



TECHNICAL DATA SHEET

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TITAN® EXP™ Parallel Valve Tapered Fin Cylinder Complete Assembly

1.0 **Subject:** TITAN® EXP™ Parallel Valve Tapered Barrel Fin Cylinder

2.0 **Availability and Part Numbers:** The Parallel Valve Tapered Barrel Fin Cylinders are sold through Engine Components Inc. (ECI®) under the TITAN EXP brand. (See 2.0 Cylinder Description table below.)

3.0 **Reference:** For documents referenced in this document go to www.eci2fly.com.

4.0 **General Description:** An EXPERIMENTAL cylinder assembly based on a certificated design but with modifications to reduce weight, improve intake airflow and accommodate 14mm spark plugs as an option, replacing 18mm spark plugs in the top position or in both positions.

5.0 **Engine Applications:** Call for information regarding engine applications

6.0 **Cylinder Schematic:** The cylinder components and their assembly are shown in Figure 3 and Figure 4 which are included in the Section "Illustrated Parts List".

7.0 **Safety Information:** The following special attention notices are used in this Technical Data Sheet to notify and advise the installer and user of the product that certain actions or procedures may be dangerous to the user or result in damage to the product.

NOTE

Notes are used to notify of installation, operation or maintenance information that is important but not safety related.

2.0 CYLINDER DESCRIPTION

| Engine Series | Cylinder Part Number | Barrel Length | Nickel+Carbide™ Bore | Top Spark Plug Dia. | Bottom Spark Plug Dia. | Piston Part Number |
|---------------|----------------------|---------------|----------------------|---------------------|------------------------|--------------------|
| 320 | TISN04.0X18CA | 6.5 | Yes | 18 mm | 18 mm | AEL75413 |
| 320 | TISN04.0X14CA | 6.5 | Yes | 14 mm | 14 mm | AEL75413 |
| 320 | TISN04.0X11CA | 6.5 | Yes | 14 mm | 18 mm | AEL75413 |
| 320 | TISN04.1X18CA | 6.5 | Yes | 18 mm | 18 mm | AEL75089 |
| 320 | TISN04.1X14CA | 6.5 | Yes | 14 mm | 14 mm | AEL75089 |
| 320 | TISN04.1X11CA | 6.5 | Yes | 14 mm | 18 mm | AEL75089 |
| 320 | TISN04.3X18CA | 6.5 | Yes | 18 mm | 18 mm | AEL15357 |
| 320 | TISN04.3X14CA | 6.5 | Yes | 14 mm | 14 mm | AEL15357 |
| 320 | TISN04.3X11CA | 6.5 | Yes | 14 mm | 18 mm | AEL15357 |
| 360 | TISN12.0X18CA | 7.0 | Yes | 18 mm | 18 mm | AEL75089 |
| 360 | TISN12.0X14CA | 7.0 | Yes | 14 mm | 14 mm | AEL75089 |
| 360 | TISN12.0X11CA | 7.0 | Yes | 14 mm | 18 mm | AEL75089 |
| 360 | TISN12.2X18CA | 7.0 | Yes | 18 mm | 18 mm | AEL75413 |
| 360 | TISN12.2X14CA | 7.0 | Yes | 14 mm | 14 mm | AEL75413 |
| 360 | TISN12.2X11CA | 7.0 | Yes | 14 mm | 18 mm | AEL75413 |
| 360 | TISN12.3X18CA | 7.0 | Yes | 18 mm | 18 mm | AEL15357 |
| 360 | TISN12.3X14CA | 7.0 | Yes | 14 mm | 14 mm | AEL15357 |
| 360 | TISN12.3X11CA | 7.0 | Yes | 14 mm | 18 mm | AEL15357 |

CAUTION

Caution is used to indicate the presence of a hazard which will or can cause minor injury or property damage if the notice is ignored.

WARNING

Warning advises that a potential hazard exists and denotes actions and procedures that must be followed exactly to either eliminate or reduce the hazard and to avoid serious personal injury or prevent future safety problems with the product.

DANGER

Danger is used to indicate the presence of a hazard that will result in severe personal injury, death or property damage if the notice is ignored.

8.0 **Assembly Description:** Some components in the TITAN EXP cylinder assembly are unique and some are common to the certified version from which the TITAN EXP version is derived.

8.1 **Unique Components:**

- Venturi intake seat, AEL72052
- Tapered fin barrel (320 and 360 series)
- 14 mm sparkplug boss option in the top position or in both positions.

