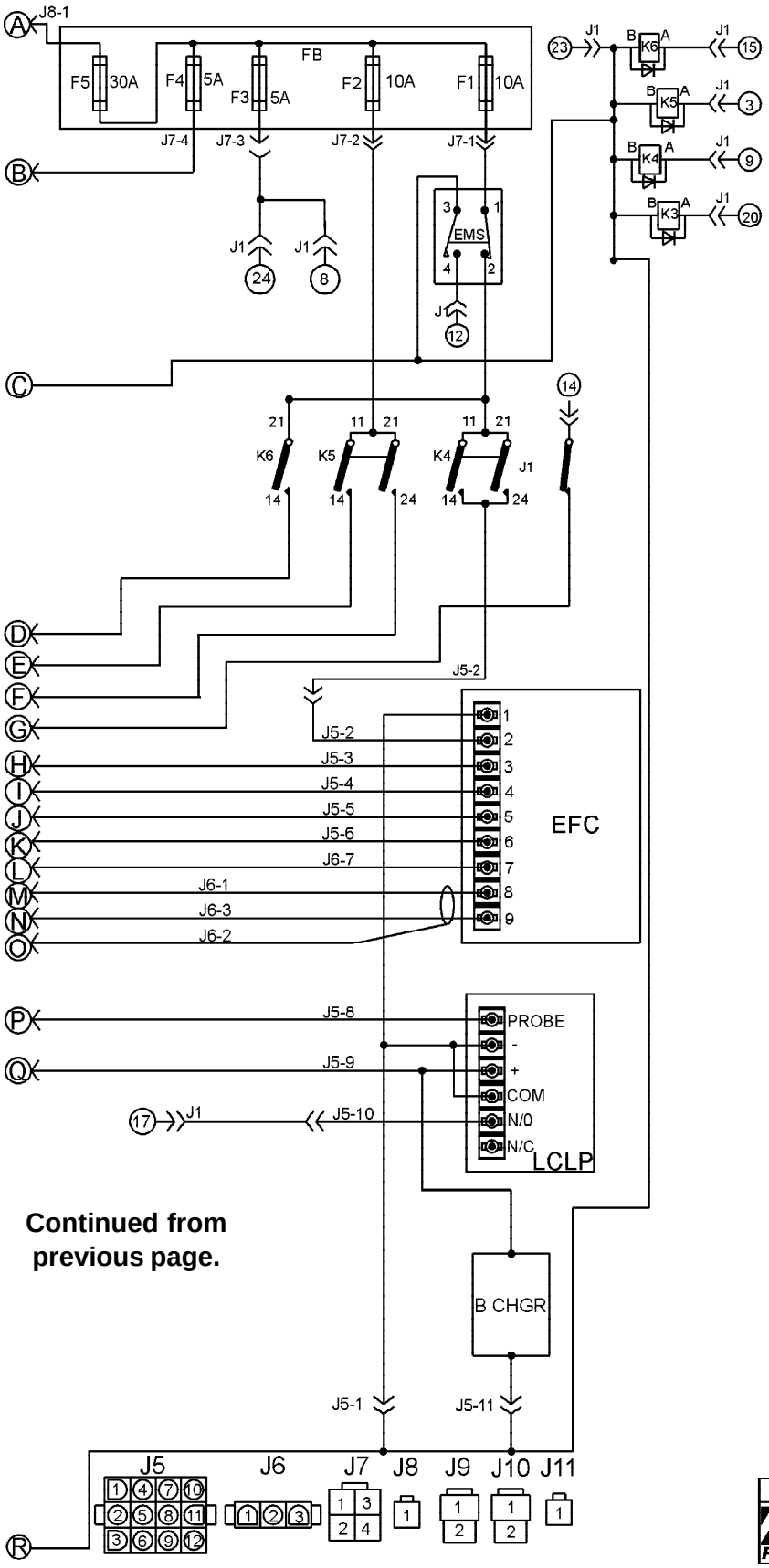
DCA-10SPX3 —GENERATOR WIRING DIAGRAM



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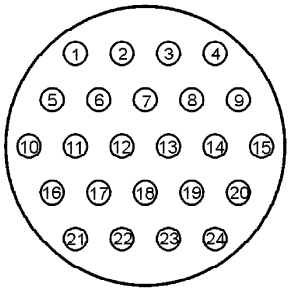
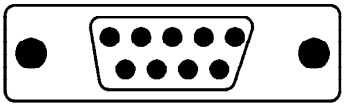
ICS-100 DC MODULE

1. MINOR ALARM OUTPUT
2. MAJOR ALARM OUTPUT
3. B+ TO AVR OUTPUT (TERMINAL "J")
4. VAPOR LPG FUELSOLENOID OUTPUT
5. C/B SHUNT TRIP OUTPUT
6. MAGNETIC PICK-UP INPUT
7. FUEL LEVEL INPUT
8. IGNITION VERIFY INPUT
9. GOVERNOR OUTPUT
10. AUX INPUT
11. OIL PRESSURE INPUT
12. EMERGENCY STOP INPUT
13. C/B OPEN INPUT
14. LOSS OF AC POWER INPUT
15. CRANK OUTPUT
16. ENGINE TEMPERATURE INPUT
17. LOW COOLANT LEVEL INPUT
18. RUPTURE BASIN FILLING INPUT
19. C/B TRIPPED INPUT
20. LIQUID LPG FUEL SOLENOID OUTPUT
21. AUX. INPUT
22. REMOTE START INPUT
23. BATTERY NEGATIVE (-)
24. BATTERY POSITIVE (+)

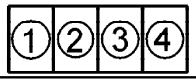
J1



J2-RS232-DATA PORT



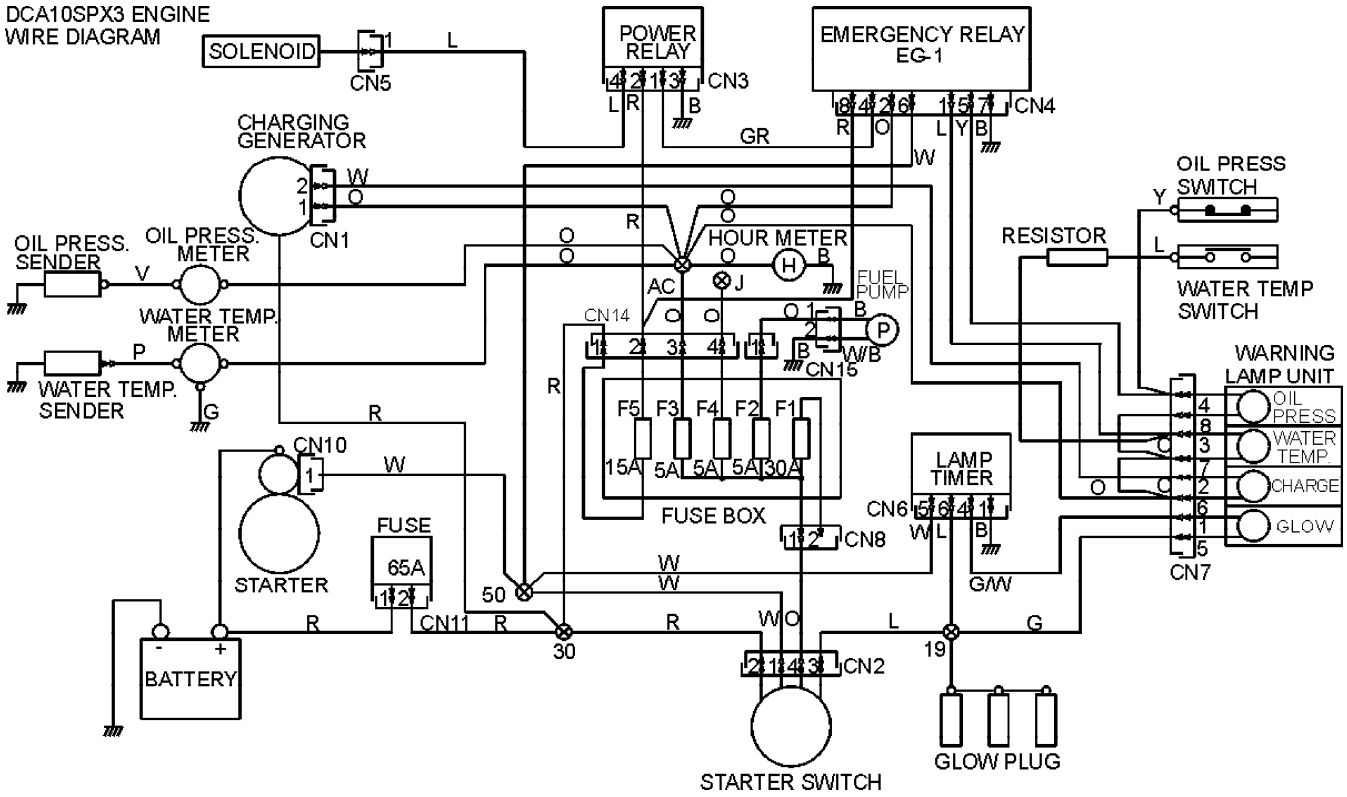
J3-COMMUNICATION LINK TO ICS-100 RELAY MODULE

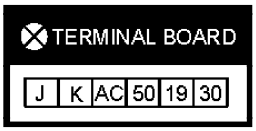


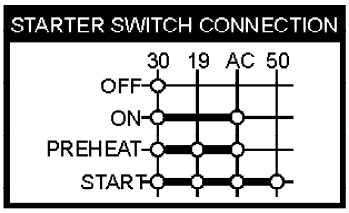
J4-COMMUNICATION LINK TO ICS-100 RELAY MODULE

DC SCHEMATIC WITH ICS-100 CONTROL		
MQ POWER	MODEL	DCA10SPX3
	DRAWING NUMBER	M10010-21095Q

DCA-10SPX3 —ENGINE WIRING DIAGRAM

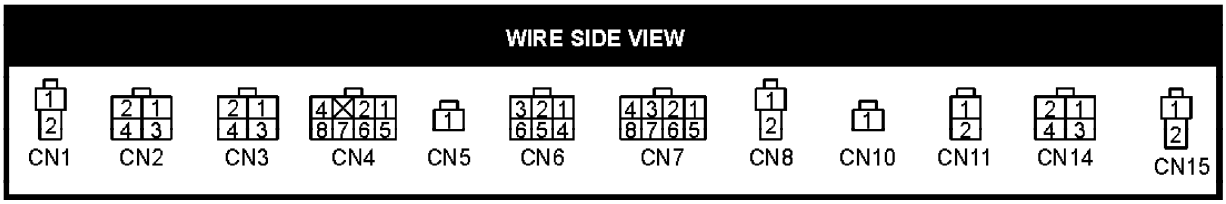






COLOR CODE TABLE

CODE/ WIRE COLOR			
B	BLACK	R	RED
L	BLUE	W	WHITE
BR	BROWN	Y	YELLOW
G	GREEN	LB	LIGHT BLUE
GR	GRAY	LG	LIGHT GREEN
V	VIOLET	O	ORAGNE
P	PINK		



NOTE PAGE

DCA-10SPX3 — TROUBLESHOOTING (ENGINE)

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, please take a remedial action following the diagnosis based on the Engine Troubleshooting (Table 7) information shown below and on the proceeding page. If the problem cannot be remedied, please leave the unit just as it is and consult our company's business office or service plant.

TABLE 7. ENGINE TROUBLESHOOTING

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
Engine does not start.	No fuel?	Replenish fuel.
	Air in the fuel system?	Bleed system.
	Water in the fuel system?	Remove water from fuel tank.
	Fuel pipe clogged?	Clean fuel pipes.
	Fuel filter clogged?	Clean or change fuel filter.
	Excessively high viscosity of fuel or engine oil at low temperature?	Use the specified fuel or engine oil.
	Fuel with low cetane number?	Use the specified fuel.
	Fuel leak due to loose injection pipe retaining nut?	Tighten nut.
	Incorrect injection timing?	Adjust.
	Fuel cam shaft worn?	Replace.
	Injection nozzle clogged?	Clean injection nozzle.
	Injection pump malfunctioning?	Repair or replace.
	Seizure of crankshaft, camshaft, piston, cylinder liner or bearing?	Repair or replace.
	Compression leak from cylinder?	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder.
	Improper valve timing?	Correct or replace timing gear.
	Piston ring and liner worn?	Replace.
	Excessive valve clearance?	Adjust.
Engine will not crank.	Battery discharged?	Charge battery.
	Starter malfunctioning?	Repair or replace.
	Wiring disconnected?	Connect wiring.

TABLE 7. ENGINE TROUBLESHOOTING (C0NTINUED)

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
Engine revolution is not smooth.	Fuel filter clogged or dirty?	Clean or change.
	Air cleaner clogged?	Clean or change.
	Fuel leak due to loose injection pipe retaining nut?	Tighten nut.
	Injection pump malfunctioning?	Repair or replace.
	Incorrect nozzle opening pressure?	Adjust.
	Injection nozzle stuck or clogged?	Repair or replace.
	Fuel over flow pipe clogged?	Clean.
	Governor malfunctioning?	Repair.
Either white or blue exhaust gas is observed.	Excessive engine oil?	Reduce to the specified level.
	Piston ring and liner worn or stuck?	Repair or replace.
	Incorrect injection timing?	Adjust.
	Deficient compression?	Adjust top clearance.
Either black or dark gray exhaust gas is observed.	Overload?	Lessen the load.
	Low grade fuel used?	Use the specified fuel.
	Fuel filter clogged?	Clean or change.
	Air cleaner clogged?	Clean or change.
	Deficient nozzle injection?	Repair or replace the nozzle.
Deficient output.	Incorrect injection timing?	Adjust.
	Engine's moving parts seem to be seizing?	Repair or replace.
	Uneven fuel injection?	Repair or replace the injection pump.
	Deficient nozzle injection?	Repair or replace the nozzle.
	Compression leak?	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder.

Practically all generator breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, use the engine troubleshooting guide (Table 9). If the problem cannot be remedied, consult our company's business office or service plant.

Table. 9. ICS-100 Warning Troubleshooting Chart

Sympton	Possible Cause	Solution
Low Oil Pressure Warning.	Low Oil Level.	Fill Oil Level
	Oil Pressure Sending Unit Failure.	Replace Oil Pressure Sending Unit.
	Short Time Delay in programmed	Increase Time Delay
	Wire is shorted.	Inspect/Repair Wire.
Low Coolant Level Warning.	Low Coolant Level.	Fill Coolant level.
	Sending Unit Failure.	Replace Sending Unit.
	Low Battery Voltage.	Replace/Charge Battery.
High Coolant Temperture Warning.	Fan Belt Tension is incorrect.	Tighten/Replace Fan Belt.
	Air Flow is not circulation through Radiator.	Clean/Repair Radiator Grill.
	Doors are open.	Close Doors.
	Exhaust is leaking.	Replace/Repair gaskets or faulty part.
	Generator is being overloaded.	Check/Reduce Load.
	Thermostat Failure	Replace Thermostat.
	Air Intake is blocked.	Clear All Air Intakes.
	Temperature Switch Failure.	Replace Temperature Switch.
Overcrank Shutdown Warning.	No Or Low Fuel.	Fill fuel level.
	Program settings incorrect.	Correct program settings.
Overspeed Shutdown Warning.	RPM engine speed is too high.	Adjust RPM.
	Governor Actuator needs to be adjusted.	Adjust Governor Actuator.
	Governor Controller needs to be adjusted.	Adjust Governor Controller.
	Program settinsg are incorrect.	Correct program settings.
Loss of MPU Shutdown Warning.	Magnetic Pick Up out of adjustment.	Adjust Magnetic Pick Up.
	Magnetic Pick up is dirty.	Clean Magnetic Pick Up.

Table 10. ICS-100 Warning Trouble Shooting Chart		
Sympton	Possible Cause	Solution
Unit not in Auto LED is illuminated. (Generator is in manual or off position.)	Unit is not in Auto position.	Set generator to auto position (standby application only).
High Battery Voltage Warning.	Alternator not working properly.	Check/replace Alternator.
	Battery Charger is not working properly.	Check/replace battery charger.
	DC regulator is not working properly.	Check/replace DC regulator.
Low Coolant Temperature Warning.	Jacket water heater is not plugged into handy box.	Plug jacket water heater into handy box.
	Improper coolant/water mixture.	Fix coolant/water mixture.
Low fuel warning.	Approaching critically low fuel.	Fill low fuel level.
	Float switch is not working properly.	Check/repair float switch.
Loss of accessory power warning.	Commercial power not connected to handy box.	Plug in commercial power.
	Commercial power failure.	Turn on commercial power.
Rupture basin warning.	The ruputre basin is now containing fuel.	Drain ruputre basin tank and repair.
	Float switch is not working properly.	Check/repair float switch.
Low power factor warning wile powering load.	Improper generator size.	Refer to dealer.
	Improper load.	Correct load application.
Emergency stop warning.	Emergency stop button is engaged.	Disengage emergency stop.
	Emergency stop switch is faulty.	Replace switch.
Over voltage warning.	AVR is malfunctioning.	Refer to dealer.
Under voltage warning	AVR is malfunctioning.	Refer to dealer.
Panel Light does not turn on.	Bulbs need to be replaced.	Replace bulbs.

DCA-10SPX3W/KUBOTA D1403 DIESEL ENGINE 1 TO 3 UNITS

Qty.	P/N	Description
1	0601820626	Automatic Voltage Regulator
1	0601806592	Main Circuit Breaker
1	0601802609	Receptacle Circuit Breaker
1	0601840073	Voltage Regulator (Rheostat)
1	M1001011012Q	Frequency Regulator (Rheostat)
3	7000032091	Oil Filter
1	1584139010	Oil Sending Unit
1	1949883040	Water Temperature Sending Unit
1	1712397010	Fan Belt
3	0602046273	Air Filter
3	1522143010	Fuel Filter

EXPLANATION OF CODE IN REMARKS COLUMN

How to read the marks and remarks used in this parts book.

Items Found In the "Remarks" Column

Serial Numbers-Where indicated, this indicates a serial number range (inclusive) where a particular part is used.

Model Number-Where indicated, this shows that the corresponding part is utilized only with this specific model number or model number variant.

Items Found In the "Items Number" Column

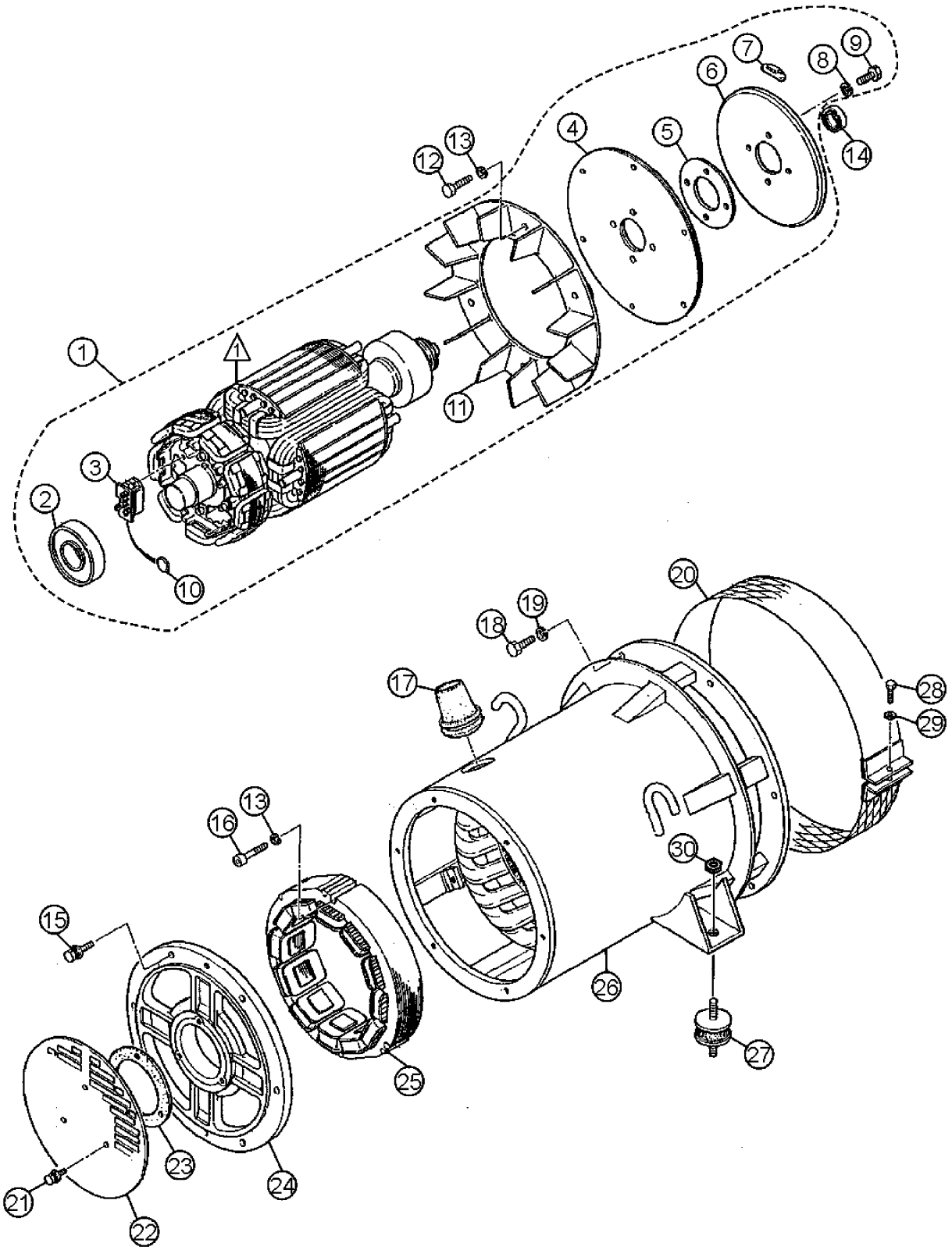
All parts with same symbol in the number column, *, #, +, %, or ■, belong to the same assembly or kit.

Note: If more than one of the same reference number is listed, the last one listed indicates newest (or latest) part available.

NOTE

The contents of this parts catalog are subject to change without notice.

GENERATOR ASSEMBLY

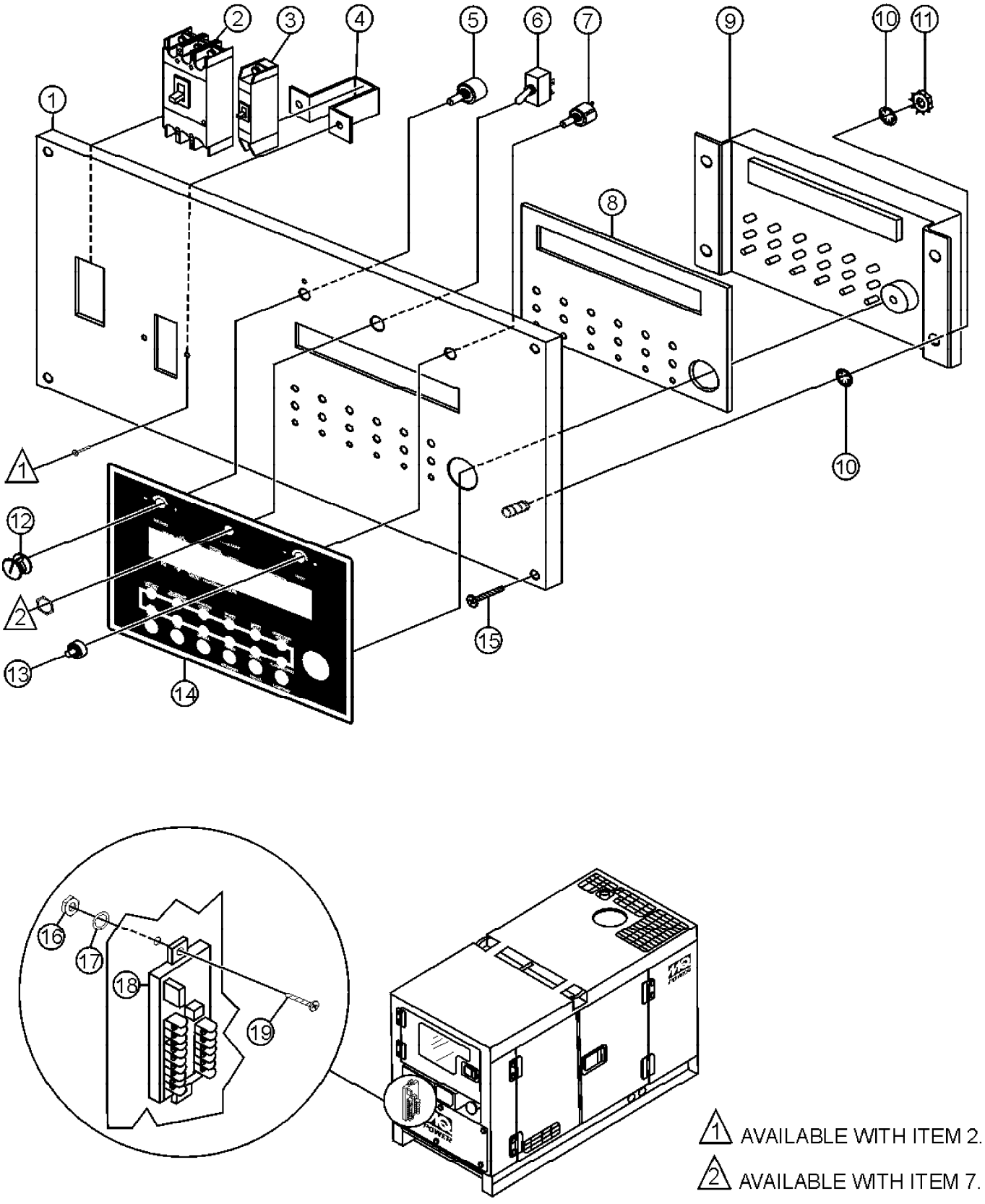


⚠1 FIELD ASSEMBLY AVAILABLE WITH ITEM 1 ONLY

GENERATOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	8321000102	ROTOR ASS'Y	1	
2	71906308	BEARING	1	6308-DDU-C3
3	7961025004	RECTIFIER	1	
4	835161104	COUPLING DISK	2	
5	8351612004	WASHER, COUPLING HUB	1	
6	8351615003	BALANCING PLATE	2	
7	0601000209	BALANCING WEIGHT KIT	1	
8	0042610000	LOCK WASHER	4	
9	0105091025	HEX HEAD BOLT	4	
10	0601822630	SURGE ABSORBER	1	TNR23G471K
11	8001070003	FAN	1	
12	0012108035	HEX HEAD BOLT	6	
13	0042508000	LOCK WASHER	3	
14	0070506903	BEARING	1	6903- ZZ
15	011208035	HEX HEAD BOLT	6	
16	0016008045	HEX SOCKET HEAD CAP SCREW	3	
17	0845041904	GROMMET	1	
18	012010030	HEX HEAD BOLT	6	
19	030210250	LOCK WASHER	6	
20	8401332004	COVER, FAN	1	
21	10017106016	HEX HEAD BOLT	3	
22	8351331004	COVER, SUCTION	1	
23	8351512004	PACKING	1	
24	8351315003	END BRACKET	1	
25	8431350003	FIELD ASS'Y EXCITER	1	
26	7561345403	STATOR ASS'Y	1	
27	0605000006	RUBBER SUSPENSION	2	
28	0010106030	HEX HEAD BOLT	1	
29	952404470	PLAIN WASHER	1	
30	0207010000	HEX NUT	2	

CONTROL PANEL ASSEMBLY



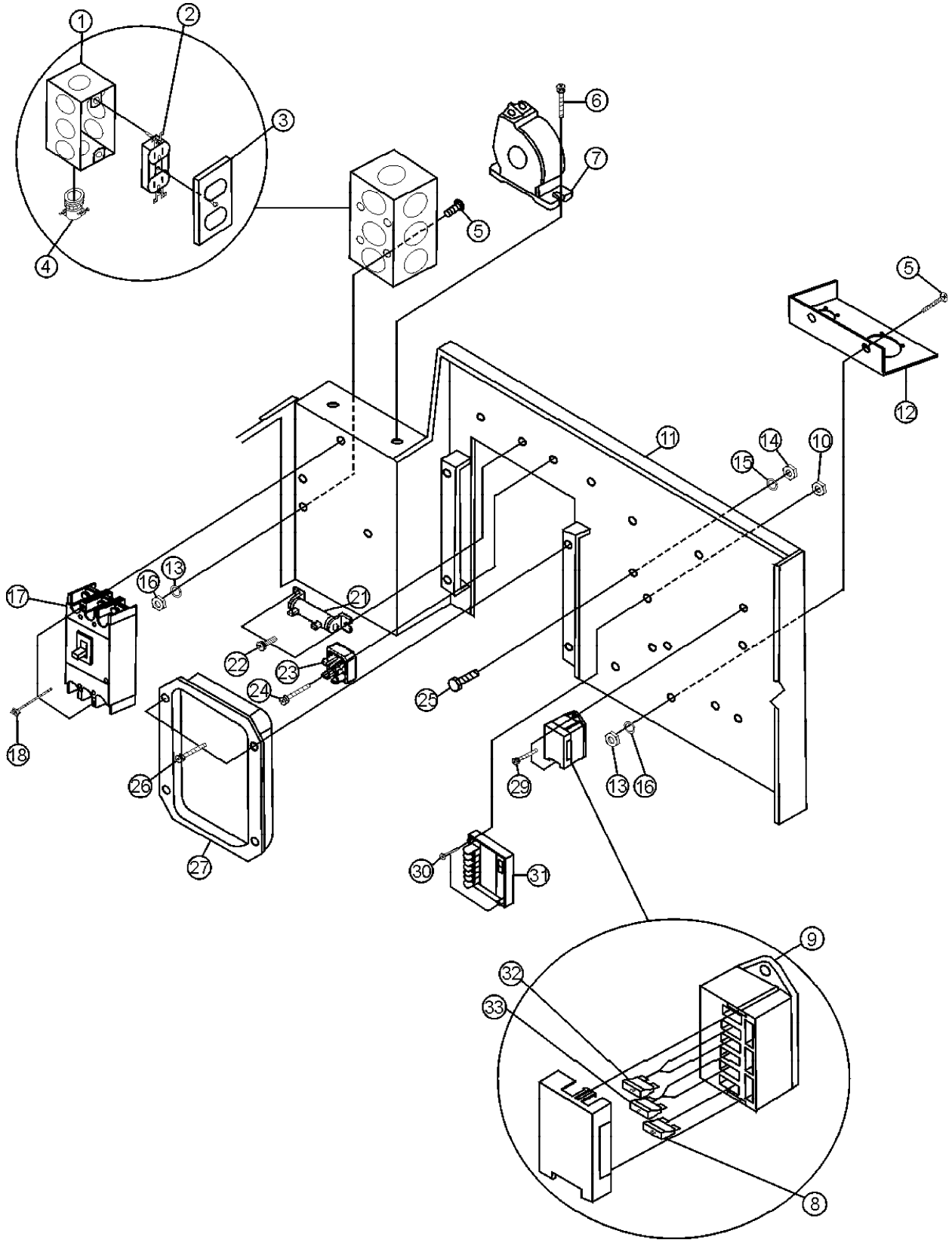
1 AVAILABLE WITH ITEM 2.

