



ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION

MAINTENANCE INSTRUCTION

AUXILIARY GENERATOR AND BLOWER ASSEMBLIES

DESCRIPTION

The auxiliary generator and blower assembly is mounted at the rear of the diesel engine. The blowers are driven by the auxiliary generator shaft, which is connected to the diesel engine by a flexible coupling.

On locomotive applications, a second blower section provides cooling air to the traction motors. It also pressurizes the electrical control cabinet to prevent the entry of dust.

On applications other than locomotive, the second blower section is used as a dust bin blower.

In this instruction, where applicable to both, the combined usage will be referred to as "traction motor/dust bin."

The auxiliary generator and blower assemblies covered in this instruction can be categorized under one of the following four basic types.

TYPE I

Type I blower assemblies have two separate blower wheels on a common shaft.

Each blower wheel has its own housing and air intake, with the main generator blower being nearest the auxiliary generator. The housings are physically connected by bolt and tie strap assemblies.

TYPE II

Type II blower assemblies have a single blower wheel with two sets of fan blades separated by a disc. The single housing is divided so that the air from one fan is directed to the traction motors, and the air from the other fan is directed to the main generator. A separate air intake is provided for each set of fan blades.

TYPE III

Type III blower assemblies have a single blower wheel with one set of fan blades. This type of blower has one air intake, and supplies cooling air to the traction motors only.

TYPE IV

Type IV blower assemblies have a single blower wheel with one set of fan blades, as in Type III blowers. However, there are differences in the air intake ring and the blower wheel inlet baffle ring. Type IV blower assemblies supply cooling air through the main generator air box to the traction motor air duct.

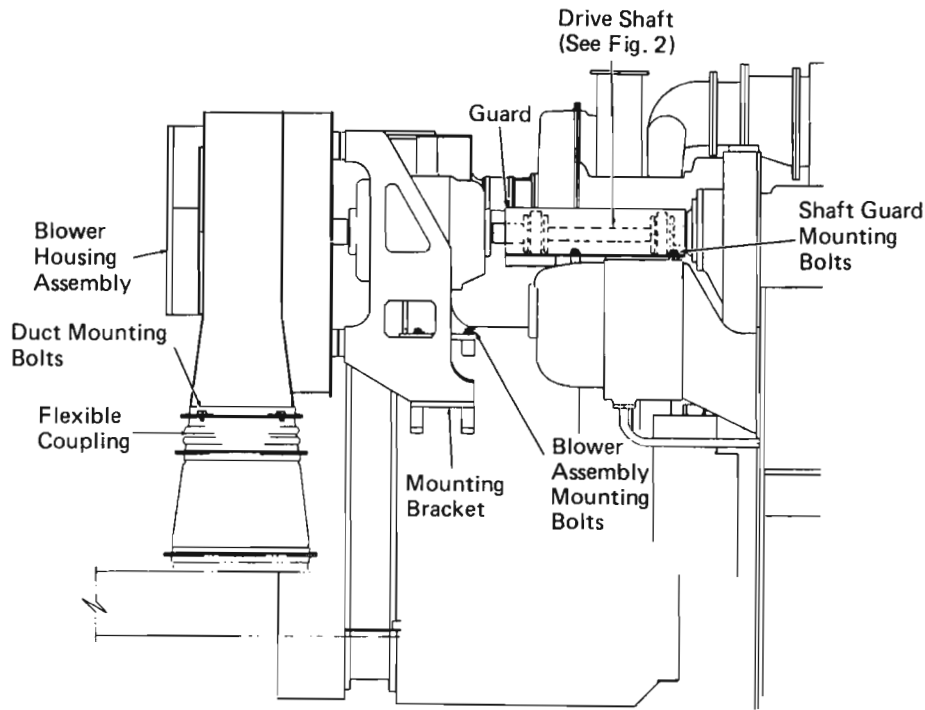
MAINTENANCE

BLOWER REMOVAL

The following blower removal procedure will apply to all blower types.

