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SERVICE INSTRUCTION

DATE: January 7, 2019 Service Instruction No. 1012K
(Supersedes Service Instruction No. 1012J)
Engineering Aspects are
FAA (DER) Approved

SUBJECT: Counterweights and Rollers on Engine Models

MODELS AFFECTED: All Lycoming engines with counterweights

TIME OF COMPLIANCE: As required

REASON FOR REVISION: Added new engine models, TEO-540-A1A and TEO-540-C1A Series to Table 6.

NOTICE: Incomplete review of all the information in this document can cause errors. Read the entire Service Instruction to make sure you have a complete understanding of the requirements.

This Service Instruction is a comprehensive reference about counterweights and rollers on the crankshaft of Lycoming engines. This Service Instruction includes:

- Definition and purpose of counterweights and rollers
- Table 1 which identifies part numbers for currently used counterweights
- Table 2 which identifies the counterweight supersedure history
- Table 3 which identifies part numbers for currently used rollers
- Table 4 which identifies the roller supersedure history
- Part numbers of the counterweights and rollers to be used on the different engine groups and engine models when replacement of these parts is necessary

Background

Crankshaft counterweights are calibrated to absorb torsional (twisting) vibrations on the crankshaft at critical frequencies between power strokes during engine operation. Each crankshaft has its torsional frequency which is a function of crankshaft length, crankshaft stiffness, stroke, mass, and moments of inertia driven by the engine.

A crescent-shaped counterweight is attached to top and bottom lugs on the crankshaft by a pair of rollers. The diameter of the holes on each counterweight is a specified size that corresponds to the pair of rollers as a matched set. The rollers rock back and forth inside the holes of the counterweight to absorb torsional vibrations as the crankshaft rotates. This dynamic causes dampening of the resonant frequency of the engine/propeller combination. The counterweights turn opposite the crankshaft's vibratory torque energy to decrease torsional vibration.



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Counterweight Part Numbers

Table 1	
Current Counterweight Replacement Parts*	
14U22538	LW-19210
14U22539	LW-19211
75637	LW-19212
76044	LW-19213
78988	LW-19227

* Refer to the supersedure history in Table 2 to identify the correct replacement part for your counterweights.

Table 2	
Counterweight Supersedure History	
Original P/N	Replaced by
▲LW-19225	14U22538
LW-19226❖	●14U22539❖
72801	□LW-19227
72534	◆LW-19213
73643	○LW-19211
73644	†LW-19210
73812	‡LW-19212
75636	78988
74901	76044

P/N 69393 counterweights are cast iron and do not include bushings in the roller bores. All of these counterweights P/N 69393 must be replaced at overhaul with P/N 14U22538.

P/N 69394 counterweights are cast iron and do not include bushings in the roller bores. All of these counterweights must be replaced at overhaul with P/N 14U22539.

P/N's 69349 counterweights use screw-in plugs and circlips to keep the rollers in the counterweight. When it is necessary to replace one of these counterweights, **all** counterweights on the crankshaft must be replaced with P/N 14U22539.

P/N 65602 and 65640 counterweights use screw-in plugs and circlips to keep the rollers in the counterweight. When it is necessary to replace one of these counterweights, **all** counterweights on the crankshaft must be replaced with P/N 14U22538.

▲ P/N 14U22538 replaces P/N LW-19225 and 71904 counterweights because of manufacturing process changes. Each counterweight is interchangeable in sets only, never as an individual counterweight, with their respective replacement counterweight. Any remaining stock of counterweight P/N LW-19225 and 71904 can be used until depleted.

▲ P/N LW-19225 counterweight on GO-480 and IGSO-540 series engines is replaced by 14U22538 because of manufacturing process changes. The counterweight is interchangeable in sets only, never as an individual counterweight, with their respective replacement counterweight. Any remaining stock of counterweight P/N LW-19225 can be used until depleted. Refer to Appendix A.

□ P/N LW-19227 replaces P/N 72801 on some engines (see Tables 5 and 6) because of manufacturing process changes.

◆ P/N LW-19213 replaces P/N 72534 because of manufacturing process changes. Each counterweight is interchangeable in sets only, never as an individual counterweight, with their respective replacement counterweight. Any remaining stock of counterweight P/N 72534 can be used until depleted.

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- P/N LW-19211 replaces P/N 73643 because counterweight P/N 73643 is no longer available.
- † P/N LW-19210 replaces P/N 73644 because of manufacturing process changes. Each counterweight is interchangeable in sets only, never as an individual counterweight, with their respective replacement counterweight. Any remaining stock of counterweight P/N 73644 can be used until depleted.
- ‡ P/N LW-19212 replaces P/N 73812 because of manufacturing process changes. Each counterweight is interchangeable in sets only, never as an individual counterweight, with their respective replacement counterweight. Any remaining stock of counterweight P/N 73812 can be used until depleted.
- ❖ Only on O-540 and IO-540 direct drive engines (Group 3 in Table 6 of this Service Instruction) counterweight P/N 71904 was replaced by LW-19225 which was replaced by LW-19226 which was then replaced by 14U22539.
- P/N 14U22539 replaces P/N LW-19226 and 71905 counterweights because of manufacturing process changes. Each counterweight is interchangeable in sets only, never as an individual counterweight, with their respective replacement counterweight.

