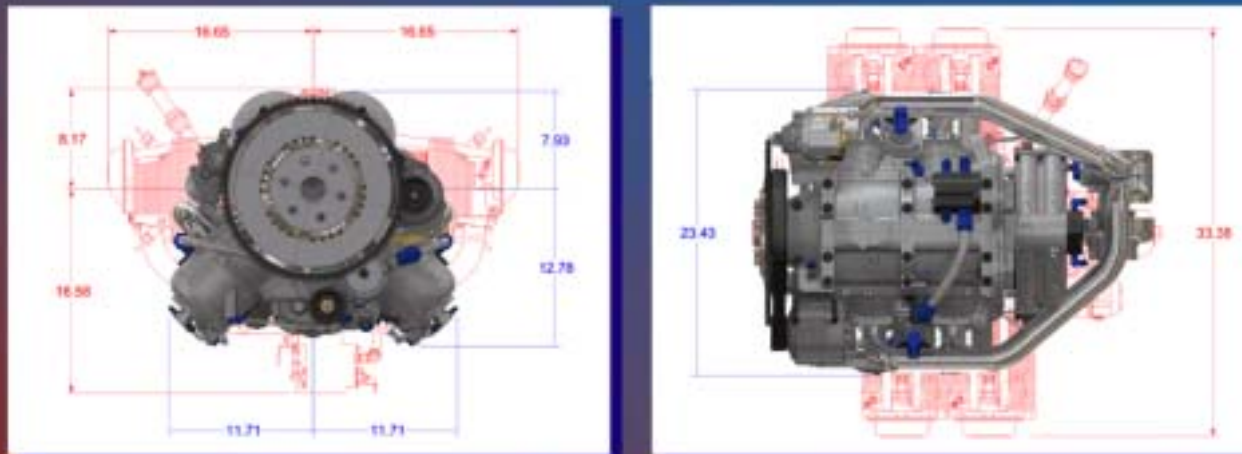


Packaging

In the two drawings below, we see the outline of the O-360 compared to the DeltaHawk V4 engines.

The natural compactness of the 90° V design significantly reduces the flat plate profile of the engine, allowing for much more streamlined fuselage design. In the case of the inverted, this width reduction is done within the height profile of the industry standard engine. The upright model, which is intended primarily for pushers, is designed to tuck the piston cluster behind the passenger/payload compartment and allow unobstructed airflow to the prop.

In addition to the orientations pictured, there is a vertical shaft mount option as well, which is intended primarily for rotorcraft applications.



DeltaHawk

Why a Diesel?

Benefits of the diesel-cycle engine include:

Desirable Fuel Type: Low flammability and worldwide availability of Jet-A or diesel fuel is valued in all applications; current aviation fuel for the IO-360 and other high compression engines is leaded and will eventually be made unavailable by the EPA (Environmental Protection Agency), making those engines unusable.

Fuel Efficiency: The DeltaHawk® is designed to BSFC (brake specific fuel consumption) of .37 lb/hp/hr versus current avgas-powered aviation engine book BSFC of .59 lb/hp/hr at 75% and above.

Lower Fuel Cost: 20-30% more range per gallon. Also, cost per gallon of Jet-A averages \$0.09 less than 100LL aviation fuel in the U.S. The price differential is much greater in Europe.*

Electromagnetic Noise Elimination: Absence of an ignition system reduces interference with navigational and communication systems; for military applications, this is desirable for tactical reasons.

Simplicity of Operation: Single-lever power operation (no mixture control).

Durability: Inherent in diesels because diesel and jet fuels provide more lubricity and because no electrical system (magnetos or electronic ignition) is required.

*As a recent e-mail stated: "In Europe and particularly the U.K. economic benefits are more pronounced due the prohibitive price of both petrol and avgas ... Jet A ... does not cost more than £0.30 per liter (\$0.45) as opposed to petrol or avgas at £0.80 per liter (\$1.28). Also given the improved economy of your engine it is not difficult to show a saving of £5000.00 (\$8000.00) per year in fuel on only 210 hours engine time. Conservative hourly savings work out at £25.00 per hour (\$40.00) in a Velocity or Cozy MK4. £100.00 (\$160.00) of fuel will carry you 2100nm with the DeltaHawk or 630nm with the Lycoming 360. While in practice these saving may not be quite so large they will still be considerable, probably over 50%.

... The incredible savings this side of the water would probably make conversion from other engine types a very real economic proposition even with the cost of a new engine!!"

DeltaHawk®

DIESEL ENGINES



DH160V4



Graeme Smith - Mob: 0412 741 742
Andrew Reid - Mob: 0410 477 407
Brisbane, Queensland Australia
Email: info@deltadieselengines.com
Website: www.deltadieselengines.com

Aviation Engine Economic Comparison:

160 Hp DeltaHawk® vs. 160 Hp Lycoming®	DeltaHawk® Upright V-4 Diesel DH160V4 ¹	Difference/Savings of Diesel	Lycoming® O-320 D Series
ENGINE CHARACTERISTIC			
Rated Power	160 hp	0	160 hp
TBO	2,000 hours	0	2,000 hours
Fuel burn @ 65%	5.5 gal/hr Jet A	\$7.16 / hour	8 gal/hr 100LL (leaned) ²
Fuel burn @ 100% (160 hp)	8.7 gal/hr Jet A	\$12.22 / hour	13 gal/hr 100LL ²
BSFC: lb/hp/hr @ < 75%	0.37	0.04	0.42
Fuel cost/gal, avg. ⁴	\$2.51 Jet A	\$0.11/gal	\$2.62 100LL
Endurance, 50 gal @ 65% power with 45 min reserve	8.08 hr	2.58 hr	5.50 hr
Dry weight	327 lbs	+49 lbs	278 lbs (listed weight of Lycoming® O320-D2A)
Total installed weight (based on Velocity RG installations)	-345 lbs	+51 lbs	294 lbs
Total mission weight (installed engine + fuel for 5.5 hrs @ 65%)	-566 lbs	+8 lbs	558 lbs
COST ESTIMATE			
Retail Price	\$23,500	-\$2170	\$21,330 ³
Overhaul cost	-\$5,000	\$10,000	\$15,000
Fuel cost over 2000 hr TBO (assuming 65% power)	\$27,610	\$14,310	\$41,920
8 spark plugs @ \$17.00 ea, replaced every 200 hours	\$0	\$1,432	\$1,432
TOTAL SAVINGS OVER 2,000 HOURS:			\$23,572

The O-320 is a product of TEXTRON Lycoming®.
¹ Estimated or based on pre-production prototype at this time.
² Interpolated from Textron Lycoming® Operator's Manual, Fig. 3-6 and verified by Velocity N90DV test data.
³ Interpolated from Textron Lycoming® Operator's Manual, Fig. 3-6.
⁴ Fillup Flyer Fuel Finder, www.fillupflyer.com/stats.htm
⁵ Estimated best discounted price.

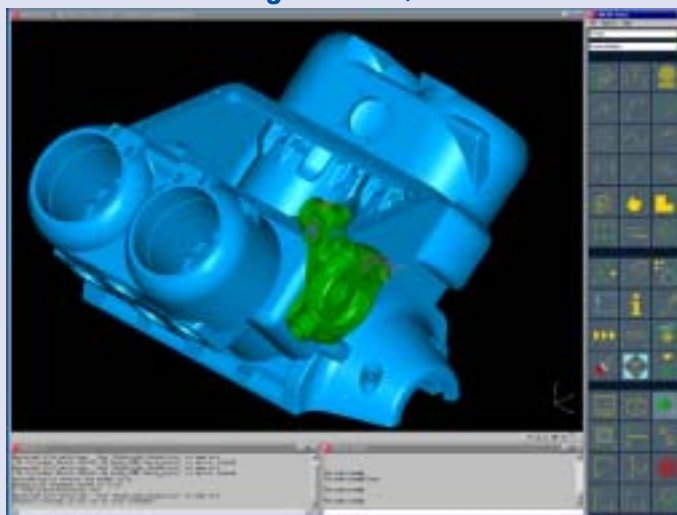
DeltaHawk Product Line

Pricing and Availability (in the United States)

		General Availability	
Model	Engine Type and Class	Estimated Unit Price \$US	Available
DH160A4/V4	160 HP non-certified aviation inverted/upright V-4	\$23,500	March 2005
DH180A4/V4	180 HP non-certified aviation inverted/upright V-4	\$25,500	2005
DH200A4/V4	200 HP non-certified aviation inverted/upright V-4	\$29,500	2005
DH160R4	160 HP non-certified aviation engine vertical shaft V-4	\$25,000	2005
DH200R4	200 HP non-certified aviation engine vertical shaft V-4	\$35,000	2005
Engines in Development			
undesignated	300-420 HP V/8 inverted/upright	TBA	2005
FAA Certified Engines			
undesignated	160 HP upright & inverted V-4	TBA	2005
undesignated	200 HP upright & inverted V-4	TBA	2005

** All prices are U.S. dollars F.O.B. DeltaHawk dock.
 ** The standard engine package delivered for the purchase price above will contain starter, supercharger, oil pump, fuel pump, water pump, all engine-to-engine lines, turbo charger, and the engine-to-turbocharger exhaust system.

Design - CAD / CAE



V4 Engine Overview

Jet/Diesel Fueled Piston Power for the New Century

8.7 GPH @ 165 HP (100%)
6.5 GPH @ 120 HP (75%)

Dry Weight 330 lbs.
Fully Installed Weight 360 lbs.

100% power to 15,000 ft MSL
70% power to 30,000 ft MSL

Easy Access Fuel Injection Nozzles

Robust 90° Monolithic Cast Aluminium Cylinder Block

Replaceable Dry Liners

Engine Coolant Pump

Standard Alternator Mount

Drilled Crankshaft Hydraulic Constant Speed Props

Forged Steel Crankshaft with SAE 2L Flange

Technologies protected by multiple patents

Two-Stage Air Induction System for Flight Critical Safety

Single Lever Fuel Control

Forged Titanium Connecting Pads

4 Point Integral Engine Mounts

3 Auxiliary Drive Pads Provided Including Standard Prop Governor

External Oil Pump

Cast Aluminium Crankcase with 12 Stud Main Bearing Support

Multi-Fuel operation permits use of most common Jet and Diesel Fuels

Mechanical Fuel Injection Pump Field Proven with Redundancy

Standard Aircraft Starter Mount

Service friendly externally mounted critical components