2 AVAILABLE WITH ITEM 7.

DCA-10SPX3 — CONTROL PANEL ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M1001021090Q	CONTROL PANEL	1	
2	0601806592	CIRCUIT BREAKER; MAIN	1	
3	0601802609	CIRCUIT BREAKER; RECEPTACLE	1	
4	4641817004	BRACKET; CIRCUIT BREAKER	1	
5	0601840073	RHEOSTAT, VOLTAGE REGULATOR	1	
6	M1001021048Q	SWITCH, PANEL LIGHT	1	
7	M1001011012Q	RHEISTAT, FREQUENCY REGULATOR	1	
8	M00000-22005Q	DUST GASKET	1	
9	M0000022001Q	ICS DC DIGITAL CONTROL	1	
10		STAR WASHER; 6-32	4	
11		STAR NUT; 6-32	4	
12	0601840121	KNOB; VOLTAGE REGUALTOR	1	
13	M1001011013Q	CONCENTRIC TURN DIAL, FREQUENCY	1	
14	M1001021091Q	ICS OVERLAY	1	
15	0021806030	SCREW; CONTROL PANEL	4	
16		NUT;	2	
17		LOCK WASHER;	2	
18	M0000042001Q	ICS AC DIGITAL CONTROL	1	
19		SCREW;	2	

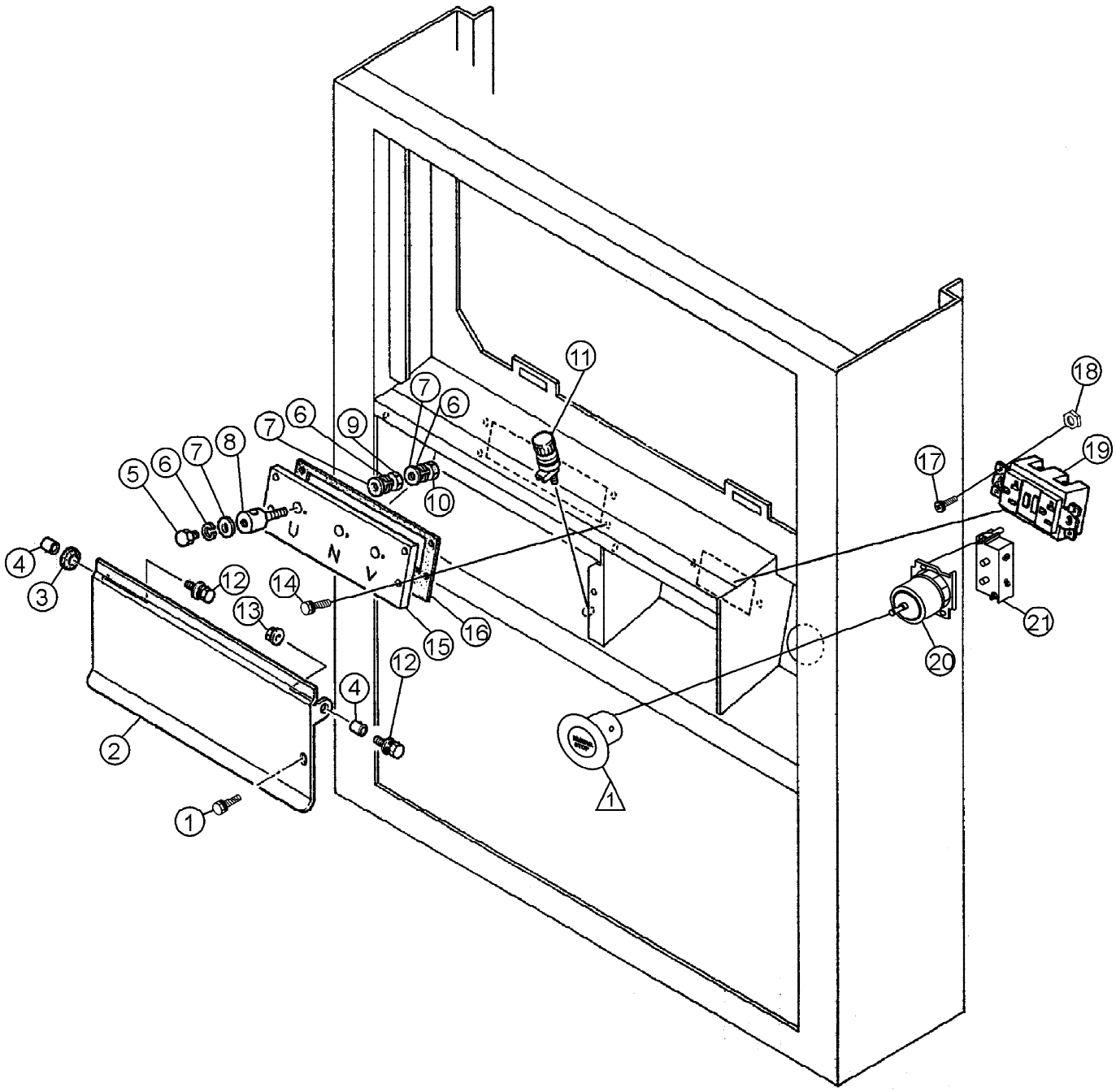
CONTROL PANEL FRAME ASSY.



DCA-10SPX3 — CONTROL PANEL FRAME ASSY

CONTROL PANEL FRAME ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M1001041035Q	HANDY BOX	1	
2	M1001041037Q	DUPLEX RECEPTACLE	1	
3	M1001041036Q	HANDY BOX COVER	1	
4	M1001041020Q	CONNECTOR, ROMEX	1	
5	3051032	MACHINE SCREW, 10-32	2	
6	0027106016	MACHINE SCREW	2	
7	0601801122	CURRENT TRANSORMER, AMMETER	1	COC-3 100A/5A
8	0601806644	FUSE, 30A	1	
9	8701899004	FUSE BOX	1	FB- 6PS
10	M0000001300Q	NUT, SELF CLINCHING, 8-32	2	
11	B0445000302	CONTROL PANEL REAR FRAME	1	
12	M1001021019Q	WIRE HARNESS BRACKET	1	
13	34525	LOCK WASHER, 10-32	2	
14	34527	NUT, 10MM	1	
15	30210250	LOCK WASHER, 10MM	1	
16	20310080	NUT, 10-32	2	
17	0601806592	CIRCUIT BREAKER	1	XE100CS 65A
18	0021004060	MACHINE SCREW	2	
19	34524	LOCK WASHER, 6-32	4	
20	632	NUT, 6-32	4	
21	0601842304	RESISTOR	1	GG20W50 OHMS
22	0027104012	MACHINE SCREW	2	
23	0601820038	RECTIFIER	1	S15VB60
24	0027104020	MACHINE SCREW	5	
25	12210020	BOLT, GROUND, 10MM	1	
26	0017105016	HEX. HEAD BOLT	4	
27	0601820626	AUTOMATIC VOLTAGE REGULATOR	1	
28	0601815759	TERMINAL BOARD	1	KT- 20 6P
29	0027105016	MACHINE SCREW	2	
30	M0000001115Q	MACHINE SCREW, 8-32 X 1 1/4"	2	
31	M1001021035Q	HIGH/LOW BATTERY VOLTAGE DECTECTOR	1	VLD1
32	0601806643	FUSE, 10A	2	
33	0601806642	FUSE, 5A	2	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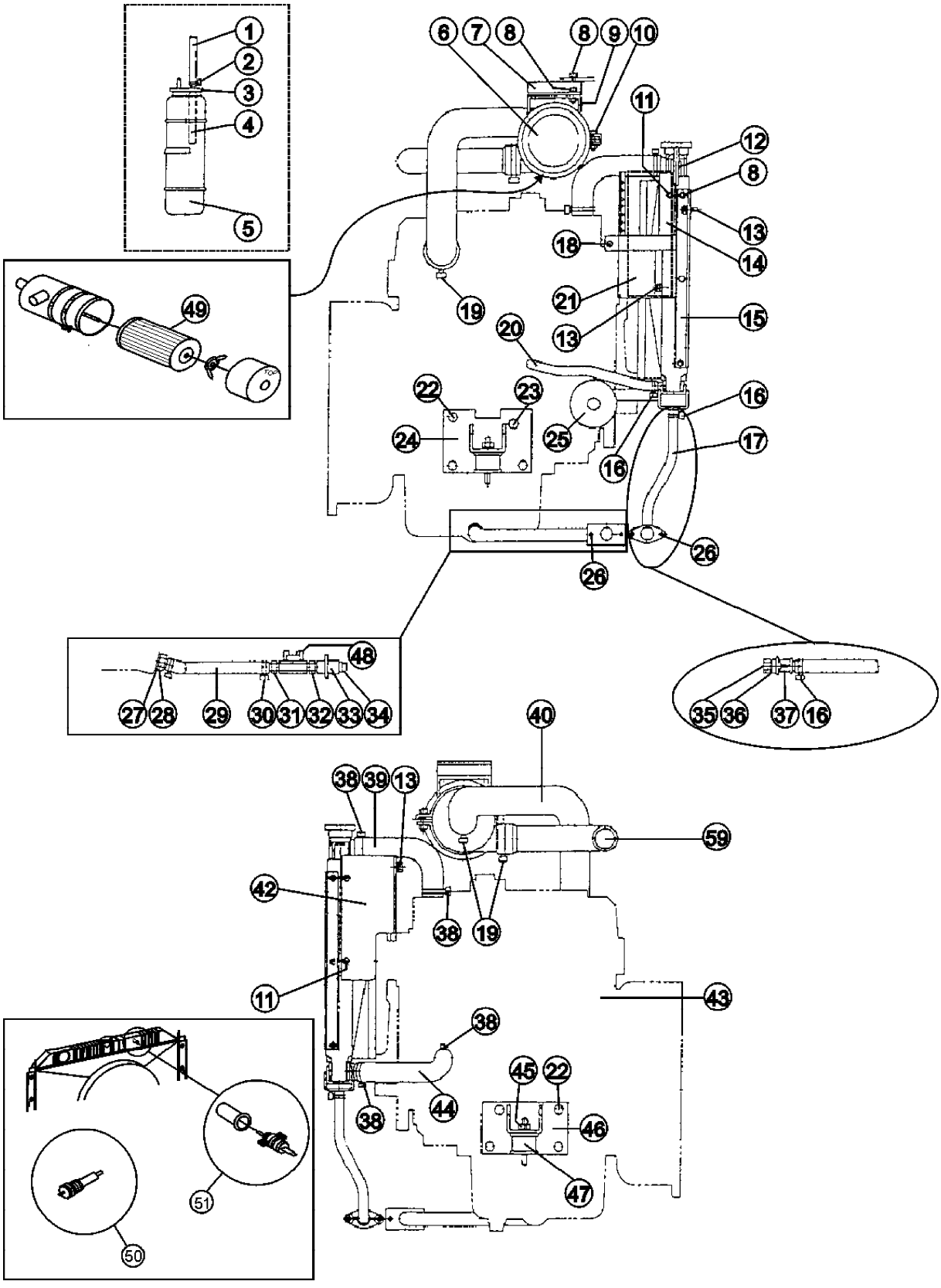
OUTPUT TERMINAL ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0017106016	HEX HEAD BOLT	1	
2	7561861003	COVER, OUTPUT TERMINAL	2	
3	0805088004	STAY RUBBER	1	
4	0821800014	COLLAR	2	
5	014208020	HEX HEAD BOLT	3	
6	0040008000	LOCK WASHER	8	
7	0041408000	PLAIN WASHER	8	
8	1621849004	OUTPUT TERMINAL	3	
9	0039508000	HEX NUT	3	
10	020108060	HEX NUT	3	
11	0601815109	GROUND TERMINAL	1	
12	011206020	HEX HEAD BOLT	2	
13	0207006000	HEX NUT	1	
14	0017105025	HEX HEAD BOLT	4	
15	7831860104	RUBBER SEAL	1	
15	7561860104	SET BOARD, OUTPUT TERMINAL	1	
17	0027104016	MACHINE SCREW	2	
18	0030004000	HEX NUT	2	
19	061812597	RECEPTACLE	1	
20	M1001021050Q	EMS CONTACT BLOCK	1	
21	M1001021049Q	EMS SWITCH	1	

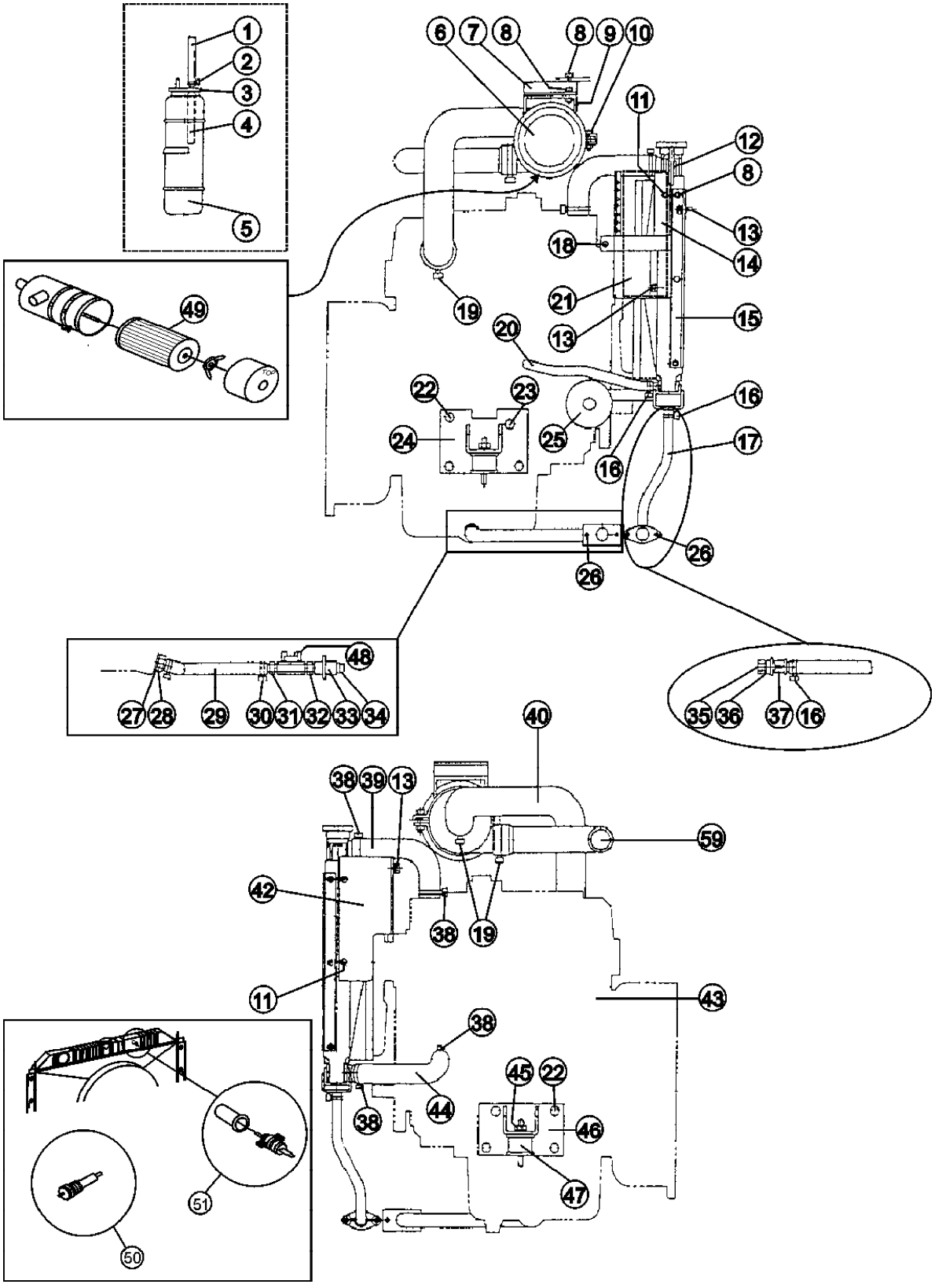
ENGINE & RADIATOR ASSY.



ENGINE AND RADIATOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0805096804	HOSE BAND	1	
2	0605515094	HOSE BAND	3	
3	0802081104	CAP, RESERVE TANK	1	
4	7222016304	HOSE BAND	1	
5	0802081403	RESERVE TANK	1	
6	1707611010	AIR CLEANER	1	
7	8322031004	BRACKET, AIR CLEANER	1	
8	011008020	HEX. HEAD BOLT	6	
9	3426013960	BAND, AIR CLEANER	1	
10	011208030	HEX. HEAD BOLT	2	
11	011006010	HEX. HEAD BOLT	4	
12	0602011974	RADIATOR	1	
13	0017106016	HEX. HEAD BOLT	4	
13	0017106016	HEX. HEAD BOLT	6	
14	8325127605	BRACKET, FAN GUARD	1	
15	7562012004	BRACKET, RADIATOR	2	
16	0605515014	HOSE BAND	4	
17	165717820171	DRAIN HOSE	1	
18	0017106035	HEX. HEAD BOLT	1	
19	0605515001	HOSE BAND	3	
20	1546173340	HOSE	1	
21	8325127113	FAN GUARD	1	
22	012212025	HEX. HEAD BOLT	7	
23	0012410025	HEX. HEAD BOLT	1	
24	8325112014	ENGINE FOOT	1	
25	7000032091	CARTRIDGE, OIL FILTER	1	
26	0017106016	HEX. HEAD BOLT	4	
27	1502025004	DRAIN JOINT	1	
28	0602021193	PACKING	1	
29	0192200380	DRAIN HOSE	1	
30	0605515003	HOSE BAND	2	
31	0602022738	HOSE JOINT	1	
32	0131506000	NIPPLE, 1/2"	1	
33	B0322300004	DRAIN JOINT	1	
34	0132006000	PLUG, 1/2"	1	
35	0802011104	PLUG	1	
36	0150000018	O RING	1	
37	1502025103C	DRAIN JOINT	1	
38	1510872870	HOSE BAND	4	
39	1706372940	RADIATOR HOSE, UPPER	1	

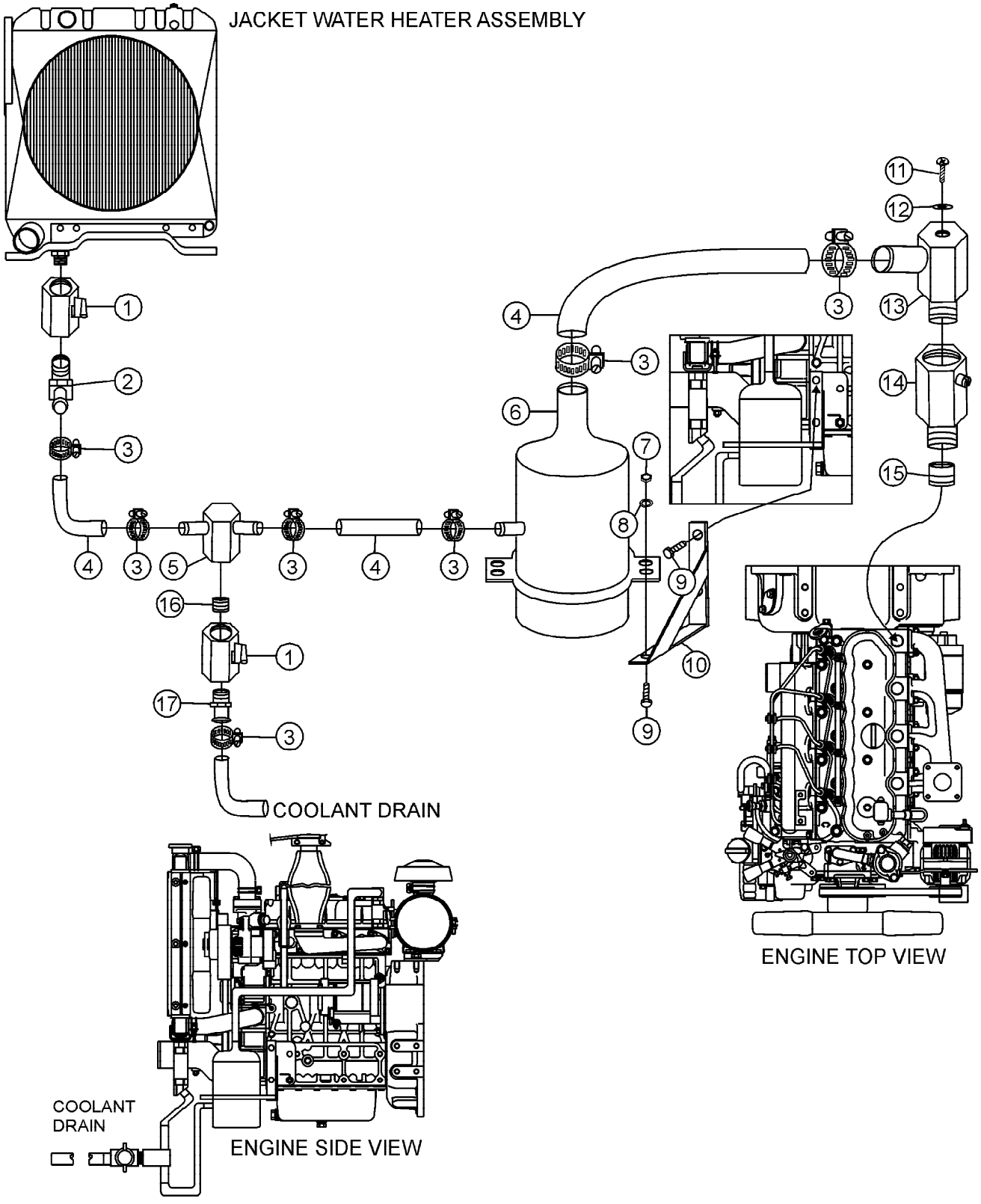
ENGINE & RADIATOR ASSY.



ENGINE AND RADIATOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
40	8322036103	HOSE, AIR CLEANER	1	
41	8432036103	HOSE, AIR CLEANER	1	
42	8325127504	BRACKET, FAN GUARD	1	
43	7560150404	ENGINE	1	KUBOTA D1403
44	0602014475	RADIATOR HOSE, LOWER	1	KUBOTA 15461-72851
45	0207010000	HEX. NUT	2	
46	8325112114	ENGINE FOOT	1	
47	7605419004	RUBBER SUSPENSION	2	
48	0603325011	VALVE	1	BBS1/2
49	0602046335	ELEMENT, AIR CLEANER	1	113043002
50	M1001031022Q	LOW COOLANT LEVEL PROBE	1	USED AFTER JUNE 1999
51	M1001031013Q	LOW COOLANT LEVEL PROBE	1	USED PRIOR TO JUNE 1999
59	8432036103	HOSE, AIR CLEANER	1	

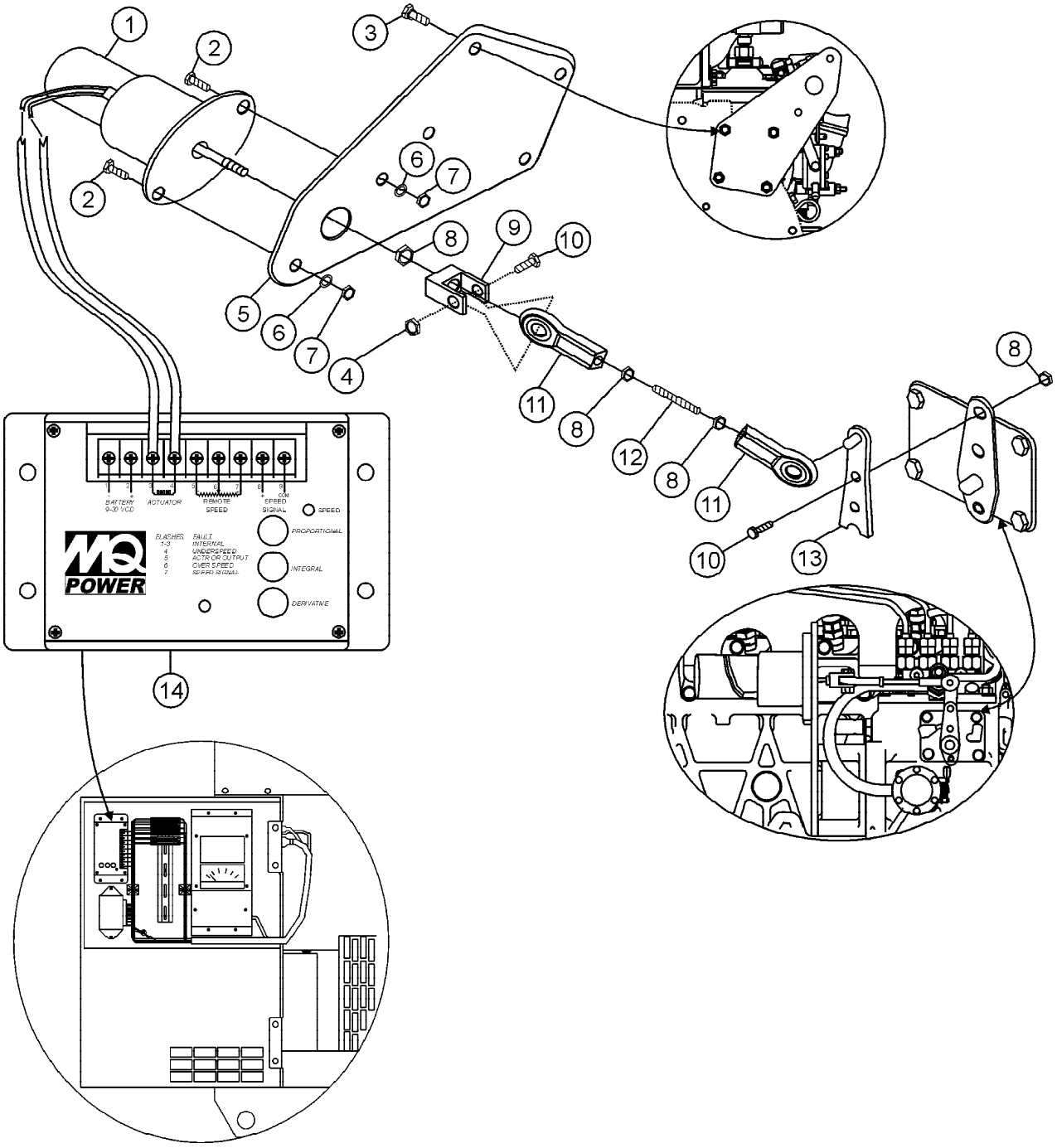
JACKET WATER HEATER ASSY.