NOTICE: For background information on P/N's LW-19225, LW-19226, and LW-19227 refer to Appendix A.

Counterweight Roller Part Numbers

Table 3 Current Roller Replacement Parts*	
14W21696	73648
14W22647	73649
69433	73814
70416	76042
72022	76043
72797	76788
72965	77385
73287	77386
73338	LW-15558
* Refer to the supersedure history in Table 4 to identify the correct replacement part for your counterweights	

Table 4 Roller Supersedure History	
Original P/N	Superseded by
LW-10977	‡14W21696
72022	◇14W22647
LW-10945	▲72797
76787	†73648
‡ P/N 14W21696 roller replaces P/N LW-10977 as a product improvement. This part is interchangeable with P/N LW-10977 in sets only, never as an individual roller. Do not mix rollers.	
◇ P/N 14W22647 roller replaces P/N 72022 on O-540-F1B5 engines only. Do not mix rollers.	
▲ P/N 72797 roller replaces P/N LW-10945 as a product improvement. This part is interchangeable with P/N LW-10945 in sets only, never as an individual roller. Do not mix rollers.	
† P/N 73648 roller replaces P/N 76787 as a product improvement and to eliminate a dispensable part. Any remaining stock of roller P/N 76787 can be used until depleted.	

NOTICE: Any O-540-A1A model engine installed in a Piper aircraft must be changed to the O-540-A1A5 configuration at overhaul. This conversion is done by installing two (2) fifth order counterweight rollers P/N 72022, in the place of two (2) of the four (4) sixth order P/N 70416 rollers, on one of the two rear crankshaft lugs (Refer to Table 3). When this modification has been completed, the number “5” must be added after the model number on the engine identification plate. See the latest revision of Service Instruction No. 1304 for instructions on identification plate modification. In addition, all identification plate modifications must be made in accordance with FAR 45.13.

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Counterweight and Roller Inspection and Replacement

1. Refer to the latest revision of Service Instruction No. 1535 for counterweight removal and inspection instructions.
2. Examine the counterweights and rollers as per the latest revision of Service Instruction No. 1535.
3. If the counterweights and/or rollers must be replaced, identify the correct counterweight and roller sets and location for your engines as per Tables 1, 3, and 5 through 10 in this Service Instruction.

⚠ CAUTION: DO NOT MAKE SCORES, SCRATCHES, OR ETCH MARKINGS OF ANY KIND ON THE CRANKSHAFT, COUNTERWEIGHTS, AND ROLLERS. A MARK IN ANY OF THESE AREAS CAN CAUSE THE PART TO WEAKEN AND TO FAIL.

INSTALL THE CORRECT ROLLERS IN IDENTICAL PAIRS ONLY. DO NOT INSTALL TWO DIFFERENT ROLLERS ON THE SAME COUNTERWEIGHT.

NOTICE: When a counterweight is removed, the counterweight washers and circlips are to be discarded (regardless of condition) and replaced with new counterweight washers and circlips. Refer to the latest revision of Service Bulletin No. 240.

4. Install the correct counterweight and rollers with new counterweight washers and circlips as per the latest revision of Service Instruction No. 1535 and Service Instruction No. 1143.

Correct Location for Counterweights and Rollers on a Crankshaft

This Service Instruction identifies 17 groups of affected engines. Some engine groups have the same basic design of crankshaft, counterweights, and rollers and are shown in Figures 1 to 6 which correspond to a table herein. Tables 5 through 10 identify the engine groups, engine models, and associated counterweight and roller part numbers, quantities, and locations. The corresponding figures show the position of the counterweights and rollers on the crankshaft.

NOTICE: The counterweights must be installed at the specified position noted in Tables 5 through 10. Also, refer to Appendix A for additional details on specific counterweights.

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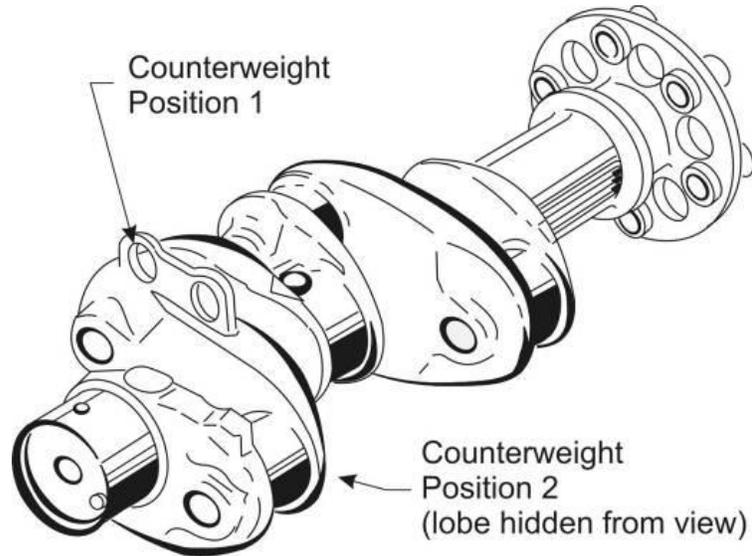


