

Chapter 78

EXHAUST

FBA-2C1, FBA-2C2, FBA-2C3
FBA-2C4, FBA-2C3T, FBA-2C4T

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78 EXHAUST

78-00 GENERAL

Reference Figure 78-00-01

The 2C1 and 2C2 exhaust system consists of a Port and Starboard collector assembly and a muffler. The muffler is encased in a heat exchanger shroud (aka heater muff) which supplies heat to the cabin heater system.

The 2C3 and 2C4 dual exhaust system consists of individual port and starboard exhaust stacks joined to port and starboard 3-into-1 collectors. This connection is made with slip joints to allow for expansion. The mufflers are connected to the 3-into-1 collectors via standard 2.5” diameter spring loaded ball joints. The tail pipes are “rigidly” connected to the mufflers with flanged clamps and project out the bottom of the cowl. The tail pipes are supported by stainless steel springs hung from the firewall which connect to tabs on the tail pipes. The ball joint connections and springs allow for the relative motion between the engine and the firewall.

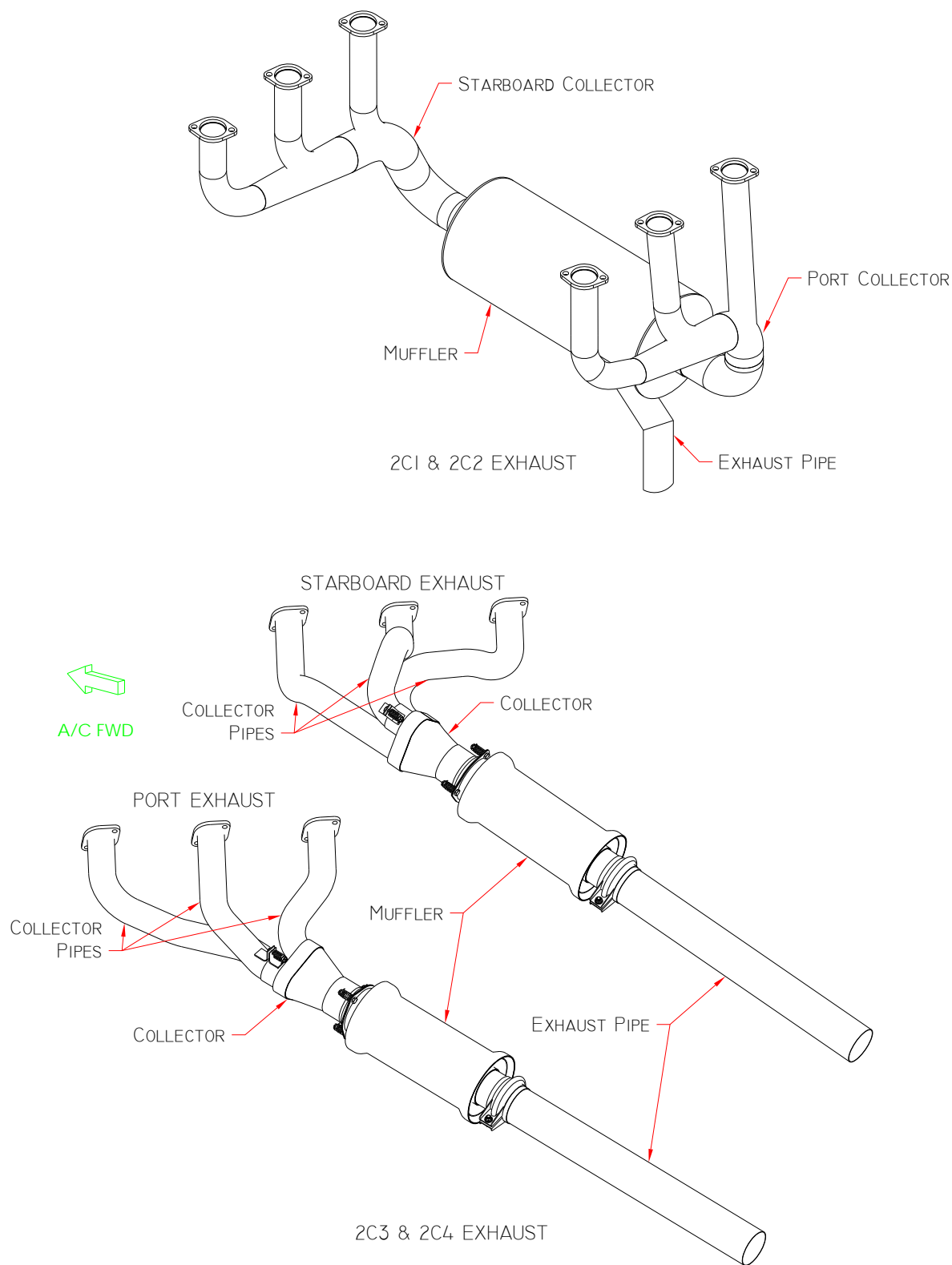


Figure 78-00-01 Exhaust System (All Models)

78-10 COLLECTOR PIPES

The collector assemblies on 2C1 and 2C2 aircraft are a one piece welded stainless steel tubes. The collectors on 2C3 and 2C4 aircraft are welded assemblies that fasten directly to the mufflers and form a slip joint with collector pipes.

71-10-10 Removal and Installation (2C1 and 2C2)

Collector Removal

- Step 1. Gain access to the Port or Starboard collector through engine access panel CP2 or CS2.
- Step 2. If the Port collector is being removed, remove the clamp which attaches the collector to the muffler. There is no clamp on the Starboard side.
- Step 3. If the Starboard collector is being removed, remove the clamp which secures the E.G.T. probe. There is no probe on the Port side.
- Step 4. Remove the two nuts from the cylinder studs on each of the three cylinders. Collector is now free.
- Step 5. Lower collector at the same time as working it outboard to clear the muffler.

Collector Installation

