Future Vehicles

Title:

Pilot´s Operating Handbook for Dingo Airplane

Document Number:

D2_01_00_EN

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1. Important Notice

The owner, every operator, and pilot of this aircraft must thoroughly familiarize themselves with this Pilot´s operating handbook.

This airplane is operated under sole responsibility of the operator.

Intentional spins, dives and aerobatics are prohibited.

2. Introduction

First Part – Handbook: Provides information necessary for the safe operation of this aircraft. It is the duty of every pilot to familiarize themselves with this information before flight.

Second Part – Aircraft Logbook: Contains records of flight operations, repairs, malfunctions, and the implementation of mandatory bulletins. The owner is obliged to keep the manual up to date, reflecting the aircraft's condition, and to continuously record all entries in the aircraft logbook.

3. POH Data

Registration	
Year of production	
Serial number	
Manufacturer	Future Vehicles s.r.o.

RECORD OF OWNERS:

First owner	
Name	
Address	
Date from – to	
Change of the owner	
Name	
Address	
Date from – to	
Change of the owner	
Name	
Address	
Date from – to	
Change of the owner	
Name	
Address	
Date from – to	

4. Airplane Description

Dingo is a single-seat biplane with an open cockpit and an engine in pusher configuration.

The construction is riveted from aluminum alloy sheets 6061 and 2024. The wings, ailerons, floating elevator, and rudder are covered with fabric. A trim tab is located on the elevator's trailing edge.

The fuselage itself has a width of 150mm. The cockpit is open, featuring a laminated seat in the front section. The pusher engine is attached to the fuselage using rubber shock mounts. A plastic fuel tank with a capacity of 10 liters is positioned in the fuselage behind the pilot's seat.

The non-sprung main landing gear is welded from thin-wall steel tubes. The non-braked main gear wheels have dimensions of 300x100mm. The tailwheel is steerable and features suspension using rubber shock mounts, with the tailwheel itself having a diameter of 120mm.

Ailerons are situated on the lower wing. Ailerons and the elevator are controlled using control rods, while the rudder is controlled using cables.

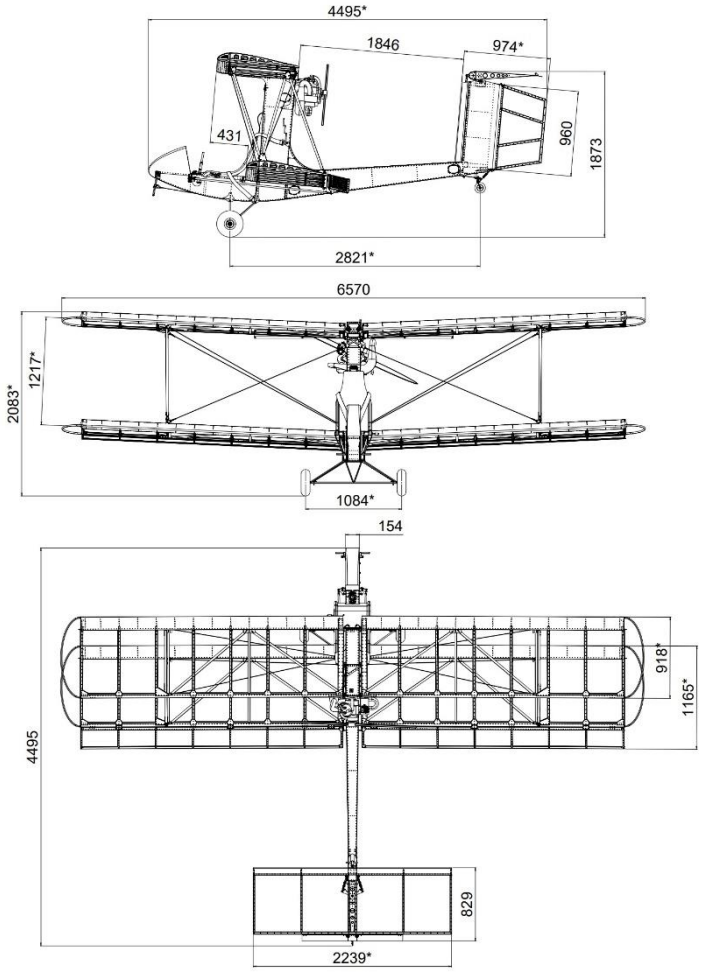


Figure 1: Basic dimension of Dingo airplane

4.1. Basic Data

Wing span.....6,57 m
Wing area.....12,55 m^2
Wing airfoil.....R III mod
Aileron deflections.....10° down, 13° up
Elevator deflections.....4° down, 12° up
Rudder deflection..... ± 25°
Fuselage length.....4,45 m
Elevator span.....2,24 m
Elevator area..... 1,68 m^2
Elevator airfoil.....sym.
Empty weight.....95 kg[1]
Max. takeoff weight.....220 kg
Fuel tank volume.....10 l

