

C152



OPERATIONS MANUAL

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PA-28R Turbo Arrow III/IV



Duchess Model 76

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Operations Manual

Please note that Aerofly FS 2 must be correctly installed on your PC prior to the installation and use of this C152 simulation.

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INTRODUCTION

The C152 is a two-seat, piston-engine aircraft equipped with fixed tricycle landing gear and a fixed-pitch propeller – ideal for touring and flight training.

Based on its predecessor, the C150, the aircraft was fitted with a more powerful engine in addition to other minor changes, such as an increased useful load.

The C152 was first introduced in 1977 and production ended in 1985. Over 7,500 C152s have been built and they continue to be flown all around the world.



Aircraft specifications

Dimensions

Length	7.3 m (24.1 ft)
Wingspan	10.2 m (33.4 ft)
Height (to top of tail)	2.6 m (8.6 ft)
Wing area	14.9 m2 (160 ft^2)

Engine

Type	Lycoming O-235 four cylinder, horizontally opposed, air-cooled piston
Power	110 horsepower at 2,550 RPM
Propeller	Two-blade, fixed-pitch

Weights

Empty weight	1,081 lb (490 kg)
Maximum weight	1,670 lb (757 kg)
Maximum baggage weight	120 lb (54 kg)
Maximum useful load	589 lb (267 kg)

Fuel and oil

Fuel capacity	26 US gallons (13 per wing tank)
Usable fuel	24.5 US gallons
Oil capacity	6 US quarts

Performance

V_{NE} (never exceed speed)	149 KIAS
V_{NO} (max. cruising speed)	111 KIAS
V_A (manoeuvring speed)	104 KIAS (at 1,670 lb) 93 KIAS (at 1,350 lb)
V_{FE} (max. flap speed)	85 KIAS
V_{SO} (stall speed)	43 KIAS (landing configuration)
Service ceiling	14,700 ft
Range	590 nautical miles (75% power at 8,000 ft)

Paint schemes

The C152 is supplied in the following eight paint schemes:

- G-BGAE (UK)
- G-BONW (UK)
- N5310H (USA)
- N95469 (USA)
- D-EBPC (Germany)
- F-GJCI (France)
- C-GQOP (Canada)
- VH-IVZ (Australia)

INSTALLATION, UPDATES AND SUPPORT

You can install this C152 software as often as you like on the same computer system:

1. Click on the 'Account' tab on the Just Flight website.
2. Log in to your account.
3. Select the 'Your Orders' button.
4. A list of your purchases will appear and you can then download the software you require.

Accessing the aircraft

To access the aircraft:

1. Load Aerofly FS 2 and click the 'Aircraft' tab to open the aircraft selection menu.
2. Use the left and right arrow keys on your keyboard to navigate through the available aircraft until you get to 'Cessna 152'.
3. Use the left and right arrow icons above the aircraft to select the paint scheme you want.
4. Press your 'Back' button to return to the main menu and finish setting up your flight in the normal way.

Uninstalling

To uninstall this product from your system, select the appropriate option for your version of Windows from the 'Control Panel':

- 'Add or Remove Programs' (Windows XP)
- 'Programs and Features' (Windows Vista or 7)
- 'Apps & features' (Windows 10 or later)

Select the product you want to uninstall and then select the 'Uninstall' option, following the on-screen instructions to uninstall the product.

Uninstalling or deleting this product in any other way may cause problems when using this product in the future or with your Windows set-up.

Updates and Technical Support

For technical support (in English) please visit the Support pages on the Just Flight website.

As a Just Flight customer you can obtain free technical support for any Just Flight or Just Trains product.

If an update becomes available for this aircraft, we will post details on the Support page and we will also send a notification email about the update to all buyers who are currently subscribed to our Newsletter and emails.

Regular News

To get all the latest news about Just Flight products, special offers and projects in development, sign up for our Newsletter and regular emails.

We can assure you that none of your details will ever be sold or passed on to any third party and you can, of course, unsubscribe from this service at any time.

You can also keep up to date with Just Flight via Facebook and Twitter.

SYSTEMS GUIDE

Airframe

The C152 is a single-engine, all-metal aircraft with fixed landing gear. The aircraft has seating for two occupants, a 120-pound luggage compartment and a 110 HP engine.

The basic airframe is constructed out of aluminium alloy, with wingtips and fairings made of fibreglass. The fuselage is a semi-monocoque structure. There is a passenger door located on each side of the aircraft.

The wings are externally braced and have a one-degree dihedral angle. The trailing edge of the wing provides a mount for the flaps and ailerons. The four-position wing flaps are electrically controlled by a lever located in the centre of the panel. Each wing contains one fuel tank.

A vertical and horizontal stabiliser, elevator and rudder make up the empennage. The horizontal stabiliser contains the elevator trim tab actuator.

Fuel system

The fuel system was designed with simplicity in mind. Fuel is contained in two 13 US gallon tanks, one in each wing. Of the total 26-gallon capacity, only 24.5 gallons are usable.

A fuel shut-off valve, located on the floor between the two seats, allows the pilot to control the flow of fuel to the engine.

Fuel quantity is indicated by electrically operated gauges on the lower left panel. There is a separate fuel quantity gauge for each tank. The gauges cannot be relied upon for accurate readings and the fuel level should be checked manually before flight.

