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**HAL PRODUCTION**

DORNIER -228

The **Dornier 228** is a twin-[turboprop](https://en.wikipedia.org/wiki/Turboprop) [STOL](https://en.wikipedia.org/wiki/STOL) [utility aircraft](https://en.wikipedia.org/wiki/Utility_aircraft),

designed and first manufactured by [Dornier GmbH](https://en.wikipedia.org/wiki/Dornier_GmbH)  from 1981 until 1998.

In 2009, [RUAG](https://en.wikipedia.org/wiki/RUAG) started building a **Dornier 228 New Generation** in Germany. The fuselage, wings and tail unit are manufactured by HAL in Kanpur, India, where RUAG Aviation carries out aircraft final assembly. Over the years, Dornier offered the 228 in upgraded variants and fitted with optional equipment for performing various special missions.

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**FEARTURE of DO-228 –**

* CARGO TRANSPORT
* MIXED/PASSAGER TRANSPORT
* VIP TRANSPORT
* MARITIME PETROL
* PHOTO GRAMMETRY
* TROOP TRANSPORT
* PARATROOP TRANSPORT
* AMBULANCE
* AIR TAXI

# In this aircraft, HIGH FREQUENCY is used for operation, in communication and navigation system and static discharger which remove electric field through wings.

**ABOUT DORNIER 228**

* **Aircraft type modal 🡪** HAL DORNIER (228-201)
* **No. of passenger 🡪** 19 seats
* **No. of crew 🡪** 2
* **Mass take -off weight 🡪** 5980 kg
* **Mass landing weight 🡪** 5900kg
* **Engine 🡪**  Two Garratt TPE (331- 5- 252D) (715 SHP)
* **Fuel 🡪** Aviation turbine fuel (2386 liter)
* **Propeller 🡪** Two – four bladed Hartzell (HC-B4TN-5ML/LT 10574FS)
* **Overall length 🡪** 16.56 m (54 ft 4in)
* **Wing span 🡪** 16.97m (55ft 8in)
* **Maximum height** 🡪4.86m (5ft 11in)
* **Material 🡪** Aluminium alloy

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**BAGGAGE COMPARTMENT**

* Fuselage front section
* Rear of the cabin section

**COCKPIT**

Cockpit is designed to accommodate two crew members, interior dimensions provide generous head and legroom for the crew.

The pilot seats are adjustable in aft and forward position and equipped with seat- belts. The cockpit – flight instrument meet the requirement of IFR standard.

**CABIN**

The standard cabin is designed to accommodate 19 passengers.

The entrance is at the rear section of the cabin on the left side cross section of the cabin is shown-

Length 🡪7.08m (23ft 3in)

Weight 🡪1.35m (4ft 5in)

Height 🡪 1.55m (5ft 1in)

**WING**

The main wing box is made of three principal section. Each wing embodies two integral fuel tanks between and rear spars.

Wing is divided into 4 sections-

* Auxiliary section
* Outboard
* Inboard
* Feeder tank



Designing department

The designing departments at Hindustan Aeronautics Limited (HAL) is tasked with modifying existing aircraft. These modifications can range for minor adjustments to major structural changes. Engineers collaborate closely with other departments (such as R&D, productions and quality assurance) to ensure that modification align with safety standard, performance requirements and customer needs.

Before any modification takes place, the design team engages in sketching and conceptualization which kind of aircraft customer wants. The design department meticulously manages accuracy throughout the modification process. Computer -Aided design (CAD) tools are used to ensure precise measurements, tolerances and alignment.

After modification and sketching process, the design pass over the production team (SOP), Quality team, Control team to works on it and then after procedure, it will be forward for approval and methods.

Deal with client and Understand customer requirements or needs for modification or upgrades. Such as—

* Atom selection
* Specification (area)
* Material selection

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**INTRODUCTION OF ELECTRICAL SYSTEM**

An aircraft electrical system of an aircraft is used to power several systems, including flight control, communication, navigation and others. Electrical power required 400 Hz frequency, two generators which provides 28DC voltage for starting DORNIER- 228 and current 300A per each engine.

* An aircraft electrical system of the aircraft engine consists of three basic components:
* An alternator or generators
* A battery
* Motors
* Electrical bus to distribute electrical power

The alternator is connected to the electrical distribution bus at the start of the flight and is disconnected at the end of the flight. The electrical distribution bus connects the batteries in each module.