8.2 **Common Components:** The following components in the TITAN EXP cylinder assembly are in common with certified cylinders of the same functional design and may be used interchangeably.

- Exhaust seat
- Exhaust and Intake Valves
- Valve springs, keepers, retainers and rotators
- Piston pin assembly *
- Rocker shaft assembly
- Rocker boss bushings
- Rocker arms *
- Valve cover *
- Studs
- Attaching hardware (including hardware for inter-cylinder baffles *), o-rings and gaskets.
-

NOTE

Components marked with an asterisk (*) are **NOT** included in a complete cylinder assembly kit but are available.

DANGER

Reconfiguring TITAN EXP cylinder complete assembly part numbers and installing the reconfigured cylinders on approved engine applications may result in product and or engine failure.

8.3 **Paint:** TITAN EXP parallel valve cylinders are supplied unpainted, however, the outside of the barrel is coated with a zinc chromate primer. Paint cylinders in accordance with the following steps:

1. Clean the cylinder to remove all traces of oil and grease.
2. Mask the following areas:
 - Rocker box section including the rocker box flange
 - Intake and exhaust port faces
 - Thermocouple hole
 - Push rod shroud tube holes
 - All other exposed threaded surfaces in which paint might accumulate
 - The underside of the flange (the area in contact with the crankcase) and the skirt that extends into the crankcase
 - The contact area where the cylinder hold down nuts touch the cylinder flange
3. Paint exposed areas with a heat resistant paint.
4. Use a rag dipped in paint thinner to remove all traces of paint from surfaces mentioned in step 2 above.

9.0 **Installation Instructions:**

9.1 **Cylinder Assemblies:** TITAN EXP cylinder assemblies should be installed on an eligible engine as described in Engine Components, Inc. Service Instruction No. 96-3.

WARNING

It is against Federal Regulations to install EXPERIMENTAL products on certified engines.

Always install TITAN EXP cylinder assemblies in sets. Do not mix TITAN EXP cylinder assemblies with certified cylinders on the same EXPERIMENTAL engine.

9.2 Inter-cylinder Baffles:

9.2.1 Part Numbers: Due to the shape of the tapered fins on the barrel, specially designed inter-cylinder baffles (and baffle assemblies) must be installed to insure proper cooling of the cylinders. The following chart contains the correct baffle part numbers to be used with various barrel lengths and fuel systems. (See table 9.2.1 Inter Cylinder Baffle Part Numbers).

NOTE

Standard baffle attaching hardware may be used.

9.2.2 Installation: All inter-cylinder baffles must be attached with an "S" type retaining hook and a slotted retainer. Hook the baffle retaining hook through the hole in the baffle. Place the baffle in position beneath and between the cylinders, running the hook up between the cylinder barrels. Place a baffle retainer in place between the cylinders and using a baffle installation tool, bring the retainer hook through the slot in the retainer. During the operation the retainer is forced down until the hook comes above the surface of the retainer

far enough to be turned and hooked over the bridge between the slots in the retainer.

10.0 Cylinder Baffles: Due to the shape of the tapered fin on the barrel, special attention should be taken to ensure the front and rear engine baffles (supplied by the airframe manufacturer) are properly sealed. Use Figure 1 and Figure 2 to build extensions and attach them to the original engine baffles.

11.0 Cylinder Break-in Instructions: Follow break-in instructions contained in ECi's booklet, "Engine Break-in Instructions and Oil Management", publication number M101.

12.0 Cylinder Removal and Reinstallation: TITAN EXP parallel valve cylinders should be removed from an engine and reinstalled as described in ECi Service Instruction No. 92-9-6

