FORTRESS

Data Sheet Ref. R7

Custom Designed Dynamic Braking Resistors

Specialising in custom designed dynamic braking resistors for the mining industry, we supply a range of resistors mounted in GR316 stainless steel cyclone rated enclosures equipped with all of the features expected on an Australian site.

These resistors are used on conveyors, shiploaders, stackers, and reclaimers, at ports and mine sites around Australia. They operate in some of the harshest conditions found anywhere in the country.

The Fortress Difference

Fortress has a history of successfully managing large projects and provides value to customers by ensuring we understand the customers requirements and expectations. We place an equal importance on technical capability, manufacturing to deadlines, and providing documentation and drawings in a concise and timely manner.

Choice

An extensive range of resistor elements allows selection of the most efficient and cost effective solution for any required duty. Fortress can manufacture dynamic braking resistors from a few kilowatts up to megawatts, for both LV and MV drives.

Predictability

Because we use high grade stainless steel alloys the change in resistance with temperature rise during operation is small and predictable. This means that you can ensure the resistance value does not increase to a point where the drive will trip on over-voltage unexpectidly.

Reliability

Fortress dynamic braking resistors have been proven over many years in conditions of severe vibration and extreme climate world wide.

Options include:

- Cyclone Wind Loading rated enclosures
- Enclosures ratings from IP00 to IP33
- GR304 or GR316 stainless steel enclosures
- All resistor pre-wired to an IP55/56 termination section
- Thermostats
- Labelling to customers' specification

IP33 GR316 stainless steel dynamic braking resistor enclosure c/w IP56 cable termination compartment

IP56 cable termination compartment showing thermostats, high temperature cable, earthed brass gland plate, cable sheath termination bar, perspex shield, and resistor labels

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The Power Resistor People

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Application Information

Dynamic braking resistors are used on AC variable frequency drives (VFDs) to dissipate energy that is produced in the motor as the drive provides braking torque to stop the motor. The dynamic braking resistor is connected to the DC bus and will see voltages as high as 800 volts during braking conditions.

A three-phase variable frequency drive (VFD) consists of three basic components; rectifier, DC line, and inverter, and a control system to manage these three components. The rectifier converts the three-phase 50Hz AC input to a DC signal. Depending on the system, an inductor, a capacitor, or combination of these components smoothes the DC signal in the DC link part of the VFD. The inverter circuit converts the DC signal into a variable frequency AC voltage to control the speed of the motor.

When an overhauling or decelerating load on a motor causes the motor to turn faster than the synchronous speed set by a drive, the motor acts as a generator and transforms mechanical energy from the motor shaft into electrical energy. This AC power from the motor flows backward into the drive and causes the DC bus voltage to increase. Unless this regenerative energy is dissipated, once the DC bus voltage reaches a certain value, the drive will trip on bus overvoltage in order to protect itself. Dynamic braking is often the simplest and most cost effective means to dissipate the regenerative energy, thus allowing the drive to safely brake the load without tripping.

The rate of braking is dictated by how fast the energy can be put into the resistor, which in turn is determined by the ohmic value of the resistor. Each drive manufacturer specifies a resistance range with a minimum to prevent over current and damage to the drive and a maximum value to give adequate power dissipation capability for the application (which prevents the drive tripping on overvoltage).

The peak braking current is a function of the drive chopper turn on voltage and the specified ohmic value.

The drive manufacturer normally determines the power rating (watts) needed to prevent overheating during braking duty. When the stop time is short in relation to the total duty cycle we may also need to consider the thermal capacity of the resistor, to ensure that it does not overheat during a single stop. In this case we will also need the absolute time on / time off in seconds.

Initial Information required:

- Application
- Peak Power
- Ohmic Value
- Duty Cycle (either a percentage or absolute time on / time off in seconds)

IP33 GR316 stainless steel dynamic braking resistor enclosure c/w IP56 cable termination compartment

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