Boston Gear®
CC & CBC Series

Preassembled Clutch and Clutch/Brake Modules

P-1507-C
819-0397

Installation and Operation

Doc. No. 83441

CC & CBC Series

Boston® Gear

An Altra Industrial Motion Company

Contents

Boston Gears' Clutch and Brake Modules have been designed to NEMA standards and can be installed with all standard power transmission drive systems.

Before installing the Clutch or Brake to a motor or reducer, make certain that the Clutch or Brake size and NEMA frame dimensions match according to the following chart.

Corresponding NEMA Frame Sizes				
				C-Face
	NEMA		Shaft	Pilot
Size	Frame		Dia.	Dia.
CC/CBC56-16A	56 C		5/8	4 1/2
CC/CBC180-30A	182 C 184 C	143 TC 145 TC	7/8	4 1/2
CC/CBC210-95A	213 C 215 C	182 TC 184 TC	1 1/8	8 1/2

Install your specific module according to the installation steps specified below.

The clutch and clutch/brake modules are furnished with a special hardened key. It is strongly recommended that this key be used with the motor shaft to avoid damage to the shaft and rotor hub.

The CC/CBC210-95A units require an adapter ring to be mounted to the motor prior to mounting the unit. Adapter and mounting hardware are provided with the assembly.

Note: The equipment covered by this service manual must be installed in accordance with these instructions. Failure to do so may damage the equipment and void the warranty.

Mounting to a Motor:

1. Replace the existing motor shaft key provided with the unit. If necessary, prick punch the keyway of the motor shaft to keep the key from moving in the keyway. Slide the assembly onto the motor shaft as shown in Figure 1. Align the key in the keyway in the rotor hub motor shaft.

   Do not use force. If the unit does not slide on freely, polish the motor shaft sufficiently to achieve a slip fit.

Figure 1

⚠WARNING Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.

2. The housing is provided with vent holes which are normally placed in the down position. Rotate the assembly to where the vent holes are toward the bottom and insert the four long capscrews (provided) through the mounting holes in the housing and into the motor face. Tighten alternately and securely. (30 to 35 ft. lbs.)

Figure 2

3. The access hole for the Allen wrench to tighten the rotor setscrews is shown in Figure 3. Rotate the clutch rotor as necessary to insert the wrench into the setscrews. Tighten both screws alternately and securely. Failure to properly tighten the setscrews may result in damage to the motor shaft and rotor hub and will void the warranty. (40 to 45 in. lbs. for 180 size, 80 to 85 in. lbs. for 56 and 210 sizes)

Figure 3

Mounting to a Reducer

The output side of a the clutch or Clutch/Brake unit may be mounted directly to a reducer.

A. Align the output shaft and key of the module with the corresponding shaft hole and keyway of the reducer. Slide the assembly together, matching the pilot diameter on the module with the pilot diameter on the reducer.

B. Bolt the module to the reducer flange. The four (4) bolts required (3/8 - 16 UNC-2A) are normally furnished with the reducer. (18 to 22 ft. lbs. for 56 and 180 sizes, 40 to 45 lbs. for 210 size)

Figure 4

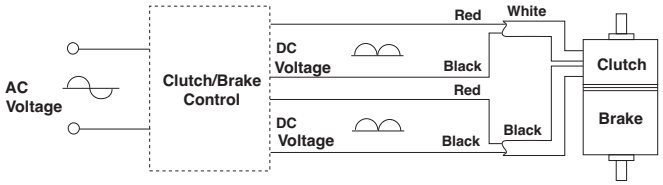
Electrical Connections

⚠WARNING To avoid injury (or even death), always make certain all power is off before attempting to install or service this control or any electrical equipment.

The Clutch and Clutch/Brake units are provided with one conduit connection hole, threaded for standard 1/2" conduit connectors. Both the clutch and the brake lead wires are brought out through this opening. The conduit box accessory kit, XCC-CB, provides two conduit connection holes for standard 1/2" conduit connectors.

The clutch and brake coils operate on 90 VDC voltage. Boston Gear offers a full line of AC voltage powered controls to meet the needs of almost every clutch/brake application. The service and installation instructions included with each Boston Gear control show the proper electrical connections.

