



### Construction and execution

*In accordance with state-of-the-art technology, rail vehicles are fitted with three-phase motors, whereby the acceleration, speed and braking is controlled and regulated using power electronics.*

*While braking, the kinetic energy of the vehicle is converted to electrical energy, and, if possible, fed back into the grid and reused. However, this assumes that you have a grid that is capable of receiving power at all times, otherwise the grid voltage merely rises and the braking effect disappears. Alternatively, the braking energy can be converted into heat with the help of a braking resistor.*

*Braking resistors are used as supplementary brakes for feeding power back into the grid, to relieve the mechanical brake and as an emergency brake resistor. The electrical braking is free from wear and tear and can be accurately controlled, which means that no abrupt braking delays occur, which are perceived as uncomfortable by the passengers.*

*Our flexible resistors are made from the classical resistor materials nickel chromium and iron chromium aluminium. Nickel chromium alloys are corrosion-resistant and heat-proof. The iron content determines the change in resistance when heated. The higher the content of iron, the greater the change in resistance. Aluminium chromium alloys can be magnetised and cause a high level of noise in the case of pulsed resistors.*

*On account of the large amounts of heat, braking resistors require adequate cool air. Depending on the cooling, a differentiation must be made between self-cooled and forced-cooled braking resistors. Air-based self-cooled braking resistors are in most cases installed outside on the vehicle, as a result of which the cooling and resistor designs can in certain cases be supported by the cooling provided by the wind generated while driving.*

*These resistors, mounted on the outside of the vehicle, are either roof-mounted resistors or underfloor resistors. In most cases, roof-mounted resistors are more easily cooled, but are sometimes accompanied by aerodynamic and optical problems. Underfloor resistors cause problems with heat dissipation, especially when the vehicle has come to standstill after braking.*

*Forced-cooled braking resistors are supplied with cool air by a fan, which means that you can also install them inside the vehicle.*

### Documents accompanying

- Product chart railway and industrial resistors (Sheet 8-0-02 up to 8-0-04)
- Product chart solid state contactor type ACS and DCS (Sheet 8-1-01/02)
- Data sheet solid state contactor type ACS 1500 (Sheet 8-1-10 up to 8-1-14)
- Data sheet solid state contactor type DCS 750 (Sheet 8-1-20 up to 8-1-24)
- Data sheet solid state contactor type 1500 (Sheet 8-1-30 up to 8-1-34)
- Data sheet solid state contactor type DCS 3000 (Sheet 8-1-40 up to 8-1-44)
- General description short circuit contact type RHK (Sheet 8-7-01)
- Data sheet short circuit contact type RHK (Sheet 8-7-10/11)

### Products

Widap took over the whole fabrication and has the exclusivity of distribution for all Sécheron (formerly as BBC) resistors products:

- Railway resistors series BW / RHW / RHK / RM / SF
- Industrial resistors series HC / HJ

### Service

We would like to offer you an *à la carte* service for:

- New products
- Replacement products
- Repairs
- Inspections

### Application fields

- Starting and breaking resistors
- Starting and regulating resistors for motors
- Excitation and de-energizing resistors
- Protection resistors
- Shunts
- Heating resistors

### Product chart

- Solid state contactor type ACS & DCS

Pages:

- Overview: 8-1-01/02
- Type ACS 1500: 8-1-10-14
- Type DCS 750: 8-1-20-24
- Type DCS 1500: 8-1-30-34
- Type DCS 3000: 8-1-40-44



- Heating resistor type RHW  
Resistance helix on ceramic

Features:

- 2 x 2'000 W (cumulative)
- Max. operating voltage 1'000 V
- Test voltage 3'000 V



- Short circuit contact type RHK

When the ESTI fuse is triggered, the blocking mandrel resiles, the connections are becoming short-circuited and the desired protection operation is executed.

Features:

- Embedded temperature cartridge
- Operational conditions -30 °C up to 300 °C



Pages: 8-7-01, 8-7-10/11

### Product chart

- Ribbon resistor type BW

The BW flexible resistor comprises a frame, generally made of stainless steel, with insulating rolls. The corrugated flexible resistor (NiCr80 / 20) is pre-tensioned and wrapped around insulating rolls and made ready for connection. Electrical connection to Cu rails.



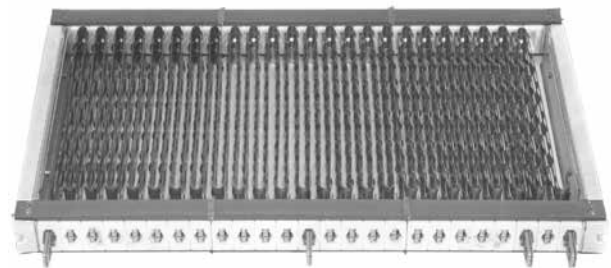
- Ribbon resistor type RMV

Forced-air ventilated high-performance resistor  
The resistor consists of a meandered ribbon mounted in an insertion rack.

Ribbon characteristics:

- High specific resistance
- Low thermal expansion coefficient
- High heat transfer coefficient
- Voltage range up to 3'000 V
- Max. temperature of the ribbon is 650 °C

Our RMV flexible resistors are made from the classical resistor materials nickel chromium and iron chromium aluminium. Nickel chromium alloys are corrosion-resistant and heat-proof. The higher the iron content, the greater the change in resistance.



- Paddle resistor type SF

The SF resistor is made from so-called scooped elements made from copper nickel or nickel chromium alloys. The various scoops with a resistance of 0.6 to 42 mOhm are mounted onto a frame and are connected in series.



- Cast iron resistor type HC

