

### Fractional Horsepower DC Speed Controls for PMDC Motors

1/15 thru 1/4

115 VAC Single Phase 50/60 Hz.

**Applications:** Conveyors, machine tools and other applications requiring adjustable speed.

**Features:** Simple DC motor control with built-in circuit breaker, center lock reversing switch (center off), on/off switch, 7 foot SJO oil resistant cord, and variable voltage transformer for manual speed adjustment. NEMA 1 enclosure is standard. CSA list file # LR54532.



Max Hp	Catalog Number	List Price	Mult. Sym.	Ap'x Shpg. Wgt.	Amp Capacity	Input Voltage
1/15	BC110	490	E9	5	1.0	115VAC
1/8	BC115	523	E9	6	1.5	115VAC
1/4	BC130	666	E9	10	3.0	115VAC

### NEMA 1 Enclosed DC Controls for PMDC and Shunt Wound Motors

1/100 thru 2 Hp

115/230 VAC Single Phase 50/60 Hz.

**Applications:** General purpose industrial use with permanent magnet or shunt wound DC motors.

**Features:** SCR controls have a free-wheeling diode and feature adjustable accel, decel, current limit, IR comp, min. and max speed pots to match applications. The anti-demag feature protects PM motors and helps protect the SCR power bridge against direct shorts. The controls have US and Canadian UL component recognition.

A Plug-in Horsepower Resistor® and armature fuse **must** be ordered and installed in BC138, BC139, BC140, BC140-FBR, BC141 and BC142.



BC140 ENCLOSED (NEMA 1)

Hp Range	Catalog Number	List Price	Mult. Sym.	Ap'x Shpg. Wgt. Lbs.	Input Voltage
1/100-1/3	BC138	194	E9	1	115
1/50-3/4	BC139	194	E9	1	230
1/100-2 (a)	BC140	329	E9	3	115/230
1/100-2 (a)	BC140-FBR	455	E9	3	115/230

**NOTE:** (a) 1 Hp at 115V and 2 Hp at 230V requires BC143 heatsink kit. See page 290 for features. FBR=Forward/Brake/Reverse.

### DC Control Accessories

Catalog Number	Description	List Price	Mult. Sym.	Ap'x. Shpg. Wgt.
BC24-LF	Ac Line Filter for use with CE Applications	66	E9	1
BC143	External Heatsink Kit (BC140, BC140-FBR, BC141, BC142, BC204)	63	E9	2
BC144	Forward-Brake-Reverse Switch Kit for BC140	110	E9	1
BC145	Signal Isolator Board	187	E9	1
BC146	Current Sensing Relay/Overload Protector	121	E9	1
BC147	Barrier Terminal Board (BC141 and BC142)	26	E9	1
BC148	Replacement Potentiometer Kit (5K ohm)	11	E9	1
BC149	Knob and Dial Kit	12	E9	1
BC152	Barrier Terminal Board With Signal Isolator (BC141 and BC142)	172	E9	1
BC218	DIN-rail mounting kit for BC141, BC142 or BC204	31	E9	1

**NOTE:** BC24-LF is an AC line filter required for applications where CE is required if the control is not filtered elsewhere in the application. This filter may be used on most 115 or 230 VAC, single phase applications where CE is required.

### Chassis Mount DC Controls

1/100 thru 1.5 Hp  
1/50 thru 5 Hp

115 VAC Single Phase 50/60 Hz.  
230 VAC Single Phase 50/60 Hz.



BC141 / BC142

**Applications:** General purpose industrial use with permanent magnet or shunt wound DC motors.

**Features:** Chassis-mount SCR controls have a free-wheeling diode and feature adjustable accel, decel, current limit, IR comp, min and max speed pots to match applications. The anti-demag feature protects PM motors and helps protect the SCR power bride against direct shorts. The controls have US and Canadian UL component recognition.