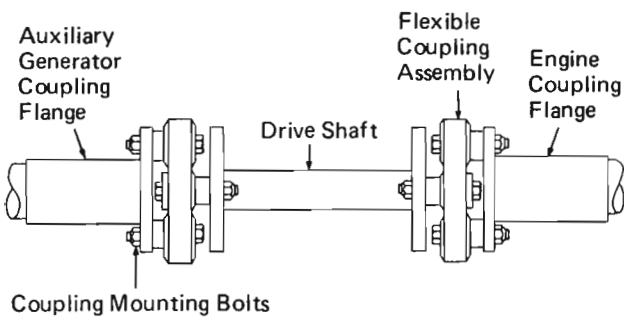
1. Remove shaft guard mounting bolts, Fig. 1, and remove shaft guard.
2. On the auxiliary generator side of the drive shaft, Fig. 2, remove the four coupling mounting bolts.
3. On the engine side of the drive shaft, Fig. 2, remove the two coupling mounting bolts joining the flexible coupling to the engine coupling flange.
4. Remove the drive shaft assembly.
5. Remove duct mounting bolts, Fig. 1, at the flexible coupling leading to the dust bin or traction motor duct. When equipped, remove duct mounting bolts at the flexible coupling leading to the main generator.

*This bulletin is revised and supersedes previous issues of this number.



22156

Fig. 1 - Typical Blower Assembly Mounting



22157

Fig. 2 - Removing Drive Shaft Assembly

NOTE: Components of an assembly should be reassembled in the same assembly.

TYPE I BLOWERS

Refer to Fig. 3 when disassembling Type I blowers.

1. Remove air intake screen mounting bolts (4) and remove air intake screen (2).
2. Remove intake ring mounting bolts (1) and remove intake ring (23).
3. Remove blower wheel mounting bolts (3) and remove traction motor/dust bin blower wheel (20).

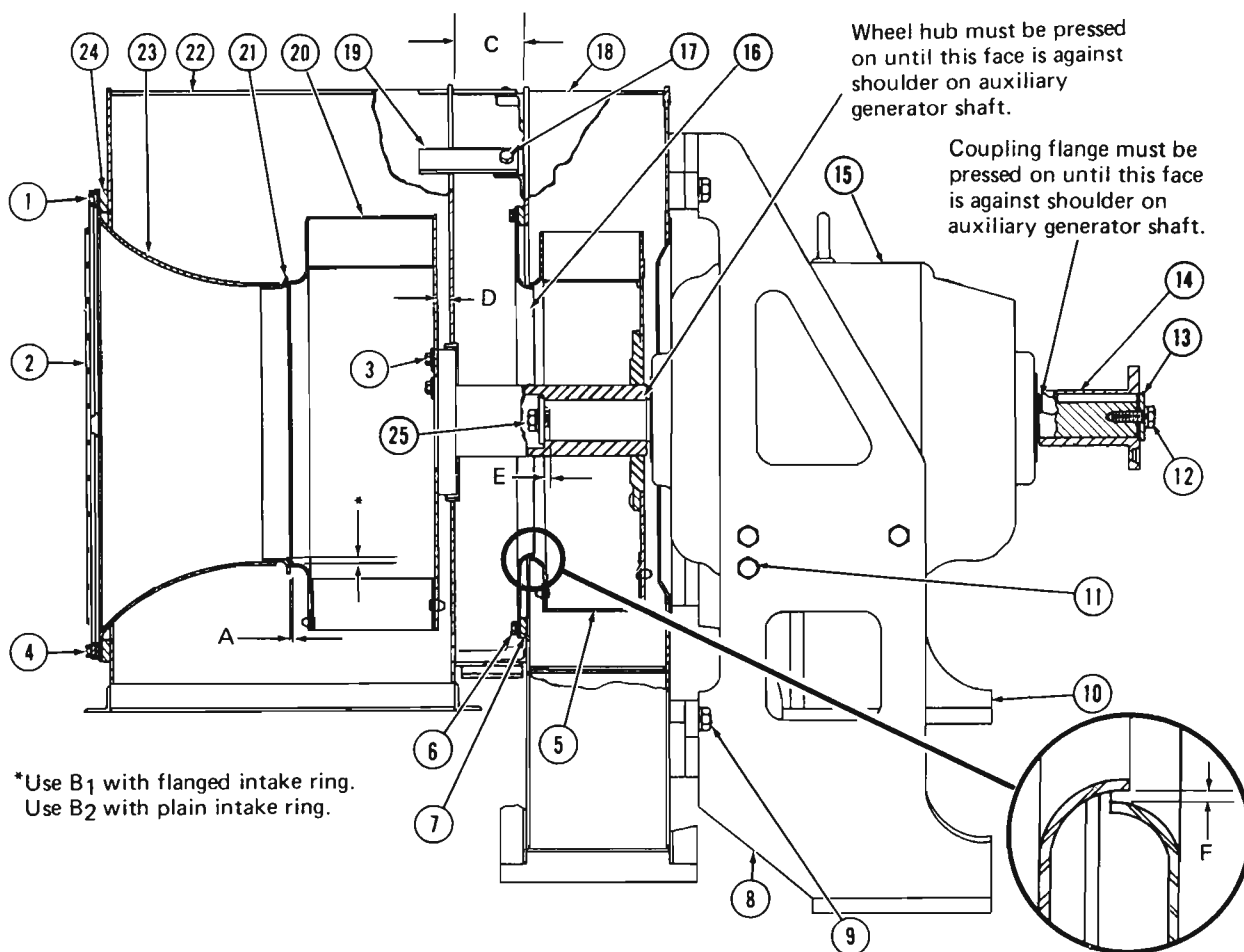
NOTE: To ease assembly and ensure proper alignment of blower housings, three location points should be marked before separating the traction motor/dust bin blower housing (22) from main generator blower housing (18). Location points are used to ensure that the housing support straps (19) are bolted to their respective mounting tangs in their original position.

