

Grove

Aircraft Landing Gear Systems Inc



CATALOG 121

QUALITY • PERFORMANCE • RELIABILITY

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Grove Wheel & Brake Features:

- Cast from aerospace grade metals
- Precision CNC machined
- Tapered roller bearings
- Felt grease seals
- Tubeless Option

Choose from Aluminum or Magnesium

Magnesium wheels weigh less than aluminum, but aluminum is more corrosion resistant. Both metals have similar strengths.

Static Load Rating — This is the weight on each wheel (at maximum static aircraft weight) that the wheel is capable of supporting. The listed static load rating for each Grove wheel includes the FAA load safety margin for normal operations. If you plan to operate your aircraft in extreme conditions, such as a very rough unpaved strip, you may wish to consider a wheel with a higher static load rating.

Kinetic Energy Rating — One of the functions of the brake system is to absorb the heat energy developed during braking. The majority of this heat is absorbed by the brake disc. The larger the mass of the disc, the more heat energy it is able to absorb. A well designed brake system will provide adequate disc mass without excessive weight. The kinetic energy required to stop an aircraft is a function of the mass (weight) of the aircraft multiplied by the square of its landing speed. You can calculate the kinetic energy requirements of your aircraft by using the following formula:

$$\text{Kinetic Energy} = \frac{0.044 \times W \times V^2}{N}$$

W = Landing Weight in lbs.

V = Begin Braking Speed in Knots

N = Number of Wheels with Brakes

The kinetic energy values shown in the charts on pages 4 through 9 are maximum values. Good design will use a wheel and brake system with at least a 25% higher rated value than the value calculated above.



BRAKE CALIPERS

Braking Torque is a function of the brake system hydraulic pressure and total brake caliper piston area. This, as well as the physical dimensions of the brake disc, determines the deceleration rate as well as the ability of the brake system to hold the aircraft at static engine run-up.

Too low a value results in poor stopping power and inability to hold the aircraft at static run-up. Too large a value results in overly sensitive brake pedal feel and excessive weight.



P/N 35-4 Caliper Dual 1.5" pistons produce 7,734 in-lbs of braking torque. Use with 66 Series wheels.



P/N 36-2 Caliper Single 2" piston produces 5,052 in-lbs of braking torque. Use with 60 Series wheels. 020-006 Torque Plate shown

Our standard wheel and brake sets provide optimum values for most aircraft. If you are using over-sized tires, or if your master cylinders produce lower than normal operating pressure, you should consider a brake caliper with larger piston area.

If you're not sure what caliper is right for your aircraft, give us a call

Smaller diameter master cylinder pistons and/or more or larger diameter caliper pistons will increase the force on the brake pads.

TSO APPROVED WHEEL AND BRAKE ASSEMBLIES

All Grove Wheel and Brake Assemblies are designed and manufactured to FAA-TSO-C26d standards.

For a current listing of our Wheel and Brake Assemblies with TSO approval, visit our web site at: groveaircraft.com

Contact us if you have a need for TSOA Wheel or Brake Assemblies.



NOSE WHEELS

PART NUMBER	WHEEL SIZE	STATIC LOAD RATING	AXLE DIAMETER	WEIGHT	PRICE
49-1A	4x2.75	1,000 lbs	0.75"	1.98 lbs	\$309.00
49-3A	4x2.25	1,000 lbs	0.75"	1.87 lbs	\$289.00
49-7A	4x2.75	1,000 lbs	0.50"	1.98 lbs	\$399.00
59-1A	500x5	1,285 lbs	1.25"	3.90 lbs	\$449.00
59-1M	500x5	1,285 lbs	1.25"	2.90 lbs	\$489.00
59-2A	500x5	800 lbs	1.25"	3.40 lbs	\$449.00
59-2M	500x5	800 lbs	1.25"	2.40 lbs	\$489.00
69-1A	600x6	1,750 lbs	1.50"	6.00 lbs	\$509.00
69-1M	600x6	1,750 lbs	1.50"	4.80 lbs	\$549.00
69-2A	600x6	1,200 lbs	1.50"	5.50 lbs	\$509.00
69-2M	600x6	1,200 lbs	1.50"	4.40 lbs	\$549.00
69-7M	600x6	1,250 lbs	1.25"	4.40 lbs	\$549.00



P/N 59-1M shown

KIT NUMBER	WHEEL NUMBER	AXLE DIAMETER INCHES	STATIC LOAD RATING POUNDS	LIMIT LOAD RATING POUNDS	WEIGHT POUNDS see Ref 1	PRICE PER KIT see Ref 2	CALIPER NUMBER	NUMBER OF PISTONS	PISTON DIAMETER INCHES	BRAKE PAD NUMBER	AXLE PATTERN TYPE	BRAKING TORQUE INCH-LBS	KINETIC ENERGY FT-LBS.	DISC THICKNESS INCHES	MIN. DISC THICKNESS INCHES
50-101	50-1A	1.25	1,285	5,140	7.10	\$1,299.00	30-1A	1	1.500	066-106	1	2,364	120,149	0.190	0.165
50-201	50-1M	1.25	1,285	5,140	6.10	\$1,349.00	30-1M	1	1.500	066-106	1	2,364	120,149	0.190	0.165
50-102	50-1A	1.25	1,285	5,140	7.10	\$1,299.00	30-2A	1	1.625	066-106	1	2,774	120,149	0.190	0.165
50-202	50-1M	1.25	1,285	5,140	6.10	\$1,349.00	30-2M	1	1.625	066-106	1	2,774	120,149	0.190	0.165
50-103	50-1A	1.25	1,285	5,140	7.10	\$1,299.00	30-3A	1	1.750	066-106	1	3,218	120,149	0.190	0.165
50-203	50-1M	1.25	1,285	5,140	6.10	\$1,349.00	30-3M	1	1.750	066-106	1	3,218	120,149	0.190	0.165
50-111	50-1A	1.25	1,285	5,140	6.30	\$1,359.00	31-1A	2	1.250	066-111	1	3,283	120,149	0.190	0.165
50-211	50-1M	1.25	1,285	5,140	6.30	\$1,419.00	31-1M	2	1.250	066-111	1	3,283	120,149	0.190	0.165
51-101	51-1A	1.25	800	3,200	6.60	\$1,299.00	30-1A	1	1.500	066-106	1	2,364	120,149	0.190	0.165
51-201	51-1M	1.25	800	3,200	5.60	\$1,349.00	30-1M	1	1.500	066-106	1	2,364	120,149	0.190	0.165
55-112	55-1A	1.25	1,285	5,140	7.60	\$1,379.00	31-2A	2	1.250	066-111	1	3,283	162,315	0.250	0.225
55-212	55-1M	1.25	1,285	5,140	6.45	\$1,439.00	31-2M	2	1.250	066-111	1	3,283	162,315	0.250	0.225
55-104	55-1A	1.25	1,285	5,140	7.50	\$1,379.00	30-4A	1	1.750	066-106	1	3,218	162,315	0.250	0.225
55-204	55-1M	1.25	1,285	5,140	6.35	\$1,439.00	30-4M	1	1.750	066-106	1	3,218	162,315	0.250	0.225
56-113	56-1A	1.25	1,285	5,140	7.90	\$1,479.00	31-3A	2	1.250	066-111	1	3,283	205,146	0.313	0.288
56-213	56-1M	1.25	1,285	5,140	6.80	\$1,529.00	31-3M	2	1.250	066-111	1	3,283	205,146	0.313	0.288
56-123	56-1A	1.25	1,285	5,140	7.90	\$1,509.00	32-3A	2	1.438	066-111	1	4,345	205,146	0.313	0.288
56-223	56-1M	1.25	1,285	5,140	6.80	\$1,559.00	32-3M	2	1.438	066-111	1	4,345	205,146	0.313	0.288
56-513	56-3A	1.25	1,285	5,140	7.70	\$1,479.00	31-3A	2	1.250	066-111	1	3,283	205,146	0.313	0.288
56-613	56-3M	1.25	1,285	5,140	6.70	\$1,529.00	31-3M	2	1.250	066-111	1	3,283	205,146	0.313	0.288
57-124	57-1A	1.25	1,285	5,140	8.30	\$1,589.00	32-4A	2	1.438	066-111	1	4,345	246,175	0.375	0.350
57-224	57-1M	1.25	1,285	5,140	7.20	\$1,659.00	32-4M	2	1.438	066-111	1	4,345	246,175	0.375	0.350
57-134	57-1A	1.25	1,285	5,140	8.30	\$1,619.00	33-4A	2	1.500	066-111	1	4,728	246,175	0.375	0.350
57-234	57-1M	1.25	1,285	5,140	7.20	\$1,678.00	33-4M	2	1.500	066-111	1	4,728	246,175	0.375	0.350
58-138	58-1A	1.25	1,285	5,140	8.33	\$1,729.00	33-8A	2	1.500	066-111	1	4,728	260,971	0.425	0.400
58-238	58-1M	1.25	1,285	5,140	7.33	\$1,779.00	33-8M	2	1.500	066-111	1	4,728	260,971	0.425	0.400

NOTE: Braking torque calculated at 600 psi brake line pressure

Ref 1: Weight for one wheel, disc and caliper

Ref 2: Set includes two wheel assemblies

All Grove 5" wheels are:

- Available in either Aluminum or Magnesium
- Fit standard 1-1/4" axles
- Have felt grease seals
- Use precision tapered roller bearings
- Brake discs are machined from a one-piece forging
- Brake calipers utilize standard brake linings and O-rings

50 Series Wheels & Brakes

Our most popular 5" wheel and brake combo.

Used on many aircraft with a gross weight of 2,570 pounds or less.



51 Series Wheels & Brakes

A lighter weight version of our 50 series wheel & brake combo.

Designed for aircraft with a gross weight of 1,600 pounds or less.

55, 56, 57 & 58 Series Wheels & Brakes

The perfect choice for larger aircraft and/or aircraft with high landing speeds.

The same wheel as the 50 series, with thicker brake discs and larger calipers for greater stopping power.



TUBELESS WHEELS

600x6 Tubeless
Wheels & Brakes

Kit No. 65-421

- Static Load Rating 1,250 lbs
- Fits 1-1/4" axle
- Price: \$1,769.00

Kit No. 60-462

- Static Load Rating 1,750 lbs
- Fits 1-1/2" axle
- Price: \$1,799.00



Most of our 600x6 wheels are available in Tubeless configuration.

