



КНААПО

Komsomolsk-on-Amur
Aircraft Production Association



Be-103

**LIGHT MULTIROLE
AMPHIBIAN**



Be103

GENERAL INFORMATION

Long sea-coasts, abundance of rivers and lakes, coupled with other hard-to-reach areas in different regions of the world are the right places for the Be-103 light amphibian operation. A most attractive and universal feature of the aircraft is its ability to operate from both paved and unpaved runways, as well as from inland water reservoirs and offshore waters.

The aircraft is a low-wing monoplane featuring +-type tail unit consisting of vertical fin with rudder and horizontal all-moving stabiliser, and tricycle landing gear with nose wheel. The power plant includes two TCM IO-360 piston engines mounted on horizontal pylons on either side of the fuselage. The low wing creates a considerable aerofoil effect at takeoff and landing, thus ensuring a three-point skimming capability (planning step, starboard and portside centre wing trailing edges).

The Be-103 amphibian is designed for a variety of applications, namely:

- passenger transportation and administrative and liaison operations;
- transportation of small-sized cargo and mail;
- emergency medical assistance;
- forestry monitoring and water ecology monitoring with water sampling capability;
- maritime border patrolling and air photography;
- pleasure trips and tourism.

PRIMARY DIMENSIONS



Clearance	0.295 m
Wing area	25.1 m ²
Leading edge sweep angle	22°
Mean aerodynamic chord	2.139 m
Wing panel dihedral	5.05°
Aileron deflection angle	±25°
Vertical stabiliser:	
Height	2.2 m
Sweep angle	33°
Area	4.4 m ²
Rudder deflection angle	±27°
Horizontal stabiliser:	
Span	3.9 m
Sweep angle	14.65°
Area	3.68 m ²
Horizontal stabiliser settings	-14°/+16°
Fuselage maximum width	1.35 m
Cabin length	3.2 m
Cabin width	1.25 m
Cabin height	1.23 m
Cabin volume	4.2 m ³
Maximum cargo length	2.5 m

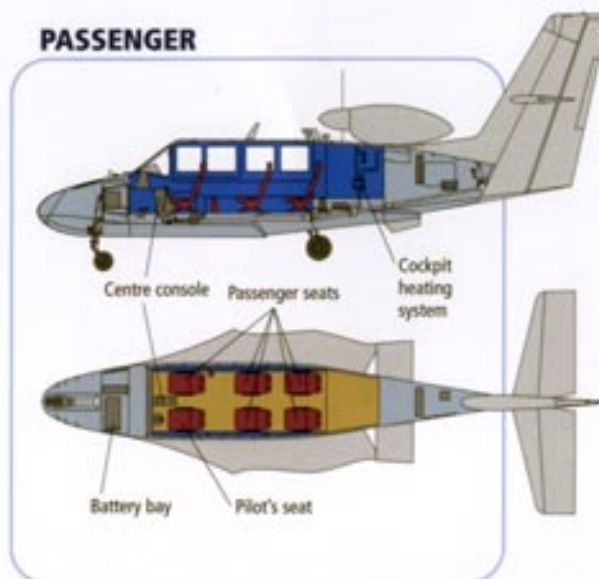
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PRIMARY FLIGHT SPECIFICATIONS

Empty weight	1,680 kg
Operational empty weight	1,760 kg
Maximum takeoff weight	2,270 kg
Maximum payload	385 kg
Useful load (cargo+fuel)	510 kg
Maximum landing weight	2,270 kg
Maximum fuel capacity	245 kg
Operating altitude	500-3,000 m
Service ceiling	5,000 m
Cruising speed:	
economy (V_{econ})	220 km/h
maximum (V_{max})	250 km/h
Stalling speed	109 km/h
Range (with 245 kg of fuel):	
at altitude 500 m	1,180 km
at altitude 3,000 m	1,100 km
Range (with 149 kg of fuel)	590 km
Mean fuel consumption per 1 hour:	
economy speed (V_{econ})	44 kg/h
maximum speed (V_{max})	58 kg/h
Run on land / water	440 m / 620 m
Roll on land / water	240 m / 320 m
Seagoing ability (wave height)	sea state 2 (0.5 m)

