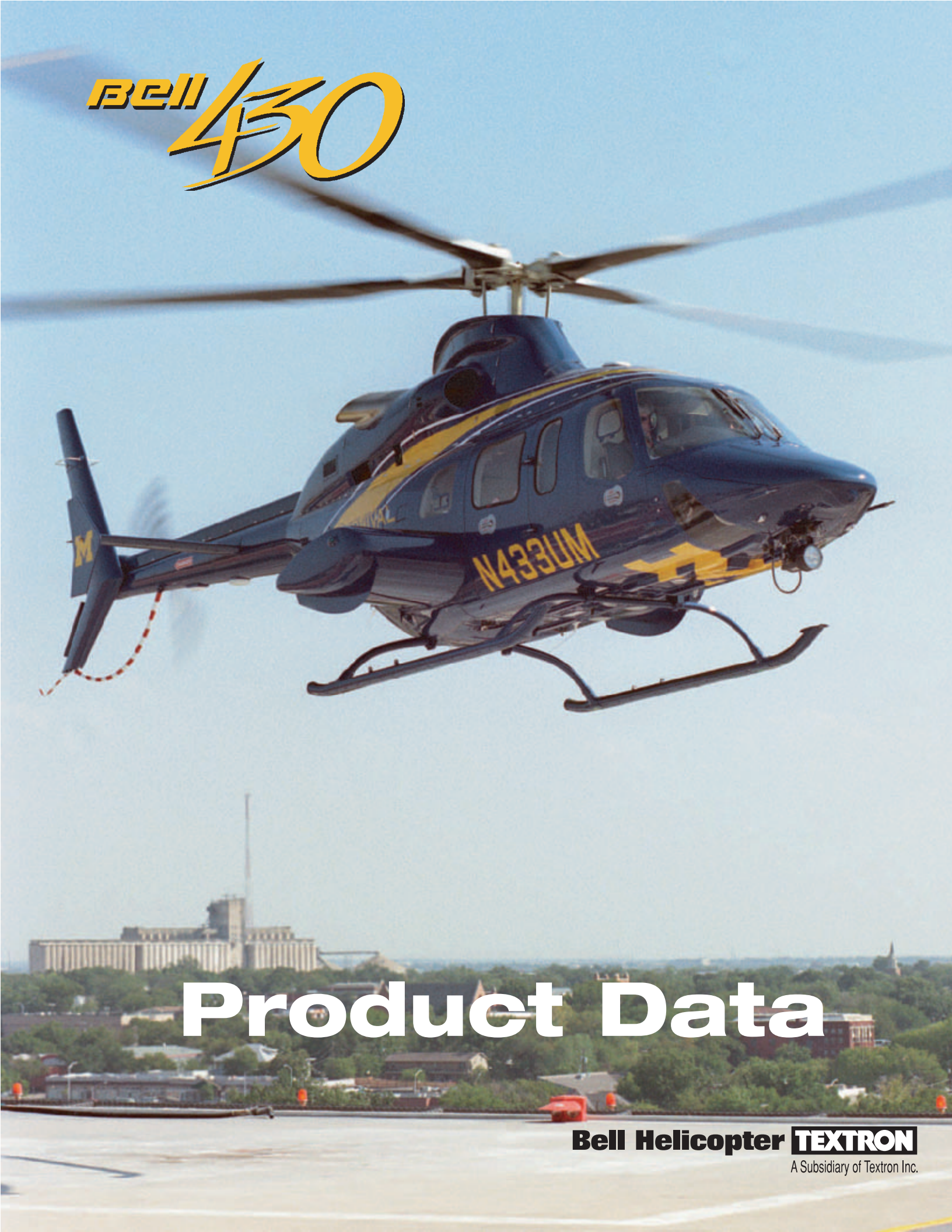

Product Data

Bell Helicopter TEXTRON

A Subsidiary of Textron Inc.

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THE **WEIGHTS, DIMENSIONS, AND PERFORMANCE DATA** SHOWN **MAY NOT BE CURRENT**. For the most current tabular data, and performance and fuel flow charts refer to the current year's Technical Information Booklets.

BELL 430

PRODUCT DATA

CONTENTS

GLOSSARY

INTERNATIONALLY APPROVED ABBREVIATIONS

Atmosphere	C	Degrees Celsius (° is not required if meaning is clear.)
	ISA	International standard atmosphere. (Standard temperature is defined as 15°C at sea level, with a lapse rate of -1 °C for each 150 meters (500 feet) increase in pressure altitude.)
	ISA+20 C ISA+30 C	International standard temperatures increased at each altitude by a constant 20 C or 30 C.
	SL	Sea level.
Rate of Climb	R/C	Rate of climb.
	ft/min	Feet per minute.
	m/s	Meters per second. (One meter per second is 3.28 ft/s)
Speed and Distance	h	Hour/hours.
	km	Kilometer/kilometers.
	km/h	Kilometers per hour. (One kilometer per hour equals 0.54 knots or 0.62 statute miles per hour.) Knots. (Nautical miles per hour.)
	M	Meter/meters. (One meter equals 3.28 feet.)
	mph	Statute miles per hour. (One mile per hour equals 0.87 knots.)
	nm	Nautical miles.
	sm	Statute miles.
Weights	kg	Kilogram/kilograms.
	lb	Pound/pounds. (One pound equals 0.45 kilograms.)
Performance Definitions	IGE	In ground effect. (Hovering near the ground creates a cushion of air that increases the weight carrying capability of the helicopter (the ground effect). This effect generally is present up to one rotor diameter above the ground.)
	OGE	Out of ground effect. (Since the ground effect extends up to one rotor diameter out of ground effect refers to flight that is higher than this height above the ground.)
	max	Maximum.
	Maximum Endurance Speed	The speed at which power required to fly is a minimum.
	Long Range Cruise Speed	The higher of the two speeds at which 99% of maximum range occurs. Cruising at this speed is a tradeoff of one percent in maximum range for 20 to 30 kilometers per hour (10 to 15 knots), higher speed.
	Pressure Altitude	The altitude indicated on an altimeter or barometer when the sea level standard pressure reading is the reference (1013 millibars (29.92 inches) of mercury).
	Service Ceiling	The altitude at which the maximum rate of climb capability is 0.5 meters per second, 100 feet per minute.

SECTION ONE

GENERAL DESCRIPTION OF

THE STANDARD CONFIGURATION

SYSTEMS OVERVIEW

Introduction

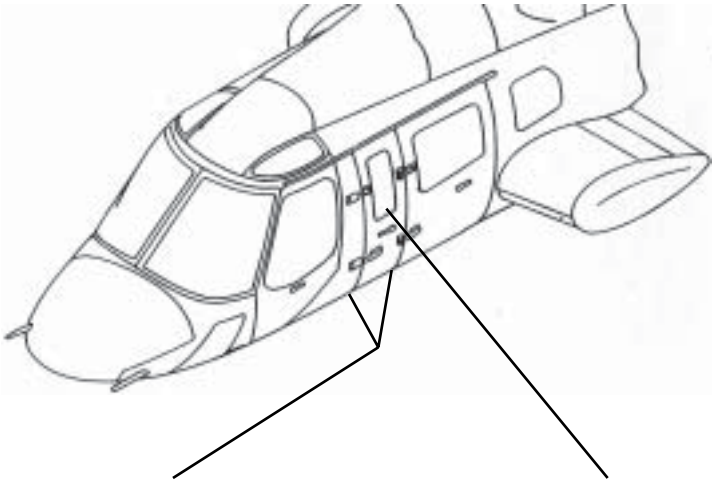
The Bell 430, a **9 to 11** place **twin turbine** powered helicopter, is the latest version of Bells' well proven **INTERMEDIATE TWIN** helicopter series whose heritage reaches back almost 20 years. This latest model in the series blends the attractive lines of the 222/230 family with Bells' advanced Model 680 Rotor Design.

ADVANCED FOUR-BLADED MAIN ROTOR

The Bell 430 FOUR-BLADED **bearingless** rotor system features primary structural elements constructed of **composite materials** to avoid corrosion and to provide benign, easily detectable failure modes, along with "on-condition" (no retirement life) operation. Main rotor blade pitch change as well as flapping and lead/lag motions occur through flexing and bending the two composite yokes (with fluid filled dampers and shear restraints), rather than by means of the customary hinges and lubricated bearings. The four blades of the main rotor are of all composite construction with a replaceable metal leading edge abrasion strip. They are designed for on-condition replacement and are fully interchangeable. A simplified pylon support system attaches the rotor and transmission systems to the fuselage.

STRETCHED FUSELAGE WITH OPTIONAL PANEL DOOR

The passenger cabin is **longer** than that of the Bell 222/230 to give each of the three main cabin seat rows more pitch, making the accommodations more comfortable and the ride more pleasant. An **optional** hinged panel door kit is available to provide greater ease of access for cargo or litters. Located between the left crew and passenger doors it is attached by hinges to the fuselage and the passenger door in a manner similar to the Litter Door of the Bell LongRanger & 407 series.



CABIN STRETCH WITH OPTIONAL LITTER DOOR

MAIN PASSENGER DOOR

OPTIONAL LITTER DOOR

BAGGAGE DOOR

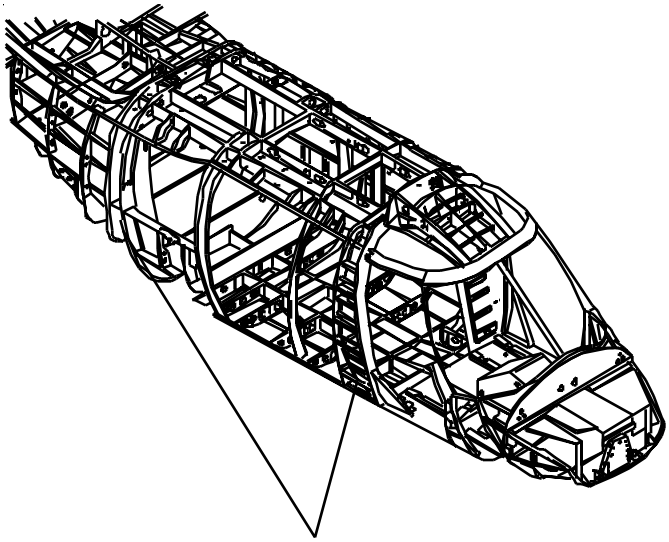
COMFORT FEATURES

The **spacious cabin** is easily entered through the wide (nearly 180°) opening passenger doors, and provides comfortable seating for **seven (standard seats)**, with ample room for baggage. The **1.05 cubic meter (37.2 cubic feet)** aft baggage compartment is accessible through it's own door, or through the rear cabin partition. Cabin furnishings include the **high backed** non-folding seats with **three-point** lap / shoulder restraints, and the **standard deluxe** interior trim, headliner / soundproofing, hard thermoplastic wall covering, and vinyl floor covering. The SIX **large cabin windows** afford each passenger a panoramic view. The cabin ventilation system directs **fresh outside air** to each seat from individual overhead outlets. In flight, the cabin's occupants receive a smooth **vibration-free** ride, courtesy of the **LIVE**® suspension.

SAFETY FEATURES

The primary design parameters of the Bell 430 emphasize **safety** in every aspect of the aircraft. All critical flight systems are either duplicated or isolated / separated to meet / exceed the specifications of FAR Part 29 Category A. **Redundant** load paths are incorporated throughout all **safety-of-flight** components, such as the main rotor blades, transmission attachment, and flight control linkage. Fuselage integrity is ensured through **two integral roll-over bulkheads** at the front and rear of the cabin. The fuel supply is contained in **rupture-resistant** fabric and rubber cells which have been **drop-tested** when **75% full** from **15 meters (50 feet)** without spillage, and are interconnected with break-away **self-sealing** fittings.

OCCUPANT PROTECTION BY REDUNDANT FUSELAGE LOAD PATHS



ROLLOVER BULKHEADS

ROLLS-ROYCE 250-C40B ENGINES WITH FADEC

The engines selected for the Bell 430 are the **Rolls-Royce 250-C40B**. These are a growth version of the well - proven 250-C30 engine series from Rolls-Royce which provide reliable power under the extremes of climatic conditions. The Rolls-Royce 250 engine series has accumulated over **100 million hours** of flight time, with deliveries totaling over 30,000 engines. Controlling each engine is a **Full Authority Digital Electronic Control** (FADEC). The FADEC provides **automatic starting**, is able to maintain rotor speed and **engine matching** within closer tolerances, and to offer a **30-second** single engine rating to enhance Category A operations. Additionally, as in all Bell Helicopters, **MANUAL** power management of each engine is immediately available to the pilot through the **collective-mounted twist grip** throttles.

ROLLS-ROYCE 250-C40B ENGINES

FADEC ELECTRONIC CONTROL UNIT

INTEGRATED INSTRUMENT DISPLAY SYSTEM (IIDS)

Another new feature of the Bell 430 is the **Integrated Instrument Display System** (IIDS) which reduces the size of the instrument panel and gives the flight crew more forward field of view. The Dual Displays help the flight crew to track, as well as to control, essential parameters of critical helicopter systems. The IIDS also controls the Chip Detector/Fuzz Burner Functions for both **engines (2 each)** and the **transmission / tail rotor (6/1)**. Additionally, the IIDS has **new maintenance and power assurance** functions. As a bonus, the IIDS is a valuable tool which also helps to increase the helicopter's reliability and maintainability.

INTEGRATED INSTRUMENT DISPLAY SYSTEM (IIDS) - SHOWN WITH OPTIONAL EQUIPMENT

MAINTAINABILITY FEATURES

The Bell 430 is engineered for reliability and ease of maintenance. Built in **steps** and **work platforms,** along with plentiful access panels, doors, and inspection windows provide for quick and thorough preflight checks and servicing. Primary components and systems are designed for routine servicing while remaining installed on the aircraft. Major service intervals are among the longest in the rotorcraft industry due to Bell's traditionally **long Time Between Overhaul / Retirement Life** components. Some things **have not, and will not change** ; Bell Helicopter's **commitment** to safety, low cost of operation, and reliable, responsive helicopters that are supportable and economic through their lifetimes.

LANDING GEAR CHOICE

The **basic airframe** of the Bell 430 is provided with complete provisions for **delivery** in either of two configurations;the **standard** SKID LANDING GEAR , or the **optional** RETRACTABLE TRICYCLE WHEEL LANDING GEAR.

BELL HELICOPTER TEXTRON CANADA, LTD.

The Bell 430 is assembled at **Bell Helicopter Textron Canada, Ltd.** The manufacturing facilities are situated in **Mirabel, Quebec**, 19 miles (30 kilometers) North of Montreal. The plant is a short drive from Dorval International Airport. The 152-acre site in Mirabel includes a 529,000 square foot facility that houses manufacturing, fabricating, processing, assembly, engineering design, research and development, product support engineering, marketing and administration.

MANUFACTURING AUTHORITY

The Bell 430 received its Canadian Type Approval Certificate [H-88] on February 23, 1996. The Bell 430 was also certificated by the FAA in accordance with provisions of 14 CFR Section 21.29 on April 11, 1996. Initial deliveries of the new Bell 430 began in February 1996.

BASIS OF CERTIFICATION

The Bell 430 is **certified** under **FAR** Part 29, Category B requirements. Additionally, the Bell 430 is approved under Canadian Airworthiness Manual Chapters 529, Sections 529.1301.1, 529.1557(c), 529.1518 (e), and 529.1093 (b) (1) (ii).

INTERNATIONAL CERTIFICATION

A new Bell 430 is delivered with a **Canadian** Certificate of Airworthiness for Export, which may be readily **exchanged** for a Certificate of Airworthiness in the destination country.

EXTERIOR PAINT SCHEMES

The overall eye appeal of the Bell 430 is aided by the sparkling **Polyurethane** paint. Not only is it durable and easy to keep clean, but it maintains and, in fact, exemplifies the high standard of Bell quality and dependability. The standard Bell 430 comes in **THREE** basic color scheme designs illustrated below, each in **THREE** colors. The colors are selected from the many shown in the **IMRON paint chip chart** available from the Bell representative.

A

B

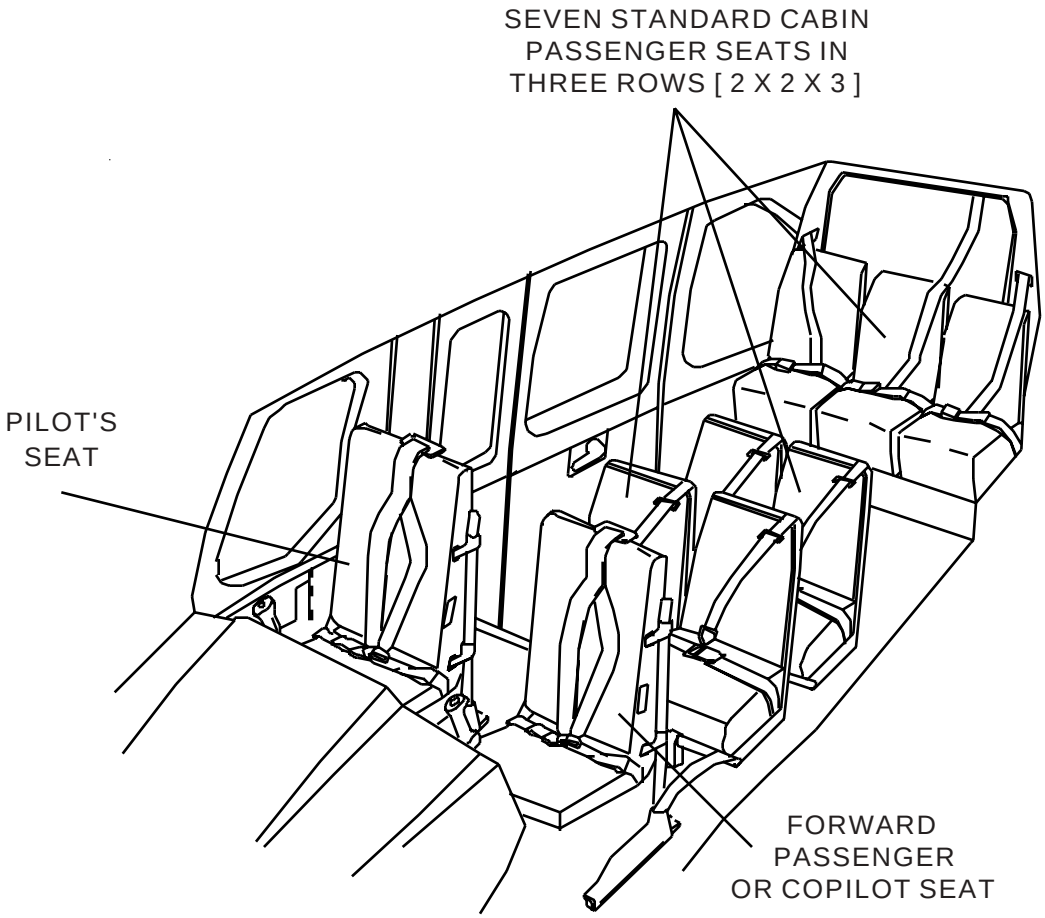
C

Special company colors, paint design, logos, etc., can be negotiated.

GENERAL DESCRIPTION

OF THE STANDARD CONFIGURATION
SERIAL NO. 49001 AND SUBSEQUENT

The **Bell 430** is the newest of the Bell intermediate twin engine helicopters and is designed to carry **nine to ten** adults comfortably, including the **pilot**. The Bell 430 is approved for **single pilot operation** (standard nine place seating) and is certified for land operation under **day** or **night** VFR non-icing conditions as a Transport Category Rotorcraft (FAR Part 29, Category B). The standard Bell 430 incorporates all of the redundant systems necessary for **Category A** certification.



The **pilot** must occupy the right front seat. A **passenger** seat is provided on the left, which may also carry a copilot with the addition of the optional dual flight control kit [provisions for this kit are standard]. **Seven additional passengers** can be accommodated in the spacious **main cabin.** Passengers can enter the cabin from either or both sides. Two rows of two seats, centrally located, face forward. The remaining three seats are in a row, facing forward, on a bench at the rear of the compartment. This is the STANDARD **nine place** interior. Headliners, soundproofing, carpet and upholstered seats add to the comfort. **Conversion** from passenger to cargo configuration is easily accomplished by removing the cabin seats.

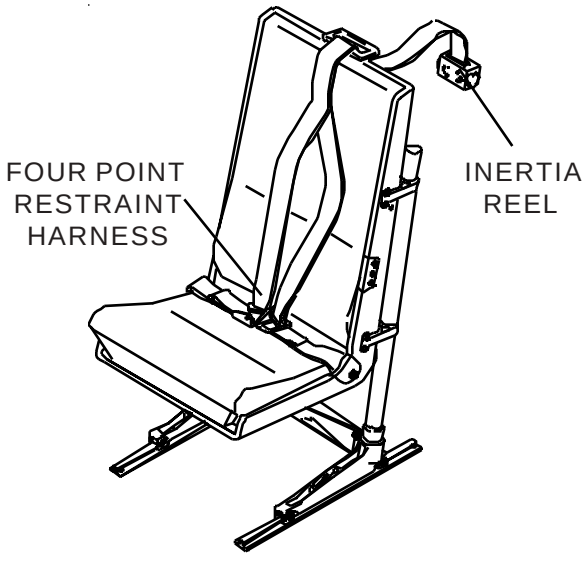
430 SEATING

PILOT AND FORWARD PASSENGER SEATING

Two individual ergonomically designed **energy-attenuating** bucket seats with adjustable lumbar support, each equipped with seat belt, double strap **[four point]** shoulder harness and inertia reel, with "Quick Release" mechanism, are located in the cockpit. The color and upholstery material for the seats, and interior trim of the cockpit match that which is selected for the cabin.

