

Power Accessories for AC and DC Drives

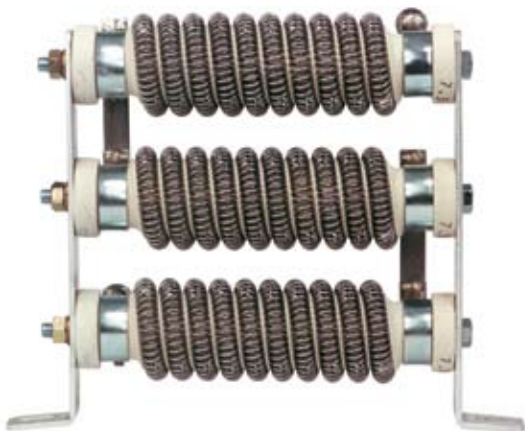
DYNAMIC BRAKING RESISTORS

The DC bus voltage level of a drive increases while the motor is re-generating, i.e. ramping to a stop. Dynamic braking resistors provide a means of rapidly stopping a rotating motor and load while maintaining an acceptable bus voltage level. The mechanical energy stored in the spinning mass is converted into electrical energy and quickly dissipated as heat through a resistor. Control Techniques offers resistor kits available for both AC and DC drives.

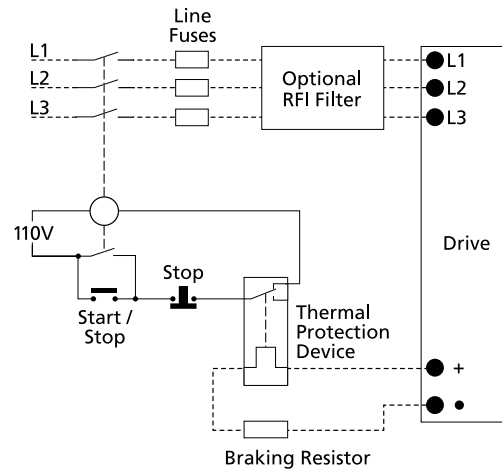
Dynamic Braking for DC Drives

DC drives provide an exponential stopping profile when a dynamic brake resistor is applied across the motor's armature circuit (when the motor acts as a DC generator). This type of braking can occur only when the drive is configured for coast stop and power has been removed from the motor (stop commanded). To apply a dynamic brake resistor to a DC drive, a motor contactor with a DB pole is required. This motor contactor is standard on Quantum III DC drives up through 250 hp.

Regen to line is also a preferred way to handle dynamic braking and is an option on Focus 3, Mentor II and Quantum III DC drives.



OVERLOAD PROTECTION



Dynamic Braking for AC Drives

AC drives provide a constant torque stopping profile when a dynamic brake resistor is applied across the DC bus circuit. Dynamic braking can be employed under a stop command or anytime a decrease in motor speed is commanded, provided the AC drive is enabled and programmed for ramp stop (fast ramp mode).

The brake is active anytime the system is enabled. Therefore, the braking circuit must be protected with an overload device.

The Commander SK, GP20 and Unidrive SP drives are equipped standard with built-in dynamic braking transistors. Simply select the proper braking resistor needed for the size of drive and duty cycle.

Control Techniques offers two types of dynamic braking kits for AC Drives. The E-stop duty kits provide a means of quickly stopping a motor / load as well as providing the ability to dissipate energy created by either a change in motor speed or a line transient.

The cyclic duty kits are intended for more severe applications that need the capability to dissipate regenerated energy on a more continuous or repetitive basis such as indexers, feeders and dynamometers.

DB Resistors for AC Drives

E-STOP DUTY

Panel mounted DB resistors are designed for non-cyclic use where energy dissipation from an active drive is required. Resistors are supplied with mounting hardware unless otherwise noted.