LAYOUT VARIANTS

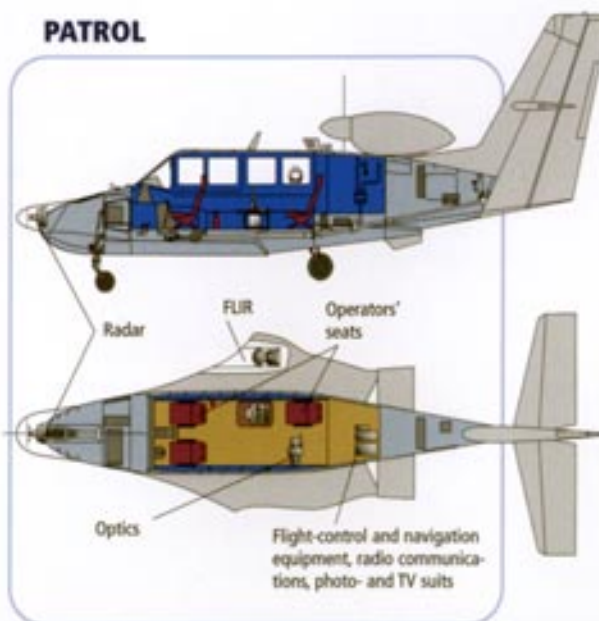
PASSENGER



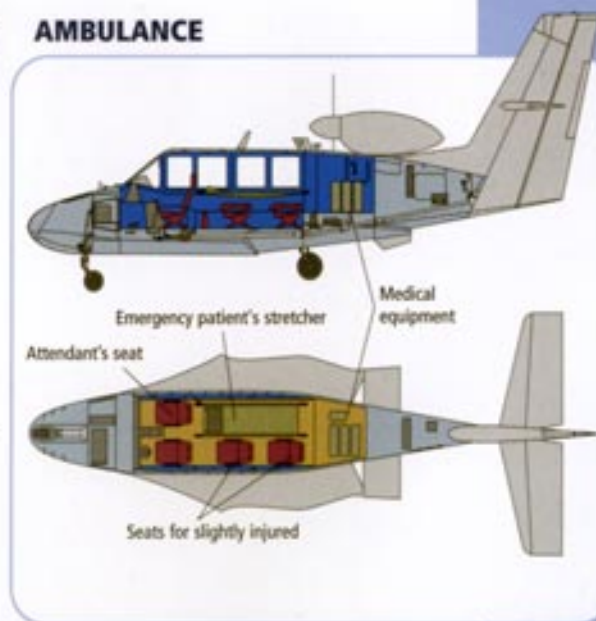
CARGO



PATROL



AMBULANCE



DESIGN

The aircraft is of riveted design, made of aluminium alloys with special rust-protective coatings to ensure operation in all climatic conditions. It also features titanium alloys, polymers and glass-reinforced plastics. The materials were chosen to ensure the required strength and weight characteristics, the set service life as well as given fire safety and survivability requirements. The airframe is a one-piece structure consisting of the boat, the centre wing section, the fin and engine pylons. The detachable parts include detachable wing sections (cantilevers), the horizontal stabiliser, the rudder and nacelles. The Be-103 systems and equipment comprises the fire-fighting system, the control system, the hydraulic system, the heating and ventilating system, the anti-icing system and the flight-control and navigation equipment.