Mark housing support strap (19) locations by drilling a 4.76 mm (3/16") diameter hole in any three straps adjacent to their mounting bolts (17).

6. Remove four blower assembly mounting bolts securing the left and right mounting brackets to the main generator.
7. Remove blower assembly and place on a platform which will support the blower housing as well as the left and right mounting brackets.

BLOWER DISASSEMBLY

Two separate disassembly procedures, with applicable Figs., are included as an aid during disassembly. One procedure is to be used when servicing Type I blowers and the other when servicing Types II, III, and IV.



DIMENSION TABLE

	Metric	Standard
A	3.18 mm ± 0.79 mm	1/8" ± 1/32"
B1	9.53 mm min. 11.11 mm max.	3/8" min. 7/16" max.
B2	3.97 mm min. 4.76 mm max.	5/32" min. 3/16" max.
C	101.6 mm	4"
D	17.46 mm	11/16"
E	6.35 mm	1/4"
F	3.18 mm min. 5.56 mm max.	1/8" min 7/32" max.

- | | |
|---------------------------------------|--|
| 1. Intake Ring Mounting Bolt | 13. Flange Washer |
| 2. Air Intake Screen | 14. Auxiliary Generator Coupling Flange |
| 3. Blower Wheel Mounting Bolt | 15. Auxiliary Generator |
| 4. Air Intake Screen Mounting Bolt | 16. Main Generator Blower Intake Ring |
| 5. Blower Wheel And Hub Assembly | 17. Housing Support Strap Mounting Bolt |
| 6. Intake Ring Mounting Bolt | 18. Main Generator Blower Housing |
| 7. Tapping Ring | 19. Housing Support Strap |
| 8. Left-Hand Mounting Bracket | 20. Traction Motor/Dust Bin Blower Wheel |
| 9. Housing To Bracket Mounting Bolt | 21. Air Intake Flanged Ring |
| 10. Right-Hand Mounting Bracket | 22. Traction Motor/Dust Bin Blower Housing |
| 11. Auxiliary Generator Mounting Bolt | 23. Traction Motor/Dust Bin Blower Intake Ring |
| 12. Flange Mounting Bolt | 24. Tapping Ring |
| | 25. Blower Wheel Mounting Bolt |

Fig. 3 - Typical Type I Blower Assembly

4. Remove housing support strap mounting bolts (17) and separate traction motor/dust bin blower housing (22) from main generator blower housing (18).
5. Remove intake ring mounting bolts (6) and remove intake ring (16).
6. Remove blower wheel mounting bolt (25). Using a suitable puller, remove blower wheel and hub assembly (5).
7. Remove auxiliary generator mounting bolts (11) from mounting brackets (8) and (10). Remove auxiliary generator (15).

mounting brackets (8) and (9), a location point should be marked at each mounting bolt securing one mounting bracket to the blower housing.