OCCUPANT RESTRAINT

Each crew and passenger seat is equipped with a restraint assembly that consists of an inertia reel, a shoulder harness [pilot & left front seat have double straps / the passenger cabin has single straps], and an adjustable seat belt. The inertia reel is provided with an anti-rebound lock feature and is capable of retracting **56 centimeters (22 inches)** of web belt.



CREW SEAT

CABIN SEATING & INTERIOR CHOICES

Standard Seating - Seven fabric covered high-backed **non-folding** seats with individual seat belts and **single strap** shoulder harness and inertia reel, arranged with two rows of two, and one row of three forward facing seats. Available in DARK RED, BLUE, BROWN, or GRAY fabric covered cushions. (108.6 lbs. [49.3 Kg.] **included** in the standard configuration weight.) All **leather** or **vinyl** is available as an **option**. This configurations also available with **optional** energy attenuating (either **with** or **without** folding seatbacks) passenger seats.

Corporate Interior - This **optional** higher level of interior trim complements the executive seating, but may also be specified with the standard seating, and includes: Floor covered with tightly woven wool carpet; Side wall armrests covered in color coordinated leather, with fine hardwood accent trim; Color coordinated seat belts; Color coordinated leather covering for the crew and passenger seat backs; Decorative accent fabric covering for the aft cabin bulkhead and small control column bulkhead. (When installed a **net increase** of **10.3 lbs. [4.7 Kg.]).**

8-Place Corporate Seating - Six deep bolstered fine wool fabric covered high-backed seats with individual seat belts and **single strap** shoulder harness and inertia reel, in the traditional CLUB arrangement, with one row of three facing **rearward**, and one row of three facing **forward**. Available in **eight** color coordinated choices of fabric covered cushions. (88.0 lbs. [39.9 Kg.]-when installed a net decrease of -3.7 lbs. [-1.7 Kg.]). All **leather** is available as an **option.**

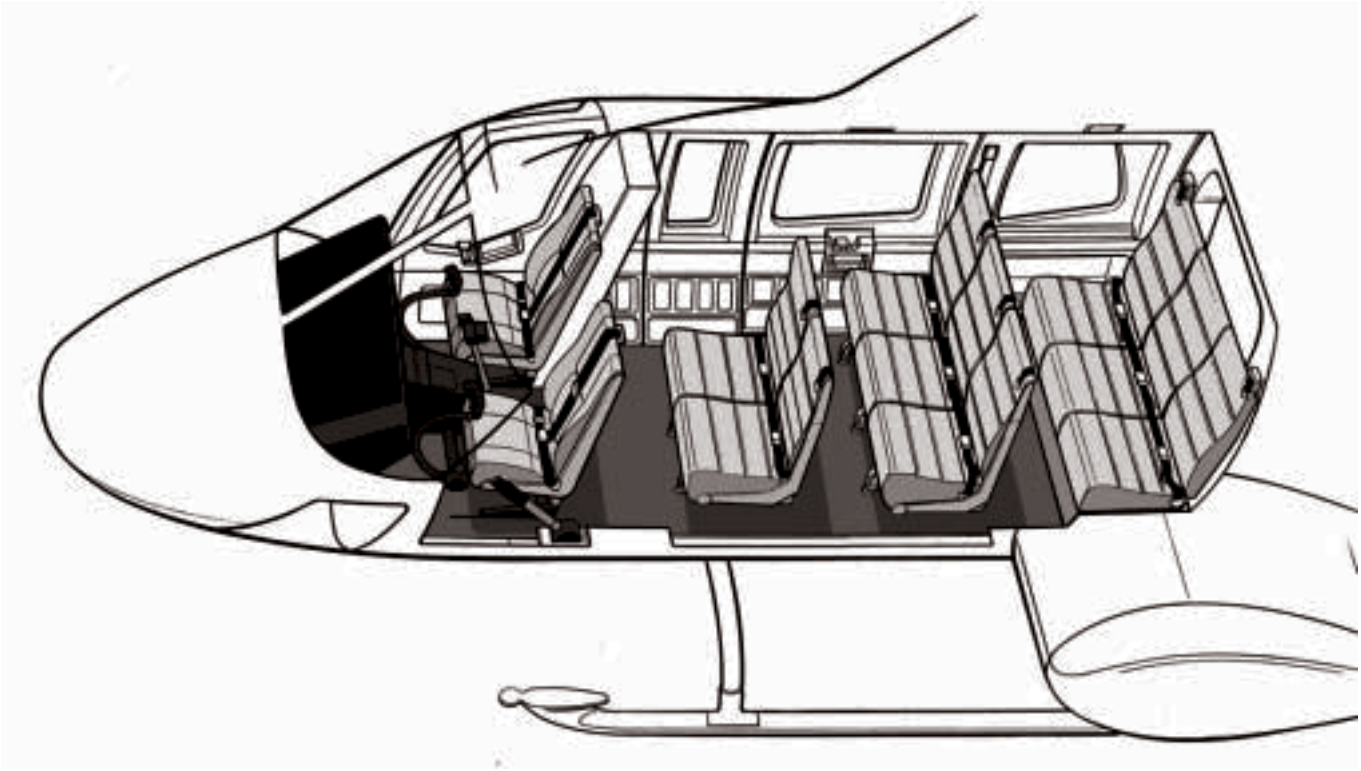
Additional Corporate Seating Arrangements - Cabin seating options with **four** or **five** passenger seats in the cabin, and one or two refreshment / entertainment cabinets are also available;

7-Place Corporate Seating w/one cabinet-[67.5 lbs. (30.6 Kg.), net -22.1 lbs. (-10.0 Kg.)]

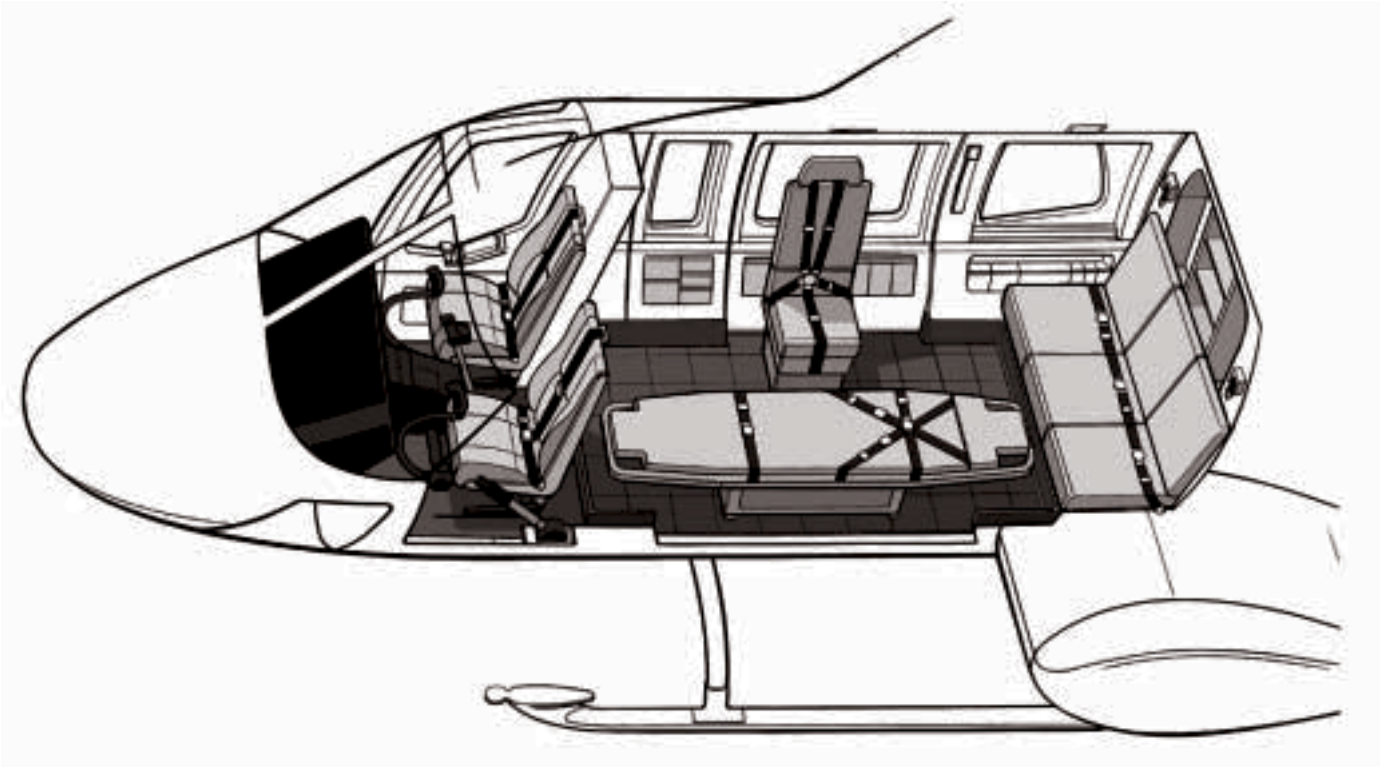
6-Place Corporate Seating w/two cabinets-[Customized, net +35 to 50 lbs.(+16 to 25 Kg.)]

ADDITIONAL CABIN SEATING & INTERIOR CHOICES

Customized 10-Place Forward Facing Seating - Nine fabric covered high-backed **energy attenuating** seats with individual seat belts and **single strap** shoulder harness and inertia reel, arranged with one row of two, and two rows of three forward facing seats. The outboard two seats in the middle row **fold forward** to provide access to the rear row. Available in DARK RED, BLUE, BROWN, or GRAY fabric covered cushions. (134.0 lbs. [60.8 Kg.]-when installed a net increase of 48.3 lbs. [21.9 Kg.]). All leather or vinyl is available as an **option**.



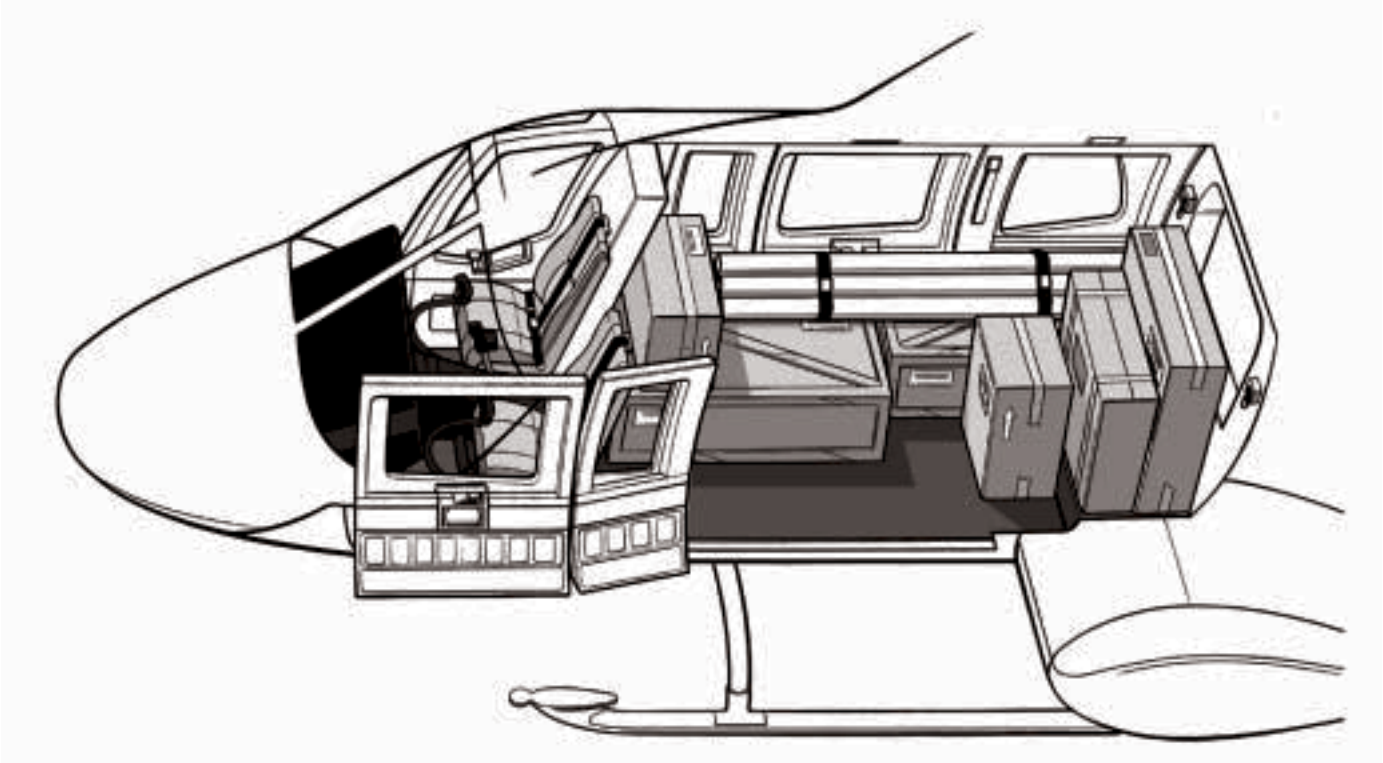
Customized EMS - Single Pivoting Litter [illustrated below] - Customized EMS interiors are available to meet a broad range of Hospital Based or Public Agency medical transport and critical care requirements. The Bell 430 cabin offers ample space for either single or dual pivoting litter installations. The **158 cubic foot (4.5 M³)** cabin volume provides an unmatched work area for multiple medical attendants, with care provided at the head of the patient, along with a complete complement of fixed and portable life support equipment [An additional **37 cubic feet (1.1 M³)** of space located in the cabin accessible baggage compartment].



CARGO

When cargo is transported, it may be secured against shifting by attachment of straps and tie-down rings to the **16 recessed studs** found in the cabin floor.

The studs are all stressed for maximum loads of **1134 kilograms (2500 pounds)** force, from perpendicular to 30° in any direction.



SOUNDPROOFING

A highly effective soundproofing installation has been engineered for the Bell 430, and is provided at **no additional cost**, unless the customer **declines** its installation. This provides the customer flexibility where **non-Bell interior completions** are planned, or utility operations require the **minimum aircraft empty weight / maximum available payload.** The Basic Soundproofing Installation reduces the noise entering the cabin from the engine and transmission compartments. The soundproofing material consists of a heavy duty blanket which fits between the headliner and interior trim panels, and the airframe. The blanket is constructed from alternating layers of sound-attenuating composite foam, lead foil, and vinyl covered fiberglass batting. Access panels and bulkhead passages for wiring, ducting, and plumbing are sealed to eliminate extraneous sound paths.

The installation is **compatible** with **only** the STANDARD INTERIOR TRIM. The installation is **not compatible** with the optional CORPORATE INTERIOR TRIM or with highly customized interior completions (such as "COCOON" isolation-type interiors).

The increase in weight with the soundproofing installed is **43.0 kilograms (95.0 pounds)**.

If the **optional auxiliary fuel tank** is also installed, the weight increase is **43.2 kilograms (95.3 pounds).**

STANDARD SOUNDPROOFING BEHIND INTERIOR TRIM PANELS REDUCES
NOISE IN THE CABIN FROM THE ENGINES AND TRANSMISSION
[SOUNDPROOFING WEIGHT IS **NOT INCLUDED**
IN THE STANDARD CONFIGURATION WEIGHT]

CREW COMPARTMENT

Access to the crew compartment is provided on either side through **large doors** which are hinged at the forward edge. The doors are secured by a **three-point / dual-action** latching system and feature **full perimeter sealing** against wind noise or water leaks. A hinged metal strap, with a strong spring action , is mounted on the bottom edge of the door to hold it in the open position. The external door handles are **flush-mounted**, spring-loaded levers, which are easy to grasp and turn. The internal handles are of the **lift-up** type, with an adjacent hinged assist handle. A common **keyed lock** is shared with the cabin/baggage doors.

DOCUMENT STOWAGE

Provisions for stowage of documents / equipment during flight are included. The following list of stowage requirements are provided for: Operators Manual, Maps, Approach Plates / Airport Directories, Flight Computer / Portable GPS. Additionally, provisions for the aircraft log book are available.

GLASS WINDSHIELDS

Excellent visibility is provided in the crew compartment by **two large glass windshields** and acrylic windows in the **doors, lower nose, and roof.** Each crew door window has a **clear vision window** in it's upper center section. The small window is hinged at the bottom, latched at it's top, and is sealed for protection against wind and water.

STANDARD GLASS WINDSHIELDS

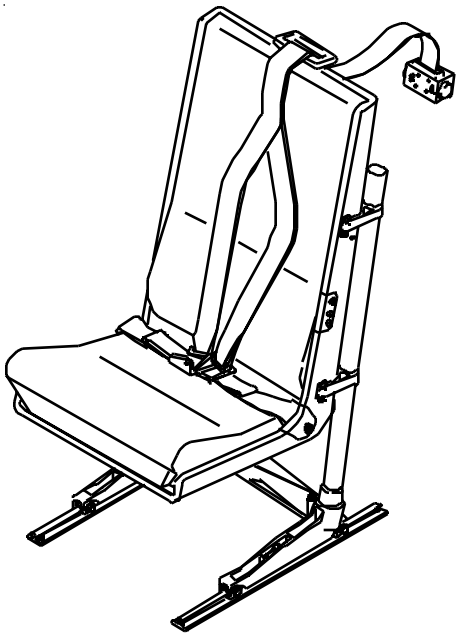
WINDSHIELD WIPERS

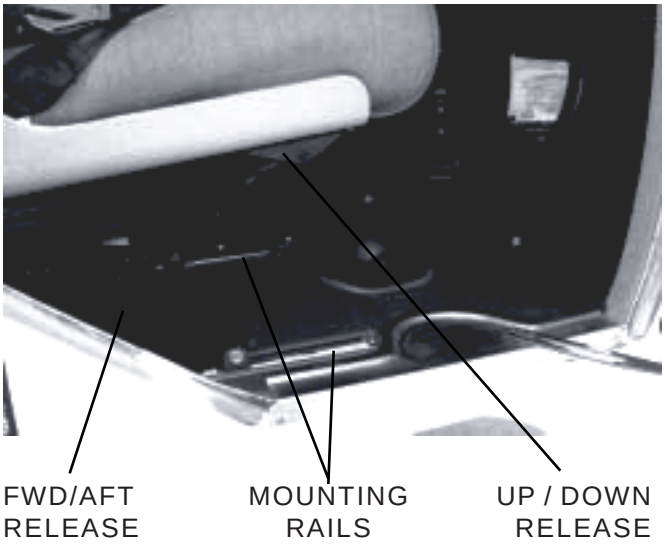
A **windshield wiper** is installed on each windshield. The wipers operate in **synchronization** and are controlled by a single switch located on the overhead console. The switch has **four** positions, HIGH, LOW, OFF, AND PARK.

CREW SEATING FEATURES

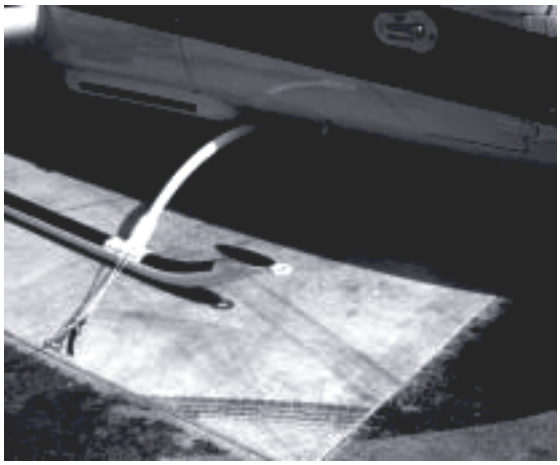
Energy attenuating bucket seats are provided for the pilot and left front passenger. These seats are upholstered with flame retardant materials and are **individually adjustable** fore and aft and up and down. Attachments on the bottom of the seats fit on to rails built into the floor and allow forward / rearward movement up to 11.4 centimeters (4.5 inches), locking every 2 centimeters (0.8 inches). The **control lever** is on the right lower seat support. Each seat has its own **seat belt and dual-shoulder harness** with inertia reel. The metal buckle of the lap belts accept the clips at the ends of the shoulder harness straps. One release motion serves to disengage the buckle and straps. The **inertia reel** locks automatically to restrain the seat occupant when it senses sudden deceleration.

Each of the crew seats weighs approximately **12.7 kilograms (28 pounds).**





The seat back is supported by **three vertical columns**, which permit up and down adjustment of up to 8.9 centimeters (3.5 inches). A **lever** under the right forward edge of the seat controls the movement, while an **assist spring** in the central column make upward adjustment easy. The **central column** also contains frangible material which **absorbs energy** and allows the seat to stroke downward in the event of severe impact. The seats are designed to begin absorbing energy as a 77 kilogram (170 pound) mass reaches 14.5 g's downward acceleration.

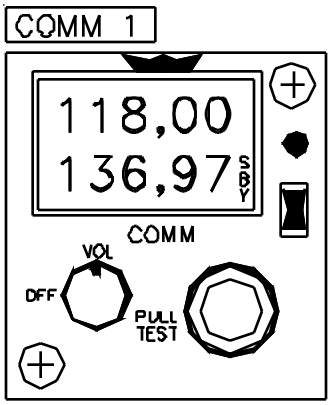


A **crew step** built in to the forward tip of the skid landing gear allows easy entrance and exit.