Hp Range	Catalog Number	Description Input Voltage / Max. Hp	List Price	Mult. Sym.	Ap'x. Shpg. Wgt.	Input Voltage
1/100-1 1/2 (a)	<b>BC141</b>	Standard Model, single voltage	180	E9	1	115
1/100-1 1/2	<b>BC141-SIH</b>	BC141 with BC152 Signal Isolator and BC143 Heatsink factory installed	425	E9	2	115
1/100-3 (a)	<b>BC142</b>	Standard Model, single voltage	180	E9	2	230
1/100 - 3	<b>BC142-SIH</b>	BC142 with BC152 Signal Isolator and BC143 Heatsink factory installed	445	E9	2	115/230
1/100-1 1/2 (a) 1/50-3	<b>BC142-5</b>	Dual voltage, without fuse holders	180	E9	1	115/230
1/100 - 1 1/2 (a) 1/50 - 3	<b>BC142-6</b>	Standard Model, dual voltage	198	E9	1	115/230
1/100 - 1 1/2 1/50 - 3	<b>BC142-6-SIH</b>	BC142-6 with BC152 signal isolator board and BC143 heatsink factory installed	445	E9	1	115/230
5	<b>BC155</b>	120V - 1 Hp, 230V - 2 Hp	588	E9	5	230

**NOTE:** Above controls include 5k speed potentiometer.

(a) 1-1.5 Hp at 115 Volts and 2-3 Hp at 230 Volts, requires BC143 Heatsink kit.

BC155 Includes integral heatsink. Please refer to page 291 for features.

### Plug-in Horsepower Resistor and Fuse Kit



A Plug-in Horsepower Resistor® and armature fuse **must** be ordered and installed in BC138, BC139, BC140, BC140-FBR, BC141 and BC142.

These should be selected based on the motor's **rated current**. The price of the Hp resistor and fuse is included in the BC138, BC139, BC140, BC140-FBR, BC141 and BC142 list price.

See selection below for catalog number.

Spare resistor kits are available for \$9.00 list, **E9** multiplier.

Motor Hp Armature Voltage		Plug-In Hp Resistor Resistance Value (Ohms)	Catalog Number	Ap'x DC Current (Amps)	DC Fuse Rating For Armature
90-130V	180V				
1/100	1/50	1.0	<b>BR1000</b>	0.20	0.5
1/50	1/25	0.51	<b>BR0510</b>	0.30	0.5
1/30	1/15	0.35	<b>BR0350</b>	0.33	0.5
1/20	1/10	0.25	<b>BR0250</b>	0.5	0.75
1/15	1/8	0.25	<b>BR0251</b>	0.8	1.0
1/12	1/6	0.18	<b>BR0180</b>	0.85	1.25
1/8	1/4	0.1	<b>BR0100</b>	1.3	2.0
1/6	1/3	0.1	<b>BR0101</b>	2.0	2.5
1/4	1/2	0.05	<b>BR0050</b>	2.5	4.0
1/3	3/4	0.035	<b>BR0035</b>	3.3	5.0
1/2	1	0.025	<b>BR0025</b>	5.0	8.0
3/4	1 1/2	0.015	<b>BR0015SP</b>	7.5	12.0
1 (a)	2 (a)	0.01	<b>BR0010SP</b>	10	15.0
1 1/2 (a)	3 (a)	0.006	<b>BR0006</b>	15	25.0 (b)

**NOTE:** (a) External Heatsink required. (b) Also used with AC Line Fuse. For AC line fuse rating see manual.

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### NEMA 4X DC Control and Accessories

**1/4 thru 2 Hp    115/230 VAC    Single Phase 50/60 Hz.**  
**3 Hp                230 VAC                Single Phase 50/60 Hz.**

**Applications:** Constant torque, new or replacement.

**Features:** BC154, BCWD140 and BC160 are non-regen controls with reversal by means of switching the armature leads (BCWD140 has a forward/brake/reverse switch mounted). BC254 is a line regenerative SCR control that can drive the motor to a timed stop. BC354 is a PWM control that provides low-ripple DC power to the motor allowing more Hp when used with a 140 or 280 VDC motor. All offer a choice of armature or tachometer feedback and a speed or torque mode. No Hp resistors are needed for these controls, current is jumper selectable. BC154, BC160, BC254 and BC354 are painted black and come with a start-stop switch. BCWD140 comes with white epoxy paint and also forward/brake/reverse and run-jog switches. See pages 290-291 for features.



