

STEERING THEORY OF OPERATION

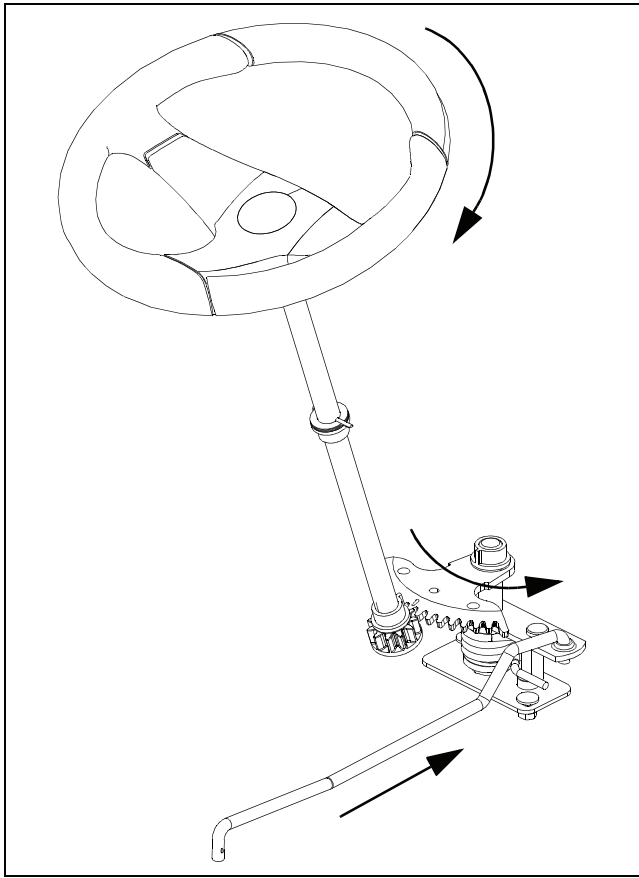
Theory Of Operation

Steering System Operation

The steering system consists of three connected systems, the steering wheel and sector gear, the steering logic assembly and the hydrostatic pump, motor and gears inside the transaxle.

For transaxle steering theory of operation and information on steering components internal to the transaxle, see "Transaxle Operation" on page 195 in the Theory of Operation of the Power Train section.

Steering Wheel And Sector Gear



When the steering wheel is turned to the right, the sector gear is rotated to the right. The front steering control rod is connected to an arm welded to the sector gear. As the sector gear rotates to the right, the arm rotates and the front steering rod is pulled forward.

The opposite occurs when the steering wheel is turned to the left. The front steering control rod is pushed to the rear. The front steering rod mechanically controls the position of the steering logic assembly.

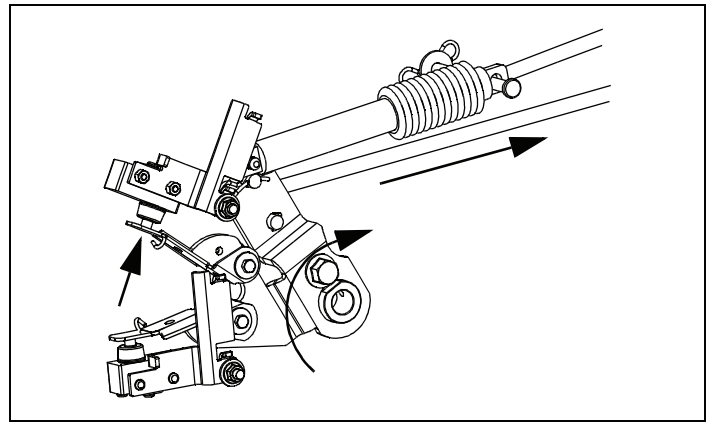
Steering Logic System

The steering logic system controls the speed and direction (for left and right turns) of the hydrostatic steering pump and motor inside the transaxle.

Mechanical input is provided by the front steering control rod, which is moved by turning the steering wheel, see Steering Wheel and Sector Gear in this section.

