
FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****FRONT COVER: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Gasket
Seal
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Fan pulley removed (WP 0075)
Crankshaft pulley and damper removed (WP 0110)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All openings must be plugged immediately after opening with clean rags to prevent contamination of the engine.

REMOVAL

1. Remove two screws (Figure 1, Item 1), eleven bolts (Figure 1, Item 2), front cover (Figure 1, Item 3), and gasket (Figure 1, Item 4) from front housing (Figure 1, Item 5).
2. Remove two nuts (Figure 1, Item 6), washers (Figure 1, Item 7), nuts (Figure 1, Item 8), and seal (Figure 1, Item 9).

END OF TASK**INSTALLATION**

1. Install seal (Figure 1, Item 9), cover (Figure 1, Item 8), two washers (Figure 1, Item 7), and nuts (Figure 1, Item 6) on front cover (Figure 1, Item 3).

CAUTION

Front housing and front cover must be clean before installation of front cover.

2. Install gasket (Figure 1, Item 4) and front cover (Figure 1, Item 3) on front housing (Figure 1, Item 5) and secure with eleven bolts (Figure 1, Item 2) and two screws (Figure 1, Item 1).
3. Torque two studs to 15-25 lb•ft (20-34 N•m).
4. Install crankshaft pulley and damper (WP 0110).
5. Install fan pulley (WP 0075).

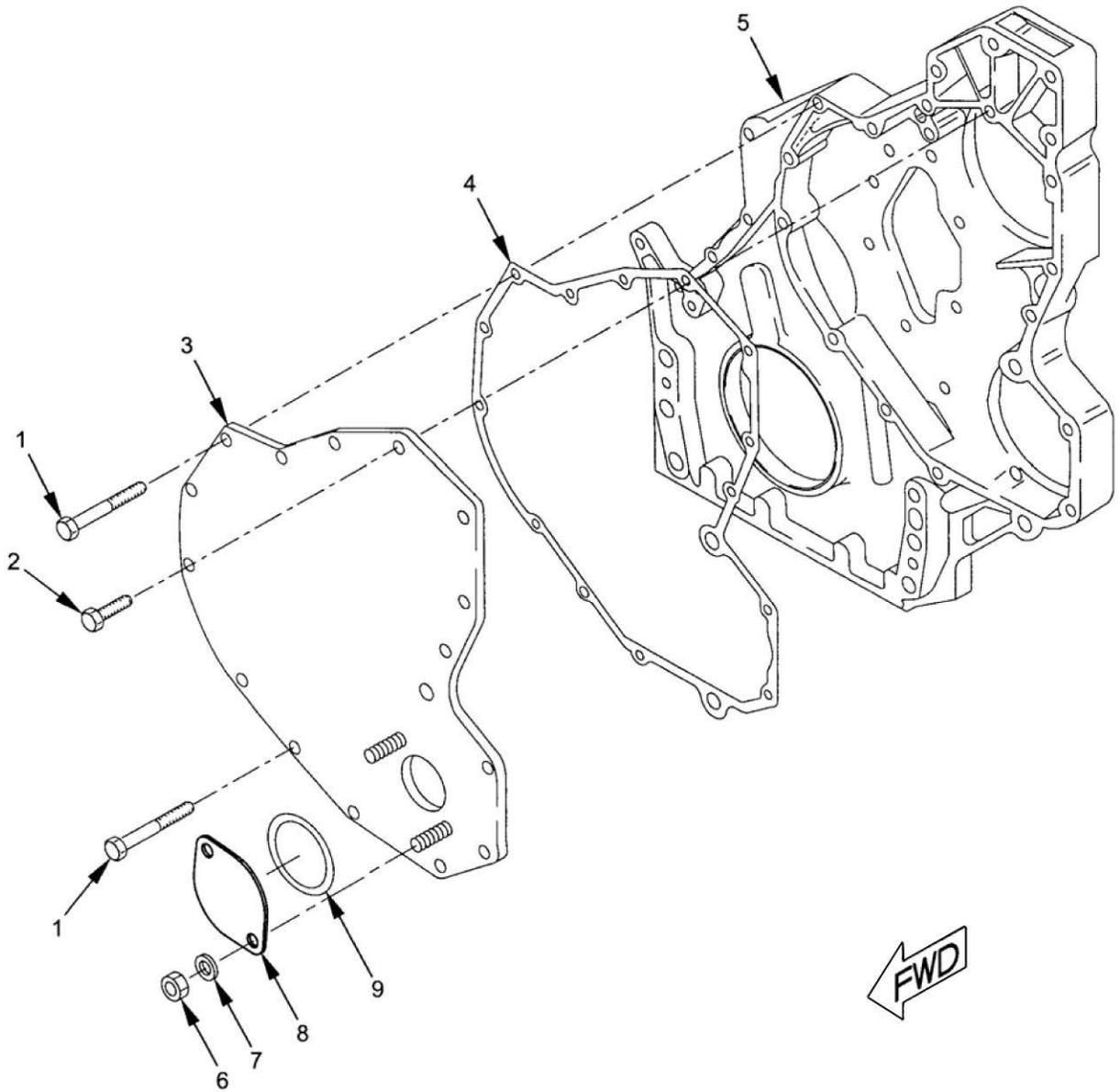


Figure 1. Front Cover.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
ENGINE OIL FILTER BASE AND OIL COOLER: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Gasket
Gasket
Lubricating oil (WP 0123, Table 1, Items 27 through 36)
O-ring
O-ring (2)
O-ring (3)
Preformed packing
Preformed packing
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Oil filter removed (WP 0080)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

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WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

REMOVAL

1. Remove three screws (Figure 1, Item 1), two bolts (Figure 1, Item 2), five washers (Figure 1, Item 3), oil filter base (Figure 1, Item 4), and three O-rings (Figure 1, Item 5).

WARNING

Oil filter base and housing springs are under tension and can act as projectiles when being removed. Use eye protection when removing springs. Failure to comply can cause injury to personnel.

2. Remove plug (Figure 1, Item 6), spring (Figure 1, Item 7), check valve (Figure 1, Item 8), and preformed packing (Figure 1, Item 9).
3. Disconnect tube (Figure 1, Item 10) and remove O-ring (Figure 1, Item 11), elbow (Figure 1, Item 12), and O-ring (Figure 1, Item 13) from oil cooler (Figure 1, Item 14).
4. Remove seven bolts (Figure 1, Item 15), two screws (Figure 1, Item 16), nine washers (Figure 1, Item 17), oil cooler (Figure 1, Item 14), and gasket (Figure 1, Item 18).
5. Remove oil cooler core (Figure 1, Item 19), gasket (Figure 1, Item 20), and two O-rings (Figure 1, Item 21).
6. Remove plug (Figure 1, Item 22), spring (Figure 1, Item 23), check valve (Figure 1, Item 24), and preformed packing (Figure 1, Item 25).

END OF TASK**INSTALLATION****WARNING**

Oil filter base and housing springs are under tension and can act as projectiles when being removed. Use eye protection when removing springs. Failure to comply can cause injury to personnel.

NOTE

Apply light coat of engine oil to all O-rings and preformed packings before installation.

1. Install preformed packing (Figure 1, Item 25), check valve (Figure 1, Item 24), spring (Figure 1, Item 23), and plug (Figure 1, Item 22).
2. Install two O-rings (Figure 1, Item 21), gasket (Figure 1, Item 20), and oil cooler core (Figure 1, Item 19).
3. Install gasket (Figure 1, Item 18), oil cooler (Figure 1, Item 14), nine washers (Figure 1, Item 17), two screws (Figure 1, Item 16), and seven bolts (Figure 1, Item 15). Torque screws (Figure 1, Item 16) and bolts (Figure 1, Item 15) to 15-25 lb•ft (20-34 N•m).
4. Install O-ring (Figure 1, Item 13), elbow (Figure 1, Item 12), and O-ring (Figure 1, Item 11) and connect tube (Figure 1, Item 10).
5. Install preformed packing (Figure 1, Item 9), check valve (Figure 1, Item 8), spring (Figure 1, Item 7), and plug (Figure 1, Item 6).
6. Install three O-rings (Figure 1, Item 5), oil filter base (Figure 1, Item 4), five washers (Figure 1, Item 3), two bolts (Figure 1, Item 2), and three screws (Figure 1, Item 1). Torque bolts (Figure 1, Item 2) and screws (Figure 1, Item 1) to 15-25 lb•ft (20-34 N•m).

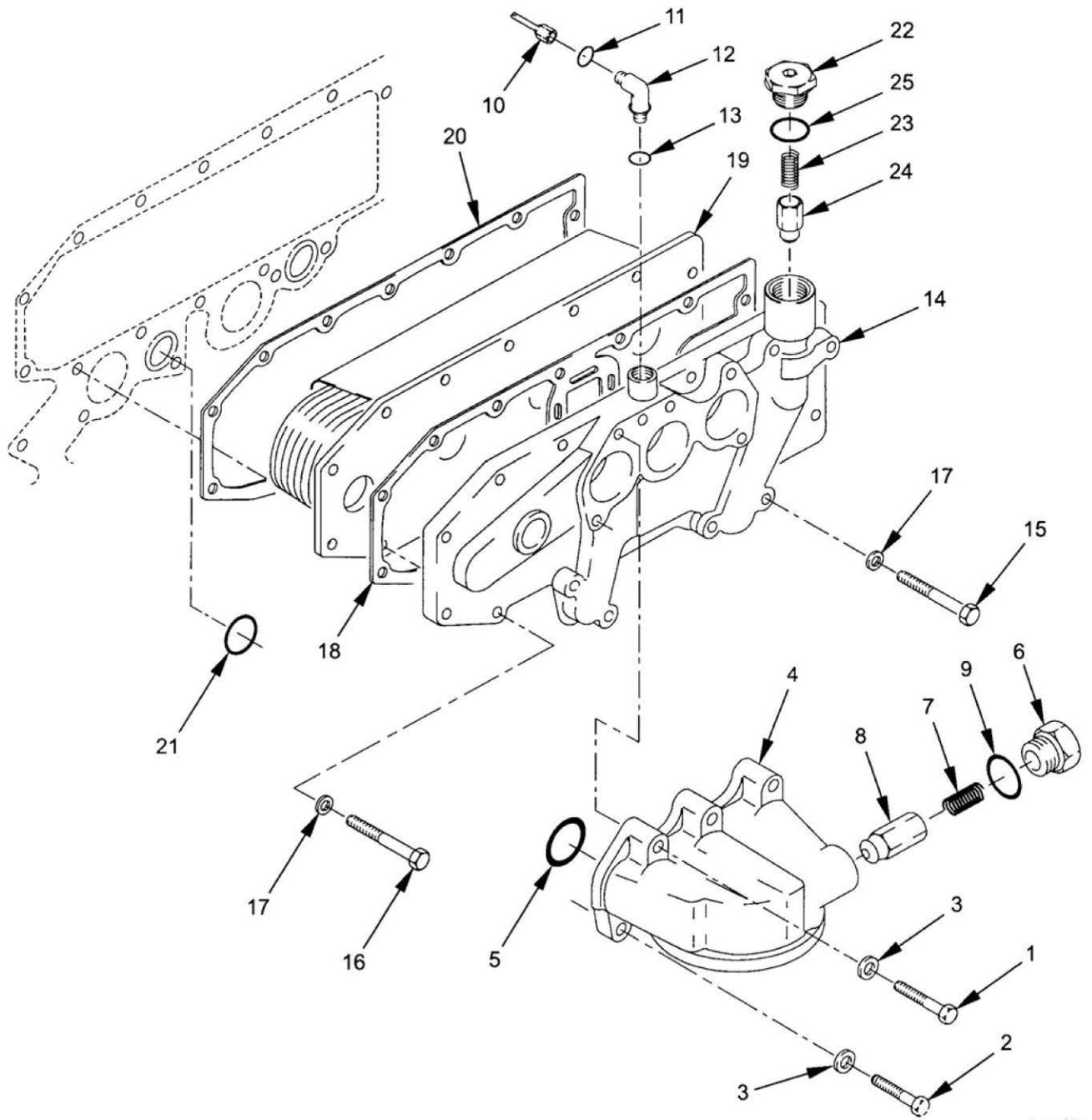


Figure 1. Engine Oil Filter Base and Oil Cooler.

7. Install oil filter (WP 0080).

END OF TASK

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FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****ENGINE OIL PAN: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Engine oil (WP 0123, Table 1, Items 27 through 36)
Gasket
Gasket cement (WP 0123, Table 1, Item 21)
O-ring
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P
WP 0080

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Engine removed (WP 0104)

WARNING

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WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be plugged immediately after opening to prevent contamination of the engine.

REMOVAL**NOTE**

Engine oil capacity is 30 quarts (27.3 L).

1. Place suitable container below oil drain valve (Figure 1, Item 1) at lower right side of oil pan (Figure 1, Item 2) and allow oil to drain from system.
2. Remove 36 bolts (Figure 1, Item 3), washers (Figure 1, Item 4), and oil pan (Figure 1, Item 2). Scrape gasket (Figure 1, Item 5) from oil pan (Figure 1, Item 2) or engine block.
3. Remove plug (Figure 1, Item 6), O-ring (Figure 1, Item 7), drain valve (Figure 1, Item 1), and O-ring (Figure 1, Item 8).
4. Remove magnetic drain plug (Figure 1, Item 9) and preformed packing (Figure 1, Item 10). Inspect magnetic drain plug (Figure 1, Item 9) for metal particles and wipe clean. Notify supervisor if particles are present.

END OF TASK**INSTALLATION**

1. Install preformed packing (Figure 1, Item 10) and magnetic drain plug (Figure 1, Item 9).
2. Install O-ring (Figure 1, Item 8), drain valve (Figure 1, Item 1), O-ring (Figure 1, Item 7), and plug (Figure 1, Item 6).
3. Apply thin coat of gasket cement between bolt holes only at four corners of oil pan (Figure 1, Item 2).

CAUTION

Do not get gasket cement on any part of engine block, gasket, or oil pan not specifically designated.

4. Position gasket (Figure 1, Item 5) on oil pan (Figure 1, Item 2) and install oil pan (Figure 1, Item 2) on engine block. Install four washers (Figure 1, Item 4) and bolts (Figure 1, Item 3) at locations marked "X" hand tight.
5. Install remaining 32 washers (Figure 1, Item 4) and bolts (Figure 1, Item 3). Tighten hand tight.
6. Beginning at the left rear corner (location marked "Z"), torque 36 bolts (Figure 1, Item 3) in a counterclockwise pattern to 21-25 lb•ft (28-34 N•m). Re-torque 36 bolts (Figure 1, Item 3) in a counterclockwise pattern to 21-25 lb•ft (28-34 N•m).
7. Refill engine with oil (WP 0080).
8. Install engine (WP 0104).

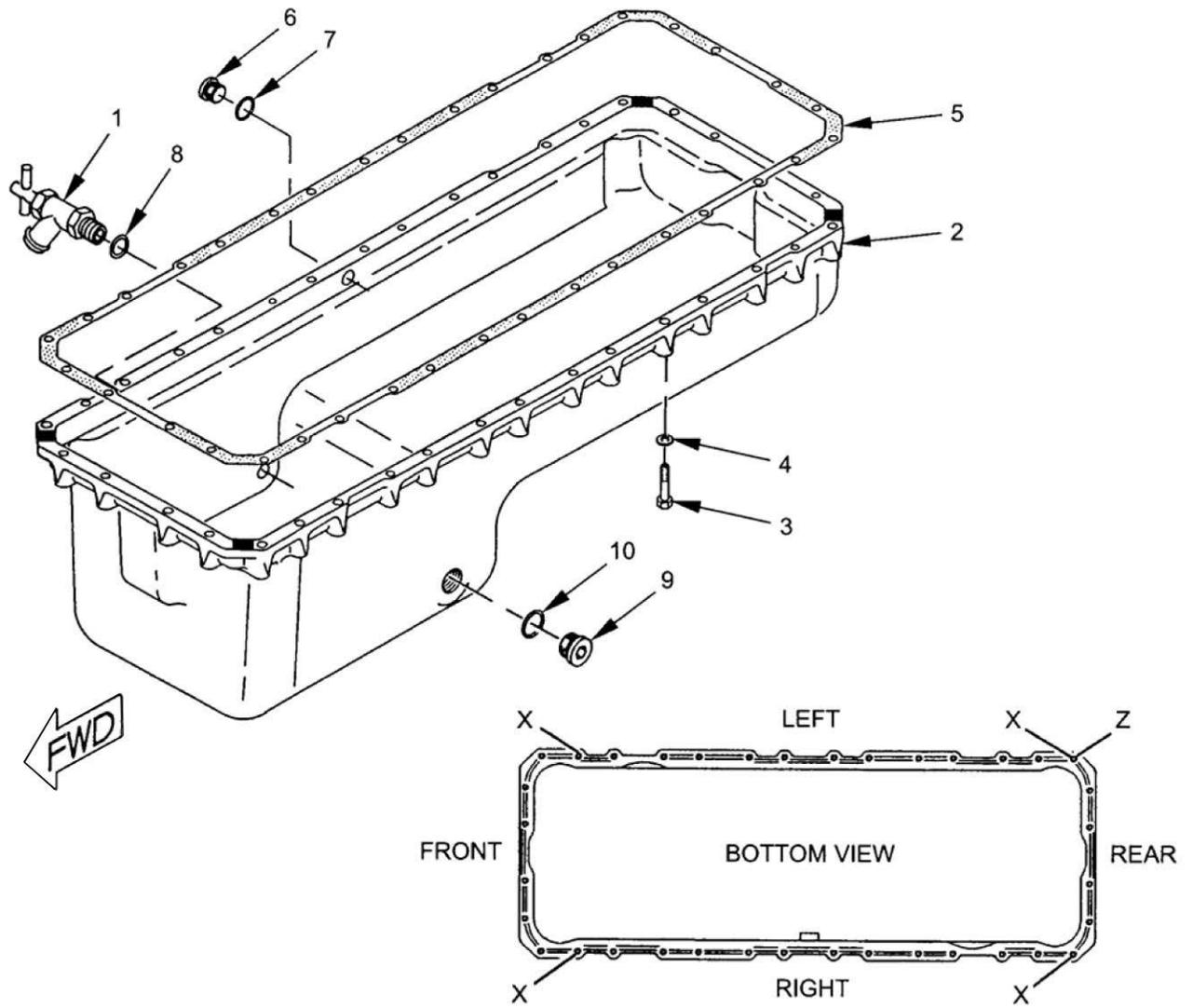


Figure 1. Engine Oil Pan.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****ENGINE OIL PUMP: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Engine oil (WP 0123, Table 1, Items 27 through 36)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Engine oil pan removed (WP 0089)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be plugged immediately after opening with clean rags to prevent contamination of the engine. Injector cleanliness is essential.

REMOVAL

Remove two screws (Figure 1, Item 1), lock washers (Figure 1, Item 2), and oil pump (Figure 1, Item 3).

END OF TASK**INSTALLATION**

1. Install oil pump (Figure 1, Item 3), two lock washers (Figure 1, Item 2), and screws (Figure 1, Item 1).

2. Torque two screws (Figure 1, Item 1) to 33-47 lb•ft (45-64 N•m).
3. Install engine oil pan (WP 0089).

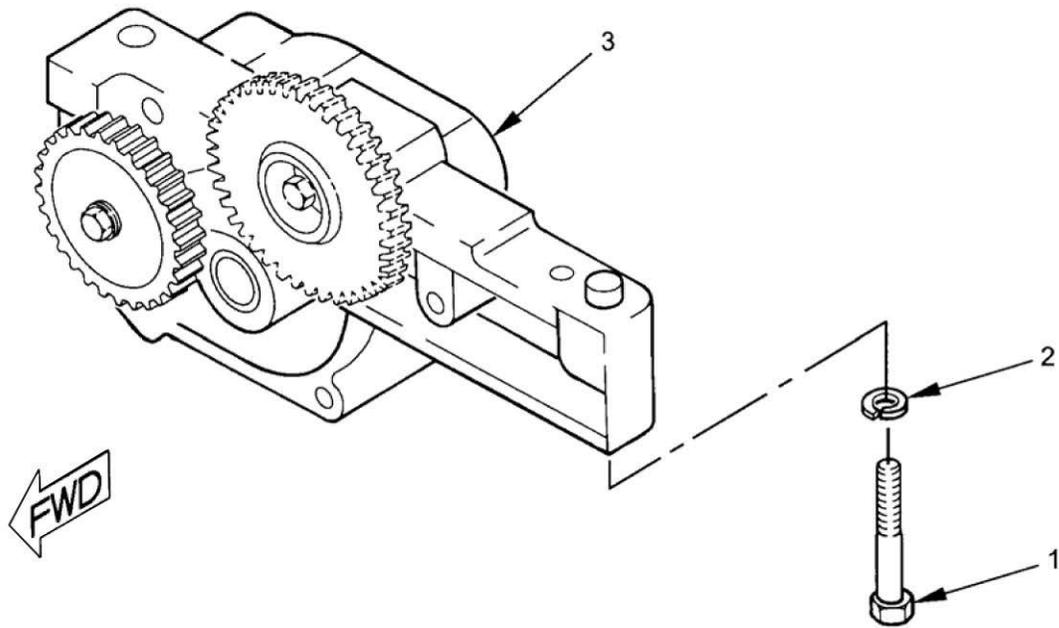


Figure 1. Engine Oil Pump.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****UNIT INJECTOR: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Backup ring
Cleaning solvent (WP 0123, Table 1, Item 10)
Engine oil (WP 0123, Table 1, Items 29 through 36)
O-ring (2)
Seal (2)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Injection actuation pressure sensor removed (WP 0106)
Valve cover, gasket, and manifold removed (WP 0107)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be plugged immediately after opening with clean rags to prevent contamination of the engine. Injector cleanliness is essential.

REMOVAL

1. Remove two oil drain plugs (Figure 1, Item 1) and O-rings (Figure 1, Item 2). Allow engine oil to drain from the ports in the cylinder head (Figure 1, Item 3).

2. Disconnect unit injector harness connector from unit injector (Figure 1, Item 4).
3. Remove shoulder bolt (Figure 1, Item 5), bolt (Figure 1, Item 6), and deflector (Figure 1, Item 7).

CAUTION

Do not pry up on unit injector at locations A or B. Pry up gently at location C only on the flywheel side of the unit injector or unit injector will be damaged.

4. Gently pry up on both sides of unit injector (Figure 1, Item 4) at location C on flywheel side of injector only and remove unit injector (Figure 1, Item 4).
5. Remove seal (Figure 1, Item 8), backup ring (Figure 1, Item 9), seal (Figure 1, Item 10), seal (Figure 1, Item 11), backup ring (Figure 1, Item 12), and backup ring (Figure 1, Item 13) from unit injector (Figure 1, Item 4).
6. Repeat steps 3 through 6 for remaining unit injectors (Figure 1, Item 4).

END OF TASK

INSTALLATION

1. Install backup ring (Figure 1, Item 13), backup ring (Figure 1, Item 12), seal (Figure 1, Item 11), seal (Figure 1, Item 10), backup ring (Figure 1, Item 9), and seal (Figure 1, Item 8) on unit injector (Figure 1, Item 4).
2. Lubricate seals and backup rings (Figure 1, Item 8) through (Figure 1, Item 13) with engine oil.
3. Clean unit injector seating surface on cylinder head (Figure 1, Item 3).

CAUTION

Do not strike unit injector with hammer. Push injector firmly straight into the injector bore by hand only or unit injector will be damaged. To avoid damaging the injector, do not use shoulder bolt or side pressure to seat injector.

4. Push unit injector (Figure 1, Item 4) straight into injector bore with the hand on top of the injector solenoid.
5. Install deflector (Figure 1, Item 7), bolt (Figure 1, Item 6), and shoulder bolt (Figure 1, Item 5). Torque bolt (Figure 1, Item 6) to 79-133 lb•in (9-15 N•m). Torque shoulder bolt (Figure 1, Item 5) to 45-63 lb•in (5-7 N•m).
6. Connect unit injector harness connector to unit injector (Figure 1, Item 4).
7. Repeat steps 1 through 6 for remaining unit injectors (Figure 1, Item 4).
8. Install two O-rings (Figure 1, Item 2) and oil drain plugs (Figure 1, Item 1) in cylinder head (Figure 1, Item 3).
9. Install manifold, gasket, and valve cover (WP 0107).
10. Install injection actuation pressure sensor (WP 0106).

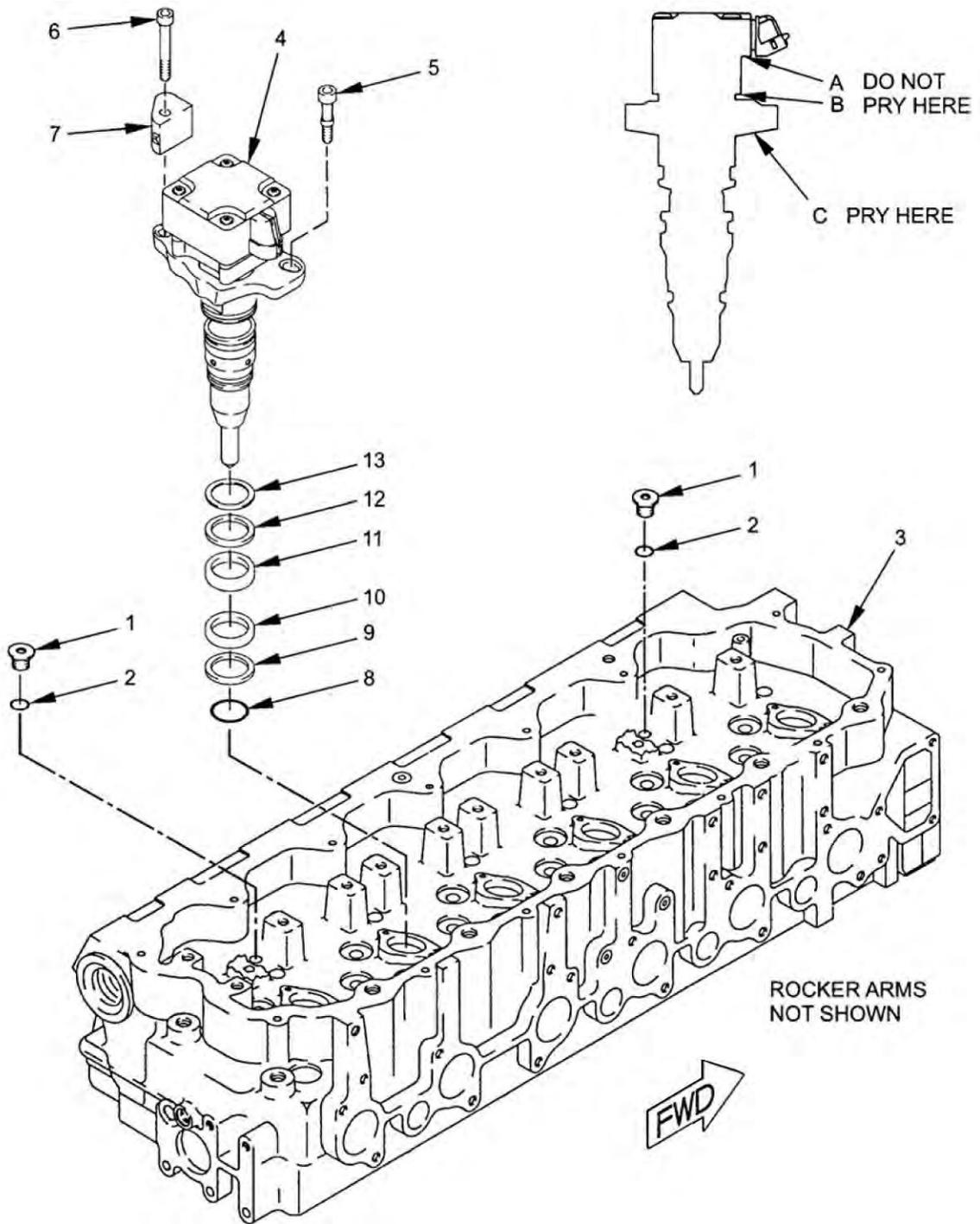


Figure 1. Unit Injector.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****ROCKER SHAFT AND PUSHRODS: REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION, VALVE LASH CHECK, VALVE LASH ADJUSTMENT**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Timing bolt, P/N 4C5851
Engine oil (WP 0123, Table 1, Items 29 through 36)

Personnel Required

Two

References

TM 9-6115-729-24P
WP 0110

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Valve cover and manifold removed (WP 0107)

WARNING

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WARNING

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WARNING

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WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be plugged immediately after opening to prevent contamination of the engine.

REMOVAL

1. Remove two bolts (Figure 1, Item 1) and washers (Figure 1, Item 2) from rocker shaft assembly.
2. Remove 11 bolts (Figure 1, Item 3), washers (Figure 1, Item 4), and entire rocker shaft assembly from cylinder head (Figure 1, Item 5).
3. Remove 12 pushrods (Figure 1, Item 6) from cylinder head (Figure 1, Item 5).

- Remove six inlet valve bridges (Figure 1, Item 7) from cylinder head (Figure 1, Item 5).

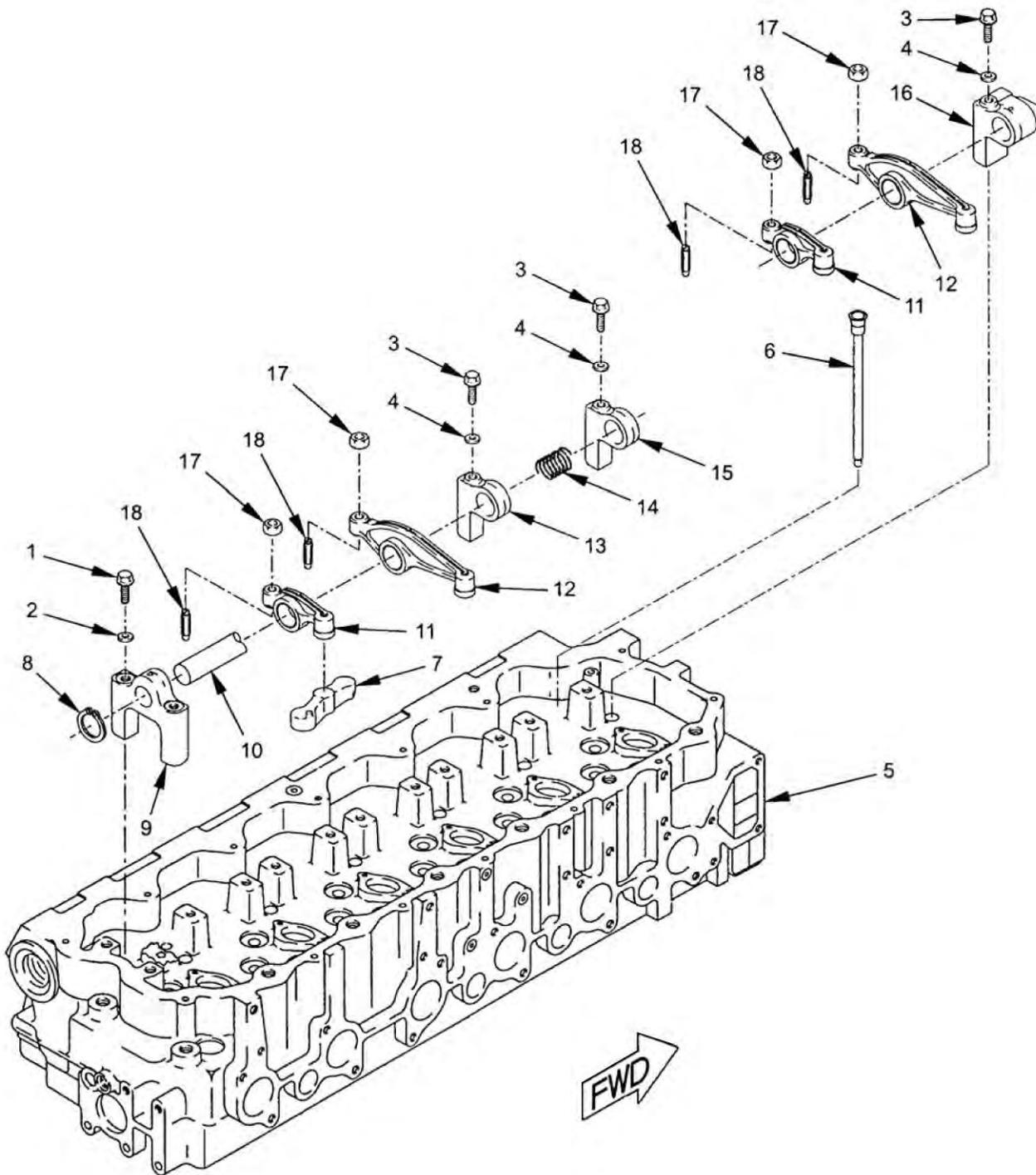


Figure 1. Rocker Shaft and Pushrods Removal and Installation.

END OF TASK

DISASSEMBLY**WARNING**

Retaining rings are under tension and can act as projectiles when being removed. Use eye protection when removing retaining rings. Failure to comply can cause injury to personnel.

1. At rear end of rocker shaft assembly, remove retaining ring (Figure 1, Item 8) and stand (Figure 1, Item 9) from rocker shaft (Figure 1, Item 10).
2. Remove inlet rocker arm (Figure 1, Item 11), exhaust rocker arm (Figure 1, Item 12), stand (Figure 1, Item 13), spring (Figure 1, Item 14), and stand (Figure 1, Item 15).
3. At front end of rocker shaft assembly, remove inlet rocker arm (Figure 1, Item 11), exhaust rocker arm (Figure 1, Item 12), and stand (Figure 1, Item 16).
4. Remove 12 nuts (Figure 1, Item 17) and adjustment screws (Figure 1, Item 18) from six inlet rocker arms (Figure 1, Item 11) and six exhaust rocker arms (Figure 1, Item 12).

END OF TASK**ASSEMBLY**

1. Install 12 adjusting screws (Figure 1, Item 18) and nuts (Figure 1, Item 17) on six exhaust rocker arms (Figure 1, Item 12) and six inlet rocker arms (Figure 1, Item 11).
2. At front end of rocker shaft assembly, install stand (Figure 1, Item 16), exhaust rocker arm (Figure 1, Item 12), and inlet rocker arm (Figure 1, Item 11).
3. Install stand (Figure 1, Item 15), spring (Figure 1, Item 14), stand (Figure 1, Item 13), exhaust rocker arm (Figure 1, Item 12), and inlet rocker arm (Figure 1, Item 11). Repeat for next four sets of rocker arms.
4. At rear end of rocker shaft assembly, install stand (Figure 1, Item 9) and retaining ring (Figure 1, Item 8).

END OF TASK**INSTALLATION**

1. Install six inlet valve bridges (Figure 1, Item 7) on cylinder head (Figure 1, Item 5).
2. Install 12 pushrods (Figure 1, Item 6) in cylinder head (Figure 1, Item 5).
3. Position entire rocker shaft assembly on cylinder head (Figure 1, Item 5) and install 11 washers (Figure 1, Item 4) and bolts (Figure 1, Item 3).
4. Install two washers (Figure 1, Item 2) and bolts (Figure 1, Item 1) on stand (Figure 1, Item 9).

END OF TASK**VALVE LASH CHECK****WARNING**

Do not use the engine starter to turn the flywheel. Failure to comply can cause injury to personnel.

NOTE

All clearance measurements must be made with the engine stopped and the valves fully closed. Otherwise, incorrect adjustments will be made resulting in engine damage.

NOTE

Valve lash adjustment is not necessary if measurement is in the acceptable range.

NOTE

Engine must be turned with the four large bolts on crankshaft retaining plate.

1. Remove crankshaft damper and damper pulley (WP 0110). Leave retaining plate and crankshaft pulley in place.
2. Remove plug (Figure 2, Item 19) from timing hole on right front side of flywheel housing. Insert timing bolt (Figure 2, Item 20) through timing hole.
3. Using four large bolts on crankshaft retaining plate, turn flywheel in direction of normal engine rotation until timing bolt (Figure 2, Item 20) engages hole in flywheel.
4. If flywheel is turned beyond point of engagement, turn flywheel in opposite direction approximately 30 degrees. Then turn flywheel in direction of normal engine rotation until timing bolt (Figure 2, Item 20) engages hole in flywheel.

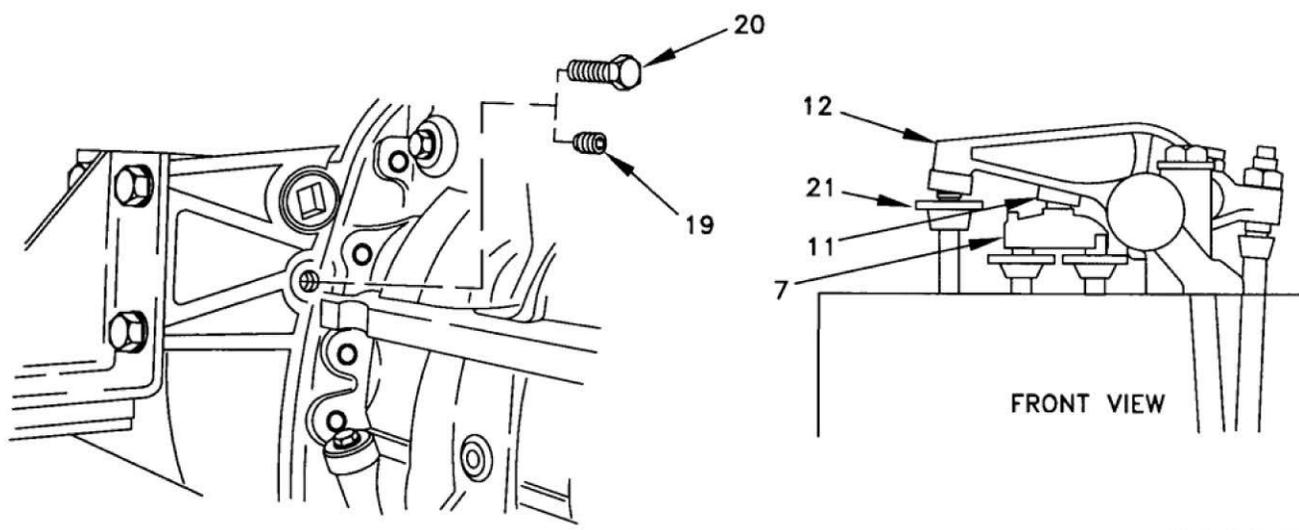


Figure 2. Valve Clearance Measurements.

5. Inlet valves and exhaust valve for cylinder number 1 are fully closed if piston number 1 is on the compression stroke and the rocker arms can be moved by hand. If rocker arms cannot be moved by hand and the valves are slightly open, the number 1 piston is on the exhaust stroke.
6. Refer to Table 1 for crankshaft positions for valve lash settings.

Table 1. Crankshaft Positions for Valve Lash Setting.

Rotation (viewed from flywheel end)	Counterclockwise
Check and adjust with piston no. 1 on this stroke	Top center compression stroke
Inlet valves	1-2-4
Exhaust Valves	1-3-5
Check and adjust with no. 1 piston on this stroke	Top center exhaust stroke
Inlet valves	2-5-6
Exhaust valves	2-4-6
Firing order)	1-5-3-6-2-4

7. For inlet valves, valve lash is measured between rocker arm (Figure 2, Item 11) and bridge (Figure 2, Item 7). For exhaust valves, valve lash is measured between rocker arm (Figure 2, Item 12) and valve stem (Figure 2, Item 21).
8. Tap each inlet rocker arm (Figure 2, Item 11) and each exhaust rocker arm (Figure 2, Item 12) with a soft face mallet. Check valves for correct valve lash shown in Table 2. Valves within the acceptable range do not have to be adjusted.

Table 2. Check for Valve Lash.

Valves	Acceptable Range
Inlet	0.012-0.018 in (0.30-0.46 mm)
Exhaust	0.022-0.028 in (0.56-0.72 mm)

9. If valve lash for all valves is within acceptable range, proceed with steps 11 through 13.
10. Perform valve lash adjustment on any valve with readings outside the acceptable range.
11. Remove timing bolt (Figure 2, Item 20) and install plug (Figure 2, Item 19) on flywheel housing.
12. Install crankshaft damper and crankshaft pulley (WP 0110).
13. Install manifold and valve cover (WP 0107).

END OF TASK

VALVE LASH ADJUSTMENT

NOTE

Perform steps 1 through 10 if No. 1 cylinder is on compression stroke.

1. Loosen nut (Figure 3, Item 17) and loosen adjustment screw (Figure 3, Item 18) on inlet rocker arm (Figure 3, Item 11) for cylinders 1, 2, and 4.

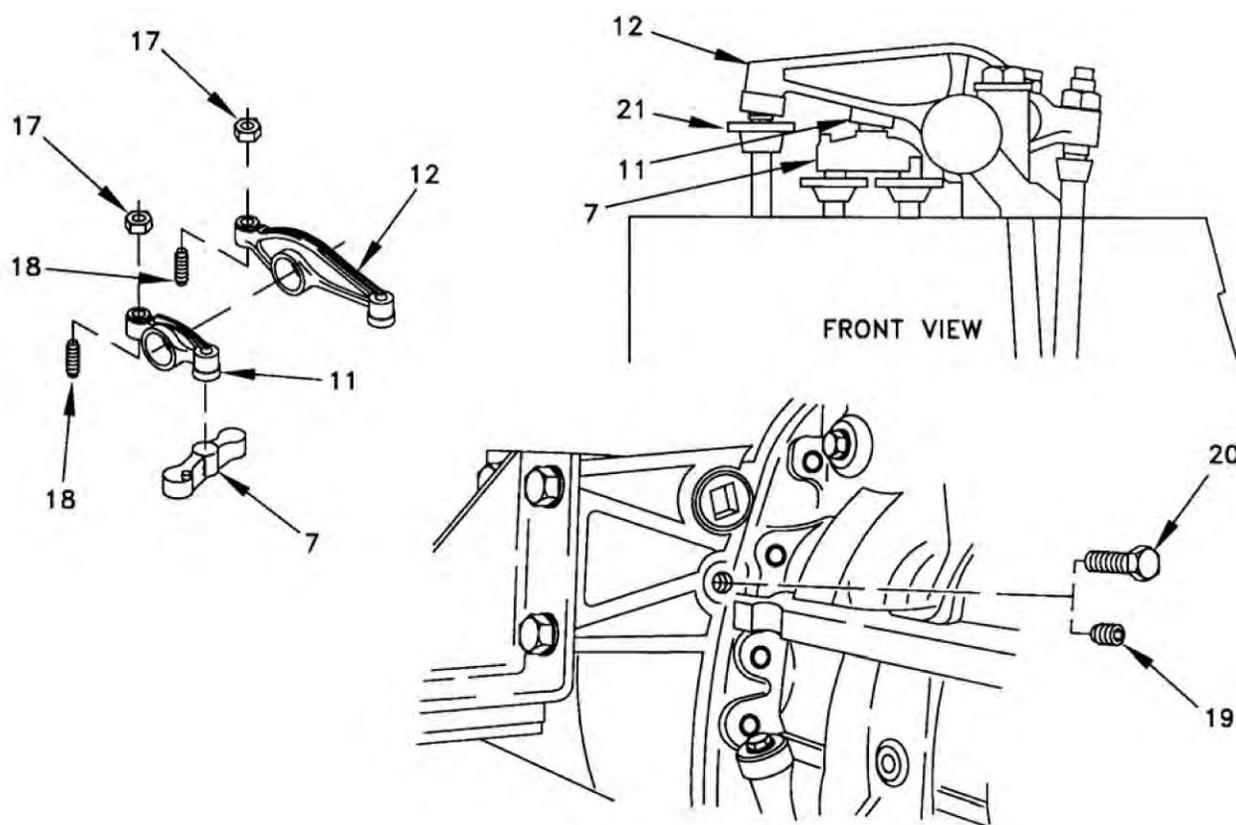


Figure 3. Valve Lash Adjustment.

2. Refer to Table 3 and insert feeler gage of correct dimension between inlet rocker arm (Figure 3, Item 11) and inlet bridge (Figure 3, Item 7).
3. Turn adjustment screw (Figure 3, Item 18) clockwise (CW) until inlet rocker arm (Figure 3, Item 11) is set to specification in Table 3.

Table 3. Valve Lash Settings.

Valves	Gage Dimension
Inlet	0.015 in (0.38 mm)
Exhaust	0.025 in (0.64 mm)

4. Tighten nut (Figure 3, Item 17) on adjustment screw to 13-23 lb•ft (18-32 N•m).
5. Check adjustment and perform steps 1 through 4 until inlet rocker arm (Figure 3, Item 11) is set to specification.
6. Perform steps 1 through 5 on remaining two inlet rocker arms (Figure 3, Item 11).
7. Loosen nut (Figure 3, Item 17) and loosen adjustment screw (Figure 3, Item 18) on exhaust rocker arms (Figure 3, Item 12) for cylinders 1, 3, and 5.
8. Refer to Table 3 and insert feeler gage of correct dimension between exhaust rocker arm (Figure 3, Item 12) and exhaust valve stem (Figure 3, Item 21).
9. Turn adjustment screw clockwise (CW) until exhaust rocker arm (Figure 3, Item 12) is set to specification in Table 3.
10. Tighten nut (Figure 3, Item 17) on adjustment screw (Figure 3, Item 18) to 13-23 lb•ft (18-32 N•m).

11. Check adjustment and perform steps 7 through 10 until exhaust rocker arm (Figure 3, Item 12) is set to specification.
12. Perform steps 7 through 11 on remaining two exhaust rocker arms (Figure 3, Item 12).
13. Remove timing bolt (Figure 3, Item 20) from front of flywheel housing. Rotate flywheel 360 degrees counterclockwise (CCW). Install timing bolt (Figure 3, Item 20) in front of flywheel housing.

NOTE

Perform steps 14 through 17 if No. 1 cylinder is on exhaust stroke.

