MagnaPLUS / MARINER / MagnaSELECT
Rectifier Replacement Guide

The MagnaPLUS is a 12 lead, brushless, AVR regulated generator. The excitation system consists of 4 main components: **the exciter stator winding, exciter rotor winding, voltage regulator and rectifier assembly**. The voltage regulator may be powered by a separate, small PMG mounted on the opposite drive end of the generator shaft.

If you have determined that one or more diodes have failed, the rectifier assembly and bearing must be replaced in order to place the generator back in service. This guide will walk you through the replacement process, step by step. For tools you will need a ratchet set, several medium-to-large flat blade screwdrivers. Several feet of string and some light duty card stock – the backside of a notepad, and a ½-13 x 4" (or longer) hex head cap screw will also be helpful.

All of the work will be done either in the conduit box on top of the generator or at the opposite drive end of the generator. The generator remains mounted to the engine.

WARNING

DISABLE AND LOCKOUT ANY ENGINE CRANKING DEVICES BEFORE ATTEMPTING TO SERVICE THE GENERATOR. FOR ELECTRIC START SETS, DISCONNECT THE CRANKING BATTERY. FOR AIR START, DISCONNECT THE AIR SUPPLY. FOR MOTOR GENERATOR SETS, OPEN THE POWER SUPPLY TO THE DRIVE MOTOR. FAILURE TO COMPLY WITH THESE SAFETY PROCEDURES COULD RESULT IN SEVERE PERSONAL INJURY OR EQUIPMENT DAMAGE.

SAFETY

1. **LOCK OUT / TAG OUT the Gen-Set.**
2. Remove Automatic Voltage Regulator power leads or fuse.
3. Remove and isolate Exciter Stator leads from Automatic Voltage Regulator

Step 1 : Heat Soak Replacement Bearing

Place new bearing in an oven (toaster ovens will work) and allow to heat soak at a maximum of 100°C (212°F) for approximately 1 hour. This will ease installation of the new bearing.

Step 2 : Disconnect Exciter Stator Leads

Remove Conduit Box Cover, set aside along with cap screws for reuse.

Disconnect exciter stator leads (F+ & F-) from the voltage regulator.

Tie the two leads together and secure the other end of the string in the conduit box.

Ensure the leads and string are free to move when the bearing bracket is removed.

Step 3 : Remove PMG Cover and PMG System (If unit is so equipped)

Discharge the capacitor by shorting the terminals with a jumper wire, screwdriver or other tool with an insulated handle.

Disconnect PMG power leads from capacitor.

At the opposite drive end of the generator, remove the plastic, PMG cover / Louver assembly and associated hardware that is mounted to the bearing bracket. Set aside for use during reassembly.

Remove PMG Stator and associated hardware. Set aside for use during reassembly.

Remove PMG Rotor and associated hardware – **including roll pin.** Set aside for use during reassembly.

Remove PMG stator adaptor and associated hardware. Set aside for use during reassembly.

Step 4 : Position Main Rotor

You should now be able to see the position of the main rotor poles through the bearing bracket.

Rotate the main shaft of the generator until two of the rotor poles are in a vertical position. If access space permits, **gently** insert card stock or other non-conductive spacer material between the main rotor and stator to limit the amount of rotor drop and ease reassembly.

Step 5 : Remove Bearing Bracket and Exciter Stator Assembly

Remove the bearing bracket retaining bolts and set aside for use during reassembly.

Using a pair of flat blade screwdrivers, work the bracket back off the generator frame. After approximately 1/8" the bracket will clear the frame support. The entire rotor and bracket assembly will drop until the main rotor is resting on the main stator.

Completely remove the bearing bracket from the bearing. Set to one side with the Exciter Stator winding face up. Untie string from exciter stator leads and allow to remain in place. You will use this string to fish the new exciter stator leads up through the generator frame in to the conduit box.

Closely inspect the bearing bore for any damage or wear which may result in the rotor dropping and contact between the rotor and stator, leading to extensive damage to the generator. **Replacement** of the bearing bracket **is strongly recommended** if any damage or wear is found.

Step 6 : Remove Bearing

Because the rectifier assembly will not pass over the bearing, it will be necessary to remove and replace the bearing as part of the rectifier assembly replacement process.

Using a bearing puller, remove the existing bearing. The PMG mounting hole is ½-13.

