P180E User Guide

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DISCLAIMER:
Milviz and all associates shall NOT be held responsible for any damages arising from the use of the P180E product.

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INTRODUCTION

The P180E is a twin-engine turboprop outfitted with a unique configuration of pusher propellers and a further-aft-than-you-would-expect laminar flow wing that's complemented by a forward wing (not a canard!). The P180E is powered by two PT6A-66B turboprop engines, which each produce 850 shaft horsepower at sea level. The aircraft is composed of a mix of aluminum alloy and composite materials, with the majority of the lift provided by the forward wing, the main wing, along with the fuselage itself.

When you think of corporate and general aviation aircraft that can fly at a top speed of 402 TAS and achieve an altitude of FL410, various light jets probably come to mind, but certainly not a turboprop, much less one manufactured by a relatively unknown Italian aircraft manufacturer. We suppose the Italians just have a knack for building high-performing aircraft that defy expectations, because what they have created is a hot rod turboprop that rivals the speed and altitude capabilities of many light jets, with a fuel burn rate that surpasses all else. In terms of single-pilot turboprops, it really does not get any better than this.

Though its powerplant selection says otherwise, we think you will find this little gem of an airplane to be more akin to flying a light jet rather than a turboprop. The simulation we have provided, we feel, is a definitive rendition of this legendary and exotic aircraft, and one in which we feel will be thoroughly enjoyed by all, no matter what style of flying satiates their appetite for flight.

PRODUCT FEATURES & HIGHLIGHTS

The Milviz P180E simulation that we have delivered features a plethora of highly-accurate systems and avionics, including a custom turboprop simulation with authentic start and spool times, realistic operating parameters, as well as engine wear and damage simulation.

The avionics package in the P180E is derived from our KA350i, which features one of the most accurate simulations of the real-world system to exist in a consumer flight simulator to date. An accurate flight model built from real-world performance data makes you truly feel like you're flying the real aircraft, keeping with our philosophy of "quality, or why bother?".

Product Features:

- Fully featured FMS-3000, including SID/STAR support, airway support, performance entry, LNAV and VNAV, and many extended features.
- Fully featured PL21, including radars, checklists, and composite mode.
- Faithfully reproduced systems and avionics, including checklist and chart functionality.
- True-to-life turboprop emulation with accurately modeled PT-6A behaviors.
- Custom RealLight night lighting, landing lights and custom effects.
- TrueGlass dynamic rain effects.
- High quality external model with high resolution PBR textures.
- High-quality internal model complete with custom 3D gauges.
- High-quality soundset provided by SimAcoustics.
- 11 HD liveries representing a wide variety of operators.

SYSTEM REQUIREMENTS

The following requirements apply as a minimum to successfully install and operate the Milviz P180E.

Please note that choice of scenery, location, simulator settings and 3rd party utilities may place additional demands on your simulation platform.

SUPPORTED PLATFORMS

- Lockheed Martin Prepar3D v5 (HF2 or greater, 5.1 HF1 preferred)

Note: This product is intended to be operated with a fully up-to-date installation of Prepar3D. This includes any released updates, patches, hotfixes, or point releases.

Do keep in mind that Prepar3D v5 will have significantly higher system requirements to run smoothly than Prepar3D v4, notably in the amount of VRAM required.

SUPPORTED OPERATING SYSTEMS

- Windows 10

PROCESSOR (CPU)

- 3.0 GHz quad core processor required (3.5 GHz or better recommended)

VIDEO CARD (GPU)

- DirectX 11 compliant video card with 6GB VRAM (8 GB or greater *strongly* recommended)

SYSTEM MEMORY (RAM)

- 8 GB RAM (16 GB recommended)

DISK SPACE

- 2.5 GB or greater

GAMING CONTROLLER

- Joystick, yoke, or other gaming controller

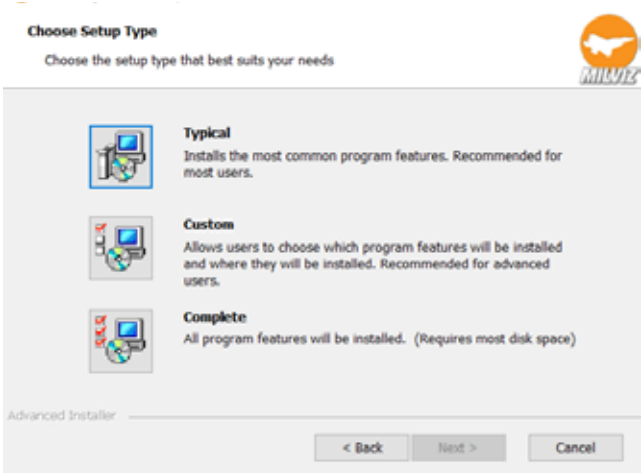
Note: All Milviz products require a functioning gaming device such as a joystick for proper operation.

INSTALLATION INSTRUCTIONS

Important: As with other flight simulator addons, pre-installation precautions should involve closing other open applications, as well as temporarily disabling any active antivirus software. Please be sure to remember to re-enable your antivirus software after installation!

After purchase, you will have been given a link or an option to download a zipped (.zip) file. This compressed file contains an executable (.exe) file, which is the installer for the Milviz P180E.

To begin installation, please right-click on the executable file and select “Run as Administrator”. After clicking past the initial page, the installer will present 3 options: Typical, Custom, and Complete.



Typical and Complete install essentially the same features, and the installer is smart enough to detect what simulators are installed. Choosing either of these options is sufficient for full installation of the aircraft, so feel free to choose whichever you feel like.

Custom allows for the inhibition of each item queued for installation For example, if only the v4 version of the product is desired but v5 is installed on the system, the v5 version can be removed from installation, and vice versa. Generally, we recommend letting the installer run its course, especially when it comes to the Microsoft redistributables.

Click on the “Next” button to continue with the installation process.

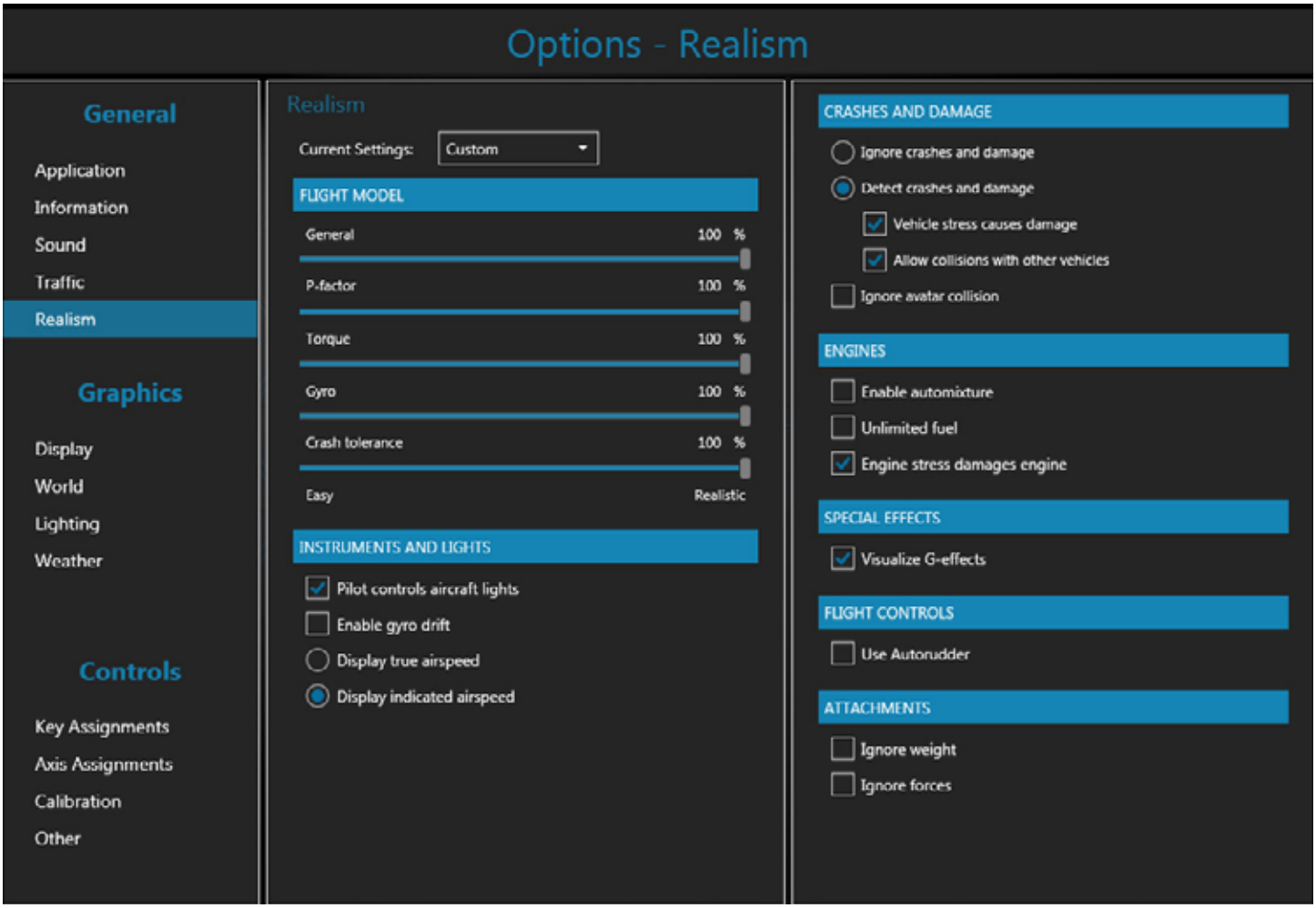
To uninstall the P180E, please run the installer again and use the ‘Remove’ option from the presented menu.