These kits are designed to meet or exceed NEMA standard 7-15-1970, which states "DB resistors will not exceed their rated temperature rise when the drive is braked from maximum speed to standstill three times in rapid succession with a load inertia equal to or less than the motor inertia". They are designed to provide 150% braking torque (peak at max speed for DC drives, constant for AC drives) for 1800 rpm base speed motors.

Note: The Commander GP20 and Unidrive SP Size 1 and 2 can be equipped with a zero-space, heatsink mountable DB resistors.

INTERNAL DYNAMIC BRAKING RESISTORS

Commander SK (size 2), GP20 and Unidrive SP

Frame Size	DC Resistance	Power Rating	Order Code
1	75 Ω	50W	SM-Heatsink-DBR1
2	37.5 Ω	100W	SM-Heatsink-DBR2

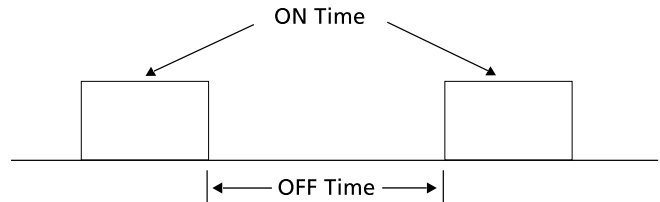
CYCLIC DUTY

NEMA 1 DB resistor kits include a wall mount enclosure with built-in junction box, a terminal strip, a normally closed thermal contact (klixon switch) and resistors pre-wired with high-temperature Teflon wire.

These heavy-duty kits have been designed to provide dynamic braking for cyclic and continuous braking applications. There are three levels available: 10%, 25% and 33%. These levels refer to the continuous allowable braking level (ie. 25% equals 25% of rated motor braking torque) or the maximum allowable duty cycle rates with maximum specified "on-time" limitations (refer to illustration below).

Duty Cycle

$$\text{Duty Cycle} = \frac{\text{On Time } (\leq \text{max "on" time})}{\text{On Time} + \text{Off Time}}$$



E-STOP DUTY CASE DB RESISTORS FOR COMMANDER SK, GP20 & UNIDRIVE SP SERIES AC DRIVES

Control Techniques E-Stop duty case dynamic braking resistors provide the energy dissipation required for a drive system while keeping the installation as compact as possible. See drive heatsink options in the drive section of the catalog.



DRIVE ORDER CODE LEGEND

y= SK for Commander SK, or CGP for Commander GP20, or SP for Unidrive SP

z= CGP for Commander GP20, or SP for Unidrive SP

230VAC Drive Order Code	Case Resistor Order Number	Dimensions (in.) L x D x H
SKA1200025	8200-00450	9 x 1.5 x 0.75
SKA1200037	8200-00451	6 x 3 x 1.5
SKA1200055	8200-00452	6 x 3 x 1.5
z1201 & SKA1200075	8200-00453	6 x 3 x 1.5
z1202 & SKBD200110	8200-00454	6 x 3 x 1.5
z1203 & SKBD200150	8200-00455	6 x 3 x 1.5
z1204 & SKCD200220	8200-00456	9 x 3 x 1.5
460VAC Drive Order Code	Case Resistor Order Number	Dimensions (in.) L x D x H
SKB3400037	8200-00412	6 x 3 x 1.5
SKB3400055	8200-00413	7.5 x 3 x 1.5
z1401 & SKB3400075	8200-00414	7.5 x 3 x 1.5
SKB3400110	8200-00415	9 x 3 x 1.5
z1402 & SKB3400150	8200-00416	9 x 3 x 1.5
z1403 & SKC3400220	8200-00417	12 x 3 x 1.5
z1404 & SKC3400300	8200-00418	12 x 3 x 1.5
z1405 & SKD3200400	8200-00419	12 x 3 x 1.5

DB Resistors for AC Drives

COMMANDER SK, COMMANDER GP20, UNIDRIVE SP AC DRIVES

DRIVE ORDER CODE LEGEND
 y= SK for Commander SK, or CGP for Commander GP20,
 or SP for Unidrive SP
 z= CGP for Commander GP20, or SP for Unidrive SP

