



PC-12 Series Changes

The PC-12 has received constant improvements since the beginning of production in 1994. It is Pilatus' engineering and production philosophy to bundle these changes into groups of aircraft called Series. Each Series, with its respective changes, covers a specific block of serial numbers. Currently, there are 10 Series of PC-12 aircraft.

Series	S/N Block	Time Period
1	101 – 120	1994 / 1995
2	121 – 140	1996
3	141 – 160	1996 / 1997
4	161 – 180	1997
5	181 – 200	1998
6	201 – 230	1998 / 1999
7	231 – 260	1999
8	261 – 320	1999 / 2000
9	321 – 400	2000 / 2001
10	401 & on	2001 / current

A new PC-12 incorporates all of the Series changes preceding it, with the exception of those items that are considered options. The options include three seat bench, recognition lights, logo light, dual navigation lights, second pitot/static system, KMD – 850 MFD and Emergency Locator Transmitter (ELT) – 406 MHz with GPS interface. The Series changes, minus options, represent a value of over \$400,000 in parts and labor (as of June 2004). Used PC-12s, depending on the Series number, may incorporate some, but not all of the changes.

The more significant changes associated with each Series aircraft are listed on the following pages.



Series 1 and 2 (101 – 140)

- PC-12 serialization which included upgrading generator wiring, anti – ice system and Engine Instrument System (EIS).

Series 3 (S/N 141 – 160)

- PC-12 gross takeoff weight increase from 9,040 lb. to 9,920 lb. The increased gross weight option became standard equipment with S/N 181. SB 04-001 3/25/97
- Flight Time Counter. No SB.

Series 4 (S/N 161 – 180)

- New pilot and copilot seat with improved adjustment mechanism. SB 25-001 9/24/97
- New passenger seats certified for increased gross weight. No SB.

Series 5 (S/N 181 – 200)

- New ducting and temperature control valve (engine compartment). SB 21-003 Rev.1 7/21/00
- New heat ducting in cabin. SB 21-002 2/17/98
- Revised ducting for auxiliary heating system air distribution. SB 21-002 2/17/98
- New heat element (auxiliary heaters) switches at higher temperature. SB 21-002 2/17/98
- New temperature sensor and sensor retainer box (headliner). SB 21-002 2/17/98
- New control panel (only one switch for recirculating fan). SB 21-002 2/17/98
- New insulation on cargo door, sidewall structure and emergency door panels. SB 25-012 11/24/00
- New head impact modifications to nine-passenger commuter layout. SB 25-006 4/7/98
- New head impact criteria – lavatory and seat location at seat #5 – executive version. SB 25-003 4/7/98



- New oxygen shutoff lever in cockpit. SB 35-001 1/23/03
- New riveted static wick bases. SB 23-001 10/24/97
- Sixty second engine start relay installed. SB 24-004 6/3/97
- New Engine Instrument System (EIS) software. No SB.

Series 6 (S/N 201 – 230)

- New smaller winglets. SB 57-003 10/1/98
- New clamps on engine exhaust for fire detection (nylon bushings installed) SB 71-002 1/13/98
- New seal on engine cowling. No SB.
- New locks on passenger, cargo and battery door. SB 52-002 10/10/97
- New heated windshield (heats full wind screen). SB 30-007 10/6/03

Series 7 (S/N 231 – 260)

- New auto-start with relay installation (Pilot's left lower panel) disconnect starter after 52% NG. SB 80-001 11/6/98
- Passenger seat cushions (standard seats) recovered at Pilatus with heavier fabric underneath. No SB.
- Hydraulic system has new pressure container with fluid level window. SB 29-002 8/12/97
- New propeller de-ice timer box with brush block mounted at two degrees instead of parallel. SB 30-004 9/18/96
- New Central Advisory Warning System (CAWS) box – chip detector shown during flight instead of only on the ground. No SB.
- Overhead panel has spring – loaded external power switch, which only allows Generator 2 to be, switched on with 21 – 31 volts. SB 24-008 8/21/98
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- New fuel vent system in wings uses hinged float instead of check valve. SB 28-005 5/4/98

Series 8 (S/N 261 – 320)

- Installation of three seat bench in PC-12 executive version. SB 25-014 4/20/99
- Improved distribution of oxygen to occupants of three-seat bench. SB 35-002 12/19/00
- New Engine Instrument System (EIS) software. No SB.
- New current sensor and Generator 1 display on overhead panel. SB 24-011 6/28/01
- New dimmer unit for landing gear cockpit lights. SB 33-004 5/10/99
- New cockpit and cabin insulation (bag type). SB 25-012 Rev.1 11/24/00
- Improved engine air intake three piece anti-ice lip. SB 71-003 12/8/99

Series 9 (S/N 321 – 400)

- New exterior lighting:
 - Recognition lights. SB 33-001 2/3/99
 - Red beacon lights. SB33-002 1/15/99
 - Logo light. SB 33-003 11/25/99
 - Wing tip strobe lights with increased life and accessibility. SB 33-005 2/2/01
- New flap reset switch on CAT panel. SB 27-006 Rev.1 6/18/01
- New heating system (change in the flow characteristics of the system). No SB.
- Second Pitot/Static System providing pilot and copilot with totally independent Pitot/Static Systems with heated Pitot Mast and Static Ports. No SB.



