210B
310
310C
430
440
530

Utility Tractors

Service Manual

9-70011

CASE CONSTRUCTION

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SECTION I

310 AND 310C CRAWLER TRACTORS

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OWATONNA TOOLS ARE SHOWN IN THE ILLUSTRATIONS IN THIS MANUAL. THEY ARE IDENTIFIED BY OTC PART NUMBER.

OTC TOOLS ARE AVAILABLE FROM OWATONNA TOOL COMPANY, OWATONNA, MINNESOTA, U.S.A.

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BACKHOE VALVE OPERATION

General Description

The backhoe control valve is called an "open center, parallel circuit" valve. There are four circuits in the valve that run parallel to each other.

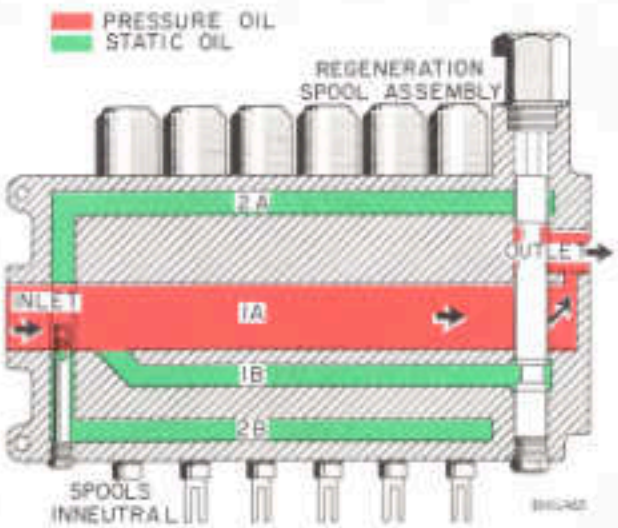


Figure 6 – Backhoe Valve Circuits

NOTE

In Figures 6, 7, and 8, the position of the inlet and outlet ports has been altered to the ends of the control valve so that the movement of oil can be more clearly illustrated.

High pressure circuit 1A runs clear through the valve and empties into the outlet. This is the path of the oil with all spools in neutral.

A tributary circuit 1B runs parallel to 1A through all the working sections and dead ends in the regeneration spool chamber of the outlet section.

Circuits 2A and 2B handle oil returning from the cylinders.

There are six working sections—swing, bucket, dipper (crowd), boom, and 2 stabilizer sections. In addition, there is an inlet section containing a regeneration check valve and an outlet section with a regeneration spool.

Actuating a Spool

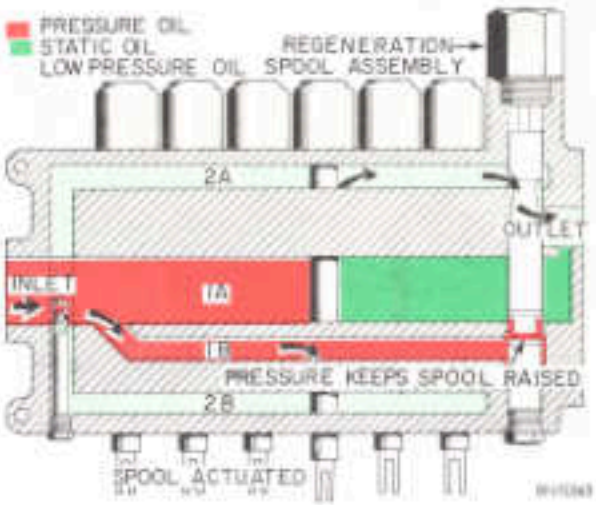


Figure 7 - Backhoe Spool Actuated

High pressure oil for the backhoe is routed from the pump through the equipment control valve. When the loader is being operated, oil is not available to the backhoe.

When a backhoe spool is actuated, circuit 1A is blocked off. However, circuit 1B is also charged with high pressure oil and remains open. The spool lands cause oil to flow from circuit 1B out through a work port to the cylinder. Oil returning from the cylinder comes through the opposite port and enters circuit 2A or 2B, which are connected with each other.