230VAC								
Drive Order Code	Duty Cycle / Order Code / Dimensions (L x D x H in inches)							
	E-Stop	Dimensions	10%	Dimensions	25%	Dimensions	33%	Dimensions
SKA1200025	8200-00218	10.25 x 2 x 2.75	8200-00001	14 x 4 x 5	8200-00015	14 x 7 x 5	8200-00029	14 x 7 x 5
SKA1200037								
SKA1200055								
z1201 & SKA1200075			8200-00002	14 x 10 x 5	8200-00016	14 x 10 x 5	8200-00030	14 x 10 x 5
z1202 & SKBD200110								
z1203 & SKBD200150								
z1204 & SKCD200220			8200-00004	14 x 13 x 5	8200-00018	14 x 10 x 5	8200-00032	14 x 13 x 5
v2201 & SKD3200400								
y2202								
y2203			8200-00006	21 x 10 x 5	8200-00019	21 x 10 x 5	8200-00033	21 x 10 x 5
y3201								
y3202								
y4201			8200-00007	28 x 13 x 5	8200-00020	28 x 13 x 5	8200-00034	28 x 13 x 5
y4202								
y4203								
y4203	8200-00008	28 x 13 x 5	8200-00021	29 x 18 x 7	8200-00035	29 x 18 x 14		
y5201								
y5202								
y5201	8200-00221	Consult Factory	8200-00012	29 x 18 x 14	8200-00026	29 x 18 x 14	8200-00040	29 x 18 x 21
y5202	8200-00222	Consult Factory	8200-00250	Consult Factory	8200-00251	Consult Factory	8200-00252	Consult Factory
460VAC								
Drive Order Code	Duty Cycle / Order Code / Dimensions (L x D x H in inches)							
	E-Stop	Dimensions	10%	Dimensions	25%	Dimensions	33%	Dimensions
SKB3400037	8200-00151	11.75 x 2 x 2.75	8200-00043	4 x 7 x 5	8200-00060	14 x 7 x 5	8200-00077	14 x 10 x 5
SKB3400055								
z1401 & SKB3400075								
SKB3400110			8200-00044	14 x 13 x 5	8200-00061	14 x 10 x 5	8200-00078	14 x 13 x 5
z1402 & SKB3400150								
z1403 & SKC3400220								
z1404 & SKC3400300			8200-00046	14 x 10 x 5	8200-00062	21 x 10 x 5	8200-00080	21 x 10 x 5
z1405 & SKD3200400								
z1406 & SKD3400550								
v2401 & SKD3400750			8200-00047	14 x 13 x 5	8200-00063	21 x 10 x 5	8200-00081	21 x 10 x 5
y2402								
y2403								
y2403			8200-00048	21 x 10 x 5	8200-00064	21 x 13 x 5	8200-00082	28 x 13 x 5
y2404								
y3401								
y3402	8200-00049	21 x 13 x 5	8200-00065	28 x 13 x 5	8200-00083	28 x 13 x 5		
y3403								
y3403								
y4401	8200-00051	29 x 18 x 7	8200-00066	29 x 18 x 14	8200-00084	29 x 18 x 14		
y4402								
y4403								
y5401	8200-00052	29 x 18 x 14	8200-00067	29 x 18 x 14	8200-00085	29 x 18 x 14		
y5402								
y6401								
y6402	8200-00053	16.5 x 8 x 4	8200-00068	29 x 18 x 14	8200-00086	29 x 18 x 14		
v6401								
v6402								
v6402	8200-00055	21 x 8 x 4	8200-00069	29 x 18 x 21	8200-00087	29 x 18 x 21		
y4403								
y5401								
y5402	8200-00057	29 x 18 x 21	8200-00070	29 x 18 x 21	8200-00088	29 x 18 x 21		
y5403								
y6401								
y6402	8200-00055	21 x 8 x 4	8200-00071	29 x 18 x 21	8200-00089	29 x 18 x 21		
y4403								