Electrical system

Electrical power is supplied by a 28-volt DC system which is powered by an engine-driven, 60-amp alternator and a 24-volt, 14-amp hour battery. The power is supplied through a single bus bar. A master switch controls the power to all circuits except the engine ignition system, clock and flight hour recorder. Avionics should be turned off prior to starting the engine.

Master switch

The master switch is a split-rocker type switch with OFF (down) and ON (up) positions. The left half of the switch (ALT) controls the alternator and the right half of the switch (BAT) controls all the electrical power to the aircraft.

In normal conditions both halves of the switch are placed in the same position, but the BAT side of the switch can be turned on separately to check equipment while on the ground.

Ammeter

The ammeter indicates the flow of current (in amperes) from the alternator to the battery, or from the battery to the electrical system. If the engine is operating and the master switch is on, the ammeter indicates the rate of battery charging. If the alternator is not functioning, or if the electrical load exceeds the output of the alternator, the ammeter indicates the rate of battery discharge.

A low voltage light indicates that the alternator has failed and that the battery is supplying all electrical power.

Circuit breakers

Most of the electrical circuits are protected by push-to-reset circuit breakers located on the lower centre of the panel.

Left-click on the circuit breakers to pull them out or push them in.

Vacuum system

The vacuum system provides the suction necessary to operate the air-driven gyro instruments – the directional and attitude indicator. The system consists of an engine vacuum pump, a vacuum relief valve, a filter and the necessary plumbing.

A suction gauge, mounted on the left panel, provides valuable information to the pilot about the operation of the vacuum system. A decrease in pressure, or zero pressure, over an extended period may indicate a problem with the vacuum system.

Normal vacuum readings are between 4.6-5.4 inches of mercury, a setting which provides sufficient vacuum to operate all the gyros at their rated RPM.

Pitot-static system

The system supplies both pitot and static pressure for the airspeed indicator, altimeter and vertical speed indicator.

Pitot pressure is picked up by the pitot head on the bottom of the left wing. The switch for pitot heat (labelled PITOT HT) is located on the left lower panel. Static pressure is sensed by button-type vents on each side of the aft fuselage. A static port is located on the lower left side of the forward fuselage.

Lighting system

Lights fitted to the aircraft include navigation, anti-collision beacon, taxi, landing, instrument panel and cabin dome lights. The lights are controlled by rocker switches on the left lower panel.

A rheostat control knob on the left lower panel controls the integral instrument lighting. A cabin dome light is located on the overhead panel and is controlled by the DOME LT switch on the left lower panel.

Instrument markings

Airspeed indicator markings

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White arc	35-85	Full flap operating range. Lower limit is maximum weight VSO in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green arc	40-111	Normal operating range. Lower limit is maximum weight VS1 with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow arc	111-149	Operations must be conducted with caution and only in smooth air.
Red line	149	Maximum speed for all operations.

Engine indicator markings

INSTRUMENT	Red line or arc	Green arc	Red line
	Minimum limit	Normal operating	Maximum limit
Tachometer	————	1,900-2,550 RPM	2,550 RPM
Oil temperature	————	100-245°F (38-118°C)	245°F (118°C)
Oil pressure	25 PSI	60-90 PSI	100 PSI
Vacuum gauge	————	4.6-5.4 inHg	————

Limits

Weight limits

Maximum weight: 1,670 lb (757 kg)

Maximum weight in baggage compartment: 120 lb (54 kg)

Centre of gravity limits

Weight (lb)	Forward limit Inches aft of datum	Rearward limit Inches aft of datum
1,670	32.65	36.5
1,350 and below	31.0	36.5

The reference datum is the front face of firewall.

Manoeuvre limits

This aircraft is certificated in the utility category. The utility category is applicable to aircraft designed for limited aerobatic operations; these are limited to stalls (except whip stalls), lazy eights, chandelles, spins and steep turns.

Flight load factor limits

Positive load factor (maximum): +4.4 G (+3.5 G with flaps down)

Negative load factor (maximum): -1.76 G

Fuel limitations

Total capacity: 26 US gallons

Unusable fuel: 1.5 US gallons

Usable fuel: 24.5 US gallons

Landing gear

The C152 is equipped with fixed tricycle landing gear.

The nose gear is steerable through a 30-degree arc each side of centre by use of the rudder pedals and toe brakes.

The hydraulically actuated disc brake system includes toe brakes on the left and right set of rudder pedals. The parking brake is controlled by a knob on the lower left part of the panel.

Doors and exits

The aircraft is fitted with a door on either side of the fuselage.

To open the door on the port side, press [Shift]+[E].

To open the door on the starboard side, press [Shift]+[E] then [2].

A door can be opened from within the virtual cockpit by clicking on the associated door latch to pull it to the open position and then clicking on the door handle to push it open. It can be closed by clicking on the door handle to pull it closed and then clicking on the associated door latch to push it to the latched position.

Flight controls

Dual flight controls are provided. The flight control system consists of conventional aileron, rudder and elevator surfaces which are operated through mechanical linkages – a yoke for the ailerons and elevator, and pedals for the rudder (and brakes).

The trim tab is controlled by a trim control wheel located in the centre of the panel. Rotating the wheel forward gives nose-down trim and rotation aft gives nose-up trim.

Electronically controlled single-slot flaps are provided. The flap control is in the centre of the panel. To extend or retract the flaps, move the lever to the desired flap setting of 10, 20 or 30 degrees. An indicator located on the left side of the lever shows the flap movement. The flap system is protected by a 15-ampere circuit breaker labelled FLAP.

