

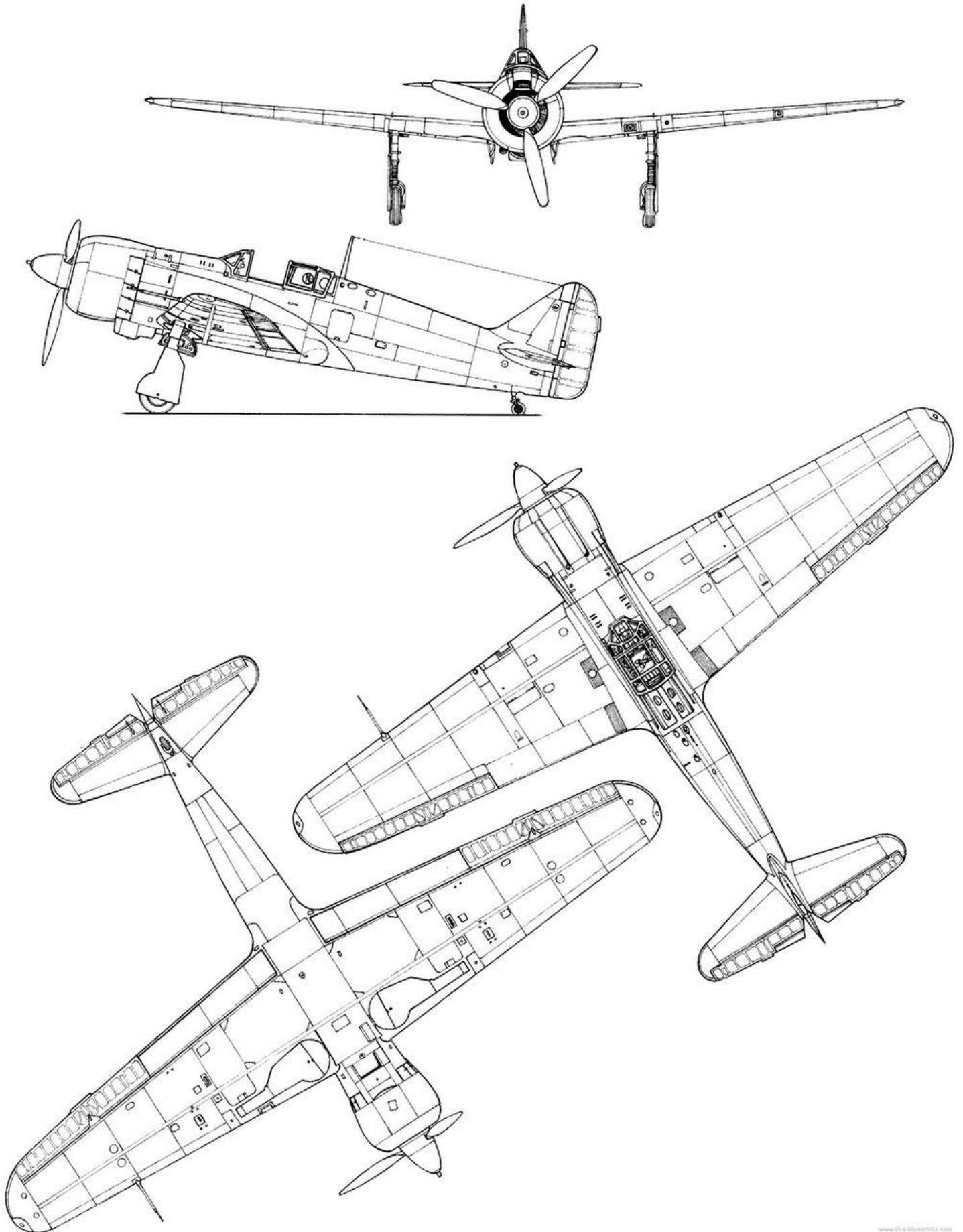
## KAWASAKI KI-100



Année de l'effondrement, 1945 fut surtout marquée, dans l'espace aérien nippon, par la suprématie du bombardier lourd [Boeing B-29 « Superfortress »](#). Les Japonais, qui avaient lâché pied sur tous les fronts, concentrèrent leurs efforts dans la lutte contre ceux-ci pour tenter d'épargner le territoire national. A un moment où les chaînes de montage tournaient à plein régime, alors que la situation générale ne se prêtait plus à l'étude de nouvelles machines, l'Armée Impériale voulut se doter d'un nouvel avion de combat peu avant la capitulation. Le 19 janvier 1945, un bombardement stoppa la fabrication du moteur Ha-140 du [Ki.61-II](#) : 275 cellules de Hien restèrent sans moyen de propulsion et le Japon ne pouvait pas se permettre de les négliger. Le haut commandement ordonna donc au constructeur de les munir du Mitsubishi Ha-112-II, version de l'armée du Kinsei 62 de la marine. Le diamètre de ce moteur étant très supérieur à la largeur du fuselage du Hien, les ingénieurs de Kawasaki s'inspirèrent du [Focke Wulf Fw-190A](#) dont un exemplaire avait été acheté. Le premier des trois prototypes fut désigné Ki.100 et effectua un premier vol très prometteur le 1er février 1945.



Les 272 autres cellules de Ki.61-II furent aussitôt remises en chantier pour donner naissance à l'appareil désigné officiellement Chasseur de l'Armée Ki. 100-la ou Type 1A chasseur modèle 5 (Go-Shiki Sen en japonais). Avec deux canons de 20 mm et deux mitrailleuses de 12,7 mm, il pesait 3500 Kg à pleine charge, soit 300 Kg de moins que le Hien. Néanmoins, à puissance égale, sa vitesse de 580 Km/h à 6000 m était inférieure. Malgré tout, Kawasaki construisit 118 de ces appareils, neufs, sous la désignation de Ki.100-lb.



Le principal défaut des Ki. 100 était la dégradation flagrante de ses performances au delà de 10000 m. Pour palier ce problème, le constructeur envisagea d'utiliser le moteur Ha-112-II Ru turbo-compressé. Quatre prototypes Ki.100-II commençaient leurs essais quand le Japon capitula. Le « Go-Shiki Sen », auquel les alliés n'eurent même pas le temps de donner un surnom, termina sa carrière comme avion-suicide, sans armement ni blindage, pour éperonner les B-29.



Source : <https://www.avionslegendaires.net/avion-militaire/kawasaki-ki-100/>