Please refer to the figure below for the proper Clutch/Brake electrical connections. **Clutch leads are identified with a white insulator sleeve. Brake leads have a black insulator sleeve.**



Start-Up

With the motor at rest, check the following:

A. Spin the output shaft by hand to ensure that it turns freely. The bearings should be quiet and the armatures should not drag.

B. With full voltage applied to the clutch or brake, switch back and forth between the clutch and brake and observe the armatures (plates) through the vent holes and opening in the fan. They should move back and forth approximately 1/32" when switched. Turn the output shaft as you check to be sure that the armatures fully engage 360 degrees.

Trouble Shooting - Electrical

If a clutch or brake or clutch/brake will not engage, review wiring, switching, and connections.

1. Using a multimeter, confirm that DC voltage is reaching the lead wires when it should be and that the coil resistance is correct. (See Electrical Coil Data)

2. Visually inspect to ensure that the lead wires are not split or cut.

Trouble Shooting - Mechanical

A likely mechanical cause for a clutch or brake not engaging when DC power is applied is that the airgap between the friction faces is too large. When power is applied to an Electro-magnetic clutch/brake, the unit magnetically clamps the friction faces together.

An airgap that is too large can keep the unit from clamping together. Sometimes this airgap, when set at the factory can shift during shipment or installation.

To reset the airgap, you will need to access the armatures. There are gaps between the fins on the housing on 1/3 of the unit circumference.

When looking through one of these gaps, you will see the fan on the clutch rotor. In that fan, there is a 1/2” x 1” window. (Figure 5)

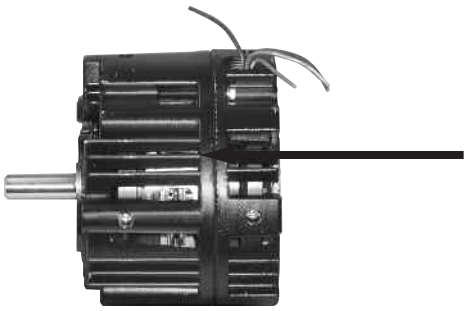


Figure 5

It is possible to look inside the unit and see the armatures by looking through this window. When looking into the window, you will be looking between the two armatures of a clutch/brake unit. (Figure 6)

Figure 6

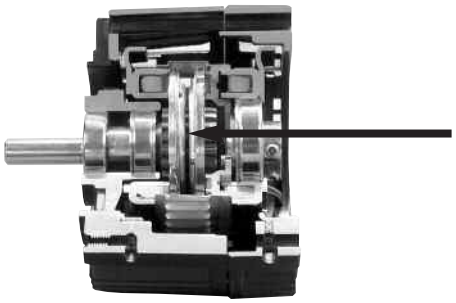


Figure 7

If the armature for either the clutch or the brake is too far away from its mating friction surface, it is possible to move this back into adjustment using a flat head screwdriver (Figure 7).

This is a three-step process.

1. Simply slide the screwdriver through the window and press the armature toward its mating friction surface.

2. Rotate the output of the unit. The rotor and window should stay in place when you do this. Only the armatures will move. Rotating the rotor will move the window.

3. Repeat steps 1 & 2 to ensure that the airgap between the armature and its mating friction surface is about 1/32" and that the armature is kept square. (If the armature is cocked, it may engage on one rim, giving the appearance of engagement but failing to provide full torque.)

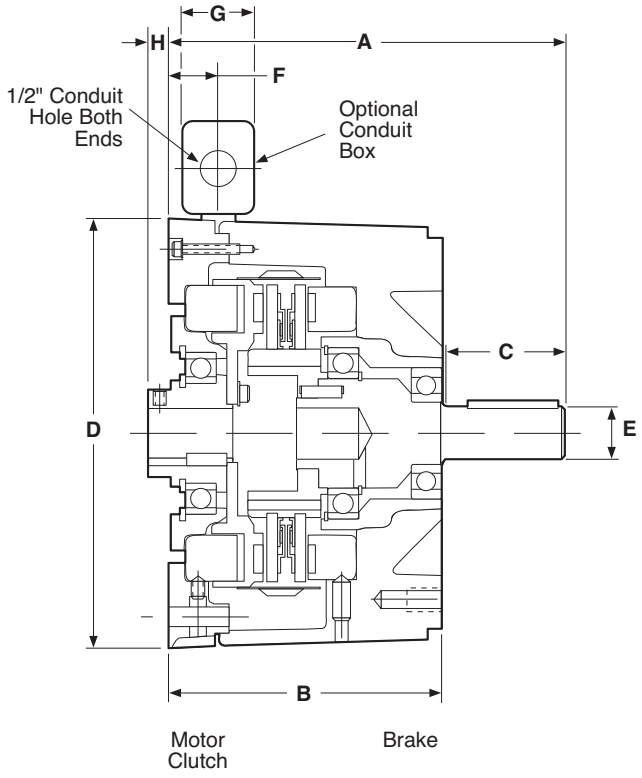
If a scraping sound is noted when the output shaft is spun, it means an armature is dragging. Insert a screwdriver through the vent holes and slot in the fan and pry the dragging armature (clutch or brake as observed) away from the mating surface evenly all the way around. Recheck the engagement as described in Step B of the Start-Up Instructions.