Series 10 (S/N 401 & on)

- New Engine Instrument System (EIS) including Engine Condition Monitoring System (ECMS) which allow the EIS to capture all critical engine parameters that can then be downloaded to a laptop and recorded for engine trend analysis. STC SA 00493DE 6/12/03. The trend analysis service comes free the first year with purchase of a new PC-12. Cost for the analysis, after the first year, is currently \$995.00 per year.
- Generator 1 and 2 V/A indicators. No SB.
- New Central Advisory Warning System (CAWS) with audio voice callout. LED display provides longer life. No SB.
- New Standby Power System utilizing a separate Standby Bus directly off the main battery to provide Pre-flight Ground Clearance Delivery and Emergency Power to the #1 Nav/Com, KLN 90B GPS, Audio Panel and MFD. In connection with this system, a separate Emergency Battery option is available for emergency power to the Standby Attitude Gyro. No SB.
- New over head panel (OHP) includes:
 - Battery V/A indicators (battery 1 and 2 when fitted);
 - System switches (external lighting, de-icing, engine start, etc.). No SB.
- KMD-850 MFD replaces existing MFD and Weather Radar Indicator options. New system includes moving map display, EGPWS, Weather radar and TCAS interfaces. No SB.
 - Initially certified to interface with GPS and Weather Radar only.
 - Update interfaces with Stormscope and TCAS.
 - Interface with EGPWS as part of certification of Ground Prox. System.
- Emergency Locator Transmitter (ELT) utilizing the satellite based monitoring system on a 406 MHz frequency. Optional from S/N 400 and above. GPS interface is available from S/N 521 and above. No SB.
- Installation of Oil Debris Monitoring (ODM) system starting with S/N 534. Retrofit SB for prior Series 10 PC-12s is pending.
- Installation of guarded condition lever that prevents inadvertent engine shutdown. SB 76-001 10/03.
- Cockpit switch allowing switch over from headset microphone to oxygen mask microphone. SB 23-004 5/03.



- Optional dual navigation lights mounted on wing tips and tailcone. SB 33-009 4/03.
- Baggage compartment light. SB 33-007 8/02
- Engine accessory gearbox chip detector. SB 79-005 8/03.

Three of the recent Series 10 improvements mentioned above, namely:

- Central Advisory and Warning System (CAWS);
- Engine Condition Monitoring System (ECMS); and
- Oil Debris Monitoring (ODM)

are of such significance, they warrant the expanded descriptions provided on the following pages.



Central Advisory and Warning System (CAWS)

The Series 10 Central Advisory and Warning System (CAWS) integrate the control and display functions of aircraft systems status into one unit. The CAWS consists of a Central Advisory Computer Unit (CACU) and a Central Advisory Display Unit (CADU). The CACU is located under the cabin floor between frame 20 and 21. The CADU is located in the lower center section of the instrument panel.

The CACU is supplied with 28 volts DC from the battery bus and generator 1 bus. It monitors the aircraft systems, processing the data and passing it to the CADU via the serial bus to display the appropriate annunciation.

The CADU displays 48 individual captioned annunciations. These annunciators indicate warning, caution and advisory conditions.

A warning annunciator light is red indicating a condition requiring immediate corrective action by the pilot.

A caution annunciator light is amber indicating a condition requiring pilot attention without an immediate reaction. It is accompanied by an aural gong.

An advisory light is green or blue and indicates that a system is operating.

Red master WARNING and ambient master CAUTION lights are located on the instrument panel directly in front of the pilot and copilot. They alert the crew to changes in CADU annunciator status. Any condition that causes a red or amber annunciator to light up also causes the applicable master WARNING or CAUTION light to come on. Pushing the active master WARNING or CAUTION light will extinguish it.

In addition to the voice call outs that accompany red annunciator light activation, the CACU also generates five voice only callouts accompanied by the illumination of the master WARNING light. The voice only callouts are:

<i>"Stall"</i>	Activated during a stall condition when the stick pusher is active.
<i>"Engine, Engine, Engine"</i>	Activated when a warning condition is present on the EIS.
<i>"Check Gear"</i>	Activated when the gear is up while in landing configuration.
<i>"Speed"</i>	Activated when an over speed condition is detected.
<i>"Decision Height"</i>	Activated when the decision height is reached.