Hp Range	Catalog Number	Description Input Voltage / Max. Hp	List Price	Mult. Sym.	Ap'x. Shpg. Wgt.	Input Voltage
<b>NEMA 4X SCR (black)</b>						
1/4-2	<b>BC154</b>	Standard model - 120V - 1 Hp, 230V - 2 Hp	416	E9	5	115/230
	<b>BC154-P</b>	BC154 with POWER SWITCH instead of START/STOP SW.	416	E9	5	115/230
	<b>BC154-R</b>	BC154 with BC156 - FBR Switch factory installed	550	E9	5	115/230
	<b>BC154-SI</b>	BC154 with BC145 Signal Isolator Board and BC158 Auto/Man Switch kit factory installed	670	E9	5	115/230
3	<b>BC160</b>	230V - 3 Hp	479	E9	3	230
<b>NEMA 4X Washdown Duty SCR (white)</b>						
1/4-2	<b>BCWD140</b>	120V - 1 Hp, 230V - 2 Hp	557	E9	6	115/230
<b>NEMA 4X Washdown Duty Line Regen SCR (black)</b>						
1/8-2	<b>BC254</b>	120V - 1 Hp, 230V - 2 Hp (a)	599	E9	5	115/230
	<b>BC254-FBR</b>	BC254 with BC253 FWD-BRAKE-REV switch factory installed	622	E9	5	115/230
<b>NEMA 4X Washdown Duty PWM DC (black) (b)</b>						
1/4-2	<b>BC354</b>	120V - 1 Hp, 230V - 2 Hp	645	E9	5	115/230

**NOTE:** (a) See page 289 for BC254 accessories.

(b) Output current is 7.5 amps; Output voltage is 140VDC for 115VAC input - 280VDC for 230VAC input. Motors designed for these voltages will give the best performance.

### DC SCR NEMA 4X DC Control Accessories

Catalog Number	Description	List Price	Mult. Sym.	Ap'x. Shpg. Wgt.
<b>BC153</b>	Electronic Forward-Dynamic Brake-Reverse Kit for BC154, BC354	198	E9	1
<b>BC156</b>	Mechanical Forward-Dynamic Brake-Reverse Switch for BC154, BC354	128	E9	1
<b>BC157</b>	Run/Jog switch for BC154 & BC160, BC354	23	E9	1
<b>BC158</b>	Auto/Manual Installation Kit for BC145 signal isolator for BC154, BC160, BC354	53	E9	1
<b>BC159</b>	AC Line Switch Kit for BC154, BCWD140, BC254, BC354	28	E9	1
<b>BC145</b>	Signal Isolator Board	187	E9	1

**NOTE:** BC159 AC Line Switch Kit is factory installed on BC154, BCWD140, BC354. Listed here as replacement or spare parts.

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### Line Regenerative DC Controls and Accessories



**1/4 thru 3 Hp  
5 Hp**

**115/230 VAC  
230 VAC**

**Single Phase 50/60 Hz.  
Single Phase 50/60 Hz.**

**Applications:** Frequent start/stop/reverse applications or where controlled braking is required.

**Features:** Single phase line regenerative open chassis control to operate permanent magnet or wound field DC motors. These line regen controls are ideal for applications with overhauling loads. In torque mode, it can be used for tensioning applications. Several accessory boards are available to further customize the control. Includes 5k speed potentiometer. Jumper selectable current settings.

Hp Range	Catalog Number	Description Input Voltage / Max. Hp	List Price	Mult. Sym.	Ap'x. Shpg. Wgt.	Input Voltage
<b>Line Regen SCR</b>						
1/8-2 (a)	<b>BC204</b>	120V 1 Hp, 230V 2 Hp, Standard Model	336	E9	3	115/230
	<b>BC204-BPSI</b>	BC204 with BC215 Bi-polar Signal Isolator factory installed	434	E9	3	
1/4-2	<b>BC200</b>	120V 1 Hp, 230V 2 Hp	628	E9	4	115/230
1/4-3	<b>BC201</b>	120V 1-1/2 Hp, 230V 3 Hp	746	E9	1	115/230
5	<b>BC203</b>	230V 5Hp	939	E9	10	230
<b>NEMA 4X Washdown Duty Line Regen SCR</b>						
1/8-2	<b>BC254</b>	120V - 1Hp, 230V - 2Hp Standard Model	599	E9	5	115/230
	<b>BC254-FBR</b>	BC254 with Power On/Off switch instead of Start/Stop switch, and BC253. Forward-Brake-Reverse switch factory installed	622	E9	5	115/230