Call for specific applications and prices.

AMPHIBIOUS WHEELS

Specially Designed for Amphibious Applications

KIT NUMBER	WHEEL SIZE	AMPHIBIOUS VERSION OF	NOTES	PRICE
49-7AF	400x4	49-7A	Nose Wheel	\$419.00
49-9AF	2.80x4	49-9A	Nose Wheel	\$419.00
59-1AF	500x5	59-1A	Nose Wheel	\$509.00
69-1AF	600x6	69-1A	Nose Wheel	\$579.00
50-921	500x5	50-121	2 Wheels w/Brakes	\$1,469.00
60-962	600x6	60-162	2 Wheels w/Brakes	\$1,759.00
67-977	600x6	67-274	2 Wheels w/Brakes	\$3,059.00

We can provide most wheels in an amphibious configuration

These wheels feature:

- Anodized A356 Aluminum
- Watertight Lip Seals in place of normal felt seals
- Grease retainer between wheel halves
- Drain holes

VENTED BRAKE DISCS

The perfect choice for light-weight aircraft



Light-weight aircraft do not require a large heavy brake disc to absorb the landing kinetic energy. However, when the thickness of the brake disc is reduced, it often results in warping.

Grove has solved this problem with a thick enough disc to prevent warping and then reducing its weight with forty-eight weight saving holes.

Available in kits marked with an * on pages 8 & 9.

P/N 65-7M
shown



60 Series — Our basic 6" wheel for aircraft up to 3,500 lbs. that use 1-1/2" axles

When selecting the proper wheel for your aircraft — consider:

- The Material—Available in either Aluminum or Magnesium
- Static Load Rating
- Kinetic Energy Rating
- Braking Torque

More information about these can be found on page 2 of this catalog.

Still in doubt? Give us a call and we will give you our recommendation.



61 Series — Lighter weight version of the 60 series for aircraft with a gross weight of 2,400 lbs. or less



65 Series — For aircraft with a gross weight up to 2,500 lbs that use 1-1/4" axles



66 Series — Same wheel as the 60 series, but with thicker discs for greater kinetic energy and larger calipers for greater braking torque



67 Series — Our highest load capacity wheel with dual piston caliper for aircraft up to 5,400 lb. that use 1-1/2" axles

KIT NUMBER	WHEEL NUMBER	AXLE DIAMETER INCHES	STATIC LOAD RATING POUNDS	LIMIT LOAD RATING POUNDS	WEIGHT POUNDS see Ref 1	PRICE PER KIT see Ref 2	CALIPER NUMBER	NUMBER OF PISTONS	PISTON DIAMETER INCHES	BRAKE PAD NUMBER	AXLE PATTERN TYPE	BRAKING TORQUE INCH-LBS	KINETIC ENERGY FT-LBS.	DISC THICKNESS INCHES	MIN. DISC THICKNESS INCHES
60-162	60-1A	1.50	1,750	7,000	10.50	\$1,719.00	36-2A	1	2.000	066-105	2	5,052	270,755	0.250	0.225
60-262	60-1M	1.50	1,750	7,000	9.20	\$1,779.00	36-2M	1	2.000	066-105	2	5,052	270,755	0.250	0.225
60-163	60-1A	1.50	1,750	7,000	10.40	\$1,699.00	36-3A	1	1.750	066-105	2	3,868	270,755	0.250	0.225
60-263	60-1M	1.50	1,750	7,000	9.20	\$1,749.00	36-3M	1	1.750	066-105	2	3,868	270,755	0.250	0.225
61-103	61-1A	1.50	1,200	4,800	9.10	\$1,679.00	30-3A	1	1.750	066-106	2	3,868	170,149	0.190	0.165
61-203	61-1M	1.50	1,200	4,800	8.00	\$1,739.00	30-3M	1	1.750	066-106	2	3,868	170,149	0.190	0.165
61-111	61-1A	1.50	1,200	4,800	9.20	\$1,689.00	31-1A	2	1.250	066-111	2	3,947	170,149	0.190	0.165
61-211	61-1M	1.50	1,200	4,800	8.10	\$1,759.00	31-1M	2	1.250	066-111	2	3,947	170,149	0.190	0.165
61-202	61-1M	1.50	1,200	4,800	8.00	\$1,759.00	30-2M	1	1.625	066-106	2	3,335	170,149	0.190	0.165
61-161	61-1A	1.50	1,200	4,800	9.20	\$1,689.00	36-1A	1	1.750	066-105	2	3,868	170,149	0.190	0.165
61-261	61-1M	1.50	1,200	4,800	8.10	\$1,759.00	36-1M	1	1.750	066-105	2	3,868	170,149	0.190	0.165
61-135	61-1A	1.50	1,200	4,800	9.20	\$1,689.00	33-5A	2	1.500	066-111	2	5,683	170,149	0.190	0.165
*61-208	61-4M	1.50	1,200	4,800	7.70	\$1,799.00	30-3M	1	1.500	066-106	2	2,842	144,385	0.190	0.165
65-101	65-1A	1.25	1,250	5,000	8.80	\$1,679.00	30-1A	1	1.500	066-106	1	2,842	170,149	0.190	0.165
65-201	65-1M	1.25	1,250	5,000	7.35	\$1,739.00	30-1M	1	1.500	066-106	1	2,842	170,149	0.190	0.165
65-102	65-1A	1.25	1,250	5,000	8.80	\$1,679.00	30-2A	1	1.625	066-106	1	3,335	170,149	0.190	0.165
65-202	65-1M	1.25	1,250	5,000	7.35	\$1,739.00	30-2M	1	1.625	066-106	1	3,335	170,149	0.190	0.165
65-103	65-1A	1.25	1,250	5,000	8.85	\$1,679.00	30-3A	1	1.750	066-106	1	3,868	170,149	0.190	0.165
65-203	65-1M	1.25	1,250	5,000	7.40	\$1,739.00	30-3M	1	1.750	066-106	1	3,868	170,149	0.190	0.165
65-105	65-1A	1.25	1,250	5,000	8.85	\$1,679.00	30-5A	1	1.500	066-106	3	2,842	170,149	0.190	0.165
65-205	65-1M	1.25	1,250	5,000	7.40	\$1,749.00	30-5M	1	1.500	066-106	3	2,842	170,149	0.190	0.165
65-106	65-1A	1.25	1,250	5,000	8.85	\$1,689.00	30-6A	1	1.625	066-106	3	3,335	170,149	0.190	0.165
65-206	65-1M	1.25	1,250	5,000	7.40	\$1,749.00	30-6M	1	1.625	066-106	3	3,335	170,149	0.190	0.165
65-107	65-1A	1.25	1,250	5,000	8.88	\$1,689.00	30-7A	1	1.750	066-106	3	3,868	170,149	0.190	0.165
65-207	65-1M	1.25	1,250	5,000	7.43	\$1,749.00	30-7M	1	1.750	066-106	3	3,868	170,149	0.190	0.165
*65-109	65-7A	1.25	1,250	5,000	8.65	\$1,719.00	30-5A	1	1.500	066-106	3	2,842	144,385	0.190	0.165
*65-209	65-7M	1.25	1,250	5,000	7.20	\$1,779.00	30-5M	1	1.500	066-106	3	2,842	144,385	0.190	0.165
65-111	65-1A	1.25	1,250	5,000	9.11	\$1,689.00	31-5A	2	1.250	066-111	1	3,947	170,149	0.190	0.165

65-211	65-1M	1.25	1,250	5,000	7.64	\$1,749.00	31-5M	2	1.250	066-111	1	3,947	170,149	0.190	0.165
65-115	65-1A	1.25	1,250	5,000	9.07	\$1,689.00	31-5A	2	1.250	066-111	3	3,947	170,149	0.190	0.165
65-215	65-1M	1.25	1,250	5,000	7.60	\$1,749.00	31-5M	2	1.250	066-111	3	3,947	170,149	0.190	0.165
*65-218	65-7M	1.25	1,250	5,000	7.20	\$1,819.00	30-2M	1	1.625	066-106	1	3,335	144,385	0.190	0.165
*65-119	65-7A	1.25	1,250	5,000	8.67	\$1,739.00	31-5A	2	1.250	066-111	3	3,947	144,385	0.190	0.165
*65-219	65-7M	1.25	1,250	5,000	7.20	\$1,819.00	31-5M	2	1.250	066-111	3	3,947	144,385	0.190	0.165
65-121	65-1A	1.25	1,250	5,000	9.07	\$1,689.00	32-1A	2	1.438	066-111	1	5,219	170,149	0.190	0.165
65-221	65-1M	1.25	1,250	5,000	7.60	\$1,749.00	32-1M	2	1.438	066-111	1	5,219	170,149	0.190	0.165
65-122	65-5A	1.25	1,250	5,000	9.37	\$1,719.00	32-6A	2	1.438	066-111	1	5,219	206,406	0.250	0.225
65-222	65-5M	1.25	1,250	5,000	7.90	\$1,799.00	32-6M	2	1.438	066-111	1	5,219	206,406	0.250	0.225
65-225	65-1M	1.25	1,250	5,000	7.90	\$1,769.00	32-5M	2	1.438	066-111	3	5,219	170,149	0.190	0.165
65-126	65-5A	1.25	1,250	5,000	9.37	\$1,719.00	32-6A	2	1.438	066-111	3	5,219	206,406	0.250	0.225
65-226	65-5M	1.25	1,250	5,000	7.90	\$1,779.00	32-6M	2	1.438	066-111	3	5,219	206,406	0.250	0.225
65-135	65-1A	1.25	1,250	5,000	9.37	\$1,739.00	33-5A	2	1.500	066-111	3	5,683	170,149	0.190	0.165
65-235	65-1M	1.25	1,250	5,000	7.90	\$1,829.00	33-5M	2	1.500	066-111	3	5,683	170,149	0.190	0.165
65-152	65-5A	1.25	1,250	5,000	10.22	\$1,949.00	35-6A	2	1.750	066-106	3	7,735	206,406	0.250	0.225
65-252	65-5M	1.25	1,250	5,000	8.95	\$1,999.00	35-6M	2	1.750	066-106	3	7,735	206,406	0.250	0.225
66-152	60-1A	1.50	1,750	7,000	11.15	\$1,929.00	35-6A	2	1.750	066-106	2	7,735	270,755	0.250	0.225
66-252	60-1M	1.50	1,750	7,000	9.90	\$2,019.00	35-6M	2	1.750	066-106	2	7,735	270,755	0.250	0.225
66-153	60-3A	1.50	1,750	7,000	11.60	\$1,989.00	35-3A	2	1.750	066-106	2	7,735	233,864	0.313	0.290
66-253	60-3M	1.50	1,750	7,000	10.30	\$2,069.00	35-3M	2	1.750	066-106	2	7,735	233,864	0.313	0.290
66-154	60-5A	1.50	1,750	7,000	11.82	\$2,029.00	35-4A	2	1.750	066-106	2	7,735	280,188	0.375	0.350
66-254	60-5M	1.50	1,750	7,000	11.82	\$2,089.00	35-4M	2	1.750	066-106	2	7,735	280,188	0.375	0.350
66-274	60-5M	1.50	1,750	7,000	12.70	\$2,379.00	37-4M	2	1.750	066-105	2	7,504	280,188	0.375	0.350
67-174	67-1A	1.50	2,500	10,000	14.25	\$2,879.00	37-8A	2	1.750	066-105	2	7,504	280,188	0.375	0.350
67-274	67-1M	1.50	2,500	10,000	12.25	\$2,949.00	37-4M	2	1.750	066-105	2	7,504	280,188	0.375	0.350
67-176	67-6A	1.50	2,800	11,000	15.05	\$3,379.00	37-6A	2	1.750	066-105	2	7,504	373,584	0.500	0.475
67-276	67-6M	1.50	2,800	11,000	13.05	\$3,439.00	37-6M	2	1.750	066-105	2	7,504	373,584	0.500	0.475

