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Technical Note

SR Relay – Operation and Selection



Many positioning applications, such as conveyors and vertical lifts, require a minimal and accurate stopping distance. Therefore, the time lapse between the moment that the motor power ceases and the moment that the brake engages must be minimal.

One SEW solution requires the user to supply an auxiliary contact and wiring from the motor contactor located inside the control panel to an SEW brake rectifier located inside the motor conduit box. Upon braking, this extra circuit changes the path of the brake coil current, allowing the coil to demagnetize quickly. The faster the coil looses energy, the faster the brake engages, and the faster the motor stops.

Another SEW solution is an inexpensive SR relay. It is a normally-open switch that screws directly into the motor conduit box. By not requiring extra wiring from the control panel, it offers a true cost savings. The switching function of either an SR relay or an auxiliary contact is sometimes referred to as "rapid reaction" since the brake "reacts" quickly to stop the motor.

Motor Energized

To illustrate the functionality of an SR relay, refer to Figure 1. The white wires of the SR connect in series with one phase of the AC motor. Notice how it replaces a jumper between T6 and T9 on a high voltage connection (Y). When the motor is energized, ac current flows across the white wires, which causes an actuator inside the SR to close the switch. Now, dc current is able to flow between the red and blue wires of the SR to provide a short circuit between terminals 4 and 5 of the rectifier. Observe the circuit path in red, beginning at the brake voltage (In 3, Out 3, In 4, Out 4, In 5, Out 2).

(Aside: The rectifier pathway shown is the same for a BG as for a BGE rectifier after 120ms).

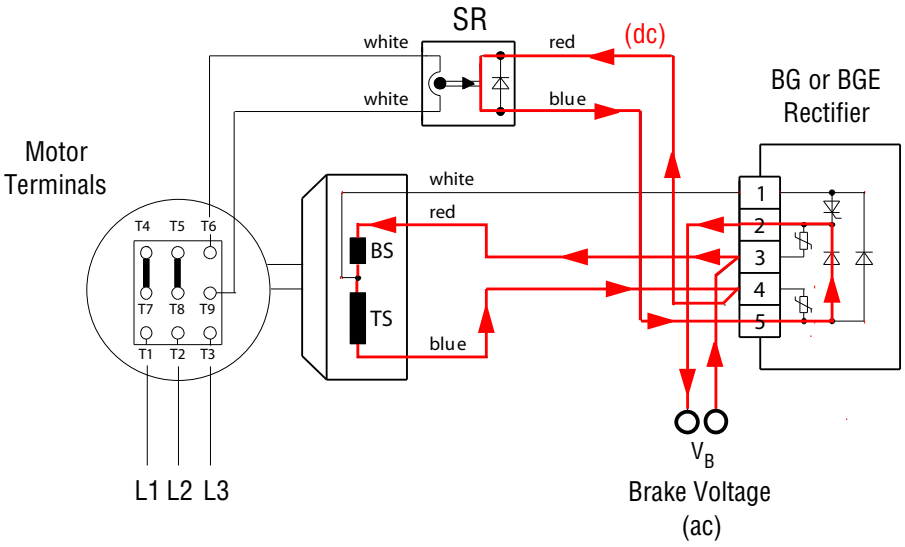


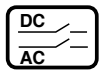
Figure 1 - Motor Energized

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Motor De-Energized

At the moment the motor power ceases, the energy stored in the brake coil must discharge as quickly as possible. Therefore, when the SR actuator detects zero current at the motor terminals, it re-opens the SR switch, as shown in Figure 2. Since terminal 3 has no available pathway for current to flow, residual energy within the brake coil cannot flow through the red coil wire. Also, since terminals 4 and 5 are no longer connected, coil energy cannot flow through terminal 5. So, the coil energy must flow through terminal 4 and across a varistor that dissipates the energy quickly, which rapidly demagnetizes the coil.