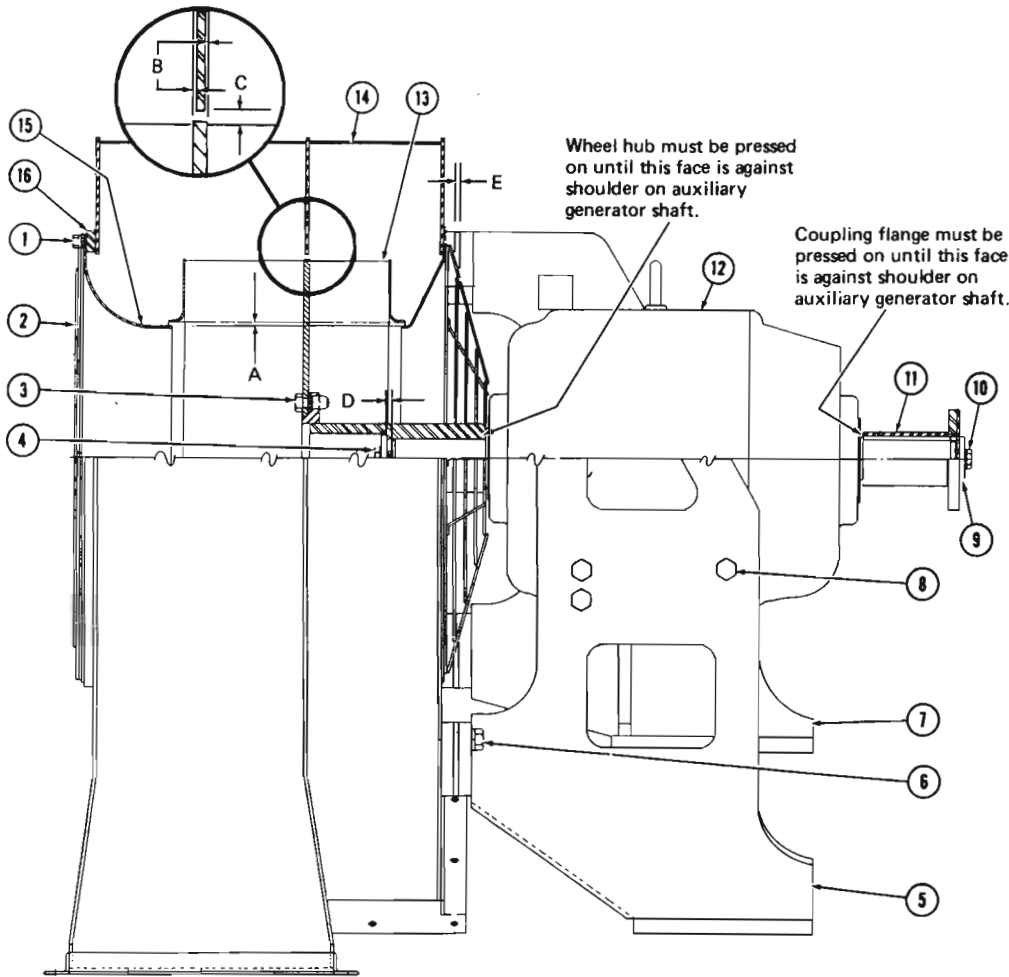
Mark mounting bracket location by drilling a 4.76 mm (3/16") diameter hole adjacent to each of the two bolts on one mounting bracket.

8. Remove housing to bracket mounting bolts (9) from each mounting bracket and remove main generator blower housing (18). Note location and number of shims for reassembly.

TYPE II BLOWERS

Refer to Fig. 4 and the following procedure when disassembling Type II blowers.

NOTE: To ease assembly and ensure proper alignment of main generator housing (18) and



DIMENSION TABLE

	Metric	Standard
A	3.18 mm min. 5.56 mm max.	1/8" min. 7/32" max.
B	0.397 mm min. circumferential	1/64" min. circumferential
C	3.18 mm min. 9.53 mm max.	1/8" min. 3/8" max.
D	6.35 mm	1/4"
E	1.59 mm nominal w/shims	1/16" nominal w/shims

- | | |
|---|---|
| 1. Intake Screen And Ring Mounting Bolt | 9. Flange Washer |
| 2. Air Intake Screen | 10. Flange Mounting Bolt |
| 3. Blower Wheel To Hub Mounting Bolt | 11. Auxiliary Generator Coupling Flange |
| 4. Blower Wheel Mounting Bolt | 12. Auxiliary Generator |
| 5. Left-Hand Mounting Bracket | 13. Blower Wheel And Hub Assembly |
| 6. Housing To Bracket Mounting Bolt | 14. Blower Housing Assembly |
| 7. Right-Hand Mounting Bracket | 15. Intake Ring |
| 8. Auxiliary Generator Mounting Bolt | 16. Tapping Ring |

Fig. 4 - Typical Type II Blower Assembly

TYPE III BLOWERS

Refer to Fig. 5 and the following procedure when disassembling Type III blowers.

TYPE IV BLOWERS

Refer to Fig. 6 and the following procedure when disassembling Type IV blowers.

1. Remove intake screen and ring mounting bolts (1). Remove air intake screen (2) and intake ring (15).
2. Remove blower wheel mounting bolt (4). Using a suitable puller, remove blower wheel and hub assembly (13).
3. Remove auxiliary generator mounting bolts (8) from mounting brackets (5) and (7). Remove auxiliary generator (12).