* Kits with vented brake discs Ref 1: Weight for one wheel, disc and caliper Ref 2: Set includes two wheel assemblies NOTE: Braking torque calculated at 600 psi brake line pressure

REPLACEMENT BRAKE PADS

Grove brake pads are specially formulated to provide maximum braking power while being gentle on the brake discs.



Brake Pad Rivets
P/N 066-001
\$0.15 each

Save time and hassle with pre-assembled brake pad assemblies.



Assemblies come ready to install. Just remove the old worn assembly and replace it with a new one. Visit www.groveaircraft.com for details.



066-105 Brake Pad
Each - P/N: 066-105 - \$8.95
Kit - P/N: 066-105K - \$34.00
Includes 4 pads and 8 rivets
FAA-TSO-PMA



066-106 Brake Pad
Each - P/N: 066-106 - \$9.35
Kit - P/N: 066-106K - \$35.00
Includes 4 pads and 12 rivets
FAA-TSO-PMA

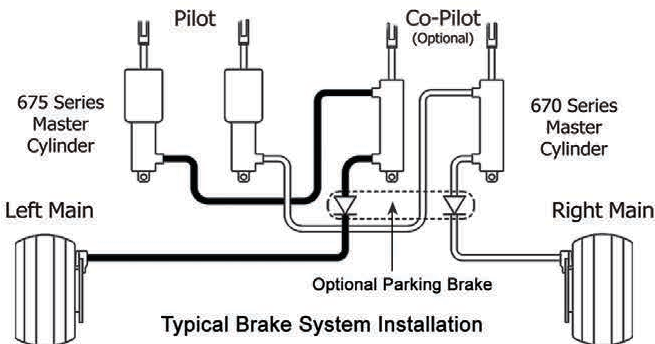


066-108 Brake Pad
Each - P/N: 066-108 - \$14.50
Kit - P/N: 066-108K - \$55.00
Includes 4 pads and 8 rivets
FAA-TSO-PMA



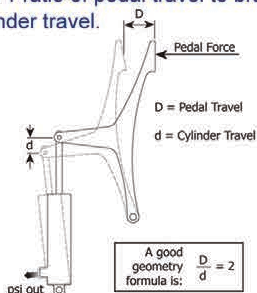
066-111 Brake Pad
Each - P/N: 066-111 - \$14.50
Kit - P/N: 066-111K - \$55.00
Includes 4 pads and 12 rivets
FAA-TSO

BRAKE PEDAL GEOMETRY



Brake pedal geometry plays an important role in the performance of a brake system.

A general rule-of-thumb is to design the brake pedal geometry to have a 2 to 1 ratio of pedal travel to brake cylinder travel.



The most "upstream" component must be a reservoir. You can use either a master cylinder with integral reservoir, or a separate remote reservoir.

INLINE PARKING BRAKE VALVE

Innovative design allows control lever to be attached in any of four positions as well as on either side of valve body.



Part Number
068-002 Shown

- Internal poppet valves insure easy, secure operation.
- Body is drilled for mounting with two 3/16" bolts.
- Valve body dimensions: 1.5" x 2.0" x 0.75"
- Control arm has 90° of travel
- Max operating pressure: 1,200 psi
- For use with MIL-H-5606 Hydraulic Fluid
- Outlet ports: 1/8" Female NPT, -3 or -4 Flare
- Side or top inlet ports: 1/8" NPT
- Weight: 0.32 lbs.

Model	Inlet	Outlet	Price
068-001	Top	1/8" NPT	\$279.00
068-002	Side	1/8" NPT	\$279.00
068-003	Top	-4 Flare	\$279.00
068-004	Side	-4 Flare	\$279.00
068-005	Top	-3 Flare	\$279.00
068-006	Side	-3 Flare	\$279.00

Part Number
068-003 Shown



Grove master cylinders are the perfect choice for all Grove brake systems as well as use with other major brands that require a high pressure master cylinder.

Consider the following when selecting the proper master cylinder for your aircraft:

1. The style (push, pull, with or without integral reservoir, etc.)
2. The pin-to-pin length—this is the length between the upper and lower attach holes.
3. The attach type for the upper end (clevis, eye bolt, etc.)
4. The attach type for the lower end (cross drilled, slotted, etc.)
5. The cylinder bore diameter.



Grove master cylinders are now available in different cylinder bore diameters!

The standard piston bore diameter of our master cylinders is 5/8" and is recommended for most aircraft. However, aircraft with poor brake pedal geometry, large diameter tires, etc. often need more brake line pressure—which is why we developed master cylinders with smaller piston bore diameters. Master cylinders with a 9/16" piston bore diameter produce 19% more pressure and those with a 1/2" piston bore diameter produce 36% more pressure than those with our standard 5/8" piston bore diameter master cylinders.

Visit our website for more Master Cylinder details and information

Calculate the displacement of your master cylinder

Modern aircraft disc brake systems depend more on pressure differential than volume displacement. Master cylinders with smaller bore diameters produce more pressure but less volume displacement. The formula to calculate the volume displacement is:

$$\text{Volume} = 0.785 \times \text{Diameter Squared} \times \text{Stroke}$$

Part Number (Bore)			Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
5/8"	9/16"	1/2"					
670-1	670-901	670-501	7.5"	Clevis	Inline	5.9 oz.	\$289.00
670-2	670-902	670-502	8.0"	Clevis	Inline	6.2 oz.	\$289.00
670-3	670-903	670-503	7.5"	Clevis	90° Offset	5.9 oz.	\$289.00
670-4	670-904	670-504	8.0"	Clevis	90° Offset	6.2 oz.	\$289.00
670-48	670-948	670-548	7.88"	Clevis	Inline	5.9 oz.	\$289.00
670-6	670-906	670-506	7.88"	Clevis	90° Offset	5.9 oz.	\$289.00
670-7	670-907	670-507	7.25"	Clevis	Inline	5.9 oz.	\$289.00
670-8	670-908	670-508	7.25"	Clevis	90° Offset	5.9 oz.	\$289.00
670-13	670-913	670-513	8.0"	3/8" Eye Bolt	90° Offset	6.2 oz.	\$289.00
670-14	670-914	670-514	8.0"	3/8" Eye Bolt	Inline	6.2 oz.	\$289.00
670-15	670-915	670-515	8.0"	1/2" Eye Bolt	90° Offset	6.2 oz.	\$289.00
670-16	670-916	670-516	7.5"	1/2" Eye Bolt	90° Offset	5.9 oz.	\$289.00
670-17	670-917	670-517	8.0"	1/2" Eye Bolt	Inline	6.2 oz.	\$289.00
670-18	670-918	670-518	7.5"	1/2" Eye Bolt	Inline	5.9 oz.	\$289.00
670-19	670-919	670-519	7.5"	3/8" Eye Bolt	90° Offset	5.9 oz.	\$289.00
670-20	670-920	670-520	7.5"	3/8" Eye Bolt	Inline	5.9 oz.	\$289.00
670-45	670-945	670-545	7.25"	Clevis	90° Offset	6.2 oz.	\$289.00



All master cylinders on this page have 1/8" NPT port threads, are available in 5/8" or 9/16" piston bore diameters, are rated at 1,000 psi and designed to use MIL-H-5606 hydraulic fluid.