Vacuum diaphragms are used to engage the rear steering rod to the steering logic assembly. This allows steering wheel movement to be transferred to the steering pump swashplate arm, controlling the speed and direction of the steering motor inside the transmission. Vacuum for the diaphragms, one left and one right, is provided by the engine intake manifold.

Vacuum System

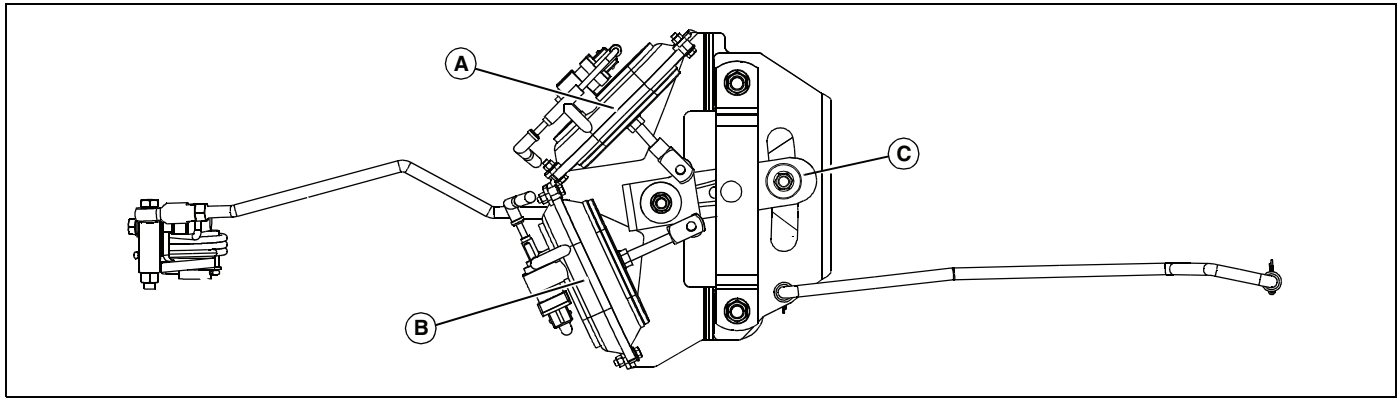


The two microswitches located at the RH rear of the tractor control the vacuum supply to the diaphragms. When the forward pedal is pushed, it pulls the connecting rod forward, rotates the adjustment/trigger bracket between the microswitches, and closes the top (forward) microswitch.

The opposite occurs when the reverse pedal is pressed. The connecting rod is pushed toward the rear, it rotates the adjustment/trigger bracket between the microswitches in the opposite direction, and closes the lower (reverse) microswitch.