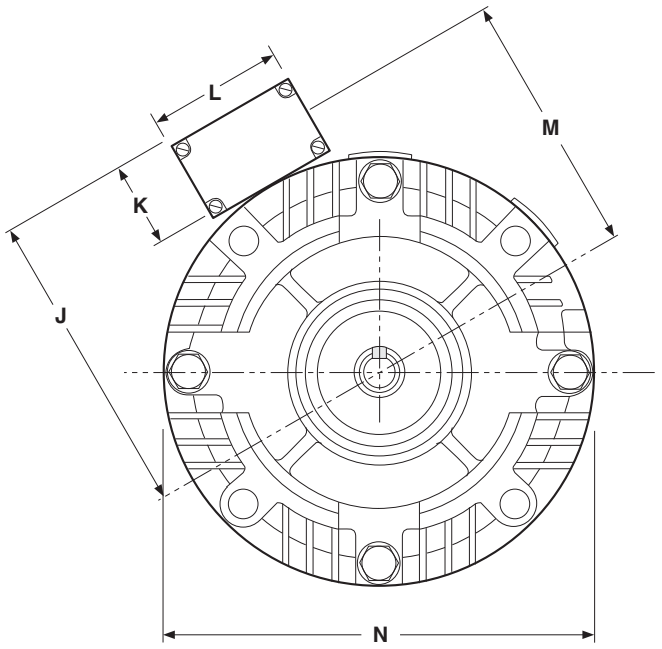
Electrical Coil Data: (Clutch/Brake)

		Clutch	Brake
Voltage–D.C.		**90**	**90**
Resistance	CC/CBC56-16A	452	452
(OHMS)	CC/CBC180-30A	362	362
	CC/CBC210-95A	248	248
Amperes	CC/CBC56-16A	199.	201
	CC/CBC180-30A	.230	.230
	CC/CBC210-95A	.363	.363
WATTS	CC/CBC56-16A	18	18
	CC/CBC180-30A	20.7	20.7
	CC/CBC210-95A	32.7	32.7
Build Up	CC/CBC56-16A	52	53
(Milliseconds)	CC/CBC180-30A	72	75
	CC/CBC210-95A	120	100
Decay	CC/CBC56-16A	6.2	5.0
(Milliseconds)	CC/CBC180-30A	12	10
	CC/CBC210-95A	20	10

Mechanical Data

	CC/CBC 56-16A	CC/CBC 180-30A	CC/CBC 210-95A
Static Torque	16 lb. ft.	30 lb. ft.	95 lb. ft.
Maximum Speed	3600 rpm	3600 rpm	3600 rpm
Average Weight-lbs.			
CC	8.3	10.3	24.3
CBC	10	13.2	30.6
Inertia - WR-lb. ft.			
CC - Input	.021	.047	.190
CC - Output	.0105	.027	.112
CBC -Input	.021	.047	.190
CBC - Output	.0195	.050	.193