JACKET WATER HEATER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M1001031019Q	BALL VALVE, 1/2 FXF	2	
2	M1001031018Q	DEGREE ELL, 5/8 X 1/2 45	1	
3	M0000003015Q	HOSE CLAMP	6	
4	M1001031025Q	HOSE 5/8 ID	4	PER FOOT
5	M1001031017Q	TEE, 5/8 X 3/8 X 5/8	1	
6	M1001031006Q	JACKET WATER HEATER	1	
7	M0000001321Q	NUT 1/4-20	2	
8	M0000001911Q	LOCK WASHER 1/4-20	2	
9	M0000001465Q	BOLT 1/4-20 X 3/4	2	
10	M1001031001Q	JWH MOUNTING BTACKET	1	
11	M0000001189Q	SCREW 8-32 X 3/8	1	
12	M1001031023Q	FIBER WASHER	1	
13	M1001031016Q	DEGREE ELL, 5/8 X 1/2 90	1	
14	M1001031015Q	BALL VALVE, 1/2 MXF SCREW	1	
15	M1001031014Q	FLUSH BUSHING	1	
16	34509	BUSHING, 3/8 X 1/2	1	
17	M1001031021Q	ADAPTER, BARB 3/8 NPT X 3/8	1	

ELECTRONIC GOVERNOR SYSTEM

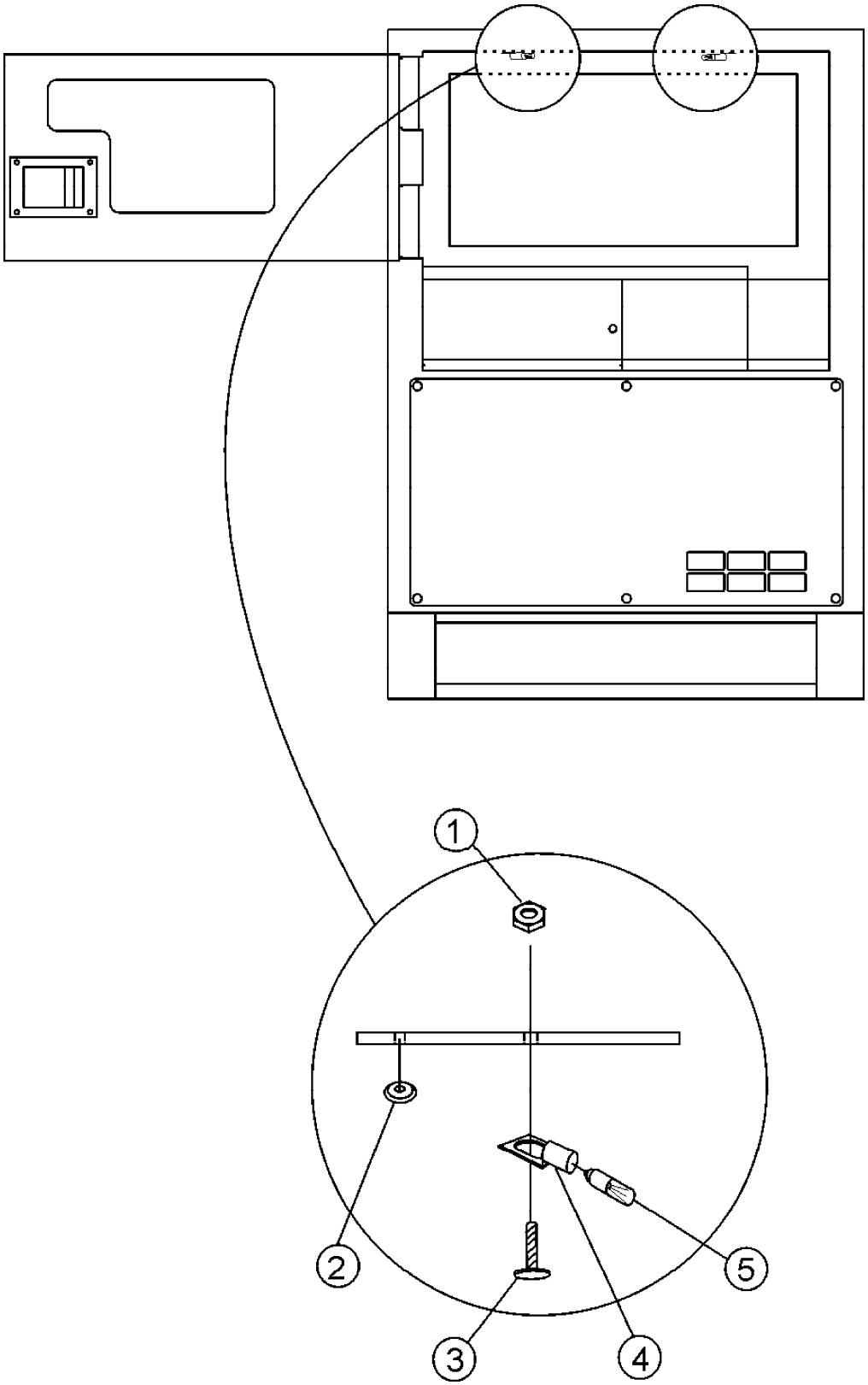


DCA-10SPX3 — ELECTRONIC GOVERNOR ASSY.

ELECTRONIC GOVERNOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M1001011010Q	ACTUATOR, 12VDC	1	
2	M0000001012Q	BOLT, 8 MM	2	
3	M0000001013Q	BOLT, 8 X 16 -6-1/4	4	
4	M0000001340Q	LOCK NUT 1/4	1	
5	M1001011001Q	ACTUATOR MOUNTING BRACKET	1	
6	M0000001014Q	LOCK WASHER, 8 MM	2	
7	M0000001020Q	NUT, 8 MM	2	
8	M0000001015Q	NUT, 1/4 SAE	3	
9	M1001011004Q	CLEVIS 1/4 TO #4	1	
10	M0000001016Q	BOLT, 1/4-20 X 3/4 GRADE 8 1-1/4	1	
11	M1001011005Q	SPHERICAL ROD	2	
12	M1001511015Q	GOVERNOR LINKAGE ROD	1	
13	M1001011003Q	GOVERNOR LEVER EXTENSION	1	
14	M1001011007Q	ACTUATOR CONTROLLER	1	

PANEL LIGHTS ASSY.

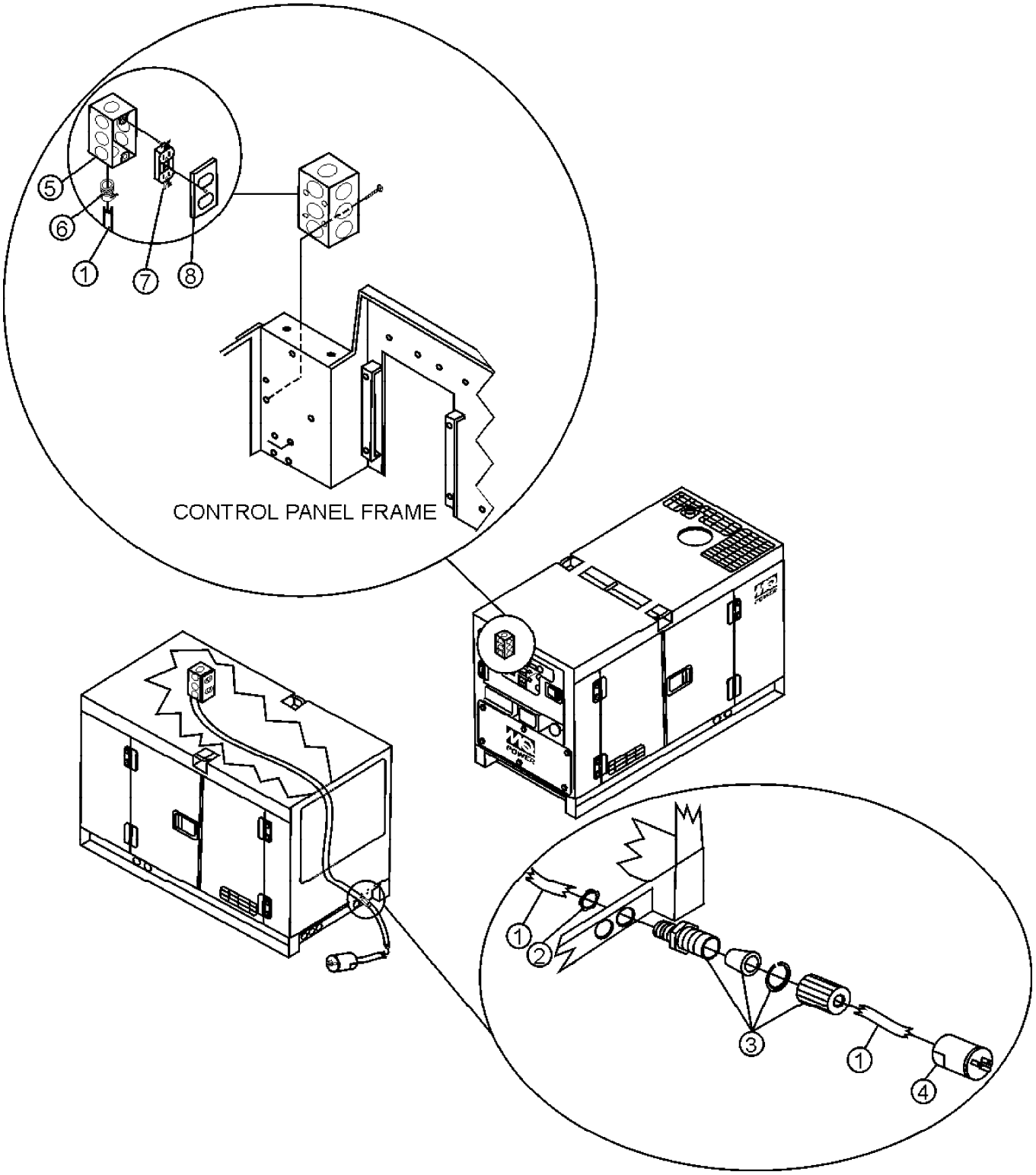


PANEL LIGHTS ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M0000001301Q	NUT, SELF CLINCHING 8-32	2	
2	M1001021075Q	GROMET	2	
3	M0000001068Q	SCREW 8-32 X 3/8	2	
4	M1001021059Q	LAMP BASE	2	
5	M1001021060Q	LAMP BULB	2	

DCA-10SPX3 — POWER CABLE AND RECEPTACLE BOX ASSY

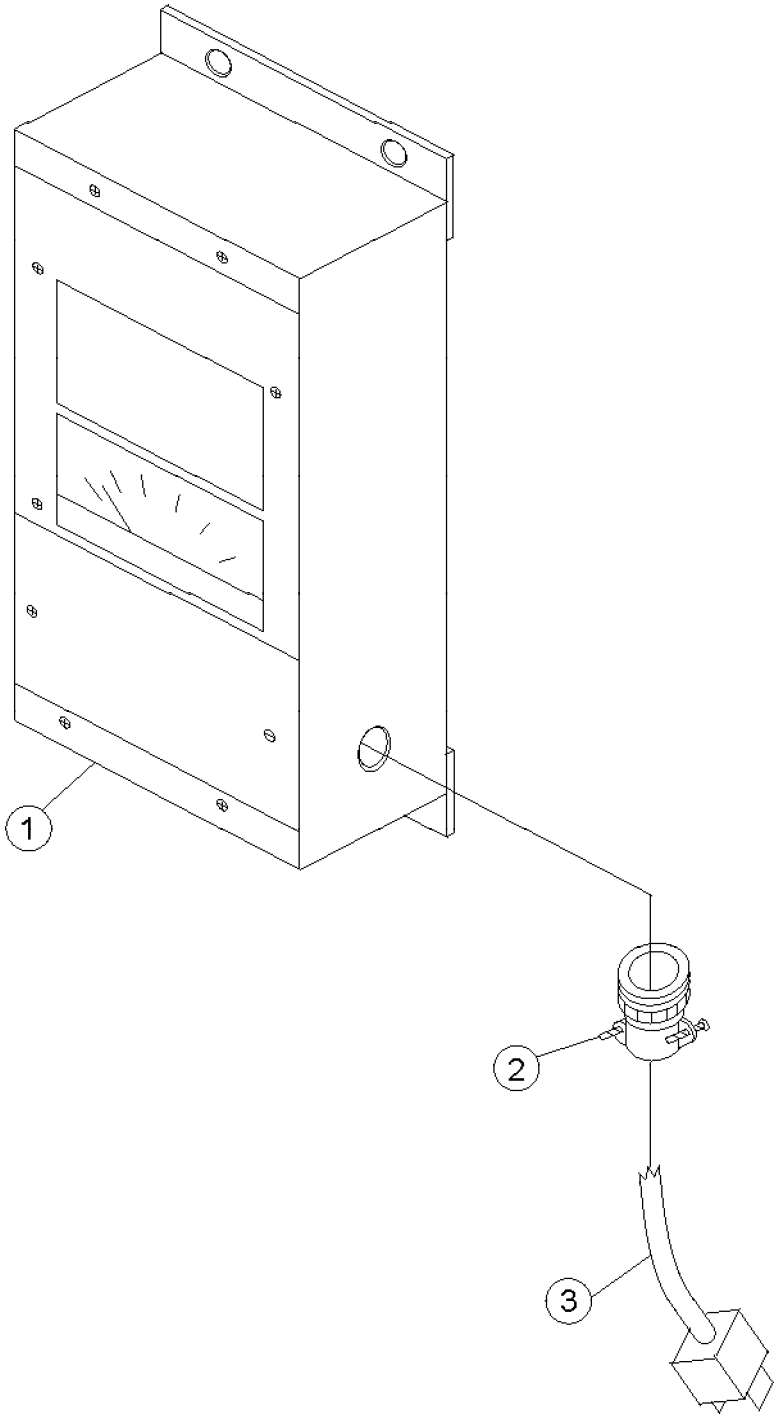
ACCESSORY POWER CABLE AND RECEPTACLE BOX



DCA-10SPX3 — POWER CABLE AND RECEPTACLE BOX ASSY

POWER CABLE AND RECEPTACLE BOX ASSY

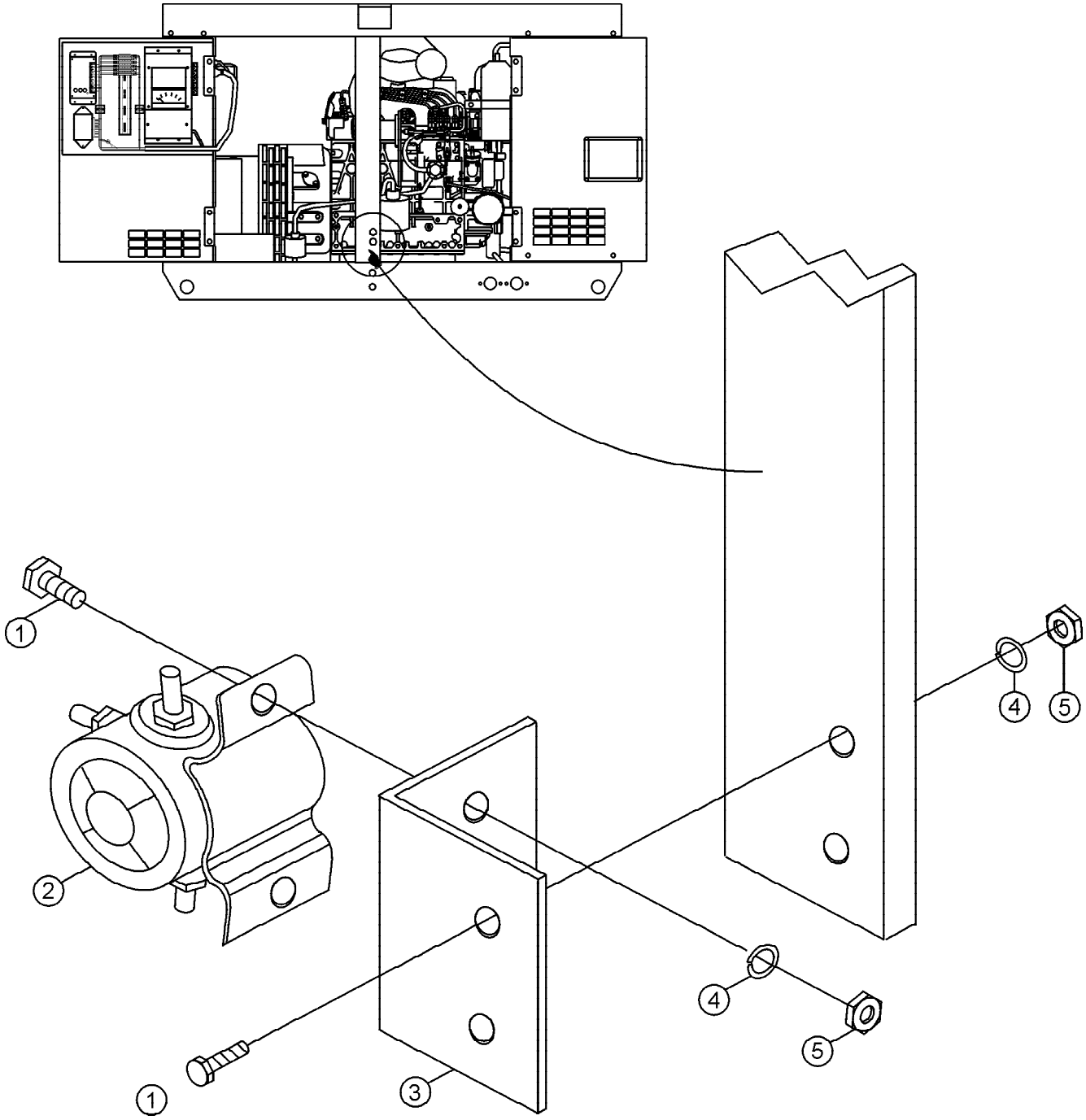
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M1001041013Q	INPUT POWER CABLE, 60 FT	1	
2	M1001041030Q	LOCK NUT, 1/2 INCH	1	
3	M1001041024Q	CONNECTOR, STRAIN RELIEF	1	
4	M1001041008Q	CONNECTOR, CORD 15A, 120VAC	1	
5	M1001041035Q	BOX, HANDY	1	
6	M1001041020Q	CONNECTOR, ROMEX 3/8"	1	
7	M1001041037Q	DUPLEX RECEPTACLE, 15A	1	
8	M1001041036Q	COVER, HANDY BOX	1	


1
2
3

BATTERY CHARGER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M1001021033Q	BATTERY CHARGER, 3A, 12VDC	1	
2	M1001041020Q	CONNECTOR, ROMEX	1	
3	M1001041034Q	POWER CORD, 16/3 SPT, 6 FT.	1	

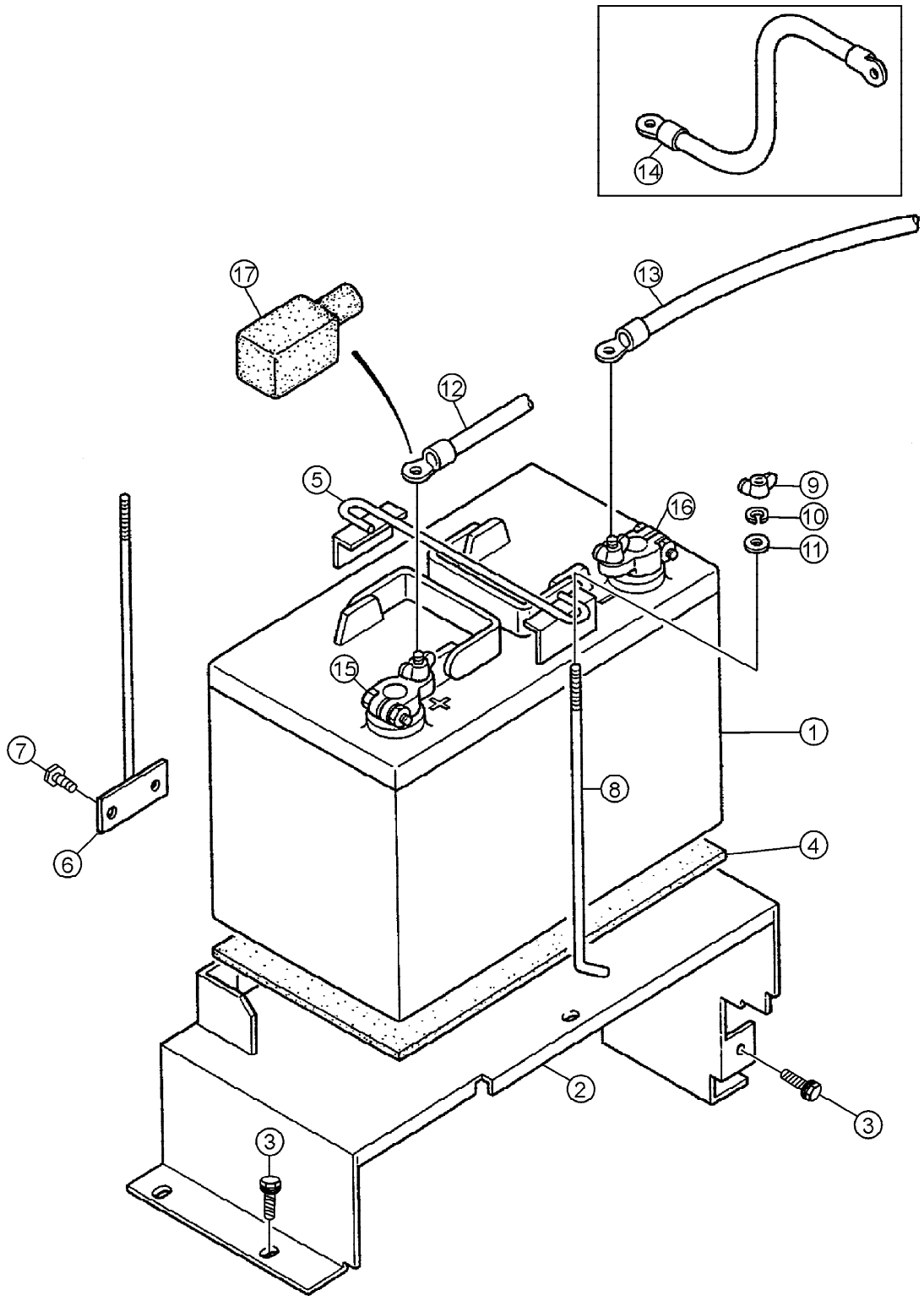
DCA-10SPX3 — PRE-HEAT SOLENOID ASSY.



PREHEAT SOLENOID ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M0000001016Q	BOLT 1/4-20 X 3/4	2	
2	M1001021031Q	PREHEAT SOLENOID 12VDC	1	
3	M1001021030Q	SOLENOID BRACKET	1	
4	M0000001017Q	LOCK WASHER 1/4	4	
5	M0000001018Q	NUT 1/4-20	4	

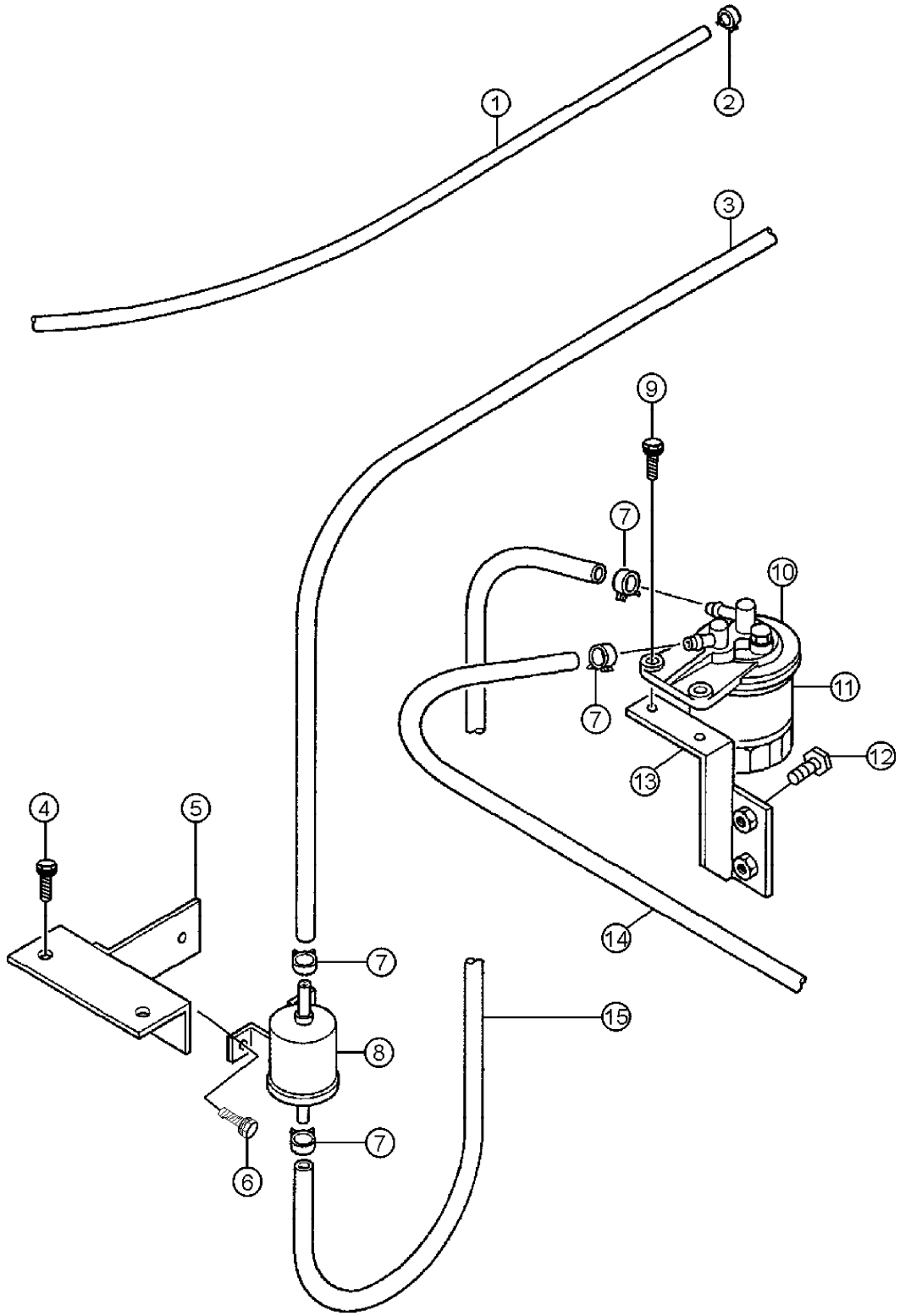
BATTERY ASSY.



BATTERY ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0167306531	BATTERY	1	65D31R
2	8452250003	BATTERY FRAME	1	
	8345967004	LINING	1	
3	0017106016	HEX HEAD BOLT	5	
4	7612251004	BATTERY SHEET	1	
5	8432255024	BATTERY BAND	1	
6	8432256024	BATTERY BOLT	1	
7	0017106016	HEX HEAD BOLT	2	
8	8432256104	BATTERY BOLT	1	
9	0037806000	WING NUT	2	
10	0040006000	LOCK WASHER	2	
11	952404470	PLAIN WASHER	2	
12	N012CABLE10SPX3	BATTERY CABLE	1	
13	N013CABLE10SPX3	BATTERY CABLE	1	
14	EARTH10SPX3	EARTH CABLE	1	
15	0602220310	TERMINAL ASS'Y. ...	1	NO.9P
16	0602220311	TERMINAL ASS'Y. ...	1	NO.9N
17	0602220600	TERMINAL CAP	1	7C7R

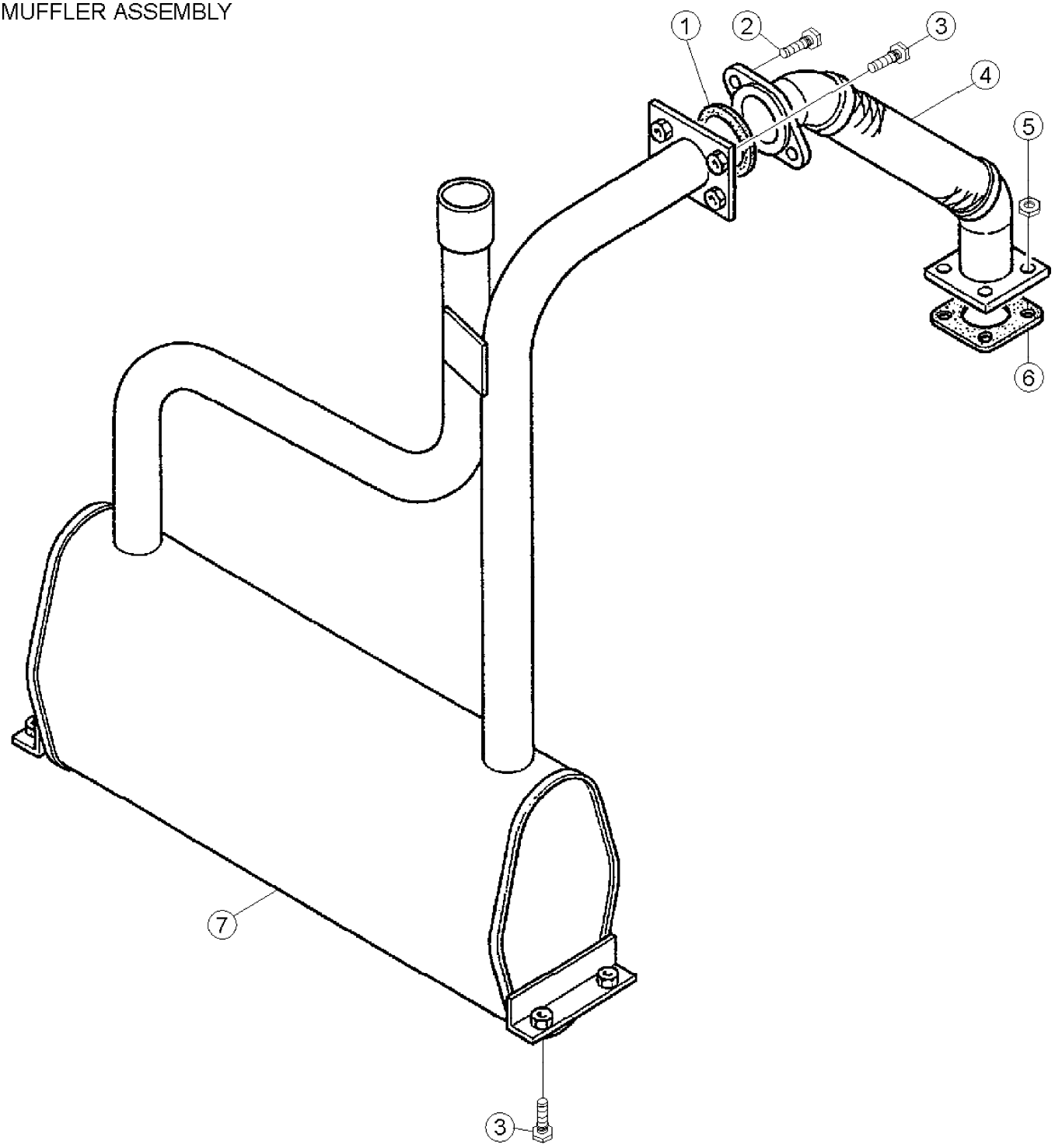
FUEL FILTER ASSY.