Figure 1
Counterweights and Rollers – Group 1

Table 5
Counterweights and Rollers for Group 1 Engines

Group	Counterweight P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group 1 (4 Cyl. Direct Drive Engines) O-360-A1F6, -A1F6D, -A1G6, -A1G6D, -A1H6, -E1A6D, -F1A6, -G1A6; LO-360-A1H6, -A1G6D, -E1A6D; IO-360-A1B6, -A1B6D, -A1D6, -A1D6D, -A3B6, -A3B6D, -A3D6D, -B1G6, -B1F6, -B2F6, -C1C6, -C1D6, -C1E6, -C1E6D, -C1G6, -J1A6D; AEIO-360-A1B6, -A1E6, -B1G6; LIO-360-B1G6, -C1E6; -C1E6D; TO-360-C1A6D, -E1A6D, -F1A6D; LTO-360-E1A6D; TIO-360-A3B6, -C1A6D. IO-390-A1A6, -A3A6, -A1B6, -A3B6, -C1A6, -C3A6, -C1B6, -C3B6 AEIO-390-A1A6, -A3A6, -A1B6, -A3B6	LW-19227 LW-19227	1 1	14W21696 72797	2 2	Figure 1 Either Position Either Position
<p>Group 1 engine models: Install two counterweights P/N LW-19227 on positions 1 and 2 (Figure 1) on the crankshaft; one with a pair of rollers P/N 72797 on either counterweight, then the other counterweight with a pair of rollers P/N 14W21696.</p>					

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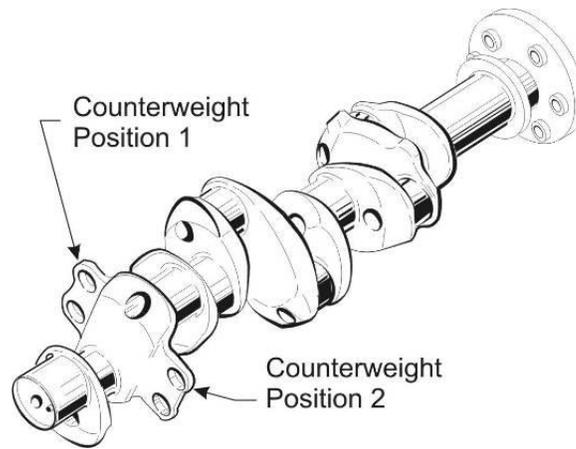


Figure 2
Counterweights and Rollers – Group 2, 3, 3a, 4, 5, 6, 7

Table 6
Counterweights and Rollers for Group 2, 3, 3a, 4, 5, 6 and 7 Engines

Group	Counterweight P/N	Qty No.	Roller P/N	Qty No.	Location
Group 2 (6 Cyl. Direct Drive Engines) O-540-A1D, -A2B.	14U22539	2	70416	4	Figure 2 Either Position
Group 2 engine models: Install two counterweights P/N 14U22539; one in position 1 and one in position 2 on the crankshaft (Figure 2), each with two roller pairs P/N 70416.					
Group 3 (6 Cyl. Direct Drive Engines) O-540-A1A, -A1A5, -A1B5, -A1C5, -A1D5, -A3D5, -B1A5, -B1B5, -B2B5, -B2C5, -F1A5, -G1A5, -G2A5, -H1B5D, -H2A5, -H2B5D; IO-540-C1B5, -C1C5.	14U22539 14U22539	1 1	70416 72022	2 2	Figure 2 Either Position Either Position
Group 3 engine models: Install two counterweights P/N 14U22539; one in position 1 and one in position 2 on the crankshaft (Figure 2). Install a pair of rollers P/N 70416 on one counterweight and another roller pair P/N 72022 on the other counterweight.					
Group 3a (6 Cyl. Direct Drive Engines) O-540-F1B5 IO-540-AE1A5	14U22539 14U22539	2 2	70416 14W22647	2 2	Figure 2 Either Position Either Position
Group 3a engine models: Install two counterweights P/N 14U22539; one in position 1 and one in position 2 on the crankshaft (Figure 2). Install a pair of rollers P/N 70416 on one counterweight and another roller pair P/N 14W22647 on the other counterweight.					
Group 4 (6 Cyl. Direct Drive Engines) AEIO-540-D4A5, -D4B5, -D4D5; IO-540-A1A5, -B1A5, -B1B5, -B2B5, -B1C5, -C4B5, -C4C5, -C4D5, -C4D5D, -D4A5, -D4B5, -E1A5, -E1B5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5, -G1F5, -J4A5, -J4B5, -P1A5, -T4A5D, -T4B5, -T4B5D, -T4C5D, -V4A5, -V4A5D, -W1A5, -W1A5D; O-540-A4A5, -A4B5, -A4D5, -A4E5, -B4B5 -E4A5, -E4B5, -E4C5, -J1A5D; TIO-540-AA1AD, -AB1AD, -AG1A, -C1A, -E1A, -G1A, -H1A	LW-19227 LW-19227	1 1	72965 72797	2 2	Figure 2 Either Position Either Position