Regeneration

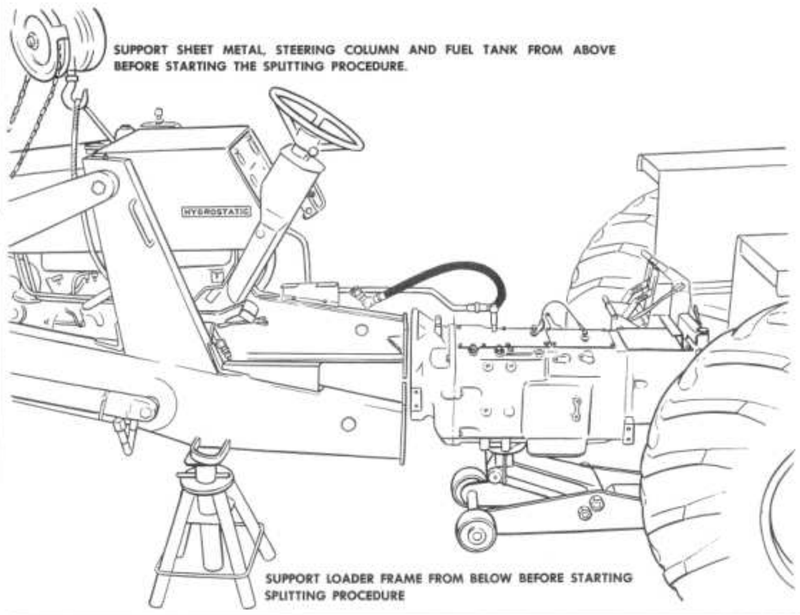
The Backhoe provides instantaneous regeneration to the high pressure circuits 1A and 1B without the use of restrictors or loss of digging power.

The outlet section contains a hydraulically actuated regeneration spool that is connected to circuit 1B (Figure 8). High pressure oil in circuit 1B dead ends in the spool chamber and exerts pressure on the regeneration spool. This pressure forces the spool to move and opens the passage from circuit 2A to the outlet. Oil returning from the cylinders enters circuit 2B (or

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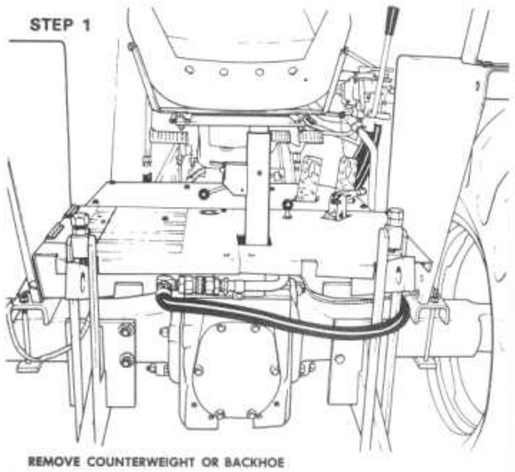
SPLITTING THE 480-580 SERIES B TRACTORS BETWEEN THE ENGINE AND TORQUE TUBE

SUPPORT SHEET METAL, STEERING COLUMN AND FUEL TANK FROM ABOVE BEFORE STARTING THE SPLITTING PROCEDURE.