**NOTE:** (a) 1 Hp at 115 volts and 2 Hp at 230 volts requires BC143 heatsink kit.

### Line Regenerative DC Control Accessories

Catalog Number	Description	List Price	Mult. Sym.	Ap'x. Shpg. Wgt.
<b>Accessories for BC200, BC201 and BC203</b>				
<b>BC212</b>	Bipolar signal isolator board	192	E9	1
<b>Accessories for BC204</b>				
<b>BC143</b>	External Heatsink Kit	63	E9	2
<b>BC215</b>	Bipolar signal isolator board	89	E9	3
<b>BC216</b>	Multispeed board for BC204	68	E9	1
<b>BC218</b>	DIN rail mounting kit	31	E9	1
<b>Accessories for BC254</b>				
<b>BC245</b>	Bipolar signal isolator for BC254	189	E9	1
<b>BC253</b>	Forward-Stop-Brake-Reverse Switch for BC254	23	E9	1
<b>BC258</b>	Auto-manual Switch for BC254	53	E9	1
<b>BC259</b>	AC Line Switch for BC254	23	E9	5

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### NEMA Enclosed DC Control Specifications

Features	Catalog Number											
	BC138		BC139		BC140 or BC140-FBR		BC154		BC160		BCWD140	
Enclosure	NEMA 1		NEMA 1		NEMA 1		NEMA 4X		NEMA 4X		NEMA 4X Washdown	
Control Type	NEMA K		NEMA K		NEMA K		NEMA K		NEMA K		NEMA K	
AC Line Input	115		230		115 230		115 230		230		115 230	
DC Armature Voltage Nominal	90		180		90 180		90 180		180		90 180	
Shunt Field Power Supply	50/100		100/200		50/100 100/200		50/100 100/200		100/200		50/100 100/200	
Rated Horsepower Range	1/100 - 1/3		1/50-3/4		1/100-1 1/50-2		1/50-1 1/25-2		3		1/50-1 1/25-2	
External Heat Sink (BC143) Required	No		No		1 Hp 2Hp		Not Required		Not Required		Not Required	
Speed Range (Motor May Be 20: 1 Constant Torque)	50:1		50:1		50:1		50:1		50:1		50:1	
Adjustable Acceleration Time	Yes		Yes		Yes		Yes		Yes		Yes	
Adjustable Deceleration Time	Yes		Yes		Yes		Yes		Yes		Yes	
Minimum Speed Adjustable	Yes		Yes		Yes		Yes		Yes		Yes	
Maximum Speed Adjustable	Yes		Yes		Yes		Yes		Yes		Yes	
Current Limit Adjustable	Yes		Yes		Yes		Yes		Yes		Yes	
Adjustable Current Limit and Trip Out Type	No		No		No		Timed or Non-Timed		Timed or Non-Timed		Timed or Non-Timed	
Control Of Speed or Torque	Speed		Speed		Speed		Speed or Torque		Speed or Torque		Speed or Torque	
IR Compensation Adjustable	Yes		Yes		Yes		Yes		Yes		Yes	
Tachometer Feedback Input	No		No		No		Yes		Yes		Yes	
Plug-In Horsepower Resistor ®	Required		Required		Required		N/A		N/A		N/A	
UL & cUL Listing, CE	Yes		Yes		Yes		Yes		Yes		Yes	
AC Line Fuse	Included		Included		Included		External		External		External	
DC Armature Fuse	Included with Hp Resistor		Included with Hp Resistor		Included with Hp Resistor		Not Supplied with Control		External		Not Supplied with Control	
<b>Options</b>												
AC Line Switch	Standard		Standard		Standard		Opt - BC159		No		Standard	
Forward/Brake/Reverse Switch	No		No		Opt-BC144		Opt-BC156		No		Standard	
Mechanical	No		No		No		Opt-BC153		No		Opt-BC153	
Electronic	No		No		No		Opt-BC157		Opt-BC157		Standard	
Run/Jog Switch	No		No		No		Internal		Internal		External	
Input Signal	No		No		Opt-BC145		Mount		Mount		Mount	
Following Mode Capability	No		No		Opt-BC145		Opt-BC145		Opt-BC145		Opt-BC145	
Current (1-5, 4-20, 20-50mA)	No		No		Opt-BC145		Standard		Standard		Standard	
Voltage (0-25,0-120, VDC)	No		No		Opt-BC145		(0-5,0-10 VDC)		(0-5,0-10 VDC)		(0-5,0-10 VDC)	
Electrical Connection To Control Barrier Terminal Block	Standard		Standard		Standard		Standard		Standard		Standard	
Current Sensing Relay/Overload Protector	No		No		Opt - BC146		Standard		Standard		Standard	
AC Line Filter for CE	Opt-BC24-LF		Opt-BC24-LF		Opt-BC24-LF		Opt-BC24-LF		Opt-BC24-LF		Opt-BC24-LF	