4.2. Engine

The aircraft can be equipped with any engine within the power range of 25 HP to 40 HP, with a maximum weight of 25 kg. The selection of a suitable engine and a corresponding propeller is the responsibility of each owner. Here, in this Pilot´s opearting handbook, performance data for the Vittorazi Moster 185 and Polini Thor 303 engines are provided in Chapter 5.

[1]With engine Vittorazi Moster 185, 25 HP and propeller Helix H30L, 1,3m-L-M-08-2

4.3. Instrument Equipment and Controls

4.3.1. Instrument Equipment

The choice of instrument equipment is the responsibility of each owner. The aircraft manufacturer strongly recommends the installation of an airspeed indicator (such as www.hallwindmeter.com) with clearly marked stall speed V_{S1} and never exceed speed V_{NE}, as well as the installation of a mobile phone with the Sky Daemon application, or another suitable app (GPS, altimeter, compass indication).

An example arrangement of the instrument panel is shown in Figure 2.

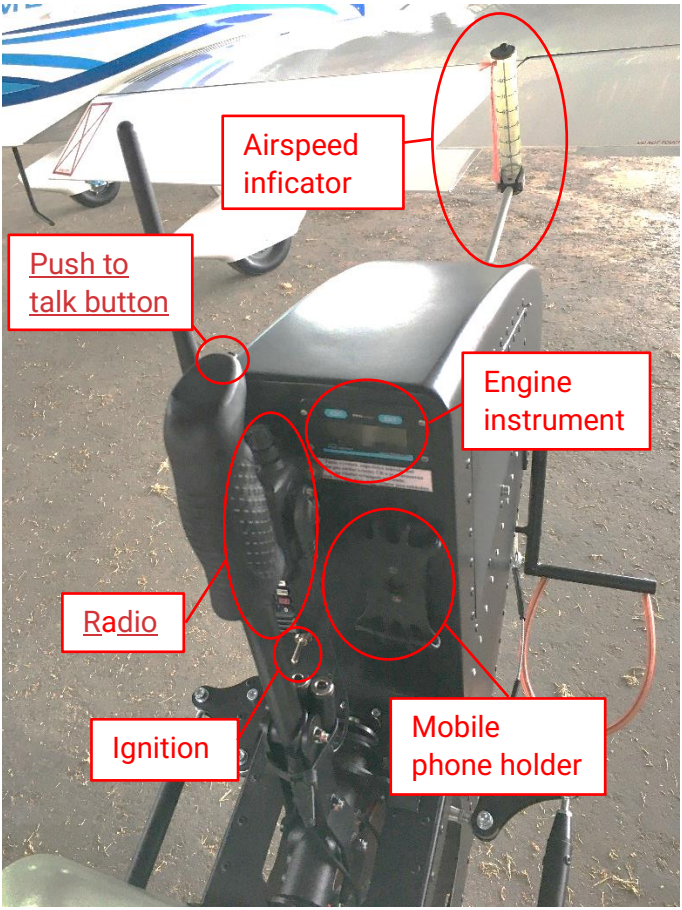


Figure 2: Instrument panel of Dingo – arrangement example

4.3.2. Controls

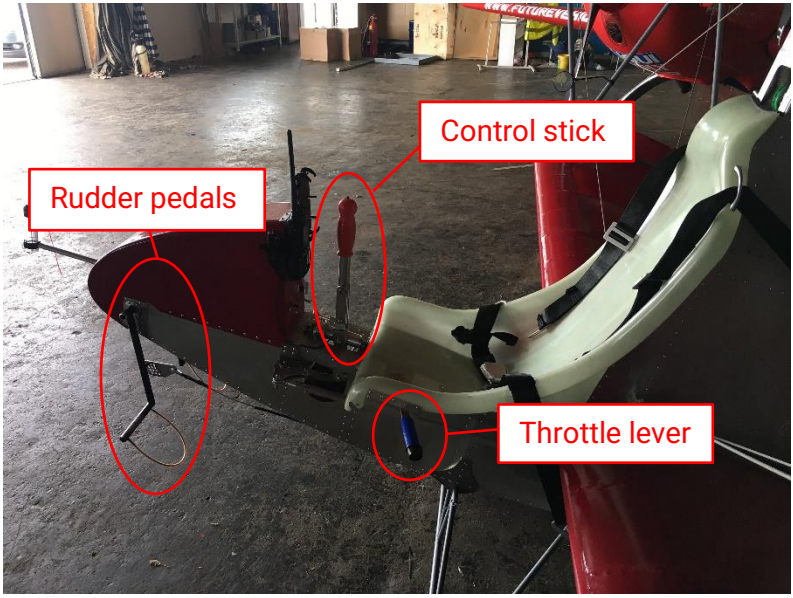


Figure 3: Controls of Dingo

5. Flight Performance

This chapter contains flight performance data measured with following power units:

- Vittorazi Moster 185 (25 HP) + propeller HELIX H30L, 1,3m-L-M-08-2
- Polini Thor 303 R3,2 (38 HP) + propeller E-Props, dia 160cm, PLUG-2 Vittorazi Cosmos 300 reducer 3.04

All data in the table below are valid for MTOW.

Power unit	Vittorazi Moster 185	Polini Thor 303
Maximum rate of climb at V_Y=55 km/hod	1,6 m/s	2,5 m/s
Optimal cruising speed at 7000 RPM	60 km/h	65k m/h
Maximum horizontal speed at maximum RPM	70 km/h (7800 RPM)	75 km/h (8000 RPM)
Take off distance over 15 m	250 m	150 m
Landing distance over 15 m	200 m	200 m

