

10-6.14. Rocker Arm Application, Installation and Reaming

CAUTION: Dual bushing rocker arms are no longer used in Continental 470, 520, or 550 engines - bushings for these rocker arms are no longer available. Current production rocker arms for 470, 520, and 550 engines feature an oil feed groove in the rocker arm bore and use a single bushing.

NOTE: Information contained in this section was derived from instructions published in **M77-19**, **SB97-11** and **SIL8-01**.

Table 10-28.1. Rocker Arm Applications

Engine	Intake Rocker Arm	Rocker Arm Bushing	Exhaust Rocker Arm	Rocker Arm Bushing
C-75, C-85, C-90, O-200-A, B, O-200-D, X, O-300, GO-300	639614	24122	639615	24122
E-165, E-185 E-225	646088	530367	646086	530367
IO-346 O-470-A, E, J IO-470-J, K LTSIO-520-AE, TSIO-520-AE	646088	530367	646086	530367
RR-O-240 Series IO-240-A, B IOF-240-B IO-360 Series L/TSIO-360 Series	639648	658703	639648	658703
O-470-G, O-470-GCI O-470-K, L, R, S O-470-M O-470-U IO-470-C, D, E, F, H, L, M, N, S, U, V, VO IO-520 Series IO-550-A, B, C IOF-550-B, C IO-550-D, E, F, L TSIO-520-AF, B, BB, C, CE, D, DB, E, EB, G, H, J, JB, K, KB, L, LB, M, N, NB, P, R, T, VB, UB, WB TSIOL-550-A, B, C	652131	658731	652130	658731
GTSIO-520 Series IO-550-G, N, P, R IOF-550-N, P, R TSIO-520-BE TSIO-550-A, B, C, E, G, J, K, N TSIOF-550-D, J, K, P	652966 ¹	658713	658745	658713

1. In earlier configurations, Part No. 652966 rocker arms were used in both intake and exhaust positions.

10-6.14.1. Rocker Arm Identification

Except for Part Nos. 639648 and 652966, rocker arms are designated as “Intake” or “Exhaust”. The distinction is important - installing rocker arms in the incorrect position may cause oil starvation to the valve train and/or shorten cylinder life.

Each rocker arm is marked with a Part Number at the time of manufacture. Over time, the part number may fade or become illegible. The illustrations in Figure 10-24.1 depict the identifying features in the intake and exhaust rocker arms combinations currently in use. Because Part No. 639648 may be installed in either location, it is not depicted in Figure 10-24.1.