REALISM SETTINGS

The Milviz P180E has been carefully built with a very high level of accuracy in mind. Both development and testing have been carried out using the highest realism settings available within the simulator.

The settings available within the Realism panel consist of changes designed to not only make the aircraft easier to fly, but to also lessen the workload of the pilot. The goal in this section is to ensure that any settings that might impact your full enjoyment of the aircraft are correctly set.

The following images of the settings for are meant to offer the most realistic depiction of the both the flight model as well as the general operation of the aircraft. Without these settings in place, particularly in regards to the flight model section, the aircraft may not perform as intended.



REALISM SETTINGS

FLIGHT MODEL

For the highest degree of realism, all sliders in the flight model section should be set fully to the right.

INSTRUMENTS AND LIGHTS

The Milviz P180E has a sophisticated lighting system in place, so the “Pilot controls aircraft lights” should be checked.
“Enable gyro drift” and “Display indicated airspeed” are not essential, but they will add to the realistic operation of any aircraft.

CRASHES AND DAMAGE

These settings are not essential, but do instill in one a sense of safe operation of the simulation.

ENGINES

The automixture can be disabled in the realism settings.
“Unlimited fuel” is non-essential, but disabling does allow for correct fuel management simulation.

SPECIAL EFFECTS

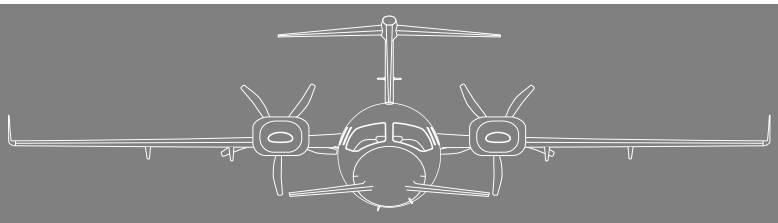
“G-effects” can be enabled to allow for screen effects to occur in excessive high or low-G situations.

FLIGHT CONTROLS

“Autorudder” should be off so long as you have means to operate the aircraft rudder via rudder pedals or a twist axis on your joystick.

For HOTAS, FSUIPC and other assignments, please navigate to Controls -> Other in the P3D menu and verify P3D is configured to use Direct Input and not Raw Input. This will allow the MVAMS control assignments to take effect.

Please ensure the simulator is being run as administrator to prevent any unintended issues.



MVAMS2

MVAMS2 stands for Milviz Addon Management System 2. It represents our updated, easy-to-use solution to the growing complexity of configurable options and choices available in our aircraft. MVAMS2 has been reworked and redesigned to offer a more feature-rich and intuitive experience over the original application.

MVAMS2 is a standalone application which is installed and utilized by our releases. It was our aim to create a user-friendly environment in which our aircraft could be easily and quickly configured in terms of visual options, avionics, loadout, etc.

The P180E installs (if not already present) and fully integrates with the MVAMS2 application, allowing the user to choose between, and set/assign, various items pertaining to the operation of the aircraft in-sim.

STARTING MVAMS

If this is your first Milviz product that includes the MVAMS2 application, running the installer will place a shortcut icon on your desktop. If this is not your first MVAMS2-equipped Milviz aircraft, the desktop shortcut icon may already exist.

You may use this icon to open the MVAMS2 application at any time while the simulator is not running to configure the aircraft to your preferences. Do ensure MVAMS2 is being run as administrator for the configurations to take effect properly.

After your installation is complete, the MVAMS2 application will open automatically. You are not required to configure your aircraft at this time; you may choose to close it if you wish.

At this point, if there are any updates available for your addons, a notification will be displayed. MVAMS2 can only display one update at a time. Once an incremental update has been installed, please run MVAMS2 once again to check if other updates are available.

INSTALLATION & CONFIGURATION

SELECTING YOUR AIRCRAFT

The P180E is the first aircraft to feature our updated MVAMS2 utility, which builds on and improves upon our legacy addon configuration system, MVAMS.

On the left side of the window, you will find an icon icon for the P180E. If only one MVAMS2-enabled aircraft is installed, there is nothing further to do here: the options will be presented automatically on the right side of the window. If more than one aircraft is presented, simply click on the desired module.

CONFIGURING THE AIRCRAFT

With the P180E, four configuration pages are available: the first page enables the payload and fuel load to be set outside of the sim, the second page has various options related to the state of the aircraft, the third controls the visibility of the chocks, and the fourth allows for various aircraft controls to be mapped to hardware. To save the configurations, be sure to press the SAVE DEFAULTS button at the bottom right of the window.

LOAD

The LOAD tab allows you to enter payload weights for the various stations (in pounds), along with the desired fuel load, all external to the simulator.

OPTIONS

From within this tab, various aspects of the aircraft's state can be controlled and set.

The STATUS options deal with how the aircraft is initially loaded, similar to panel states in other aircraft. Under OPTIONS, the 'Render to transparent surfaces' toggle can be unchecked in order to increase performance on lower end systems.

The SOUNDS section allows sound mixing to be configured, and whether or not they should sync with the simulator audio settings or be independently set.

On the right side, the ENGINE section displays the current state of both engines: in our simulation, engine wear is accumulated over time and the engines will fail when they deteriorate too far. A full green bar indicates a healthy engine; both engines can be set to full health by clicking the RESTORE button.

OPTIONS

The OPTIONS tab configures whether or not the chocks are shown by default regardless of the selected default aircraft state.

CONTROLS

From within this section, various PL-21 controls can be mapped to physical hardware. To assign a control, simply click on the orange box to the right of the desired control (and beneath the tab of what hardware you want to assign it to), actuate the control, then click 'Save'. Clicking 'Clear' will clear any current assignments.

To enable these assignments, make sure the 'Enable hardware mapping' checkbox is ticked.

EVENT MAPPING

The Milviz P180E includes provisions for assignment of various controls to physical hardware. If you have additional hardware panels, or a HOTAS joystick, you may use FSUIPC to assign various axis using these event map tables.

Control	Lvar, Event Type
Left Power Lever	AXIS_THROTTLE1_SET, enum
Right Power Lever	AXIS_THROTTLE2_SET, enum
Both Power Levers	AXIS_THROTTLE_SET, enum
Left Condition Lever	AXIS_PROPELLER1_SET, enum
Right Condition Lever	AXIS_PROPELLER2_SET, enum
Both Condition Levers	AXIS_PROPELLER_SET, enum

TROUBLESHOOTING

Most issues are caused by:

1. Interference with either anti-virus software or other sim software.
2. Version incompatibility.
3. Insufficient permissions.
4. An overlooked item in the manual.

The following are essential:

1. Disable your anti-virus before downloading and installing.
2. Make sure that the P3D directory is off limits to any AV scanning (exclusions are set).
3. Disable UAC via Control Panel -> User Accounts -> Change User Account Control Settings and move the bar all the way to the bottom.
4. Install and run sim as an admin (right-click on the sim desktop icon and select Properties ->Compatibility->Run This Program as Administrator).
5. Your video card needs to be DirectX 11 compatible with access to the correct DirectX libraries.
6. Do not use any Milviz (or any other addon) aircraft as the default aircraft.
7. Ensure that you have the appropriate simconnect libraries installed by running the simconnect.msi found in your P3D\redist\Interface\FSX-SP2-XPACK\retail\lib.

PRODUCT SUPPORT

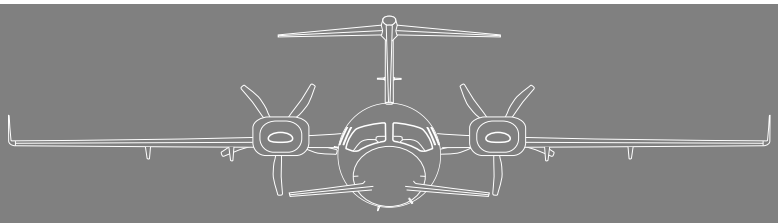
Our product support forums are staffed by the systems programmers who created this simulation, along with members of our support and development team.

For access, please send your proof of purchase and preferred display name to **oisin@milviz.com.**

If you need product support please have a look in the forums for an existing solution. If you cannot find one, please start one new topic in the product's support forum only including details of:

1. Your system OS.
2. Your sim platform and product version number.
3. Any 3rd-party hardware or software in use.
4. Any error reports (Control Panel -> Administrative Tools->Event Viewer->Windows Logs -> Application).

The Milviz P180E requires the Microsoft Visual C++ redistributable package, which is included in the installer.



DESCRIPTION

The Milviz P180E is a twin-engine, pusher-style turboprop designed for both the private and corporate aviation market. The performance of this aircraft is akin to a light jet rather than a turboprop, and the below specifications prove that to be true.