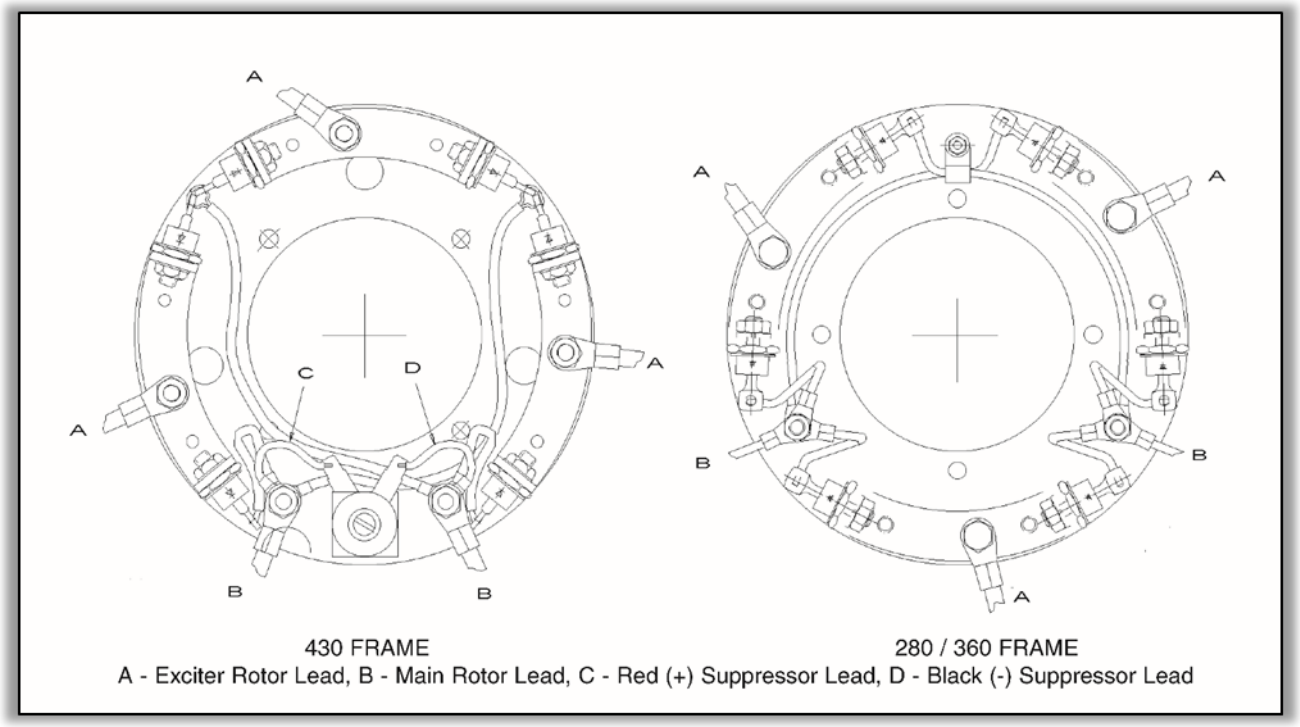
Step 7 : Remove Rotating Rectifier Assembly

All 6 diodes are in essentially the same circuit. When one diode has failed, all of the remaining diodes are stressed and there is no easy method in the field to determine the remaining life in the other diodes. To avoid continued failures, replacing the entire rotating rectifier assembly is strongly recommended.

Order the replacement rectifier assembly based unit model number and serial number.

Remove the three exciter rotor leads (**label A**) from the heat sinks and the two main rotor leads (**label B**) from the main rotor posts. Set hardware aside for possible reuse.

Remove the screws securing the rectifier assembly and remove the rectifier assembly from the mounting plate and shaft. Set hardware aside for possible reuse.



430 FRAME 280 / 360 FRAME

A - Exciter Rotor Lead, B - Main Rotor Lead, C - Red (+) Suppressor Lead, D - Black (-) Suppressor Lead

Slide the replacement rectifier assembly over the generator shaft and secure to the mounting plate. A small amount of non-permanent thread lock may be used. Torque until snug. Do not over-torque as this may result in damage to composite components.

Reattach the three exciter rotor leads (**label A**) to the heat sinks and the two main rotor leads (**label B**) to the main rotor posts. Torque until snug. Do not over-torque as this may result in damage to composite components.

Step 8 : Install Replacement Bearing

Always install the same type and size bearing that was supplied as original equipment. Order by part number from the parts list, and include the unit serial number and part number when ordering.