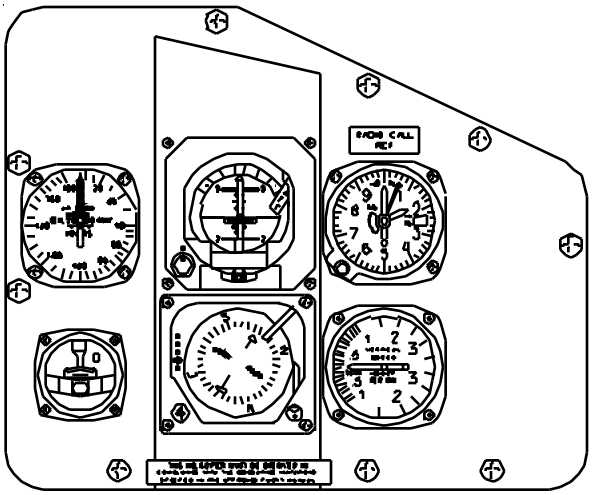
COCKPIT FEATURES

The standard **instrument panel** is equipped with the basic VFR flight instruments with ample space to add a wide selection of options. Visibility forward and to the side is excellent due to the panel's low, compact design. The standard VHF-AM communications system (VHF comm No.1) is a **King KTR-908** lightweight airborne radio. It provides two-way amplitude-modulated voice communications within the frequency range of 118.000 **MHz** to 135.975 **MHz**. The radio's control head is located on the upper center section of the instrument panel. The remote mounted transceiver unit is located in the nose avionics compartment and the antenna is on the aircraft belly. The transmit function is controlled by a switch on the **cyclic stick** and the floor mounted **foot switch**.

VHF COMM 1 CONTROL HEAD



PILOTS INSTRUMENTS [STANDARD ELECTROMECHANICAL]



PILOT CYCLIC TRANSMIT SWITCH

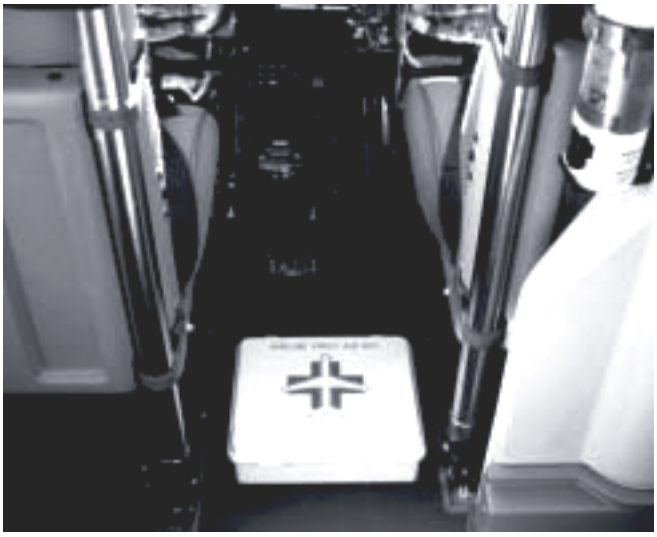
FLOOR TRANSMIT SWITCH

A **center pedestal** between the two cockpit seats contains the pilots' ICS control panel, pilot and left seat ICS / radio foot switch selectors, and gyrocompass control switch. The remaining space is available for optional equipment.

COCKPIT FURNISHINGS

A hand-portable **Halon fire extinguisher** is located in the cabin. Installed on the vertical control tunnel's left side in a quick-release bracket, it is readily accessible to the pilot or passengers. A **first aid kit** is mounted in between the two cockpit seats.

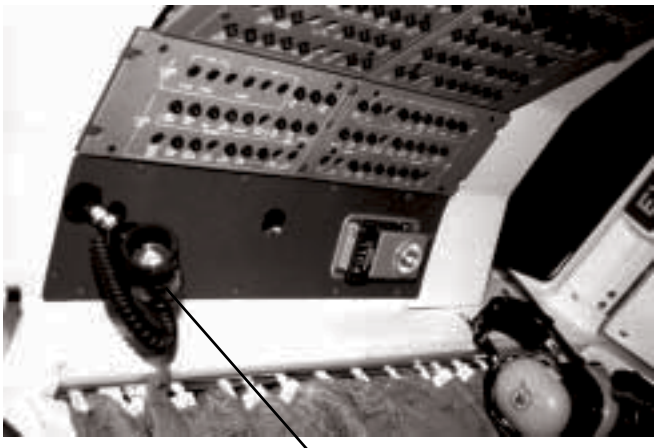
FIRE EXTINGUISHER



FIRST AID KIT

Two **ash trays**, one on each side of the cockpit, are located near the forward door posts at arm level. An aircraft DC electric powered **cockpit utility light** is located at the rear of the overhead control panel. It may be removed from its mounting and used by either crew member by means of its **coiled cord**.

CREW ASH TRAY



UTILITY LIGHT
[GRIMES LIGHT]

Map pockets are located in the lower portion of each crew door. An **approach plate holder** and directable **map light** are located on the pilots' door. The approach plate holder swings up into position near the standby magnetic compass, directly below the map light.

DOOR MAP POCKET

MAP LIGHT IS
DIRECTABLE
AND DIMABLE

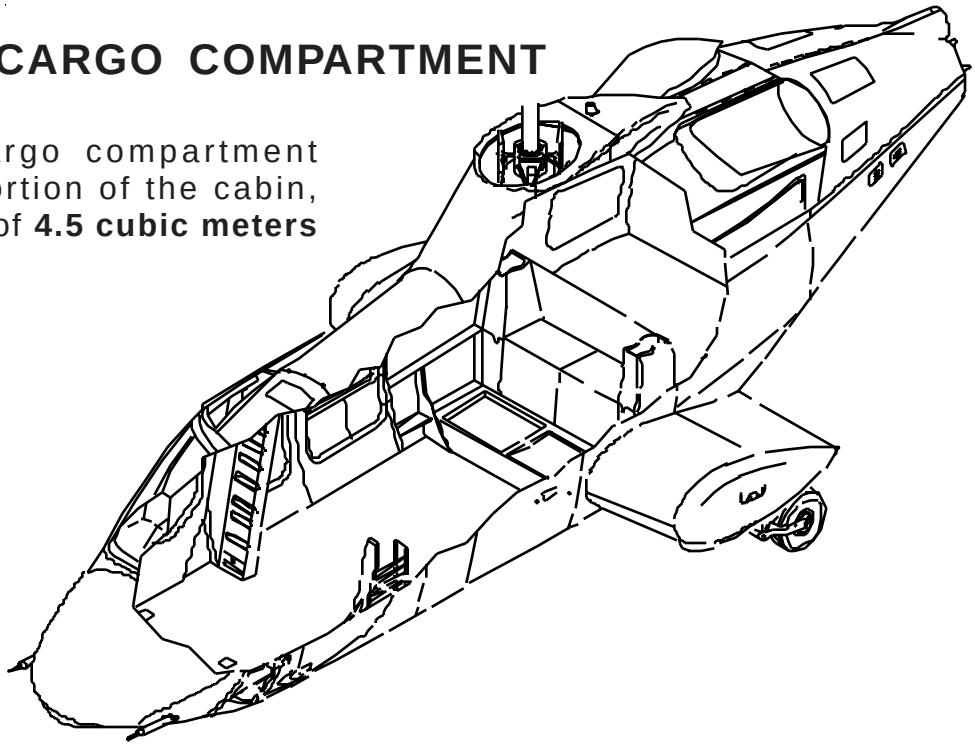
SAFETY MIRROR

APPROACH PLATE HOLDER
SWINGS AWAY IF NOT NEEDED

A **convex safety mirror** on the left inside door post allows the pilot to observe cabin security / loading passengers at a glance, with a minimum of effort, and upper body movement.

PASSENGER / CARGO COMPARTMENT

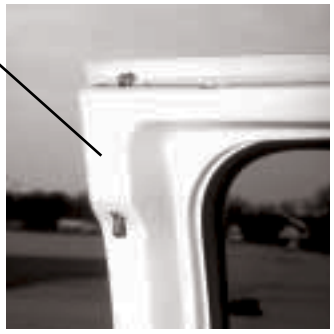
The passenger/cargo compartment occupies the aft portion of the cabin, enclosing a volume of **4.5 cubic meters (158 cubic feet).**



Access to the passenger compartment is provided through two wide-opening doors, one on each side. The doors are hinged at their forward edge, and swing open through nearly 180° to present an almost unobstructed threshold to the cabin. The door opening is **0.9 meters (35.6 inches) wide by 1.45 meters (57 inches) high.** The three-point latching system, and **slam-closing** feature insure a secure, tight fit when closed. The flush exterior handles, common keyed lock, and full perimeter sealing are the same as for the crew doors. Additionally, a **door open indicator pin**, visible to the pilot, identifies an unlocked door. The door hinge incorporates **hold-open detents** at approximately 90° and 115° and a **pin-type securing mechanism** which enables the door to be locked in it's forward position.

CLOSED

DOOR OPEN INDICATOR

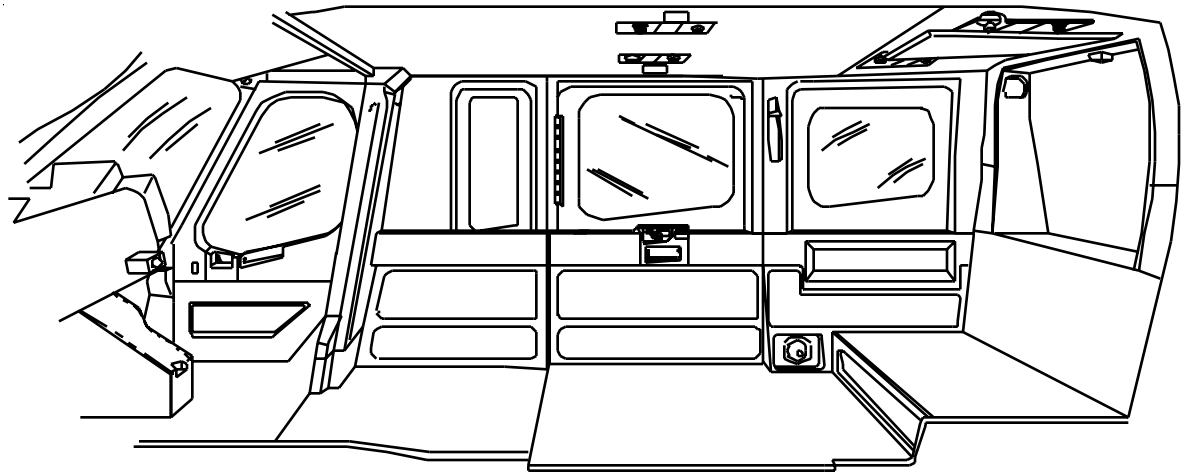


OPEN

EMERGENCY EXITS

The cabin door windows are fabricated from tinted stretched acrylic, mounted in silicone rubber molding. The window openings are **0.67 meters (2.2 feet) wide by 0.52 meters (1.7 feet)** high, and serve as **emergency exits** when pushed out at the lower corners.

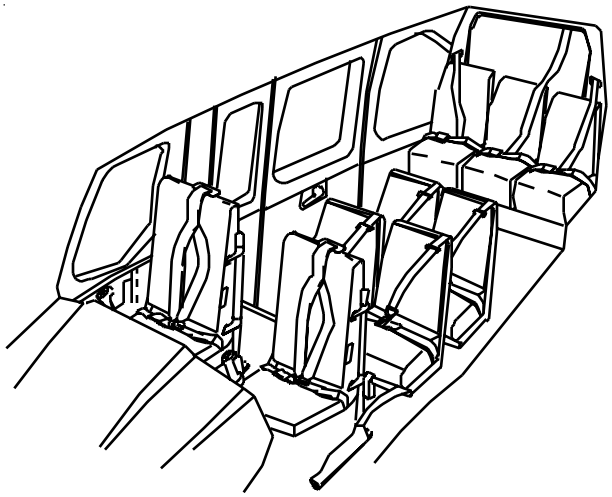
CABIN FURNISHINGS

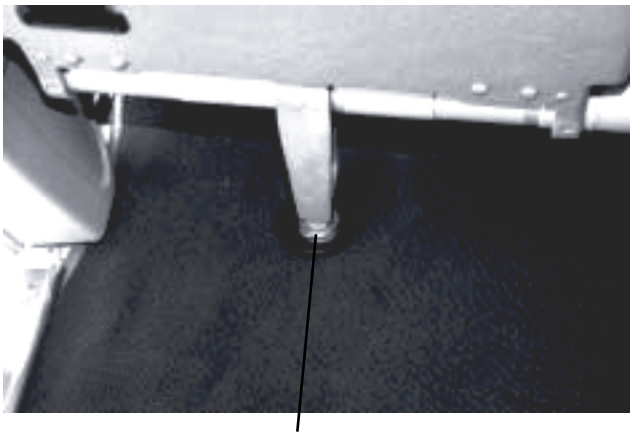


Included in the standard interior trim are; **entry assist straps** at each cabin door, hinged **door closure assist handles**, four **ash trays**, durable padded VINYL floor covering **or** plush NYLON loop carpet, **hat-rack** stowage area, and cabin **dome lights.** Six ash trays are located in the outboard window trim panels, three on each side of the cabin. The weight of the standard utility interior trim is **33.8 kilograms (74.5 pounds)** and is ***included in the standard configuration***.

STANDARD SEATING

The **nine place**[seven **cabin** seat]**utility interior** is standard. There are **three rows** of cabin passenger seats, one aft row of **three**, and two rows of **two** (one intermediate and one forward). The lightweight **folding** seats with high backs and individual lap belts / shoulder harnesses meet the latest **FAR** specifications for occupant restraint. The seats are comfortably upholstered in **flame retardant fabric**, and feature advanced **ergonomic** design.





FLOOR FITTING

The seats are secured to the floor of the cabin with quick-release / positive locking **ring-on-stud** type fasteners. They are easily removed in only moments to convert the cabin for carriage of large or bulky cargo. The average weight for each two seat module is **15.9 kilograms (35 pounds).** The average weight for each individual rear row seat is **6.8 kilograms (15 pounds).** The total weight of the standard seating is **49.3 kilograms (108.6 pounds).**

The long cabin has room for comfortable seat pitch in the standard 9 place seating arrangement. The standard arrangement has:

- Two seats in the cockpit
- Two seats in the front row of the passenger cabin
- Two seats in the middle row, and
- Three seats in the aft row.

Seat pitch is generous:

- 35.9 inches, 91.2 centimeters, between the crew seats and the front row.
- 34.8 inches, 88.4 centimeters, between the front and middle rows,
- 35.6 inches, 91.2 centimeters, between the middle and aft rows.

PHOTOS FOR ILLUSTRATION OF DOOR WIDTH ONLY
[SEATS SHOWN ARE OPTIONAL 8-PLACE CORPORATE CONFIGURATION]

OPTIONAL
LITTER DOOR
54 INCHES [1.37 METERS]
WIDE ACCESS

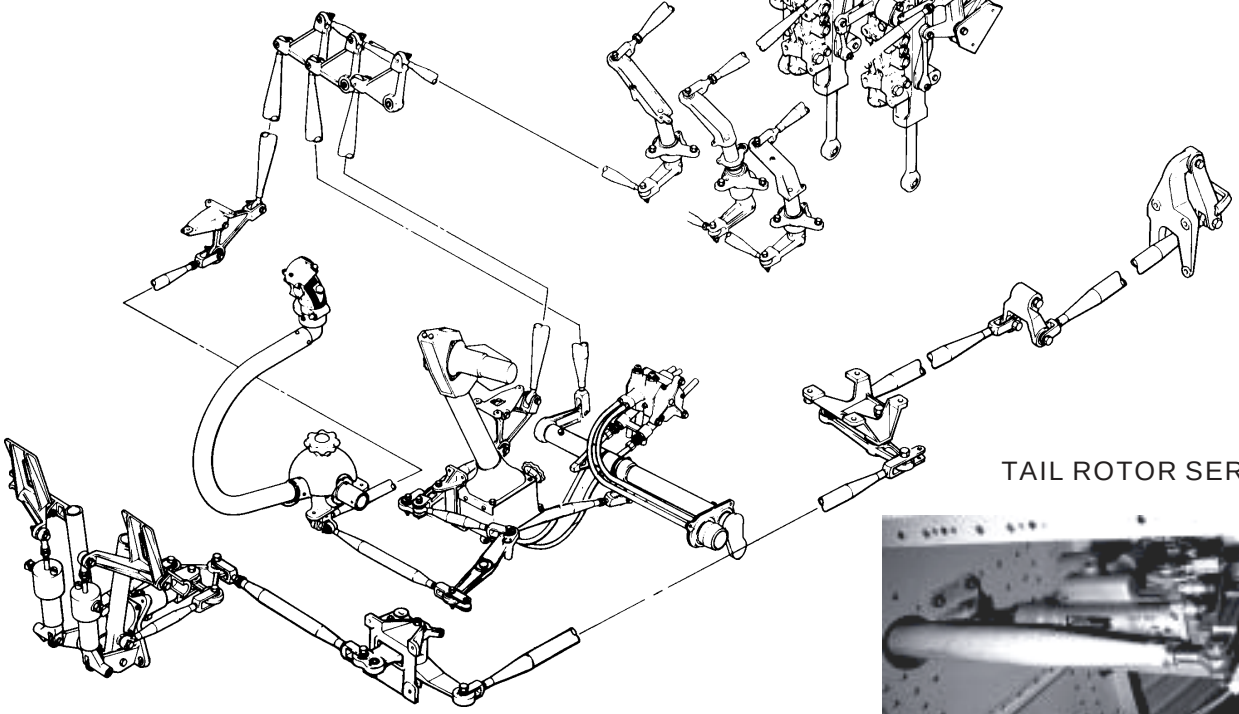
STANDARD
36 INCHES [0.92 METERS]
WIDE ACCESS

These seat pitch values are well in excess of the 30 to 32 inches found in the coach section of jet airliners. The standard left and right cabin doors open to an unobstructed area of **3 feet, 92 centimeters**, wide by **4 feet, 122 centimeters**, high. An **optional** hinged panel door kit is available that consists of two doors on the left side of the cabin. The main door is identical to the right one. It is attached with a hinge to a panel door in a manner similar to the Bell LongRanger series. This panel door also is hinged, and both doors can swing open to give a **54 inch, 137 centimeter**, access to the cabin to facilitate litter or bulky cargo loading.

FLIGHT CONTROLS

Conventional helicopter flight controls are provided to control attitude, altitude, and direction. Inputs from the **cyclic** and **collective** controls are transmitted to the MAIN ROTOR, and inputs to the **anti-torque** (directional control) pedals are transmitted to the TAIL ROTOR. The flight control system is a direct **mechanical linkage**, using only push-pull tubes and bellcranks. All bearings in the tubes and bellcranks are spherical, self-aligning, and require **no lubrication**. There are no cables or pulleys to require tension adjustments or fraying inspections.

CYCLIC AND COLLECTIVE SERVOS



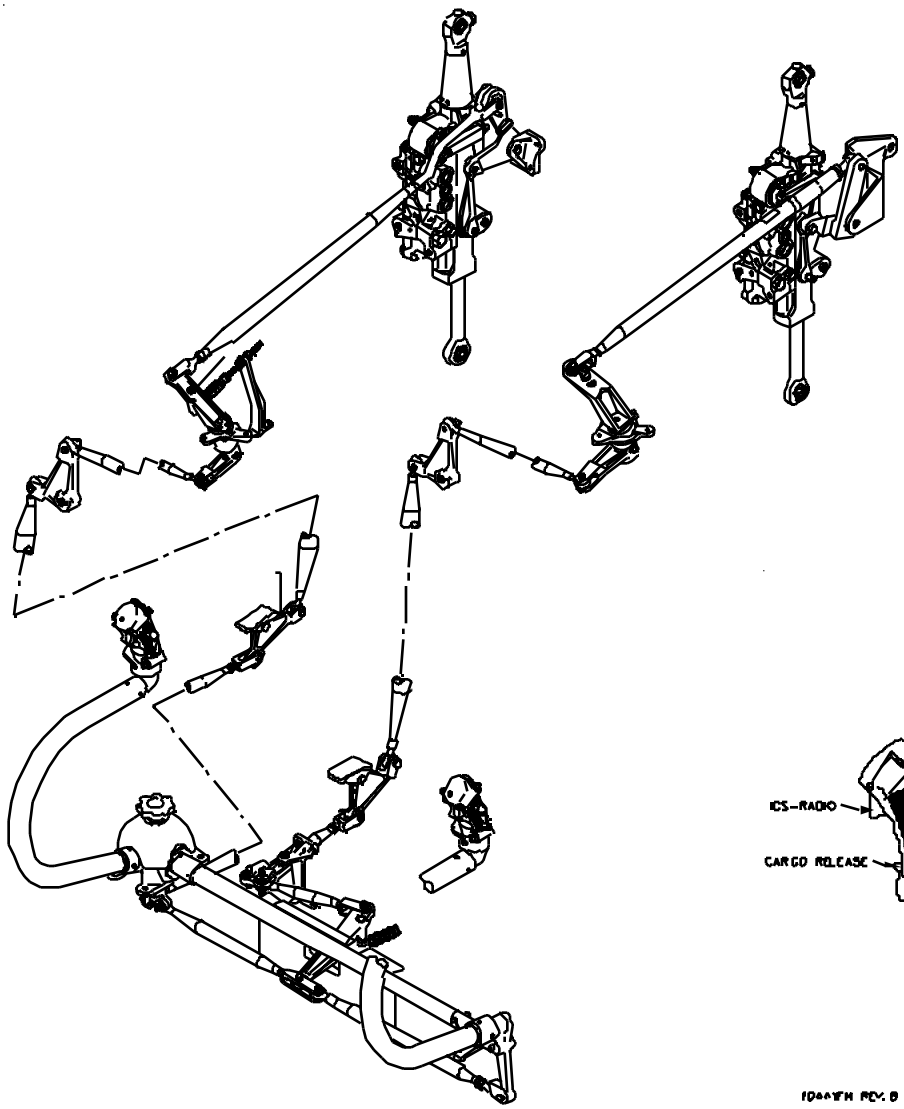
TAIL ROTOR SERVO

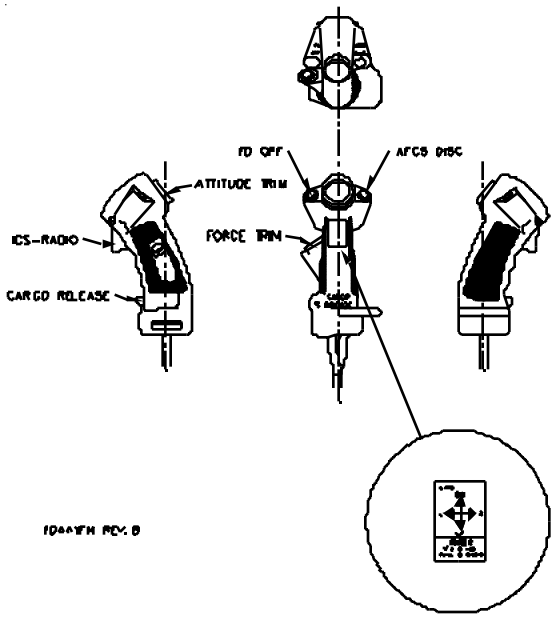
HYDRAULIC BOOSTED CONTROL

The CYCLIC and COLLECTIVE controls have **dual hydraulic servo actuators** , and the DIRECTIONAL controls have a **single hydraulic servo actuator** to amplify the force of the pilot's inputs. The hydraulic servo actuators also **prevent feedback** forces from the rotor systems from moving the pilot's flight controls.