Stroke = 1.4"



P/N 671-21 shown

Part Number (Bore)			Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
5/8"	9/16"	1/2"					
671-18	671-918	671-518	7.5"	Clevis	Cross Drilled	5.9 oz.	\$289.00
671-19	671-919	671-519	8.0"	Clevis	Cross Drilled	6.2 oz.	\$289.00
671-20	671-920	671-520	7.5"	1/2" Eye Bolt	Cross Drilled	5.9 oz.	\$289.00
671-21	671-921	671-521	7.5"	3/8" Eye Bolt	Cross Drilled	5.9 oz.	\$289.00
671-22	671-922	671-522	8.0"	1/2" Eye Bolt	Cross Drilled	6.2 oz.	\$289.00
671-23	671-923	671-523	8.0"	3/8" Eye Bolt	Cross Drilled	6.2 oz.	\$289.00

Stroke = 1.4"



P/N 673-9 shown

Part Number (Bore)			Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
5/8"	9/16"	1/2"					
673-1	673-901	673-501	7.5"	Clevis	Left Offset	5.9 oz.	\$289.00
673-2	673-902	673-502	7.5"	Clevis	Right Offset	5.9 oz.	\$289.00
673-9	673-909	673-509	7.5"	Clevis	Cross Drilled	5.9 oz.	\$289.00
673-10	673-910	673-510	8.0"	Clevis	Cross Drilled	6.2 oz.	\$289.00
673-11	673-911	673-511	7.5"	1/2" Eye Bolt	Left Offset	5.9 oz.	\$289.00
673-12	673-912	673-512	7.5"	1/2" Eye Bolt	Right Offset	5.9 oz.	\$289.00
673-13	673-913	673-513	7.5"	1/2" Eye Bolt	Slotted 90°	5.9 oz.	\$289.00
673-14	673-914	673-514	7.5"	1/2" Eye Bolt	Slotted Inline	5.9 oz.	\$289.00

Stroke = 0.77"



P/N 672-1 shown

P/N (Bore)			Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
5/8"	9/16"	1/2"					
672-1	672-901	672-501	5.0"	Clevis	Cross Drilled	4.0 oz.	\$289.00
672-2	672-902	672-502	5.5"	Clevis	Cross Drilled	4.2 oz.	\$289.00
672-3	672-903	672-503	6.0"	Clevis	Cross Drilled	4.5 oz.	\$289.00
672-4	672-904	672-504	6.5"	Clevis	Cross Drilled	4.8 oz.	\$289.00

Stroke = 1.4"



P/N 674-1 shown

P/N (Bore)			Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
5/8"	9/16"	1/2"					
674-1	NA	674-501	7.5"	Clevis	Cross Drilled	5.0 oz.	\$289.00
674-2	NA	674-502	8.0"	Clevis	Cross Drilled	5.0 oz.	\$289.00
674-3	NA	674-503	7.0"	Clevis	Cross Drilled	5.0 oz.	\$289.00

Reservoir Volume 2.0 cu-in
Stroke = 1.2"

P/N 675-1 shown

P/N (Bore)		Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
5/8"	9/16"					
675-1	675-901	8.0"	Clevis	Inline	8.1 oz.	\$319.00
675-2	675-902	7.5"	Clevis	Inline	7.9 oz.	\$319.00
675-3	675-903	8.0"	Clevis	90° Offset	8.1 oz.	\$319.00
675-4	675-904	7.5"	Clevis	90° Offset	7.9 oz.	\$319.00
675-5	675-905	8.0"	1/2" Eye Bolt	Inline	8.1 oz.	\$319.00
675-6	675-906	8.0"	1/2" Eye Bolt	90° Offset	8.1 oz.	\$319.00
675-7	675-907	8.0"	3/8" Eye Bolt	Inline	8.1 oz.	\$319.00
675-8	675-908	8.0"	3/8" Eye Bolt	90° Offset	8.1 oz.	\$319.00
675-9	675-909	7.25"	Clevis	Inline	7.8 oz.	\$319.00
675-10	675-910	7.25"	Clevis	90° Offset	7.8 oz.	\$319.00
675-11	675-911	7.5"	Clevis	Cross Drilled	8.1 oz.	\$319.00
675-12	675-912	8.0"	Clevis	Cross Drilled	8.1 oz.	\$319.00
675-13	675-913	8.0"	1/2" Eye Bolt	Cross Drilled	8.1 oz.	\$319.00
675-14	675-914	8.0"	3/8" Eye Bolt	Cross Drilled	8.1 oz.	\$319.00

Using the Proper Brake System Hydraulic Fluid . . .

We use Buna-N (Nitrile) O-rings in all our master cylinders which is compatible with the standard MIL-H-5606 hydraulic fluid and is also compatible with MIL-PRF-5606, MIL-PRF-83282 and MIL-PRF-87257. Use of other hydraulic fluids may cause damage to the brake system O-rings.

Grove FAA-PMA Approved Master Cylinders

FAA-PMA Master Cylinders are available for some aircraft such as Aviat and Maule. Call for details.

Reservoir Volume 3.05 cu-in
Stroke = 1.2"



P/N 676-1 shown

P/N (Bore)		Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
5/8"	9/16"					
676-1	676-901	8.0"	Clevis	Inline	9.3 oz.	\$319.00
676-2	676-902	7.5"	Clevis	Inline	9.0 oz.	\$319.00
676-3	676-903	8.0"	Clevis	90° Offset	9.3 oz.	\$319.00
676-4	676-904	7.5"	Clevis	90° Offset	9.0 oz.	\$319.00
676-5	676-905	7.5"	Clevis	Cross Drilled	9.0 oz.	\$319.00
676-6	676-906	8.0"	Clevis	Cross Drilled	9.3 oz.	\$319.00

Stroke = 1.02"



P/N 678-4 Shown

Part No.	Bore	Pin-to-Pin Length	Upper Attachment	Lower Attachment	Port Thread	Weight	Price
678-1	1.0"	7.5"	Clevis	Inline	3/8-24	12.0 oz.	\$439.00
678-2	1.0"	8.0"	Clevis	Inline	3/8-24	12.2 oz.	\$439.00
678-3	1.0"	7.5"	Clevis	90° Offset	3/8-24	12.0 oz.	\$439.00
678-4	1.0"	8.0"	Clevis	90° Offset	3/8-24	12.2 oz.	\$439.00
678-5	1.0"	8.5"	Clevis	Inline	3/8-24	12.3 oz.	\$439.00
678-6	1.0"	8.5"	Clevis	90° Offset	3/8-24	12.3 oz.	\$439.00
679-1	0.875"	7.5"	Clevis	Inline	3/8-24	12.0 oz.	\$439.00
679-2	0.875"	8.0"	Clevis	Inline	3/8-24	12.2 oz.	\$439.00
679-3	0.875"	7.5"	Clevis	90° Offset	3/8-24	12.0 oz.	\$439.00
679-4	0.875"	8.0"	Clevis	90° Offset	3/8-24	12.2 oz.	\$439.00

Displacement = 0.490 cu-in
Stroke = 1.6"
Bore = 5/8"



P/N 684-15 shown

Part Number	Pin-to-Pin Length	Upper Attach	Lower Attachment	Port Thread	Weight	Price
684-1	8.0"	Clevis	Inline	7/16-20	7.2 oz.	\$319.00
684-2	8.5"	Clevis	Inline	7/16-20	7.5 oz.	\$319.00
684-3	8.0"	Clevis	90° Offset	7/16-20	7.2 oz.	\$319.00
684-4	8.5"	Clevis	90° Offset	7/16-20	7.5 oz.	\$319.00
684-5	7.5"	1/2" Eye Bolt	90° Offset	7/16-20	6.4 oz.	\$319.00
684-6	7.5"		Inline	7/16-20	6.4 oz.	\$319.00
684-7	7.5"	3/8" Eye Bolt	90° Offset	7/16-20	6.4 oz.	\$319.00
684-8	7.5"		Inline	7/16-20	6.4 oz.	\$319.00
684-9	8.0"	1/2" Square Eye Bolt	90° Offset	7/16-20	7.2 oz.	\$319.00
684-10	8.0"		Inline	7/16-20	7.2 oz.	\$319.00
684-11	9.5"	1/2" Square Eye Bolt	90° Offset	1/8" NPT	7.5 oz.	\$319.00
684-12	9.5"		Inline	1/8" NPT	7.5 oz.	\$319.00
684-13	8.0"	1/2" Square Eye Bolt	90° Offset	1/8" NPT	7.2 oz.	\$319.00
684-14	8.0"		Inline	1/8" NPT	7.2 oz.	\$319.00
684-15	10.0"	1/2" Square Eye Bolt	90° Offset	7/16-20	7.8 oz.	\$319.00
684-16	10.0"		Inline	7/16-20	7.8 oz.	\$319.00
684-17	10.0"	1/2" Square Eye Bolt	90° Offset	1/8" NPT	7.8 oz.	\$319.00
684-18	10.0"		Inline	1/8" NPT	7.8 oz.	\$319.00

Clevis Upper Attach
Stroke = 1.438"



P/N 682-2
shown
Volume 1.83 cu-in

Part Number (Bore)			Pin-to-Pin Length	Lower Attachment	Port Thread	Weight	Price
5/8"	9/16"	1/2"					
682-1	682-901	682-501	8.0"	Inline	1/8" NPT	6.4 oz.	\$319.00
682-2	682-902	682-502	7.5"	Inline	1/8" NPT	6.1 oz.	\$319.00
682-3	682-903	682-503	8.0"	90° Offset	1/8" NPT	6.4 oz.	\$319.00
682-4	682-904	682-504	7.5"	90° Offset	1/8" NPT	6.1 oz.	\$319.00
682-25	682-925	682-525	8.0"	Cross Drilled	1/8" NPT	6.4 oz.	\$319.00
682-26	682-926	682-526	7.5"	Cross Drilled	1/8" NPT	6.1 oz.	\$319.00

Pull -type Master Cylinders for those special applications

Stroke = 1.25"



P/N 677-1
shown

Part No.	Bore	Pin-to-Pin Length	Upper Attachment	Lower Attachment	Port Thread	Weight	Price
677-1	7/8"	5.25"	No Fitting	Inline	7/16-20	11.2 oz.	\$439.00
677-2	7/8"	5.25"	1/4-28	90° Offset	7/16-20	11.2 oz.	\$439.00
677-3	0.927"	5.25"	Female	Inline	7/16-20	11.2 oz.	\$439.00
677-4	0.927"	5.25"	Thread	90° Offset	7/16-20	11.2 oz.	\$439.00
677-5	7/8"	8.25"	Clevis	Inline	7/16-20	12.0 oz.	\$439.00

Stroke = 1.2"



P/N 681-1
shown

Part No.	Bore	Pin-to-Pin Length	Upper Attachment	Lower Attachment	Port Thread	Weight	Price
681-1	0.687"	6.0"	1/2" Eye Bolt	Inline	1/8" NPT	10.0 oz.	\$329.00
681-2	0.687"	6.0"	1/2" Eye Bolt	90° Offset	1/8" NPT	10.0 oz.	\$329.00
681-3	0.687"	6.0"	3/8" Eye Bolt	Inline	1/8" NPT	10.0 oz.	\$329.00
681-4	0.687"	6.0"	3/8" Eye Bolt	90° Offset	1/8" NPT	10.0 oz.	\$329.00
681-5	0.687"	6.25"	Clevis	Inline	1/8" NPT	10.1 oz.	\$329.00
681-6	0.687"	6.25"	Clevis	90° Offset	1/8" NPT	10.1 oz.	\$329.00

Visit our website
for more details
and information



Master Cylinders with Reservoir & Parking Brake

All-in-one design combines master cylinder, reservoir and parking brake into one compact unit.

