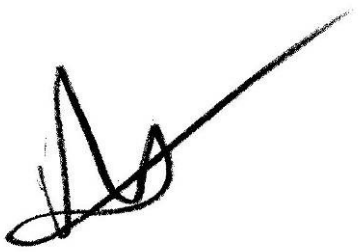
Rev #	Date	Author	Change	Version
001	20-Sep-2015	IV	Release Candidate	0.90
002	23-SEP-2015	IV	Release Candidate	0.95
003	25-SEP-2015	IV	RC – added note on estimating TOD	0.96
004	28-SEP-2015	IV	RC – checked weights on coherence and added standard profile to section on descent planning in enroute chapter	0.97
005	13 Oct. 2015	MK	Formatting	0.98
006	18-Apr-2017	MK	Final checks	1.00
007	02-Aug-2017	MK	Tweaks	1.0.0.3

On behalf of Authority



This is the most important manual of the six that are provided for this product. It explains how to fly the CRJ and how to use it in FS/P3D. Even if you are well acquainted with all CRJ's system it is still very worthwhile to fly this Step-by-Step guide at least once.

When you contact support one of the first things we'll do is ask if you have flown the Step-by-Step flight and exactly where thing in the text do not match what you see on screen.

It's a complex document and we strongly suggest you print it and make notes where needed.

CONTENTS

1 INTRODUCTION

This tutorial guides you through your first flight with the Digital Aviation / Aerosoft CRJ700. All flight phases are going to be discussed and brief explanations will be provided. The 'systems manual' will provide more in-depth descriptions of the aircraft's systems. We assume you have read and understood Vol 1 of the manuals before starting here.

This tutorial can be divided roughly into two parts: flight preparation and performing the flight.

During flight preparation, the route will be discussed, weight and balance calculated, fuel consumption being estimated and the CRJ700 loaded and configured for this tutorial flight.

In case users like to skip parts of the preparation, we added 'navigation pages' which offer hyperlinks to later chapters. The navigation pages will furthermore brief your which cockpit state you need to load, which flight situation you are supposed to load and possibly further settings you need to make to continue with the tutorial.

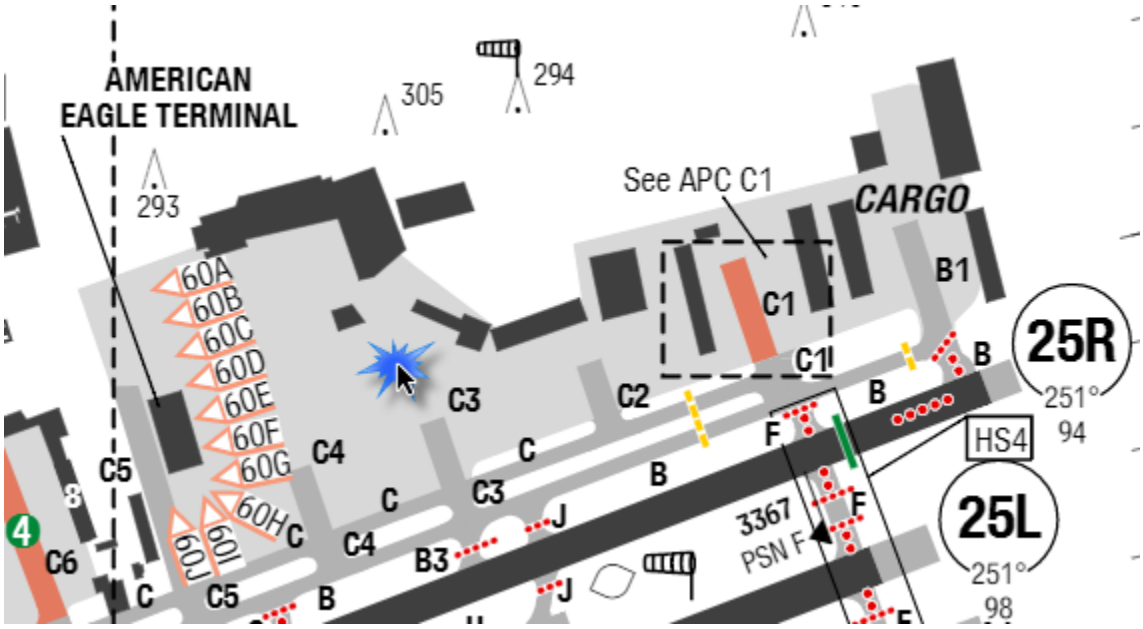
When you seek support, we might ask if you have followed this guide and exactly at what point things on your screen do not match with what you expect from the text. Please be as exact as possible in that!

2 LOADING THE AIRCRAFT

To prepare an aircraft for take-off and the following flight a number of checklists needs to be worked through. The flight starts with the cockpit preparation. To start with the preparation, you need to load the CRJ700 first.

2.1 LOADING THE CRJ IN FSX

Load the flight “Aerosoft CRJ Tutorial” that will place the aircraft with all the correct settings and at the correct location. We will start your flight at the American Eagle terminal, so the CRJ-700 is placed on their platform.



Press [s] three times to cycle the view to the Virtual Cockpit. Take some time to scroll around to get an idea of the layout of this rather cramped cockpit.

3 FLIGHT PLANNING / PREPARATION

Flight preparation is a very important part of performing a flight. Hence it is recommended to invest some time for preparation, especially if you aim for an immersive flight experience in your sim.

This tutorial flight takes you from Los Angeles, California (KLAX) to Monterey (KMRY), California.

A flight conducted by American Eagle, flight number 2861, scheduled departure from Los Angeles at 16.20 and scheduled arrival in Monterey at 17.25. American Eagle usually departs from terminal 4. Hence we expect a gate in between of gate 40 and 49A (we'll assume gate 45 for this flight). Accordingly, a departure from the southern runways minimizes taxiing time and we'll expect a departure from runway 25R.

Preparation of the aircraft and shutdown will take some time as well, so please estimate a total of 2 to 2,5 hrs to work through this tutorial flight.

3.1 WEATHER

The weather should be loaded with the flight but do check so you have a good idea what the conditions are.

- Clouds:
  - Layer 1: Base 5.500ft / 1.524m, Tops 8.900ft / 2.713m 3/8 lightly scattered, Cumulus, no turbulence, no icing
  - Layer 2: Base 38.000ft / 11.582m, Tops 39.500ft / 12.040m, 2/8 few, Cirrus, no turbulence, no icing
  - Precipitation: none
- Wind:
  - 181 no turbulence (Surface Winds 0 – 5.600ft / 1.707m)
  - 233@20, no turbulence (5.601ft / 1.708m – 18.000ft / 5.486m)
  - 241@30, no turbulence (18.001ft / 5.487m – 42.000ft / 12.802m)
- Temperature: 0ft / 0m, 18°C / 64°F Dew point 05°C / 41°F
- Barometric pressure: 29,89 in. Hg / 1.012,1891 mbar
- Vis: 30 nm / 48km (-1.465 – 8.500ft / 2.591m)

3.2 ROUTE PLANNING AND FUEL PLANNING

Several tools are available for route planning like:

- Aerosoft's Professional Flight Planner X (www.aerosoft.com/products/professional-flight-planer-x/professional-flight-planer-x.html)
- Aerosoft's NavDataPro Charts package (www.aerosoft.com/products/navdatapro-charts/navdatapro-charts.html)
- Ernie Astons FS Build (www.fsbuild.com/)
- Flight Operation Center, FOC (www.danur.com/deutsch/foc.htm)

The flight planning for this tutorial flight was done in PFPX. Most likely you get slightly different results when recompiling this route meanwhile as new AIRAC cycles might include changes to airways, waypoints or whatsoever. These changes are supposed to be neglected for this tutorial. PFPX calculated the following route, displayed as a route string:

KLAX VTU7 RZS J88 SNS DCT SHOEY KMRY
(please note departure VTU7 was named VTU5 until recently)

We'll depart Los Angeles from runway 25R and follow VENTURA7 SID (Standard Instrument Departure) to San Marcus, RZS VOR. Then we follow airway J88 to Salinas, SNS VOR, and dive directly into the approach into Monterey (KMRY) after passing Salinas VOR. While heading out over the ocean we pass north of the airport flying directly to SHOEY waypoint. After passing SHOEY waypoint, we turn back to the airport, to intercept the ILS and land in Monterey.

In case we can't land in Monterey (for example due to bad weather) we'd have to fly to an alternate. During flight planning the alternate is going to be selected taking several aspects such as distance to alternate, weather forecast into consideration. For this tutorial we'll select San Jose, KSJC. The route to San Jose starts by following MR2 SID out of KMRY to Woodside OSI VOR. From there we'd follow PYE1 STAR into KSCJ.

So, the route to our alternate in string-format looks like this: KMRY MR2 OSI PYE1 KSJC

Airway	Waypoint	Name	Frequency	Course	Distance	Altitude
	KLAX	Los Angeles				
VTU7	VTU	Ventura	108.20		34	CLB
VTU7	RZS	San Marcus	114.90	289	43	CLB
	*TOC	Top of Climb			7	30,000
J88	CEANO			313	56	30,000
	*TOD	Top of Descend			20	30,000
J88	ROBIE			312	25	DES
J88	GOALI			312	35	DES
J88	SNS	Salinas	117.30	311	15	DES
DCT	SHOEY			267	26	2,500
Approach	KMRY				24	1,700
					285	

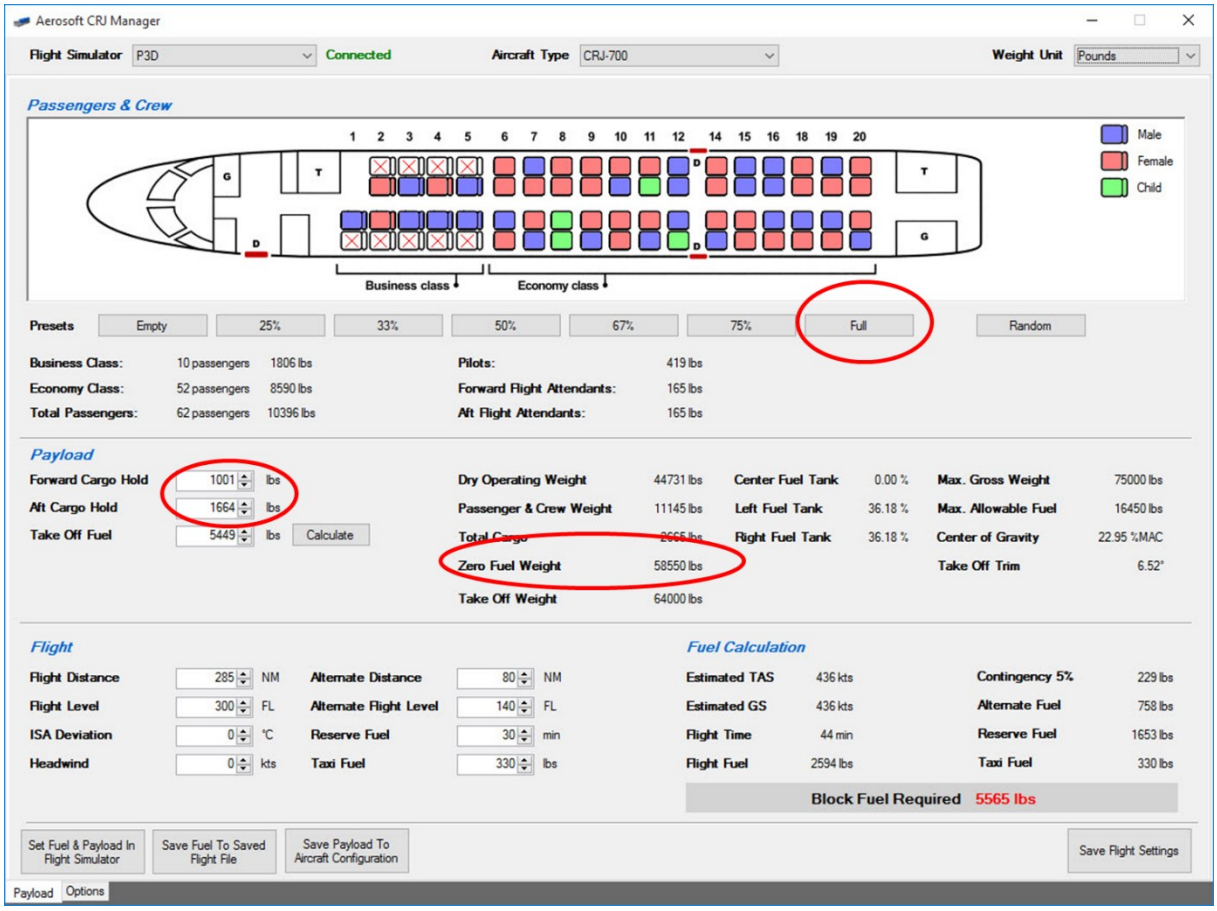
Before being able to estimate the fuel consumption, weight and balance needs to be taken into consideration.

3.4 ADJUSTING WEIGHT AND BALANCE USING THE CRJ MANAGER

The CRJ is accompanied by a powerful tool called "CRJ Manager" which lets you adjust the aircrafts payload, fuel load and even perform a fuel estimation. Please start the CRJ manager now. You will find this application in the following location (or using the Windows Start Menu under Aerosoft\Digital Aviation CRJ).

- FSXMainFolder\Aerosoft\Digital Aviation CRJ\
- Prepar3DMainFolder\Ecosystem\Aerosoft\Digital Aviation CRJ\
- Or via the Windows Start menu, Aerosoft setting

Make sure your simulator remains running!



Please note it is NOT needed to get exactly the same numbers as shown here, just make sure you get close.

We will be flying close to maximum load today, so please press the "full load" button. We aim for a passenger load of approximately 10,396 lbs / 4,716 kg. The load manager simulates not only a seat being taken but also distinguishes between male, female or child passengers and associates different weights accordingly. So every time you press the "full load" button a different combination of passengers is created – most likely you have to hit the "full load" button a few times get a passenger load equal to approx. 10,400 lbs (± 50 lbs is sufficient).

This also explains why you possibly notice a different number of passengers. Please remember that the passenger weight is the only important parameter for your flight simulator. So do not get confused in case you have a differing number of passengers as long as the weight is fine. Given an average weight of approx. 185 lbs, the ~10,400 lbs equal 56 passengers.

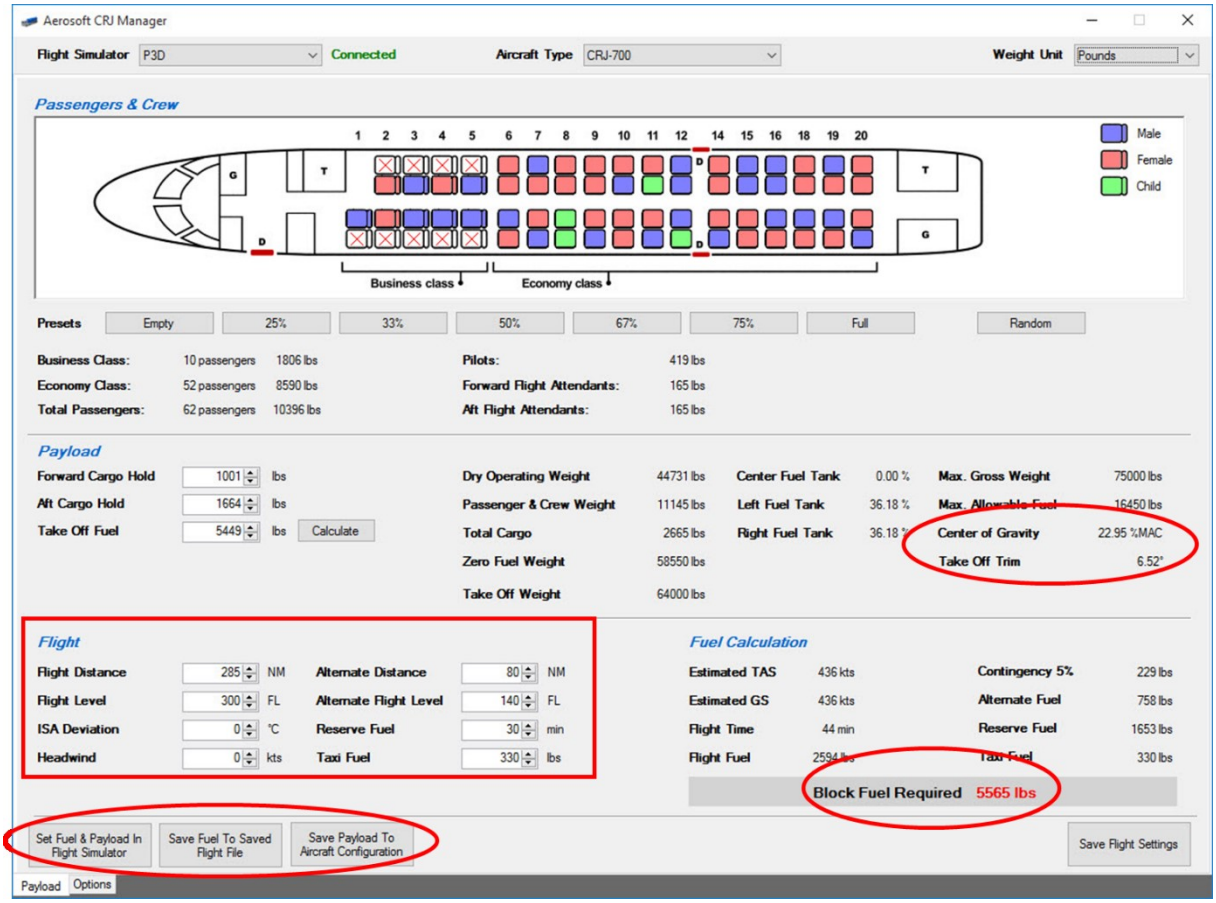
Now please set the load in the forward cargo hold to 1.000 lbs and the load in the aft cargo hold to 1.664 lbs. The CRJ manager should now read a Zero Fuel Weight of 58.550 lbs ± 50 lbs.

The CRJ's weight and balance is modelled with a certain number of load stations. They are visible when you open the payload dialogue in your flight simulator. You may use the CRJ manager to set up the payload. As the CRJ manager distributes payload randomly you are most likely going to get slightly different values for payload, centre of gravity, trim settings and so on.

3.5 AUTOMATIC FUEL CALCULATION USING THE CRJ MANAGER

Given you provide some more data, the CRJ estimates the fuel needed based on the data entered. To make the CRJ Manager estimate the fuel needed for this trip, please enter the following information:

Distance to KMRY [nm]	285	Distance to alternate [nm]	80
Flight Level / Cruise altitude [100ft]	300	Alternate Flight Level [100ft]	140
ISA deviation [°C]	0°C	Reserve Fuel [minutes]	30
Headwind component [kts]	0	Taxi fuel	330



The CRJ Manager instantly calculates the needed fuel which is indicated in the lower right corner: 5,565 lbs / 2,524 kg.

Press “Set Fuel & Payload in Flight Simulator” to send the data to your simulator.

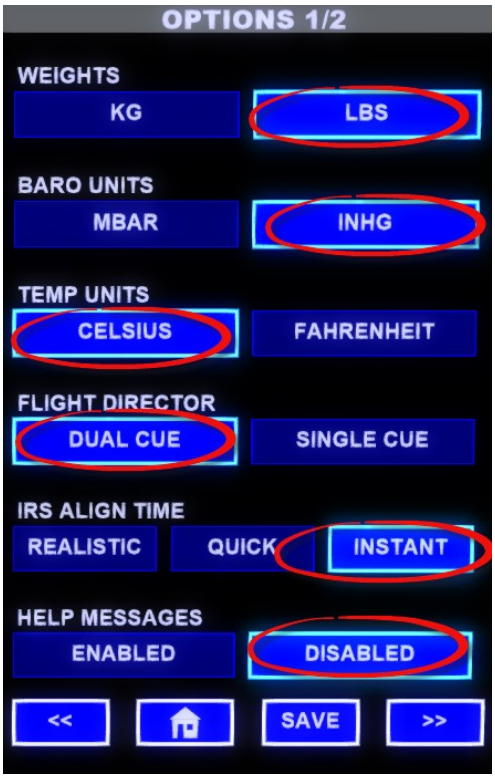
Please note another important parameter: the current centre of gravity as this parameter is needed to estimate the appropriate trim setting for take-off. Given the payload distribution shown in the table above the centre of gravity is 22.95% MAC. Yours might vary a bit but anything between 22.5 and 23.5 is fine.

3.6 CONFIGURATING OPTIONS (INTRODUCING DAVE)

To adjust the CRJ's weight and balance please use the CRJ Manager as introduced in an earlier section. There are further options which need to be configured prior to the first flight. Dave is going to help here. There is a complete chapter on DAVE in Vol 1 of the manuals, we hope you started with that one.

Dave is mounted on the left side of the cockpit and appears in a fashion similar to a tablet computer / EFB device. It is no replication of a real device though but nevertheless very helpful and I am sure many CRJ pilots envy you for having Dave available. After powering on Dave with its own power button (it can run from its own internal battery) select the options dialog and adjust the options according to the following screenshot:

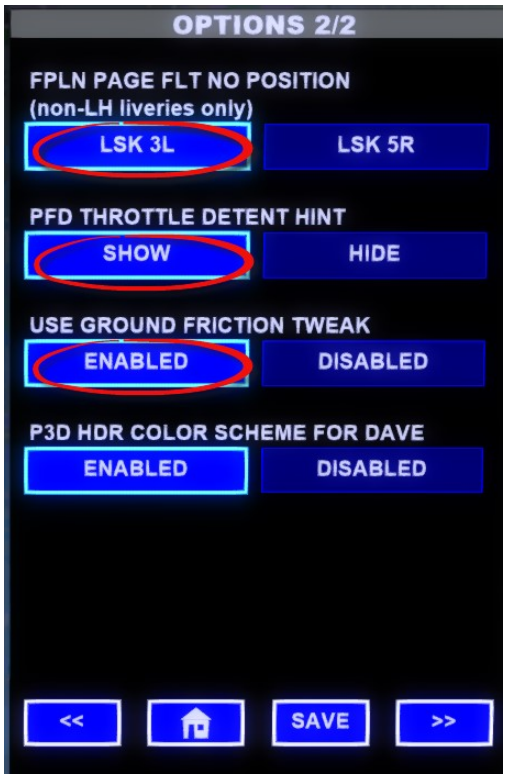
- **WEIGHTS**- please set to lbs: Allows you to choose whether weights are displayed in kilograms or pounds.
- **BARO UNITS** – please set to inHG: Even though you may switch the units in which barometric pressure is displayed, this setting determines the default value.
- **TEMP UNITS** – please set to Celsius: Determines whether temperatures are displayed in Fahrenheit or Celsius.
- **FLIGHT DIRECTOR** – please set to Dual Cue: You may choose if the flight director is displayed as a v-bar or cross-hair.
- **IRS ALIGN TIME** – please set to Instant: When set to realistic, IRS alignment depends on various factors and will take approx. 6-17 minutes. If set to quick, alignment will take 3 minutes and if set to instant the IRS will align instantly.
- **HELP MESSAGES** - keep this disabled for now. Activating it will add some additional information to the EICAS screens.
- **<<** opens previous page,
  home sign returns to start screen,
  SAVE saves currently displayed settings,
  >> opens following page.