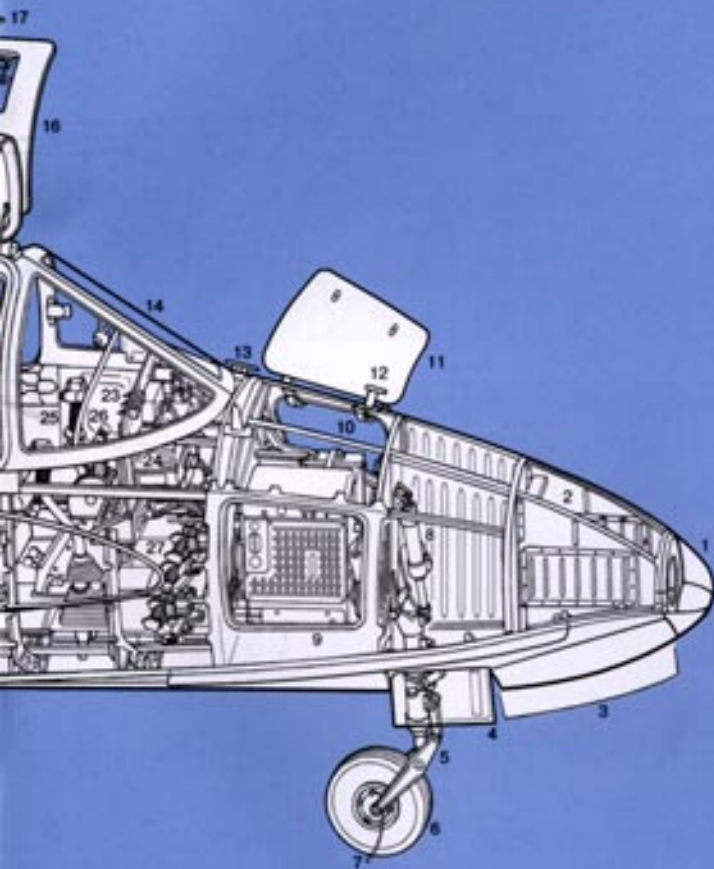


POWER PLANT



The Be-103 amphibian is fitted with two US Teledyne Continental Motors 210 hp TCM IO-360ES4 air-cooled piston engines. The power plant ensures reliable startup of engines in a wide variety of temperatures (from +45°C to -55° C), and provides for comfortable conditions in the cockpit, complying with noise and emissions requirements. The two engines allow flying at an altitude of 3,000 m at a speed of 250 km/h to the ranges of up to 1,180 km. The engines are operated along with the MTV-12 three-blade reverse-pitch propellers designed by MT-Propeller, Germany.

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1. Nosecone
2. Landing gear well
3. Forward doors of the landing gear well
4. Rear doors of the landing gear well
5. Nosegear strut
6. Nosegear wheel
7. Static discharger cable
8. Nosegear retraction hydraulic cylinder
9. Forward maintenance access hatch
10. Battery access hatch
11. Forward maintenance access hatch's door
12. Pitot static tube
13. Lashing hook
14. Canopy windshield
15. Entrance hatch
16. Entrance door
17. Entrance door external handle
18. External door internal handle
19. Entrance door actuating cylinder
20. Pneumatic damper
21. Sliding window
22. Pilot seat
23. Instrument panel
24. Radio set
25. Control stick
26. Throttle controls
27. Pedals
28. Copilot/passenger seat
29. Entrance stairs' door
30. Passenger seats
31. Canopy side window
32. Radio antennae
33. Pitot static tube
34. Wing leading edge extension
35. First step
36. Inner wing
37. Outer wing
38. Fuel tank
39. Landing gear well
40. Main landing gear strut
41. Main landing gear wheel
42. Main landing gear retraction cylinder
43. Drainage/ventilation compartment
44. Aircraft floodability compartment
45. Light
46. Aileron
47. Aileron control cable
48. White (flash) and green navigation lights
49. Static discharger
50. Luggage compartment
51. Avionics units
52. Aircraft control linkage
53. Fuel system tank
54. Rear wall of the luggage compartment
55. Rear maintenance access door
56. Teledyne TCM I0-360ES engine
57. Three-blade variable pitch propeller
58. Propeller pitch control cone
59. Engine cooling system door
60. Exhaust pipe
61. Powerplant pylon
62. Second step
63. Fin
64. Dorsal fin
65. Rudder
66. Rudder balancer
67. Rudder hinge fitting
68. Rudder trimmer
69. Navigation light (white)
70. Radio antennae
71. Flashing beacon

RADIO COMMUNICATIONS, FLIGHT-CONTROL AND NAVIGATION EQUIPMENT

Elements of the radio communications, flight-control and navigation equipment, as well as the aircraft systems control panels are accommodated on the instrument panel, the central, the upper and the side consoles in the cockpit. This equipment provides for self-sufficiency during flight preparation or aircraft maintenance, as well as VFR and IFR manual flight modes, in daytime and at night, in any season and any region of the world. Also, it allows fulfilling the following tasks: a 10-minute preflight preparation; continuous measuring of the aircraft present position, the set track angle and lateral deviation; ICAO Category I manual approach; measuring of the flight altitude, vertical speed and airspeed, and outside air temperature; indication and warning of operating limitations and critical flight conditions.