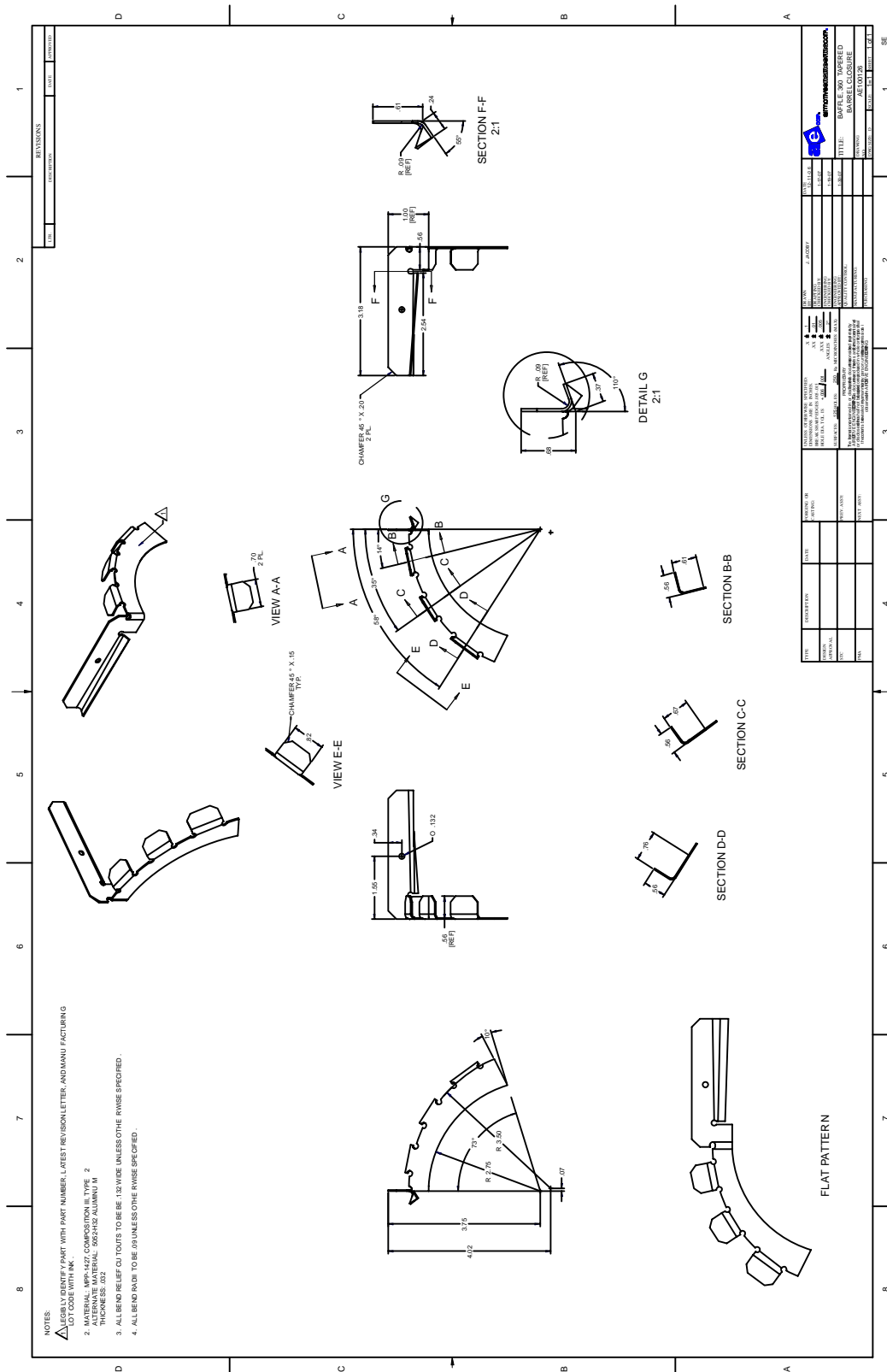
13.0 Continued Airworthiness and TBO: Follow the instructions for continued airworthiness contained in ECi Service Instruction No. 96-3. This Service Instruction also contains recommendations for Time Between Overhaul (TBO).