Now please save and open the second options page.

- FLPN PAGE FLT NO POSITION - set to LSK 3L. This is the standard location of the flight number. Only Lufthansa uses a different location.
- PFD THROTTLE DETENT HINT – set to SHOW. This will show the throttle detent on the PFD. This is NOT realistic but it will make your first flights a lot easier as it is often hard to see where the throttle is set.
- USE GROUND FRICTION TWEAK – set to ENABLED. This will make all ground movement a lot more realistic (like allowing single engine taxi). If you have this tweak already done to FS/P3D don't activate it.
- P3D HDR COLOR SCHEME FOR DAVE – if you use P3D and find the colours of Dave to bright, activate this option.

Do not forget to save before closing!



3.7 LOADING PANEL STATE

This flight starts with a cold and dark cockpit which means that there is no power or air-conditioning being supplied to the aircraft. If the CRJ700 presents after loading in the sim in a different configuration, load the cold and dark configuration first. To do so please perform the following steps:

- Start "Dave"
- Click „Aircraft State"
- Select "Cold & Dark"

The CRJ will now be as it would be when the first crew of the day finds it.

4 CONDUCTING THE FLIGHT

As already mentioned several checklist items are waiting to be performed.
The checklists are divided into 5 parts:

- Prior to start – prior to engine start-up
- Prior to take-off
- After take-off
- Prior to landing
- After landing

There is no explicit checklist for cruise flight.

Please be aware that apart from checklist items there are also procedures and Standard Operating Procedures (SOPs) which describe how a flight is supposed to be conducted. The procedures are provided by the manufacturer as well as the operator of the aircraft. Hence differences between procedures are possible and those are often the reason for discussions in internet forums. Please be aware of that as people tend to use their own sources of information which might differ from how it is explained here.

In case you encounter any problems please stick to the procedures described in the products manuals and check if you continue to observe any problems.

4.1 PRIOR TO START

4.1.1 SAFETY CHECK

1. CIRCUIT BREAKERS ..... CLOSED
Back side of the cockpit.
As a pulled circuit breaker would deactivate the respective system by disconnecting the power supply, the circuit breaker panels are to checked for pulled circuit breakers. As the circuit breakers are not simulated you may skip this item. In a real aircraft, you might find some CBs pulled to deactivate aircraft systems which would be indicated in the techlog, the deferred item list and the pulled CB would have a red collar.

2.N/W STRG SWITCH..... OFF
Pilots side panel
Two modes are available: ARMED and OFF. In OFF mode, the actuators of the nose wheel steering are deactivated. With deactivated actuators, the nose wheel steering cannot be controlled from the cockpit.

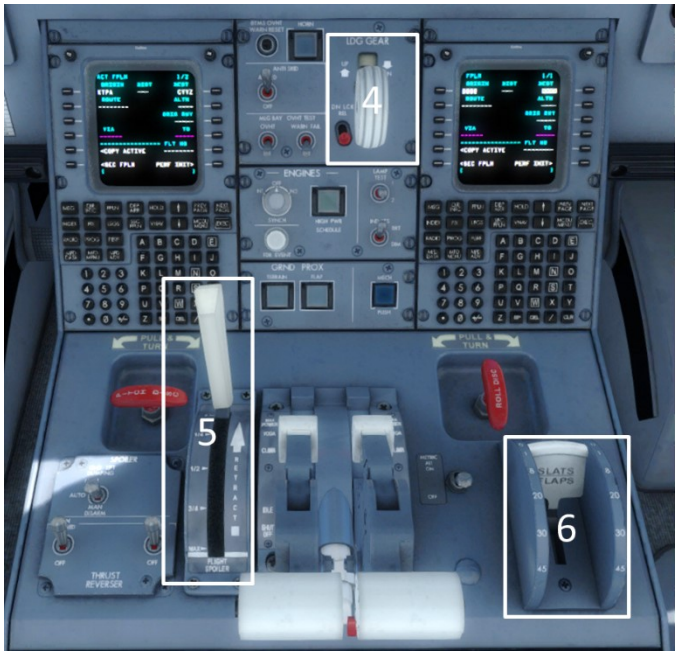
This mode is necessary during pushback to prevent the pushback truck damaging the actuators or hydraulic hoses.

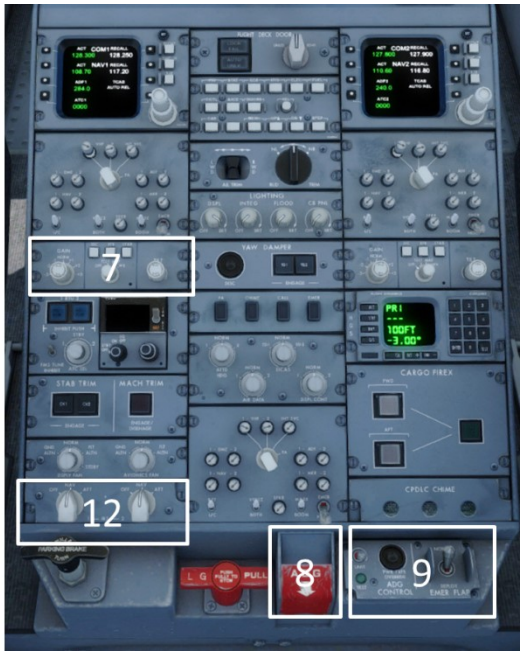
3. HYDRAULIC PUMPS ..... OFF

Overhead Panel

All hydraulic pumps are to be switched off to prevent sudden movements of the control surfaces and hence injuries to other persons or collisions of control surfaces with any obstacles (like ladders, catering trucks, gates, fuel trucks, whatsoever).

Note that the right and left mouse button control the setting of switches with three settings!





4. LDG GEAR LEVER ..... DN / DOWN

Upper pedestal

The gear lever needs to be in the DN position to prevent sudden starting of the gear retraction sequence when the hydraulic is activated.

5.FLIGHT SPOILER LEVER 0

Lower pedestal

The spoilers are to be retracted for similar reasons as described in the previous two checklist items

6. SLATS / FLAPS LEVER ..... SET (TO ACTUAL FLAP POS.)

Lower pedestal

As well as the flaps are to be retracted. In case the flaps are extended the flaps position and the position of the flap lever need to agree. Again this step is to prevent sudden movements when the hydraulics are activated.

7. RADAR ..... OFF

Central pedestal

The radar is supposed to be off on ground to prevent any ground personnel being injured by the radar beam. At the current state of development the CRJ's radar will show an actual representation of any precipitation in case you are using Hifi-Sims Active Sky Next.

8.ADG MANUAL RELEASE ..... STOWED

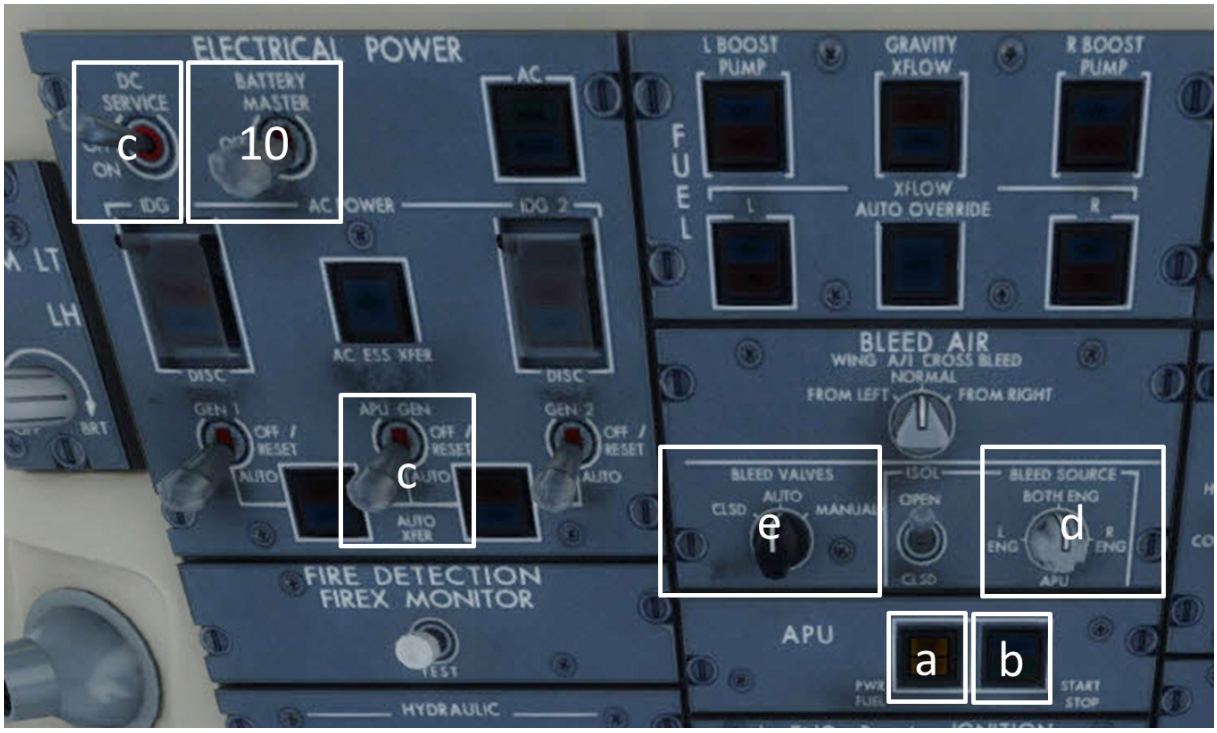
Lower pedestal

The air driven generator (ADG) is a backup emergency generator. Basically it is a kind of propeller which can be extended into the airflow. There it starts to turn and hence generate power. Of course a certain airspeed is needed that the ADG is able to provide sufficient power. The ADG is supposed to be stowed away before conducting a flight.

9. EMER FLAP SWITCH ..... NORMAL

Lower pedestal

In case the flaps do not react on movement of the flap lever the emergency flap switch provides a backup. This switch is supposed to be in the normal position.



10. BATTERY MASTER SWITCH ..... ON

Overhead panel

Now the aircraft is about to be powered up by switching on the master battery. To prevent the battery from draining an external power source should be connected or the APU should be switched on as soon as possible. As the engines need bleed air for start-up we later need the APU anyway and as virtual fuel virtually doesn't cost anything we'll power up the APU now.

Note: To prevent BLEED MISCONFIG caution messages during APU start, ensure that the wing and cowl anti-ice switches are OFF prior to APU START.

APU START SEQUENCE

(a). APU, PWR Fuel switch **ON**

Overhead Panel Check that the APU SOV (Shutoff Valve) OPEN message appears on the EICAS. Afterwards the APU IN BITE message appears momentarily. Now the APU RPM and EGT appear on the EICAS, followed by the APU DOOR status message. The APU IN BITE message disappears now.

(b).APU, START/STOP Switch **Start**

Overhead Panel Press the APU, START/STOP button to initiate the start sequence. This will be followed by a APU START message on the EICAS, then the APU spools up. Before reaching 60% the START light and APU START message disappear. Roughly 2 seconds after reaching 99% the AVAIL light will illuminate indicating the power and bleed air is now available through the APU.

(c). DC and AC electrical power **Check**

Overhead Panel

Check that the APU Gen switch is set to AUTO and AUTO Transfer lights are extinguished. The DC Services switch stays set to OFF for the remainder of the tutorial flight.

(d) BLEED SOURCE switch **As required**

Overhead Please set to APU so that bleed air is supplied by the APU

(e).BLEED VALVES switch **As required**

Overhead Panel

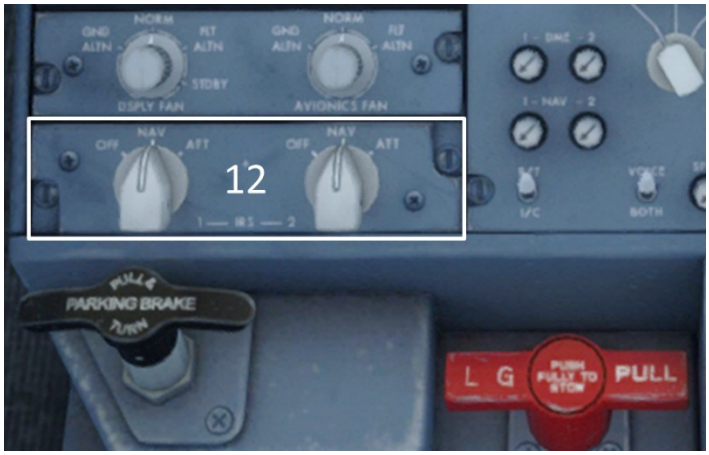
Set to AUTO .....

END OF APU START SEQUENCE

11. APU / AC ELECTRICS ..... AS REQUIRED / ESTABLISHED

Overhead Panel

Check that the APU is running and the APU generator is connected (see item (c) of the APU start checklist.



12. AHRS / IRS ..... NAV

Lower Pedestal

The Inertial Reference System, IRS is able to determine aircraft movements. To enable the IRS following a route it needs a starting point. Hence during the initialization sequence the start position needs to be entered. This step is performed during FMS setup later on and is the reason why you often see coordinates on the plates displaying the gate / parking position.

Please note that the Yaw dampers only engage, when the IRS is initialized properly.

13. EMERGENCY EQUIPMENT ..... CHECKED

not simulated

All aircraft have emergency equipment on board. For example, the oxygen masks, swim vests, possibly a rope to leave the cockpit in emergency and much more comprises the emergency equipment. Depending on the aircraft operator differences are possible. As a check of emergency equipment is kind of superfluous for flight simming this is a suitable time to check if everything is available to conduct the flight.

14. GEAR AND SAFETY PINS ..... ON BOARD

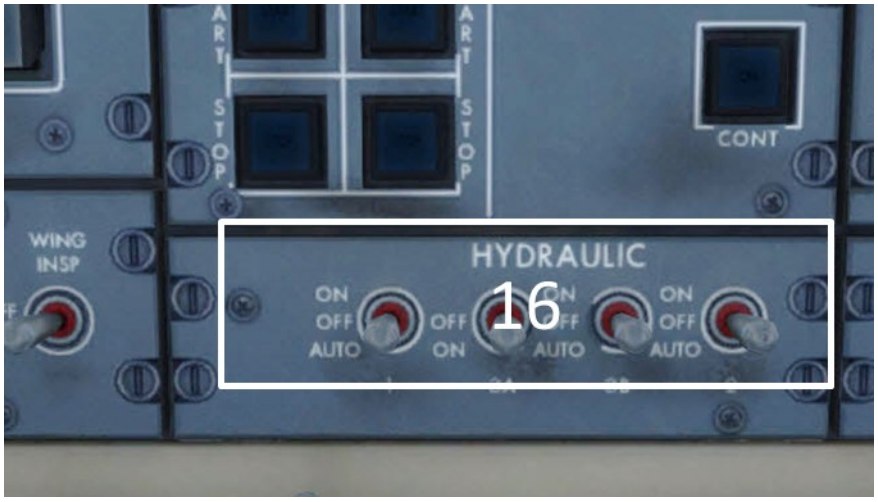
not simulated

In a real aircraft safety pins prevent the gear from retracting as long as the pins are inserted. Of course safety pins are not available in flightsim.

15. AIRPLANE DOCUMENTS ..... CHECKED

not simulated

Normally you'd now check all documents needed during the flight like the flight plan, load manifest etc. pp.



16. HYDRAULIC 3A PUMP..... AS REQUIRED

Overhead Panel

The CRJs hydraulic system is comprised of 3 subsystems with two pumps each (1A, 1B, 2A, 2B, 3A, 3B). The hydraulic pumps of system 1 and 2 are engine driven pumps, while the system 3 pumps are electric pumps powered by alternating current (AC). Hence you need to switch on the pumps of system 3 when you need hydraulic pressure with the engines still off. The second pump of system three (3B) is a backup pump. For this tutorial flight please leave the 3A pump OFF for now.

17. FMS INITIALIZATION..... COMPLETE

Centre Pedestal / FMS

For better handling of this tutorial the FMS initialization is done at a later stage – as soon as you feel more comfortable managing the CRJ please activate the FMS at this stage to check the STATUS page and perform the POS INIT. Especially when you set the IRS alignment time to the real value you want to initiate the POS INIT now.

4.1.2 CABIN INSPECTION

1. EMER LTS Switch ..... ON
Overhead Panel
Check that EMER LTS ON message appears on EICAS

2. NO SMOKING and SEAT BELT SIGNS ..... AUTO
Overhead Panel
Check that no smoking and seat belt signs are switched to auto.

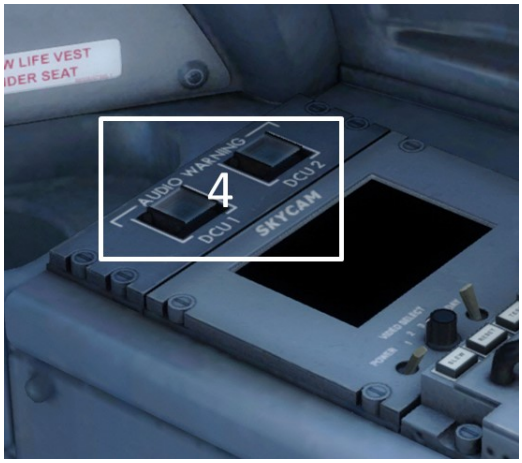
3. EMER LTS Switch ..... OFF
Overhead Panel
Check that EMER LTS ON message disappears on EICAS while the EMER LTS OFF message appears.

4.1.3 ORIGINATING CHECK

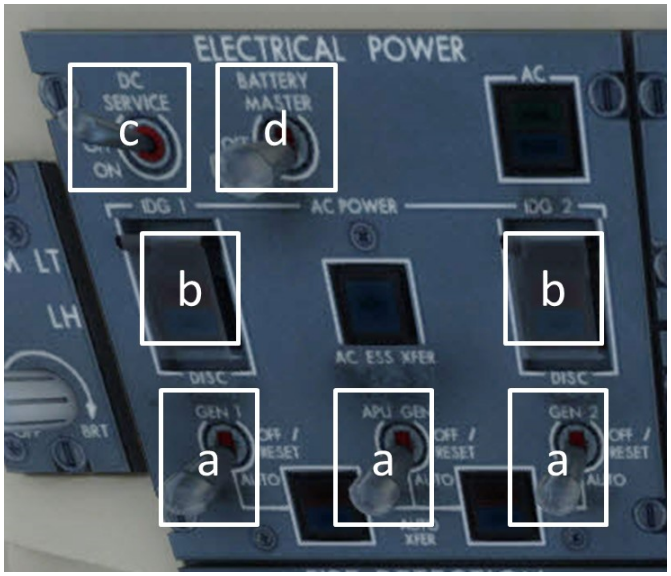
1. INTERNAL & EXTERNAL PREFLIGHT CHECKS ..... COMPLETE
not simulated

2. PEDALS, SEAT AND HARNESS..... ADJUSTED
not simulated

3. CREW OXYGEN AND MASKS ..... CHECKED / QUANTITY
only first flight of the day
not simulated



4. AUDIO WARNING PANEL ..... CHECKED
Audio Warning Panel (copilot's side panel)
Check that both pushbuttons are safe-guarded and no lights are illuminated.



