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HEINKEL He 64 c SPORT AIRPLANE (GERMAN)  
A Two-Seat Low-Wing Cantilever Monoplane

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AIRCRAFT CIRCULAR NO. 175

HEINKEL He 64 c SPORT AIRPLANE (GERMAN)\*

A Two-Seat Low-Wing Cantilever Monoplane

The Ernst Heinkel Aircraft Corporation, of Warnemünde, Germany, in producing the He 64 light airplane, have designed an airplane with particular regard to the competition requirements of the 3d International Touring Contest, 1932, in consideration of which the following information is of particular interest.

Contrary to all previous European contests, the last year has shown a remarkable increase in high speeds. While in the year 1930 the fastest airplane did not show more than about 125 mi./hr. (200 km/h), the last contest has brought speeds up to more than 150 mi./hr. (240 km/h). Even before this competition, one had foreseen higher speeds, and consequently the regulations have provided a flying time of only six days instead of twelve days as in former contests for the same pace of about 4,700 miles (7,500 km). However, these expectations have been greatly surpassed by the Heinkel airplanes, in flying over the whole distance within three days only.

In accordance with the idea of producing a general-purpose sport airplane, apart from a racing type, the greatest attention was paid to safety and comfort, and it is worthy of special note that a low landing speed has been obtained by the use of the maneuverable slotted wing, and that excellent visibility is obtained in all directions, even downward. (Figs. 1, 2, 3, and 4.)

Roomy and comfortable seats for pilot and passenger are covered by a transparent roof, which can be slid forward or backward at will, so that both have adequate protection from the elements and easy access for entrance and exit.

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\*From data furnished by the manufacturers.

The airplane is a two-seat cantilever low-wing monoplane of wooden construction.

### Fuselage

The fuselage has an oval cross section and a semicircular cabin structure of good aerodynamic design. The fuselage structure consists of bulkheads and longerons covered with three-ply, in which special doors are provided to facilitate an easy inspection of the inside of the fuselage. The steel tube engine mounting is attached to the first bulkhead, which is fireproof, and rubber buffers, are fitted to prevent engine vibration from being transmitted to the rest of the airplane. The oil tanks are immediately behind the fireproof bulkhead. In the pilot's cockpit is an adjustable seat, fitted with arm rests, and also a very well-equipped instrument board. The coaming behind the pilot is occupied by an additional oil tank. The second cockpit is fitted with detachable dual control which can be easily disconnected by the pilot. The passenger's seat, like the pilot's, is adjustable.

### Wings

The single-spar trapezoidal-shaped wings are built up entirely of wood and attached to the central portion by means of bolts.

For light aircraft it is very desirable to be able to fold the wings back easily and quickly, and this requirement has been achieved in the He 64 c by the operation of a single lever which enables the wings to be folded in less than one minute. (Figs. 5 and 6.) This has also been the reason why the conventional sheet covering at the wing connection could be omitted since the free slot at the connection point can be reduced to less than .04 inch (1 mm). The wings are fitted with automatic slots coupled to trailing flaps, and by the use of these devices a very low landing speed and steep climbing angle have been obtained. (Figs. 7 and 8.)

Although the slotted wing is now very well known, this is the first application of the device to an airplane with a single-spar wing.

### Tail Unit

The construction of the tail unit is similar to that of the main wing, being entirely of wood, covered with three-ply.

The controls are operated in the usual way, by means of the conventional stick and rudder bar. The auxiliary control stick in the observer's room can be easily removed or blocked from the pilot's seat.

### Landing Gear

The landing gear is braced by streamline tubes, which insure the advantage of quick interchangeability. A combined oleo-pneumatic shock absorber has been incorporated. The wheels are fitted with 600 by 100 mm (23.62 by 3.94 in.) tires and with brakes operated by a hand lever. A rubber-spring tail skid is provided.

### Engine

The airplane can be fitted with either of the following engines: 150 hp Argus, or Gipsy III, as well as Hirth. The airplanes of this type used in the international European flight, were fitted with the new Argus As 8.3 engine having a maximum output of 160 hp. The engine is mounted in the nose and has a fairing of light metal. The fuel supply is effected by engine-driven pumps.