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The Be-103 amphibian is equipped with the Bendix/King radio communications, flight-control and navigation equipment including:

- **KX 165** radio navigation and communication system, operating within the band of 108-117.95 MHz
- **KY 196A** radio operating within the band of 118-136.975 MHz
- **KMA24** intercom
- **C 2400L4VT** magnetic compass
- **KR 87** automatic direction finder
- **KCS 55A** compass system
- **KT 70** aircraft responder
- **KLN 89B** satellite navigation system with 1,602-1,616 MHz frequency band
- **KEA 130A** aneroid altimeter
- **P/N 8000** airspeed indicator
- **P/N 7040** vertical speed indicator
- **P/N 9551B** gyro turn and slip indicator
- **510-44A** attitude indicator
- **307FC** outside air temperature indicator

The following auxiliary equipment can also be installed:

- **RDR-2000** or **RDR-1400** weather radar
- **KAP-140** or **KFC-150** autopilot
- **KRA 405** radio altimeter



KCS 55A compass system helps to pick up heading and fly the aircraft by means of gyro and magnetic assets.



KMA-24 intercom ensures internal communications between the pilots as well as commutation with navigation equipment and the KY196A radio.



KEA 130A is an aneroid altimeter.

The navigation system of the Be-103 aircraft comprising the KLN 89B satellite navigation system, the KR 87 radio compass, the KX 165 radio navigation and communication system and the KT 70 responder allows the pilot to find the actual position of the aircraft and pick up heading, take the bearings of radio stations and listen to weather reports and commercial radio stations.



AIRCRAFT CABIN

The interior of the aircraft cabin, together with the heating and ventilating systems and furnishings, provide comfortable conditions for the pilot and passengers in various flight situations. The cabin's walls and ceiling are finished, and there's carpeting on the floor. The interior is provided on the individual order of a customer and according to his design.

The access to the Be-130 is through the 1,300x900-mm hatch folding upwards in the front part of the cabin on the left. There is a ladder in the left wing leading edge extension just under the hatch to allow access for the crew and passengers both on the ground and afloat. The emergency hatch is on starboard. It has the same dimensions as the main one.

The cabin has a pilot's seat and five passenger ones (two seats in a row with 200 mm central aisle and a 1,220 or 860-mm pitch of rows). A second control panel can be fitted as well.

The cargo compartment is accommodated behind the back side of the cabin. There is a buffer shelf between the seats and the back wall with slots for food and dishes.

The rear part of the cabin also houses elements of the electric power supply system and the temperature adjustment system. The volume of air fed into the cabin is not less than 100 kg/h, while the temperature inside does not drop below +15°C, with the heating system operating in a normal mode.

There is a life jacket under each seat for emergency escape when afloat.

The pilot's work place has an emergency radio station and a portable fire extinguisher.



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OPERATION AFLOAT

The sea-going capabilities of the aircraft ensure its operation in sea state 2 (with 0.5 m high waves). There are waterproof bulkheads separating the boat and the wing compartments to ensure floodability if part of the hull is flooded. The landing gear wells are also waterproof and are separated from the inside of the boat. The Be-103 can be operated both at berthed and free waters, using floating assets and without them. The aircraft can independently climb soft slopes on the shore and set itself afloat from the