Clean and apply a thin coat of clean lubricating oil to the press fit area of the rotor shaft.

Using suitable heat resistant gloves, install the bearing over the end of the shaft until it seats firmly against the shaft shoulder. The bearing should slide on the shaft and be seated without excessive force. Should the bearing bind on the shaft prior to being seated against the shoulder, a piece of tubing slightly larger than the press fit area can be used to drive the bearing to its final position. Using light taps with a soft mallet, apply pressure to the inner race only.

Step 9 : Re-install Bearing Bracket and Exciter Stator Assembly

Position bearing bracket and exciter stator assembly at opposite drive end of generator.

Using string in place, tie new exciter leads together. Make sure that the leads will freely move when pulled back up to the conduit box.

Insert ½-13 x 4" hex head cap screw in to the PMG mounting hole on the shaft end.

Position bearing bracket in to generator frame, lifting main rotor and shaft assembly slightly until the shaft and bearing align with the bearing bore. Push the bearing bracket forward until firmly seated in the generator frame. Remove ½-13 x 4" hex head cap screw used for lifting.

Secure bracket with 4 hex head cap screws.

281 – 287 frame : 4 - M8 x 1.25 hex head cap screws. Torque to 18 - 20 ft-lbs.
361 – 364 frame : 4 - M8 x 1.25 hex head cap screws. Torque to 18 - 20 ft-lbs.
431 – 433 frame : 4 - 3/8-16 hex head cap screws. Torque to 25 – 30 ft-lbs.

Feed exciter stator leads up in to generator conduit box. Secure exciter stator leads (F+ & F-) on to F+ and F- on voltage regulator.

Step 10 : Re-install PMG Kit (If unit is so equipped)

Install PMG stator adaptor on bearing bracket. Secure with 4 - M6 x 1 hex head cap screws. Torque cap screws to 70 - 90 in-lbs.

Position PMG rotor and **roll pin** on generator shaft, inserting roll pin in to the predrilled hole in the generator shaft end. Secure PMG rotor to shaft with ½ - 13 x 4" hex head cap screw. Torque cap screw to 25 ft-lbs.

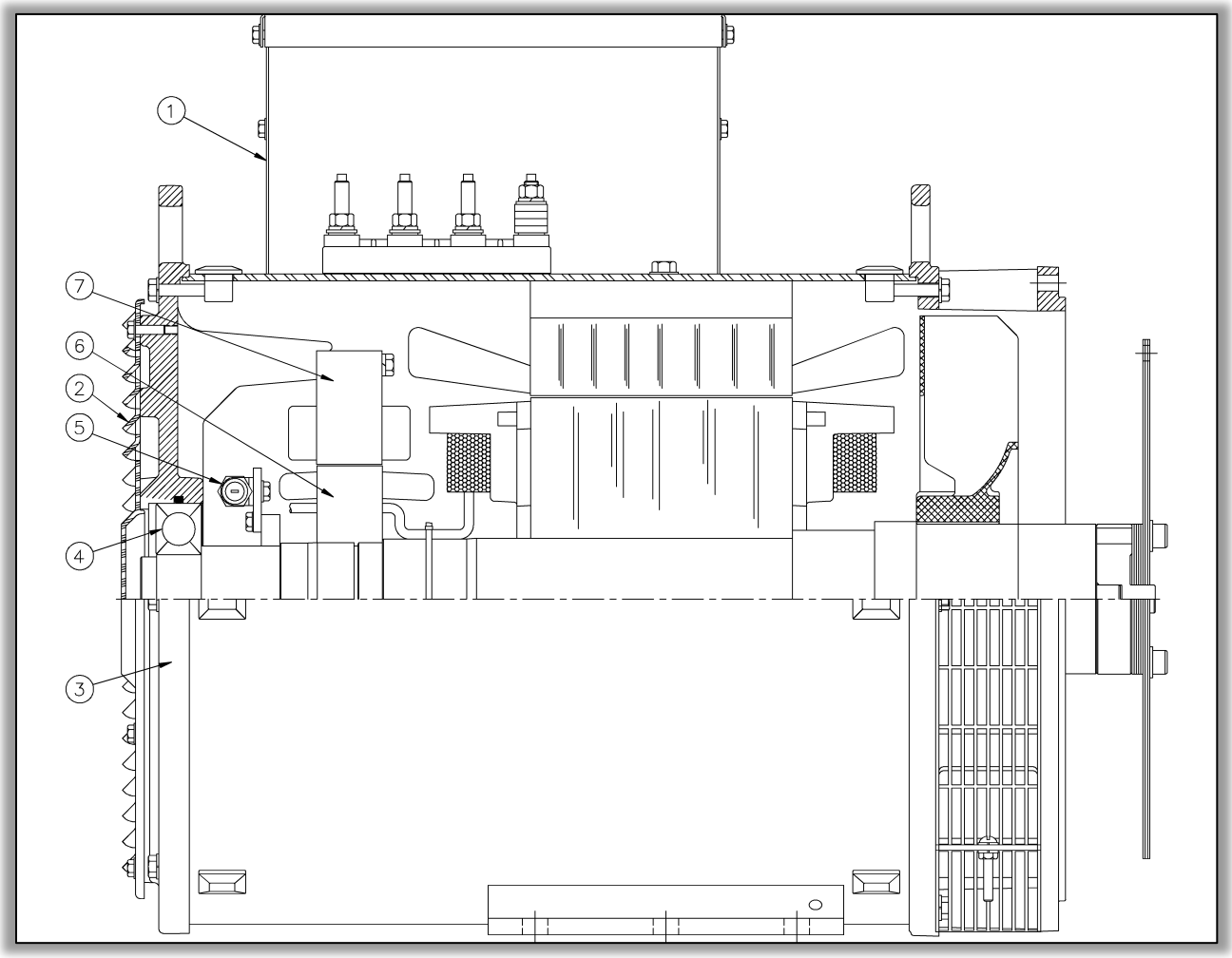
Install PMG stator assembly on to stator adaptor. Secure with 4 - ¼-20 x .75" hex head cap screws. Torque to 6 ft-lbs. Pass PMG stator leads through upper opening in bearing bracket and up in to generator conduit box. Attach PMG stator leads to capacitor in conduit box.

