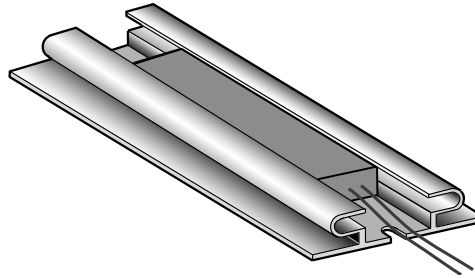


12 Braking Resistors

12.1 4Q operation with integrated BW.. braking resistor

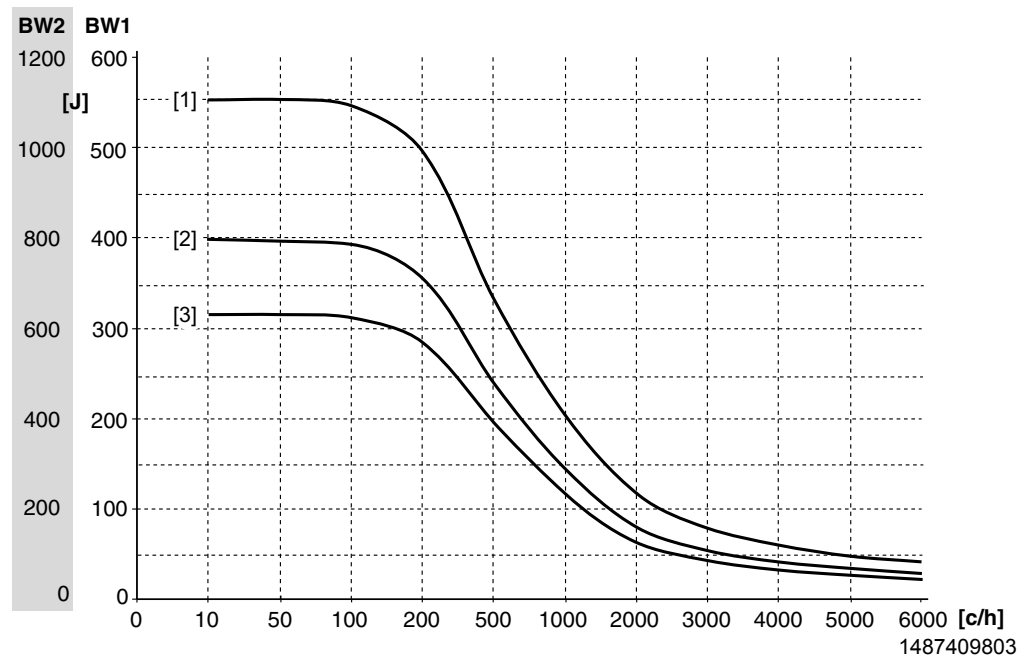
- 4Q operation with integrated braking resistor is recommended for applications in which the level of regenerative energy is low.
- The resistor protects itself (reversible) against regenerative overload by changing abruptly to high resistance and no longer consuming any more energy. The inverter then switches off and signals an overvoltage error (error code 04).



1487411723

12.1.1 Regenerative load capacity of the internal braking resistors

The following figure shows the regenerative load capacity of the internal braking resistors:

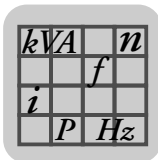


[c/h] cycles per hour

[1] Brake ramp 10 s

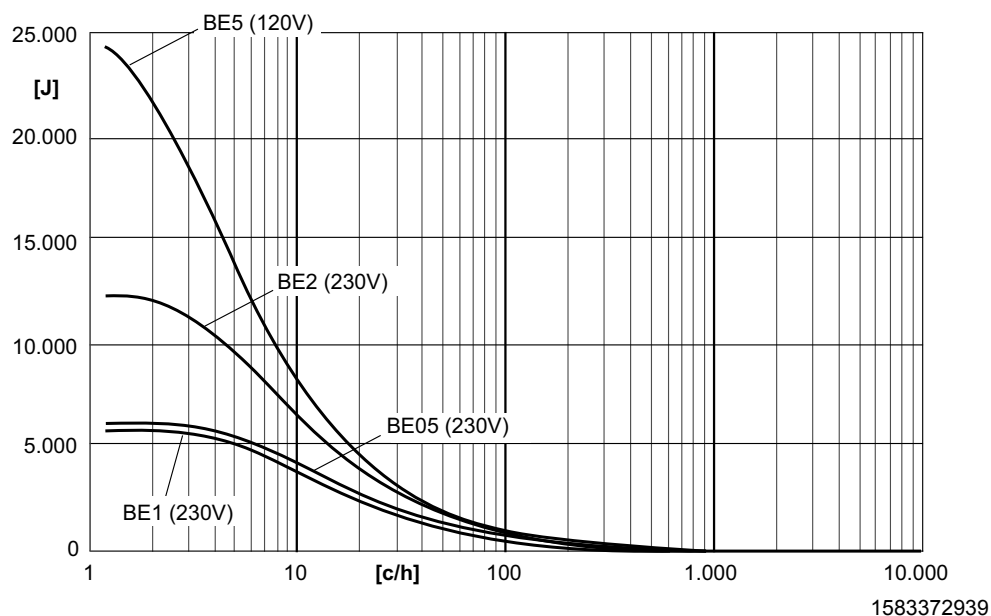
[2] Brake ramp 4 s

[3] Brake ramp 0.2 s

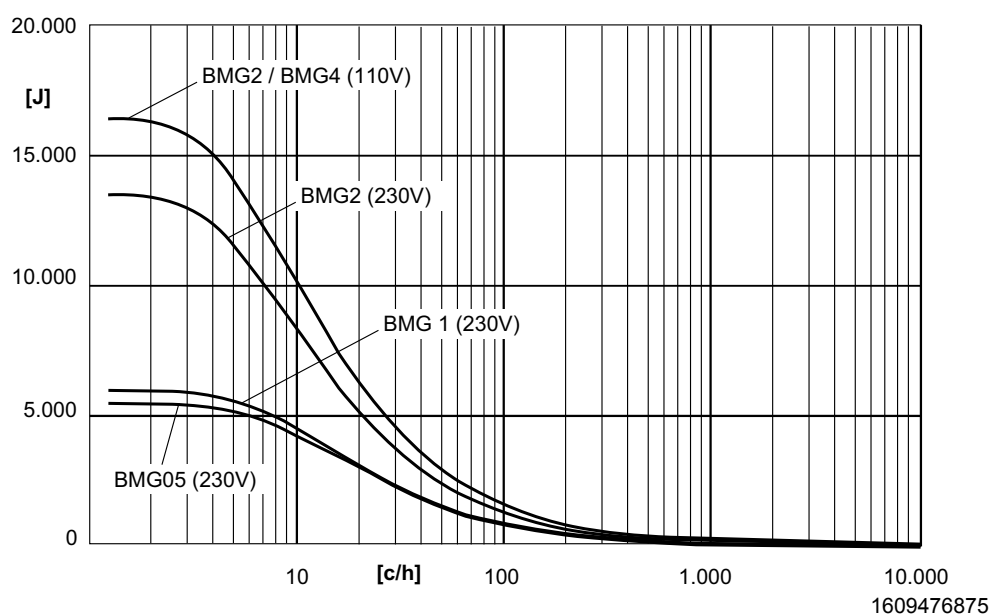


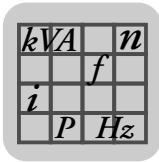
12.2 Motors with mechanical brake – 4Q operation

- In 4Q operation, the brake coil can be used as a braking resistor.
- Brake voltage is generated internally within the unit, which means it is mains-independent.
- Should the regenerative load capacity not be sufficient for the application, refer to section "4Q operation with integrated brake and external brake resistor" (see page 241):
- The following figure shows the load capacity of the DR motor brake coils:



- The following figure shows the load capacity of the DT/DV motor brake coils:



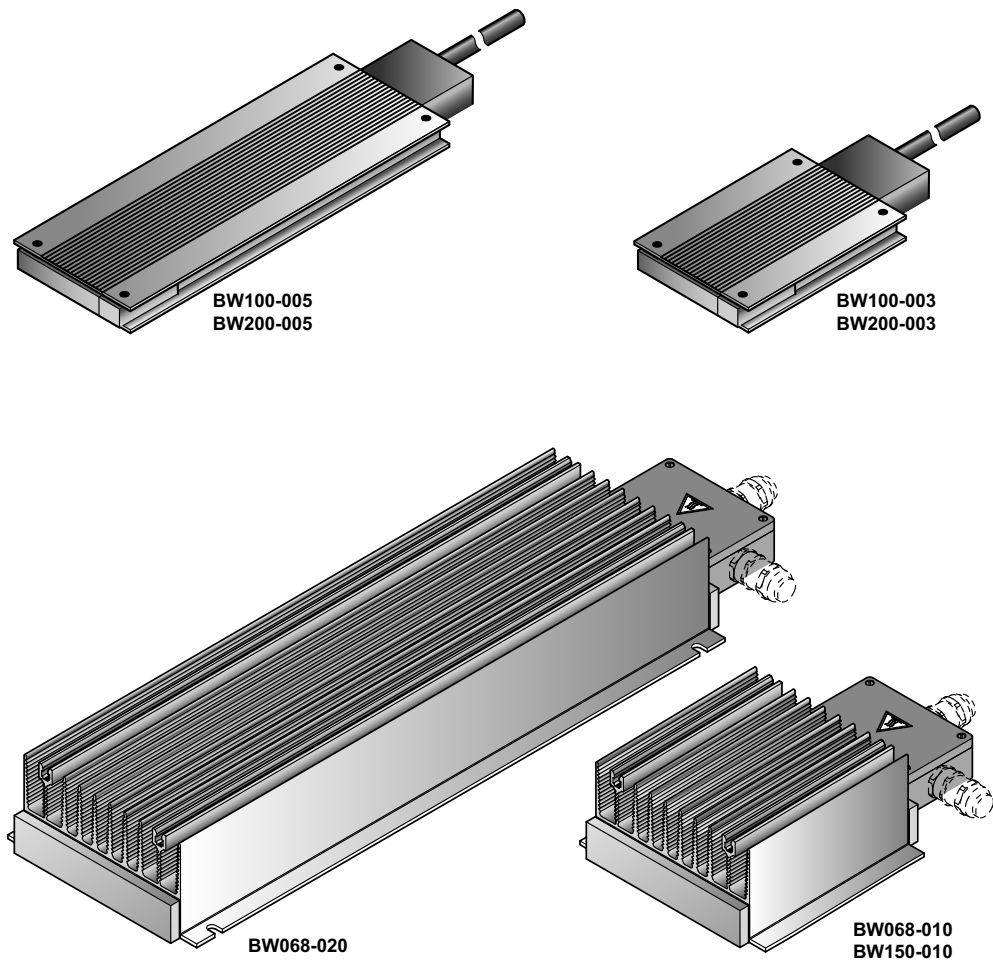


12.3 4Q operation with integrated brake and external braking resistor

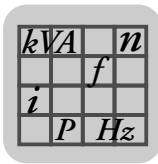
4Q operation with external braking resistor is recommended for applications in which the level of regenerative energy is high.

12.3.1 Overview

The following figure gives an overview of the external braking resistors:

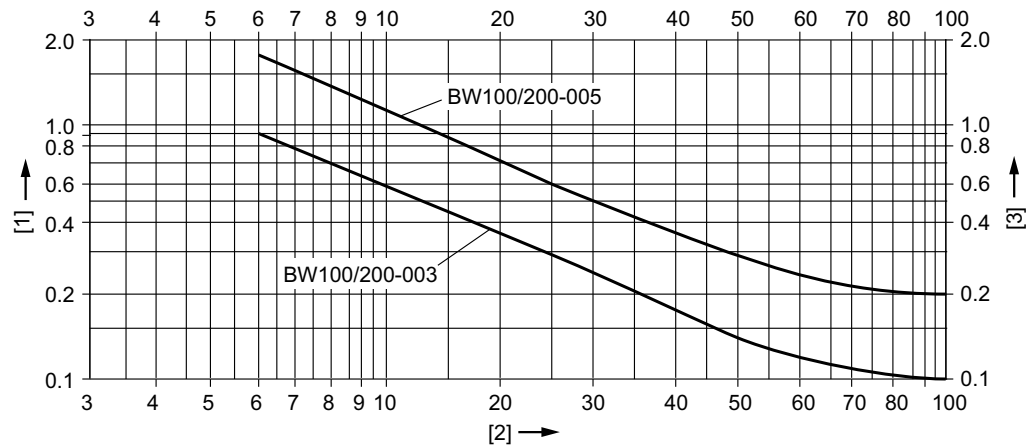


1490214411



12.3.2 Power diagrams of braking resistors BW100-003, BW200-003, BW100-005 and BW200-005

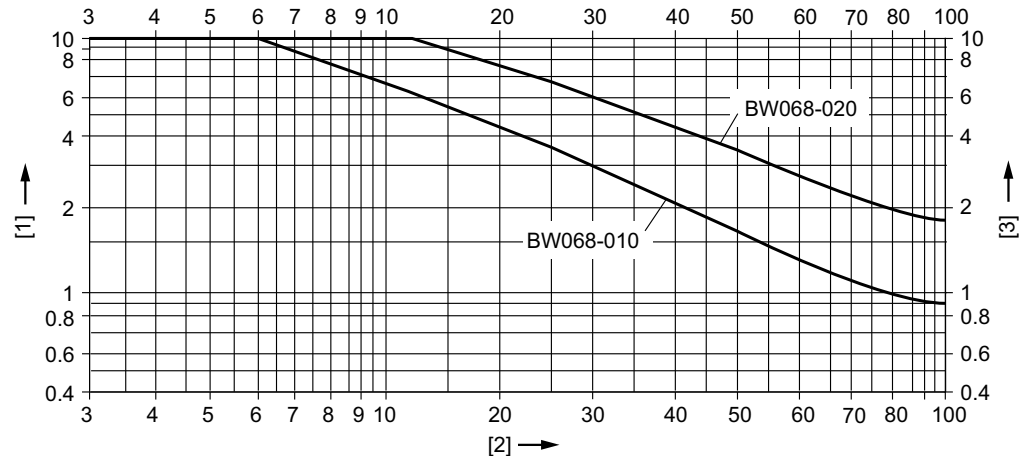
The following figure shows the power diagrams of braking resistors BW100-003, BW200-003, BW100-005 and BW200-005



- [1] Short-time power in kW
- [2] Cyclic duration factor cdf in %
- [3] Continuous power 100% cdf in kW

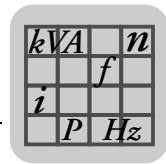
12.3.3 Power diagrams of BW068-010 and BW068-020

The following figure shows the power diagrams of braking resistors BW068-010 and BW068-020:



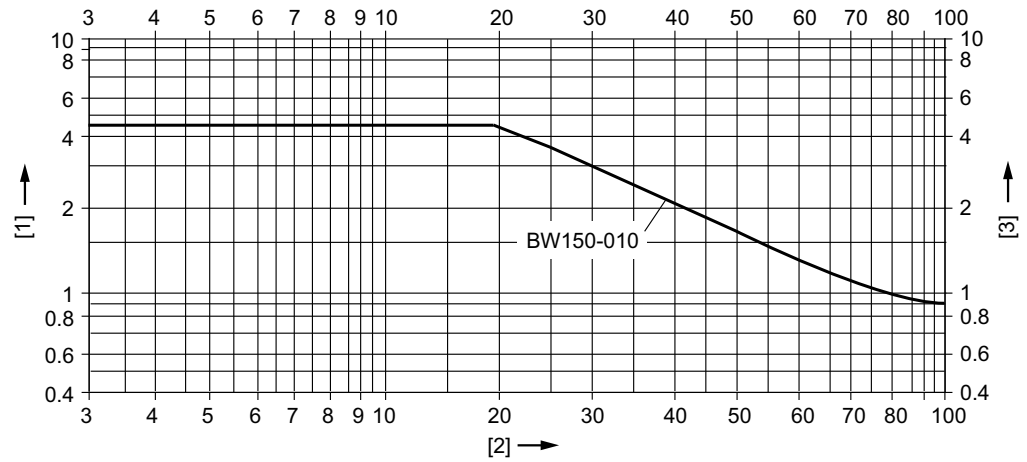
- [1] Short-time power in kW
- [2] Cyclic duration factor cdf in %
- [3] Continuous power 100% cdf in kW

cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration $T_D \leq 120$ s.



12.3.4 Power diagrams BW150-010

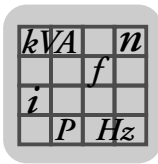
The following figure shows the power diagrams of the BW150-010 braking resistors:



1689642251

- [1] Short-time power in kW
- [2] Cyclic duration factor cdf in %
- [3] Continuous power 100% cdf in kW

cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration $T_D \leq 120$ s.

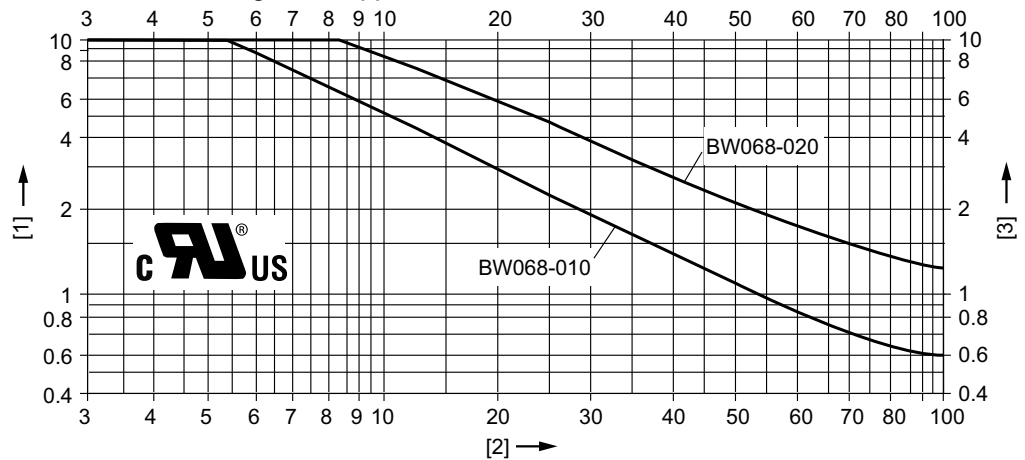


Braking Resistors

4Q operation with integrated brake and external braking resistor

12.3.5 Power diagrams of BW068-010 and BW068-020 according to UL approval

The following figure shows the power diagrams of braking resistors BW068-010 and BW068-020 according to UL approbation:

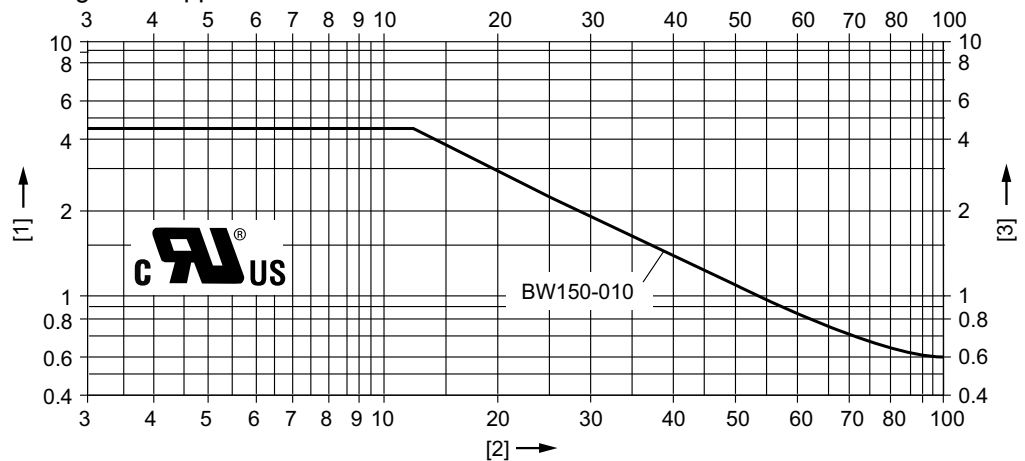


1490208651

- [1] Short-time power in kW
- [2] Cyclic duration factor cdf in %
- [3] Continuous power 100% cdf in kW

12.3.6 BW150-010 – power diagrams according to UL approval

The following figure shows the power diagrams of the BW150-010 braking resistors according to UL approval:



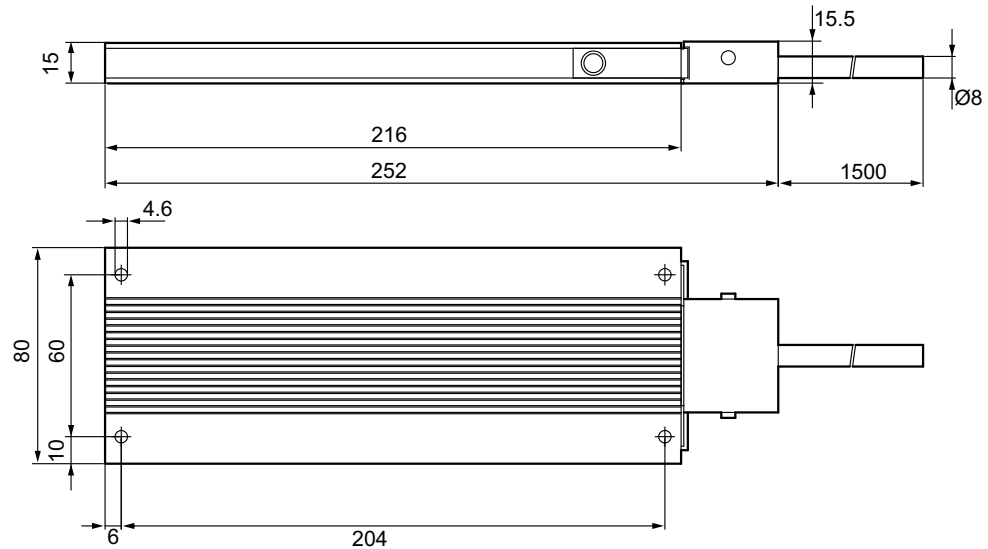
1686015499

- [1] Short-time power in kW
- [2] Cyclic duration factor cdf in %
- [3] Continuous power 100% cdf in kW

cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration $T_D \leq 120$ s.

12.3.7 Dimension drawing for BW100-005 and BW200-005

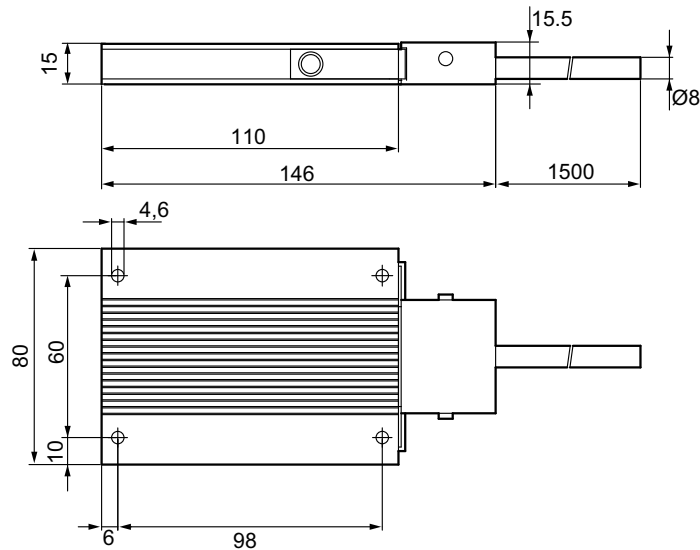
The following figure shows the dimensions of the external braking resistors BW100-005 and BW200-005:



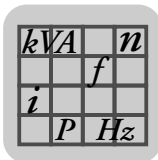
1490210571

12.3.8 Dimension drawing for BW100-003 and BW200-003

The following figure shows the dimensions of the external braking resistors BW100-003 and BW200-003:



1490212491

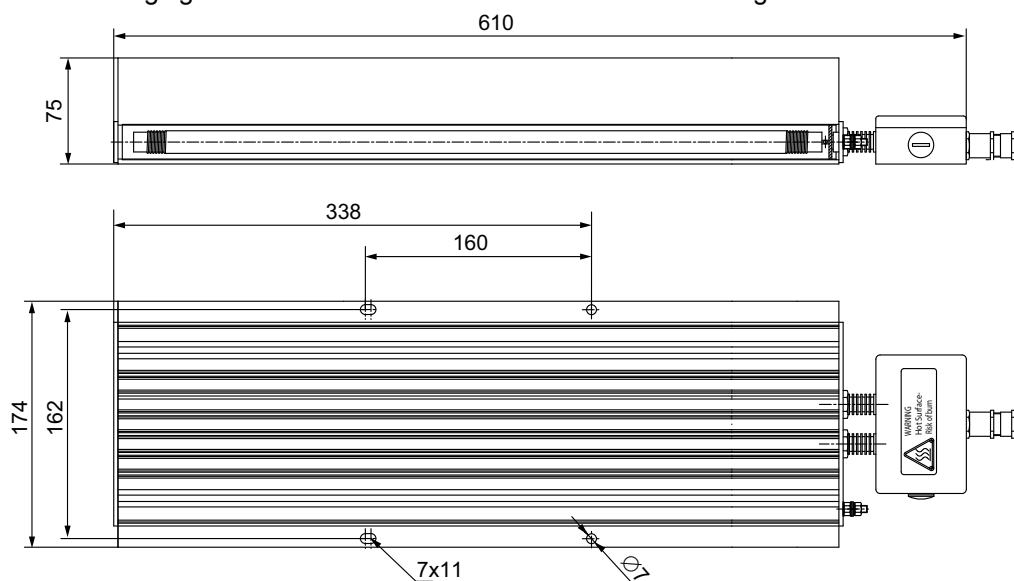


Braking Resistors

4Q operation with integrated brake and external braking resistor

12.3.9 Dimension drawing for external braking resistor BW068-020

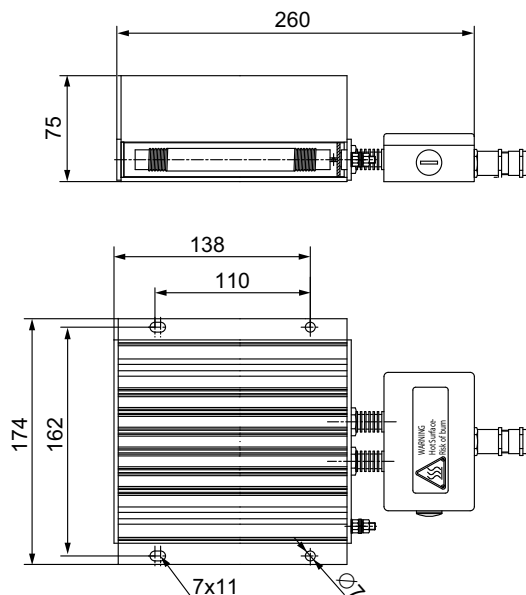
The following figure shows the dimensions of the external braking resistor BW068-020:



1490062091

12.3.10 Dimension drawing for external braking resistors BW068-010 and BW150-010

The following figure shows the dimensions of the external braking resistors BW068-010 and BW150-010:



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