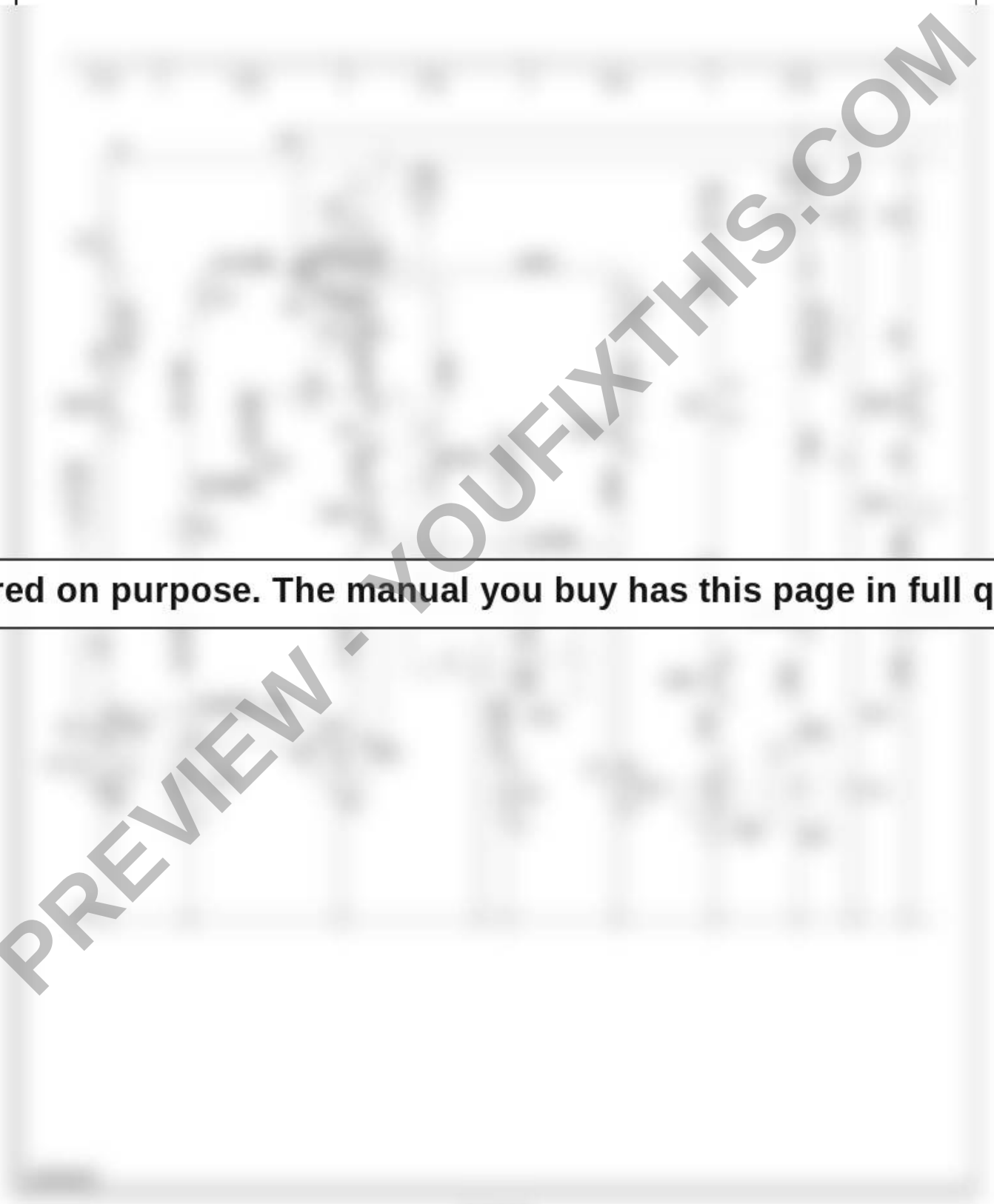
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Removal, Installation and Wiring of Electrical Components

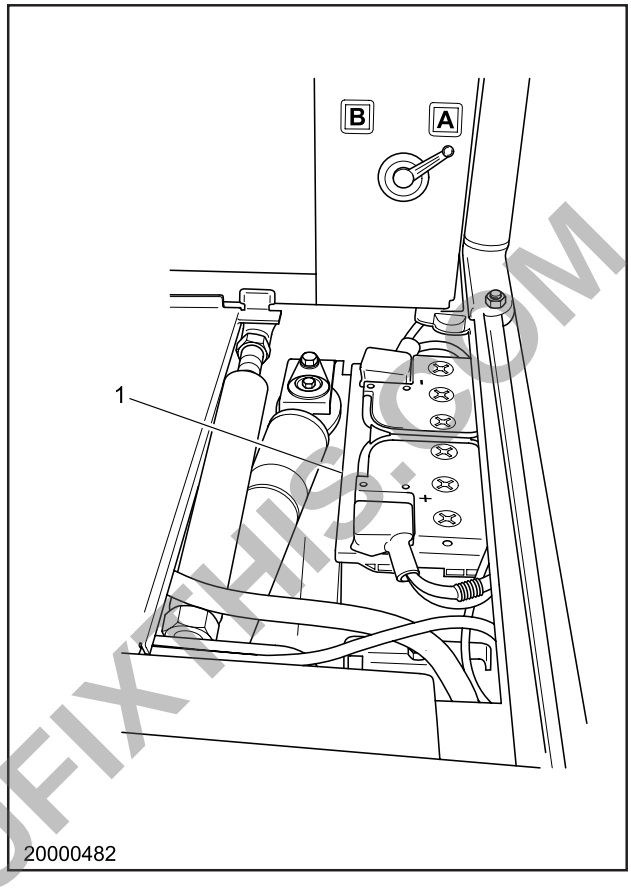
Battery

EC15

Removal

The battery is located on the left side of the machine below the floor mat of the operator platform.