FUEL FILTER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0605514016	RETURN HOSE	1	REPLACES 0966141000
2	1024442320	HOSE BAND	2	REPLACES 1497142751
3	0605513105	SUCTION HOSE	1	REPLACES 0966180500
4	011008020	HEX HEAD BOLT	2	
5	B0368700004	BRACKET, FUEL PUMP	1	
6	0017106016	HEX. HEAD BOLT	2	
7	1491142750	HOSE BAND	6	REPLACES 1491142751
8	6837151210	PUMP, FUEL	1	REPLACES 1747652031
9	011208035	HEX. HEAD BOLT	2	
10	1522143010	FUEL FILTER	1	REPLACES 1522143016
11	7000043081	CARTRIDGE, FUEL FILTER	1	REPLACES 1522143172
12	0017108025	HEX. HEAD BOLT	2	
13	7675528004	BRACKET, FUEL FILTER	1	
14	0605513174	SUCTION HOSE	1	
15	0605513106	SUNCTION HOSE	1	

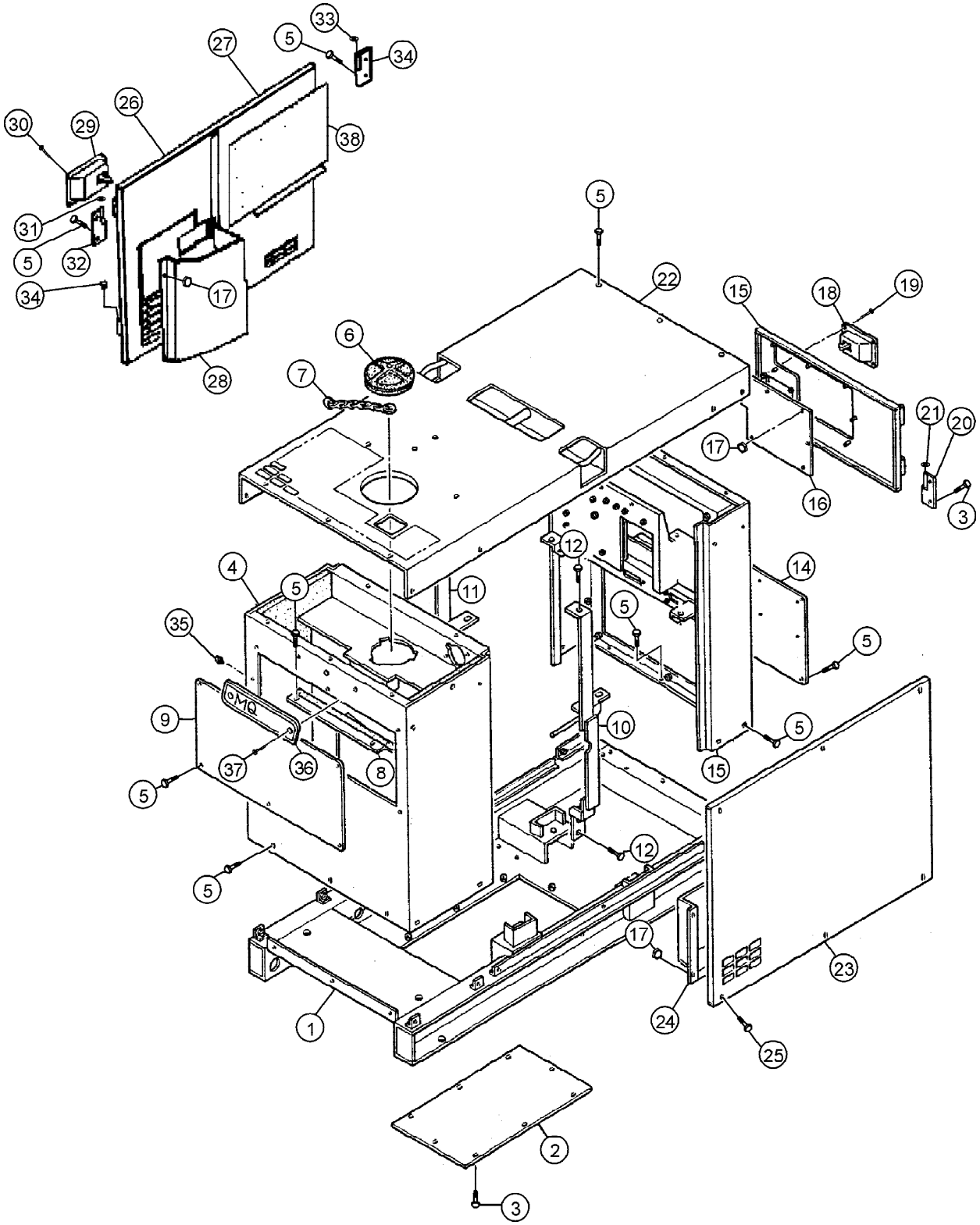
MUFFLER ASSEMBLY



MUFFLER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	8342311003	MUFFLER	1	
2	0017108020	HEX HEAD BOLT	6	
3	8342350103	EXHAUST PIPE	1	
4	0602320150	GASKET	1	..... KUBOTA 15471-12231
5	1502336004	GASKET	1	
6	020108060	HEX NUT	4	
7	011208035	HEX HEAD BOLT	2	

ENCLOSURE ASSY.

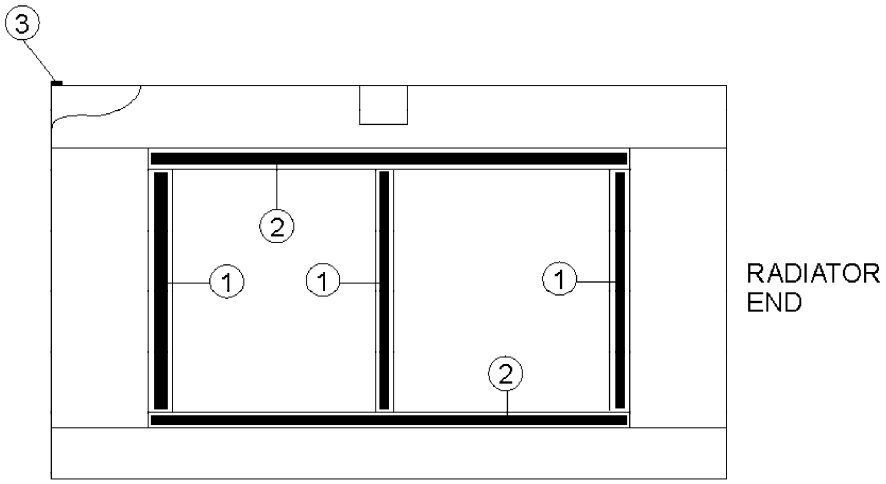


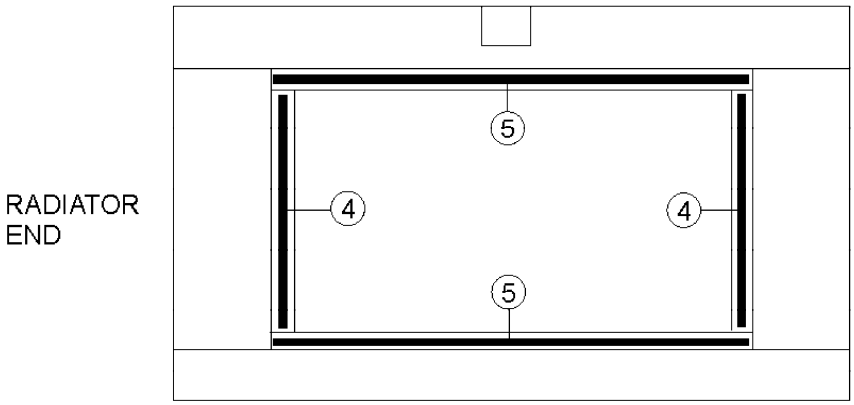
ENCLOSURE ASSEMBLY

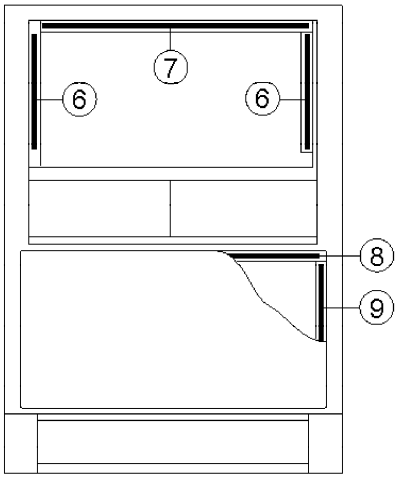
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	7565111403	BASE FRAME	1	
2	8445116114	FLOOR PANEL	1	
3	0017106016	HEX HEAD BOLT	12	
4	7565121502	FRONT FRAME	1	
5	011008020	HEX HEAD BOLT	54	
6	1625165103	FILLER COVER	1	
7	1625165204	CHAIN	1	
8	8322313003	COVER, MUFFLER	1	
9	8435125004	COVER, FRONT FRAME	1	
10	8345130203	HANGER	1	
11	8435132113	HANGER	1	
12	012212030	HEX HEAD BOLT	6	
13	B0445000302	REAR FRAME	1	
14	7565144104	COVER, REAR FRAME	1	
15	B0445200203	DOOR, REAR FRAME	1	
16	B0445600104	WINDOW PLATE	1	
17	0207006000	HEX NUT	18	
18	0605010230	DOOR HANDLE	1	
19	0021805012	MACHINE SCREW	4	
20	0810015204	HINGE	2	
21	0810015504	WASHER	2	
22	B0465000202	ROOF PANEL	1	
23	8325172103	SIDE PANEL	1	
24	8325173004	DUCT	1	
25	011208035	HEX HEAD BOLT	6	
26	8325170203	SIDE DOOR	1	
27	B0445000203	SIDE DOOR	1	
28	8325171113	DUCT	1	
29	B9114000002	DOOR HANDLE	1	
30	0021806016	MACHINE SCREW	4	
31	0845045004	WASHER	4	
32	M9110100304	HINGE	2	
33	M9110100204	HINGE	2	
34	0845031504	CAP	4	
35	0601850097	STOPPER	2	
36	0600500090	EMBLEM	1	
37	0021106020	MACHINE SCREW	2	
38	M1001021011Q	INNER DOOR CONTROL PANEL	1	

ENCLOSURE (SEALS)ASSY.

RUBBER SEALS







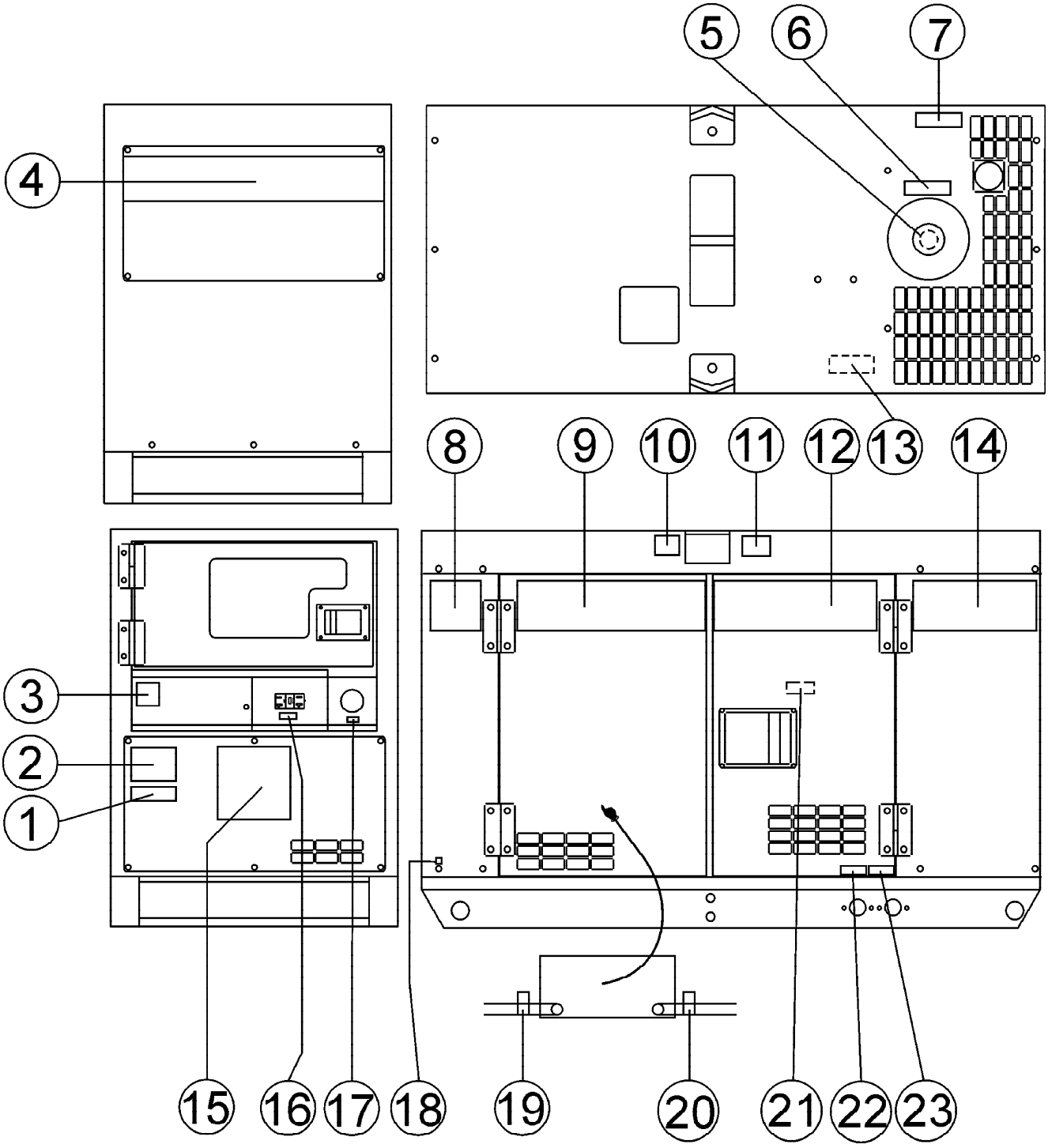
REAR VIEW

DCA-10SPX3 — ENCLOSURE (RUBBERSEALS) ASSY.

ENCLOSURE (RUBBER SEALS)ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0229400650	RUBBER SEAL	3	
2	0229400895	RUBBERSEAL	2	
3	0229200650	RUBBER SEAL	1	
4	0220400650	RUBBER SEAL	2	
5	0227600895	RUBBER SEAL	2	
6	0229400265	RUBBER SEAL	2	
7	0229400550	RUBBER SEAL	1	
8	0229200580	RUBBER SEAL	2	
9	0229200245	RUBBER SEAL	2	

NAME PLATE AND DECALS



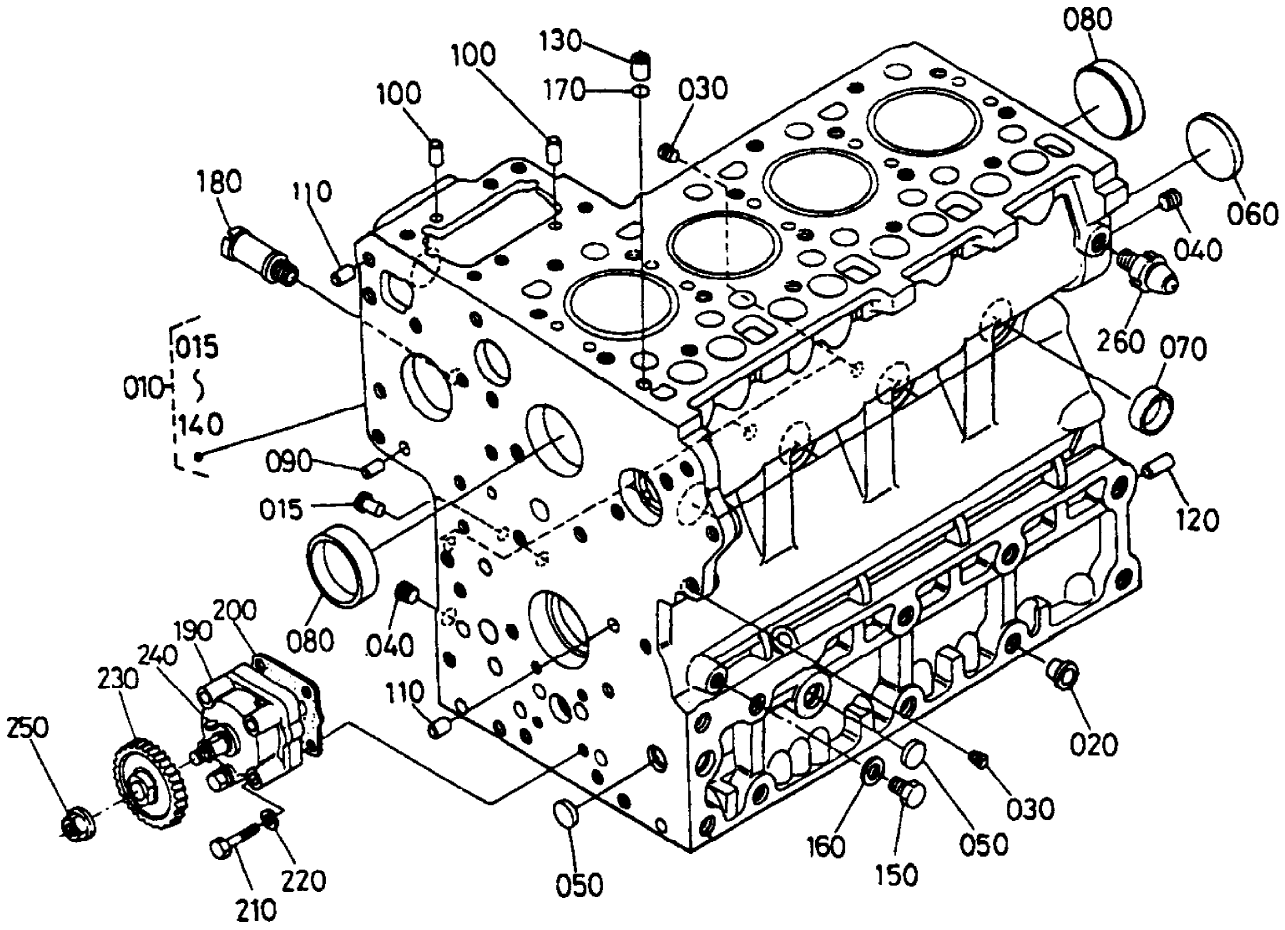
NAME PLATE AND DECALS

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0820610404	WARNING! TRANSFER SWITCH	1	
2	6390671104	IMPORTANT "CHECK DAILY"	1	
3	8700611904	DANGER: ELEC.SHOCK HAZARD	1	
4	7670633003 *	STRIPE; FRONT END	1	
5	1630610304	DANGER: REMOVE ONLY WHEN COOL	1	
6	6360620104	WATER	1	
7	8700611804	WARNING	1	
8	7670633804 *	15 STRIPE	2	
9	7670633404 *	STRIPE; DOOR	2	
10	M0000001020Q**	DRAIN FUEL PRIOR TO LIFTING	2	
11	1320621504	SUPPORT HOOK	2	
12	7670633504 *	STRIPE: DOOR WITH HANDLE	2	
13	M9503000103	OIL LEVEL CHECK	1	
14	7670633204 *	STRIPE; FRONT SIDE	2	
15	0840625902 *	MQ DECAL	1	
16	0800622704	120V	1	
17	M0000001021Q	60HZ	1	
18	0800628504	GROUND	1	
19	0800689404	+	1	
20	0800689504	-	1	
21	1630610504	DO OPERATE WITH DOORS OPEN	1	
22	6360620204	OIL DRAIN PLUG	1	
23	6360620104	WATER DRAIN PLUG	1	

* DECALS SHIPPED INSIDE OF UNIT AS OPTIONAL DECALS

** SHIPPED ONLY WHEN MOUNTED ON A TRAILER OR SUB-BASE FUEL CELL

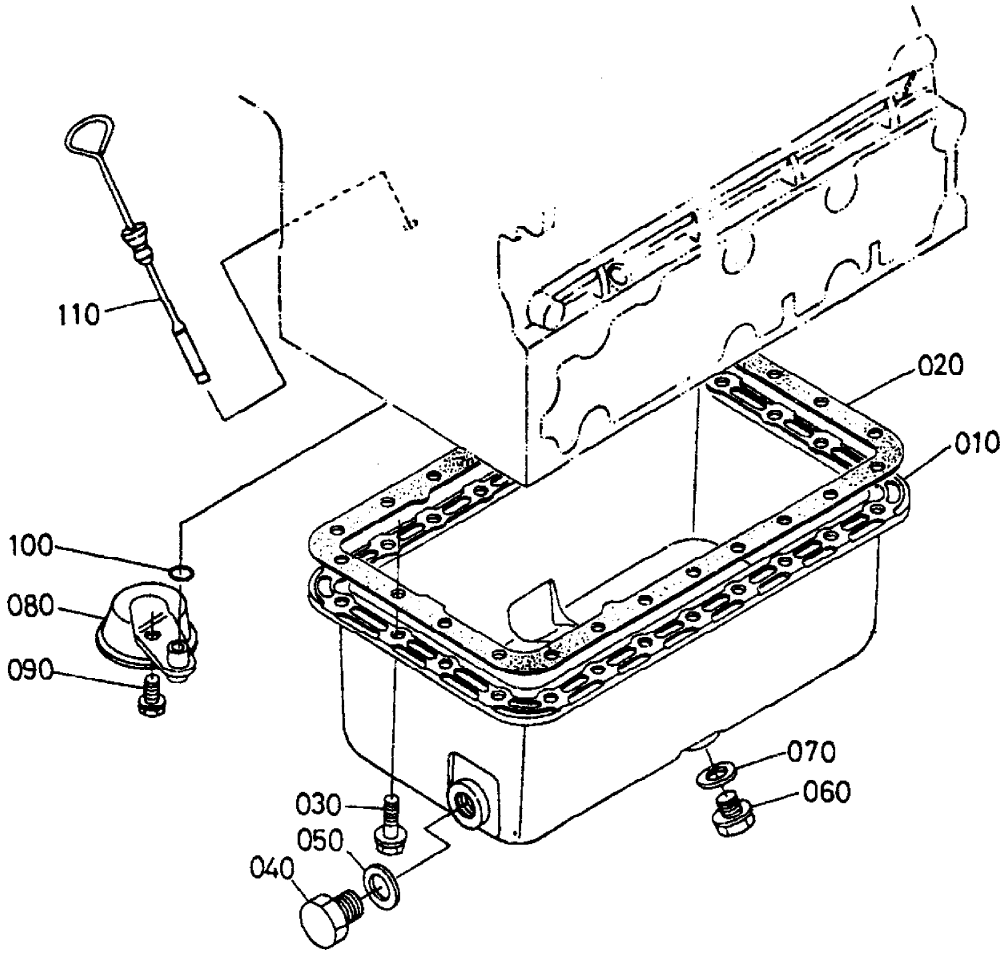
CRANKCASE ASSY.



CRANKCASE ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1649401010	COMP. CRANKCASE	1	
015	3415027580	PLUG	1	
020	3221027580	PLUG	2	
030	1552196020	PLUG	6	
040	1552196030	PLUG	2	
050	1739196160	EXPANSION PLUG	3	
060	0631175045	EXPANSION PLUG	1	
070	1522103380	SEALING CAP	6	
080	1522103390	SEALING CAP	2	
090	0501200408	STRAIGHT PIN	2	
100	0501200609	STRAIGHT PIN	2	
110	0501200512	STRAIGHT PIN	2	
120	0501201018	STRAIGHT PIN	1	
130	1522133650	PIPE PIN	1	
150	1522133610	PLUG	1	
160	1502133660	GASKET	1	
170	1522133700	O RING	1	
180	1532173340	WATER RETURN PIPE	1	
190	1547135010	OIL PUMP ASSY.	1	
200	1520635150	OIL PUMP GASKET	1	
210	0105350650	BOLT	4	
220	0451260060	LOCK WASHER	4	
230	1920235660	OIL PUMP DRIVE GEAR	1	
240	0571200410	FEATHER KEY	1	
250	1522135682	FLANGE NUT	1	
260	1584139010	OIL SWITCH	1	

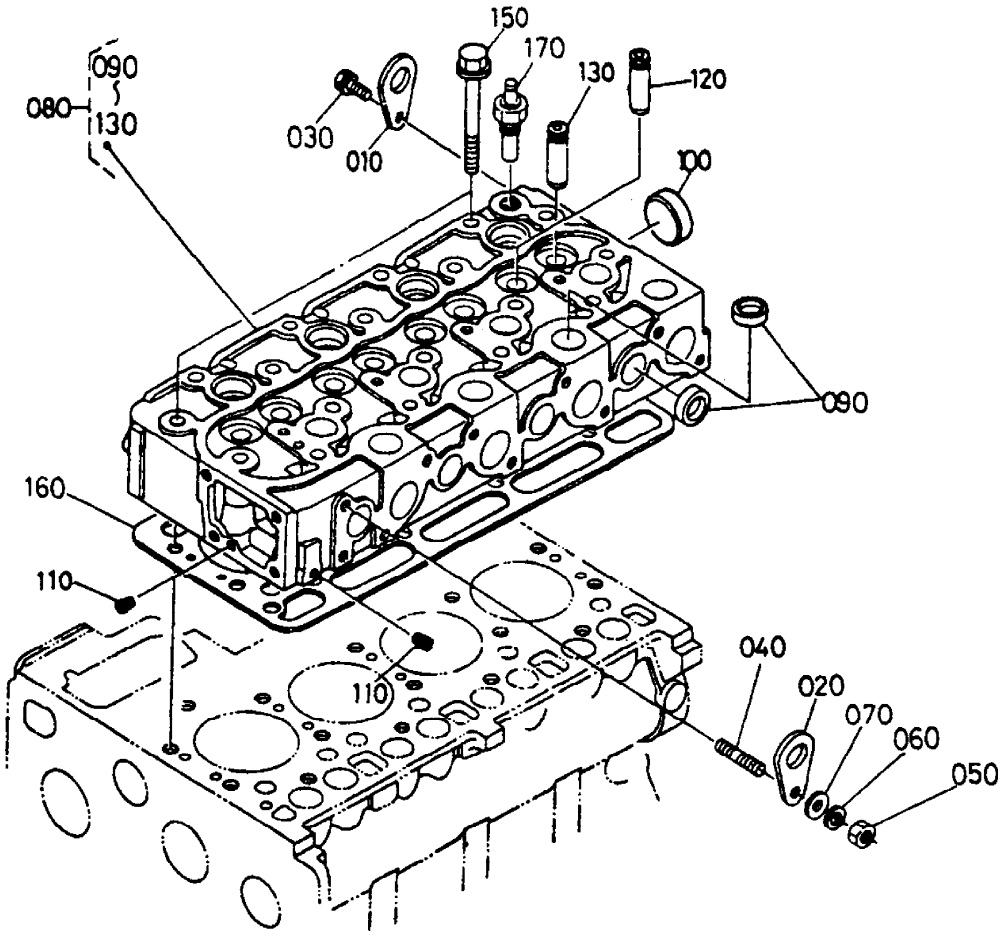
OIL PAN ASSY.