The aircraft will experience a pitch change during flap extension or retraction. This pitch change can be corrected by either elevator trim or increased yoke force.

Engine

The C152 is powered by a four-cylinder, horizontally opposed engine rated at 110 horsepower at 2,550 RPM. It is equipped with a starter, alternator, two magnetos, a vacuum pump and an oil filter.

Engine controls

The engine controls consist of a throttle control and a mixture control knob. These controls are located on the lower centre of the instrument panel.

The throttle knob is used to adjust the engine RPM, with the full forward position being fully open and the full aft position being fully closed. The mixture control knob is used to adjust the air-to-fuel ratio. The engine is shut down by placing the mixture control knob in the fully lean position.

The carburettor heat control knob is located to the left of the throttle.

Engine instruments

Indicators enable the pilot to check oil pressure, oil temperature and RPM. The engine instruments are located on the lower left panel.

Ignition and starter system

Engine ignition is provided by a dual magneto on two spark plugs per cylinder. Ignition is controlled by a key-operated rotating selector on the lower left portion of the left panel. The selector operates clockwise, with right, left, left/right and start positions.

Primer system

To assist with engine starting, the aircraft is equipped with a manual priming system. The primer is operated by a plunger knob on the lower left panel, which features a lock to prevent inadvertent use. To operate the knob, left-click once to unlock it and then again to pull it out. Right-click to push in the knob, and once you have finished priming the aircraft, right-click again to lock it.

Stall warning system

An approaching stall is indicated by a stall warning horn which is activated between 5-10 knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall. Stall speeds are shown on a graph in the OPERATING DATA MANUAL included with this C152 software.

The stall warning horn emits a continuous sound and is not dependent on electrical power.

PANEL GUIDE

The instrument panel features the primary flight instruments and the engine instruments, as well as radios and navigation equipment.

The attitude and directional indicator, located on the left-hand instrument panel, are vacuum-operated. The vacuum (suction) gauge is co-located with these gauges. The turn indicator is electrically operated.

The radios are located in the centre section of the panel and the circuit breakers are in the lower right corner of the panel. The engine controls and wing flap lever are below the radios on the centre panel.

The right-hand instrument panel also contains the tachometer, ammeter and other instruments such as the flight hour recorder.

Additional features include door windows and two sun visors.

A large baggage area behind the rear seats is accessible from the cabin. When baggage is loaded, it is the pilot's responsibility to ensure that the aircraft's centre of gravity falls within the allowable CG range.



Left main panel



1. Airspeed indicator (ASI) – indicates airspeed in knots (outer scale) and MPH (inner scale)
2. Suction gauge
3. Attitude indicator (AI) – a pitch reference knob allows for the pitch bars (aircraft symbol) position to be adjusted nose-up or nose-down
4. Clock – a knob allows for adjustment of the hour and minute hands
5. Altimeter – a barometric pressure scale is provided for hPa/mb. The pressure setting knob tooltip displays the currently selected pressure in hPa/mb or inHg, depending on which unit of measurement is currently active in the simulator settings.
6. Omni-course (VOR 1) indicator – features a CDI needle, fail flag and back course light
7. Low voltage warning light
8. Turn and bank indicator
9. Direction indicator – caging knob (bottom left) controls rotation of the compass card
10. Vertical speed indicator (VSI)
11. ADF indicator – driven by 300 ADF system. HDG knob controls rotation of the compass card.

Control lock

A control lock can be fitted to lock the ailerons and elevator control surfaces in a neutral position. The control lock features a red flag which covers the ignition switch.

To install or remove the control lock, click on the base of the yoke where it enters the centre of the panel.

The lock can only be fitted when the aircraft is on the ground.



Hiding the yoke

To enable easier access to the controls, you can hide the yokes by using the clickspot on the aircraft registration placard in the centre of the left main panel.

Left lower panel



1. Parking brake knob
2. Left and right fuel quantity indicators
3. Oil temperature and pressure indicators
4. Primer plunger knob
5. Master switch (battery/alternator)
6. Ignition/magneto selector
7. Panel light knob
8. Starter engaged light
9. Electrical switches – (left to right) dome light, pitot heat, navigation lights, strobe lights, beacon light, taxi light and landing light

Start selector

Fitting the control lock will automatically remove the ignition key. The ignition key can be inserted or removed by clicking on the metal area surrounding the ignition key slot.



Cabin doors



1. Window – the latch must be moved prior to opening/closing the window
2. Door latch – click to latch or unlatch the door
3. Door handle – click to push the door open or pull it shut