14. Loosen nut (Figure 3, Item 17) and loosen adjustment screw (Figure 3, Item 18) on inlet rocker arms (Figure 3, Item 11) for cylinders 3, 5, and 6.
15. Perform steps 1 through 5 on three inlet rocker arms (Figure 3, Item 11).
16. Loosen nut (Figure 3, Item 17) and loosen adjustment screw (Figure 3, Item 18) on exhaust rocker arms (Figure 3, Item 12) for cylinders 2, 4, and 6.
17. Perform steps 7 through 11 on three exhaust rocker arms (Figure 3, Item 12).
18. Remove timing bolt (Figure 3, Item 20) and install plug (Figure 3, Item 19) on front of flywheel housing.
19. Install crankshaft damper and damper pulley (WP 0110).
20. Install manifold and valve cover (WP 0107).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
CYLINDER HEAD AND GASKET: REMOVAL, CLEANING, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Lifting Device, 200 lb (91 kg) Capacity
Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Cleaning solvent (WP 0123, Table 1, Item 10)
Engine oil (WP 0123, Table 1, Items 29 through 36)
Gasket
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

Two

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Fuel filter base removed (WP 0079)
Air inlet elbow, heater, and cover removed (WP 0109)
Thermostat housing removed (WP 0082)
Exhaust manifold removed (WP 0113)
Rocker shaft and pushrods removed (WP 0090)
Unit Injectors removed (WP 0089)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

REMOVAL

1. Remove fourteen bolts (Figure 1, Item 1) and ring spacers (Figure 1, Item 2).
2. Remove six bolts (Figure 1, Item 3) and lock washers (Figure 1, Item 4).

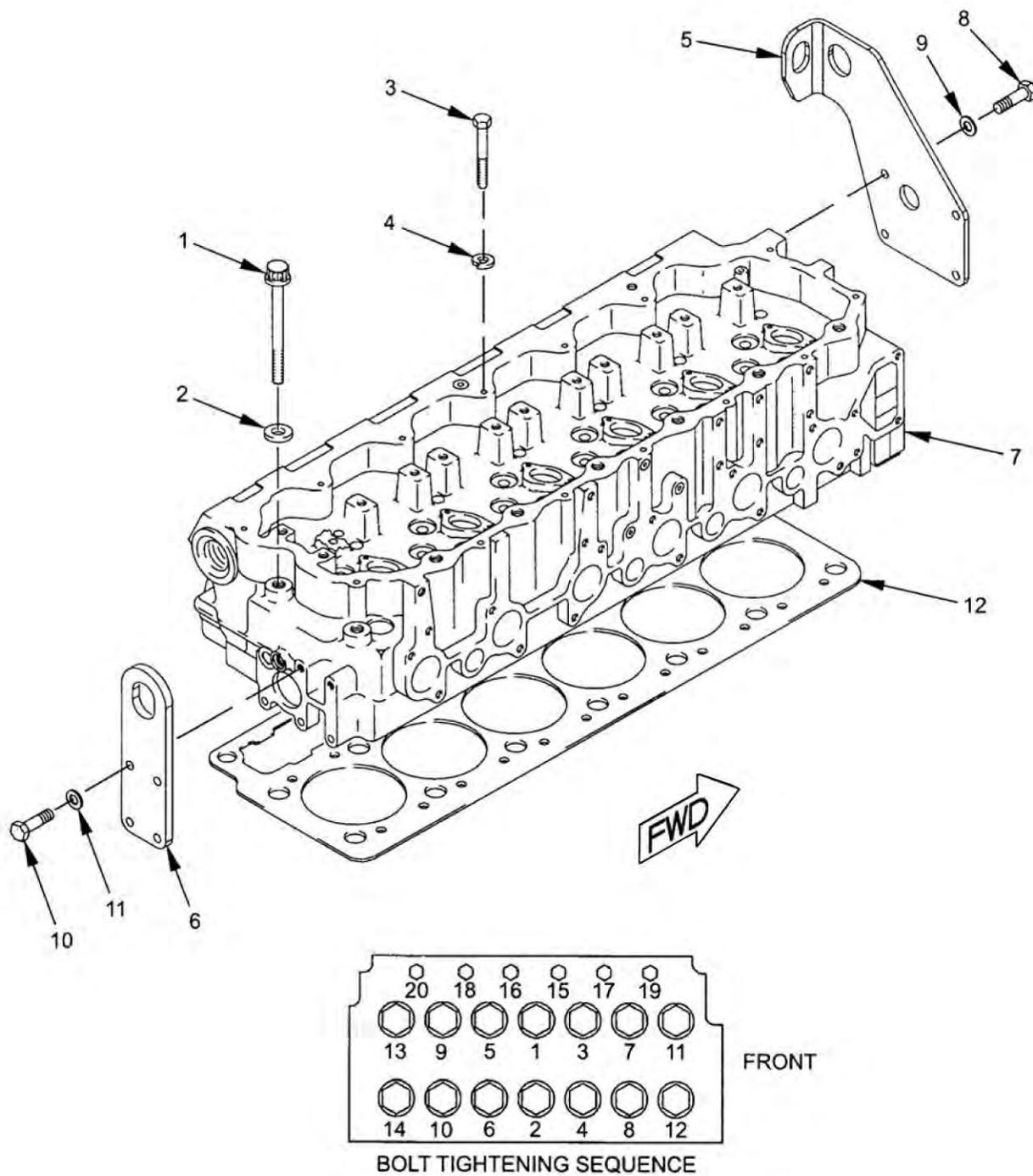


Figure 1. Cylinder Head and Gasket.

WARNING

Cylinder head weighs more than 187 pounds (85 kg) and requires an assistant and a suitable lifting device. Ensure proper lifting techniques are used when lifting cylinder head. Failure to comply can cause injury to personnel.

CAUTION

Cylinder head must be removed level and straight up, or damage will result.

3. With lifting device attached to front lifting bracket (Figure 1, Item 5) and rear lifting bracket (Figure 1, Item 6), carefully lift cylinder head (Figure 1, Item 7) straight up away from engine block.
4. Remove four bolts (Figure 1, Item 8), lock washers (Figure 1, Item 9), and front lifting bracket (Figure 1, Item 5).
5. Remove four bolts (Figure 1, Item 10), lock washers (Figure 1, Item 11), and rear lifting bracket (Figure 1, Item 6).
6. Remove gasket (Figure 1, Item 12).

END OF TASK

CLEANING AND INSPECTION

WARNING

Cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin and eye protection are required when working in contact with cleaning solvent. Avoid repeated or prolonged contact. Work in ventilated area only. Failure to comply can cause injury or death to personnel.

1. Clean all parts with cleaning solvent.

CAUTION

Be careful not to gouge or scrape contact surface of cylinder head or engine block. Imperfections in contact surface may cause leakage of cylinder head gasket and equipment damage.

CAUTION

Contact surfaces of cylinder head and engine block must be thoroughly clean before installation or cylinder head gasket may leak and cause equipment damage.

2. Carefully remove all remnants of head gasket from bottom of head gasket and from top of engine block.
3. Measure contact surface of cylinder head for flatness. Maximum deviation should not exceed 0.002 in (0.03 cm) in a six inch area, or 0.006 in (0.02 cm) overall.

END OF TASK

INSTALLATION

1. Install rear lifting bracket (Figure 1, Item 6) on cylinder head (Figure 1, Item 7) with four lock washers (Figure 1, Item 11) and bolts (Figure 1, Item 10).
2. Install front lifting bracket (Figure 1, Item 5) on cylinder head (Figure 1, Item 7) with four lock washers (Figure 1, Item 9) and bolts (Figure 1, Item 8).
3. Place gasket (Figure 1, Item 12) on engine block.

WARNING

Cylinder head weighs more than 187 pounds (85 kg) and requires an assistant and a suitable lifting device. Ensure proper lifting techniques are used when lifting cylinder head. Failure to comply can cause injury to personnel.

CAUTION

Cylinder head must be removed level and straight up, or damage will result.

4. With lifting device attached to front lifting bracket (Figure 1, Item 5) and rear lifting bracket (Figure 1, Item 6), carefully position cylinder head (Figure 1, Item 7) straight over engine block and carefully lower cylinder head onto engine block.
5. Apply engine oil to threads of fourteen bolts (Figure 1, Item 1) and six bolts (Figure 1, Item 3).

6. Install fourteen ring spacers (Figure 1, Item 2) and bolts (Figure 1, Item 1). Install six washers (Figure 1, Item 4) and bolts (Figure 1, Item 3).
7. Torque fourteen bolts (Figure 1, Item 1) in sequence shown to 210-232 lb•ft (285-315 N•m).
8. Loosen fourteen bolts until ring spacers (Figure 1, Item 2) are loose.
9. Torque fourteen bolts (Figure 1, Item 1) in sequence shown to 85-107 lb•ft (115-145 N•m).
10. Re-tighten fourteen bolts (Figure 1, Item 1) in sequence shown to 85-107 lb•ft (115-145 N•m).
11. Tighten fourteen bolts (Figure 1, Item 1) in sequence shown an additional one-fourth turn.
12. Torque six bolts (Figure 1, Item 3) to 36-45 lb•ft (48-62 N•m).
13. Install unit injectors (WP 0089).
14. Install rocker shaft and pushrods (WP 0090).
15. Install exhaust manifold (WP 0113).
16. Install thermostat housing (WP 0082).
17. Install air inlet elbow, heater, and cover (WP 0109).
18. Install fuel filter base (WP 0079).

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
REPROGRAMMING: REPROGRAMMING DVR, REPROGRAMMING GSC**

INITIAL SETUP:

Personnel Required

One

References

TM 9-6115-729-24P
WP 0003

Equipment Condition

TQG is not operating and powered down

REPROGRAMMING DVR PARAMETERS FOR VOLTAGE AND FREQUENCY CHANGE

The following procedure is used if the voltage and frequency settings for the generator set must be changed because of mission requirements. When that occurs, the reconnection board must be repositioned and the DVR must be reprogrammed for specified frequency and voltage.

NOTE

Note that the GSC OP-5 parameters must be reprogrammed, also.

1. Set Battery Disconnect Switch to ON.
2. Set DEAD CRANK SWITCH to NORMAL.
3. On EMCP, set ENGINE CONTROL Switch (ECS) to COOL DOWN/STOP.
4. Select reprogramming data from Table 1 below according to the desired output voltage and desired frequency. Mission requirements will define requirements.

NOTE

All six of the DVR PARAMETERS must be changed or verified.

Table 1. 100 kW TQG DVR Voltage and Frequency Programming Parameters and Setpoints.

DESIRED OUTPUT		DVR PARAMETER NUMBER					
VOLTS	HERTZ	:01	:02	:03	:04	:05	:06
120/208	60	217	1.0	0	347	4.34	58.8
120/208	50	205	1.0	0	289	3.61	49.8
240/416	60	434	2.0	0	174	4.34	58.8
240/416	50	410	2.0	0	145	3.61	49.8

5. Press the up arrow key . DVR display should read :01 (the colon with the number indicates that the number is a parameter number).
6. Press and hold up arrow key  until display shows parameter number :90. Parameter number: 90 is a password that can be used to protect the settings.
7. Press Function  key on DVR once to display data for parameter :90.
8. Press and hold up arrow key  or down arrow key  to set the data for parameter number :90 to 0200.
9. Press Function  key on DVR once to display parameter :90.
10. Press and hold up arrow key  or down arrow key  to change to parameter number :01.

11. Press Function  key on DVR once to display data for parameter.
12. Press and hold up arrow key  or down arrow key  to set the data for parameter per Table 1.
13. Press Function  key on DVR once to switch back to the parameter number.
14. Press up arrow key  once to change to next parameter number per Table 1.
15. Keep repeating from Step 9, entering parameter data from Table 1, until all 6 parameter data is entered or verified to be correct.
16. Press Function  key on DVR once to display data for parameter :90.
17. Press and hold up arrow key  or down arrow key  to set the data for parameter number :90 to any number but 0009 to lock the DVR. DVR will not stay locked when Engine Control switch is switched from either COOL DOWN/STOP to OFF/RESET and back to COOL DOWN/STOP or from COOL DOWN/STOP to MANUAL START.
18. Press Function  key on DVR once to switch back to parameter number. Press and hold up arrow key  or down arrow key  to set the parameter number back to 01.
19. Proceed to REPROGRAMMING GSC SETPOINTS FOR VOLTAGE AND FREQUENCY CHANGE and reprogram the OP5 parameters for P028 through P031 (steps 1 through 25).
20. If the generator set is not to be used, set ENGINE CONTROL Switch (ECS) to OFF/RESET, set DEAD CRANK SWITCH to OFF, and set Battery Disconnect Switch to OFF.

END OF TASK

REPROGRAMMING OR VERIFYING DVR PARAMETERS

The following procedure is used to reprogram the DVR if a DVR is replaced or if there is some reason to verify DVR parameters. Table 2 describes the parameters and lists values to be programmed or verified.

1. Set Battery Disconnect Switch to ON.
2. Set DEAD CRANK SWITCH to NORMAL.
3. On EMCP, set ENGINE CONTROL Switch (ECS) to COOL DOWN/STOP.
4. Select reprogramming data or parameter to be verified from Table 2.
5. DVR display should read :01 (the colon with the number indicates that the number is a parameter number).
6. Press and hold up arrow key  until display shows parameter number :90.
7. Press Function  key on DVR once to display data for parameter :90

Table 2. 100 kW TQG DVR Programming Parameters.

DESCRIPTION	PARAMETER	ACTION	UNITS	TQG SETPOINTS 240/216		TQG SETPOINTS 120/206	
				60 Hz	50 Hz	60 Hz	50 Hz
Generator Output Voltage	:01	Program	Volts	434	410	217	205
Ratio of Output Volts to Sensing Volts	:02	Program	—	2.0	2.0	1.0	1.0
Generator Type	:03	Program	—	0	0	0	0
Rated Generator Output Current	:04	Program	Ampere	174	145	347	289
CT Voltage at Rated Output Current	:05	Program	Volts	4.34	3.61	4.34	3.61

Table 2. 100 kW TQG DVR Programming Parameters. - Continued

DESCRIPTION	PARAMETER	ACTION	UNITS	TQG SETPOINTS 240/216		TQG SETPOINTS 120/206	
				60 Hz	50 Hz	60 Hz	50 Hz
Knee Frequency	:06	Program	Hz	58.8	49.8	58.8	49.8
Decreasing Volts/Hz Slope 1	:07	Program	Volts/Hz	3.0	3.0	3.0	3.0
Decreasing Volts/Hz Slope 2	:08	Program	Volts/Hz	2.0	2.0	2.0	2.0
Minimum Voltage	:09	Program	%	50.0	50.0	50.0	50.0
Under Frequency Point	:10	Program	Hz	25.0	25.0	25.0	25.0
Overvoltage Trip Point	:11	Program	%	125.0	125.0	125.0	125.0
Overvoltage Trip Time	:12	Program	Seconds	2	2	2	2
Under Voltage Trip Point	:13	Program	%	75	75	75	75
Under Voltage Trip Time	:14	Program	Seconds	30	30	30	30
Voltage Gain (IR Compensation)	:15	Program	%	0	0	0	0
Integral Gain	:16	Program	—	2.4	2.4	2.4	2.4
Proportional Gain	:17	Program	—	1.0	1.0	1.0	1.0
Single Phase Sensing 3ph=0 1ph=1	:18	Program	—	0000	0000	0000	0000
Diode Monitor Trip Point	:19	Program	Ampere	2.0	2.0	2.0	2.0
Reverse VAR Trip Time	:20	Program	Seconds	.5	.5	.5	.5
Reverse VAR Fault Selection	:21	Program	—	2	2	2	2
Droop/CCC Select 0+D 1=CCC	:22	Program	—	0	0	0	0
Droop Percentage	:30	Program	%	1.8	1.8	1.8	1.8
Reverse Power Trip Point	:34	Program	%	20	20	20	20
Reverse Power Trip Time	:35	Program	Seconds	7	7	7	7
Frequency	:50	View	Hz	—	—	—	—
Voltage	:51	View	Volts	—	—	—	—
Current	:52	View	Ampere	—	—	—	—
Reactive Output Current	:53	View	Ampere	—	—	—	—

Table 2. 100 kW TQG DVR Programming Parameters. - Continued

DESCRIPTION	PARAMETER	ACTION	UNITS	TQG SETPOINTS 240/216		TQG SETPOINTS 120/206	
				60 Hz	50 Hz	60 Hz	50 Hz
Generator Real Current	:54	View	Ampere	—	—	—	—
Exciter Field Current	:55	View	Ampere	—	—	—	—
3-Phase kW	:56	View	kW	—	—	—	—
Power Factor	:57	View	—	—	—	—	—
3-Phase kVAR	:58	View	—	—	—	—	—
Hours	:60	View	Hours	—	—	—	—
Password	:90	Program	—	0009	0009	0009	0009
Software ID	:91	View	—	1.05	1.05	1.05	1.05
Latest Fault	:92	View	—	—	—	—	—
Previous Fault	:93	View	—	—	—	—	—
Fault Clear	:94	Switch	—	—	—	—	—
Shutdown Fault Reset	:96	Switch	—	—	—	—	—

8. Press and hold up arrow key ▲ or down arrow key ▼ to set the data for parameter number :90 to 0009. DVR will not stay locked when Engine Control switch is switched from either COOL DOWN/STOP to OFF/RESET and back to COOL DOWN/STOP or from COOL DOWN/STOP to MANUAL START.
9. Press Function ◀▶ key on DVR once to display parameter: 90.
10. Press and hold up arrow key ▲ or down arrow key ▼ to change to parameter number :01.
11. Press Function ◀▶ key on DVR once to display data for parameter.
12. Press and hold up arrow key ▲ or down arrow key ▼ to set the data for parameter per Table 2.
13. Press Function ◀▶ key on DVR once to switch back to the parameter number.
14. Press up arrow key ▲ once to change to next parameter number per Table 2.
15. Keep repeating from Step 7, entering or viewing parameter data from Table 2, until all parameter data is entered or verified to be correct.
16. Press Function ◀▶ key on DVR once to display data for parameter :90.
17. Press and hold up arrow key ▲ or down arrow key ▼ to set the data for parameter number :90 to any number but 0009 to lock the DVR. DVR will not stay locked when Engine Control switch is switched from either COOL DOWN/STOP to OFF/RESET and back to COOL DOWN/STOP or from COOL DOWN/STOP to MANUAL START.
18. If the generator set is not to be used, set ENGINE CONTROL Switch (ECS) to OFF/RESET, set DEAD CRANK SWITCH to OFF, and set Battery Disconnect Switch to OFF.

END OF TASK

REPROGRAMMING GSC SETPOINTS FOR VOLTAGE AND FREQUENCY CHANGE

1. Set Battery Disconnect Switch to ON.
2. Set DEAD CRANK SWITCH to NORMAL.
3. On EMCP, set ENGINE CONTROL Switch (ECS) to COOL DOWN/STOP.

- Select programming data for GSC from Table 3 for desired output voltage and desired frequency.

Table 3. 100 kW TQG GSC Programming Setpoints.

DESIRED OUTPUT		OP5-0				OP5-1			
VOLTS	HERTZ	P028	P029	P030	P031	P114	P117	P120	P123
120/208	60	208	347	100	60	63	66	57	54
120/208	50	208	289	83	50	53	55	48	45
240/416	60	416	173	100	60	63	66	57	54
240/416	50	416	144	83	50	53	55	48	45

NOTE

In SERVICE MODE, the buttons on the GSC keypad perform new functions as follows:
 POWER METER is Scroll Right
 AC METER is Scroll Up
 ENGINE METER is Scroll Down
 LAMP TEST is Select
 ALARM CODES is Enter

- Press SERVICE MODE key on GSC. SERV will be displayed on upper display. OP1 will be displayed on lower display.
- Press AC METER key four times. OP3 will be displayed.
- Press the LAMP TEST key. P E ----- will be displayed. The left-most underline will be flashing. If an error is made any time during the password entry, P E FAIL will be displayed. Password entry can be restarted by pressing LAMP TEST key.
- Press POWER METER key. P E 1 _ _ _ _ will be displayed. The left-most underline will be flashing.
- Press ENGINE METER key. P E 1 3 _ _ _ will be displayed. The left-most underline will be flashing.
- Press AC METER key. P E 1 3 2 _ _ will be displayed. The left-most underline will be flashing.
- Press ENGINE METER key. P E 1 3 2 3 _ will be displayed. The underline will be flashing.
- Press POWER METER key. P E 1 3 2 3 1 will be displayed.
- Press ALARM CODES key. P E PASS will be displayed.
- Press EXIT key. OP4 will be displayed.
- Press AC METER key. OP5 will be displayed.

NOTE

For input values the OP set and the parameter values will toggle between the upper and lower displays as each OP set is entered.

- Press AC METER key or ENGINE METER key until OP5-0 is displayed.
- Press LAMP TEST key. P001 will be displayed followed by the value of the setpoint.
- Press ENGINE METER key until P028 is displayed (P028 is first setpoint in table).
- Press LAMP TEST key. The value of the setpoint will begin to flash.
- Press AC METER key or ENGINE METER key to change the value, as required, to what is shown in Table 3 corresponding to the desired voltage and frequency.
- Press ALARM CODES key. The value of the setpoint will stop flashing.
- Repeat Steps 18 through 21 until all setpoint values are checked or changed for OP5-0.

23. Repeat Steps 16 through 22 for OP5-1. The first setpoint displayed will be P101. The first setpoint to be changed/verified is P114, per Table 3.
24. At the completion of the programming, press EXIT key until SERV is no longer displayed on upper display.
25. If the generator set is not to be used, set ENGINE CONTROL Switch (ECS) to OFF/RESET, set DEAD CRANK SWITCH to OFF, and set Battery Disconnect Switch to OFF.

END OF TASK

REPROGRAMMING OR VERIFYING GSC SETPOINTS

The following procedure is used to reprogram the GSC if a GSC is replaced or if there is some reason to verify GSC setpoints as part of troubleshooting or analysis. Table 4 describes 100 kW OP5-0 Engine/Generator Setpoint Programming and lists values to be programmed or verified. Table 5 describes OP5-1 Protective Relaying Setpoint Programming and lists values to be programmed or verified. Table 6 describes OP5-3 Synchronization Setpoint Programming and lists values to be programmed or verified. Table 7 describes OP6-0 Spare Input/Output Setpoint Programming. Table 8 describes OP8 data from ATB and BTB transformers in the control panel that must be entered if either of those devices is replaced.

1. Set Battery Disconnect Switch to ON.
2. Set DEAD CRANK SWITCH to NORMAL.
3. On EMCP, set ENGINE CONTROL Switch (ECS) to COOL DOWN/STOP.
4. Select programming data for GSC from Tables 4 through 8 for GSC programming to be verified or completed. If GSC has been replaced, all setpoints must be verified or reprogrammed. Factory default values must be verified and TQG custom values must be programmed.

NOTE

In SERVICE MODE, the buttons on the GSC keypad perform new functions as follows:

POWER METER is Scroll Right

AC METER is Scroll Up

ENGINE METER is Scroll Down

LAMP TEST is Select

ALARM CODES is Enter

5. Press SERVICE MODE key on GSC. SERV will be displayed on upper display. OP1 will be displayed on lower display.
6. Press AC METER key five times. OP3 will be displayed.
7. Press the LAMP TEST key. P E ----- will be displayed. The left-most underline will be flashing. If an error is made any time during the password entry, P E FAIL will be displayed. Password entry can be restarted by pressing LAMP TEST key.
8. Press POWER METER key. P E 1 _ _ _ _ will be displayed. The left-most underline will be flashing.
9. Press ENGINE METER key. P E 1 3 _ _ _ will be displayed. The left-most underline will be flashing.
10. Press AC METER key. P E 1 3 2 _ _ will be displayed. The left-most underline will be flashing.
11. Press ENGINE METER key. P E 1 3 2 3 _ will be displayed. The underline will be flashing.
12. Press POWER METER key. P E 1 3 2 3 1 will be displayed.
13. Press ALARM CODES key. P E PASS will be displayed.
14. Press EXIT key. OP4 will be displayed.
15. Press AC METER key. OP5 will be displayed.

NOTE

For input values the OP set and the parameter values will toggle between the upper and lower displays as each OP set is entered.

16. Press AC METER key or ENGINE METER key until OP5-0 is displayed.
17. Press LAMP TEST key. P001 will be displayed followed by the value of the setpoint.
18. Press ENGINE METER key until next setpoint to be verified or changed is displayed.
19. Press LAMP TEST key. The value of the setpoint will begin to flash.
20. Press AC METER key or ENGINE METER key to change the value, as required, to what is shown in Table 4 corresponding to the desired setpoint value.
21. Press ALARM CODES key. The value of the setpoint will stop flashing.
22. Repeat Steps 18 through 21 until all setpoint values are checked or changed for OP5-0.
23. Repeat the process in Steps 16 through 22 for OP5-1. The first setpoint displayed for OP5-1 will be P101. The first setpoint to be changed/verified is P101 per Table 5.
24. Repeat the process in Steps 16 through 22 for OP5-3. The first setpoint displayed for OP5-3 will be P301. The first setpoint to be changed/verified is P301, per Table 6.
25. Repeat the process in Steps 16 through 22 for OP6-0. The first setpoint displayed for OP6-0 will be SP01. The first setpoint to be changed/verified is SP01 per Table 7.
26. At the completion of the programming, press EXIT key until SERV is no longer displayed on upper display.
27. If the generator set is not to be used, set ENGINE CONTROL Switch (ECS) to OFF/RESET, set DEAD CRANK SWITCH to OFF, and set Battery Disconnect Switch to OFF.

Table 4. 100 kW OP5-0 Engine/Generator Setpoint Programming.

DESCRIPTION	RANGE OF VALUES	FACTOR DEFAULT	240/416 60 Hz (50 Hz) ⁸	120/208 60Hz (50 Hz)
P001 – Fuel Solenoid Type: Type of fuel system solenoid used on the TQG.	0 – ETR fuel solenoid 1 – ETS fuel solenoid	0	0	0
P002 – Units Shown: Type of measurement units shown on the GSC display.	0 – for English units (psi, °F) 1 – for metric units (kPa, °C)	0	0	0
P003 – Shutdown Override for Engine Fault: GSC response to a low engine oil pressure or high coolant temperature fault.	0 – for engine shutdown 1 – for alarm only (shutdown override, no engine shutdown)	0	0	0
P004 – Shutdown Override For Sensor Fault: GSC response to a diagnostic fault with the engine oil pressure sensor, coolant temperature sensor, oil temperature sensor, sensor power supply, or coolant loss sensor.	0 – for alarm only (shutdown override, no engine shutdown) 1 – for engine shutdown	0	0	0
P005 – Coolant Loss Sensor Installed: Tells whether or not the optional engine coolant loss sensor is installed on the TQG.	0 – for TQGs without a coolant loss sensor 1 – for TQGs with coolant loss sensor	0	1	1
P006 – Shutdown Override for Coolant Loss Fault: GSC response to an engine coolant loss fault.	0 – for engine shutdown 1 – for alarm only (shutdown override, no engine shutdown)	0	1	1
P007 – System Voltage, 24 or 32 Volts: System voltage (battery voltage) of the TQG.	24 or 32	24	24	24
P008 – This setpoint is not currently being used by GSC and cannot be programmed.	N/A	N/A	N/A	N/A

⁸ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 4. 100 kW OP5-0 Engine/Generator Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTOR DEFAULT	240/416 60 Hz (50 Hz) ⁸	120/208 60Hz (50 Hz)
P009 – Number of Ring Gear Teeth: Number of teeth on the ring gear of the engine. Used by GSC to determine engine speed.	95 to 350 teeth in increments of one tooth.	136	156	156
P010 – Engine Overspeed: Engine speed used by GSC to declare that an engine overspeed fault exists. The engine overspeed setpoint (for all 60 Hz applications) is 1.18 times rated speed.	500 to 4,330 rpm in increments of 10 rpm.	2,120 rpm	2,120 rpm	2,120 rpm
P011 – Crank Terminate Speed: Engine speed used by GSC to disengage starting motor during engine cranking.	100 to 1,000 rpm in increments of 10 rpm.	400 rpm	400 rpm	400 rpm
P012 – Oil Step Speed: Engine speed used by GSC for distinguishing between rated speed and idle speed when a low oil pressure fault exists.	400 to 1,800 rpm in increments of 10 rpm	1,350 rpm	1,350 rpm	1,350 rpm
P013 – Low Oil Pressure Shutdown at Rated Speed: Oil pressure used by GSC to declare that a low oil pressure shutdown fault exists with engine at rated speed (the engine speed must have exceeded the oil step speed for 9 seconds). ²	5 to 61 psi (34 to 420 kPa) in increments of 1	30 psi (205 kPa)	26 psi	26 psi

² When oil pressure drops to within 34 kPa (5 psi) of the P013 or P014 setpoint, GSC issues a low oil pressure alarm.

⁸ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 4. 100 kW OP5-0 Engine/Generator Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTOR DEFAULT	240/416 60 Hz (50 Hz) ⁸	120/208 60Hz (50 Hz)
P014 – Low Oil Pressure Shutdown at Idle Speed: Oil pressure used by GSC to declare that a low oil pressure shutdown fault exists with the engine at idle speed (the engine must have been running for at least 9 seconds and the engine speed must be less than oil step speed). ²	3 to 49 psi (20 to 336 kPa) in increments of 1	10 psi (70 kPa)	10 psi	10 psi
P015 – High Water Temperature Shutdown: Coolant temperature used by GSC to declare a high coolant temperature shutdown fault exists (after a 10 second delay). ³	85 to 123 °C (185 to 253 °F) in increments of 1	107 °C (225 °F)	230 °F	230 °F
P016 – Low Water Temperature Alarm: Coolant temperature used by GSC to declare that a low coolant temperature alarm fault exists (after a 2 second delay).	0 to 36°C (32 to 97°F) in increments of 1	21 °C (70 °F)	70 °F	70 °F
P017 – Total Cycle Crank Time: Cycle crank time used by GSC to declare that an overcrank fault exists.	5 to 120 seconds in increments of 1 second	90 sec	90 sec	90 sec
P018 – Cycle Crank Time: Amount of time GSC cranks and then rests the starting motor during a single crank cycle.	5 to 60 seconds in increments of 1 second	10 sec	30 sec	30 sec

² When oil pressure drops to within 34 kPa (5 psi) of the P013 or P014 setpoint, GSC issues a low oil pressure alarm.

³ When coolant temperature rises to within 6°C (11°F) of the P015 setpoint, GSC issues high coolant temperature alarm.

⁸ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 4. 100 kW OP5-0 Engine/Generator Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTOR DEFAULT	240/416 60 Hz (50 Hz) ⁸	120/208 60Hz (50 Hz)
P019 – Cooldown Time: Amount of time GSC allows the engine to run after a normal shutdown is initiated.	0 to 30 minutes in increments of 1 minute.	5 min	5 min	5 min
P020 – AC Voltage: Nominal AC voltage of generator. The GSC measures and displays the AC voltage. ⁴	700, 150, 300, 500, 600, 750, 3.0k, 4.5k, 5.20k, 5.25k, 9.0k, 15.0k, 18.0k, 30.0k	700V	700V	700V
P021 – AC Current Full Scale: Nominal full scale AC current of generator. AC current full scale is equal to ratio of external current transformers in generator housing.	75, 100, 150, 200, 300, 400, 600, 800, 1000, 1200, 1500, 2000, 2500, 3000, and 4000A		400	400
P022 – GSC Engine Number: Informs other devices on the CAT Data Link of the engine number for GSC. ⁵	01 through 08	01	01	01
P023 – Engine Type: Identifies the engine as a mechanical unit injector (MUI) diesel, spark ignited (gas), or electronic unit injector (EUI) diesel engine.	0 – MUI diesel 1 – Gas 2 – EUI diesel	0	2	2

⁴ The values other than the default (700V) are for switch gear applications and require the use of external potential transformers and the removal of the AC voltage range jumper located in the relay module.

⁵ After setpoint P022 is reprogrammed, GSC must be power cycled (powered down and then powered up).

⁸ Setpoint to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 4. 100 kW OP5-0 Engine/Generator Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTOR DEFAULT	240/416 60 Hz (50 Hz) ⁸	120/208 60Hz (50 Hz)
P024 – Crank Time Delay: Amount of time GSC delays activation of the fuel control relay (FCR) during a crank cycle. This setpoint is for gas engines only. The P024 setpoint only functions when the P023 setpoint is set to 1 (gas engine). ⁷	0 to 20 seconds in increments of 1 second	5 sec	5 sec	5 sec
P025 – Oil Temperature Sensor Installed: Tells whether or not the optional engine oil temperature sensor is installed on the TQG.	0 – for TQGs without an oil temperature sensor 1 – for TQGs with an oil temperature sensor	0	0	0
P026 – High Oil Temperature Shutdown: Oil temperature used by GSC to declare a high oil temperature shutdown fault exists (after a 10 second delay). Refer to the panel model number.	85 to 123°C (185 to 253°F) in increments of 1	107°C (225°F)	253°F	253°F
P027 – Shutdown Override for High Oil Temperature Fault: GSC+ response to an engine high oil temperature fault.	0 – for alarm only (shutdown override, no engine shutdown) 1 – for engine shutdown	0	0	0
P028 – Nameplate Voltage: Rated voltage of generator. This setpoint is used for protective relaying functions.	100 to 25kV in increments of 1	480V	416V (416V)	208V (208V)
P029 – Nameplate Current: Rated current output of generator.	0 to 4000 A in increments of 1	600A	173A (144A)	347A (288A)

⁷ The P024 setpoint only functions when the P023 setpoints is set to 1 (gas engine).

⁸ Setpoints to be changed from factory defaults to 100 TQG setpoint at switch gear supplier.

Table 4. 100 kW OP5-0 Engine/Generator Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTOR DEFAULT	240/416 60 Hz (50 Hz) ⁸	120/208 60Hz (50 Hz)
P030 – Nameplate Power: Rated power capability of generator.	0 through 10 MW in increments of 1 kW	400 kW	100 kW (83 kW)	100 kW (83 kW)
P031 – Rated Frequency: Nominal frequency rating of TQG.	50 or 60 Hz	60 Hz	60 Hz (50 Hz)	60 Hz (50 Hz)
P032 – Connection Configuration of Generator: Wye or Delta configuration of generator.	0 – Wye 1 – Delta	0	0	0
P033 – Number of Generator Poles. ⁶	0 through 254 in increments of 2	4	4	4

¹ The setpoints (stored or being programmed) must match the specified setpoints of the TQG.

⁶ When P033 is programmed to 0 poles, the AL15 (GSC Configuration Error) fault is disabled.

⁸ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 5. OP5-1 Protective Relaying Setpoint Programming.

DESCRIPTION	RANGE OF VALUES	FACTOR DEFAULT	SETPOINTS 60 Hz (50 Hz) ³
P101 Generator Overvoltage Alarm Enable: GSC enables or disables generator overvoltage alarm function.	0 – disabled 1 – enabled	1	1
P102 – Generator Overvoltage Alarm Threshold: Voltage GSC uses to issue overvoltage alarm.	100 to 125% of nameplate voltage in increments of 1%	105%	125%
P103 – Generator Overvoltage Alarm Time Delay: Amount of time the FSC+ waits before issuing overvoltage alarm.	0 through 120 seconds ² in increments of 1	10 sec	0 sec

² When programmed to 0 seconds, the actual time is from 0.5 to 1.0 seconds.

³ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

⁴ Setpoint values for disabled parameters are for fail safe/pack purposes.

Table 5. OP5-1 Protective Relaying Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS 60 Hz (50 Hz) ³
P104 – Generator Overvoltage Shutdown Enable: GSC enables or disables the generator overvoltage shutdown function.	0 – disabled 1 – enabled	1	1
P105 – Generator Overvoltage Shutdown Threshold: Voltage GSC used to issue an overvoltage shutdown.	100 to 125% of nameplate voltage in increments of 1%	110%	125%
P106 – Generator Overvoltage Shutdown Time Delay: Amount of time GSC waits before issuing an overvoltage shutdown.	0 through 120 seconds ² in increments of 1	10 sec	1 sec
P107 – Generator Undervoltage Alarm Enable: GSC enables or disables the generator undervoltage alarm function.	0 – disabled 1 – enabled	1	1
P108 – Generator Undervoltage Alarm Threshold: Voltage GSC uses to issue an undervoltage alarm.	60 to 100% of nameplate voltage in increments of 1%	90%	82%
P109 – Generator Undervoltage Alarm Time Delay: Amount of time GSC waits before issuing an undervoltage alarm.	0 through 120 seconds ² in increments of 1	10 sec	6 sec
P110 – Generator Undervoltage Shutdown Enable: GSC enables or disables the generator undervoltage shutdown function.	0 – disabled 1 – enabled	1	0
P111 – Generator Undervoltage Shutdown Threshold: Voltage GSC uses to issue an undervoltage shutdown.	60 to 100% of nameplate voltage in increments of 1%	85%	75%
P112 – Generator Undervoltage Shutdown Time Delay: Amount of time GSC waits before issuing an undervoltage shutdown.	0 through 120 seconds ² in increments of 1	15 sec	6 sec

² When programmed to 0 seconds, the actual time is from 0.5 to 1.0 seconds.

³ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 5. OP5-1 Protective Relaying Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS 60 Hz (50 Hz) ³
P113 – Generator Overfrequency Alarm Enable: GSC enables or disables the generator overfrequency alarm function.	0 – disabled 1 – enabled	1	1
P114 – Generator Overfrequency Alarm Threshold: Frequency GSC uses to issue an overfrequency alarm.	50-60 Hz, for 50 Hz generator 60-70 Hz, for 60 Hz generator 400-480 Hz, for 400 Hz generator	53 Hz 63 Hz 422 Hz	63 Hz/53 Hz
P115 – Generator Overfrequency Alarm Time Delay: Amount of Time GSC waits before issuing an overfrequency alarm.	0 through 120 seconds ² in increments of 1	10 sec	10 sec
P116 – Generator Overfrequency Shutdown Enable: GSC enables or disables the generator overfrequency shutdown function.	0 – disabled 1 – enabled	1	0
P117 – Generator Overfrequency Shutdown Threshold: Frequency GSC uses to issue an overfrequency shutdown.	50-60 Hz, for 50 Hz generator 60-70 Hz, for 60 Hz generator 400-480 Hz, for 400 Hz generator	55 Hz 66 Hz 440 Hz	66 Hz/55 Hz
P118 – Generator Overfrequency Shutdown Time Delay: Amount of time GSC waits before issuing an overfrequency shutdown.	0 through 120 seconds ² in increments of 1	10 sec	10 sec
P119 – Generator Underfrequency Alarm Enable: GSC enables or disables the generator underfrequency alarm function.	0 – disabled 1 – enabled	1	1

² When programmed to 0 seconds, the actual time is from 0.5 to 1.0 seconds.

³ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 5. OP5-1 Protective Relaying Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS 60 Hz (50 Hz) ³
P120 – Generator Underfrequency Alarm Threshold: Frequency GSC uses to issue an underfrequency alarm.	30-50 Hz, for 50 Hz generator 36-60 Hz, for 60 Hz generator 240-400 Hz, for 400 Hz generator	48 Hz 57 Hz 378 Hz	57 Hz/48 Hz
P121 – Generator Underfrequency Alarm Time Delay: Amount of time GSC waits before issuing an underfrequency alarm.	0 through 120 seconds ² in increments of 1	10 sec	10 sec
P122 – Generator Underfrequency Shutdown Enable: GSC enables or disables the generator underfrequency shutdown function.	0 – disabled 1 – enabled	1	0
P123 – Generator Underfrequency Shutdown Threshold: Frequency GSC uses to issue an underfrequency shutdown.	30-50 Hz, for 50 Hz generator 36-60 Hz, for 60 Hz generator 240-400 Hz, for 400 Hz generator	45 Hz 54 Hz 360 Hz	54 Hz/45 Hz
P124 – Generator Underfrequency Shutdown Time Delay: Amount of time GSC waits before issuing an underfrequency shutdown.	0 through 120 seconds ² in increments of 1	15 sec	15 sec
P125 – Generator Reverse Power Shutdown Enable: GSC enables or disables the generator reverse power shutdown function.	0 – disabled 1 – enabled	1	1
P126 – Generator Reverse Power Shutdown Threshold: Level of reverse power GSC uses to issue a reverse power shutdown.	0 through 20% of rated power in increments of 1%	15%	17%

² When programmed to 0 seconds, the actual time is from 0.5 to 1.0 seconds.

³ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 5. OP5-1 Protective Relaying Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS 60 Hz (50 Hz) ³
P127 – Generator Reverse Power Shutdown Time Delay: Amount of time the FSC+ waits before issuing a reverse power shutdown.	0 through 30 seconds ² in increments of 1	10 sec	3 sec
P128 – Generator Overcurrent Alarm Enable: GSC enables or disables the overcurrent alarm.	0 – disabled 1 – enabled	1	1
P129 – Generator Phase Overcurrent Alarm Threshold: Level of current GSC uses to issue a phase overcurrent alarm.	100 through 160% of nameplate current in increments of 5%	105%	160%
P130 – Generator Phase Overcurrent Alarm Time Delay: Amount of time GSC waits before issuing a phase overcurrent alarm.	0 through 250 seconds ² in increments of 1	0 sec	0 sec
P131 – Generator Total Overcurrent Alarm Threshold: Level of current GSC uses to issue a total overcurrent alarm.	100 through 160% of nameplate current in increments of 5%	105%	160%
P132 – Generator Total Overcurrent Alarm Time Delay: Amount of time GSC waits before issuing a total overcurrent alarm.	0 through 250 seconds ² in increments of 1	0 sec	0 sec
P133 – Generator Overcurrent Shutdown Enable: GSC enables or disables the overcurrent shutdown.	0 – disabled 1 – enabled	1	0
P134 – Generator Phase Overcurrent Shutdown Threshold: Level of current GSC uses to issue a phase overcurrent shutdown.	100 through 160% in increments of 5%	110%	160%
P135 – Generator Phase Overcurrent Shutdown Time Delay: Amount of time GSC waits before issuing a phase overcurrent shutdown.	0 through 500 seconds ² in increments of 1	0 sec	0 sec

² When programmed to 0 seconds, the actual time is from 0.5 to 1.0 seconds.³ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 5. OP5-1 Protective Relaying Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS 60 Hz (50 Hz) ³
P136 – Generator Total Overcurrent Shutdown Threshold: Level of current GSC uses to issue a total overcurrent shutdown.	100 through 160% of three times nameplate current in increments of 5%	110%	160%
P137 – Generator Total Overcurrent Shutdown Time Delay: Amount of time GSC waits before issuing a total overcurrent shutdown.	0 through 500 seconds ² in increments of 1	0 sec	0 sec
P138 – KW Level Relay Enable: GSC enables or disables the kW level relay function.	0 – disabled 1 – enabled	1	1
P139 – KW Level Relay Threshold: Level of power GSC uses to activate the kW level relay function.	0 through 110% of nameplate power in increments of 1%	105%	110%
P140 – KW Level Relay Time Delay: Amount of time GSC waits before activating the kW level relay function.	0 through 120 seconds ² in increments of 1	0 sec	0 sec
P141 – KW Level Relay Disengage Threshold: Level of power GSC uses to deactivate the kW level relay function.	0 through 110% of nameplate power in increments of 1%	100%	100%
P142 – KW Level Relay Disengage Time Delay: Amount of time GSC waits before deactivating the kW level relay function.	0 through 120 seconds ² in increments of 1	10 sec	10 sec

¹ Setpoints are programmed at the factory to default value. Some setpoints changed to satisfy application requirements.

² When programmed to 0 seconds, the actual time is from 0.5 to 1.0 seconds.

³ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 6. OP5-3 Synchronization Setpoint Programming.

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS
P301 – Synchronization Enable: Enables or disables synchronization function and specifies Load Share control being driven.	0 – disabled 1 – Woodward	0	1
P302 – Breaker Coil Time Limit: Maximum amount of time breaker coil can be energized without damaging coil.	0.2 to 5.0 seconds in increments of 0.1 seconds	1.0 sec	1
P303 – Voltage Limit Enable: Enables or disables generator-bus voltage checking during automatic synchronization.	0 – disabled 1 – enabled	1	1
P304 – Voltage Limit: Maximum acceptable difference between bus voltage and oncoming voltage, expressed as a percentage of bus voltage.	1% to 15% in increments of 1%	1%	4%
P305 – Phase Tolerance Limit: Maximum phase angle magnitude allowed for breaker closure. ²	1 to 25 degrees in increments of 1 degree	5 deg	5 deg
P306 – Dwell Time: Time during which the phase angle between generator and bus must be within Phase Tolerance Limit for breaker closure. ²	0.1 to 1.0 seconds in increments of 0.1 second	0.5 sec	0.5 sec
P307 – Speed Control Gain: Controls how fast engine speed will change during synchronization. ^{2,3}	0.0% to 100.0% in increments of 0.1%	50.0%	% varies typical 12%

² P305, P306, P307, P308, and P309 can be adjusted to precisely match individual engine response and breaker closure characteristics using OP11-Synchronization Setpoint Turning.

³ GSC used P-1-D (proportional-integral-derivation) control to accomplish synchronization quickly and smoothly. The P, I, and D parameters are independently controlled by setpoints P307, P308, and P309, respectively. Adjusting any one of these setpoints will not affect the other two settings.

Table 6. OP5-3 Synchronization Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS
P308 – Speed Control Rate: Controls rate of change of the phase angle difference between the generator and bus during synchronization. ^{2 3}	0.0% to 100.0% in increments of 0.1%	50.0%	% varies typical 17%
P309 – Speed Control Damping: Controls rate of change of the phase angle difference between the generator and bus during synchronization. ^{2 3}	0.0% to 100.0% in increments of 0.1%	0.0%	% varies typical 8%
P310 – Dead Bus Closure Enabled: Enables or disables automatic closure to a dead bus.	0 – disabled 1 – enabled	0	1
P311 – Dead Bus Limit: Maximum acceptable voltage for bus to be considered dead as a percentage of rated voltage.	5% to 50% in increments of 1%	20%	20%
P312 – Dead Bus On Time Delay: Amount of time GSC waits before closing to a dead bus.	0 to 120 seconds in increments of 1 second	0 sec	2 sec
P313 – Frequency Match Notification Time: Amount of time before notification of possible synchronization failure. Must not be greater than the Maximum Synchronization Time.	5 to 1000 seconds in increments of 1 second	20 sec	20 sec
P314 – Maximum Synchronization Time: Maximum amount of time to spend attempting to synchronize before setting Synchronization Timeout Alarm.	5 to 1000 seconds in increments of 1 second	20 sec	30 sec

¹ Setpoints are programmed at the factory to the default value. Setpoints changed to satisfy application requirements.