Gliding ratio at 55 km/h	1:5
Stall speed	40 km/h
Rate of descent at 50 km/h with the engine at idle	-3,7 m/s
Rate of descent at 50 km/h with the engine off	-3,9 m/s
Optimal approach speed for landing with the engine running	55 km/h
Optimal approach speed for landing with the engine off, rate of descent: -4 m/s	55 km/h

6. Operational Limitations

6.1. Permissible Range of Speed

Never exceed speed V_{NE}.....100 km/h
Stall speed..... 40 km/h

6.2. Weight and Center of Gravity

Empty weight.....Engine depending
Maximum takeoff weight..... 220 kg
Minimum pilot weight..... 80 kg

The stated minimum pilot weight is valid for the Vittorazi 185 engine and the HELIX H30L, 1.3m-L-M-08-2 propeller. When installing a different engine, it may be higher! It's necessary to obey the allowed range of center of gravity!

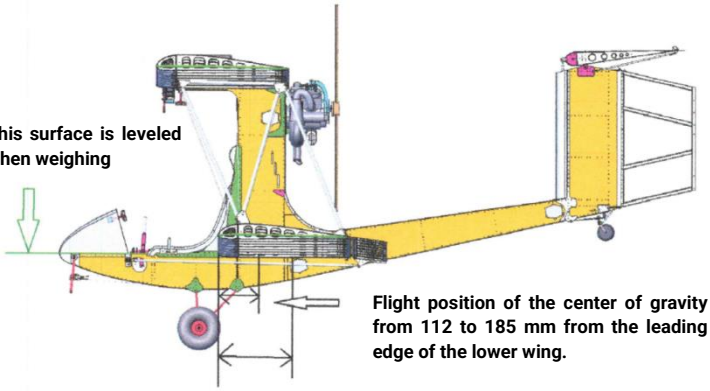
Limit forward flight center of gravity.....112 mm
Limit aft flight center of gravity ..... 185 mm
Measured from the leading edge of the lower wing.

At lower pilot weight, it's necessary to attach ballast to the front part of the fuselage (ahead of the rudder controls)!

Never exceed the maximum takeoff weight of the aircraft and the allowed range of flight center of gravity!

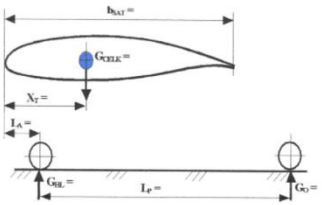
6.2.1. Center of Gravity Determining

The diagram below depicts the aircraft's position for determining the center of gravity and the formulas required for calculation.



For the airplane with tail wheel:

$$X_{T(mm)} = L_A + \frac{G_O * L_P}{G_{CELK}}$$



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6.3. Allowed Maneuvers

In addition to maneuvers during normal flight the aircraft is allowed to perform sharp banked turns up to 60° and climbing turns.

Aerobatics, intentional spins, and dives are prohibited!