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Neutral

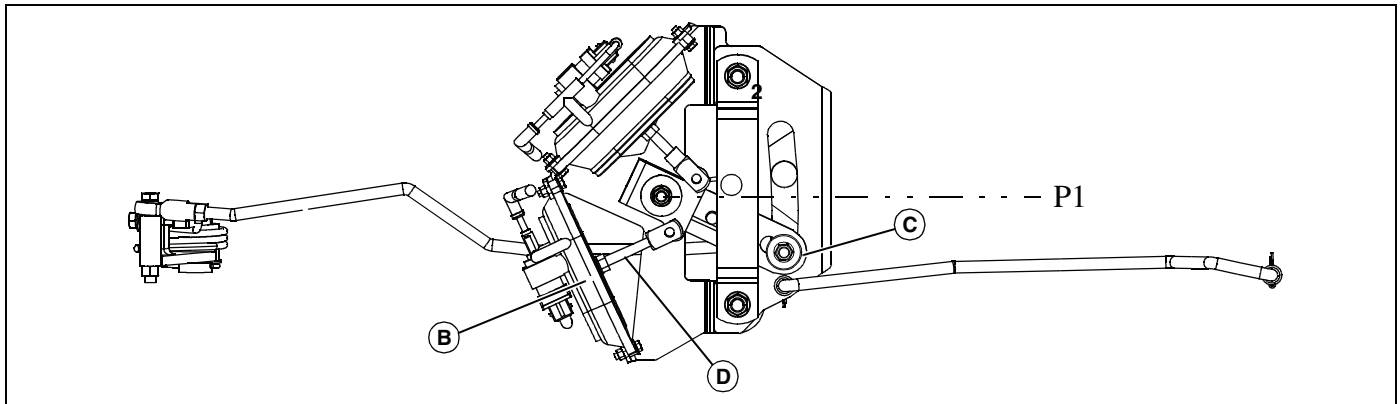


Picture Note: Reverse logic vacuum system in the neutral position.

Each microswitch controls a solenoid mounted on each of the vacuum actuators (A and B).

With steering wheel and foot control pedals in neutral, neither of the vacuum actuators is activated and the forward/reverse steering pivot arm (C) is in its spring centered neutral position.

Forward

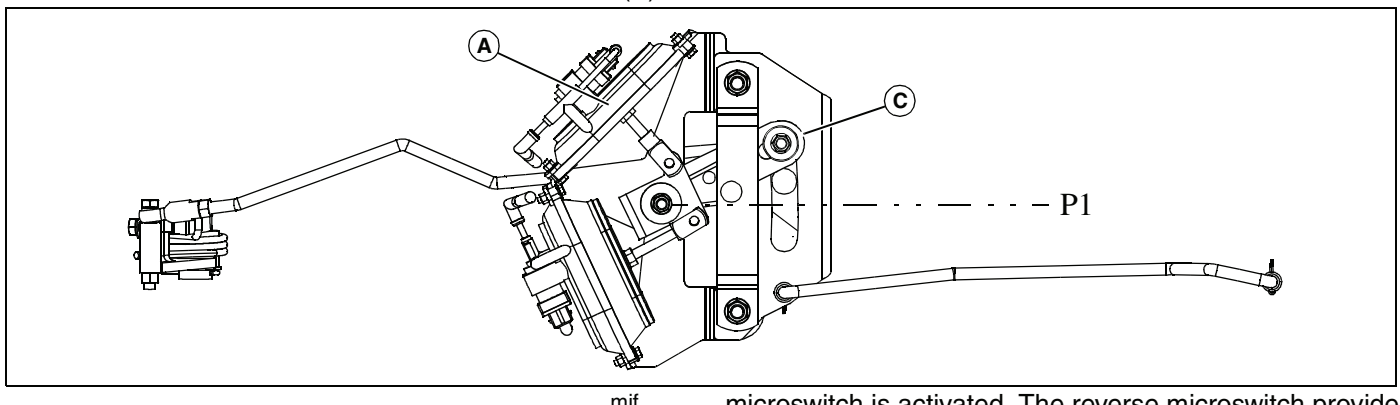


Picture Note: Reverse logic vacuum system in the forward position.

With the forward pedal pushed down, the forward microswitch is activated. The forward microswitch provides power to the solenoid on the forward vacuum actuator (B).

The solenoid engages and the vacuum actuator diaphragm is pulled in. The rod (D) attached to the diaphragm plate pulls the forward/reverse pivot arm (C) and rotates the forward end to the right of its pivot point P1.

Reverse



Picture Note: Reverse logic vacuum system in the reverse position.