CYCLIC CONTROL SYSTEM

The **cyclic control stick** attaches to the floor, directly in front of the pilot's seat. A direct linkage beneath the floor separates **fore and aft**, and **lateral** inputs, and transmits them through the vertical control tunnel to the respective servo actuators. Provisions to connect the optional **dual/copilot** control kit are **standard**.



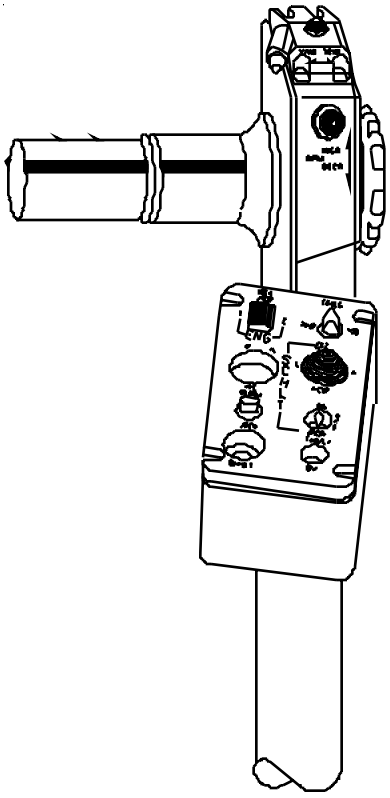


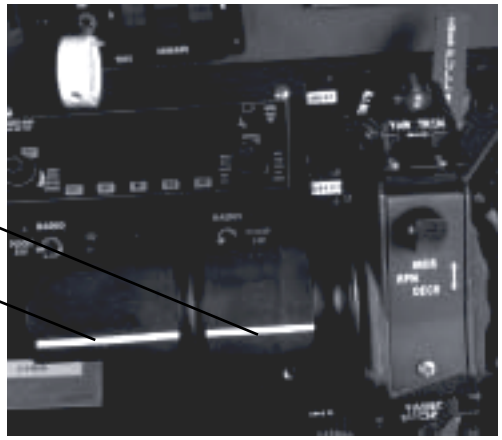
CYCLIC STICK GRIP

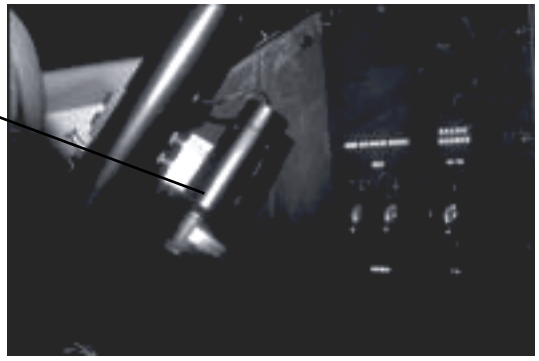
The cyclic grip has a **two-position** radio "trigger" **switch** on it's forward face. The first detent activates the intercom, while the second activates the VHF communications transmitter. Space is provided on the grip for additional switches used to control optional equipment. A **friction adjustment** control, located at the cyclic's base, allows the pilot to set the desired amount of control resistance.

COLLECTIVE CONTROL SYSTEM

The collective control lever attaches to the cabin floor on the pilot's left, at the base of the pedestal. A **direct linkage**, beneath the floor, transmits collective input through the vertical control tunnel to the **collective** servo actuator. Provision to connect the optional dual/copilot control kit is standard. The standard **collective-mounted** twist-grip engine throttles are arranged **horizontally** on the left side of the control head, and **align directly** with their respective engine instruments. They are **always available** for pilot management, without releasing the collective lever. The left/right arrangement corresponds to the physical engine location; left - **No.1**/left**- No.2**/right. This insures correct identification of engine/throttle.

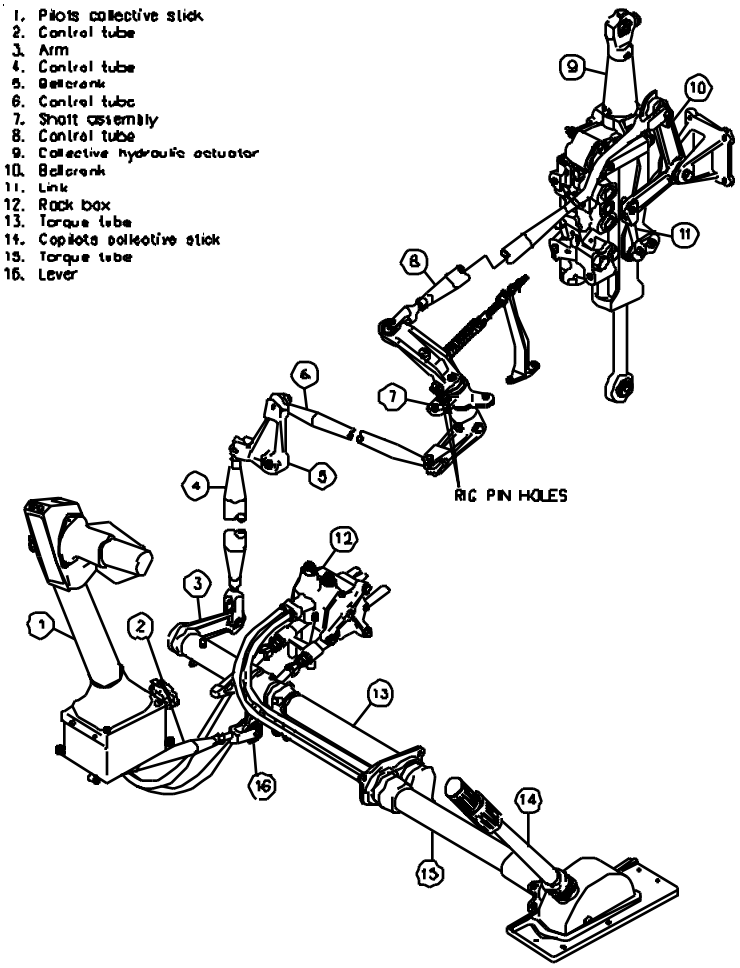


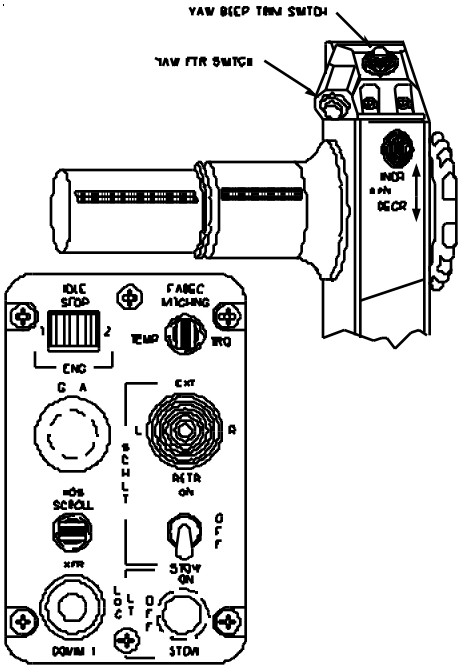




The Bell 430 collective lever incorporates some **unique design features** which reduce pilot effort and enhance safe operation. The collective operates in a near **horizontal arc** (i.e.; increasing collective pitch equates to more rearward than upward motion of the lever) perpendicular to any vertical rotor system vibrations, which **eliminates** any pilot induced oscillations. The motion is natural and pilot control inputs are instinctively correct. The throttles are **canted aft** about 10° and form a comfortable and natural **left hand** grip. Bold **white lines** on the finely ribbed black rubber grips **visibly** indicates throttle position throughout their range. Throttle motion is conventional and instinctive; rotating up and forward to **open** and down and rearward to **close**. A **stick shaker** is located on the collective lever, and when an impending OVERTORQUE condition is sensed by the IIDS it functions (vibrates) to warn the pilot to reduce power. A shaker test button is located on the pedestal.

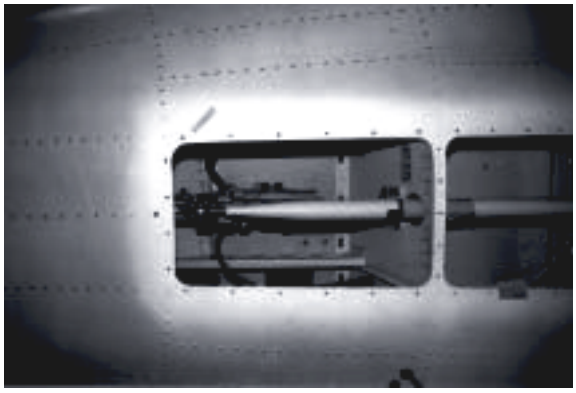
Throttle **friction** adjustment is provided by a large **knurled ring** on the right side of the collective lever. The engine **RPM (N_p)** control is located at the top of the collective. This **two-way** RPM "**beep**" switch serves to adjust RPM of **both** engines simultaneously when moved **fore/aft** (for fine adjustment of rotor RPM). A **collective control box** is attached just below the throttles. It contains the **FADEC MATCHING** switch (which selects either **torque** or **temperature** matching for the engines), the **idle stop release switch (**which permits the respective throttles to advance past idle or to be closed), the **landing/searchlight's** on-off-stow and directional switches, the VHF comm No.1 standby **frequency transfer** button, and the **IIDS Scroll switch** (which allows the pilot to advance through the IIDS secondary display pages). There is extra space provided for optional equipment controls.



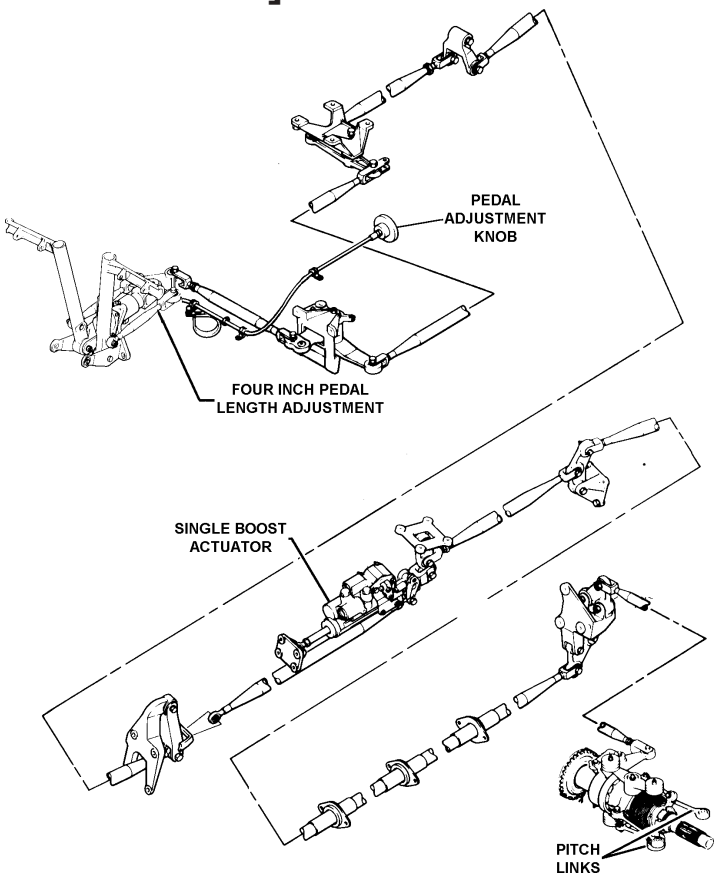


ANTI-TORQUE [DIRECTIONAL CONTROL] SYSTEM

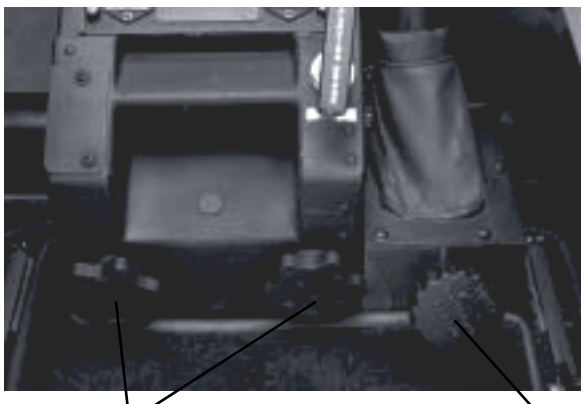
This system transmits movement from the control pedals to the tail rotor. The **direct linkage** under the floor transmits input through the belly control tunnel to the **single servo-actuator** and on to the tail rotor.



TAIL ROTOR SERVO

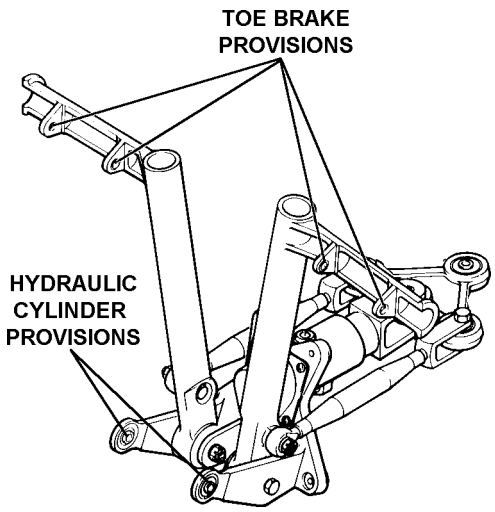


There is a pedal length **adjustment knob** located at the rear base of the pedestal, which allows approximately **10.2 centimeters (4 inches)** fore/aft movement of the pedals relative to the pilots feet. **Provisions** exist for both the addition of the optional dual/copilot control kit, and the hydraulic brake pedals of the optional wheel landing gear.



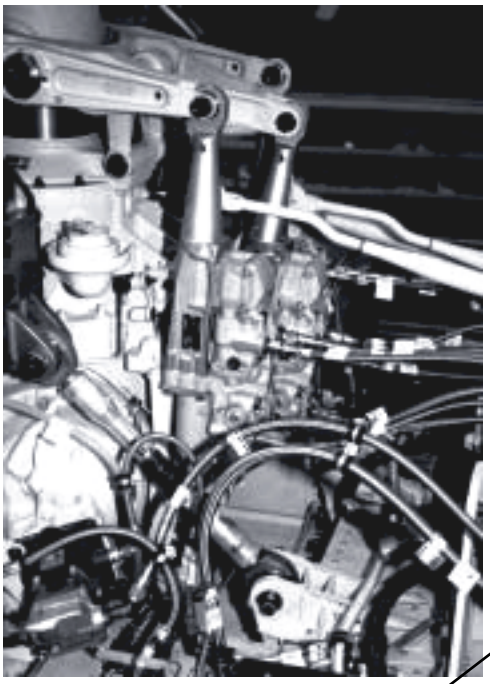
PEDAL ADJUSTMENT
CONTROL KNOBS

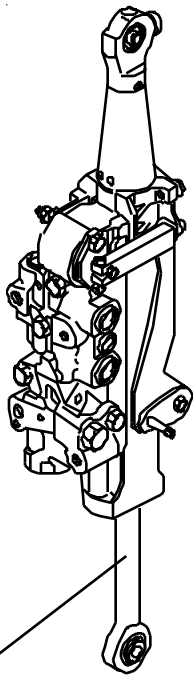
COLLECTIVE
FRICTION
CONTROL



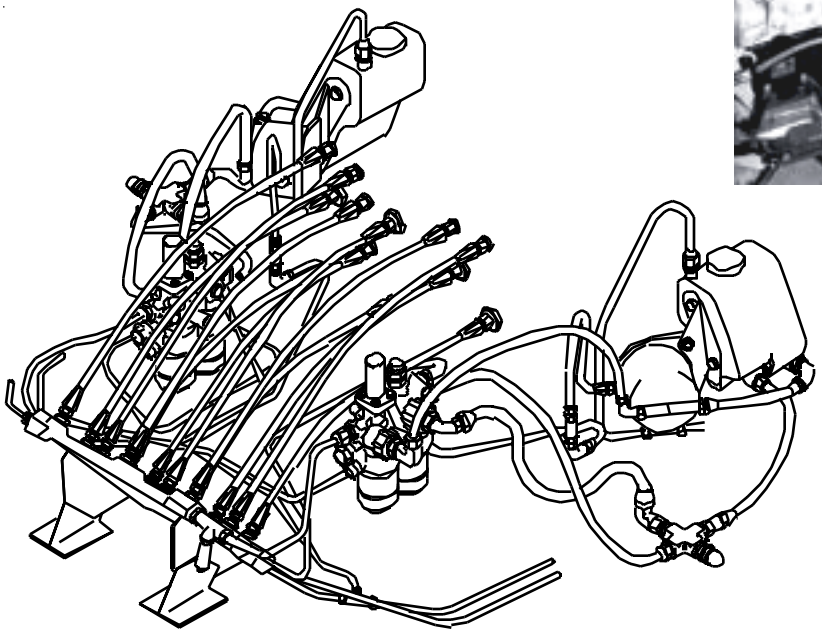
HYDRAULIC SYSTEM

The Bell 430 has **two** completely independent hydraulic systems, each with its own reservoir, variable-delivery pump, integrated valve and filter module, temperature and pressure monitoring sensors, "Quick Disconnect" ground test fittings, check valves, pressure and return manifolds, and distribution network. Each of the variable-delivery pumps is powered by **separate** drive quills located on the **left** and **right** freewheeling units of the transmission.





•EXAMPLE•



The **three dual hydraulic servo actuators** in the cyclic and collective control system are operated by **both** systems, which are designated **PC 1** and **PC 2.** Additionally, the directional control (ANTI-TORQUE) system **servo actuator** is powered by **PC 1**, and **provisions** exist for **PC 2** to power the optional wheel landing gear **retraction** mechanism. **Both** systems operate continuously, but may be **individually** de-energized for functional preflight system check. Two switches (HYD #1 & HYD#2), located on the overhead console, control solenoid valves and are connected so that only **one** system at a time can be de-energized.

The cyclic and collective servo actuators are mounted on the forward side of the transmission in order to isolate them from any inputs caused by pylon motion.

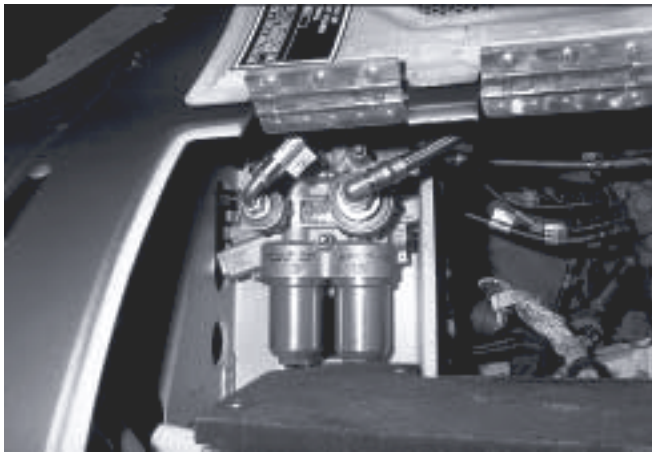
The lower half of each servo is powered by **PC 1**, while the upper halves are powered by **PC 2**. The nominal operating pressure of both systems is **10,342 kPa (1500 psi)** throughout the approved temperature range of **-54° to +82°C (-65° to +180°F).**

HYDRAULIC RESERVOIRS

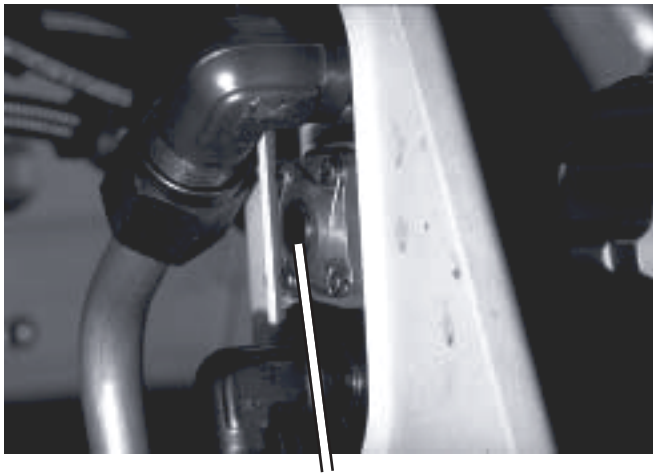
The **hydraulic reservoirs** are mounted on either side of the transmission. Each tank has a **sight glass** to visually check fluid level. **Temperature bulbs** in each tank provide input to the respective hydraulic display of the IIDS.