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**Table 6 (Cont.)
Counterweights and Rollers for Group 2, 3, 3a, 4, 5, 6 and 7 Engines**

Group	Counterweight P/N	Qty No.	Roller P/N	Qty No.	Location
<p>Group 4 engine models: Install two counterweights P/N LW-19227; one in position 1 and one in position 2 on the crankshaft (Figure 2). Install a pair of rollers P/N 72965 on one counterweight and another roller pair P/N 72797 on the other counterweight.</p>					
<p>Group 5 (6 Cyl. Direct Drive Engines) IO-540-K1A5, -K1A5D, -K1B5, -K1C5, -K1D5, -K1E5, -K1E5D, -K1F5, -K1F5D, -K1G5, -K1G5D, -K1H5, -K1J5, -K1J5D, -K1K5, -L1A5, -L1A5D, -L1B5, -L1B5D, -L1C5, -M1A5, -M1A5D, -M1B5D, -M2A5D, -M1C5, -N1A5, -R1A5, -R1A5D, -S1A5, -U1B5D, -AA1A5, -AA1B5, -AC1A5, -AG1A5; AEIO-540-L1B5, -L1B5D, -L1C5, -L1D5; HIO-540-A1A; TIO-540-A1A, -A1B, -A2A, -A2B, -A2C, -AE2A, -AH1A, -AJ1A, -F2BD, -J2B, -J2BD, -N2BD, -R2AD, -S1AD, -T2AD, -U2A, -V2AD, -W2A; TEO-540-A1A; -C1A LTIO-540-F2BD, -J2B, -J2BD, -N2BD, -R2AD, -U2A, -V2AD, -W2A; IO-580-A1A, B1A; AEIO-580-B1A.</p>	LW-19210	1	73648	2	<p align="center">Figure 2 Either Position Either Position</p>
	LW-19210	1	76788	2	
<p>Group 5 engine models: Install two counterweights P/N LW-19210; one in position 1 and one in position 2 on the crankshaft (Figure 2). Install a pair of rollers P/N 73648 on one counterweight and another roller pair P/N 76788 on the other counterweight.</p>					
<p>Group 6 (6 Cyl. Direct Drive Engines) O-540-J3A5, -J3A5D, -J3C5D, -L3C5D; IO-540-W3A5D, -AB1A5; TIO-540-AF1A, -AF1B, -AK1A, -AB1BD.</p>	LW-19210	1	LW-15558	2	<p align="center">Figure 2 Either Position Either Position</p>
	LW-19210	1	76788	2	
<p>Group 6 engine models: Install two counterweights P/N LW-19210; one in position 1 and one in position 2 on the crankshaft (Figure 2). Install a pair of rollers P/N LW-15558 on one counterweight and another roller pair P/N 76788 on the other counterweight.</p>					
<p>Group 7 (6 Cyl. Direct Drive Integral Accessory Housing Engines) TIO-541-A1A.</p>	76044	1	76042	2	<p align="center">Figure 2 Either Position Either Position</p>
	76044	1	76043	2	
<p>Group 7 engine models: Install two counterweights P/N 76044; one in position 1 and one in position 2 on the crankshaft (Figure 2). Install a pair of rollers P/N 76042 on one counterweight and another roller pair P/N 76043 on the other counterweight.</p>					

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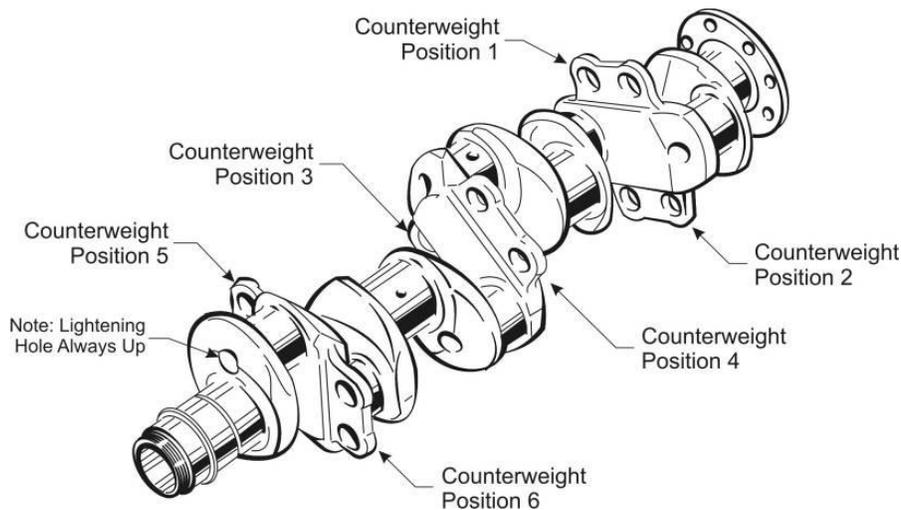


