Variable speed drives
Altivar 312
Option: braking resistors

Presentation

The resistor enables the Altivar 312 drive to operate while braking to a standstill or during slowdown braking, by dissipating the braking energy.
Two types of resistor are available:
- Enclosed model (IP 20 casing) designed to comply with the EMC standard and protected by a temperature-controlled switch or thermal overload relay.
This model enables maximum transient braking torque.
The resistors are designed to be mounted on the outside of the enclosure, but should not inhibit natural cooling. Air inlets and outlets must not be obstructed in any way.
The air must be free of dust, corrosive gas and condensation.
- Non-protected model (IP 00) for lower power ratings only.

Applications

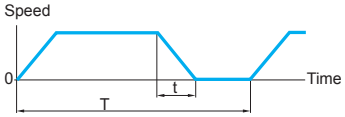
Machines with high inertia, driving loads and machines with fast cycles.

General characteristics

Type of braking resistor			VW3 A7 723 to VW3 A7 725	VW3 A7 701 to VW3 A7 705
Ambient air temperature around the device	Operation	°C	40	0…+ 50
	Storage	°C	- 25…+ 70	
Degree of protection of the casing			IP 00	IP 20
Thermal protection			None	Via temperature-controlled switch or via the drive
Temperature controlled switch *(1)*	Tripping temperature	°C	–	120
	Max. voltage - max. current		–	250 V ∿ - 1 A
	Min. voltage - min. current		–	24 V ⎓ - 0.1 A
	Maximum switch resistance	mΩ	–	60
Operating factor for the dynamic brake transistors			The average power that can be dissipated at 40°C from the resistor into the casing is determined for a load factor during braking that corresponds to most common applications. The dynamic brake transistor is sized so that it can tolerate: - The nominal motor power continuously - 150% of the nominal motor power for 60 s	

(1) The switch must be connected in the sequence (use for signalling or in line contactor control).

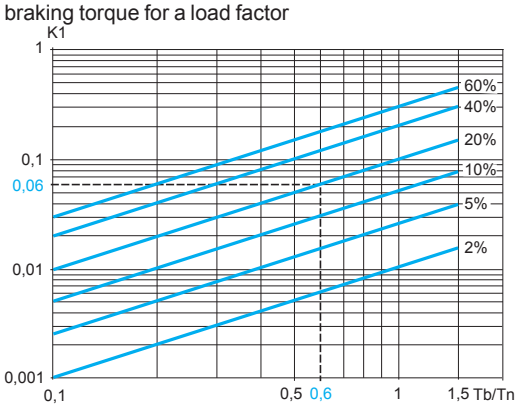
Load factor and determining the nominal power



Load factor: $\frac{t}{T}$
t: braking time in s
T: cycle time in s

The average power that can be dissipated at 40°C from the resistor into the casing is determined for a load factor during braking that corresponds to most common applications. This load factor is defined in the table above.
For a specific application (example: handling), the nominal power of the resistor must be redefined incorporating the new load factor.

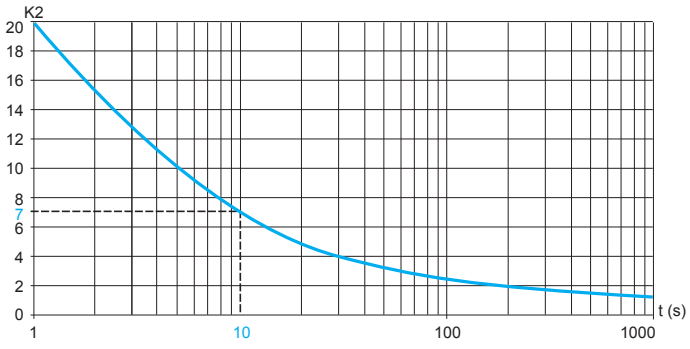
Chart 1
Graph of the average power as a function of the braking torque for a load factor



Example:
Motor power Pm = 4 kW
Motor efficiency h = 0.85
Braking torque Tb = 0.6 Tn
Braking time t = 10 s
Cycle time T = 50 s
Load factor fm = $\frac{t}{T}$ = 20%

Use chart 1 to determine coefficient K1 corresponding to a braking torque of 0.6 Tn and a load factor of 20%:
K1 = 0.06

Chart 2
Permissible resistor overload as a function of time (characteristic curve)



Use chart 2 to determine coefficient K2 corresponding to a braking time of 10 seconds.
K2 = 7

The nominal power of the resistor (Pn) must be greater than:

$$Pn = Pm \times K1 \times \eta\left(1 + \frac{1}{K2 \times fm}\right) = 4.10^{3} \times 0.06 \times 0.8\left(1 + \frac{1}{7 \times 0.2}\right) = 350\ W$$

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531231

VW3 A7 723

105659

VW3 A7 701

For drives	Minimum resistor value *(1)*	Ohmic value	Average power available at		Reference	Weight
			40°C *(2)*	50°C		
	Ω	Ω	W	W		kg
Non-protected braking resistors						
ATV 312H018M2…H075M2	40	100	32	28	**VW3 A7 723**	0.600
ATV 312HU11M2, HU15M2	27					
ATV 312H018M3…H075M3	40					
ATV 312HU11M3, HU15M3	27					
ATV 312H037N4…H075N4	80					
ATV 312HU11N4…HU22N4	54					
ATV 312H075S6	96					
ATV 312HU15S6, HU22S6	64					
ATV 312HU30N4	55	100	40	35	**VW3 A7 725**	0.850
ATV 312HU40N4	36					
ATV 312HU40S6	44					
ATV 312HU22M2, ATV 312HU22M3	25	68	32	28	**VW3 A7 724**	0.600
ATV 312HU30M3	16					
Protected braking resistors						
ATV 312H018M2…H075M2	40	100	58	50	**VW3 A7 701**	2.000
ATV 312HU11M2, HU15M2	27					
ATV 312H018M3…H075M3	40					
ATV 312HU11M3, HU15M3	27					
ATV 312H037N4…H075N4	80					
ATV 312HU11N4…HU22N4	54					
ATV 312HU22M2, ATV 312HU22M3	25	60	115	100	**VW3 A7 702**	2.400
ATV 312HU30M3	16					
ATV 312HU30N4	55	100	58	50	**VW3 A7 701**	2.000
ATV 312HU40N4	36					
ATV 312HU55N4	29	60	115	100	**VW3 A7 702**	2.400
ATV 312HU75N4	19					
ATV 312HU55S6	34					
ATV 312HU75S6	23					
ATV 312HU40M3	16	28	231	200	**VW3 A7 703**	3.500
ATV 312HD11N4, HD15N4	20					
ATV 312HD11S6, HD15S6	24					
ATV 312HU55M3, HU75M3	8	15	1154	1000	**VW3 A7 704**	11.000
ATV 312HD11M3, HD15M3	5	10 *(3)*	1154	1000	**VW3 A7 705**	11.000

(1) Depends on the drive rating.
(2) Power that can be dissipated by the resistor at the maximum temperature of 115°C, corresponding to a maximum temperature rise of 75°C in a 40°C environment.
(3) Ohmic value obtained as a function of the connection described in the resistor operating instructions.

Dimensions:
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Schemes:
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