Centre panel



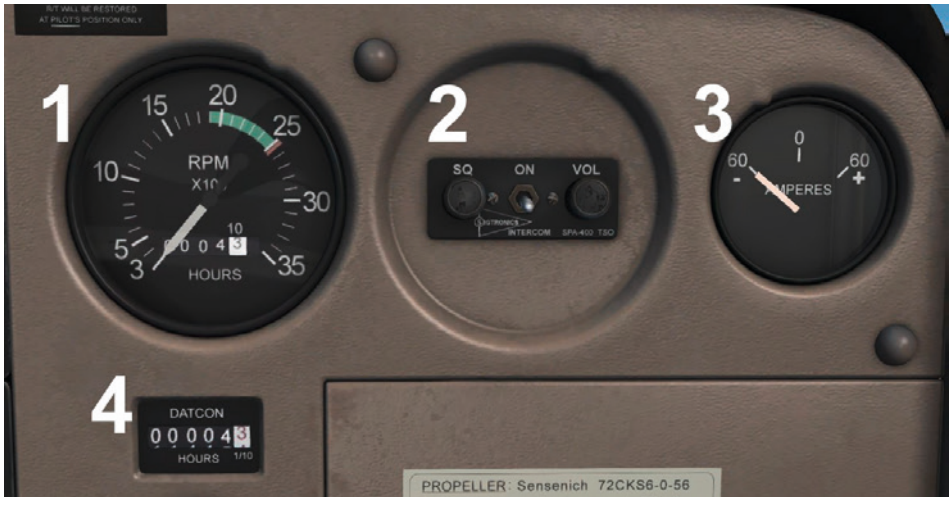
1. KMA 20 audio selector
2. GNS 430 GPS unit
3. 300 ADF receiver
4. RT-359A transponder

Lower centre panel



1. Carburettor heat control knob
2. Throttle control knob
3. Mixture control knob
4. Flap control lever and position indicator
5. Cabin air and heating control knobs
6. Elevator trim wheel and position indicator
7. Circuit breakers
8. Map storage – click and drag to open and close the door

Right panel



1. Tachometer (RPM) – incorporates an engine hour totaliser
2. Intercom controls
3. Ammeter
4. Flight hour recorder

Upper cockpit



1. Outside air temperature indicator
2. Sun visors – click and drag to move
3. Whiskey compass

Lower cockpit



1. Fuel shut-off valve

KMA 20 – audio selector



1. Microphone selector switch
2. AUTO switch
3. Receiver selector switches
4. Marker beacon sensitivity and lamp test switch
5. Marker beacon lights

The KMA 20 is an audio control system which provides control over transceiver and receiver outputs through the use of selector switches. The simulator doesn't allow for separate speaker and headphone outputs so both buttons perform the same function.

The COM 1 and COM 2 switches are used to toggle the COM 1 and COM 2 transceiver audio, allowing you to select COM 1 and/or COM 2 as the audio source(s) to monitor.

The NAV, DME, MKR and ADF switches are used to toggle the associated audio sources.

When the AUTO switch is placed in either the SPEAKER or PHONE position, the unit will automatically match the corresponding receiver audio with the selected transmitter. For example, with COM 1 selected on the microphone selector knob, the COM 1 audio source will be automatically enabled.

The microphone selector knob connects the microphone to the selected output. Due to simulator limitations, transmissions can only be made on COM 1.

GNS 430 – GPS unit



1. COM 1 volume
2. NAV 1 volume
3. COM 1 frequency swap
4. NAV 1 frequency swap
5. Small left knob
6. Large left knob
7. CDI
8. OBS
9. MSG (message)
10. FLP (flight plan)
11. PROC (procedures)
12. RNG (map range)
13. Direct-to
14. CLR (clear)
15. MENU
16. ENT (enter)
17. Large right knob
18. Small right knob

Left-hand keys and knobs

1. COM volume knob
2. VLOC volume knob
3. COM swap key – swaps the active and standby COM frequencies
4. VLOC swap key – swaps the active and standby VLOC frequencies
5. Small left knob (COM/VLOC) – used to tune the kilohertz (kHz) value of the standby frequency for the communications transceiver (COM) or the VLOC receiver, whichever is currently selected by the tuning cursor. Press this knob momentarily to toggle the tuning cursor between the COM and VLOC frequency fields.
6. Large left knob (COM/VLOC) – used to tune the megahertz (MHz) value of the standby frequency for the communications transceiver (COM) or the VLOC receiver, whichever is currently selected by the tuning cursor.

Bottom row keys

7. CDI key – used to toggle which navigation source (GPS or VLOC) provides output to the VOR1
8. OBS key – currently not supported
9. MSG key – used to view system messages and to alert the pilot to important warnings and requirements
10. FPL key – allows the pilot to create, edit, activate and invert flight plans
11. PROC key – currently not supported

Right-hand keys and knobs

12. RNG key – allows the pilot to select the desired map range. Use the Up arrow to zoom out to a larger area or the Down arrow to zoom in to a smaller area.
13. Direct-to key – provides access to the direct-to function, which allows the pilot to enter a destination waypoint and establishes a direct course to the selected destination
14. CLR key – used to erase information, remove map detail or cancel an entry
15. MENU key – displays a context-sensitive list of options. This options list allows the pilot to access additional features or make setting changes which relate to the currently displayed page.
16. ENT key – used to approve an operation or complete data entry. It is also used to confirm information during power on.
17. Large right knob – used to select page groups: NAV, WPT, AUX or NRST. With the on-screen cursor enabled, the large right knob allows the pilot to move the cursor about the page.
18. Small right knob – used to select pages within one of the page groups. Press this knob momentarily to display the on-screen cursor. The cursor allows the pilot to enter data and/or make a selection from a list of options. When entering data, the small right knob is used to select the desired letter or number, and the large right knob is used to move to the next character space.

COM controls

Rotate the power/test switch to the ON position. Turn up the volume using the volume knob and then rotate the concentric selector knobs to tune in a COM frequency.

The COM radio will operate with either ON or TEST selected.

NAV controls

Rotate the power/mode switch to the VOICE position. Turn up the volume using the volume knob and then rotate the concentric selector knobs to tune in a NAV frequency.