Characteristics

- Crew: 2
- Length: 47 ft 3 in
- Wingspan: 47 ft 1 in
- Height: 13 ft 1 in
- Empty Weight: 7,850 lbs
- Max Takeoff Weight: 12,100 lbs
- Power Plant: 2x PT6A-66B turbines rated at 850 shp at sea level
- Propeller: 2x Hartzell scimitar low noise propellers
- Fuel Capacity: 2,802 lbs

Performance

- Maximum Speed: 402 KTAS at 31,000 ft
- Maximum Mach: Mach .70
- Max Range: 1,490 nm
- Service Ceiling: 41,000 ft
- Rate of Climb: 2,770 FPM at MTOW

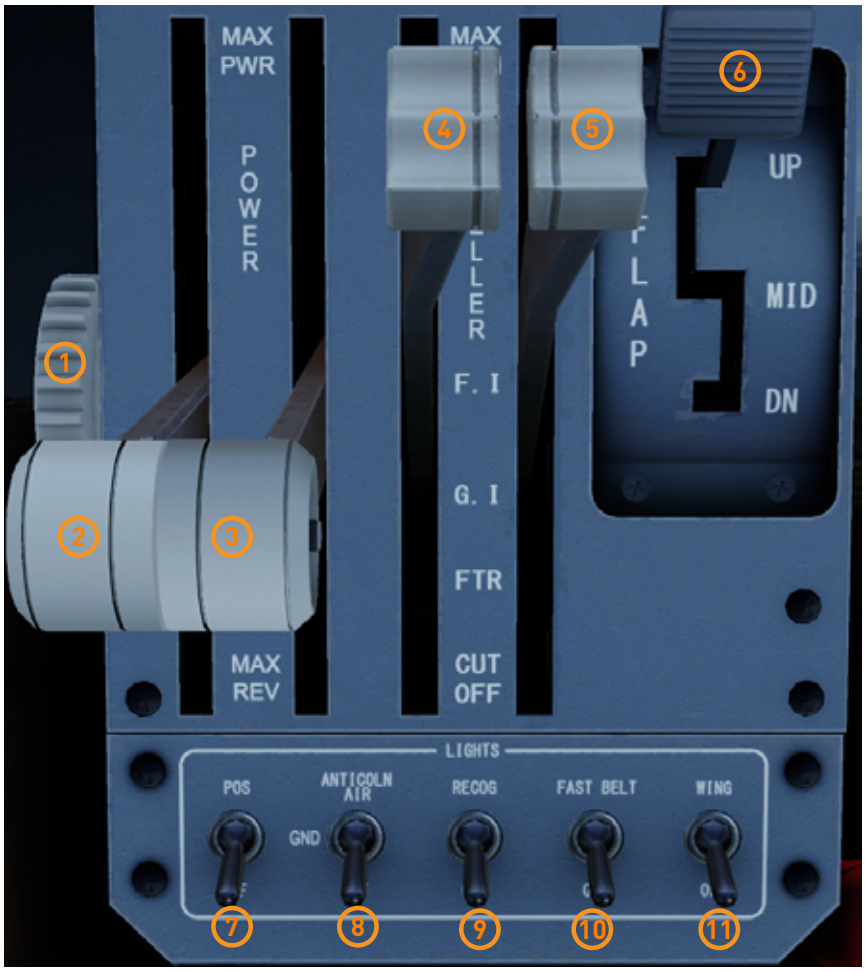
MAIN INSTRUMENT PANEL

1. Magnetic Compass
2. Flight Guidance Panel
3. Master Warning Panel
4. Reversionary Panel
5. ESIS
6. Primary Flight Display
7. Display Control Panel
8. Multifunction Display
9. Annunciator Panel
10. Digital Clock
11. ELT Panel
12. Radio Tuning Unit
13. Audio Control Panel
14. Environmental Control Panel
15. Alternate Static Source
16. Hydraulic and Landing Gear Panel
17. Parking Brake
18. Anti-Ice Panel
19. System Test Selector
20. Pressurization Panel

FORWARD CENTER CONSOLE

1. Battery Switch
2. Left Generator Switch
3. Right Generator Switch
4. EPU Switch
5. Bus Interconnection Switch
6. Avionics Master Switch
7. Left Firewall Shutoff Switch
8. Left Main Fuel Pump Switch
9. Fuel Crossfeed Knob
10. Right Main Fuel Pump Switch
11. Right Firewall Shutoff Switch
12. Left Engine Start Switch
13. Left Engine Ignition Switch
14. Left Oil Cool Switch
15. Right Oil Cool Switch
16. Right Engine Ignition Switch
17. Right Engine Start Switch
18. Prop Overspeed Test Switch
19. Autofeather Switch
20. Prop Syncrophaser Swtich

THROTTLE QUADRANT



1. Trim Wheel
2. Left Power Lever
3. Right Power Lever
4. Left Condition Lever
5. Right Condition Lever
6. Flap Lever
7. Position Light Switch
8. Anti-Collision Light Switch
9. Recognition Light Switch
10. Fast Belts Switch
11. Wing Light Switch

TRIM PANEL

1. Pitch Trim Indicator
2. Left Roll Trim Indicator
3. Right Roll Trim Indicator
4. Yaw Trim Indicator
5. Pitch Trim Mode Switch
6. Pitch Trim Switch
7. Yaw Trim Switch

COCKPIT SYSTEMS

As a general rule for the contents of this manual, any panels or components (such as the ESIS or Display Control Panel among others) that have been already covered in the Milviz FMS MV-21 User's Guide will not be covered again in an effort to decrease duplicate information.

Any changes to these controls/displays that have been made when compared to the avoinics installed in the KA350i will, of course, be detailed when applicable later on in this document.

With that being said, the following pages will detail all of the systems and controls in the cockpit, with each control being detailed below its relevant system.

ELECTRICAL SYSTEM

The electrical system in the P180E consists of two 28 volt, 400 amp, DC starter/generators that provide torque for both engine starting and DC power generation.

One 25.2 volt, 28 amp-hour battery provides power for starting as well as reserve power in the event of duel generator failure. One Emergency Power Unit (EPU) is installed as well, which provides power to flight-critical equipment in the event of total aircraft electrical failure.

BATTERY SWITCH

The battery switch has two positions, BAT and OFF, which controls the power delivery from the battery to the electrical bus system.

GENERATOR SWITCHES

The two generator switches allow for the controlling of the corresponding generators. Moving the switches to the RESET position will reset the respective generator.

EPU

The Emergency Power Unit (EPU) supplies power to the ESIS, landing gear position lights, VHF COM1, and emergency lighting of the magnetic compass and ISIS bezel when a complete electrical failure occurs.

The EPU DRAIN light will annunciate when the EPU switch is set to OFF after the engines are started, the EPU starts to supply the Emergency Power Bus, or the EPU battery capacity is less than 50%.

EPU SWITCH

The EPU switch controls the state of the EPU, and allows for either the test or arming of the EPU. This switch remains in arm whenever the engines are running.

BUS INTERCONNECTION SWITCH

The Bus Interconnection (BUS INTC) Switch allows for the control of the electrical buses. This switch has three positions: EMER, NORM, and BUS DISC. The switch usually remains in NORM for typical operation but, when conditions necessitate the bus can be disconnected from the electrical system by placing the switch in the BUS DISC position.

In the EMER position, the L/R generator buses are fed by their on-side generators, the essential/duel fed from the battery bus, and the battery bus from the battery in an effort to save battery voltage.

AVIONICS MASTER SWITCH

The Avionics Master Switch provides a means for the selection of power distribution to the avionics system.

In NORM, power is delivered to the entire avionics equipment package, while COM 1 ONLY routes power to the primary VHF communication system only.

DIGITAL CLOCK

The digital clock installed in the P180E is a M877 Aircraft Time Management system. The time displayed by default is GMT, and the clock has additional functions that make it a truly useful piece of kit.

For ease of use in our simulation, right clicking either button will simulate pressing both buttons at the same time.

BASICS OF OPERATION

The operation of the clock itself is rather straightforward. The SEL button selects what is to be displayed in the window, while the CTL button controls what is being displayed. Pressing SEL will sequentially select GMT, Local Time (LT), Flight Time (FT), Elapsed Time (ET), then finally back to GMT. The CTL button both starts and resets the Elapsed Time when pushed. When there is no power applied, the SEL and CTL buttons are disabled.

FLIGHT TIME ALARM

With the Flight Time displayed, pressing both the SEL and CTL buttons simultaneously to enter the set mode. The alarm time is entered identically to the GMT setting and when the FT equals the set alarm value, the display will flash, with the alarm output activated. Pressing either the SEL or CTL buttons will turn off the alarm with no change to the ongoing Flight Time.

FLIGHT TIME RESET

To reset the FT, the FT must be displayed when resetting. Holding down CTL for 3 seconds, or until either 99:59 or 99:99 appears on the display. Once this happens, the Flight Time will be zeroed upon the release of the CTL button.

ELAPSED TIME COUNT

To enable the Elapsed Time counting up, select ET for display via the SEL key. Pressing the CTL button will start the counting, which will count to 59 minutes and 59 seconds before switching to an hour:minute format. Pressing CTL with ET running will stop the counting and pressing it a second time will reset the time.

ELAPSED TIME COUNT

Select ET for display via the SEL key and enter set mode by pressing both buttons. After this occurs, the countdown timer can now be set. Once the time is entered and the last digit is no longer is no longer flashing, the clock is ready to start the countdown.

Pressing CTL will start the countdown, and once the count reaches zero, the display will flash, and the external alarm is activated. Pressing either SEL or CTL will deactivate the alarm. Pressing CTL once will pause the count down and pressing it a second time will reset the timer to zero.

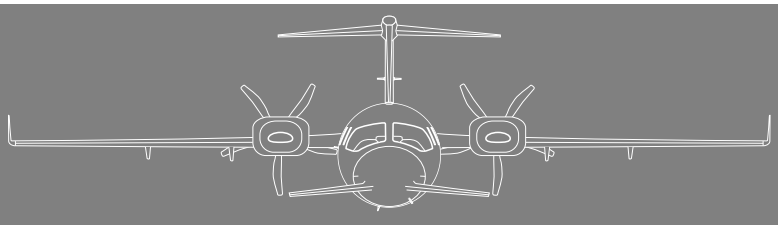
TEST MODE

Hold the SEL button down for three seconds and the display will indicate 88:88 and all 4 annunciators.

AUDIO CONTROL PANEL

The audio control panel is a rather straightforward design. There are volume controls for each of the main audio sources, along with input selections for NAV audio tones such as Marker (MKR) and DME.

Pushing in the button below a placard will enable the source, while pushing it again will disable it.