5. ELECTRICAL POWER PANEL..... CHECKED

Overhead Panel

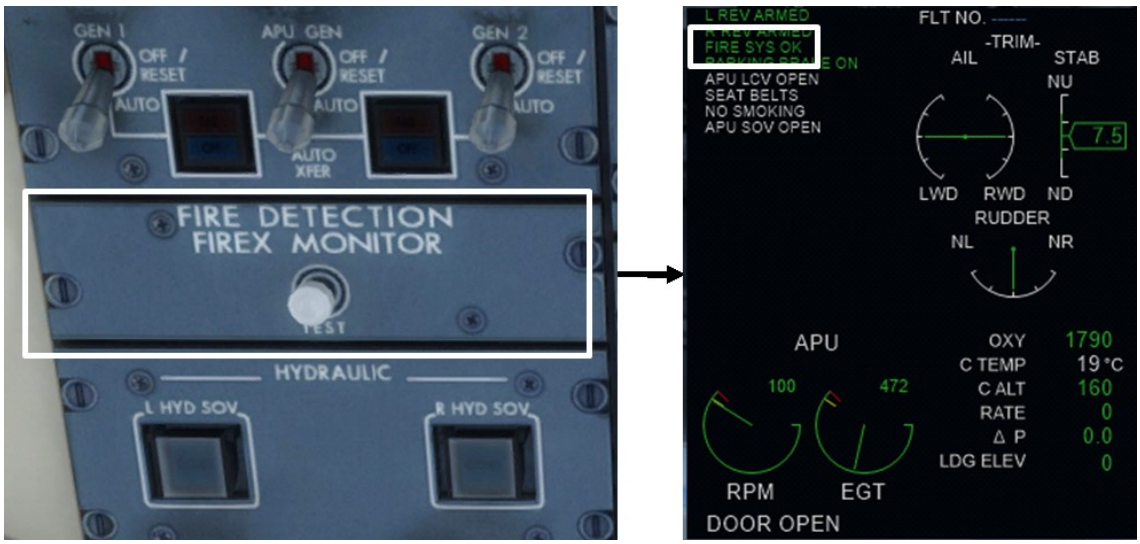
(a). All GEN switches ..... AUTO

(b). IDG Disc switches..... Guarded

(c). DC service switch ..... ON

(d). BATTERY Master ..... ON

Ensure that the battery switch is on and either an external power source is available and connected or the APU is running and connected



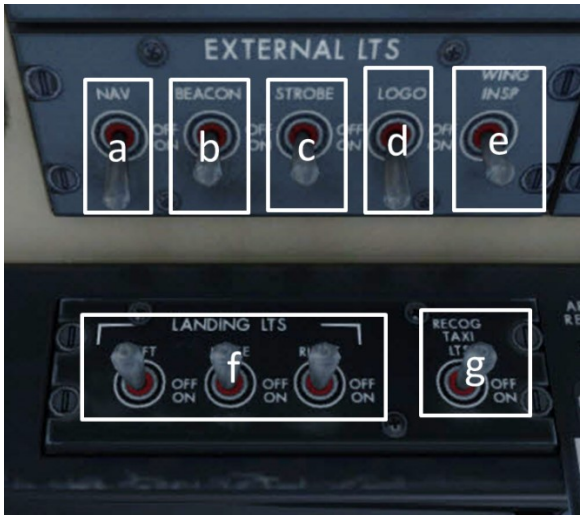
6. FIRE DETECTION / FIRE MONITOR TEST..... COMPLETE

Overhead Panel

Fire Test Routine – only first flight of the day

a). press fire detection monitor test switch for 2 seconds

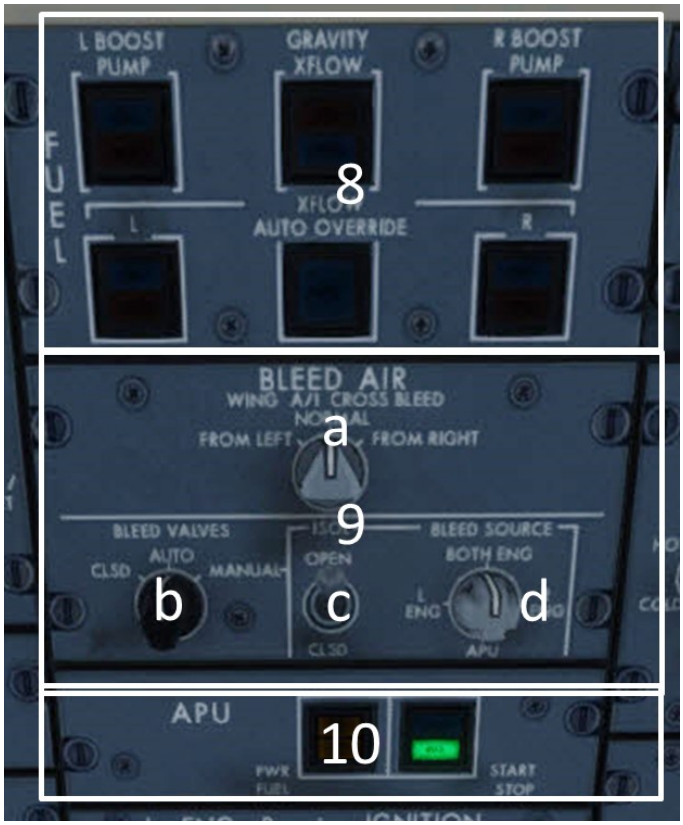
b). FIRE SYS OK advisory (green) illuminates on EICAS



7. EXTERNAL LIGHTS PANEL ..... CHECKED
Overhead Panel

Please check that the light switches are selected accordingly:

a)	**NAV switch**	**ON**
b)	**Beacon**	**OFF**
c)	**Strobe**	**OFF**
d)	**Logo Lights**	**ON**
e)	**WING INSP**	**OFF**
f)	**Landing Lights**	**OFF**
g)	**RECOG Taxi lights**	**OFF**

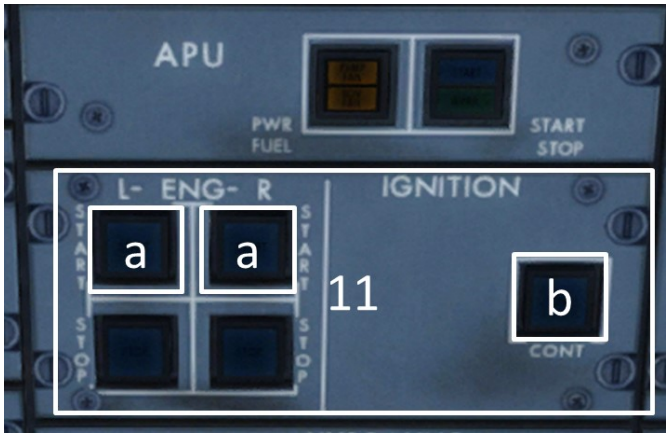


8. FUEL PANEL ..... CHECKED
Overhead Panel
Ensure that fuel pumps are switched off, which is indicated by all lights being off

9. BLEED AIR PANEL..... CHECKED
Overhead Panel

a) Wing A/I Cross Bleed switch **Normal**
b) BLEED VALVES switch **AUTO**
c) **ISOL switch** **OPEN**
The ISOL switch is only active, when the bleed valve switch is set to MANUAL. As soon as set to CLSD, only the left pack is supplied with bleed air (accordingly only the cockpit is supplied by the air condition). So leave it to OPEN so in case you need to switch to MANUAL the cockpit and the cabin are supplied with air conditioned air.
d) **BLEED SOURCE switch** **Both Engines**
The Bleed Source Switch is only active when the bleed valve switch is set to Manual – otherwise the CRJ adjusts the bleed system automatically.

10. APU PANEL ..... AS REQUIRED
Overhead Panel
check that APU START/STOP light is illuminated green indicating the running APU.

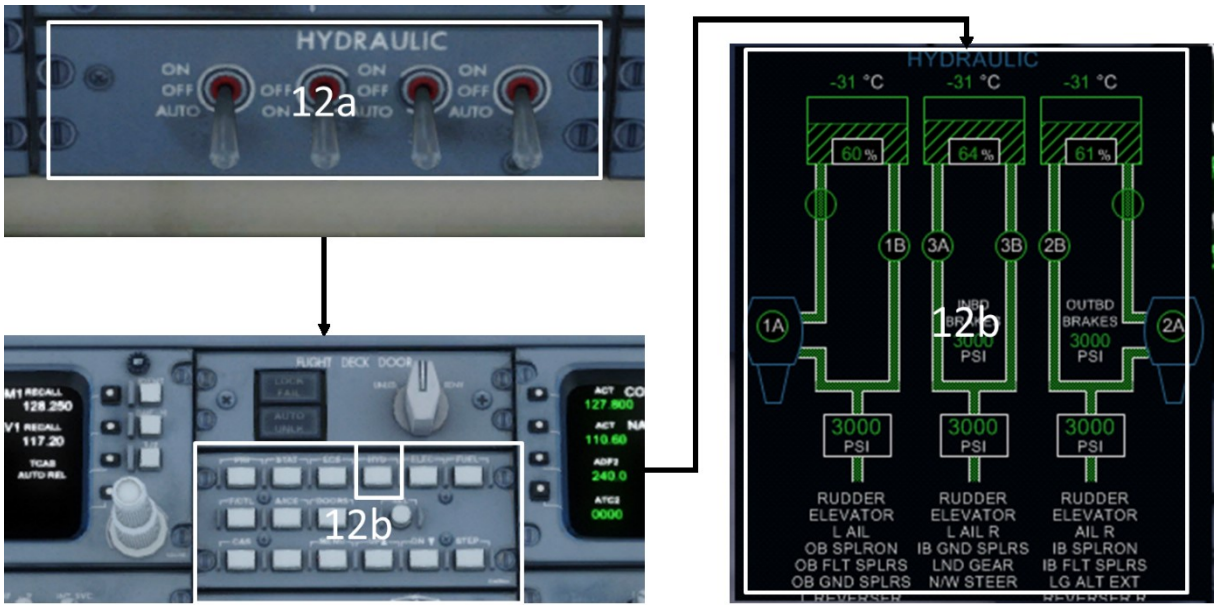


11. START PANEL ..... CHECKED
Overhead Panel

As the engines are not to be started yet check that the start switches are in the off position and secured.

(a). L and R ENG START switches ..... OFF
Check that the L and R START lights are out

(b). IGNITION, CONT switch ..... OFF
Check that the switch for continuous ignition is off.



12. HYDRAULIC PANEL..... CHECKED
Overhead Panel & EICAS & pedestal

The hydraulic system is still unpressurized, so please check that all hydraulic pumps are still switched off.

(a). HYDRAULIC switches — **All OFF**

(b). EICAS HYD synoptic page — **Select**

(c). STAB TRIM switches — **Disengage**
Not simulated – please skip this item

(d). Fluid quantities — **Check**
Check for sufficient hydraulic fluid quantity
(Normal hydraulic fluid quantity is 45-85%).

(e). PUMP 1, 3B and 2 switches ..... ON
Assure that all control surfaces are clear before powering up the hydraulic system. Check that all pressures and quantities are normal

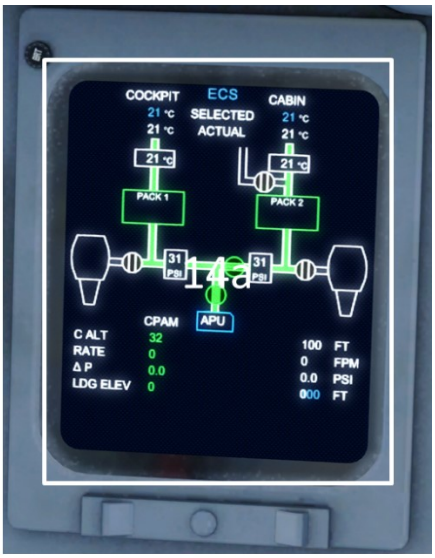
(f). EICAS STAT synoptic page ..... Select

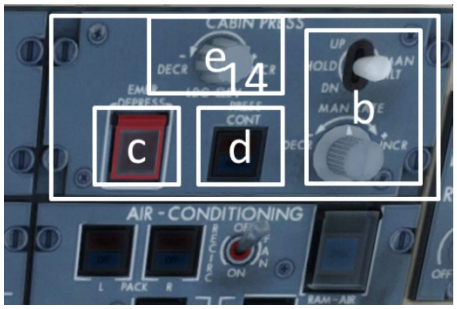
(g). STAB TRIM switches ..... engage
Not simulated – please skip this item

(h). PUMP 1, 3B and 2 switches ..... AUTO
Setting the hydraulic pump switches to AUTO prepares them to being activated as soon as the engines are started.

(I). PUMP 3A switch ..... ON
The hydraulic 3A pump switch only offers a ON and a OFF position, so please set it to ON.

13. ELT SWITCH ..... ARM / RESET
Overhead Panel
The emergency locator transmitter (ELT) transmits the aircrafts position as soon as activated, such as in case of a crash. Ensure that it is set to the ARM position.





14. CABIN PRESS PANEL ..... CHECKED
Overhead Panel, pedestal and EICAS

The cabin pressurization pretty much works automatically. You are only supposed to adjust the elevation of the landing airport. In case some issue arises after take-off you possibly need to return to your origin airport. Hence you first dial in the elevation of your originating airport. The landing field elevation is going to be dialled in during the descend preparation.

(a). EICAS, ECS synoptic page **Select**

Please proceed to the EICAS selector panel on the pedestal to select the ECS page

(b). MAN ALT switch and RATE selector **Center position**
Check that the cabin differential pressure as well as cabin climb rate is zero and cabin altitude roughly equals field altitude (Field elevation is 125 ft →set to 120ft)

(c). EMER DEPRESS switch **Off / Guarded**
Check that no light is illuminated and the button is guarded

(d). PRESS CONTROL switch **Off / flushed**
Check that the button is not illuminated

(e). MAN RATE switch **Full DECR**
The setting to full decrease of the manual cabin climb rate switch leads to all valves opening as soon as the system is switched to manual control. So in case the system goes haywire while on ground, the cabin is prevented from being pressurized which may harm ground personnel (like popping doors / hatches).

15. AIR CONDITIONING PANEL ..... CHECKED
(pack switches pushed and recirc fans ON)
Overhead Panel and EICAS

Now check if the air-condition and bleed system is setup correctly. The pack switches are supposed to be pushed and the EICAS is supposed to indicate FAULT for the pack switches as the engines are still off and hence provide no bleed air.
The recirculation fans ensure that the air-conditioned air is dispersed throughout the entire aircraft.

(a). PACK switches **AUTO**
The packs are basically the aircrafts air-condition. By setting them to Auto they start to regulate the temperature in the aircraft according to the temperature setting by heating up external air with bleed air drawn from the engines. These airstreams are not mixed though. Drawing bleed air from the engine reduces the engines power. Hence operators try to optimize the ratio of external air which needs to be preheated and recirculating air already in the cabin.

(b). RECIRC FAN switch **ON**
To be able to recirculate cabin air recirculation fans are needed. Please switch them ON now.

(c). Temperature control mode **AUTO**
Temperature for the cockpit and passenger compartment is set using the turning knobs on the overhead panel. Two temperature-control-subsystems automatically regulate the temperature in the cockpit and passenger compartment according this setting. In case those subsystems fail a manual mode is available which is activated by pressing the respective MAN pushbuttons. Illuminated lights indicate that a subsystem is set to manual mode – so please ensure that both pushbuttons are extinguished.

(d). RAM AIR switch **Off / Guarded**

Ram air ventilation is used when both packs fail. As this would definitely be a no-go-item if happening before departure please check that RAM AIR OPEN light is out and the pushbutton is guarded.

(e). WING and COWL Anti-ice switches **Off**

Please check that no anti-ice system is activated and hence then wing and cowl-anti-ice switches are off.

16.ICE DETECTOR TESTS ..... COMPLETE

Only first flight of the day

Overhead Panel

During preparation of the first flight of the day the ice detectors are to be tested. Push and hold the ICE DET / TEST button for 5 seconds. This starts the test sequence, which is finished with the “ADS HEAT TEST OK” message appearing on the EICAS.

(a). EICAS, PRI and STAT pages ..... SELECT

Please proceed to the EICAS selector panel on the pedestal to select the ECS page

(b). DET TEST switch ..... SELECT AND HOLD

Ensure that ICE light is on, ICE caution message is on, ADS HEAT TEST OK advisory message is on

(c).DET TEST switch ..... RELEASE

Assure that after releasing the DET TEST switch the ICE light extinguishes, the ICE caution message and ADS HEAT TEST OK messages disappear

17. WSHLD SWITCHES ..... LOW

Overhead Glare Panel

Now activate the windshield heating (L and R probe switches) to prevent icing or fogging of the windshield.

18. EMER LTS SWITCH ..... ARM

Overhead Glare Panel

As soon as passengers are on boad the emergency lights must be available in case of an emergency. Boarding is supposed to start soon, so please arm the emergency lights.

19. STANDBY COMPASS..... CHECKED

Overhead Glare Panel

Please check that the indicated heading on the standby compass agrees with the actual aircraft's heading.

20. STALL TEST ..... COMPLETE
only first flight of the day
Pilot Side Panel

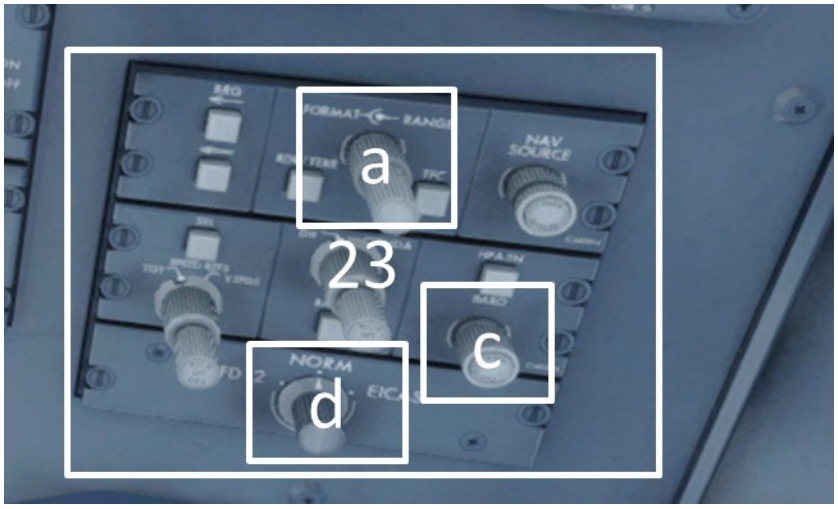
(a). STALL PTCT, PUSHER switches ..... ON
Make sure that the Stall system is activated and the switch set to ON

(b). STALL switch (either) ..... Select momentarily
Open the protective cover over the stall switch with a right mouse click. Then press the pushbutton and release it again – this initiates the stall test sequence. Please check that the test follows the sequence below:

1. The pilot's stick shaker is activated
2. CONT, ON light is on
3. CONT IGNITION message appears
4. The copilot's stick shaker is activated
5. Stick pusher is activated and STALL switches flash
6. Stick pusher is de-activated and STALL switches are out
7. The pilot's stick shaker stops
8. The copilot's stick shaker stops
9. CONT, ON light goes out
10. CONT IGNITION message disappears

21. N/W STRG SWITCH ..... OFF
Pilot Side Panel
To prevent damage of the nosewheel steering mechanism during pushback, the nosewheel steering needs to be switched OFF.

22. CLOCKS ..... SET
Main Panel
Adjust the clock / ensure that time / date is correct (nothing to actually worry about)



23. EFIS Control panels..... checked

Side Panels

Adjust the EFIS displays according your needs. We suggest: MAP mode and 25 nm range.

(a). Display control switches ..... MAP

(b). Air data reference switches FMS1

(c). BARO switch..... Set
Adjust barometer setting to 29,89 in. Hg / 1012,2 mbar. You may also press "B" in case you still use the standard key assignment in your flightsimulator to calibrate the altimeters.

(d). Display reversionary selector ..... NORM

24. Instrument panels ..... checked

Main Panels

Check that display brightness is adjusted according to your needs.

(a). Primary flight display .....CHECK
Check that no annunciators are displayed. Cross-check ADI's and RMI's

(b). Altimeter readout .....CROSS-CHECK
Check that on both sides (pilot's an copilot's) the same altitude is displayed/indicated

(c). Multifunction display .....CHECK

Check that no flags are displayed

(d). Cockpit voice recorder .....TEST
Press and hold Voice Recorder TEST switch for 5 seconds and verify that the green light appears

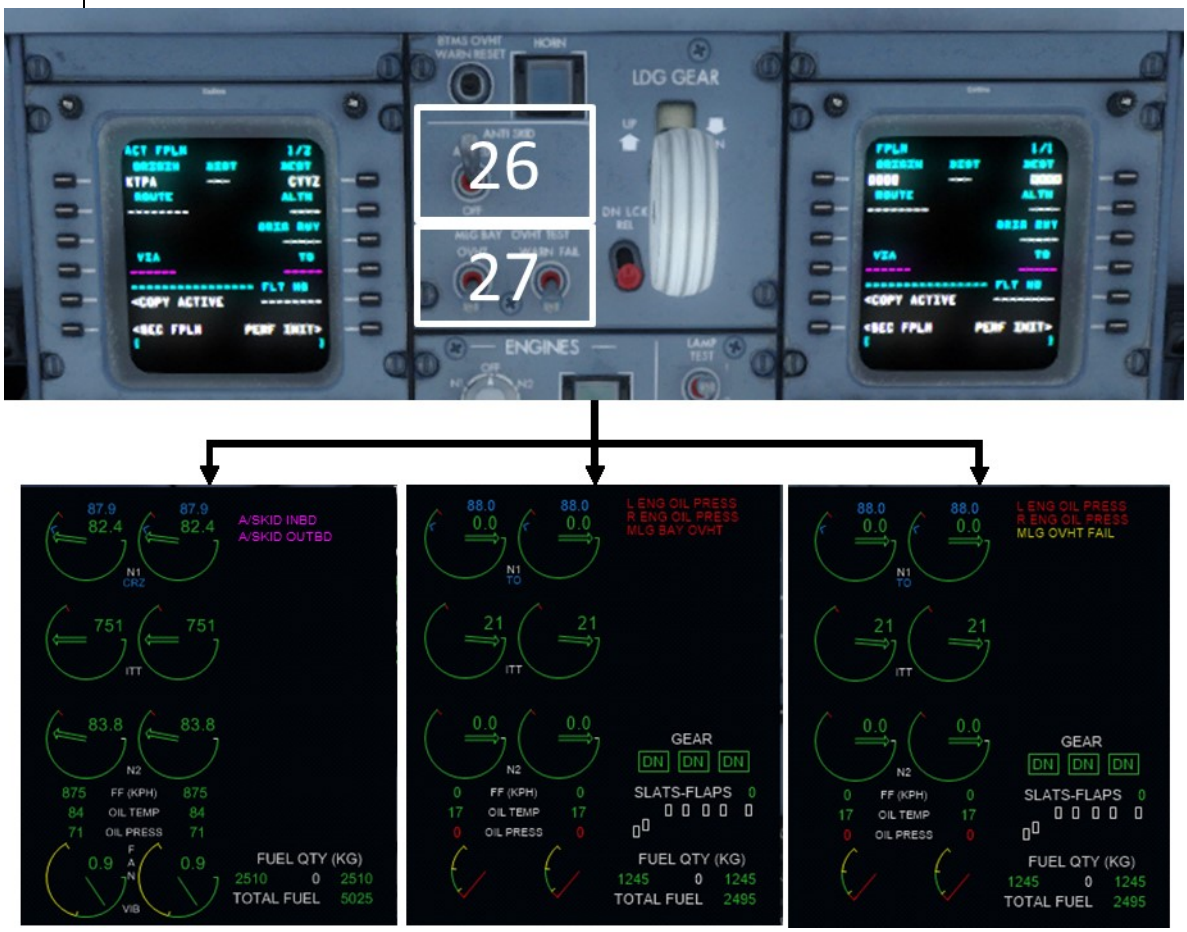
25. EICAS and Standby instrument..... checked
Main Panels

Check the EICAS and standby instruments if you notice any fault flags which are not plausible.

(a). EICAS primary display .....CHECK
Check that no caution messages or flags are displayed and all other indications are normal

(b). Stdby altimeters / airspeed indicator.....CROSS-CHECK
Check that all altimeters display the same altitude

(c). EICAS secondary display.....CHECK
Check that no caution messages or flags are displayed and all other indications are normal



26. ANTI SKID TEST..... COMPLETE
Only first flight of the day
Overhead Glare Panel

Initiate the anti skid test sequence

(a). ANTI SKID switch.....ARMED
Ensure no A/SKID INBD or A/SKID OUTBD caution messages are displayed

(b). ANTI SKID switch.....OFF
Ensure A/SKID INBD and A/SKID OUTBD caution messages are displayed

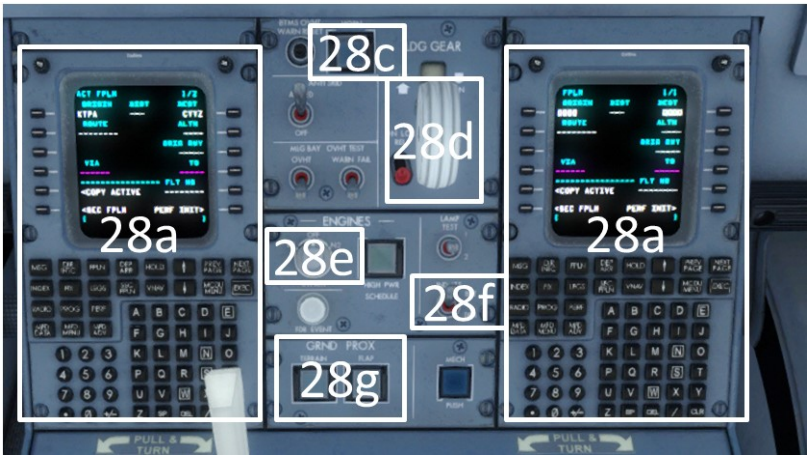
(c). ANTI SKID switch .....ARMED
Ensure A/SKID INBD and A/SKID OUTBD caution messages are extinguished

27. MLG BAY OVHT TEST ..... COMPLETE
Only first flight of the day
Upper pedestal

Used to simulate an overheat condition in the main landing gear bay.