OIL PAN ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1543401613	OIL PAN	1	
020	1922801620	OIL PAN GASKET	1	
030	1733391010	FLANGE BOLT	24	
040	1522133750	PLUG	1	
050	1510933660	GASKET	1	
060	1595133750	DRAIN PLUG	1	
070	0472400160	GASKET	1	
080	1562832110	OIL FILTER	1	
090	0112360816	BOLT	1	
100	0481100160	O RING	1	
110	1711136410	OIL GAGUE	1	

CYLINDER HEAD ASSY.

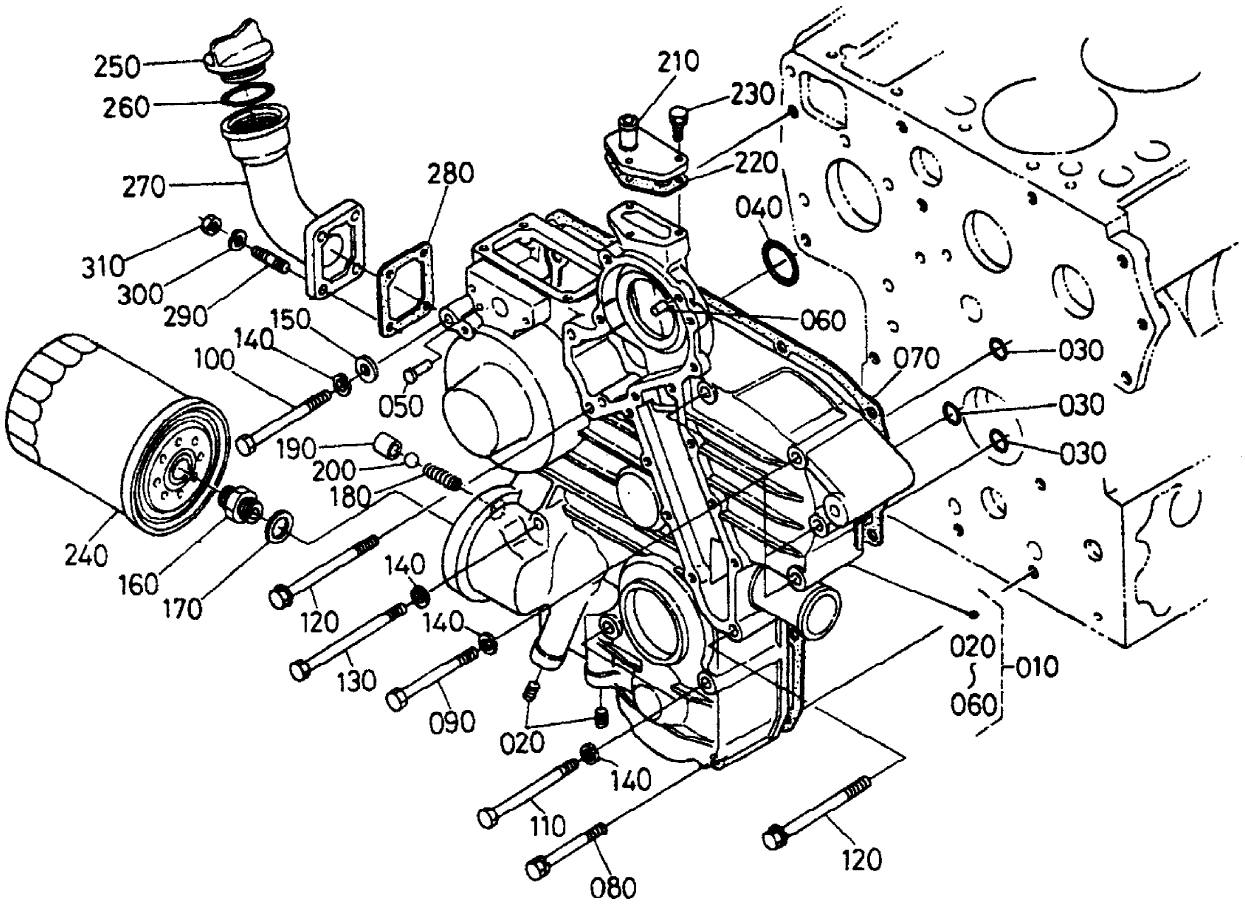


KUBOTA V2203 - ENGINE — CYLINDER HEAD ASSY.

CYLINDER HEAD ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1641501752	ENGINE HOOK	1	
020	1522101750	ENGINE HOOK	1	
030	0112360816	BOLT	1	
040	1522191530	STUD	1	
050	0215650080	NUT	1	
060	0451260080	LOCK WASHER	1	
070	0401250080	PLAIN WASHER	1	
080	1907703045	COMP. CYLINDER HEAD	1	
090	1522103370	SEALING CAP	12	
100	1522103490	SEALING CAP	1	
110	1526196010	PLUG	2	
120	1732113580	INLET VALVE GUIDE	4	
130	1732113560	EXHAUST VALVE GUIDE	4	
150	1901303450	CYLINDER HEAD BOLT	18	
160	1907703310	CYLINDER HEAD GASKET	1	
170	1949883040	THERMOSWITCH, ASSY.	1	

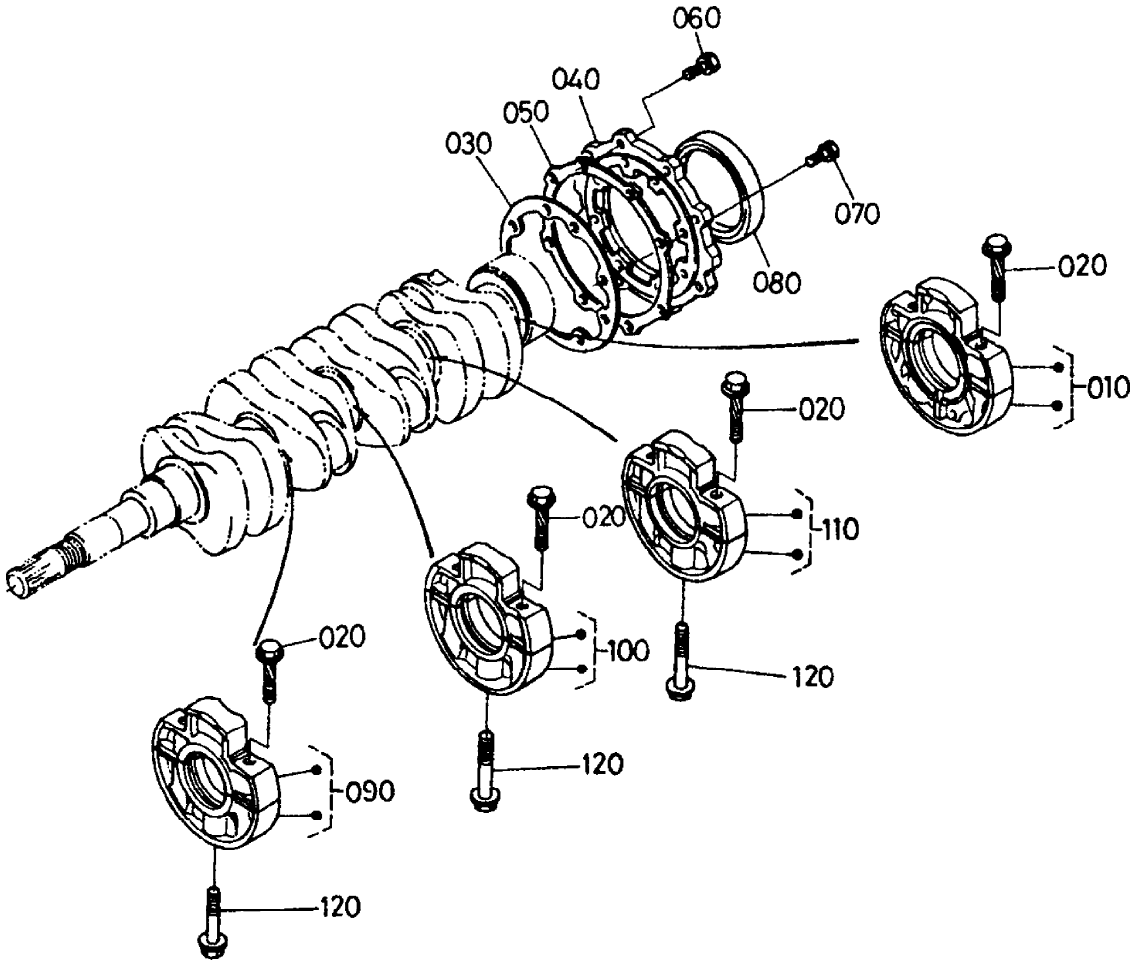
GEAR CASE ASSY.



GEAR CASE ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1718204010	GEAR CASE ASSY	1	
020	1685196010	PLUG	2	
030	0481100150	O RING	3	
040	0481100360	O RING	1	
050	1981856280	START SPRING PIN	1	
060	0501200612	STRAIGHT PIN	2	
070	1708904130	GEAR CASE GASKET	1	
080	0112350860	BOLT	2	
090	0115350870	BOLT	5	
100	1736791030	BOLT	1	
110	0115350880	BOLT	2	
120	1736791020	BOLT	3	
130	0115350895	BOLT	2	
140	0451260080	LOCK WASHER	10	
150	0401250080	PLAIN WASHER	1	
160	1552132290	PIPE JOINT	1	
170	0401150180	PLAIN WASHER	1	
180	1524136950	SPRING	1	
190	1552136930	VALVE SEAT	1	
200	0771503213	BALL	1	
210	1552173320	WATER RETURN FLANGE	1	
220	1576673330	GASKET	1	
230	0102350620	BOLT	3	
240	1732132430	OIL FILTER CARTRIDGE	1	
250	1585233140	OIL FILTER PLUG	1	
260	0481150300	O RING	1	
270	1718233110	OIL FILTER FLANGE	1	
280	1547154550	BOOST BASE C. GASKET	1	
290	1718291510	STUD	4	
300	0451260060	LOCK WASHER	4	
310	0205650060	NUT	4	

MAIN BEARING CASE ASSY.

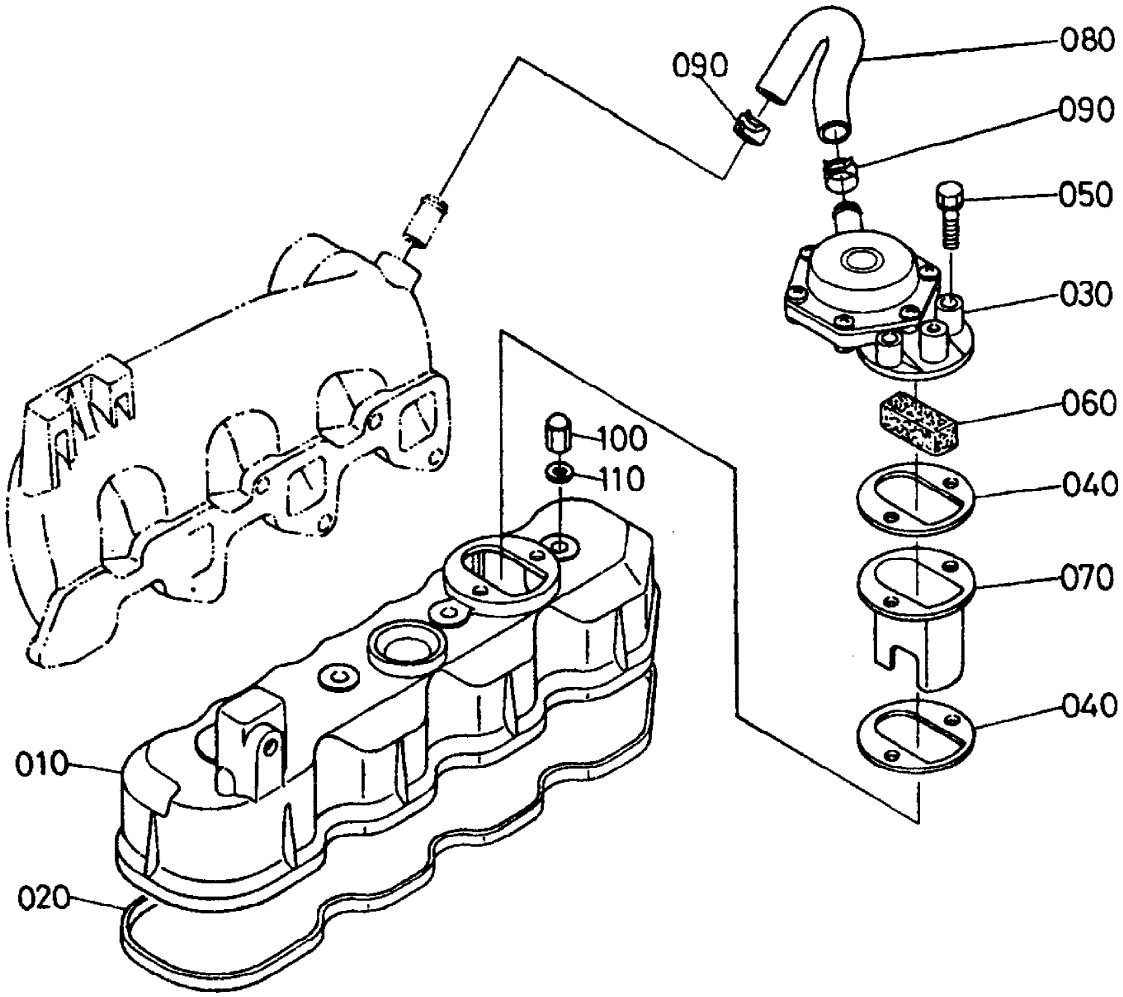


KUBOTA V2203 - ENGINE — MAIN BEARING CASE ASSY.

MAIN BEARING CASE ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1901304090	MAIN BEARING CASE ASSY.	1	
020	1901304540	BEARING CASE BOLT	8	
030	1907704360	BEARING CASE GASKET	1	
040	1901304813	BEARING CASE COVER	1	
050	1711804830	CASE COVER GASKET	1	
060	0112350825	BOLT	8	
070	0112350828	BOLT	8	
080	1920204460	OIL SEAL	1	
090	1901304040	MAIN BEARING CASE ASSY.	1	
100	1901304050	MAIN BEARING CASE ASSY.	1	
110	1901304060	MAIN BEARING CASE ASSY.	1	
120	1560104560	BEARING CASE BOLT	3	

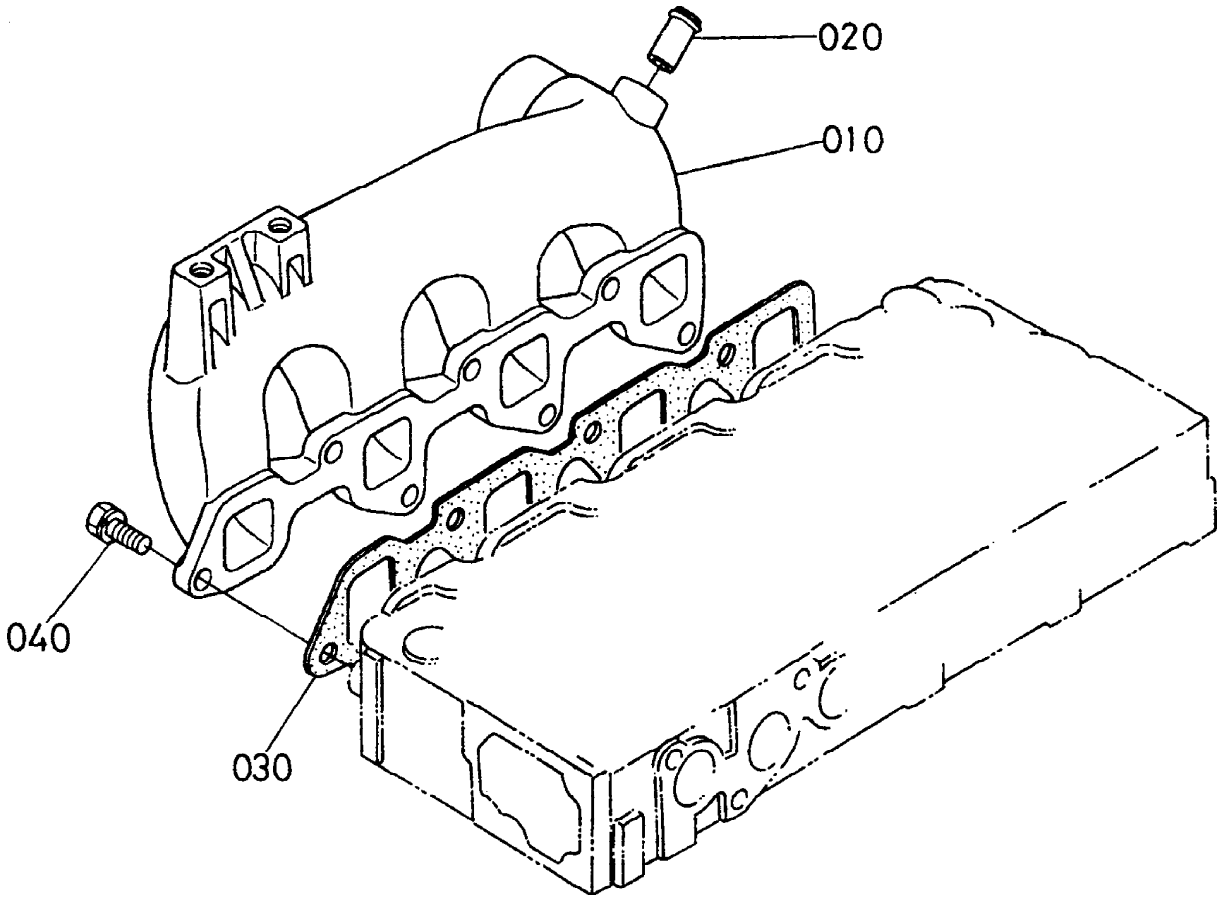
HEAD COVER ASSY.



HEAD COVER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1711414510		1	
020	1547114520	HEAD COVER GASKET	1	
030	1718205020	COMP BREATHER	1	
040	1711405130	GASKET	2	
050	0112350840	BOLT	2	
060	1624105670	BREATHER ELEMENT	1	
070	1718214490	PLATE	1	
080	1718205510	BREATHER TUBE	1	
090	0931888200	HOSE CLAMP	2	
100	1545192330	CAP NUT	4	
110	1502133660	GASKET	4	

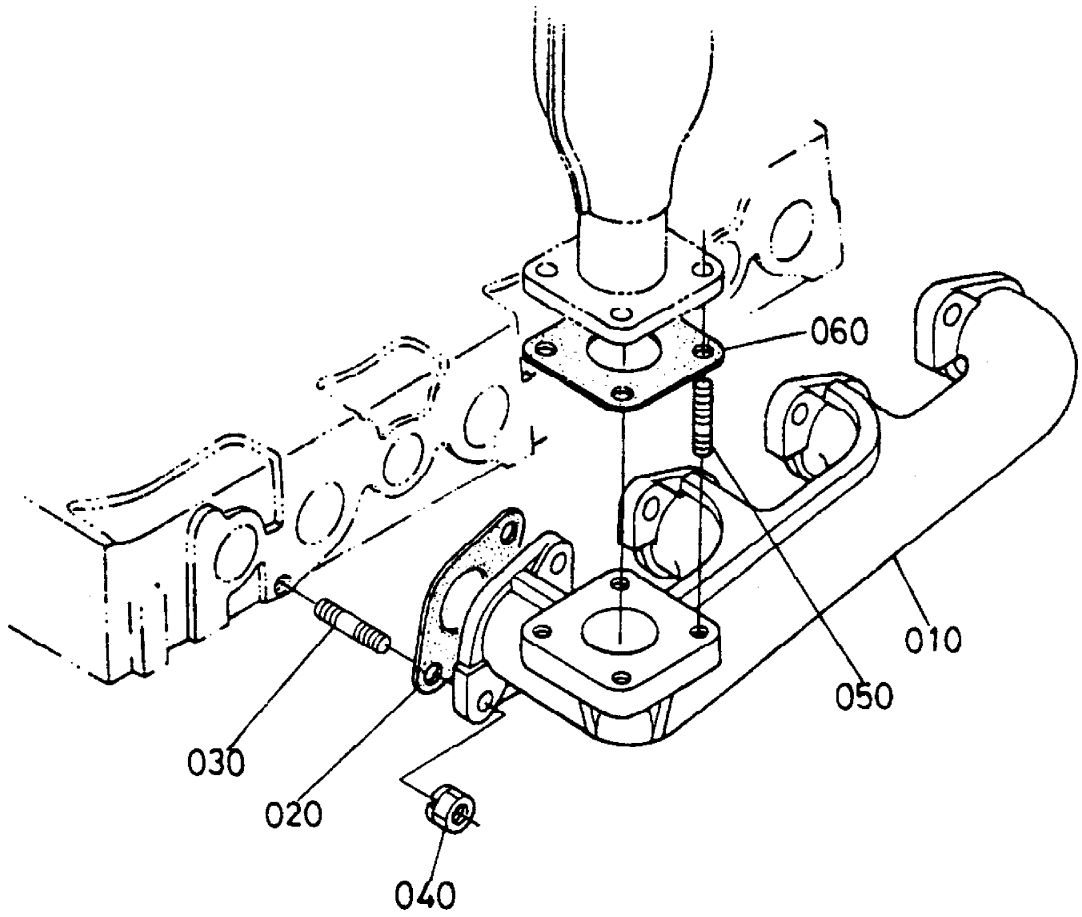
INLET MANIFOLD ASSY.



INLET MANIFOLD ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1711411760	INLET MANIFOLD	1	
020	1718205550	BREATHER JOINT	1	
030	1642311820	IN - MANIFOLD GASKET	1	
040	0112350822	BOLT	7	

EXHAUST MANIFOLD ASSY.



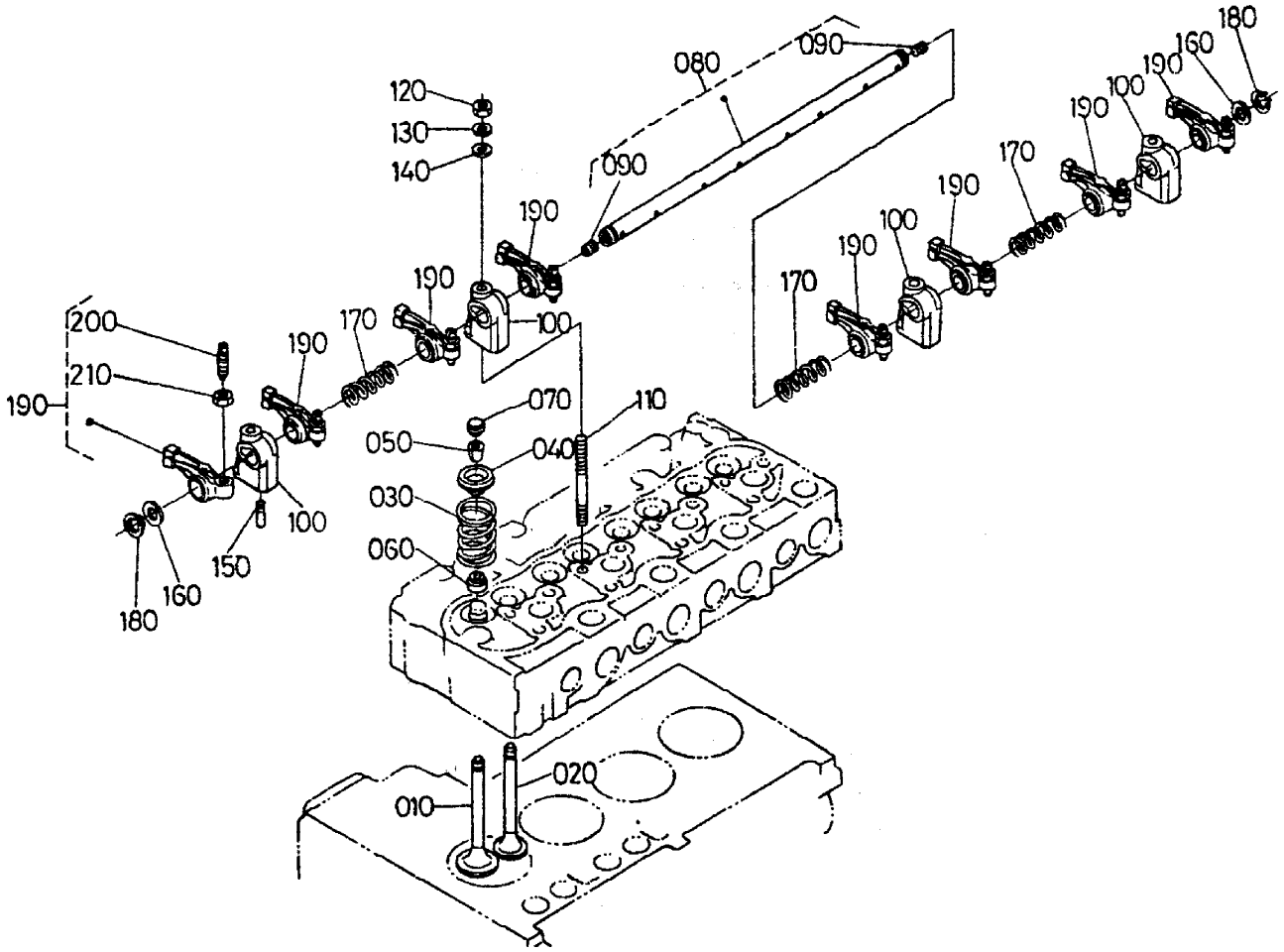
KUBOTA V2203 - ENGINE — EXHAUST MANIFOLD ASSY.

EXHAUST MANIFOLD ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1737712312	EXHAUST MANIFOLD	1	
020	1552212350	EX-MANIFOLD GASKET	4	
030	1522191530	STUD	8	
040	1642992010	NUT	8	
050	0151350822	STUD	4	
060	T007016420	MUFFLER GASKET	1	

KUBOTA V2203 -EB ENGINE — VALVE AND ROCKER ASSY.

VALVE AND ROCKER ASSY.

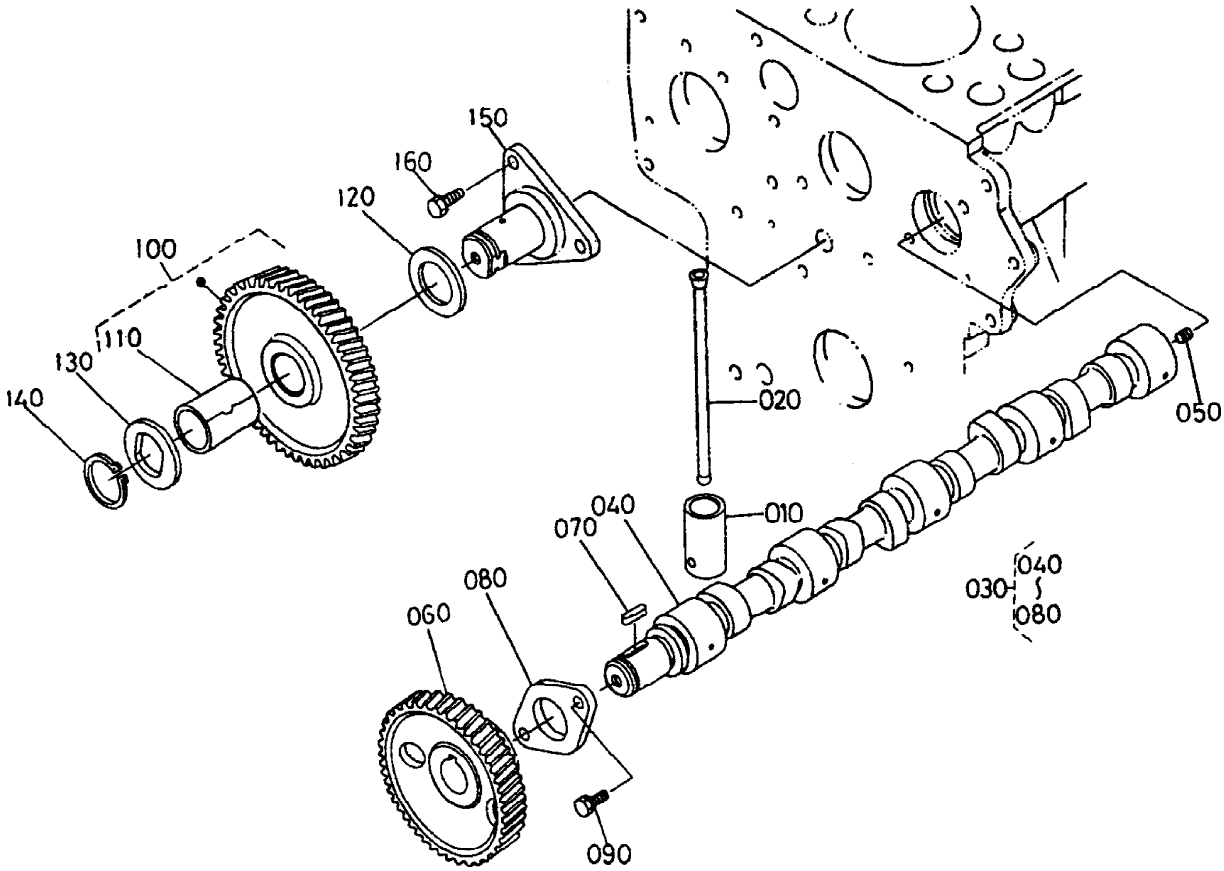


KUBOTA V2203 -EB ENGINE — VALVE AND ROCKER ASSY.