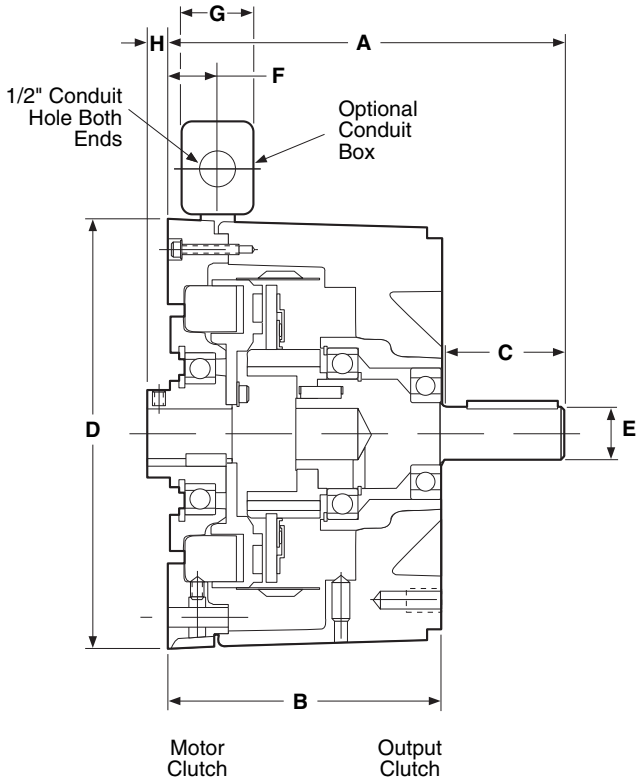
XCC-CB conduit box is optional and is ordered separately.

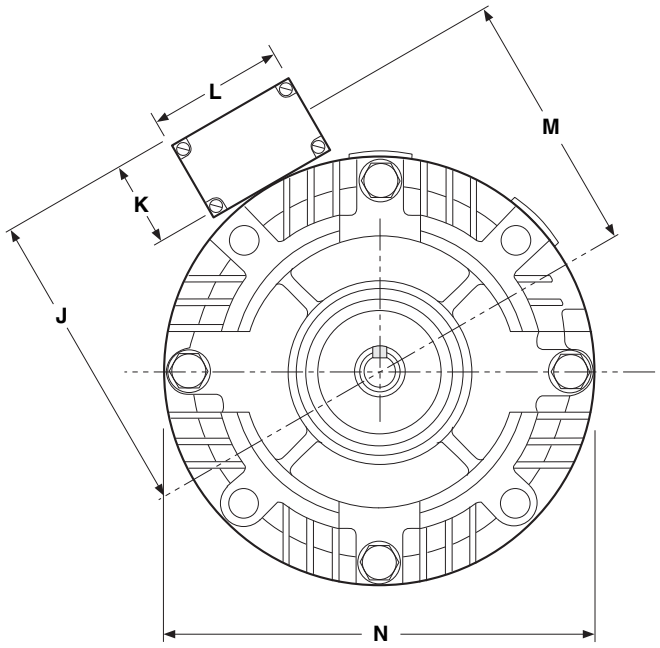
All dimensions are nominal, unless otherwise noted.

Catalog Number	A	B	C	D	E	F	G	H
CBC56-16A	6.750	4.844	1.813	6.750	.625	.937	2.203	----
CBC180-30A	6.828	4.844	1.812	6.750	.875	.937	2.203	----
CBC210-95A	8.891	5.922	2.500	9.250	1.125	.500	2.203	.500

Catalog Number	J	K	L	M	N
CBC56-16A	5.531	2.188	3.250	4.438	6.688
CBC180-30A	5.531	2.188	3.250	4.438	6.688
CBC210-95A	6.859	2.188	3.250	5.766	9.688

Catalog Number	Voltage DC	Static Torque	Max. Speed	NEMA Frame Size
CBC56-16	90	16 lb. ft.	3600 rpm	56C
CBC180-30A	90	30 lb. ft.	3600 rpm	182C/143TC 184C/145TC
CBC210-95A	90	95 lb. ft.	3600 rpm	213C/182TC 215C/184TC