y5401								
y5402	8200-00057	29 x 18 x 21	8200-00072	29 x 18 x 28	8200-00090	29 x 18 x 28		
y5403								
y6401								
v6401	8200-00205	30 x 8 x 4	8200-00260	29 x 18 x 35	8200-00261	29 x 18 x 49	8200-00262	29 x 18 x 56
v6402								
v6402								
575VAC								
Drive Order Code	Duty Cycle / Order Code / Dimensions (L x D x H in inches)							
	E-Stop	Dimensions	10%	Dimensions	25%	Dimensions	33%	Dimensions
v3501	8200-03501	14 x 4 x 5	8200-13501	14 x 13 x 5	8200-23501	14 x 13 x 5	8200-33501	14 x 13 x 5
v3502	8200-03502		8200-13502		8200-23502		8200-33502	
v3503	8200-03503		8200-13503		8200-23503		8200-33503	
v3504	8200-03504	14 x 7 x 5	8200-13504	21 x 13 x 5	8200-23504	28 x 13 x 5	8200-33504	28 x 13 x 5
v3505	8200-03505		8200-13505		8200-23505		8200-33505	
v3506	8200-03506		8200-13506		8200-23506		8200-33506	
v3507	8200-03507	14 x 13 x 5	8200-13507	29 x 18 x 7	8200-23507	29 x 18 x 7	8200-33507	29 x 18 x 14
y4603	8200-03508		8200-13508		8200-23508		8200-33508	
y4604	8200-03509		8200-13509		8200-23509		8200-33509	
y4605	8200-03510	21 x 13 x 5	8200-13510	29 x 18 x 14	8200-23510	29 x 18 x 21	8200-33510	29 x 18 x 21
y4606	8200-03511		8200-13511		8200-23511		8200-33511	
y5601	8200-03512		8200-13512		8200-23512		8200-33512	
y5602	8200-03513	29 x 18 x 14	8200-13513	29 x 18 x 21	8200-23513	29 x 18 x 28	8200-33513	29 x 18 x 35
v6601	8200-03514		8200-13514		8200-23514		8200-33514	
v6602	8200-03515		8200-13515		8200-23515		8200-33515	
690VAC								
Drive Order Code	Duty Cycle / Order Code / Dimensions (L x D x H in inches)							
	E-Stop	Dimensions	10%	Dimensions	25%	Dimensions	33%	Dimensions
y4601	8200-03601	14 x 13 x 5	8200-13601	29 x 18 x 14	8200-23601	29 x 18 x 14	8200-33601	29 x 18 x 14
y4602	8200-03602		8200-13602		8200-23602		8200-33602	
y4603	8200-03603		8200-13603		8200-23603		8200-33603	
y4604	8200-03604	21 x 13 x 5	8200-13604	29 x 18 x 14	8200-23604	29 x 18 x 21	8200-33604	29 x 18 x 21
y4605	8200-03605		8200-13605		8200-23605		8200-33605	
y4606	8200-03606		8200-13606		8200-23606		8200-33606	
y5601	8200-03607	29 x 18 x 7	8200-13607	29 x 18 x 21	8200-23607	29 x 18 x 28	8200-33607	29 x 18 x 35
y5602	8200-03608		8200-13608		8200-23608		8200-33608	
y6601	8200-03609		8200-13609		8200-23609		8200-33609	
y6602	8200-03610	28 x 13 x 5	8200-13610	29 x 18 x 28	8200-23610	29 x 18 x 35	8200-33610	29 x 18 x 42
y5602	8200-03608		8200-13608		8200-23608		8200-33608	
y6601	8200-03609		8200-13609		8200-23609		8200-33609	
y6602	8200-03610	29 x 18 x 14	8200-13610	29 x 18 x 42	8200-23610	58 x 18 x 35	8200-33610	58 x 18 x 35
y6601	8200-03609		8200-13609		8200-23609		8200-33609	
y6602	8200-03610		8200-13610		8200-23610		8200-33610	