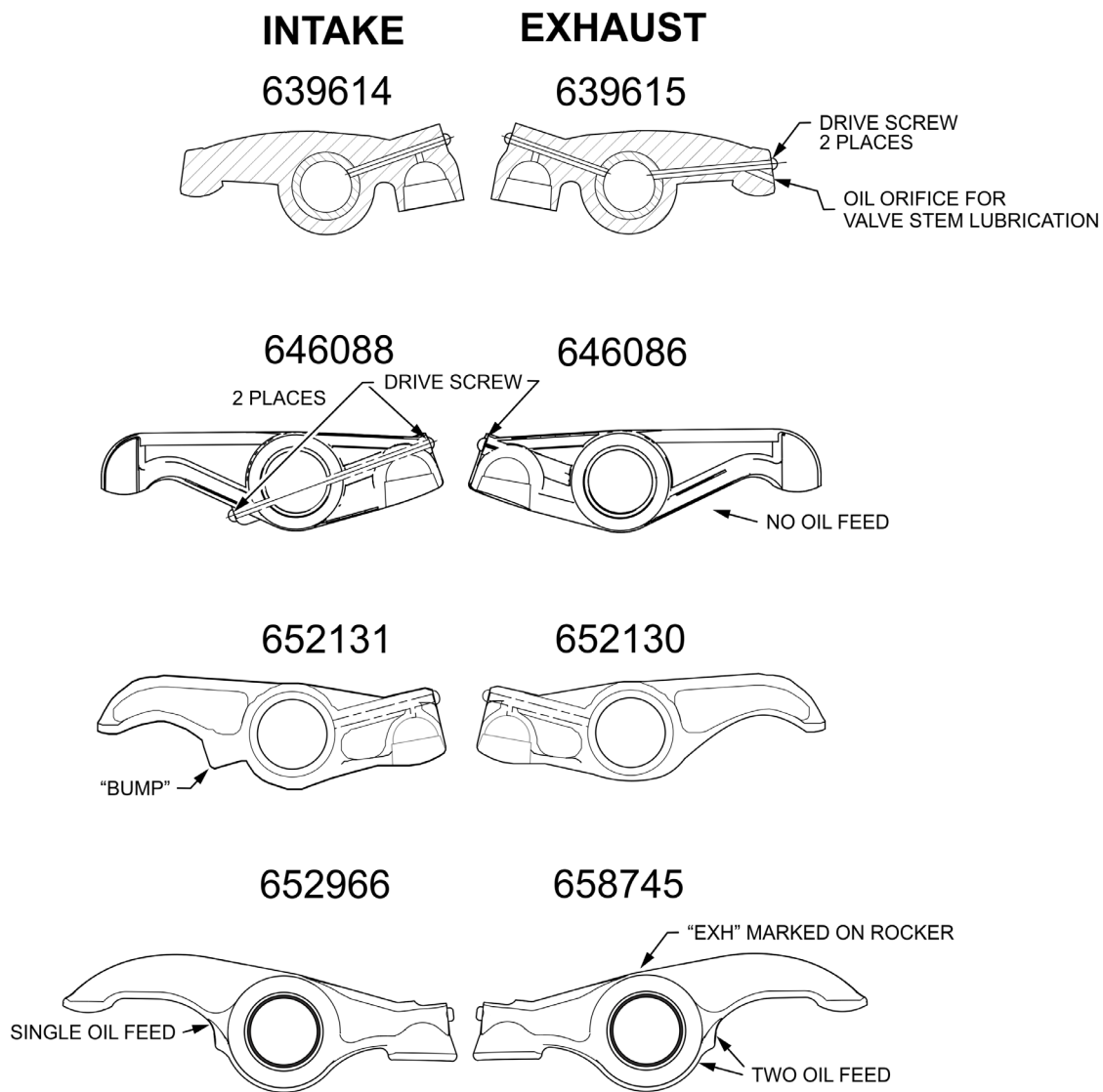


Figure 10-24.1. Rocker Arm Identification

10-6.14.2. Rocker Arm Inspection

1. Inspect the rocker arm foot contact area for wear, galling, spalling, scoring, or grooves; discard rocker arms exhibiting these conditions.
2. Inspect the rocker arm ball seats for wear and smoothness; discard rocker arms with gouged, scratched, etched, pitted or mushroomed ball seats.
3. Inspect the thrust surfaces of the rocker arm shaft bore for displaced metal, spalling, or galling; discard rocker arms exhibiting these conditions.
4. Inspect rocker arm exhibiting peeling copper plating, which can be a source of contamination in oil and spectrographic oil analysis. Use a scotch-brite pad to remove loose copper plating material.
5. Inspect for and discard rocker arms with loose or missing oil passage drive screws. Inspect oil passages for obstructions. Use an oil squirt bottle with clean 50 weight aviation engine oil to check oil passages for free flow. Discard rocker arms with blocked oil passages which cannot be cleared with solvent.
6. Perform Visual and Magnetic Particle Inspections of the rocker arm assembly according to instructions in Sections 11-1 and 11-3 to ensure the rocker arm is free of cracks prior to bushing replacement.

10-6.14.3. Rocker Arm Bushing Replacement

WARNING

Do not attempt to replace rocker arm bushings with makeshift tools. Use the specified tools and an arbor press.