² P305, P306, P307, P308, and P309 can be adjusted to precisely match individual engine response and breaker closure characteristics using OP11-Synchronization Setpoint Turning.

³ GSC used P-1-D (proportional-integral-derivation) control to accomplish synchronization quickly and smoothly. The P, I, and D parameters are independently controlled by setpoints P307, P308, and P309, respectively. Adjusting any one of these setpoints will not affect the other two settings.

⁴ Setpoints to be changed from factory defaults to 100 TQG setpoints at switch gear supplier.

Table 7. OP6 Spare Input/Output Setpoint Programming.

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS
SP01 – Spare Input 1 Active State: Input state used by GSC to declare that SP01 fault exists.	0 – Active low 1 – Active high	0	0
SP02 – Spare Input 1 Response: GSC response to SP01 fault.	0 – Shutdown 1 – Alarm	0	0
SP03 – Spare Input 1 Time Delay: Amount of time GSC waits before responding to a SP01 fault.	0 to 250 seconds in increments of 1	0 seconds	1 seconds
SP04 – Spare Input 2 Active State: Input stated used by GSC to declare that SP02 fault exists.	0 – Active low 1 – Active high	0	1
SP05 – Spare Input 2 Response: GSC response to SP02 fault.	0 – Shutdown 1 – Alarm	0	0
SP06 – Spare Input 2 Time Delay: Amount of time GSC waits before responding to SP02 fault.	0 to 250 seconds in increments of 1	0 seconds	0 seconds
SP07 – Spare Input 3 Active State: Input state used by GSC to declare that SP03 fault exists.	0 – Active low 1 – Active high	0	0
SP08 – Spare Input 3 Response: GSC response to SP03 fault.	0 – Shutdown 1 – Alarm	0	0
SP09 – Spare Input 3 Time Delay: Amount of time GSC waits before responding to SP03 fault.	0 to 250 seconds in increments of 1	0 seconds	0 seconds
SP10 – Spare Input 4 Active State: Input state used by GSC to declare that SP04 fault exists.	0 – Active low 1 – Active high	0	0
SP11 – Spare Input 4 Response: GSC response to SP04 fault.	0 – Shutdown 1 – Alarm	0	0

Table 7. OP6 Spare Input/Output Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS
SP12 – Spare Input 4 Time Delay: Amount of time GSC waits before responding to SP04 fault.	0 to 250 seconds in increments of 1	0 seconds	0 seconds
SP13 – Spare Output Response: GSC response to the spare output trigger condition.	0 – Active low 1 – Active high	0	0
SP15 – Spare Relay Output Response: GSC response to the spare relay trigger condition.	0 – Relay inactive when triggered 1 – Relay active when triggered	1	1
SP14 – Spare Output Trigger Condition: The condition used by GSC to trigger the spare output trigger response.	0 – Unused 1 – Active SP01 fault ² 2 – Active SP02 fault ² 3 – Active SP03 fault ² 4 – Active SP04 fault ² 5 – Any combination of active SP01, SP02, SP03, or SP04 faults ² 6 – Any active shutdown fault (AL1 thru AL14, SP01 – SP04, or CID FMI)	8	8
SP16 – Spare Relay Output Trigger Condition: The condition used by GSC to trigger the spare relay.	7 – Any active alarm or shutdown fault (AL1 through AL15, SP01 through SP04, or CID FMI) 8 – Cooldown mode 9 – Coolant loss fault ² 10 – High oil temperature fault ² 11 – CCM control ² 12 – Other protective relay	8	12

² Either alarm or shutdown faults are valid trigger conditions.

Table 7. OP6 Spare Input/Output Setpoint Programming. - Continued

DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINTS
SP17 – Spare Indicator 1 Trigger Condition: The condition used by GSC to trigger Spare Indicator 1.	0 – Unused 1 – Active SP01 fault ³ 2 – Active SP02 fault ³ 3 – Active SP03 fault ³	0	0
SP18 – Spare Indicator 2 Trigger Condition: The condition used by GSC to trigger Spare Indicator 2.	4 – Active SP04 fault ³ 5 – Any combination of active SP01, SP02, SP03, or SP04 faults ³	0	0
SP19 – Spare Indicator 3 Trigger Indicator: The condition used by GSC to trigger Spare Indicator 3.	6 – Coolant loss fault ³ 7 – High oil temperature fault ³ 8 – kW level relay active	0	0

¹ The setpoints are programmed at the factory to the default value. The setpoints may be changed to satisfy customer requirements or application requirements.

³ SP14 is programmed to 11 (CCM control), the spare output is always active low. When SP16 is programmed to 11 (CCM control), the spare relay is always active when triggered.

Table 8. OP8 Voltmeter Ammeter Programming.

SETPOINT	NAME	DESCRIPTION	RANGE OF VALUES	FACTORY DEFAULT	SETPOINT
AC01	VA	Phase A voltage calibration used by GSC to compensate for voltage characteristics of ATB A5.	0 to 255 in increments of 1	0	Barcode on ATB A5
AC02	VB	Phase B voltage calibration used by GSC to compensate for voltage characteristics of ATB A5.	0 to 255 in increments of 1	0	Barcode on ATB A5
AC03	VC	Phase C voltage calibration used by GSC to compensate for voltage characteristics of ATB A5.	0 to 255 in increments of 1	0	Barcode on ATB A5
AC04	IA	Phase A current calibration used by GSC to compensate for current characteristics of ATB A5.	0 to 255 in increments of 1	0	Barcode on ATB A5
AC05	IB	Phase B current calibration used by GSC to compensate for current characteristics of ATB A5.	0 to 255 in increments of 1	0	Barcode on ATB A5
AC06	IC	Phase C current calibration used by GSC to compensate for current characteristics of ATB A5.	0 to 255 in increments of 1	0	Barcode on ATB A5
AC07	VA	Phase A voltage calibration used by GSC to compensate for voltage characteristics of BTB A6.	0 to 255 in increments of 1	0	Barcode on BTB A6

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
INSTALLATION OF GENERATOR SET ON TRAILER: INSTALLATION****INITIAL SETUP:****Tools and Special Tools**

Lifting Device, 7,000 lb (3,175 kg) Capacity
Tool Kit, General Mechanic's (GMTK) (WP 0122,
Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP
0122, Table 2, Item 3)

Personnel Required

Two

References

TM 9-2330-376-14&P
TM 9-6115-729-24P

WARNING

The 100 kW TQG weighs approximately 6,100 lb (2,767 kg) and requires a lifting device (forklift, overhead lifting device) with sufficient capacity. Failure to comply can cause serious injury or death to personnel.

WARNING

Be extremely careful when working near the 100 kW TQG as it is being positioned on the trailer. Failure to comply can cause injury to personnel.

INSTALLATION

1. Park M1061/M1061A1 trailer (Figure 1, Item 1) on level hard surface. Lower support legs (TM 9-2330-376-14&P). Level trailer and chock wheels.
2. Using lifting device with sufficient capacity (at least 7,000 lb (3,175 kg), maneuver TQG (Figure 1, Item 2), with control panel end toward tongue of trailer.
3. Slowly lower TQG (Figure 1, Item 2) into position onto trailer (Figure 1, Item 1).
4. Align with mounting holes.
5. Remove lifting device.

NOTE

All TQG-mounting screws are installed with nuts on top of bed of trailer, except at location A, at right rear of trailer.

6. Install eight screws (Figure 1, Item 3), 16 washers (Figure 1, Item 4), and eight nuts (Figure 1, Item 5) on trailer (Figure 1, Item 1). Torque to 125 lb•ft (69 N•m).
7. Install two fire extinguisher brackets (Figure 1, Item 6), eight screws (Figure 1, Item 7), washers (Figure 1, Item 8), and locknuts (Figure 1, Item 9).
8. Install accessory box (Figure 1, Item 10), four screws (Figure 1, Item 7), washers (Figure 1, Item 8), and locknuts (Figure 1, Item 9).
9. Install load terminal (Figure 1, Item 11), washer (Figure 1, Item 12), and locknut (Figure 1, Item 13).
10. Install grommet (Figure 1, Item 14) in deck.

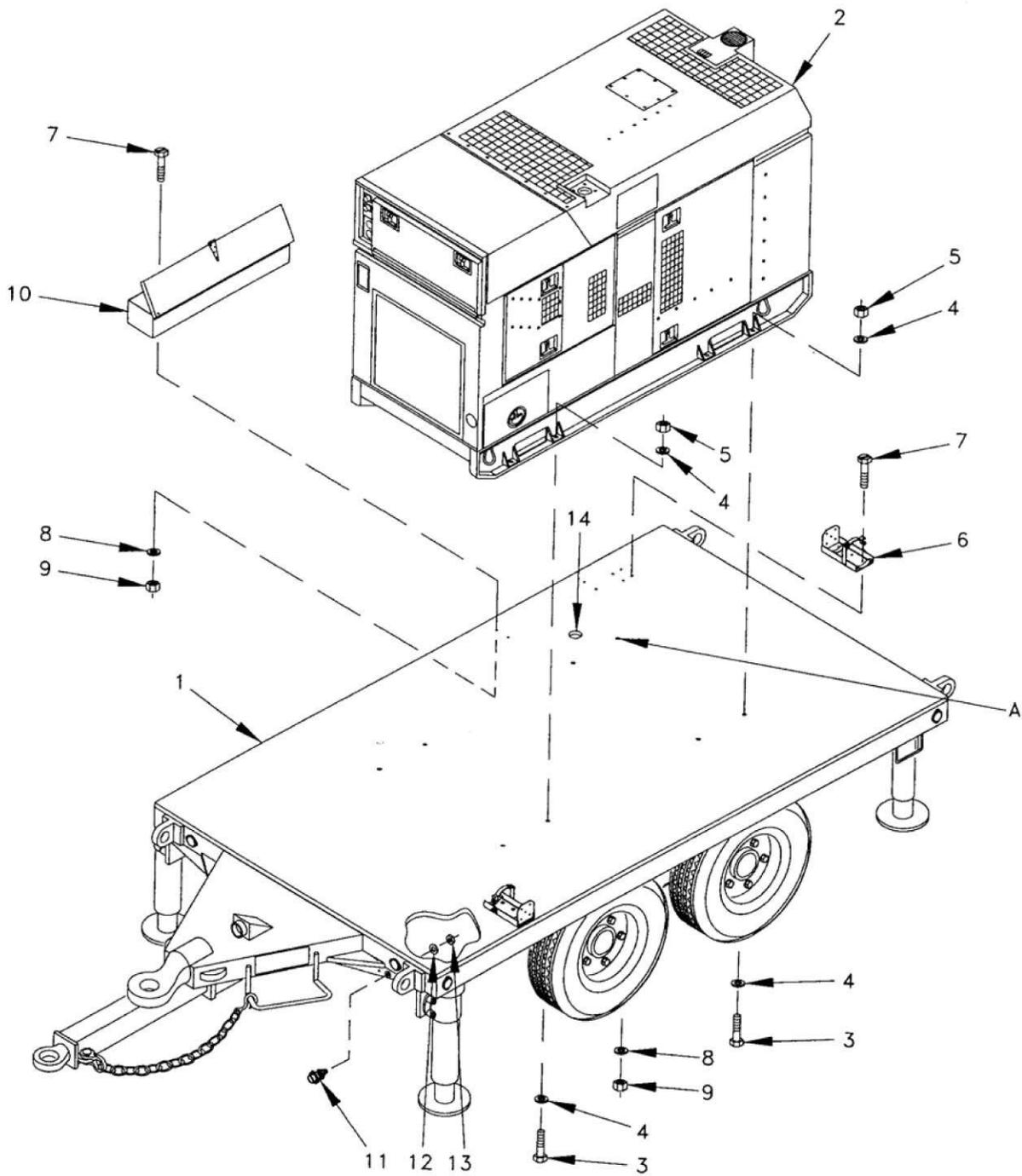


Figure 1. Installation of Generator Set On Trailer.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****PREPARATION FOR STORAGE OR SHIPMENT****INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
 Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Antifreeze (WP 0123, Table 1, Item 7)
 Fuel (WP 0123, Table 1, Item 19)
 Lubricating oil, preservation (WP 0123, Table 1, Item 36A)
 Lubricating oil, preservation (WP 0123, Table 1, Item 36B)
 Lubricating oil, general purpose (WP 0123, Table 1, Item 36C)
 Petroleum jelly (WP 0123, Table 1, Item 36D)
 Tape (WP 0123, Item 54A)
 Wiping rags (WP 0123, Item 38)
 Wood block, 1 in (2.54 cm) thick

Personnel Required

One

References

TM 9-6115-729-10
 TM 9-6115-729-24P
 WP 0015
 WP 0048
 WP 0066
 WP 0069
 WP 0080

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

SHORT TERM STORAGE

NOTE

Short term is storage from 1 to 45 days.

1. Perform Quarterly PMCS (WP 0015). Correct all deficiencies found.
2. Check that all Modification Work Orders (Army), MIs (Marines), and TCTOs (Air Force) have been applied.
3. Top off engine oil level with preservation oil (WP 0080).
4. Drain cooling system completely (WP 0066). Refill cooling system with a 50/50 mixture of antifreeze and water. Operate engine for a minimum of five minutes to circulate mixture.
5. Place auxiliary fuel lines and paralleling cables in the storage box inside the left battery access door.
6. Place TM 9-6115-729-10 and TM 9-6115-729-24 in a heat sealed bag in the document box (inside right battery access door).
7. Select an indoor storage site, if possible. If inside storage is not available, a truck, conex container, or other container may be used.

END OF TASK

LONG TERM STORAGE

NOTE

Long term is storage longer than 45 days

1. Perform Quarterly PMCS (WP 0015). Correct all deficiencies found.
2. Check that all Modification Work Orders (Army), MIs (Marines), and TCTOs (Air Force) have been applied.
3. Drain cooling system completely (WP 0066). Refill cooling system with 50/50 mixture of antifreeze and water. Operate engine for a minimum of five minutes to circulate the antifreeze. Stop engine and allow to cool for 10 minutes.
4. Drain engine oil completely (WP 0080). Refill engine with preservation oil (WP 0123, Item 34A).
5. Open left front doors.
6. Disconnect fuel pickup hose (Figure 1, Item 1), from elbow (Figure 1, Item 2) on fuel tank (Figure 1, Item 3). Disconnect fuel return hose (Figure 1, Item 4) from elbow (Figure 1, Item 5) on fuel tank (Figure 1, Item 3).
7. Position three containers, with at least a two gallon (7.57 L) capacity each, beside the left doors.
8. Place end of fuel return hose (Figure 1, Item 4) into container A (waste container).
9. Fill container B with one gallon (3.78 L) fuel (WP 0123, Item 16). Fill container C with one gallon (3.78 L) general purpose oil (WP 0123, Item 34C).
10. Place end of fuel pickup hose (Figure 1, Item 1) into container B (fuel).

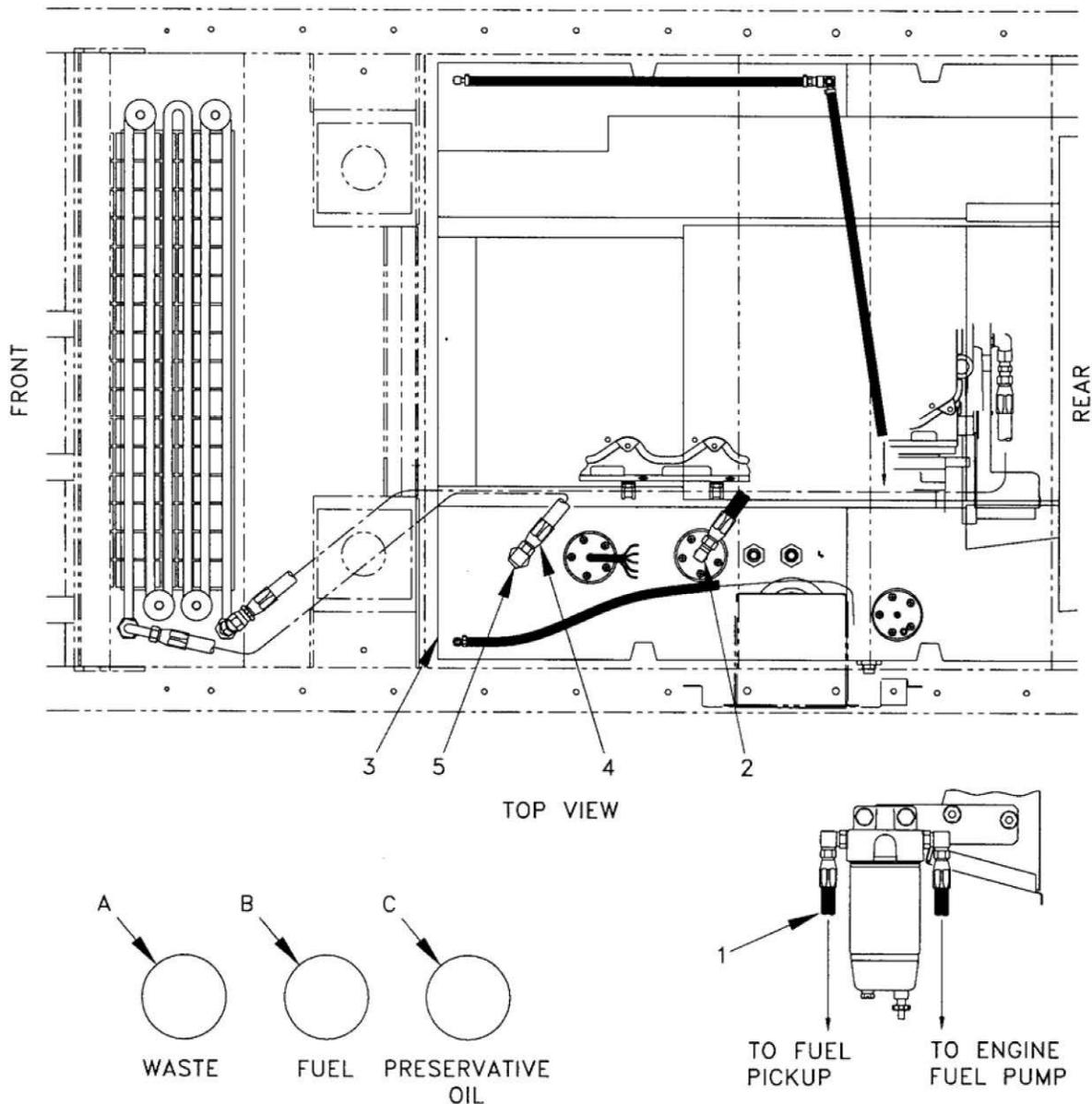


Figure 1. Preparation for Storage or Shipment.

11. Start engine and run for two minutes using the fuel in container B. After two minutes, place end of fuel pickup hose (Figure 1, Item 1) into container C (oil). Operate until oil from container C comes out of fuel return line into container A (waste container). Shut down engine and allow to cool at least 10 minutes.
12. Reconnect fuel pickup hose (Figure 1, Item 1) to elbow (Figure 1, Item 2) on fuel tank (Figure 1, Item 3). Connect fuel return hose (Figure 1, Item 4) to elbow (Figure 1, Item 5) on fuel tank (Figure 1, Item 3).

CAUTION

Do not use waste fuel/oil mixture to preserve other engines or damage may occur.

13. Dispose of fuel/oil mixture in container A (waste) in accordance with local regulations.
14. Open left rear door. Disconnect manifold in hose from intake manifold (WP 0066). While using dead crank switch to turn over engine, use a pneumatic oil gun to spray preservative oil (WP 0123, Item 34B) into air inlet for one minute. Release dead crank switch. Connect manifold in hose.

15. Remove air cleaner cover (WP 0069), gasket, and both filter elements. While using dead crank switch to turn over engine, use a pneumatic oil gun to spray preservative oil (WP 0123, Item 34B) into air cleaner housing for 30 seconds. Release dead crank switch. Install both filter elements, gasket, and air cleaner cover.
16. Allow muffler to cool. Use a pneumatic oil gun to spray preservative oil (WP 0123, Item 34B) into exhaust outlet housing for 30 seconds.
17. On left side of TQG, place a suitable container under the fuel drain. Remove cap from fuel drain and open the fuel drain valve. Completely drain the fuel tank. Close fuel drain valve and install cap to first locking position.
18. Completely drain cooling system (WP 0066).
19. Apply preservative oil (WP 0123, Item 34B) to all hinges and latches on the TQG.
20. Disconnect all battery cables from batteries (WP 0048). Secure battery cable terminals away from the batteries with tape. Apply petroleum jelly (WP 0123, Item 34D) to all battery terminals.
21. Select an indoor storage site, if possible. If inside storage is not available, a truck, conex container, or other container may be used.
22. Place TM 9-6115-729-10 and TM 9-6115-729-24 in a heat sealed bag in the document box (inside left battery access door).
23. Place auxiliary fuel lines and paralleling cables in the storage box inside the left battery access door.
24. Close all doors.
25. Prepare tag with the following statements: "CRANKCASE FILLED WITH PRESERVATIVE OIL (MIL-PRF-21260, GRADE 30). GOOD FOR OPERATION UNTIL FIRST REQUIRED OIL CHANGE."
26. Prepare tag with the following statements: "COOLING SYSTEM DRAINED. FILL WITH PROPER ANTIFREEZE MIXTURE BEFORE OPERATION."
27. Prepare tag with the following statements: "FUEL SYSTEM PRESERVED WITH PRESERVATIVE OIL (MILPRF- 21260, GRADE 10W). DRAIN FUEL LINES BEFORE OPERATING. CHANGE FUEL FILTER AFTER ONE HOUR OF OPERATION."
28. Place all the above tags on the control panel and secure with tape.
29. Secure all doors with tape.

END OF TASK

END OF WORK PACKAGE

FIELD MAINTENANCE

TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A

TORQUE LIMITS

INTRODUCTION

This work package contains the torque standards for specific types and sizes of hardware. It defines the different types of bolts by grade. Special torque values and sequences are listed in the specific maintenance procedure.

Table 1. Torque Limits.

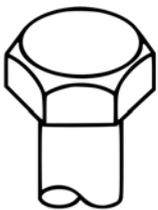
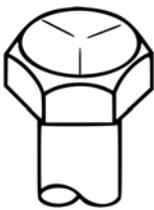
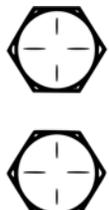
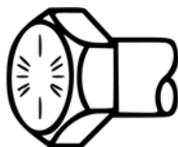
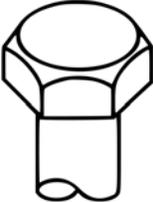
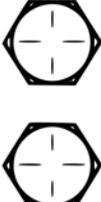
SAE Grade Number	1 or 2		5		6 or 7		8		
Quality of Material	Indeterminate		Minimum Commercial		Medium Commercial		Best Commercial		
Capscrew Head Markings									
NOTE Head marking may vary with different manufacturers.									
Capscrew Body Size		Torque		Torque		Torque		Torque	
(Inches)	(Thread)	Ft•Lb	(N•m)	Ft•Lb	(N•m)	Ft•Lb	(N•m)	Ft•Lb	(N•m)
1/4	20	5	(7)	8	(11)	10	(14)	12	(16)
	28	6	(8)	10	(14)			14	(19)
5/16	18	11	(15)	17	(23)	19	(26)	24	(33)
	24	13	(18)	19	(16)			27	(37)
3/8	16	18	(24)	31	(42)	34	(46)	44	(60)
	24	20	(27)	35	(47)			49	(66)
7/16	14	28	(38)	49	(66)	55	(75)	70	(95)
	20	30	(41)	55	(75)			78	(106)
1/2	13	39	(53)	75	(102)	85	(115)	105	(142)
	20	41	(56)	85	(115)			120	(163)
9/16	12	51	(69)	110	(149)	120	(163)	155	(210)
	18	55	(75)	120	(163)			170	(231)
5/8	11	83	(113)	150	(203)	167	(226)	210	(285)
	18	95	(129)	170	(231)			240	(325)
3/4	10	105	(142)	270	(366)	280	(380)	375	(508)
	16	115	(156)	295	(400)			420	(569)
7/8	9	160	(217)	395	(536)	440	(597)	605	(820)

Table 1. Torque Limits. - Continued

SAE Grade Number		1 or 2		5		6 or 7		8	
Quality of Material		Indeterminate		Minimum Commercial		Medium Commercial		Best Commercial	
Capscrew Head Markings									
NOTE Head marking may vary with different manufacturers.									
Capscrew Body Size		Torque		Torque		Torque		Torque	
(Inches)	(Thread)	Ft•Lb	(N•m)	Ft•Lb	(N•m)	Ft•Lb	(N•m)	Ft•Lb	(N•m)
	14	175	(237)	435	(590)			675	(915)
1	8	235	(319)	590	(800)	660	(895)	910	(1234)
	14	250	(339)	660	(895)			990	(1342)

NOTE

Always use the torque values listed above when specific torque values are not available.

END OF WORK PACKAGE

FIELD MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****WIRING DIAGRAMS**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Personnel Required

One

References

FO-1
FO-2
FO-3
FO-4
TM 55-1500-323-24

INTRODUCTION**WARNING**

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

This work package contains the wire diagrams for the 100 kW Tactical Quiet Generator Set (TQG). The wire diagrams are used in conjunction with the schematic diagrams (Figure FO-1 through FO-4, located in the back of this manual) during troubleshooting and repair of the TQG. All wiring information is provided, including wire color, wire gauge, wire type by part number/specification, and wire splice data. The wire diagrams are double ended which diagrams each wire path twice. The second wire path listing transposes the origin and destination components. Double ending a wire list facilitates locating a particular wire path by permitting a search for either component as the origin.

Notes peculiar to each wire diagram are located on the first page of each wire diagram.

Location diagrams of the engine sensors and connector diagrams are Figure 1 and Figure 2, ahead of the wire diagrams.

This work package contains the following wire diagrams:

Table 1. Control Panel Wire Diagram

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire Diagram

Table 3. ECM to EMCP Harness Wire Diagram

Table 4. Engine Harness Wire Diagram

Table 5. Engine Harness to Unit Injectors Wire Diagram

Table 6. Winterization Control Panel Wire Diagram

Table 7. Winterization Kit Heater Cable Wire Diagram

Table 8. Winterization Kit Power Cable Wire Diagram

GENERAL WIRING REPAIR PROCEDURES

The following general procedures should be followed as a guide to wiring repair and troubleshooting. Detailed repair procedures and the use of standard repair tools and methods are found in TM 55-1500-323-24 (TO 1-1A-14/NAVAIR 01-1A-505).

1. Verify that the engine cannot be started while maintenance is being performed. Engine Control Switch set to OFF/RESET; Battery disconnect switch is OFF; DEAD CRANK SWITCH is OFF.
2. Tag and identify all wires before removing or disconnecting.
3. Inspect wire labels and replace if missing or damaged.
4. Verify continuity of wires point to point using digital multimeter.
5. Inspect all wires for breaks, nicks, abrasions, and heat damage.
6. Inspect wiring for signs of arcing or electrical damage.
7. Tighten all connectors and check for cracks, signs of electrical damage, or missing pins or sockets.
8. Inspect for loose connections at electrical components and tighten as necessary.
9. Inspect terminal board connections and tighten spade connectors as necessary.
10. Inspect wire harnesses and ensure that wire ties are not broken or removed.
11. Replace wire ties as necessary to prevent wires from chafing or other damage.

END OF TASK

HARNESS INSPECTION PROCEDURES

Most electrical problems are caused by poor connections. The following procedure will assist in detecting problems with connectors and wiring. If a problem is found, correct the condition and verify that the problem is resolved. Intermittent electrical problems are sometimes resolved by disconnecting and reconnecting connectors. It is very important to check for diagnostic codes immediately before disconnecting a connector. Also check for diagnostic codes after reconnecting the connector. If the status of a diagnostic code is changed due to disconnecting and reconnecting a connector, there are several possible reasons. The likely reasons are loose terminals, improperly crimped terminals, moisture, corrosion, and inadequate mating of a connection. Follow these guidelines:

1. Always use the correct tools designed for each connector. Never solder the terminals onto the wires.
2. Always use a breakout harness for a voltmeter probe or a test light. Never break the insulation of a wire in order to access to a circuit for measurements.
3. If a wire is cut, always install a new terminal as part of the repair.

END OF TASK

WARNING

The connection or disconnection of any electrical equipment and the disconnection of any electrical equipment may cause an explosion hazard which may result in injury or death. Do not connect any electrical equipment or disconnect any electrical equipment in an explosive atmosphere.

Moisture and Corrosion Inspection

1. Inspect all wiring harnesses. Ensure that the routing of the wiring harness allows the wires to enter the face of each connector at a perpendicular angle. Otherwise, the wire will deform the seal and will create a path for the entrance of moisture. Verify that the seals for the wires are sealing properly.
2. Ensure that the sealing plugs are in place. If any of the plugs are missing, replace the plug. Ensure that the plugs are inserted correctly into the connector.
3. Disconnect the suspect connector and inspect the connector seal. Ensure that the seals are in good condition. If necessary, replace the connector.
4. Thoroughly inspect the connectors for evidence of moisture.

NOTE

Minor abrasion on connector seals is normal and will not allow the entry of moisture.

5. If moisture or corrosion is evident in the connector, the source of the moisture must be found and repaired. If the source of the moisture is not repaired, the problem will recur. Simply drying the connector will not fix the problem. Check the following items for possible moisture entry.
 - a. Missing or improperly installed seals.
 - b. Nicks in exposed insulation
 - c. Improperly mated connectors
6. Moisture can also travel to a connector through the inside of a wire. If moisture is found in a connector, thoroughly check the connector's harness for damage. Also check other connectors that share the harness for moisture. Repair the connectors or the wiring, as required. Ensure that all of the seals are properly in place and that the connectors have been reconnected.

NOTE

The ECM is a sealed unit. If moisture is found in an ECM connector, the ECM is not the source of the moisture. Do not replace the ECM.

7. If corrosion is evident on the terminals or the connector, use only denatured alcohol to remove the corrosion. Use a cotton swab or a soft brush to remove the corrosion.
8. If moisture was found in the connectors, run the engine for several minutes and check again for moisture. If moisture reappears, the moisture is wicking into the connector. Even if the moisture entry path is repaired, it may be necessary to replace the wires.

END OF TASK

Wire Insulation Damage Inspection

1. Carefully inspect each wire for signs of abrasion, nicks, and cuts. Inspect the wires for the following conditions:
 - a. Exposed conductors
 - b. Wire rubbing against the engine
 - c. Wire rubbing against a sharp point
2. Check all wiring harness fasteners and verify that the harness is properly secured. Also check all of the fasteners and verify that the harness is not compressed. Pull back the harness sleeves in order to check for a flattened portion of wire. A fastener that has been over-tightened flattens the harness. This damages the wires that are inside the harness. Repair or replace damaged wires, as required.

END OF TASK**Connector Terminal Inspection**

Visually inspect each terminal in the connector. Verify that the terminals are not damaged. Verify that the terminals are properly aligned in the connector and verify that the terminals are properly located in the connector. Repair the terminals and/or replace the terminals, as required.

Wire Terminal Connection Pull Test

1. Ensure that the locking wedge for the connector is installed properly. Terminals cannot be retained inside the connector if the locking wedge is not installed properly.
2. Conduct an adequate pull test on each wire. Each terminal and each connector should easily withstand 10 lb (45 N) of tension and each wire should remain in the connector body. This test checks whether the wire was properly crimped in the terminal and whether the terminal was properly inserted into the connector. Replace damaged connectors, as required.

END OF TASK**Terminal Retention into Socket Inspection**

Verify that the connector sockets provide good retention for the terminals. Insert a new terminal into each connector socket one at a time in order to check for a good grip on the terminal by the socket. If a new terminal is not secure in the connector socket, replace the connector.

Connector Locking Mechanism Inspection

1. Ensure that the connectors lock properly. After locking the connectors, ensure that the two mating connector sections cannot be pulled apart. Repair the connector or replace the connector, as required.
2. Verify that the latch tab of the connector is properly latched. Also verify that the latch tab of the connector returns to the locked position. Repair the connector or replace the connector, as required.

END OF TASK**Connector Allen Head Screw Inspection**

1. Visually inspect the allen head screws on the ECM connectors (Figure 2, Sheet 2).
2. Ensure that the threads on each allen head screw are not damaged.
3. Connect the engine harness connectors to the ECM connectors J1 and J2. Connect ENG-P37 to J37.
 - a. Torque the allen head screw for the ECM harness connectors to 55.0 +13.0 -4.0 lb•in. (6.0 +1.5 -0.5 N•m). If connector cannot be tightened, repair or replace the connector, as required.
 - b. Torque the allen head screw for the ECM harness connector J37 to 20.0±2.0 lb•in. (2.25 ±0.25 N•m). If connector cannot be tightened, repair or replace the connector, as required.

END OF TASK

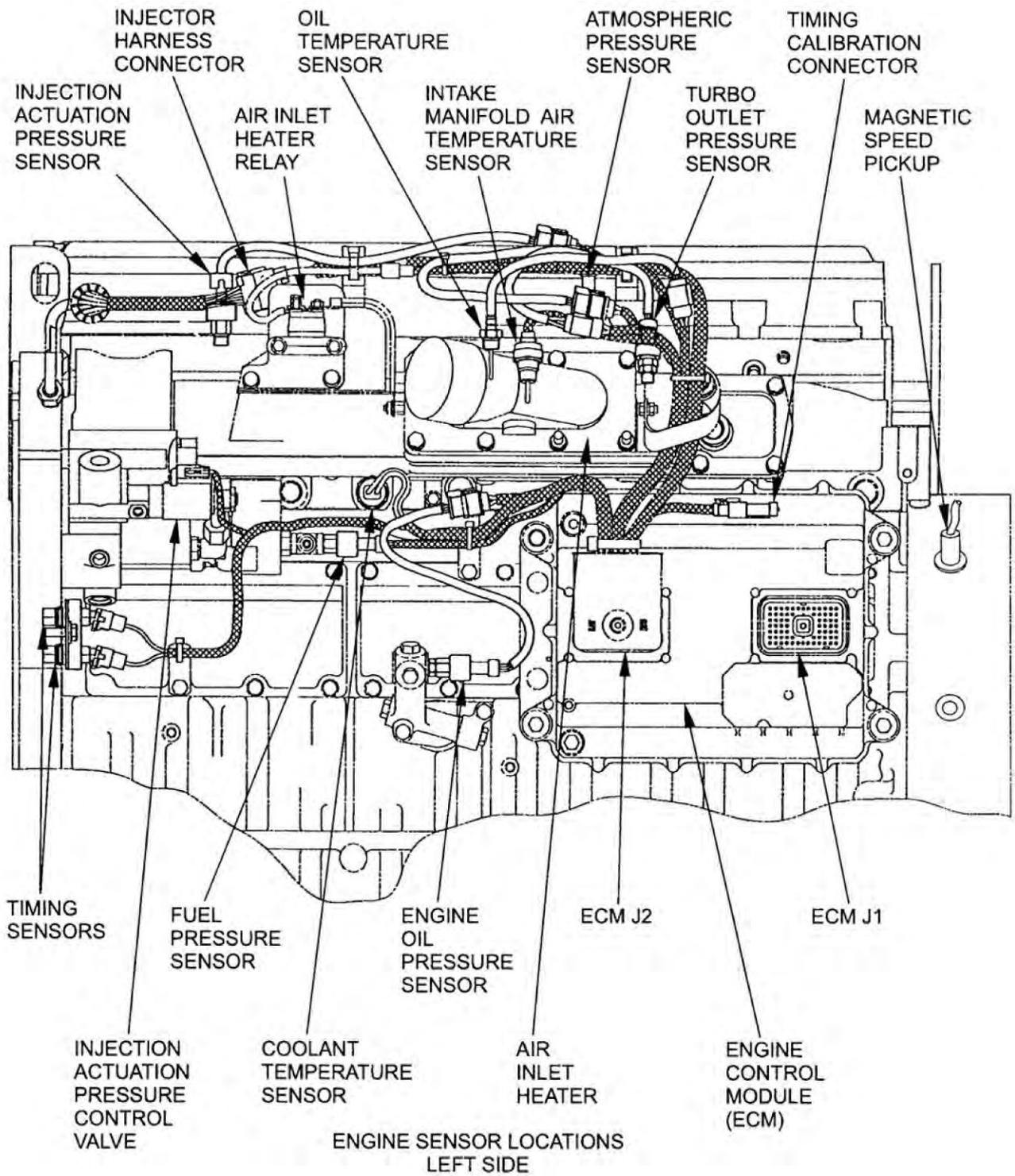


Figure 1. Engine Sensors (Sheet 1 of 2).

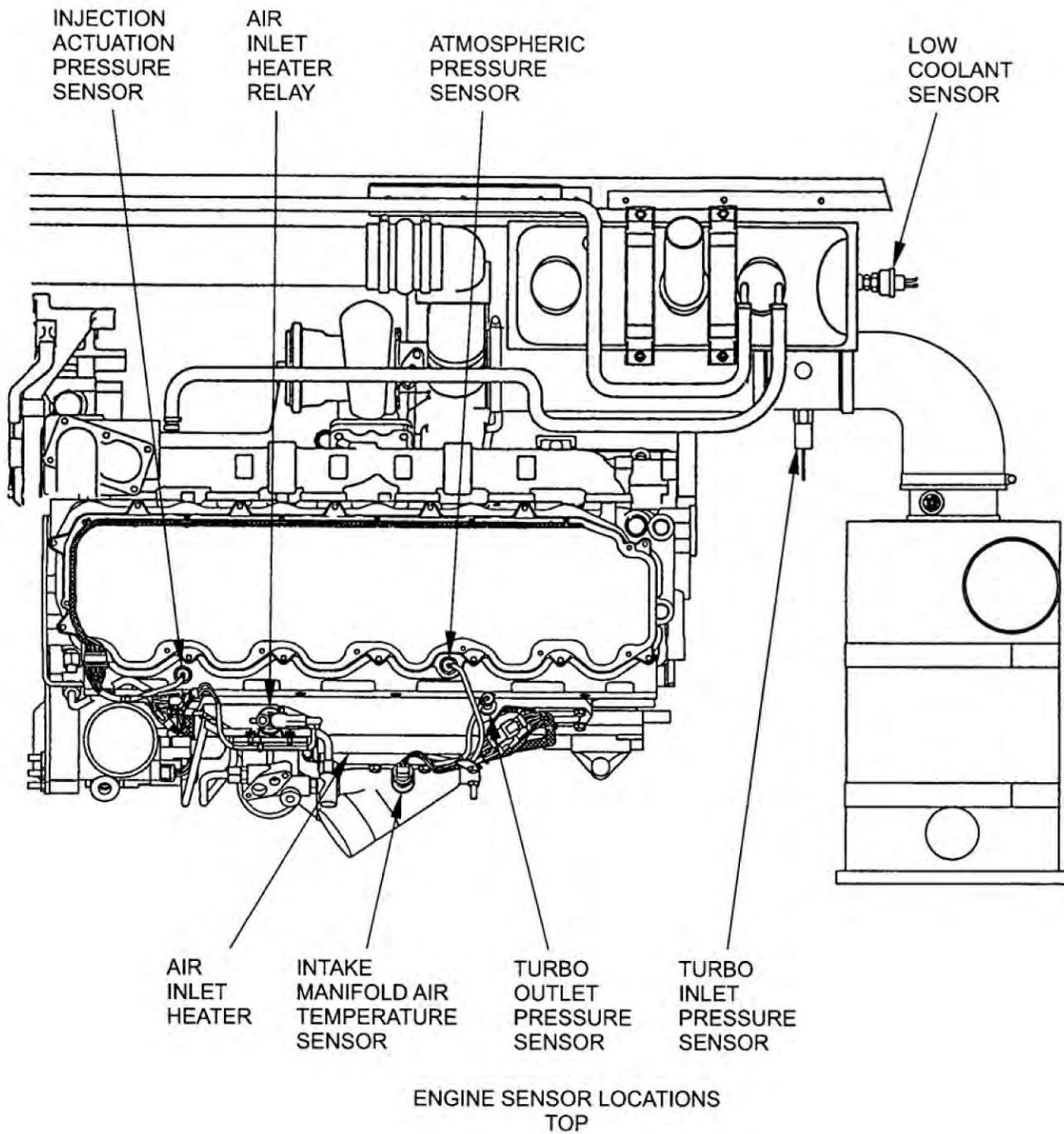
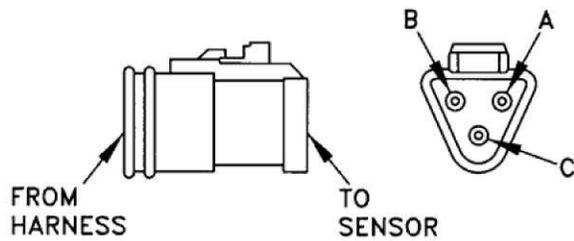
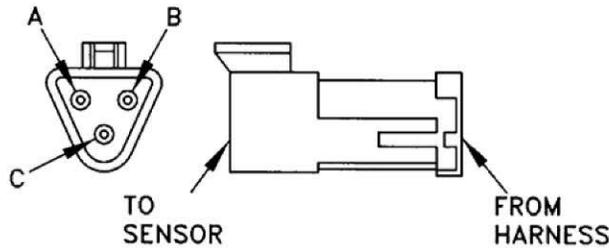


Figure 1. Engine Sensors (Sheet 2 of 2).

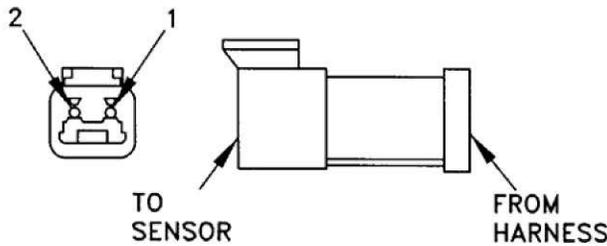


ENGINE HARNESS CONNECTOR TO
TURBO OUTLET PRESSURE SENSOR (ENG-P12)

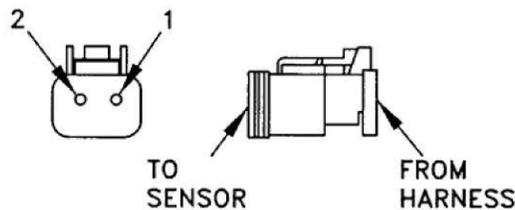


ENGINE HARNESS CONNECTOR TO
ATMOSPHERIC PRESSURE SENSOR (ENG-P11)
INJECTOR ACTUATION PRESSURE SENSOR (ENG-P13)
OIL PRESSURE SENSOR (ENG-P15)
FUEL PRESSURE SENSOR (ENG-P17)

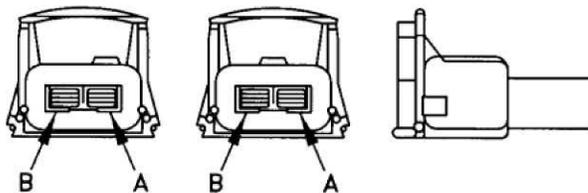
ECM J1 TO EMCP HARNESS
TURBO INLET PRESSURE SENSOR (ENG-P8)
LOW COOLANT SENSOR (ENG-P16)



ENGINE HARNESS CONNECTOR TO
OIL TEMPERATURE SENSOR (ENG-P18)

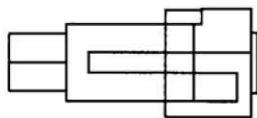
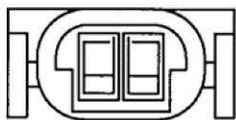
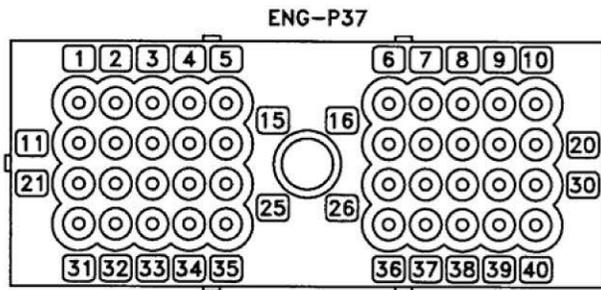
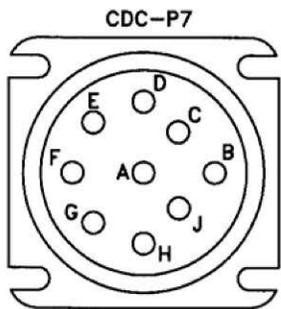


ENGINE HARNESS CONNECTOR TO
AIR INLET HEATER RELAY (ENG-P101)
COOLANT TEMPERATURE SENSOR (ENG-P6)
INTAKE MANIFOLD AIR TEMPERATURE SENSOR (ENG-P7)
TIMING CALIBRATION CONNECTOR (ENG-P10)
MAGNETIC SPEED PICKUP (ENG-P14)

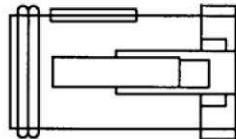
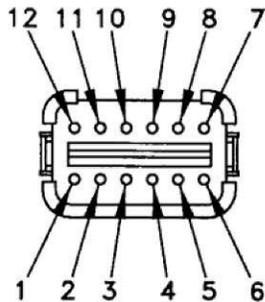


ENGINE HARNESS CONNECTOR TO
CRANKSHAFT TIMING SENSORS (ENG-P4 AND ENG-P5)

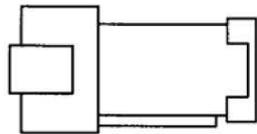
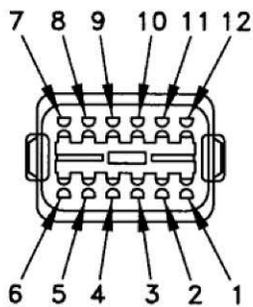
Figure 2. Engine Sensors (Sheet 1 of 3).