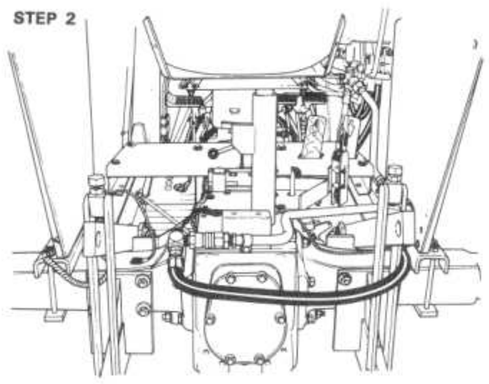
SUPPORT LOADER FRAME FROM BELOW BEFORE STARTING SPLITTING PROCEDURE

STEP 1



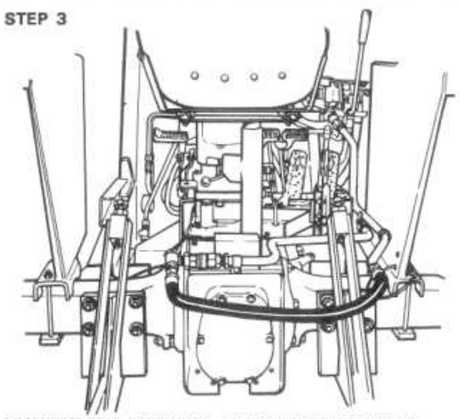
REMOVE COUNTERWEIGHT OR BACKHOE

STEP 2



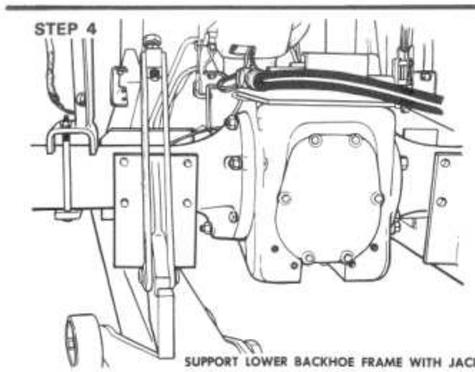
REMOVE REAR FLOOR PLATES, DIFFERENTIAL LOCK LINKAGE

STEP 3



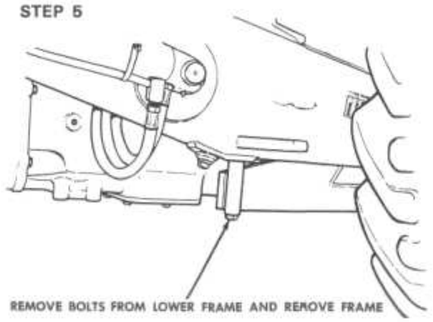
DISCONNECT REAR LIGHT PLUGS REMOVE FRONT FLOOR PLATES

STEP 4



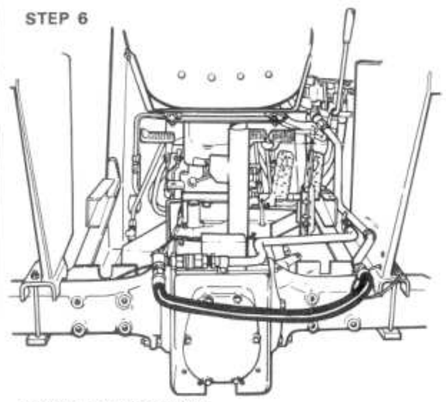
SUPPORT LOWER BACKHOE FRAME WITH JACK
REMOVE BACKHOE TOP BRACKET PIVOT PINS
REMOVE MOUNTING BOLTS FROM TOP BRACKET, AXLE HOUSING, AND LOADER FRAME