- Available in various sizes and configurations.
- Outlet port threads are 1/8" NPT

Stroke = 1.2"



P/N 676-8
shown
Volume 3.05 cu-in

Part Number (Bore)			Pin-to-Pin Length	Upper Attach	Lower Attachment	Weight	Price
5/8"	9/16"	1/2"					
676-7	676-907	N/A	7.5"	Clevis	90° Offset	9.6 oz.	\$429.00
676-8	676-908	N/A	7.5"	Clevis	Inline	9.6 oz.	\$429.00
676-9	676-909	N/A	8.0"	Clevis	90° Offset	9.9 oz.	\$429.00
676-14	676-914	N/A	8.0"	Clevis	Inline	9.9 oz.	\$429.00
676-11	676-911	N/A	7.5"	Clevis	Cross Drilled	9.6 oz.	\$429.00
676-12	676-912	N/A	8.0"	Clevis	Cross Drilled	9.9 oz.	\$429.00

Stroke 1.438"



P/N 682-513
shown
Volume 1.83 cu-in

Part Number (Bore)			Pin-to-Pin Length	Upper Attach	Lower Attachment	Weight	Price
5/8"	9/16"	1/2"					
682-13	682-913	682-513	8.0"	Clevis	90° Offset	7.7 oz.	\$419.00
682-14	682-914	682-514	8.0"	Clevis	Inline	7.7 oz.	\$419.00
682-15	682-915	682-515	7.5"	Clevis	90° Offset	7.2 oz.	\$419.00
682-16	682-916	682-516	7.5"	Clevis	Inline	7.2 oz.	\$419.00
682-31	682-931	682-531	7.5"	Clevis	Cross Drilled	7.7 oz.	\$419.00
682-32	682-932	682-532	8.0"	Clevis	Cross Drilled	7.2 oz.	\$419.00

Master Cylinders with 3/4" Bore

Displacement = 0.684 cu-in
 Ports: 1/8" NPT
 Stroke = 1.55"
 3/4" Bore



P/N 687-12 shown

Part Number	Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
687-1	7.50"	Clevis	0.313" Wide Tab 90° Offset	7.2 oz.	\$429.00
687-3	8.00"	Clevis		7.4 oz.	\$429.00
687-5	8.38"	Clevis		7.5 oz.	\$429.00
687-7	8.50"	Clevis		7.7 oz.	\$429.00
687-2	7.50"	Clevis	0.313" Wide Tab Inline	7.2 oz.	\$429.00
687-4	8.00"	Clevis		7.4 oz.	\$429.00
687-6	8.38"	Clevis		7.5 oz.	\$429.00
687-8	8.50"	Clevis		7.7 oz.	\$429.00
687-9	7.50"	Clevis	0.380" Diameter 90° Offset Tab	7.2 oz.	\$429.00
687-11	8.00"	Clevis		7.4 oz.	\$429.00
687-13	8.42"	Clevis	0.380" Diameter Inline Tab	7.8 oz.	\$429.00
687-15	8.50"	Clevis		7.7 oz.	\$429.00
687-10	7.50"	Clevis		7.2 oz.	\$429.00
687-12	8.00"	Clevis		7.4 oz.	\$429.00
687-14	8.42"	Clevis	0.500" Diameter	7.8 oz.	\$429.00
687-16	8.50"	Clevis		7.7 oz.	\$429.00
687-17	7.50"	Clevis	Cross Drilled	7.2 oz.	\$429.00
687-18	8.00"	Clevis		7.4 oz.	\$429.00
687-19	8.50"	Clevis	0.750" Diameter	7.7 oz.	\$429.00
687-20	7.50"	Clevis		7.2 oz.	\$429.00
687-21	8.00"	Clevis	Cross Drilled	7.4 oz.	\$429.00
687-22	8.50"	Clevis		7.7 oz.	\$429.00

REMOTE BRAKE FLUID RESERVOIRS

All of our remote reservoirs are quality machined from 6061 billet and anodized for corrosion resistance

Attaches to firewall or other remote location.



Adequate capacity to serve both master cylinders.

Outlet has 1/8" female NPT thread at bottom of reservoir.

2.75" high; 1.75" diameter
 Holds 2.42 fluid ounces.
 Weight: 3.6 ounces.

P/N 067-054 \$62.00



Larger capacity reservoir has 35% more fluid capacity than our P/N 067-054 reservoir.

Attaches to firewall with integral 10-32 tapped holes. 1/8" female NPT port at side of reservoir. Weight: 3.3 ounces
 2.63" high; 2.0" diameter.
 Holds 3.25 fluid ounces.

P/N 067-067 \$69.00



1/8" female NPT port at bottom of reservoir. Weight: 3.3 ounces
 2.75" high; 2.0" diameter.
 Holds 3.38 fluid ounces
 P/N 067-065 \$69.00

Attach directly to your Master Cylinder

Normal installation requires two — one for each master cylinder. Supplied with 1/8" NPT fitting.



1.98" high
 1.38" diameter
 Weight: 1.5 ounces
 Holds 1.10 fluid ounces

P/N 067-050 \$49.00



Un-Vented Reservoir for Aerobatic Aircraft



Screw-on cap for easy servicing

Flexible diaphragm

0.90 fl.-oz capacity
 2.13" high
 1.38" diameter
 Weight 1.8 oz

Reservoir shown mounts directly to your master cylinder.

P/N 067-078 \$119

Also available as a remote reservoir with bottom outlet and with mounting bracket.
 P/N 067-077 \$129

800x4 Wheel — TSO & PMA Approved

Accepts Original
Brake Drum or
Grove STC
Brake Disc

Static load
rating:
1,100 lbs.

Modern 3-bolt,
2-piece wheel design

P/N 40-208 **\$499⁰⁰_{ea}**



FAA-PMA Approved direct replacement
for B.F. Goodrich/ Hayes 800x4
split-rim wheels

CNC machined from
light-weight
magnesium

Fits 1-1/4" Axle

Drilled & tapped for
"Cub Cap" installation

Heavy duty 2,130 lb.
rated tapered roller
bearings

600x6 Wheel & Brake FAA-STC Approved for Piper Aircraft

J-3, J-4, J-5,
PA-11, PA-12,
PA-14, PA-15,
PA-16, PA-17,
PA18 & PA-20

\$2,099⁰⁰

Easy Bolt-on Installation
Kit comes complete with:
2 Wheel & Brake assemblies

Visit www.groveaircraft.com
for more information and
detailed Approved Model List

Approved Tires include:
6.00-6, 7.00-6, 8.00-6,
8.50-6 and 26x10.5-6

KIT NUMBER	AXLE SIZE	WHEEL MATERIAL	STATIC LOAD RATING	KINETIC ENERGY
28-4001	1-1/4"	MAG	1,250 lb.	170,149 ft-lb
28-4001A	1-1/4"	ALUM	1,250 lb.	170,149 ft-lb
28-4002	1-1/4"	MAG	1,750 lb.	206,406 ft-lb
28-4002A	1-1/4"	ALUM	1,750 lb.	206,406 ft-lb
28-4003	1-1/2"	MAG	1,750 lb.	206,406 ft-lb
28-4003A	1-1/2"	ALUM	1,750 lb.	206,406 ft-lb

Good news for owners of early Piper aircraft...

Say "good-bye" to brake expander tube problems forever!

**STC APPROVED
FAA-PMA**

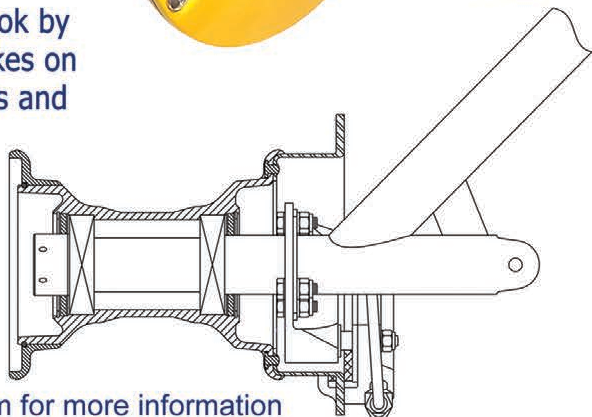
APPROVED
MODELS
INCLUDE:

- J-3
- J-4
- J-5
- PA-11
- PA-12
- PA-14
- PA-15
- PA-16
- PA-17
- PA-18
- PA-19
- PA-20



Maintain the classic cub look by installing modern disc brakes on your existing 800x4 wheels and tires.

- No more soft brake pedal
- Improved braking and ground handling
- Easy Installation



Visit www.groveaircraft.com for more information



STC Kit comes complete with all parts, special tools and STC documentation.

Installation requires only standard hand and rivet tools. No modifications are required to be made on the gear leg, or any other part of the aircraft.

Use your existing wheels, tires, tubes master cylinders and brake lines.

Part Number 76002 **\$919.00**

RV-8 Standard Lightweight Gear

- Precision CNC Machined
- Meets FAR 23 Drop Test Specifications
- Gun Drilled Brake Lines

Material: 7075-T6
Weight: 12.0 lbs per leg
Axle Type 1 for 500x5

P/N 1220-1 Price \$2,149



Can be Fairded
or Polished

Double Taper for
Maximum Weight
Savings

**Save 17 lbs
over stock gear**

Easy Installation! Fits existing mounting points

Landing Gear comes with complete installation kit which includes Heat Treated 4130 Steel Brackets and all AN & NAS Hardware



Airfoil shaped for
Low Drag

Includes
Gun-Drilled brake
lines

**Save 11 lbs
over stock gear**

Same specifications as
our standard RV-8 gear.

Material: 7075-T6
Weight: 15.0 lbs per leg
Type 1 Axle for 500x5

P/N 1219-1 Price \$2,519



RV-8 Airfoiled Lightweight Gear

Eliminates the need for fairings
for additional weight savings!



Airfoil contour extends to
within wheel pant area

Improve your aircraft handling with a genuine aircraft quality Grove Nose Wheel

New Tubeless Nose Wheel

- Sealed Ball Bearings
- Black Anodized
- Use with Tubless 11x4.00-5 Tires
- 800 lb Static Load Rating
- Machined from Billet Aluminum



EASY INSTALLATION

Innovative Stepped Bushings tighten against internal sleeve bushing which allows for the proper load on the bearings, independent of the tightness of the axle nuts.