1. Turn off the machine.
2. Lift the floor mat on the left side of the machine, then remove the left floor cover plate.
3. Disconnect the battery negative (ground) cable first, then disconnect the positive cable.
4. Remove the clamping bracket (1).
5. Lift out the battery.



Installation

1. Place the battery in the machine with the positive terminal positioned toward the front of the machine.
2. Secure with the clamping bracket (1).
3. First connect the positive cable, then connect the battery negative (ground) cable.

NOTE: *Ensure that the negative terminal is connected to the negative pole (-) and the positive terminal to the positive pole (+).*

4. Install the left floor cover plate, then install the floor mat.

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MINIMUM HARDWARE TIGHTENING TORQUES

IN FOOT POUNDS (NEWTON-METERS) FOR NORMAL ASSEMBLY APPLICATIONS

INCH HARDWARE AND LOCKNUTS

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TROUBLESHOOTING CHARTS

Hydraulic Control Valve		
Trouble	**Reason**	**Corrections**
The load drops when switching the spool from the neutral position to the UP position.	Oil leakage from the spool.	Replace the valve housing assembly.
	Oil leakage from the port relief valve.	Disassemble and clean the port relief valve or replace it.
	Dirt is caught in the load check valve.	Disassemble and clean the load check valve.
	The poppet, or seat of the load check valve is damaged.	Replace the poppet or lap the poppet and seat.
	The oil temperature rises abnormally.	Remove the cause of a resistance to the oil flow in the pipe.
Spool is sticking.	The hydraulic oil is dirty.	Replace the oil and clean the circuit.
	The valve housing is distorted due to the overtightening of the pipe port joint.	Check the tightening torque.
		Loosen and adjust the mounting bolt.
	Foreign matter is caught by the cutout of the spool.	Remove the foreign matter or replace the valve housing assembly.
	The pressure is too high.	Check and adjust using the pressure gage.
	The lever or link is bent.	Remove and check the link.
	The spool is warped.	Replace the valve housing assembly.
	The return spring or cap is damaged or incorrectly aligned.	Replace the return spring.
		Set the alignment by loosening the cap and retighten.
	The distribution of the temperature in the valve is unequal.	Warm up the circuit.
Oil is leaking from the oil seal.	Foreign matter is adhering to the seal.	Remove and clean the seal.
	The back pressure of the valve return circuit is too high.	Enlarge the return circuit.
	Dirt is caught by the seal or the seal plate is loose.	Remove and clean the seal.
		Clean the seal plate and fasten it using the bolt.
	The spool is damaged.	Replace the valve housing assembly.
	The seal is cut or damaged.	Replace the seal.

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EC15, EC25, EC35, EC45
CRAWLER EXCAVATOR
SERVICE MANUAL
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SECTION 7 - HYDRAULIC SYSTEM

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SECTION 11 - TRACTION/UNDERCARRIAGE

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PRECAUTIONARY STATEMENTS

Personal Safety

Throughout this manual and on machine decals, you will find precautionary statements (“CAUTION”, “WARNING”, and “DANGER”) followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.

CAUTION

THE WORD “CAUTION” IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.

WARNING

THE WORD “WARNING” DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.

DANGER

THE WORD “DANGER” DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.

FAILURE TO FOLLOW THE “CAUTION”, “WARNING”, AND “DANGER” INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

This “ ” symbol is used throughout this manual whenever personal safety is involved. Take time to read and follow the instructions. Be Careful!

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.

Machine Safety

Additional precautionary statements (“ATTENTION” and “IMPORTANT”) are followed by specific instructions. These statements are intended for machine safety.

ATTENTION: The word “ATTENTION” is used to warn the operator of potential machine damage if a certain procedure is not followed.

IMPORTANT: The word “IMPORTANT” is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.

NOTE: The word “NOTE” is used for information containing important notes about the correct use and/or how to proceed. Non-compliance may lead to malfunction.