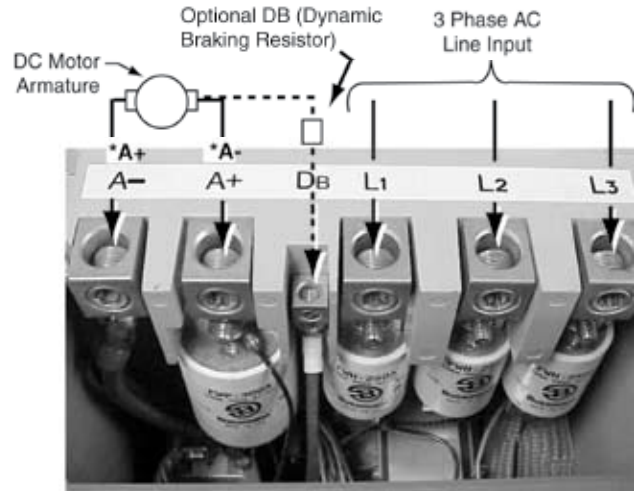
* For larger drives and SPM modules please consult factory.

DB Resistors for DC Drives

E-stop duty dynamic braking resistors are available to provide for the fast stopping of DC motors.

Quantum III DC drives come supplied with a DB Resistor Pole, which is conveniently located adjacent to the either A- on non-regen models, or A+ in regen models.

DB resistors are shipped loose and mounted external to the drive (by customer). NEMA 1 Enclosure is Galvanized Steel and meets UL508A standard.



230VAC DB Resistors

HP	Chassis		NEMA 1	
	Order Code	Dimensions (in.) H x W x D	Order Code	Dimensions (in.) H x W x D
5	8200-00100	10.25 x 2 x 2.75	005-4301	5 x 14 x 4
7.5	8200-00101		005-4302	
10	8200-00102		005-4303	
15	8200-00103		005-4304	
20	8200-00104		005-4305	
25	8200-00105		005-4306	
30	8200-00106*	14 x 4 x 5	005-4307	5 x 14 x 7
40	8200-00107*		005-4308	
50	8200-00108*		005-4309	
60	8200-00109*		005-4310	5 x 14 x 4
75	8200-00110*		005-4311	
100	8200-00111*	14 x 10 x 5	005-4312	5 x 14 x 10
125	8200-00112*	14 x 13 x 5	n/a	

460VAC DB Resistors

HP	Chassis		NEMA 1	
	Order Code	Dimensions (in.) H x W x D	Order Code	Dimensions (in.) H x W x D
5-7.5	8200-00115	10.25 x 2 x 2.75	005-4351	5 x 12 x 4
10	8200-00116		005-4352	
15	8200-00117		005-4353	
20	8200-00118		005-4354	5 x 14 x 7
25	8200-00119		005-4355	
30	8200-00120	10.25 x 2 x 5.5	005-4356	5 x 14 x 10
40	8200-00121		005-4357	
50	8200-00122		005-4358	
60	8200-00124*		14 x 7 x 5	
75		14 x 10 x 5	005-4360	5 x 14 x 13
100	8200-00125*		005-4361	
125	8200-00126*	14 x 13 x 5	005-4362	5 x 21 x 10
150	8200-00127*		005-4363	
200	8200-00128*		005-4364	
250	8200-00129*		005-4365	

The DC Dynamic braking components have been sized for occasional non-repeated use, assuming load inertia is equal to or less than motor inertia. The Dynamic resistor will be sized at approximately 150% of rated motor current. The DB enclosures are galvanized NEMA 1

enclosure shipped loose and mounted external to the drive to meet UL508A standard. The DC drive will also require a DB contactor option for dynamic braking action.

* Resistor is wall mounted, not panel mounted.