Figure 3

Counterweights and Rollers – Group 8, 9, 10, 11, 12, 13, 14

Table 7					
Counterweights and Rollers for Group 8, 9, 10, 11, 12, 13 and 14 Engines					
Group	Counterweight P/N	Qty No.	Roller P/N	Qty No.	Location
Group 8 (6 Cyl. Geared Engines) GO-435-C2, -C2A, -C2A2, -C2B, -C2B1, -C2B2, -C2C, -C2E; GO-480-B Series (except –B1A6, -B1E6), -C2C6, -C2D6, -D Series; IGO-480-A1B6.	14U22538	6	69433	12	Figure 3 All Positions
Group 8 engine models: Install a counterweight P/N 14U22538 on the six positions on the crankshaft with the lightening hole up (Figure 3), each with two roller pairs P/N 69433 for a total of six counterweights and 12 rollers.					
Group 9 (6 Cyl. Geared Engines) GO-435-C2B2-6; GO-480-B1A6 (Also see Group 10), -B1E6, -C Series; -F Series, -G Series; GSO-480 Series (except –B1B3); IGSO-480 Series (except –A1F3)	14U22538	4	69433	8	Figure 3 Positions 1,2,3,4 Position 6 Position 5
	14U22538	1	70416	2	
	14U22539	1	69433	2	
Group 9 engine models: Install one counterweight P/N 14U22538 on positions 1, 2, 3 and 4 on the crankshaft with the lightening hole up (Figure 3), each with two roller pairs P/N 69433 for a total of 8 rollers. Install counterweight P/N 14U22539 on position 5 of the crankshaft with a roller pair P/N 69433. Finally, install a counterweight P/N 14U22538 on position 6 of the crankshaft with a roller pair P/N 70416.					
Group 10 (6 Cyl. Geared Engines) (Special) GO-480-B1A6 with the following Engine S/N's: L-567-28, L-569-28, L-573-28, L-574-28, L-575-28, L-576-28.	14U22538	6	70416	12	Figure 3 All Positions
Group 10 engine models: Install a counterweight P/N 14U22538 on the six positions on the crankshaft with the lightening hole up (Figure 3), each with two roller pairs P/N 70416 for a total of six counterweights and 12 rollers.					
Group 11 (6 Cyl. Geared Engines) GSO-480-B1B3; IGSO-480-A1F3.	LW-19210	2	76788	4	Figure 3 Positions 1,2 Positions 3,4,5,6
	LW-19213	4	69433	8	

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Table 7 (Cont.)
Counterweights and Rollers for Group 8, 9, 10, 11, 12, 13 and 14 Engines

Group	Counterweight P/N	Qty No.	Roller P/N	Qty No.	Location
Group 11 engine models: Install two counterweights P/N LW-19210, one on position 1, and the other on position 2 of the crankshaft with the lightening hole up (Figure 3), each with a pair of rollers P/N 76788. Install four counterweights P/N LW19213, one on positions 3, 4, 5, and 6 of the crankshaft, each with a roller pair P/N 69433.					
Group 12 (6 Cyl. Geared Engines) IGO-540-A, -B Series.	LW-19213	4	73287	8	Figure 3 Positions 1,2,3,4
	14U22538	1	70416	2	Position 6
	14U22539	1	73287	2	Position 5
Group 12 engine models: Install one counterweight P/N LW-19213 on positions 1, 2, 3 and 4 on the crankshaft with the lightening hole up (Figure 3), each with two roller pairs P/N 73287 for a total of eight rollers. Then install a counterweight P/N 14U22539 on position 5 of the crankshaft with a roller pair P/N 73287. Finally, install a counterweight P/N 14U22538 on position 6 of the crankshaft with a roller pair P/N 70416.					
Group 13 (6 Cyl. Geared Engines) IGSO-540-A, -B Series.	LW-19213	4	69433	8	Figure 3 Positions 1,2,3,4
	14U22538	1	70416	2	Position 6
	14U22539	1	69433	2	Position 5
Group 13 engine models: Install one counterweight P/N LW-19213 on positions 1, 2, 3 and 4 on the crankshaft with the lightening hole up (Figure 3), each with a roller pair P/N 69433 for a total of eight rollers. Then install a counterweight P/N 14U22539 on position 5 of the crankshaft with a roller pair P/N 69433. Finally, install a counterweight P/N 14U22538 on position 6 of the crankshaft with a roller pair P/N 70416.					
Group 14 (6 Cyl. Vertical Engines) VO-540-B1B3, -C1C3.	LW-19213	6	73338	12	Figure 3 All Positions
Group 14 engine models: Install six counterweights P/N LW-19213, on the crankshaft with the lightening hole up (Figure 3), each with a pair of rollers P/N 73338 for a total of 12 rollers.					