Inspect air gap between PMG rotor and stator. Nominal air gap is 0.040" which should be uniform. A piece of card stock, paper or other non-metallic material approximately 1/32" thick can be used as a feeler gauge. You may need to loosen the PMG stator and stator adaptor bolts to adjust the position of the PMG stator to achieve a uniform air gap. Make sure to re-torque any bolts loosened for alignment purposes.

Step 11 : Re-install PMG Cover (If unit is so equipped)

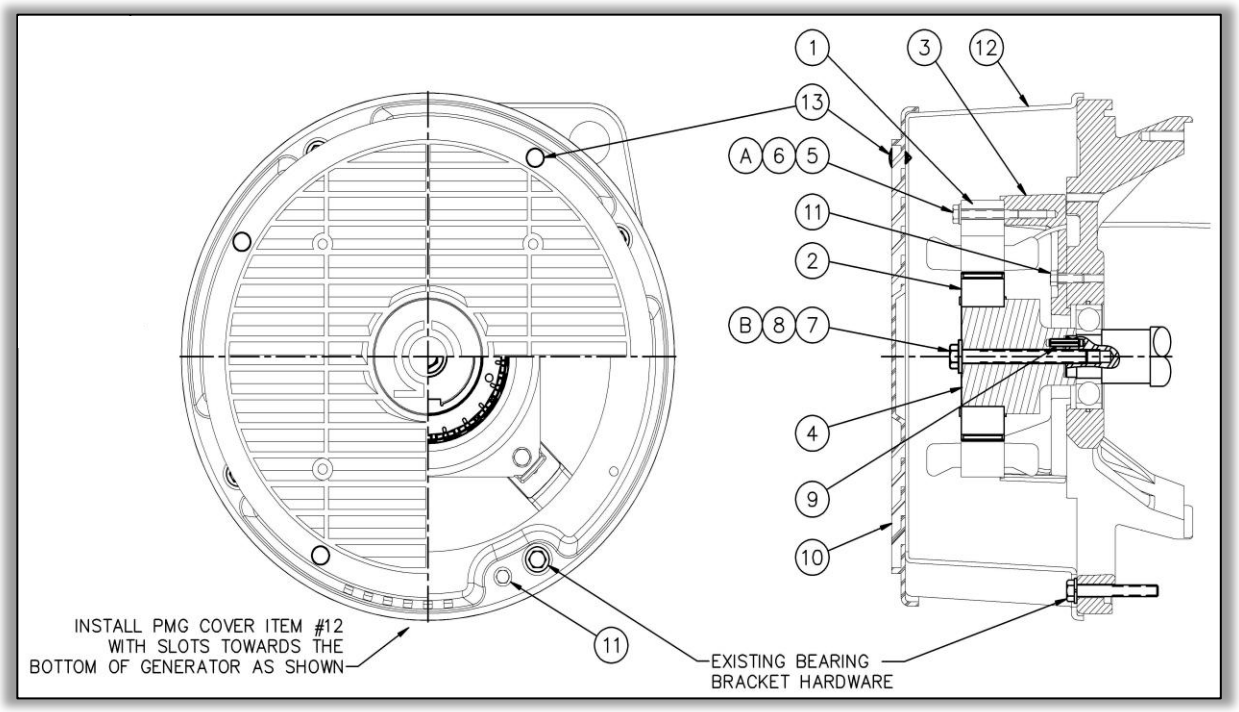
Re-install the plastic, PMG cover / Louver assembly with the 4 large holes fitting over the 4 bearing bracket retaining bolts. Secure 4 - hex flange cap screws. Tighten to snug. Do not over torque as this will break the plastic cover.