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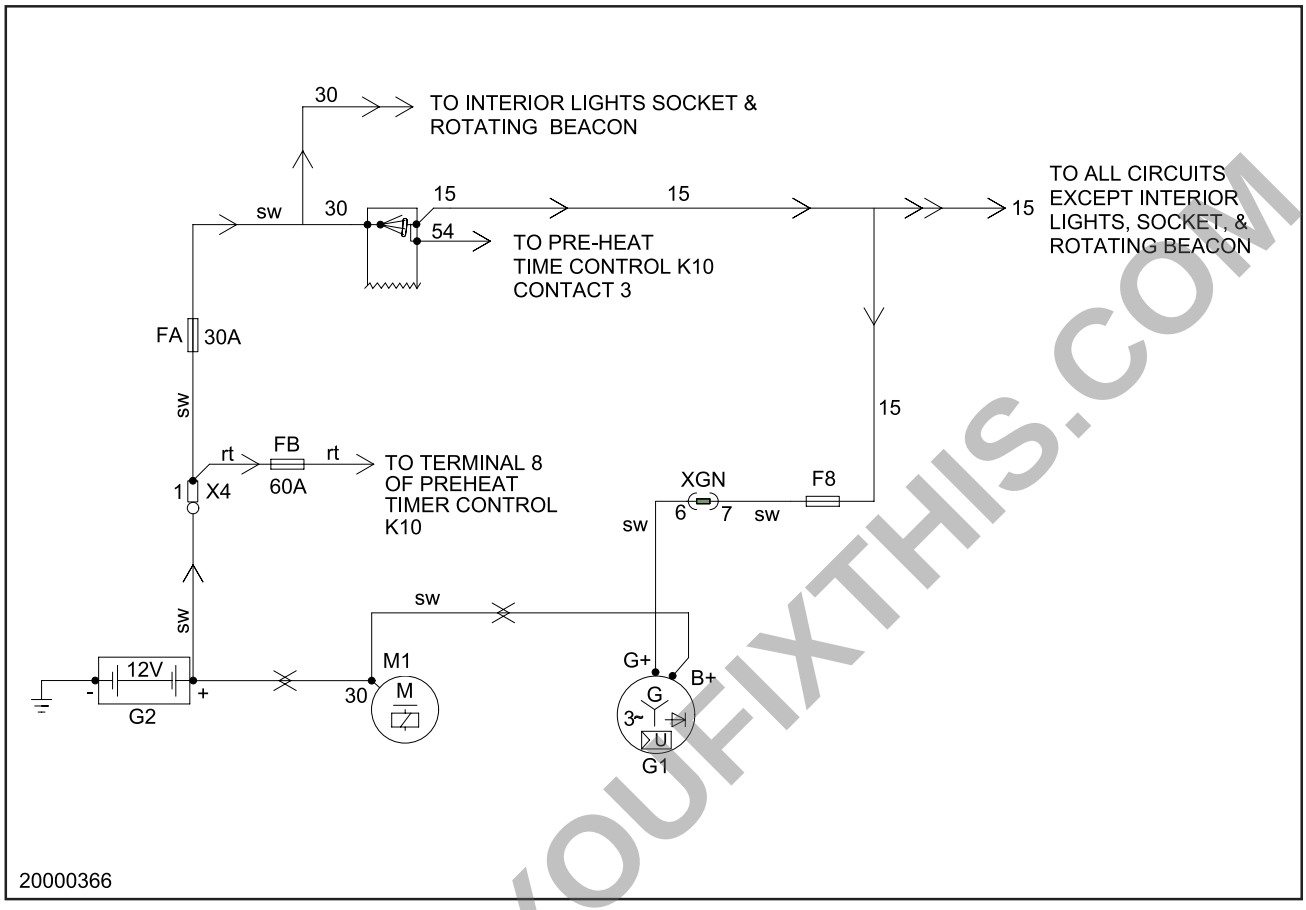
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ELECTRICAL CIRCUITS



Power Supply Circuit

The power supply circuit consists of the battery which supplies initial voltage for starting the engine and the alternator (G1) that supplies voltage after the engine has started. The alternator (G1) is driven by a belt from the engine. Terminal (30) on the starter motor (M1) is the relay located on top of the starter motor. Positive battery voltage is routed through black wire (sw), to connector (X4-1). The voltage at (X4-1) is divided into two paths. One path, through red wire (rt) and 60A fuse (FB), goes to the preheat timer control unit (K10). The second path, through wire (sw) and fuse (FA), goes to terminal (30) of the pre-heat/starter switch (ignition switch) (S2) and, via wire (30), to the interior lights, the socket in the cab, the radio presets and the rotating beacon. The preheat timer unit (K10) is not energized at this time so no current flows in the preheat circuit.

With the ignition switch (S2) is in the 0 (off) position, no current can flow through the ignition switch and the engine cannot be started.

Voltage through 30A fuse (FA) is present at all times for the interior lights, the socket in the cab, the radio preset time and push buttons and for the rotating beacon through wire (30). These circuits can operate without the ignition switch being turned on. All components connected to wire (15), must have the key switch (S2), turned on before they can be operated. When the engine is not operating, the alternator (G1) provides no output. If the ignition switch is rotated to position 1, battery voltage routed through fuse (FA) is routed through ignition switch terminals (30) and (15) and to all other circuits via wire (15). If these circuits are left on for any length of time, the battery can be rundown.

When the engine is started, the alternator (G1) generates voltage which is fed back from terminal (B+) through wire (sw) to the battery positive terminal to charge the battery. The voltage applied to alternator terminal (G+), is used to excite the field coil in the Alternator armature, through wire (sw), through connector (XGN) terminals (6) and (7), through the fuse (F8) from voltage output wire (15).

