

Safety instructions for application and installation of power resistors

Valid in combination with „Dimension Sheet“ and „Technical List“ of the respective device

Intended applications

A power resistor is a passive component that must be used according to its sizing and taking into account the safety instructions for application and installation.

A power resistor has been designed for one or several of the following applications:

- Braking, chopper or starting resistor for electric drive applications
- Load and testing resistor
- Damping resistor
- Snubber circuit resistor
- Earthing resistor
- Heating resistor for cabinets
- Limiting series resistor

Any application differing from the aforementioned is not permitted.

The power resistor must not be remodeled or modified.

Safety indications

- Operational safety can only be assured if the resistor is installed and maintained by qualified and electrically instructed persons.
- For installation and maintenance of resistors the personal protective equipment (PPE) must be worn.
- Using an inappropriate resistor can cause damage to property or injury to persons.
- The resistor must not be overloaded beyond its specifications and should be protected against overloading by appropriate measures.
- The resistor can become very hot under load and must be protected against unwanted contact. There must be enough space around the resistor. A sufficient supply of cooling air and transportation of hot air away from the resistor must be assured.
- Within close proximity to the resistor neither flammable parts nor explosive zones are allowed.

How to reduce remaining hazards

FRIZLEN offers several factory-provided options to protect a resistor against thermal overloading.

This includes (depending on the favoured type series):

- Installation of bi-metal temperature switch
- Installation of a thermal overload relay
- Installation of a DC-Powerswitch inside the device or within the supply line.

You will find more information about safe resistors checking out www.frizlen.com/en/safe-resistors.

Technical data of the resistor

Refer to the technical list of the type series or type data sheet and the type plate of the resistor.

Maximum ambient temperature: 40°C.

For higher ambient temperatures the continuous dissipation must be derated by 4% per 10 K temperature rise!

Allowed humidity range (at operation): 5% up to 85% (not condensating).

Installation

The allowable installation positions can be taken from the dimension sheet of the respective type series.

The resistor must be installed on a heat resistant surface. If installed vertically the connection terminals and cables must be located on the bottom side of the resistor.

Any installation must be done according to the designated protection degree.

For installations of resistor devices with open bottom sides any outstanding elements on the mounting surface that could underrun the necessary air and creepage distance must be removed.

Recommended minimum distances to surrounding parts, walls and ceiling can be taken from table A.



HAZARD NOTE

Resistors with **protection degree IP00** must be equipped with an appropriate protection housing or must be installed into a protected device or cabinet.

Otherwise there is a hazard of electric shock and thermal burning.

For installations of IP00 resistors into any housing the necessary **air and creepage distances** between conducting resistor parts and ambient parts must be complied with.

Connection

All cables and terminals that are used for the connection of the resistor must be chosen according to current, voltage, temperature and other relevant parameters that apply for the application.

If wiring directly to the resistor connection points (e.g. type series FE.31, FKE.31, FZ.A, FZ.H) we recommend using at least 150°C rated teflon or silicone rubber insulated wiring to prevent melting or burning of the insulation.

Avoid running the connection wires on top of, or too close to the hot resistor elements (the temperature level underneath the resistor elements is much cooler).

Resistor units featuring terminal connection may be wired to the terminal blocks using standard 80°C rated wire.

The necessary torque to fixate the cables at the terminals must be observed.

The resistor must be connected to the earth conductor at the specified connection point.

All resistors without specified earth conducting point (e.g. flat type resistors in anodized aluminium housing) must be grounded by using a thrust washer (Type K) for electrical connections.

Initial operation

Before any initial operation it must be assured

- the intended protection degree is complied with
- all connection cables are installed properly
- the waste heat can be dissipated properly
- all installation notes on the dimension sheet have been observed
- the insulation resistance of the resistor is at least 1 MΩ (measured between housing and resistor)

Table A: Recommended minimum distances to ambient parts for convection cooled resistors (without fan cooling)

Continuous dissipation	Installation (orientation of the mounting surface)	Side distance and between resistors	Distance below the resistor	Distance above the resistor
Up to 1 kW	Horizontally	200 mm	Not applicable	350 mm
	Vertically (wall)	150 mm	250 mm	300 mm
Up to 10 kW	Horizontally	300 mm	Not applicable	650 mm
	Vertically (wall)	250 mm	350 mm	600 mm
Up to 22 kW	Horizontally	400 mm	Not applicable	750 mm
	Vertically (wall)	350 mm	400 mm	700 mm
Up to 44 kW	Horizontally	500 mm	Not applicable	850 mm
	Vertically (wall)	Not applicable	Not applicable	Not applicable
Up to 88 kW	Horizontally	600 mm	Not applicable	1000 mm
	Vertically (wall)	Not applicable	Not applicable	Not applicable

Horizontal installation: e.g. on the floor, on top of a cabinet, on a table or similar

Vertical installation: e.g. on the wall, on a mounting plate for cabinets or similar