Kit includes Nose Wheel & Axle Assy
For RV-6A, 7A, 8A, 9A
Part Number 59-19-RV **\$519.00**

Weight of Wheel and Axle Assembly: 3.20 lbs.

Tube-Type Nose Wheel

- Felt grease retainer eliminates bearing drag on wheel spin-up
- Direct replacement for Matco Nose Wheel
- Use your existing tire and tube



Three Piece Axle:

- Prevents axle bolt from bending
- Allows precise preload on bearings



Custom fit inner sleeve controls bearing pre-load — allowing axle bolt to be securely tightened

Kit includes Nose Wheel & Axle Assembly

Use On	Part Number	Material	Weight*	Kit Price
RV-6A, 7A	59-4A-RV	Aluminum	3.90 lb	\$469.00
8A & 9A	59-4M-RV	Magnesium	2.90 lb	\$499.00
RV-10	59-1A-RV-10	Aluminum	4.50 lb	\$469.00
RV-14A	59-1M-RV-10	Magnesium	3.50 lb	\$499.00

* Weight of Wheel & Axle

Upgrade your RV with Grove Wheels & Brakes

- Fits on Existing Van's Axles
- Cast from light-weight aircraft grade magnesium
- Static load rating 1,285 lbs

Recommended for Tail-draggers:

- Single piston caliper
- Kinetic Energy 118,164 ft-lb.
P/N 50-201 \$1,349.00

Recommended for Tri-gear RVs

- Dual piston caliper
- 75% braking power increase over standard brakes
- Kinetic Energy 205,146 ft-lb.
P/N 56-213 \$1,529.00



P/N 56-213 shown

Upgrade to Grove Master Cylinders

673-12



- Adjustable upper attach fitting allows for easy installation
- Genuine Aircraft Quality
- Polished Stainless Steel Shaft
- Use with MIL-H-5606 Fluid
- Rated at 1,000 psi
- 5/8" Cylinder Bore
- 1/8" NPT Outlets

RV-7, RV-9 & RV-10 use 1 P/N 673-11 & P/N 673-12 — RV-8 uses 2 P/N 673-13

Part	Pin-to-Pin Length	Upper Attachment	Lower Attachment	Weight	Price
673-11	7.5"	1/2" Eye Bolt	Left Offset	5.9 oz.	\$289.00
673-12	7.5"	1/2" Eye Bolt	Right Offset	5.9 oz.	\$289.00
673-13	7.5"	1/2" Eye Bolt	Slotted 90°	5.9 oz.	\$289.00

LANCAIR 320/360 & LEGACY WHEEL & BRAKE UPGRADE

Improved Braking Power • Longer Brake Pad Life



Kits include wheels, brakes, axles and spacers

Standard Upgrade Kit

For models with 11.4 x 5 Tires
 Alum Wheel Kit: 56-516 **\$1,499**
 Mag Wheel Kit: 56-616 **\$1,529**

Outback Upgrade Kit

For models with 500 x 5 Tires
 Alum Wheel Kit: 56-516OB **\$1,499**
 Mag Wheel Kit: 56-616OB **\$1,529**

Legacy Upgrade Kit

Alum Wheel Kit: 57-124 **\$1,589**
 Mag Wheel Kit: 57-224 **\$1,659**

Lancair Nose Wheel Upgrade Kits

Kits include Nose Wheel and Adapter Bushings

Alum Nose Wheel Kit: P/N 59-3A-LA **\$449.00**

Mag Nose Wheel Kit: P/N 59-3M-LA **\$479.00**

LONG-EZ

**Double the Braking Power*
 of your Stock Long-EZ with
 Grove Wheels & Brakes**

- Easy Installation
- Use your existing axle

Standard Upgrade Kit

For standard weight EZs

- Dual 1.25" brake caliper pistons give 39% increase of Braking Torque
- 0.313" brake disc gives Kinetic Energy increase of 75% over stock brakes

Alum Wheel Kit: 56-113 **\$1,479**

Mag Wheel Kit: 56-213 **\$1,529**

Heavy Duty Upgrade Kit

For heavier EZs with larger engines

- Dual 1.438" brake caliper pistons give 84% increase of Braking Torque
- 0.375" brake disc gives Kinetic Energy increase of 110% over stock brakes

Alum Wheel Kit: 57-124 **\$1,589**

Mag Wheel Kit: 57-224 **\$1,659**



* Comparison of stock wheels & brakes with 0.18" brake discs and 117,500 K.E. rating

HUB CAP

For *Grove*, Cleveland and Gerdes 500x5 wheels.

Includes mounting screws
P/N 011-012
Price: \$19.95 each



HUB CAP

For *Grove*, Cleveland and Gerdes 600x6 wheels.

Includes mounting screws
P/N 011-013
Price: \$24.95 each



AXLE SPACER

- I.D. 1.25"
- O.D. 1.75"
- Thickness 0.25"
- Used with 5013 & 5018 axle
- 2 required per axle

P/N 5710
Price: \$5.50 each



AXLE NUT

- For 500x5 axles
- 1-1/4" x 16

P/N 5510
Price: \$18.50 each



AXLE SPACER

- I.D. 1.25"
- O.D. 1.438"
- Thickness 0.320"
- Used with 5015 axle
- 1 required per axle

P/N 5712
Price: \$5.50 each



AXLE NUT

- For 600x6 axles
- 1-1/2" x 16

P/N 5511
Price: \$19.50 each



WHEEL PANT AXLE NUT

- For 500x5 axles
- 1-1/4" x 16

P/N 5512
Price: \$39.00 each



CUB-TYPE AXLE NUT

FAA-PMA See web site for a/c eligibility

- For 1-1/4" axles
- 1-1/4 X 12

P/N 5514
Price: \$29.00 each



WHEEL PANT AXLE NUT

- For 600x6 axles
- 1-1/2" x 16

P/N 5513
Price: \$45.00 each



AXLE NUT

- For 400x4 axles
- 3/4" x 16

P/N 5518
Price: \$36.00 each



Axle Bolt Kits

Save time and money with these custom assembled axle bolt kits. Each kit comes complete with all the correctly sized AN bolts, washers, nuts, etc. to properly install both axles to the landing gear.



500x5 Axle Bolt Kits

Gear Thickness	Part No.	Price
5/8"	5801	\$11.00
3/4"	5802	\$11.15
7/8"	5803	\$11.25
1"	5804	\$11.35
1-1/8"	5805	\$11.45

600x6 Axle Bolt Kits

Gear Thickness	Part No.	Price
5/8"	5901	\$14.00
3/4"	5902	\$14.60
7/8"	5903	\$14.70
1"	5904	\$15.35
1-1/8"	5905	\$15.85
1-1/4"	5906	\$16.00

Axle Bolt Kit for Grove Steel Axles

Gear Thickness	Part No.	Price
5/8"	6801	\$10.15
3/4"	6802	\$10.25
7/8"	6803	\$10.35
1"	6804	\$10.45

AXLE SHIMS

Install these axle shims between your landing gear and axles to insure that your tires track true.

Toe-In or toe-out shims correct any misalignment in 1/4" increments. Adjust the vertical alignment of your wheels with camber alignment shims. Visit our website for directions on selecting the proper shim.

Shims for Type 1 are typically used for 500x5 wheels, and Type 2 for 600x6 — but not always. Consult the chart on page 22 for your axle pattern.

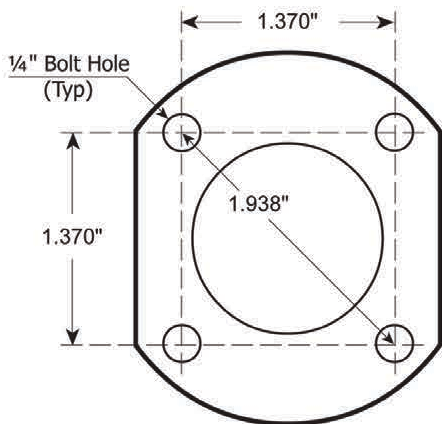
Precision machined from 6061-T6 aluminum.



Price \$29.00 each

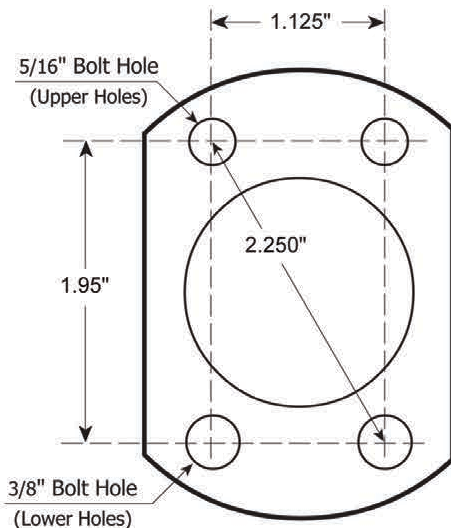
Toe-In or Toe-Out Realignment Shims		
Correction	Type 1	Type 2
1/4°	P/N 6101-1	P/N 6102-1
1/2°	P/N 6101-2	P/N 6102-2
3/4°	P/N 6101-3	P/N 6102-3

Camber Adjustment Shims		
Correction	Type 1	Type 2
1/2°	P/N 6201-2	P/N 6202-2
1°	P/N 6201-4	P/N 6202-4
2°	P/N 6201-8	P/N 6202-8



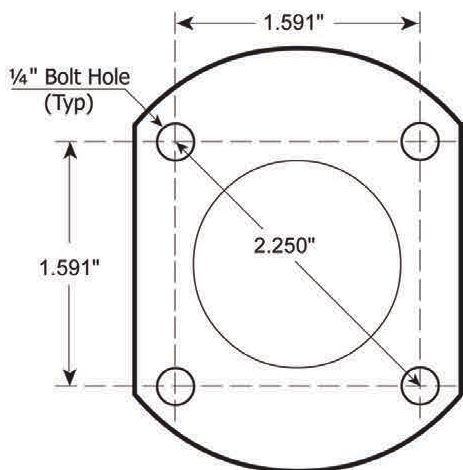
Type 1 Hole Pattern

This pattern matches axle part numbers 5010, 5011, 5012, 5013, 5014, 5014-1, 5015, 5018, 5026 and 5032.



