# NEUTRAL START SWITCH
# CUMMINS ENGINE WITH TWIN-DISC TRANSMISSION

The neutral start switch installation is designed to prevent starting of the engine while the transmission is in gear.

This is accomplished by a heavy duty electrical switch which is positioned on the transmission shifter valve body (see #37555900). The switch senses the position of the forward-neutral-reverse valve spool on the Twin-Disc transmission. The switch contains two sets of contacts. One set opens when the valve spool is shifted to forward and another set opens when the spool is shifted to reverse. The two contact sets are wired in series so that both sets must be closed for current to pass through from the starter switch to the starter auxiliary relay.

Referring to the neutral start switch operational diagram, it can be seen that current comes from the +12V supply to the ignition switch. When the ignition switch (or the starter button) is turned to the "START" position, current is fed through the starter switch to the neutral switch. If the transmission is in gear the current cannot go any further and the engine will not crank. If the transmission is in neutral the current will travel through the switch down to the auxiliary relay. The purpose of this relay is to amplify the current available from the ignition switch. (The current required to pick up the starter solenoid exceeds the current rating of the ignition switch). The auxiliary relay sends current to the starter motor which can then crank up the engine.

The transmission is shifted by an air cylinder mounted on the shifter valve body. The neutral position is midway between forward and reverse and is held there by detents in the valve spool. The neutral start kit replaces the pneumatic push-button with an electrical pushbutton and a solenoid valve. The valve is normally open so that in the off position of the ignition switch the valve allows air to pass from the air supply to the neutral port and shift to neutral. When the ignition switch is turned on, the valve closes permitting the transmission to be shifted by the operator. The neutral button is a normally closed electrical pushbutton which interrupts the current to the valve, permitting air to pass through to the neutral port of the shuttle and then to the shift cylinder.

This arrangement causes the transmission to automatically shift to neutral whenever the engine is shut off. If the engine is stalled by an overload the neutral button can be pressed or the ignition can be turned off and then on again to reset the transmission.

# NEUTRAL START SWITCH
## OPERATION DIAGRAM
## TWIN DISC TRANS. CUMMINS ENG.