The **Kawasaki Ki-100** (≠ *100*) is a single-seat single-engine [monoplane fighter aircraft](#) used by the [Imperial Japanese Army Air Service](#) during [World War II](#). The Japanese Army designation was "**Type 5 Fighter**" (五式戦闘機, *Go-shiki sentouki*, or abbreviated as *Goshikisen*). It was not assigned an [Allied code name](#). In early 1945, 275 Ki-100s were modified from Ki-61s as an emergency measure to accept a 14-cylinder [Mitsubishi Ha-112-II radial engine](#) in place of the original [Kawasaki Ha-40 inverted V-12 inline engine](#) — resulting in one of the best [interceptors](#) used by the Army during the war. It combined excellent power and maneuverability,<sup>[2]</sup> and from the first operational missions in March 1945 until the end of the war, it performed better than most IJAAF fighters<sup>[3]</sup> against both [United States Army Air Forces B-29 Superfortress](#) bombers and [P-51 Mustang](#) fighters, as well as [U.S. Navy F6F Hellcat](#) carrier fighters.<sup>[4]</sup> A newly built variant, the Ki-100-Ib, was produced with a cut down rear fuselage during the last months of the war which equipped five home defence *sentai*. High-altitude performance was further improved with the final variant, the Ki-100-II, however only three of these were produced before the war ended and this final variant never saw operational service.

## Design and development

The Ki-100 was a stressed-skin cantilever low-wing single-seat enclosed-cockpit radial engine monoplane fighter with retractable undercarriage. Control surfaces were fabric covered.

### Ki-61 engine problems

In mid-1944, the [Ki-61](#) was one of the best fighters of the [Imperial Japanese Army Air Service](#). It was also the only production Japanese fighter to have an [inline](#) powerplant, the V-12 [Kawasaki Ha-40](#), a Japanese adaptation of the [German Daimler-Benz DB 601](#) engine, as well as one of the first with factory-installed [armor](#) and [self-sealing fuel tanks](#). It also had a respectable performance, in line with contemporary American designs, with speed and rate of climb emphasized instead of manoeuvrability and range. It was an effective design, but suffered from engine shortages and reliability problems. These problems led to the development of an improved model, the **Ki-61-II** (later **Ki-61-II-KAI**), powered by the improved 1,120 kW (1,500 hp) [Kawasaki Ha-140](#) inverted V-12 engine, which was heavier than the Ha-40 it replaced. Maximum speed increased from 590 to 610 km/h (370 to 380 mph) and aside from the rate of climb, general performance was improved as well. However, it never performed as expected due to continued quality control problems with the engine, while far fewer engines were produced than required.