Engine Condition Monitoring System (ECMS)

The Series 10 Engine Condition Monitoring System (ECMS) monitors the engine's health, detecting and recording engine degradation that may be caused by such events as:

- early hot section deterioration;
- hot starts;
- faulty fuel nozzles;
- dirty or eroded compressors;
- FOD damage;
- bleed leaks;
- instrument errors.

This monitoring of the engine's condition helps the operator to plan corrective action and / or preventive maintenance.

At intervals during each flight, the ECMS processor in the Engine Instrument System (EIS) records the following parameters:

- interturbine temperature (ITT);
- engine torque pressure (TRQ / TORQUE);
- gas generator speed (Ng);
- propeller rotational speed (Np);
- fuel flow;
- engine oil pressure;
- engine oil temperature;
- weight on wheels condition;
- compressor discharge air pressure (P3);
- inertial separator system mode;
- pressure altitude;
- true airspeed;
- air temperature;
- chip detection

All the data is recorded, with the date and time, on a data storage card, which has been placed in an opening on the front of the EIS. The component serial numbers of the EIS, engine, gas generator, power section and the aircraft registration number and manufacturer's build number are also recorded.

In flight, automatic trend recording begins above 10,000 ft. altitude, when conditions stabilize for more than two minutes. Recording is for 20 seconds at a time with the data stored on the storage card. The STORE light comes on to indicate that the system is operating correctly. The function is repeated every two minutes. Recorded parameters



are constantly compared with a typical engine data set. If an over limit condition occurs, it is recorded by the ECMS and stored.

Manual trend recording is possible both in the air and on the ground, with engine operating, by pushing the STORE switch. The ECMS gets each parameter for 20 seconds and stores the readings on the storage card.

When the flight is over and the engine is stopped, the ECMS records the engine and flight start and stop date, times and the number of total flights and engine runs since EIS installation. This information is also stored on the data storage card.

The operator downloads the data storage card information using software provided by pilatusserviceworx.com. Recommended downloading is once a week or every six to eight flight hours. Downloaded data is passed on to the Pilatus Business Aircraft Propulsion Diagnostic Engineer at pilatusdiagnostix.com. The Propulsion Diagnostic Engineer edits the data and passes it to the Trend Group for analysis. Trend Group provides the operator with a report on engine status, which includes any trend variance. The Propulsion Diagnostic Engineer is copied on this report.



Oil Debris Monitoring (ODM)

The Series 10 Oil Debris Monitoring (ODM) system detects particles in the engine oil. During engine operation, the Engine Condition Monitoring System (ECMS) processor counts the particle pulses received from the ODM in the Chip Counter. Chip Counter and Threshold values are set when the ECMS programming procedure is accomplished.

There are two key threshold values.

Threshold 2 – 100 particles within 30 seconds*

Threshold 3 – 800 particles within 120 seconds*

Threshold 2 represents a low-level caution. If this threshold is exceeded, fault code 86 will be displayed after the Engine Instrument System (EIS) test. Also, the amber CHIP annunciator in the EIS will blink if the aircraft is on the ground.

Threshold 3 represents a high level caution. If this threshold is exceeded, the amber CHIP annunciator in the EIS will constantly be illuminated with the aircraft in the air, as well as on the ground.

The EIS CHIP indication is completely independent from the Central Advisory and Warning System (CAWS) CHIP indication. CHIP indication from the EIS is initiated by the ODM system while the Magnetic Chip Detector (s) initiate CHIP indication from the CAWS. The CAWS CHIP indication simply tells you that the Magnetic Chip Detectors have picked up metal in the oil. Quantity is unknown. The EIS CHIP indication, through the ODM system, is more specific. It provides a clearer picture as to quantity of metal and level of urgency for action.

Exceedance of Threshold 2 (low level caution) requires that the engine be inspected as per PWC EMM 72-00-00/Fault Isolation (inspect Magnetic Chip Detector(s) and Oil Filter). The EIS must then be reset per AMM 77-40-00.

Exceedance of Threshold 3 (high level caution) requires that the aircraft land as soon as practicable and the engine be inspected as described in the above paragraph. The EIS must then be reset per AMM 77-40-00.

Introduction of the ODM system in the Series 10 Pilatus PC-12 (Serial # 534 and above) is considered to be a very significant product improvement.

*Subject to change based on field experience.

In addition to the Series 1 through 10 improvements, a new PC-12 also has the benefits described in the pages that follow.