HYDRAULIC RESERVOIR

The **integrated valve and filter modules** are located on each side of the cabin roof. They contain **dual filters**, pressure and return, to insure that a single source of contamination does not spread to other system components. Both filters have RED **indicator buttons** which warn of filter obstruction. When the return filter becomes excessively obstructed a **bypass** valve opens. Each module incorporates **two relief** valves which eliminate residual or thermal induced pressure from the systems after shutdown. The pumps and reservoirs are coupled to the integrated modules by flexible hoses with quick disconnect fittings which allow a standard hydraulic **ground power unit** (hydraulic mule) to be attached for system maintenance checks.



FILTER MODULE W/"QUICK DISCONNECTS"

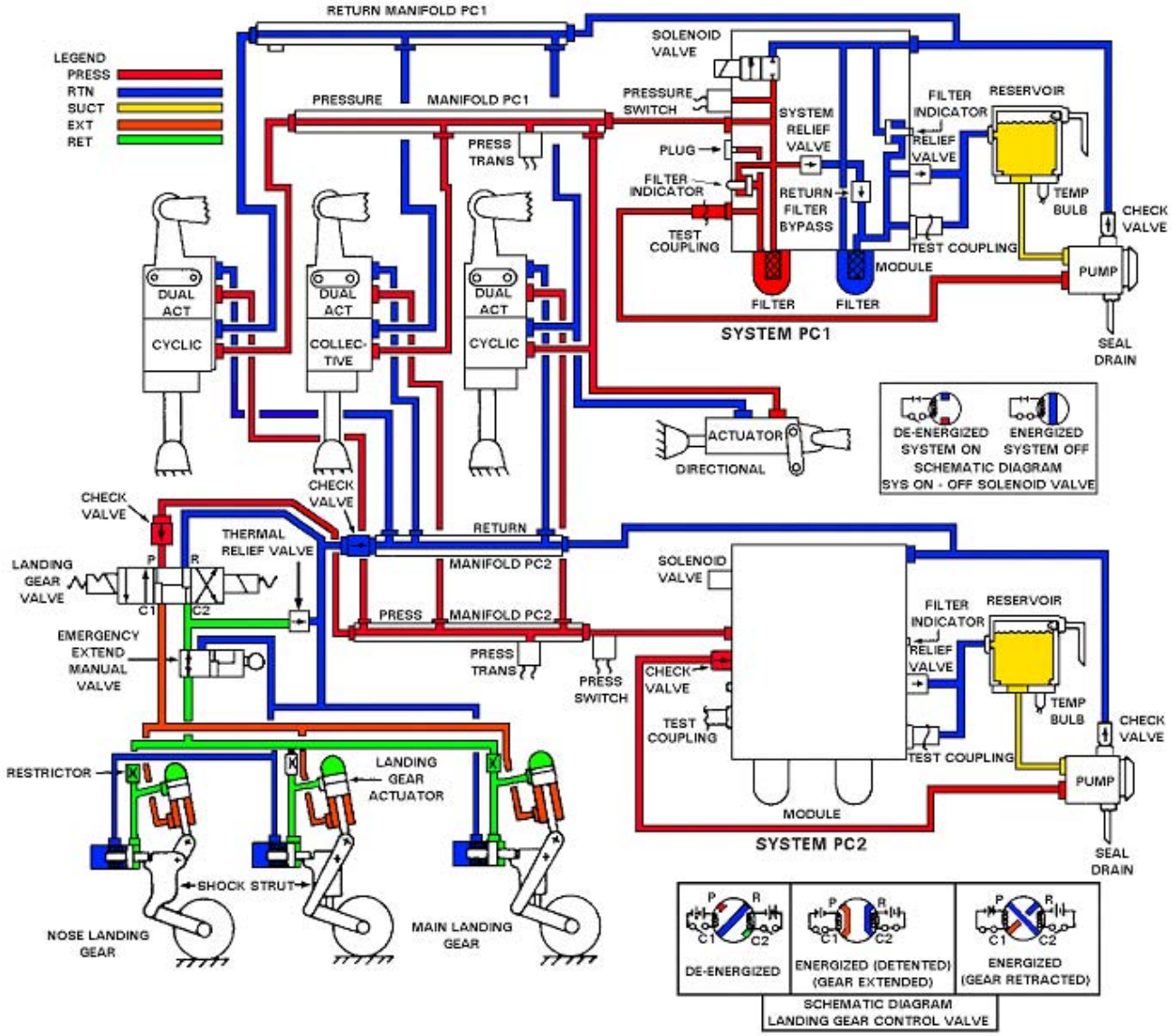


FILTER BYPASS BUTTON

Each system has **two** pressure sensors; a **pressure switch**, and a **pressure transmitter**. The pressure transmitters are located in the pressure manifolds, and provide input for the TEMP / PRESS display of the IIDS. The pressure switches are on the pressure side of the integrated modules, and are connected to the hydraulic warning/caution display of the IIDS. The indication illuminates when system pressure decreases below 6895 kPa (**1000 psi**). The indication extinguishes when system pressure increases above 8274 kPa (**1200 psi**).

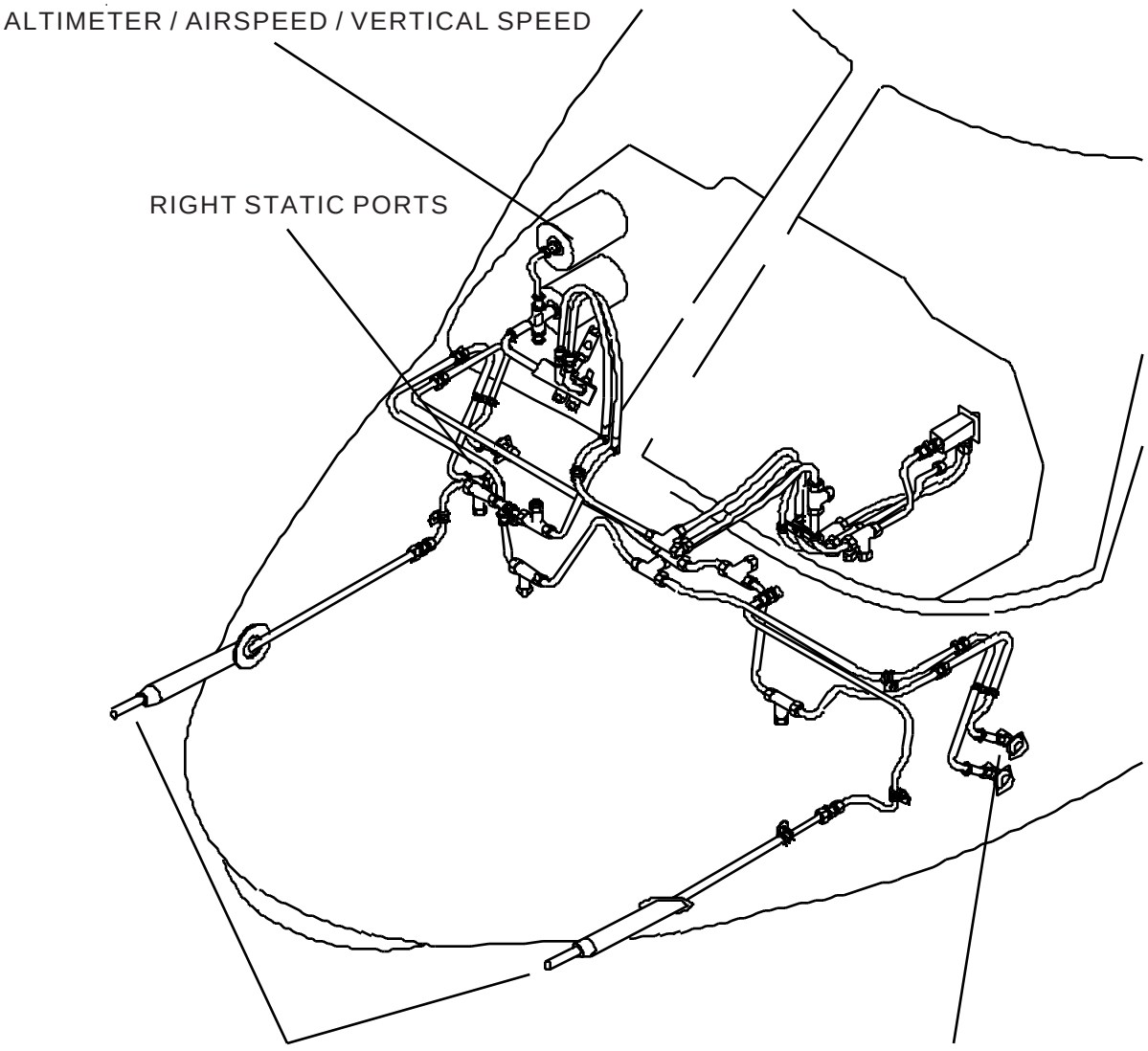
HYDRAULIC SYSTEM SCHEMATIC

[WHEEL LANDING GEAR CONFIGURATION SHOWN FOR EXAMPLE ONLY - STANDARD SKID LANDING GEAR CONFIGURATION INCLUDES PROVISION TO ADD WHEEL SUBSYSTEM]



PITOT-STATIC SYSTEM

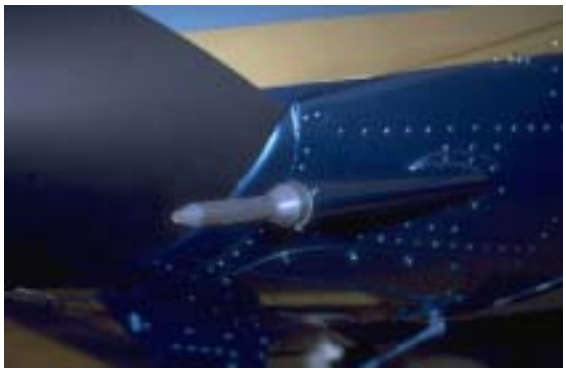
The pitot system (**ram** air pressure) consists of one **electrically heated** pitot tube on the left side of the nose, connected to the airspeed indicator. The static system (**ambient** air pressure) contains four **electrically heated** ports, two per side (upper and lower) located immediately in front of each crew door.



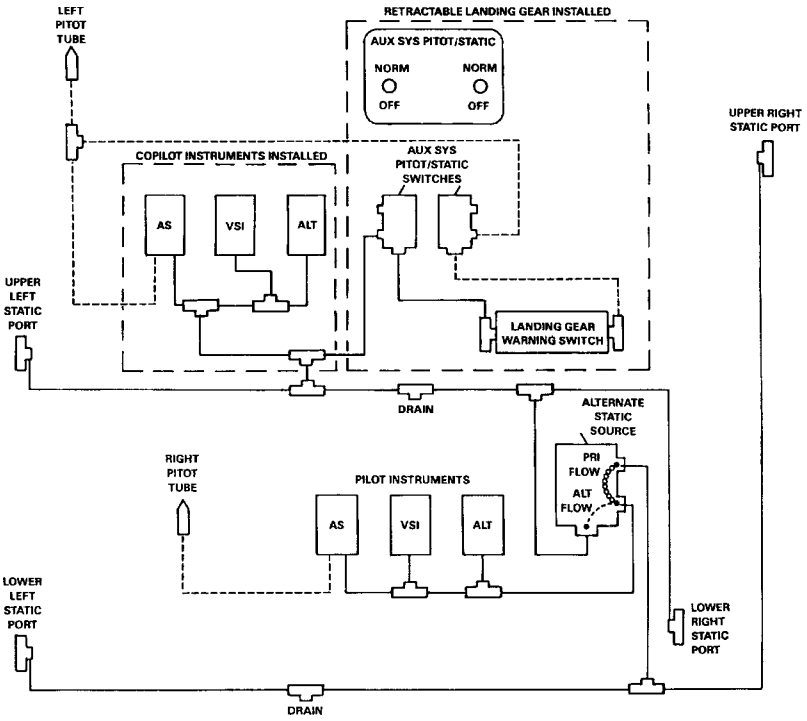
The upper right and lower left static ports provide **primary** equalized ambient pressure to the airspeed and vertical speed indicators, and altimeter through the **alternate static source switch** [PRI position]. The lower right and upper left ports provide the switch an **alternate** ambient source [ALT position], and include **provisions** to connect to the **optional** copilot instruments and **optional** wheel landing gears' auxiliary pitot-static system (landing gear warning switch).

The alternate static source switch is located on the lower right side of the **center pedestal**. Since a second **external** source is provided there in no need for an internal source, which could cause inaccurate instrument indications.

PITOT TUBE



DUAL STATIC PORTS



PRI / ALT STATIC SOURCE SELECT SWITCH

Additionally, a **second** pitot tube is installed as standard equipment. Located on the **left** side of the nose, but not connected internally, it is included to facilitate installation of the **optional** copilot instrument kit. The pitot-static system is fitted with condensation **drains** and provisions to attach standard flight instrument ground **calibration** test equipment.

INSTRUMENT PANEL

The instrument panel, which consists of **four** separate sections, extends across the front of the flight crew compartment. All instruments are **front mounted** in the panel to make removal / replacement quick and easy. All the instruments are **integrally illuminated** with adjustable blue/ white lighting. Two **map lights**, located on the door posts on either side of the instrument panel, are also provided.

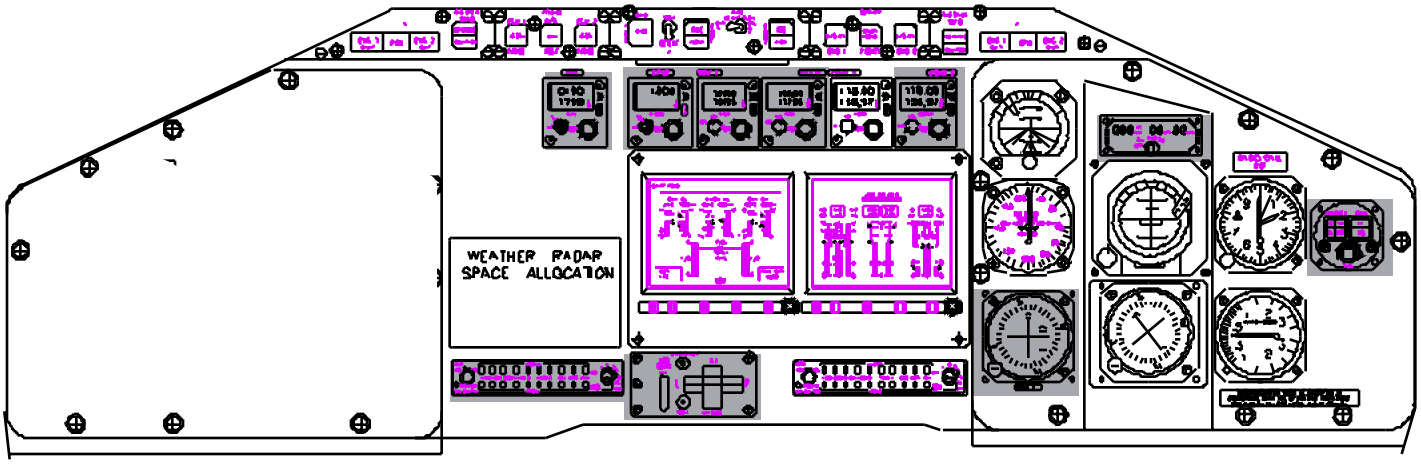
INSTRUMENT PANEL LAYOUT WITH SOME OPTIONAL EQUIPMENT SHOWN

Primary flight and navigation instruments are mounted on the **right (pilot) section** of the panel, in the conventional **"T"** presentation, for an easy cross-check. Space is provided on the **left (copilot) section** of the panel for the **optional** copilot flight and navigation instrument kit. All aircraft system indications are displayed on the **IIDS [Integrated Instrument Display System]** located in the **center section** for easy observation from either crew seat. The **center section** also contains space for **optional** avionics control heads arranged for convenient viewing/adjustment by pilot or copilot. Space is also allocated for the **optional** wheel landing gears' control panels (RETRACT / EXTEND). Additionally, a 15 centimeter (six inch) wide column between the IIDS and copilot group is suitable for placement of standard width panel mounted avionics customized installations (Loran, Global Positioning, Weather Radar, and other communications radios, etc.). The **top section** contains control panels for engine starting, fire detection and extinguishing, FADEC functions, and master warning and caution annunciation.

INSTRUMENT PANEL LAYOUT

The standard instrument panel in the Bell 430 is **fully equipped** for **VFR** (Visual Flight Rules) flight, **day or night**. It also has **space** to install additional communications and navigation equipment, instruments and indicators necessary to conduct **IFR/IMC** (Instrument Flight Rules/Instrument Meteorological Conditions) flight. The illustration below shows the normal locations for standard instruments, as well as space reserved for selected factory installed options .

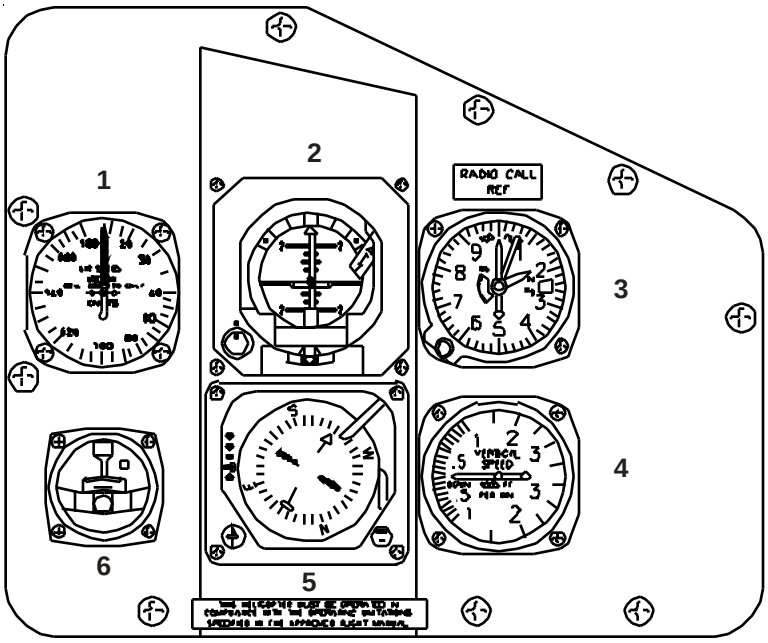
OVERALL INSTRUMENT PANEL LAYOUT
[SHOWN WITH OPTIONAL EQUIPMENT SHADED]



RIGHT (PILOT) SECTION

STANDARD ELECTROMECHANICAL PILOT INSTRUMENTS

Operating limitations are clearly indicated on all electromechanical instruments, with **green**, **yellow**, and **red** bands on the face, or the bezel. The following instruments are provided with the standard configuration.



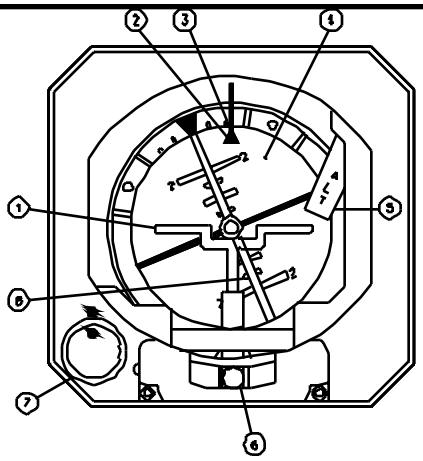
1. AIRSPEED
2. ATTITUDE INDICATOR
3. ALTIMETER
4. VERTICAL SPEED
5. HSI-[WITH COMPASS SYSTEM]
6. TURN AND SLIP
7. STANDBY MAGNETIC COMPASS

(STBY. COMP. NOT SHOWN-SEE NEXT PAGE)

FLIGHT INSTRUMENTS

ATTITUDE INDICATOR

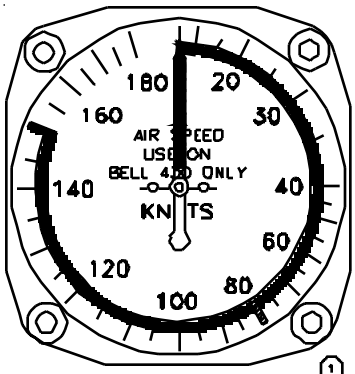
The attitude indicator is a self-contained 4-inch, DC-powered instrument which displays the pitch and roll flight attitude of the helicopter in relation to the earth's horizontal plane. A pitch trim knob adjusts the aircraft symbol vertically. An inclinometer is built in to the instrument face to provide yaw trim indication. An ATT FAIL flag is visible when attitude information is unreliable.