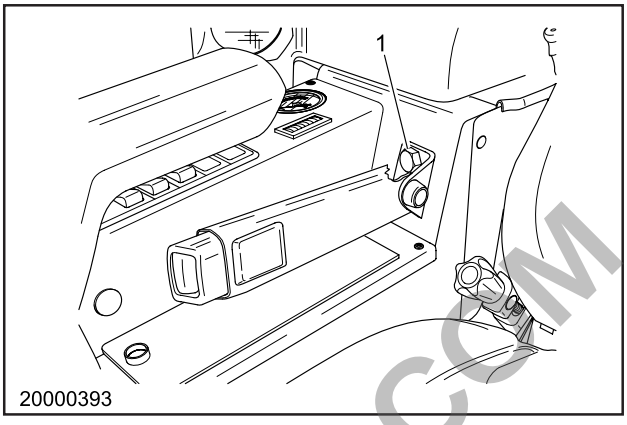
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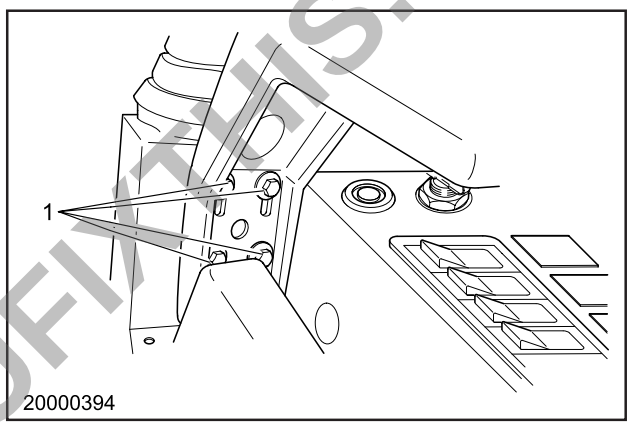
Removal

1. Disconnect negative (-) battery cable.

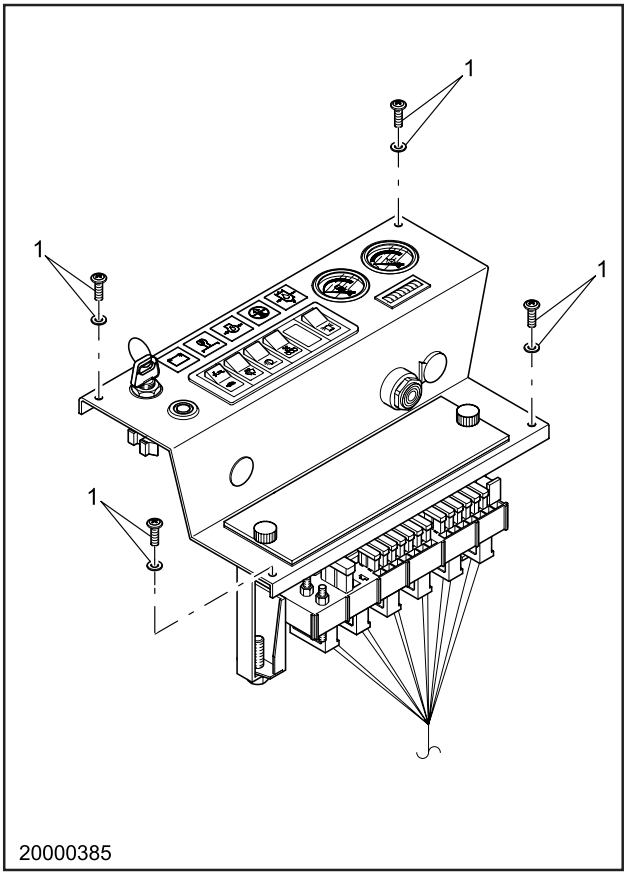
2. Remove seat belt bracket by removing mounting hardware (1).



3. Remove right armrest by removing mounting hardware (1).



4. Remove screws and washers (1) attaching control panel to machine.

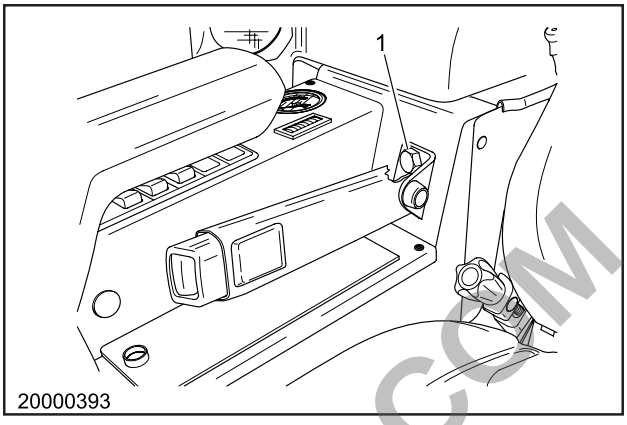


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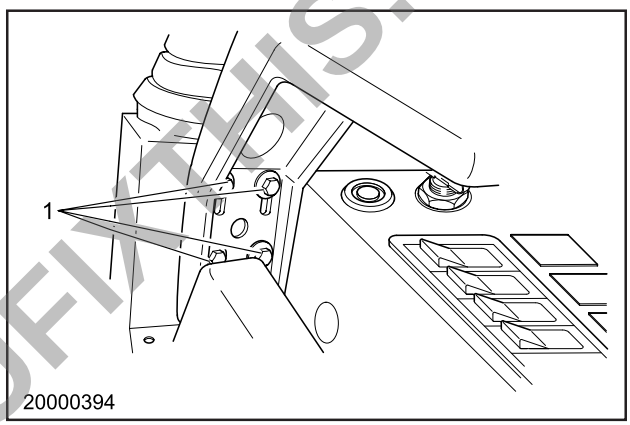
Socket