(a). MLG BAY OVHT switch.....Select OVHT and hold

(b). MLG TEST WARN FAIL switch .....WARN FAIL



28. Upper pedestal..... checked
Lower Pedestal

(a). FMS..... As Required
We'll deal with the FMS later on.

(b). Brake temperature ..... CHECK
Check that a normal temperature is indicated (green)

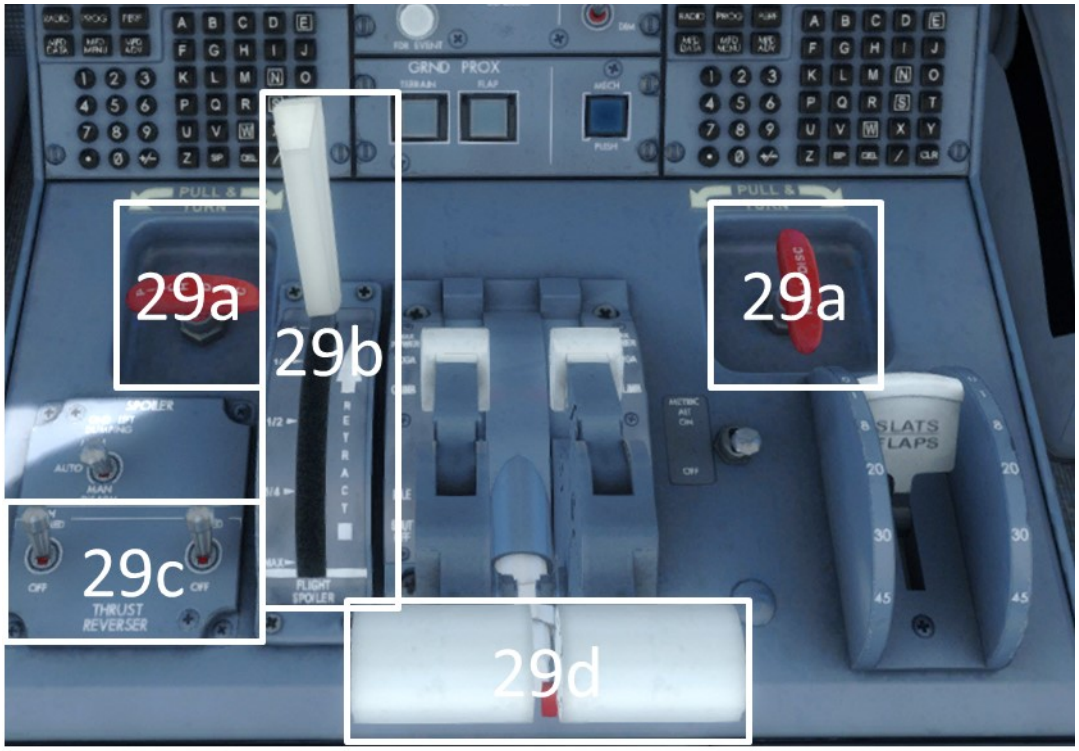
(c). MUTE HORN switch ..... Guarded
MUTE HORN light needs to be out

(d). LDG GEAR lever ..... DN
Verify the gear lever is down

(e). ENGINES, SYNC switches..... N_1 or N_2
Please set the engine synchronizing switch to N_1. The FADEC will synchronize both engines either by rpm of the fan (N_1) or the core engine (N_2). This is done for noise reduction.

(f). IND LTS switch ..... As Required
Choose between either BRT or DIM according to your needs

(g). GRND PROX switches..... CHECKED
Ensure that TERRAIN and FLAP switch are guarded and no lights are on



29. Thrust lever quadrant..... checked
Pedestal

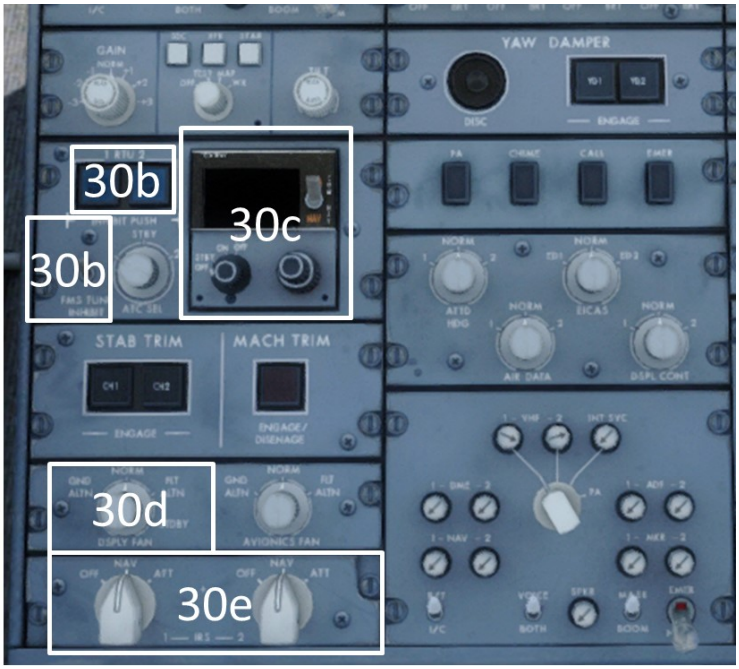
The throttle levers are to be set to idle and reverse thrust deactivated / stowed.

(a). PITCH and ROLL DISC handles..... IN / STOWED
Check that the Pitch and roll trim disconnect handles are stowed.

(b). GND LIFT DUMPING switch ..... CHECK / AUTO
Check that the GND LIFT DUMPING switch is set to AUTO so that the ground spoilers are deployed automatically after touchdown.

(c). LH and RH THRUST REVERSER
switches ..... ARMED
L and R REV ARMED advisory messages are on

(d). Thrust Levers ..... CHECK / SHUT OFF
Check that the thrust levers are still set to shut off.



30. Avionics / Radio Tuning Panels..... checked

Pedestal

(a). Radio Tuning Panels

(a1). Display Control Panel,

TCAS switch..... Select

When the TCAS is switched on for the first time, it goes through a test sequence, hence the TCAS TEST message appears on the MFD. Verify that the threat symbols and VSI indications (vertical advisorys to either climb or descend to prevent a conflict/crash) are displayed.

(a2). ALT line select key..... Select

Turn on the altitude reporting mode. The ATC page indicates ALT ON. The displayed altitude is based on standard atmospheric pressure (29,92 in. Hg)

(b). RTU & FMS TUNE INHIBIT switches ..... Off / Flushed

The radio tuning unit, RTU, inhibit switches enable the flight crew to deactivate a failed RTU and enable cross-side tuning. Hence there are two switches for either RTU.
Furthermore there is a FMS tune inhibit switch which inhibits the autotune function of the FMS.

(c). Back-up Mode selector switch ..... STBY

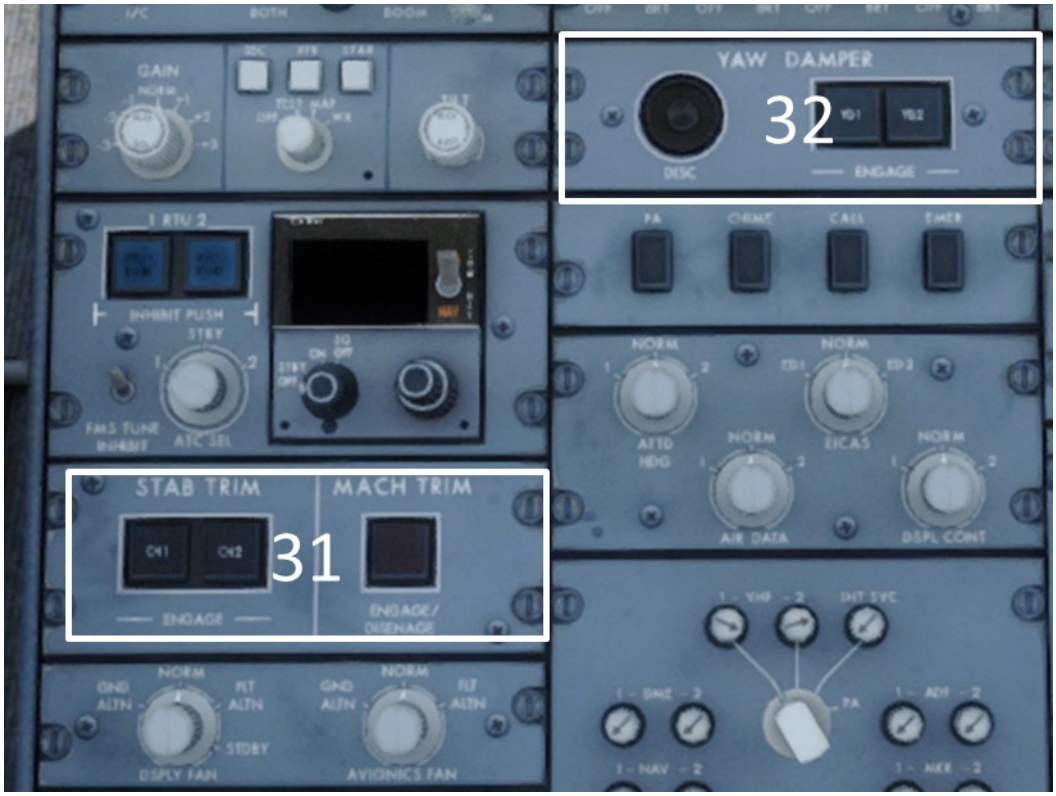
Check the back-up tuning unit indicates the same frequencies as COM1 and NAV1.

(d). DSPLAY FAN switch ..... NORM

Set the Display fan switch to NORM

(e). IRS switch ..... NAV

Ensure that the IRS switches are set to NAV.



31.Trims..... Checked
Pedestal

> **(a). STAB TRIM and MACH TRIM switches..... Engage**
> Engage STAB TRIM and MACH TRIM and check that caution messages are out
>
> (**b).AIL and RUD trim..... Select**
> Verify free movement in both directions, then set trim to neutral again

32. YAW DAMPER..... ENGAGE
Lower Pedestal
Please switch on the yaw damper on the lower pedestal panel

33. SOURCE SELECT PANEL ..... NORM
Lower pedestal
Please check that all selectors on the source selector panel are set to normal

34. Lower pedestal ..... Checked
Lower pedestal

(a). PARKING BRAKE ..... SET
Check that the parking brake is set.

(b). LANDING GEAR MANUAL RELEASE HANDLE ..... STOWED
Every aircraft has a manual release for the landing gear. Check that the CRJ's is stowed.

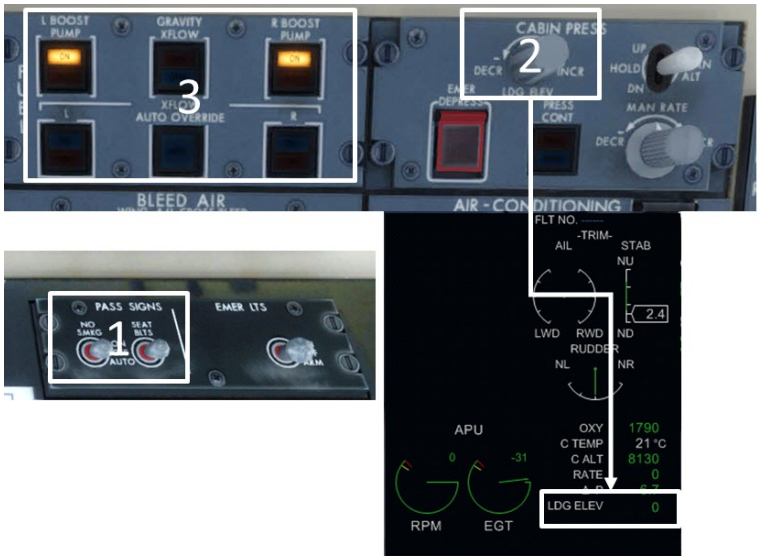
(c). ADG manual deploy handle ..... Stowed
Recheck that the ADG handle is stowed as well

(d). EMER FLAP switch ..... NORMAL
Recheck that the EMER FLAP switch is set to normal

4.1.4 BEFORE START CHECK

Nearly all preparation work is completed and we are about to start the engines. The Before Start Checklist is the last checklist which ensures that the aircraft is set up properly for the engine start.

Make sure that ATIS and start-up clearance by ATC is received (not an issue for this tutorial – as the weather was pre-defined and we are not using ATC instructions. In case you use real weather and intend to use ATC please make sure you listened to ATIS and received a taxi clearance to your assigned take-off runway).



1. PASS SIGNS..... ON
Overhead Glare Panel
Ensure that all passenger signs (seat belts and no smoking) are switched on

2. LDG ELEV ..... SET
Overhead Panel
Please dial in the landing elevation of your departure field (120 ft).
In case you have to return after your take-off the correct altitude is already set.

3. BOOST PUMPS ..... ON / CHECKED
Overhead Panel
Monitor center tank quantity for not less than 10 minutes.
Center tank fuel quantity must not increase by more than 68 kg (150 lbs) after both boost pumps are selected on. Switch on the fuel / boost pumps and monitor the fuel quantity.

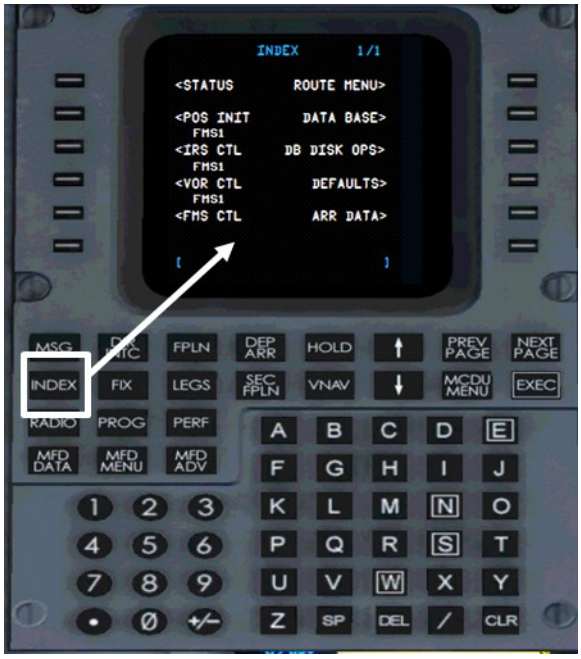
4. ALTIMETERS ..... SET
Main Panel
Cross-check that the altimeters are set to the pressure (QNH) at the departure airport

5. FMS / IRS..... SET
Pedestal
Now we are about to initialize the FMS, enter the route as well as departure route (SID) and arrival route (STAR)

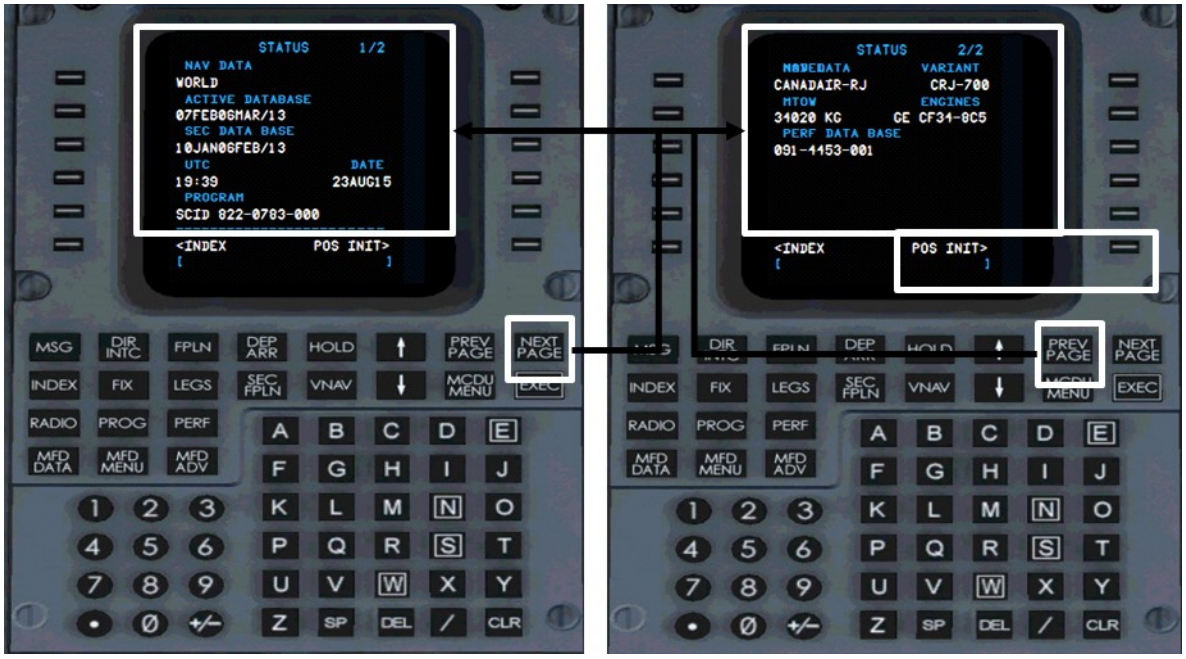
4.1.5 FMS INITIALIZATION SEQUENCE & SETUP

Centre Pedestal / FMS

Handling of the Flight Management System, FMS, follows a certain procedure / logic as well. In general, the first thing is to start the FMC. The initial position set up on the POS INIT page as well as entering the route on the FPLN page is going to follow later.



1. Start FMS – MCDU Index page
   To ensure the same starting point, please press the INDEX function key to open the INDEX page



2. Initialize - STATUS pages
   After switching the FMC on and a certain self test procedure the status pages are displayed. There are two pages of status pages with the following information. Please review the first page:
   - An identification-number for the installed database (should read WORLD)
   - The dates to indicate in which timeframe the active database is valid
   - The dates to indicate in which timeframe the secondary (SEC) database is valid
   - The FMC's time (in UTC) and date
   - The software-part number of the FMC's installed software
     (not relevant for flight simming – will read SCID 822-0783-000)
   - An option to switch to the position init page (POS INIT)

Now switch to the second page by pressing the NEXT PAGE button.

Now review the second status:

- The Aircraft MODEL name
- Aircraft VARIANT
- Maximum Take-off Weight (MTOW)
- ENGINES type name/number
- The PERF DATA BASE identifier for the performance database installed in the FMS.

Please press PRV PAGE to return to page 1 (or NEXT PAGE again – you'll start with the first page as soon you cycled through all sub-pages.

Then press POS INIT on LSK6R to open the POS INIT page.

3. POS INIT
   On the Position Initialization page the current position of the aircraft is entered into the FMS, so that the FMS knows where the aircraft is located. It comprises:

   1. FMS POS
      The saved aircrafts position in latitude and longitude

   2. AIRPORT
      Available on ground – you can enter an airport (ICAO format) and the FMS provides/displays the known lat/long for the respective airport. This function is used during setting up the position
      Please enter KLAX into the scratchpad and press LSK 2L to copy this entry into this line. The display should read about N33°56.5 W110°24.4
      This line might vary a bit depending on the position and scenery you are using.

   3. PILOT/REF WPT
      This line is used to enter a specific waypoint to read out its position and use during set up of the position.
      This feature is not used with this tutorial.

   4. GATE
      As soon as an airport is available this line lets you enter a specific gate. The gates position is saved in the FMS and may be used during set up of the aircraft's position
      Please enter 45 for gate 45 at terminal 4 in KLAX.

4. SET POS
   As long as no specific position (in latitude / longitude) is provided, this line shows dashes and boxes. Please press LSK 4R to copy the airports position into the scratchpad. Then press LSK 5R to copy this position into the SET POS line.

   The aircrafts position is now saved in the FMS and the FMS now knows that you are located at KLAX.

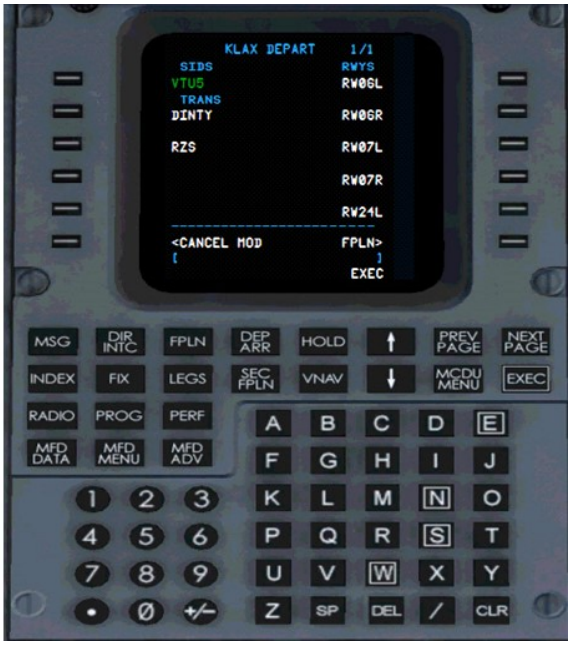
   The second POS INIT page shows the latitude and longitude currently used by the FMS, and either inertial reference system (IRS). These are for review only and not further used in this tutorial.

   Please press LSK6R to open the flight plan (FPLN) page

5. FPLAN

The flight plan (FPLN) page displays the currently active route which you may alter or enter a new route entirely.
To create a route you normally enter four items:
The originating (ORIGIN) airports ICAO identifier (KLAX)
The destination (DEST) airports ICAO identifier (KMRY)
The alternate (ALTN) airports ICAO identifier (KSJC)
The FPLN page may have several pages – the first page always displays the basic information while the route with airways and intersections is displayed / entered from page two on.
Nevertheless it is important to understand that the FPLN page is linked closely to the departure / arrival (DEP/ARR) page as well as the LEGS page and you will need to switch between these pages while setting up the FMS.