- Step 1. Place the collector in position by working the lower end into the muffler and the top pipes into the exhaust openings of each cylinder.
- Step 2. Install the two nuts for the cylinder studs on each of the three cylinders.
- Step 3. If the Port collector is being installed, install the clamp which attaches the collector to the muffler. There is no clamp on the Starboard side.
- Step 4. If the Starboard collector is being installed, install the clamp which secures the E.G.T. probe. There is no probe on the Port side.
- Step 5. Torque the cylinder exhaust flange nuts to 15 to 17 ft. lbs.
- Step 6. Carry out an engine run to confirm connections and operation of the collector

71-10-20 Removal and Installation (2C3 and 2C4)

Collector Removal

Refer to Figure 78-10-01

- Step 1. Remove cowl – see Chapter 71.
- Step 2. Remove heat exchanger shroud from muffler. The shroud is clamped onto the muffler using several bolts along the length of the shroud.
- Step 3. Remove heat shield. The heat shield is fastened to the collector and collector pipes using gear clamps.
- Step 4. Release springs securing the exhaust pipe at the fire wall.
- Step 5. Remove hardware securing collector to collector pipe (1 place). Cotter pin is scrap and must be replaced on installation.
- Step 6. Slide the collector, muffler and exhaust pipe off the collector pipes and remove from aircraft.
- Step 7. Remove hardware securing collector to muffler (3 places). Cotter pin is scrap and must be replaced on installation.
- Step 8. Collector is now free.

Collector Installation

Refer to Figure 78-10-01

- Step 1. Polish the ball joint on the collector and muffler with emery cloth to ensure the surfaces are smooth and free of burrs.
- Step 2. Apply a thin layer of high temperature (+1600 F) anti-seize to polished joint surfaces.
- Step 3. Fit the collector with muffler.
- Step 4. Install the hardware to secure the collector to the muffler - bolts, springs, washers, nuts and cotter pins - (3 places). Torque the nuts far enough to install cotter pin. Ensure that the collector and muffler will rotate about the ball joint.