ALTERNATE STATIC SWITCH

The pilot's alternate static source switch has a guard surrounding it to prevent inadvertent activation of the source. Flipping this will read static pressure from inside the cockpit rather than from the static system, but this has no effect in a simulated environment.

COCKPIT BLOWER SWITCH

The cockpit blower switch controls the cockpit blower, which increases cockpit airflow and is part of the environmental and ventilation system. Flipping the switch to OFF disables the blower.

HYDRAULICS CONTROL

The hydraulics system provides power for the actuation of the landing gear, nose wheel steering, and the main brake system. The system has three modes, High Duty, Low Duty, and non-operating, and the mode of operation is dependent on the status of the landing gear. During extension and retraction, the system is in high duty, and switches to low duty once the movement of the gear is complete.

The hydraulics panel contains a switch and a pressure gauge, with the switch controlling the state of the system (on or off), and the gauge reading the current pressure in the hydraulic lines.

CABIN UTILITIES SWITCH

The cabin utilities switch controls electrical power to appliances in the cabin of the aircraft, such as the galley. Again, this is something not applicable to a simulated environment. Flipping this switch to off cuts of the electrical supply to the cabin.

BLEED AIR CONTROL

Engine bleed air is controlled by two bleed air switches, one for the left engine and one for the right, along with an emergency switch. The emergency switch can be used in the event when both bleed air switches fail.

LANDING GEAR CONTROL

Control of the landing gear is straightforward: the landing gear handle controls the status of the gear, either up or down, with two sets of annunciator lights displaying the status of the gear. When the gear is in transit and/or not fully locked, a red light will illuminate for the respective component that is not set. When the gear is locked, a green light will illuminate for the component.

Also, on the landing gear control panel is a switch for control of the nose gear-mounted lights. The fully up position selects the landing lights, the middle for the taxi lights, and the bottom for all lights off.

ANTI-ICE CONTROL

The P180E is certified for flight into known icing conditions, which is not achieved without a robust ice prevention system. On the ANTI-ICE panel, each individual element can be controlled, including the de-icing boots, probe and vane heaters, along with the wing heat. Notably absent from this panel is prop heat, but due to the pusher style configuration, the propellers are placed in the exhaust flow of the engines and, thus, do not require any additional measures for ice buildup prevention.

The aircraft features an ice detection system, which consists of an ice detector on the right side of the nose, along with two amber caution light pushbuttons labeled ICE on the instrument panel. When an ice buildup is encountered, the ICE lights will periodically illuminate for 5 seconds. Flashing ICE lights indicate that one or more of the anti-ice systems has not been switched on.

Additionally, a wing inspection light is mounted on the outboard side of the left engine nacelle for visual identification of ice at night.

PITOT/STATIC HEATERS

These two switches control the heading elements for the pitot/static system. The left switch also controls stall heat, while the right switch controls TAT probe heat.

FORWARD WING HEATERS

The two Forward Wing (FWD WING) switches control the heating elements that are mounted in the leading edge of the forward wing.

ENGINE ICE VANE

The two ENG ICE VANE switches control the engine's inertial separator system. This system positions deflector vanes and the ice bypass doors in an attempt to prevent ice accretion at the engine inlet and/or ice ingestion.

WINDSHIELD HEATER

The two Windshield Heater (WSHLD HTR) switches control six heating elements in the windshield: these elements are divided into two independent systems, one being the Primary (PRI) and the other being the secondary (SEC). Each of these systems heats a different zone of the windshield, ensuring that if one fails, the other is able to keep at least some of the windshield clear of ice.

TRIM SYSTEM

The P180E uses aileron, elevator and rudder trim tabs for pitch and yaw trimming needs. All of the trim surfaces on the aircraft are electronically actuated, and the current deflection of each trim surface can be viewed via the TRIM indicator on the center pedestal.

PITCH TRIM SELECTOR SWITCH

The pitch trim selector switch has three positions: PRI, OFF, and SEC. When the switch is set to PRI, trim changes are accomplished via the trim switches on the yoke. In the SEC position, trim changes are accomplished via the pedestal pitch and yaw trim switches.

Note that with the trim selector switch in OFF, the autopilot is inoperative.

PITCH TRIM SWITCH

The pitch trim switch is active when the pitch trim selector switch is in the SEC position. The switch is spring loaded back to the center detent and can be used to make adjustments to the pitch trim configuration.

RUDDER TRIM SWITCH

The rudder trim selector switch, like the pitch trim switch, is active when the pitch trim selector switch is in SEC. Moving the switch to the right will yaw the nose right, and moving it to the left will yaw left. The switch is spring loaded back to center.

AUDIO CONTROL PANEL

The audio control panel is a rather straightforward design. There are volume controls for each of the main audio sources, along with input selections for NAV audio tones such as Marker (MKR) and DME.

Pushing in the button below a placard will enable the source, while pushing it again will disable it.

LIGHTING CONTROL SYSTEM

The lighting arrangement installed on the P180E is fairly standard. All of the external lights, apart from the landing/taxi light, are controlled via the lighting control panel on the center pedestal.

POS LIGHT SWITCH

The Position (POS) light includes two forward (left wing red and right wing green) along with two rearward (white) lights.

ANTI-COLLISION LIGHT SWITCH

The anti-collision lights on the aircraft consist of two strobe lights, along with one ground beacon strobe light. The first strobe light is mounted at the top of the vertical fin's upper fairing, while the second is mounted on the bottom of the fuselage. The ground beacon is mounted on the top of the fuselage as well.

With the switch in the Ground (GND) position, the strobe lights are disabled, with only the ground beacon light illuminating.

RECOGNITION LIGHT SWITCH

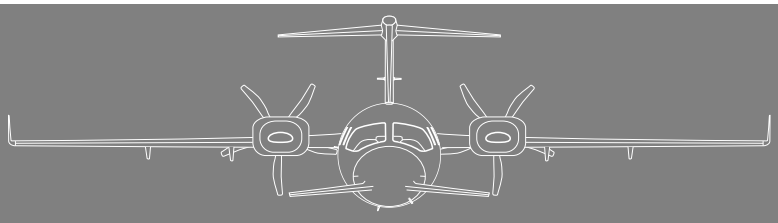
The recognition light is installed at the top of the vertical's fin trailing edge which flashes to aid in increasing aircraft visibility to other traffic.

FASTEN BELT LIGHT SWITCH

This switch controls the state of the seat belt light in the cabin.

WING LIGHT SWITCH

Also known as the ice inspection light, the wing light allows for visual identification of icing buildup on the left wing at night.



REVERSIONARY PANEL

The Reversionary (REV) panel is a multifunction control panel that allows for the reversion of various displays, systems, and communication methods.

In the event of a display failure, this panel will allow the affected component to by bypassed and its function/display to be sent to a working display to mitigate the effects of the failure and ensure no critical data is lost.

FMS ON GROUND BUTTON

The FMS ON GND button allows the FMS to be operated without the avionics master switch in the ON position.

EMER COMM1 BUTTON

This button, when pushed, tunes COM1 to the emergency frequency of 121.5 to allow for rapid transmission of an emergency call.

TAWS TEST BUTTON

The TEST button sends the system into its test routine, which includes aural alerts and terrain radar display verification.

TAWS INHIBIT BUTTON

The TAWS Inhibit (INHIB) button inhibits the aural alerts generated by the system; this button is mainly used during a steep approach into an airport.

TCAS ALT/TEST BUTTON

The ALT/TEST button toggles the TCAS system between ALT, OFF, and TEST.

TCAS OPR/STBY BUTTON

The OPR/STBY button toggles the state of the TCAS system between ON and STANDBY.

DISPLAY REVERSION SWITCHES

The rocker switches directly to the right of the TCAS portion control display and flight computer reversion. The PFD/MFD rocker will transfer the data from one of the screens and overlay it on to the other depending on the selection.

In the event that it is necessary or desired, the ADC and AHC systems can be deselected as well, with their data being sourced from their respective secondary systems.

AHRS SLEW CONTROLS

The AHRS portion allows for the Directional Gyros (DG) of either AHC1 or AHC2 to be slewed in the desired direction in order to correct for gyroscopic procession.

To enable slewing, press the corresponding button for each system to use the controls for the selected computer.

MV-21 CHANGES

OVERVIEW

As briefly touched on before, the changes to the MV-21 as compared to the system fitted to our KA350i are relatively minuscule, especially given how different the design philosophy of both aircraft are.

With that being said, there are some changes to be touched on, and further information on the MV21 or FMS system as a whole can be found in FMS MV-21 Guide.pdf, located in the P180E folder in the P3D directory.

PFD CHANGES

The first addition to the PFD is the flap position indicator at the top left corner of the display. The indicator displays the current flap position, with positions including UP, and intermediary position, and Down (DN).

There have been a couple of alterations to the FMA and its annunciations. The Yaw Damper (YD) annunciation has been moved to the right side of the Flight Mode Annunciator (FMA), and the message TEST has also been added in yellow. TEST shows when the on-side Flight Guidance Computer (FGC) is in test.

The airspeed tape and its indications have received a bit of adjustment as well. The reference approach speed is now displayed via a green line as opposed to <APP in the KA350i. The Reference Approach Speed (RAS) Low Speed Cue (LSC) has also been added in the form of a green line. This cue indicates 1.3 times the computed stall speed.

Fixed Airspeed References are now included for flap extension speeds, with a blue line indicating Vyse and a red lime marking Vmca.

MID, which indicates the maximum speed with flaps in the MID setting, is marked by a white, triangular pointer followed by the text MID. DN, or the maximum speed with flaps in the full down setting, is marked with a white, triangular pointer with the text DN.