To enter the current route, please enter KLAX into the scratchpad and press LSK 1L to copy into the originating airport field.
Please enter KMRY into the scratchpad and press LSK 1R to copy into the arrival airport field.
Now please enter KSJC and press LSK 2R to copy into the alternate airport field.
Now enter 25R into the scratchpad
Press LSK 3R to select 25R as the originating runway.
Please enter 2861 into the scratchpad and then press LSK 5R to copy it into the flight number field.
Afterwards please select the DEP/ARR page to enter the SID

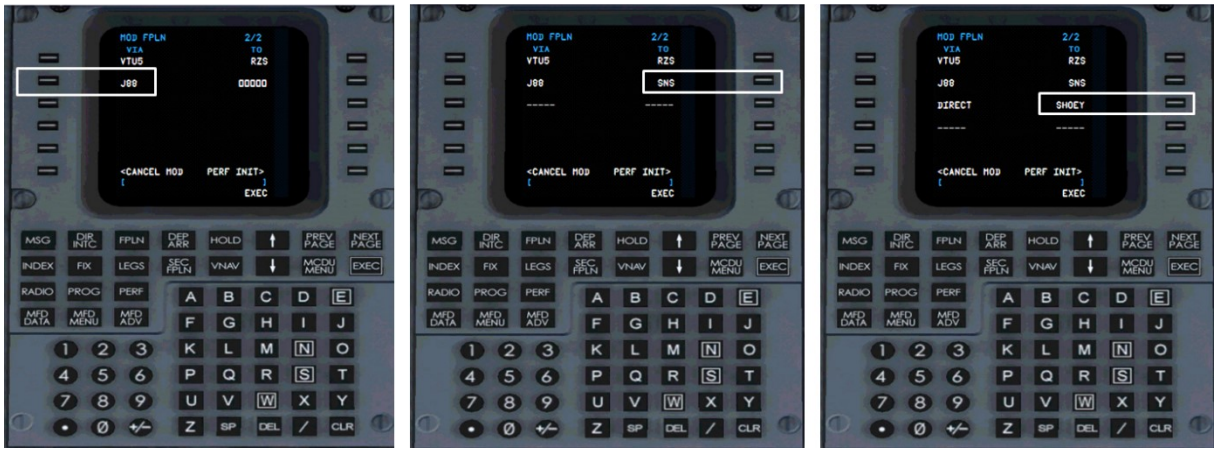


6. DEP / ARR Index Page

Select the DEP/ARR button to open the departure / arrival page.
Now press LSK 1L to open the available departure routes for KLAX.
The runway is already selected so please proceed with selection of the departure route (SID).
The list of available departure routes is already reduced to all SIDs available for runway 25R, nevertheless there are still 3 pages of SIDs available. Please press NEXT PAGE twice to open page 3 of 3 and then press LSK 4L to select VTU5 SID.
Now please select the RZS transition by pressing LSK3L
To finalize entering the SID, press the EXEC button.

As you maybe noticed, the SID contains a segment on which the flight crew receives vectors from ATC. Please open the LEGS page and take a look at the entered SID. You'll find a line (VECT) indicating that the FMS assumes ATC providing vectors to the next waypoint. As we have no ATC and want to experience a trouble-free departure, please press the left LSK next to VTU to copy VTU into the scratchpad and then press the left LSK next to (VECT) to remove the vectors-segment from the flightplan. Even though this is not close to real-ops, it'll spare you trouble later.

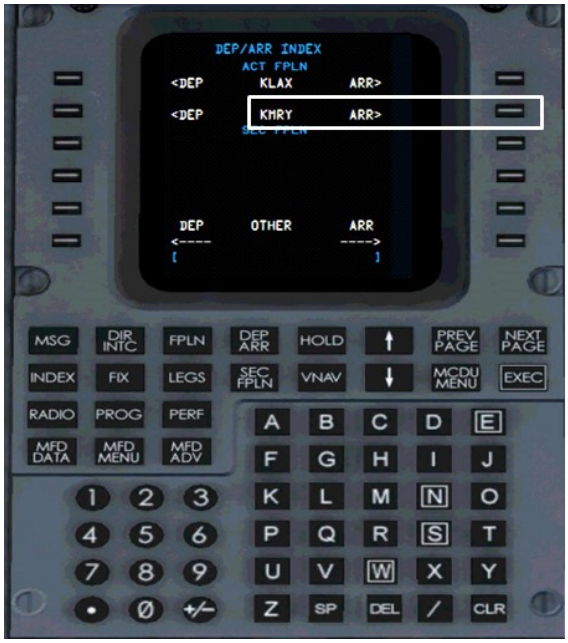
Please return to the FPLN page to enter the route.



7. FPLN page (cont'd)
   The FLTPLN page now shows the entered SID and you may proceed to enter the following route.
   Please go to page two by pressing the NXT PAGE button once.
   Now you see the entered SID ending at RZS VOR.
   Please do remember the route string we used earlier:
   KLAX VTU7 RZS J88 SNS DCT SHOEY KMRY
   Route strings read in a similar manner as you maybe provide route descriptions when travelling by car via interstates / highways. You name the interstate / highway and the intersection where you change interstates. The segment RZS J88 SNS of the route string tells us, that we start to travel on airway J88 at San Marcus RZS VOR and leave J88 at Salinas SNS VOR. You may enter this in a similar way into the FMS by entering J88 into the scratchpad and press LSK 2L to add the airway first (RZS is the SIDs endpoint so already there).
   Then enter SNS and press LSK 2R to tell the FMS where we leave airway J88. The FMS will now automatically add all the waypoints and VORs in between.
   Please bear in mind that you need the same navdata revision though for your CRJs navdata and the tool you are computing the route with.
   Afterwards we head directly to SHOEY waypoint, so please enter SHOEY into the scratchpad and press LSK 3R to copy it into the FMS as a direct route segment from Salinas SNS VOR to SHOEY waypoint.

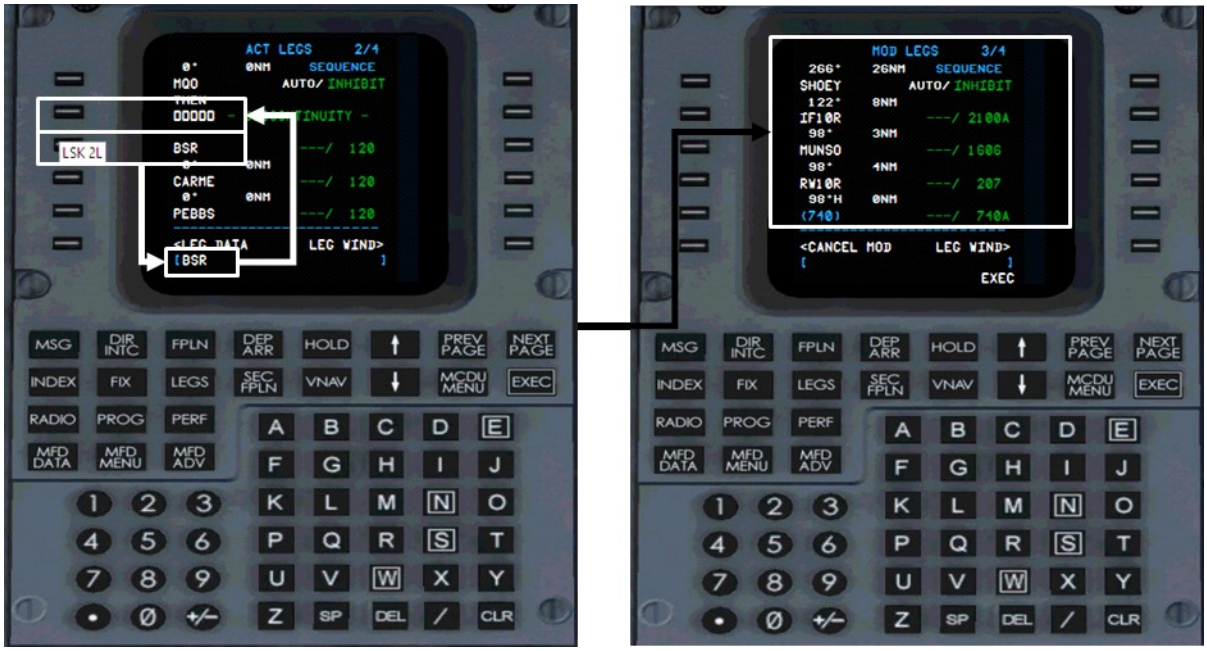
   As this is a very short flight, there is no need for further route entries – the next step would be to select the arrival route (STAR).
   For short flights (nearly all flights with the CRJ) the STAR needs to be entered directly before departure.
   On long-haul flights the weather at the destination might change. Hence the STAR might change during the last few hours of the flight. In case you want to avoid double data entry you may postpone entering the STAR on a long haul flight until you have the latest weather. But bear in mind that this would violate the standard procedures on most companies.

   So please open the DEP/ARR page again to enter the STAR



8. DEP / ARR page
   Press the DEP/ARR function key to open the DEP / ARR page.
   Please select LSK 2R to open the available approach routes in KMRY.
   Please select LSK 1R to select the ILS approach to runway 10R (ILS10R).
   As SHOEY waypoint is already the last waypoint before the final approach fix, there is no need to select a STAR procedure.
   Press EXEC to copy the approach route into the flight plan

   Now please verify the route on the LEGS page.
   Press the LEGS button to open the LEGS page.



9. LEGS page

The entire route spreads normally over several pages on the LEGS page. For flights with the CRJ700 you might expect 3 to 5 pages normally. Of course the number of waypoints during departure routes and approach routes influence the number of pages very much.

Please check that all waypoints from the route planning are also entered in the FMS and the headings and altitude restrictions comply.
Furthermore check if there are any route discontinuities.

One discontinuity should be between the end of the route and the beginning of the STAR.
As deleting it later might get lost during the course of the flight, please delete it now but bear this option in mind for longer flights when the STAR is more likely to change during the flight.
To do so please press the left LSK next to the designator IF10R (LSK 3L in the picture) to copy the waypoint into the scratchpad. Now press the LSK left to the prompts (boxes next to LSK 2L in the picture), then press EXEC.

Please check on the navigation display that the route is drawn without any interruptions.

In case you made a mistake while entering or modifying a flight plan here are three quick ways to fix mistakes.

a) Cancel MOD

As you already most likely noticed, you need to confirm modifications of entered data by pressing the EXEC button. As soon as you start to add or modify a route “CANCEL MOD” appears next to LSK 6L. By pressing LSK 6L you undo all the entries made into the FMS since the last “EXEC”.

Assume you are entering the route for this flight and because you were somewhat distracted you entered PYE VOR instead of SNS VOR as the point to leave airway J88. As long as you haven’t confirmed the entered data by pressing the EXEC button, you can remove all entries by pressing the LSK next to CANCEL MOD which removes all entries made since the last “EXEC”.

b) DELETE entries

In case you realised that a waypoint was entered incorrectly you may want to delete an entry. For example navaids like VORs or NDBs have identifiers which are use more than once worldwide, so you possibly entered the correct identifier but selected the wrong navaid and just realized this after pressing EXEC so “CANCEL MOD” is not an option anymore. Than you may press the “DEL” button on the FMS which will indicate “DELETE” in the scratchpad. Then press the LSK on the left next to the waypoint/navaid you want to remove from your flight plan.

After successful removal, the FMS will indicate a route discontinuity (disco) by prompting empty boxes. Enter a valid waypoint or navaid or copy one from the already existing flight plan to remove the discontinuity.

For instance you already entered MR NDB as a direct after SHOEY waypoint, not realizing it is part of the approach procedure contained in the FMS and also already pressed the EXEC button.

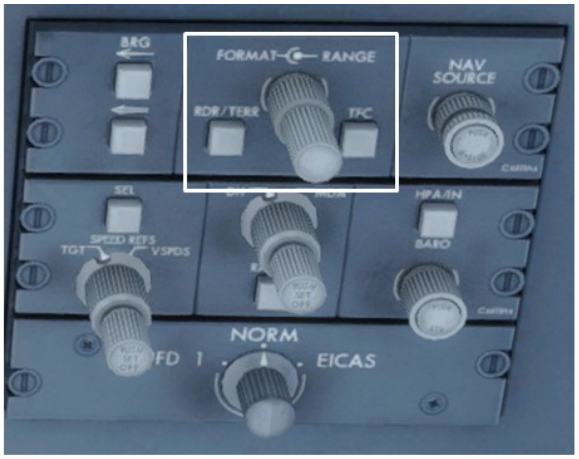
To remove MR again, you press the DEL button at the lower end of the FMS. This prompts DELETE in the scratchpad and then you hit the LSK next to the waypoint you want to remove (in this case LSK4R). This will remove the waypoint and enter a route discontinuity indicated by the boxes.

c) Move entries

Assuming you get a direct clearance from ATC and you want to skip one waypoint (or more waypoints) from your flight plan you may “move” the following waypoint to the position of the waypoint you want to skip. For example we use the already entered MR NDB on our approach into KMRY again. This time you also already entered the approach procedure and you remove MR NDB by moving the first waypoint of the approach procedure to MR NDBs position.

As the first step please copy the first waypoint of the approach procedure (IF10R) into the scratchpad by pressing the adjacent LSK (LSK 4L). Then copy IF10R onto MR NDBs position by pressing the LSK next to MR NDB (LSK 2L). As you can see this removes all waypoints (and also discontinuities) between those two waypoints.

Now back to programming the FMS for this tutorial flight.



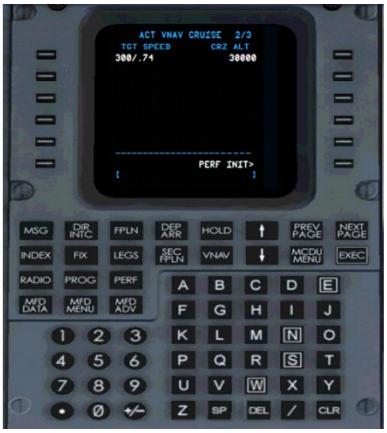
1. Open the FPLN page by pressing the FPLN function key
2. Go to the second page by pressing the NXT PAGE function key – now the flight plan should be visible as shown in the picture above.
3. Proceed to the side panel and switch the MFD to PLAN mode (lower knob).
4. Use the upper knob to cycle through different display ranges and check if the displayed route stays consistent.
5. No faults, no weird turns in your route? Great … Now you are ready to set up the performance page.

6. PERF Menu
   There are several ways available to open the PERF INIT page.
   In case you open the FPLN page LSK 6R lets you open the PERF INIT page or you directly press the PERF button on the FMS.
   Please check and add where necessary so that the PERF page looks like this:

   On page 1 please add the missing information – the CRJ's fuel is displayed on the EICAS as shown in the picture below the table.

Field	LSK	Value
Pass	2L	56
Cargo	3L	2.665
Fuel	4L	5.565
CRZ ALT	1R	30,000
ALTN CRZ ALT	2R	14,000

The next step is to review the following performance pages which contain different performance information.



7. VNAV Profile
   The VNAV pages contain information on the basis / performance calculations and hence which profile you need to follow / fly (remember, there is no VNAV autopilot function and no auto throttle).

6. Radios and Nav aids ..... Set for departure
Pedestal
Please tune the navaids as required to follow the departure route. For this tutorial please use the following frequencies:
Please set NAV 1 to VTU7 VOR, VTU 108,20MHz,
Please set Course 1 to 289
Please set NAV 2 to Santa Monica VOR, SMO 110,80MHz
Please set Course 2 to 154
Further please activate the bearing pointers, so that one bearing pointer points towards VOR1 (VTU VOR) and the other one points towards VOR2 (SMO VOR).

7. take-off briefing ..... Complete
Charts
Please take a look at the departure chart (SID) and review the departure route.
The departure route includes an altitude constraint. We are supposed to cross radial 154 to Santa Monica SMO VOR at 3,000ft or below. Normally we would be guided by radar vectors to Ventura VTU VOR. As we are flying without ATC support during this tutorial please turn towards Ventura VOR after crossing the radial 154 to Santa Monica VOR and as soon as the flaps are fully retracted.

Now the aircraft is prepared to start the engines and get going.

4.1.5 CLEARED TO START CHECK

After receiving the engine start up clearance the engines may now be started. Before actually starting the engines you need to check several items to ensure that the aircraft is properly prepared for engine start.

1. APU / AC ELECTRICS ..... ON / CHECKED

Overhead Panel

Please check that the APU is running, electrical power is supplied by the APU, and the APU also supplies bleed air (see APU start up sequence for details).

2. PAPERS ..... ON BOARD

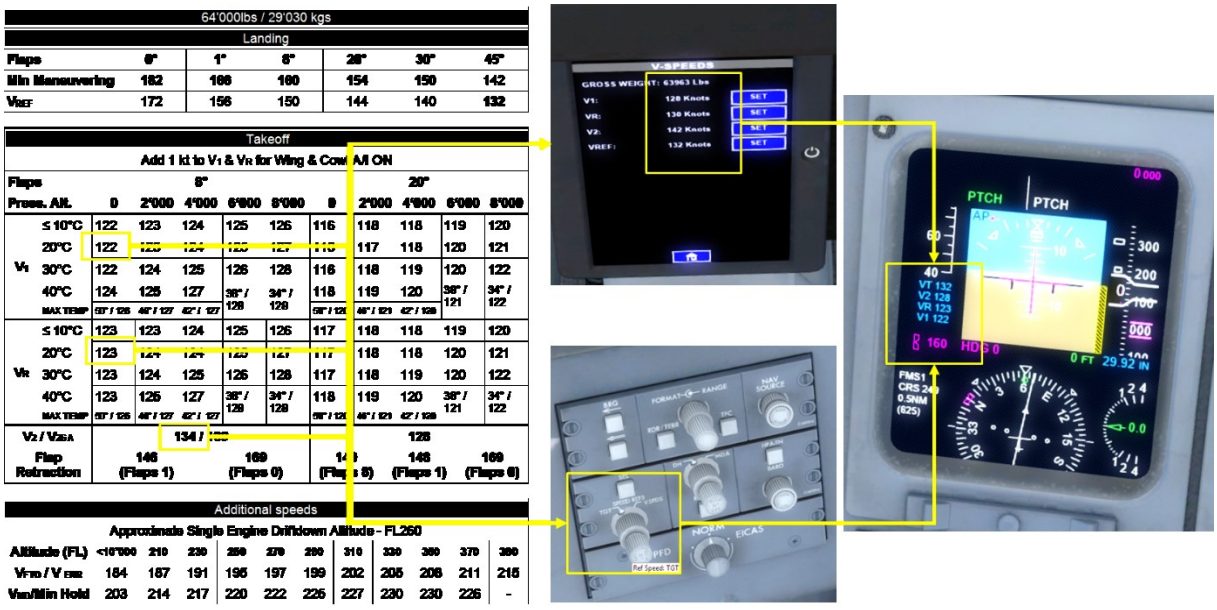
For a real-world flight you would now make sure that the load manifest is on board and all necessary papers are available.

3. TAKE-OFF DATA ..... SET

Glareshield & Side Panel

Please check that the first cleared altitude is dialled in (cruise altitude for this tutorial – thus 30,000ft), the heading bug is set according to the runway's heading (249°), check the nav radios are properly tuned and set the V-speed bugs. You need to check the QRH first to get the V-speeds. First you need the current aircraft's weight. Its zero fuel weight is 58.550 lbs (26.558 kg) and we loaded 5.565 lbs (2.524 kg) of fuel which totals up to 64.115 lbs (29.079 kg). Search for the speed card for a weight as close as possible. In this case we'll take the speed card for 64.000 lbs obviously.

You may adjust the V-speeds manually via the pilot's side panel or with Dave's support as shown in the picture below.



64'000lbs / 29'030 kgs

Landing

Flaps	0°	1°	8°	28°	30°	45°
Min Manoeuvring	182	166	160	154	150	142
V_{REF}	172	156	150	144	140	132

Takeoff

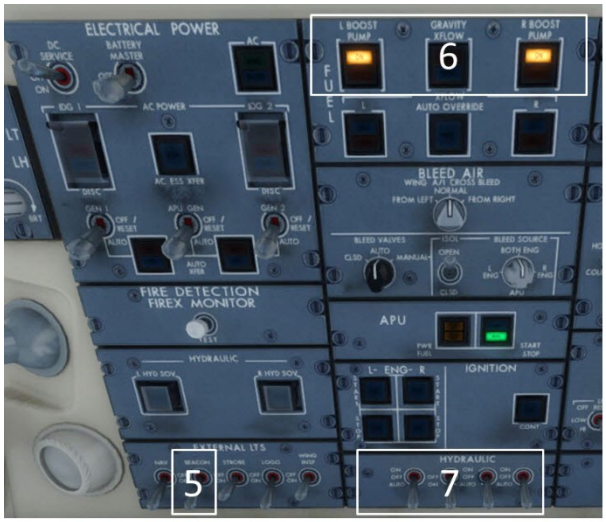
Add 1 kt to V_1 & V_R for Wing & Cowl A/I ON

Flaps		8°				20°				
Press. Alt.		0	2'000	4'000	6'000	8'000	0	2'000	4'000	6'000	8'000
V_1	≤ 10°C	122	123	124	125	126	116	118	118	119	120
	20°C	122	123	124	125	127	116	117	118	120	121
	30°C	122	124	125	126	128	116	118	119	120	122
	40°C	124	125	127	36° / 128	34° / 128	118	119	120	36° / 121	34° / 122
	MAX TEMP	59° / 126	48° / 127	42° / 127			59° / 126	48° / 123	42° / 128		
V_R	≤ 10°C	123	123	124	125	126	117	118	118	119	120
	20°C	123	124	124	125	127	117	118	118	120	121
	30°C	123	124	125	126	128	117	118	119	120	122
	40°C	123	126	127	36° / 128	34° / 128	118	119	120	36° / 121	34° / 122
	MAX TEMP	59° / 126	48° / 127	42° / 127			59° / 126	48° / 123	42° / 128		
V_2 / V_{SEA}			134 /					128			
Flap Retraction		146 (Flaps 1)			169 (Flaps 0)		14 (Flaps 8)	146 (Flaps 1)			169 (Flaps 0)

Additional speeds

Approximate Single Engine Driftdown Altitude - FL260

Altitude (FL)	<16'000	210	230	250	270	290	310	330	350	370	390
V_{FTO} / V_{SRC}	184	187	191	195	197	199	202	205	208	211	215
Vmin/Min Hold	203	214	217	220	222	226	227	230	230	226	-



4. DOORS ..... CLOSED / LOCKED

EICAS

Before starting the engines you also need to check that the doors are closed and the respective messages are extinguished.

5. BEACON..... ON

Overhead Panel

Please switch on the beacon light to inform ground personnel as well that the engines are to be started.

6. FUEL PUMPS AND QUANTITY..... ON (QTY)

Overhead Panel

Switch on the fuel pumps and recheck the proper amount of fuel, fuel distribution, fuel temperature and pressure

7. HYDRAULIC PUMPS..... AUTO / ON

Overhead Panel

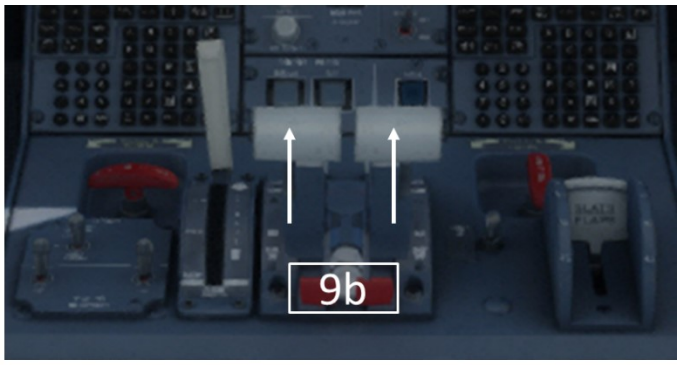
Check that the hydraulic pumps are switched on or set to AUTO respectively.