- Step 5. Fit the collector (with muffler) to the collector pipes and attach the springs securing the exhaust pipe at the fire wall.
- Step 6. Install the hardware securing the collector to the collector pipe (1 place). Torque the nut far enough to install cotter pin. Note that only one collector pipe is attached to the collector with hardware.
- Step 7. Install heat shield.
- Step 8. Install heat exchanger shroud onto the muffler
- Step 9. Install cowl – see Chapter 71.
- Step 10. Carry out an engine run to confirm connections and operation of the collector

Collector Pipes Removal

Refer to Figure 78-10-01

- Step 1. Remove cowl – see Chapter 71.
- Step 2. Remove heat exchanger shroud from muffler. The shroud is clamped onto the muffler using several bolts along the length of the shroud
- Step 3. Remove heat shield. The heat shield is fastened to the collector and collector pipes using gear clamps
- Step 4. Disconnect the springs securing the exhaust pipe at the fire wall – see Figure 78-10-01 Detail A.
- Step 5. Remove the E.G.T. probes from each collector pipe. The E.G.T. probes are secured to collector pipes with a worm gear type clamp.
- Step 6. Remove the two nuts from the cylinder studs on each of the three cylinders.
- Step 7. The entire exhaust is now free.
- Step 8. Remove hardware securing collector to collector pipe (1 place) – see Figure 78-10-01 Detail B. Cotter pin is scrap and must be replaced on installation.
- Step 9. The collector pipes are now free. Note that only one pipe is secured to the collector with hardware. The other two pipes form only a slip joint with the collector.

Note: To free the collector pipes from the collector you might have to wiggle, rotate, and pull the pipes as they may be seized due to frequent heat cycles.

Collector Pipes Installation

Refer to Figure 78-10-01

- Step 1. Fit the collector pipes into the collector.
- Step 2. Install the hardware securing the collector pipe to the collector (1 place) – see Figure 78-10-01 Detail B. Torque the nut far enough to install cotter pin. Note that only one pipe is attached to the collector with hardware.
- Step 3. Bring the exhaust assembly to the engine and fit the collector pipe flanges onto the cylinder studs (2 per collector pipe).
- Step 4. Install nuts to secure the collector pipes to the cylinder heads.
- Step 5. Torque the nuts to 15 to 17 ft. lbs.
- Step 6. Attach springs located at the fire wall to the exhaust pipe – see Figure 78-10-01 Detail A.
- Step 7. Install heat shield.
- Step 8. Install heat exchanger shroud onto the muffler
- Step 9. Install cowl – see Chapter 71.
- Step 10. Carry out an engine run to confirm connections and operation of the collector pipes