Airspeed Marking	Value
MID	170
DN	150
Vyse	140
Vmca	100

Along with the Fixed Airspeed References, Vspeed references have also been added. These allow the pilot to set takeoff and approach speed values and show the set references on the PFD speed tape. These values can be set via the REFS menu and are displayed on both PFDs.

The last notable change to the PFD is the Steering Messages. These messages annunciate which mode the nosewheel steering is set to, and reads STEER TAXI when the system is in taxi mode, and STEER T-O when in takeoff mode.

MFD CHANGES

Unlike the PFD, the MFD only has one change, though it is major: this is the System Page. The system page can be brought up by pressing LSK 4R on the MFD display bezel, and displays information about the electrical system, anti-ice systems status, external power connection, flaps position, and landing lights door status. This page is annunciated as SYS when the MFD is in a lower-format mode that is not the menu.

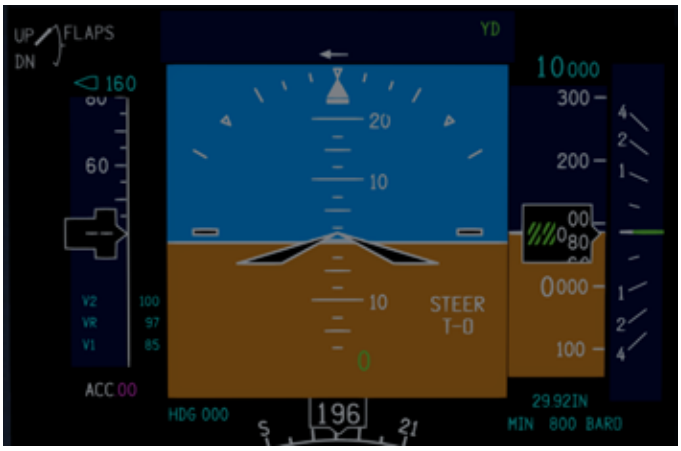
L and R GEN AMPS show the current electrical load for each of the generators.

The next graphic to the right indicate the current flap positions.

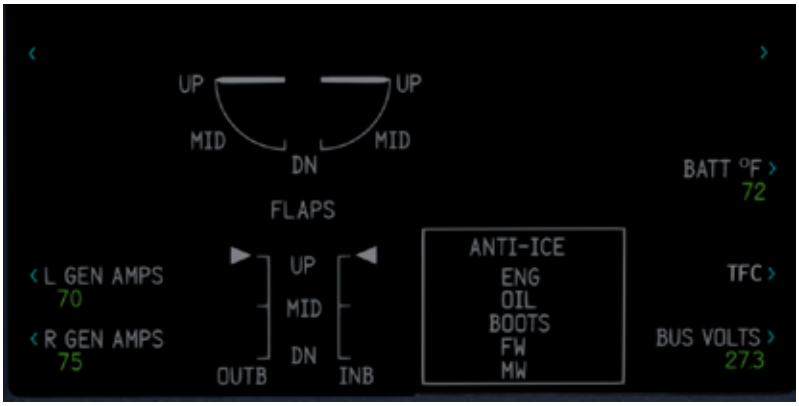
The box titled ANTI-ICE displays the status of the various components of the anti-icing system, with the text ON annunciating next to the component when it is active.

Above the anti-ice box is the external power and landing lights door status. This section will be blank when none of the display criteria are met. The text EXT POWER will annunciate when external power is connected, and LTS DOOR OPEN will show then the landing lights door is open.

Directly to the right is the current battery temp, along with the battery bus voltage.



Notable changes to the PFD are shown above.



The MFD System Page.

ANNUNCIATOR SYSTEM

The P180E contains a comprehensive annunciation and warning system that contains various lights to warn the pilot of any malfunction or failure. The two types of lights, warnings and cautions, are displayed via red and amber lights respectively on the annunciator panel, respectively. An amber caution light will trigger the master caution light, while a red warning light will trigger the master warning light.

The lights and their causes for display can be found below

ANNUNCIATOR LIGHTS – RED

Annunciation	Cause for Display
L Fire	Fire in the left engine compartment
R Fire	Fire in the right engine compartment
L OIL TEMP	Left engine oil overtemperature
R OIL TEMP	Right engine oil overtemperature
L OIL PRESS	Low oil pressure in left engine
R OIL PRESS	Low oil pressure in right engine
L BLEED TEMP	Left bleed air line overtemperature
R BLEED TEMP	Right bleed air line overtemperature
L MN WG OVHT	Left main wing anti-ice overheat
R MN WG OVHT	Right main wing anti-ice overheat
L FD WG OVHT	Left forward wing anti-ice overheat
R FD WG OVHT	Left forward wing anti-ice overheat
L WSHLD ZONE	Left windshield zone overheat
R WSHLD ZONE	Right windshield zone overheat
CAB PRESS	Cabin pressurization outside limits
STEER FAIL	Steering system failure
BAG DOOR	Baggage door open or not secure
CAB DOOR	Cabin door open or not secure
DUCT TEMP	Cabin air supply duct overtemperature
BAT OVHT	Battery overheat above 150F

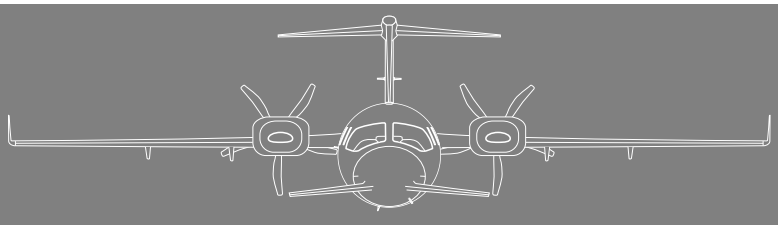
ANNUNCIATOR LIGHTS - AMBER

Annunciation	Cause for Display
L F/W V INTRAN	Left fuel firewall shutoff valve in transit
R F/W V INTRAN	Right fuel firewall shutoff valve in transit
L F/W V CLSD	Left fuel firewall shutoff valve closed
R F/W V CLSD	Right fuel firewall shutoff valve closed
L FUEL PUMP	Left main fuel boost pump inoperative
R FUEL PUMP	Right main fuel boost pump inoperative
L FUEL PRESS	Left fuel pressure below minimum
R FUEL PRESS	Right fuel pressure below minimum
L FUEL FILTER	Left fuel filter obstructed
R FUEL TILTER	Right fuel filter obstructed
L LOW FUEL	Mitnimum fuel level in the left tank
R LOW FUEL	Minimum fuel level in the right tank
L GEN	Left DC generator inoperative
R GEN	Right DC generator inoperative
L PROP PITCH	Left propeller beyond low pitch stop
R PROP PITCH	Right propeller beyond low pitch stop
FUEL XFEED	Fuel crosfeed valve open
BAT TEMP	Battery temperature above 120F
BUS DISC	Electrical busses not interconnected
AVCS FAN FAIL	Failure of the main avionics bay cooling fan
HYD PRESS	HYD pressure outside range or system inop
EPU DRAIN	EPU OFF or EPU battery draining
FLAP SYNC	Flap synchronization failed
STALL FAIL	Stall warning system failure
OIL COOLING	Forced engine oil cooling operating
AUTOFEATHER	Autofeather not armed
DOOR SEAL	Failure of cabin door sealing
L PITOT HTR	Left pitot heat system off or inop
R PITOT HTR	Right pitot heat system off or inop

CENTRAL SYSTEM TEST

The P180E includes a central test system that allows for the checking of correct operation of some airplane systems though the SYS TEST selector. This selector has a pushbutton which runs the corresponding system test as selected by the knob.
The various tests and the actions that take place are as listed below:

Selection	System Test Behavior
ENG EXCEED	The Engine Exceedance aural warning tone should be generated.
ANN	The amber BAT TEMP and the red BAT OVHT, L OIL TEMP, and R OIL TEMP lights should come on.
LAMP	The MASTER WARNING, MASTER CAUTION, and all of the annunciator lights should come on.
FIRE DET	The L ENG FIRE and R ENG FIRE warning lights should flash. The L and R ENG FIRE EXT should flash too.
FUEL QTY	The L and R LOW FUEL amber caution lights should illuminate.
LDG GR	The UNSAFE red lights should illuminate, and the gear warning tone should be activated.
AVCS FAN	The AVCS FAN FAIL amber light should come on after about 7 seconds from test selection.
RAD ALT	The Radio Altimeter readout of 50 feet should be displayed on the PFDs.
OVSP WRN	The overspeed warning aural tone should be generated from the left side ADC first, then, after about 2 seconds, from the right-side ADC.
HYD	The needle of the hydraulic pressure indicator should move to the 1300 PSI reading while the HYD PRESS amber caution light should come on.
STEER	The STEER FAIL red warning light should come on when the steering is engaged in either takeoff or taxi operating mode.
STALL	The STALL FAIL amber light should illuminate then extinguish after 15 to 20 seconds. The Red STALL light will be illuminated, and the aural warning horn activated.
FLAPS	The FLAP SYNC amber caution light should illuminate and the FLAP annunciation on the PFDs/MFDs should become yellow, flashing for the first 5 seconds.



CABIN PRESSURE SYSTEM

The Cabin Pressure Control System (CPCS) is an electropneumatic system operated by a digital electronic controller. The air used to pressurize the cabin is supplied by the Environmental Control System (ECS) or by the emergency pressurization system.

When the emergency bleed air is required, the air flows directly to the cabin through the bulkhead check valve, preventing reverse flow from the cabin.

The pressurization system controls are grouped in the CABIN PRESS panel.

MODE SELECTOR SWITCH

This switch allows for the selection of the system's operating move: the system can either be operated in automatic mode with the switch in AUTO, or in manual mode with the switch in the MAN position.