MagnaPLUS Cross Section



ITEM #	DESCRIPTION
1	Conduit Box
2	Louvered Drip Cover
3	Bearing Bracket
4	Bearing
5	Rotating Rectifier Assembly
6	Exciter Rotor
7	Exciter Stator

282 - 287 Frame PMG Cross Section

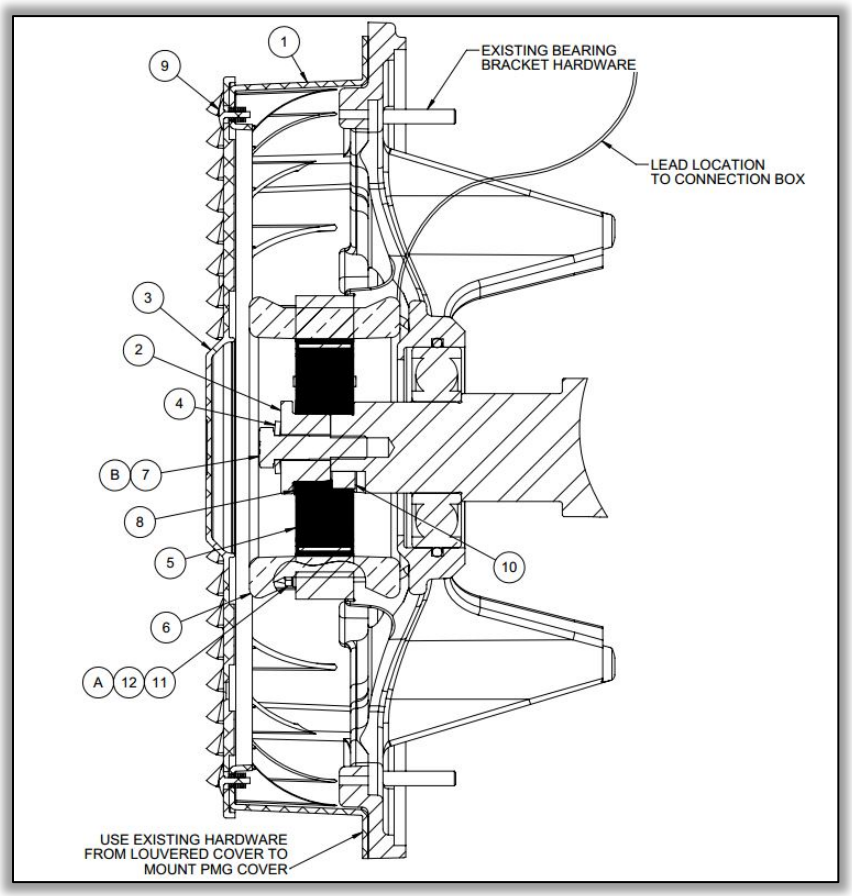


ITEM #	PART DESCRIPTION	QTY.	PART NUMBER
1	PMG Sator Assembly	1	A-525548-1
2*	PMG Rotor Assembly	1	A-526816
3	PMG Stator Adaptor	1	712705-01
4*	PMG Shaft	1	701846-01
5	Screw, Hex Hd Cap, 1/4 - 20 x 1.75"	4	A-9812-175RC
6	Washer, Belleville - 1/4”	4	A-9682-2RC
7	Screw, Hex Hd Cap, 3/8 - 16 x 3.75"	1	801004-16
