marathon®

260 Frame LIMA® MAC Generator Installation, Operation, Maintenance and Safety Instructions

Marathon Electric LLC
100 East Randolph Street
Wausau, WI 54402-8003
Phone: 715-675-3359
Fax: 715-675-8026
marathonelectric.com

FORM
SB0312E
April 2025

⚠ WARNING

- Warning indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

- Caution indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

- Notice indicates a situation not related to personal injury which, if not avoided, could result in motor or equipment damage.

TABLE OF CONTENTS

1.0 INTRODUCTION **02**
2.0 SAFETY INSTRUCTIONS **02**
3.0 INSTALLATION **02**
3.1 Storage 02
3.2 Generator Mounting 02
3.3 Electrical Connections 02
3.4 Connection Diagrams 02
4.0 OPERATION **02**
4.1 Pre-start Inspection 02
4.2 Starting the Generator Set 03
4.3 Shutdown Procedures 03
5.0 MAINTENANCE **03**
6.0 SERVICE **03**
6.1 Drying Generator Windings 03
6.2 Cleaning Generator Windings 03
6.3 Restoring Residual Magnetism 03
6.4 Bearing Replacement Procedure 03
6.5 Testing Diodes on the Lima MAC Rectifier Assembly 03
6.6 Rectifier Assembly Replacement Procedure 04
7.0 TROUBLESHOOTING **04**
8.0 GENERATOR SERVICE PARTS **05**
9.0 IMPORTANT INFORMATION **05**
9.1 Resale of Goods 06

1.0 INTRODUCTION

Thank you for choosing a Marathon LIMA MAC Generator. Please read the installation and service sections of this manual carefully. A clean environment and proper installation are critical to generator performance and we are confident that by following these guidelines, you will get many years of reliable service from your Marathon product.

2.0 SAFETY INSTRUCTION

This manual emphasizes the safety precautions necessary during the installation, operation and maintenance of your LIMA MAC generator. Many sections of this manual include warning messages. These messages are for your safety and if any of these warnings are not readily understood, seek clarification from qualified personnel before proceeding.

This manual is not intended to be a substitute for properly trained personnel. Installation and repairs should only be conducted by qualified, trained people. The warnings point out known conditions and situations that are potentially hazardous, but each installation may well create its own set of unique hazards. No manual can cover every possible situation.

WARNING! Before any service work is done, disconnect all external power sources and, where appropriate, lock out all controls to prevent an unexpected start-up of the generator set engine. Proper grounding (earthing) in compliance with local and national electrical codes and standards is required.

WARNING! Always assume that there will be voltage present at the generator terminals whenever the generator's shaft is rotating and proceed accordingly. Residual voltage may also be present at the generator terminals and at the automatic voltage regulator panel connections, even with the regulator fuse removed.

3.0 INSTALLATION

Receiving Your New LIMA MAC Generator. Carefully examine the generator upon receipt for possible shipping damage. Any damage should be noted on the freight bill before accepting the shipment. Claims for damage must be promptly filed with the delivering carrier.

Unpacking and Handling. Carefully read all instruction tags shipped with the unit. When lifting, attach an overhead crane to the lifting eyes on the generator frame. Ensure that the lifting eye bolts are firmly screwed into the frame prior to lifting. Apply lifting forces in a vertical direction.

WARNING! The lifting lugs on this generator are designed to support the generator only. Do not lift the complete generator set by means of lifting lugs on the generator.

3.1 STORAGE

It is recommended that the unit be stored in a clean, dry location. In the event of long term storage, see Maintenance section of this manual prior to assembling to the engine.

3.2 GENERATOR MOUNTING

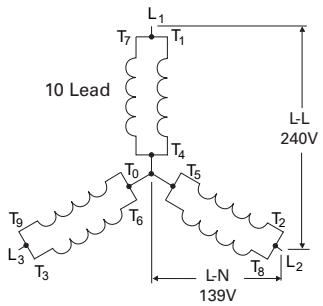
See the generator nameplate for all adaption specifications. The generator feet should be shimmed and bolted where necessary to obtain solid contact with the sub-base.