### Safety Devices and Equipment

Apart from the slotted wing, which will give additional safety in itself due to the slow landing speed, the airplane has been equipped with all modern safety devices, such as fire extinguishers, swimming jackets, parachutes, medicine kit, safety belts, complete instrument board, fireproof dopes, etc.

A remarkably good connection between pilot and passenger has been accomplished by the installation of a talking tube.

## SPECIFICATIONS

## Dimensions:

Span	9.80 m	32.15 ft.
Length	8.31 "	27.26 "
Height	2.06 "	6.76 "

## Areas:

Wing, with ailerons	13.00 m <sup>2</sup>	139.93 sq.ft.
Aerodynamic lifting surface	14.40 "	155.00 "
Fin	0.318 m <sup>2</sup>	3.42 "
Rudder	0.464 "	4.99 "
Vertical empennage	0.782 "	8.42 "
Stabilizer	0.964 "	10.38 "
Elevator	0.802 "	8.63 "
Horizontal empennage	1.786 "	19.01 "
Ailerons (2 x 0.486 m <sup>2</sup> )		10.46 "

## Characteristics:

Dihedral	4½°
Sweepback	0
Angle of wing setting with respect to axis of engine	+1½°
Fin	adjustable
Stabilizer, adjustable	+3° to -8°
Propeller	variable-pitch

## Weights:

Empty	450 kg	992 lb.
Pilot and passenger	160 kg	353 lb.
Oil for 3 hours	15 "	33 "
Gasoline for 3 hours	95 "	209 "
Baggage and parachute	30 "	66 "
Total load	300 kg	661 lb.
Permissible flying	750 "	1,653 "

## Performances:

The following figures have been reached and officially measured in the 3d International European Contest.

Maximum speed	245 km/h	152.2 mi./hr.
Landing speed	52 "	32.3 "
Climb to 1,000 m (3,280 ft.)	4 min.	4 min.
Range	900 km	559 miles
Wing loading	57.7 kg/m <sup>2</sup>	11.8 lb./sq.ft.
Power loading	5.0 kg/hp	11 lb./hp

## Outstanding Features

A speed range of One to Four is an achievement never before reached on an aircraft of this type. Such a speed range is, indeed excelled only by the Schneider Cup racers.

A maximum lift coefficient of about 1.5 was obtained by several pilots during the technical tests for the "Europa Rundflug" on the He 64 c airplane. From wind-tunnel tests a maximum lift coefficient of about 1.25 was expected and the increase above this figure seems to be due to the slipstream effect.