STEP 5



REMOVE BOLTS FROM LOWER FRAME AND REMOVE FRAME

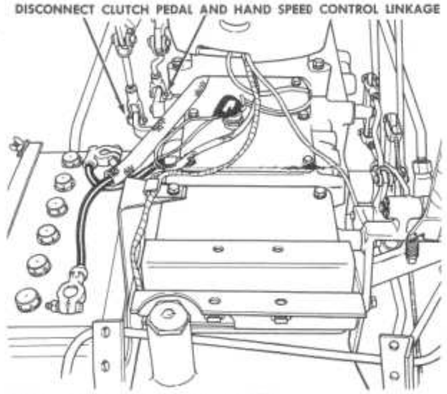
STEP 6



REMOVE SEAT AND SUPPORT
REMOVE TUBE TO LOADER CONTROL VALVE

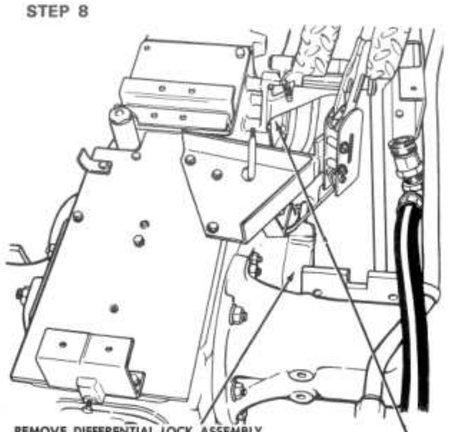
STEP 7

DISCONNECT CLUTCH PEDAL AND HAND SPEED CONTROL LINKAGE

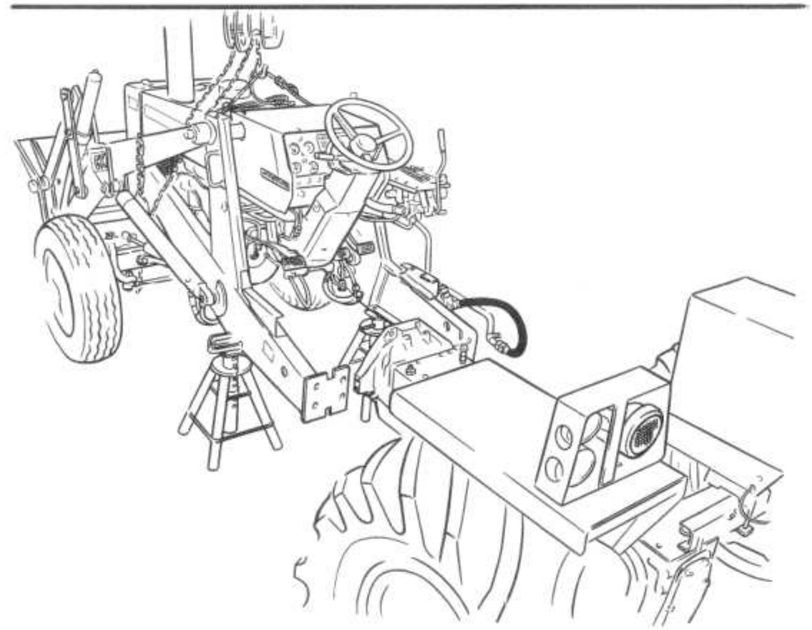


DISCONNECT-REMOVE BATTERY AND BOX

STEP 8

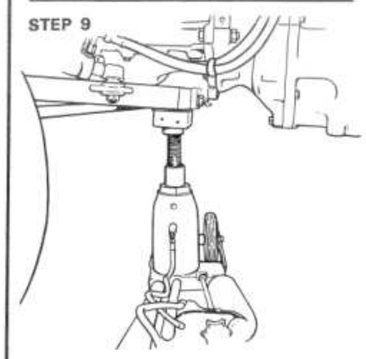


REMOVE DIFFERENTIAL LOCK ASSEMBLY
DISCONNECT TRANSMISSION TEMPERATURE GAUGE SENDING UNIT WIRE LOCATED ON LOWER RIGHT HAND SIDE OF TRANSMISSION CASE FRONT FLANGE



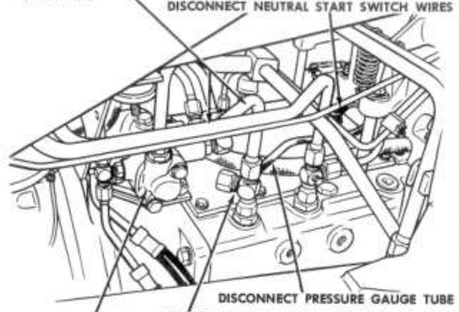
SUPPORT ENGINE UNDER RADIUS ROD REAR SUPPORT
INSTALL FLOOR JACK UNDER TORQUE TUBE