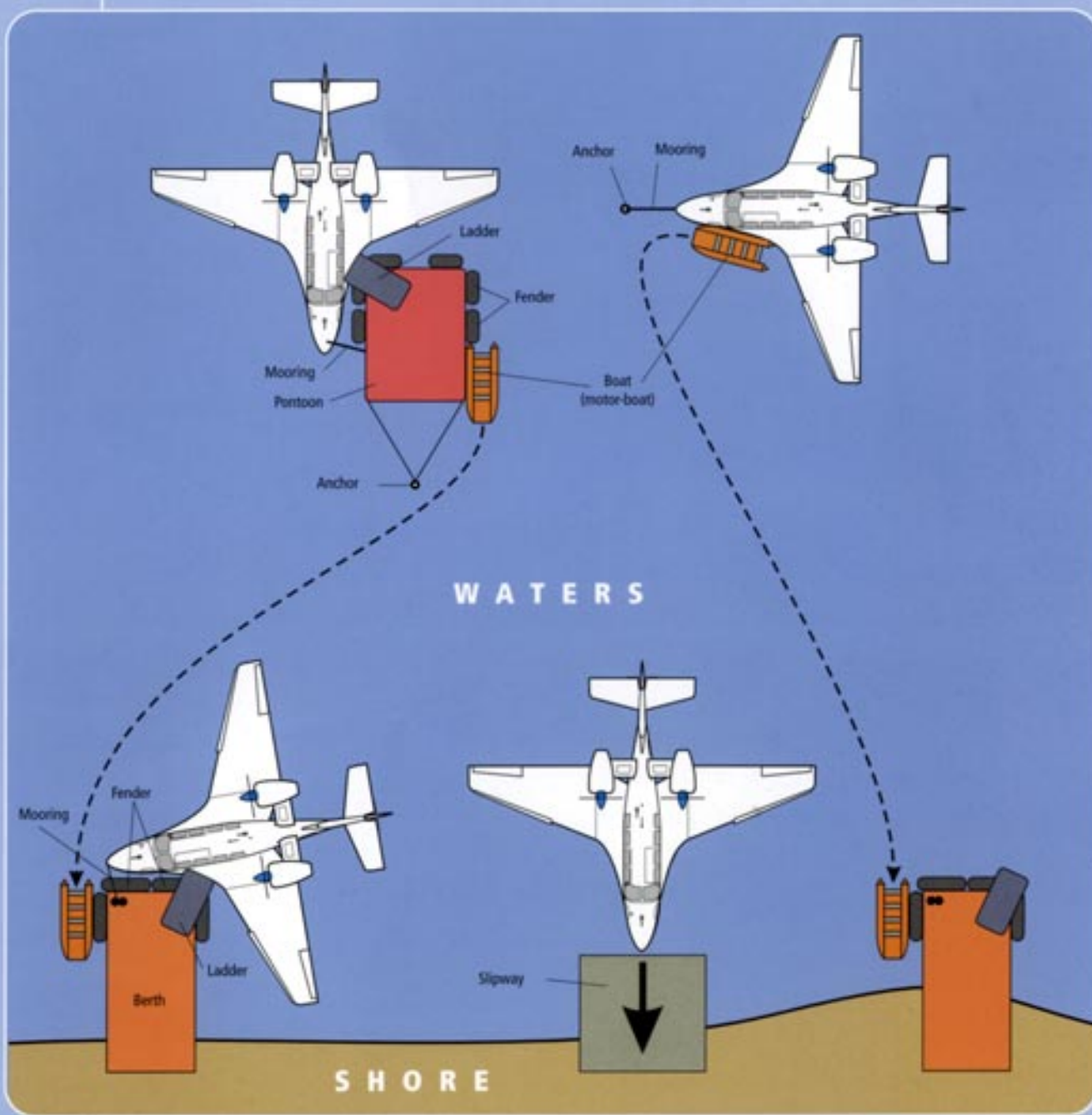
shore. The stationary slipway has winches that can be attached to bow snatch cleats or the stern lug to help climb or descend the aircraft. When afloat the aircraft can be tugged by a boat with the help of a special kapron cord. At anchorage the aircraft is moored with the help of the anchor tab attached to snatch cleats. The cabin houses seagoing equipment, including a drag-anchor, a heaving line, a boat hook and water-resistant gloves. Also, a special pump is provided to drain water out of the compartments.



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AFLOAT OPERATION PATTERNS



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