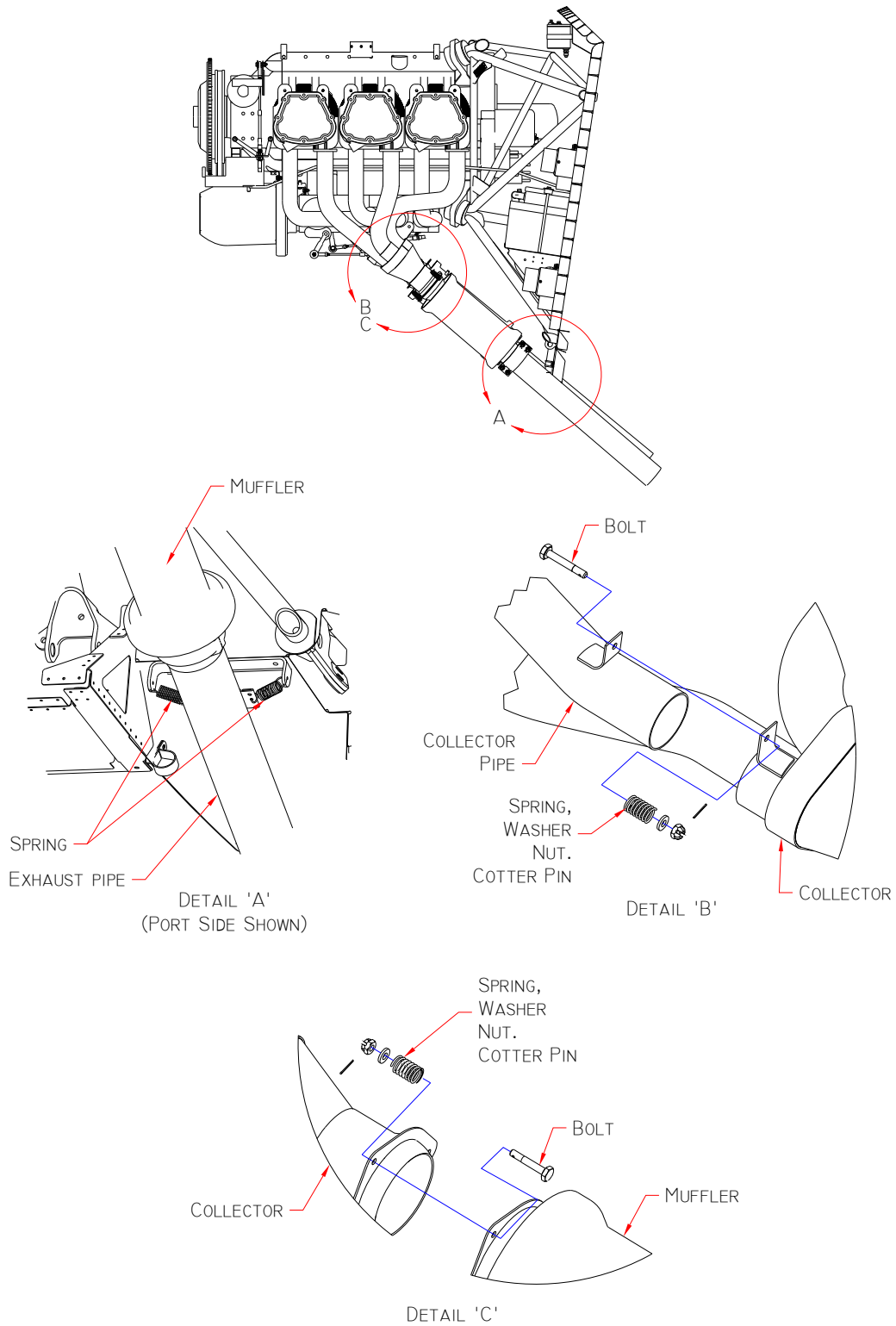


Figure 78-10-01 2C3 & 2C4 Collector Installation

FBA-2C1, FBA-2C2, FBA-2C3
FBA-2C4, FBA-2C3T, FBA-2C4T

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78-11 EXHAUST GASKETS

Unless there is an obvious failure of one exhaust gasket, it is recommended that if one gasket is leaking and must be replaced, then all the gaskets on that collector be replaced at the same time.

Exhaust Gasket Removal

- Step 1. Remove either the Port or Starboard collector/collector pipes as required per Chapter 78-10.
- Step 2. Remove the exhaust gasket(s) from the exhaust port on each cylinder.

Exhaust Gasket Installation

- Step 1. Place exhaust gasket on the cylinder exhaust port.
- Step 2. Install the collector/collector pipes per Chapter 78-10.
- Step 3. Carry out an engine run, and then check the gasket(s) for evidence of leakage.

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78-21 MUFFLER

78-21-10 Removal and Installation (2C1 and 2C2)

Muffler Removal

- Step 1. Gain access to the muffler through engine access CP1 and CP2.
- Step 2. Remove the clamp on the Port side which attaches the Port collector.
- Step 3. Remove the heater muff inlet duct and outlet duct clamps and ducts.
- Step 4. Remove either the Port or Starboard collector per Chapter 78-10.
- Step 5. Remove muffler through side which collector was removed.

Muffler Installation

- Step 1. Lay muffler in roughly in position in the belly cowl.
- Step 2. Install either the Port or Starboard collector per Chapter 78-10. As collector is being installed locate muffler on lower end of both collectors.
- Step 3. Install clamp on Port side which attaches Port collector to muffler. Position the exhaust stub in the center of the exhaust cutout in the belly cowl and then tighten the Port side clamp.
- Step 4. Install the heater muff inlet duct and outlet ducts and clamps.
- Step 5. Carry out an engine run to confirm all connections and operation of the muffler.

78-21-20 Removal and Installation (2C3 and 2C4)

Muffler Removal

Refer to Figure 78-21-01

- Step 1. Remove the collector – see 78-10
- Step 2. Remove hardware from the clamp securing exhaust pipe to the muffler.
- Step 3. Remove the clamp.

Step 4. The muffler is now free.

Muffler Installation

Refer to Figure 78-21-01

- Step 1. Fit the clamp over the flanges in exhaust pipes and the muffler.
- Step 2. Install hardware. Do not torque as the exhaust pipe will need position adjustment later.
- Step 3. Install the collector per 78-10 except Steps 7 through 10.
- Step 4. Ensure alignment of the exhaust pipe per Figure 78-10-01 Detail A.
- Step 5. Torque hardware securing the muffler/exhaust pipe clamp to 50-70 in-lbs
- Step 6. Install heat shield.
- Step 7. Install heat exchanger shroud onto the muffler
- Step 8. Install cowl – see Chapter 71.
- Step 9. Carry out an engine run to confirm all connections and operation of the muffler.