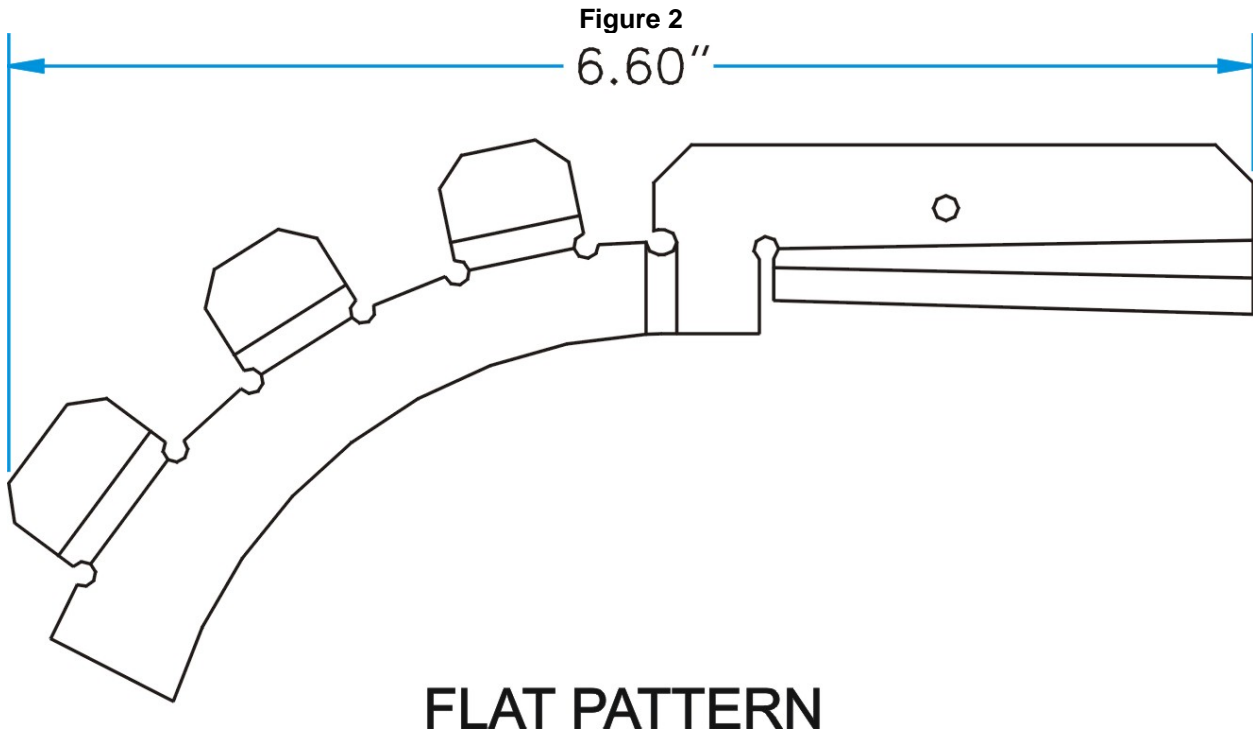
9.2.1 INTER-CYLINDER BAFFLE PART NUMBERS

| Barrel Length (inches) | Fuel System | Left Side | Right Side |
|------------------------|---------------------------------|-----------|------------|
| 6.5 | Carburetor | AE100105 | AE100105 |
| 6.5 | TITAN EXP Fuel Injection System | AE100105 | AE100106* |
| 7.0 | Carburetor | AE100060 | AE100060 |
| 7.0 | TITAN EXP Fuel Injection System | AE100060 | AE100061* |

* AE100106 and AE100061 are baffle assemblies that incorporate a grommetted hole in their design to accommodate a fuel line passing through the baffle.

Figure 1

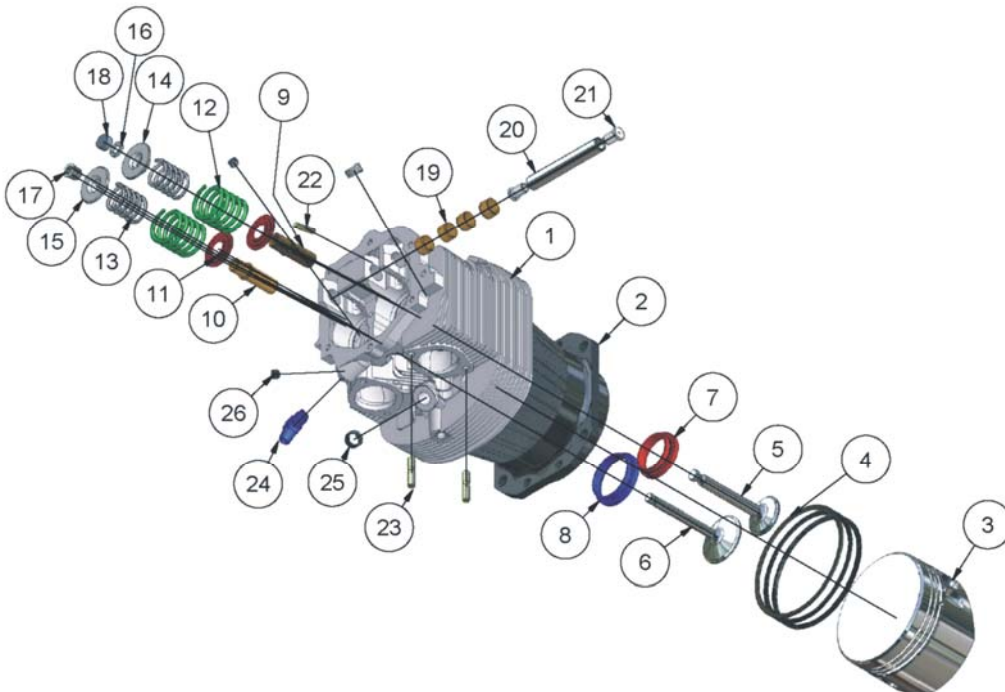




14.0 **Illustration and Parts List:**

14.1 Cylinder Complete Assembly Illustration

Figure 3



Note: Item No. 27 Gasket Set not shown.