ENGINE HARNESS CONNECTOR TO IAP CONTROL VALVE (ENG-P3)

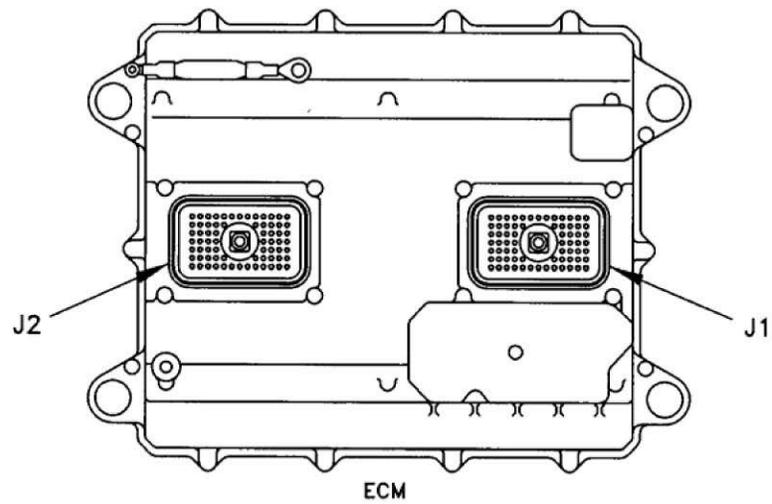


ENGINE HARNESS CONNECTOR TO FUEL INJECTOR HARNESS (ENG-P300)

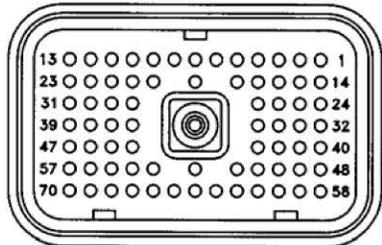


FUEL INJECTOR HARNESS (ENG-J300)

Figure 2. Engine Sensors (Sheet 2 of 3).



ECM J2



ECM J1

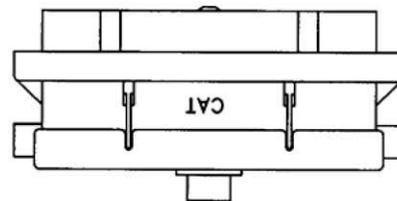
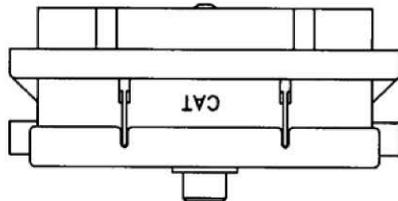
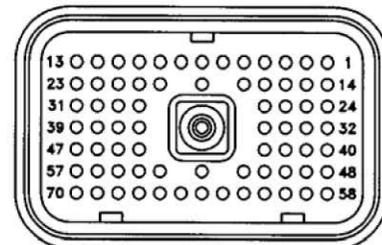


Figure 2. Engine Sensors (Sheet 3 of 3).

Table 1. Control Panel Wire List

NOTES

Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 1:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	88-20274-1	Terminal, Spade, 22-18 AWG #6
2	88-20274-5	Terminal, Spade, 16-14 AWG #6
3	88-20274-10	Terminal, Spade, 12-10 AWG #6
4	88-2219-18	Terminal, Ring Tongue, 16-14 AWG 1/4
5	0116-1201-19	Socket, Connector
6	88-21943	Pin
7	0116-1201-17	Plug, Seal
8	0116-1223	Pin, Connector
9	0116-1201-16	Pin, Connector
10	98-19529-02	Contact, Electrical, Female, 18-24 AWG
11	88-20274-11	Terminal, Spade, 16-14 AWG #8
12	88-20274-6	Terminal, Spade, 16-14 AWG #10
13	88-22119-17	Terminal Lug, Ring Tongue 12-10 AWG 1/4
14	88-20274-3	Terminal, Spade, 22-18 AWG #8
15	88-20274-4	Terminal, Spade, 22-18 AWG #10
16	MS25036-102	Terminal Lug
17	-	Solder to terminal
18	0116-1207-02	Contact, Electrical, Male

The list below describes Wire Type column in Table 1:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire, Electric, 14 Ga	M22759/16-14-9
B	Wire, Electric, 16 Ga	M22759/16-16-9
C	Wire, Electric, 18 Ga	M22759/16-18-9
D	Wire, Electric, 10 Ga	M22759/16-10-9
E	Cable, Shielded 2 Conductor, 18 AWG	0116-1262-01
F	Cable, Shielded 3 Conductor, 18 AWG	0116-1262-02

Table 1. Control Panel Wire List.

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
A1	B+	4	A	14	9			TB4	22B	27C14
A1	1	1	C	18	9			AR	1	41E18
A1	2		A	14	9			A1	B (+)	
A1	10	2	B	16	9			A1	24	61A16
A1	13	1	C	18	9			TB3	14B	44C18
A1	14	1	C	18	9			J37	26	45A18
A1	18	1	C	18	9			KFF	12	14A18
A1	22	1	C	18	9			GFR	14	43A18
A1	24	2	B	16	9			A1	10	61A16
A1	26	2	B	16	9			TB4	11A	54A16
A1	27	1	C	18	9			TB3	7A	2AL18
A1	28		A	14	9			A1	B (-)	-
A1	28						SH9	511 SHIELD	GND	
A1	28						SH10	512 SHIELD	GND	
A1	28						SH4	504 SHIELD	GND	
A1	29		A	14	9			A1	B (+)	
A1	38	1	C	18	9			TB4	21A	27F18
A1	39	2	A	14	9			TB4	19B	21A14
A1	B(-)	4	B	16	9			CB	GND	2J16
A1	B(-)	4	B	16	9			CP	GND	2K16
A2	1	1	C	18	9			TB4	19B	21H18
A2	4	1	C	18	9			TB3	19A	4A18
A2	7	1	C	18	9			TB3	5A	2AG18
A2	8	1	C	18	9			P51	18	5A18
A2	9	1	C	18	9			P51	5	6A18
A2	12	1	C	18	9			AR	13	3A18
A3	B(-)	1	C	18	9			TB3	9A	2AT18
A3	B+	1	C	18	9			TB4	18A	21L18
A3	F1	2	A	14	9			TB3	22B	99A14
A3	F2	2	A	14	9			TB3	21B	98A14
A3	GND	2	A	14	9			CB	GND	2BN14
A3	3	2	E	18	9			P7	24	34A18
A3	5	2	B	16	9			A7	5	116A16
A3	6	2	B	16	9			A7	6	115A16
A3	7	1	E	18	2		SH5	VAR	3	505

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
A3	20	2	B	16	9			TB4	6B	109D16
A3	22	2	B	16	9			TB4	8B	107D16
A3	24	2	B	16	9			TB4	7B	108D16
A3	26	2	A	14	9			J31	6	135A14
A3	28	2	A	14	9			J31	7	136A14
A3	30	2	A	14	9			J31	5	134A14
A3	45	1	E	-	-		SH5	Dead		
A3	45	1	E	18	9		SH5	VAR	1	505
A4	GND	1	C	18	9			TB3	5A	2AA18
A4	1	1	C	18	9			TB4	8A	107E18
A4	2	1	C	18	9			TB4	7A	108E18
A4	3	1	C	18	9			TB4	6A	109H18
A4	4	2	B	16	9			J31	16	111B16
A4	5	2	B	16	9			P51	2	127A16
A4	6	2	B	16	9			J31	15	112B16
A4	7	2	B	16	9			P51	1	128A16
A4	8	2	B	16	9			J31	18	113B16
A4	9	2	B	16	9			P51	12	129A16
A4	10	1	E	18	2		SH1	PAR	10	501
A4	11	1	E	18	9		SH1	PAR	9	501
A4	12	1	E	-	-		SH1	Dead End		501
A4	13	1	C	18	9			A7	1	137A18
A4	14	1	C	18	9			J30	32	139A18
A4	15	2	A	14	9			TB4	19A	21C14
A4	16	2	A	14	9			TB3	4A	2T14
A4	19	1	E	18	2		SH8	J37	23	508
A4	20	1	E	18	9		SH8	J37	11	508
A4	21	1	F	-	-		SH6	Dead End		506
A4	21	1	E	-	-		SH7	Dead End		507
A4	21	1	E	-	-		SH8	J37	12	508
A4	24	1	E	18	2		SH7	P7	27	507
A4	25	1	E	18	9		SH7	P7	28	507
A4	25	2	B	16	9			TB3	9A	2AW16
A4	26	1	F	18	0		SH6	SSP	3	506
A4	27	1	F	18	9		SH6	SSP	2	506
A4	28	1	F	18	2		SH6	SSP	1	506

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
A5	F1	14	C	18	9			J31	1	101D18
A5	F2	14	C	18	9			J31	3	102D18
A5	F3	14	C	18	9			J31	12	103D18
A5	H21	1	C	18	9			TB4	2A	110G18
A5	TBC 50	2	B	16	9			J31	14	150B16
A5	TBC 51	2	B	16	9			J31	4	151B16
A5	TBC 52	2	B	16	9			J31	9	152B16
A5	TBC 53	2	B	16	9			J31	13	153B16
A5P1	1	9	C	18	9			P7	10	149A18
A5P1	2	9	C	18	9			P7	11	148A18
A5P1	3	9	C	18	9			P7	12	147A18
A5P1	4	9	C	18	9			P7	4	144A18
A5P1	5	9	C	18	9			P7	5	145A18
A5P1	6	9	C	18	9			P7	6	146A18
A5P1	7	9	C	18	9			P7	16	110E18
A5P1	8	9	C	18	9			A6P1	C	110D18
A6	B21	1	C	18	9			TB4	1A	110F18
A6	F1	14	C	18	9			J31	19	121D18
A6	F2	14	C	18	9			DBHI	14	123F18
A6P1	A	9	C	18	9			P7	17	155A18
A6P1	B	9	C	18	9			P7	18	156A18
A6P1	C	9	C	18	9			A5P1	8	110D18
A7	1	1	C	18	9			A4	13	137A18
A7	11	2	A	14	9			J30	9	17B14
A7	12	2	A	14	9			TB4	22A	27B14
A7	2	1	C	18	9			J30	31	138B18
A7	3	1	C	18	9			DBHI	4	122E18
A7	4	1	C	18	9			DBHI	13	154A18
A7	5	2	B	16	9			A3	5	116A16
A7	5	2	B	16	9			J30	35	116B16
A7	6	2	B	16	9			A3	6	115A16
A7	6	2	B	16	9			J30	36	115B16
A7	8	1	C	18	9			KFF 8	8	15A18
A7	9	1	C	18	9			TB3	22A	99D18
AFPR	5	1	C	18	9			TB4	20A	21E18
AFPR	8	1	C	18	9			J30	2	10A18
AFPR	9	1	C	18	9			J30	1	8A18
AFPR	12	1	C	18	9			AFPR	14	11B18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
AFPR	13	1	C	18	9			TB3	1B	2U18
AFPR	14	1	C	18	9			AFPR	12	11B18
AFPR	14	1	C	18	9			J30	3	11A18
AFPS	1	1	C	18	9			J30	5	69A18
AFPS	2	1	C	18	9			TB4	18B	21K18
AR	1	1	C	18	9			A1	1	41E18
AR	1	1	C	18	9			TB4	16B	41D18
AR	9	1	C	18	9			P51	8	42A18
AR	13	1	C	18	9			A2	12	3A18
AR	14	1	C	18	9			TB4	20A	21F18
BSS	1	2	C	18	9			TB3	16B	56A18
BSS	2	2	C	18	9			GFR	9	52B18
BSS	4	1	C	18	9			J37	35	73A18
BSS	5	1	C	18	9			TB3	3B	2AS18
CB	GND	14	A	14	9			A3	GND	2BN14
CB	GND	4	B	16	9			AI	B(-)	2J16
CB	GND	13	D	10	9			TB3	4A	2H10
CCL	1	17	C	18	9			TB4	22B	27D18
CCL	2	17	C	18	9			TB3	12B	68B18
CCL	3	17	C	18	9			TB3	8B	2AX18
CCS	1	2	C	18	9			PSU	2	65A18
CCS	2	2	C	18	9			TB4	15B	49B18
CCS	4	2	C	18	9			TB4	15B	49A18
CCS	5	2	C	18	9			TB3	16B	56B18
CDR	4	2	C	18	9			TB4	11B	54D18
CDR	12	1	C	18	9			KR	14	36A18
CDR	13	1	C	18	9			P7	36	78A18
CDR	14	2	C	18	9			KR	12	54C18
CP	GND	11	B	16	9			A1	B(-)	2K16
DBHI	1	1	C	18	9			DBLO	1	58A18
DBHI	2	1	C	18	9			P7	29	29A18
DBHI	4	1	C	18	9			A7	3	122E18
DBHI	4	1	C	18	9			J31	8	122D18
DBHI	9	1	C	18	9			PSU	3	57A18
DBHI	10	1	C	18	9			DBLO	12	59A18
DBHI	12	1	C	18	9			DBLO	13	157A18
DBHI	13	1	C	18	9			A7	4	154A18
DBHI	14	1	C	18	9			A6	F2	123F18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
DBHI	14	1	C	18	9			DBLO	14	123E18
DBLO	1	1	C	18	9			DBHI	1	58A18
DBLO	4	1	C	18	9			TB3	3B	2Y18
DBLO	9	1	C	18	9			TB3	4B	2Z18
DBLO	12	1	C	18	9			DBHI	10	59A18
DBLO	13	1	C	18	9			DBHI	12	157A18
DBLO	14	1	C	18	9			DBHI	14	123E18
DBLO	14	1	C	18	9			J31	17	123D18
DCA	(-)	4	C	18	9			J30	24	24G18
DCA	(+)	4	C	18	9			J30	25	25D18
ECS	1	15	C	18	9			TB3	6A	2AJ18
ECS	2	15	C	18	9			P7	39	39A18
ECS	3	15	C	18	9			P7	40	40A18
ECS	4	7	C	18	9			TB3	17B	33B18
ECS	5	15	C	18	9			P7	32	32A18
ECS	6	15	C	18	9			TB4	21B	27H18
ECS	8	15	C	18	9			TB4	16A	41A18
ECS	9	15	C	18	9			TB4	16A	41B18
ECS	10	15	C	18	9			TB4	16B	41C18
End	-	505	-							
ESPB	1	1	C	18	9			KFF	14	14C18
ESPB	1A	1	C	18	9			TB3	14B	44A18
ESPB	2	1	C	18	9			J30	15	60A18
ESPB	2A	1	C	18	9			TB3	6A	2AH18
ESPB	3	1	C	18	9			P7	38	38A18
ESPB	4	1	C	18	9			TB3	7A	2AK18
FLG	G	14	C	18	9			TB3	5B	2AB18
FLG	I	14	C	18	9			TB4	20B	21D18
FLG	S	14	C	18	9			J30	7	80B18
GFR	1	2	C	18	9			P51	10	53A18
GFR	9	2	C	18	9			BSS	2	52B18
GFR	9	2	C	18	9			P51	7	52A18
GFR	13	1	C	18	9			TB3	1B	2V18
GFR	14	1	C	18	9			A1	22	43A18
J101	G	11	C	16	9			TB3	7B	2AV16
J30	1	6	C	18	9			AFPR	9	8A18
J30	2	6	C	18	9			AFPR	8	10A18
J30	3	6	C	18	9			AFPR	14	11A18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
J30	4	6	C	18	9			TB3	19A	4C18
J30	5	6	C	18	9			AFPS	1	69A18
J30	7	6	C	18	9			FLG	S	80B18
J30	8	6	B	16	9			TB4	19A	21B16
J30	9	8	A	14	9			A7	11	17B14
J30	10	6	B	16	9			TB4	6A	109C16
J30	12	6	C	18	9			TB3	12A	68C18
J30	13	6	B	16	9			TB4	21A	27J16
J30	14	6	C	18	9			TB4	10A	76B18
J30	15	6	C	18	9			ESPB	2	60A18
J30	16	8	A	14	9			TB4	5A	109F14
J30	17	8	A	14	9			TB4	1A	110M14
J30	18	6	B	16	9			TB4	17A	21M16
J30	19	6	C	18	9			TB4	15A	49C18
J30	20	6	B	16	9			TB3	4B	2S16
J30	23	6	B	16	9			KR	8	50A16
J30	24	6	C	18	9			DCA	(-)	24G18
J30	25	6	C	18	9			DCA	(+)	25D18
J30	28	8	A	14	9			TB3	21A	98C14
J30	29	8	A	14	9			TB3	22A	99C14
J30	31	6	C	18	9			A7	2	138B18
J30	32	6	C	18	9			A4	14	139A18
J30	33	7	C	18	9			TB3	17A	33C18
J30	34	6	B	16	9			TB4	7A	108C16
J30	35	6	B	16	9			A7	5	116B16
J30	36	6	B	16	9			A7	6	115B16
J30	37	6	B	16	9			TB4	8A	107C16
J31	1	6	C	18	9			A5	F1	101D18
J31	3	6	C	18	9			A5	F2	102D18
J31	4	6	B	16	9			A5	TBC-51	151B16
J31	5	8	A	14	9			A3	30	134A14
J31	6	8	A	14	9			A3	26	135A14
J31	7	8	A	14	9			A3	28	136A14
J31	8	6	C	18	9			DBHI	4	122D18
J31	9	6	B	16	9			A5	TBC-52	152B16
J31	10	6	B	16	9			TB4	3A	110C16
J31	11	6	B	16	9			TB4	14A	114D16
J31	12	6	C	18	9			A5	F3	103D18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
J31	13	6	B	16	9			A5	TBC-53	153B16
J31	14	6	B	16	9			A5	TBC-50	150B16
J31	15	6	B	16	9			A4	6	112B16
J31	16	6	B	16	9			A4	4	111B16
J31	17	6	C	18	9			DBLO	14	123D18
J31	18	6	B	16	9			A4	8	113B16
J31	19	6	C	18	9			A6	F1	121D18
J32	A	17	E	18	9		SH2	PAR	5	502
J32	B	17	E	18	2		SH2	PAR	6	502
J32	E	-	C	18	9			RP GND		2JA18
J33	A	17	E	18	9		SH3	PAR	5	503
J33	B	17	E	18	2		SH3	PAR	6	503
J33	E	-	C	18	9			RP GND		2JB18
J37	1	9	E	18	2		SH4	P7	1	504
J37	2	9	E	18	9		SH4	P7	2	504
J37	3	18	E	-	-		SH4	A1	28	504
J37	7	9	C	18	9			P7	7	19A18
J37	8	9	C	18	9			P7	8	20A18
J37	9	9	C	18	9			P7	9	9A18
J37	11	9	E	18	9		SH8	A4	20	508
J37	12	18	E	-	-		SH8	A4	21	508
J37	13	9	C	18	9			P7	13	13A18
J37	14	9	C	18	9			P7	14	16A18
J37	19	9	E	18	2		SH9	P7	19	511
J37	20	9	E	18	9		SH9	P7	20	511
J37	21	9	E	18	2		SH10	P7	21	512
J37	22	9	E	18	9		SH10	P7	22	512
J37	23	9	E	18	2		SH8	A4	19	508
J37	26	9	C	18	9			A1	14	45A18
J37	27	9	C	18	9			TB3	14A	44B18
J37	30	9	C	18	9			P7	30	18A18
J37	31	6	C	18	9			P7	31	31A18
J37	35	9	C	18	9			BSS	4	73A18
J37	40	9	B	16	9			TB4	17A	21N16
KFF	5	1	C	18	9			TB3	21A	98E18
KFF	8	1	C	18	9			A7	8	15A18
KFF	9	1	C	18	9			TB3	2B	2X18
KFF	12	1	C	18	9			A1	18	14A18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
KFF	12	1	C	18	9			KFF	14	14B18
KFF	13	1	C	18	9			TB3	2B	2W18
KFF	14	1	C	18	9			ESPB	1	14C18
KFF	14	1	C	18	9			KFF	12	14B18
KR	8	2	B	16	9			J30	23	50A16
KR	12	2	C	18	9			CDR	14	54C18
KR	12	2	B	16	9			TB4	11B	54B16
KR	13	6	C	18	9			P51	6	51A18
KR	14	1	C	18	9			CDR	12	36A18
P51	6	10	C	18	9			KR	13	51A18
P51	1	10	B	16	9			A4	7	128A16
P51	2	10	B	16	9			A4	5	127A16
P51	3	10	B	16	9			TB4	14B	114E16
P51	4	10	C	18	9			TB3	2A	2N18
P51	5	10	C	18	9			A2	9	6A18
P51	7	10	C	18	9			GFR	9	52A18
P51	8	10	C	18	9			AR	9	42A18
P51	9	10	C	18	9			TB3	3A	2M18
P51	10	2	C	18	9			GFR	1	53A18
P51	11	10	B	16	9			TB4	14B	114F16
P51	12	10	B	16	9			A4	9	129A16
P51	13	10	B	16	9			TB4	14A	114G16
P51	15	10	B	16	9			TB4	5A	109G18
P51	16	10	C	18	9			TB4	2A	110H18
P51	18	10	C	18	9			A2	8	5A18
P51	19	10	C	18	9			TB3	2A	2P18
P51	20	10	C	18	9			TB3	16A	56C18
P7	1	5	E	18	2		SH4	J37	1	504
P7	2	5	E	18	9		SH4	J37	2	504
P7	4	5	C	18	9			A5P1	4	144A18
P7	5	5	C	18	9			A5P1	5	145A18
P7	6	5	C	18	9			A5P1	6	146A18
P7	7	5	C	18	9			J37	7	19A18
P7	8	5	C	18	9			J37	8	20A18
P7	9	5	C	18	9			J37	9	9A18
P7	10	5	C	18	9			A5P1	1	149A18
P7	11	5	C	18	9			A5P1	2	148A18
P7	12	5	C	18	9			A5P1	3	147A18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
P7	13	5	C	18	9			J37	13	13A18
P7	14	7	C	18	9			J37	14	16A18
P7	15	5	C	18	9			SMS	1	55A18
P7	16	5	C	18	9			A5P1	7	110E18
P7	17	5	C	18	9			A6P1	A	155A18
P7	18	5	C	18	9			A6P1	B	156A18
P7	19	5	E	18	2		SH9	J37	19	511
P7	20	5	E	18	9		SH9	J37	20	511
P7	21	5	E	18	2		SH10	J37	21	512
P7	22	5	E	18	9		SH10	J37	22	512
P7	23	7	C	18	9			TB3	19B	4D18
P7	24	5	C	18	9			A3	3	34A18
P7	25	5	C	18	9			TB3	12A	68D18
P7	26	5	C	18	9			SMS	6	46A18
P7	27	5	E	18	2		SH7	A4	24	507
P7	28	5	E	18	9		SH7	A4	25	507
P7	29	5	C	18	9			DBHI	2	29A18
P7	30	5	C	18	9			J37	30	18A18
P7	31	5	C	18	9			J37	31	31A18
P7	32	5	C	18	9			ECS	5	32A18
P7	33	5	C	18	9			TB3	17B	33A18
P7	36	5	C	18	9			CDR	13	78A18
P7	37	5	C	18	9			SMS	11	47A18
P7	38	5	C	18	9			ESPB	3	38A18
P7	39	5	C	18	9			ECS	2	39A18
P7	40	5	C	18	9			ECS	3	40A18
PAR	5	1	E	18	9		SH2	J32	A	502
PAR	5	1	E	18	9		SH3	J33	A	503
PAR	6	1	E	18	2		SH2	J32	B	502
PAR	6	1	E	18	2		SH3	J33	B	503
PAR	9	1	E	18	9		SH1	A4	11	501
PAR	10	1	E	18	2		SH1	A4	10	501
PAR	13	1	C	18	9			PSU	5	64A18
PAR	14	1	C	18	9			TB4	22A	27E18
PL1	(-)	1	C	18	9			TB3	8A	2AM18
PL1	(+)	1	C	18	9			TB3	11B	30D18
PL2	(-)	1	C	18	9			TB3	8A	2AN18
PL2	(+)	1	C	18	9			TB3	11A	30B18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
PL3	(-)	1	C	18	9			TB3	8B	2AP18
PL3	(+)	1	C	18	9			TB3	11B	30C18
PLS	1	1	C	18	9			TB4	21B	27G18
PLS	2	1	C	18	9			TB3	11A	30A18
PSU	1	2	C	18	9			TB3	15A	48A18
PSU	2	1	C	18	9			CCS	1	65A18
PSU	3	1	C	18	9			DBHI	9	57A18
PSU	4	1	C	18	9			TB3	12B	68A18
PSU	5	1	C	18	9			PAR	13	64A18
RP	GND	15	C	18	9			TB3	9B	2AR18
RP	GND	-	C	18	9			J32E		2JA18
RP	GND	15	C	18	9			J33E		2JB18
RP	GND	15	E	-	-		SH2	Dead End		502
RP	GND	15	E	-	-		SH3	Dead End		503
SMS	1	15	C	18	9			P7	15	55A18
SMS	4	15	C	18	9			TB3	5B	2AC18
SMS	5	15	C	18	9			TB3	6B	2AD18
SMS	6	15	C	18	9			P7	26	46A18
SMS	8	15	C	18	9			TB3	6B	2AE18
SMS	10	15	C	18	9			TB3	7B	2AF18
SMS	11	15	C	18	9			P7	37	47A18
SMS	13	2	C	18	9			TB3	15B	48C18
SMS	14	2	C	18	9			TB4	13A	63A18
SMS	15	12	C	18	9			TB3	15B	48B18
SSP	1	17	F	18	2		SH6	A4	28	506
SSP	2	17	F	18	9		SH6	A4	27	506
SSP	3	17	F	18	0		SH6	A4	26	506
TB3	1B	1	C	18	9			AFPR	13	2U18
TB3	1 B	1	C	18	9			GFR	13	2V18
TB3	2A	1	C	18	9			P51	4	2N18
TB3	2A	1	C	18	9			P51	19	2P18
TB3	2B	1	C	18	9			KFF	13	2W18
TB3	2B	1	C	18	9			KFF	9	2X18
TB3	3A	1	C	18	9			P51	9	2M18
TB3	3B	1	C	18	9			BSS	5	2AS18
TB3	3B	1	C	18	9			DBLO	4	2Y18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
TB3	4A	3	D	10	9			CB	GND	2H10
TB3	4A	2	A	14	9			A4	16	2T14
TB3	4B	1	C	18	9			DBLO	9	2Z18
TB3	4B	1	B	16	9			J30	20	2S16
TB3	5A	1	C	18	9			A2	7	2AG18
TB3	5A	1	C	18	9			A4	GND	2AA18
TB3	5B	1	C	18	9			FLG	G	2AB18
TB3	5B	1	C	18	9			SMS	4	2AC18
TB3	6A	1	C	18	9			ECS	1	2AJ18
TB3	6A	1	C	18	9			ESPB	2A	2AH18
TB3	6B	1	C	18	9			SMS	5	2AD18
TB3	6B	1	C	18	9			SMS	8	2AE18
TB3	7A	1	C	18	9			A1	27	2AL18
TB3	7A	1	C	18	9			ESPB	4	2AK18
TB3	7B	2	B	16	9			J101	3	2AV16
TB3	7B	1	C	18	9			SMS	10	2AF18
TB3	8A	1	C	18	9			PL1	(-)	2AM18
TB3	8A	1	C	18	9			PL2	(-)	2AN18
TB3	8B	1	C	18	9			CCL	3	2AX18
TB3	8B	1	C	18	9			PL3	(-)	2AP18
TB3	9A	1	C	18	9			A3	B(-)	2AT18
TB3	9A	2	B	16	9			A4	25	2AW16
TB3	9B	1	C	18	9			RP	GND	2AR18
TB3	10B	1	C	18	9			HTR2	1	2BM18
TB3	11A	1	C	18	9			PL2	(+)	30B18
TB3	11A	1	C	18	9			PLS	2	30A18
TB3	11B	1	C	18	9			PL1	(+)	30D18
TB3	11B	1	C	18	9			PL3	(+)	30C18
TB3	12A	1	C	18	9			J30	12	68C18
TB3	12A	1	C	18	9			P7	25	68D18
TB3	12B	1	C	18	9			CCL	2 (-)	68B18
TB3	12B	1	C	18	9			PSU	4	68A18
TB3	14A	1	C	18	9			J37	27	44B18
TB3	14B	1	C	18	9			A1	13	44C18
TB3	14B	1	C	18	9			ESPB	1A	44A18
TB3	15A	2	C	18	9			PSU	1	48A18
TB3	15B	2	C	18	9			SMS	15	48B18
TB3	15B	2	C	18	9			SMS	13	48C18

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
TB3	16A	2	C	18	9			P51	20	56C18
TB3	16B	2	C	18	9			CCS	5	56B18
TB3	16B	2	C	18	9			BSS	1	56A18
TB3	17A	5	C	18	9			J30	33	33C18
TB3	17B	15	C	18	9			ECS	4	33B18
TB3	17B	15	C	18	9			P7	33	33A18
TB3	19A	1	C	18	9			A2	4	4A18
TB3	19A	1	C	18	9			J30	4	4C18
TB3	19B	1	C	18	9			P7	23	4D18
TB3	21A	2	A	14	9			J30	28	98C14
TB3	21A	1	C	18	9			KFF	5	98E18
TB3	21B	2	A	14	9			A3	F2	98A14
TB3	22A	1	C	18	9			A7	9	99D18
TB3	22A	2	A	14	9			J30	29	99C14
TB3	22B	2	A	14	9			A3	F1	99A14
TB4	1A	1	C	18	9			A6	B21	110F18
TB4	1A	2	A	14	9			J30	17	110M14
TB4	1B				9			CB3	LINE	
TB4	2A	1	C	18	9			A5	H21	110G18
TB4	2A	1	C	18	9			P51	16	110H18
TB4	3A	1	B	16	9			J31	10	110C16
TB4	5A	2	A	14	9			J30	16	109F14
TB4	5A	1	C	18	9			P51	15	109G18
TB4	5B				2			CB3	LINE	
TB4	6A	1	C	18	9			A4	3	109H18
TB4	6A	2	B	16	9			J30	10	109C16
TB4	6B	2	B	16	9			A3	20	109D16
TB4	7A	1	C	18	9			A4	2	108E18
TB4	7A	2	B	16	9			J30	34	108C16
TB4	7B	2	B	16	9			A3	24	108D16
TB4	8A	1	C	18	9			A4	1	107E18
TB4	8A	2	B	16	9			J30	37	107C16
TB4	8B	2	B	16	9			A3	22	107D16
TB4	10A	1	C	18	9			J30	14	76B18
TB4	10B	1	C	18	7			HTR1	1	76C18
TB4	11A	2	B	16	9			A1	26	54A16
TB4	11B	2	C	18	9			CDR	4	54D18
TB4	11B	2	B	16	9			KR	12	54B16

Table 1. Control Panel Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
TB4	12B	2	C	18	9			TS	2	87WA18
TB4	13A	2	C	18	9			SMS	14	63A18
TB4	14A	2	B	16	9			J31	11	114D16
TB4	14A	2	B	16	9			P51	13	114G16
TB4	14B	2	B	16	9			P51	3	114E16
TB4	14B	2	B	16	9			P51	11	114F16
TB4	15A	2	C	18	9			J30	19	49C18
TB4	15B	2	C	18	9			CCS 4	4	49A18
TB4	15B	2	C	18	9			CCS	2	49B18
TB4	16A	1	C	18	9			ECS	8	41A18
TB4	16A	1	C	18	9			ECS	9	41B18
TB4	16B	1	C	18	9			AR	1	41D18
TB4	16B	1	C	18	9			ECS	10	41C18
TB4	17A	2	B	16	9			J30	18	21M16
TB4	17A	2	B	16	9			J37	40	21N16
TB4	17B	1	C	18	9			TS	1	21WA18
TB4	18A	1	C	18	9			A3	B+	21L18
TB4	18B	1	C	18	9			AFPS	2	21K18
TB4	19A	2	A	14	9			A4	15	21C14
TB4	19A	2	B	16	9			J30	8	21B16
TB4	19B	2	A	14	9			A1	39	21A14
TB4	19B	1	C	18	9			A2	1	21H18
TB4	20A	1	C	18	9			AFPR	5	21E18
TB4	20A	1	C	18	9			AR	14	21F18
TB4	20B	1	C	18	9			FLG	1	21D18
TB4	21A	1	C	18	9			A1	38	27F18
TB4	21A	2	B	16	9			J30	13	27J16
TB4	21B	1	C	18	9			ECS	6	27H18
TB4	21B	1	C	18	9			PLS	1	27G18
TB4	22A	2	A	14	9			A7	12	27B14
TB4	22A	1	C	18	9			PAR	14	27E18
TB4	22B	2	A	14	9			A1	(B+)	27C14
TB4	22B	1	C	18	9			CCL	1 (+)	27D18
VAR	1	17	E	18	9		SH5	A3	45	505
VAR	3	17	E	18	2		SH5	A3	7	505

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List**NOTES**Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 2:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	88-21944	Socket (18-16 AWG)
2	88-20274-1	Terminal, Spade 20 AWG, #6
3	88-20477	Contact, Electrical, Female
4	88-20274-3	Terminal, Spade 20 AWG, #8
5	88-20274-10	Terminal, Spade 12 AWG, #6
6	MS25036-158	Terminal Lug, Ring Tongue, 10 AWG
7	88-20274-5	Terminal, Spade 16 AWG, #6
8	401256-001	Terminal Lug, Push-on
9	0116-1215	Adapter, Terminal Disconnect
10	88-22119-19	Terminal Lug, Ring Tongue, 10-12 AWG
11	88-22119-21	Terminal Lug, Ring Tongue, 4AWG
13	MS25036-125	Terminal Lug, Ring Tongue, 4 AWG
14	0116-1224	Socket, Connector (18 - 14 AWG)
15	88-20274-9	Terminal, Spade 12 AWG, #8
16	88-20274-7	Terminal, Spade 12 AWG, #10
17	-	Solder to terminal
18	88-20274-11	Terminal, Spade 16 AWG, #8
19	88-22119-17	Terminal Lug, Ring Tongue
20	88-22119-18	Terminal Lug, Ring Tongue
21	MS25036-155	Terminal Lug, Ring Tongue, 16 AWG
22	MS25036-151	Terminal Lug, Ring Tongue, 20 AWG
23	0116-1232-02	Terminal, Pin, 16-14 AWG
24	88-22119-13	Terminal Lug, Ring Tongue
25	MS25036-105	Terminal Lug, Ring Tongue, 20 AWG

The list below describes Wire Type column in Table 2:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire, Electric, Extruded ETFE 14 Ga	M22759/16-14-9
B	Wire, Electric, Extruded ETFE 16 Ga	M22759/16-16-9
C	Wire, Electric, Extruded ETFE 18 Ga	M22759/16-18-9
D	Wire, Electric, Extruded ETFE 10 Ga	M22759/16-18-9
E	Wire, Electrical, 4 AWG	88-20540-10

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List.

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
AFP	CASE	-	C	18	9			AFPV	2	2BH18
AFP	1	-			0			AFPV	1	
AFPV	1	1	C	18	9			P30	1	8B18
AFPV	2	1	C	18	9			AFP	CASE	2BH18
AFPV	2	3	C	18	9			TB5	17B	2BG18
ALT	(-)	10	D	10	9			SM	(-)	2BE10
ALT	(+)	6	D	10	9			CB5	2	28A10
BDS	1	-	-	-	0			BT2	(-)	1A410
BDS	2	-	-	-	0			SM	(-)	2A410
BT1	(-)	-	-	-	0			BT2	(+)	12A410
BT1	(+)	-	-	-	0			PS	(+)	24A410
BT1	(+)	-	-	-	0			SR	(+)	24D410
BT2	(-)	-	-	-	0			BDS	1	1A410
BT2	(-)	-	-	-	0			SR	(-)	1C410
BT2	(+)	-	-	-	0			BT1	(-)	12A410
BDS	A	8	C	16	9			TB5	5A	22B16
Field										
BDS	B		B	16	9			TB5	6A	91A16
Field										
CATSW 1	2	2	C	18	9			TB5	21A	2BJ18
CATSW 2	2	2	C	18	9			TB5	21A	2BK18
CB	GND	10	D	10	9			SM	(-)	2D10
CB2	1	15	D	10	9			PS	(+)	24C10
CB2	2	11	D	10	9			SMMS	1	75A10
CB4	1	18	A	14	9			R4	4	25E14
CB4	2	18	A	14	9			SRY	30	74A14
CB5	1	16	D	10	9			R4	4	25A10

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
CB5	2	18	D	10	9			ALT	(+)	28A10
CCCT	X1	11	B	16	9			P30	36	115C16
CCCT	X2	11	B	16	9			P30	35	116C16
CT1	X1	11	B	16	9			P31	4	151A16
CT1	X2	11	B	16	9			CT2	X2	150C16
CT1	X2	11	B	16	9			P31	14	150A16
CT2	X1	11	B	16	9			P31	9	152A16
CT2	X2	11	B	16	9			CT1	X2	150C16
CT2	X2	11	B	16	9			CT3	X2	150D16
CT3	X1	11	B	16	9			P31	13	153A16
CT3	X2	11	B	16	9			CT2	X2	150D16
CT7	X1	11	B	16	9			P31	16	111A16
CT7	X2	11	B	16	9			CT8	X2	114C16
CT8	X1	11	B	16	9			P31	15	112A16
CT8	X2	11	B	16	9			CT7	X2	114C16
CT8	X2	11	B	16	9			CT9	X2	114B16
CT9	X1	11	B	16	9			P31	18	113A16
CT9	X2	11	B	16	9			CT8	X2	114B16
CT9	X2	11	B	16	9			P31	11	114A16
D1	Anode	17	D	10	9			R4	4	25B10
D1	Cathode	21	A	14	9			DCS	2	26A14
DCS	1	2	C	18	9			TB5	5A	22A18
DCS	2	7	A	14	9			D1	Cathode	26A14
DCS	3	7	A	14	9			P30	9	17A14
F1	1	23	B	16	9			TB5	7A	107F16
F1	2	23	B	16	9			PT3	IN-115	124A16
F2	1	23	B	16	9			TB5	8A	108F16
F2	2	23	B	16	9			PT2	IN-0	125A16
F3	1	23	B	16	9			TB5	9A	109J16
F3	2	23	B	16	9			PT2	IN-115	126A16
FLSU	1	15	C	18	9			P30	7	80A18
FLSU	G	4	C	18	9			TB5	20A	2AZ18
Frame	GND	13	E	4	9			TB2	GND	2F4
GEN	GND	13	E	4	9			TB2	GND	2E4
K1	A1	-	-	-	0			TB1	1	101A410
K1	A2	25	C	18	9			P31	19	121C18

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
K1	B1	-	-	-	0			TB1	2	102A410
K1	B2	25	C	18	9			P31	8	122C18
K1	C1	-	-	-	0			TB1	3	103A410
K1	C2	27	C	18	9			P31	17	123C18
K1	X1	7	B	16	9			P30	23	50B16
K1	X2	7	B	16	9			TB5	19B	2BR16
K1	21	7	B	16	9			TB5	20B	2BB16
K1	22	2	C	18	9			P30	12	68E18
K1	41	7	B	16	9			TB5	20B	2BC16
K1	42	2	C	18	9			P30	19	49D18
P11	1	3	C	18	9			P30	4	4B18
P11	2	3	C	18	9			TB5	19A	2AY18
P12	1	3	C	18	9			P30	1	8B18
P30	1	1	C	18	9			AFPV	1	8B18
P30	2	1	C	18	9			P8	2	10B18
P30	3	1	C	18	9			P8	3	11C18
P30	4	1	C	18	9			P11	1	4B18
P30	5	1	C	18	9			P8	1	69B18
P30	7	1	C	18	9			FLSU-S	1	80A18
P30	8	1	B	16	9			TB5	12B	21P16
P30	9	14	A	14	9			DCS	3	17A14
P30	10	1	B	16	9			TB1	9	109B16
P30	12	1	C	18	9			K1	22	68E18
P30	13	1	B	16	9			TB5	16B	27K16
P30	14	1	C	18	9			TB5	15B	76A18
P30	15	1	C	18	9			TB5	4B	60B18
P30	16	14	A	14	9			TB1	9	109E14
P30	17	14	A	14	9			TB1	13	110N14
P30	18	1	B	16	9			TB5	11B	21R16
P30	19	1	C	18	9			K1	42	49D18
P30	20	1	B	16	9			TB5	20A	2AU16
P30	23	1	B	16	9			K1	X1	50B16
P30	24	1	C	18	9			R4	2	24F18
P30	25	1	C	18	9			R4	3	25C18
P30	28	14	A	14	9			TB5	1B	98B14
P30	29	14	A	14	9			TB5	2B	99B14

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
P30	33	1	C	18	9			TB5	22A	33D18
P30	34	1	B	16	9			TB5	8B	108B16
P30	35	1	B	16	9			CCCT	X2	116C16
P30	36	1	B	16	9			CCCT	X1	115C16
P30	37	1	B	16	9			TB5	7B	107B16
P31	1	1	C	18	9			TB1	1	101C18
P31	3	1	C	18	9			TB1	2	102C18
P31	4	1	B	16	9			CT1	X1	151A16
P31	5	14	A	14	9			PT2	OP-115	134B14
P31	6	14	A	14	9			PT3	OP-0	135B14
P31	7	14	A	14	9			PT3	OP-115	136B14
P31	8	1	C	18	9			K1	B2	122C18
P31	9	1	B	16	9			CT2	X1	152A16
P31	10	1	B	16	9			TB5	10A	110B16
P31	11	1	B	16	9			CT9	X2	114A16
P31	12	1	C	18	9			TB1	3	103C18
P31	13	1	B	16	9			CT3	X1	153A16
P31	14	1	B	16	9			CT1	X2	150A16
P31	15	1	B	16	9			CT8	X1	112A16
P31	16	1	B	16	9			CT7	X1	111A16
P31	17	1	C	18	9			K1	C2	123C18
P31	18	1	B	16	9			CT9	X1	113A16
P31	19	1	C	18	9			K1	A2	121C18
P8	1	3	C	18	9			P30	5	69B18
P8	2	3	C	18	9			P30	2	10B18
P8	3	3	C	18	9			P30	3	11C18
PS	(+)	6	D	10	9			CB2	1	24C10
PS	(+)	6	D	10	9			R4	1	24E10
PS	Coil (+)	16	D	10	9			SMMS	2	23A10
PT2	ESS	11	B	16	9			PT3	ESS	2BS16
PT2	IN-0	11 & 9	B	16	9			F2	2	125A16
PT2	IN-0	23	B	16	9			PT2	IN-115	Jumper
PT2	IN-0	23	B	16	9			PT3	IN-0	125B16
PT2	IN-115	11	B	16	9			F3	2	126A16
PT2	IN-115	23	B	16	9			PT2	IN-0	Jumper
PT2	OP-0	23	A	14	9			PT2	OP-0	135E14
PT2	OP-0	23	A	14	9			PT2	OP-0	135E14
PT2	OP-0	11 & 9	A	14	9			PT3	OP-0	135D14

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
PT2	OP-115	23	A	14	9			PT2	OP-115	134C14
PT2	OP-115	23	A	14	9			PT2	OP-115	134C14
PT2	OP-115	11	A	14	9			P31	5	134B14
PT2	OP-ESS	23	B	16	9			PT2	OP-GND	Jumper
PT2	OP-GND	18	B	16	9			PT2	OP-ESS	Jumper
PT3	ESS	11	B	16	9			PT2	ESS	2BS16
PT3	GND	11	B	16	9			TB5	18B	2BT16
PT3	IN-0	23	B	16	9			PT3	IN-115	Jumper
PT3	IN-0	23	B	16	9			PT2	IN-0	125B16
PT3	IN-115	11	B	16	9			F1	2	124A16
PT3	IN-115	23	B	16	9			PT3	IN-0	Jumper
PT3	OP-ESS	23	B	16	9			PT3	OP-GND	Jumper
PT3	OP-GND	18	B	16	9			PT3	OP-ESS	Jumper
PT3	OP-0	11	A	14	9			PT2	OP-0	135D14
PT3	OP-0	23	A	14	9			PT3	OP-0	135C14
PT3	OP-0	23	A	14	9			PT3	OP-0	135C14
PT3	OP-0	11	A	14	9			P31	6	135B14
PT3	OP-115	23	A	14	9			PT3	OP-115	136C14
PT3	OP-115	23	A	14	9			PT3	OP-115	136C14
PT3	OP-115	11	A	14	9			P31	7	136B14
R4	1	10	D	10	9			PS	(+)	24E10
R4	2	4	C	18	9			P30	24	24F18
R4	3	5	C	18	9			P30	25	25C18
R4	4	20	A	14	9			CB4	1	25E14
R4	4	10	D	10	9			CB5	1	25A10
R4	4	10	D	10	9			D1	Anode	25B10
SM	(-)				0			BDS	2	2A410
SM	(-)	6	D	10	9			ALT	GND	2BE10
SM	(-)				0			TB2	GND	2C410
SM	(-)	6	D	10	9			CB	GND	2D10
SM	(-)	6	D	10	9			TB5	19B	2BA10

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
SMMS	1	15	D	10	9			CB2	2	75A10
SMMS	2	15	D	10	9			PS	Coil (+)	23A10
SMMS	3	7	B	16	9			TB5	6A	91B16
SMMS	4	8	C	18	9			TB5	18A	2BD18
SRV	30	11	A	14	9			CB4	2	74A14
SRV	85	8 & 9	C	18	9			TB5	12A	21S18
SRV	86	8 & 9	C	18	9			TB5	18B	2BF18
TB1	1			4	0			K1	A1	101A410
TB1	1	22	C	18	9			P31	1	101C18
TB1	2			4	0			K1	B1	102A410
TB1	2	22	C	18	9			P31	3	102C18
TB1	3			4	0			K1	C1	103A410
TB1	3	22	C	18	9			P31	12	103C18
TB1	7	21	B	16	9			TB5	7B	107A16
TB1	8	21	B	16	9			TB5	8B	108A16
TB1	9	21	B	16	9			TB5	9B	109A16
TB1	9	21	B	16	9			P30	10	109B16
TB1	9	21	A	14	9			P30	16	109E14
TB1	9	21	A	14	9			P30	16	109E14
TB1	10			4				TB2	N	110K410
TB1	12							TB2	N	110K410
TB1	13	21	B	16	9			TB5	10B	110A16
TB2	GND	5	E	4	9			Frame	GND	2F4
TB2	GND	12	E	14	9			GEN	GND	2E4
TB2	GND							SM	(-)	2C410
TB2	L1	24	B	16	9			V1	1	121E16
TB2	L1							K1	A2	121A410
TB2	L1							K1	A2	121B410
TB2	L2	24	B	16	9			V2	1	122F16
TB2	L2							K1	B2	122A410
TB2	L2							K1	B2	122B410

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
TB2	L3	24	B	16	9			V3	1	123H16
TB2	L3							K1	C2	123A410
TB2	L3							K1	C2	123B410
TB2	N	24	B	16	9			V4	1	110J16
TB2	N			4	0			TB1	10	110K410
TB2	N			4	0			TB1	12	110L410
TB5	1A	7	A	14	9			G1	F2	
TB5	1B	7	A	14	9			P30	28	98B14
TB5	2A	7	A	14	9			G1	F1	
TB5	2B	7	A	14	9			P30	29	99B14
TB5	4	2	C	18	9			P30	15	60B18
TB5	5A	2	C	18	9			DCS	1	22A18
TB5	5A	2	C	18	9			BDS Field	A	22B16
TB5	6A	7	B	16	2			SMMS	3	91A16
TB5	6A	8	B	16	2			BDS FIELD	B	91B16
TB5	7A	7	B	16	9			F1	1	107F16
TB5	7B	7	B	16	9			P30	37	107B16
TB5	7B	7	B	16	9			TB1	7	107A16
TB5	8A	7	B	16	9			F2	1	108F16
TB5	8B	7	B	16	9			P30	34	108B16
TB5	8B	7	B	16	9			TB1	8	108A16
TB5	9A	7	B	16	9			F3	1	109J16
TB5	9B	7	B	16	9			TB1	9	109A16
TB5	10A	7	B	16	9			P31	10	110B16
TB5	10B	7	B	16	9			TB1	13	110A16
TB5	11B	7	B	16	9			P30	18	21R16
TB5	12A	2	C	18	9			SRY	85	21S18
TB5	12B	7	B	16	9			P30	8	21P16
TB5	15A	2	C	18	9			P26	B	76WA18
TB5	15B	2	C	18	9			P30	14	76A18
TB5	16A	2	C	18	9			P26	E	27WA14
TB5	16B	7	B	16	9			P30	13	27K16
TB5	17A	2	C	18	9			P26	A	2WB14
TB5	17B	2	C	18	9			P12	2	2BG18

Table 2. Generator Set Harness (Generator, Engine, Control Panel) Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
TB5	18A	2	C	18	9			SMMS	4	2BD18
TB5	18B	7	B	16	9			PT3	GND	2BT16
TB5	18B	2	C	18	9			SRY	86	2BF18
TB5	19A	2	C	18	9			P11	2	2AY18
TB5	19B	7	B	16	9			K1	X2	2BR16
TB5	19B	5	D	10	9			SM	(-)	2BA10
TB5	20	2	C	18	9			FLSU	G	2AZ18
TB5	20A	2	B	16	9			P30	20	2AU16
TB5	20B	7	B	16	9			K1	21	2BB16
TB5	20B	7	B	16	9			K1	41	2BC16
TB5	21A	2	C	18	9			CATSW 1	2	2BJ18
TB5	21A	2	C	18	9			CATSW 2	2	2BK18
TB5	22A	2	C	18	9			P30	33	33D18
V1	1	3	B	16	9			TB2	L1	121E16
V2	1	3	B	16	9			TB2	L2	122F16
V3	1	3	B	16	9			TB2	L3	123H16
V4	1	3	B	16	9			TB2	N	110J16

Table 3. ECM to EMCP Harness Wire List.**NOTES**Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 3:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	9X-3402	Socket
2 3	9X-0141 9W-0852	Plug Assy Pin
4	126-1768	Socket
5	8T-8730	Socket
6	8T-8729	Pin
7	-	

The list below describes Wire Type column in Table 3:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire, 16 GA T (twisted pair)	6A-3770
B	Wire, 14 GA T (twisted pair)	5P-4704
C	Wire, 16 GA GN/YEL	6V-8241
D	Wire, 18 GA BK	5P-3075
E	Wire, 18 GA WH	6V-2648

The list below describes the ECM J1 to EMCP Harness Connectors

<u>Connector</u>	<u>Description</u>
CDC-P7	Plug, Cat Diagnostic Computer Connector
ENG-P1	Plug, ECM Connector J1
ENG-P8	Plug, Turbo Inlet Pressure Sensor
ENG-P14	Plug, Magnetic Speed Pickup (MPU) Connector
ENG-P16	Plug, Low Coolant Sensor Connector
ENG-P37	Plug, EMCP Connector

Table 3. ECM to EMCP Harness Wire List.