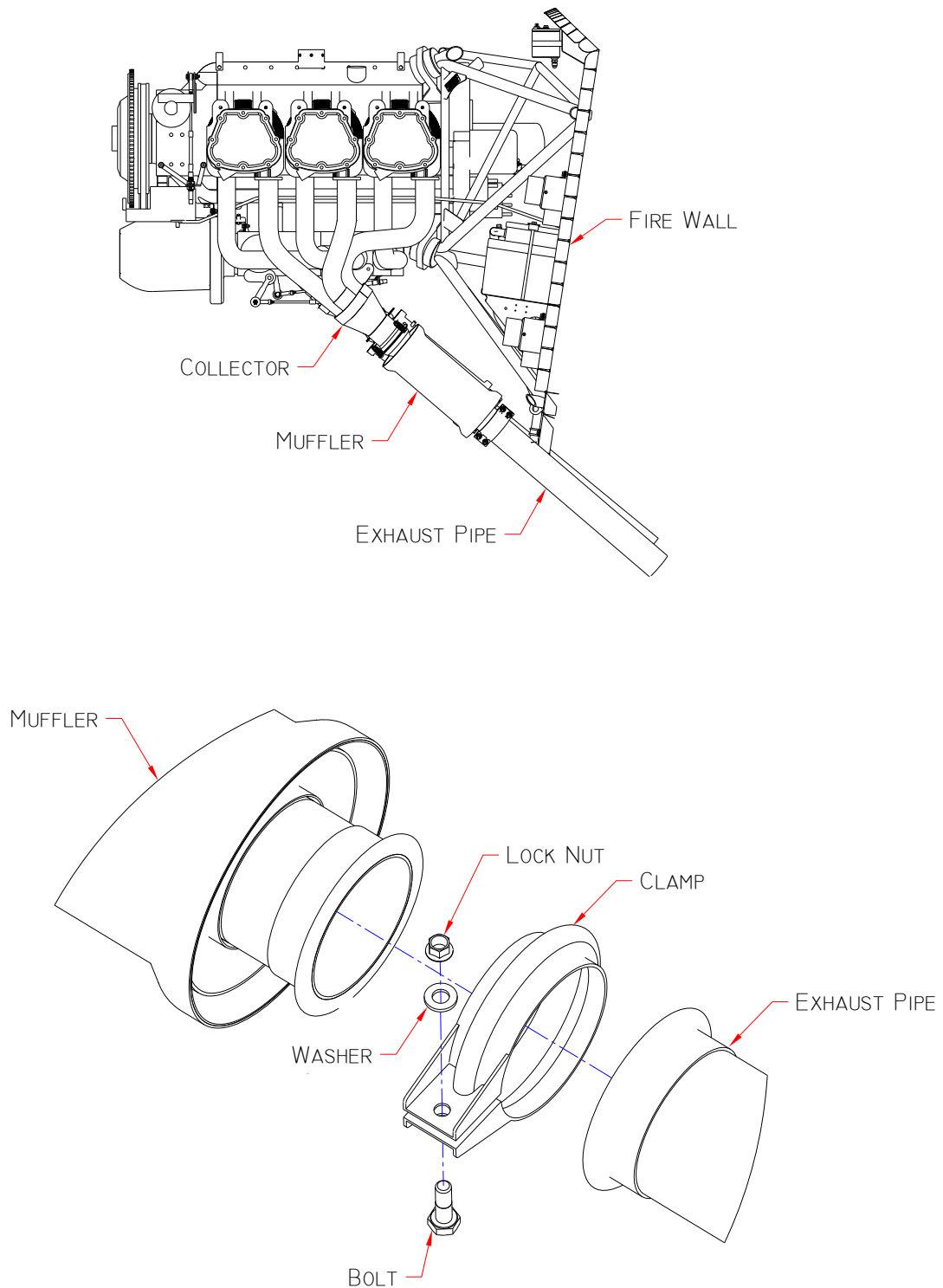


Figure 78-21-01 2C3 & 2C4 Muffler Installation

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