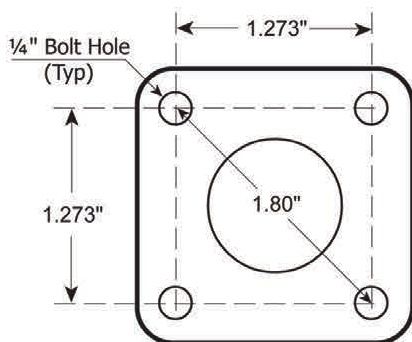
Type 2 Hole Pattern

This pattern matches axle part numbers 5016 and 5017.



Type 3 Hole Pattern

This pattern matches axle part number 5022 and is the same as the Cub-Type hole pattern.



Type 4 Hole Pattern

This pattern matches axle part numbers 5030 and 5031.

Visit www.groveaircraft.com to download full sized templates



\$57.00
P/N 5013
500x5
Standard Axle

Material: Solid 2024-T3
Anodized Finish
Type 1 Hole Pattern
Diameter: 1.25"
Axle Weight: 0.92 lbs.
Static Load Rating 1,285 lbs.
Use with Grove 50, 51, 52,
55, 56, 57 & 58 Series and
Cleveland 500x5 Wheels



\$65.00
P/N 5018
500x5 Axle with
Wheel Pant Stub

Material: Solid 2024-T3
Anodized Finish
Type 1 Hole Pattern
Diameter: 1.25"
Axle Weight: 0.95 lbs.
Static Load Rating 1,285 lbs.
Use with Grove 50, 51, 52,
55, 56, 57 & 58 Series and
Cleveland 500x5 Wheels



5014 Series
500x5 Axles for
Narrow Wheels

Material: Solid 2024-T3
Anodized Finish
Type 1 Hole Pattern
Diameter: 1.25"
Use with Grove 50-3, 51-3,
56-3, and 57-3 Wheels
Standard Axle P/N 5014:
Axle Weight: 0.82 lbs.
Static Load Rating 1,285 lbs.
Price: **\$59.00**
Light Weight Axle P/N 5014-2:
Axle Weight: 0.62 lbs.
Static Load Rating 900 lbs.
Price: **\$59.00**



\$78.00
P/N 5016
600x6
Standard Axle

Material: Solid 2024-T3
Anodized Finish
Type 2 Hole Pattern
Diameter: 1.50"
Axle Weight: 1.28 lbs.
Static Load Rating 1,750 lbs.
Use with Grove 60, 61 & 66
Series and Cleveland
600x6 Wheels



\$92.00
P/N 5017
600x6 Axle with
Wheel Pant Stub

Axle has built-in wheel pant
stub with 1/4-28 thread
Material: Solid 2024-T3
Anodized Finish
Type 2 Hole Pattern
Diameter: 1.50"
Axle Weight: 1.43 lbs.
Static Load Rating 1,750 lbs.
Use with Grove 60, 61 & 66
Series and Cleveland
600x6 Wheels



1-1/4" Diameter
600x6 Axle

\$91.00
P/N 5015
with Pant Stub
\$87.00
P/N 5032
without Stub
Axle has built-in wheel pant
stub with 1/4-28 thread
Material: Solid 2024-T3
Anodized Finish
Type 1 Hole Pattern
Diameter: 1.25"
Axle Weight: 1.43 lbs.
Static Load Rating 1,250 lbs.
Use with Grove 65 series
Wheels



\$83.00
P/N 5022
1-1/4" Diameter
600x6 Axle

Material: Solid 2024-T3
Anodized Finish
Type 3 Hole Pattern
Diameter: 1.25"
Axle Weight: 1.16 lbs.
Static Load Rating 1,250 lbs.
Fits Grove 65 Series Wheel



\$59.00
4 Inch Series
400x4 Axles

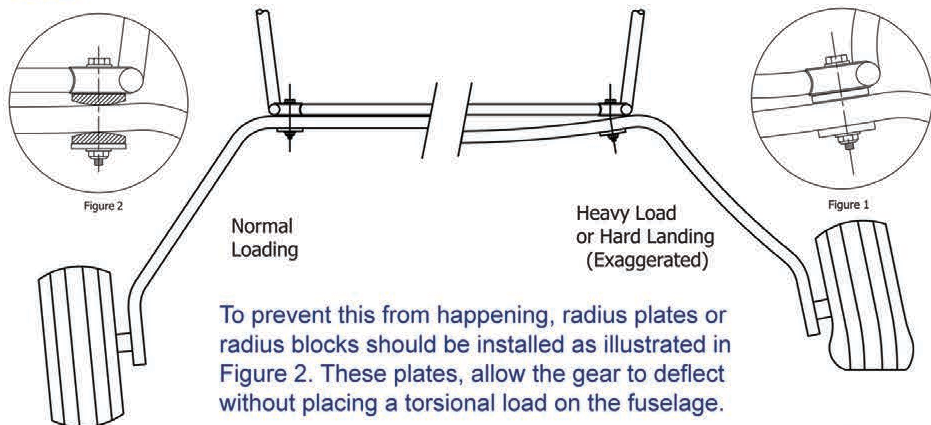
Material: Solid 7075-T6
Anodized Finish
Type 4 Hole Pattern
Diameter: 0.75"
Static Load Rating 700 lbs.
P/N 5030 for 40-1A wheel
Axle Weight: 0.40 lbs.
Length 4.525"
P/N 5031 for 40-3A Wheel
Axle Weight: 0.37 lbs.
Length 4.025"



\$88.00
P/N 5012
Axle for Matco
W-62 Wheels

Material: Heat treated 4130
steel with epoxy primer finish.
Type 1 Hole Pattern
Diameter: 0.75"
Axle Weight: 0.95 lbs.
Static Load Rating 700 lbs.
Use with Matco W-62 Wheels

Spring aluminum landing gear is normally mounted on the fuselage structure with a shackle-type clamping system as shown in the diagram below. With heavy loading or hard landings, the gear strut legs deflect upward and the center section of the gear deflects downward. If the gear is attached rigidly to the fuselage and not allowed to deflect (as shown in Fig. 1), the deflecting gear will transmit torsional loads to the fuselage which can cause stress failures in the lower longerons near the gear attach points.



RADIUS PLATES

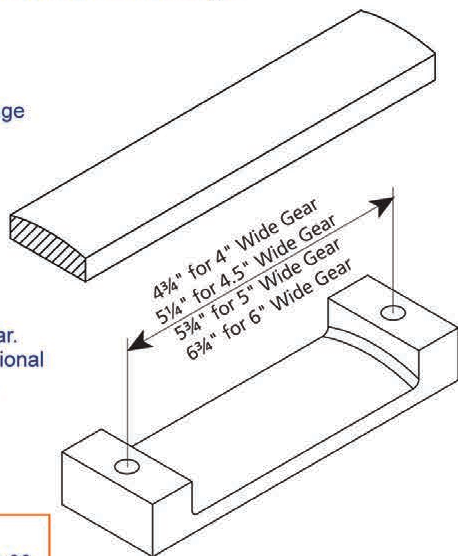
Designed to eliminate torsional loads on the fuselage as the landing gear deflects.

Material: 6061-T6 aluminum.

Dimensions: 1½" x 7" x ¼"

Typical installation requires four plates.

P/N 6300 Price: \$19.00 each



RADIUS BLOCKS

Mounting brackets for spring aluminum landing gear. Inside faces have a special radius to eliminate torsional loads on the fuselage as the landing gear deflects.

Blocks are pre-drilled with 3/8" holes

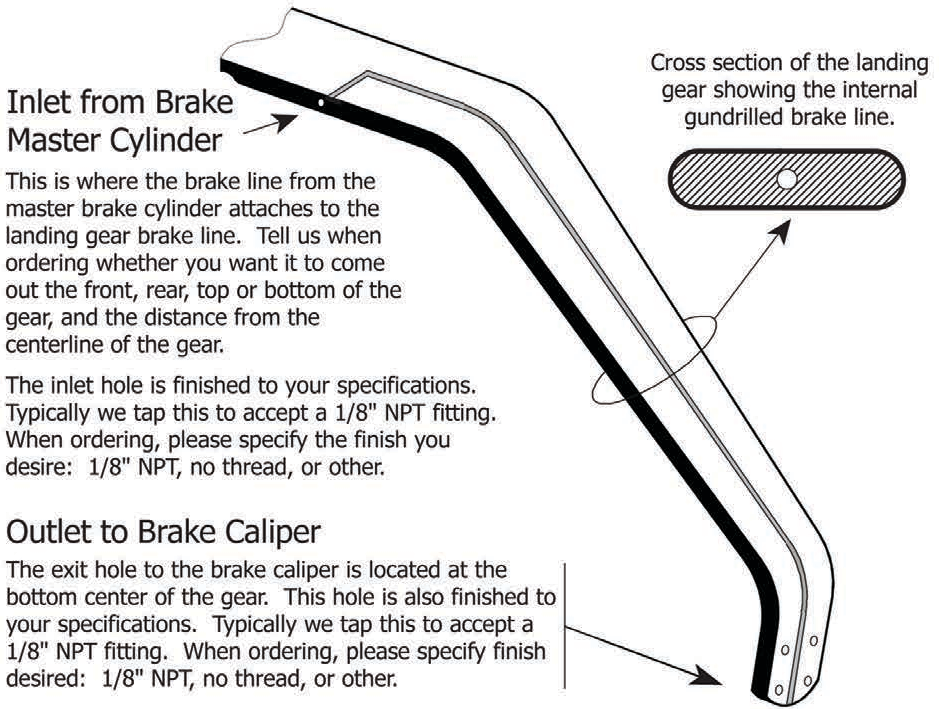
Material: 7075-T6 aluminum.

NOTE: Typical installation requires 4 blocks.