8	Washer, Belleville - 3/8”	1	A-9682-5RC
9*	Roll Pin, 0.19 x 0.88"	1	811807-02
10	Louvered Cover (re-use existing)	1	720651-01
11	Screw, Hex Hd Whiz Lk, 1/4 x 20 x 0.75"	8**	A-9646-75RC
12	PMG Cover	1	720647-01
13	Push Pin (1/4" Christmas Tree Type)	4	801203-01
A	PMG stator mounting bolts to be torqued to 6 Ft – Lb (8 N-m).		
B	PMG rotor mounting bolt to be torqued to 25 Ft – Lb (34 N-m).		

*The PMG rotor assembly, PMG shaft, and Roll Pin are pre-assembled per drawing S526816-2.

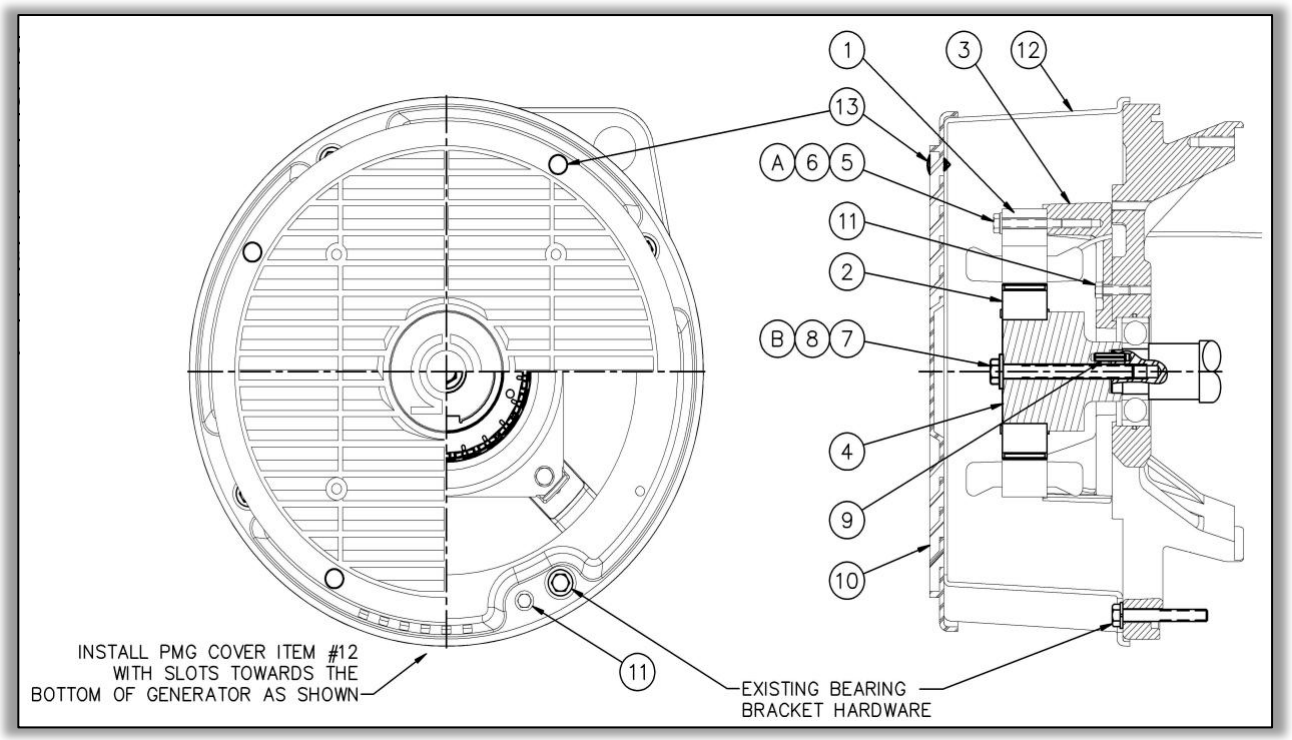
**Four (4) included in kit, four (4) re-used.

