

# BRAKE RESISTOR PROTECTION CIRCUIT

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## **Description:**

This document will cover the brake resistor protection circuit that is recommended with ABB drives when using dynamic braking resistors to handle regenerative applications and why an input contactor is recommended.

## **How to protect the resistor, drive and why an input contactor is needed:**

### **Resistor installation and wiring**

All resistors must be installed outside the drive module in a place where they can be cooled sufficiently, do not block the airflow to other equipment, or dissipate hot air into the air inlets of other equipment.

### **WARNING!**

The materials near the braking resistor must be non-flammable. The surface temperature of the resistor may rise above 200 °C (400 °F), and the temperature of the air flowing from the resistor is hundreds of degrees Celsius.

Protect the resistor against contact.

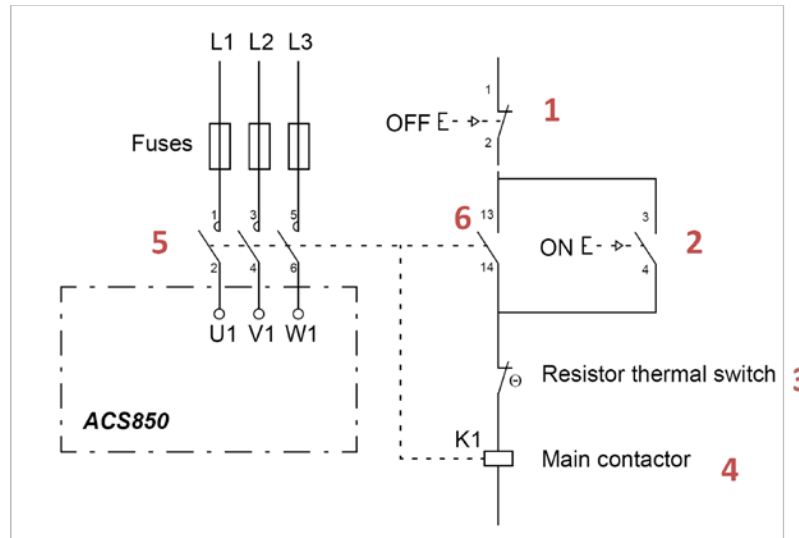
The maximum length of the resistor cable(s) is 20 m (65 ft). For the connections, see section [Power cable connection](#) on page 52.

### **Contactor protection of drive**

It is highly recommended to equip the drive with a main contactor for safety reasons. Wire the contactor so that it opens in case the resistor overheats. This is essential for safety since the drive will not otherwise be able to interrupt the main supply if the chopper remains conductive in a fault situation.

Below is a simple example wiring diagram and a description of the functionality. The diagram is from an ACS850 hardware manual but applies to any ABB drive using the internal brake chopper.

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- 1- This the system disconnect on the voltage being fed to this control circuit.
- 2- This is a momentary start switch.
- 3- This is the resistor thermal switch.
- 4- Main contactor coil.
- 5- Main contactor.
- 6- Aux contacts off of the main contactor.

### Operation:

The momentary start switch (2) must be closed in order to start the sequence. This momentary switch when closed allows the main contactor (5) to close as long as the system disconnect (1) and the resistor thermal switch (3) are closed. Once the main contactor coil (4) receives the necessary voltage the main contactor (5) will close which then closes the aux contacts on the contactor (6). The momentary switch can be released and the circuit is ready to operate.

If the resistor begins to overheat due to overuse, dust or some other problem keeping it from cooling properly or if the braking IGBT shorts the thermal switch will open which will open the coil on the main contactor causing the main contactor to open. The reason the main contactor is used and not just a drive enable, interlock or the safe torque off is because if the braking IGBT in the drive does short for some reason stopping the drive does not open this circuit and the resistor would then overheat and possibly cause more damage.

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