### Ha-112 Radial engine

At this point of the war, the IJAAF was in desperate need of effective interceptors to stop bombing raids over the Japanese mainland, so in October 1944 a decision was made to use the 1,120 kW (1,500 hp) [Mitsubishi Ha-112-II](#) (*Kinsei* ["Venus"] 60 series), a 14-cylinder, two-row [radial engine](#). The need for a new engine became urgent on 19 January 1945, when a bombing raid destroyed the Ha-140 production plant,<sup>[5]</sup> leaving 275 otherwise complete Ki-61s engineless. Ki-100-I-Ko Army Fighter Type 5 Mark 1a of 59th Sentai showing original faired rear fuselage The Mitsubishi Ha-112-II was 54 kg (119 lb) lighter than the Ha-140 and developed the same power but with much greater reliability. Three Ki-61-II-KAIs were modified to carry this engine as prototypes. Chief engineer Takeo Doi with two other engineers redesigned the Ki-61 airframe to accept the new engine. Their solution was to use a second skin to form a [fairing](#) riveted to the fuselage to smooth out the airflow behind the cooling flaps and multiple exhaust stubs of the new engine [cowling](#).<sup>[6]</sup> As this engine was lighter, they were able to remove the lead counterweight in the tail that balanced out the heavier Ha-140 engine. The new model was flown for the first time on 1 February 1945. Without the need for the heavy coolant [radiator](#) and other fittings required for a liquid-cooled engine, the Ki-100 was 329 kg (725 lb) lighter than the Ki-61-II, reducing the [wing loading](#) from 189 kg/m<sup>2</sup> (38.8 lb/ft<sup>2</sup>) to 175 kg/m<sup>2</sup> (35.8 lb/ft<sup>2</sup>). This had a positive effect on the flight characteristics, enhancing landing and takeoff qualities as well as improving manoeuvrability and reducing the turning radius.<sup>[6]</sup> During March and April 1945, experienced instructors from the Akeno Army Flying School flew the Ki-100 in extensive tests against the Ki-84, which was the best JAAF fighter then in operational service. Their conclusions were that, given pilots of equal experience, the Ki-100 would always win in combat.<sup>[4]</sup>

The flight characteristics of the plane surpassed the *Hien's* in all but maximum speed, which was reduced by 29 km/h (18 mph) by the larger cross sectional area of the radial engine, and the model was ordered into production as the *Goshikisen* (*Go*=five; *shiki*=type; *sentoki*=fighter) or *Army Fighter Type 5*. The company's designation for it was **Ki-100-I-Ko**. All Ki-100-I-Ko were converted from existing Ki-61-II Kai and Ki-61-III airframes. The integral engine mount and cowling was cut off and a tubular steel engine mount was bolted to the firewall. Some redundant fittings from the liquid-cooled engine, such as the radiator shutter actuator, were left in place. The first 271 aircraft with the original faired rear fuselage were rolled out of the factory between March and June 1945. In contrast to the unreliable engines used by the [Kawanishi N1K-J](#), Kawasaki Ki-61 and [Nakajima Ki-84](#) that were keeping many of these aircraft grounded, the new engine was much more reliable.<sup>[7]</sup> Although its maximum speed in level flight was a bit slow for 1945, the Ki-100 could dive with [North American P-51 Mustangs](#) and maintain speed after pullout, unlike most Japanese fighters.