8. PARKING BRAKE ..... AS REQUIRED

Lower Pedestal

As the engines are normally started during pushback ensure that the parking brake is released. In case you plan to start the engines while the aircraft is not moving ('drive-through' parking position or already positioned on the taxiway), please set the parking brake. Use either the parking brake handle on the lower pedestal, the key assignment in your flight-sim (Ctrl + "." For example) or your joystick button assignment.

NOTE: For a push-back, please check that the parking brake is released and nosewheel steering is turned off. Audio and visual communications with the ground crew must be maintained at all times during push-back



9. ENGINES ..... START
Lower Pedestal & Overhead Panel

START OF ENGINE START SEQUENCE
Select Engine 2 start switch Bleed air is transferred into the engines starting system and it starts to rotate (see N_2), At N_2 ~20% set thrust lever to idle This initiates fuel injection – hence the ITT rises quickly. Monitor that no limitations are exceeded until the engine is stabilized at idle. To do so, press the red lock switches with the left mouse button to unlock and then advance the respective throttle lever to idle.
END OF ENGINE START SEQUENCE

DO NOT START THE OTHER ENGINE YET.
In case this is the first flight of the day please perform the fuel feed check valve test:

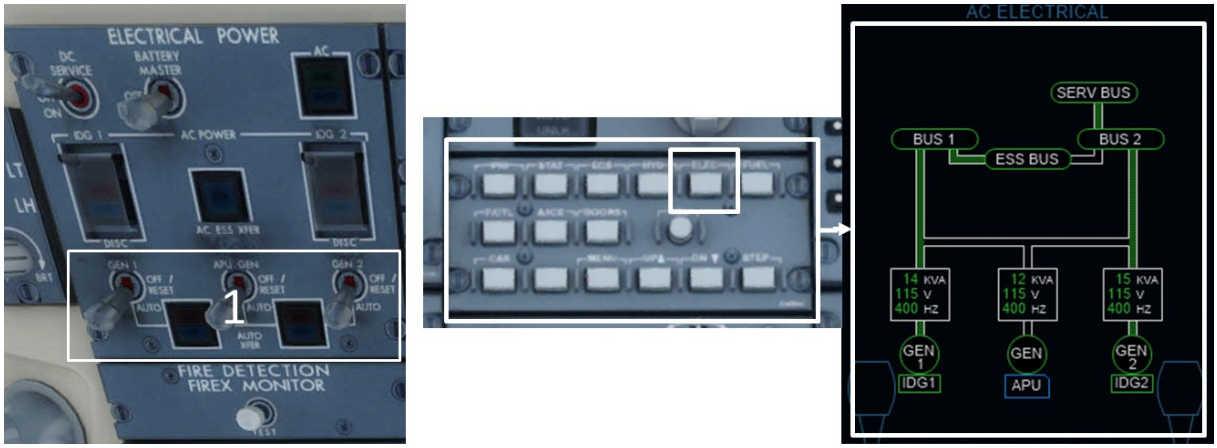
10. FUEL FEED CHECK VALVE TEST ..... COMPLETE
First flight of the day
Overhead Panel & Lower Pedestal

START OF FUEL FEED CHECK VALVE TEST
Open the fuel page on the EICAS Switch OFF fuel pumps on both sides the message “RIGHT FUEL LO PRESS” should appear Switch on the fuel boost pumps again
END OF FUEL FEED CHECK VALVE TEST

Now you may start engine 1. Please keep in mind that now you have to shut down engine 2 first to complete the test procedure! With the engines up and running some more items are to be checked to prepare for taxi and finally take-off. So please do not advance the thrust levers, or start taxiing yet and go through the After Start Checklist.

4.1.6 AFTER START CHECK

Note: Do not accelerate engine until oil pressure is in the normal operating range

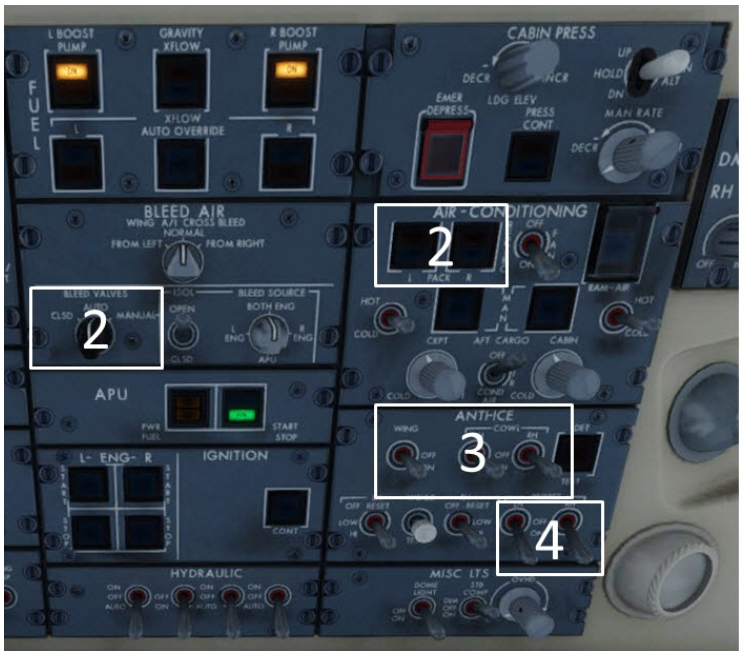


1. GEN 1 AND GEN 2 ..... AUTO

Overhead Panel

Check that electrical power is now provided by both engines and respectively the generators for engine 1 and 2 are set to AUTO. To verify open the ELEC EICAS page by pressing the ELEC button on the EICAS selector panel and check that the engines supply electrical power to the aircraft's busses.

Afterwards switch back to STAT page.



2. BLEED VALVES AND PACKS ..... AUTO / ON

Overhead Panel

Similar to the electrical power, bleed air is now supposed to be provided by the engines. Hence check that the bleed valves are set to AUTO and the packs (air-condition units) are set to ON. Furthermore, confirm the bleed source switch is still set to both engines.

3. ANTI-ICE ..... AS REQUIRED

Overhead Panel

With a temperature of 18°C icing is not to be expected so Anti-Ice may stay turned OFF.

4. PROBES ..... ON

Overhead Panel

Please make sure that the probe (I.e. pitot tubes) heating is ON.

5. ELECTRICS ..... CHECKED

Overhead Panel

Please check that electrical power is now provided by the engines generators.

6. RUDDER ..... CHECKED
Pedestal
Check that rudder trim is set to zero

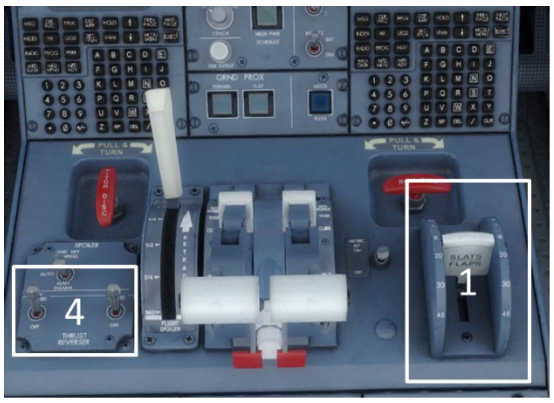
7. N/W STRG ..... ARMED
Pilots side panel
Please reactivate the nosewheel steering in case it was deactivated for pushback.

4.2 READY TO TAXI

4.2.1 TAXI CHECK

Now the final steps are to be prepared before taxiing to the runway.

Note: At airports where runway structural repair or debris is known to exist, use thrust reversers with extreme caution to preclude the possibility of foreign object damage (fod) from occurring



1. FLAPS ..... ___ ° INDICATING

Lower Pedestal

Please set the flaps to 8°

2. FLIGHT CONTROLS..... CHECKED

Main Panel & EICAS

Now check the flight control's functionality by comparing the shown deflection on the F/CTL page of the EICAS and movement of the yoke within its full range.

START OF FLIGHT CONTROLS TEST
Move the yoke fully to the left and then to the right and check that movement is 'undisturbed' and the full deflection of the ailerons is displayed on the EICAS. Move the yoke fully forward and then backward and check that movement is 'undisturbed' and the full deflection of the elevators is displayed on the EICAS.
END OF FLIGHT CONTROLS TEST

3. TRIMS..... GREEN AND ____°

Lower Pedestal

According to the CRJ Manager the elevator trim needs to be set to 6.5.
Please use either the rocker switches you find on the yoke, the standard flightsim key assignments (mostly POS1 and END key) or the buttons you assigned on your joystick / yoke.

4. THRUST REVERSERS ..... ARMED

Upper Pedestal

Make sure that the thrust reversers are armed in case of an aborted take-off.

5. FLIGHT INSTRUMENTS..... CHECKED

Main Panel

Check that no flags are displayed on the flight instruments to indicate failures.

6. FMS ..... AS REQUIRED / AUTOTUNE

Upper pedestal

The FMS offers an autotune function which automatically tunes suitable Nav stations on NAV 1 and NAV 2. In case the FMS develops a failure during departure this might influence the tuned navigation stations. As the CRJ does not simulate non normal procedures you don't need to expect a FMS failure. Anyway previously tuned stations will be lost once set to autotune so please decide for yourself which way you prefer.
In case you don't want to use the autotune function yet, make sure to activate it after passing 10,000ft the latest. In case you want to activate autotune now, please open the FMS "RADIO" page and make sure that next to NAV 1 and NAV 2 (LSK 4L and 4R) "AUTO" is highlighted.

Furthermore check that the NAV Source is set to FMS. Otherwise the autopilot WILL NOT follow the FMS flight plan.

7. BRAKE TEMP ..... Checked

EICAS

Before starting taxiing check that the brake temperature within limits (BRAKE OVHT nor IB or OB BRAKE PRESS message is not indicated on the EICAS) and the pressure is within limits (can be checked on the HYD page – pressure should read between 1800 und 3200PSI). See item 28b of the Originating Checklist for information where to find the Brake Temp indication.

Now the aircraft is ready for taxiing. Please slowly advance the thrust levers but do not exceed a N_1 of 40% (this is usually the maximum setting allowed on airports but recheck the charts to make sure). As soon as the aircraft starts to move please reduce thrust as necessary.

Aim for a taxi speed of 10 to max 15 knots on ground and 5 to max 10 knots during turns. For tight turns reduce to 5 knots. Starting at gate 45 please follow taxiways C10, B, F to runway 25R.

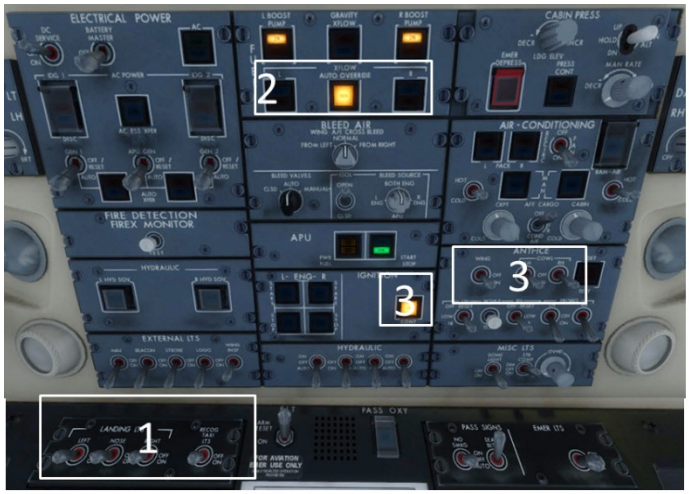
The ground speed is indicated on the Navigation Display.

A N_1 of ~27% should suffice for a taxi speed of approx. 15 knots.

As soon as you reach the holding point, you need to request take-off clearance. After receiving the take-off clearance please perform the 'Before take-off check' to ensure the aircraft is ready for take-off.

4.3 READY FOR TAKE-OFF

4.3.1 BEFORE TAKE-OFF CHECK



1. LIGHTS AND STROBES..... AS REQUIRED
Overhead Panel
Please check that Beacon, Strobe, Logo, Taxi and Landing lights are switched ON.

2. FUEL, XFLOW..... MAN AND OFF
Overhead Panel
Make sure that Crossfeed is switched to Manual and the Crossfeed switches left and right are OFF.

3. IGNITION / ANTI-ICE..... AS REQUIRED
Overhead Panel
As said previously icing conditions are not expected during this tutorial so anti-ice is supposed to be switched OFF.
Nevertheless please do activate the Continuous ignition (and press the CONT ignition pushbutton and make sure the pushbutton's light illuminates).

4. FLIGHT ATTENDANT..... ADVISED
N/A
In a real-world flight you'd now inform the cabin crew to be prepared for take-off.

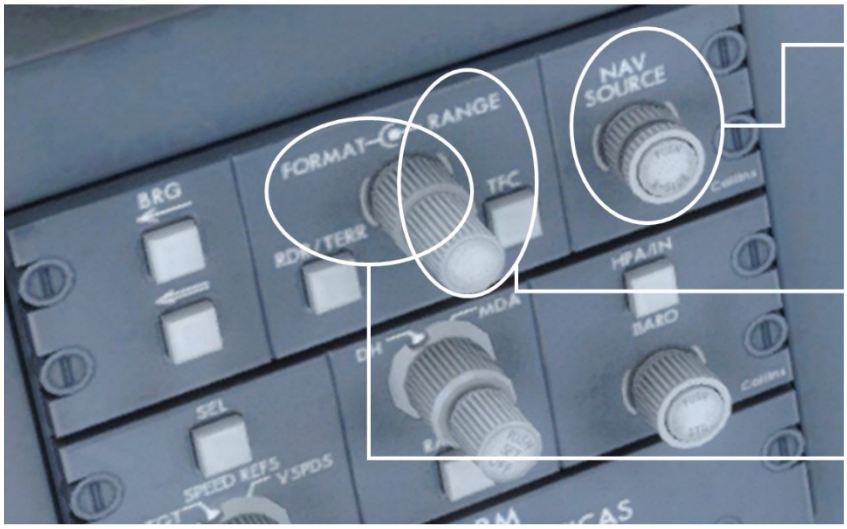
5. TRANSPONDER / TCAS ..... ON / AS REQUIRED
Lower Pedestal
Please activate the transponder no. 1 by turning the ATC selector to "1".

6. RADAR / TERRAIN DISPLAY ..... AS REQUIRED
Side Panel
As terrain is not to be expected to be an issue during departure, only activate the weather radar. Please press the RDR / TERR button on the side panel to activate the weather radar display on the MFD (indicated by the WX description on the top of the page) and activating the radar itself on the lower pedestal by selecting MAP mode. Please keep in mind that the weather radar only works in conjunction with Active Sky Next.

7. CAS..... CHECKED AND CLEARED
Main Panel

Check that the crew advisory system displays no error messages.
All error and caution messages are displayed on the EICAS displays (the two central displays) in red (warning) or amber (caution). Check that none are displayed.

Please do now check / verify that the nav source (pilot side panel) is set to the FMS and the Navigation Display is in Map or Plan mode and hence the programmed route is displayed.



Turn NAV SOURCE until the tool-tip reads FMS1

Turn RANGE knob (upper knob) until the tool-tip reads 25

Turn FORMAT knob (lower knob) until the tool-tip reads MAP

Furthermore, please check that the cruising altitude is dialled in on the altitude selector. Normally you'd first dial in the altitude you were cleared for by ATC but to ease things for this tutorial we are going to neglect this little deviation from real operation.

The CRJs engines are FADEC (full authority digital electronic control) managed. The FADEC computes appropriate N_1 settings depending on Mach number, ambient temperature, and pressure altitude.
Gates assist to select certain modes for which the FADEC computes the appropriate N_1 values. The thrust levers may be locked in five gates (detents):

- Fuel Shut-Off; Shuts off fuel supply to the engines
- Idle; For idle (also flight idle) thrust
- Climb; Continuous climb thrust
- Take-off / Go-around: Take-off or go-around power
- Max Thrust; Either engine is able to provide a power reserve in case of engine failure. Maximum thrust is raised from 13,500 lbs to 14,100 lbs.

Remember that DAVE offers the option to show the detent in the PFD so you do not need to look at the throttles to know where they are.

For take-off slowly advance the throttles to approx. 60% N_1. The engines will take some time to spool up and stabilize at 60%. Make sure that no limits (EGT, vibration) are exceeded and the engines stabilize at 60%.

Afterwards advance the throttle until locked in the take-off / go-around detent. Take-off thrust is computed and selected automatically.

4.3.2 NORMAL TAKE-OFF SEQUENCE AND CALLOUTS

The following graphic shows the sequence of a normal take-off including the respective callouts. PF is the pilot flying and PM is the pilot monitoring (formally PNF, pilot non flying).

We'd like to provide some further information though.

As mentioned before, check that the nav source is set to FMS so that the flight directors and autopilots NAV mode is going to follow the previously programmed route.

First of all, you distinguish between lateral and vertical modes. The vertical modes comprise altitude hold, vertical speed and speed mode. Altitude hold commands the autopilot to hold the current altitude – the autopilot is able to switch from another vertical mode to altitude hold. After describing the other two modes this will make more sense. Vertical speed mode commands the autopilot to hold a predefined/commanded vertical speed (say +2,000 feet per minute). In case the autopilot approaches a pre-selected altitude with activated vertical speed mode, the autopilot will switch from vertical speed mode to altitude hold.
In "SPD mode" the autopilot will adjust the aircraft's pitch to achieve and hold a pre-selected speed. The thrust setting is not taken into account – so the pitch and hence the vertical speed will depend on the commanded speed and selected thrust.

This mode is not to be misunderstood as some sort of auto thrust. The CRJ700 has no auto thrust system and will not adjust thrust to hold a certain speed.

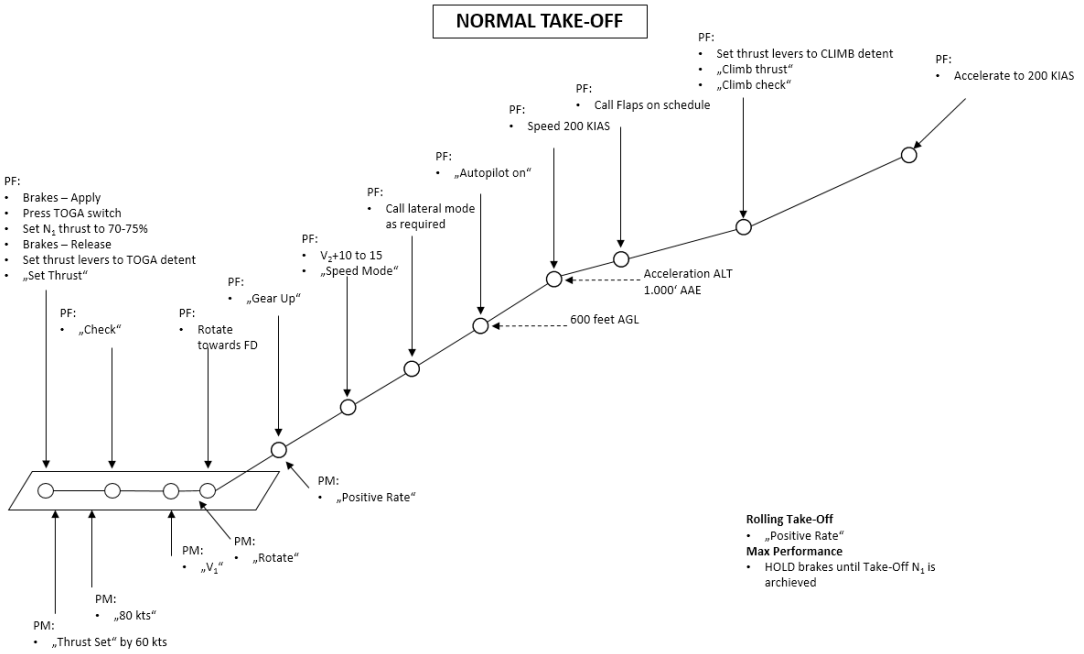
Nevertheless, the SPD mode is rather helpful – especially when working with the already mentioned fixed throttle lever gates / detents. The CRJ700 offers a CLB detent – with the thrust levers moved to the CLB detent the FADEC will automatically compute the respective maximum climb thrust. By activating the SPD mode and selecting the speed settings according to the current flight phase / requirements in conjunction with the thrust levers in the CLB detent you will experience a huge relief in work load.

Now let's take a look at the lateral modes. These are basically NAV and HDG mode (there are some more modes but these are not important for the moment). The HDG mode makes the autopilot follow a commanded heading. The heading is displayed in the HDG window and also displayed as a bug on the navigation display / HSI. The NAV mode on the other hand will either follow a radial to or from a VOR or follow a programmed route. The autopilot distinguishes the source depending on the setting of the navigation source selector of the side panel. That is why it is very important to reassure that the NAV selector is set to FMS as the source to make the autopilot follow the programmed route.

As a last step we'd like to explain the difference between the flight director and the autopilot. The flight director basically tells – dependant on the selected modes – where to fly the aircraft to follow the selected modes. Assuming you selected NAV (nav source = FMS) and SPD mode (220 kts) the flight director will direct the flight path which needs to be flown to follow the programmed route flying at 220 kts. Nothing is happening on its own yet. This is the autopilot's job. It will basically command the needed deflections of the flight controls to follow the commanded flight path. The flight director will show where to go and the autopilot will make the aircraft go there ☺

It makes sense to first activate the flight director and make sure that the commanded flight path makes sense and the deviation to the current aircraft's attitude is as small as possible. Otherwise you might experience very abrupt changes due to autopilot commands.

Back to the tutorial flight.



After lift-off make sure that the aircraft is in a stable climb and it doesn't accelerate too fast. Ideally the aircraft climbs steady with 144 kts (V_2 + 10 kts). Then activate the SPD mode – do not activate the autopilot yet – and try to follow the vertical commands of the flight director. Afterwards activate NAV mode – please still do not activate the autopilot yet and try to follow the flight director's lateral commands as well. When the flight director is centered you may now activate the autopilot. Ideally you'd be passing 600 ft above ground now – practically you are most likely at a higher altitude.

As soon as the aircraft is stabilized in climb at 144 kts, please retract the flaps to 1°. Assure that the vertical speed drops as little as possible without slowing down either. When the aircraft accelerates again and passes 169 kts fully retract the flaps. Then speed up to 200 kts by dialing in 200 kts in the speed window. As soon as the flaps are retracted speed up to 250 kts. Try not to chase speeds – in case you are off by a few knots, don't care. Following the correct sequence of steps is more important – over time you'll get faster and more precise.

The aircraft is now flown by the autopilot and in a so-called clean configuration (no flaps, no gear extended). Now it is time to go through the climb checklist.