With the switch in the MAN position, there are a few required items of operation on the part of the pilot:

-Set the toggle switch to the detented UP or DN position to obtain an increment or a reduction of cabin altitude as required to control cabin pressure.
-Regulate the rate of cabin climb with the INCR/DECR knob as desired.

SCHEDULE SELECTOR SWITCH

Directly below the mode selector switch is the schedule selector switch. The modes controlled by this switch are only active when the above mode switch is in AUTO, and there are two positions: AUTO SCHED, and CAB SEL.

With the switch in AUTO SCHED, the system utilizes a pre-programmed relationship between the cabin and aircraft altitudes in order to set the pressurization schedule.

Pilot Actions:

-Select the pressure altitude of the destination airport using knob A.
-Select the proper barometric correction before landing using knob B.
-Verify on the cabin altitude gauge that the cabin is depressurized before landing.

The CAB SEL mode allows the crew to manually set the cabin rate of climb along with the cabin altitude itself. While in this mode, like the manual pressurization mode, there are some required pilot actions to be aware of:

-Select the cruise altitude as desired with knob A.
-Set the barometric correction with knob B to 29.92 in Hg.
-Set the cabin rate of climb with knob B.
-Re-select the cruse altitude for flight plan variation.
-Verify on the cabin altitude gauge that the cabin is depressurized before landing.

UP/DN SWITCH

The UP/DN switch is used when the system is in the manual mode and allows for manual control of the cabin altitude in order to obtain the desired cabin pressure. Moving the switch momentarily UP will yield an increase in the cabin altitude, while moving it DOWN (DN) will see a decrease.

INCR/DECR KNOB

Working in tandem with the UP/DN switch, the INCR/DECR knob is also used when the system is in the manual mode of operation and allows the cabin rate of climb to be set as the pilot desires. Moving the knob in the direction of INCR will increase the rate of climb, and vice versa for DECR.

DUMP SWITCH

The cabin pressure dump switch is guarded to prevent inadvertent actuation, and dumps the cabin pressure down to the altitude limiter set of 13,000 ft, +- 500 ft, in the event when it may become necessary to do so.

PRESSURIZATION GAUGE

This gauge and its knobs are the means of control of the pressurization system. Knob A allows for the selection of the desired cruise altitude to be shown on the altitude gauge.

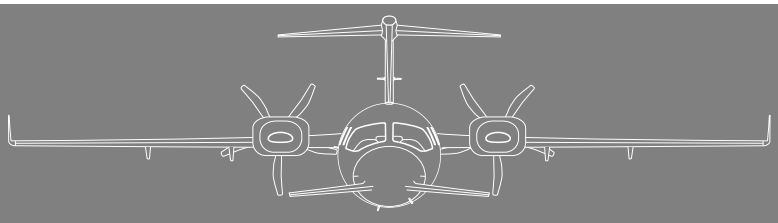
Knob B sets the barometric correction for the set altitude, and knob R allows for the cabin rate of climb to be set, which will then be reflected on the cabin rate of climb gauge.

CABIN ALTITUDE GAUGE

The altitude gauge displays a variety of information about the state of the pressurization system. The outer ring of numbers displays the selected cruise altitude in thousands of feet, with the corresponding pressure differential being shown by the inner ring of numbers.

CABIN RATE OF CLIMB GAUGE

This gauge shows the selected rate of pressurization in the cabin, measured in Feet Per Minute of cabin altitude change, which makes it easy to judge if the selected schedule is too aggressive for the virtual passengers.



ECS CONTROLS AND DESCRIPTION

The Environmental Control System (ECS) utilizes engine bleed air for cabin pressurization and cabin heating/cooling. Both the heating and cooling systems are combined into a single panel, where cockpit and cabin temperature can be controlled using the shared buttons. When a system is enabled, a light will illuminate atop the corresponding button.

The left display shows the cockpit temperature, with the right display showing that of the cabin. When the system is first powered on, the system runs a self-test which consists of illuminating all of the lights and displaying test digits on both displays.

SYS PWR BUTTON

The System Power (SYS PWR) button turns the entire system on or off. Both the Cockpit and Cabin visors on the panel display OFF when the system is off, and the current temperature is displayed when the system is on.

CK CB BUTTON

The Cockpit/Cabin (CK CB) button selects the sector (either cockpit or cabin) to control both operating mode and temperature. Control is on the cockpit side by default (CB light is on), and pressing the button enables selection of the cabin control (CB light is on), and vice versa.

+/- BUTTONS

These buttons increment and decrement, respectively, the ECS-targeted temperature.

AUTO BUTTON

When in the AUTO mode of operation, the temperature in the selected sector is automatically maintained using both hot and cool air to the selected level by means of the +/- buttons.

TEMP BUTTON

The TEMP button provides bleed air flow to fast warm the sector to the selected temperature. With this disabled, bleed air is regulated only to maintain the selected temperature. This mode is enabled by default, though the disabled mode can be used on the ground in hot days or in the air once the temperature feels comfortable.

FAN BUTTON

The FAN button selects either the HI or LOW speeds of the ECS unit's fan. The fan speed is LOW by default (light off).

MAN BUTTON

With the system in Manual (MAN), temperature is regulated by manual movements of the valve from the full hot (HI) to the full cold (LO) positions using the +/- buttons, and requires about 15 seconds to traverse the full range. This mode is off by default, and when the system is enabled, the cooling system is inoperative.

A/C BUTTON

When this button is enabled, the A/C system (blowers and compressor) is online. With the system offline, only the blowers are operated.

IGNITION SYSTEM

The ignition system in the P180E is a spark-type system, which consists of one exciter, two ignition leads, and two spark igniters for each engine. When the ignition switches are set to NORM, the igniters will operate automatically to start combustion.

START SWITCHES

The two start switches, L and R for each respective engine, are used for initial engine start and begin the starting process.

IGNITION SWITCHES

The two ignition switches provide for control of the ignition system. The switch has two positions, IGN and NORM; the IGN provides manual actuation of the igniters, while the NORM position will have the igniters operate automatically to start combustion.

OIL COOL SWITCHES

The two oil cool switches operate the oil cool shut off valves to both engines. The oil coolers themselves utilize ram air through a scoop on the engine nacelle to cool engine oil before returning it to the oil tank. When on the ground, bleed air is routed into the cooling duct through the valves to aid airflow.

OVERSPEED TEST SWITCHE

An overspeed governor is installed on both engine's gearboxes in order to take control of the propeller speed in the event of an engine overspeed; this system activates at approximately 1900 RPM. The system can be checked during the runup to ensure proper operation, and this is where the test switches come in.

Setting the switch to either the L or R position tests the governor of the on-side selected engine.

AUTOFEATHER SWITCH

The autofeather system provides a means of automatically feathering a propeller upon engine failure in order to minimize the drag of the dead propeller. With this switch in the ARM position, the system automatically moves the propeller blades on the corresponding engine towards the feather position if oil pressure drops below a prescribed setting.

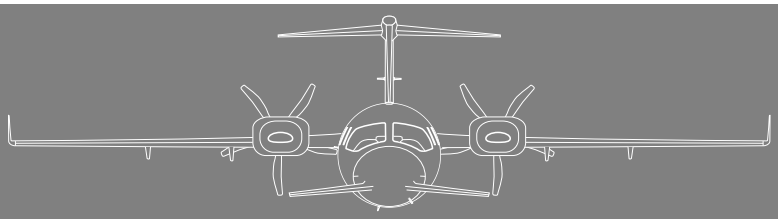
The switch should be moved to the OFF position once the climb is established as the system is intended for use during takeoff and landings only. A green AFX indication on the EIS will indicate the system is armed.

The TEST position of this switch allows the operation of the system to be checked on the ground by moving the switch to the position and moving the power below 90% NG.

SYNCROPHASER SWITCH

The Propeller Syncrophaser (PROP SYNCPH) system allows for the synchronization of the propellers in order to reduce the noise level in the cabin. Before engaging the system, it is necessary to match the propeller RPM to within 10 RPM or less.

Setting the switch to SYNCPH will engage the system which will disengage automatically if the system is engaged during an in-flight shutdown or propeller feathering. The system must be turned off during approach and landing as well.



FIRE SYSTEM OVERVIEW

Like its larger light-jet brethren, the P180E features a fire control system that is capable of both detecting and extinguishing nacelle and engine fires. There are two parts to this system: the warning and the extinguishing system, both of which will be detailed in further detail below.

ENGINE FIRE WARNING SYSTEM

Fire warning is provided by a thermal detector running through each engine compartment along and around the engine. This system is capable of sensing a localized fire as well as a diffused overheating condition.

Fire indication is provided by the L and R FIRE red warning lights on top of the annunciator display, along with the two, red L and R ENG FIRE EXT pushbuttons. The lights will extinguish if and when the overhead or fire source is removed. The system can be checked by rotating to the FIRE DET position

ENGINE FIRE EXTINGUISHING SYSTEM

The engine fire extinguishing system consists of a cylinder full of a fire extinguishing agent located in each engine nacelle. The cylinder can be manually activated by pressing the L or R ENG FIRE EXT pushbuttons, which provides the means of releasing the extinguishing agent into the hot section of the turbine itself.

This system is single-use only for each engine, and the engine should be shut down upon activation of the system.

FUEL SYSTEM OVERVIEW

The engine fuel system consists of an oil-to-fuel heater, an engine driven fuel pump, a fuel control unit, a flow divider and purge valve, and duel fuel manifold, and two fuel drain valves. Fuel from the oil-to-fuel heater enters the pump, which increases fuel pressure and delivers it to the fuel control unit. The fuel control unit schedules fuel flow to the engine according to operating conditions as well as the position of the cockpit engine controls.