All aircraft electrical systems have components with the ability to generate electricity. Depending upon the aircraft, generators are used to produce electricity. In DO-228, the hard panel is placed at the middle of the aircraft body which is main source of provide electric city through wires (MIL-C-27500 shielded wire) and performed all the function.



**battery:**

Battery is used during pre-flight to power up the electrical system and to start the auxiliary power unit or engine.

* **Nickel cadmium (Ni Cd):**
* Ni-Cd batteries require relatively low maintenance are reliable and have a wide operating temperature range. The storage of battery can be either a **12volt battery or 24volt battery.** Ni-Cd batteries made up of the heavy metals used in their manufacture.
* Nickel oxide as its cathode and cadmium as its anode.

**Electric Generator:**

Power generation is generated by engine- driven generator, which connected to the aircraft engine and producing alternating current (AC) which rectified by diode bridge to convert into (DC) current. A generator, produces electrical power when the aircraft battery is completely discharged.

* **Auxiliary power unit (APU) generator:**

APU generator are found in large aircraft and providing electrical power when the main engine is not operational as backup.



**Motor:**

* **Servo motor**

In DO 228 aircraft, a servo motor consists of an error detector which senses the error between the actual and the desired signal, and is used for installed on an aircraft control surface to assist the movement of the control surface.

A servo motor actuator regulates the speed of a fuel- powered aircraft by rotating a shaft connected to the engine throttle.

**INTRODUCATION OF AVIONIC SYSTEM**

Avionics (a blend of *Avionics* and *electronics)* are the electronic system used on aircraft.Avionics system include navigation system, communication system, radios, weather radar, flight instruction.

The cockpit or, in larger aircraft, under the cockpit of an aircraft or in a movable nosecone, is a typical location for avionics bay equipment, including control, monitoring, communication, navigation, weather and anti-collision system (light system). The majority of aircraft power their avionics using 14 or 28-volt DC electrical system: however, larger, more sophisticated aircraft (such as airlines or military combat aircraft) have AC system operating at 115 volts 400 Hz, AC.



**COMMUNICATION SYSTEM**

The VHF/UHF aviation communication system works on the Airband of 118.000 MHz to 136.975MHz. Each channel is spaced from the adjacent ones by 8.33 kHz in Europe. 25 kHz elsewhere. VHF is also used for line-of-sight communication such as aircraft -to-aircraft and aircraft-to-ATC

* The range of communication system about 1111Km and in which Tx and Rx (VUC-201), Integrated control unit, V/UHF transducer and control unit are operated.

**NAVIGATION SYSTEM**

* Air navigation is the determination of position and direction of aircraft. Avionics can use satellite navigation system (such as GPS and WASS), inertial navigation system(INS), ground- based radio navigation system(such as VOR or LORAN), or any combination thereof.
* There are many systems such as-

VOR 🡪VHF omnidirectional range

DME 🡪Distance measuring equipment

ADF 🡪Automatic direction finder

RAM 🡪Radar alti-meter

GPS 🡪Global positioning system

AHRS🡪Attitude heading reference system

ADC 🡪air data computer

FMS 🡪flight management system



**LIST OF LRU’S (in avionics)**

A line-replaceable unit (LRU) is a modular component of an aircraft that is designed to be replaced quickly at an operating location. These are designed to specifications to assures that they can be interchanged, especially if they are from different manufacturers.

**Audio Selector and Intercom Unit AS-3100(11A)** :

* It is a components parts of the audio selector and intercom system AS3100 as suitable for installation in aircraft. It serves a purpose of communication between the crew, radio telephone communication. As well as monitoring call and warning signals.
* The Audio selector and intercom unit is designed for connection of headset with standard mikes of 150 M and headset of 8 ohm or 300ohm.

**STATIC INVERTER**

* the statics inverter converts 28- Vdc to 115-Vac single phase output. O/P power na d freqency vary depending on model. O/P AC is derived by dc-to-dc converter.
* A switcing bridge to generate the positive and negative half-cycle and filtreing circuit that shape the waveform into a sinusoidal O/P.

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**DIMMER**

* The dim unit services for dimming of bulbs supplied from th e28V- DC net.
* Warnung lamp of thr cockpit may be opeared in bright or dimmed mode which is selected by an external day/night switch.

