HORSTMANN Antriebstechnik

ELECTRONICAL BRAKES FOR DIRECT CURRENT MOTORS

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Weiteres Lieferprogramm:
Gleichstrombremsen
Frequenzumrichter

Electronical brake for 3-phase Current Motors

A rapid reduction of the rotational frequency of 3-phase current motors has been proved to be of increasing importance, both from a technical safety angle and the overall operation. Electronical direct current brakes are ideal for this and can also be used moreover as:

Emergency Brake
Brake to shorten the phase times

An electrical brake has several advantages compared to its mechanical counterpart, since it is not subject to wear and tear and therefore requires no maintenance. Fitting onto existing machinery requires no constructional alteration to the machine. The braking moment (braking current) and the braking ratio time can be adjusted to suit existing requirements.

Function

After disconnecting the motor from the mains, a direct voltage is found on the stator winding of the motor. The rotor, which is till turning, generates a current proportional to the braking moment. By means of a controllable semi-conductor and an idler diode, the braking current can be directly adjusted.

A timer is built into the braking device which switches off the braking current after an adjustable period of time. This prevents the current from continuing to flow once the motor has braked down to a standstill and causing unnecessary heating of the winding.

Control of the braking device

In order to start braking, the motor should be set to voltage-free. (K1 drops out). Simultaneously an auxiliary contact (opener) takes over the locking off of the braking device. The contact 8-9 of the braking device opens and prevents the motor contactor K1M from being switched on again. By activating the "brake on" button, the braking of the motor takes place in accordance with the pre-set braking current and braking time.

The braking current can be adjusted to achieve the required braking effect with the potentiometers "coarse" and "fine". Braking begins with a delay between 500 ms and 2.5 s depending on the size of the motor, to ensure the safe reduction of the remanence voltage in the motor.

Ascertainment of braking current

To ascertain the braking current the following formula can be used. The best result is normally achieved with a braking current which equates to twice the nominal motor current.

$I_B = k \times I_N \times \sqrt{t_A/t_B}$ [A]

I_N = nominal energy of the motor in amperes
t_A = start-up time of the motor in seconds
t_B = required braking time in seconds
k = factor (after switching of the motor winding)

The usual values for the start-up time t_A in seconds are:

conveyor belt 20-30	pump 5-8	jawbreaker 30-40
compressor 10-30	fan 20-40	cement breaker 20-25

Technical data

type HBR	10	20	40	60	80	100	150	200
nominal voltage	380 / 400V AC others upon request							
eff. braking current [A]	10	20	40	60	80	100	150	200
power fuse [A]	10	20	40	60	80	100	150	200
setting of eff. braking current	0 - 100 % (coarse and fine adjustment)							
braking time	0 - 15 seconds							
power handling capacity of the switch contact 8-9	8 A							
power input	8 VA							
switch-on duration	10 % ED							
ambient temperature	- 10 up to 40 °C							
protective system	IP30/IP20		IP 00					
fastening	snap-on or screw fastening		screw fastening					
weight	400 g		1,5 kg				3 kg	
measurements (hxwxd)	100x70x134		200 x 100 x 175				200x160x175	

Connection Diagramm