Removal

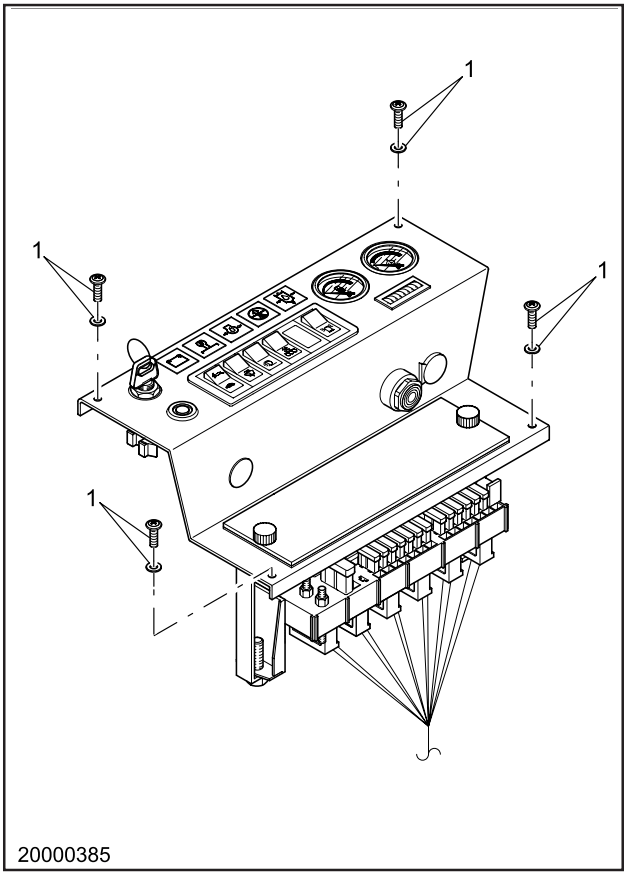
1. Disconnect negative (-) battery cable.
2. Remove seat belt bracket by removing mounting hardware (1).



3. Remove right armrest by removing mounting hardware (1).



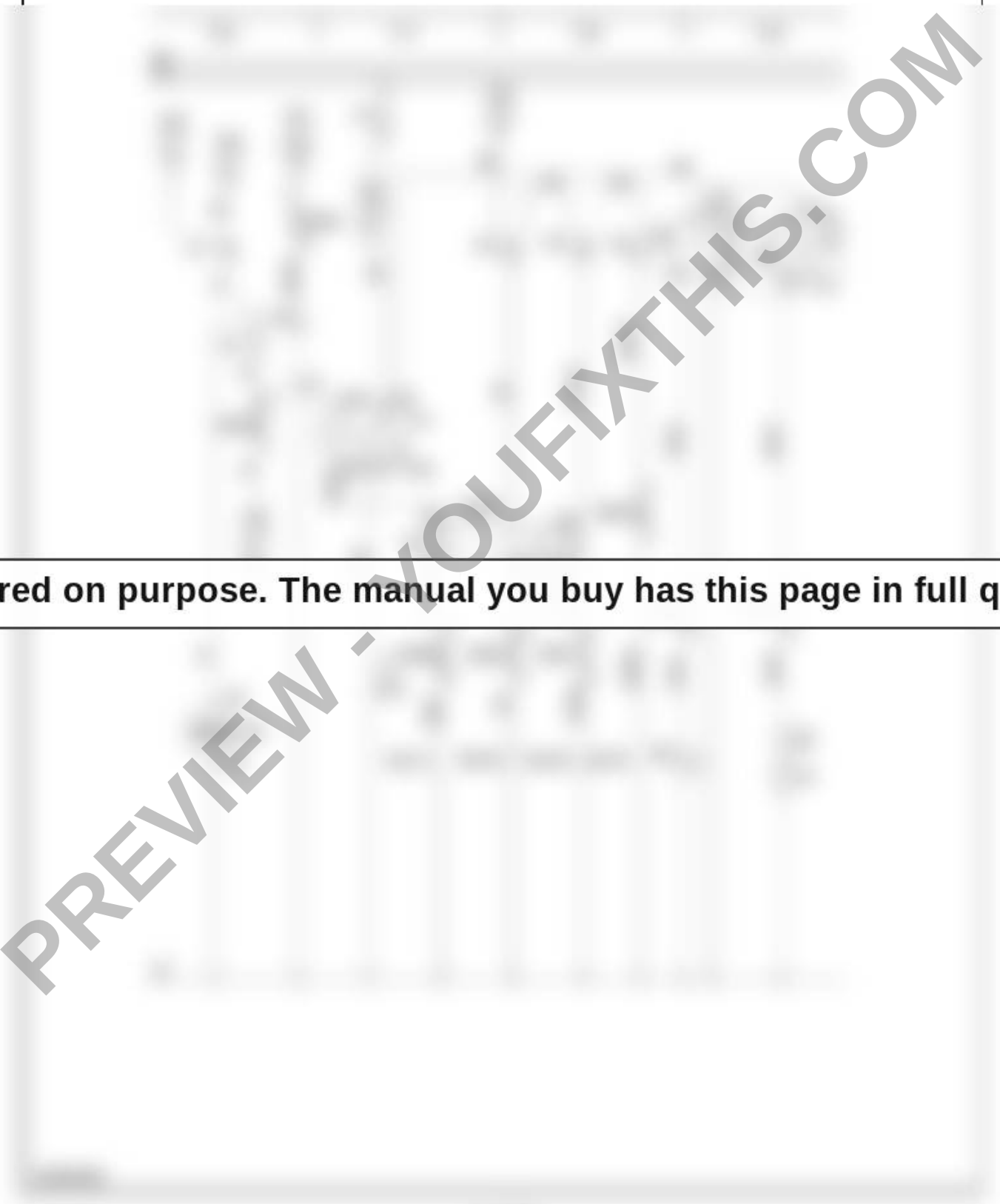
4. Remove screws and washers (1) attaching control panel to machine.