3.3 ELECTRICAL CONNECTIONS

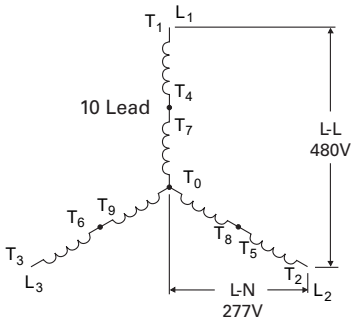
Refer to the connection diagram supplied with the unit and the proper diagrams shown in this manual. Install all wiring in accordance with national and local electrical codes.

3.4 CONNECTION DIAGRAMS

The following two Connection Diagrams are to be used to connect the generator in a Low Voltage (Parallel Wye) 240Y/139 volts connection or a High Voltage (Series Wye) 480Y/277 volts connection.



10-LEAD LOW WYE (PARALLEL)
240Y/ 139V 480Y/ 277V
Terminal Strip Connections
L1 = T1 & T7 Jumpered L1 = T1
L2 = T2 & T8 Jumpered L2 = T2
L3 = T3 & T9 Jumpered L3 = T3
L0 = T4, T5, T6, T0 Jumpered



10-LEAD HIGH WYE (PARALLEL)
480Y/ 277V
Terminal Strip Connections
L1 = T1
L2 = T2
L3 = T3
L0 = T0

4.0 OPERATION

4.1 PRE-START INSPECTION

Before starting the unit, the following inspection and checks are recommended:

4.1.1 Complete a visual inspection of generator being mindful of any loose parts, connections or foreign material that could be drawn into the generator upon startup.

4.1.2 Ensure the set turns freely. Turning the set over by hand at least [2] revolutions will verify there is no interference.

WARNING! Do not apply any force to the generator fan while rotating the rotor.

4.1.3 Check all wiring against the supplied connection diagram, making sure all lead hardware on the terminal strip is tight and secure.

4.1.4 Verify that all equipment is properly grounded (earthed).

4.1.5 Check all covers, screens and guards. If they have been removed for assembly or inspection, re-install as required.

4.1.6 Review all engine pre-start instructions, ensuring that all recommended steps and procedures have been followed.

4.2 STARTING THE GENERATOR SET

The following procedure should be used for initial generator start up.

4.2.1 Disconnect the generator output from any load. Be sure that the main circuit breaker is in the 'Open' position.

4.2.2 Ensure that all engine pre-start and start-up procedures have been followed.

4.2.3 Start the engine and adjust it to the proper speed. For 60 Hz operation, synchronous speed is 1800 RPM.

WARNING! Do not overspeed the generator. Excessive centrifugal forces could damage the rotating fields or mechanical components. Be prepared for an emergency shutdown.

4.2.4 Check all Line-to-Line and Line-to-Neutral voltages for balance. If voltages are unbalanced, shut down the equipment and check for improper lead connections.

4.2.5 Once voltages are balanced, close the main circuit breaker to the load.

4.2.6 Monitor the generator output current to verify it is at or below nameplate value.

4.2.7 Check generator speed under load and adjust as necessary. (Refer to engine/governor manuals)

4.3 SHUT DOWN PROCEDURES

Although not required, several good engineering practices should be observed to prolong equipment life.

4.3.1 Disconnect all loads (open main circuit breaker) prior to shut down.

4.3.2 Isolate any condition that could allow the generator to see a voltage at its terminals while at rest.

5.0 MAINTENANCE

5.1 The following maintenance procedures should be followed to ensure long equipment life and satisfactory performance:

5.1.1 Routinely check all intake and exhaust air screens on the generator to ensure they are free of debris.

5.1.2 Check all bearings every [1000] operating hours. The LIMA MAC is equipped with sealed, pre-lubricated bearing which does not require lubrication. If the bearing requires replacement, follow the instructions in the 'Service' section of this manual.

5.1.3 Inspect the unit for buildup of contamination (dirt, oil, etc.) on the rotor and stator windings. Clean as necessary following instructions in the Service section of this manual.

6.0 SERVICE

WARNING! Residual voltage may be present at the generator leads. Consult qualified personnel with any questions.

6.1 DRYING GENERATOR WINDINGS

All windings should be thoroughly dry before operating the unit. If the windings are wet or damp refer to drying procedures below prior to operation

6.1.1 Oven - Place the generator in an oven at a temperature not exceeding 194°F (90°C).

6.1.2 Hot air - With the engine running at a low idle speed, blow hot air from a space heater or similar device into the generator's intake air openings for a minimum of 1-hour. When performing this operation increase the engine speed as slowly as possible to 1000 RPM. Do not let the engine speed exceed 1000 RPM during start-op or during the drying process.