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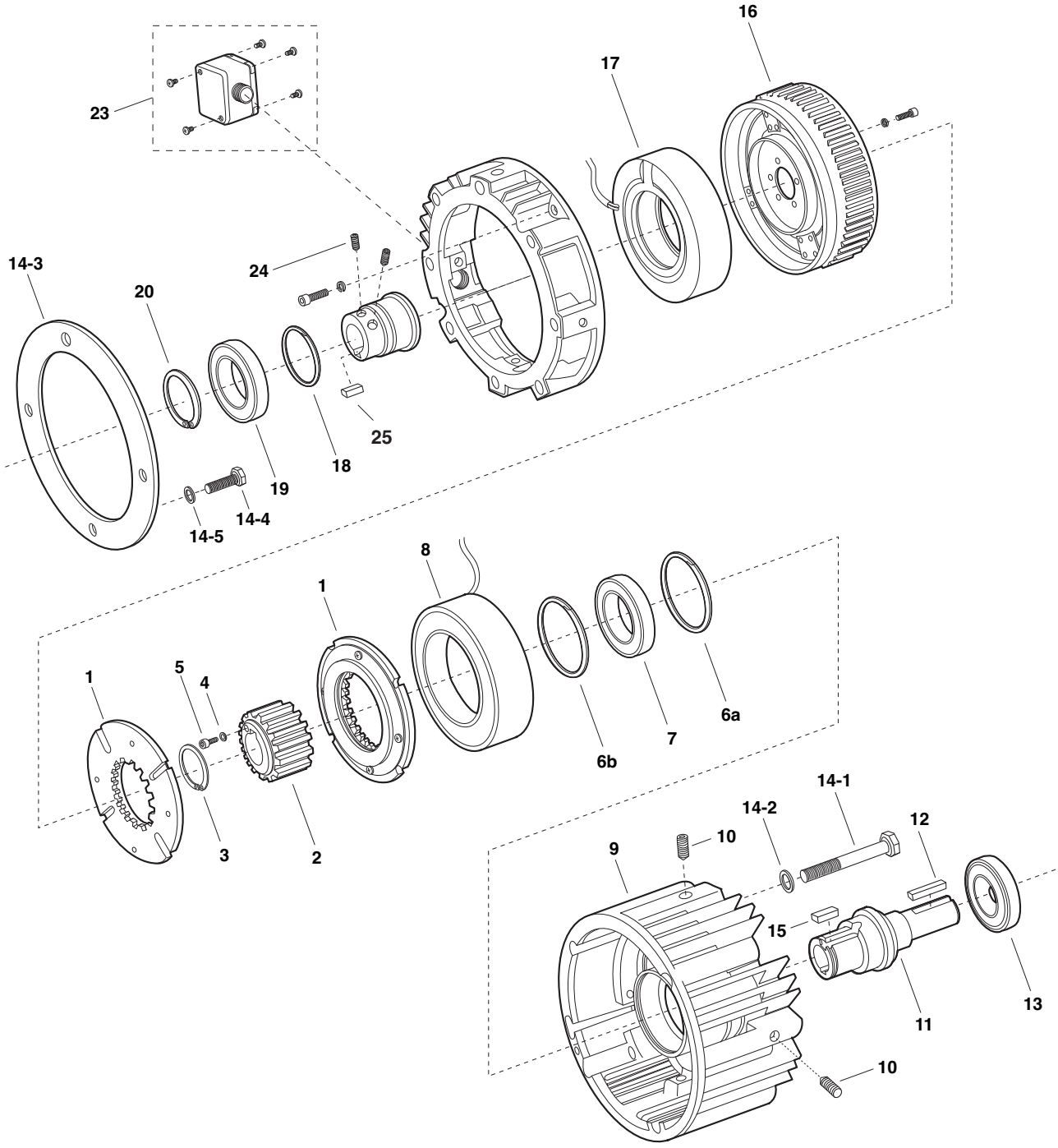
CC56-16A	90	16 lb. ft.	3600 rpm	56C
CC180-30A	90	30 lb. ft.	3600 rpm	182C/143TC
				184C/145TC
CC210-95A	90	95 lb. ft.	3600 rpm	213C/182TC
				215C/184TC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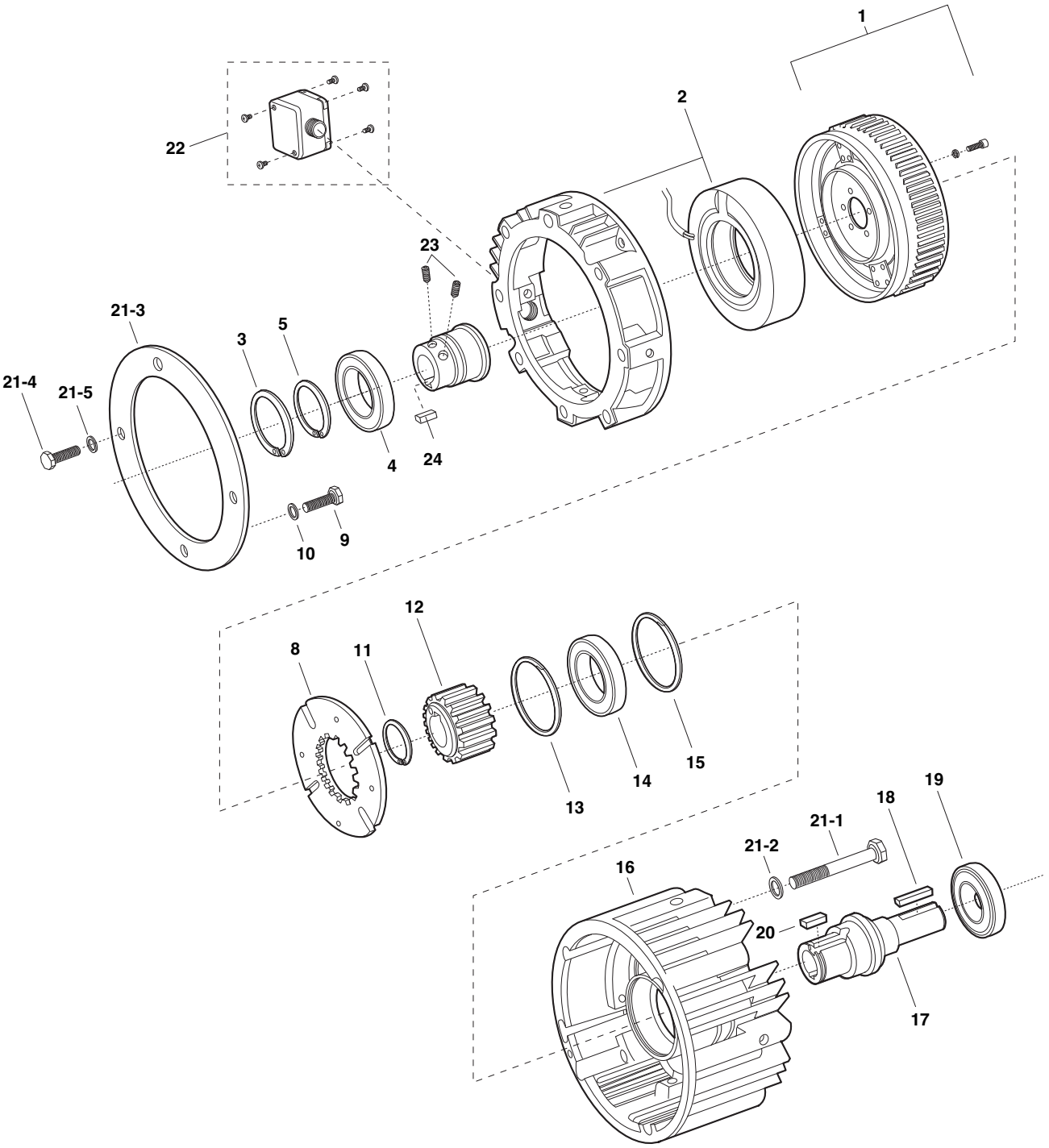
Item	Description	CBC56-16A Part No.	CBC56-16A Qty	CBC180-30A Part No.	CBC180-30A Qty	CBC210-95A Part No.	CBC210-95A Qty
1	Armature Assembly	5370-111-011	2	5370-111-013	2	5371-111-005	2
2	Armature Hub	540-1638	1	540-1642	1	540-2053	1
3	Retaining Ring	748-0445	1	748-0676	1	N/R	
4	Lockwasher	N/R		N/R		950-0372	6
5	Capscrew	N/R		N/R		797-0081	6
6a	Retaining Ring	748-0113	1	748-0101	1	748-0112	1
6b	Retaining Ring	748-0113	1	N/R		N/R	
7	Ball Bearing	166-0149	1	166-0101	1	166-0142	1
8	Magnet	5370-631-007	1	5370-631-003	1	5371-631-003	1
9	Housing	535-0165	1	535-0162	1	535-0163	1