NOTE: To ease assembly and ensure proper alignment of blower housing assembly (14)

and mounting brackets (5) and (7), a location point should be marked at each mounting bolt securing one mounting bracket to the blower housing.

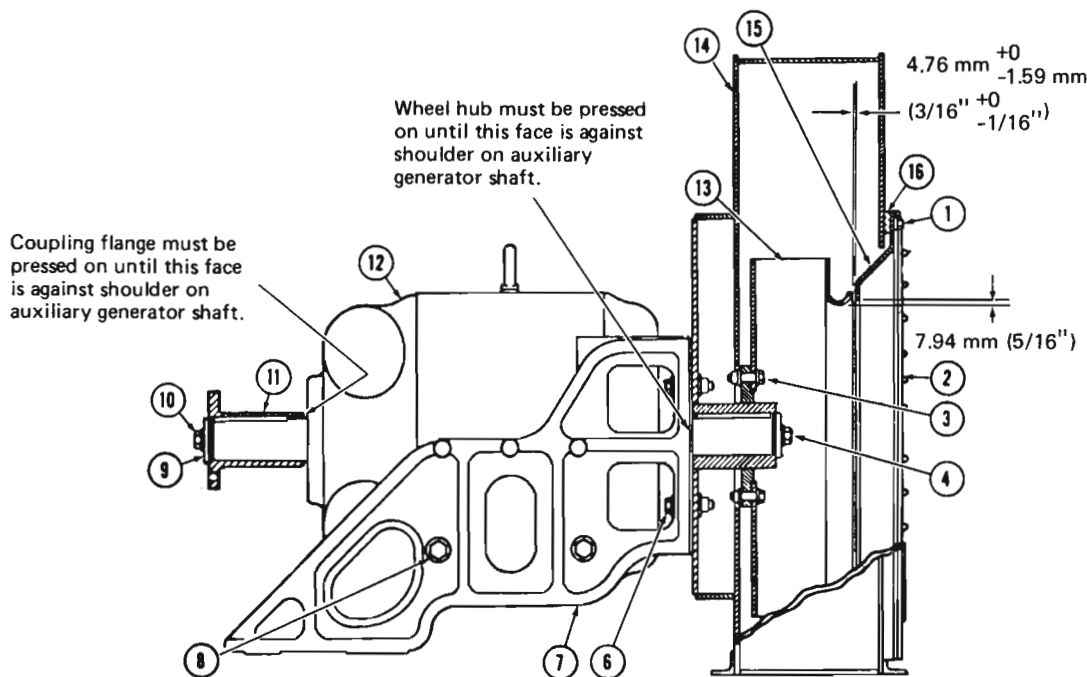
Mark mounting bracket location by drilling a 4.76 mm (3/16") diameter hole adjacent to each of the two bolts on one mounting bracket.

4. Remove housing to bracket mounting bolts (6) from mounting brackets (5) and (7), and remove blower housing assembly (14). Note location and number of shims for reassembly.