Rotate the power/mode switch to the IDENT position to hear the audio identifier.

300 ADF receiver



1. Power/volume knob
2. Mode selector knob – selects BFO, REC, ADF or TEST mode
3. Frequency display
4. Frequency select knobs – tune the ADF frequency

Frequency selection

The ADF frequency is displayed on three counters.

The frequency is selected using the frequency select knobs which are rotated either clockwise or anti-clockwise. The right inner knob tunes the 1s. The right outer knob tunes the 10s. The left knob tunes the 100s and the 1,000s.

Operating modes

REC mode provides improved audio reception from the station tuned and is usually used for identification. The bearing pointer on the ADF indicator will be deactivated and immediately turn to the 90° relative position and remain there during reception.

ADF mode activates the bearing pointer on the ADF indicator, causing it to point in the direction of the station relative to the aircraft heading.

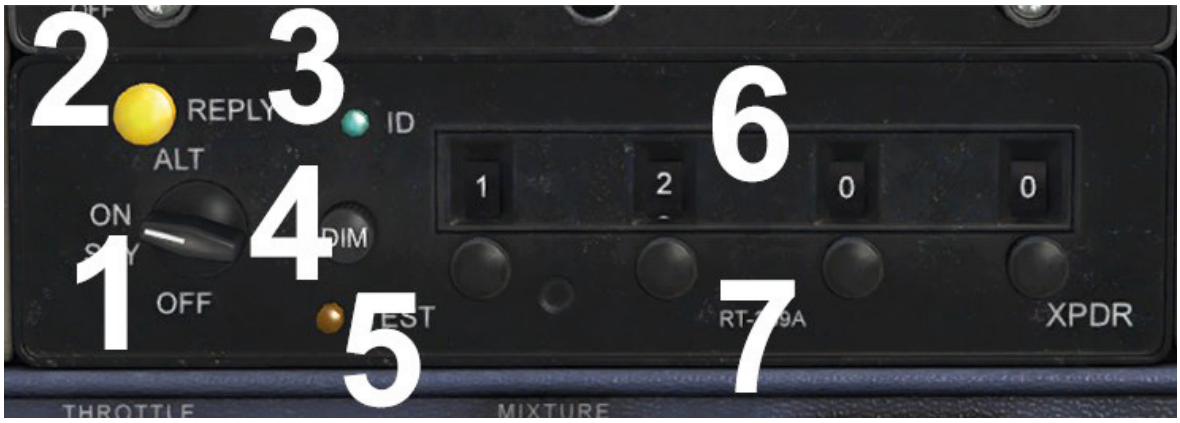
BFO mode permits the carrier wave and the associated Morse code identifier broadcast on the carrier wave to be heard.

With TEST mode selected, the bearing pointer on the ADF indicator will be deactivated, immediately turn to the 90° relative position and remain there.

ADF test

Select TEST mode and confirm that the bearing pointer moves directly to the parked 90° position. Make sure that the unit is tuned to a usable frequency and then select ADF mode. Confirm that the needle moves to the station bearing.

RT-359A – transponder



1. Function selector knob
2. Reply light
3. Identification push-button
4. Dimmer knob (non-functional in this simulation)
5. Test push-button
6. Code windows
7. Code knobs

Operating the transponder

The function selector knob should be in the OFF position before starting the aircraft's engine. Select the required reply code by rotating the four code knobs (one per code digit). The code will be displayed in the four code windows.

After starting the engine, turn the function selector to standby (SBY). The transponder will take approximately 45-50 seconds to become operational. Once you are airborne, turn the function selector to ON, enabling normal Mode A operation.

Turn the function selector to the altitude (ALT) position for altitude reporting (Mode C) to ATC.

Important codes

7700: Emergency

7600: Communications failure

7500: Hijacking

0000: Reserved for military aircraft

Squawk ident

When you are asked to ident by ATC, press and release the ident push-button. Your aircraft will be positively identified to the air traffic controller.

Reply light

During normal operation the reply light will flash to indicate that the transponder is functioning properly and replying to interrogations from ground radar. Interrogations occur at 10-15 second intervals, corresponding to each radar sweep.

GROUND EQUIPMENT

The aircraft can be fitted with chocks and tie-downs whilst on the ground.



The chocks and tie-downs will appear whenever the aircraft is loaded with the flight beginning on the ground. They can also be controlled via the clipboard located on the co-pilot's seat.

FLYING THE C152

This tutorial flight describes a basic VFR flight in the C152 and will allow you to familiarise yourself with the controls of the aircraft.

1. Start Aerofly FS 2.
2. Open the **Aircraft** menu and select the Cessna 152.
3. Select the airport from which you want to begin your flight and choose a location away from the runway.
4. Click **Start** to begin the flight.

You should now find yourself sitting in the cockpit and the aircraft in a ‘cold & dark’ state, with all the cockpit systems switched off. By beginning in this configuration, we will need to spend some additional time setting up the cockpit, but doing so will allow you to learn a considerable amount about the features and functions on board this light aircraft.



This tutorial will cover the necessary steps for you to get from point A to point B, but it will not explore each system in depth. Please refer to the rest of this manual for details of each system.

Getting started

The first step is to open both doors to allow entry into the cockpit. In the virtual cockpit, click on the ‘PULL TO OPEN’ door latches and then click on the black door handles to push them open.



We can now start working through the pre-flight inspections.