6.2 CLEANING GENERATOR WINDINGS

Contact an authorized Marathon Service Center or an electric motor repair shop in your area to assist with the proper cleaning of the generator windings.

6.3 RESTORING RESIDUAL MAGNETISM

Residual magnetism may be lost by a strong neutralizing magnetic field from an outside source or prolonged non-operation. Should the generator fail to build voltage, a momentary short circuit of any two generator output leads should correct this condition.

Alternatively, restoring residual magnetism may also be achieved by applying 20V-30V (AC or DC) to any two generator output leads. Do not make a firm bolted connection, but rather touch the leads together until the generator voltage begins to rise and then remove. A 30A fuse is suggested in the supply voltage circuit to prevent damage.

Both "Restoring Residual Magnetism" procedures detailed above must be performed while the generator is turning at 1800 RPM.

6.4 BEARING REPLACEMENT PROCEDURE

Prior to performing this operation, it is suggested that the generator rotor be orientated so that two of the main rotor poles are in a vertical position.

6.4.1 Non-Drive End Bearing Carrier Removal - Remove all hex head screws from the bearing carrier. Using a flat blade screwdriver or putty knife, carefully pry the bearing carrier from the frame. Upon removal, visually inspect the bearing bore and rubber O-ring for damage or wear and replace as required.

6.4.1.1 Drive End Bearing Carrier Removal - Procedure is same as above, but also includes removal of [2] center-most screws retaining the inner bearing lock. Drive end bearing carrier does not utilize an O-ring.

6.4.2 Bearing Removal - Using a bearing puller, remove the bearing from shaft end.

6.4.3 Bearing Replacement - Heating the new bearing to a maximum of 212°F in an oven, apply a thin coat of clean lubricating oil to the bearing step and install the bearing with the inner bearing race seating tight against the shaft shoulder. Bearing part number is identified in the replacement service parts list on Section 6.4, page 3.

6.5 TESTING DIODES ON THE LIMA MAC RECTIFIER ASSEMBLY

The rectifier assembly is in-board of the bearing and is mounted on the exciter rotor core.

To test the diodes without removing them from the heat sinks, electrically isolate the individual diodes by removing each of exciter rotor lead flag terminals from the quick connect terminals and removing the two main rotor leads from the main rotor terminal posts. Test each sub-assembly separately. An ohmmeter or continuity test-light may be used to find an open or shorted condition in the diode. Place one tester probe on the main post. In succession, touch the other test probe to each diode terminal. Reverse the probes and repeat the procedure.

These tests should result in one of three conditions:

6.5.1 Good diode - Confirm that reverse resistance is 30,000-300,000 ohms and forward resistance is less than 10 ohms. When tested with a continuity test-light, light should be "on" in one direction, and "off" in the other.

6.5.2 Shorted condition - Ohmmeter reading will be zero (or very low) in both directions.

6.5.3 Open condition - Ohmmeter will have a maximum (infinity) reading in both directions. The continuity test-light will be "off" in both directions.

In the condition of a diagnosed diode failure it is recommended to replace the rectifier assembly. The rectifier assembly part number is identified in the replacement service parts list on Section 6.6, page 4.

marathon®

6.6 RECTIFIER ASSEMBLY REPLACEMENT PROCEDURE

The rectifier assembly consists of two semi-circular sub-assemblies. To remove each subassembly, remove the three exciter rotor lead flag terminals from the quick connect terminals. Remove the main rotor lead from the main rotor terminal post and the two retaining screws from each mounting board.

Install each new sub-assembly, ensuring that the white exciter rotor leads are installed on the sub-assembly having white diode leads. The black diode leads receive the black exciter rotor leads.

7.0 TROUBLESHOOTING

WARNING! High voltages may be present at the generator terminals. High residual voltages can be present even with the leads disconnected or fuses removed. Some equipment may be energized when the generator is off. Tools, equipment, clothing, and your body must be kept clear of rotating parts and electrical connections.

WARNING! Special caution must be taken during troubleshooting as protective covers and safety devices may be disabled to gain access and make tests.