BLOWER ASSEMBLY

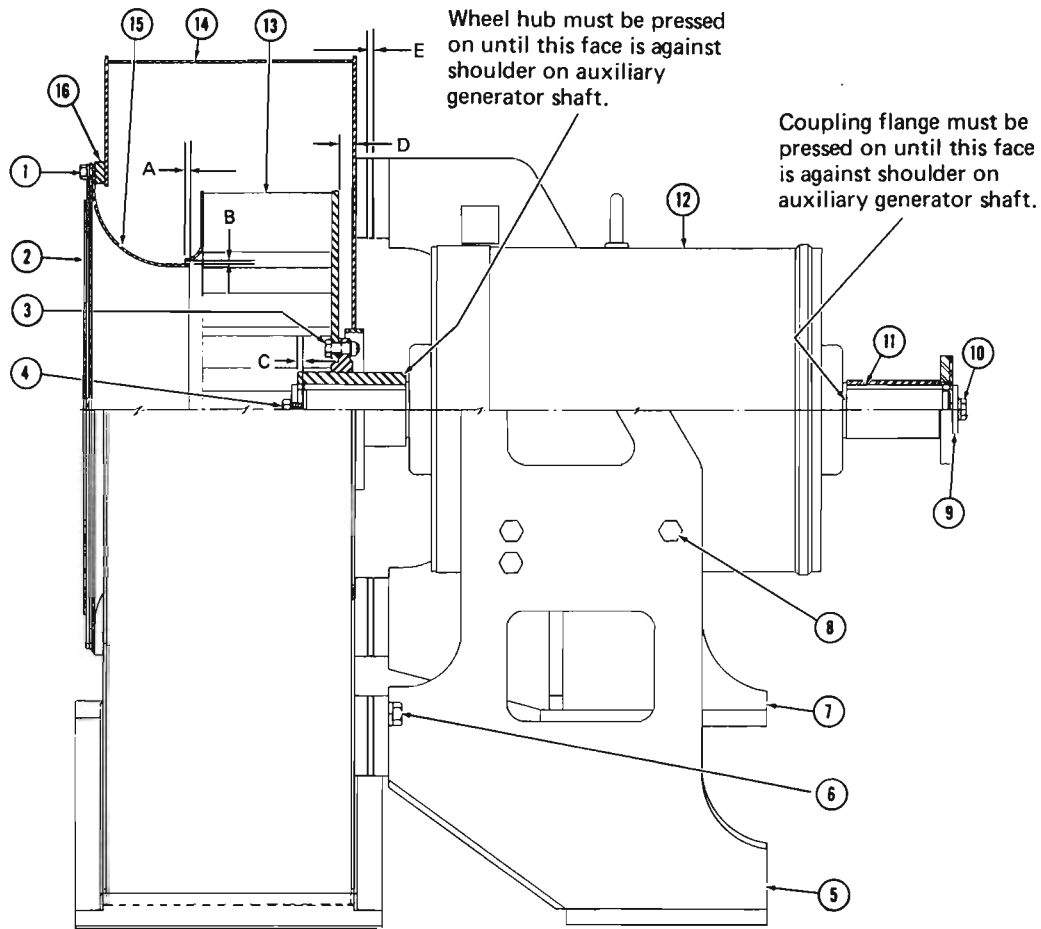
Two separate assembly procedures are included. One procedure is to be used when servicing Type I blowers and the other when servicing Types II, III, and IV.

NOTE: Components of an assembly should be reassembled in the same assembly.



- | | |
|---|---|
| 1. Intake Screen And Ring Mounting Bolt | 9. Flange Washer |
| 2. Air Intake Screen | 10. Flange Mounting Bolt |
| 3. Blower Wheel To Hub Mounting Bolt | 11. Auxiliary Generator Coupling Flange |
| 4. Blower Wheel Mounting Bolt | 12. Auxiliary Generator |
| 5. Left-Hand Mounting Bracket (Not Shown) | 13. Blower Wheel And Hub Assembly |
| 6. Housing To Bracket Mounting Bolt | 14. Blower Housing Assembly |
| 7. Right-Hand Mounting Bracket | 15. Intake Ring |
| 8. Auxiliary Generator Mounting Bolt | 16. Tapping Ring |

Fig. 5 - Typical Type III Blower Assembly



DIMENSION TABLE

	Metric	Standard
A	6.35 mm	1/4"
B	3.18 mm min. 5.56 mm max.	1/8" min. 7/32" max.
C	6.35 mm	1/4"
D	18.26 mm	23/32"
E	1.59 mm nominal w/shims	1/16" nominal w/shims

- 1. Intake Screen And Ring Mounting Bolt
- 2. Air Intake Screen
- 3. Blower Wheel To Hub Mounting Bolt
- 4. Blower Wheel Mounting Bolt
- 5. Left-Hand Mounting Bracket
- 6. Housing To Bracket Mounting Bolt
- 7. Right-Hand Mounting Bracket
- 8. Auxiliary Generator Mounting Bolt
- 9. Flange Washer
- 10. Flange Mounting Bolt
- 11. Auxiliary Generator Coupling Flange
- 12. Auxiliary Generator
- 13. Blower Wheel And Hub Assembly
- 14. Blower Housing Assembly
- 15. Intake Ring
- 16. Tapping Ring

22161

Fig. 6 - Typical Type IV Blower Assembly

TYPE I BLOWERS

Refer to Fig. 3 when reassembling Type I blowers.

1. Bolt auxiliary generator (15) to left and right mounting brackets (8) and (10), using auxiliary generator mounting bolts (11). Do not tighten bolts.
2. Bolt main generator blower housing (18) to left and right mounting brackets, using housing to bracket mounting bolts (9) and any shims removed during disassembly. To not tighten bolts.
3. Apply two 4.76 mm diameter x 38.1 mm long (3/16" x 1-1/2") spring pins 457008 at location points drilled during disassembly. This will retain the original bracket to housing location. Torque housing to bracket mounting bolts (9) to 278 N·m (205 ft-lbs).
4. Install blower wheel and hub assembly (5) to the auxiliary generator shaft. Ensure that blower wheel hub is properly aligned with

key in auxiliary generator shaft. Apply and torque blower wheel mounting bolt (25) to 122 N·m (90 ft-lbs).