10	Setscrew	797-0471	4	797-0471	4	797-0471	4
11	Shaft	798-0046	1	798-0085	1	798-0051	1
12	Key	590-0029	1	590-0029	1	590-0019	1
13	Ball Bearing	166-0155	1	166-0143	1	166-0144	1
14	Mounting Accessory	5370-101-040	1	5370-101-040	1	5370-101-038	1
	14-1 Capscrew	797-1378	4	797-1378	4	797-1440	4
	14-2 Washer	950-0354	4	950-0354	4	950-0111	4
	14-3 Adapter	N/R		N/R		104-0321	1
	14-4 Capscrew	N/R		N/R		797-1442	4
	14-5 Washer	N/R		N/R		950-0101	4
15	Key	590-0043	1	590-0084	1	N/R	
16	Rotor Assembly (with fan and hub)	5370-751-019	1	5370-751-017	1	5371-751-012	1
17	Field (with housing)	5370-451-063	1	5370-451-058	1	5371-451-028	1
18	Retaining Ring	748-0101	1	748-0101	1	748-0558	1
19	Bearing	166-0150	1	166-0101	1	166-0168	1
20	Retaining Ring	748-0018	1	748-0001	1	748-0067	1
23	Conduit Box (Optional)	XCC-CB	1	XCC-CB	1	XCC-CB	1
24	Set Screw	797-1028	2	797-1028	2	797-1028	2
25	Key	5370-101-072	1	5370-101-072	1	5371-101-043	1