1. Miniature aircraft
2. Fixed roll index
3. Moving roll scale
4. Attitude sphere
5. Attitude warning flag
6. Inclinometer
7. Pitch trim knob
8. Pitch scale

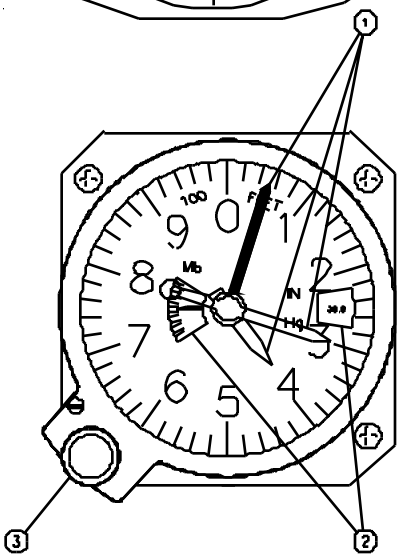
AIRSPEED INDICATOR

The airspeed indicator is a standard 3-inch pitot -static instrument that indicates the airspeed in knots on a scale graduated from 0 to 180 knots.



ALTIMETER (BAROMETRIC)

The altimeter, a standard 3-inch instrument, indicates the altitude of the helicopter from minus 1000 feet to plus 27,500 feet. The barometric pressure scale for setting reference pressure is shown in inches of mercury and in millibars.



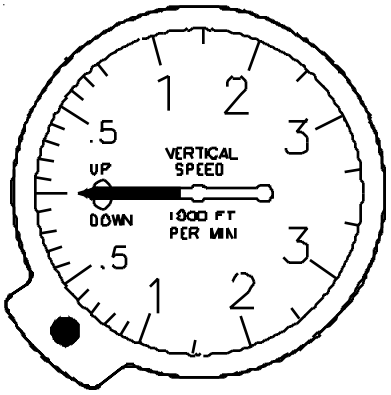
1. Pointers
2. Barometric pressure scale readout
3. Barometric pressure setting knob

STANDBY MAGNETIC COMPASS

The magnetic compass is mounted on the central windshield post. A compass card holder is provided to record the individual helicopter magnetic deviation.

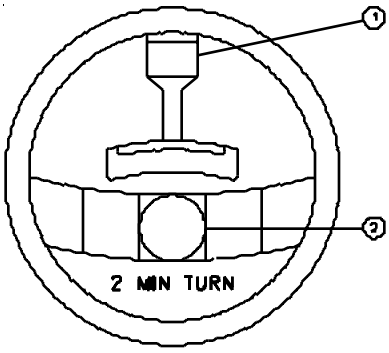
VERTICAL SPEED

The vertical speed indicator is a standard 3-inch instrument which shows the **rate of climb or descent** by sensing the rate of atmospheric pressure change. Information is shown in **feet per minute** (fpm) on a scale from zero to plus or minus 3500 fpm. The indicator incorporates a sensitive accelerometer to provide **instantaneous** vertical speed indication.



TURN & SLIP

The standard 2-inch turn and slip indicator is a 28 Volt DC powered self contained gyroscopic instrument which has an indicating needle to show the rate of turn of the helicopter, along with fluid dampened ball which shows turn coordination [trim].

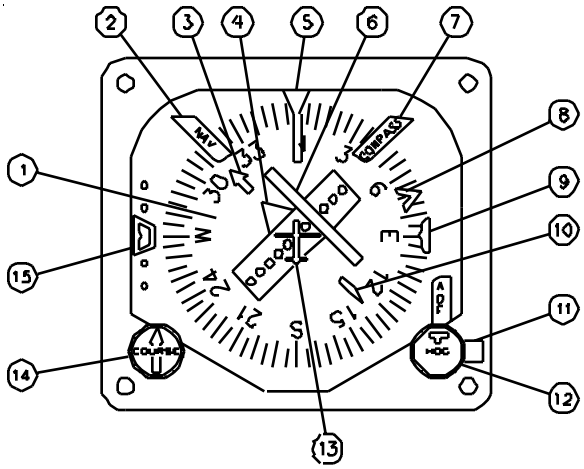


1. Turn pointer
2. Slip ball

NAVIGATION INDICATORS

HORIZONTAL SITUATION INDICATOR (HSI)

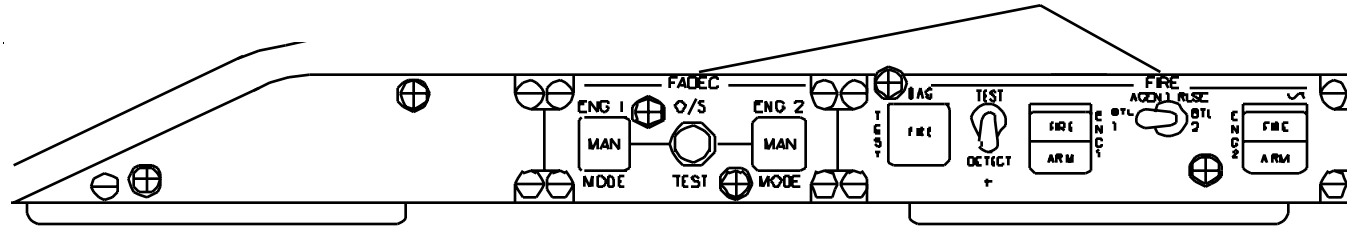
The HSI provides a display of the **gyro stabilized magnetic heading** of the helicopter. When connected to optional VOR / ILS, ADF, and GPS navigation receivers this instrument combines the functions of multiple indicators to display bearing to / from, selected course, and course / localizer / glideslope deviation. The King **KPI-552B** is driven by the remote mounted King **KCS-305** Gyrocompass System, located in the aft avionics compartment. **Two adjustment knobs** are used to set desired heading and course. **Warning flags** (NAV, GS, & HDG) appear to indicate unreliable navigation signal or gyro failure.



1. Compass card
2. Navigation warning flag
3. Course pointer
4. To/From flag
5. Lubber line
6. Course deviation bar
7. Compass warning flag
8. ADF/NAV indicator
9. Heading marker
10. Reciprocal course pointer
11. ADF/NAV selector
12. Heading select knob
13. Aircraft symbol
14. Course set knob
15. Glideslope deviation indicator

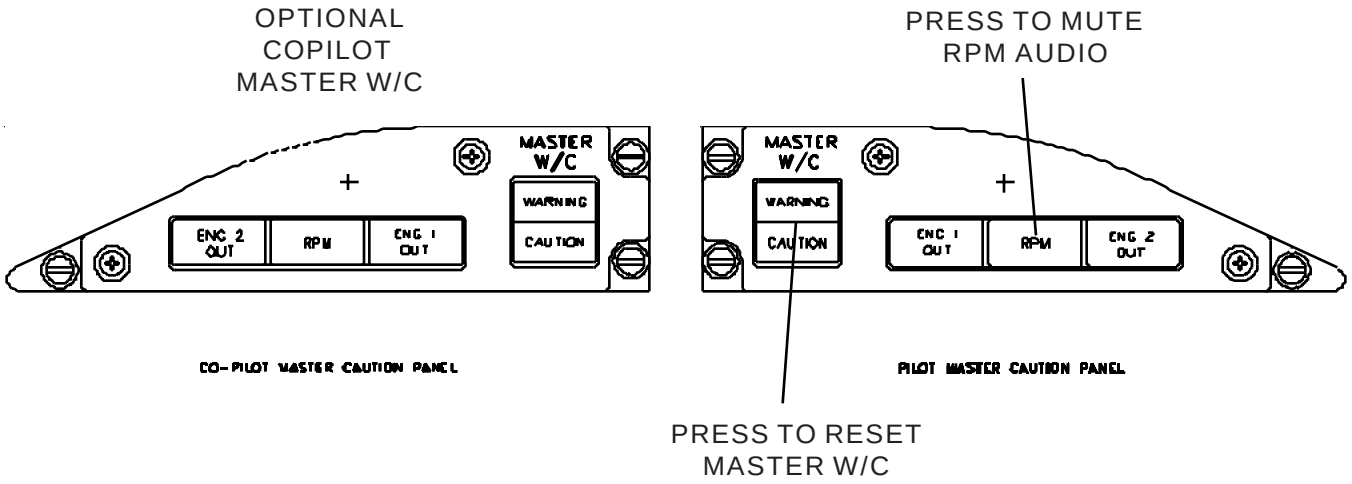
TOP SECTION

GLARESHIELD MOUNTED CONTROLS



MASTER CAUTION PANEL [PILOTS]

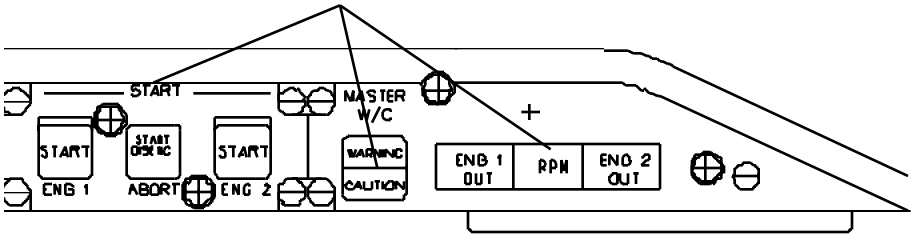
The Master Caution Panel is located directly above the pilots' airspeed indicator, and consists of a split RED warning/ AMBER caution "push to reset" light, and eng 1 out / RPM /eng 2 out display. When **any** of the warning/caution annunciators of the IIDS are activated the WARNING or CAUTION (or both) **master caution segment** light also illuminates to alert and direct the pilots' attention to the panel. The **press-to-reset** feature extinguishes and rearms the light. The RED **ENG OUT** lights will illuminate whenever the respective engines' gas producer speed **(N_G) drops** below 56%±1%. The AMBER **MAIN ROTOR RPM** caution light will illuminate whenever the main rotor RPM (N_R) **drops** below 93%±1%, or **exceeds** 105%±1%. In addition to the warning light, the LOW ROTOR RPM AUDIO is activated when RPM **drops** below 93%±1%, transmitting a continuous tone through the intercom system to the pilots' headset. The tone will continue until rotor RPM is i**ncreased** above 93%±1%, or the RPM caution light is **pressed.**



RPM AUDIO WARNING

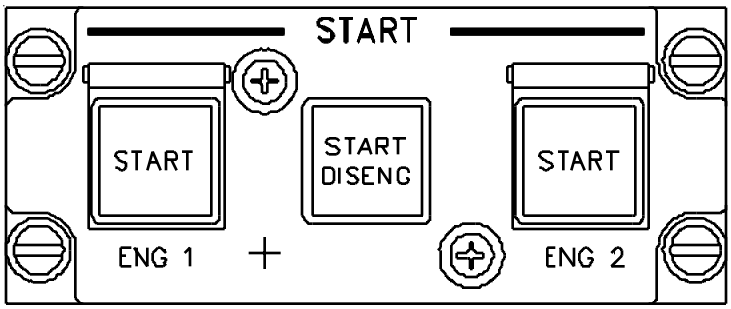
The RPM audio warning is transmitted through the intercom system and is heard in the pilot and copilot headsets. The audio warning activates whenever the ROTOR RPM drops below 93 ±1% (simultaneous with the RPM caution light illumination) and will continue to sound until the ROTOR RPM is increased above 93 ±1% or ROTOR RPM drops below 77 ±1%, or the RPM caution light is pressed.

GLARESHIELD MOUNTED CONTROLS



RPM CAUTION AND WARNING LIGHTS

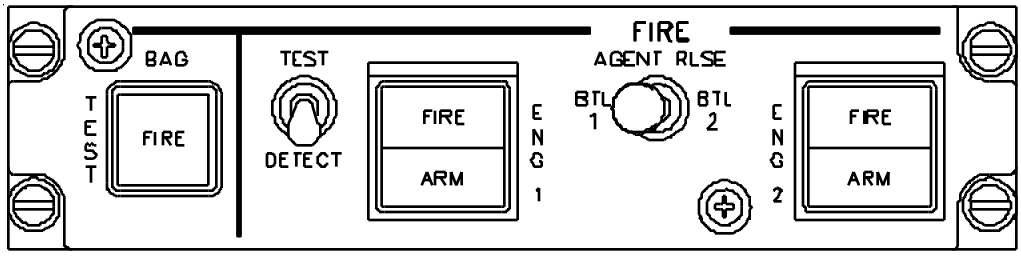
The RPM caution and warning lights form a cluster with red ENG 1 OUT and ENG 2 OUT warning lights, separated by an amber main rotor RPM caution light. The ENG 1 OUT and ENG 2 OUT lights will illuminate whenever the respective gas producer RPM (NG) drops below 56%±1%. The main rotor RPM caution light will illuminate whenever the ROTOR RPM exceeds 105%±1% or droops below 93%±1%. The low ROTOR RPM will also actuate an audio signal to aid the pilot in distinguishing low RPM condition and to warn of possible loss of performance. The RPM caution light also incorporates a press-to-mute feature that silences the audio warning signal.



ENGINE START CONTROL PANEL

Engine starting is controlled by three **push -on** illuminated switches mounted above the engine instruments group. When the START 1 or START 2 switches are engaged the AUTOMATIC START SEQUENCE begins. The starter is **continuously** motored until automatic disengagement occurs at **56%±1% N_G** or the center START DISENG switch is depressed.

ENGINE / BAGGAGE FIRE PANEL



The **engine fire** panel is located on the glareshield, and consists of a RED **warning light** / WHITE **arm light** for each engine (FIRE ENG 1 & FIRE ENG 2), and a test switch. The engine fire extinguishing **agent release** select switch is located between the two warning lights. The RED **baggage fire** warning light (BAG FIRE) immediately to the left, is of the press-to-test type.

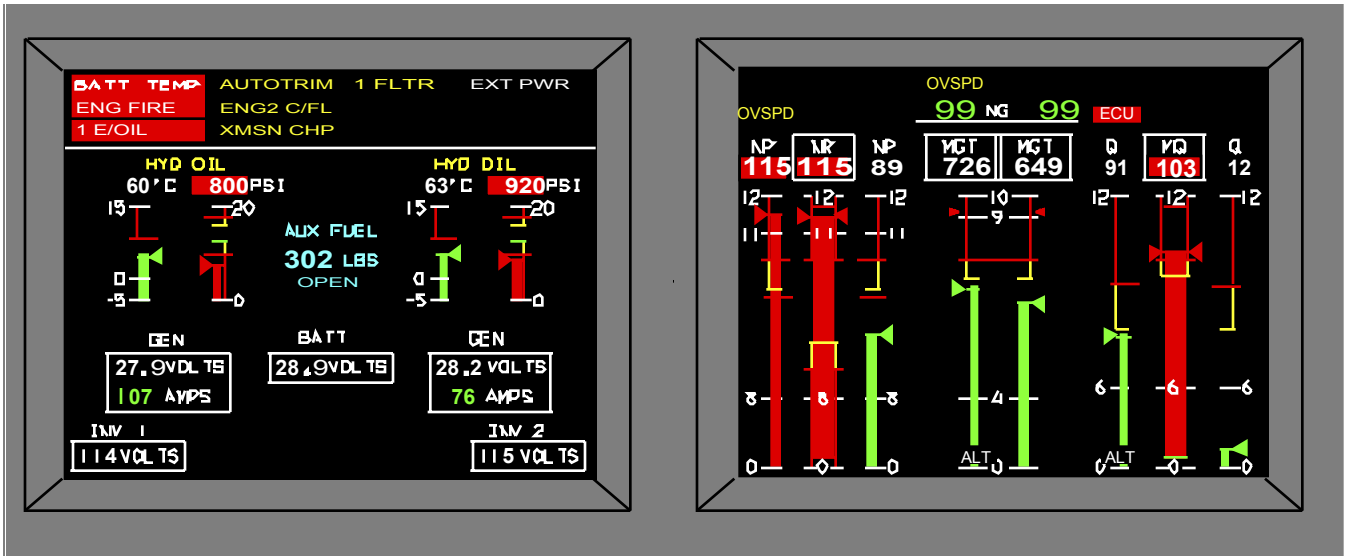
ENGINE FADEC / OVERSPEED TEST PANEL

The engine FADEC / overspeed test panel consists of **guarded** push-on switches for each engine, and a TEST toggle switch located on the glareshield. The MODE switches control selection of either AUTO or MANUAL mode for the FADEC of each engine. The toggle switch is used during engine run-up to test the electronic overspeed protection system of each engine.

CENTER SECTION

INTEGRATED INSTRUMENT DISPLAY SYSTEM [IIDS]

The Integrated Instrument Display System (IIDS) consists of a single integrated **color** active matrix **liquid crystal display (LCD)** unit to display and process the airframe and engine instrumentation information accurately, and provide caution, warning and advisory annunciation and controls. The IIDS also performs engine parameter **exceedance monitoring** and records these exceedances and faults in **nonvolatile memory (NVM)** for maintenance purposes. Warm-up time for the IIDS does not exceed five minutes after a cold non-operational period at -45°C for ten hours. The IIDS power consumption does not exceed 120 watts at maximum display brightness not taking into account display heaters. The displayed data and symbology is crisp and clear and does not have any smearing effect which would reduce information legibility. The display is consistent and parameter recognition is easy. Digit and label size is distinct and easy to read to minimize pilot or crew effort to extract information. The IIDS display is fully readable under all ambient display illumination as low as **100 ft-lamberts**. The display has a contrast ratio of 10:1 minimum under all possible lighting conditions (day or night) within viewing angles of 45° ± 5° vertical axis and ±45° horizontal axis. IIDS display colors are consistent with other flight compartment equipment displays. The colors are **white, red, green, cyan and yellow**. Alphanumerics are sized in order to ensure good readability from both the pilot and copilot positions.



NOTE: DETAILED SYSTEM INFORMATION

FOR THE ROGERSON KRATOS IIDS MAY

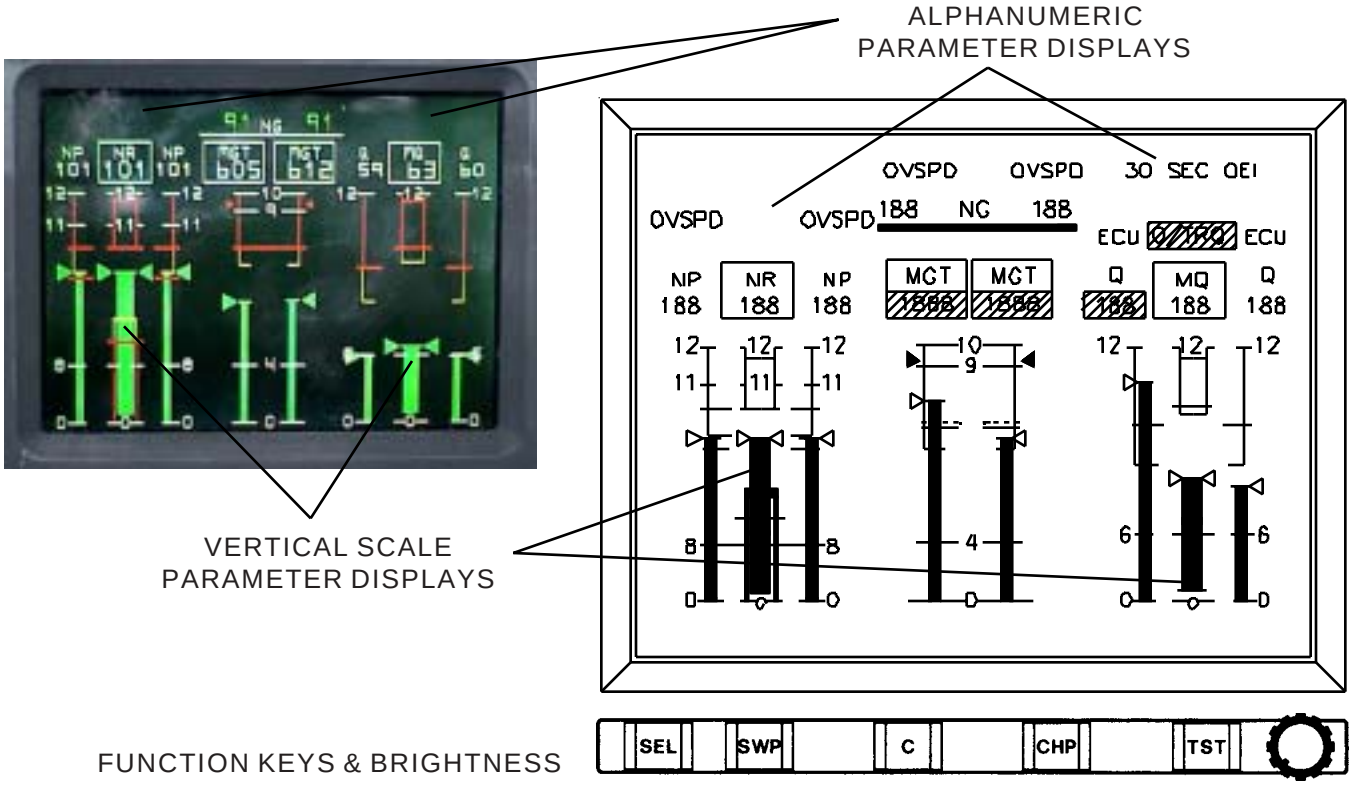
BE FOUND IN THE ATTACHED DOCUMENT;

LINK (RK-IIDS-PHB10-97.PDF)

COLOR CODED GRAPHIC & DIGITAL DATA

All **engine**, **transmission**, **hydraulic** [temperatures and pressures], and **electrical** indications are displayed on the IIDS along with **warning, caution, and advisory messages**. Also included is **engine and mast torque** (Q/MQ), **power turbine and main rotor speed** (NP/NR), **gas producer speed** (NG), and **measured gas temperature** (MGT). The electrical systems information shown is **voltage** and **amperage** for **both generators**, **battery** voltage, and **inverter** voltage. Fuel system data displayed is **fuel quantity** for both main tanks and **total** fuel, aux fuel tanks quantity (if installed), and position of the interconnect valve.