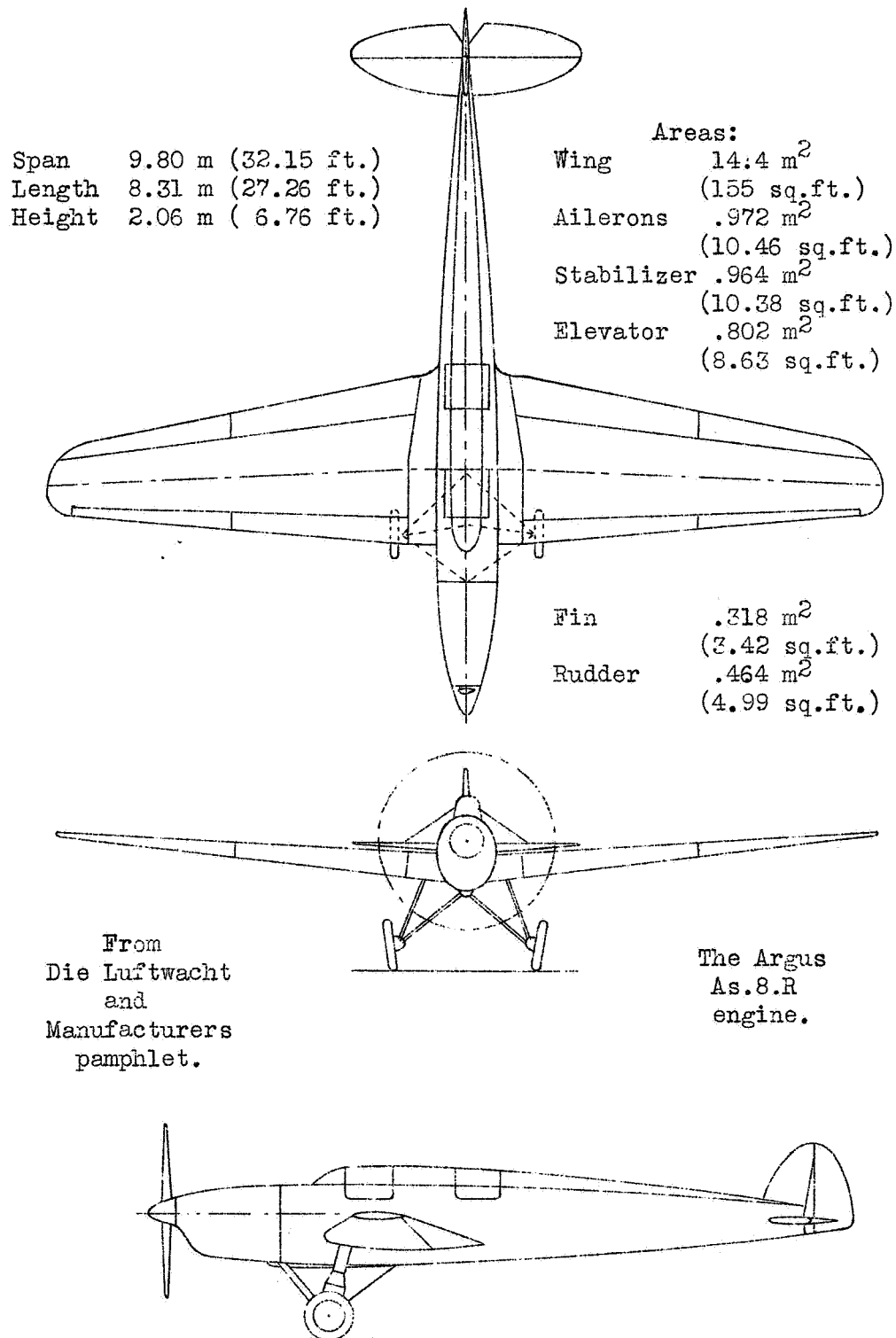


Figure 1.- General arrangement drawings of the He.64c airplane.

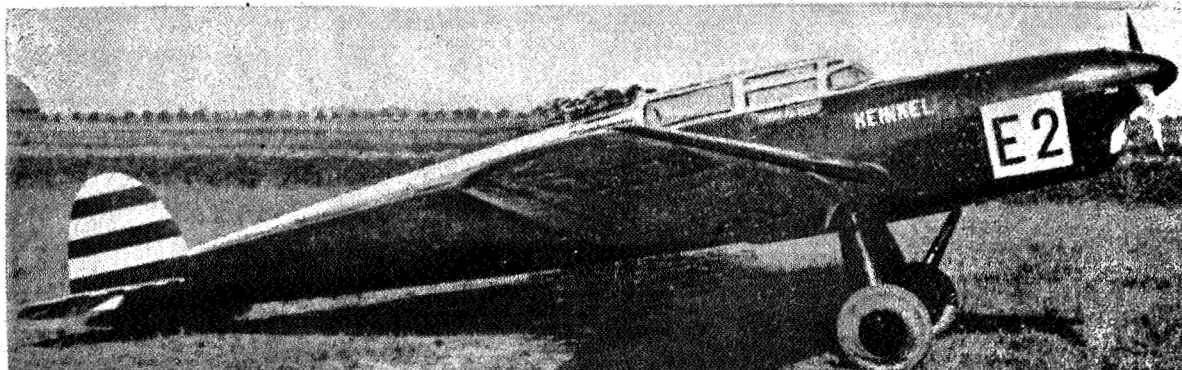


Figure 2.- The latest Heinkel He.64c monoplane. from The Aeroplane



Figure 3.- A three-quarter rear view of the Heinkel He.64c.