Start by removing the control lock from the left yoke by clicking on the base of the yoke, where it is mounted to the panel.

To enable easier access to the controls, you may want to hide the yokes by using the clickspot on the base of the yoke.

Check that the magneto selector is set to **OFF** (rotated fully anti-clockwise) and that the ignition key is removed.



Confirm that the parking brake knob is pulled **ON**.



Check that all avionics are **OFF** and that the mixture knob is set to **IDLE CUT-OFF**. Then switch **ON** the battery master.



Check the left and right fuel quantity gauges to confirm that we have full tanks (25 gallons per tank).



Switch **ON** all the exterior lights and extend the flaps to **30°**.



Switch to the exterior view and confirm that all the lights are illuminated and that the flaps are fully extended before returning to the cockpit and switching **OFF** the lights and battery master.



Check that you have full and free movement of the flying controls and then move the elevator trim through its full range before returning it to the centre (take-off) position.



Switch to the external view and carry out a visual inspection of the aircraft. The wheel chocks and tie-downs should be visible.

Starting the engine

To avoid battery draining, we will start the engine before configuring the avionics for our departure.

Close the passenger doors by first clicking on the black door handles to pull them shut and then clicking on the door latches to move them to the latched/locked position.



Check that the parking brake is set and that all circuit breakers are pushed in.



On the floor, make sure that the fuel shut-off valve lever is in the **ON** position.



On the throttle quadrant, move the mixture knob to the **FULL RICH** (fully forward) position and advance the throttle knob to approximately **1/4 open**.

Confirm that the carburettor heat lever is set to **OFF** (pushed in).



Switch **ON** the battery master and alternator switches to provide electrical power to the aircraft.



Turn **ON** the beacon and navigation lights, warning anyone in the area that we are about to start the engine.



Insert the ignition key by clicking on the metal area surrounding the ignition key slot.



Check that the area surrounding the aircraft is clear of obstructions and then rotate the magneto/start selector to the **START** (fully clockwise) position.



When the engine starts, release the magneto/start selector and it will return to the BOTH position. Check that the oil pressure and temperature are rising.



With the engine running and the alternator charging the battery, we can now switch on the avionics. Starting at the top of the centre panel and working down, switch on the KMA 20, GNS 430, 300 ADF and RT-359A units.



Taxi

We can now taxi to the runway. Check that the area around the aircraft is clear of obstacles and then release the parking brake. Apply power slowly to get the aircraft rolling and then start your taxi to the runway threshold.

Steering the aircraft with the rudder pedals only is generally sufficient. The combined use of the rudder pedals and the brakes permits, if necessary, tight turns.

Check the operation of gyroscopic instruments (horizontal attitude, heading and turn and bank indicators) by means of alternate turns.

Stop at the holding point just short of the runway. We can carry out the power (ground) checks here.

Set the parking brake and advance the throttle knob to obtain 1,700 RPM and then rotate the magneto selector to the **LEFT** position, note the RPM drop and then rotate it back to the **BOTH** position. Repeat the process for the right magneto.

To carry out a carburettor heat check, pull the carburettor heat lever to **ON**, check for a small drop in RPM and then push the carburettor heat lever to **OFF**. If the RPM increases to significantly more than the original 1,700 RPM, icing conditions are likely to be present. With clear skies and moderate temperatures for our flight, however, that shouldn't be an issue.



Check that the suction, oil temperature, oil pressure and ammeter readings are within limits.



Finally, reduce the throttle to idle and check for rough running.

We can now run through the before take-off checks.

Move the flap lever to **10°** and look left and right to confirm that the flaps have extended.

Confirm that the battery master and alternator switches are both set to **ON**.

Check that the carburettor heat lever is set to **OFF** and that the mixture knob is in the **FULL RICH** (fully forward) position.

Confirm that the magneto selector is in the **BOTH** position and that the primer is pushed in and locked, then switch **ON** the landing light.

Confirm that the elevator trim wheel indicator sits in the centre (TAKEOFF) position.



Confirm that both doors are latched and that you have full and free movement of the flying controls.

Finally, switch **ON** the PITOT HEAT switch.

With the before take-off checks complete, have a look left and right, verify that nothing is on approach and that the runway is clear, and then taxi onto the runway.

Take-off

Line up with the runway centre line and then come to a stop. Smoothly apply full power and, as the aircraft starts to gather speed, keep it running down the centre line with rudder inputs. As you approach **55 knots** start to raise the nose of the aircraft.

Make elevator inputs as required to maintain an initial climb speed of approximately **65 knots**, holding the runway heading (276 degrees).



Climb

Retract the flaps as you climb through 300ft AGL.

Lower the nose of the aircraft to maintain a cruise climb speed of **80 knots**.

Cruise

Level the aircraft out as you approach 2,500ft and once the aircraft has reached **90 knots**, reduce the throttle to maintain that airspeed.



Descent

As your destination airfield comes into view, pull the carburettor heat **ON** and reduce the throttle to obtain **1,700 RPM**. Lower the nose and trim the aircraft to begin a descent at **90 knots**.

Approach and landing

As you descend, confirm that the landing light is switched **ON**, the mixture is set to the FULL RICH **(fully forward)** position, the primer is pushed **IN** and the parking brake is **OFF**.

Once established on the base leg, raise the nose to reduce your airspeed to **80 knots** and extend the flaps to the **20°** position. Pitch the nose down to maintain **65 knots**.