VALVE AND ROCKER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1648413110	INLET VALVE	4	
020	1648413120	EXHAUST VALVE	4	
030	1522113240	VALVE SPRING	8	
040	1522113330	VALVE SPRING RETAINER	8	
050	1522113360	VALVE SPRING COLLET	8	SET
060	1522113150	VALVE STEM SEAL	8	
070	1522113280	VALVE CAP	8	
080	1540114052	ROCKER ARM SHAFT ASSY.	1	
090	0341000808	SET SCREW	2	
100	1522114350	ROCKER ARM BRACKET	4	
110	1552191500	STUD	4	
120	0215650080	NUT	4	
130	0451260080	LOCK WASHER	4	
140	0401250080	PLAIN WASHER	4	
150	0541100528	SPRING PIN	1	
160	1522114430	ROCKER ARM SHAFT WASHER	2	
170	1522114310	ROCKER ARM SPRING	3	
180	0461200140	EXTERNAL CIR CLIP	2	
190	1562114030	ROCKER ARM ASSY.	8	
200	1552114230	ADJUSTING SCREW	8	
210	1502114240	NUT	8	

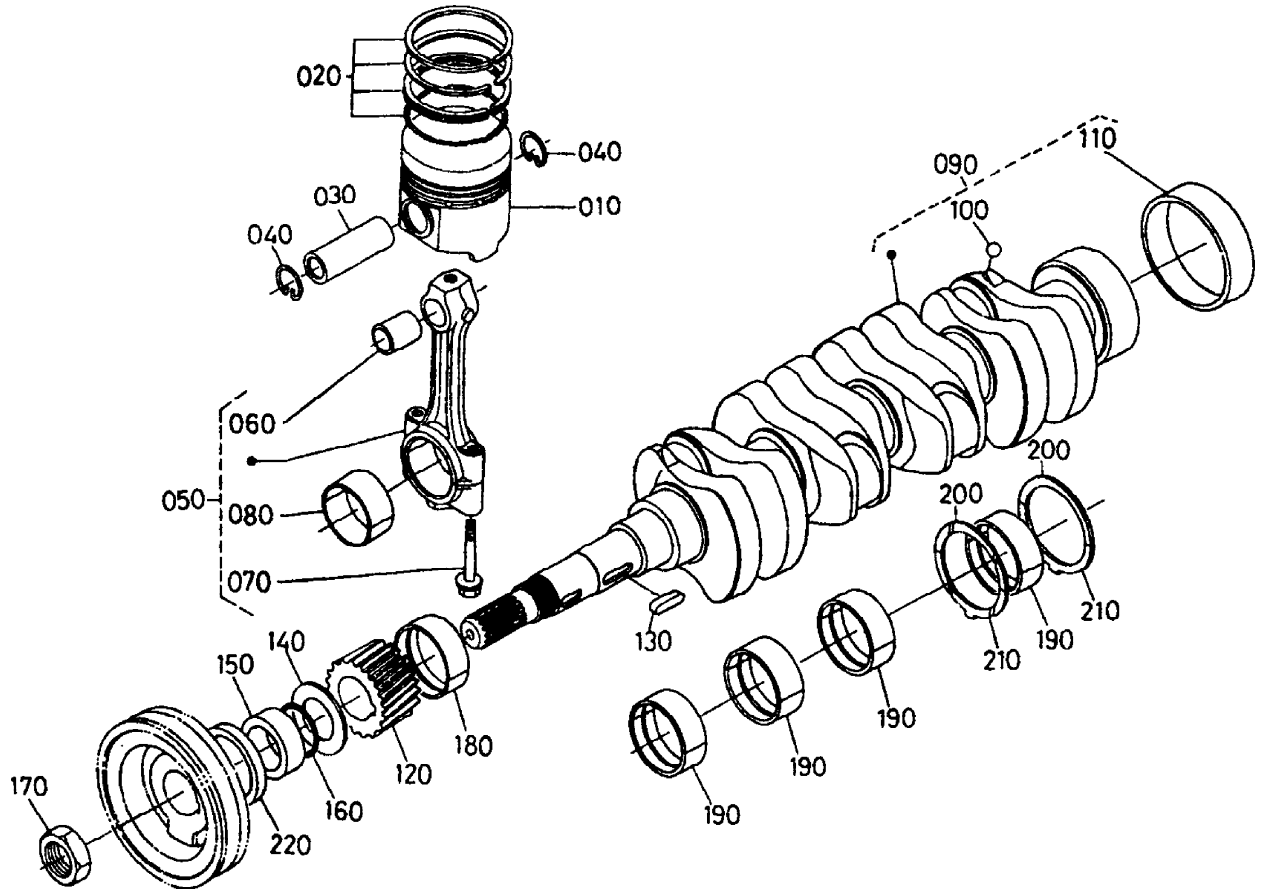
CAMSHAFT ASSY.



CAMSHAFT ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1560115550	TAPPET	8	
020	1901315110	PUSH ROD	8	
030	1734316010	CAMSHAFT ASSY.	1	
040	1734316150	CAMSHAFT	1	
050	1552193610	SET SCREW	1	
060	1552116510	CAM GEAR	1	
070	0571200720	FEATHER KEY	1	
080	1522116270	CAMSHAFT STOPPER	1	
090	0112350818	BOLT	2	
100	1522124010	IDLE GEAR COMP.	1	
110	1733124980	IDLE GEAR BUSH	1	
120	1552124360	COLLAR	1	
130	1552124370	COLLAR	1	
140	1522124320	IDLE GEAR CIR CLIP	1	
150	1981824250	IDLE GEAR SHAFT	1	
160	0112350818	BOLT	3	

PISTON AND CAMSHAFT ASSY.



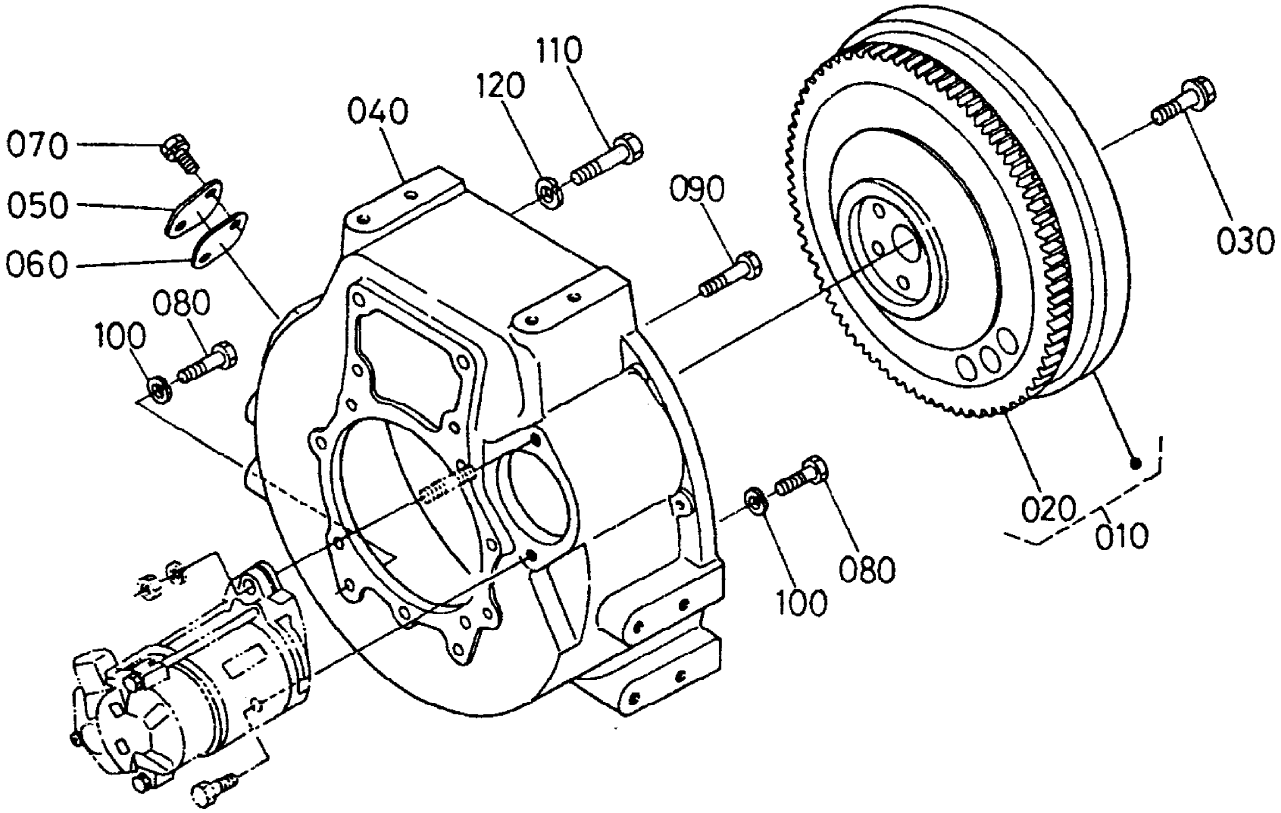
KUBOTA V2203 - ENGINE — PISTON AND CAMSHAFT ASSY.

PISTON AND CAMSHAFT ASSY.

PISTON AND CRANKSHAFT ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1907721110	PISTON	4	S T D
010	1907721910	PISTON	4	+ 0.5 M M
020	1733121050	PISTON RING ASSY.	4	
030	1490121310	PISTON PIN	4	
040	1410921330	PISTON PIN CLIP	8	
050	1731122010	CONNECTING ROD ASSY.	4	
060	1733121980	PISTON PIN BUSH	4	
070	1552122142	CONNECTING ROD BOLT	8	
080	1731122310	CRANKPIN METAL	4	STD SET
080	1733122970	CRANKPIN METAL	4	- 0.20 M M SET
080	1733122980	CRANKPIN METAL	4	- 0.40 M M SET
090	1664123010	COMP. CRANKSHAFT	1	
100	0771500401	BALL	4	
110	1920223280	CRANKSHAFT BUSU	1	
120	1547124110	CRANK GEAR	1	
130	0571200720	FEATHER KEY	1	
140	1547123312	OIL SLINGER	1	
150	1920223250	CRANKSHAFT COLLAR	1	
160	0481110300	O RING	1	
170	1522123360	CRANKSHAFT NUT	1	
180	1731123470	CRANKSHAFT METAL	1	STD
180	1731123910	CRANKSHAFT METAL	1	- 0.20 M M
180	1731123920	CRANKSHAFT METAL	1	- 0.40 M M
190	1731123480	CRANKSHAFT METAL	4	STD SET
190	1731123930	CRANKSHAFT METAL	4	- 0.20 M M SET
190	1731123940	CRANKSHAFT METAL	4	- 0.40 M M SET
200	1552123530	SIDE METAL	2	STD
200	1522123950	SIDE METAL	2	+ 0.20 M M
200	1522123960	SIDE METAL	2	+ 0.40 M M
210	1920223540	SIDE METAL	2	STD
210	1920223970	SIDE METAL	2	+ 0.20 M M
210	1920223980	SIDE METAL	2	+ 0.40 M M
220	1920204140	OIL SEAL	1	

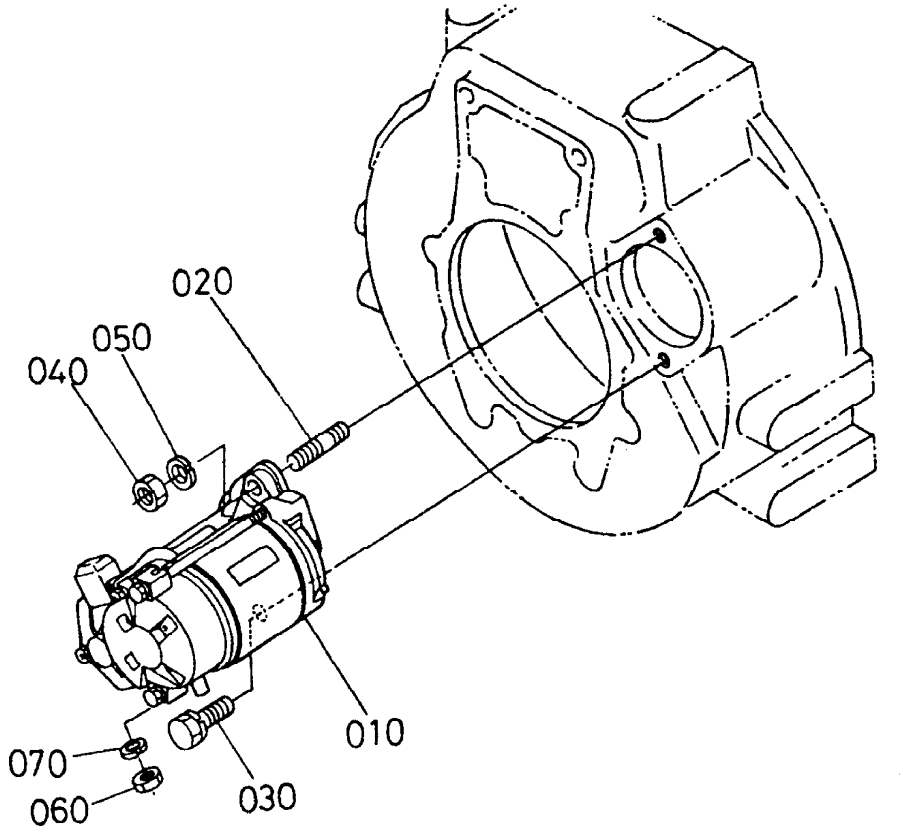
FLYWHEEL ASSY.



FLYWHEEL ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1747525010	COMP. FLYWHEEL	1	
020	1560263820	RING GEAR	1	
030	1532125163	FLYWHEEL BOLT	6	
040	1747504610	FLYWHEEL HOUSING	1	
050	1552104680	COVER	1	
060	1552104790	COVER PACKING	1	
070	0112360816	BOLT	2	
080	0107351032	BOLT	11	
090	0107351042	BOLT	3	
100	0451260100	LOCK WASHER	11	
110	0107351250	BOLT	2	
120	0451260120	LOCK WASHER	2	

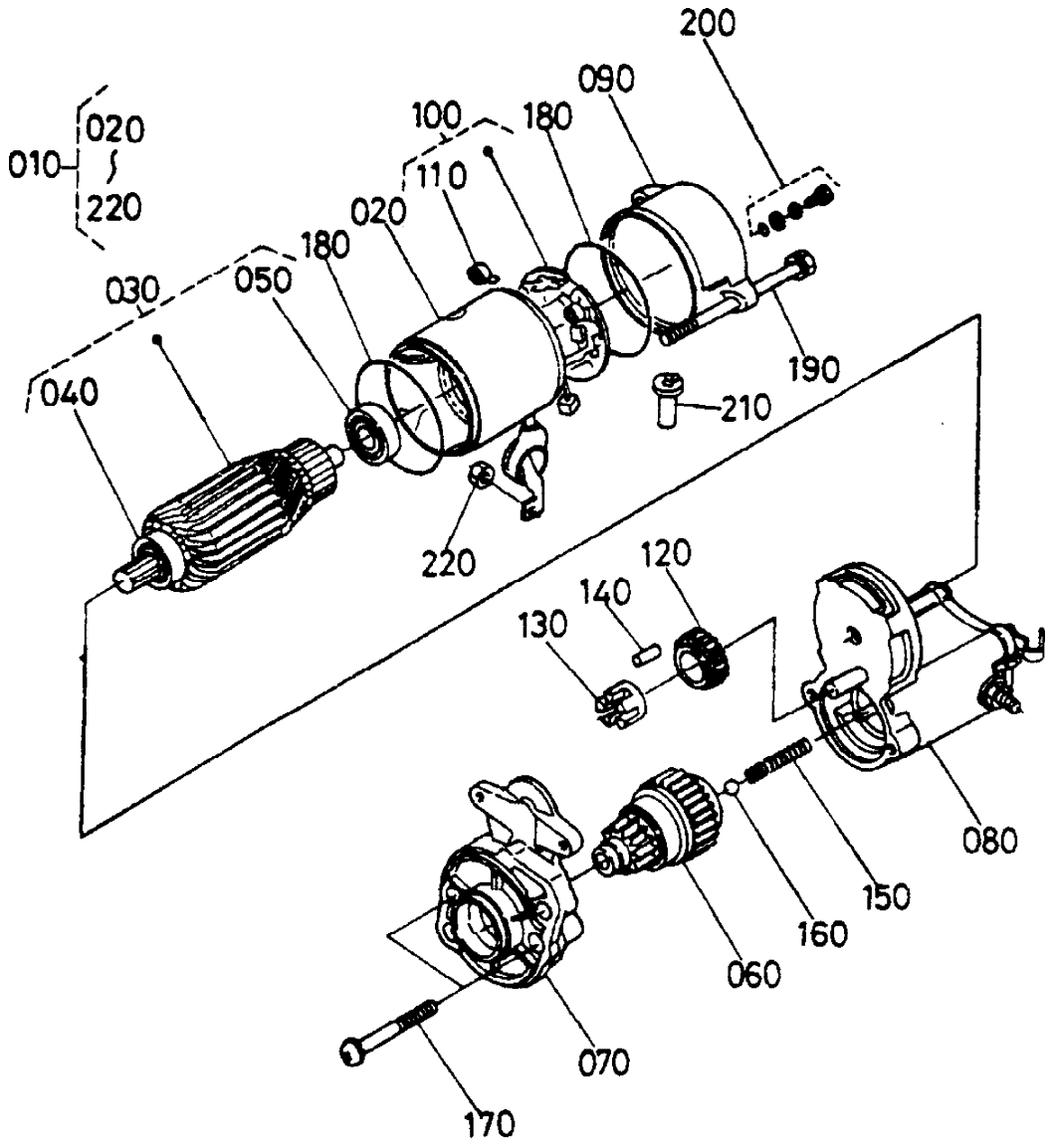
STARTER ASSY.



STARTER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1738163012	STARTER ASSY.	1	
020	0151751028	STUD	1	
030	0113351030	BOLT	1	
040	0217650100	NUT	1	
050	0451260100	LOCK WASHER	1	
060	0211450080	NUT	1	
070	0451260080	LOCK WASHER	1	

STARTER (COMPONENTS) ASSY.

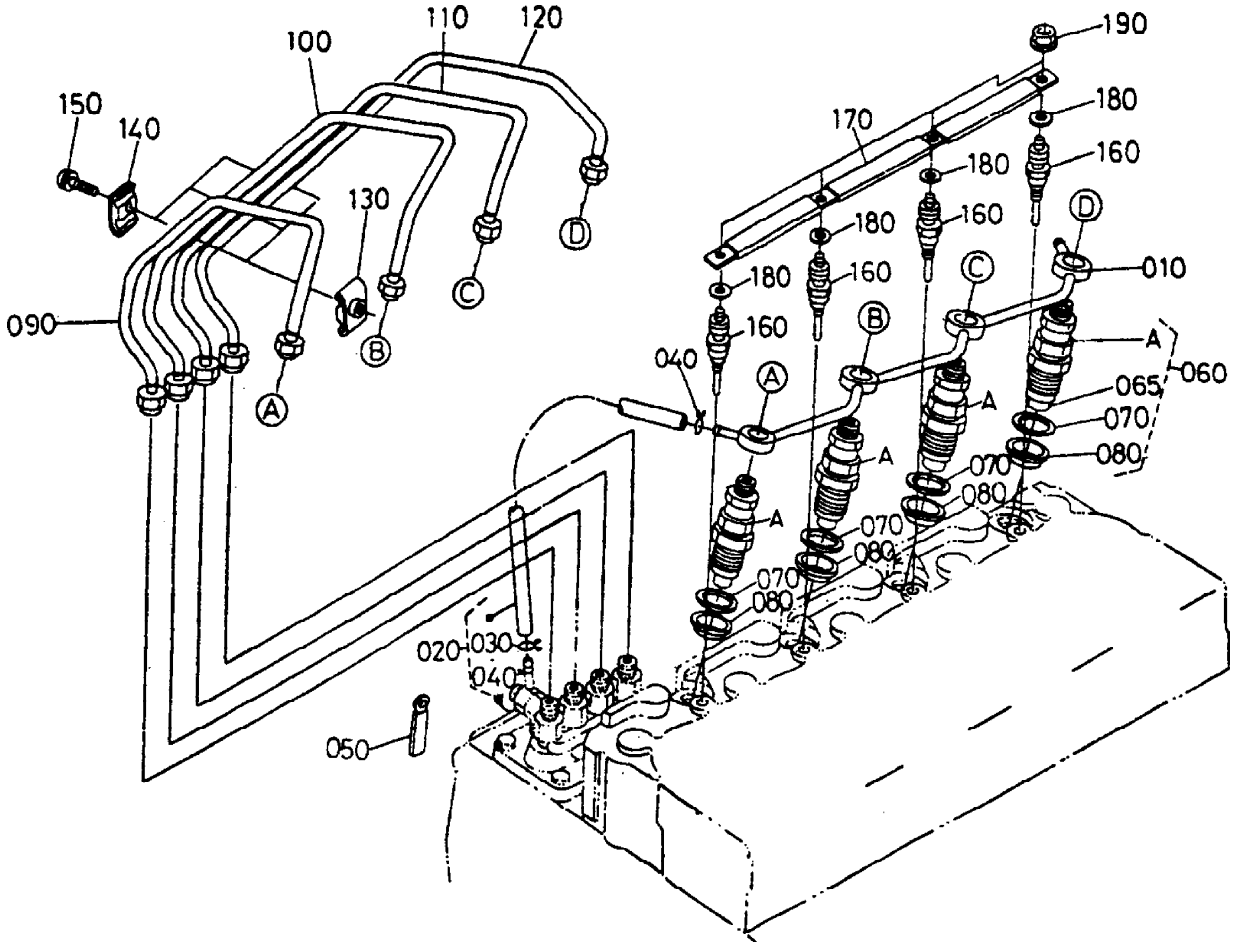


KUBOTA V2203 - ENGINE — STARTER (COMPONENTS) ASSY.

STARTER (COMPONENTS) ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1738163012	STARTER ASSY.	1	
020	1119763080	YOKE ASSY.	1	
030	1119763070	ARMATURE ASSY.	1	
040	1146063500	BEARING	1	
050	1146063530	BEARING	1	
060	1562163040	OVER RUNNING CLUTCH	1	
070	1648463030	DRIVE END FRAME	1	
080	1648463020	MAGNETIC SWITCH	1	
090	1648463200	END FRAME	1	
100	1738163380	BRUSH HOLDER ASSY.	1	
110	1540163390	BRUSH SPRING	4	
120	1146063270	GEAR	1	
130	1146063110	RETAINER	1	
140	1921263100	ROLLER	5	
150	1146063120	SPRING	1	
160	1921297130	BALL	1	
170	1146093310	BOLT	2	
180	1551196660	O RING	2	
190	1119763320	BOLT	2	
200	1551163760	BOLT ASSY.	2	
210	1628563570	DRAIN PIPE	1	
220	1396392010	HEXAGON NUT	1	

NOZZLE HOLDER ASSY.

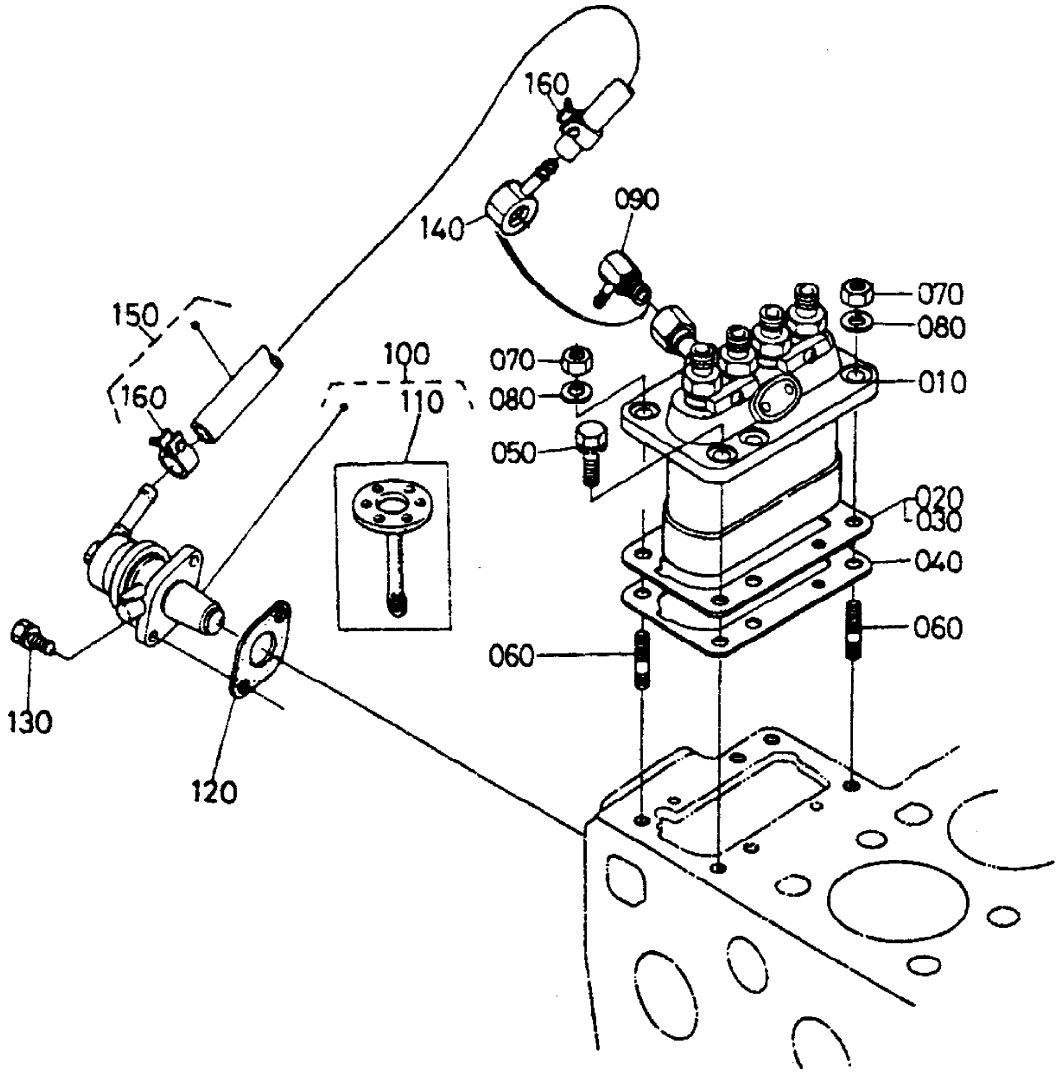


KUBOTA V2203 - ENGINE — NOZZLE HOLDER ASSY.