361E – 364E Frame PMG Cross Section



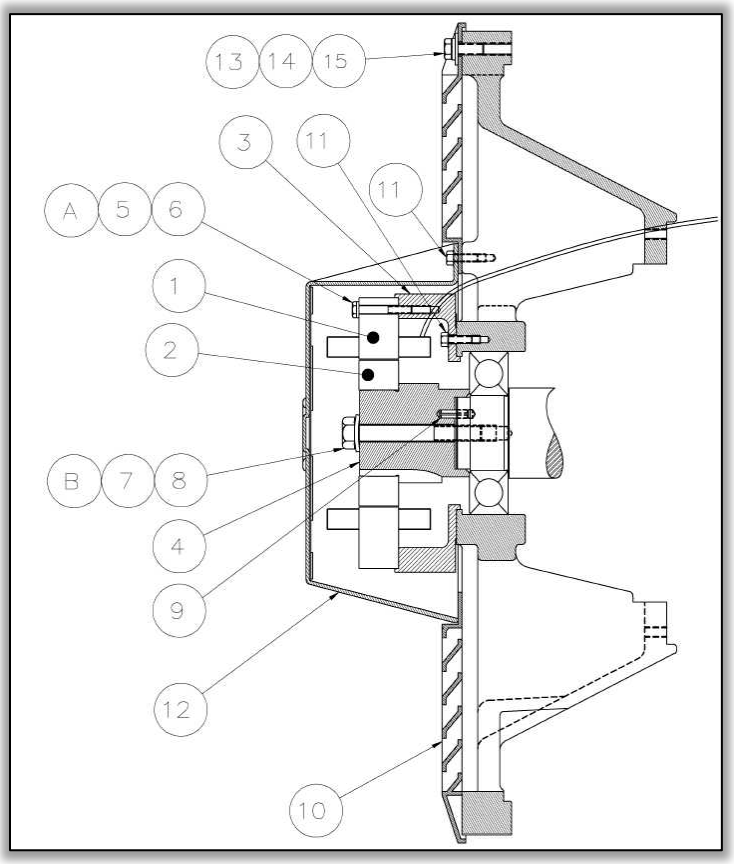
ITEM #	PART DESCRIPTION	QTY.	PART NUMBER
1	PMG Extension Cover	1	720665-01
2	PMG Rotor Cap	1	136033-01
3	Louvered Cover (reuse existing)	1	720526-03
4	Washer Belleville – ½”	1	9682-1
5	PMG Rotor Assembly	1	526838
6	PMG Stator Assembly	1	525548-1
7	Screw, Hex Hd Cap, ½- 3 x 2"	1	9670-200
8	Wave Spring	1	7661-25
9	Push Pins (¼” Christmas tree type)	4	801203-02
10	Key, 3/8” Sq. x ½ Lg.	1	7605-50
11	Washer Belleville – ¼	4	9682-2
12	Screw, Hex Hd Cap, ¼-20 x 1-¾”	4	9812-175
A	[4] PMG Stator mounting bolts to be torqued to 6 ft/lbs [8 N-m]		
B	[1] PMG Rotor mounting bolt to be torqued to 84 ft/lbs [114 N-m]		

361 /362 / 363 Frame PMG Cross Section



ITEM #	DESCRIPTION
1	PMG Stator Assembly
2	PMG Rotor Assembly
3	PMG Stator Adaptor
4	PMG Shaft
5	Screw, Hex Head Cap, 1/4 - 20 x 1.75"
6	Washer Belleville - 1/4”
7	Screw, Hex Head Cap, 1/2 - 13 x 4"
8	Washer, Belleville – 1/2”
9	Roll Pin, 0.25 x 0.88"
10	Louvered Cover (Re-use existing)
11	Screw, Hex Flange, M6 x 1 x 20
12	PMG Cover
13	Push Pin (1/4" Christmas Tree Type)

431 / 432 / 433 Frame PMG Cross Section



ITEM #	DESCRIPTION
1	PMG Stator Assembly
2	PMG Rotor Assembly
3	PMG Stator Adaptor
4	PMG Shaft
5	Screw, Hex Head Cap, 1/4 - 20 x 1.75"
6	Washer Belleville - 1/4”
7	Screw, Hex Head Cap, 1/2 - 13 x 4"
8	Washer, Belleville – 1/2”
9	Roll Pin, 0.25 x 0.88"
10	Drip Cover – PMG Add-on
11	Screw, Hex Head, Whiz Lock, 1/4 - 20 x 1.75"
12	PMG Cover
13	Screw, Hex Head Cap, 3/8-16 x 1”
14	Washer, Flat, 3/8”
15	Washer, Split Lock, 3/8”