7.1 Generator Produces No Voltage or Residual Voltage

	Cause	Check and remedy
1.	Low Operational Speed	Check enginer RPM. Correct as necessary.
2.	Voltmeter Off	Check meter selector switch to ensure it is not in the "Off" position.
3.	Defective voltmeter	Check voltage with separate meter at the generator terminals.
4.	Loss of residual magnetism	See "Restoring Residual Magnetism" (Section 6.3, page 3)
5.	Malfunctioning diodes	See "Testing Diodes on the Lima MAC Rectifier Assembly". (Section 6.5, page 3)
6.	Damaged or malfunctioning Exciter	Inspect for damaged or burned main rotor or main rotor windings. Consult an authorized service location for diagnosis and repairs.
7.	Damaged or malfunctioning Main Stator or Rotor	Inspect for damaged or burned main rotor or main rotor windings. Consult an authorized service location for diagnosis and repairs.

7.2 Generator Produces Low Voltage When Load is Applied

	Cause	Check and remedy
1.	Engine speed droop	Check engine speed and adjust governor as necessary. For proper operation, engine must be running approximately 1800 RPM.
2.	Generator is overloaded	Reduce electrical load. Check with ammeter and compare with nameplate ratings. The load on each leg should be as balanced as possible and should not exceed rated current on any leg.

7.3 Generator Produces Fluctuating Voltage (May Be Indicated By Light Flicker)

	Cause	Check and remedy
1.	Irregular engine speed	Check engine for malfunction or load for fluctuation.
2.	Loose terminal lugs or hardware	Check all lead connections. Tighten or re-connect as necessary.

7.4 Generator Produces High Voltage)

	Cause	Check and remedy
1.	Faulty metering	Check voltage with separate meter at generator terminals.
2.	Excessive speed	Check engine for proper speed. Adjust as necessary.

7.5 Generator Is Overheating

	Cause	Check and remedy
1.	Generator is overloaded	Reduce electrical load. Check with ammeter and compare with nameplate ratings. The load on each leg should be as balanced as possible and should not exceed rated current on any leg.
2.	Clogged ventilating screens or covers	Clean all air passages. See "Maintenance" (Section 5, page 3)
3.	High room temperature or altitude	Improve ventilation or reduce electrical load.
4.	Unbalanced load	Check with ammeter and compare with nameplate ratings. The load on each leg should be as balanced as possible and should not exceed rated current on any leg.
5.	Dry bearing	Replace bearing. See "Bearing Replacement Procedure" (Section 6.4, page 3)

7.6 Generator Produces Mechanical Noise

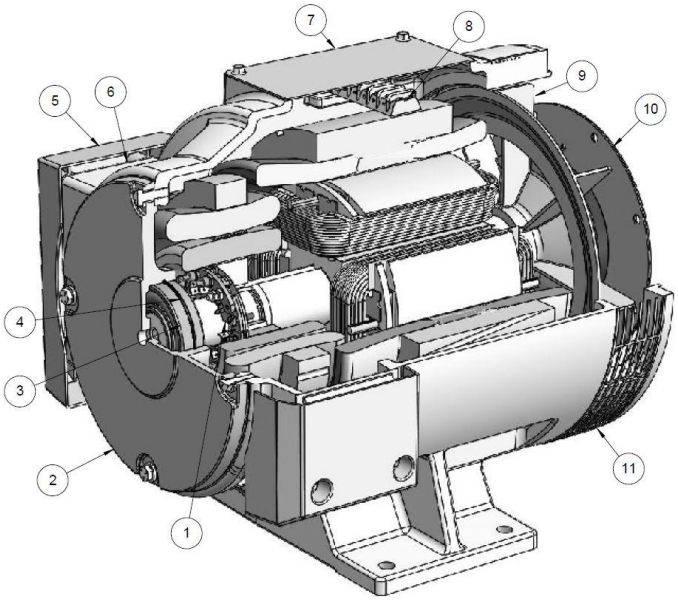
	Cause	Check and remedy
1.	Defective bearing	Replace bearing. See "Bearing Replacement Procedure" (Section 6.4, page 3)
2.	Loose screens or guards	Tighten screens and guards as necessary.