Equipment Required

- Borroughs Part No. 8118 Rocker Arm Bushing Remover/Installer
- Borroughs Part No. 8116-1R through 15R Reamers, or equivalent
- Arbor Press

Rocker arm bushings must be replaced at engine overhaul. Rocker arms may be re-used in the same cylinder position from which they are removed for in-service cylinder repairs until engine overhaul if visual and dimensional inspection criteria is met.

WARNING

“Dual bushing” Rocker Arms for large bore (470, 520, and 550 cu. in. displacement) engines have been discontinued. Bushings are no longer available to overhaul “dual bushing” type rocker arms. Discard the obsolete rocker arms and obtain the suitable single bushing rocker arms for the cylinder assemblies.

Installation of single piece rocker bushings in rocker arms designed for two piece bushings may restrict or block oil flow to the rocker shaft and valve guides, resulting in possible engine failure.

NOTE: The initial release of SB97-11 contained installation instructions for rocker arm bushing Part Nos. 652129 and 652963. Bushing Part Nos. 652129 and 652963 are superseded by Part Nos. 658731 and 658713.

1. Verify rocker arm part number is correct for the applicable cylinder assembly. Except for 240 or 360 cu. in. displacement engines, discard “dual bushing” rocker arms (no oil feed groove machined in rocker inside diameter) and obtain the current replacement.
2. Remove the old rocker arm bushing using an arbor press.

NOTE: Oversize rocker arm bushings may be available if the ID of the rocker arm requires minor rework. A P001 oversize bushing will allow the rocker arm bore to be increased by 0.001” (add 0.001” to the rocker bore dimension specified on the drawing. Check for bushing availability prior to machining rocker bore to oversize dimensions.

3. Measure rocker arm bushing bore inside diameter to verify it conforms to the dimensional specifications for the rocker arm part number in Figure 10-24.2 through Figure 10-24.6. If rework is required, oversize rocker arm bushings are available. A surface finish of 80 RMS is required in the rocker arm bore I.D. before bushing installation.
4. Measure the outside diameter of the new bushing to verify it conforms to the specifications for the part number being inspected in Figure 10-24.2 through Figure 10-24.6.

WARNING

Incorrectly positioned bushing oil passages will result in a loss of rocker arm shaft lubrication, severe wear of the rocker arm bushing, shaft, and valve guide and possible engine failure.

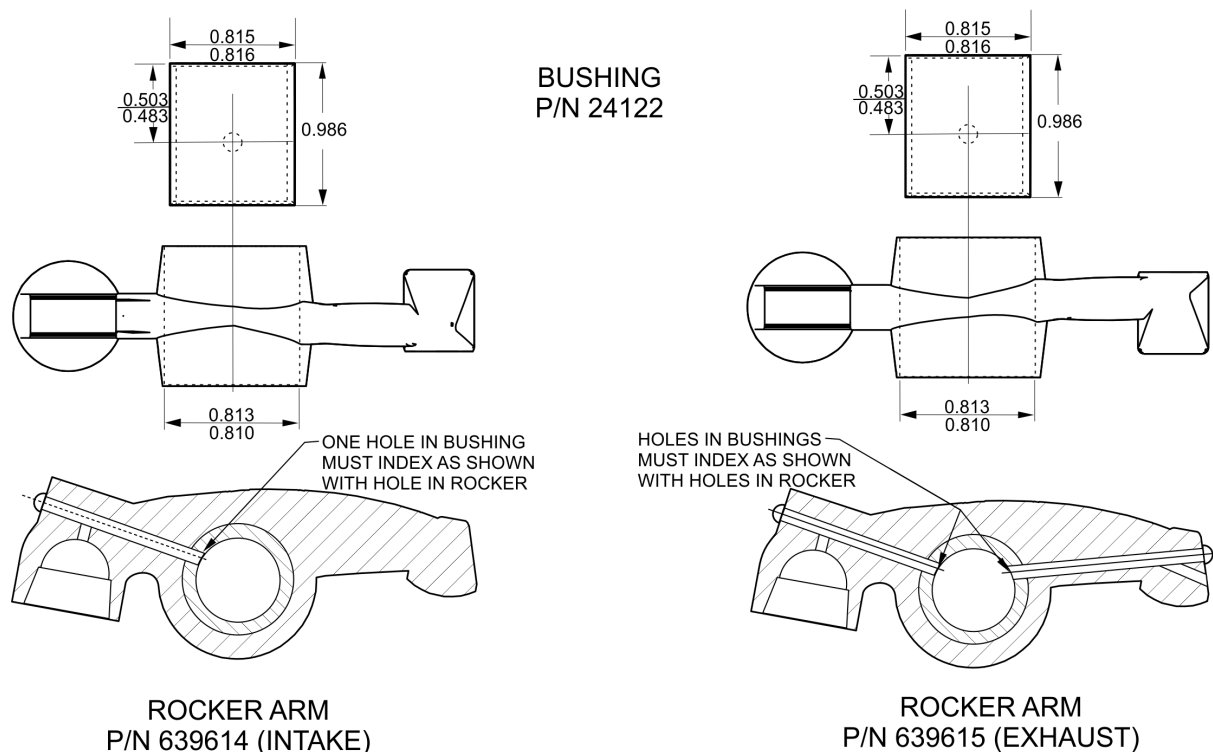
NOTE: The rocker arm oil feed channel is NOT aligned to center. Bushings must be oriented at the time of installation to align oil feed holes in the bushing with the oil groove in the rocker arm.