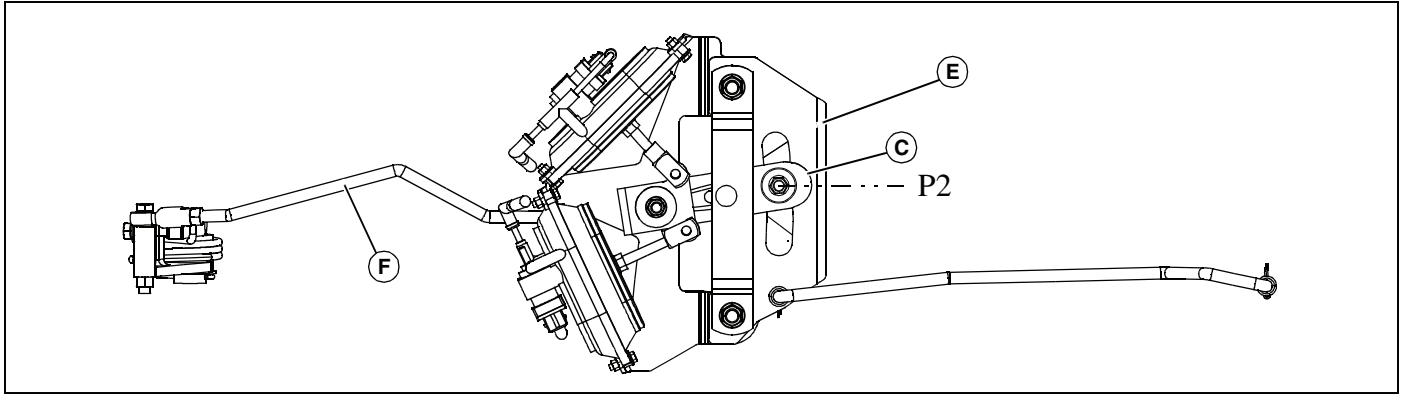
With the reverse pedal pushed down, the reverse

microswitch is activated. The reverse microswitch provides power to the solenoid on the reverse vacuum actuator (A). The solenoid engages and the vacuum actuator diaphragm is pulled in. The rod attached to the diaphragm plate pulls

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the forward/reverse pivot arm (C) and rotates the forward end to the left of its pivot point P1.

Steering Operation - Neutral



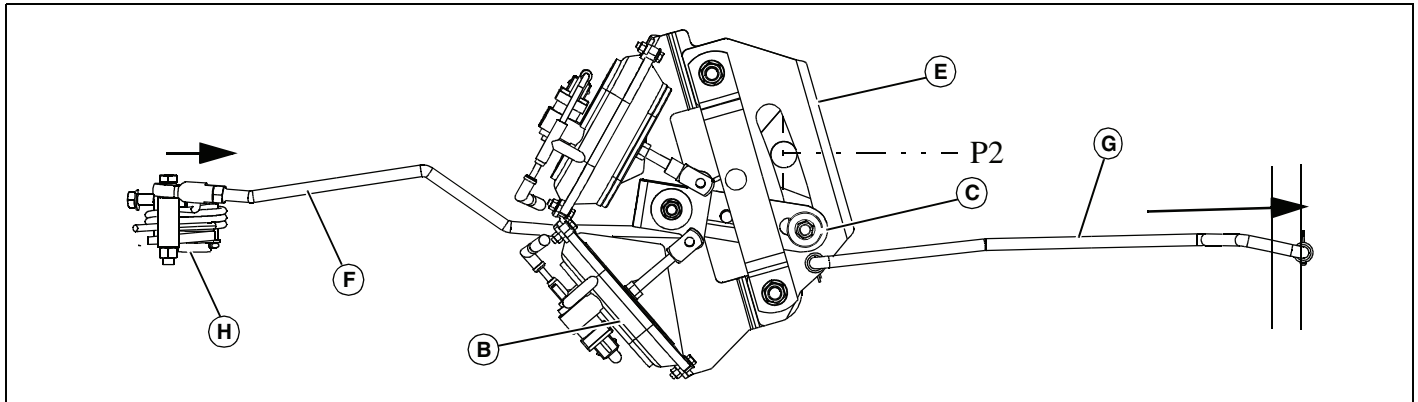
When neither of the foot control pedals (forward or reverse) are pushed down, the solenoids on the vacuum actuators are not activated. A spring returns the forward/reverse pivot arm (C) and steering wheel to its neutral position. In the neutral position the front of the forward/reverse pivot arm (C) aligns on top of the pivot point P2 of the vacuum actuator mounting bracket (E). The front of the forward/reverse pivot arm (C) is where the rear steering control rod (F) is attached.

turned the vacuum actuator mounting bracket (E) rotates but the rear steering control rod (F) does not move. Therefore, there is no steering in neutral. The forward pedal or the reverse pedal must be pushed down.