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Electrical Schematic EC45
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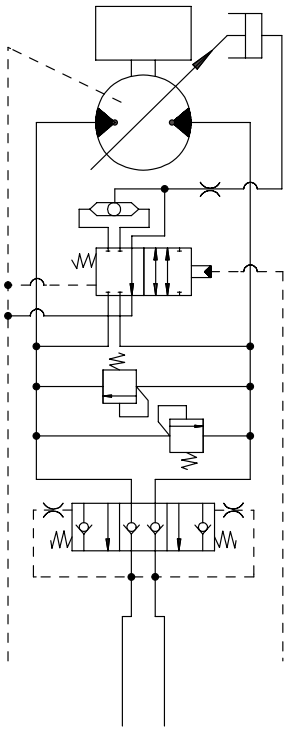
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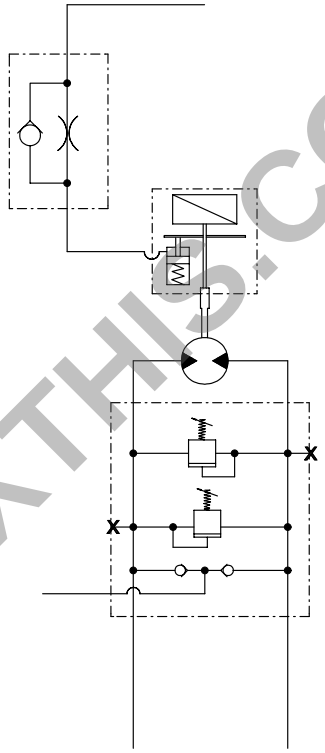
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EC35 Hydraulic Diagram of Pilot Control, Travel Motor, and Slew Motor

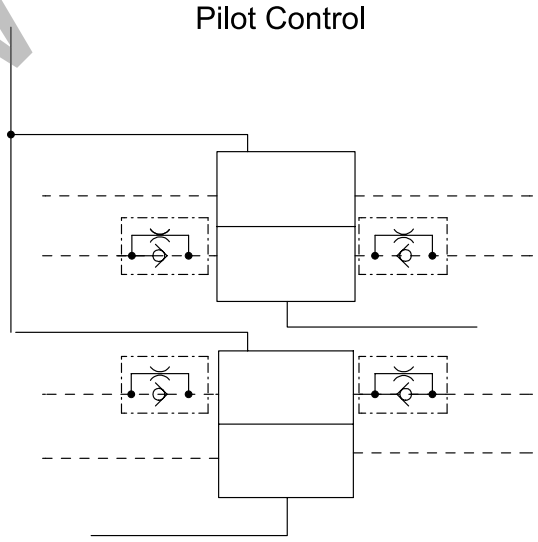
Travel Motor



Slew Motor



Pilot Control



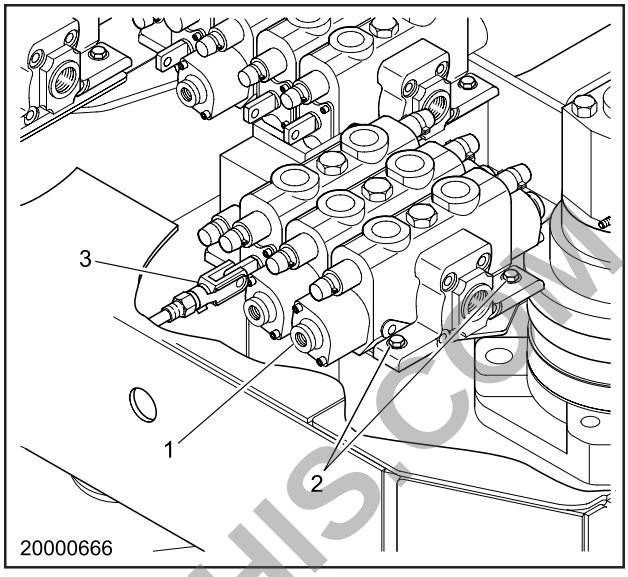
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Valve Bank 2 Installation

1. Align the mounting holes in valve (1), with holes in uppercarriage.
2. Attach valve (1), to undercarriage with four screws, washers, and nuts (2).
3. Connect travel left linkage (3).
4. Apply sealant on the hydraulic fittings and connect all hydraulic hoses disconnected during removal.
5. Add hydraulic oil, if necessary, to hydraulic tank then tighten cap on hydraulic filter.
6. Operate machine and check for any hydraulic oil leaks.
7. Stop machine and remove key.
8. Install floor cover plate and floor mat.