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### Chassis Mount DC Control Specifications

Features	Catalog Number								
	BC141	BC142	BC142-6	BC155	BC204	BC200	BC201	BC203	
Enclosure	Chassis	Chassis	Chassis	Chassis	Chassis	Chassis	Chassis	Chassis	Chassis
Control Type	NEMA K	NEMA K	NEMA K	NEMA K	Regenerative	Regenerative	Regenerative	Regenerative	Regenerative
AC Line Input	115	230	115 230	230	115 230	115 230	115 230	115 230	230
DC Armature Voltage Nominal	90	180	90 180	180	90 180	90 180	90 180	90 180	180
Shunt Field Power Supply Voltage - DC	50/100	100/200	50/100 100/200	50/100 100/200	50/100 100/200	50/100 100/200	50/100 100/200	100/200	100/200
Rated Horsepower Range	1/100-1.5	1/50-3	1/100-1 1/2 1/50-3	5	1/8-1 1/4-2	1/4-1 1/2-2	1/4-1-1/2 1/2-3		5
External Heat Sink (BC143) Required	1 Hp-Up	2 Hp-Up	1/2 Hp-Up 1 Hp-Up	Not Required	90V-1Hp 180V-2Hp	Not Required	Not Required	Not Required	Not Required
Speed Range (Motor may be 20:1 Constant Torque)	50:1	50:1	50:1	50:1	50:1	50:1	50:1	50:1	50:1
Adjustable Acceleration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjustable Deceleration	Yes	Yes	Yes	Yes	Fwd & Rev Regen	Fwd & Rev Regen	Fwd & Rev Regen	Fwd & Rev Regen	Fwd & Rev Regen
Min. Speed Adjustable	Yes	Yes	Yes	Yes	No	No	No	No	No
Max. Speed Adjustable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjustable Current	Non	Non	Non	Non	Non	Non	Non	Non	Timed
Limit and Tripout Type	Timed	Timed	Timed	Timed	Timed	Timed	Timed	Timed	Timed
Control of Speed or Torque	Speed	Speed	Speed	Speed Torque	Speed or Torque	Speed or Torque	Speed or Torque	Speed or Torque	Speed
IR Compensation Adjustment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tachometer Feedback Input	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plug-in Horsepower Resistor®	Required	Required	Required	N/A	N/A	N/A	N/A	N/A	N/A
UL & cUL Listing, CE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AC Line Fuse	Included	Included	Included	External	External	Included	Included	Included	External
DC Armature Fuse	Included with Hp Resistor	Included with Hp Resistor	Included with Hp Resistor	Included with Hp Resistor	External	Included with Hp Resistor	Included with Hp Resistor	Included with Hp Resistor	External
<b>Options</b>									
Input Signal									
Following Mode Capability					No				No
Current (1-5, 4-20, 20-50 mA)	Opt-BC145	Opt-BC145	Opt-BC145	Opt-BC145	Std	No	No	Std 0-±10VDC	
Voltage (0-25, 0-120, VDC)	Opt-BC145	Opt-BC145	Opt-BC145	Std 0-10 VDC	Opt BC215	Std 0-±10 VDC	Std 0-±10 VDC	Opt-BC212	
0-25, 0-120, VDC)	No	No	No	No	with BC214	Opt-BC212	Opt-BC212		
Electrical Connection									
To Control									No
Push-On Quick Connects	Standard	Standard	Standard	No	Standard	No	No	Standard	
Barrier Terminal Block	Opt-BC147	Opt-BC147	Opt-BC147	Standard	N/A	Standard	Standard		
Current Sensing Relay/									
Overload Protector	Opt-BC146	Opt-BC146	Opt-BC146	Opt-BC146	N/A	Standard	Standard	Standard	
Regenerative						Opt	Opt	Opt	
Accel / Decel Board	No	No	No	No	No				
AC Line Filter for CE	Opt-BC24-LF	Opt-BC24-LF	Opt-BC24-LF	Opt-BC24-LF	Opt-BC24-LF	Opt-BC24-LF	Opt-BC24-LF	Opt-BC24-LF	Opt-BC24-LF

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