5. Lubricate the outside diameter of the new bushing with clean 50 wt. aviation engine oil. Align the new bushing to mate with the rocker arm oil passages as illustrated in Figure 10-24.2 through Figure 10-24.6.
6. Using the Borroughs Part No 8118 Rocker Arm Bushing Remover/Installer, or equivalent and an arbor press, carefully press the bushing into the rocker arm bushing bore. The bushing must be installed flush to 0.020” below surface.
7. Plug the bushing oil holes with beeswax to prevent milling debris from entering the oil passages.
8. Ream the installed bushing to the dimension specified in Table 10-28.2. A surface finish of 32 RMS or better is required when reaming is complete.

Table 10-28.2. Rocker Arm Bushing Finished I.D. (after reaming)

Intake			Exhaust		
Rocker Arm Part Number	Bushing after Reaming		Rocker Arm Part Number	Bushing after Reaming	
	ID (inches)	Surface Finish (RMS)		ID (inches)	Surface Finish (RMS)
639614	0.6097 - 0.6107	32	639615	0.6097 - 0.6107	32
646088	0.7192 - 0.7202		646086	0.7192 - 0.7202	
639648	0.5945 - 0.5955		639648	0.5945 - 0.5955	
652131	0.7505 - 0.7515		652130	0.7505 - 0.7515	
652966	0.7505 - 0.7515		658745	0.7505 - 0.7515	

9. Inspect the bushing bore and surface finish to verify it meets specifications.
10. After reaming, clean and flush the oil passages with clean mineral spirits to remove the beeswax; ensure the oil passages are clean and free of debris.
11. Clean obstructed oil passages in rocker arms by soaking the parts in clean mineral spirits and blowing compressed air through them. Discard rocker arms if clogged oil passages cannot be cleared.
12. Perform Visual and Magnetic Particle Inspections of the rocker arm assembly according to instructions in Sections 11-1 and 11-3 to ensure the rocker arm is free of cracks following bushing installation.

**Figure 10-24.2. Rocker Assembly Dimensions - 639614 and 639615**

NOTE: The dual bushings depicted in Figure 10-24.3 are the only dual bushing rocker arms in current production.