STEP 9



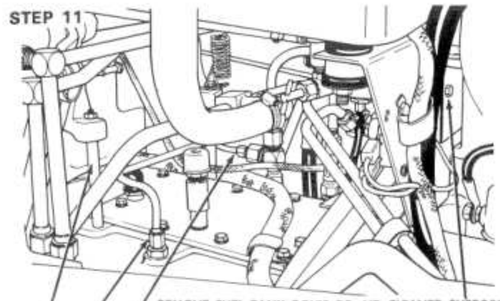
STEP 10

DISCONNECT COOLER TUBES
DISCONNECT NEUTRAL START SWITCH WIRES



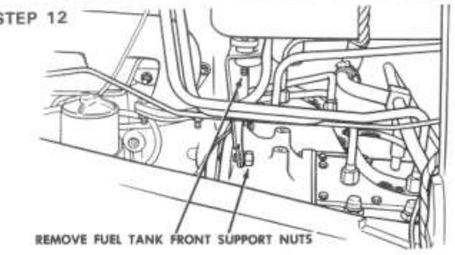
DISCONNECT PRESSURE GAUGE TUBE
REMOVE FITTINGS FROM BULKHEAD FITTINGS
DISCONNECT TUBES TO STEERING VALVE
REMOVE STEERING VALVE AND STEERING VALVE BRACKET

STEP 11



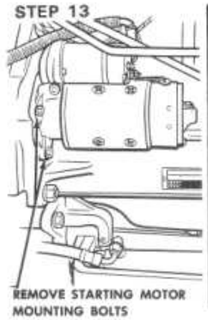
REMOVE FUEL TANK BOLTS TO AIR CLEANER SUPPORT
DISCONNECT RATE CONTROL VALVE TUBES
REMOVE STEERING COLUMN BOLTS, NUTS AND SPACERS

STEP 12



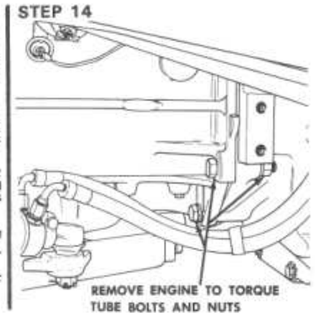
REMOVE FUEL TANK FRONT SUPPORT NUTS

STEP 13



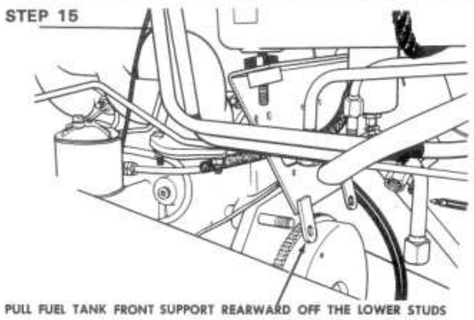
REMOVE STARTING MOTOR MOUNTING BOLTS

STEP 14



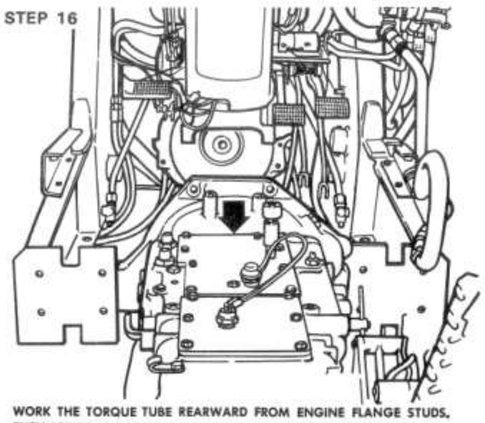
REMOVE ENGINE TO TORQUE TUBE BOLTS AND NUTS

STEP 15



PULL FUEL TANK FRONT SUPPORT REARWARD OFF THE LOWER STUDS

STEP 16



WORK THE TORQUE TUBE REARWARD FROM ENGINE FLANGE STUDS, THEN LOWER FRONT OF TORQUE TUBE APPROX. 4" AND MOVE REARWARD UNTIL CLEAR OF THE STEERING COLUMN. THEN RAISE TORQUE TUBE AND MORE REARWARD UNTIL CLEAR OF THE FRAME.

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