

CAR AT REST–SOLENOID COILS DE–ENERGIZED

The car at rest is held by a hydraulic fluid system locked in place by a check valve, solenoid pilot valves and a manual-lowering valve.

UP DIRECTION

When an up call is registered and the pump starts, the up solenoid (U) and the up stop solenoid (US) are simultaneously energized; closing ball checks US and UT, the pump output flows through the up valve and back to the reservoir.

Hydraulic fluid from the pump travels through the up control fluid strainer to the by-pass sizing adjustment, then the control side of the up piston. The control side of the up piston is larger in area than the area of the up piston exposed to the pump pressure; therefore, the up piston begins to move rapidly towards the up valve, restricting the opening in the up valve, raising the pump pressure. When the pump pressure reaches a point slightly below the pressure on the jack side of the check valve, the fluid coming through the by-pass sizing adjustment is shut off. Then, the fluid from the up acceleration adjustment (UA), which also comes from the control fluid strainer, causes a continuing movement of the up valve. Fluid begins flowing from the up control fluid strainer through a ball check to the down piston holding it firmly in position. This allows the guide end of the down check assembly to act independently as a check valve. As the pump pressure increases above that on the jack side of the check valve, the check valve is opened, allowing fluid to flow to the jack cylinder, causing the jack to move in the up direction. The elevator then accelerates to full speed as the up piston closes the up valve.

Upon reaching a predetermined distance below the floor to which the car is traveling (2 inches for each 10 fpm of car speed NOT to exceed 6 inches for every 25 fpm of car speed), the up solenoid (U) is de-energized, allowing fluid from the control side of the up piston to flow through the up transition adjustment (UT), then to the up leveling speed regulator (LS) orifice which is held open by a mechanical linkage attached to the check valve. The control fluid then returns to the reservoir and the up piston moves toward the open position. As the up piston moves, opening the up valve, hydraulic fluid begins flowing to the reservoir, reducing the pump pressure. As the pump pressure is reduced, the check valve begins closing, also, partially closing the (LS) orifice in the up leveling speed regulator.

When the flow through the (LS) orifice equals in quantity, the flow through the maximum up acceleration adjustment (UA) and the up leveling adjustment (UL), the car will be in leveling speed. Upon reaching a point slightly before the floor (usually 3/8 of an inch to 1/4 of an inch), the up stop solenoid (US) is de-energized. This allows fluid to flow through the up stop adjustment (US), causing the up piston to fully open, permitting the total pump output to flow to the reservoir, causing the car to stop. After the car comes to a complete stop, the pump motor is then electrically timed out and stops. If, during up movement, the car has been overloaded or hits an obstruction, the fluid on the control side of the up piston is evacuated to the reservoir through the relief valve, causing the up piston to cycle open and by-pass the entire pump output.

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DOWN DIRECTION

When a down call is registered, the down leveling solenoid (DL) and the down valve solenoid (D) are simultaneously energized, allowing fluid from the control side of the down piston and fluid from the down control adjustments, down stop (DS) and down transition (DT), to flow through the down acceleration adjustment (DA) and back to the reservoir. This reduces the pressure on the control side of the down piston. The pressure acting on the area of the down piston exposed to the jack pressure causes the down piston to open the down valve. The down valve will remain in the open position as long as the flow of control fluid passing through the down acceleration adjustment (DA) exceeds the flow through the down transition (DT) and the down stop (DS) adjustments. The maximum down speed is controlled by a mechanical stop limiting the down piston travel (Down Adjustment (D)).

Upon reaching a predetermined distance above the floor to which the car is traveling (6 inches for each 25 feet per minute of car speed) the down solenoid (D) is de-energized. The fluid input to the control side of the down piston from the jack continues, as the control side of the piston is larger in area than the area exposed to jack pressure. This causes the down piston to start closing. A control rod follows the movement of the piston, uncovering control porting and allowing fluid to flow through the down level adjustment (DL), which when equal in quantity to the flow through the down transition adjustment (DT), stops the motion of the piston, placing the down valve in the leveling position. The rate of movement of the down piston from the open position to the leveling position is controlled by the down transition adjustment (DT). Upon reaching a point slightly before floor level, (usually 3/8 of an inch to 1/4 of an inch), the down leveling solenoid (DL) is de-energized, causing the fluid coming through the down stop (DS) adjusters to be diverted to the control side of the down piston, moving the down piston to the fully closed position of the down valve.

The final closing rate of the down valve is controlled by the down stop adjustment (DS). Opening the down stop adjustment (DS) will cause the car to stop more firmly, as control fluid is sent to the control side of the down piston at a more rapid rate.

DOWN DIRECTION UC4MR

Constant down speed is controlled by the down speed regulator adjustment (DSR) which regulates the movement of the down piston and down valve in the event of increased jack pressure. This continuous regulation causes a constant rate of flow in the down direction from the jack through the down valve and back to the reservoir regardless of varying loads on the elevator. The UC4MR valve does not require the down stop adjustment (DS) as does the UC4 and UC4M valves. With the above exception, the UC4MR valve operates in general as the UC4 and UC4M valves.