5th *Sentai* Ki-100-I-Otsu Army Fighter Type 5 Mark 1b, showing cut down rear fuselage

Two remaining problems continued to hamper Japanese fighters towards the end of the war, these being unreliable electrical systems and poor radio equipment, and while the latter was never resolved, the Ki-100's electrical system was less of a problem than with other types.<sup>[4]</sup> The armament remained the same as was used on the Ki-61, which was two cowl-mounted [20 mm \(0.79 in\) calibre Ho-5 cannons](#), with 200 rounds per gun complemented by two wing-mounted 12.7 mm (0.50 in) [Ho-103 machine guns](#) with 250 rounds per gun.<sup>[8]</sup>

## Fuselage improvements

The **Ki-100-I-Otsu** were newly built as such, rather than being conversions, with a cut-down rear fuselage and improved canopy and 118 were produced from May through to the end of July 1945. This version also featured a modified oil cooler under the engine in a more streamlined fairing.<sup>[6]</sup>



Kawasaki Ki-100-II. [Turbocharger](#) on underside is revealed by offset oil cooler, and additional intake on other side

## High altitude improvements

The **Ki-100-II** was fitted with a [turbocharged](#) water-methanol injected engine for improved high-altitude performance, mainly to improve interception capabilities against the Boeing B-29 Superfortresses, but only three prototypes were built, and none were used operationally.<sup>[9]</sup> Due to a lack of space no [intercooler](#) was installed; however, performance was still enhanced above 8,000 m (26,000 ft).<sup>[10]</sup>

## Operational history

The Ki-100 made its combat debut on the night of 9 March 1945<sup>[7]</sup> and suffered its first loss a month later on the night of 7 April 1945, when a single Ki-100 of the *18th Sentai* was downed by a B-29 Superfortress after "attacking the formation again and again".<sup>[7]</sup> Allied aircrews soon realised that they were facing a formidable new fighter.<sup>[11]</sup> Although far fewer Ki-100s were available than Nakajima Ki-84s, it was an important fighter in the Army's inventory. A well-handled Ki-100 was able to outmanoeuvre any American fighter, including the P-51D Mustangs and [Republic P-47N Thunderbolts](#) which escorted the B-29s over Japan, and was comparable in speed, especially at medium altitudes. The Ki-100 was a tough opponent in the hands of an experienced pilot. The Ki-100 along with the Army's Nakajima Ki-84 and the Navy's Kawanishi N1K-J were equal to the latest [Allied](#) types in the final year of the Pacific War.<sup>[12]</sup> Army fighter units equipped with this model included the 5th, 17th, 18th, 20th, 59th, 111th, 112th, 200th and 244th *Sentai*, and the 81st Independent Fighter Company. Pilots were trained at the [Akeno](#) and [Hitachi](#) (Mito) Army Flying Schools. Many Akeno and Hitachi instructors were from operational units and between training sorties they also flew combat missions, making the most of the few fighters that were operational, but these wings were only partially re-equipped.<sup>[13]</sup>



111th *Sentai* Ki-100-I-Otsu

During interception of high-flying [B-29 Superfortresses](#) (before the B-29s switched to low-level missions) the new fighters struggled as the engine's performance still dropped off at high altitudes. The most effective strategy against the B-29 Superfortress remained the exceedingly dangerous head-on attack, which left the fighter relatively stationary in the sights of the bomber's defensive guns, making it an easy target. In this type of combat, the Navy's [Mitsubishi J2M Raiden](#) remained superior.<sup>[14]</sup> 111th *Sentai* Ki-100s intercepted B-29 Superfortresses attacking [Kobe](#) on 5 June 1945, claiming six bombers shot down and five 'probables'. The Americans recorded a loss of nine B-29s, including those downed by Ki-100s over the target area. Ki-100s of the same unit joined by 244th *Sentai* Ki-84s in a large-scale engagement against [506th Fighter Group](#) P-51 Mustangs over Nagoya Bay on 16 July 1945. The Ki-100 pilots claimed six P-51s and in return, five Ki-100s were lost, with three pilots killed, although American records only show one loss.<sup>[15]</sup> On 25 July 1945, 18 244th *Sentai* Ki-100 fighters clashed with 10 VF-31 [Grumman F6F Hellcats](#) from the [light aircraft carrier USS Belleau Wood](#) in an air battle where the Ki-100 pilots claimed 12 victories with two losses. Claims and counter-claims for this action remain contentious. The Americans claimed two Ki-100s and admitted to losing two VF-31 F6F-5 Hellcats. These include a Ki-100 and a Hellcat which collided, killing both pilots.<sup>[16][17]</sup> After the bombing of the [Kagamigahara](#) plant and the slow deliveries of components by satellite plants, the production rate of the Ki-100 declined, and between May and July, only 12 were delivered. Bombing would end production with only 118 of the Army Type 5 Fighter Model 1b having been delivered. The final flights made by the Imperial Japanese Army Air Service were made by two Ki-100s ferried from [Komachi](#) to [Yokosuka](#), where they were handed over to the United States, who then shipped them back to the US for evaluation.<sup>[10]</sup> Kawasaki Ki-100-1b s/n 8476M was captured at [Tân Sơn Nhứt Airfield, Saigon](#), in August 1945 in airworthy condition, having only recently been delivered.<sup>[20]</sup> However it was damaged there on 26 Nov 1945 during a wheels-up landing, after the undercarriage failed to lower for an attempted landing at [Biên Hòa](#) airfield, 15 miles away; it was being ferried there by a Japanese pilot for flight tests.<sup>[20]</sup> The oil cooler, propeller, and tailwheel were repaired but not returned to complete airworthy condition; it was later shipped to the United Kingdom along with three other Japanese aircraft including a [Mitsubishi A6M Zero](#) (Zeke) fuselage, a [Mitsubishi Ki-46](#) (Dinah) and a [Nippon Kokusai Ki-86](#) (Cyprus).<sup>[20]</sup> After years of being in storage in various locations, and being misidentified as a [Nakajima Ki-43](#) (Oscar), it was restored was on display at the [RAF Museum](#) in [Hendon, United Kingdom](#).<sup>[20]</sup> Moved to RAF Museum Cosford on 30 January 2012, though now relocated again to the Hendon museum as of December 2022.<sup>[21]</sup>