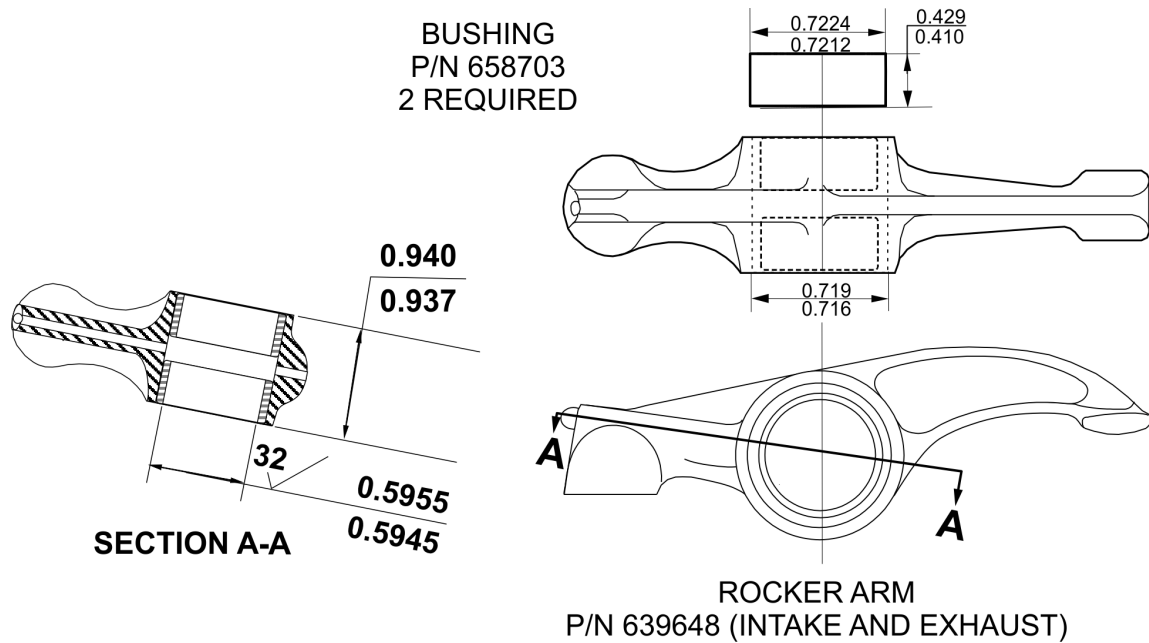


Figure 10-24.3. Rocker Assembly Dimensions - 639648

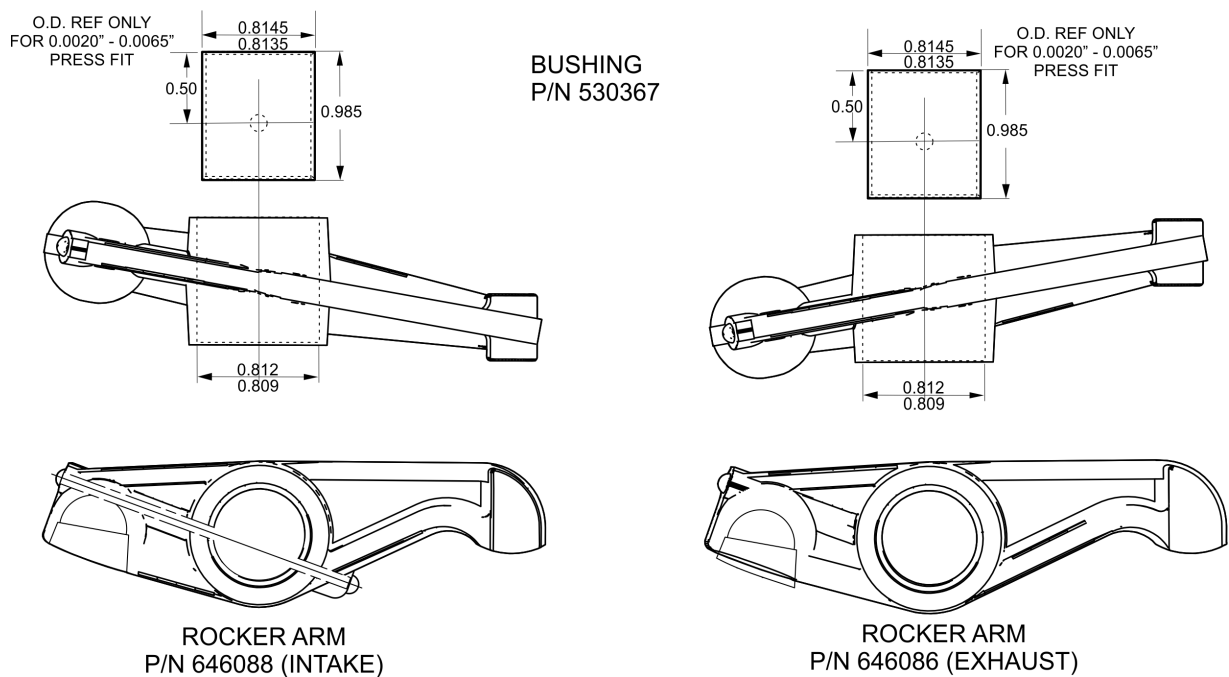


Figure 10-24.4. Rocker Assembly Dimensions - 646088 and 646086

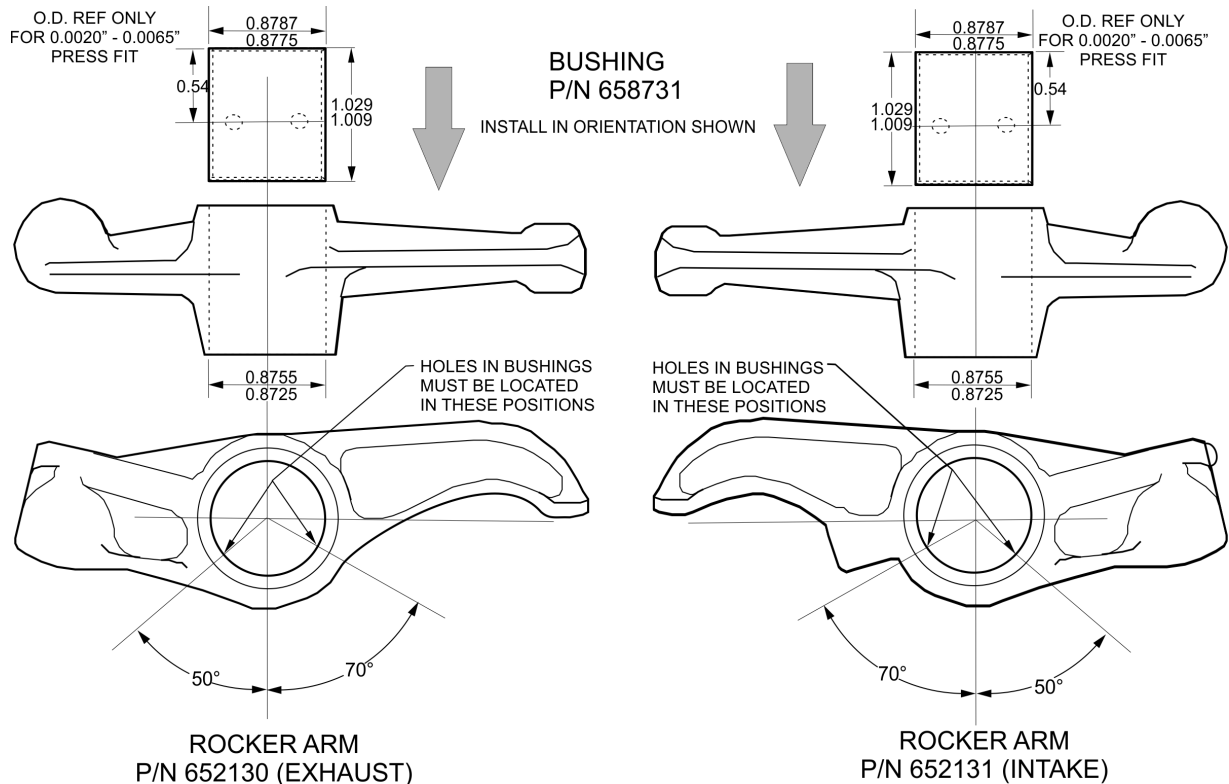