KITFOX V Installation Kit
Includes four radius blocks and installation hardware. P/N 6360 **\$249⁰⁰**

Gear Thickness	For 4" Wide Gear					For 4.5" Wide Gear					For 5" Wide Gear					For 6" Wide Gear				
	L	W	H	P/N	Price	L	W	H	P/N	Price	L	W	H	P/N	Price	L	W	H	P/N	Price
3/4"	5¼"	1½"	3/4"	6346	\$41.00	6¼"	1½"	3/4"	6351	\$49.00	6¾"	1½"	3/4"	6356	\$52.00	7¾"	1½"	3/4"	6359	\$59.00
7/8"	5¾"	1½"	7/8"	6347	\$41.00	6¼"	1½"	7/8"	6352	\$49.00	6¾"	1½"	7/8"	6357	\$52.00	7¾"	1½"	7/8"	6360	\$59.00
1"	5¾"	1½"	1"	6348	\$41.00	6¼"	1½"	1"	6353	\$49.00	6¾"	1½"	1"	6358	\$52.00	7¾"	1½"	1"	6361	\$59.00

An option available on **Grove** Landing Gear is internal gundrilled brake lines. A hole, drilled through the neutral axis of the landing gear, provides a conduit for the brake fluid between the upper and lower parts of the landing gear. This results in a cleaner installation (no exposed brake line), and reduced risk of brake line damage.



Grooved Trailing Edges



Grooved trailing edges provide a protective channel in which you can place your brake line. Standard sizes accommodate 3/16" or 1/4" OD brake lines. Other sizes available. Add \$200.00 to the price of the landing gear.

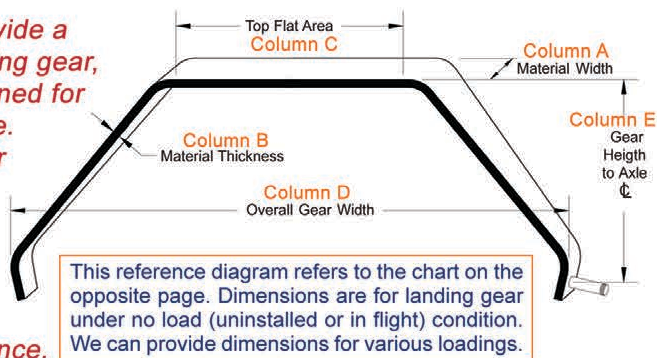
There's a reason we're the largest manufacturer of Spring Aluminum Landing Gear in the world!

1. We're airplane people—it's our passion. We design, build and fly them. We can help you select the proper product for your airplane. Call today for fast friendly design assistance from someone who knows airplanes.
2. We're committed to excellence. All of our products, from Wheels & Brakes to Landing Gear, are designed for the highest performance and reliability. Your safety and satisfaction is our goal.
3. All of our landing gear are manufactured to the same exacting FAA specifications and quality control that we use for our certified aircraft customers such as American Champion, CubCrafters, Diamond and Maule.

AIRCRAFT TYPE	GROSS WEIGHT	GEAR WEIGHT	A	B	C	D	E	F	G	PART NO.	PRICE
Acro Duster II	1800 lb	36.5 lb	5"	1"	29.0"	58.5"	26.75"	2	Y	1048-3	\$2,139
Acro Sport I	1100 lb	28.0 lb	4"	1"	26.75"	66.0"	20.75"	1	Y	1121-3	\$2,019
Acro Sport II	1550 lb	34.7 lb	5"	1"	26.75"	68.0"	21.5"	2	Y	1122-3	\$2,139
Baby Lakes	900 lb	16.2 lb	4"	0.75"	21.38"	48.0"	16.5"	1	Y	1091-3	\$1,559
Cassut	850 lb	16.5 lb	5"	0.75"	14.5"	37.5"	15.75"	1	Y	1071-3	\$1,629
Christen Eagle Std.	1600 lb	27.4 lb	5"	0.875"	25.0"	56.0"	21.0"	1	Y	1042-3	\$2,019
Christen Eagle Heavy	1600 lb	31.1 lb	5"	1"	25.0"	56.0"	21.0"	1	Y	1041-3	\$2,139
Corby Starlet	650 lb	12.0 lb	3.5"	0.75"	Two Piece Gear			1	Y	1182-1	\$1,439
Corby Starlet	750 lb	14.0 lb	3.5"	0.75"	20.5"	45.75"	15.75"	1	Y	1181-3	\$1,439
Fisher Celebrity	1100 lb	23.5 lb	5"	0.75"	26.0"	54.0"	21.0"	1	Y	1046-3	\$1,629
Fisher Horizon 2	1050 lb	21.0 lb	4"	0.875"	27.35"	56.5"	14.5"	1	Y	1101-3	\$1,789
Kitfox Model III & IV*	1200 lb	24.3 lb	4"	0.875"	31.5"	60.0"	20.5"	1	I	1021-3	\$2,199
Kitfox Series 5	1550 lb	34.3 lb	4.6"	1"	35.8"	68.0"	22.0"	1	I	1022-3	\$2,069
KR2	1050 lb	21.6 lb	4.5"	0.75"	32.0"	59.0"	16.0"	1	Y	1171-3	\$1,599
Lazer/Stephens	1250 lb	25.4 lb	4"	1"	21.0"	52.0"	23.75"	1	Y	1051-3	\$2,019
Midget Mustang 1	950 lb	15.3 lb	4.38"	0.875"	Two Piece Gear			1	Y	1161-1	\$1,699
Midget Mustang 2	1600 lb	21.0 lb	5.38"	1"	Two Piece Gear			1	Y	1162-1	\$1,979
One Design	1200 lb	21.0 lb	4"	0.875"	21.0"	48.0"	21.75"	1	Y	1044-3	\$1,789
Pitts S1	1050 lb	21.0 lb	4"	0.875"	21.0"	48.0"	21.75"	1	Y	1031-3	\$1,799
Pitts S1-11B	1500 lb	32.9 lb	5"	1"	23.25"	56.7"	24.75"	1	Y	1032-3	\$2,139
Pitts S2S, S2A, S2B	1750 lb	34.5 lb	5"	1"	27.0"	56.0"	25.5"	1	Y	1034-3	\$2,139
RV8 Standard	2000 lb	24.0 lb	3.3"	1.25"	Two Piece Gear			1	I	1220-1	\$2,149
RV8 Airfoiled	2000 lb	30.0 lb	3.3"	1.25"	Two Piece Gear			1	I	1219-1	\$2,519
Skybolt (4 Cyl)	1800 lb	39.0 lb	5"	1"	31.0"	63.0"	28.5"	2	Y	1061-3	\$2,139
Skybolt (6 Cyl)	2000 lb	43.6 lb	5"	1.125"	31.0"	63.0"	28.5"	2	Y	1062-3	\$2,529
Smith MiniPlane	1050 lb	21.8 lb	4"	0.875"	22.0"	54.0"	21.0"	1	Y	1045-3	\$1,789
Soneri 1	600 lb	15.0 lb	5"	0.625"	18.0"	44.0"	14.5"	1	Y	1141-3	\$1,489
Soneri 2	950 lb	20.8 lb	5"	0.75"	24.0"	50.38"	16.5"	1	Y	1142-3	\$1,659
Starduster II	1950 lb	46.5 lb	6"	1"	30.0"	64.0"	30.0"	2	Y	1081-3	\$2,389
VP-1 (cable braced)	800 lb	12.5 lb	6"	0.375"	22.0"	50.0"	16.5"	1	N	1131-3	\$1,069
VP-1 (free standing)	800 lb	20.2 lb	6"	0.625"	22.0"	50.0"	16.5"	1	Y	1133-3	\$1,539
VP-2 (cable braced)	1100 lb	14.6 lb	6"	0.375"	30.0"	60.0"	17.9"	1	N	1132-3	\$1,149
VP-2 (free standing)	1100 lb	24.5 lb	5"	0.75"	30.0"	60.0"	17.9"	1	Y	1134-3	\$1,759
Zenair CH601XL	1320 lb	32.7 lb	4.5"	0.875"	46.85"	73.13"	20.45"	1	Y	1216-1	\$1,979
Zenair CH701	1200 lb	21.0 lb	3.25"	0.875"	43.5"	62.0"	15.5"	1	Y	1214-3	\$1,519
Zenair CH801	2400 lb	40.3 lb	5"	1"	48.5"	70.0"	19.0"	2	Y	1218-3	\$2,139

* These Landing Gear include mounting brackets

Grove Aircraft can provide a complete custom landing gear, ready to bolt on, designed for your individual airplane. We can work from your drawings, or we can engineer a design that satisfies your requirements. Just contact us for fast, friendly design assistance.



Material Width (A) and Thickness (B): We use aircraft grade 7075 aluminum, heat treated to T6 specifications, for most light aircraft applications. The width and thickness of the material determines the spring rate and ultimate strength. It is important that these values be properly chosen. If you don't know these values, contact us and we will recommend material width and thickness appropriate to your aircraft based on its gross weight, wing loading, and gear geometry.

Flat Width (C): This is the upper flat portion of the gear, measured from inboard edge of the upper bend radius to the inboard edge of the other upper bend radius. Typically this is the distance between the outside of the longerons where the gear attaches to the fuselage.

Overall Width (D): This is the overall outside gear width unloaded (not installed on the aircraft). We can also give you an approximate overall dimension with the aircraft at full gross weight.

Height to Axle ζ (E): This is the distance measured vertically from the top of the landing gear to the center of the axle, also measured in the "unloaded" condition. It will decrease slightly with aircraft loading. We can also give you an approximate value for this at full gross weight.

Camber: This is the angle between the lower gear leg and vertical. This angle is built into the gear so that at full gross weight, the camber is approximately zero degrees. If you know what value you desire, let us know. Otherwise we will compute the proper camber for your gear based on material width and thickness, gear geometry, and aircraft weight.

Axle Holes (F): Select your axle type from the preceding pages. Do you want us to drill holes for your axles at no extra charge, or do you want to do that yourself—just let us know.

Trailing Edge Grooved Brake Lines: We can groove the trailing edge of the gear leg to accept the brake line. This is a convenient way to incorporate the brake line into the gear itself. 3/16" and 1/4" grooves available at an additional cost of \$200.

Gundrilled Brake Lines (G): A popular option is to drill a hole through the interior of the landing gear which acts as the brake line. The increased aesthetic and protective values are a good investment. This option eliminates any risk of damage to the brake line between the fuselage and the wheel area. In column G on the opposite page, "N" indicates not available, "Y" available at an additional cost of \$250, "I" is included in the landing gear price.



Maule



Diamond



American Champion



WACO

Grove is proud to be an OEM supplier of quality products to many Aircraft Manufacturers



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Aircraft Landing Gear Systems Inc.