## Specifications (Ki-100-I-Ko/Otsu Goshikisen )

### General characteristics

- **Crew:** One
- **Length:** 8.82 m (28 ft 11 in)
- **Wingspan:** 12.00 m (39 ft 4 in)
- **Height:** 3.75 m (12 ft 4 in)
- **Wing area:** 20 m<sup>2</sup> (220 sq ft)
- **Airfoil:** [NACA 2R1 16](#) (root), [NACA 24009](#) (tip)<sup>[23]</sup>
- **Empty weight:** 2,525 kg (5,567 lb)
- **Gross weight:** 3,495 kg (7,705 lb)
- **Fuel capacity:** 595 L (157 US gal; 131 imp gal) (internal fuel)
- **Water methanol capacity:** 95 L (21 imp gal; 25 US gal)
- **Undercarriage track:** 4.050 m (13.29 ft)<sup>[24]</sup>
- **Powerplant:** 1 × [Mitsubishi Ha-112-II/Ha-33](#) 14-cylinder two row [air-cooled radial engine](#), 1,120 kW (1,500 hp) at take off
- **Propellers:** 3-bladed [constant-speed propeller](#), 3.00 m (9 ft 10 in) diameter <sup>[24]</sup>

### Performance

- **Maximum speed:** 580 km/h (360 mph, 310 kn) at 6,000 m (20,000 ft)
- **Cruise speed:** 400 km/h (250 mph, 220 kn) at 4,000 m (13,000 ft)
- **Range:** 1,400 km (870 mi, 760 nmi) on internal fuel only, 2,200 km (1,400 mi; 1,200 nmi) with 2 × 200 L (44 imp gal; 53 US gal) external droppable fuel tanks
- **Endurance:** 3 hours 30 minutes
- **Service ceiling:** 11,000 m (36,000 ft)
- **Time to altitude:** \*\* 6 minutes to 5,000 m (16,000 ft)
  - 20 minutes to 10,000 m (33,000 ft)
- **Wing loading:** 174.8 kg/m<sup>2</sup> (35.8 lb/sq ft)

### Armament

- **Guns:** 2 × [20 mm \(0.8 in\)](#) fuselage-mounted [Ho-5 cannons](#) (400 rpg) and 2 × 12.7 mm (0.50 in) wing-mounted [Ho-103 machine guns](#) (500 rpg)
- **Hardpoints:** 2 × 200 L (44 imp gal; 53 US gal) external drop tanks, carried outboard of the undercarriage legs
- **Bombs:** 2 × 250 kg (550 lb) bombs, carried in lieu of drop tanks on same hardpoints outboard of the undercarriage

Source : [https://en.wikipedia.org/wiki/Kawasaki\\_Ki-100](https://en.wikipedia.org/wiki/Kawasaki_Ki-100)