These units meet the standards of UL 508 and are listed under guide card #NMTR 2, file #59164. These units are CSA certified under file #LR11543.

N/R - Not Required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Item	Description	CC56-16A Part No.	CC56-16A Qty	CC180-30A Part No.	CC180-30A Qty	CC210-95A Part No.	CC210-95A Qty
1	Rotor Assembly (with fan and hub)	5370-751-019	1	5370-751-017	1	5371-751-012	1
2	Field (with housing)	5370-451-063	1	5370-451-058	1	5371-451-028	1
3	Retaining Ring	748-0101	1	748-0101	1	748-0558	1
4	Bearing	166-0150	1	166-0101	1	166-0166	1
5	Retaining Ring	748-0018	1	748-0001	1	748-0067	1
8	Armature Assembly	5370-111-011	1	5370-111-013	1	5371-111-005	1
9	Capscrew	N/R		N/R		797-0081	6
10	Lockwasher	N/R		N/R		950-0372	6
11	Retaining Ring	748-0445	1	748-0676	1	N/R	
12	Hub	540-1638	1	540-1642	1	540-2053	1
13	Retaining Ring	748-0113	1	748-0101	1	748-0112	1
14	Ball Bearing	166-0149	1	166-0101	1	166-0142	1
15	Retaining Ring	748-0113	1	N/R		N/R	
16	Housing	535-0167	1	535-0168	1	535-0169	1
17	Shaft	798-0046	1	798-0085	1	798-0051	1
18	Key	590-0029	1	590-0029	1	590-0019	1
19	Ball Bearing	166-0155	1	166-0143	1	166-0144	1
20	Key	590-0043	1	590-0084	1	N/R	
21	Mounting Accessory	5370-101-040	1	5370-101-040	1	5370-101-038	1
	21-1 Capscrew	797-1378	4	797-1378	4	797-1440	4
	21-2 Lockwasher	950-0354	4	950-0354	4	950-0111	4
	21-3 Adapter	N/R		N/R		104-0321	1
	21-4 Capscrew	N/R		N/R		797-1442	4
	21-5 Lockwasher	N/R		N/R		950-0101	4
22	Conduit Box (Optional)	XCC-CB	1	XCC-CB	1	XCC-CB	1
23	Set Screw	797-1028	2	797-1028	2	797-1028	2
24	Key	5370-101-072	1	5370-101-072	1	5371-101-043	1

N/R - Not Required

Warranty

Boston Gear warrants that products manufactured or sold by it shall be free from defects in material and workmanship. Any products which shall within two (2) years of delivery, be proved to the Company's satisfaction to have been defective at the time of delivery in these respects will be replaced or repaired by the Company at its option. Freight is the responsibility of the customer. The Company's liability under this limited warranty is limited to such replacement or repair and it shall not be held liable in any form of action for direct or consequential damages to property or person. The foregoing limited warranty is expressly made in lieu of all other warranties whatsoever, express, implied and statutory and including without limitation the implied warranties of merchantability and fitness.

No employee, agent, distributor, or other person is authorized to give additional warranties on behalf of Boston Gear, nor to assume for Boston Gear any other liability in connection with any of its products, except an officer of Boston Gear by a signed writing.

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