4.3.3 CLIMB CHECK

1. FUEL, XLFOW ..... AUTO
Overhead Panel
Set the crossfeed valve to AUTO (lights out)

2. BLEEDS AND APU ..... SET
Overhead Panel
The APU is supposed to be shut off and APU bleed disconnected.

3. LIGHTS AND PASS SIGNS ..... AS REQUIRED
Overhead Panel
Switch off the taxi-light, when climbing through 10,000ft you may switch off the seatbelt signs. Depending on the airline the no smoking signs stay illuminated throughout the entire flight.

4. THRUST REVERSERS ..... OFF

Upper Pedestal

The thrust reverser arm switches are set to OFF again.

5. CAS ..... CHECKED AND CLEARED

Main Panel

Check the CAS for any advisories or error messages – normally none should be indicated. In case you didn't activate the FMS radio autotune function activate it now by opening the RADIO page of the FMS and pressing LSK and LSK respectively to activate autotuning for NAV 1 and 2.

As soon as the CRJ700 passes 10,000ft please speed up to 290 knots by dialling in 290 knots on the glare shield / autopilot control panel. The autopilot is still in SPD mode and will slow climb until 290 knots are held and then increase climb rate again.

When you are passing transition altitude (18,000ft in the US, much lower in Europe) the altimeter is to be set to 29.92 in. HG / 1013 hPa respectively. Please press the baro button to set to standard pressure.

Turn the knob to adjust altimeter baro setting. Press it to set standard pressure (29,92 in Hg / 1013 mbar)

The CRJ climbs rather fast in the beginning but after passing around 25,000ft you'll notice that climb speeds slow down.

Maintain 290 knots until passing Mach 0.74. Then please adjust speed to hold Mach 0.74 until reaching cruising altitude by switching to Mach hold. Pressing the Speed knob on the autopilot panel, switches between IAS and Mach hold mode. Check if you need to adjust the selected Mach speed.

The altitude at which 290 knots equals Mach 0.74 depends on several different aspects – given the pre-defined weather settings 290 knots equal Mach 0.74 at approximately 28,500ft.

4.4 ENROUTE

A little while after passing Ventura VTU VOR, roughly 20 miles out San Marco RZS VOR you are supposed to reach the cruising altitude. There is no cruise checklist and cruise flight is supposed to be rather uneventful. As the CRJ700 is not equipped with an auto throttle you need to keep an eye on your cruise speed of Mach 0.74.

During climb we already switched from Speed mode to Mach hold and were climbing with Mach 0.74 so there is no need to speed up after level-off. As soon as the cruising altitude is captured, reduce thrust to cruise setting.

Continuously check the power setting and cruise speed – at 30,000ft the CRJ700 normally cruises at Mach 0.74. Depending on several things like weight, wind, pressure, temperature the needed power setting may vary slightly. Aim for approx. 79% N_1 for a cruise speed of Mach 0.74 (approx. 280 knots).

Bear in mind that with wind changes or after turns on a different leg a slight power adjustment may be necessary. Furthermore, keep an eye on fuel consumption and remaining fuel.

As soon as the CRJ is established in cruise flight you already need to prepare the descent into Monterey.

Just a quick note on estimating the top of descent (the point along your route when you actually want to start the descent). Currently there are two options available: check the Quick Reference Handbook, QRH, for the descent chart and derive the needed distance in reference to your current gross-weight and cruise altitude. In case you don't have the QRH handy, there is a very basic rule of thumb: remove the last three digits of your current altitude (expressed in thousands of feet), multiply the resulting value by three and there is the distance the aircraft covers during descent. Here is an example: cruising altitude is 30,000 feet. Step one, remove last three digits 30,~~000~~ → 30. Step 2: multiply by three: 30 x 3 = 90 miles.

During descent please follow the standard profile: M0.74 / 290 kts / 250 kts. Start your descent in SPD mode with M0.74 until you pass 290 kts then switch to 290 kts (SPD mode stays active) and after passing 10,000ft descend with 250 kts. The autopilot will adjust the descent rate automatically – in case you need to adjust use the throttle or even spoiler.

You'll start the descent when you are 25 miles out ROBIE waypoint. We aim to reach Salinas SNS VOR (117.30 MHz) at 8,200ft altitude with 190 kts and flaps 8.

Reset the altitude to 10,000ft (even though we will descend to 8,200, setting the altitude to 10,000ft prevents you from exceeding 250 knots below 10,000 ft), set the IAS selector to 290 knots and slowly pull back the throttles to approximately 65% N_1.

Be careful with flights at higher altitudes and start descending in Mach mode (0.74) first. Now monitor the descent rate and adjust with the throttle – by applying thrust you reduce your descent rate and by reducing thrust you increase your descent rate. The CRJ's wing area isn't that big compared to other aircraft so expect the CRJ to descend fast when applying little thrust.

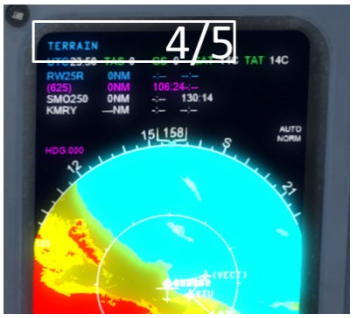
When you are descending through 25,000ft tune COM1 to 119,250 MHz to check Monterey's ATIS. In case you are using the predefined weather this step is not that important but otherwise you need some information provided by the ATIS to determine your landing runway and the local atmospheric pressure to adjust your altimeter when you are descending through transition altitude (18,000ft in the US).

Always monitor your altitude and the remaining distance to adjust your thrust setting and hence the descent rate. When you are descending through 20.000ft reduce thrust to approx. 50% N_1.

As soon as the CRJ is established in descent, proceed with the descent checklist. This checklist needs to be completed before descending through 18,000ft.

4.5 PRIOR TO LANDING

4.5.1 DESCENT CHECK



1. LDG ELEV ..... SET

Overhead Panel

Dial in the landing field elevation (260 ft). This enables the cabin pressurization system to minimize the pressure difference after landing

2. FUEL ..... CHECKED

Overhead Panel

Check that the fuel pumps are switched on, crossfeed is switched off (for this tutorial flight – otherwise as appropriate) and sufficient fuel is left

3. TCAS ..... AS REQUIRED

Lower Pedestal

Check that the squawk is set correctly and TCAS is set to down.

4. RADAR ..... AS REQUIRED

side panel

Check that the weather radar is switched off by turning the mode selector on the pedestal to OFF. You may only choose whether you want to display the weather radar OR the terrain data.

5. TERRAIN DISPLAY ..... AS REQUIRED

side panel

The terrain – especially during go-around– in KMRY is mountainous so please activate the terrain display by pressing the RDR / TERR button once. The MFD will display TERRAIN on top of the display as soon as the terrain display is activated. Please keep in mind that the terrain display is not an active radar but terrain information extracted from the GPWS database.

6. CAS ..... CHECKED AND CLEARED

Main Panel

Check the EICAS for any advisories or error messages

7. LANDING DATA ..... SET

Lower Pedestal & Side Panel

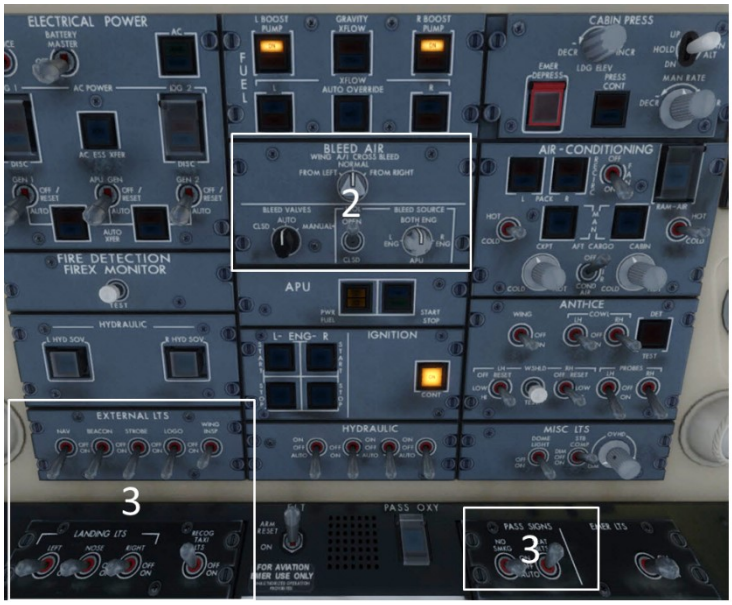
Please tune NAV1 to the Localizer frequency I-MTB (110,70 MHz) and the course to 098°. Please preset Salinas SNS VOR (117,30 MHz) in case of a go-around.
Please tune NAV2 to Salinas SNS VOR (117,30 MHz).
Please tune the ADF to Munro MR DB (385.0 KHz)
Please set the decision height knob to Decision Height, DHand tune to 480'.
Adjust the heading bug to 278°.

8. APPROACH BRIEFING ..... COMPLETE

Approach charts

Normally you'd go through the approach briefing with your copilot now to review the flight route, constraints and missed approach procedure. Most likely you won't have a copilot but anyway it makes sense to review those items. When passing transition altitude (18,000ft) please proceed with the approach checklist and have it completed before reaching 10,000ft.

4.5.2 APPROACH CHECK



1. ALTIMETERS..... ___ . ___ SET

Main Panel

Now adjust the altimeters to the arrival airports altimeter setting (29.89 in Hg / 1012.18 hPa).

2. APU AND BLEEDS ..... SET

Overhead Panel

Check that bleed air is provided by the engines and the APU is off

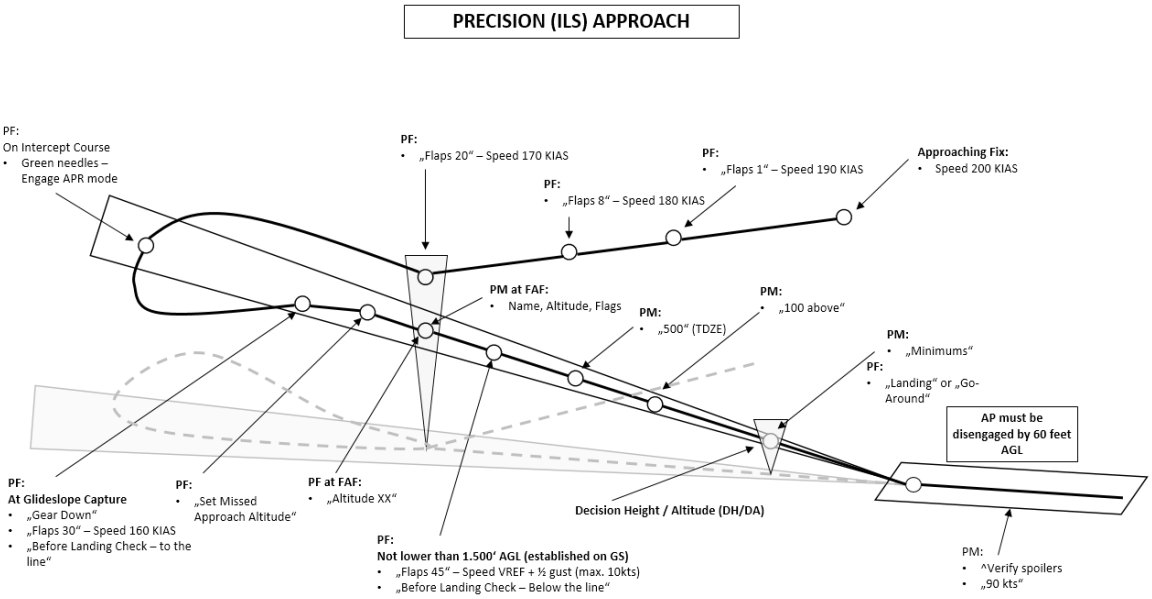
3. LIGHTS AND PASS SIGNS ..... AS REQUIRED

Overhead Panel

Check that the landing lights, no smoking signs, seatbelt signs and logo lights are switched on.

As soon as you are approaching 10,000ft the autopilot will switch to altitude capture mode (indicated by flashing ALTS on the PFD). Now you can safely readjust the altitude as the altitude to be captured is already saved in the autopilot and any adjustments to the altitude selector are ignored. Please dial in 8,200ft, readjust the speed setting to 250 knots and reduce thrust to idle (the FADEC will automatically regulate N_1 so that a minimum N_1 is maintained and oil pressure keeps stable).

As soon as the CRJ is about to pass through 250 knots, activate the speed mode again and proceed descending to 8,200ft. Prepare for the approach and landing and review the approach charts and following description on the sequence of events. The following graphic shows the usual sequence of events during an ILS approach. Please take your time (and pause the flight simulator) to review the graphic and read the following explanations, as well as taking your time to go through the checklists at each segment. In case you feel more confident handling the CRJ you may of course not make use of the pause function – we'd recommend it for the first flight though.



Please press pause now to take your time and read the approach description as a lot of things need to be taken care of during the approach.

As mentioned earlier, we aim to pass Salinas SNS VOR at 8,200ft with 190 knots and flaps 8. So please aim to reach 8,200ft approx. 5-10 miles before reaching Salinas SNS VOR. As soon as the CRJ captured altitude do not touch the throttles and let the aircraft slow down. When passing 210 knots extend the flaps to 1 and let the aircraft slow down further. When the CRJ approaches 190 knots extend flaps to 8 and increase thrust to approx. 70% N1 to maintain 190 knots.

After passing Salinas SNS VOR and when established on your way to SHOEY waypoint, please dial in 2,500ft. Then activate SPD mode again and reduce throttle to idle thrust to descend with 190 kts. On your way you will pass north of KMRY – so take a look out your left window to familiarize with the airport and surrounding.

The CRJ should capture 2,500ft before reaching SHOEY waypoint (approximately over the coast). Let it slow down to 170 knots and extend the flaps to 20. As the turn to intercept the ILS will be very sharp please press the HDG mode button to synchronize the heading bug with the current heading (approx. 267°). Furthermore, dial in an altitude of 1,700ft and make sure the bearing pointers are set to I-MRY ILS and MR NDB. Roughly 1,5 miles before reaching SHOEY waypoint select heading 110° - the CRJ Is going into a steep left turn so monitor the speed closely and apply thrust of necessary to prevent a stall.

As soon as the CRJ is established after the turn, select VS (vertical speed) mode and use the thumb dial to dial in a sink rate of 1,000 feet per minute (fpm – indicated as “-1,000”) and reduce thrust to idle. As the CRJ captures 1,700ft extend the flaps to 30 and the gear. Please establish a speed of 150 kts, arm the APP (approach) mode and go through the Before Landing Checklist.

4.5.3 BEFORE LANDING CHECK

1. FLIGHT ATTENDANT..... ADVISED
N/A
Please advise your flight crew, to take their seats ;-)

2. PASS SIGNS..... ON
Overhead Panel
Make sure the passenger signs are switched ON.

3. THRUST REVERSERS ..... ARMED
Upper Pedestal
Make sure that the thrust reversers are ARMED and the respective switches set to ARMED.

4. LDG GEAR..... DN / DOWN
Main Panel
Check that the gear lever is down and three greens are indicated. Now please check that the missed approach altitude (5,000ft) is dialled in. When passing Munso MR NDB, please check your altitude – it should read 1,600ft. Extend the flaps to 45° (full flaps) and reduce speed to V_{REF} = 125 KIAS.

To determine V_{REF} you need to take a look at the speed cards in the QRH again. As you need the actual aircraft weight you need the zero fuel weight and current fuel load.
ZFW = 58.550 lbs
Fuel ~ 3.400 lbs
Hence the current aircraft's weight is approximately 61.950 lbs.

Before landing you want to finalize the Before Landing Checklist by checking the remaining item:

5. FLAPS ..... ___ ° INDICATING
Lower Pedestal
Check that the flaps are extended to 45°

Unfortunately, the ILS signal gets unreliable closer than 1,8 miles to I-MRY ILS, so please deactivate the autopilot as soon as you feel comfortable, or the autopilot has established the CRJ on the ILS and V_{Ref} is captured.

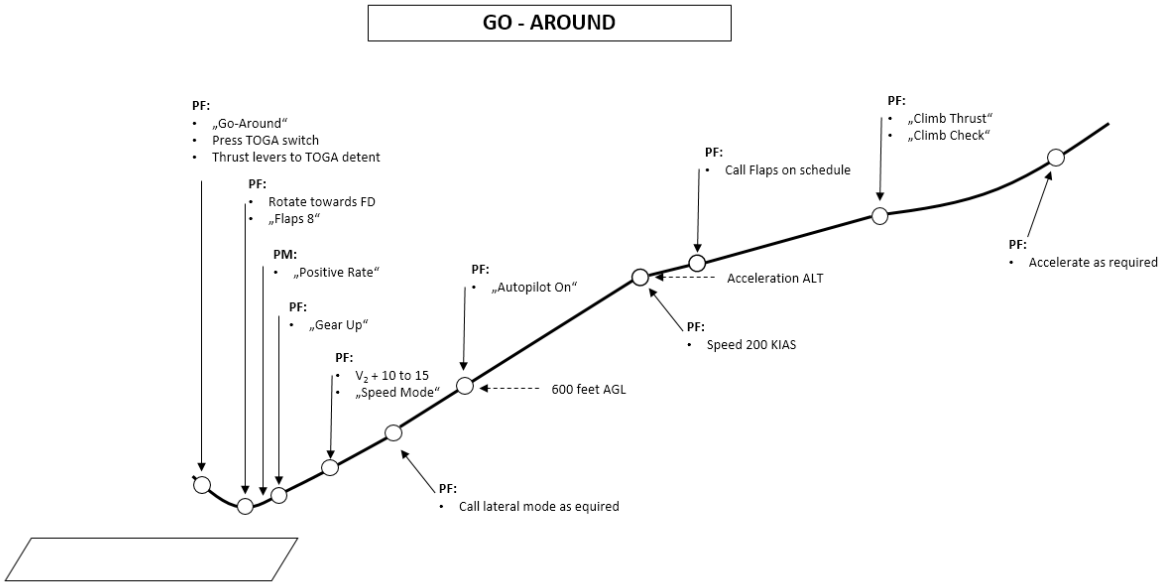
At 480 ft above ground you need to have the runway in sight. Otherwise a go-around is necessary, which is not supposed to happen for this tutorial flight.

Just a quick comment on landing attitude of the CRJ – the CRJ normally has a slightly positive or even occasionally neutral pitch attitude during landing. Hence it is important to increase pitch during flare to prevent landing on the nose wheel.
When the 50ft-call of the GPWS is sounded prepare to pull back the yoke a bit – at 20' above the runway actually perform the 'break' and pull back the yoke to increase pitch and assure landing on the main wheels.

Nevertheless, in case a go-around should be necessary the following chapter describes the procedure.

4.5.5 GO-AROUND PROCEDURE

As you can deduct from the sections headline there is no go-around checklist, instead it is a sequence of work steps, which are illustrated in the following graphic as well:



1. RADIOS AND NAV AIDS ..... SET FOR GO AROUND
Lower Pedestal
First of all check that all navigation radios are set according the needs for your go-around-procedure. For a go-around on runway 10R you need Salinas (SNS) VOR and you need to fly towards Salinas SNS VOR. So please dial in SNS VOR (117,30 MHz) on Nav1 and make sure that the BRG pointer points towards SNS VOR.

Caution: A go-around manoeuvre should not be attempted after the thrust reverser have been deployed

NOTE: The minimum fuel quantity for go-around is 272 kg (600 lbs) per wing (with the airplane level) and assuming a maximum airplane climb attitude of 10° nose up

The normal condition when starting go-around is:
Gear – down, Flaps 45°

1. THRUST LEVERS / TOGA SWITCH ..... ADVANCE TO TOGA / PRESS
Advance thrust levers to the TOGA detent, simultaneously press TOGA switch

2. AIRPLANE ..... ROTATE
smoothly towards the flight director command bar. This means to increase pitch so the aircraft starts to climb. But you need to keep an eye on airspeed to prevent a stall.

3. FLAPS 8
Please retract flaps to 8°

4. PITCH ATTITUDE ..... ADJUST
to achieve an airspeed of V_{2GA}+10 or higher as flaps are retracted to 8°

When a positive rate of climb is achieved:

5. LANDING GEAR ..... RETRACT / UP
As soon as you notice a positive rate of climb retract the gear as well.

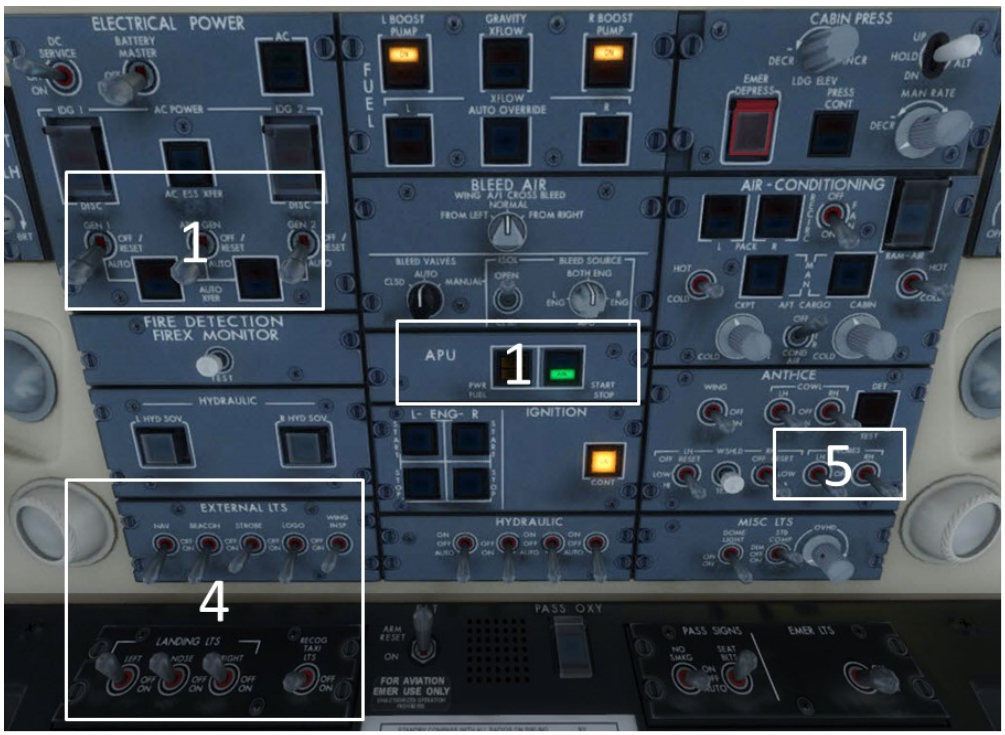
6. AIRSPEED ..... MAINTAIN
V_{2GA}+10 or higher
As said previously you need to watch airspeed – similar to climb out after take-off you aim for a certain speed (in this case go-around-speed plus 10 kts or higher) and adjust pitch to hold that speed.