6.4. Operational G-loads

Maximum positive G-load..... +4 g
Maximum negative G-load..... -2 g

6.5. Types of Operations

Only day VFR flights are permitted. Night flights, IFR flights. and flights in conditions conducive to icing are prohibited.

6.6. Operational Fluids

Fuel according to the engine manufacturer's manual. Maximum of 10 liters. Other fluids according to the engine manufacturer's manual.

6.7. Wind

It is possible to perform safe takeoff and landing with a crosswind of maximum speed 3 m/s.

6.8. Other Limitations

Smoking, transporting flammable materials, explosives, and unsecured objects are prohibited on board.

7. Emergency Procedures

7.1. Engine Shutdown During Takeoff

1. Push the stick to bring the aircraft into gliding at speed of 60 km/h.
2. Determine wind direction, turn off ignition, secure seat belts.
3. Perform landing:
   a. At an altitude below 50 m, considering obstacles, perform landing in the direction of flight, possibly with a deviation of up to 90° sideways.
   b. At an altitude above 50 m, choose a suitable area for emergency landing within gliding distance.

7.2. Engine Shutdown in Flight

1. Bring the aircraft into gliding at a speed of 60 km/h.
2. Check the fuel level and ensure that the ignition is turned on.
3. If the aircraft is equipped with an electric starter and if the altitude allows, try to restart the engine.
4. If the engine does not start, perform an emergency landing as described in section 7.5.

7.3. In-flight Fire

1. Turn the ignition off.
2. Perform an emergency landing as described in 7.5.
3. Leave the airplane.

7.4. Flight with the Engine Off

1. Speed of 60 km/h

7.5. Emergency Landing

This is performed after the engine shut down.

1. Speed of 60 km/h.
2. Secure seat belts.
3. Turn off the ignition.
4. Perform landing:
   a. At an altitude below 50 m, considering obstacles, perform landing in the direction of flight, possibly with a deviation of up to 90° sideways.
   b. At an altitude above 50 m, choose a suitable area for emergency landing within gliding distance.

7.6. Precautionary Landing

This is performed in case of disorientation, running out of fuel, sudden deterioration of weather, or for other reasons, when the aircraft is fully controllable.

1. Determine wind direction.
2. Select a suitable area.
3. Conduct a low pass against the wind, along the right side of the area, and thoroughly inspect it.
4. Perform a pattern and approach for landing.
5. Land in the first third of the area.

In case of an emergency or precautionary landing into terrain on fields not approved for takeoff and landing, there is a risk of damaging the aircraft or injuring the crew!

7.7. Vibrations

If any abnormal vibrations occur in the flight, it's necessary to:

1. Attempt to adjust the engine RPM to minimize vibrations or shut down the engine if necessary.
2. Perform a precautionary landing (with the engine running) following section 7.6, or an emergency landing (with the engine off) following section 7.5.

8. Normal Procedures

8.1. Preflight Inspection

Conducting a pre-flight inspection is crucial. Incomplete or careless execution of this inspection can lead to accidents!
Perform the pre-flight inspection as follows:

- Ignition - off.
- Wing – overall surface condition, aileron freedom of movement, free play and overall conditions, inspection of wing attachment pins and their security, condition of aileron hinges and their security, condition of struts and cables, inspection of aileron control attachment. Check for the controls free play.
- Tail control surfaces – overall condition, freedom of movement and free play, attachments condition, inspection of elevator pushrod and rudder cables attachment, check for a free play in controls, check the condition of trim tab and its hinges.
- Fuselage – overall surface condition.
- Landing Gear - check inflation of main wheels and their wear, security of bolts and nuts.
- Fuel system - checking the permeability of the supply lines to the engine and the air vent hose.
- Engine – inspect engine attachment to the aircraft – integrity of bolts and shock mounts, integrity of

fuselage sheets to which the engine is attached, integrity of fuel circuit hoses, security of nuts and bolts, exhaust attachment, inspect belt tension + other checks as per the engine manufacturer's manual.

- Propeller - surface condition, integrity.
- Seatbelt adjustment.
- Transceiver adjustment - if installed in the aircraft, headset connection.
- Adjust and activate the Smartphone with the Sky Daemon app (or another suitable app).

8.2. Engine Startup

- Check for the presence of loose objects in the area in front of the propeller.
- Throttle lever – idle.
- Ignition – on.
- Stand in front of the aircraft, leaning against the leading edge of the lower wing.
  Follow the engine manufacturer's instructions to start the engine. Be ready to quickly reduce throttle or turn the ignition off, when necessary.
- Obey safety to prevent injury to individuals or damage to the aircraft.
- Warm up the engine to operational temperature.
- Board the aircraft.