NOZZLE HOLDER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1645442502	OVER FLOW PIPE ASSY.	1	
020	1733142500	OVER FLOW PIPE ASSY.	1	
030	1497142750	PIPE CLIP	1	
040	1024442320	PIPE CLIP	1	
050	1524167580	CORD CLAMP	1	
060	1645453900	NOZZLE HOLDER KIT	1	
065	1645453610	NOZZLE PIECE	4	
070	1584153622	GASKET	4	
080	1907753650	HEAT SEAL	4	
090	1907753650	INJECTION PIPE	1	
100	1907753723	INJECTION PIPE	1	
110	1907753733	INJECTION PIPE	1	
120	1907753743	INJECTION PIPE	1	
130	1584153850	PIPE CLAMP	3	
140	1584153860	PIPE CLAMP	3	
150	0302450520	WASHER WITH SCREW	3	
160	1907765510	GLOW PLUG	4	
170	1647565560	GLOW PLUG CORD	1	
180	0401360040	PLAIN WASHER	4	
190	0276150040	FLANGE NUT	4	

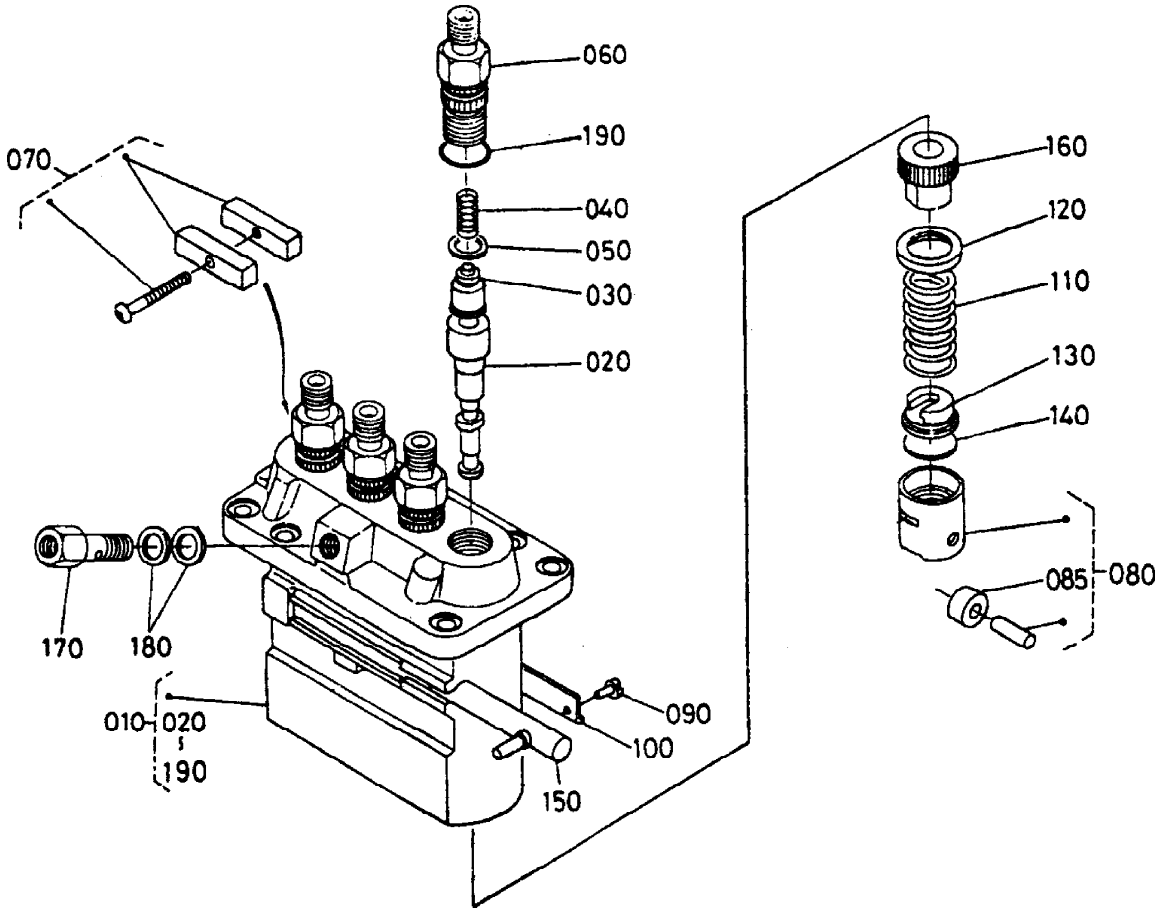
INJECTION PUMP 1 ASSY.



INJECTION PUMP 1 ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1667251010	INJECTION PUMP ASSY.	1	
020	1907752090	INJECTION SHIM	1	
030	1907752110	INJECTION SHIM	1	
040	1907752120	INJECTION SHIM	1	
050	0112350822	BOLT	4	
060	1522191530	STUD	2	
070	0215650080	NUT	2	
080	0451260080	LOCK WASHER	2	
090	1574860570	ORIFICE ASSY.	1	
100	1712152030	FUEL PUMP ASSY.	1	
120	1526352140	FUEL PUMP GASKET	1	
130	0102350616	BOLT	2	
140	1540195690	EYE JOINT	1	
150	1468142010	FUEL PIPE ASSY.	1	
160	1430142750	PIPE CLIP	2	

INJECTION PUMP 2 ASSY.

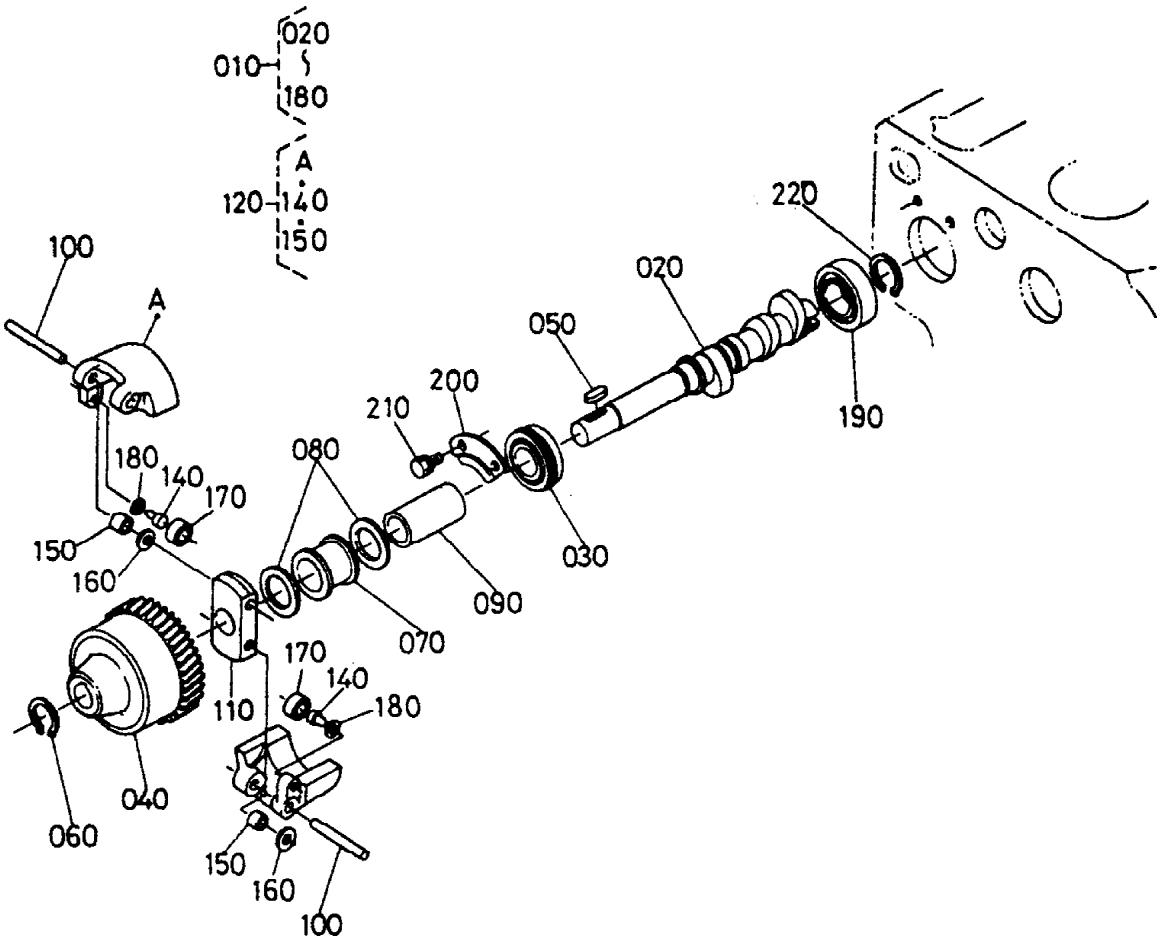


KUBOTA V2203 - ENGINE — INJECTION PUMP 2 ASSY.

INJECTION PUMP ASSY. 2

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1667251010	INJECTION PUMP ASSY.	1	
020	1667251050	PUMP PLUNGER	4	
030	1647551030	DELIVERY VALVE	4	
040	1647551230	DELIVERY VALVE	4	
050	1142051240	DELIVERY VALVE GASKET	4	
060	1641551220	DELIVERY VALVE HOLDER	4	
070	1647551610	LOCK PLATE ASSY.	2	
080	1522151070	TAPPET ASSY.	4	
090	1461151250	TAPPET GUIDE PIN	4	
100	1461151440	PLATE	2	
110	1522151280	PLUNGER SPRING	4	
120	1522151270	UPPER SPRING SEAT	4	
130	1522151290	LOWER SPRING SEAT	4	
140	1907751490	SHIM	4	
150	1540151060	CONTROL RACK	1	
160	1522151382	CONTROL SLEEVE	4	
170	1547151382	FOLLOW SCREW	1	
180	1540196650	GASKET	2	
190	1461151200	O RING	4	

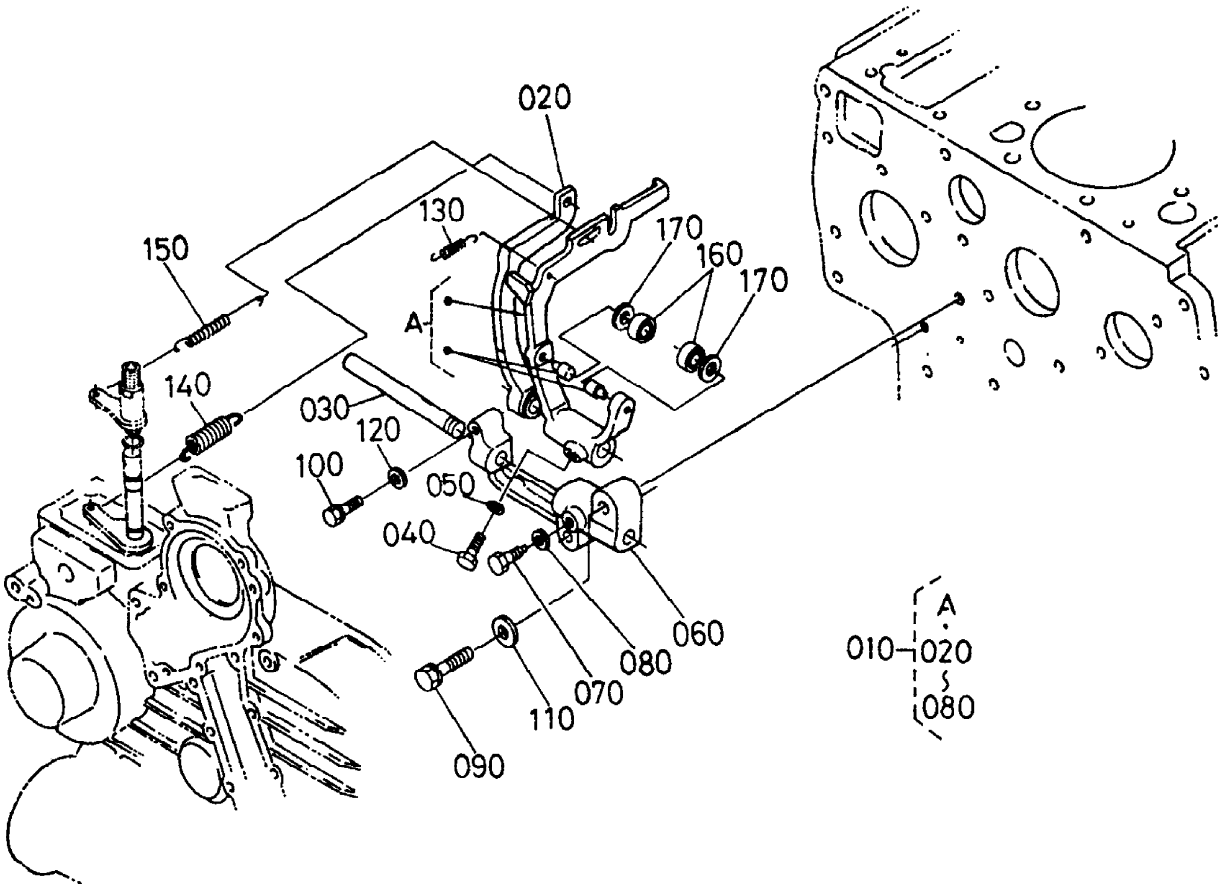
FUEL CAMSHAFT ASSY.



FUEL CAMSHAFT ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1666216020	FUEL CAMSHAFT ASSY.	1	
020	1666216170	FUEL CAMSHAFT	1	
030	0815306205	BALL BEARING	1	
040	1666251150	INJECTION PUMP GEAR	1	
050	0571200525	FEATHER KEY	1	
060	0461200240	EXTERNAL CIR CLIP	1	
070	1981855450	GOVERNOR SLEEVE	1	
080	1981855460	THRUST WASHER	2	
090	1981855510	GOV. WEIGHT COLLAR	1	
100	1981855260	GOV. WEIGHT SHAFT	2	
110	1666255270	GOV. WEIGHT HOLDER	2	
120	1666255060	GOVERNOR COMP. WEIGHT	2	
140	1982855280	GOVERNOR WEIGHT PIN	2	
150	1981855380	GOVERNOR BUSH	4	
160	1666255620	PLAIN WASHER	4	
170	1981855600	BEARING	2	
180	1981855340	WASHER	2	
190	0824000001	BALL BEARING	1	
200	1522116320	FUEL C/SHAFT STOPPER	1	
210	0112360814	BOLT	2	
220	0461200250	EXTERNAL CIR CLIP	1	

GOVERNOR ASSY.

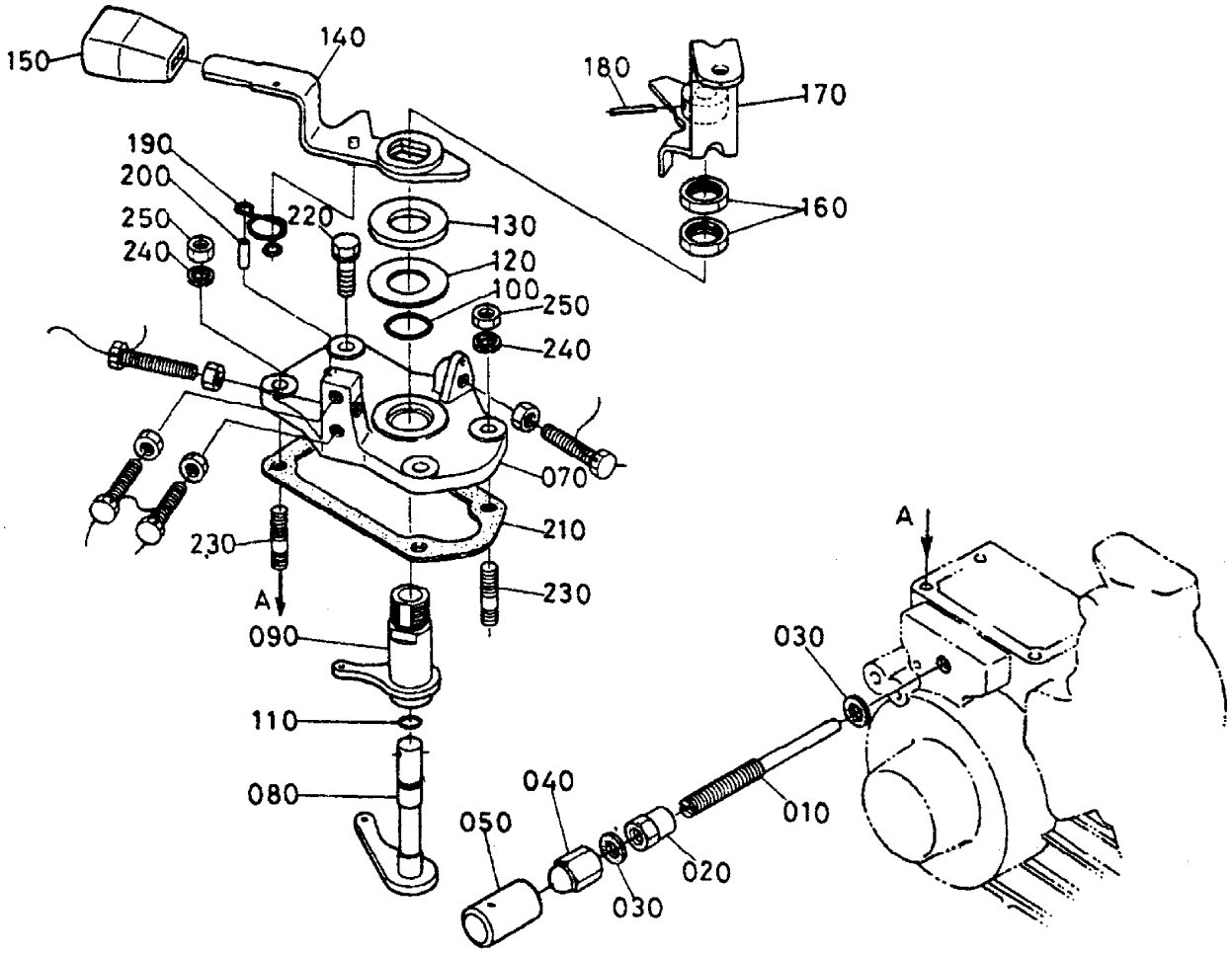


GOVERNOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1718256050	FORK LEVER ASSY.	1	
020	1707656130	FORK LEVER	1	
030	1981856150	FORK LEVER SHAFT	1	
040	0105350518	BOLT	1	
050	0451260050	LOCK WASHER	1	
060	1707656230	FORK LEVER HOLDER	1	
070	1522166410	BOLT	1	
080	0451260060	LOCK WASHER	1	
090	0112350832	BOLT	2	
100	0102350628	BOLT	1	
110	0401250080	PLAIN WASHER	2	
120	0401250060	PLAIN WASHER	1	
130	1981856480	START SPRING	1	
140	1718256412	GOVERNOR SPRING	1	
150	1718256420	GOVERNOR SPRING	1	
160	1981855600	BEARING	2	
170	1981855340	WASHER	2	

KUBOTA V2203 - ENGINE — SPEED CONTROL PLATE ASSY.

SPEED CONTROL PLATE ASSY.

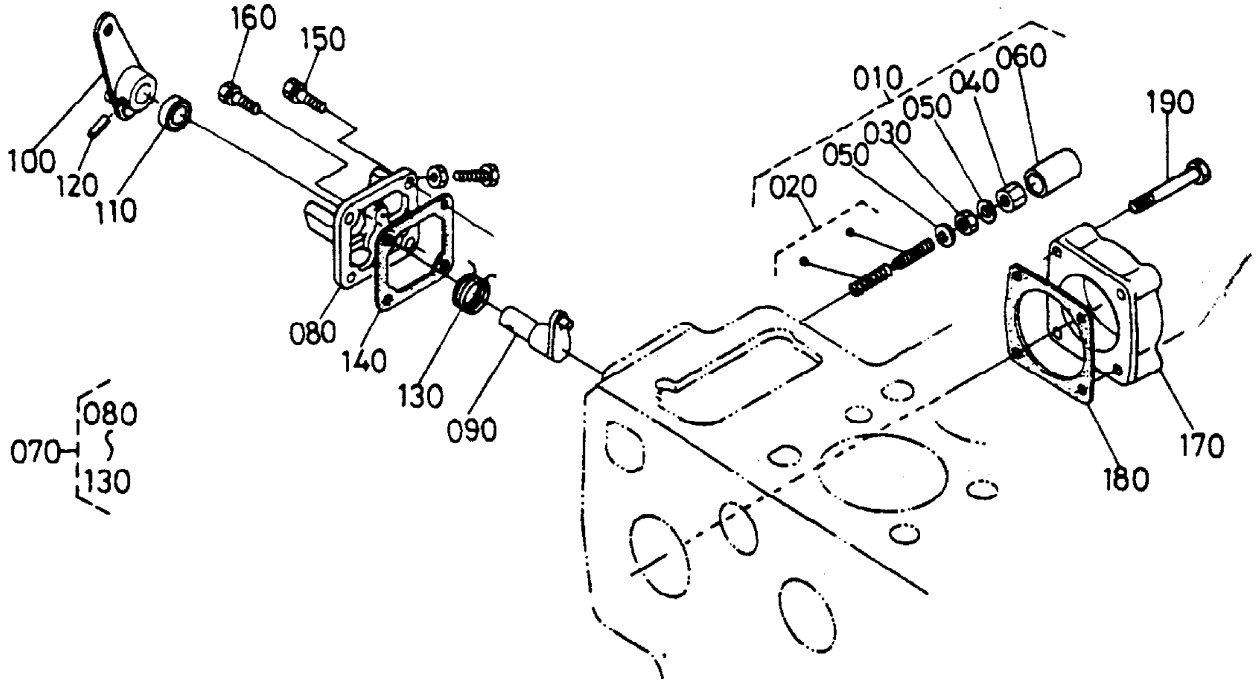


KUBOTA V2203 - ENGINE — SPEED CONTROL PLATE ASSY.

SPEED CONTROL PLATE ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1981854120	ADJUSTING BOLT	1	
020	1560192010	NUT	1	
030	1560196650	GASKET	2	
040	1584114620	CAP NUT	1	
050	1622154420	CAP	1	
070	1707657110	SPEED CONTROL PLATE	1	
080	1707657740	LEVER SHAFT	1	
090	1707656110	GOVERNOR LEVER	1	
100	0481110160	O RING	1	
110	0481110070	O RING	1	
120	1362216670	CAMSHAFT SHIM	1	
130	1707957380	COLLAR	1	
140	1707657162	CHANGE LEVER	1	
150	3691927820	PTO LEVER GRIP	1	
160	1584192010	SPEED CONTROL NUT	2	
170	1707657152	SPEED CONTROL LEVER	1	
180	0541100318	SPRING PIN	1	
190	1707657510	CHANGE SPRING	1	
200	0501200412	STRAIGHT PIN	1	
210	1543957210	GASKET	1	
220	0102350620	BOLT	2	
230	1522188210	STUD	2	
240	0451260060	LOCK WASHER	2	
250	0205650060	NUT	2	

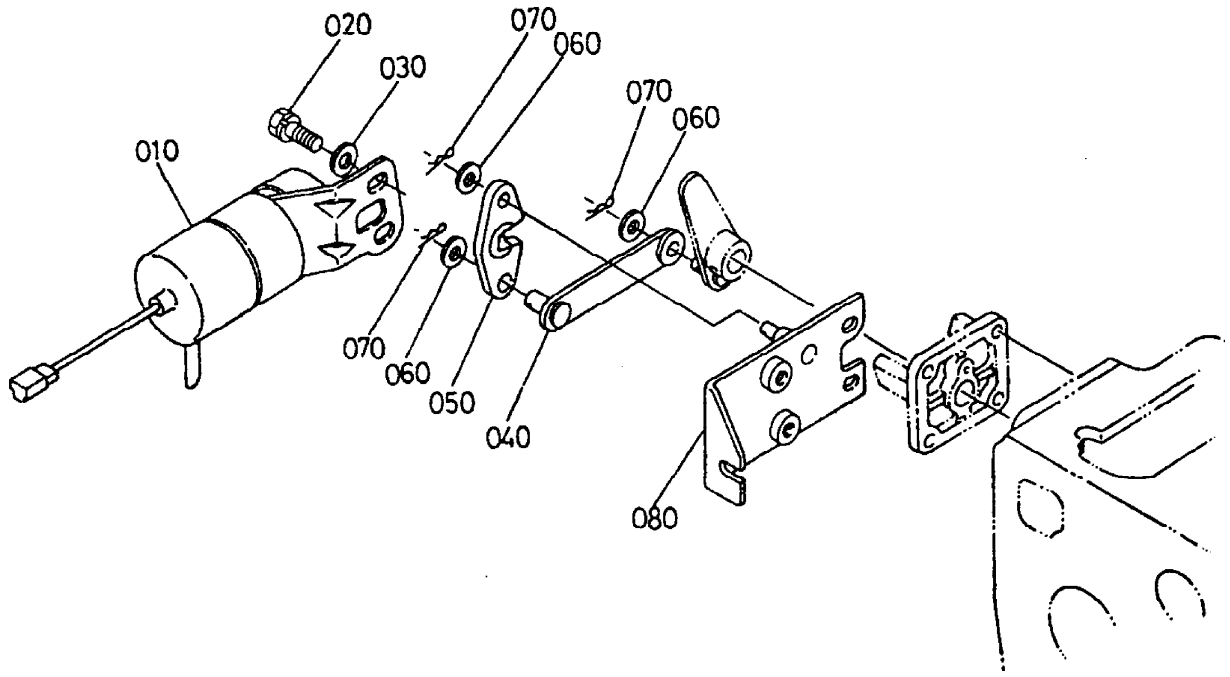
ENGINE STOP LEVER ASSY.



ENGINE STOP LEVER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1707654093	IDILING APPARATUS	1	
020	1707654103	ASJUSTMENT BOLT ASSY.	1	
030	1540192010	NUT	1	
040	1552192330	CAP NUT	1	
050	1502133660	GASKET	2	
060	1552154270	CAP	1	
070	1748257702	ENGINE STOP LEVER ASSY.	1	
080	1718351650	INJECTION PUMP COVER	1	
090	1733157740	LEVER SHAFT	1	
100	1748257720	ENGINE STOP LEVER	1	
110	1547157980	OIL SEAL	1	
120	0541100420	SPRING PIN	1	
130	1748257920	RETURN SPRING	1	
140	1529651660	PUMP COVER GASKET	1	
150	0102350618	BOLT	2	
160	0102350622	BOLT	2	
170	1718316210	FUEL CAMSHAFT COVER	1	
180	3539437860	GASKET	1	
190	0115350865	BOLT		

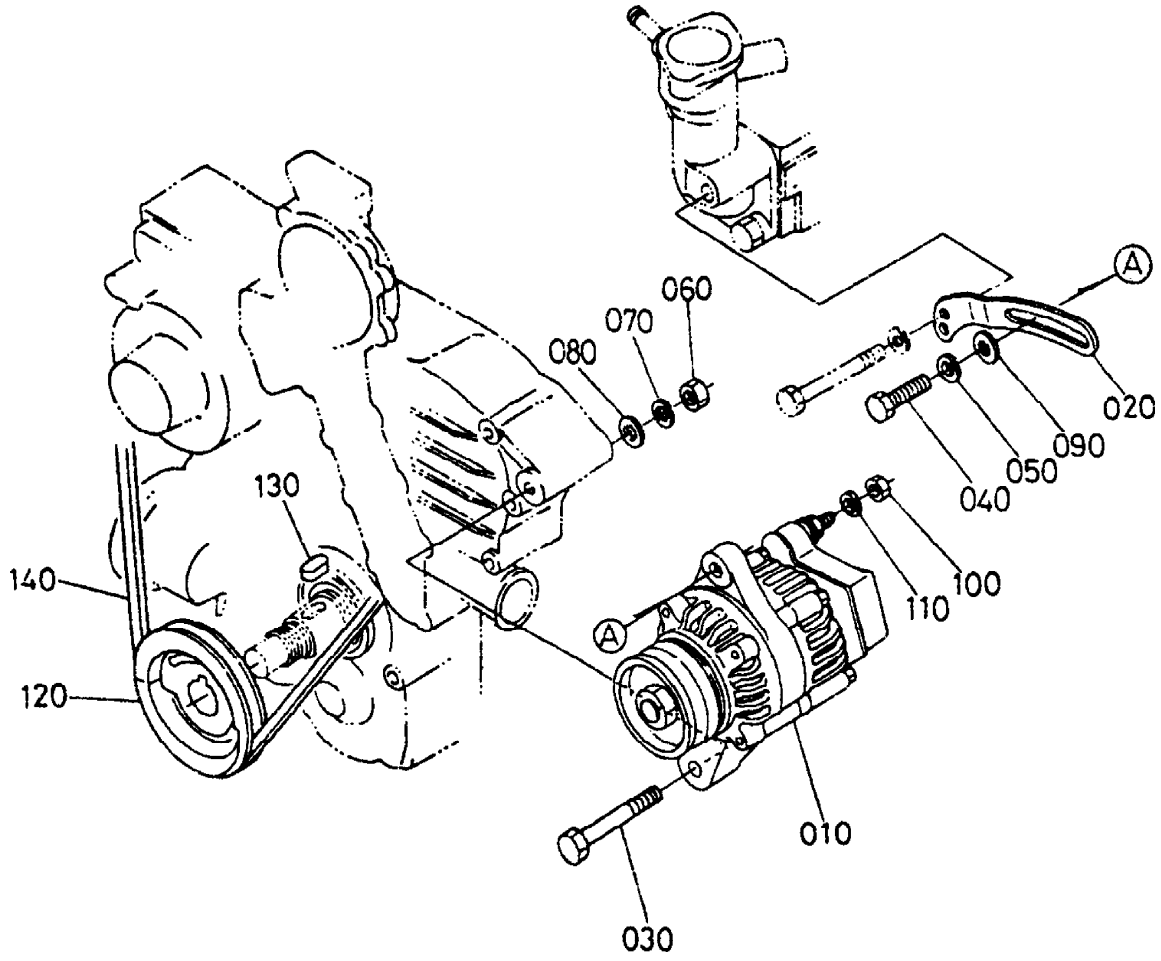
STOP SOLENOID ASSY.