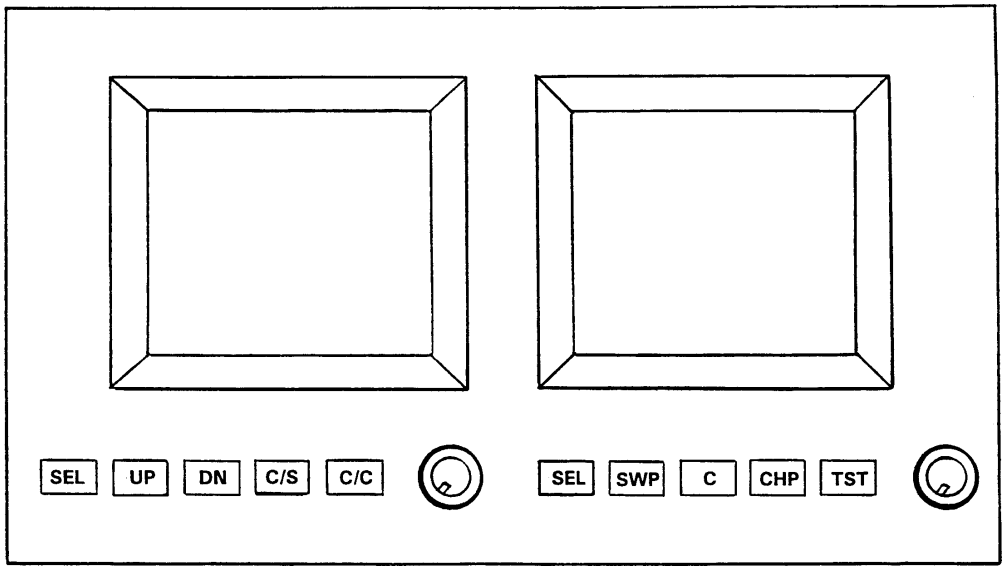
EXAMPLE INDICATIONS ON PRIMARY DISPLAY PAGE



The **VERTICAL SCALE** displays are **color coded** to show operating parameters, with **green** being used to show normal/continuous operating range, **yellow** for cautionary, and **red** for limit/exceeding limit. All fuel information is displayed **blue**, except for the **last 90 ± 10 pounds** (lbs) of fuel which will be displayed red. The **DIGITAL** information displays are also **color coded**; **White digits with no background** are used to show normal conditions and values (except NG and AMP where green digits are used), **yellow digits with no background** or **black digits with a yellow background** are used to show cautionary conditions, and **white digits on a red background** are used to announce a warning.

IIDS OPERATION FEATURES-DISPLAY CONTROLS

The IIDS unit front bezel provides function keys and function identification to allow flight and ground personnel system interaction. Left and right rotary knobs provide individual brightness control for each side of the IIDS unit.



LEFT SIDE CONTROLS

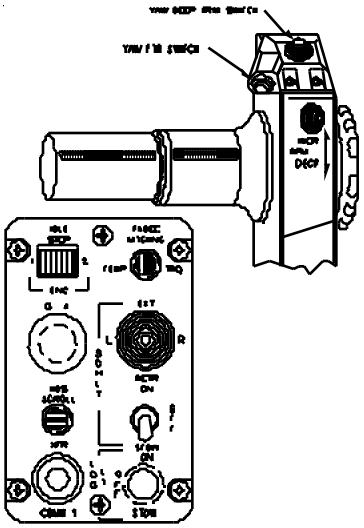
1. **"SEL" - SELECTS THE VARIOUS SECONDARY SCREEN FORMATS.**
2. **"UP" - SCROLLS UP THE WARNING/ CAUTION/ADVISORY WINDOW.**
3. **"DN" - SCROLLS DOWN THE WARNING/ CAUTION/ADVISORY WINDOW.**
4. **"C/S" - SELECTS THE CLOCK DISPLAY MODES.**
5. **"C/C" - CONTROLS THE CLOCK ET AND ETD.**

RIGHT SIDE CONTROLS

6. **"SEL" - SELECTS THE VARIOUS SECONDARY SCREEN FORMATS.**
7. **"SWP" - SWAPS THE PRIMARY AND SECONDARY SCREEN**
8. **"C" - SELECTS THE COMPOSITE SCREEN FORMATS.**
9. **"CHP" - TRIGGERS THE CHIP FUZZ BURNER OUTPUT.**
10. **"TST" - PILOT INITIATED BIT.**

PILOT SCROLL CONTROL

In addition to the bezel mounted controls, the pilot's collective control box has an IIDS SCROLL button which permits the pilot to advance through the secondary page formats without releasing the primary flight controls.



IIDS OPERATION FEATURES-DUAL POWER & PROCESSORS

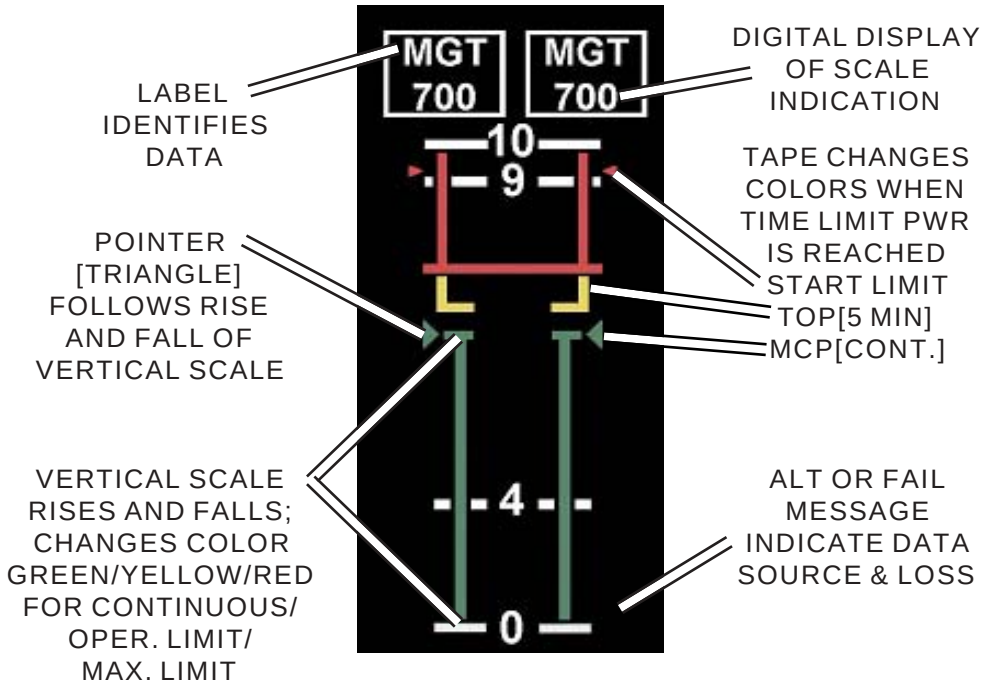
The IIDS processes and displays information from the engines and systems **separately** so that a single failure does not cause the complete loss of one parameter for both engines/systems. The IIDS contains **two power supplies**, **two independent microprocessors** and **two independent displays**.

Each power supply has **two isolated 28 Volt DC inputs** from **two helicopter sources** so that the loss of one power source does not cause the loss of the alternate power source or loss of power altogether. **Two processors** ensure the loss of one processor does not cause the loss of any information shown on the display, except for fuel quantity, where loss of one processor will cause the loss of its associated fuel sensor, and only the fuel in one side of the fuel system will be displayed. In the event of a failure of one of the displays, pressing the **"C"** switch under the primary display will cause the **composite** screen to be shown.

IIDS OPERATION FEATURES-DUAL DATA INPUT

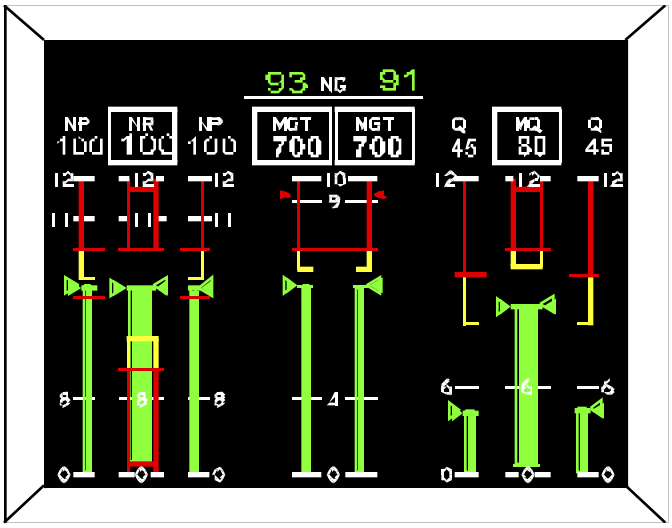
The IIDS receives data for **most** display parameters from **dual sources**. All operating system data transmitted on the AIRINC 429 data bus is available to the IIDS, as well as the corresponding analog input port data for each parameter [thermocouple signal, monopole pulse signal, transducer signal, etc.]. Whenever the primary source of data for a MGT, Q, NP, NR, or NG parameter is missing or invalid, the secondary source will provide backup data for display. When data displayed is from a secondary source (except NG), the word "ALT" will be displayed below the data. If both primary and secondary sources are missing or invalid the digital display will revert to dashes, the vertical scale will remain empty, and an amber "FAIL" (except NG) will appear below the scale.

TYPICAL DISPLAY FEATURES



IIDS DISPLAY PAGE FORMATS

PRIMARY DISPLAY PAGE



PRIMARY PAGE DATA

[COLUMNS FROM LEFT TO RIGHT]

1. ENGINE ONE NP
2. ROTOR RPM
3. ENGINE TWO NP
4. ENGINE ONE MGT [W/DIGITAL NO. 1 NG]
5. ENGINE TWO MGT [W/DIGITAL NO. 2 NG]
6. ENGINE ONE TORQUE
7. ROTOR TORQUE
8. ENGINE TWO TORQUE

[DIGITAL INDICATIONS AND ADVISORY TEXT APPEARS ABOVE THE RESPECTIVE COLUMN]

WARNING/CAUTION/ADVISORY MESSAGES

The WARNING, CAUTION, and ADVISORY messages available for **all display pages** will be described as a GROUP immediately following the descriptions of the SYSTEM data displays.

TRIPLE TACHOMETER

The **triple tachometer** display has three vertical scale displays that simultaneously display rotor RPM (NR) on the inner scale and engine 1 and 2 NP on the left and right scales. Engine and rotor speed data is also displayed in digital format above the vertical scales. The data displayed is in percent of allowable RPM.

MEASURED GAS TEMPERATURE INDICATORS

The **measured gas temperature** (MGT) display presents the engine gas temperature of air between gas producer turbine and power turbine, in degrees Celsius. MGT data is displayed on a vertical scale in the center of the primary screen and in digital format just above it.

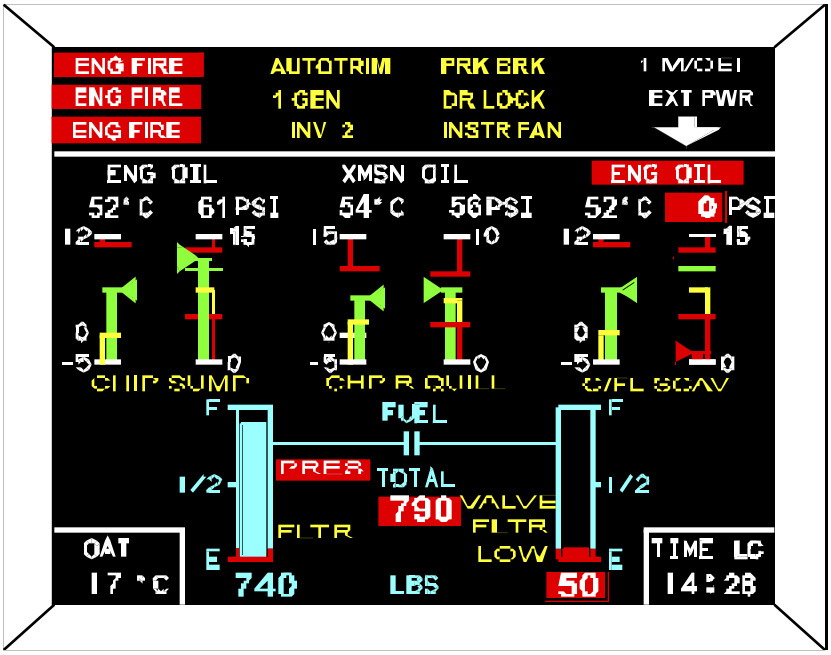
TRIPLE TORQUE DISPLAY

The **triple torque** display simultaneously displays torque output of two engines (Q) and torque applied to main rotor mast (MQ). Engine torque is displayed on the right and left vertical scales, and main rotor mast torque is displayed on the center vertical scale. All indications are percent of maximum torque. Torque data is also displayed in digital format just above the vertical scales.

GAS PRODUCER TACHOMETERS

The gas producer tachometer (NG) display is presented in **digital form only** directly above the MGT display in the middle of the primary IIDS screen.

SECONDARY PAGE ONE



W/C/A MESSAGES

The WARNING, CAUTION, and ADVISORY messages available for **all display pages** will be described as a GROUP immediately following the descriptions of the SYSTEM data displays.

ENGINE OIL TEMPERATURE AND PRESSURE DISPLAYS

Both engine oil temperature and pressure displays simultaneously present oil temperature in degrees Celsius on the left scale and oil pressure in PSI on the right scale. Temperature and pressure data is displayed on a vertical scale and in digital format just above it.

OUTSIDE AIR TEMPERATURE

Outside air temperature (OAT) display is a digital format display on page 1 and the START page of the secondary IIDS display. The OAT temperature probe protrudes from the underside of the nose. The system displays OAT within a range of -60 to +105 degrees C.

SECONDARY PAGE ONE DATA

[UPPER DATA BOX]
WARNING CAUTION ANNUNCIATOR DISPLAY
[UPPER DATA ROW-FROM LEFT TO RIGHT]
1. ENGINE ONE OIL TEMPERATURE
2. ENGINE ONE OIL PRESSURE
3. TRANSMISSION OIL TEMPERATURE
4. TRANSMISSION OIL PRESSURE
5. ENGINE TWO OIL TEMPERATURE
6. ENGINE TWO OIL PRESSURE

[LOWER DATA ROW-LEFT TO RIGHT]
1. OUTSIDE AIR TEMPERATURE
2. LH, TOTAL, AND RH FUEL [LBS]
   [FUEL FLOW INDICATION **OPTIONAL**]
3. TIME

TRANSMISSION OIL TEMPERATURE AND PRESSURE DISPLAY

The transmission oil temperature and pressure displays simultaneously present the oil temperature in degrees Celsius on the left scale and oil pressure in PSI on the right scale. Temperature and pressure data is displayed on a vertical scale and in digital format just above it.

FUEL QUANTITY DISPLAY

The fuel quantity display presents left and right fuel system quantity as individual vertical scales with a **digital total** fuel quantity in between. Advisory text indications show low fuel pressure, fuel valve position, fuel filter bypass, and low fuel warning. The fuel quantity scales are normally BLUE, with the last 90±10 pounds shown RED. If the **optional** fuel flow indicating system is installed the left and right fuel flow **digital** indications will appear on outboard sides of the fuel quantity display.

CLOCK

The clock is a digital display in the lower right corner of the IIDS secondary screen, page 1. The clock is controlled by two control buttons under the screen. An auxiliary rechargeable battery pack [dual, 9 Volt DC nickel-cadmium type] provides electrical power to keep the clock function active [but not displayed] whenever normal 28 Volt DC is not available to the IIDS. The battery pack is recharged anytime normal electrical power is applied to the airframe. The clock modes are as follows:

•Greenwich Mean Time (GMT) in 24 hour format.

•Local Time (LC) in 24 hour format.

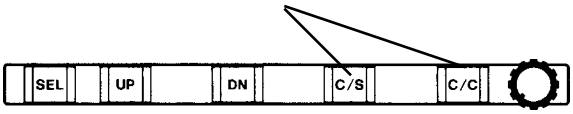
•Elapsed Time (ET) count up timer to maximum of 99 hours, 59 minutes.

•Elapsed Time (ETD) count down timer from maximum 59 minutes, 59 seconds.

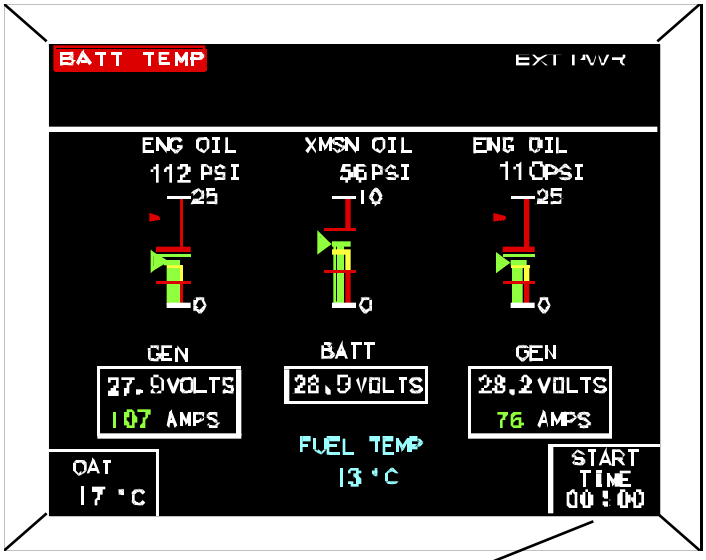
The clock select (C/S) switch, on the IIDS bezel, is used to select the mode for operation, GMT, LC, ET, or ETD. The clock control (C/C) switch is used to start, stop, and reset the ET clock, or to set the ETD counter to the desired value.

The START TIME clock mode is displayed on the lower right corner of the START PAGE and is the only clock mode available during engine start. The start clock automatically begins counting up from zero when the first engine throttle is moved for start. The counter stops upon starter shutoff, resets to zero and begins counting again when the second engine throttle is advanced for start.

CLOCK FUNCTION SOFT-KEYS
SECONDARY PAGE DISPLAY

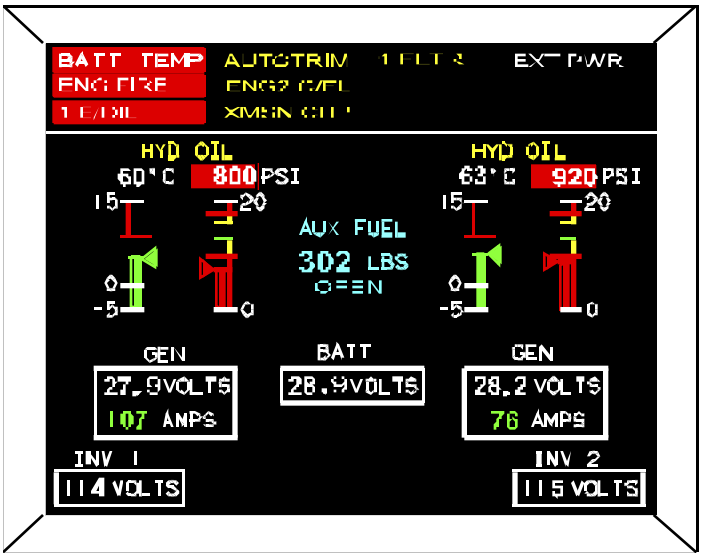


START PAGE



START PAGE START TIME CLOCK

SECONDARY PAGE TWO



SECONDARY PAGE TWO DATA

[UPPER DIGITAL DATA BOX]
- WARNING CAUTION ANNUNCIATOR DISPLAY

[UPPER GRAPHIC DATA ROW-LEFT TO RIGHT]
1. NO. 1 HYD OIL TEMPERATURE
2. NO. 1 HYD OIL PRESSURE
3. OPTIONAL AUX FUEL [LBS]
4. NO. 2 HYD OIL TEMPERATURE
5. NO. 2 HYD OIL PRESSURE

[LOWER DIGITAL DATA ROW-LEFT TO RIGHT]
1. NO. 1 GEN VOLTS/AMPS
2. BATTERY VOLTS
3. NO. 2 GEN VOLTS/AMPS

[BOTTOM DIGITAL DATA ROW]
1. INVERTER NO. 1 VOLTS
2. INVERTER NO. 2 VOLTS

WARNING/CAUTION/ADVISORY MESSAGES

The WARNING, CAUTION, and ADVISORY messages available for **all display pages** will be described as a GROUP immediately following the descriptions of the SYSTEM data displays.

HYDRAULIC TEMPERATURE AND PRESSURE DISPLAYS

A hydraulic temperature and pressure display simultaneously presents hydraulic fluid temperature, in degrees Celsius, on the left vertical scale and fluid pressure, in psi, on the right vertical scale for each system. This data is also presented in digital format. The displays are connected to pressure transmitters located on the pressure manifolds and to temperature sensing bulbs on the system reservoirs.

GENERATOR VOLTAGE AND CURRENT DISPLAY

Each generator voltage and current output is presented in numerical format on the IIDS secondary screen, page 2 and start page.