As you begin your final approach, extend the flaps to the **30°** position.



As the aircraft arrives over the runway, start to bring the aircraft into a flare, gently raising the nose just above the horizon. Reduce the throttle to idle and the aircraft should touch down smoothly.



Apply gentle braking and, once the aircraft has slowed to a fast walking pace, turn right off the runway. When you are safely off the runway, raise the flaps and push the carburettor heat to **OFF**.

You can also switch **OFF** the landing light and pitot heat.

Shutdown

Begin your taxi to the nearest available parking spot.

Once you have come to a stop at your chosen parking spot, engage the parking brake and switch **OFF** the avionics.

Bring the throttle knob back to **IDLE** and then bring the mixture knob back to **IDLE CUT-OFF** to shut down the engine.

Once the engine comes to a stop, rotate the magneto selector to the **OFF** position and remove the ignition key.

Switch **OFF** the navigation and beacon lights and then switch **OFF** the alternator and battery to disconnect the electrical power.

Congratulations – you have completed the C152 tutorial flight!



NORMAL PROCEDURES

Airspeed (IAS) for normal operations

Take-off:	
Normal climb out	**65-75 KIAS**
Short field take-off, flaps 10°, speed at 50ft	**54 KIAS**
Climb (flaps up):	
Normal	**70-80 KIAS**
Best rate of climb (V_Y)	**67 KIAS**
Best angle of climb (V_X)	**55 KIAS**
Landing approach:	
Normal approach, flaps up	**60-70 KIAS**
Normal approach, flaps 30°	**55-65 KIAS**
Short field approach, flaps 30°	**54 KIAS**
Operating speed in turbulent air:	
1,670 lb	**104 KIAS**
1,350 lb	**93 KIAS**
Maximum demonstrated crosswind	**12 KIAS**

Pre-flight

Cockpit

Control lock	**REMOVE**
Parking brake	**SET**
Mixture	**IDLE CUT-OFF**
Ignition switch	**OFF**
Master switch	**ON**
Fuel gauges	**CHECK QUANTITY**
Flaps	**30°**
Master switch	**OFF**
Fuel shut-off valve	**ON**

Left/right wing

Flap and aileron	**CHECK**
Wing tip and lights	**UNDAMAGED**
Tie-down	**REMOVED**
Fuel tank	**CHECK LEVEL**

Nose section

Chocks	**REMOVED**
Oil	**CHECK LEVEL**
Propeller	**GOOD CONDITION**
Air inlets	**CLEAR**
Landing/taxi light	**CHECK**

Tail section

Fin	**CHECK CONDITION**
Rudder	**CHECK CONTROLS**
Trim tab	**CHECK CONTROLS**
Tail cone	**CHECK CONDITION**

Before starting engine

Parking brake	**SET**
Circuit breakers	**IN**
Carburettor heat	**OFF**
Avionics	**OFF**
Fuel shut-off valve	**ON**

Engine starting

Caution: *If a positive oil pressure is not indicated within 30 seconds after an engine start, stop the engine and determine the cause of the trouble. In cold weather it will take a few seconds longer to get a positive oil pressure indication.*

Hot engine

Mixture	**FULL RICH**
Carburettor heat	**OFF**
Prime	**AS REQUIRED (up to 3 strokes)**
Throttle	**HALF AN INCH OPEN**
Master switch	**ON**
Ignition switch	**START**

When the engine starts:

Ignition switch	**BOTH**
Oil pressure	**CHECK**
Throttle	**800-1,000 RPM**

Taxiing

Taxi area	**CLEAR**
Parking brake	**RELEASE**
Throttle	**APPLY SLOWLY**
Brakes	**CHECK**
Steering	**CHECK**

Steering the aircraft with the rudder pedals only is generally sufficient. The combined use of rudder pedals and brakes permits, if necessary, tight turns.

Check the operation of gyroscopic instruments (horizontal attitude, heading and turn and bank indicators) by means of alternate turns.

Before take-off

Parking brake	**SET**
Flight controls	**FREE and CORRECT**
Fuel shut-off valve	**ON**
Mixture	**RICH**
Elevator trim	**TAKEOFF**
Throttle	**1,700 RPM**
Magnetos	**CHECK (max. drop 125 RPM)**
Carburettor heat	**CHECK (for RPM drop)**
Vacuum	**4.6-5.4 inHg**
Oil temperature	**CHECK**
Oil pressure	**CHECK**
Ammeter	**CHECK**
Lights	**AS REQUIRED**
Throttle	**RETARD**
Brakes	**RELEASE**

Take-off

Lined up on runway	**CHECK COMPASS**

Normal technique

Flaps	**0-10°**
Carburettor heat	**OFF**
Throttle	**FULL OPEN**
Accelerate to 50 KIAS.	
Yoke	**Back pressure to rotate smoothly to climb attitude**
Climb speed	**65-75 KIAS**

Short field take-off

Flaps	**10°**
Carburettor heat	**OFF**
Brakes	**APPLY**
Throttle	**FULL OPEN**
Mixture	**RICH**
Brakes	**RELEASE**

Accelerate to 54 KIAS.

Yoke	**Back pressure to rotate smoothly to climb attitude**

Maintain 54 KIAS until obstacle is cleared then accelerate to 65 KIAS.