7. NORMAL CLIMB OUT PROCEDURES ..... ACCOMPLISH
Now you are back in the regular sequence of events of a climb

4.6 AFTER LANDING

As soon as the reversers are stowed and you vacated the runway, take your time, stop the aircraft, apply parking brakes and then go through the after landing checklist.

4.6.1 AFTER LANDING CHECK



1. APU ..... AS REQUIRED

Overhead Panel

Start the APU to have a source for electrical power and bleed air available upon switching off the engines. APU Start Sequence is described on the following page.

APU START SEQUENCE
(a). APU, PWR Fuel switch.....ON *Overhead Panel* Check that the APU SOV (Shutoff Valve) OPEN message appears on the EICAS. Afterwards the APU IN BITE message is appears momentarily. Now the APU RPM and EGT appear on the EICAS, followed by the APU DOOR status message. The APU IN BITE message disappears now. **(b). APU, START/STOP Switch .....Start** *Overhead Panel* Press the APU, START/STOP button to initiate the start sequence. This will be followed by a APU START message on the EICAS, then the APU spools up. Before reaching 60% the START light and APU START message disappear. Roughly 2 seconds after reaching 99% the AVAIL light will illuminate indicating the power and bleed air is now available through the APU. **(c). DC and AC electrical power .....Check** *Overhead Panel* Check that the APU Gen switch is set to AUTO and AUTO Transfer lights are extinguished. BLEED SOURCE switch.....As required *Overhead* Please set to APU so that bleed air is supplied by the APU **(e). BLEED VALVES switch .....As required** *Overhead Panel* Set to AUTO.....
END OF APU START SEQUENCE

2. TRANSPONDER / RADAR .....STBY / OFF
Lower Pedestal
Switch off the terrain display and set the transponder to stdby.

3. FLAPS .....UP
Lower Pedestal
Set the flap lever to UP to retract the flaps.

4. LIGHTS AND STROBES.....AS REQUIRED
Overhead Panel
Switch Off the strobes and landing lights and switch on the taxi lights

5. PROBES .....OFF
Overhead Panel
Switch off the probe heat.

Now you can request taxi clearance, and taxi to a free parking position via taxiways L and A.

As soon as you arrived at the parking position, set the parking brake and proceed through the shutdown check to shut off the engines and prepare the aircraft for disembarking.

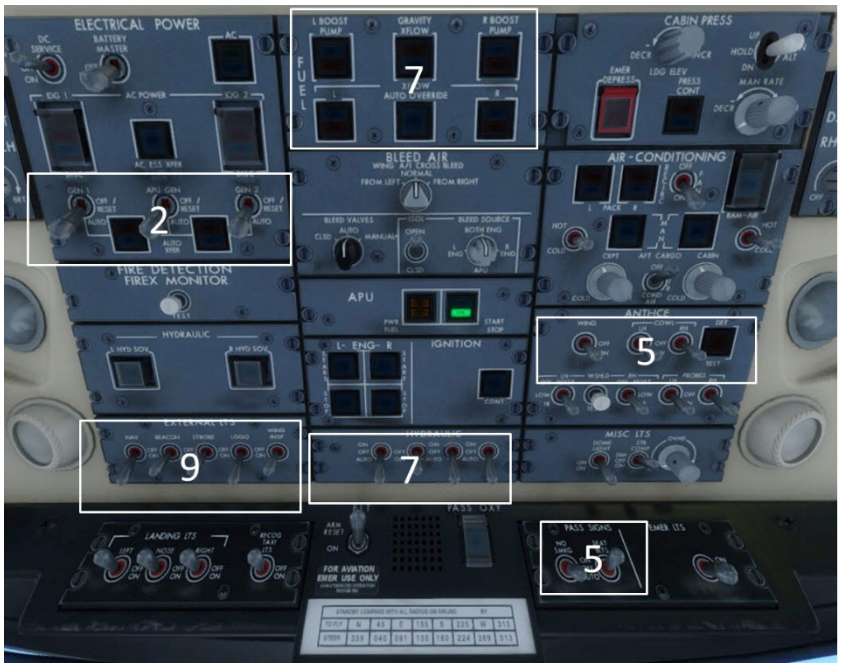
Dave will help, setting the chocks as well as opening the doors.

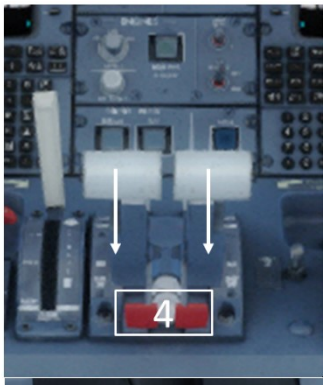
4.6.2 SHUTDOWN CHECK

Note: Thrust reversers must be stowed prior to engine shutdown

Caution: Inform ground crew of 'hot' brakes condition as soon as possible

As soon as you have arrived at the gate and the aircraft is parked at the final parking position you may work through the shutdown checklist.





1. CHOCKS AND BRAKES..... AS REQUIRED
FMS
Set the parking brake and then activate the chocks through Dave. As soon as the chocks are set, deactivate the parking brake.

2. ELECTRICS..... SET
Overhead Panel
Make sure that the APU is running and the APU generator is activated.
Otherwise make sure that external power is connected.

3. FUEL AND CHECK VALVE TEST..... COMPLETE
Overhead Panel & EICAS
Complete fuel check valve Test for engine 1 – see chapter ” during preparation.

4. THRUST LEVERS..... SHUT OFF
Lower Pedestals
Set the thrust levers to the shut off detent – use the right mouse button to unlock the lock switches and then shut off the engines by moving the throttle lever to the shut off position.

5. SEAT BELTS ..... OFF
Overhead Panel
As soon as the N_2 is below 20% you may switch off the seatbelt sign.

6. ANTI ICE ..... OFF
Overhead Panel
Make sure that all anti ice switches are set to OFF.

7. FUEL PUMPS..... OFF
Overhead Panel
Switch off the fuel pumps.

8. HYDRAULIC 3A PUMP..... AS REQUIRED
Overhead Panel

Please switch it OFF.

9. BEACON..... OFF
Overhead Panel
Now you can also switch off the beacon light

10. N/W STRG switch ..... OFF
Pilots side panel
As the nosewheel steering is not needed anymore, you can switch it off now.

As soon as all passengers disembarked, you may power off the aircraft.

TERMINATING CHECK

Apart from the previous checklists I won't add explanations per checklist item in this checklist as basically everything is switched OFF to shut down the aircraft.

1. Chocks and Brakes..... In / OFF
N/A

2. IRS ..... OFF
Pedestal

3. Thrust levers ..... OFF
Lower Pedestal

4. EMER LTS SWITCH ..... OFF
Overhead Panel

5. WSHLD SWITCH..... OFF
Overhead Panel

6. AFT CARGO SWITCH ..... OFF
Overhead Panel

7. HYDRAULIC PUMPS..... OFF
Overhead Panel

8. EXTERNAL LTS SWITCHES..... OFF
Overhead Panel

9. APU START / STOP..... OFF
Overhead Panel

10. APU PWR FUEL..... OFF
Overhead Panel

11. DC SERVICE SWITCH ..... OFF
Overhead Panel

12. BATTERY MASTER SWITCH ..... OFF
Overhead Panel

13. DOME LIGHT SWITCH ..... OFF
Overhead Panel

14. BOARDING LIGHTS ..... OFF
Overhead Panel

Congratulations – you just finished your first flight with the CRJ.

5 APPENDIX

5.1 TAKE-OFF AND LANDING DATA CARD

CRJ 700 TAKE-OFF AND LANDING DATA CARD

WEIGHT AND BALANCE

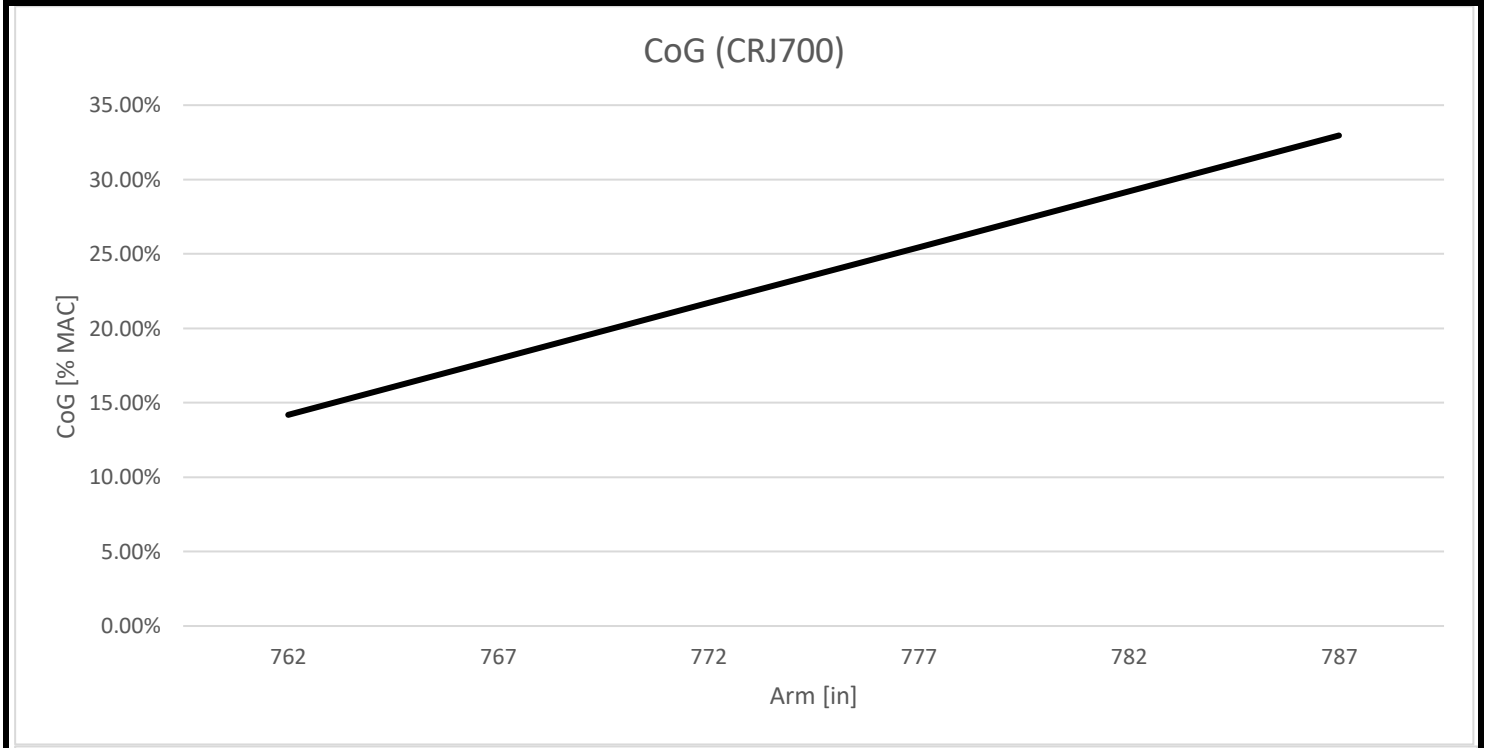
PAYLOAD

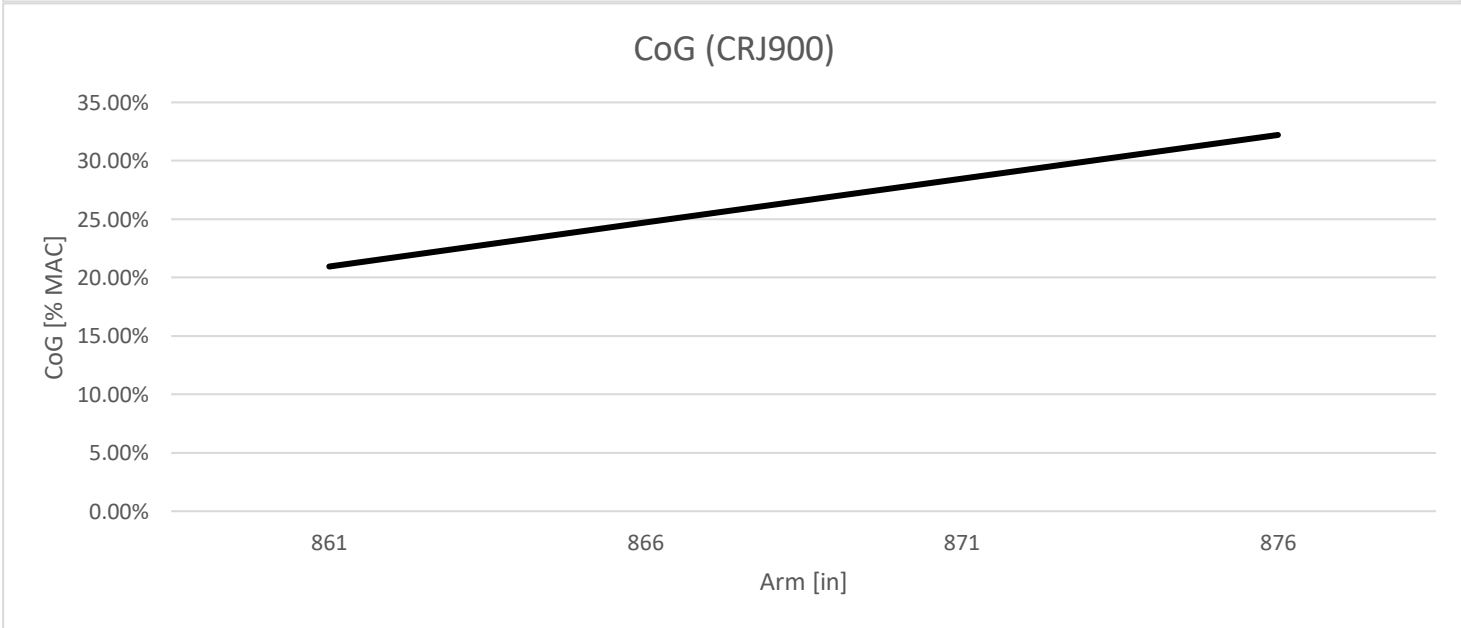
Maximum CRJ700ER: 8‘190kg / 18‘055lbs **Maximum CRJ900ER:** 9‘907kg / 21‘840lbs

Description	Maximum Weight		Pax count		Arm		Weight	Moment
	[kg]	[lbs]	Max	Act	[in]	[ft]	[kg or lbs]	
Dry Operation Weight	20.290	44.731			789,6	65,80	44.731	3.571.428
Pilots	95ea	209ea	2		255	21,25	419	8.901
Forward Flight Attendant	75ea	165ea	1		312	26,00	165	4.299
Aft Flight Attendant	75ea	165ea	1		962	80,17	165	15.350
Passengers Rows 1-3	84ea	185ea	10		439	36,58	1.058	38.705
Passengers Rows 4-6	84ea	185ea	12		530	44,17	1.411	62.319
Passengers Rows 7-9	84ea	185ea	12		623	51,92	1.852	96.150
Passengers Rows 10-12	84ea	185ea	12		716	59,67	1.940	115.753
Passengers Rows 14-16	84ea	185ea	12		819	68,25	2.116	144.417
Passengers Rows 18-20	84ea	185ea	12		912	76,00	2.028	154.128
Forward Cargo compartment	454	1.001			557	46,42	1.001	46.463
Aft Cargo compartment	1.497	3.003			1.049	87,42	1.664	145.461
Zero Fuel Weight (ZFW)	28.259	62.300					58.550	
FUEL								
Fuel Wing tanks (left + right)	6.832	15.062			777	64,75	2.783/2.783	
Fuel Center tank	2.115	4.663			745	62,08	0	
Total	Arm [ft] = Sum moment / Sum weight = 4.130.076 / 64.063 Arm [in] = Arm [ft] * 12 = 64,47 * 12				774	64,47	64.063	4.130.076

TAKE-OFF

Description	Maximum Weight		Passenger count		Arm		Weight	Moment
	[kg]	[lbs]	Max	Actual	[in]	[ft]	[kg or lbs]	
Take-off Weight = Zero Fuel Weight + Est. Fuel at Take-off	34.019	75.000					64.063	4.130.076
Centre of Gravity [% MAC]	= (Sum moment - 743,1 - 90) / 133,185 = (4.130.076 - 743,1 - 90) / 133,185							22,92





TAKE-OFF

Airport	Field Elev.	QNH
KLAX	124	29,89 inHG / 1012,1891 mbar
RWY.	C.G. & Trim	Temp.
25R	22,9 / 6,5	18°C
V_1	V_R	V_2
122	123	134
Flaps 20 → Flaps 8	Flaps 8 → Flaps 1	Flaps 1 → Flaps 0
N/A	144	169

LANDING

3.400	Est. Rem. Fuel
61.950	Landing Weight = Zero Fuel Weight + Est. Rem. Fuel

Max. Landing Weight

CRJ700ER: 30.391kg / 67.000lbs.....**CRJ900ER**: 33.340kg / 73.500lbs

Airport	Field Elev.	QNH
KMRY	254	29,89 inHg / 1012,1891 mbar
RWY.	C.G. & Trim	Temp.
ILS 10R	N/A	18°C

V_{Ref}	$V_{2GA^{\wedge}}$
129	126

Flaps 20 → Flaps 8	Flaps 8 → Flaps 1	Flaps 1 → Flaps 0
138	146	166

5.2 QRH – SPEED CARD TAKE-OFF 64’000 LBS (29’030 KG)

64'000lbs / 29'030 kgs

64'000lbs / 29'030 kgs						
Landing						
Flaps	**0°**	**1°**	**8°**	**20°**	**30°**	**45°**
Min Maneuvering	**182**	**166**	**160**	**154**	**150**	142
V_{REF}	172	156	150	144	140	**132**

Takeoff											
Add 1 kt to V_1 & V_R for Wing & Cowl A/I ON											
Flaps		**8°**					**20°**				
Press. Alt.		**0**	**2'000**	**4'000**	**6'000**	**8'000**	**0**	**2'000**	**4'000**	**6'000**	**8'000**
V_1	≤ 10°C	122	123	124	125	126	116	118	118	119	120
	20°C	122	123	124	125	127	116	117	118	120	121
	30°C	122	124	125	126	128	116	118	119	120	122
	40°C	124	125	127	38° / 128	34° / 128	118	119	120	38° / 121	34° / 122
	MAX TEMP	50° / 126	46° / 127	42° / 127			50° / 120	46° / 121	42° / 120		
V_R	≤ 10°C	123	123	124	125	126	117	118	118	119	120
	20°C	123	124	124	125	127	117	118	118	120	121
	30°C	123	124	125	126	128	117	118	119	120	122
	40°C	123	125	127	38° / 128	34° / 128	118	119	120	38° / 121	34° / 122
	MAX TEMP	50° / 126	46° / 127	42° / 127			50° / 120	46° / 121	42° / 120		
V_2 / V_{2GA}		134 / 139					128				
Flap Retraction		146 (Flaps 1)			169 (Flaps 0)		140 (Flaps 8)		148 (Flaps 1)		169 (Flaps 0)

Additional speeds											
Approximate Single Engine Driftdown Altitude - FL260											
Altitude (FL)	**<10'000**	**210**	**230**	**250**	**270**	**290**	**310**	**330**	**350**	**370**	**390**
V_{FTO} / V_{ENR}	184	187	191	195	197	199	202	205	208	211	215
V_{MD}/Min Hold	203	214	217	220	222	225	227	230	230	226	-

5.3 QRH – TAKE-OFF STAB TRIM CHART – FLAPS 8

Stabilizer Trim Take-Off Setting - Flaps 8

C.G [%MAC]	Trim Setting [Units]								
	22'680kg	**24'267kg**	**25'855kg**	**26'000kg**	**27'259kg**	**28'259kg**	**30'000kg**	**32'000kg**	**34'000kg**
	50'000lbs	**53'500lbs**	**57'000lbs**	**61'300lbs**	**62'300lbs**	**65'000lbs**	**69'000lbs**	**72'000lbs**	**75'000lbs**
14	6,7	7,2	7,7	8,4	8,4	8,6	8,8	8,9	9,1
15	6,6	7,0	7,5	8,2	8,2	8,5	8,6	8,7	8,9
17	6,3	6,7	7,1	7,8	7,8	8,1	8,2	8,3	8,5
19	6,0	6,4	6,8	7,5	7,5	7,7	7,8	8,0	8,1
21	5,7	6,1	6,5	7,1	7,1	7,4	7,5	7,6	7,7
23	5,4	5,8	6,1	6,7	6,7	6,9	7,1	7,2	7,2
25	5,1	5,4	5,8	6,1	6,4	6,6	6,7	6,8	6,8
27	4,8	5,1	5,5	6,0	6,0	6,2	6,3	6,4	6,4
29	4,5	4,8	5,1	5,6	5,6	5,8	5,9	6,0	6,0
31	4,2	4,5	4,8	5,3	5,3	5,4	5,5	5,6	5,6
33	3,9	4,2	4,4	4,9	4,9	5,0	5,1	5,2	5,2
35	3,6	3,9	4,1	4,5	-	-	-	-	-

5.4 QRH – SPEED CARD LANDING 62'000 LBS (28'123 KG)

62,000lbs / 28,123 kgs

62,000lbs / 28,123 kgs						
Landing						
Flaps	**0°**	**1°**	**8°**	**20°**	**30°**	**45°**
Min Maneuvering	179	163	157	151	147	139
V_{REF}	169	153	147	14	137	129

Takeoff										
Add 1 kt to V_1 & V_R for Wing & Cowl A/I ON										
Flaps		8°				20°				
Press. Alt.		**0**	**2000**	**4000**	**6000**	**8000**	**0**	**2000**	**4000**	**6000**	**8000**
V_1	≤ 10°C	120	121	122	123	124	114	115	116	117	118
	20°C	120	121	122	123	124	114	115	116	117	118
	30°C	120	121	123	124	125	114	116	117	118	119
	40°C	122	123	124	38° / 125	34° / 125	116	117	118	38° / 119	34° / 119
	MAX TEMP	50° / 123	46° / 125	42° / 124			50° / 117	46° / 118	42° / 118		
V_R	≤ 10°C	120	121	122	123	124	114	115	116	117	118
	20°C	121	121	122	123	124	115	115	116	117	118
	30°C	121	122	123	124	125	115	116	117	118	119
	40°C	121	123	124	38° / 125	34° / 125	116	117	118	38° / 119	34° / 119
	MAX TEMP	50° / 123	46° / 125	42° / 124			50° / 117	46° / 118	42° / 118		
V_2 / V_{2GA}		133 / 137					126				
Flap Retraction		145 (Flaps 1)			166 (Flaps 0)		138 (Flaps 8)	146 (Flaps 1)		166 (Flaps 0)	