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
BATT	(-)	7	C	16	54			Splice 3	2	
CATSW 1	1	7	D	18	0			ENG-P1	6	
CATSW 2	1	7	D	18	0			ENG-P1	60	
ENG-P1	1	1	D	18	0			CDC-P7	J	
ENG-P1	2	1	A	16	T			ENG-P8	B	
ENG-P1	3	1	A	16	T			ENG-P8	A	
ENG-P1	5	1	E	18	9			ENG-P37	11	
ENG-P1	6	1	D	18	0			CATSW 1	1	
ENG-P1	8	1	D	18	0			CDC-P7	D	
ENG-P1	9	1	E	18	9			CDC-P7	E	
ENG-P1	14	1	E	18	9			CDC-P7	H	
ENG-P1	17	1	A	16	T			ENG-P8	C	
ENG-P1	23	1	A	16	T			ENG-P37	27	
ENG-P1	34	1	E	18	9			CDC-P7	G	
ENG-P1	40	1	A	16	T			ENG-P37	26	
ENG-P1	42	1	D	18	0			CDC-P7	C	Shield
ENG-P1	48	4	B	14	T			Splice 4	1	
ENG-P1	50	1	D	18	0			CDC-P7	F	
ENG-P1	52	4	B	14	T			Splice 4	1	
ENG-P1	53	4	B	14	T			Splice 4	1	
ENG-P1	58	1	A	16	T			ENG-P37	35	
ENG-P1	60	1	D	18	0			CATSW 2	1	
ENG-P1	61	1	C	16	54			Splice 3	1	
ENG-P1	63	1	C	16	54			Splice 3	1	
ENG-P1	65	1	C	16	54			Splice 3	1	
ENG-P1	66	1	D	18	0			ENG-P37	23	
ENG-P1	70	1	A	16	T			ENG-P37	40	
ENG-P1	-	-	D	18	0			ENG-P37	12	Shield
CDC-P7	A	3	B	14	T			Splice 4	2	

Table 3. ECM to EMCP Harness Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
CDC-P7	B	3	C	16	54			Splice 3	2	
CDC-P7	C	6	D	18	0			ENG-P1	42	Shield
CDC-P7	D	3	D	18	0			ENG-P1	8	
CDC-P7	D	3	D	18	0			ENG-P37	19	
CDC-P7	E	3	E	18	9			ENG-P1	9	
CDC-P7	E	3	E	18	9			ENG-P37	20	
CDC-P7	F	6	D	18	0			ENG-P1	50	
CDC-P7	G	6	E	18	9			ENG-P1	34	
CDC-P7	H	6	E	18	9			ENG-P1	14	
CDC-P7	J	6	D	18	0			ENG-P1	1	
CDC-P7	-	-	D	18	0			ENG-P37	18	Shield
ENG-P8	A	6	A	16	T			ENG-P1	3	
ENG-P8	B	6	A	16	T			ENG-P1	2	
ENG-P8	C	6	A	16	T			ENG-P1	17	
ENG-P14	1	5	D	18	0			ENG-P37	1	
ENG-P14	2	5	E	18	9			ENG-P37	2	
ENG-P14	-	-	D	18	0			ENGP37	3	Shield
ENG-P16	A	5	A	16	T			ENG-P37	9	
ENG-P16	B	5	A	16	T			ENG-P37	31	
ENG-P16	C	5	A	16	T			ENG-P37	13	
ENG-P37	1	5	D	18	0			ENG-P14	1	
ENG-P37	2	5	E	18	9			ENG-P14	2	
ENG-P37	3	5	D	18	0			ENG-P14		Shield
ENG-P37	9	1	A	16	T			ENG-P16	A	
ENG-P37	11	5	E	18	9			ENG-P1	5	
ENG-P37	12	5	D	18	0			ENG-P1		Shield
ENG-P37	13	1	A	16	T			ENG-P16	C	

Table 3. ECM to EMCP Harness Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
ENG-P37	18	5	D	18	0			CDC-P7		Shield
ENG-P37	19	5	D	18	0			CDC-P7	D	
ENG-P37	20	5	E	18	9			CDC-P7	E	
ENG-P37	23	5	D	18	0			ENG-P1	66	
ENG-P37	26	2	A	16	T			ENG-P1	40	
ENG-P37	27	2	A	16	T			ENG-P1	23	
ENG-P37	31	1	A	16	T			ENG-P16	B	
ENG-P37	35	1	A	16	T			ENG-P1	58	
ENG-P37	40	1	A	16	T			ENG-P1	70	
Splice 3	1	-	C	16	54			ENG-P1	61	
Splice 3	1	-	C	16	54			ENG-P1	63	
Splice 3	1	-	C	16	54			ENG-P1	65	
Splice 3	2	-	C	16	54			BATT	(-)	
Splice 3	2	-	C	16	54			CDC-P7	B	
Splice 4	1		B	14	T			ENG-P1	48	
Splice 4	1		B	14	T			ENG-P1	52	
Splice 4	1		B	14	T			ENG-P1	53	
Splice 4	2	-	B	14	T			CDC-P7	A	
Splice 4	2		B	14	T			SRY	87	
SRY	87	7	B	14	T			Splice 4	2	

Table 4. Engine Harness Wire List.

NOTES

Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 4:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	180-9340	Socket
2	180-9339	Pin
3	111-1567	Socket
4	123-1198	Socket

The list below describes Wire Type column in Table 4:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire, 18 GA BU	5P-9082
B	Wire, 18 GA GY	130-4672
C	Wire, 18 GA PU	130-4671
D	Wire, 18 GA BR	130-4675
E	Wire, 18 GA GN	130-4676
F	Wire, 18 GA BU	130-4670
G	Wire, 18 GA RD	5P-9073
H	Wire, 18 GA YL	5P-9074
I	Wire, 18 GA PK	5P-9076
J	Wire, 18 GA BK	5P-3075
K	Wire, 18 GA WH	6V-2648
L	Wire, 18 GA GN	5P-9080
M	Wire, 18 GA BR	5P-9072
N	Wire, 18 GA RD	5P-9073
O	Wire, 18 GA OR	5P-9075
P	Wire, 18 GA PU	5P-9077
Q	Wire, 18 GA WH	130-4669
R	Wire, 18 GA OR	130-4674
S	Wire, 18 GA YL	130-4673
T	Wire, 18 GA GY	5P-3074

The list below describes ECM J2 Engine Harness Connectors

<u>Connector</u>	<u>Description</u>
ENG-P2	Plug, ECM Connector J2
ENG-P3	Plug, IAP Control Valve
ENG-P4	Plug, Top Crankshaft Timing Sensor
ENG-P5	Plug, Bottom Crankshaft Timing Sensor
ENG-P6	Plug, Coolant Temperature Sensor
ENG-P7	Plug, Intake Manifold Air Temperature Sensor
ENG-P10	Plug, TDC Probe Connector (Timing Calibration)
ENG-P11	Plug, Atmospheric Pressure Sensor
ENG-P12	Plug, Turbo Outlet Pressure Sensor
ENG-P13	Plug, Injector Actuation Pressure Sensor
ENG-P15	Plug, Oil Pressure Sensor
ENG-P17	Plug, Fuel Pressure Connector
ENG-P18	Plug, Oil Temperature Sensor
ENG-P101	Plug, Air Inlet Heater Relay Connector
ENG-P300	Plug, Fuel Injector Harness Connector

Table 4. Engine Harness Wire List.

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
ENG-P2	2	1	K	18	9			Splice 6	1	G828-NG1
ENG-P2	3	1	L	18	6			Splice 5	1	G829-NG2
ENG-P2	9	1	G	18	2			ENG-P101	1	C987-NG46
ENG-P2	12	1	A	18	6			ENG-P101	2	G850-NG3
ENG-P2	14	1	T	18	8			ENG-P11	C	R747-NG4
ENG-P2	16	1	I	18	PK			ENG-P17	C	C991-NG51
ENG-P2	18	1	I	18	PK			Splice 2	1	G833-NG5
ENG-P2	22	1	K	18	9			ENG-P10	1	G856-NG6
ENG-P2	23	1	H	18	4			ENG-P10	2	G857-NG7
ENG-P2	24	1	H	18	4			ENG-P15	C	C990-NG8
ENG-P2	27	1	M	18	1			ENG-P13	C	G849-NG9
ENG-P2	32	1	A	18	6			ENG-P6	1	995-NG10
ENG-P2	34	1	L	18	5			ENG-P18	1	F411-NG45
ENG-P2	35	1	O	18	3			CDC-P7	1	G853-NG12
ENG-P2	36	1	B	18	8			ENG-P300	1	A701-NG13
ENG-P2	37	1	C	18	7			ENG-P300	2	A702-NG14
ENG-P2	38	1	D	18	1			ENG-P300	3	A703-NG15
ENG-P2	39	1	E	18	5			ENG-P300	4	A704-NG16
ENG-P2	40	1	I	18	PK			ENG-P12	C	R746-NG17
ENG-P2	41	1	M	18	1			Splice 8	1	G826-NG56
ENG-P2	42	1	A	18	6			Splice 9	1	G827-NG57
ENG-P2	44	1	Q	18	9			Splice 4	1	L983-NG19
ENG-P2	45	1	R	18	3			Splice 7	1	L984-NG20
ENG-P2	46	1	S	18	4			Splice 3	1	L985-NG47
ENG-P2	48	1	K	18	9	TW1		ENG-P4	B	E964-NG21
ENG-P2	49	1	J	18	0	TW1		ENG-P4	A	E963-NG22
ENG-P2	54	1	F	18	6			ENG-P300	5	A705-NG23
ENG-P2	55	1	B	18	8			ENG-P300	6	A706-NG24
ENG-P2	58	1	H	18	4	TW2		ENG-P5	B	E966-NG25
ENG-P2	59	1	A	18	6	TW2		ENG-P5	A	E965-NG26
ENG-P2	61	1	I	18	PK			ENG-P3	1	G854-NG27
ENG-P2	62	1	P	18	7			ENG-P3	2	G855-NG28
ENG-P101	1	1	G	18	2			ENG-P2	9	C987-NG46
ENG-P101	2	1	A	18	6			ENG-P2	12	G850-NG3
ENG-P3	1	4	I	18	PK			ENG-P2	61	G854-NG27
ENG-P3	2	4	P	18	7			ENG-P2	62	G855-NG28
ENG-P4	A	3	J	18	0	TW1		ENG-P2	49	E963-NG22
ENG-P4	B	3	K	18	9	TW1		ENG-P2	48	E964-NG21

Table 4. Engine Harness Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
ENG-P5	A	3	A	18	6	TW2		ENG-P2	59	E965-NG26
ENG-P5	B	3	H	18	4	TW2		ENG-P2	58	E966-NG25
ENG-P6	1	1	A	18	6			ENG-P2	32	995-NG10
ENG-P6	2	1	I	18	PK			Splice 2	2	G833-NG42
ENG-P7	1	1	O	18	3			ENG-P2	35	G853-NG12
ENG-P7	2	1	I	18	PK			Splice 2	1	G833-NG43
ENG-P300	1	2	B	18	8			ENG-P2	36	A701-NG13
ENG-P300	2	2	C	18	7			ENG-P2	37	A702-NG14
ENG-P300	3	2	D	18	1			ENG-P2	38	A703-NG15
ENG-P300	4	2	E	18	5			ENG-P2	39	A704-NG16
ENG-P300	5	2	F	18	6			ENG-P2	54	A705-NG23
ENG-P300	6	2	B	18	8			ENG-P2	55	A706-NG24
ENG-P300	7	2	S	18	4			Splice 3	2	L985-NG40
ENG-P300	8	2	S	18	4			Splice 3	2	L985-NG39
ENG-P300	9	2	R	18	3			Splice 7	2	L984-NG38
ENG-P300	10	2	R	18	3			Splice 7	2	L984-NG37
ENG-P300	11	2	Q	18	9			Splice 4	2	L983-NG36
ENG-P300	12	2	Q	18	9			Splice 4	2	L983-NG35
ENG-P10	1	1	K	18	9			ENG-C1	22	G856-NG6
ENG-P10	2	1	H	18	4			ENG-C1	23	G857-NG7
ENG-P11	A	2	K	18	9			Splice 6	2	G828-NG30
ENG-P11	B	2	L	18	6			Splice 5	2	G829-NG34
ENG-P11	C	2	T	18	8			ENG-P2	14	R747-NG4
ENG-P12	A	1	K	18	9			Splice 6	2	G828-NG29
ENG-P12	B	1	L	18	6			Splice 5	2	G829-NG33
ENG-P12	C	1	I	18	PK			ENG-P2	40	R746-NG17
ENG-P13	A	2	K	18	9			Splice 6	2	G828-NG31
ENG-P13	B	2	L	18	6			Splice 5	2	G829-NG32
ENG-P13	C	2	M	18	1			ENG-P2	27	G849-NG9
ENG-P15	A	2	M	18	1			Splice 8	1	G826-NG18
ENG-P15	B	2	A	18	6			Splice 9	2	G827-NG48
ENG-P15	C	2	H	18	4			ENG-P2	24	C990-NG8
ENG-P17	A	2	M	18	1			Splice 8	2	G826-NG53
ENG-P17	B	2	A	18	6			Splice 9	2	G827-NG54
ENG-P17	C	2	I	18	PK			ENG-P2	16	C991-NG51
ENG-P18	1	2	L	18	5			ENG-P2	34	F411-NG45
ENG-P18	2	2	I	18	PK			Splice 2	1	G833-NG44
Splice 2	1		I	18	PK			ENG-P18	2	G833-NG44

Table 4. Engine Harness Wire List. - Continued

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
Splice 2	1		I	18	PK			CDC-P7	2	G833-NG43
Splice 2	1		I	18	PK			ENG-P2	18	G833-NG5
Splice 2	2		I	18	PK			ENG-P6	2	G833-NG42
Splice 3	1		S	18	4			ENG-P2	46	L985-NG47
Splice 3	2		S	18	4			ENG-P300	7	L985-NG40
Splice 3	2		S	18	4			ENG-P300	8	L985-NG39
Splice 4	1		Q	18	9			ENG-P2	44	L983-NG19
Splice 4	2		Q	18	9			ENG-P300	11	L983-NG36
Splice 4	2		Q	18	9			ENG-P300	12	L983-NG35
Splice 5	1		L	18	6			ENG-P2	3	G829-NG2
Splice 5	2		L	18	6			ENG-P13	B	G829-NG32
Splice 5	2		L	18	6			ENG-P11	B	G829-NG34
Splice 5	2		L	18	6			ENG-P12	B	G829-NG33
Splice 6	1		K	18	9			ENG-P2	2	G828-NG1
Splice 6	2		K	18	9			ENG-P11	A	G828-NG30
Splice 6	2		K	18	9			ENG-P12	A	G828-NG29
Splice 6	2		K	18	9			ENG-P13	A	G828-NG31
Splice 7	1		R	18	3			ENG-P2	45	L984-NG20
Splice 7	2		R	18	3			ENG-P300	9	L984-NG38
Splice 7	2		R	18	3			ENG-P300	10	L984-NG37
Splice 8	1		M	18	1			ENG-P15	A	G826-NG18
Splice 8	1		M	18	1			ENG-P2	41	G826-NG56
Splice 8	2		M	18	1			ENG-P17	A	G826-NG53
Splice 9	1		A	18	6			ENG-P2	42	G827-NG57
Splice 9	2		A	18	6			ENG-P15	B	G827-NG48
Splice 9	2		A	18	6			ENG-P17	B	G827-NG54

Table 5. Engine Harness to Unit Injectors Wire List.**NOTES**Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 5:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	126-1766	Socket
2	154-2389	Socket

The list below describes Wire Type column in Table 5:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire 16 Ga GY	3E-9420
B	Wire 16 Ga PU	3E-9475
C	Wire 16 Ga BR	3E-9472
D	Wire 16 Ga GN	3E-9469
E	Wire 16 Ga BU	3E-9471
F	Wire 16 Ga WH	3E-9474
G	Wire 16 Ga YL	3E-9467
H	Wire 16 Ga OR	3E-9468

The list below describes the Engine Harness to Unit Injectors Harness Connectors

<u>Connector</u>	<u>Description</u>
ENG-J300	Jack, Unit Injector Harness Connector
ENG-P301	Plug, Unit Injector No. 1 Connector
ENG-P302	Plug, Unit Injector No. 2 Connector
ENG-P303	Plug, Unit Injector No. 3 Connector
ENG-P304	Plug, Unit Injector No. 4 Connector
ENG-P305	Plug, Unit Injector No. 5 Connector
ENG-P306	Plug, Unit Injector No. 6 Connector

Table 5. Engine Harness to Unit Injectors Wire List.

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
ENG-J300	1	1	A	16	8			ENG-P301	A	
ENG-J300	2	1	B	16	7			ENG-P302	A	
ENG-J300	3	1	C	16	1			ENG-P303	A	
ENG-J300	4	1	D	16	5			ENG-P304	A	
ENG-J300	5	1	E	16	6			ENG-P305	A	
ENG-J300	6	1	A	16	8			ENG-P306	A	
ENG-J300	7	1	F	16	9			ENG-P301	B	
ENG-J300	8	1	F	16	9			ENG-P302	B	
ENG-J300	9	1	H	16	3			ENG-P303	B	
ENG-J300	10	1	H	16	3			ENG-P304	B	
ENG-J300	11	1	G	16	4			ENG-P305	B	
ENG-J300	12	1	G	16	4			ENG-P306	B	
ENG-P301	A	2	A	16	8			ENG-J300	1	
ENG-P301	B	2	F	16	9			ENG-J300	7	
ENG-P302	A	2	B	16	7			ENG-J300	2	
ENG-P302	B	2	F	16	9			ENG-J300	8	
ENG-P303	A	2	C	16	1			ENG-J300	3	
ENG-P303	B	2	H	16	3			ENG-J300	9	
ENG-P304	A	2	D	16	5			ENG-J300	4	
ENG-P304	B	2	H	16	3			ENG-J300	10	
ENG-P305	A	2	E	16	6			ENG-J300	5	
ENG-P305	B	2	G	16	4			ENG-J300	11	
ENG-P306	A	2	A	16	8			ENG-J300	6	
ENG-P306	B	2	G	16	4			ENG-J300	12	

Table 6. Winterization Control Panel Wire List.**NOTES**Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 6:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	-	Solder to terminal
2	MS25036-102	Terminal Lug, Ring Terminal 22-18 AWG .138 Stud
3	MS25036-153	Terminal Lug Ring Terminal 16-14 AWG .164 Stud
4	MS25036-149	Terminal Lug Ring Terminal 22-18 AWG .164 Stud

The list below describes Wire Type in Table 6:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire, Electric, Extruded ETFE 14 Ga	M22759/16-14-9
B	Wire, Electric, Extruded ETFE 18 Ga	M22759/16-18-9

Table 6. Winterization Control Panel Wire List.

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
CB1	1	3	A	14	9			J26	E	
CB1	2	3	A	14	9			J27	E	
CB1	2	4	B	18	9			S1	4	
CR1	1	2	B	18	9			K20	9	
CR1	3	2	B	18	9			J26	B	
DS1	1	1	B	18	9			K20	13	
DS1	1	1	B	18	9			J26	A	
DS1	2	1	B	18	9			K20	9	
DS1	3	1	B	18	9			S1	1	
DS2	(+)	1	B	18	9			S1	3	
DS2	(-)	1	B	18	9			J27	D	
J26	A	1	B	18	9			DS1	1	
J26	A	1	A	14	9			J27	A	
J26	B	1	B	18	9			CR1	3	
J26	E	1	A	14	9			CB1	1	
J27	A	1	A	14	9			J26	A	
J27	B	1	B	18	9			K20	14	
J27	C	1	B	18	9			S1	3	
J27	D	1	B	18	9			DS2	(-)	
J27	E	1	A	14	9			CB1	2	
K20	9	1	B	18	9			CR1	1	
K20	9	1	B	18	9			DS1	2	
K20	5	1	B	18	9			S1	6	
K20	13	1	B	18	9			DS1	1	
K20	14	1	B	18	9			J27	B	
S1	1	2	B	18	9			DS1	3	
S1	1	2	B	18	9			S1	4	
S1	3	2	B	18	9			J27	C	
S1	3	2	B	18	9			DS2	(+)	
S1	4	2	B	18	9			S1	1	
S1	4	2	B	18	9			CB1	2	
S1	6	2	B	18	9			K20	5	

Table 7. Winterization Kit Heater Cable Wire List.**NOTES**Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 7:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	-	Solder to terminal
2	0116-1811-006	Connector Kit (comes with pins)
3	88-20274-1	Terminal, Spade 22-18 AWG #6

The list below describes Wire Type in Table 7:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire, Electric, Extruded ETFE 14 Ga	M22759/16-14-9
B	Wire, Electric, Extruded ETFE 18 Ga	M22759/16-18-9

Table 7. Winterization Kit Heater Cable Wire List.

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
P27	A	1	A	14	9			P28	C3	2WA14
P27	B	1	B	18	9			P27	C	82WB18
P27	C	1	B	18	9			P27	B	82WB18
P27	C	1	B	18	9			P28	A1	82WA18
P27	D	1	B	18	9			P28	B3	83WA18
P27	E	1	A	14	9			P28	C2	27WB14
P28	A1	2	B	18	9			P27	C	82WA18
P28	B3	2	B	18	9			P27	D	83WA18
P28	C2	2	A	14	9			P27	E	27WB14
P28	C3	2	A	14	9			P27	A	2WA14
P28	C4	2	B	18	9			P29	2	84WB18
P29	1	2	B	18	9			TB5	17B	2WC18
P29	2	2	B	18	9			P28	C4	84WB18
TB5	17B	3	B	18	9			P29	1	2WC18

Table 8. Winterization Kit Power Cable Wire List.

NOTES

Color Code

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Abbreviations used in table can be found in FO-1 at the back of this manual or in List of Abbreviations/Acronyms (WP 0001).

The list below describes End Prep in Table 8:

<u>Code</u>	<u>Part Number</u>	<u>Nomenclature</u>
1	88-20274-5	Terminal, Spade 16-14 AWG #6
2	88-20274-1	Terminal, Spade 22-18 AWG #6
3	-	Solder to terminal

The list below describes Wire Type in Table 8:

<u>Wire Code</u>	<u>Nomenclature</u>	<u>Part Number</u>
A	Wire, Electric, Extruded ETFE 14 Ga	M22759/16-14-9
B	Wire, Electric, Extruded ETFE 18 Ga	M22759/16-18-9

FROM REF DES	PIN	END PREP	WIRE TYPE	GAGE	COLOR	TWISTED WITH	SHIELD	TO REF DES	PIN	NOTES
TB5	15A	2	B	18	9			P26	B	
TB5	16A	1	A	14	9			P26	E	
TB5	17A	1	A	14	9			P26	A	
P26	A	3	A	14	9			TB5	17A	
P26	B	3	B	18	9			TB5	15A	
P26	E	3	A	14	9			TB5	16A	

END OF WORK PACKAGE

CHAPTER 4

SUSTAINMENT TROUBLESHOOTING PROCEDURES

FOR

TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz
MEP-807A/PU-807A

CHAPTER 4
SUSTAINMENT TROUBLESHOOTING PROCEDURES

WORK PACKAGE INDEX

<u>Title</u>	<u>WP Sequence No.</u>
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Troubleshooting Procedures	0098

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****TROUBLESHOOTING INDEX**

No information available.

Malfunction/Symptom**Troubleshooting
Procedure****SP FAULT CODE**

No information available.

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE
TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Not Applicable

No information available.

END OF WORK PACKAGE

CHAPTER 5

SUSTAINMENT MAINTENANCE INSTRUCTIONS

FOR

TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz
MEP-807A/PU-807A

CHAPTER 5
SUSTAINMENT MAINTENANCE INSTRUCTIONS

WORK PACKAGE INDEX

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PMCS, Including Lubrication Instructions.....	0101
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Valve Cover, Gasket, and Manifold.....	0107
Fuel Transfer Pump/Injection Actuation Pump, and Injection Control Valve.....	0108
Air Inlet Elbow, Heater, and Manifold Cover.....	0109
Crankshaft Pulley and Damper.....	0110
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Turbocharger	0112
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Winterization Heater Control Box Assembly.....	0115
Winterization Heater Assembly	0116
Winterization Heater Hoses.....	0117
Winterization Thermostat, Resistors, and Diode	0118
Winterization Wiring Harnesses	0119

SUSTAINMENT MAINTENANCE

TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A

SERVICE UPON RECEIPT

INITIAL SETUP:

Not Applicable

There are no procedures for service upon receipt at Sustainment level.

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****PMCS INTRODUCTION****GENERAL**

PMCS are performed to keep the TQG in operating condition. Inspect the TQG within specified intervals so defects are found and corrected or problems are reported before any serious damage or failure occurs. Do the PMCS per WP 0101, Table 1. Pay attention to WARNINGS and CAUTIONS. A WARNING means someone might be killed or injured. A CAUTION means equipment could be damaged.

CAUTION

Designated intervals are performed under usual operating conditions. PMCS intervals must be performed more frequently when operating under unusual conditions to prevent premature engine failure.

1. Always perform preventive maintenance in the same order so it gets to be a habit. Once you have had some practice, you will spot anything wrong in a hurry.
2. Tools included with the TQG are to be used when doing the PMCS. Wiping rags are needed to remove dirt or grease.
3. If you find something wrong when performing the PMCS, fix it if you can, using troubleshooting procedures (see WP 0097 and WP 0098) and/or maintenance procedures (see Chapter 5).
4. Item numbers in column 1 of WP 0101, PMCS Table 1 indicate the PMCS sequence. Use these item numbers for the TM number column on DA Form 5988-E.
5. Information in column 5 of WP 0101, Table 1 lists conditions that make the TQG not ready/available. Write up items not repaired on DA Form 5988-E for Sustainment level maintenance. For further information on how to use these forms, see DA PAM 750-8.
6. Ensure all Field PMCS has been performed (WP 0013 through WP 0015).

FLUID LEAKAGE

Wetness around seals, gaskets, fittings, or connections indicates leakage. A stain also denotes leakage. If a fitting or connector is loose, tighten it. If a fitting or connector is broken or defective, repair it.

LEAK DEFINITION FOR PMCS**CAUTION**

Operation is allowable with class I and II leakage. However, any wetness or leakage of fuel is classified as a class III leak and the TQG must be shut down immediately and the problem corrected. All other class III leaks must be repaired immediately or reported to your supervisor. When operating with class I or class II leaks, check fluid levels more frequently. Failure to do this will result in damage to the 100 kW TQG.

1. Class I - Leakage indicated by wetness or discoloration, but not great enough to form drops.
2. Class II - Leakage great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.
3. Class III - Leakage great enough to form drops that fall from the item being checked/inspected.

INSPECTION

Look for signs of a problem or trouble. You can feel, smell, hear, or see many problems. Be alert when in or around the TQG.

Inspect the TQG to see if items are in good condition. Are they correctly assembled, stowed, and secured; excessively worn, leaking, or corroded; or properly lubricated? Correct any problems found or notify Sustainment level maintenance.

There are some common items to check all over the TQG. These include the following:

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

WARNING

Cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin and eye protection are required when working in contact with cleaning solvent. Avoid repeated or prolonged contact. Work in ventilated area only. Failure to comply can cause injury or death to personnel.

1. Dirt, grease, oil, and debris: They only get in the way and may cover up a serious problem. Keep the equipment clean. Clean as you work and as needed. Use Breakthrough cleaning solvent to clean metal surfaces. Use soap and water to clean rubber or plastic material.
2. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, bare metal, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose.
3. Welds: Many items on the TQG are welded. To check these welds, look for chipped paint, rust, corrosion, or gaps. When these conditions exist, notify Sustainment level maintenance on DA Form 5988-E.
4. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors.
5. Hoses and fluid lines: Check hoses and fluid lines for wear, damage, and leaks. Ensure clamps and fittings are tight.
6. Hinges: Check hinges for security and operation.
7. Data plates: Check data, caution, and warning plates for security and legibility.

PMCS COLUMN DESCRIPTIONS

ITEM NO. - Lists order in which PMCS should be performed; also used as a source of item numbers for the TM number column on DA Form 5988-E when recording results of PMCS.

INTERVAL - Indicates when each check is to be performed.

ITEM TO BE CHECKED OR SERVICED - Lists item to be checked or serviced.

PROCEDURE - Provides brief description of procedure as well as any information required to accomplish each check or service.

EQUIPMENT NOT READY/AVAILABLE IF - Lists condition in which TQG should not be operated or accepted.

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE

**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
PMCS, INCLUDING LUBRICATION INSTRUCTIONS**

INITIAL SETUP:

Not Applicable

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

Table 1. Sustainment Preventive Maintenance Checks and Services.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/AVAILABLE IF:
No information available.				

LUBRICATION INSTRUCTIONS

No information available.

MANDATORY REPLACEMENT PARTS LIST

There are no replacement parts required for these PMCS procedures.

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
GENERATOR MAINTENANCE: DISASSEMBLY, CLEANING, ASSEMBLY**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Grease (WP 0123, Table 1, Item 25)
Technical alcohol (WP 0123, Table 1, Item 6)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

Two

References

TM 9-6115-729-24P

Equipment Condition

If necessary for disassembly/repair, generator removed from generator set (WP 0103)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

When running, generator set engine has hot metal surfaces that will burn flesh on contact. Shut down generator set, and allow engine to cool before performing checks, services, and maintenance. Wear gloves and additional protective clothing as required. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

DISASSEMBLY

1. Remove twelve screws (Figure 1, Item 1) and cover (Figure 1, Item 2) from body assembly (Figure 1, Item 3).

CAUTION

Bearing bracket supports the main rotor, which will drop and sustain damage when bearing bracket is removed. To avoid damage to rotor, bar rotor so that two main rotor poles are vertical in stator. This will limit amount of rotor drop.

2. Bar rotor (Figure 1, Item 4) so that two main rotor poles are vertical in body assembly (Figure 1, Item 3).

NOTE

Tag and disconnect wiring before removal of components as required.

3. Remove eight screws (Figure 1, Item 5), lock washers (Figure 1, Item 6), nuts (Figure 1, Item 7), and bearing bracket (Figure 1, Item 8) with exciter stator (Figure 1, Item 9) attached.

CAUTION

If bearing needs to be removed, it is easily damaged, and should be replaced.

4. Use bearing puller to remove bearing (Figure 1, Item 10) from shaft of rotor (Figure 1, Item 4) and discard bearing.
5. Remove rotating rectifier (Figure 1, Item 11) from rotor (Figure 1, Item 4).

CAUTION

Magnets in exciter stator are very strong and will attract loose screws, washers, etc, which may cause damage to stator. Keep loose hardware away from stator. Strong magnets in stator will also impede removal of stator.

6. Note orientation of Belleville washers (Figure 1, Item 12) and remove four screws (Figure 1, Item 13), Belleville washers (Figure 1, Item 12), and exciter stator (Figure 1, Item 9) from bearing bracket (Figure 1, Item 8).
7. Remove two nuts (Figure 1, Item 14), screws (Figure 1, Item 15), and exhaust screen (Figure 1, Item 16).
8. Remove 16 screws (Figure 1, Item 17), lock washers (Figure 1, Item 18), washers (Figure 1, Item 19), and flywheel housing adapter (Figure 1, Item 20).

CAUTION

Rotor and attached parts must be removed carefully to avoid damaging rotor or stator windings. Do not apply any force to fan when removing rotor to avoid damage to fan.

9. Use suitable rotor lifting device to carefully remove rotor (Figure 1, Item 4) and attached parts from body assembly (Figure 1, Item 3).

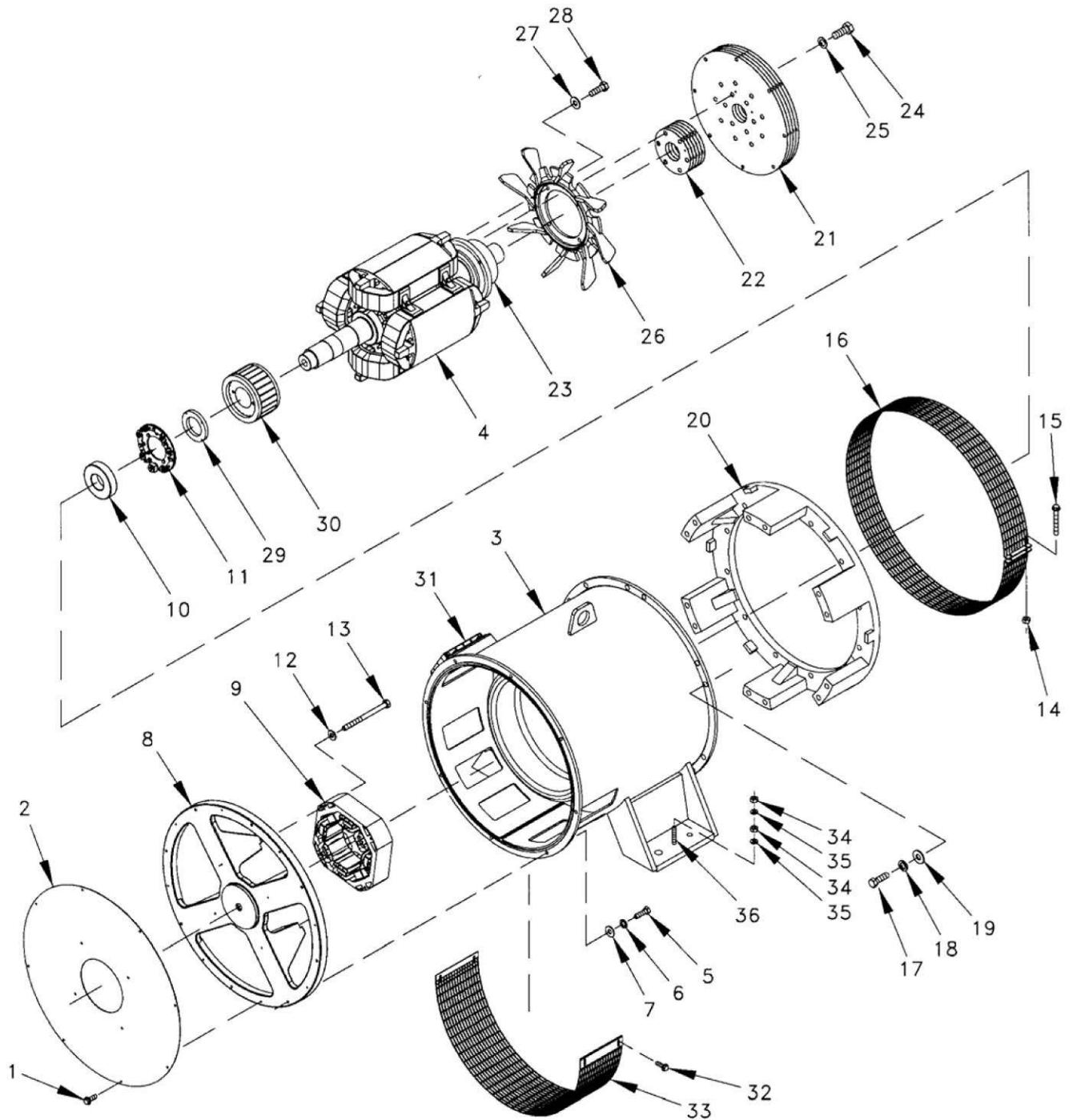


Figure 1. Generator Repair.

10. Mark drive discs (Figure 1, Item 21), spacer discs (Figure 1, Item 22), and drive hub (Figure 1, Item 23) for proper alignment during assembly.
11. Remove six screws (Figure 1, Item 24), washers (Figure 1, Item 25), five drive discs (Figure 1, Item 21) and six spacer discs (Figure 1, Item 22) from drive hub (Figure 1, Item 23).
12. Mark fan (Figure 1, Item 26) and drive hub (Figure 1, Item 23) for proper alignment and balancing of fan during assembly.

13. Note orientation of Belleville washers (Figure 1, Item 27) as they are removed, and remove four screws (Figure 1, Item 28), Belleville washers (Figure 1, Item 27), and fan (Figure 1, Item 26) from drive hub (Figure 1, Item 23).

WARNING

Wear heat resistant gloves and avoid contacting hot metal surfaces with your hands after components have been heated. Wear additional protective clothing as required. Failure to comply can cause injury to personnel.

14. Install suitable puller to drive hub (Figure 1, Item 23) Use torch to rapidly heat only outside diameter of drive hub (Figure 1, Item 23) (to avoid expanding rotor shaft while tightening puller). Remove drive hub (Figure 1, Item 23) from rotor (Figure 1, Item 4).
15. Remove rectifier mounting hub (Figure 1, Item 29) and exciter rotor (Figure 1, Item 30) from rotor (Figure 1, Item 4).
16. If necessary, remove lead block assembly (Figure 1, Item 31).
17. Remove four screws (Figure 1, Item 32) and intake air screen (Figure 1, Item 33).
18. If necessary, remove nameplate and three decals.
19. Remove two nuts (Figure 1, Item 34), two lock washers (Figure 1, Item 35), and grounding stud (Figure 1, Item 36).

END OF TASK

CLEANING

CAUTION

Winding varnishes are epoxy or polyester based. Do not use any cleaning materials which will attack these materials. Be careful not to damage magnet wire or winding insulation. Do not use a wire brush.

1. Most components of the generator can be cleaned with alcohol or breakthrough cleaning solvent and a soft brush or cloth.

WARNING

Cleaning with compressed air can cause flying particles. When using compressed air, wear protective glasses and use clean, low pressure air, less than 30 PSI (208 kPa). Failure to comply can cause eye injury to personnel.

2. Compressed air may be used to clean dirt from areas where a cloth will not reach. Use low pressure compressed air, 30 PSI maximum.
3. Dry dust and dirt may be removed by vacuum cleaning.
4. When completely disassembled, most generator components (except electronic parts) may be steam cleaned.
5. Make sure all components are completely dry before assembly.

END OF TASK

ASSEMBLY

1. Install grounding stud (Figure 1, Item 36), two lock washers (Figure 1, Item 35), and two nuts (Figure 1, Item 34).
2. If removed, install three decals and nameplate.
3. Install intake air screen (Figure 1, Item 33) and four screws (Figure 1, Item 32).
4. If removed, install lead block assembly (Figure 1, Item 31).

5. Install exciter rotor (Figure 1, Item 30) and rectifier mounting hub (Figure 1, Item 29) on rotor (Figure 1, Item 4).

WARNING

Wear heat resistant gloves and avoid contacting hot metal surfaces with your hands after components have been heated. Wear additional protective clothing as required. Failure to comply can cause injury to personnel.

6. Heat new drive hub (Figure 1, Item 23) in oven to 500-600 degrees F (260-316 degrees C). Using suitable heat resistant gloves, slide drive hub (Figure 1, Item 23) on shaft until it seats against shaft shoulder. Allow drive hub (Figure 1, Item 23) to cool for one hour.

CAUTION

Fan and drive hub must be installed and aligned properly to avoid an unbalanced condition and considerable vibration.

7. Align marks on fan (Figure 1, Item 26) with marks on drive hub (Figure 1, Item 23). Note orientation of Belleville washers (Figure 1, Item 27). Install fan (Figure 1, Item 26), four Belleville washers (Figure 1, Item 27), and screws (Figure 1, Item 28). Torque screws (Figure 1, Item 28) in an alternating pattern to 60 lb•ft (81 N•m).
8. Align marks made on drive discs (Figure 1, Item 21) and spacer discs (Figure 1, Item 22) with marks on drive hub (Figure 1, Item 23). Install five spacer discs (Figure 1, Item 22), five drive discs (Figure 1, Item 21), six washers (Figure 1, Item 25) and screws (Figure 1, Item 24). Torque screws (Figure 1, Item 24) in an alternating pattern to 192 lb•ft (260 N•m).

CAUTION

Rotor and attached parts must be installed carefully to avoid damaging rotor or stator windings.

9. Use suitable lifting device and carefully install rotor (Figure 1, Item 4) and attached parts into body assembly (Figure 1, Item 3).
10. Install flywheel housing adapter (Figure 1, Item 20), 16 washers (Figure 1, Item 19), lock washers (Figure 1, Item 18), and screws (Figure 1, Item 17). Torque screws (Figure 1, Item 17) in an alternating pattern to 25 lb•ft (34 N•m).
11. Install exhaust screen (Figure 1, Item 16), two screws (Figure 1, Item 15), and nuts (Figure 1, Item 14).
12. Note orientation of Belleville washers (Figure 1, Item 12). Install exciter stator (Figure 1, Item 9) in bearing bracket (Figure 1, Item 8) and install four Belleville washers (Figure 1, Item 12) and screws (Figure 1, Item 13). Torque screws (Figure 1, Item 13) to 60 lb•ft (81 N•m).
13. Install rotating rectifier assembly (Figure 1, Item 11) on rotor (Figure 1, Item 4).

WARNING

Wear heat resistant gloves and avoid contacting hot metal surfaces with your hands after components have been heated. Wear additional protective clothing as required. Failure to comply can cause injury to personnel.

CAUTION

Do not strike bearing directly with hammer. Do not apply pressure to outer race. Use only light taps from a soft mallet, or bearing will be damaged.

14. Heat new bearing (Figure 1, Item 10) in an oven to a maximum of 212 degrees F (100 degrees C). Apply a thin coat of clean oil to the press fit area of the shaft on rotor (Figure 1, Item 4). Using heat resistant gloves, install bearing (Figure 1, Item 10) over end of shaft until it seats against shaft shoulder. Bearing should slide on shaft and be seated without excessive force. If bearing binds on shaft before fully seated, use a piece of tubing slightly larger than the press fit area and a soft mallet to drive bearing into place. Use light taps and apply pressure only to inner race of bearing. After installation, allow bearing to cool for one hour before continuing assembly of generator.
15. After bearing (Figure 1, Item 10) has cooled, fill bearing grease cavity one third to one half full of grease.