8.3. Actions After Boarding

- Fasten seat belts.
- Check the function of rudder controls.
- Check the function of aileron and elevator control.

8.4. Before the Takeoff Checks

- Throttle lever – idle.
- Controls – freedom of movement.
- Fuel gauge – check for the fuel level.
- Engine instruments – values within the permitted limits.
- Seatbelt – check for proper fastening.

8.5. Takeoff

There are two possible takeoff methods:

a) From the main landing gear, with the control stick pushed forward while smoothly applying throttle. This action causes the tailwheel to lift off the ground. Once the required speed is reached, the aircraft will naturally lift off the ground.
b) With the control stick pulled back, allowing for quicker throttle input. The rate of throttle increase should be adjusted according to the raising of the tailwheel.

It's crucial to never simultaneously apply throttle and push the control stick forward, as this could lead to the aircraft flipping over.

After reaching the necessary speed, the aircraft will naturally lift off the ground. Accelerate to 55 km/h, and then gently pull back to initiate a climb at speeds of 50-60 km/h.

8.6. Cruise Flight

After reaching the desired altitude, level the aircraft into horizontal flight, reduce the throttle, and set the appropriate RPM for cruise flight – the optimal cruising speed is approximately 60 km/h.

8.7. Approach and Landing

- Descent with the throttle at an elevated idle while maintaining a speed of 60 km/h.
- Flare out and reduce the throttle to idle.
- During the glide, decrease speed by gently pulling back on the control stick. The aircraft will touch down at a speed of approximately 45 km/h.

8.8. Flight in Rain

It is not recommended to use the aircraft in rainy conditions. In the event of flying in the rain, it's necessary to count with an increased stall speed, which consequently lengthens the takeoff roll and shortens the glide during landing.

9. Aircraft Assembly and Disassemb.

The aircraft may be stored disassembled on a trailer.

9.1. Aircraft Assembly

The aircraft assembly is conducted following the manual D2_00_00, available on the website www.dingosupport.eu.

9.2. Aircraft Disassembly

The disassembly of the aircraft is carried out in the reverse order as the assembly.

10. Maintenance and Care

To ensure safe operation of the aircraft, it is essential to adhere to the following maintenance plan:

Periodic Inspections	Časový plán prohlídek v hod.				
	10	25	50	100	200
Engine – per manufacturer's manual					
Exhaust system – per manufacturer's manual					
Carburetor – per manufacturer's manual					
Operating fluids – per manufacturer's manual					
Engine mount			X		
Connecting bolts			X		
Shock mounts			X		
Hoses		X			
Engine controls			X		
Electrical wiring					X
Propeller attachment		X			
Control stick				X	
Rudder pedals			X		
Instruments			X		
Seatbelts				X	
Fuel system		X			
Main landing gear		X			
Wheels and tires of the main landing gear		X			
Tail wheel		X			
Fuselage			X		
Wing			X		
Rudder			X		
Elevator			X		

10.1. Aircraft Cleaning

For surface cleaning, an appropriate detergent can be used. To remove oil residues, suitable cleaning agents can be applied, considering the aircraft's surface finish and covering material.

11. Airplane Logbook

11.1. Performed Maintenance Log

PERFORMED MANITENANCE LOG

Log of performed maintenance, prescribed inspections, repairs, and replacement of critical components.			
Action (reason):	Date of execution:	Flight hours:	Signature – performed by:

PERFORMED MANITENANCE LOG

Log of performed maintenance, prescribed inspections, repairs, and replacement of critical components.			
Action (reason):	Date of execution:	Flight hours:	Signature – performed by:

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PERFORMED MANITENANCE LOG

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Action (reason):	Date of execution:	Flight hours:	Signature – performed by:

11.2. Logbook

LOGBOOK

Date	Pilot	Place of takeoff / landing	Daily		Total		Notes
			Flights	Flight time	Flights	Flight time	

LOGBOOK

Date	Pilot	Place of takeoff / landing	Daily		Total		Notes
			Flights	Flight time	Flights	Flight time	

LOGBOOK

Date	Pilot	Place of takeoff / landing	Daily		Total		Notes
			Flights	Flight time	Flights	Flight time	

LOGBOOK

Date	Pilot	Place of takeoff / landing	Daily		Total		Notes
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LOGBOOK

Date	Pilot	Place of takeoff / landing	Daily		Total		Notes
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LOGBOOK

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