Power Accessories
for AC and DC Drives

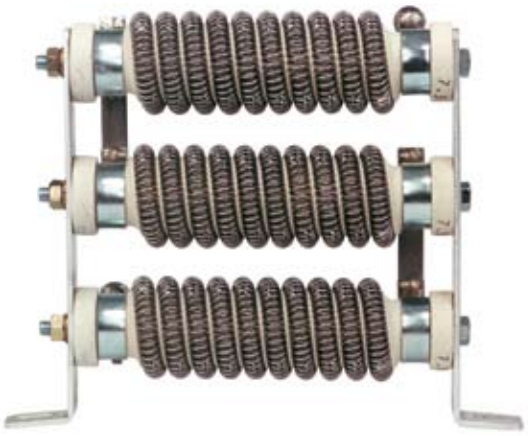
DYNAMIC BRAKING RESISTORS

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.

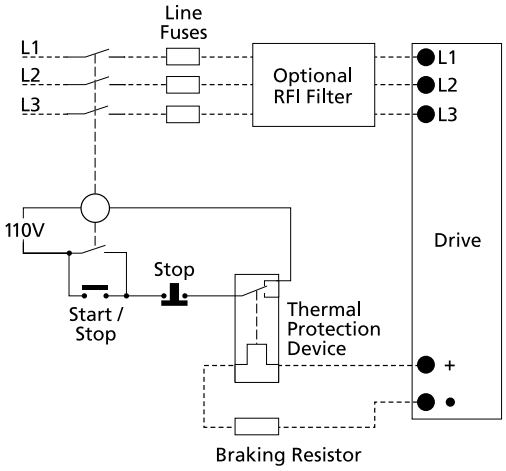
Dynamic Braking for DC Drives

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

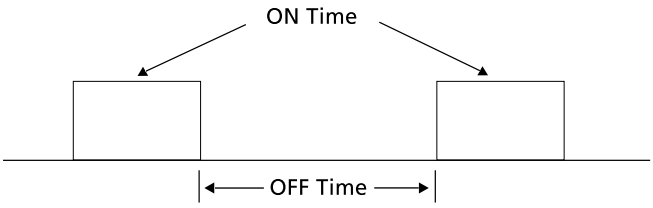
CYCLIC DUTY

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

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



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 SKA1200037 SKA1200055 z1201 & SKA1200075	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
z1202 & SKBD200110	8200-00208		8200-00002		8200-00016		8200-00030	14 x 10 x 5
z1203 & SKBD200150	8200-00209		8200-00003		8200-00017	14 x 10 x 5	8200-00031	
z1204 & SKCD200220	8200-00210		8200-00004		8200-00018		8200-00032	14 x 13 x 5
y2201 & SKD3200400	8200-00210		8200-00004		8200-00018		8200-00032	
y2202	8200-00211		8200-00005		8200-00019	21 x 10 x 5	8200-00033	21 x 10 x 5
y2203	8200-00212		8200-00006	21 x 10 x 5	8200-00020		8200-00034	28 x 13 x 5
y3201	8200-00213		8200-00007		8200-00021	28 x 13 x 5	8200-00035	
y3202	8200-00214		8200-00008	28 x 13 x 5	8200-00022	29 x 18 x 7	8200-00036	
y4201	8200-00215		8200-00009		8200-00023	29 x 18 x 14	8200-00037	29 x 18 x 14
y4202	8200-00216		8200-00010		8200-00024	29 x 18 x 7	8200-00038	
y4203	8200-00217		8200-00010		8200-00024		8200-00038	
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 SKB3400055 z1401 & SKB3400075	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
SKB3400110	8200-00152		8200-00044		8200-00061	14 x 10 x 5	8200-00078	
z1402 & SKB3400150	8200-00153		8200-00045		8200-00062	14 x 13 x 5	8200-00079	14 x 13 x 5
z1403 & SKC3400220	8200-00155	10.25 x 2 x 2.75	8200-00046	14 x 10 x 5	8200-00063	21 x 10 x 5	8200-00080	21 x 10 x 5
z1404 & SKC3400300	8200-00155		8200-00046		8200-00063		8200-00080	
z1405 & SKD3200400	8200-00156		8200-00047	14 x 13 x 5	8200-00064		8200-00081	
z1406 & SKD3400550	8200-00156		8200-00047		8200-00064		8200-00081	
y2401 & SKD3400750	8200-00157	10.25 x 2 x 5.75	8200-00048	21 x 10 x 5	8200-00065	21 x 13 x 5	8200-00082	28 x 13 x 5
y2402	8200-00158		8200-00049	21 x 13 x 5	8200-00066	28 x 13 x 5	8200-00083	
y2403	8200-00161		8200-00051	29 x 18 x 7	8200-00068	29 x 18 x 14	8200-00085	29 x 18 x 14
y2404	8200-00162		8200-00052		8200-00069		8200-00086	
y3401	8200-00162		8200-00052		8200-00069		8200-00086	
y3402	8200-00163	16.5 x 8 x 4	8200-00053	29 x 18 x 14	8200-00070		8200-00087	
y3403	8200-00163		8200-00053		8200-00070		8200-00087	
y4401	8200-00165	21 x 8 x 4	8200-00055		8200-00072		8200-00089	29 x 18 x 21
y4402	8200-00165		8200-00055		8200-00072		8200-00089	