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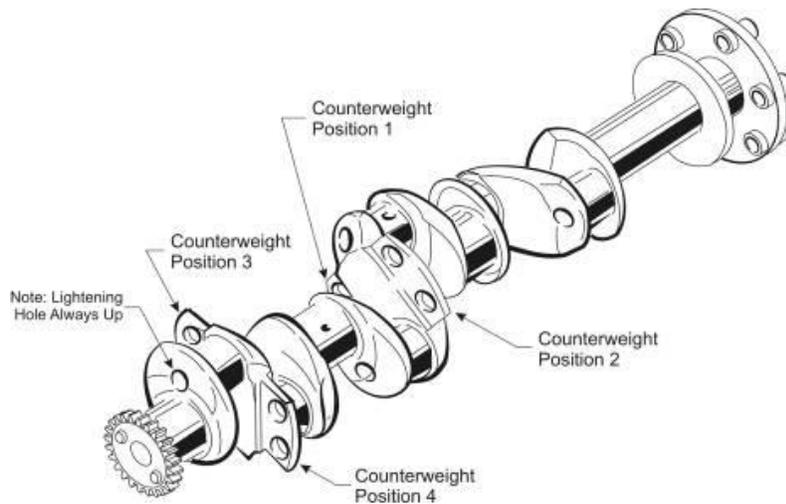


Figure 4
Counterweights and Rollers – Group 15

Table 8
Counterweights and Rollers for Group 15 Engines

Group	Counterweight P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group 15 (6 Cyl. Direct Drive Integral Accessory Housing Engines) TIO-541-E1A4, -E1B4, Engine S/N's 101-59 thru 297-59.	75637	1	77386	2	Figure 4 Position 1
	76044	1	76042	2	Position 3
	76044	1	76043	2	Position 4
	78988	1	77385	2	Position 2
Group 15 TIO-540-E1A4, -E1B4 (serial numbers 101-59 through 297-59): Install four separate counterweights on the crankshaft with the lightening hole up, each with a specified roller pair as follows: Install counterweight P/N 75637 with a pair of rollers P/N 77386 on position 1 of the crankshaft (Figure 4). Install counterweight 78988 with a pair of rollers P/N 77385 on position 2 of the crankshaft (Figure 4). Install counterweight P/N 76044 with a pair of rollers P/N 76042 on position 3 of the crankshaft (Figure 4). Install counterweight P/N 76044 with a pair of rollers P/N 76043 on position 4 of the crankshaft (Figure 4).					
Group 15* (6 Cyl. Direct Drive Integral Accessory Housing Engines) TIO-541-E1A4, -E1B4, Engine S/N's 298-59 and up, -E1C4, -E1D4.	75637	1	77386	2	Figure 4 Position 1
	76044	1	76042	2	Position 3
	76044	1	76043	2	Position 4
	78988	1	77385	2	Position 2
Group 15* TIO-540-E1A4, -E1B4 (serial numbers 298-59 and up) plus -E1C4 and -E1D4 engine models: Install four separate counterweights on the crankshaft with the lightening hole up, each with a specified roller pair as follows: Install counterweight P/N 75637 with a pair of rollers P/N 77386 on position 1 of the crankshaft (Figure 4). Install counterweight P/N 78988 (to be converted to P/N 78989) with a pair of rollers P/N 77385 on position 2 of the crankshaft (Figure 4). Install counterweight P/N 76044 with a pair of rollers P/N 76042 on position 3 of the crankshaft (Figure 4). Install counterweight P/N 76044 with a pair of rollers P/N 76043 on position 4 of the crankshaft (Figure 4).					
NOTE: Change P/N 77887 crankshaft and counterweight assembly to P/N 78989 at engine overhaul by using P/N 78988 counterweight instead of P/N 75636. Re-stamp the new crankshaft and counterweight assembly to P/N 78989.					

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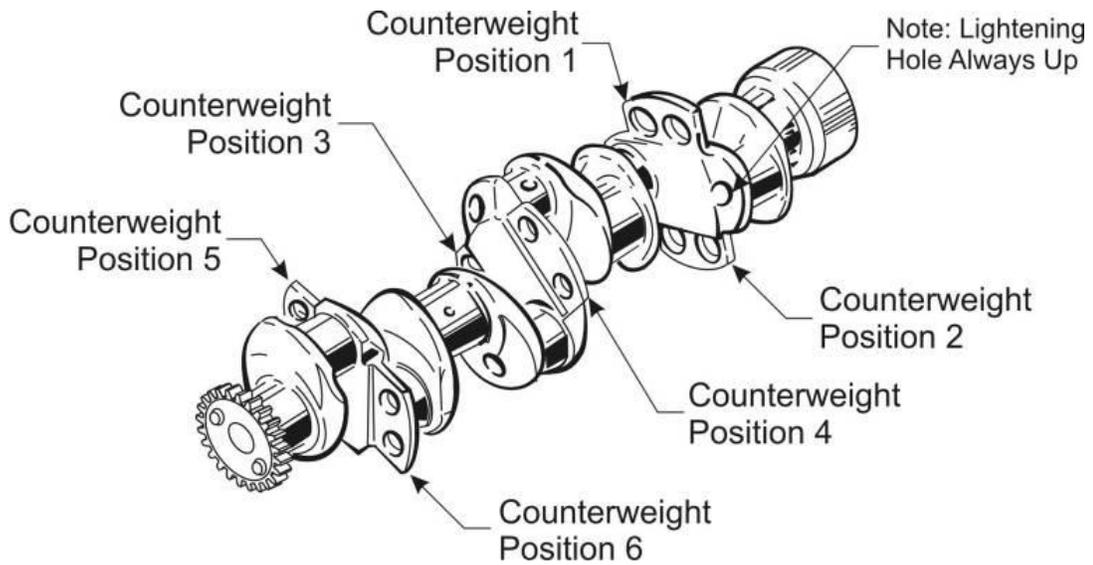