5. Apply main generator blower intake ring (16) and secure, using intake ring mounting bolts (6). Adjust intake ring so that radial clearance is within dimension shown in Fig. 3. Additional adjustment is possible by making use of slack at the auxiliary generator mounting feet. Once this adjustment is made, torque auxiliary generator mounting bolts (11) to 278 N·m (205 ft-lbs).
6. Using housing support strap mounting bolts (17), secure traction motor/dust bin blower housing (22) to main generator blower housing (18). Do not tighten mounting bolts.
7. Apply three 4.76 mm diameter x 9.53 mm long (3/16" x 3/8") spring pins 454779 at location points drilled during disassembly. This will retain the original housing to housing location. Torque housing support strap mounting bolts (17) to 79 N·m (58 ft-lbs).
8. Install traction motor/dust bin blower wheel (20) using blower wheel mounting bolts (3). Torque bolts to 37 N·m (27 ft-lbs).
9. Apply traction motor/dust bin blower intake ring (23) and attach with the intake ring mounting bolts (1). Do not tighten bolts. Adjust intake ring so that radial clearance is within dimension shown in Fig. 3. Tighten mounting bolts after adjusting ring.
10. Install air intake screen (2), using air intake screen mounting bolts (4).
11. Rotate assembly. If assembled properly and all original relationships have been retained, the assembly should rotate without interference. Proceed to Blower Installation.

TYPE II BLOWERS

Refer to Fig. 4 and the following procedure when assembling Type II blowers.

TYPE III BLOWERS

Refer to Fig. 5 and the following procedure when assembling Type III blowers.

TYPE IV BLOWERS

Refer to Fig. 6 and the following procedure when assembling Type IV blowers.

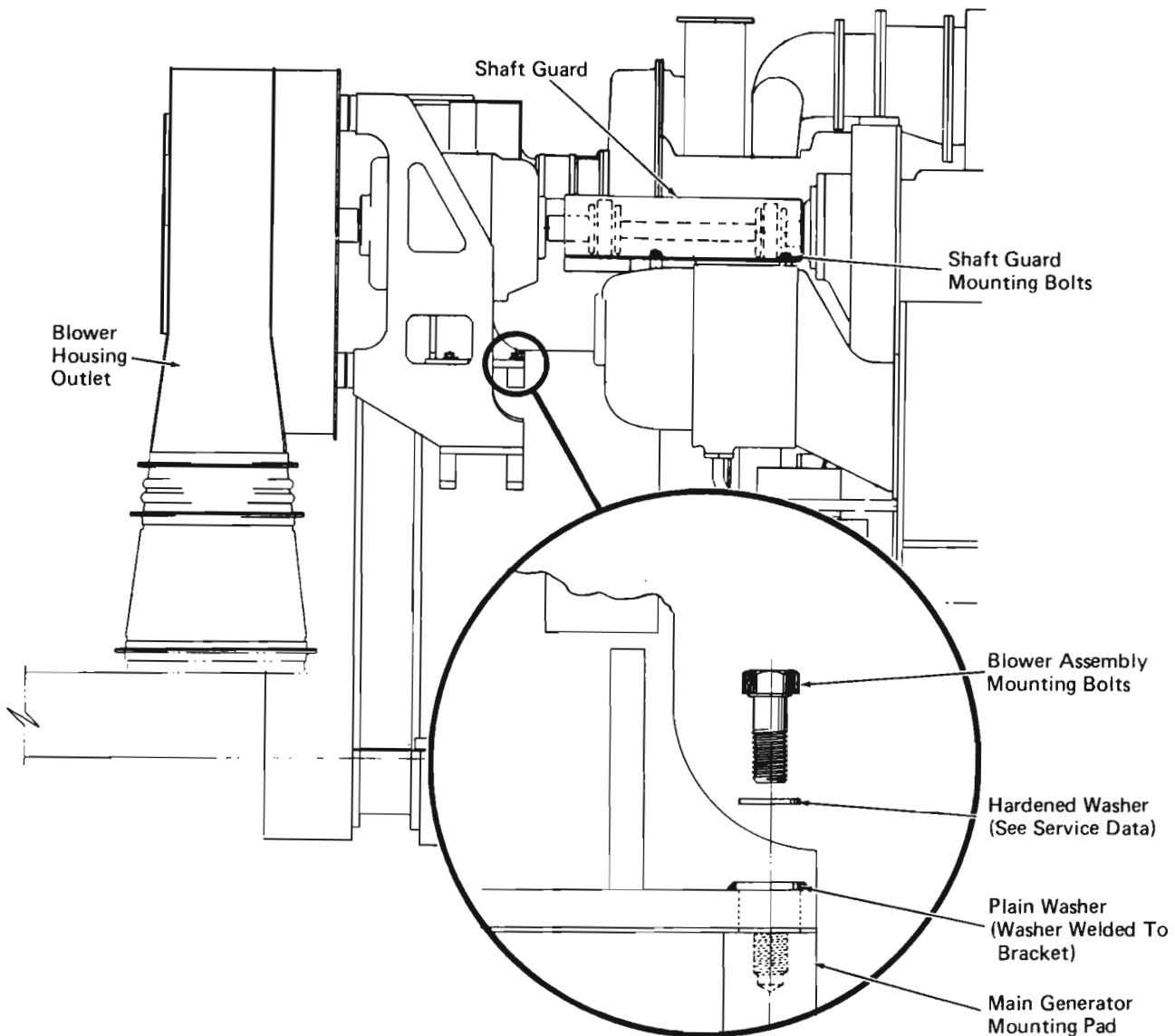
1. Bolt auxiliary generator (12) to left and right mounting brackets (5) and (7), using auxiliary generator mounting bolts (8). Do not tighten bolts.
 2. Bolt blower housing assembly (14) to left and right mounting brackets, using housing to bracket mounting bolts (6) and any shims removed during disassembly. Do not tighten bolts.
 3. Apply two 4.76 mm diameter x 38.1 mm long (3/16" x 1-1/2") spring pins 457008 at location points drilled during disassembly. This will retain the original bracket to housing location. On Type II and Type IV blowers, torque housing to bracket mounting bolts (6) to 278 N·m (205 ft-lbs). On Type III blowers these bolts should be torqued to 79 N·m (58 ft-lbs).
 4. Install blower wheel and hub assembly (13) to the auxiliary generator shaft. Ensure that blower wheel hub is properly aligned with key in auxiliary generator shaft. Apply and torque blower wheel mounting bolt (4) to 122 N·m (90 ft-lbs).
 5. Adjust auxiliary generator so that blower wheel hub is centered in the blower housing. Once this adjustment is made, torque auxiliary generator mounting bolts (8) to 278 N·m (205 ft-lbs).
- NOTE: When assembling Type II blower assemblies, refer to Fig. 4 for blower wheel to housing clearance dimension.
6. Apply blower intake ring (15) and air intake screen (2). Adjust intake ring so that radial clearance is within dimension as shown in the applicable illustration.
 7. Rotate assembly. If assembled properly and all original relationships have been retained, the assembly should rotate without interference. Proceed to Blower Installation.