y4403	8200-00167		8200-00056		8200-00073	29 x 18 x 21	8200-00090	
y5401	8200-00170		8200-00057	29 x 18 x 21	8200-00074	29 x 18 x 28	8200-00091	29 x 18 x 28
y5402	8200-00170		8200-00057		8200-00074		8200-00091	
y6401	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
y6402	8200-00205		8200-00260		8200-00261		8200-00262	
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
y3501	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
y3502	8200-03502		8200-13502		8200-23502	28 x 13 x 5	8200-33502	28 x 13 x 5
y3503	8200-03503	14 x 7 x 5	8200-13503	21 x 13 x 5	8200-23503		8200-33503	
y3504	8200-03504	14 x 13 x 5	8200-13504	28 x 13 x 5	8200-23504		8200-33504	
y3505	8200-03505		8200-13505		8200-23505	29 x 18 x 7	8200-33505	29 x 18 x 14
y3506	8200-03506		8200-13506		8200-23506	29 x 18 x 14	8200-33506	
y3507	8200-03507		8200-13507	29 x 18 x 7	8200-23507		8200-33507	
y4603	8200-03508		8200-13508	29 x 18 x 14	8200-23508		8200-33508	
y4604	8200-03509	21 x 13 x 5	8200-13509		8200-23509		8200-33509	
y4605	8200-03510		8200-13510		8200-23510	29 x 18 x 21	8200-33510	29 x 18 x 21
y4606	8200-03511	29 x 18 x 7	8200-13511		8200-23511		8200-33511	
y5601	8200-03512	29 x 18 x 14	8200-13512	29 x 18 x 21	8200-23512	29 x 18 x 28	8200-33512	29 x 18 x 35
y5602	8200-03513		8200-13513	29 x 18 x 28	8200-23513	29 x 18 x 35	8200-33513	29 x 18 x 42
y6601	8200-03514		8200-13514		8200-23514		8200-33514	29 x 18 x 49
y6602	8200-03515		8200-13515	29 x 18 x 42	8200-23515	29 x 18 x 49	8200-33515	29 x 18 x 56
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	21 x 13 x 5	8200-13603		8200-23603	29 x 18 x 21	8200-34603	29 x 18 x 21
y4604	8200-03604	29 x 18 x 7	8200-13604		8200-23604		8200-33604	
y4605	8200-03605		8200-13605	29 x 18 x 21	8200-23605	29 x 18 x 28	8200-33605	29 x 18 x 35
y4606	8200-03606		8200-13606		8200-23606	29 x 18 x 35	8200-33606	29 x 18 x 42
y5601	8200-03607	28 x 13 x 5	8200-13607	29 x 18 x 28	8200-23607		8200-33607	29 x 18 x 49
y5602	8200-03608	29 x 18 x 7	8200-13608		8200-23608	29 x 18 x 49	8200-33608	29 x 18 x 56
y6601	8200-03609	29 x 18 x 14	8200-13609	29 x 18 x 42	8200-23609	29 x 18 x 56	8200-33609	58 x 18 x 35
y6602	8200-03610		8200-13610		8200-23610	58 x 18 x 35	8200-33610	

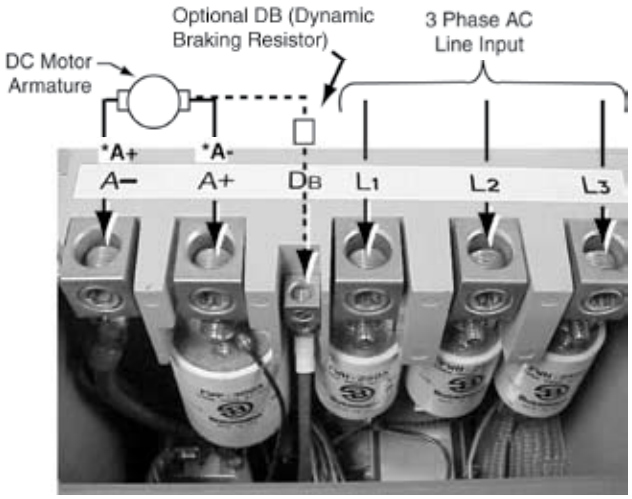
* For larger drives and SPM modules please consult factory.

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	
40	8200-00107*		005-4308	5 x 14 x 7
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	
40	8200-00121		005-4357	5 x 14 x 10
50	8200-00122		005-4358	
60	8200-00124*	14 x 7 x 5	005-4359	
75			005-4360	
100	8200-00125*	14 x 10 x 5	005-4361	5 x 14 x 13
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.