Figure 10-24.5. Rocker Assembly Dimensions - 652130 and 652131

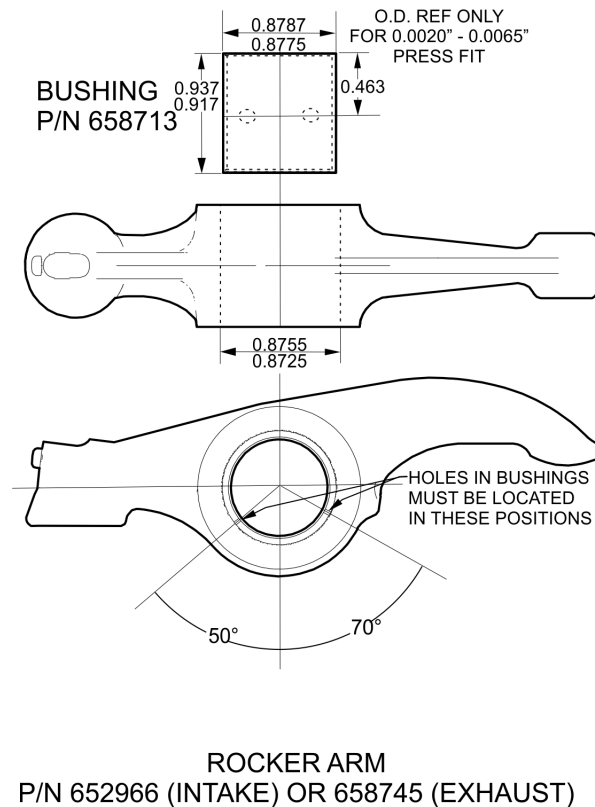
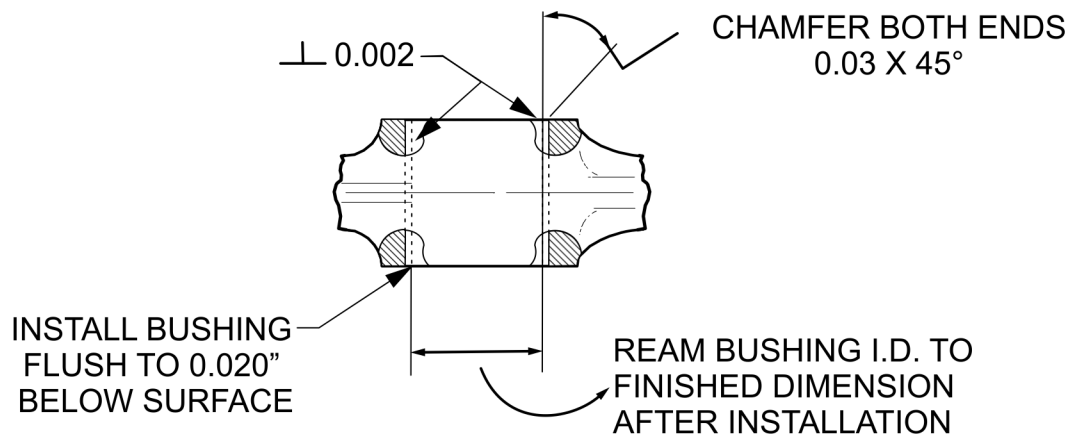


Figure 10-24.6. Rocker Assembly Dimensions - 652966 and 658745



NOTE: BUSHING I.D. SURFACE FINISH OF 32 RMS REQUIRED AFTER REAMING

— SURFACES MUST BE SQUARE WITH THE BUSHING BORE CENTERLINE WITHIN 0.002 INCH FULL INDICATOR READING

Figure 10-24.7. Finished Bushing Installation