The fuel system has a total capacity of 1597 liters, or 421.9 gallons, with a total usable capacity of 1583 liters, or 418.2 gallons. This translates roughly to about 1,401 lbs of usable fuel per tank. Each engine is fed by its own fuel system consisting of an integral fuselage tank just above the wing, a wet wing tank, along with two fuselage collector tanks just under the wings. A crossfeed line allows feeding one side engine with fuel from the opposite side's tank.

The left and right fuel systems are independent except during pressure refueling operations, which allows for single point refueling. Two electric fuel boost pimps are connected to the engine, though only one, referred to as MAIN, is normally supplying the engine driven fuel pump. The second pump, referred to as STANDBY, is the backup of the main, and automatically switches on in the event of a main boost pump failure.

FIREWALL VALVE SWITCHES

Each of the two firewall shutoff valves, one per engine, are able to be controlled through the firewall valve switches. Moving the switch from OPEN to CLOSED closes the valve which cuts off the low-pressure fuel from the boost pump.

Closing these valves will display the L or R F/W V CLSD amber annunciator on the panel, with the light L or R F/W V INTRAN displaying then the valves are in transit from open to closed, or vice versa.

FUEL PUMP SWITCHES

The two fuel pump switches allow for the selection of the active fuel boost pump. As discussed before, the pump supplying the engine is the MAIN pump, and the backup pump is the STANDBY (STBY). This switch allows for the one of the pumps to be disabled in the event of a failure, which should never be an issue since the standby pump automatically switches on when the main pump's delivery pressure drops below 5.7 PSI.

The amber caution lights L or R fuel pump come on in the event of the main pump being inoperative (the switch in STBY) or failed outright.

FUEL CROSSFEED KNOB

The fuel crossfeed switch allows for control of the fuel crossfeed valve in the event that it is desired to supply an off-side engine with fuel from the opposite tank. The FUEL XFEED caution light comes on and remains on when the crossfeed valve is in the opened position. Take note that crossfeed is not approved for takeoff or landing.

The valve should always remain on the OFF position except during either single engine operations and/or for the purpose of fuel balancing. Crossfeed operation requires that the boost pump of the non-feeding side of the system be set to off just after the crossfeed valve has been opened.

COCKPIT PREFLIGHT CHECKLIST

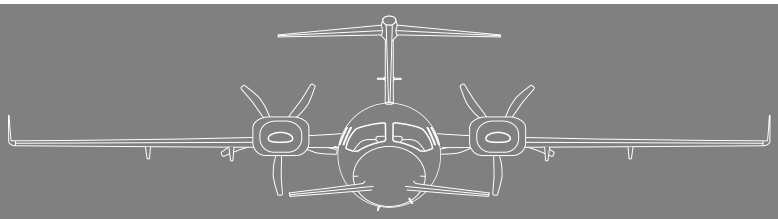
1. Parking Brake.....SET LOCKED
2. Flight Controls.....CHECK FREE
3. Circuit Breakers.....IN
4. Gear Handle.....DN
5. Battery Switch.....BAT
6. Bus Voltage.....CHECK
7. Annunciator Panel.....TEST
8. Engine Fire Detector.....TEST
9. Fuel Quantity System.....TEST
10. Gear Lights.....CHECK THREE GREEN AND TEST
11. Battery Switch.....OFF
12. Oxygen Pressure.....CHECK

BEFORE ENGINE START CHECKLIST

1. Entrance Door.....SECURE
2. Crew/PAX Briefing.....COMPLETE
3. Avionics Master Switch.....COM1 ONLY
4. Battery Switch.....BAT
5. Bus Volts (SYS Page).....24.0 V to 25.0 V
6. Battery Temp.....CHECK BELOW 120F
7. EPU Switch.....TEST THEN EPU
8. Fuel Quantity.....CHECK
9. Parking Brake.....CHECK LOCKED
10. Fast Belts Switch.....FAST BELTS
11. Bus Tie Switch.....NORMAL
12. Environmental Panel.....SYS PWR OFF

ENGINE START (BATTERY) CHECKLIST

1. Anti-Collision Light Switch.....GND
2. Power Lever.....IDLE
3. Condition Lever.....CUTOFF
4. Firewall Shutoff Valve.....CHECK OPEN
5. Fuel Pump.....TEST/CHECK MAIN
6. Fuel Press Light.....CHECK OFF
7. Bleed Air Switches.....CHECK OFF
8. Generator Switch.....OFF
9. Ignition Switch.....CHECK NORM
10. Propeller.....CLEAR
11. Start Switch.....START
12. Condition Lever (NG 13%+).....GROUND IDLE
13. ITT.....BELOW 1000C
14. Oil Pressure.....INCREASING
15. NG RPM.....INCREASING
16. Start Switch (Auto).....OFF (40% NG)
17. ITT.....750C MAX
18. Oil Pressure.....60 PSI MIN
19. Oil Temperature.....110C MAX
20. NG RPM.....54% MIN
21. PROP RPM.....900 MIN
22. Condition Lever.....FLIGHT IDLE
23. Generator Switch.....ON (L/R)
24. Gen Amps (SYS Page).....CHECK ABOVE 0
25. Bus Volts (SYS Page).....27.0 V to 29.0 V
26. HYD Pump Switch.....HYD
27. HYD Press Light.....CHECK OFF

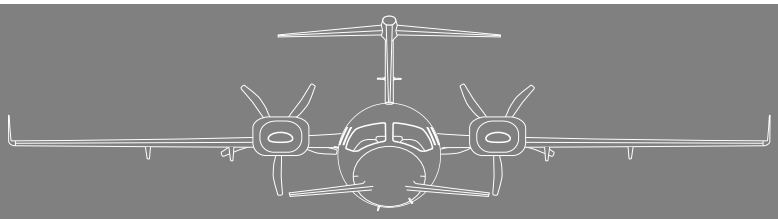


ENGINE CROSS-START CHECKLIST

1. Condition Lever (Operating Engine)...FLIGHT IDLE
2. Generator (Operative Engine).....CHECK ON
3. Gen Amps (ENGINE-SYS Page).....BELOW 160
4. F/W Shutoff Valve (INOP Engine).....CHECK OPEN
5. Power Lever (INOP Engine).....IDLE
6. Condition Lever (INOP Engine).....CUTOFF
7. Fuel Pumps.....CHECK MAIN
8. Fuel Press Lights.....CHECK OFF
9. Bleed Air Switches.....CHECK OFF
10. Ignition Switch (Operative Engine)..CHECK NORM
11. Propeller (INOP Engine).....CLEAR
12. Start Switch (INOP Engine).....START
13. Cond. Lever (13%+ INOP Engine)....GROUND IDLE
14. ITT (Starting Engine).....BELOW 1000C
15. Oil Pressure (Starting Engine).....INCREASING
16. NG RPM (Starting Engine).....INCREASING
17. Start Switch (Auto).....OFF (40% NG)
18. ITT.....750C MAX
19. Oil Pressure.....60 PSI MIN
20. Oil Temperature.....110C MAX
21. NG RPM.....54% MIN
22. Prop RPM.....900 MIN
23. Condition Lever.....BOTH GROUND IDLE
24. Generator Switches.....BOTH ON (L/R)
25. Gen Amps (SYS Page).....CHECK BOTH ABOVE 0
26. Bus Volts (SYS Page).....27.0 V to 29.0 V

EXTERNAL POWER START CHECKLIST

1. Anti-Collision Light Switch.....GND
2. GPU.....CONNECT
3. External Power MSG (MFD).....EXT POWER
4. Bus Volys (SYS Page).....28.0 V to 30.0 V
5. Power Lever.....IDLE
6. Condition Lever.....CUTOFF
7. Firewall Shutoff Valve.....CHECK OPEN
8. Fuel Pump.....TEST/CHECK MAIN
9. Fuel Press Light.....CHECK OFF
10. Bleed Air Switches.....CHECK OFF
11. Generator Switch.....OFF
12. Ignition Switch.....CHECK NORM
13. Propeller.....CLEAR
14. Start Switch.....START
15. Condition Lever (NG 13%+).....GROUND IDLE
16. ITT.....BELOW 1000C
17. Oil Pressure.....INCREASING
18. NG RPM.....INCREASING
19. Start Switch (Auto).....OFF (40% NG)
20. ITT.....750C MAX
21. Oil Pressure.....60 PSI MIN
22. Oil Temperature.....110C MAX
23. NG RPM.....54% MIN
24. Prop RPM.....900 MIN
25. Condition Lever.....FLIGHT IDLE
26. GPU (After Both Starts).....DISCONNECT
27. External Power MSG (MFD).....OFF
28. Generator Switch.....ON (L/R)
29. Gen Amps (SYS Page).....CHECK BOTH ABOVE 0
30. Bus Volts (SYS Page).....27.0 V to 29.0 V
31. HYD Pump Switch.....HYD
32. HYD Press Light.....CHECK OFF