7.7 Generator Produces Mechanical Noise

	Cause	Check and remedy
1.	Static charge	Ground generator frame.
2.	Grounded armature or field coil	Consult an authorized service location for diagnosis and repairs.

marathon®

8.0 GENERATOR SERVICE PARTS



Item	Cause	Check and remedy
1.	RECTIFIER ASSEMBLY	778714-0A
2.	OPPOSITE DRIVE END BEARING BRACKET	703824-01
3.	OPPOSITE DRIVE END BEARING	90005R-40
4.	BEARING O-RING	865876-01
5.	INTAKE COVER	720383-01
6.	LOUVERED COVER	720382-01
7.	CONNECTION COVER	718356-01
8.	TERMINAL STRIP	761663-01
9.	FAN	716002-01
10.	DRIVE DISC	CONTACT FOR
11.	SCREEN BAND	720363-0A
-	LIFTING EYE (NOT SHOWN)	9177210
-	2-BRG DRIVE END BEARING (NOT SHOWN)	7811R-50
-	2-BRG DRIVE END BEARING BRACKET (NOT SHOWN)	703313-02
-	2-BRG DRIVE END BEARING LOCK (NOT SHOWN)	705715-01
-	2-BRG SHAFT KEY (NOT SHOWN)	809869-01

Note: When ordering replacement service parts, please supply your generator nameplate details including model number, serial number and adaption (if applicable).

9.0 IMPORTANT INFORMATION

This document is not intended to provide operational instructions. Appropriate instructions provided with the generator and precautions attached to the generator should be read carefully prior to installation, operations and/or maintenance of the equipment . Injury to personnel or generator failure may be caused by improper installation, maintenance or operation.

The following information is supplied to you for your protection and to provide you with many years of trouble free and safe operation of your product:

1. Buyer shall be solely responsible for determining the adequacy of the product for any and all uses to which Buyer shall apply the product . The application by Buyer shall not be subject to any implied warranty of fitness for a particular purpose .
2. For safety, Buyer or User should provide protective guards over all shaft extensions and any moving apparatus mounted thereon . The User is responsible for checking all applicable safety codes in his area and providing suitable guards . Failure to do so may result in bodily injury and/ or damage to equipment .
3. Disconnect power and lock out drive equipment before working on a generator.
4. Always keep hands and clothing away from moving parts.
5. The lifting eyes on the generator are not to be used to lift the entire generator set. Only the generator may be safely lifted by the lifting eyes . Do not use the conduit box for lifting or support of the generator .
6. Install and ground the generator per local and national codes.
7. Misapplication of a generator in a hazardous environment can cause fire or an explosion and result in serious injury.
8. Never attempt to measure the temperature rise of a generator by touch. Temperature rise must be measured by thermometer, resistance, imbedded detector or thermocouple .
9. Operation of a generator at higher than its nameplate ratings may result in fire, damage to equipment or serious injury to personnel.
10. Do not apply any force to the generator fan when rotating the generator rotor.
11. Generators should not be operated faster than their rated speed.
12. Mounting bolts should be routinely checked to ensure that the unit is firmly anchored for proper operation.
13. Consult qualified personnel with questions. All electrical repairs must be performed by trained and qualified personnel only.
14. Make sure the generator is properly secured and aligned before operation.
15. When installing the generator, ensure that loose parts or tools do not fall inside the generator.
16. When connecting the generator, be sure to follow the correct wiring diagram for the desired voltage. Ensure that the voltage regulator is connected per the wiring diagram.

marathon®

9.1 RESALE OF GOODS

In the event of the resale of any of the goods, in whatever form, Resellers/Buyers will include the following language in a conspicuous place and in a conspicuous manner in a written agreement covering such sale:

The manufacturer makes no warranty or representations, express or implied, by operation of law or otherwise, as to the merchantability or fitness for a particular purpose of the goods sold hereunder . Buyer acknowledges that it alone has determined that the goods purchased hereunder will suitably meet the requirements of their intended use . In no event will the manufacturer be liable for consequential, incidental or other damages . Even if the repair or replacement remedy shall be deemed to have failed of its essential purpose under Section 2-719 of the Uniform Commercial Code, the manufacturer shall have no liability to Buyer for consequential damages.

Resellers/Buyers agree to also include this entire document including the cautions and warnings above in a conspicuous place and in a conspicuous manner in writing to instruct users on the safe usage of the product .

This information should be read together with all other printed information supplied by Regal Rexnord Corporation

For more information contact: Marathon Electric LLC, 100 E . Randolph St . PO Box 8003, Wausau, WI 54401-8003

Email: generator.help@marathonelectric.com

marathon®

Reliable power... *for the long run*

Marathon Electric LLC

100 East Randolph Street
Wausau, WI 54402-8003
Phone: 715-675-3359
Fax: 715-675-8026
www.marathonelectric.com