From "Flight"

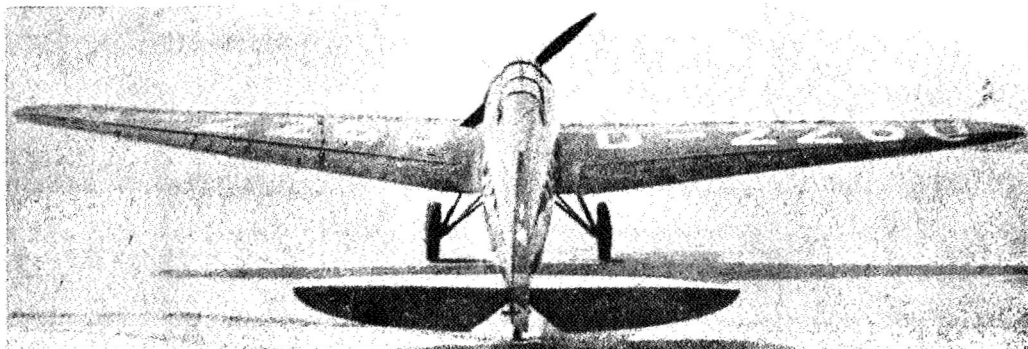


Figure 4.- The Heinkel He.64c showing the slotted trailing edge of the wings.

From "Aircraft Engineering"

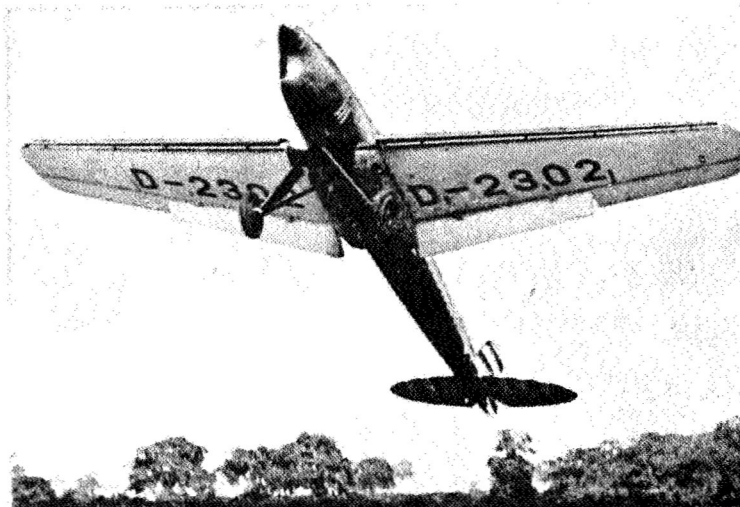
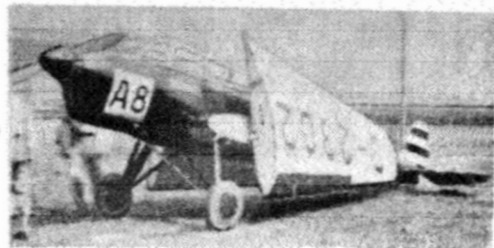


Figure 7.- A take-off demonstration of the Heinkel He.64c. Note lift flaps down and all slots open.

From "Flight"

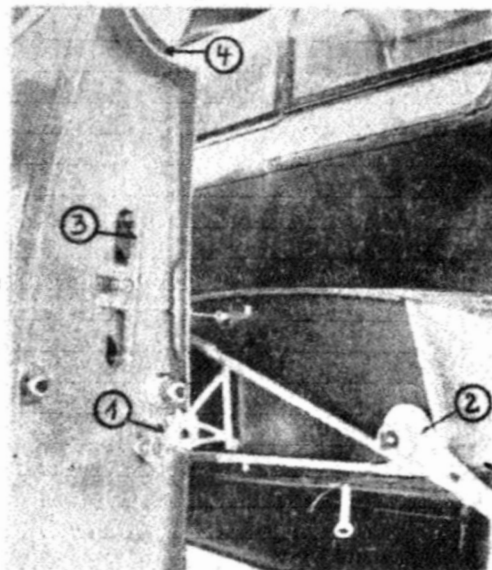


Figure 5.- He.64c with wings folded.



*From Zeitschrift für Flugtechnik und Motorluftschiffahrt*

Figure 6.- Close up of wing hinge of He.64c, showing universal joint (1), otherwise slip bolts in the form of forks operated by levers; secured by bayonet socket (2); divided control rods with end levers close together (3); Wing section but slightly cambered; shaped aileron-connecting edge (4). One-spar wing (with false spar, which however absorbs no bending stresses, forming a rigid box girder).



*From Die Luftwacht*

Figure 8.- Slotted wing and flaps on the He.64c airplane. The picture also shows the landing gear with brace wires as first used on the type c.