16. Install bearing bracket (Figure 1, Item 8) with exciter stator (Figure 1, Item 9) attached onto body assembly (Figure 1, Item 3) with eight washers (Figure 1, Item 7), lock washers (Figure 1, Item 6), and screws (Figure 1, Item 5). Torque screws (Figure 1, Item 5) in an alternating pattern to 25 lb•ft (34 N•m).
17. Install cover (Figure 1, Item 2) and 12 screws (Figure 1, Item 1). Torque screws (Figure 1, Item 1) in an alternating pattern to 25 lb•ft (34 N•m).

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****GENERATOR REPLACEMENT: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Lifting Device, 2,000 lb (907 kg) Capacity
Tool Kit, General Mechanic's (GMTK) (WP 0122,
Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP
0122, Table 2, Item 3)

Personnel Required

Two

References

TM 9-6115-729-24P

Equipment Condition

Left rear door assembly removed (WP 0021)
Left rear door assembly (latch) removed (WP 0022)
Right rear door assembly removed (WP 0025)
Right rear door assembly (latch) removed (WP
0026)
Front roof section housing assembly removed (WP
0028)
Rear roof section housing assembly removed (WP
0029)
Engine generator compartment ceiling assembly
removed (WP 0030)
Rear section housing assembly removed (WP 0033)
Right rear panel assembly removed (WP 0036)
Potential transformers removed (WP 0051)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

CAUTION

When rear and right side panels and doors are removed it may be necessary to support the electrical component mounting brackets assembly with a block of wood between generator and bracket assembly or damage to equipment may result.

REMOVAL

1. Ensure generator set is fully stopped, ENGINE CONTROL switch is OFF/RESET, Battery Disconnect Switch is OFF, and DEAD CRANK SWITCH is OFF before proceeding.
2. Tag and disconnect ten generator cables T1 through T10 from reconnection board TB1 (Figure 1, Sheet 1, Item 1).
3. Tag and disconnect two generator field leads G1-F2 and G1-F1 from terminal board TB5-1 and -2 (Figure 1, Sheet 1, Item 2 and FO-3, sheet 1).
4. Cut tiedown straps as required and tag and remove generator leads from current transformers (Figure 1, Sheet 1, Item 3).
5. Remove two screws (Figure 1, Sheet 1, Item 4), lock washers (Figure 1, Sheet 1, Item 5), and washers (Figure 1, Sheet 1, Item 6).
6. Remove two screws (Figure 1, Sheet 1, Item 7), lock washers (Figure 1, Sheet 1, Item 8), and washers (Figure 1, Sheet 1, Item 9).
7. Carefully remove electrical component mounting brackets assembly (Figure 1, Sheet 1, Item 10) and position at left side of engine generator frame.
8. Lay generator cables across generator (Figure 1, Sheet 2, Item 11).
9. Remove two nuts (Figure 1, Sheet 2, Item 12), screws (Figure 1, Sheet 2, Item 13), and air exhaust screen (Figure 1, Sheet 2, Item 14).
10. Loosen two nuts (Figure 1, Sheet 2, Item 15) and turn two jackscrews (Figure 1, Sheet 2, Item 16) clockwise (CW) to raise engine (Figure 1, Sheet 2, Item 17) approximately $\frac{1}{2}$ inch (1.27 cm) to allow separation of generator (Figure 1, Sheet 2, Item 11) and engine (Figure 1, Sheet 2, Item 17).
11. Remove eight screws (Figure 1, Sheet 2, Item 18) and lock washers (Figure 1, Sheet 2, Item 19) to uncouple the generator (Figure 1, Sheet 2, Item 11) rotor from the engine (Figure 1, Sheet 2, Item 17) flywheel.
12. Remove 12 screws (Figure 1, Sheet 2, Item 20) and lock washers (Figure 1, Sheet 2, Item 21) to disconnect the generator (Figure 1, Sheet 2, Item 11) from the engine (Figure 1, Sheet 2, Item 17).

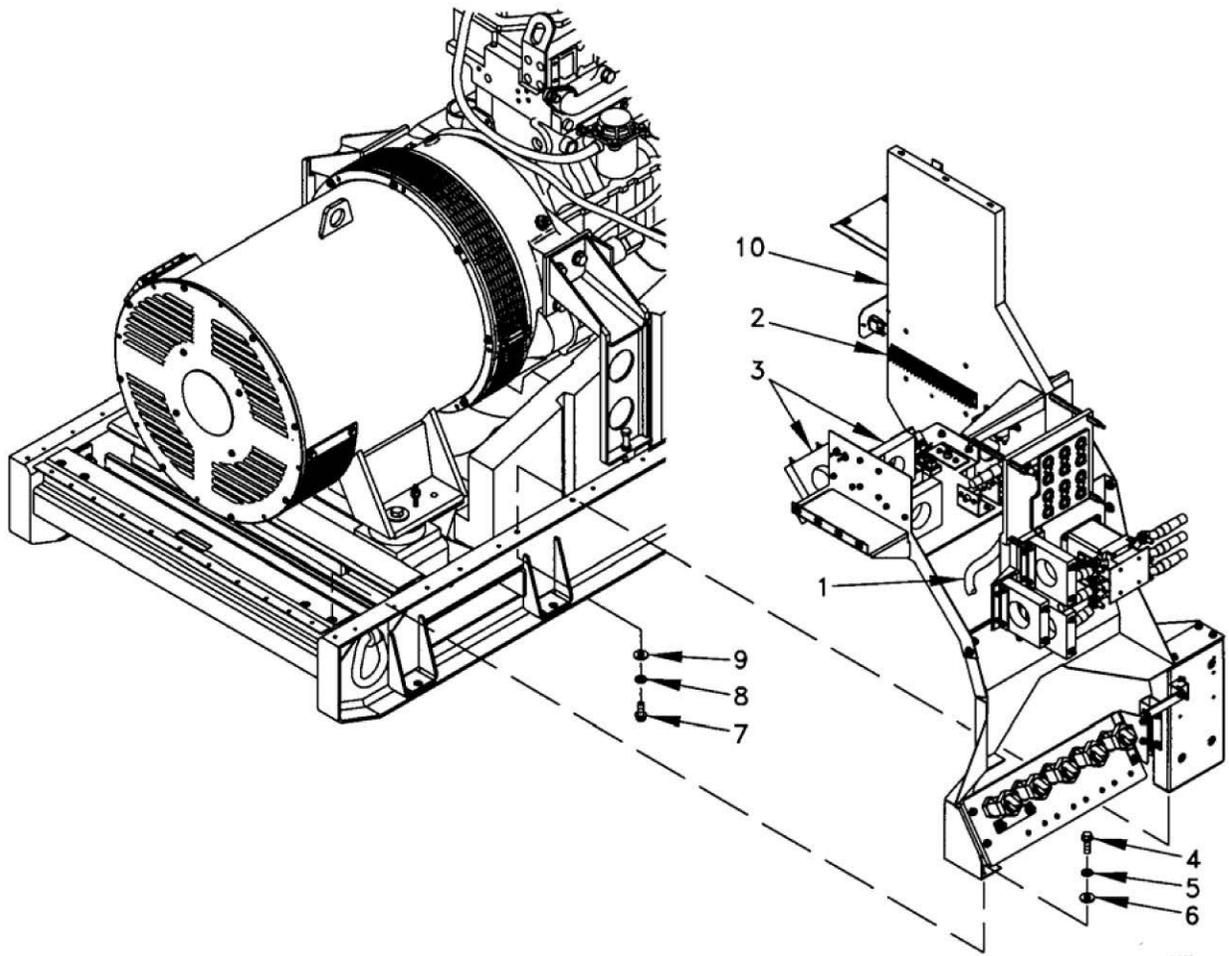


Figure 1. Generator Replacement (Sheet 1 of 2).

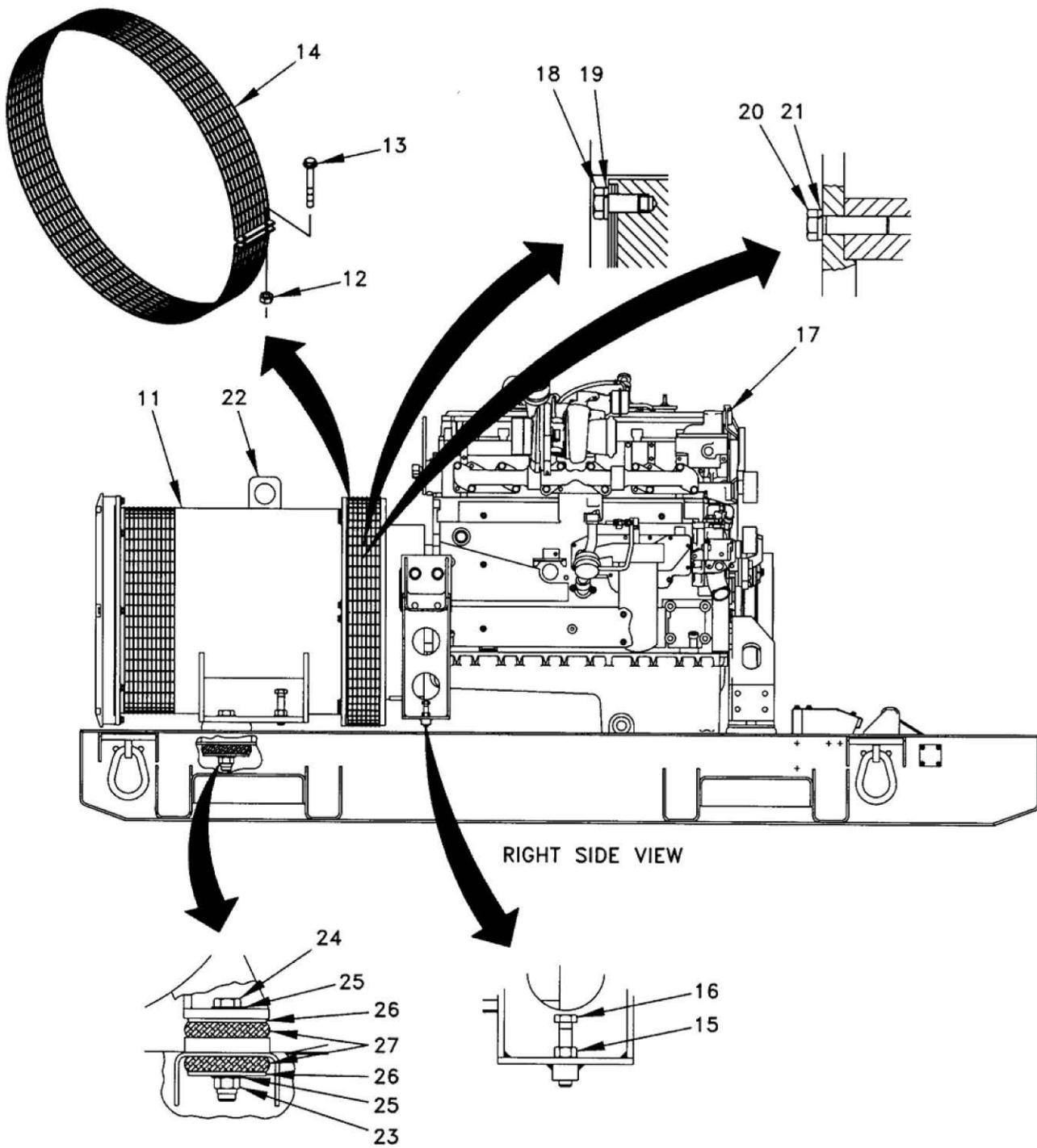


Figure 1. Generator Replacement (Sheet 2 of 2).

WARNING

The generator weighs more than 1,500 pounds (680 kg) and requires an assistant and a lifting device (forklift, overhead lifting device) with sufficient capacity. Be careful and keep hands and arms out of the way when lifting generator out of engine generator base. Failure to comply can cause serious injury or death to personnel.

13. Attach suitable lifting device with at least 2,000 lb (907 kg) capacity to lifting eye (Figure 1, Sheet 2, Item 22) on generator (Figure 1, Sheet 2, Item 11) and take slack out of lifting device.
14. Remove two locknuts (Figure 1, Sheet 2, Item 23), two screws (Figure 1, Sheet 2, Item 24), four washers (Figure 1, Sheet 2, Item 25), and four snubbing washers (Figure 1, Sheet 2, Item 26) from generator shock mounts (Figure 1, Sheet 2, Item 27).
15. Carefully lift generator (Figure 1, Sheet 2, Item 11) out of engine generator base.

END OF TASK

INSTALLATION

WARNING

The generator weighs more than 1,500 pounds (680 kg) and requires an assistant and a lifting device (forklift, overhead lifting device) with sufficient capacity. Be careful and keep hands and arms out of the way when lifting generator out of engine generator base. Failure to comply can cause serious injury or death to personnel.

1. Install two top generator shock mounts (Figure 1, Sheet 2, Item 27), snubbing washers (Figure 1, Sheet 2, Item 26), and washers (Figure 1, Sheet 2, Item 25).
2. Using suitable lifting device with at least 2,000 lb (907 kg) capacity, carefully lower generator (Figure 1, Sheet 2, Item 11) onto engine generator base and align with engine (Figure 1, Sheet 2, Item 17).
3. Install two bottom generator shock mounts (Figure 1, Sheet 2, Item 27), snubbing washers (Figure 1, Sheet 2, Item 26), with two screws (Figure 1, Sheet 2, Item 24) and two locknuts (Figure 1, Sheet 2, Item 23). Torque screws to 216-264 lb•ft (293-357 N•m).
4. Turn two jackscrews (Figure 1, Sheet 2, Item 16) counterclockwise (CCW) to lower engine (Figure 1, Sheet 2, Item 17) into proper alignment with generator (Figure 1, Sheet 2, Item 11). Tighten two nuts (Figure 1, Sheet 2, Item 15).
5. Allow slack in lifting device and disconnect from lifting eye (Figure 1, Sheet 2, Item 22) on generator (Figure 1, Sheet 2, Item 11).
6. Align holes and install 12 lock washers (Figure 1, Sheet 2, Item 21) and screws (Figure 1, Sheet 2, Item 20). Align holes and install eight lock washers (Figure 1, Sheet 2, Item 19) and screws (Figure 1, Sheet 2, Item 18). Torque screws (Figure 1, Sheet 2, Item 20) and (Figure 1, Sheet 2, Item 18) to 41-49 lb•ft (56-66 N•m).
7. Install air exhaust screen (Figure 1, Sheet 2, Item 14), two screws (Figure 1, Sheet 2, Item 13), and nuts (Figure 1, Sheet 2, Item 12).
8. Carefully position electrical component mounting brackets assembly (Figure 1, Sheet 1, Item 10) over generator (Figure 1, Sheet 2, Item 11) and onto engine generator frame.
9. Install two washers (Figure 1, Sheet 1, Item 9), lock washers (Figure 1, Sheet 1, Item 8), and screws (Figure 1, Sheet 1, Item 7).
10. Install two washers (Figure 1, Sheet 1, Item 6), lock washers (Figure 1, Sheet 1, Item 5), and screws (Figure 1, Sheet 1, Item 4).
11. Remove tags and route generator cables through current transformers (Figure 1, Sheet 1, Item 3).
12. Remove tags and connect two generator field leads G1-F2 and G1-F1 to terminal board TB5-1 and -2 (Figure 1, Sheet 1, Item 2 and FO-3, sheet 1).
13. Remove tags and connect ten generator cables T1 through T10 to reconnection board TB1 (Figure 1, Sheet 1, Item 1).
14. Install potential transformers (WP 0051).

15. Install right rear panel assembly (WP 0036).
16. Install rear section housing assembly (WP 0033).
17. Install engine generator compartment ceiling assembly (WP 0030).
18. Install rear roof section housing assembly (WP 0029).
19. Install front roof section housing assembly (WP 0028).
20. Install right rear door assembly (latch) (WP 0026).
21. Install right rear door assembly (WP 0025).
22. Install left rear door assembly (latch) (WP 0022).
23. Install left rear door assembly (WP 0021).

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE
TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
ENGINE REPLACEMENT: REMOVAL, INSTALLATION

INITIAL SETUP:
Tools and Special Tools

Lifting Device, 2,000 lb (907 kg) Capacity
 Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
 Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Personnel Required

Two

References

TM 9-6115-729-24P
 WP 0054
 WP 0055
 WP 0060
 WP 0062
 WP 0071
 WP 0073
 WP 0096
 WP 0116
 WP 0103
 WP 0106

Equipment Condition

Batteries removed (WP 0048)
 Left front door assembly (latch) removed (WP 0020)
 Left rear door assembly removed (WP 0021)
 Left rear door assembly (latch) removed (WP 0022)
 Load board door assembly removed (WP 0023)
 Right front door assembly (latch) removed (WP 0024)
 Right rear door assembly removed (WP 0025)
 Right rear door assembly (latch) removed (WP 0026)
 Access covers removed (WP 0027)
 Front roof section housing assembly removed (WP 0028)
 Control box assembly removed (WP 0040)
 Rear roof section housing assembly removed (WP 0029)
 Coolant recovery system bottle removed (WP 0062)
 Surge tank removed (WP 0063)
 Exhaust system removed (WP 0067)
 Fan guards and shrouds from engine removed (WP 0064)
 Coolant hoses removed from engine (WP 0065)
 Radiator removed (WP 0066)
 Engine generator compartment ceiling assembly removed (WP 0030)
 Front section housing assembly removed (WP 0032)
 Left center panel assembly removed (WP 0034)
 Right center panel assembly removed (WP 0035)
 Right rear panel assembly removed (WP 0036)
 Left rear panel assembly removed (WP 0037)
 Door support assembly removed (WP 0038)
 Auxiliary fuel pump assembly and solenoid valve removed (WP 0057)
 Air cleaner system removed (WP 0070)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

When running, generator set engine has hot metal surfaces that will burn flesh on contact. Shut down generator set, and allow engine to cool before performing checks, services, and maintenance. Wear gloves and additional protective clothing as required. Failure to comply can cause injury or death to personnel.

REMOVAL

1. Attach suitable lifting device with at least 2,000 lb (907 kg) capacity to front lifting bracket (Figure 1, Item 1) and rear lifting bracket (Figure 1, Item 2) on engine (Figure 1, Item 3) and take slack out of lifting device.
2. Tag and disconnect wires from fuel level switch (WP 0054).
3. Tag and disconnect wires from alternator (WP 0071).
4. Tag and disconnect wires from fuel level sender (WP 0060).
5. Tag and disconnect magnetic speed pickup from engine harness connector ENG-P14 (WP 0106).
6. Tag and disconnect turbo inlet pressure sensor from engine harness connector ENG-P15 (WP 0106).
7. Tag and disconnect low coolant sensor from engine harness connector ENG-P16 (WP 0106).
8. Tag and disconnect engine harness connector ENG-P1 from ECM connector J1 (WP 0096).
9. Tag and disconnect fuel hose from engine fuel pump (WP 0055).
10. Tag and disconnect all wires and cables from starter (WP 0073).
11. Tag and disconnect winterization heater hoses from engine (if installed) (WP 0116).
12. Remove two locknuts (Figure 1, Item 4), two bolts (Figure 1, Item 5), four washers (Figure 1, Item 6), and two snubbing washers (Figure 1, Item 7) and bottom engine shock mounts (Figure 1, Item 8).
13. Loosen two nuts (Figure 1, Item 9) and snug down two jackscrews (Figure 1, Item 10). Re-tighten two nuts.
14. Adjust generator jackscrews to support generator (WP 0103).
15. Remove hardware connecting generator to engine and flywheel (WP 0103).

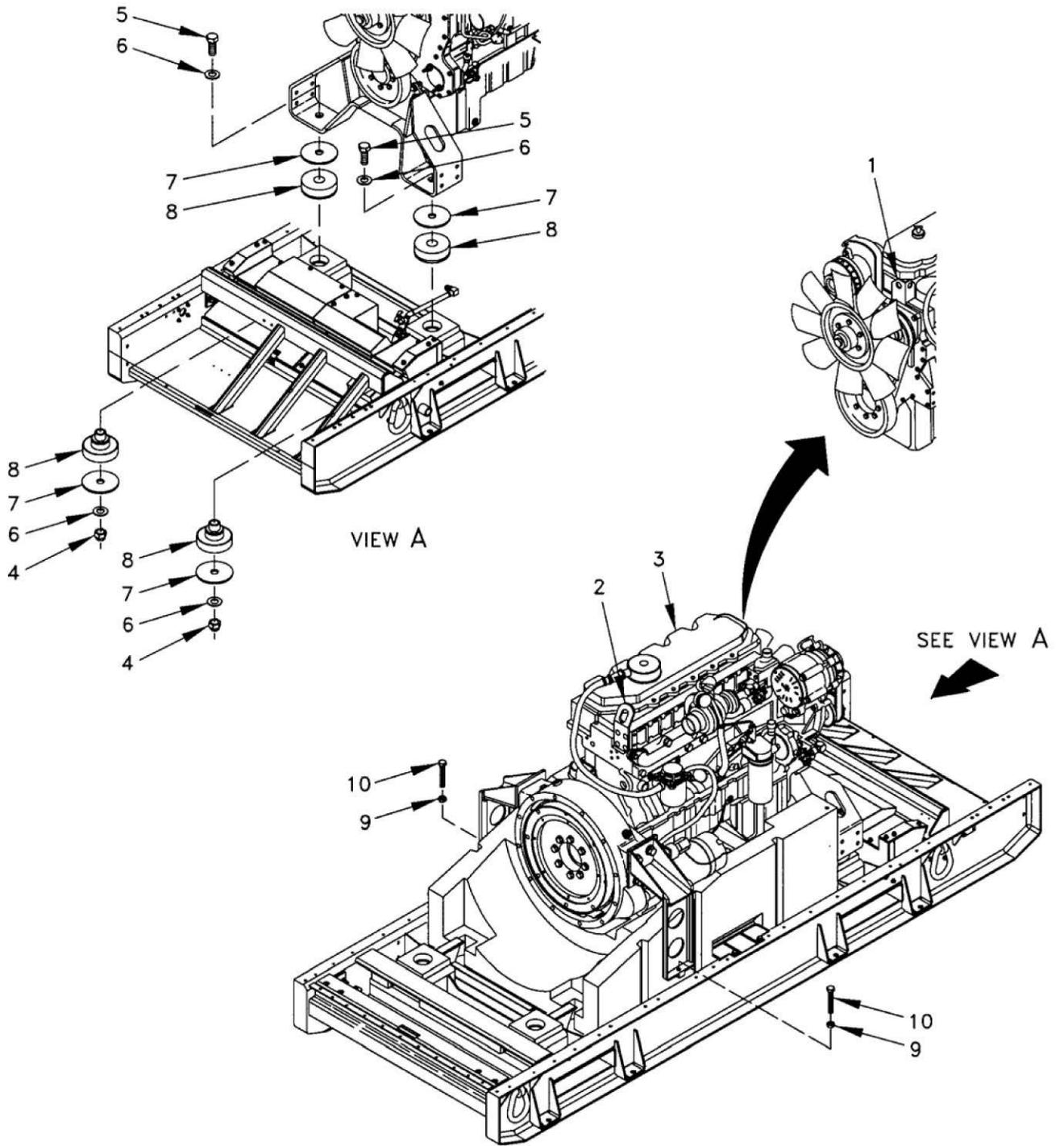


Figure 1. Engine Replacement.

WARNING

The generator weighs more than 1,500 pounds (680 kg) and requires an assistant and a lifting device (forklift, overhead lifting device) with sufficient capacity. Be careful and keep hands and arms out of the way when lifting generator out of engine generator base. Failure to comply can cause serious injury or death to personnel.

16. Carefully lift engine (Figure 1, Item 3) off engine generator base.
17. Remove two top snubbing washers (Figure 1, Item 7) and two top engine shock mounts (Figure 1, Item 8).

END OF TASK

INSTALLATION

WARNING

The generator weighs more than 1,500 pounds (680 kg) and requires an assistant and a lifting device (forklift, overhead lifting device) with sufficient capacity. Be careful and keep hands and arms out of the way when lifting generator out of engine generator base. Failure to comply can cause serious injury or death to personnel.

1. Install two top engine shock mounts (Figure 1, Item 8) and snubbing washers (Figure 1, Item 7).
2. Using a suitable lifting device with at least 2,000 lb (907 kg) capacity, connected to front lifting bracket (Figure 1, Item 1) and rear lifting bracket (Figure 1, Item 2), carefully lower engine (Figure 1, Item 3) onto engine generator base and top engine shock mounts assemblies. Align flywheel to generator.
3. Install two bottom engine shock mounts (Figure 1, item 8), snubbing washers (Figure 1, Item 7), four washers (Figure 1, Item 6), two bolts (Figure 1, Item 5), and two locknuts (Figure 1, Item 4). Torque bolts (Figure 1, Item 5) to 216-264 lb•ft (293-357 N•m).
4. Install hardware connecting generator to engine and flywheel (WP 0103).
5. Draw-up generator jackscrews (WP 0103).
6. Loosen two jackscrews (Figure 1, Item 10) and two nuts (Figure 1, Item 9). Draw-up bolts and tighten nuts.
7. Connect winterization heater hoses to engine (WP 0116, Items 11 and 13) (if previously installed).
8. Remove tags and connect wires and cables to starter (WP 0073).
9. Connect fuel hose to engine fuel pump (WP 0055).
10. Remove tag and connect engine harness connector ENG-P1 to ECM connector J1 (WP 0096).
11. Remove tag and connect low coolant sensor to engine harness connector ENG-P16 (WP 0106).
12. Remove tag and connect turbo inlet pressure sensor to engine harness connector ENG-P15 (WP 0106).
13. Remove tag and connect magnetic speed pickup to engine harness connector ENG-P14 (WP 0106).
14. Remove tags and disconnect wires to fuel level sender (WP 0060).
15. Remove tags and connect wires to alternator (WP 0071).
16. Remove tags and connect wires to fuel level switch (WP 0054).
17. Install air cleaner system (WP 0070).
18. Install radiator (WP 0066).
19. Remove tags and connect coolant hoses to engine (WP 0065).
20. Install fan guards and shrouds (WP 0064).
21. Install auxiliary fuel pump assembly and solenoid valve (WP 0057).
22. Install doors and panels (WP 0038 through WP 0034 and WP 0032).
23. Install engine generator compartment ceiling assembly (WP 0030).
24. Install exhaust system (WP 0067).

25. Install surge tank (WP 0063).
26. Install coolant recovery system bottle (WP 0062).
27. Install rear roof section housing assembly (WP 0029).
28. Install control box assembly (WP 0040).
29. Install door and panels (WP 0028 and WP 0020).
30. Install batteries (WP 0048).

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
ENGINE/GENERATOR BASE ASSEMBLY: REPAIR OR REPLACEMENT**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Crocus cloth (WP 0123, Item 11)
Foam damping sheet (WP 0123, Item 12)
Foam damping sheet (WP 0123, Item 13)
Foam damping sheet (WP 0123, Item 14)
Foam damping sheet (WP 0123, Item 15)
Foam damping sheet (WP 0123, Item 17)

Personnel Required

Two

References

TM 9-6115-729-24P
MIL-DTL-53072C
TC 9-237

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

WARNING

Chemical Agent Resistant Coating (CARC) paint is a health hazard, and is irritating to eyes, skin, and respiratory system. Wear protective eyewear, mask, and gloves when applying or removing CARC paint. Failure to comply can cause injury to personnel.

REPAIR OR REPLACEMENT

1. Ensure generator set is fully stopped, ENGINE CONTROL switch is OFF/RESET, Battery Disconnect Switch is OFF, and DEAD CRANK SWITCH is OFF before proceeding.

NOTE

Repair of the engine/generator base assembly is limited to removal of corrosion, welding of cracks, and painting.

2. Remove attached assemblies as required to gain access to parts of engine/generator base assembly requiring repair.
3. Remove corrosion as required using crocus cloth (WP 0123, Item 9).
4. Repair cracks in weldment by welding in accordance with TC 9-237.
5. Clean weld surface and surrounding area, pretreat, and paint in accordance with MIL-DTL-53072C, green color 383, with top coat to a thickness of 1-2 mils.
6. Replace foam damping sections by using the old sections as templates to cut the new sections.
7. Install attached assemblies that were removed.

END OF TASK**END OF WORK PACKAGE**

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****ENGINE ELECTRICAL SYSTEM: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Cap and plug set (WP 0123, Table 1, Item 8)
Tiedown straps (WP 0123, Table 1, Item 50)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Fuel drained to prevent spillage when removing fuel pressure sensor (WP 0055)
Coolant drained below the coolant temperature sensor (WP 0066)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

WARNING

When running, generator set engine has hot metal surfaces that will burn flesh on contact. Shut down generator set, and allow engine to cool before performing checks, services, and maintenance. Wear gloves and additional protective clothing as required. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

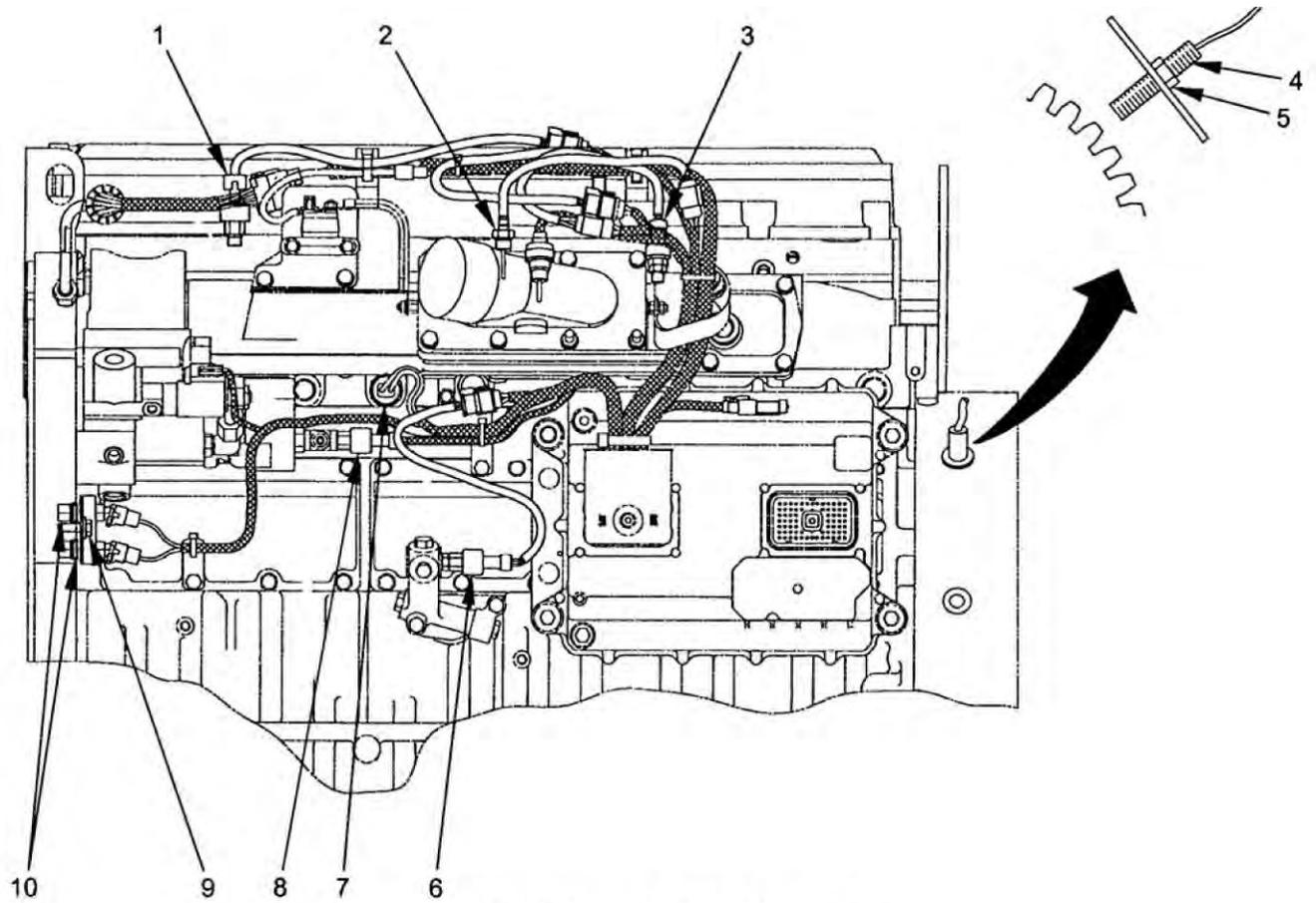
NOTE

Cut tiedown straps as required during removal. Install tiedown straps as required during installation. Table 1 identifies removal and installation steps for engine sensors.

REMOVAL**Table 1. WP 0106 Guide.**

NAME	FIGURE 1 ITEM	REMOVAL STEPS	INSTALLATION STEPS	RELATED WP
Injector actuation pressure sensor	1	1 and 2	29 and 30	
Oil temperature sensor	2	3 and 4	27 and 28	
Turbocharger outlet temperature sensor	3	5 and 6	25 and 26	
Magnetic speed pickup	4	7 and 8	20 through 24	
Engine oil pressure sensor	6	9 and 10	18 and 19	
Coolant temperature sensor	7	11 through 13	15 through 17	WP 0063
Fuel pressure sensor	8	14 through 16	12 and 14	WP 0055 and WP 0015
Engine timing sensors	10	17 and 18	9 through 11	WP 0012
Atmospheric pressure sensor	11	19 and 20	7 and 8	
Low coolant sensor	12	21 and 22	5 and 6	
Turbocharger inlet pressure sensor	13	23 and 24	3 and 4	
Intake manifold air temperature sensor	14	25 and 26	1 and 2	

1. Tag and disconnect engine harness connector ENG-P13 from the injector actuation pressure sensor.
2. Remove the injector actuation pressure sensor (Figure 1, Sheet 1, Item 1) by unscrewing the sensor.
3. Tag and disconnect engine harness connector ENG-P18 from the oil temperature sensor.
4. Remove the oil temperature sensor (Figure 1, Sheet 1, Item 2) by unscrewing the sensor.



ENGINE SENSOR LOCATIONS
LEFT SIDE

Figure 1. Electrical System (Sheet 1 of 2).

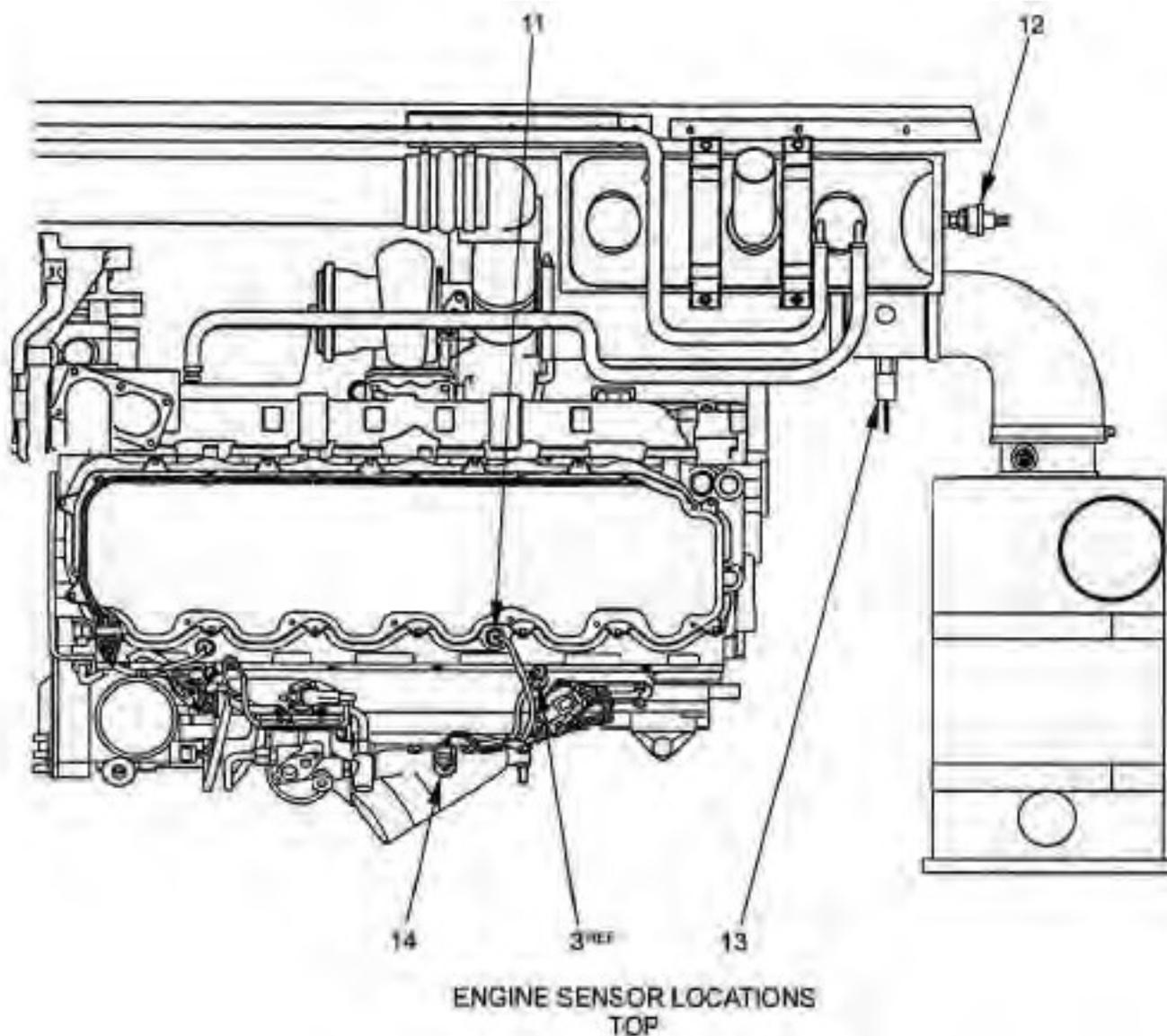


Figure 1. Electrical System (Sheet 2 of 2).

5. Tag and disconnect engine harness connector ENG-P12 from the turbocharger outlet pressure sensor.
6. Remove the turbocharger outlet pressure sensor (Figure 1, Sheet 1, Item 3) by unscrewing the sensor.
7. Tag and disconnect ECM to EMCP harness connector ENG-P14 from the magnetic speed pickup sensor.
8. Loosen locknut (Figure 1, Sheet 1, Item 5) and remove magnetic speed pickup (Figure 1, Sheet 1, Item 4) by loosening the top nut and then unscrewing the sensor.
9. Tag and disconnect engine harness connector ENG-P15 from the engine oil pressure sensor.
10. Remove the engine oil pressure sensor (Figure 1, Sheet 1, Item 6) by unscrewing the sensor.
11. Drain level of coolant below the coolant temperature sensor (Figure 1, Sheet 1, Item 7) (WP 0066).
12. Tag and disconnect engine harness connector ENG-P6 from the coolant temperature sensor.
13. Remove the coolant temperature sensor (Figure 1, Sheet 1, Item 7) by unscrewing the sensor.
14. Drain sufficient fuel from system so fuel does not spill during removal of the fuel pressure sensor (WP 0055).

15. Tag and disconnect engine harness connector ENG-P17 from the fuel pressure sensor.
16. Remove the fuel pressure sensor (Figure 1, Sheet 1, Item 8) by unscrewing the sensor.
17. Tag and disconnect engine harness connectors ENG-P4 and ENG-P5 from the engine timing sensors.
18. Remove bolt (Figure 1, Sheet 1, Item 9) and two engine timing sensors (Figure 1, Sheet 1, Item 10). The engine timing sensors pull out after the bracket bolt is removed.
19. Tag and disconnect engine harness connector ENG-P11 from the atmospheric pressure sensor.
20. Remove the atmospheric pressure sensor (Figure 1, Sheet 2, Item 11).
21. Tag and disconnect ECM to EMCP harness connector ENG-P16 from the low coolant sensor.
22. Remove the low coolant sensor (Figure 1, Sheet 2, Item 12) by unscrewing the sensor.
23. Tag and disconnect ECM to EMCP harness connector ENG-P8 from the turbocharger inlet pressure sensor.
24. Remove the turbocharger inlet pressure sensor (Figure 1, Sheet 2, Item 13).
25. Tag and disconnect engine harness connector ENG-P7 from intake manifold air temperature sensor.
26. Remove the intake manifold air temperature sensor (Figure 1, Sheet 2, Item 14) by unscrewing the sensor.

END OF TASK

INSTALLATION

1. Install the intake manifold air temperature sensor (Figure 1, Sheet 2, Item 14). Screw in and torque sensor to 11-19 lb•ft (15-25 N•m).
2. Remove tag and connect engine harness connector ENG-P7 to the intake manifold air temperature sensor.
3. Install the turbocharger inlet pressure sensor (Figure 1, Sheet 2, Item 13) by screwing in.
4. Remove tag and connect ECM to EMCP harness connector ENG-P8 to the turbocharger inlet pressure sensor.
5. Install the low coolant sensor (Figure 1, Sheet 2, Item 12) by screwing in.
6. Remove tag and connect ECM to EMCP harness connector ENG-P16 to the low coolant sensor.
7. Install the atmospheric pressure sensor (Figure 1, Sheet 2, Item 11). Screw in and torque sensor to 72-108 lb•in (8-12 N•m).
8. Remove tag and connect engine harness connector P11 to the atmospheric pressure sensor.

NOTE

Engine timing sensors must be replaced as a pair.

9. Ensure sensors are properly seated on flanges.
10. Install the two engine timing sensors (Figure 1, Sheet 1, Item 10) and install bolt (Figure 1, Sheet 1, Item 9).
11. Remove tag and connect engine harness connectors ENG-P4 and ENG-P5 to the engine timing sensors. Perform Engine Timing Sensor Calibrate (WP 0012, SYMPTOM 11).
12. Install the fuel pressure sensor (Figure 1, Sheet 1, Item 8) by screwing in.
13. Remove tag and connect engine harness connector ENG-P17 to the fuel pressure sensor.
14. Refill fuel system as required (WP 0015).
15. Install the coolant temperature sensor (Figure 1, Sheet 1, Item 7). Screw in and torque sensor to 11-19 lb•ft (15-25 N•m).
16. Remove tag and connect engine harness connector ENG-P6 to the coolant temperature sensor.
17. Refill cooling system to the correct level (WP 0066).
18. Install the engine oil pressure sensor (Figure 1, Sheet 1, Item 6). Screw in and torque sensor to 72-108 lb•in (8-12 N•m).
19. Remove tag and connect engine harness connector ENG-P15 to the engine oil pressure sensor.

20. Align a ring gear tooth directly in the center of the threaded sensor opening.
21. Screw the magnetic speed pickup (Figure 1, Sheet 1, Item 4) into hole until end contacts gear tooth.
22. Turn the magnetic speed pickup (Figure 1, Sheet 1, Item 4) counterclockwise (CCW) 270 degrees ($\frac{3}{4}$ turn).
23. Tighten locknut (Figure 1, Sheet 1, Item 5) to 14-22 lb•ft (20-30 N•m).
24. Remove tag and connect ECM to EMCP harness connector P14 to the Magnetic Speed Pickup sensor.
25. Install the turbocharger outlet pressure sensor (Figure 1, Sheet 2, Item 3) by screwing in.
26. Remove tag and connect engine harness connector ENG-P12 to the turbocharger outlet pressure sensor.
27. Install the oil temperature sensor (Figure 1, Sheet 1, Item 2). Screw in and torque sensor to 72-108 lb•in (8-12 N•m).
28. Remove tag and connect engine harness connector ENG-P18 to the oil temperature sensor.
29. Install the injector actuation pressure sensor (Figure 1, Sheet 1, Item 1). Screw in and torque sensor to 72-108 lb•in (8-12 N•m).
30. Remove tag and connect engine harness connector ENG-P13 to the injector actuation pressure sensor.

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****VALVE COVER, GASKET, AND MANIFOLD: REMOVAL, CLEANING, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Gasket (WP 0123, Table 1, Item 21)
Gasket (WP 0123, Table 1, Item 22)
Sealing compound (WP 0123, Table 1, Item 44)
Silicone sealant (WP 0123, Table 1, Item 41)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

REMOVAL

1. Remove bolt (Figure 1, Item 1) and washer (Figure 1, Item 2), and pull breather (Figure 1, Item 3) and gasket (Figure 1, Item 4) away from valve cover (Figure 1, Item 5).
2. Remove 14 bolts (Figure 1, Item 6), washers (Figure 1, Item 7), valve cover (Figure 1, Item 5), and gasket (Figure 1, Item 8).
3. Disconnect unit injector plug from wiring harness at left front of valve cover manifold (Figure 1, Item 9).
4. Disconnect plug (Figure 1, Item 10) from each of six unit injectors (Figure 1, Item 11).