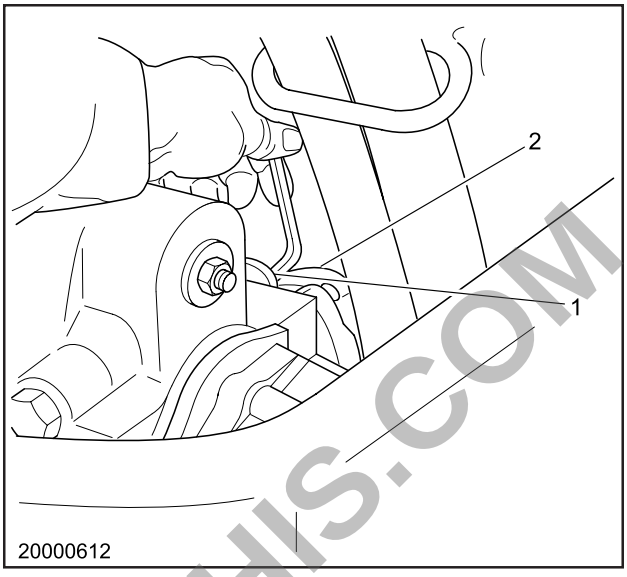


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11. Remove the bolt (1), from the suction flange with a hexagon wrench.

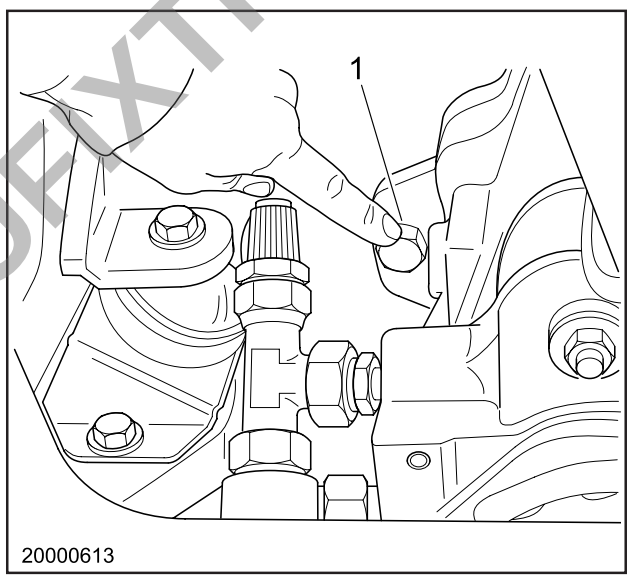
12. Remove the suction hose (2), and allow hydraulic oil to drain into the container.



WARNING

PUMP IS HEAVY, DO NOT REMOVE BOLTS UNTIL INSTRUCTED.

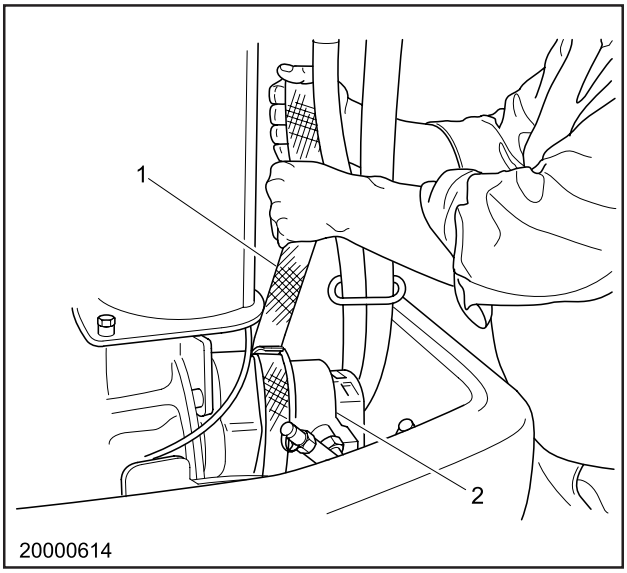
13. Loosen, but do not remove, the two bolts (1), attaching the pump to the engine.



14. Attach a sling (1), to the pump (2).

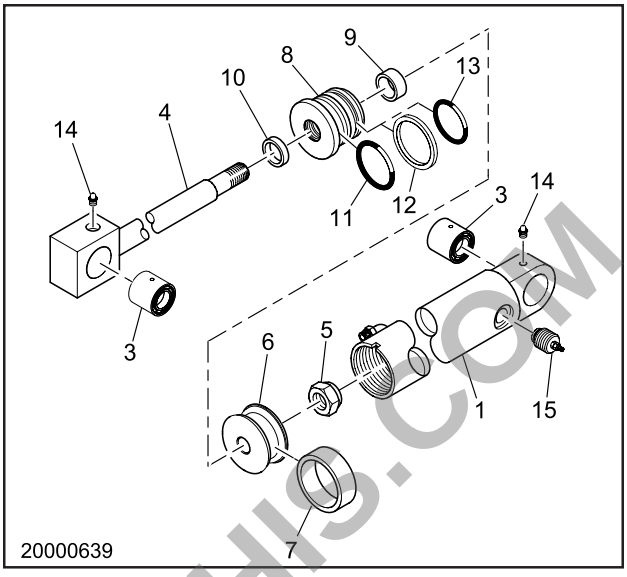
15. Remove the two mounting bolts previously loosened.