STOP SOLENOID ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1547160010	STOP SOLENOID	1	
020	0112360816	BOLT	2	
030	0401250080	PLAIN WASHER	2	
040	1733160150	STOP LEVER	1	
050	1547160162	STOP LEVER	1	
060	0401250060	PLAIN WASHER	3	
070	0552550600	SNAP PIN	3	
080	1718260110	SOLENOID SUPPORT	1	

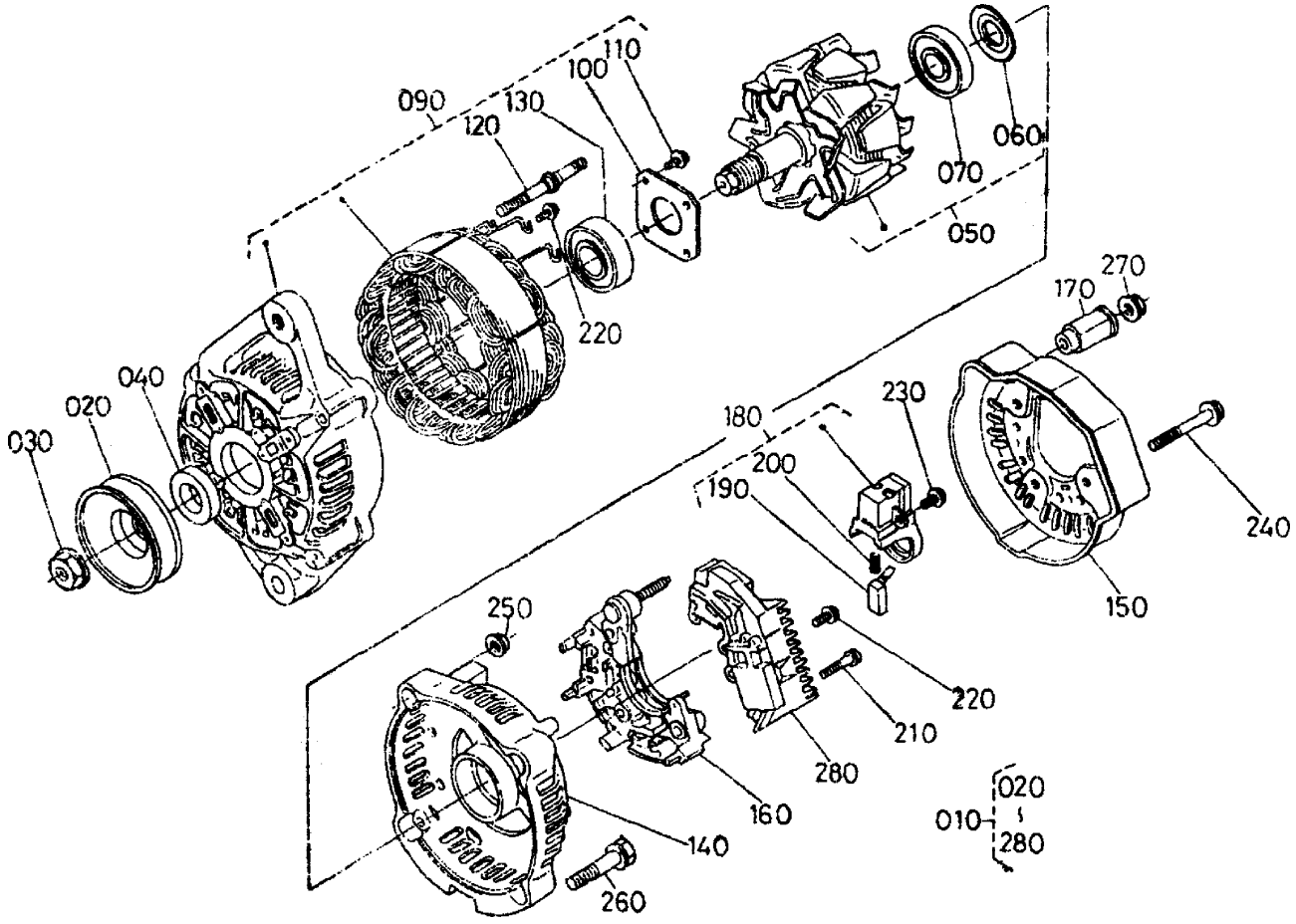
ALTERNATOR ASSY.



ALTERNATOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1642764010	ALTERNATOR ASSY.	1	
020	TA04074020	DYNAMO STAY	1	
030	0117351000	BOLT	1	
040	0115360830	BOLT	1	
050	0451260080	LOCK WASHER	1	
060	0215650100	NUT	1	
070	0451260100	LOCK WASHER	1	
080	0401150100	PLAIN WASHER	1	
090	0401560080	PLAIN WASHER	1	
100	0205650060	NUT	1	
110	0451260060	LOCK WASHER	1	
120	1920274280	FAN DRIVE PULLEY	1	
130	0571200720	FEATHER KEY	1	
140	1712397010	V - BELT	1	

ALTERNATOR (COMPONENTS) ASSY.

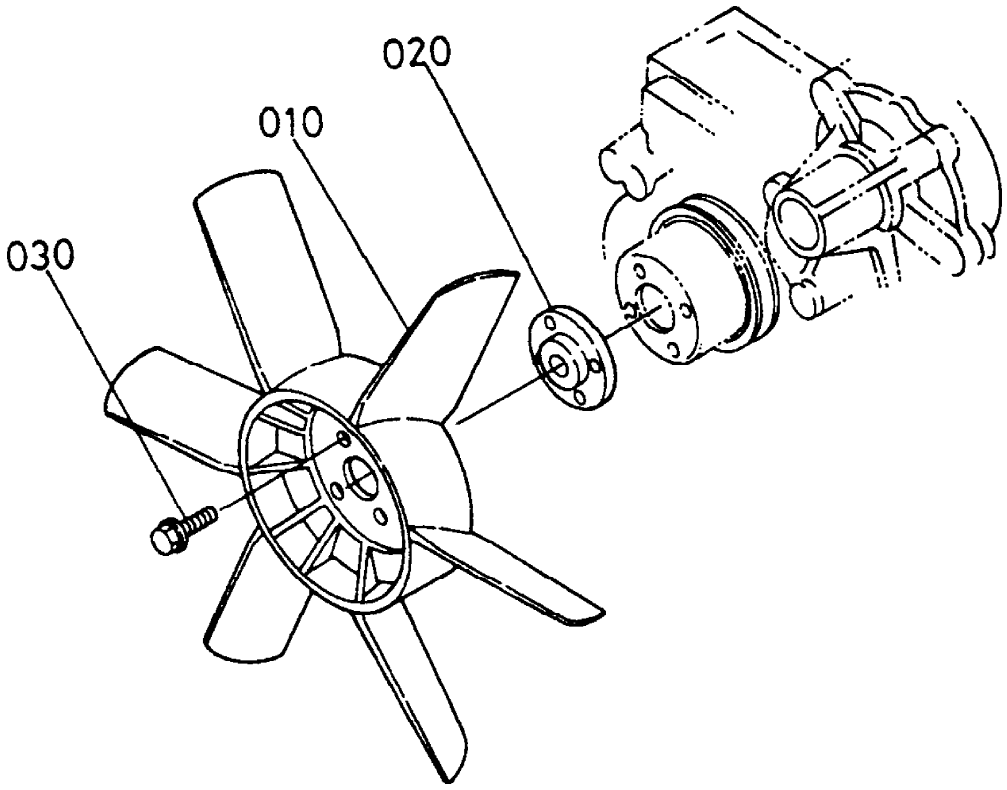


KUBOTA V2203 - ENGINE — ALTERNATOR (COMPONENTS) ASSY.

ALTERNATOR (COMPONENTS) ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1642764010	ALTERNATOR ASSY.	1	
020	1642764110	ALTERNATOR PULLEY	1	
030	1588192010	NUT	1	
040	1588164150	COLLAR	1	
050	1588164040	ROTOR	1	
060	1588164800	BEARING COVER	1	
070	1588164770	BALL BEARING	1	
090	1642764020	DRIVE END FRAME	1	
100	1588164710	RETAINER PLATE	1	
110	1588193010	ROUND HEAD SCREW	4	
120	1588164260	THROUGH BOLT	2	
130	1588164780	BALL BEARING	1	
140	1624164060	END FRAME	1	
150	1624164230	END COVER	1	
160	1623164850	RECTIFIER ASSY.	1	
170	1624164900	INSULATION BUSH	1	
180	1588164310	BRUSH HOLDER	1	
190	1588164090	BRUSH	2	
200	1588164330	BRUSH SPRING	2	
210	1588193020	ROUND HEAD SCREW	2	
220	1588193030	ROUND HEAD SCREW	6	
230	1588193040	ROUND HEAD SCREW	1	
240	1588191040	BOLT	3	
250	1588192020	NUT	2	
260	1588191050	BOLT	2	
270	1418292030	NUT	1	
280	1588164600	REGULATOR ASSY.	1	

FAN ASSY.

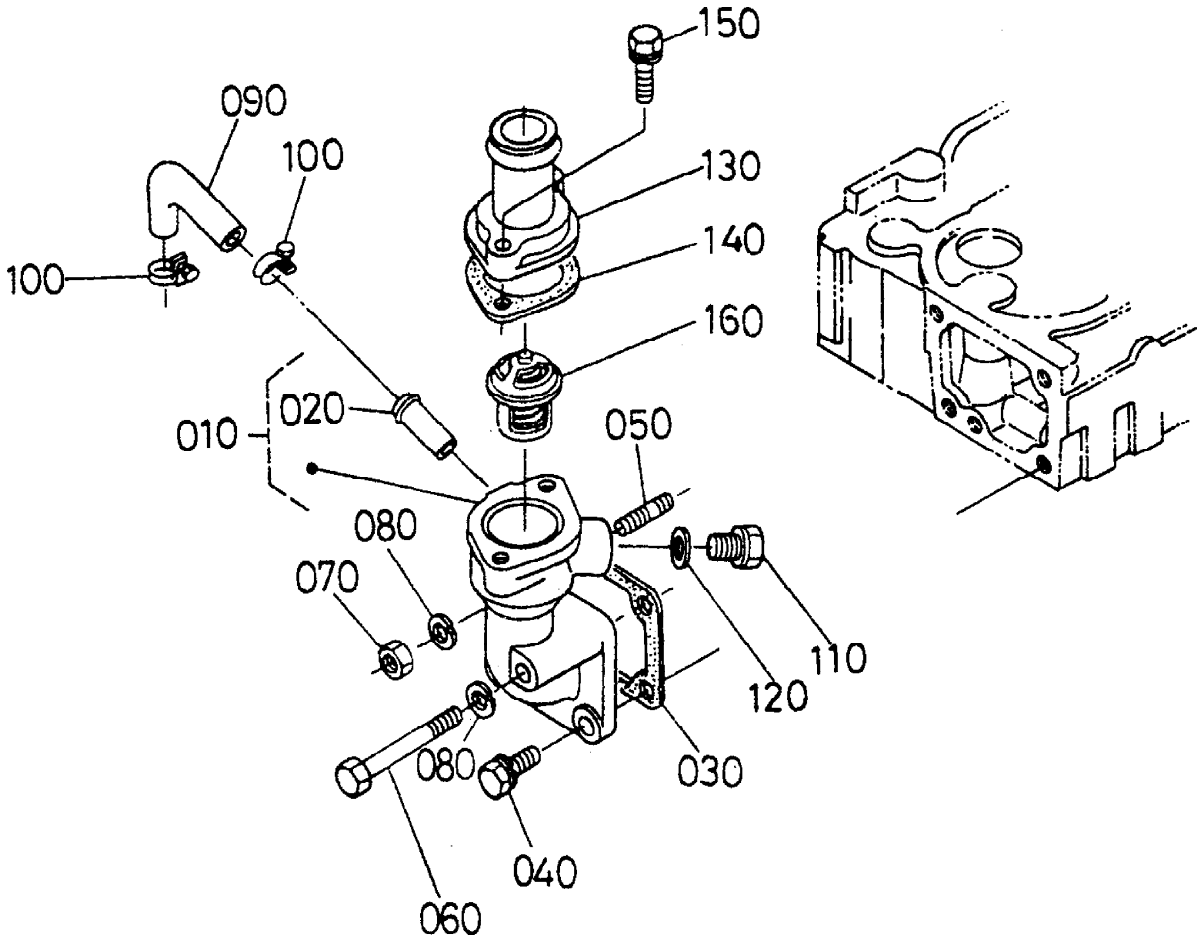


FAN ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1737174110	FAN	1	
020	1981874150	FAN COLLAR	1	
030	0175450625	FLANGE BOLT	4	

KUBOTA V2203 -EB ENGINE — WATER FLANGE AND THERMOSTAT ASSY.

WATER FLANGE AND THERMOSTAT ASSY.

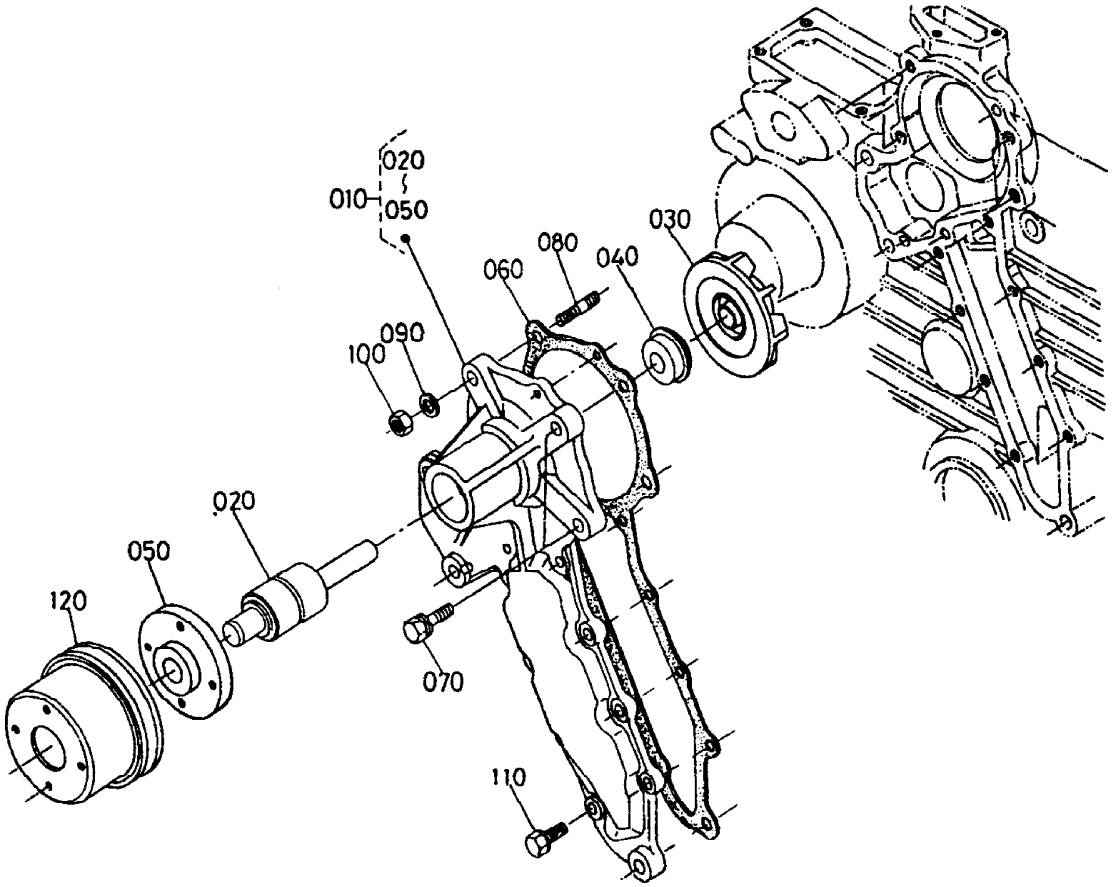


KUBOTA V2203 -EB ENGINE — WATER FLANGE AND THERMOSTAT ASSY.

WATER FLANGE AND THERMOSTAT ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1551272702	WATER FLANGE COMP.	1	
020	1733173342	WATER RETURN PIPE	1	
030	1576672920	WATER FLANGE GASKET	1	
040	0112350822	BOLT	2	
050	0151350822	STUD	1	
060	0115350870	BOLT	1	
070	0215650080	NUT	1	
080	0451260080	LOCK WASHER	2	
090	1552173340	WATER RETURN PIPE	1	
100	1510973360	PIPE BAND	2	
110	1551296010	PLUG	1	
120	0471702150	RUBBER WITH WASHER	1	
130	1532173260	THERMOSTAT COVER	1	
140	1531373270	GASKET	1	
150	0112350835	BOLT	2	
160	1943473010	THERMOSTSAT ASSY.		

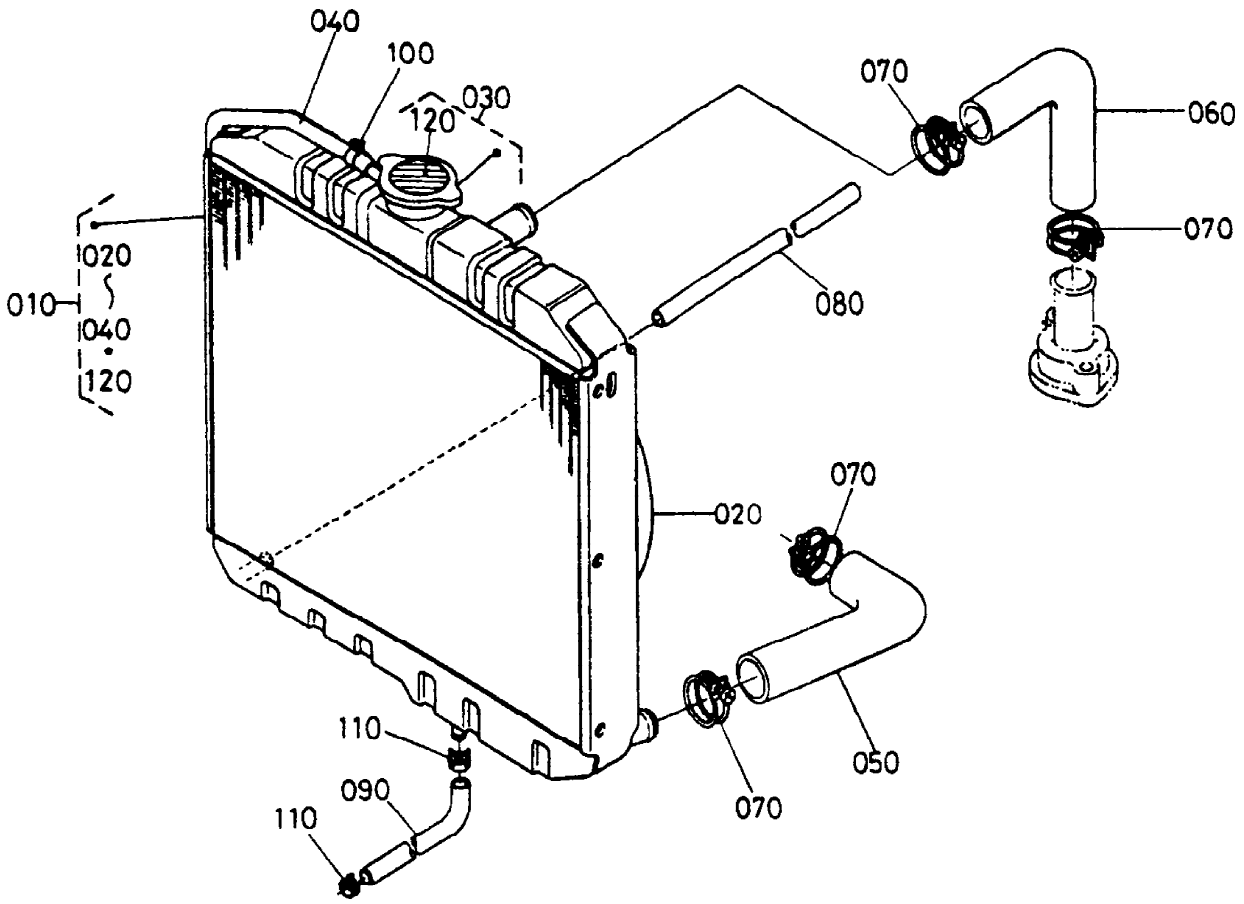
WATER PUMP ASSY.



WATER PUMP ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1552173033	WATER PUMP ASSY.	1	
020	1552173550	BEARING	1	
030	1666173510	IMPELLER	1	
040	1666173050	MECHANICAL SEAL ASSY.	1	
050	1552173520	WATER PUMP FLANGE	1	
060	1576673430	WATER PUMP GASKET	1	
070	0112350828	BOLT	2	
080	1552191510	STUD	2	
090	0451260080	LOCK WASHER	2	
100	0215650080	NUT	2	
110	0102350618	BOLT	8	
120	1736574250	FAN PULLEY	1	

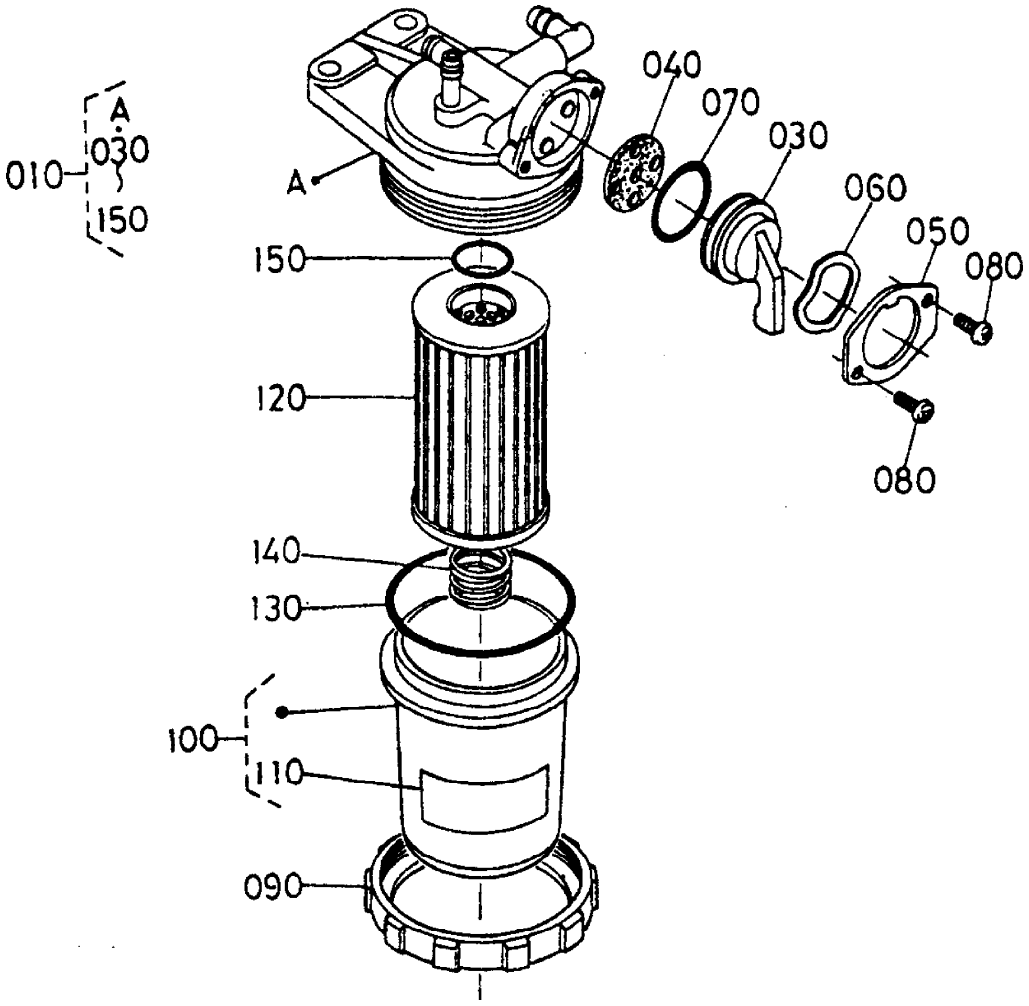
RADIATOR ASSY.



RADIATOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1707972062	RADIATOR ASSY.	1	
020	1560172330	FAN SHROUD	1	
030	1527272020	CAP ASSY.	1	
040	1707972710	WATER OVER FLOW PIPE	1	
050	1560172850	WATER PIPE	1	
060	1542872940	WATER PIPE	1	
070	1510872870	BAND	4	
080	1546173340	WATER RETURN PIPE	1	
090	1718273340	PIPE	1	
100	1540111720	PIPE BAND	2	
110	1430142750	PIPE CLIP	4	
120	1907787240	CAUTION LABEL	1	

FUEL FILTER ASSY.



FUEL FILTER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
010	1707643012	FUEL FILTER ASSY.	1	
030	1552143522	FILTER HANDLE	1	
040	1552143672	GASKET	1	
050	1552143552	HANDLE RETAINER	1	
060	1552143542	THRUST PLATE	1	
070	0481110290	O RING	1	
080	1552193310	WASHER WITH SCREW	2	
090	1552143150	RETAINER RING	1	
100	1552143100	FILTER CUP ASSY.	1	
110	1687388430	FUEL LABEL	1	
120	1552143160	FILTER ELEMENT	1	
130	0481150650	O RING	1	
140	1552143930	SPRING	1	
150	0481100160	O RING	1	

TERMS AND CONDITIONS OF SALE — PARTS

PAYMENT TERMS

Terms of payment for parts are net 10 days.

FREIGHT POLICY

All parts orders will be shipped collect or prepaid with the charges added to the invoice. All shipments are F.O.B. point of origin. Multiquip's responsibility ceases when a signed manifest has been obtained from the carrier, and any claim for shortage or damage must be settled between the consignee and the carrier.

MINIMUM ORDER

The minimum charge for orders from Multiquip is $15.00 net. Customers will be asked for instructions regarding handling of orders not meeting this requirement.

RETURNED GOODS POLICY

Return shipments will be accepted and credit will be allowed, subject to the following provisions:

1. A Returned Material Authorization must be approved by Multiquip prior to shipment.
2. To obtain a Return Material Authorization, a list must be provided to Multiquip Parts Sales that defines item numbers, quantities, and descriptions of the items to be returned.
    a. The parts numbers and descriptions must match the current parts price list.
    b. The list must be typed or computer generated.
    c. The list must state the reason(s) for the return.
    d. The list must reference the sales order(s) or invoice(s) under which the items were originally purchased.
    e. The list must include the name and phone number of the person requesting the RMA.
3. A copy of the Return Material Authorization must accompany the return shipment.
4. Freight is at the sender's expense. All parts must be returned freight prepaid to Multiquip's designated receiving point.
5. Parts must be in new and resalable condition, in the original Multiquip package (if any), and with Muiltiquip part numbers clearly marked.
6. The following items are not returnable:
    a. Obsolete parts. (If an item is listed in the parts price book as being replaced by another item, it is obsolete.)
    b. Any parts with a limited shelf life (such as gaskets, seals, "O" rings, and other rubber parts) that were purchased more than six months prior to the return date.
    c. Any line item with an extended dealer net price of less than $5.00.
    d. Special order items.
    e. Electrical components.
    f. Paint, chemicals, and lubricants.
    g. Decals and paper products.
    h. Items purchased in kits.
7. The sender will be notified of any material received that is not acceptable.
8. Such material will be held for 5 working days from notification, pending instructions. If a reply is not received within 5 days, the material will be returned to the sender at his expense.
9. Credit on returned parts will be issued at dealer net price at time of the original purchase, less a 15% restocking charge.
10. In cases where an item is accepted for which the original purchase document can not be determined, the price will be based on the list price that was effective twelve months prior to the RMA date.
11. Credit issued will be applied to future purchases only.

PRICING AND REBATES

Prices are subject to change without prior notice. Price changes are effective on a specific date and all orders received on or after that date will be billed at the revised price. Rebates for price declines and added charges for price increases will not be made for stock on hand at the time of any price change.

Multiquip reserves the right to quote and sell direct to Government agencies, and to Original Equipment Manufacturer accounts who use our products as integral parts of their own products.

SPECIAL EXPEDITING SERVICE

A $20.00 to $50.00 surcharge will be added to the invoice for special handling including bus shipments, insured parcel post or in cases where Multiquip must personally deliver the parts to the carrier.

LIMITATIONS OF SELLER'S LIABILITY

Multiquip shall not be liable here under for damages in excess of the purchase price of the item with respect to which damages are claimed, and in no event shall Multiquip be liable for loss of profit or good will or for any other special, consequential or incidental damages.

LIMITATION OF WARRANTIES

No warranties, express or implied, are made in connection with the sale of parts or trade accessories nor as to any engine not manufactured by Multiquip. Such warranties made in connection with the sale of new, complete units are made exclusively by a statement of warranty packaged with such units, and Multiquip neither assumes not authorizes any person to assume for it any other obligation or liability whatever in connection with the sale of its products. A part from such written statement of warranty, there are no warranties, express, implied or statutory, which extend beyond the description of the products on the face hereof.

NOTE PAGE

PARTS AND OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

PARTS DEPARTMENT
800/427-1244 or 310/537-3700
FAX: 800/672-7877 or 310/637-3284

SERVICE DEPARTMENT
800/835-2551 or 310/537-3700
FAX: 310/638-8046

WARRANTY DEPARTMENT
800/835-2551 or 310/537-3700
FAX: 310/638-8046

MAIN
800/421-1244 or 310/537-3700
FAX: 310/537-3927

Manufactured for Multiquip Inc.
by
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FAX: 310-537-3927
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WWW: multiquip.com

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