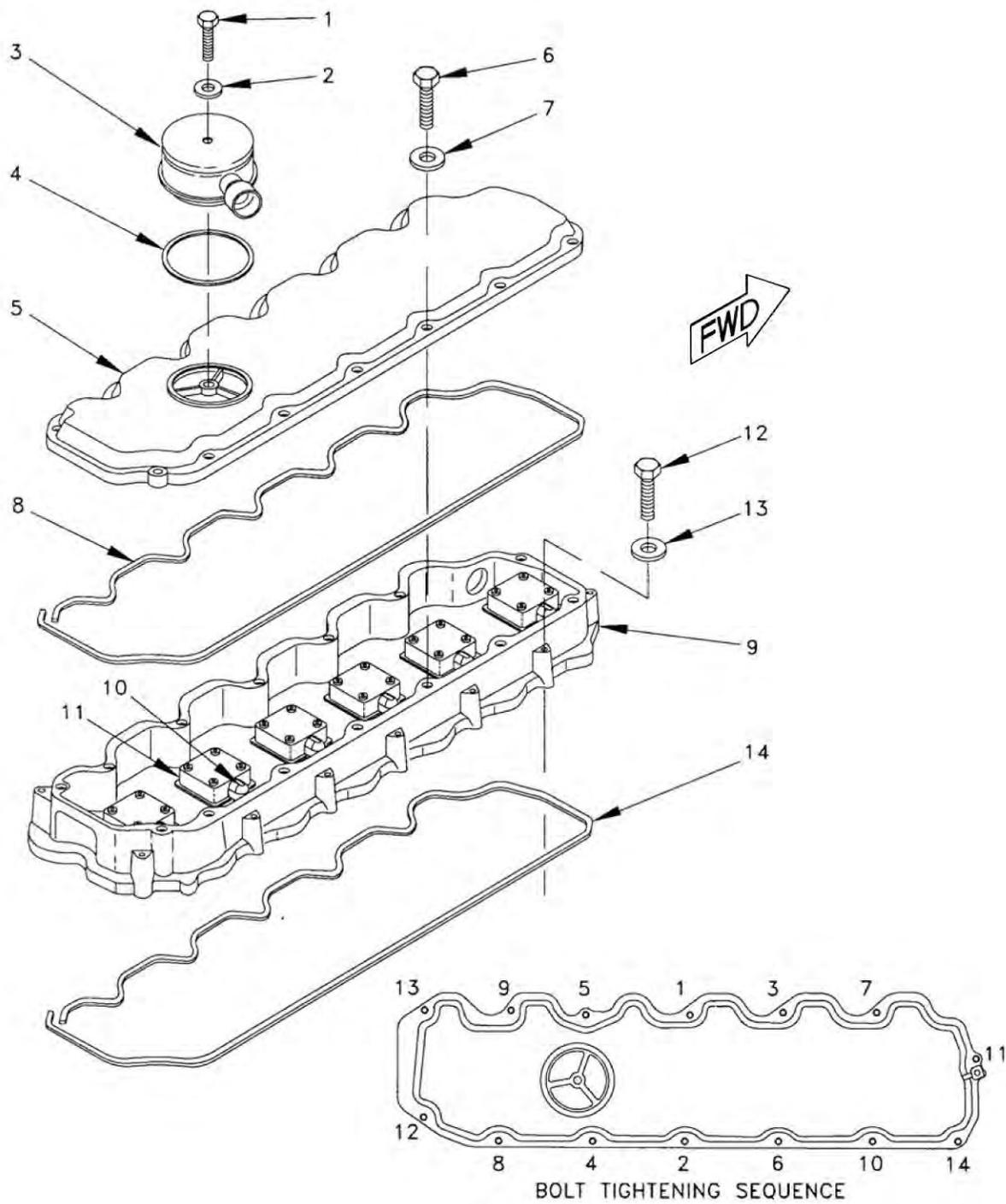


Figure 1. Valve Cover, Gasket, and Manifold.

- Remove 14 bolts (Figure 1, Item 12), washers (Figure 1, Item 13), valve cover manifold (Figure 1, Item 9), and gasket (Figure 1, Item 14).

END OF TASK

CLEANING

1. Remove remaining gasket material from cylinder head, top and bottom surfaces of valve cover manifold (Figure 1, Item 9), and mating surface of valve cover (Figure 1, Item 5).

WARNING

Cleaning solvent is flammable and toxic to eyes, skin, and respiratory tract. Skin and eye protection are required when working in contact with cleaning solvent. Avoid repeated or prolonged contact. Work in ventilated area only. Failure to comply can cause injury or death to personnel.

2. Clean all parts thoroughly before installing.

END OF TASK**INSTALLATION**

1. Apply bead of sealing compound to both sides of new gasket (Figure 1, Item 14).
2. Install gasket (Figure 1, Item 14), valve cover manifold (Figure 1, Item 9), fourteen washers (Figure 1, Item 13), and bolts (Figure 1, Item 12). Using the illustrated sequence, torque bolts (Figure 1, Item 12) to 79-133 lb•in (9-15 N•m).
3. Connect plug (Figure 1, Item 10) to each of six unit injectors (Figure 1, Item 11). Connect unit injector plug to wiring harness.
4. Apply bead of silicone sealant to both sides of new gasket (Figure 1, Item 8).
5. Install gasket (Figure 1, Item 8), valve cover (Figure 1, Item 5), 14 washers (Figure 1, Item 7), and bolts (Figure 1, Item 6). Using the illustrated sequence, torque bolts (Figure 1, Item 6) to 79-133 lb•in (9-15 N•m).
6. Install gasket (Figure 1, Item 4), breather (Figure 1, Item 3), washer (Figure 1, Item 2), and bolt (Figure 1, Item 1).

END OF TASK**END OF WORK PACKAGE**

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****FUEL TRANSFER PUMP/INJECTION ACTUATION PUMP, AND INJECTION CONTROL VALVE: REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION****INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Personnel Required

One

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
O-ring
Wiping rags (WP 0123, Table 1, Item 38)

References

TM 9-6115-729-24P

WARNING

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WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

NOTE

The injection actuation pressure control valve (IAPCV) is part of the fuel transfer pump. The IAPCV can be replaced without further disassembly of the pump. DISASSEMBLY and ASSEMBLY procedures should be followed for replacement of the IAPCV. These procedures can be performed without removal of the fuel transfer pump.

REMOVAL

1. Place a suitable drain pan under components to catch any fuel which may drain.
2. Tag and disconnect hose (Figure 1, Item 1) and electrical connector (Figure 1, Item 2) from fuel transfer pump (Figure 1, Item 3).

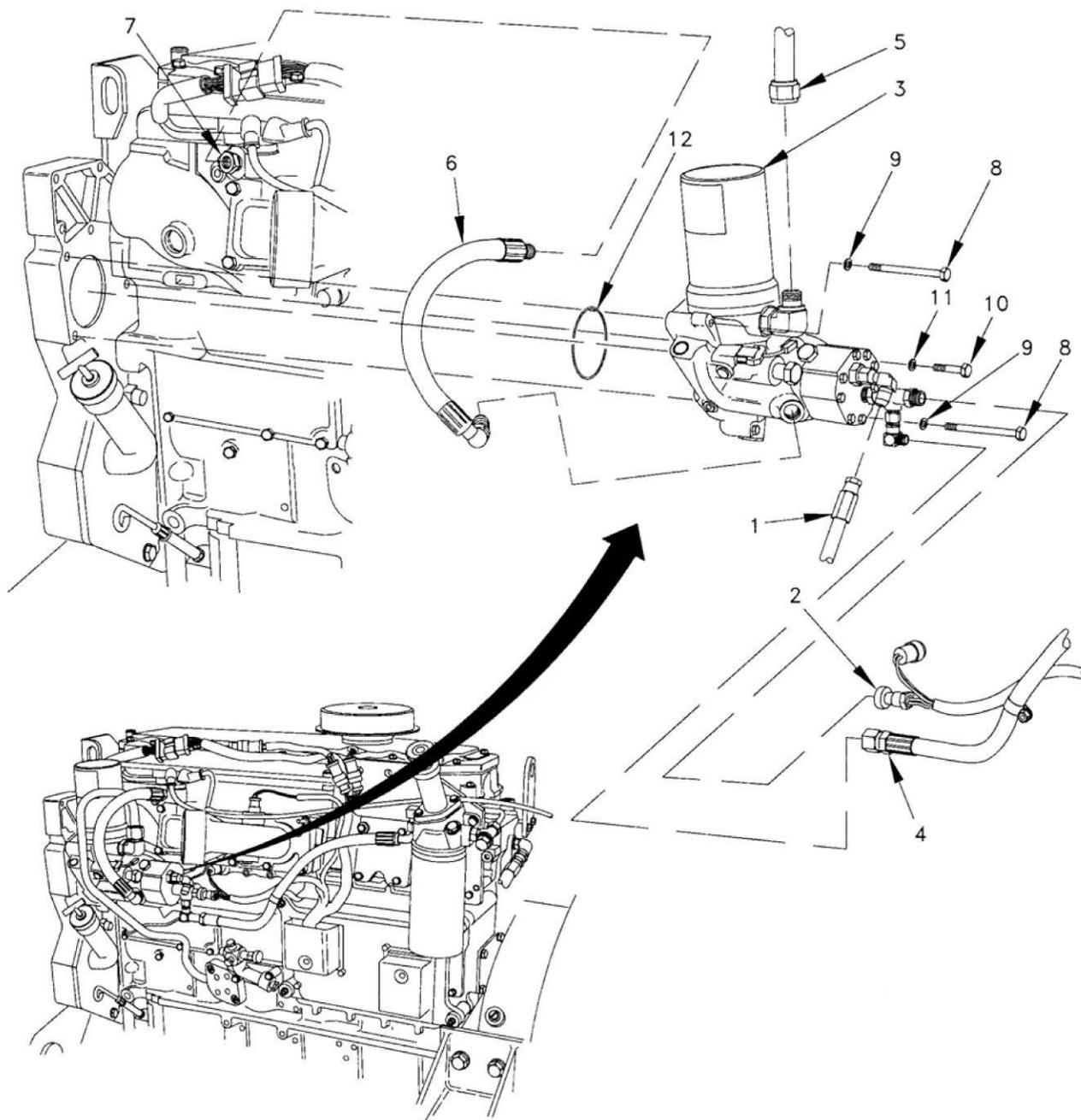


Figure 1. Fuel Transfer Pump.

3. Disconnect hose (Figure 1, Item 4) and tube (Figure 1, Item 5) from fuel transfer pump (Figure 1, Item 3).
4. Disconnect hose (Figure 1, Item 6) from adapter (Figure 1, Item 7) on engine and from fuel transfer pump (Figure 1, Item 3).
5. Remove two screws (Figure 1, Item 8), washers (Figure 1, Item 9), screw (Figure 1, Item 10), and washer (Figure 1, Item 11). Remove fuel transfer pump (Figure 1, Item 3) and O-ring (Figure 1, Item 12).

END OF TASK

DISASSEMBLY**CAUTION**

Except for removal of the IAPCV, do not attempt to disassemble the fuel transfer pump or pump will be damaged.

1. Place a suitable drain pan under components to catch any fluid which may drain.
2. Tag and disconnect engine wiring harness connector C3 (Figure 2, Item 1) from injection actuation pressure control valve (IAPCV) (Figure 2, Item 2).
3. Remove nut (Figure 2, Item 3), spacer (Figure 2, Item 4), and solenoid valve (Figure 2, Item 5) from IAPCV (Figure 2, Item 2).
4. Remove IAPCV (Figure 2, Item 2) from fuel transfer pump (Figure 2, Item 6).
5. Remove O-rings (Figure 2, Items 7 and 8) and backup ring (Figure 2, Item 9).
6. Inspect components of the IAPCV for wear and damage and replace as needed.

END OF TASK**ASSEMBLY**

1. Clean IAPCV and components before assembly.
2. Lubricate O-rings with clean engine oil and install new backup ring (Figure 2, Item 9), and O-rings (Figure 2, Items 7 and 8) on IAPCV (Figure 2, Item 2).
3. Install IAPCV (Figure 2, Item 2) into fuel transfer pump (Figure 2, Item 6). Torque to 37 ± 4 lb•in. (50 ± 5 N•m).
4. Install solenoid valve (Figure 2, Item 5) and spacer (Figure 2, Item 4) to IAPCV (Figure 2, Item 2) and secure with nut (Figure 2, Item 3). Torque nut to 49 ± 13 lb•in. (5.5 ± 1.5 N•m).
5. Remove tag and connect engine wiring harness connector C3 (Figure 2, Item 1) to IAPCV (Figure 2, Item 2).

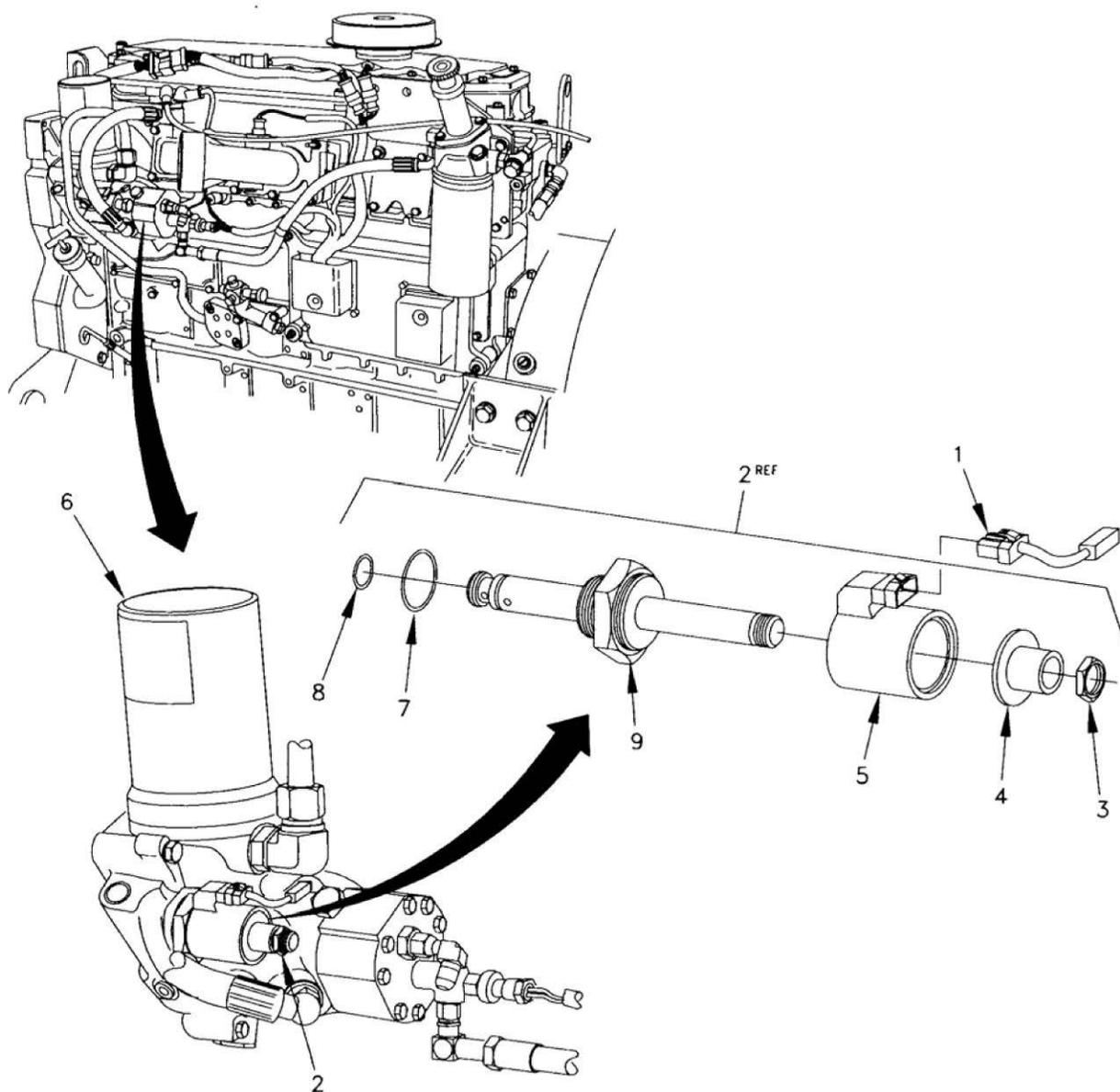


Figure 2. Injection Actuation Pump Control Valve.

END OF TASK

INSTALLATION

1. Install O-ring (Figure 1, Item 12) and fuel transfer pump (Figure 1, Item 3) with washer (Figure 1, Item 11), screw (Figure 1, Item 10), two washers (Figure 1, Item 9), and screws (Figure 1, Item 8).
2. Install hose (Figure 1, Item 6) onto adapter (Figure 1, Item 7) on engine and onto fuel transfer pump (Figure 1, Item 3) by aligning the hose fitting into the mating fittings, pushing the hose fittings until a definite snap and a solid stop are felt. Then abruptly pull back out on the hose on both ends to verify a proper connection has been made.
3. Connect tube (Figure 1, Item 5) and hose (Figure 1, Item 4) to fuel transfer pump (Figure 1, Item 3).

4. Connect electrical connector (Figure 1, Item 2) and hose (Figure 1, Item 1) to fuel transfer pump (Figure 1, Item 3).

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****AIR INLET ELBOW, HEATER, AND MANIFOLD COVER: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Gasket
O-ring
Primer, sealant compound (WP 0123, Table 1, Item 37)
Sealant, adhesive (WP 0123, Table 1, Item 40)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Fuel filter and fuel filter base removed (WP 0079)
Air inlet temperature sensor removed (WP 0106)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

REMOVAL

1. Remove nut (Figure 1, Item 1) and lock washer (Figure 1, Item 2), and disconnect bracket (Figure 1, Item 3) from air inlet heater (Figure 1, Item 4).
2. Pull back boot on cable (Figure 1, Item 5), remove nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7), and disconnect cable (Figure 1, Item 5) from air inlet heater (Figure 1, Item 4).
3. Pull back boot on cable (Figure 1, Item 5), remove nut (Figure 1, Item 8) and lock washer (Figure 1, Item 9),

and remove cable (Figure 1, Item 5) from air inlet heater relay (Figure 1, Item 10).

4. Pull back boot on cable (Figure 1, Item 11), remove nut (Figure 1, Item 12) and lock washer (Figure 1, Item 13), and disconnect cable (Figure 1, Item 11) from air inlet heater relay (Figure 1, Item 10).
5. Remove two nuts (Figure 1, Item 14), four washers (Figure 1, Item 15), two bolts (Figure 1, Item 16), and air inlet heater relay (Figure 1, Item 10).
6. Remove nut (Figure 1, Item 17), two washers (Figure 1, Item 18), screw (Figure 1, Item 19), and loop clamp (Figure 1, Item 20) from air inlet heater relay bracket (Figure 1, Item 21).
7. Remove two bolts (Figure 1, Item 22), washers (Figure 1, Item 23), and air inlet heater relay bracket (Figure 1, Item 21).
8. Remove two studs (Figure 1, Item 24), six bolts (Figure 1, Item 25), eight washers (Figure 1, Item 26), clip (Figure 1, Item 27), bracket (Figure 1, Item 3), air inlet elbow (Figure 1, Item 28), and air inlet heater (Figure 1, Item 4), from air inlet manifold cover (Figure 1, Item 29).
9. Remove two bolts (Figure 1, Item 30), washers (Figure 1, Item 31), four bolts (Figure 1, Item 32), five washers (Figure 1, Item 33), clip (Figure 1, Item 34), fuel filter bracket (Figure 1, Item 35), air inlet manifold cover (Figure 1, Item 29), and gasket (Figure 1, Item 36).
10. Remove two plugs (Figure 1, Item 37), O-rings (Figure 1, Item 38), plug (Figure 1, Item 39), and O-ring (Figure 1, Item 40).

END OF TASK

INSTALLATION

1. Install O-ring (Figure 1, Item 40) and plug (Figure 1, Item 39) in air inlet elbow (Figure 1, Item 28).
2. Install two O-rings (Figure 1, Item 38) and plugs (Figure 1, Item 37) in air inlet manifold cover (Figure 1, Item 29).
3. Apply primer to both mating sides of gasket (Figure 1, Item 36) and allow to dry for five minutes.

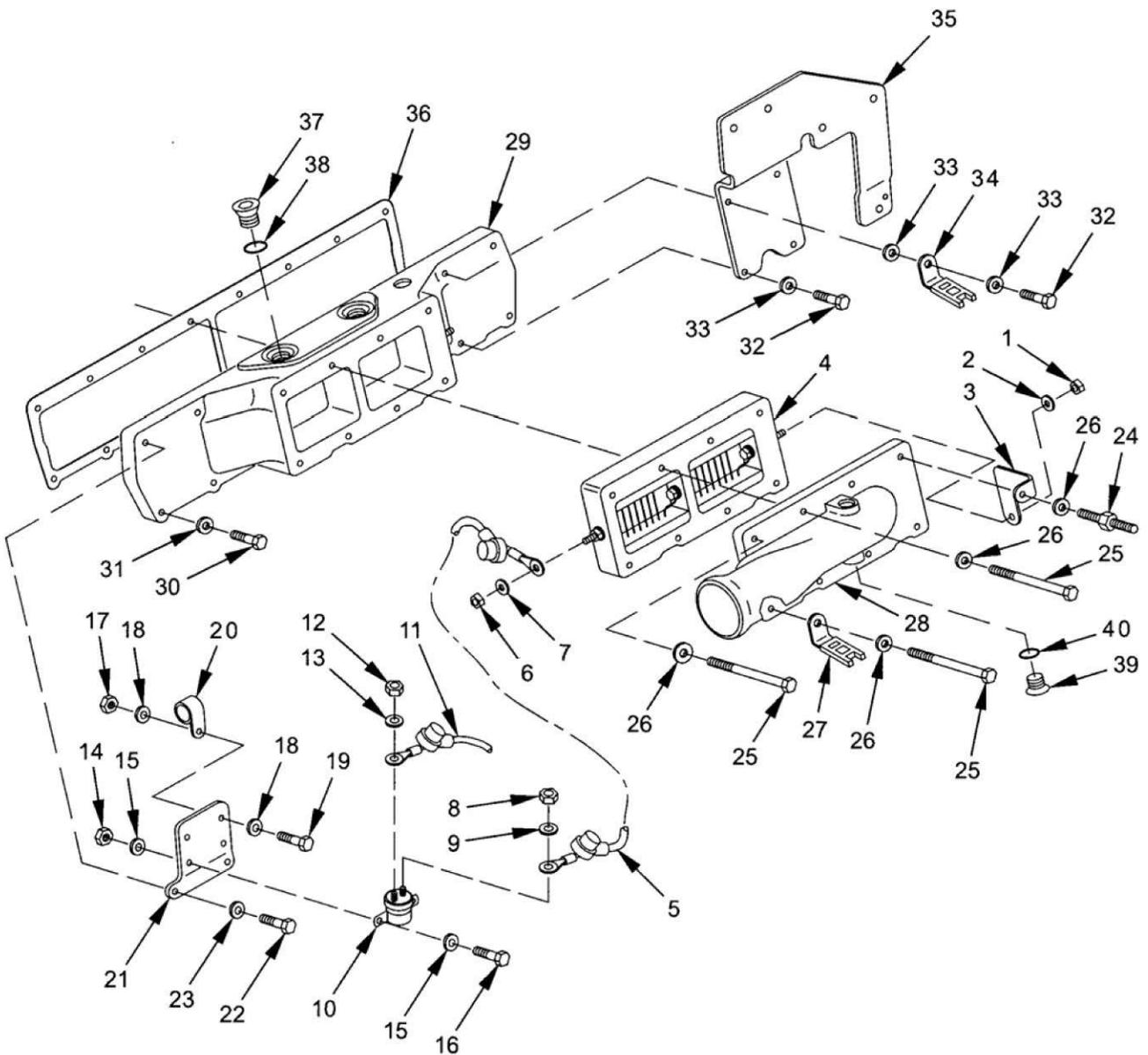


Figure 1. Air Inlet Elbow, Heater, and Manifold Cover.

NOTE

Sealant will harden in less than ten minutes. Installation must continue immediately.

4. Apply sealant to both mating sides of gasket (Figure 1, Item 36). Install gasket (Figure 1, Item 36), air inlet manifold cover (Figure 1, Item 29), fuel filter bracket (Figure 1, Item 35), clip (Figure 1, Item 34), five washers (Figure 1, Item 33), four bolts (Figure 1, Item 32), two washers (Figure 1, Item 31), and two bolts (Figure 1, Item 30). Tighten bolts (Figure 1, Item 32) and (Figure 1, Item 30) in an alternating pattern, making sure that the gasket (Figure 1, Item 36) does not slip. Torque bolts (Figure 1, Item 32) and (Figure 1, Item 30) to 16-26 lb•ft (21-35 N•m).
5. Apply primer to mating sides of air inlet manifold cover (Figure 1, Item 29) and air inlet heater (Figure 1, Item 4) and allow to dry for five minutes.

NOTE

Sealant will harden in less than ten minutes. Installation must continue immediately.

6. Apply sealant to mating sides of air inlet manifold cover (Figure 1, Item 29) and air inlet heater (Figure 1, Item 4). Install air inlet heater (Figure 1, Item 4), air inlet elbow (Figure 1, Item 28), clip (Figure 1, Item 27), bracket (Figure 1, Item 3), bracket (Figure 1, Item 26), six bolts (Figure 1, Item 25), and two studs (Figure 1, Item 24). Tighten studs (Figure 1, Item 24) and bolts (Figure 1, Item 25) in an alternating pattern. Torque studs (Figure 1, Item 24) and bolts (Figure 1, Item 25) to 16-26 lb•ft (21-35 N•m).
7. Install air inlet heater relay bracket (Figure 1, Item 21), two washers (Figure 1, Item 23), and two bolts (Figure 1, Item 22). Torque two bolts (Figure 1, Item 22) to 16-26 lb•ft (21-35 N•m).
8. Install loop clamp (Figure 1, Item 20) on air inlet heater relay bracket (Figure 1, Item 21) with screw (Figure 1, Item 19), two washers (Figure 1, Item 18), and screw (Figure 1, Item 17).
9. Install air inlet heater relay (Figure 1, Item 10), two bolts (Figure 1, Item 16), four washers (Figure 1, Item 15), and two nuts (Figure 1, Item 14).
10. Connect cable (Figure 1, Item 11) to air inlet heater relay (Figure 1, Item 10) and install lock washer (Figure 1, Item 13) and nut (Figure 1, Item 12). Torque nut (Figure 1, Item 12) to 49-57 lb•in (6-7 N•m).
11. Connect cable (Figure 1, Item 5) to air inlet heater relay (Figure 1, Item 10) and install lock washer (Figure 1, Item 9) and nut (Figure 1, Item 8). Torque nut (Figure 1, Item 8) to 49-57 lb•in (6-7 N•m).
12. Connect cable (Figure 1, Item 5) to air inlet heater (Figure 1, Item 4) and install lock washer (Figure 1, Item 7) and nut (Figure 1, Item 6). Torque nut (Figure 1, Item 6) to 60-78 lb•in (7-9 N•m).
13. Install bracket (Figure 1, Item 3) to air inlet heater (Figure 1, Item 4) and install lock washer (Figure 1, Item 2) and nut (Figure 1, Item 1). Torque nut (Figure 1, Item 1) to 60-78 lb•in (7-9 N•m).
14. Install air inlet temperature sensor and oil temperature sensor (WP 0106).
15. Install fuel filter base and fuel filter (WP 0079).

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
CRANKSHAFT PULLEY AND DAMPER: REMOVAL, INSTALLATION****INITIAL SETUP:****Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Grease (WP 0123, Table 1, Item 25)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Fan and fan guards removed (WP 0064)
Fan belt removed (WP 0072)
Alternator belt removed (WP 0071)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

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WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

REMOVAL

1. Use a wrench to rotate tensioner pulley (Figure 1, Item 1) clockwise (CW) to relieve tension on alternator belt (Figure 1, Item 2) and remove belt from damper pulley (Figure 1, Item 3).
2. Loosen two screws (Figure 1, Item 4) to relieve tension on water pump belt (Figure 1, Item 5) and remove water pump belt from crankshaft pulley (Figure 1, Item 6).
3. Remove eight bolts (Figure 1, Item 7), washers (Figure 1, Item 8), damper (Figure 1, Item 9), and damper pulley (Figure 1, Item 3).

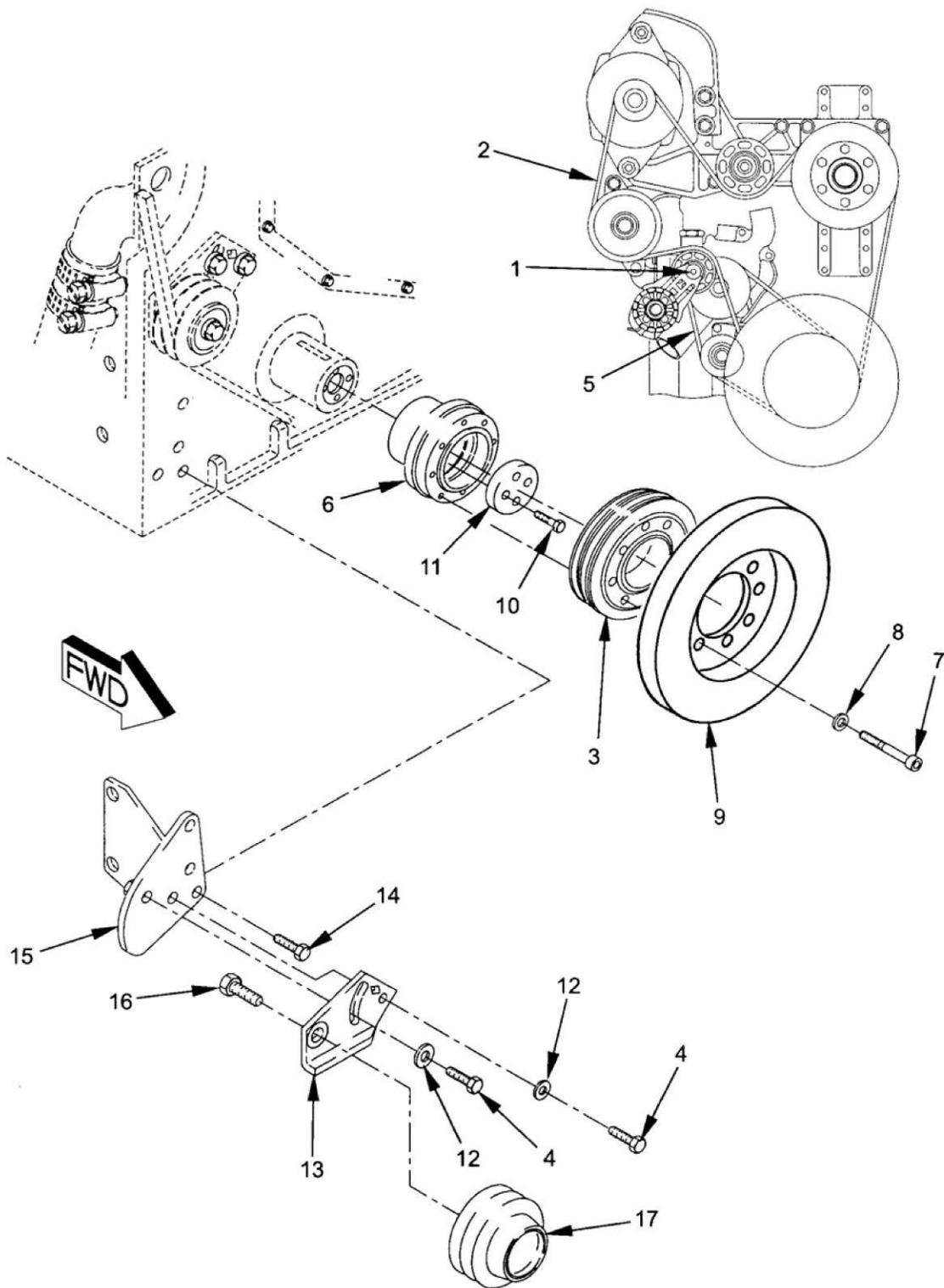


Figure 1. Crankshaft Pulley and Damper.

4. Remove four screws (Figure 1, Item 10), retaining plate (Figure 1, Item 11), and crankshaft pulley (Figure 1, Item 6).

5. Remove two screws (Figure 1, Item 4), washers (Figure 1, Item 12), and belt adjusting arm (Figure 1, Item 13).
6. Remove three screws (Figure 1, Item 14) and bracket (Figure 1, Item 15).
7. Remove screw (Figure 1, Item 16) and idler pulley (Figure 1, Item 17).

END OF TASK

INSTALLATION

1. Apply grease to bearings in idler pulley (Figure 1, Item 17). Install idler pulley (Figure 1, Item 17) on belt adjusting arm (Figure 1, Item 13) with screw (Figure 1, Item 16).
2. Install bracket (Figure 1, Item 15) and three screws (Figure 1, Item 14).
3. Install belt adjusting arm (Figure 1, Item 13), two washers (Figure 1, Item 12), and two screws (Figure 1, Item 4), but do not tighten screws (Figure 1, Item 4).
4. Install crankshaft pulley (Figure 1, Item 6), retaining plate (Figure 1, Item 11), and four screws (Figure 1, Item 10). Torque screws (Figure 1, Item 10) to 130-165 lb•ft (175-225 N•m).

NOTE

Dash marks on front of the damper must be in alignment, or a new damper must be installed.
Maximum permissible runout on the face of the damper is 0.080 in (2.03 mm).

5. Install damper pulley (Figure 1, Item 3), damper (Figure 1, Item 9), eight washers (Figure 1, Item 8), and eight bolts (Figure 1, Item 7). Torque bolts (Figure 1, Item 7) to 33-47 lb•ft (45-65 N•m).
6. Position water pump belt (Figure 1, Item 5) on crankshaft pulley (Figure 1, Item 6) and idler pulley (Figure 1, Item 17). Tighten tension on belt adjusting arm (Figure 1, Item 13) and tighten two screws (Figure 1, Item 4). Torque two screws (Figure 1, Item 4) to 43-51 lb•ft (58-69 N•m).
7. Use a wrench to rotate tensioner pulley (Figure 1, Item 1) clockwise (CW), position alternator belt (Figure 1, Item 2) on damper pulley (Figure 1, Item 3) and tensioner pulley (Figure 1, Item 1), and slowly release tensioner pulley (Figure 1, Item 1).
8. Install alternator belt (WP 0071).
9. Install fan belt (WP 0072).
10. Install fan and fan guards (WP 0064).

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****CRANKSHAFT FRONT SEAL: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Seal
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Crankshaft pulley removed (WP 0110)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

REMOVAL

1. Remove excluder (Figure 1, Item 1).

CAUTION

Care must be taken to avoid damaging the crankshaft flange.

CAUTION

Crankshaft front seal will be damaged during removal and must be replaced with a new seal.

2. Use a small drill bit to drill three evenly spaced holes in front seal (Figure 1, Item 2).
3. Use slide hammer puller to remove front seal (Figure 1, Item 2).

END OF TASK

INSTALLATION**CAUTION**

Crankshaft flange and adjacent front housing must be thoroughly clean before installing a new front seal or seal will be damaged.

NOTE

Replacement crankshaft front seal is supplied with a shipping sleeve. Do not remove shipping sleeve until seal is installed. Crankshaft front seal is designed to be installed dry.

1. Position crankshaft front seal (Figure 1, Item 2) over crankshaft.
2. Use old front seal to protect new front seal and install. Remove old front seal.
3. Install retaining plate (Figure 1, Item 3), four washers (Figure 1, Item 4), and screws (Figure 1, Item 5).

NOTE

Front seal is properly seated when recessed into front housing 0.08-0.12 in (0.20-0.30 cm).

4. Measure distance from surface of crankshaft front seal (Figure 1, Item 2) to surface of front housing. Tighten four screws (Figure 1, Item 5) until seal is properly seated.
5. Remove four screws (Figure 1, Item 5), washers (Figure 1, Item 4), and retaining plate (Figure 1, Item 3).
6. Remove shipping sleeve from crankshaft front seal (Figure 1, Item 2).
7. Apply light coat of liquid cleaner to inside diameter of excluder (Figure 1, Item 1).
8. Install excluder (Figure 1, Item 1) on crankshaft pulley (Figure 1, Item 6) approximately 1/4 in (0.6 cm).
9. Continue installation of crankshaft pulley and damper (WP 0110).

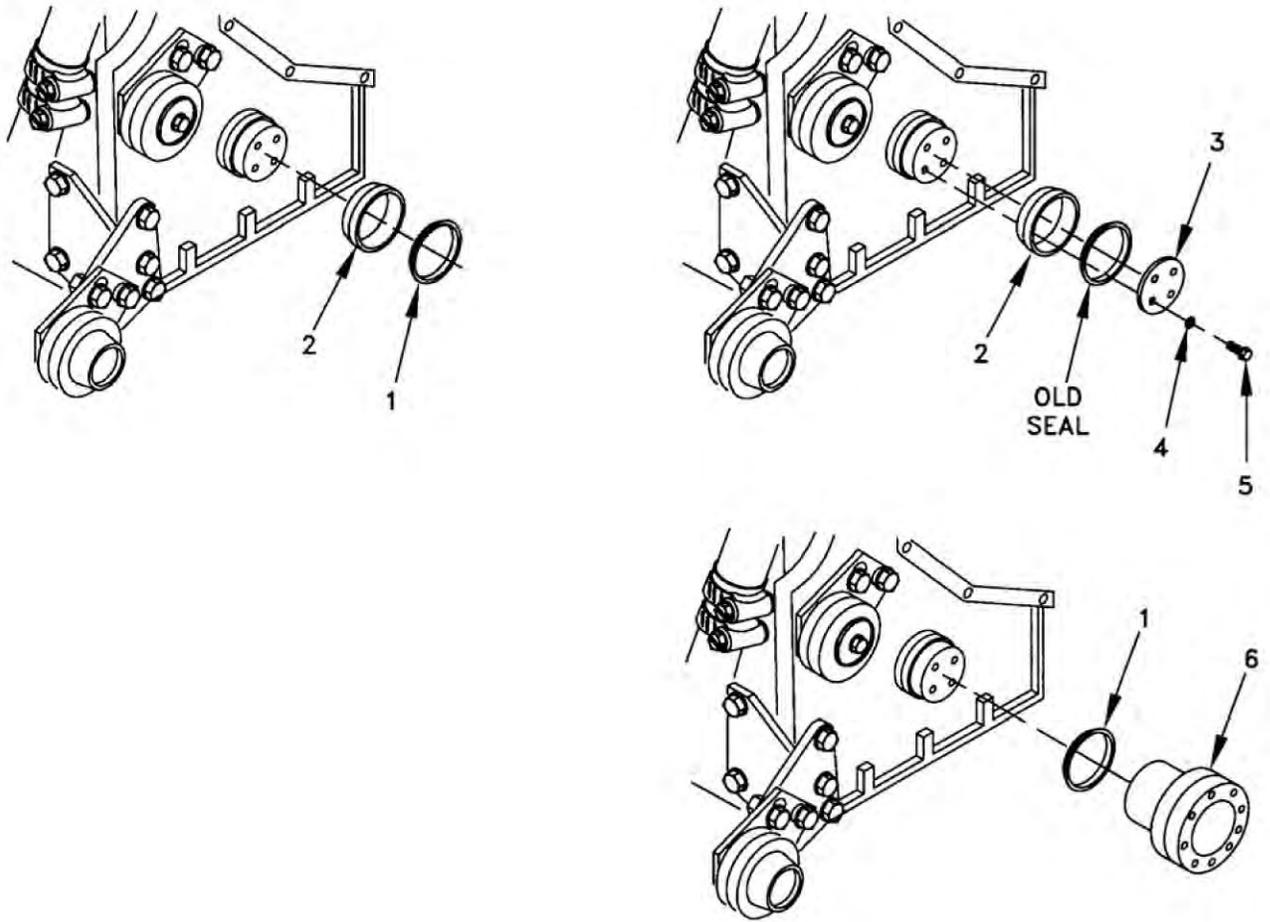


Figure 1. Crankshaft Front Seal.

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****TURBOCHARGER: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Anti-seize compound (WP 0123, Table 1, Item 3)
Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Gasket
O-ring
O-ring
Seal
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

Two

References

TM 9-6115-729-24P

Equipment Condition

Turbo out elbow removed (WP 0064)
Exhaust in elbow removed (WP 0067)
Air vent hose removed (WP 0070)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be plugged immediately after opening to prevent contamination of the engine.

REMOVAL

1. Remove two screws (Figure 1, Item 1), washers (Figure 1, Item 2), tube (Figure 1, Item 3), gasket (Figure 1, Item 4), and seal (Figure 1, Item 5).
2. Disconnect tube (Figure 1, Item 6) and remove two O-rings (Figure 1, Item 7) and connector (Figure 1, Item 8) from turbocharger (Figure 1, Item 9).

3. Loosen two hose clamps (Figure 1, Item 10) and remove hose (Figure 1, Item 11).
4. Remove four locknuts (Figure 1, Item 12), turbocharger (Figure 1, Item 9), and gasket (Figure 1, Item 13) from four studs (Figure 1, item 14) of engine block.

END OF TASK

INSTALLATION

1. Apply anti-seize compound to threads of four studs (Figure 1, Item 14). Install gasket (Figure 1, Item 13), turbocharger (Figure 1, Item 9), and four locknuts (Figure 1, Item 12). Torque four locknuts to 36-44 lb•ft (49-60 N•m).
2. Install hose (Figure 1, Item 11) and tighten two hose clamps (Figure 1, Item 10).
3. Install two O-rings (Figure 1, Item 7) and connector (Figure 1, Item 8) on turbocharger (Figure 1, Item 9), and connect tube (Figure 1, Item 6).
4. Install seal (Figure 1, Item 5), gasket (Figure 1, Item 4), tube (Figure 1, Item 3), two washers (Figure 1, Item 2), and screws (Figure 1, Item 1). Torque screws (Figure 1, Item 1) to 15-25 lb•ft (20-34 N•m).
5. Install air vent hose (WP 0070).
6. Install exhaust in elbow (WP 0067).
7. Install turbo out elbow (WP 0064).

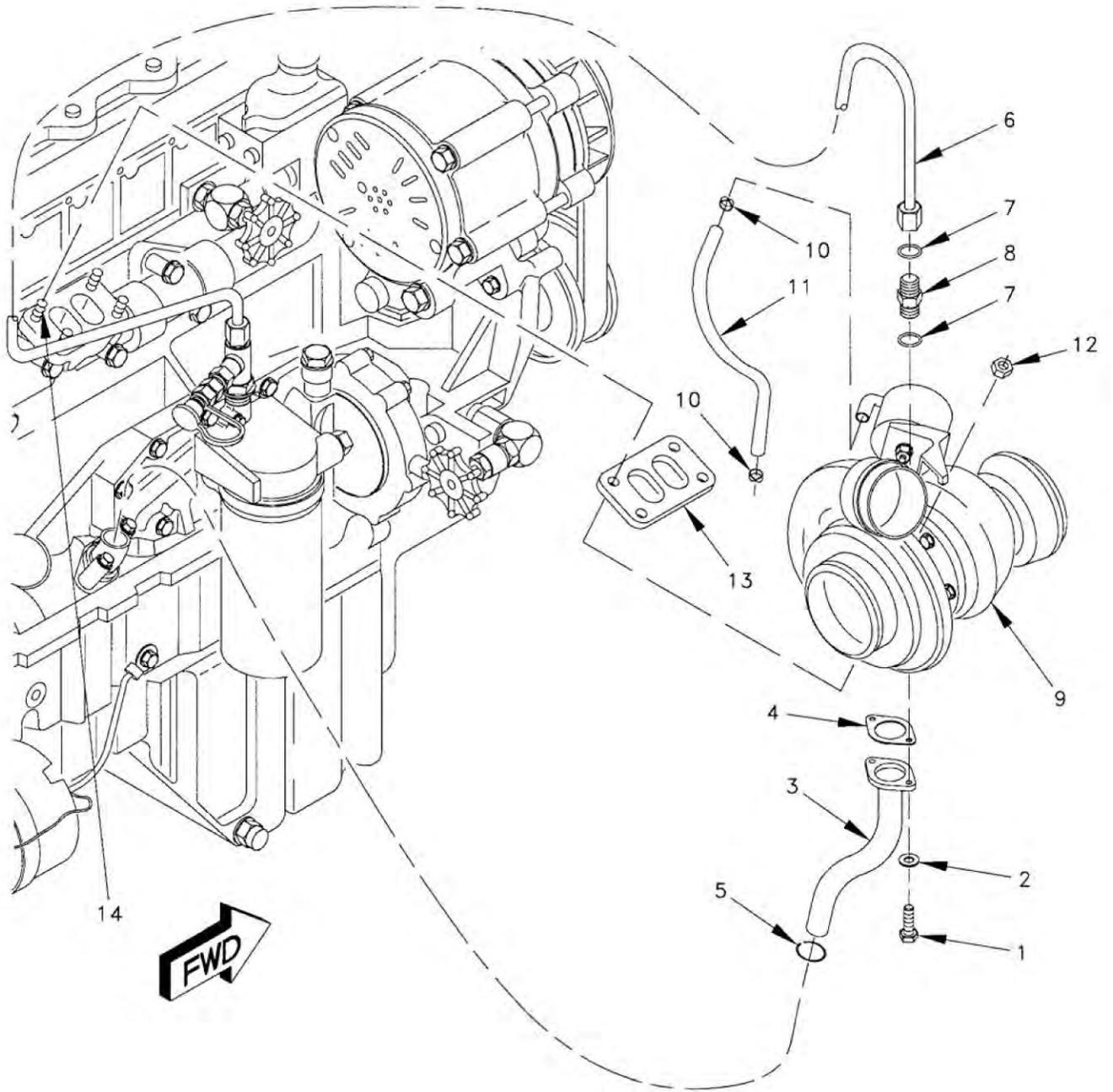


Figure 1. Turbocharger.

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE
TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
EXHAUST MANIFOLD: REMOVAL, INSTALLATION

INITIAL SETUP:
Tools and Special Tools

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
 Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Anti-seize compound (WP 0123, Table 1, Item 3)
 Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
 Engine oil (WP 0123, Table 1, Items 29 through 36)
 Gasket (3)
 High temperature sealer (WP 0123, Table 1, Item 42)
 Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Turbocharger removed (WP 0112)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be plugged immediately after opening to prevent contamination of the engine.

REMOVAL

1. Remove ten bolts (Figure 1, Item 1) and spacers (Figure 1, Item 2).

NOTE

Exhaust manifold breaks into three parts.