16. Remove the pump from the engine compartment. Pump will need to be taken out at an angle to clear frame.



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EC25/EC35



Disassembly

1. Remove cylinder from machine as previously described.
2. Clamp the hydraulic cylinder horizontally in a suitable vise.
3. Place a container under the cylinder to collect the oil.
4. Use a hook wrench and unscrew the gland nut (8), from the cylinder housing (1).
5. Pull the piston rod assembly (4), with piston (6), and gland nut (8), out of cylinder housing (1).
6. Clamp the piston rod eye horizontally in a suitable vise.

NOTE: *Nut (5), is held by Loctite, warm to 392°F (200°C) if necessary.*

7. Remove the nut (5), then remove the piston (6), with the piston seal (7), attached.
8. Remove the gland nut (8), from the piston rod (4).
9. Remove the rod seal (9), and scraper ring (10), from gland nut (8).
10. Check the piston rod (4), for damage.
11. Remove grease fittings (14).
12. Remove the bushings (3), and check bushings for damage.
13. Carefully remove piston seal (7), from piston (6), taking care not to damage the piston.
14. Remove O-rings (11) and (13), and backup ring (12), taking care not to damage the gland nut (8).
15. Remove safety valve (15).

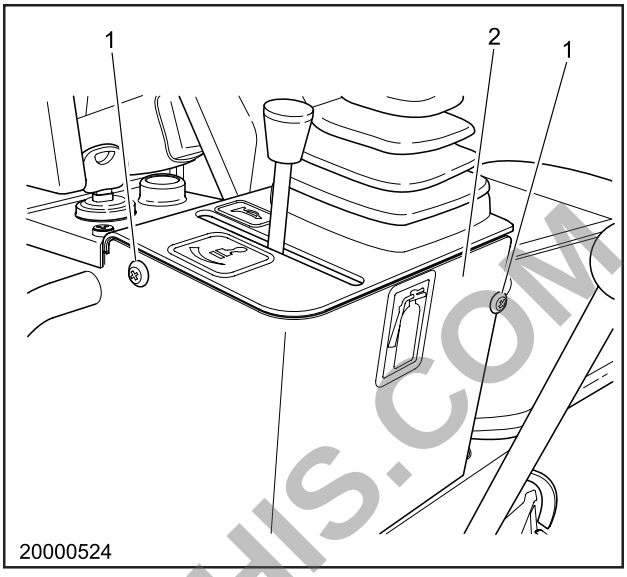
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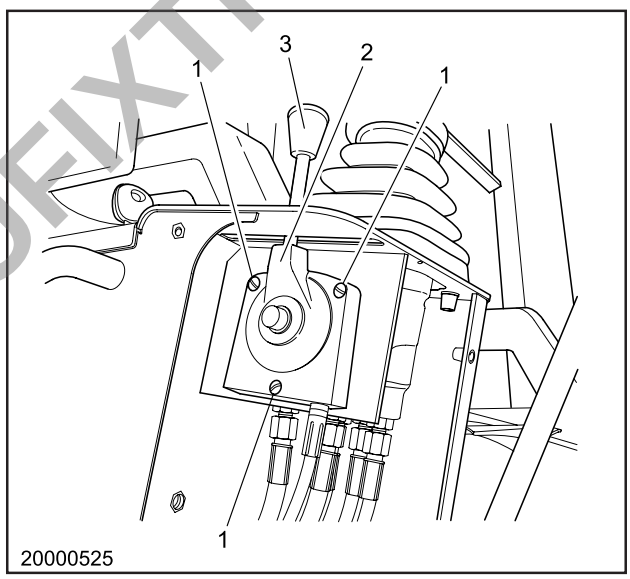
EC45

Removal

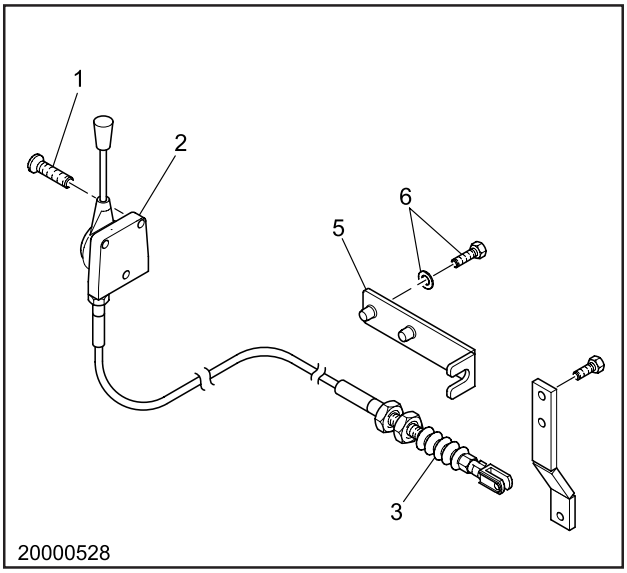
1. Remove four screws and crown washers (1), attaching cover panel (2).
2. Slide cover panel off.



3. Remove knob (3), from accelerator control (2).
4. Remove three screws and washers (1), attaching accelerator (2), to bracket.
5. Remove accelerator from bracket.



6. In engine compartment, disconnect accelerator cable end (3), from throttle arm.
7. Loosen nuts on throttle cable and remove accelerator cable from bracket (5).
8. If bracket (5), requires replacement, remove screw and washer (6).
9. Pull accelerator cable out of engine compartment and remove the accelerator (2), from the machine.



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