The concurrent removal of AC current from the brake-supply voltage and DC current from terminals 4 and 5 is commonly referred to as "cut-off in the DC and AC circuit" represented by symbol at right.



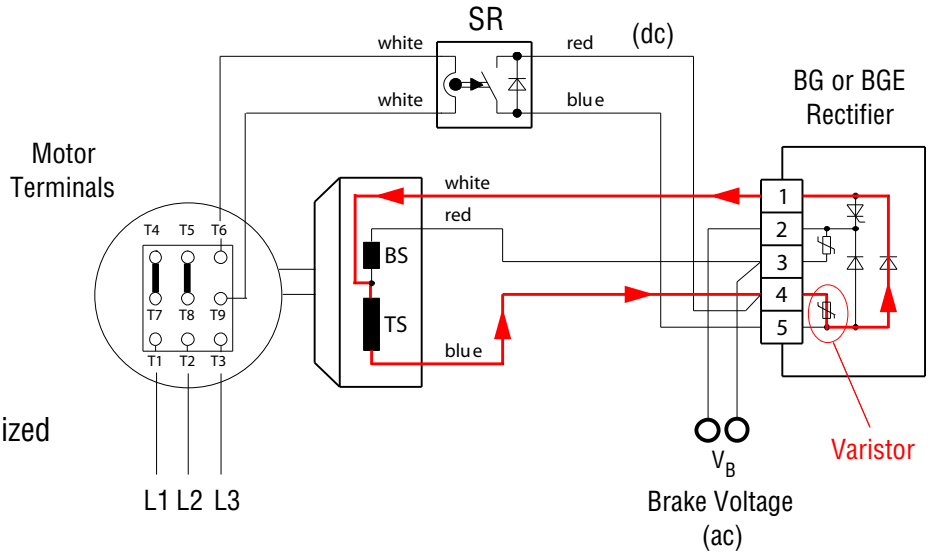


Figure 2:
Motor De-energized

Important Notes

- SR relay cannot be used with an inverter! Since inverters vary the voltage signal to the motor, the voltage to the SR relay may not be high enough for proper operation. The correct product for an inverter application is a UR relay. It receives a constant supply voltage directly from the control panel, not from the motor terminals.

- SR relay cannot replace a UR relay. Even though SR and UR relays both screw into the motor conduit box and look nearly identical, they are not interchangeable. The SR relay is a current sensor that receives power from the motor terminal. The UR relay is a voltage sensor that receives separate power from the control panel. If a UR relay were to be incorrectly connected to motor terminals in a vertical lifting application, a considerably large stopping distance may occur. The reason is because a hoisting motor acts a generator when power ceases. Therefore, the UR relay detects positive voltage instead of zero voltage and does not function properly.

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Technical Note

SR Selection

The following table lists the assignment of SR relays per motor and motor voltage.

Motor	AC Motor Voltage in Y wiring (ex: 230YY/460Y, 230Δ/400Y)																				
	40-58	59-66	67-73	74-82	83-92	93-104	105-116	117-131	132-147	148-164	165-185	186-207	208-233	234-261	262-293	294-329	330-369	370-414	415-464	465-522	523-690
DT56M...BMG																					
DT56L...BMG																		SR10			
DR63S...BR																					
DR63M...BR																					
DR63L...BR																					
DT71D...BMG											SR11										
DT80K...BMG																					
DT80N...BMG																					
DT90S...BMG																					
DT90L...BMG																					
DT100LS…BMG																					
DT100L….BMG																					
DV100M...BMG																					
DV100L...BMG																					
DV112M...BMG																					
DV132S...BMG																					
DV132M...BM														SR15							
DV132ML...BM																					
DV160M...BM																					
DV160L...BM			Not Available																		
DV180M...BM																					
DV180L...BM																					
DV200L...BM																	SR19				
DV225S...BM																					
DV225M...BM																					
DV250M...BMG																					
DV280S...BMG																					
DV280M...BMG																					

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