14.2 Complete Assembly Parts List

Figure 4

| Item No. | Part Number | Description | TISN04.0X18CA | TISN04.0X14CA | TISN04.0X11CA | TISN04.1X18CA | TISN04.1X14CA | TISN04.1X11CA | TISN04.3X18CA | TISN04.3X14CA | TISN04.3X11CA | TISN12.0X18CA | TISN12.0X14CA | TISN12.0X11CA | TISN12.2X18CA | TISN12.2X14CA | TISN12.2X11CA | TISN12.3X18CA | TISN12.3X14CA | TISN12.3X11CA |
|----------|-------------|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | | | | | | | | | | | | | | | | | | |
| 1 | AE65100-1 | Head, Cylinder (18 mm S/P - Short Reach) | 1 | | | 1 | | | 1 | | | 1 | | | 1 | | | 1 | | |
| 1 | AE65100-3 | Head, Cylinder (14 mm S/P - Short Reach) | | 1 | | | 1 | | | 1 | | | 1 | | | 1 | | | | 1 |
| 1 | AE65100-4 | Head, Cylinder (14 & 18 mm S/P - Short Reach) | | | 1 | | | 1 | | | 1 | | | 1 | | | 1 | | | 1 |
| 2 | AE65161 | Barrel, Lyc. 540 Series, Wide Deck, Tapered | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | AE65162 | Barrel, Lyc. 320 Series, Wide Deck, Tapered | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | |
| 3 | AEL75089 | Piston (8.5:1 Compression Ratio) | | | | 1 | 1 | 1 | | | | 1 | 1 | 1 | | | | | | |
| 3 | AEL75413 | Piston (7.2:1 Compression Ratio) | 1 | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | | | |
| 3 | AEL15357 | Piston (9.0:1 Compression Ratio) | | | | | | | 1 | 1 | 1 | | | | | | | 1 | 1 | 1 |
| 4 | CN203 | Ring Set Nickel Bores | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | AEL19001 | Valve, Exhaust | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 6 | AEL73938 | Valve, Intake | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | AEL72058 | Insert, Valve Seat, Exhaust | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | AEL72052 | Insert, Valve Seat, Intake (Venturi) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | AEL74230HC | Guide, Exhaust High Chrome | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | AEL61681 | Guide, Valve, Intake | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | AEL13323 | Retainer, Valve Spring, Lower, Int. & Exh. | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 12 | AEL11800 | Spring Valve, Outer | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 13 | AEL11795 | Spring, Valve, Inner | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 14 | AEL16475 | Retainer, Valve Spring, Upper, Exhaust | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 15 | AEL10077 | Retainer, Valve Spring, Upper, Intake | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 16 | AEL13997-3 | Key, Valve, Exhaust | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 17 | AEL60009 | Key, Valve, Intake | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 18 | AEL13998-3 | Cap, Exhaust Valve | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 19 | AEL66610 | Bushing, Rocker Shaft | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 20 | AEL13790 | Shaft, Rocker, Parallel | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 21 | AEL12892 | Thrust Button, Rocker Shaft | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 22 | AEL25C9 | Stud, 1-1/8 Long | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 23 | AEL31C12 | Stud, Exhaust, 5/16x1-1/2 Long | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 24 | MS20823-6D | Elbow, 45 Degree, Pipe to tube | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | C2-52 | Insert, Helicoil (18 mm Short Reach) | 2 | | 1 | 2 | | 1 | 2 | | 1 | 2 | | 1 | 2 | | 1 | 2 | | 1 |
| 25 | 137-45 | Insert, Helicoil (14 mm) | | 2 | 1 | | 2 | 1 | | 2 | 1 | | 2 | 1 | | 2 | 1 | | 2 | 1 |
| 26 | MS27769-2 | Plug Pipe, Socket Head.1/8-27NPTF | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 27 | AEL12032-SC | Gasket Set , Parallel* | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

*Not shown in illustration.