Figure 5
Counterweights and Rollers – Group 16

NOTICE: TIGO-541 Series engines in Table 9 are no longer supported.

Table 9 Counterweights and Rollers for Group 16 Engines					
Group	Counterweight P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group 16 (6Cyl. Integral Accessory Housing Engines) TIGO-541-B1A, -D1A, -D1B, -E1A.	75637	5	75631 (Out of production)	10	Figure 5 Positions 2,3,4,5,6 Position 1
	77002 (Obsolete)	1	77007 (Out of production)	2	

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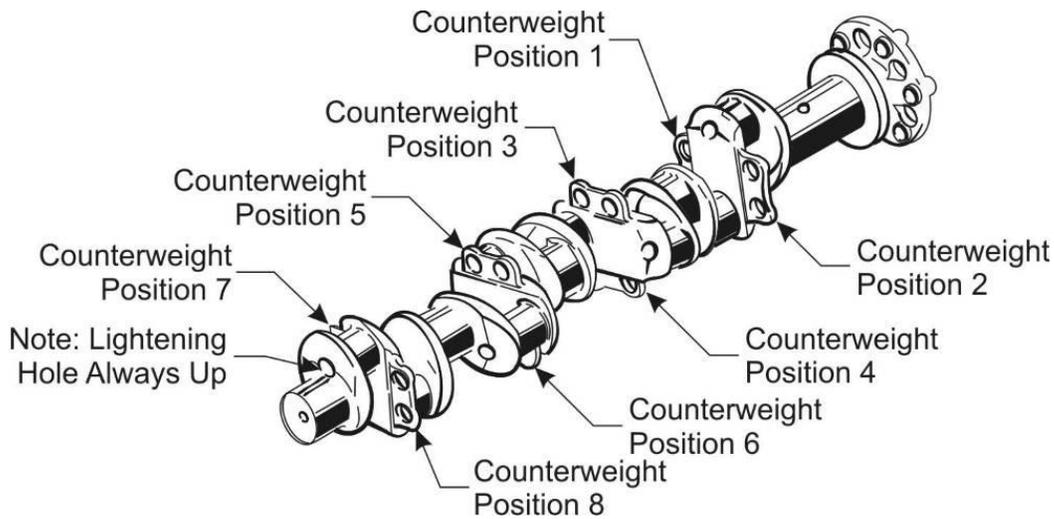


Figure 6
Counterweights and Rollers – Group 17

Table 10
Counterweights and Rollers for Group 17 Engines

Group	Counterweight P/N	Qty. No.	Roller P/N	Qty. No.	Location
Group 17 (8 Cyl. Direct Drive Engines) IO-720-A, -B, -C, -D Series.	LW-19211	6	73649	12	Figure 6 Positions 1,2,4,5,7,8
	LW-19212	1	73814	2	Position 3
	LW-19210	1	73648	2	Position 6

Group 17 engine models: Install six counterweights P/N LW-19211 on positions 1, 2, 4, 5, 7, and 8 on the crankshaft with the lightening hole up (Figure 6) each with a pair of rollers P/N 73649 for a total of 12 rollers. Install counterweight P/N LW-19212 on position 3 of the crankshaft with roller pair P/N 73814. Finally, install counterweight LW-19210 on position 6 of the crankshaft with roller pair P/N 73648.

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APPENDIX A

Table A-1 supplies background information about specific counterweight part numbers.

Table A-1 Counterweight Change Summary	
Counterweight Part Number	Description of Change
LW-19225E LW-19226E LW-19227E	<p>These parts have a different Dimension A (See Figure A-1 and Table A-2). The distance from the centerline of the counterweight bushing bore to the flat edge on the counterweight is different from counterweight part numbers with suffix A through D as well as suffix "F" and beyond.</p> <p>NOTE: The suffix E parts cannot be installed on a reduction geared engine. Whereas counterweight part numbers with revision "A" through "D" and "F" and beyond have the same original Dimension A and therefore can be installed on geared engines.</p>
LW-19225D LW-19226D LW-19227D	<p>Counterweights made to the original Dimension A (Figure A-1) specifications are identified with the suffix letter "D" added to the part number.</p> <p>Counterweights with suffix D can be used at any designated location.</p>
LW-19225F LW-19226F LW-19227F	Counterweights with suffix F or higher can be used at any designated location.