Flaps	**Retract after reaching 60 KIAS**

Climb

Airspeed	**70-80 KIAS**
Throttle	**FULL OPEN**
Mixture	**RICH below 3,000ft**
	LEAN for maximum RPM above 3,000ft

Cruise

Power	**1,900-2,550 RPM (no more than 75%)**
Elevator trim	**ADJUST**
Mixture	**LEAN**

Before landing

Mixture	**RICH**
Carburettor heat	**ON (before closing throttle)**

Landing

Normal landing

Airspeed	**60-70 KIAS (flaps UP)**
Flaps	**AS REQUIRED (below 85 KIAS)**
Airspeed	**55-65 KIAS (flaps DOWN)**
Touchdown	**MAIN WHEELS FIRST**
Landing roll	**LOWER NOSE-WHEEL GENTLY**
Braking	**MINIMUM REQUIRED**

Short field landing

Airspeed	**60-70 KIAS (flaps UP)**
Flaps	**30° (below 85 KIAS)**
Airspeed	**MAINTAIN 54 KIAS**
Power	**REDUCE to idle as obstacle is cleared**
Touchdown	**MAIN WHEELS FIRST**
Brakes	**APPLY HEAVILY**
Flaps	**RETRACT**

After landing

Flaps	**UP**
Carburettor heat	**OFF**

Securing aircraft

Parking brake	**SET**
Avionics	**OFF**
Mixture	**IDLE CUT-OFF**
Ignition switch	**OFF**
Master switch	**OFF**
Control lock	**INSTALL**

Stalls

The stall characteristics of the C152 are conventional. An approaching stall is indicated by a stall warning horn which is activated between 5-10 knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall.

EMERGENCY PROCEDURES

Airspeed (IAS) for emergency operations

Engine failure after take-off	**60 KIAS**
Manoeuvring speed (1,670 lb)	**104 KIAS**
Manoeuvring speed (1,350 lb)	**93 KIAS**
Maximum glide	**60 KIAS**
Precautionary landing with engine power	**55 KIAS**
Landing without engine power (flaps up)	**65 KIAS**
Landing without engine power (flaps down)	**60 KIAS**

Engine failures

Engine failure during take-off run

Throttle	**IDLE**
Brakes	**APPLY**
Flaps	**RETRACT**
Mixture	**IDLE CUT-OFF**
Ignition switch	**OFF**
Master switch	**OFF**

Engine failure immediately after take-off

If sufficient runway remains for a normal landing, land straight ahead.

Airspeed	**60 KIAS**
Mixture	**IDLE CUT-OFF**
Fuel shut-off valve	**OFF**
Ignition switch	**OFF**
Flaps	**AS REQUIRED**
Master switch	**OFF**

Engine failure during flight

Airspeed	**60 KIAS**
Carburettor heat	**ON**
Primer	**IN/LOCKED**
Fuel shut-off valve	**ON**
Mixture	**RICH**
Ignition switch	**START then BOTH**

Forced landings

Emergency landing without engine power

Airspeed	**65 KIAS (flaps up), 60 KIAS (flaps down)**
Mixture	**IDLE CUT-OFF**
Fuel shut-off valve	**OFF**
Ignition switch	**OFF**
Flaps	**AS REQUIRED**
Master switch	**OFF**
Brakes	**APPLY ON TOUCHDOWN**

Precautionary landing with engine power

Airspeed	**60 KIAS**
Flaps	**20°**
Selected field	**POSITION FOR APPROACH**
Avionics	**OFF**
Flaps	**30°**
Airspeed	**55 KIAS**
Master switch	**OFF**
Ignition switch	**OFF**
Brakes	**APPLY ON TOUCHDOWN**

Fires

During engine start on ground

Engine	**CONTINUE TO CRANK**
Master switch	**OFF**
Ignition switch	**OFF**
Fuel shut-off valve	**OFF**

Engine fire in flight

Throttle	**CLOSED**
Mixture	**IDLE CUT-OFF**
Fuel shut-off valve	**OFF**
Cabin heat	**OFF**
Master switch	**OFF**
Airspeed	**85 KIAS**

Execute emergency landing without power.

Electrical fire

Master switch	**OFF**
Avionics	**OFF**
Cabin heat	**OFF**

Land as soon as possible.

Electrical failures

Over-voltage light illuminates

Master switch	**OFF**
Master switch	**ON**
Over-voltage light	**CHECK OFF**

If over-voltage light illuminates again, terminate flight as soon as practical.

Ammeter shows discharge

Alternator	**OFF**
Avionics	**OFF**

Terminate flight as soon as practical.

Icing

IMPORTANT! *Flight into known icing conditions is prohibited.*

Carburettor heat	**ON**
Cabin heat	**FULL HOT**
Pitot heat	**ON**
Engine	**MAX. RPM**

Adjust course and/or altitude to obtain best outside air conditions. Divert to nearest airport.

Spin recovery

Rudder	**HOLD OPPOSITE DIRECTION OF ROTATION**
Yoke	**FULL FORWARD, AILERONS NEUTRAL**
Throttle	**IDLE**

When spinning stops, centralise rudder, level the wings and ease out of the dive.

Airspeed indicating system failure

In case of erroneous indications in flight:

Pitot heat	**ON**

If erroneous indications persist, carry out a precautionary approach, maintaining an adequate airspeed margin above stall warning speed.

CREDITS

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Aircraft systems and cockpit programming	Propair Flight
Aircraft liveries	David Sweetman
Flight dynamics	Propair Flight
Sounds	Turbine Sound Studios
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