Steering Operation - Forward Travel

Since there is no steering in neutral, one of the foot control pedals must be depressed to activate a diaphragm and engage the forward/reverse pivot arm in the vacuum actuator bracket.

Because of the alignment, when the steering wheel is



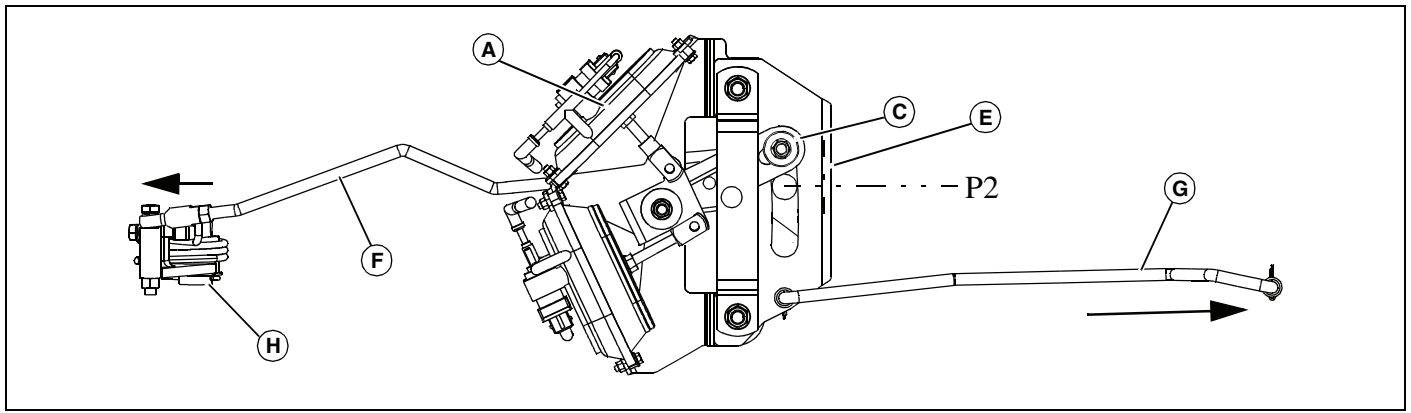
When the forward control pedal is pressed down, the forward vacuum actuator (B) pulls the forward/reverse pivot arm (C) to the right side of the actuator mounting bracket (E). When the steering wheel is turned to the right, the front steering rod (G) pulls the entire logic assembly forward, rotating at pivot point P2. The rear steering rod (F) moves in the same direction as the front, pulling the steering control arm (H) forward. The further the steering wheel is turned, the faster the steering motor turns.

In order to maintain correct steering orientation when operating in reverse, the steering motor must turn in the opposite direction from when operating in forward.

Turning the steering wheel to the left simply rotates the logic assembly the opposite way at pivot point P2. When the steering wheel is turned left, both front and rear steering rods move backward. This reverses the direction of the steering motor and the tractor turns to the left.

Steering Operation - Reverse Travel

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When the reverse control pedal is pressed down, the reverse vacuum actuator (A) pulls the forward/reverse pivot arm (C) to the left side of the actuator bracket (E). This positions the arm on the left side of pivot point P2. When the steering wheel is turned right, the front steering rod (G) pulls the entire logic assembly forward rotating at pivot point P2. The rear steering rod (F) moves in the opposite direction, pushing the steering control arm (H) backward.

Turning the steering wheel left reverses the process. The front steering rod pushes the logic assembly back, rotating at pivot P2. The rear steering rod moves in the opposite direction, pulling the steering control arm forward, reversing the direction of the turn.