BEFORE TAXI CHECKLIST

1. Electrical System.....CHECK
2. Avoinics Master Switch.....AVIONICS
3. Environmental Panel.....SYS PWR ON
4. CK/CB Button.....CK ON
5. AUTO Button.....ON
6. TEMP Button.....ON
7. AC/FAN Buttons.....AS REQUIRED
8. Cockpit Temp.....SELECT
9. CK/CB Button.....CB ON
10. AUTO Button.....ON
11. TEMP Button.....ON
12. AC/FAN Buttons.....AS REQUIRED
13. Cabin Temp.....SELECT
14. CAB UTIL Switch.....CABIN UTILITIES
15. Cockpit Blower.....AS REQUIRED
16. Bleed Air Switches.....SET L AND R
17. PRESS AUTO/MAN Switch.....AUTO (Test)
18. AUTO SCHED/CAB SEL Switch.....AUTO SCHED
19. Landing Altitude.....SET
20. Barometric Correction.....SET
21. Rate Selection.....SET
22. Engine Oil Coolers.....AS REQUIRED
23. Radios.....SET AND CHECK
24. Air Data Computers.....TEST
25. Overspeed Warning.....TEST
26. Hydraulic System.....TEST
27. Steering System.....TEST
28. Steering.....TAXI
29. Pitot/Stall Static Heat.....CHECK
30. Stall Warning.....TEST
31. Flaps System.....TEST
32. Pitch Trim System.....TEST PRI/SEC
33. Pitch Trim.....PRI-SET TAKEOFF
34. Rudder Trim.....TEST-AS REQUIRED
35. Windshield Heat.....CHECK
36. Engine Ice Vanes.....CHECK
37. Engine Deice Boots.....CHECK
38. Oil Cool Intakes Anti-Ice.....CHECK
39. Main Wings Anti-Ice.....TEST
40. Forward Wings Anti-Ice.....TEST
41. Autopilot.....TEST
42. Radio Altimeter.....TEST
43. Annunciator Panel.....TEST
44. BAG/CAB Door Warn Lights.....CHECK OFF
45. Prop Sync Switch.....SYNCPH (ON)
46. TCAS.....TEST
47. TAWS.....TEST
48. V1 VR V2.....CHECK/SET
49. Altimeters.....SET
50. ESIS Altimeter.....SET
51. FLAPS.....MID
52. Flight Controls.....CHECK
53. LDG/Taxi Lights.....TAXI
54. Parking Brake.....RELEASE

TAXI CHECKLIST

1. Brakes.....CHECK
2. Steering System.....OFF
3. Airplane No Yaw Tendency.....CHECK
4. Steering System.....TAXI
5. Prop Reverse.....CHECK-AS-REQUIRED
6. Prop Feathering.....CHECK
7. Flight and Engine Instruments.....CHECK

RUNUP CHECKLIST

1. Parking Brake.....SET LOCKED
2. Condition Levers.....MAX RPM
3. Power Lever.....ADVANCE 1800
4. Overspeed Test Switch.....TEST L/R
5. Prop RPM.....CHECK 1600-1650
6. Autofeather.....TEST
7. Parking Brake.....RELEASE

BEFORE TAKEOFF CHECKLIST

1. Anti-Collision Light Switch.....AIR
2. Windshield Heat.....AS REQUIRED
3. Pitot/Stall Static Heat..... L&STALL/R&TAT
4. Fast Belts Switch.....CHECK FAST BELTS
5. Flight Instruments.....SET AND CHECK
6. Engine Gauges.....CHECK
7. Warning/Caution Lights.....CHECK OFF
8. Transponder.....SET
9. Bleed Air Switches.....CHECK L AND R
10. Fuel Pumps.....CHECK MAIN
11. Condition Levers.....CHECK MAX RPM
12. Flaps.....CHECK MID
13. Pitch Trim.....CHECK TAKEOFF
14. Aileron Trim.....CHECK NEUTRAL
15. Rudder Trim.....CHECK NEUTRAL
16. Flight Controls.....CHECK FREE
17. Steering.....TAKEOFF
18. Oil Coolers.....OFF
19. Taxi/Landing Lights.....AS REQUIRED
20. Navigation Lights.....AS REQUIRED
21. Ice Protection Systems.....AS REQUIRED

TAKEOFF CHECKLIST

1. Brakes.....HOLD
2. Power Levers.....MAX TAKEOFF POWER
3. Autofeather.....CHECK ARMED
4. Autofeather Lights.....ON
5. Engine Gauges.....WITHIN LIMITS
6. Steering (Not over 60 KIAS).....OFF
7. VR Rotate to Approx.....10 DEGREES
8. Airspeed Above 50FT.....120 KIAS/UP
9. Landing Gear (Positive Climb).....UP
10. Taxi/Landing Lights.....OFF
11. Autofeather (Above 150 KIAS).....OFF
12. Flaps (Below 170 KIAS).....UP

CLIMB CHECKLIST

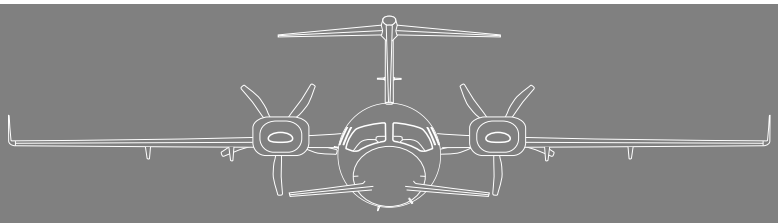
1. Condition Levers.....MAX RPM
2. Climb Power.....SET
3. Yaw Damper.....ON
4. Seat Belts.....AS REQUIRED
5. Pressurization.....CHECK
6. Windshield Heat.....LO/HI AS REQUIRED

CRUISE CHECKLIST

1. Condition Levers.....MAX RPM
2. Cruise Power.....SET
3. Engine Instruments.....MONITOR
4. Pressurization.....CHECK
5. Environmental Panel.....CHECK/SET

DESCENT CHECKLIST

1. Condition Levers.....CHECK MAX RPM
2. Windshield Heat.....LO/HI AS REQUIRED
3. Pressurization.....CHECK



BEFORE LANDING CHECKLIST

1. Condition Levers.....CHECK MAX RPM
2. Seat Belts.....ON
3. Flaps (Below 170 KIAS).....MID
4. Landing Gear (Below 180 KIAS).....DOWN
5. Autofeather.....CHECK ARMED
6. Autofeather Lights.....ON
7. Landing Lights.....ON
8. Flaps (Final).....DN
9. Steering.....OFF
10. Cabin Pressure.....CHECK

NORMAL LANDING CHECKLIST

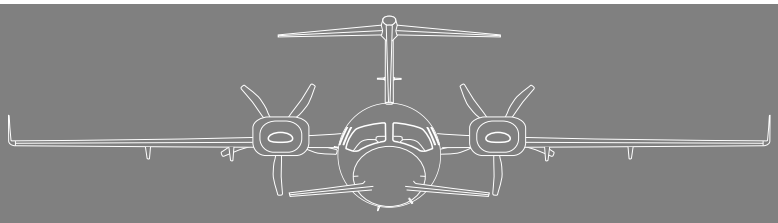
1. Landing Gear.....CHECK DOWN
2. Flaps.....CHECK DN
3. Power.....AS REQUIRED
4. Condition Levers.....CHECK MAX RPM
5. Brakes (After Touchdown).....AS REQUIRED
6. Steering (Below 60 KIAS).....TAKEOFF
7. Reverse (Above 40 KIAS).....AS REQUIRED
8. Reverse (Below 40 KIAS).....AVOID USE
9. Condition Levers.....GROUND IDLE

AFTER LANDING CHECKLIST

1. Power Levers.....IDLE
2. Steering.....TAXI
3. Flaps.....UP
4. Transponder.....OFF
5. Anti-Collision Lights.....GROUND
6. Taxi/Landing Lights.....AS REQUIRED
7. Ice Protection Systems.....OFF
8. Autofeather.....OFF

SHUTDOWN CHECKLIST

1. Parking Brake.....SET
2. Avionics Switch.....OFF
3. ESIS Power.....OFF
4. Environmental Panel.....SYS PWR OFF
5. Bleed Air Switches.....OFF
6. Power Levers.....CHECK IDLE
7. Condition Levers.....GROUND IDLE
8. ITT Stabilize At MIN Temp.....FOR 1 MINUTE
9. Hydraulic Pump.....OFF
10. Condition Levers.....CUT OFF
11. Fuel Pump Switches.....OFF
12. Exterior Lights.....OFF
13. All Electrical Switches.....OFF
14. Battery Switch.....OFF



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With thanks to Ronnie Wainscott for providing the panel images in this document.

GLOSSARY

A

ADC Air Data Computer
AFX Autofeather
AHRS Attitude and Heading Reference System
AHS Air Heading Computer
ALT Altitude
AVCS Avionics

B

BAT Battery

C

CPCS Cabin Pressure Control System
CTL Control

D

DCP Display Control Panel
DECR Decrease
DG Directional Gyro
DISC Disconnect
DME Distance Measuring Equipment
DN Down

E

ECS Environmental Control System
EIS Engine Indicating System
EMER Emergency
EPU Emergency Power Unit
ESIS Electronic Standby Instrument System
ET Elapsed Time

F

FGC Flight Guidance Computer
FGP Flight Guidance Panel
FGS Flight Guidance System
FL Flight Level
FMA Flight Mode Annunciator
FMS Flight Management System
FT Flight Time
FWD Forward

G

GEN Generator
GMT Greenwich Mean Time
GND Ground
GS Groundspeed

H

HTR Heater
HYD Hydraulic

I

INCR Increase
INTC Interconnection/intersection
ISIS Integrated Standby Instrument System

L

LNAV Lteral Navigation
LSC Low Speed Cue
LSK Line Select Key
LT Local Time
LTS Lights

M

MAN Manual
MFD Multifunction Display
MKR Marker
MTOW Maximum Takeoff Weight
MV Milviz

N

NAV Navigation
NORM Normal
NWS Nosewheel Steering

O

OPR Operate
OVHT Overheat

P

PFD Primary Flight Display
POS Position
PRI Primary

R

RAS Reference Approach Speed

S

SEC Secondary
SEL Select
STBY Standby
SYNCYPH Syncrophaser

T

TAS True Airspeed
TAWS Terrain Avoidance and Warning System
TCAS Traffic Collision Avoidance System
TEMP Temperature
TO Takeoff
TST Test

V

VHF Very High Frequency
VNAV Vertical Navigation

W

WNG Wing
WSHLD Windshield

X

XMT Transmit

Y

YD Yaw Damper