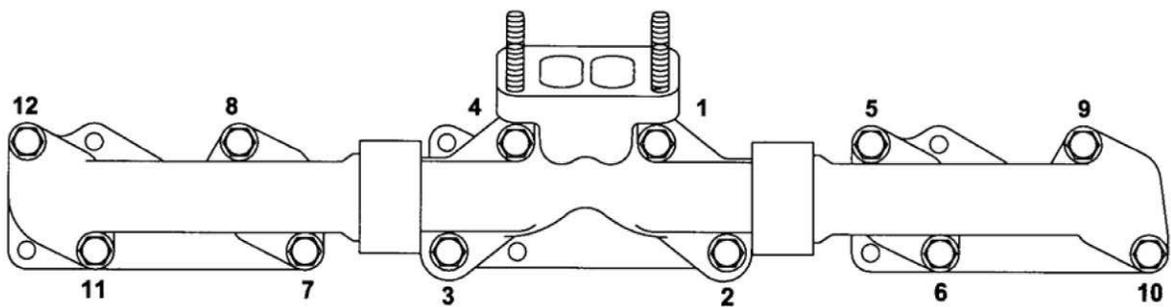
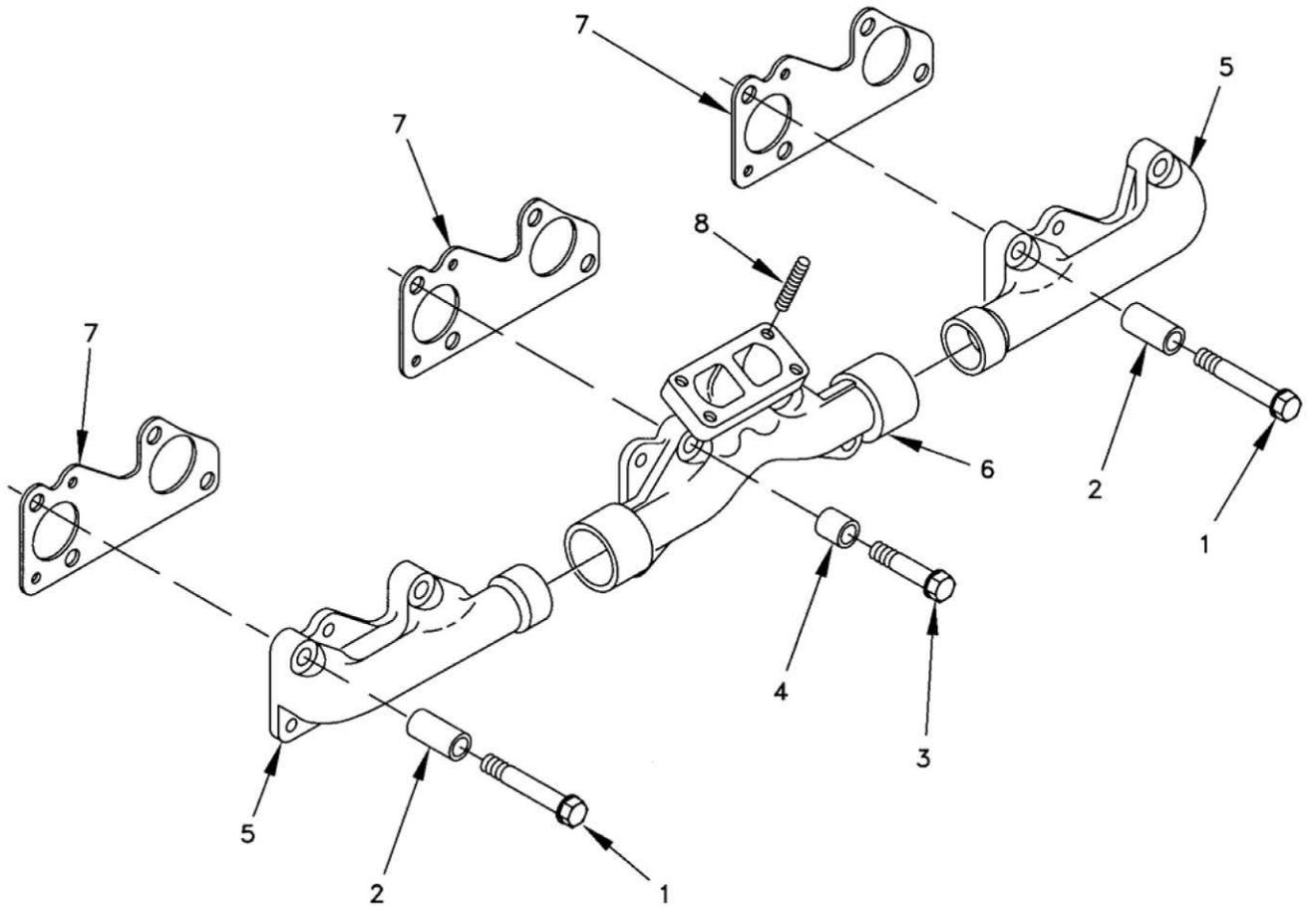
2. Remove two bolts (Figure 1, Item 3), spacers (Figure 1, Item 4), two exhaust manifolds (Figure 1, Item 5), exhaust manifold (Figure 1, Item 6), and three gaskets (Figure 1, Item 7).

3. Remove two studs (Figure 1, Item 8).

END OF TASK

INSTALLATION

1. Apply anti-seize compound to threads of two studs (Figure 1, Item 8). Install two studs (Figure 1, Item 8) and torque to 22-29 lb•ft (30-40 N•m).
2. Apply thin coat of sealer to outside diameter of male ends of two exhaust manifolds (Figure 1, Item 5). Apply light coat of engine oil to female ends of exhaust manifold (Figure 1, Item 6). Assemble all three exhaust manifolds (Figure 1, Item 5) and (Figure 1, Item 6).
3. Install three gaskets (Figure 1, Item 7), exhaust manifolds (Figure 1, Item 5) and (Figure 1, Item 6), ten spacers (Figure 1, Item 2), ten bolts (Figure 1, Item 1), two bolts (Figure 1, Item 3), and spacers (Figure 1, Item 4). Tighten bolts (Figure 1, Item 1) and (Figure 1, Item 3) hand tight.
4. Following bolt tightening sequence, torque twelve bolts (Figure 1, Item 1) and (Figure 1, Item 3) to 2-3 lb•in (3-5 N•m). Then, following bolt tightening sequence, re-torque twelve bolts (Figure 1, Item 1) and (Figure 1, Item 3) to 30-36 lb•in (40-50 N•m).
5. Install turbocharger (WP 0112).



BOLT TIGHTENING SEQUENCE

Figure 1. Exhaust Manifold.

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****FLYWHEEL: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Breakthrough cleaning solvent (WP 0123, Table 1, Item 49)
Thread locking compound (WP 0123, Table 1, Item 46)
Wiping rags (WP 0123, Table 1, Item 38)

Personnel Required

Two

References

TM 9-6115-729-24P

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

REMOVAL**WARNING**

Flywheel weighs more than 50 pounds (23 kg) and requires a two-person lift. Lifting flywheel can cause back strain. Ensure proper lifting techniques are used when lifting flywheel. Failure to comply can cause injury to personnel.

1. Remove top bolt (Figure 1, Item 1) and washer (Figure 1, Item 2).
2. Install guide bolt that is longer than the top bolt (Figure 1, Item 1) to assist in removal of flywheel (Figure 1, Item 3).
3. Remove seven remaining bolts (Figure 1, Item 1) and washers (Figure 1, Item 2).
4. Remove flywheel (Figure 1, Item 3) from crankshaft, and remove guide bolt.

END OF TASK

INSTALLATION

1. Apply thread locking compound to threads of eight bolts (Figure 1, Item 1).
2. Install guide bolt in top hole.
3. Align arrows on flywheel (Figure 1, Item 3) and crankshaft and position flywheel (Figure 1, Item 3).
4. Install seven washers (Figure 1, Item 2) and bolts (Figure 1, Item 1).
5. Remove guide bolt. Install top washer (Figure 1, Item 2) and bolt (Figure 1, Item 1).
6. Torque eight bolts (Figure 1, Item 1) to 75-100 lb•ft (100-140 N•m).

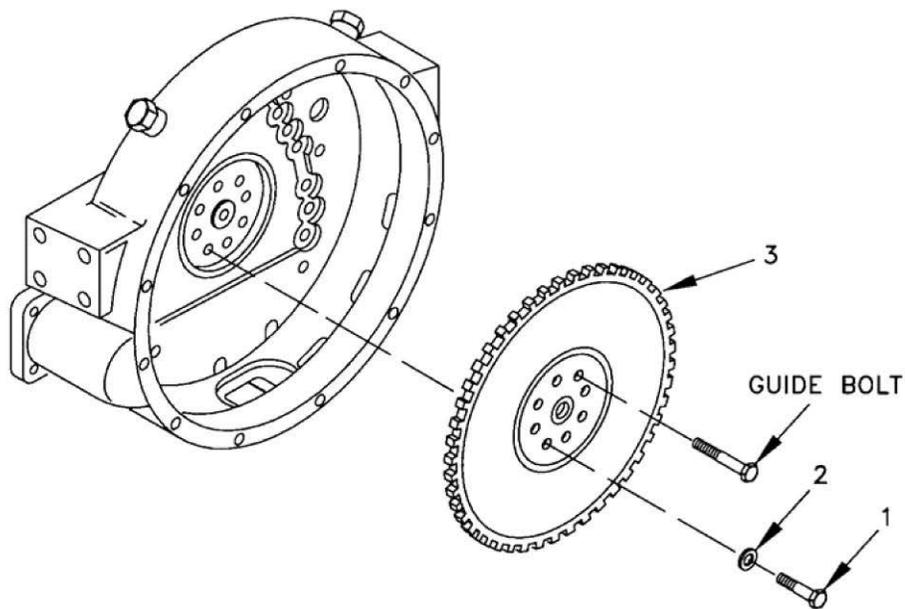


Figure 1. Flywheel.

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****WINTERIZATION HEATER CONTROL BOX ASSEMBLY: REMOVAL, DISASSEMBLY, ASSEMBLY,
INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122,
Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP
0122, Table 2, Item 3)

Materials/Parts

Tie down straps (WP 0123, Table 1, Item 51)

Personnel Required

Two

References

ATM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

REMOVAL

1. Ensure generator set is fully stopped, ENGINE CONTROL switch is OFF/RESET, Battery Disconnect Switch is OFF, and DEAD CRANK SWITCH is OFF before proceeding.
2. Open left rear doors.
3. Disconnect connector P26 from connector J26 (Figure 1, Item 1) and connector P27 from connector J27 (Figure 1, Item 2) of winterization heater control box assembly.

- Remove two screws (Figure 1, Item 3), lock washers (Figure 1, Item 4), and washers (Figure 1, Item 5), and remove winterization heater control box assembly (Figure 1, Item 6) from rear of generator housing.

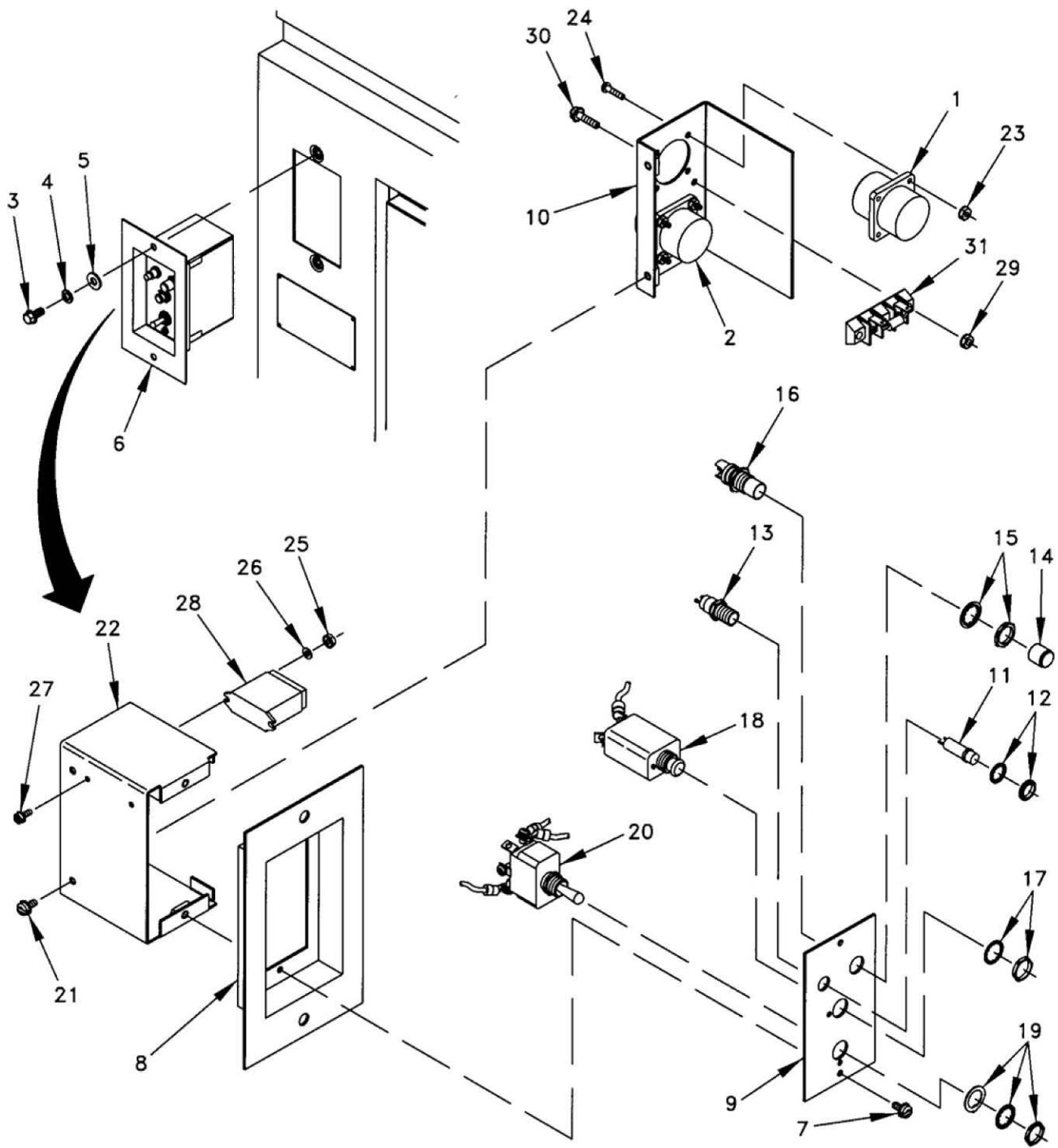


Figure 1. Winterization Heater Control Box Assembly.

END OF TASK

DISASSEMBLY

1. Remove two screws (Figure 1, Item 7), control box mounting bracket (Figure 1, Item 8), and control box faceplate (Figure 1, Item 9) from control box frame (Figure 1, Item 10).

NOTE

Tag and disconnect wiring during component removal.

2. Remove collar (Figure 1, Item 11), jam nut and lock washers (Figure 1, Item 12), and LED holder (Figure 1, Item 13) from control box faceplate (Figure 1, Item 9).
3. Remove lens cap (Figure 1, Item 14), jam nut and lock washers (Figure 1, Item 15), and press-test indicator light (Figure 1, Item 16) from control box faceplate (Figure 1, Item 9).
4. Remove jam nut and lock washers (Figure 1, Item 17) and circuit breaker (Figure 1, Item 18) from control box faceplate (Figure 1, Item 9).
5. Remove jam nut and lock washers (Figure 1, Item 19) and toggle switch (Figure 1, Item 20) from control box faceplate (Figure 1, Item 9).
6. Remove two screws (Figure 1, Item 21) and control box cover (Figure 1, Item 22) from control box frame (Figure 1, Item 10).
7. Remove eight nuts (Figure 1, Item 23), screws (Figure 1, Item 24), connector J26 (Figure 1, Item 1) and J27 (Figure 1, Item 2) from control box frame (Figure 1, Item 10).
8. Remove two nuts (Figure 1, Item 25), washers (Figure 1, Item 26), screws (Figure 1, Item 27), and relay (Figure 1, Item 28) from control box frame (Figure 1, Item 10).
9. Remove two nuts (Figure 1, Item 29), screws (Figure 1, Item 30), and terminal block and rectifier assembly (Figure 1, Item 31) from control box frame (Figure 1, Item 10).

END OF TASK**ASSEMBLY****NOTE**

Connect wiring as tagged and remove tags during component installation.

1. Install terminal block and rectifier assembly (Figure 1, Item 31) on control box frame (Figure 1, Item 10) with two screws (Figure 1, Item 30) and nuts (Figure 1, Item 29).
2. Install relay (Figure 1, Item 28) on control box frame (Figure 1, Item 10) with two screws (Figure 1, Item 27), washers (Figure 1, Item 26) and nuts (Figure 1, Item 25).
3. Install connectors J27 and J26 (Figure 1, Item 2) and (Figure 1, Item 1) on control box frame (Figure 1, Item 9) with eight screws (Figure 1, Item 24) and nuts (Figure 1, Item 23).
4. Install control box cover (Figure 1, Item 22) on control box frame (Figure 1, Item 10) with two screws (Figure 1, Item 21).
5. Install toggle switch (Figure 1, Item 20) on control box faceplate (Figure 1, Item 9) with jam nut and lock washers (Figure 1, Item 19).
6. Install circuit breaker (Figure 1, Item 18) on control box faceplate (Figure 1, Item 9) with jam nut and lock washers (Figure 1, Item 17).
7. Install press-test indicator light (Figure 1, Item 16) on control box faceplate (Figure 1, Item 9) and install jam nut and lock washers (Figure 1, Item 15) and lens cap (Figure 1, Item 14).
8. Install LED holder (Figure 1, Item 13) on control box faceplate (Figure 1, Item 9) and install jam nut and lock washers (Figure 1, Item 12) and collar (Figure 1, Item 11).
9. Install control box faceplate (Figure 1, Item 9) and control box mounting bracket (Figure 1, Item 8) on control box frame (Figure 1, Item 10) with two screws (Figure 1, Item 7).

END OF TASK

INSTALLATION

1. Install winterization heater control box assembly (Figure 1, Item 6) on rear of generator housing and secure with two washers (Figure 1, Item 5), lock washers (Figure 1, Item 4), and screws (Figure 1, Item 3).
2. Connect connector P27 to connector J27 (Figure 1, Item 2) and connector P26 to connector J26 (Figure 1, Item 1).
3. Close left rear doors.

END OF TASK**END OF WORK PACKAGE**

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A
WINTERIZATION HEATER ASSEMBLY: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Cap and plug set (WP 0123, Table 1, Item 8)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

WARNING

When running, winterization heater has hot metal surfaces that will burn flesh on contact. Shut down generator set and allow heater to cool before performing maintenance. Wear gloves and additional protective clothing as required. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

REMOVAL

1. Ensure generator set is fully stopped, ENGINE CONTROL switch is OFF/RESET, Battery Disconnect Switch is OFF, and DEAD CRANK SWITCH is OFF before proceeding.
2. Open battery access doors and right front door.
3. Close shutoff valves (Figure 1, Item 1) and (Figure 1, Item 2).
4. Remove hose clamp (Figure 1, Item 3) and disconnect low-pressure hose (Figure 1, Item 4) from IN side of fuel metering pump (Figure 1, Item 5) on heater (Figure 1, Item 6).
5. Remove hose clamp (Figure 1, Item 7) and disconnect flexible braided hose (Figure 1, Item 8) from OUT side of fuel metering pump (Figure 1, Item 5) on heater (Figure 1, Item 6).
6. Disconnect generator set wiring harness (Figure 1, Item 9) connectors P28 and P29 from heater (Figure 1, Item 6).
7. Remove hose clamp (Figure 1, Item 10) and disconnect 90-degree elbow coolant hose (Figure 1, Item 11) from fitting on top of heater (Figure 1, Item 6).
8. Remove hose clamp (Figure 1, Item 12) and disconnect 90-degree elbow coolant hose (Figure 1, Item 13) from bottom of heater (Figure 1, Item 6).
9. Remove screw (Figure 1, Item 14), washer (Figure 1, Item 15), clamp (Figure 1, Item 16) and fuel metering pump (Figure 1, Item 5) from heater (Figure 1, Item 6).
10. Remove hose clamp (Figure 1, Item 17) and disconnect flexible exhaust tubing (Figure 1, Item 18) from heater (Figure 1, Item 6).
11. Remove four screws (Figure 1, Item 19), lock washers (Figure 1, Item 20), washers (Figure 1, Item 21), and heater (Figure 1, Item 6) from vertical heater mounting bracket (Figure 1, Item 22).

NOTE

Horizontal heater bracket attaches in one place to vertical bracket and two places to skid base.

12. Remove three locknuts (Figure 1, Item 23), washers (Figure 1, Item 24), screws (Figure 1, Item 25), and horizontal heater bracket (Figure 1, Item 26).

NOTE

Three nuts can be accessed from under the bottom of the skid base and two nuts can be accessed from right side of bracket.

13. Remove five locknuts (Figure 1, Item 27), washers (Figure 1, Item 28), screws (Figure 1, Item 29), and vertical heater mounting bracket (Figure 1, Item 22).

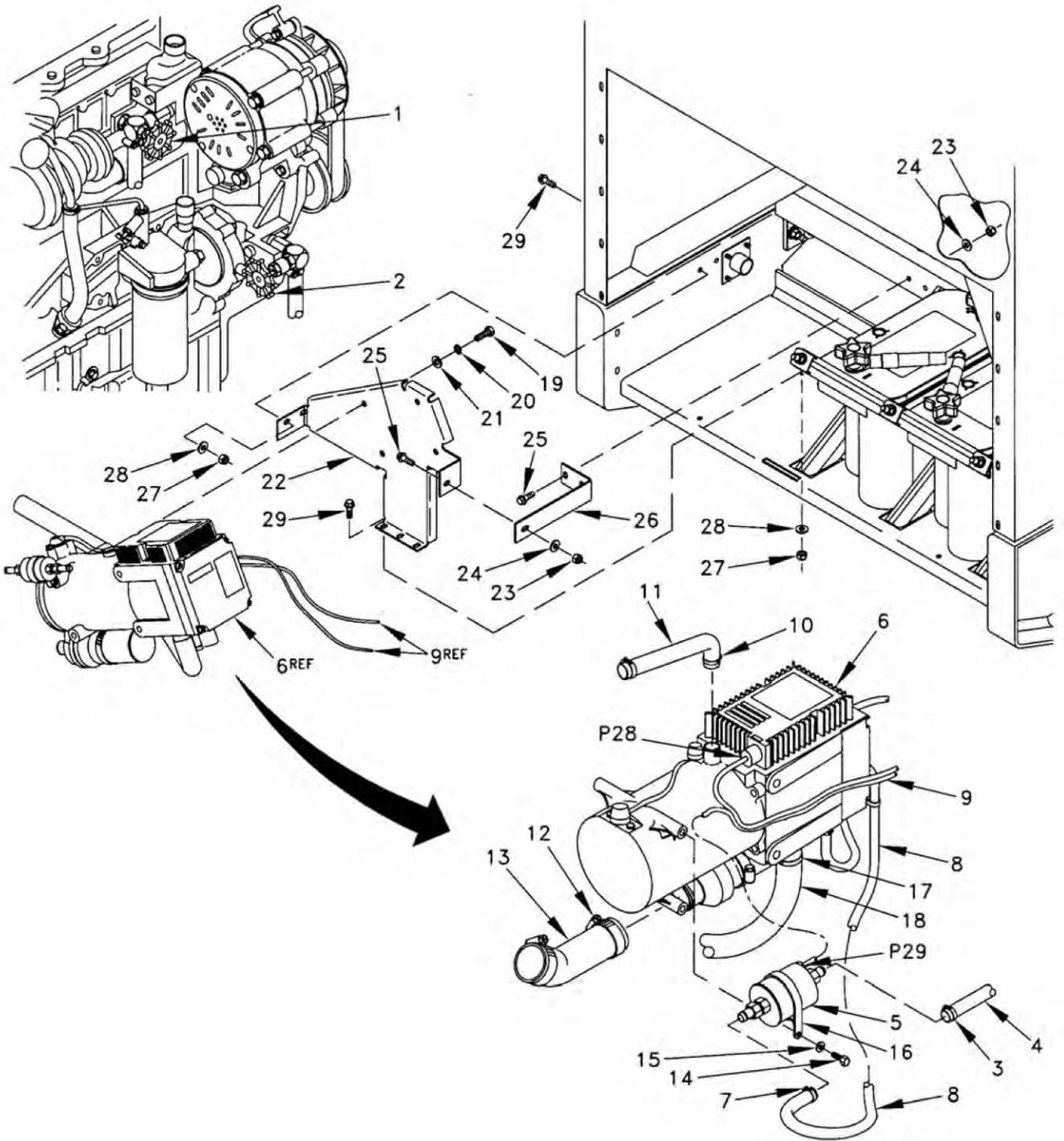


Figure 1. Winterization Heater Assembly.

END OF TASK

INSTALLATION**NOTE**

Three nuts can be accessed from under the bottom of the skid base and two nuts can be accessed from right side of bracket.

1. Install vertical heater mounting bracket (Figure 1, Item 22) and secure with five screws (Figure 1, Item 29), washers (Figure 1, Item 28), and locknuts (Figure 1, Item 27).

NOTE

Horizontal heater bracket attaches in one place to vertical bracket and two places to skid base.

2. Install horizontal heater bracket (Figure 1, Item 26), and secure with three screws (Figure 1, Item 25), washers (Figure 1, Item 24), and locknuts (Figure 1, Item 23).
3. Install heater (Figure 1, Item 6) on vertical heater mounting bracket (Figure 1, Item 22) and secure with four washers (Figure 1, Item 21), lock washers (Figure 1, Item 20), and screws (Figure 1, Item 19).
4. Connect flexible exhaust tubing (Figure 1, Item 18) on heater (Figure 1, Item 6) and install hose clamp (Figure 1, Item 17).
5. Install fuel metering pump (Figure 1, Item 5) and clamp (Figure 1, Item 16) on heater (Figure 1, Item 6) and secure with washer (Figure 1, Item 15) and screw (Figure 1, Item 14).
6. Connect 90-degree elbow coolant hose (Figure 1, Item 13) to bottom of heater (Figure 1, Item 6) and install hose clamp (Figure 1, Item 12).
7. Connect 90-degree elbow coolant hose (Figure 1, Item 11) to top of heater (Figure 1, Item 6) and install hose clamp (Figure 1, Item 10).
8. Connect generator set wiring harness (Figure 1, Item 9) connectors P28 and P29 to heater (Figure 1, Item 6) in two places.
9. Connect flexible braided hose (Figure 1, Item 8) to OUT side of fuel metering pump (Figure 1, Item 5) and install hose clamp (Figure 1, Item 7).
10. Connect low-pressure hose (Figure 1, Item 4) to IN side of fuel metering pump (Figure 1, Item 5) and install hose clamp (Figure 1, Item 3).
11. Open shutoff valves (Figure 1, Item 2) and (Figure 1, Item 1).
12. Close battery access doors and right front door.

END OF TASK**END OF WORK PACKAGE**

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****WINTERIZATION HEATER HOSES: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Cap and plug set (WP 0123, Table 1, Item 8)
Sealing compound (WP 0123, Table 1, Item 43)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position
Cooling system drained (WP 0063)

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

WARNING

When running, winterization heater has hot metal surfaces that will burn flesh on contact. Shut down generator set and allow heater to cool before performing maintenance. Wear gloves and additional protective clothing as required. Failure to comply can cause injury or death to personnel.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent contamination of the engine.

REMOVAL

1. Ensure generator set is fully stopped, ENGINE CONTROL switch is OFF/RESET, Battery Disconnect Switch is OFF, and DEAD CRANK SWITCH is OFF before proceeding.
2. Open battery access doors, and right and left front doors.
3. Close shutoff valves (Figure 1, Sheet 1, Item 1) and (Figure 1, Sheet 1, Item 2).
4. Remove hose clamp (Figure 1, Sheet 1, Item 3) and disconnect hose (Figure 1, Sheet 1, Item 4) from shutoff valve (Figure 1, Sheet 1, Item 1) located behind alternator.
5. Remove screws (Figure 1, Sheet 2, Item 5), lock washer (Figure 1, Sheet 2, Item 6), and hose clamp (Figure 1, Sheet 2, Item 7).
6. Remove hose clamp (Figure 1, Sheet 2, Item 8) and disconnect hose (Figure 1, Sheet 1, Item 4) from hose mender fitting (Figure 1, Sheet 2, Item 9) at bottom of heater (Figure 1, Sheet 2, Item 10), and remove hose (Figure 1, Sheet 1, Item 4).
7. Remove two hose clamps (Figure 1, Sheet 2, Item 11), hose mender fitting (Figure 1, Sheet 2, Item 9), and 90-degree hose elbow (Figure 1, Sheet 2, Item 12) from heater (Figure 1, Sheet 2, Item 10).
8. Remove hose clamp (Figure 1, Sheet 1, Item 13) and disconnect hose (Figure 1, Sheet 1, Item 14) from shutoff valve (Figure 1, Sheet 1, Item 2) located below alternator.
9. Remove two screws (Figure 1, Sheet 2, Item 15), two nuts (Figure 1, Sheet 2, Item 16), and two hose clamps (Figure 1, Sheet 2, Item 17).
10. Remove hose clamp (Figure 1, Sheet 2, Item 18) and disconnect hose (Figure 1, Sheet 1, Item 14) from hose mender fitting (Figure 1, Sheet 2, Item 19) at top of heater (Figure 1, Sheet 2, Item 10), and remove hose (Figure 1, Sheet 1, Item 14).
11. Remove two hose clamps (Figure 1, Sheet 2, Item 20), hose mender fitting (Figure 1, Sheet 2, Item 19), and 90-degree hose elbow (Figure 1, Sheet 2, Item 21) from heater (Figure 1, Sheet 2, Item 10).
12. Remove hose clamp (Figure 1, Sheet 2, Item 22) and disconnect low-pressure hose (Figure 1, Sheet 2, Item 23) from IN side of fuel metering pump (Figure 1, Sheet 2, Item 24).
13. Remove hose clamp (Figure 1, Sheet 1, Item 25) and disconnect low-pressure hose (Figure 1, Sheet 1, Item 23) from male hose barb fitting (Figure 1, Sheet 1, Item 26) on left side of fuel tank, and remove hose (Figure 1, Sheet 1, Item 23).
14. Remove two hose clamps (Figure 1, Sheet 2, Item 27) and disconnect flexible braided leak-off hose (Figure 1, Sheet 2, Item 28) from OUT side of fuel metering pump (Figure 1, Sheet 2, Item 24) and from bottom of heater (Figure 1, Sheet 2, Item 10).

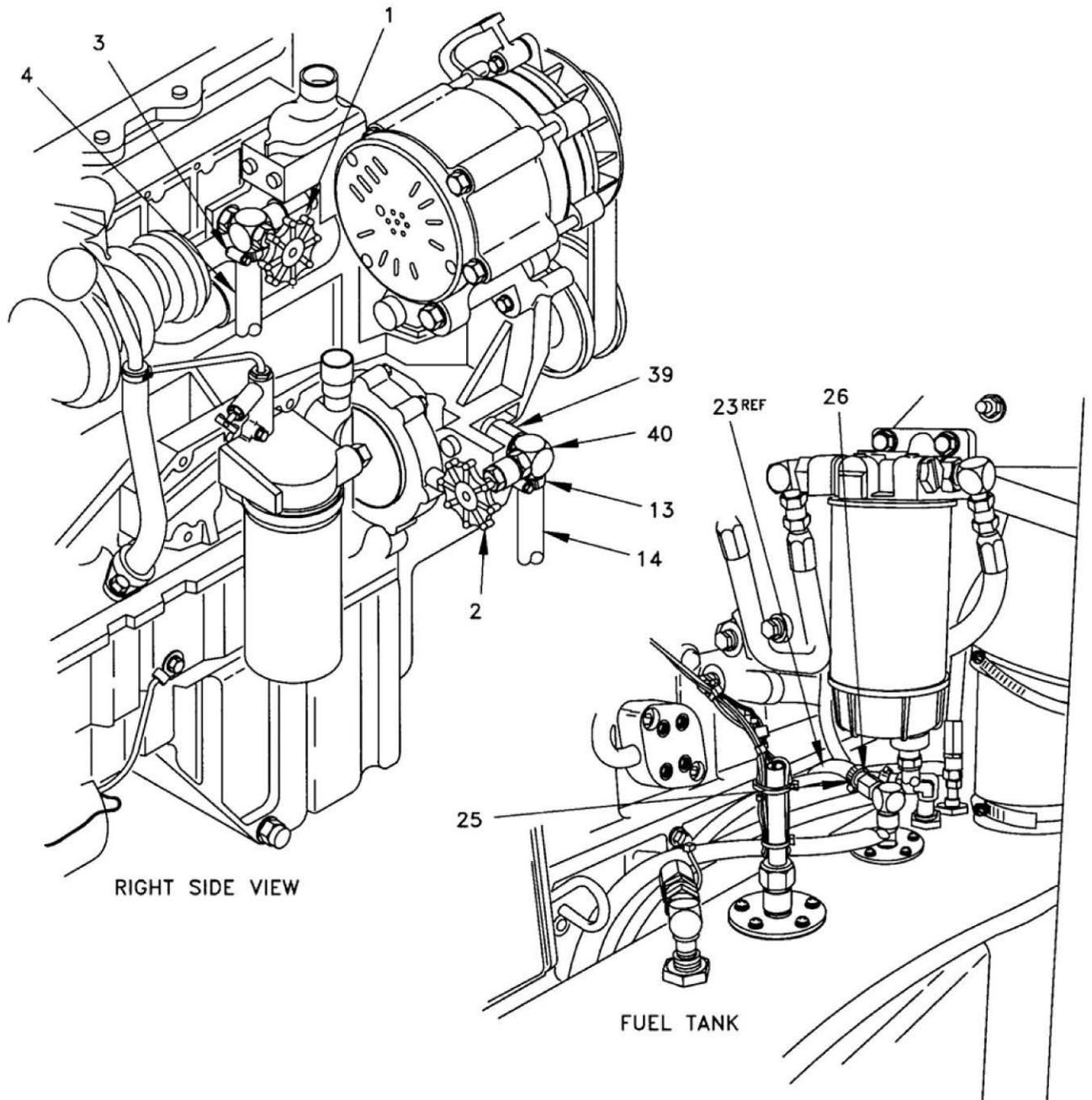


Figure 1. Winterization Heater Hoses (Sheet 1 of 2).

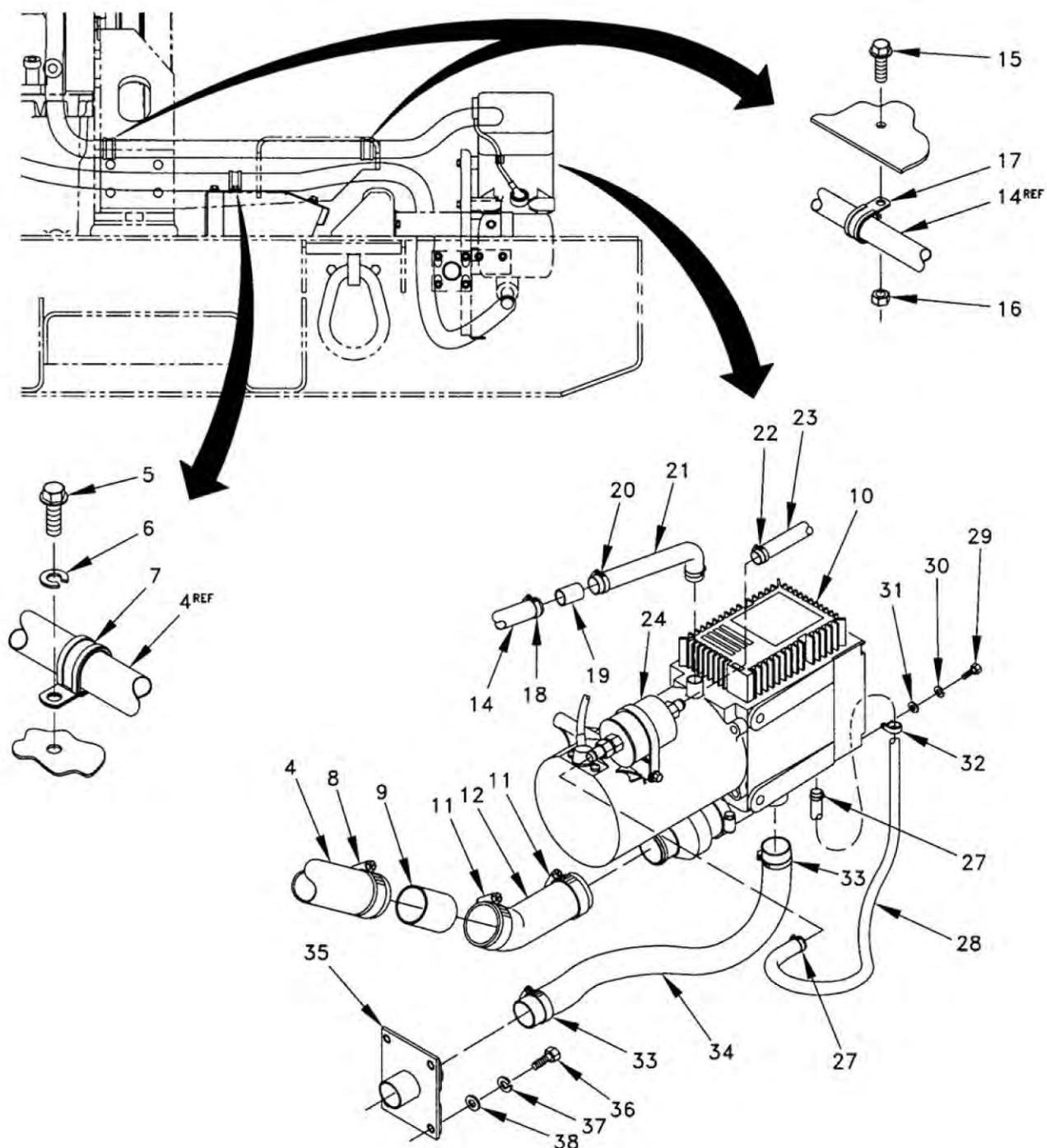


Figure 1. Winterization Heater Hoses (Sheet 2 of 2).

15. Remove screw (Figure 1, Sheet 2, Item 29), lock washer (Figure 1, Sheet 2, Item 30), washer (Figure 1, Sheet 2, Item 31), clamp (Figure 1, Sheet 2, Item 32), and flexible braided leak-off hose (Figure 1, Sheet 2, Item 28).
16. Remove two hose clamps (Figure 1, Sheet 2, Item 33) and disconnect flexible exhaust tubing (Figure 1, Sheet 2, Item 34) from heater (Figure 1, Sheet 2, Item 10) and from heater exhaust adapter (Figure 1, Sheet 2, Item 35).

17. Remove four screws (Figure 1, Sheet 2, Item 36), lock washers (Figure 1, Sheet 2, Item 37), washers (Figure 1, Sheet 2, Item 38), and heater exhaust adapter (Figure 1, Sheet 2, Item 35) from skid base.
18. Remove shutoff valve (Figure 1, Sheet 1, Item 2), adapter (Figure 1, Sheet 1, Item 39), and elbow (Figure 1, Sheet 1, Item 40). Repeat for other shutoff valve (Figure 1, Sheet 1, Item 1).

END OF TASK

INSTALLATION

NOTE

Apply sealing compound to all male pipe threads before connecting.

1. Install elbow (Figure 1, Sheet 1, Item 40), adapter (Figure 1, Sheet 1, Item 39), and shutoff valve (Figure 1, Sheet 1, Item 2). Repeat for other shutoff valve (Figure 1, Sheet 1, Item 1).
2. Install heater exhaust adapter (Figure 1, Sheet 2, Item 35) on skid base and secure with four washers (Figure 1, Sheet 2, Item 38), lock washers (Figure 1, Sheet 2, Item 37), and screws (Figure 1, Sheet 2, Item 36).
3. Connect flexible exhaust tubing (Figure 1, Sheet 2, Item 34) to heater exhaust adapter (Figure 1, Sheet 2, Item 35) and to heater (Figure 1, Sheet 2, Item 10) and install two hose clamps (Figure 1, Sheet 2, Item 33).
4. Install flexible braided leak-off hose (Figure 1, Sheet 2, Item 28), hose clamp (Figure 1, Sheet 2, Item 32), washer (Figure 1, Sheet 2, Item 31), lock washer (Figure 1, Sheet 2, Item 30), and screw (Figure 1, Sheet 2, Item 29).
5. Connect flexible braided leak-off hose (Figure 1, Sheet 2, Item 28) to OUT side of fuel metering pump (Figure 1, Sheet 2, Item 24) and to bottom of heater (Figure 1, Sheet 2, Item 10) and install two hose clamps (Figure 1, Sheet 2, Item 27).
6. Connect low-pressure hose (Figure 1, Sheet 1, Item 23) to male hose barb fitting (Figure 1, Sheet 1, Item 26) on left side of fuel tank and install hose clamp (Figure 1, Sheet 1, Item 25).
7. Connect low-pressure hose (Figure 1, Sheet 1, Item 23) to IN side of fuel metering pump (Figure 1, Sheet 2, Item 24) and install hose clamp (Figure 1, Sheet 2, Item 22).
8. Install 90-degree hose elbow (Figure 1, Sheet 2, Item 21) and hose mender fitting (Figure 1, Sheet 1, Item 19) on top of heater (Figure 1, Sheet 2, Item 10), and install two hose clamps (Figure 1, Sheet 1, Item 20).
9. Connect hose (Figure 1, Sheet 1, Item 14) to hose mender fitting (Figure 1, Sheet 2, Item 19), and install hose clamp (Figure 1, Sheet 2, Item 18).
10. Install two hose clamps (Figure 1, Sheet 2, Item 17) with two screws (Figure 1, Sheet 2, Item 15) and two nuts (Figure 1, Sheet 2, Item 16).
11. Connect hose (Figure 1, Sheet 1, Item 14) to shutoff valve (Figure 1, Sheet 1, Item 2) located below alternator and install hose clamp (Figure 1, Sheet 1, Item 13).
12. Install 90-degree hose elbow (Figure 1, Sheet 2, Item 12) and hose mender fitting (Figure 1, Sheet 2, Item 9) on bottom of heater (Figure 1, Sheet 2, Item 10) and install two hose clamps (Figure 1, Sheet 2, Item 11).
13. Connect hose (Figure 1, Sheet 1, Item 4) to hose mender fitting (Figure 1, Sheet 2, Item 9) and install hose clamp (Figure 1, Sheet 2, Item 8).
14. Install hose clamp (Figure 1, Sheet 2, Item 7) with screw (Figure 1, Sheet 2, Item 5) and lock washer (Figure 1, Sheet 2, Item 6).
15. Connect hose (Figure 1, Sheet 1, Item 4) to shutoff valve (Figure 1, Sheet 1, Item 1) located behind alternator and install hose clamp (Figure 1, Sheet 1, Item 3).
16. Open shutoff valves (Figure 1, Sheet 1, Item 1) and (Figure 1, Sheet 1, Item 2).
17. Refill coolant system (WP 0063).
18. Close right and left front doors and battery access doors.

END OF TASK

END OF WORK PACKAGE

SUSTAINMENT MAINTENANCE**TACTICAL QUIET GENERATOR 100 kW, 50/60 Hz MEP-807A/PU-807A****WINTERIZATION THERMOSTAT, RESISTORS, AND DIODE: REMOVAL, INSTALLATION**

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, General Mechanic's (GMTK) (WP 0122, Table 2, Item 2)
Tool Set, Standard Automotive (SATS) Base (WP 0122, Table 2, Item 3)

Materials/Parts

Insulation sleeving (WP 0123, Table 1, Item 28)
Solder (WP 0123, Table 1, Item 48)
Tiedown strap (WP 0123, Table 1, Item 51)

Personnel Required

One

References

TM 9-6115-729-24P

Equipment Condition

Generator Set fully stopped
Engine Control Switch in OFF/RESET Position
Battery Disconnect Switch set in OFF Position
Dead Crank Switch set in OFF Position

WARNING

Metal jewelry will conduct electricity. All jewelry can become entangled in generator set components. Remove all jewelry when working on generator set. Failure to comply can cause injury or death to personnel by electrocution.

WARNING

DO NOT wear loose clothing when performing checks, services and maintenance. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when this generator set is in operation. Make sure unit is completely shut down and free of any power source before attempting any repair or maintenance on the unit. Failure to comply can cause injury or death to personnel.

WARNING

High voltage is produced when the generator set is in operation. Never attempt to start or maintain the generator set unless it is properly grounded. Failure to comply can cause injury or death to personnel.

WARNING

DC voltages are present at generator set electrical components even with generator set shut down. Avoid shorting any positive with ground/negative. Failure to comply can cause injury to personnel and damage to equipment.

WARNING

Avoid breathing fumes generated by soldering. Eye protection is required. Good general ventilation is normally adequate. Failure to comply can cause injury to personnel.

REMOVAL**NOTE**

Cut tiedown straps as required.

1. Ensure generator set is fully stopped, ENGINE CONTROL switch is OFF/RESET, Battery Disconnect Switch is OFF, and DEAD CRANK SWITCH is OFF before proceeding.
2. Open control box door and control box panel.
3. To remove thermostat (Figure 1, Item 1), at left side of control box assembly, tag and disconnect spade terminals as follows:
 - Lead from TS-1 to TB4-17
 - Lead from TS-2 to TB4-12
4. Remove two nuts (Figure 1, Item 2), screws (Figure 1, Item 3), and thermostat (Figure 1, Item 1).
5. To remove either resistor HTR1 (Figure 1, Item 4), located below GSC+P, or HTR2 (Figure 1, Item 5), located on right side of control panel, unsolder leads and remove two nuts (Figure 1, Item 6), screws (Figure 1, Item 7), and resistor (Figure 1, Item 4) or (Figure 1, Item 5).
6. Tag and disconnect spade terminals and wiring as follows:
 - HTR-1 lead 1 to TB4-10B
 - HTR-2 lead 1 to TB3-10B
 - HTR-1 lead 2 to HTR-2 lead 2

NOTE

Note orientation of diode before removing.

7. To remove diode (Figure 1, Item 8), tag and disconnect spade terminals as follows:
 - Cathode of diode to TB4-10
 - Anode of diode to TB4-12
8. Remove diode (Figure 1, Item 8).

END OF TASK**INSTALLATION****NOTE**

Install tiedown straps as required.

1. To install diode (Figure 1, Item 8), connect spade terminals as follows:
 - Cathode of diode to TB4-10
 - Anode of diode to TB4-12