

# Nakajima Ha-5

The Nakajima Ha-5 is a twin row, 14 cylinder air-cooled radial aircraft engine built by the Japanese Nakajima Aircraft Company. The engine was a development of earlier single-row Japanese engines, the Kotobuki and Hikari, which had combined features of the Bristol Jupiter and Pratt & Whitney R-1340 Wasp designs. First introduced in a 1,000 PS prototype in 1933, about 7,000 civilian and 5,500 military Ha-5's were built during World War II. The Ha-5 had separate cam-discs for the front and rear rows of cylinders like American designs, rather than using a single, front-mounted cam-disc with long and short pushrods to operate both rows of cylinder valves. The Ha-5 was a twin-row development of the Nakajima Hikari, which was itself a development of the Nakajima Kotobuki. It spawned several improved variants, namely the Ha-41, with a two-stage supercharger, and the Ha-109, which featured a two-speed, two stage supercharger. The later Ha-219 was based on the same cylinder design, but was increased in size to 18 cylinders.

## Specifications - Ha-5

### General characteristics

- Type: 14-cylinder, air-cooled, two-row radial piston engine
- Bore: 146 mm (5.75 in)
- Stroke: 160 mm (6.3 in)
- Displacement: 37.5 L (2,288 in<sup>3</sup>)
- Diameter: 1,260 mm (49.6 in)
- Dry weight: 625kg (1,378 lb) (720kg Ha109)

### Components

- Valvetrain: four-valve intake and exhaust pushrod-operated overhead valve system
- Supercharger: Centrifugal, 280mm impeller at 8.39:1 reduction (Ha-5 and Ha-41), 6.55:1 and 8.55:1 for Ha-109 (twin stage supercharger)
- Cooling system: Air-cooled
- Reduction gear: 0.6875:1 (11/16)

### Performance

Power output:

- 890hp (663.7 kW) at 2,200 rpm at 4700m (15,490 ft) with -50mm boost (Nominal Power)
- 950hp (708.4 kW) at 2,200 rpm with +50mm boost (Takeoff Power)
- Specific power: ( to ) 0.58 hp/in<sup>3</sup> to 1.02 hp/in<sup>3</sup>
- Compression ratio: 6.7:1

### Applications

Ha-5:

- Mitsubishi Ki-21 "Sally"
- Mitsubishi Ki-30
- Mitsubishi Ki-57

Ha-41:

- Nakajima Ki-49-I Donryu (Helen)
- Nakajima Ki-44-I Shoki (Tojo)

Ha-109:

- Nakajima Ki-49-II
- Nakajima Ki-44-II

### Source:

Gunston, Bill. *World Encyclopedia of Aero Engines*. Cambridge, England. Patrick Stephens Limited, 1989.  
[Wikipedia](#).