Applicable counterweights that are not identified with a letter suffix in the part number must be measured to identify the "A" dimension in Figure A-1.

If the measured "A" dimension (refer to Figure A-1) on the counterweight agrees with those in Table A-2 for a counterweight with a D suffix, use the vibropeen tool to make a D etch mark at the end of the part number on the counterweight. If the measured "A" dimension agrees with those in Table A-2, for a counterweight with an E suffix, use the vibropeen tool to make an E etch mark at the end of the part number on the counterweight. If the dimension A measurement is different from those shown in Table A-2, speak with a Lycoming Field Service Representative.

⚠ CAUTION: THE COUNTERWEIGHTS WITH THE "E" SUFFIX MUST BE AN IDENTICAL PAIR AND INSTALLED ON OPPOSITE POSITIONS OF THE TOP AND BOTTOM LUGS OF THE SAME CRANKSHAFT LOCATION. FOR EXAMPLE, IN FIGURE 6, THEY WOULD BE INSTALLED IN POSITIONS 1 AND 2 OR 3 AND 4, ETC.

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APPENDIX A (CONT.)

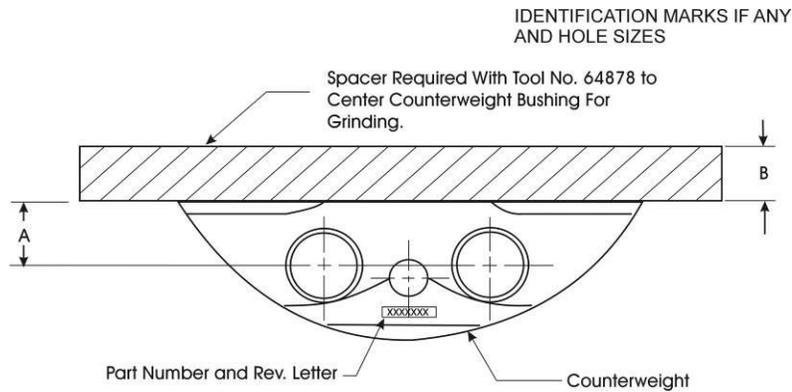


Figure A-1
Dimension "A" and "B" on the Counterweight

NOTICE: In Table A-2, some of the counterweights that have been made to the new specifications do not have the same Dimension A as superseded counterweights.

Table A-2 Counterweight Dimensions A and B						
Counterweight Part No.	Dimensions in Figure A-1				Weight Minimum	
	A ± 0.010		B ± 0.002		(Lbs.)	(Kg)
	(in.)	(mm)	(in.)	(mm)		
71904	0.825	21.0	0.425	10.8	1.796	0.81
LW-19225D	0.855	21.7	0.395	10.0	1.796	0.81
LW-19225E	0.875	22.2	0.375	9.5	1.796	0.81
14U22538	0.855	22.2	0.375	9.5	1.796	0.81
71905	0.825	21.0	0.425	10.8	1.752	0.79
LW-19226D	0.855	21.7	0.395	10.0	1.756	0.80
LW-19226E	0.875	22.2	0.375	9.5	1.756	0.80
14U22539	0.835	21.2	0.415	10.5	1.756	0.80
72801	0.715	18.2	0.535	13.6	1.846	0.84
LW-19227D	0.740	18.8	0.510	13.0	1.846	0.84
LW-19227E*	0.760	19.3	0.489	12.4	1.846	0.84
72534	0.950	24.1	0.300	7.6	2.246	1.02
LW-19213	0.965	24.5	0.285	7.2	2.246	1.02
73643	0.805	20.4	0.445	11.3	2.212	1.00
LW-19211	0.825	21.0	0.425	10.8	2.212	1.00
73644	0.741	18.8	0.509	12.9	2.166	.098
LW-19210	0.761	19.3	0.489	12.4	2.166	.098
73812	0.908	23.1	0.342	8.69	2.266	1.03
LW-19212	0.923	23.4	0.327	8.31	2.266	1.03
74901	0.720	18.3	0.530	13.5	1.470	0.67
76044	0.730	18.5	0.520	13.2	1.810	0.82

* Use spacer No. 30 and .001-inch-thick shim stock to achieve .490 spacer thickness when grinding the bushings in a P/N LW-19227E counterweight.

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Table A-2 (Cont.) Counterweight Dimensions A and B						
Counterweight Part No.	Dimensions in Figure A-1				Weight Minimum	
	A ± 0.010		B ± 0.002		(Lbs.)	(Kg)
	(in.)	(mm)	(in.)	(mm)		
75636	0.720	18.3	0.530	13.5	1.600	0.73
78988	0.730	18.5	0.520	13.2	1.600	0.73
75637	0.875	22.2	0.375	9.5	1.678	0.76
76044	0.730	18.5	0.520	13.2	1.810	0.82
78988	0.730	18.5	0.520	13.2	1.600	0.73
14U22539	0.0835	21.2	0.415	10.5	1.756	0.080

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