BLOWER INSTALLATION

The following blower installation procedure will apply to all blower types.

1. Remove the four tack welded plain washers from the left and right mounting bracket flanges, Fig. 7.

Grind mounting bracket flange surfaces smooth, and discard previously used plain washers.



22162

Fig. 7 - Typical Blower Assembly Installation

2. Install auxiliary generator and blower assembly. The inlet of the duct system must line up with the blower housing outlet within 12.7 mm (1/2") on all four sides. Adjust as necessary to obtain alignment.
3. Secure left and right mounting brackets to main generator using new plain washers, hardened washers, and blower assembly mounting bolts. Do not tack weld plain washers at this time.
4. Apply the auxiliary generator flexible drive coupling arrangement. Refer to Service Data for applicable Maintenance Instruction covering installation and alignment of flexible coupling.
5. Tack weld plain washers to the mounting brackets. This will prevent any shift between the mounting brackets and mounting bolts.
6. Check and retorquer blower assembly mounting bolts, if necessary.
7. Install drive shaft guard.

When flexible coupling is properly aligned, torque blower assembly mounting bolts to 278 N·m (205 ft-lbs).

NOTE: The hardened washer applied in Step 3 reduces the possibility of losing bolt torque due to deformation of the plain washer. All applications should include the new hardened washer arrangement.

SERVICE DATA

REFERENCES

Alignment Of Locomotive Rotating Equipment	M.I. 1753
Alignment Of Rotating Equipment	M.I. 1765
Auxiliary Generators And Exciters	M.I. 3706

MATERIALS

	<u>Part Number</u>
Spring Pin, 4.76 mm diameter x 9.53 mm long (3/16" x 3/8")	454779
Spring Pin, 4.76 mm diameter x 38.1 mm long (3/16" x 1-1/2")	457008
Plain Washer	8018580
Hardened Washer	8140912