AUXILIARY FUEL QUANTITY DISPLAY [OPTIONAL]

AUXILIARY fuel quantity (if installed) is displayed between the hydraulic system displays as a digital total. Advisory text shows the position of the fuel transfer valve (open/closed/in transit).

BATTERY VOLTAGE DISPLAY

Battery voltage is presented in numerical format on the IIDS secondary screen, page 2 and start page.

INVERTER VOLTAGE DISPLAY

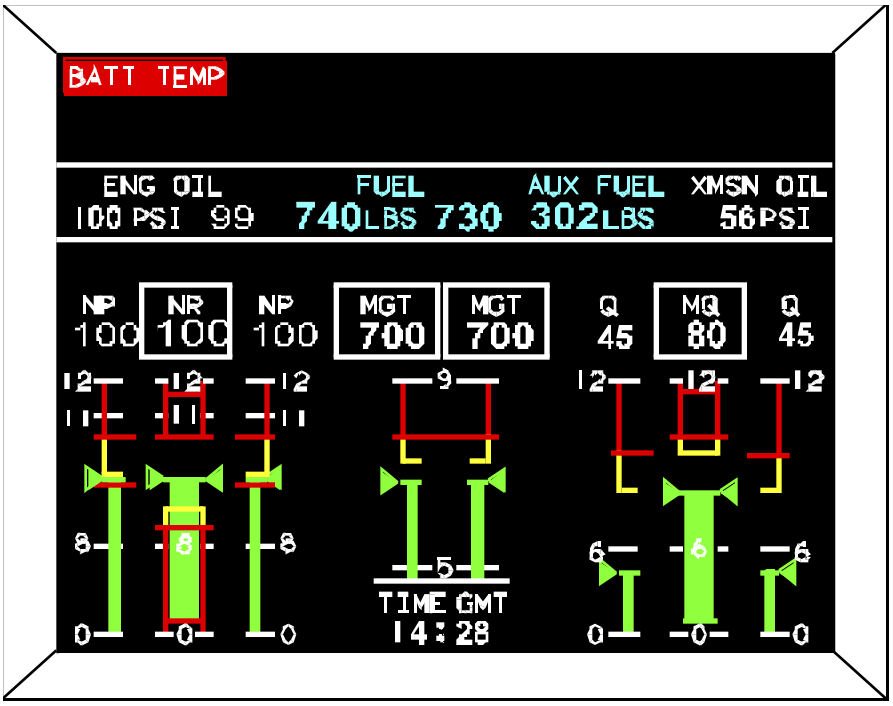
Each inverter voltage output is presented in numerical format on the IIDS secondary screen, page 2.

COMPOSITE PAGE

This display page format is provided in the event **one** of the dual LCD displays should fail. The data shown is a **condensed** version of that found on the PRIMARY DISPLAY PAGE , along with Engine Oil Pressures, Transmission Oil Pressure, Fuel Quantity (Aux Fuel), and Clock [presented as **digital only** indications]

W/C/A MESSAGES

The WARNING, CAUTION, and ADVISORY messages available for **all display pages** will be described as a GROUP immediately following the descriptions of the SYSTEM data displays.



COMPOSITE PAGE DATA

[UPPER DATA BOX]

WARNING CAUTION ANNUNCIATOR DISPLAY

[UPPER DIGITAL DATA ROW-FROM LEFT TO RIGHT]

1. NO. 1 & NO. 2 ENG OIL PRESS [PSI]
2. LEFT & RIGHT FUEL QTY [LBS]
3. OPTIONAL AUX FUEL [LBS]
4. TRANSMISSION OIL PRESS [PSI]

[LOWER GRAPHIC DATA ROW-LEFT TO RIGHT]

1. ENGINE ONE NP
2. ROTOR RPM
3. ENGINE TWO NP
4. ENGINE ONE MGT [W/DIGITAL NO. 1 NG]
5. ENGINE TWO MGT [W/DIGITAL NO. 2 NG]
6. ENGINE ONE TORQUE
7. ROTOR TORQUE
8. ENGINE TWO TORQUE

[DIGITAL INDICATIONS AND ADVISORY TEXT APPEARS ABOVE THE RESPECTIVE COLUMN]

[BOTTOM DIGITAL DATA ROW]

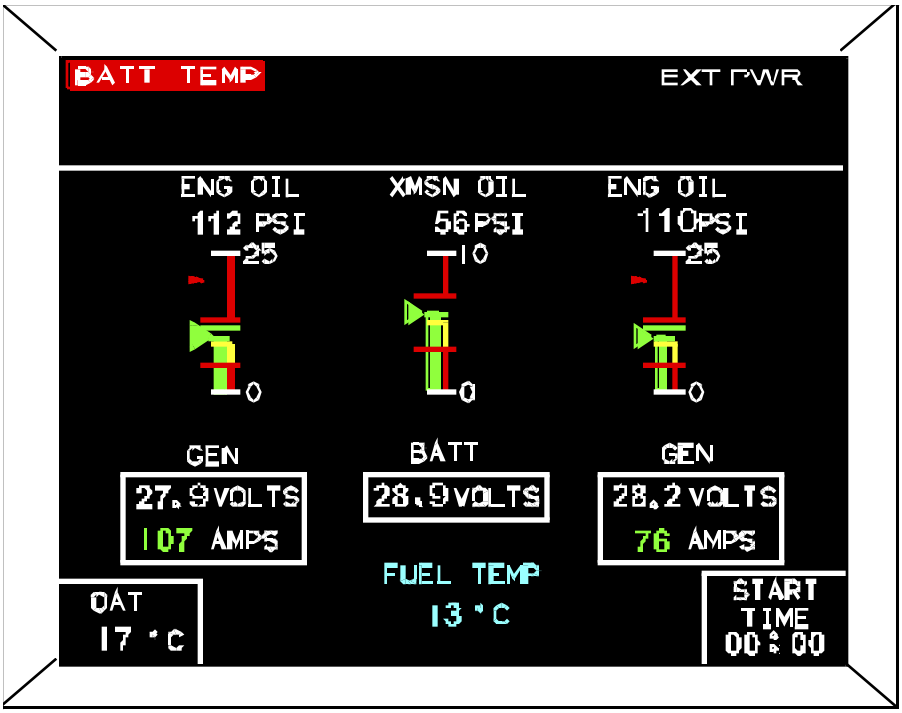
1. CLOCK

START PAGE FORMAT

When performing an engine start sequence, the secondary page display may be scrolled to the START PAGE, which presents **expanded scale** representations of **engine** and **transmission** oil pressure. If both engines are running (both engines NG above 10% indicated) access to this page is inhibited.

FUEL TEMPERATURE DISPLAY

The fuel temperature display is a digital readout which displays the fuel temperature from the tank in degrees Celsius. This display is provided on the bottom center area of the start page. The display range is from -50 to 100 C. The display is driven by a temperature bulb located at the bottom of the fuel tank.



START PAGE DATA

[UPPER DIGITAL DATA BOX]
WARNING CAUTION ANNUNCIATOR DISPLAY
[UPPER GRAPHIC DATA ROW-LEFT TO RIGHT]
1. NO. 1 ENG OIL PRESS
2. TRANSMISSION OIL PRESSURE
3. NO. 2 ENG OIL PRESS
[DIGITAL INDICATIONS AND ADVISORY TEXT APPEARS ABOVE THE RESPECTIVE COLUMN]
[LOWER DIGITAL DATA ROW-LEFT TO RIGHT]
1. NO. 1 GEN VOLTS/AMPS
2. BATTERY VOLTS
3. NO. 2 GEN VOLTS/AMPS
[BOTTOM DIGITAL DATA ROW]
1. OUTSIDE AIR TEMPERATURE
2. FUEL TEMPERATURE
3. START TIMER

MAINTENANCE PAGES

The maintenance pages are accessed by simultaneously pressing the **two outboard** soft-key bezel switches under either IIDS screen, SEL and TST switches on the secondary screen, or SEL and C/C switches on the primary screen. This will display the IIDS MAINTENANCE FUNCTIONS page. After entrance to the Top Level Maintenance Page, the functions of the soft-keys below each screen will be **changed** to the function specified **above each key** at the bottom edge of the LCD display. Using the UP, DN, and SEL switches will allow the selection of the desired maintenance function, while RTN will exit the display to its' normal display format. Each of the maintenance function displays are MENU DRIVEN, with various soft-key functions specified above each key at the bottom edge of the LCD display.

TOP LEVEL MAINTENANCE DISPLAY

ENGINE HOURMETER

The engine hourmeter is an integral part of the IIDS and can be accessed thorough the ENGINE HISTORY maintenance pages.

There are ten maintenance functions accessible through the IIDS. They are;

1. POWER ASSURANCE CHECK
2. ENGINE DATA
3. ECU-ENGINE FAULTS
4. ENGINE EXCEEDANCE
5. IIDS REVISION-FAULTS
6. ENGINE HISTORY [HOURMETER]
7. PARAMETER SETUP
8. FUEL CALIBRATION

9 CONFIGURATION

10. MAST TORQUE CALIBRATION

WARNING / CAUTION SYSTEM

The Warning/Caution System includes all warning, caution, and advisory lights related to the numerous helicopter systems as well as the electrical power and sensors required to operate them. With the introduction of the IIDS, the old style separate caution panel has been eliminated. The IIDS now displays all previously available warning and caution indications, provides numerous additional caution, warning, and advisory indications previously not available. The older style master caution lights have been replaced with new master w/c lights. Specific IIDS warning, caution and advisory indications, as well as instrument panel and glareshield panel mounted ENGINE OUT warnings RPM caution, FADEC, FIRE, and START indications are covered in detail in the areas relating to those systems.

WARNING/CAUTION/ADVISORY WINDOW

The upper portion of Display 1 incorporates the WARNING / CAUTION/ADVISORY WINDOW. It is commonly referred to as the W/C/A Window and consists of the three lines, each of which is divided horizontally into four segments. Each of the **twelve** (12) segments can display either a warning, caution or advisory message.

A **warning** message consists of white lettering on a red background, a **caution** message has black letters on an amber background and an **advisory** message will consist of white lettering on a black background.

Should there be more than 12 messages active at one time, an **arrow**, pointing either **upwards** or **downwards** will appear in one of the segments in the far right column of messages. The arrow indicates that the pilot should scroll the Display 1 pages up or down, depending on how the arrow is pointing to see more messages.

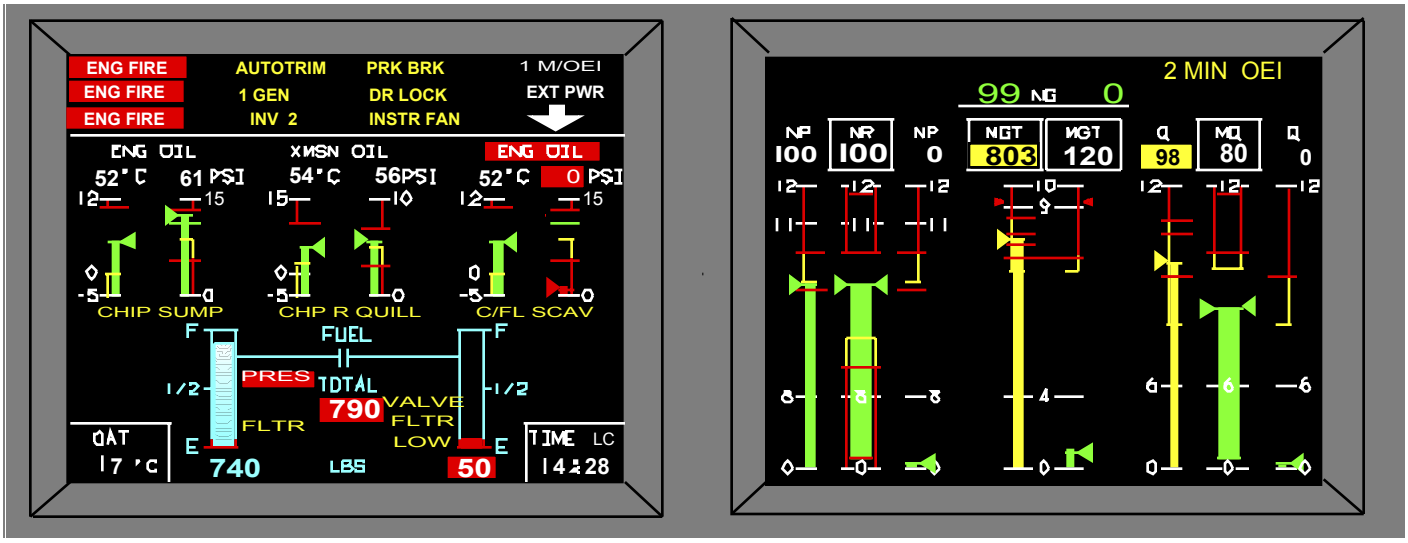
WARNING / CAUTION / ADVISORY INDICATIONS				
[DISPLAYS IN THE IIDS W / C / A WINDOW]				
RED	**AMBER**			**WHITE**
AFCS DISC*	AFCS PIT*	ENG 2 C/FL	LDG GR UP*	A/FUEL OP*
BAG FIRE	AFCS ROL*	CDPU FL	PAGE 2	A/FUEL XT*
BATT TEMP	AFCS YAW*	DR LOCK	PARK BRK*	1 A/ICE 2
ENG FIRE	AP*	FAIL	RPM	C/H ARM*
1 E/OIL 2	A/RLT	1 GEN 2	SCAS*	EXT PWR
1 FU/PR 2	AUTOTRIM*	1 HYD 2	SRT ABT	FLTS ARM*
1 GEN 2**	BATT RLY	1 FLTR 2	1 VALVE 2	FUEL INT
RTR BRK	BUS INT	1 F/LOW 2	L W/S HOT	START
XMSN OIL	ENG 1 CHP	IIDS	R W/S HOT	
	ENG 2 CHP	INST FAN	XMSN CHIP	
	ENG 1 C/FL	1 INV 2	XMSN C/FL	
* DISPLAY FOR OPTIONAL EQUIPMENT				
** RED WHEN BOTH GEN FAIL				

SYSTEM AREA WARNING/CAUTION/ADVISORY INDICATIONS

Additional warning, caution, and advisory messages are **embedded** within the SYSTEM AREA of the IIDS displays. In most cases the message will be located in or near the **label** of the effected system. The system area embedded messages are primarily related to the Chip Detection System and the FADEC (faults, failures, overspeed, and OEI conditions), but also include some messages duplicating or supplementing the messages in the warning caution window.

WARNING/CAUTION WINDOW

ADDITIONAL W/C MESSAGE ARROW



SYSTEM AREA W/C MESSAGES [TYPICAL]

WARNING / CAUTION / ADVISORY INDICATIONS			
[DISPLAYS IN THE IIDS SYSTEMS AREA]			
RED	**AMBER**		**WHITE**
ECU	A/RLT	30SEC OEI	OPEN (aux fuel)
PRES (fuel)	BUS INT	SRT ABT	TRANSIT
FAIL (volt/amps)	CHIP SUMP	VALVE	ALT
O/TRQ	CHIP SCAV	CHIP BRG	ECU
XMSN OIL	C/FL SUMP	CHIP L/R QUILL	dash line(fuel int)
	C/FL SCAV	CHIP TAIL RTR	1 M/ECU 2
	FAIL	CHIP COLL GEAR	1 M/OEI 2
	GEN	CHIP PLTRY GEAR	
	HYD OIL	CHIP SUMP PUMP	
	FLTR	C/FL BRG	
	LOW QTY	C/FL L/R QUILL	
	FAIL (IIDS)	C/FL TAIL RTR	
	INV	C/FL COLL GEAR	
	2 MIN OEI	C/FL PLTRY GEAR	
	OVSPD	C/FL SUMP PUMP	

WARNING/CAUTION AND ADVISORY INDICATIONS

Messages preceded by **1** indicate fault/condition is in **left hand** system or No.1 engine;
Messages followed by **2** indicate fault/condition is in **right hand** system or No.2 engine.

"XMSN OIL"

This warning appears when the transmission oil pressure increases to 38 psig, decreases to 30±2 psig or the temperature increases to 110 C. This warning uses the transmission pressure/temperature label annunciator by turning it red and flashing.

"ENG OIL" or "1 E/OIL" (Engine1)

This warning appears when the engine 1 oil pressure decreases below 52.5±2.5 psig. This warning uses the engine 1 pressure/temperature label annunciator by turning it red and flashing or as "1E/OIL" in the W/C/A window when on page 2.

"ENG OIL" or "E/OIL 2" (Engine2)

This warning appears when the engine 2 oil pressure decreases below 52.5±2.5 psig. This warning uses the engine 2 oil pressure/temperature label annunciator by turning it red and flashing or as "E/OIL 2" in the W/C/A window when on page 2.

"PRES" or "1 FU/PR" (Engine 1)

This warning appears when the engine 1 fuel pressure decreases below 4.5±1.5 psig. The "PRES" warning appears on the right hand side of the LH fuel quantity vertical display when on the secondary display page 1 or as "1 FU/PR" in the W/C/A window when on page 2 or the start page.

"PRES" or "FU/PR 2" (Engine 2)

This warning appears when the engine 2 fuel pressure decreases below 4.5±1.5 psig. The "PRES" warning appears on the left hand side of the RH fuel quantity vertical display when on the secondary display page 1 or as "FU/PR 2" in the W/C/A window when on page 2 or the start page.

"RTR BRK"

This warning appears when either or both of the rotor brake switches are engaged. This warning appears only into the W/C/S window.

"BATT TEMP"

This warning appears when the battery temperature sensor exceeds 71±3°C (160±5°F). This warning appears only into the W/C/A window.

"ECU" (Engine 1)

This caution appears when the engine 1 FADEC-ECU sends its failed discrete output. This output is enabled whenever sensor or functional faults are detected such as:

1. Power input fault (dual)
2. CPU fault
3. Speed sensor fault (dual)
4. Memory fault
5. Fuel flow sensor fault
6. PLA fault

This caution appears above the engine 1 torque display on the primary screen.

"ECU" (Engine 2)

This caution appears when the engine 2 FADEC-ECU sends it failed discrete output. This output is enabled whenever sensor or functional faults are detected such as:

1. Power input fault (dual)
2. CPU fault

3. Speed sensor fault (dual)
4. Memory fault
5. Fuel flow sensor fault
6. PLA fault

This caution appears above the engine 2 torque display on the primary screen.

"SCAS"

This warning appears when the AFCS failure is declared by the FCC. This warning appears only into the W/C/S window.

"AP"

This warning appears when all the AFCS trim actuators are failed. This warning appears only into the W/C/A window.

"AFCS PIT"

This warning appears when the AFCS pitch trim actuator has failed. This warning appears only into the W/C/S window.

"AFCS ROL"

This warning appears when the AFCS roll trim actuator has failed. This warning appears only into the W/C/A window.

"AFCS YAW"

This warning appears when the AFCS yaw trim actuator has failed. This warning appears only into the W/C/S window.

"AFCS DISC"

This warning appears when the AFCS has disengaged from the aircraft controls. This warning appears only into the W/C/A window.

"O/TRQ

This warning appear when the mast torque has exceeded 100%. This annunciator remains latched until reset through the attention-getter. This warning appears above the mast torque display on the primary screen.

"AUTO TRIM"

This caution appears upon AFCS mistrim command. This caution appears only into the W/C/A window.

"INV 1" or "1 INV"

This caution appears when either inverter 1 has failed or 28vdc to the inverter 1 is not present. This caution actually uses the inverter 1 voltmeter label as annunciator by turning it amber and flashing or as "1 INV" in the W/C/A window when on page 1 or the start page.

"INV 2" or "2 INV "

This caution appears when either inverter 2 has failed or 28vdc to inverter 2 is not present. This caution actually uses the inverter 2 voltmeter label as the annunciator by turning it amber and flashing or as "INV 2" in the W/C/A window when on page 1 or on the start page.

"DR LOCK"

This caution appears unless all passenger and baggage compartment doors are locked. This caution appears only into the W/C/A window.

"BATT RLY"

This caution appears when the battery relay in not closed. This caution appears only into the W/C/A window.

"1 A/ICE"

This white advisory appears when the engine 1 anti-ice system is turned on. This advisory appears only into the W/C/A window.

"A/ICE 2"

This white advisory appears when the engine 2 anti-ice system is turned on. This advisory appears only into the W/C/A window.

"CHP SCAV" or "ENG 1 CHP" (Engine 1)

This caution appears when a chip detection event has been monitored by the engine detector in the engine 1 oil outlet connection and the CDPU. This caution appears below the engine 1 oil temp/pressure vertical display or as "ENG 1 CHP" in the W/C/A window when on the secondary screen page 2.

"CHP SCAV" or "ENG 2 CHP" (Engine 2)

This caution appears when a chip detection event has been monitored by the engine chip detector in the engine 2 oil outlet connection and the CDPU. This caution appears below the engine 2 oil temp/ pressure vertical display or as "ENG 2 CHP" in the W/C/A window when on the secondary screen page 2.

"CHP SUMP" or "ENG 1 CHP" (Engine 1)

This caution appears when a chip detection event has been monitored by the engine chip detector in the engine 1 sump gearbox assembly and the CDPU. This caution appears below the engine 1 oil temp/ pressure vertical display or as "ENG 1 CHP" in the W/C/A window when on the secondary screen page 2.

"CHP SUMP" or "ENG 2 CHP" (Engine 2)

This caution appears when a chip detection event has been monitored by the engine chip detector in the engine 2 sump gearbox assembly and the CDPU. This caution appears below the engine 2 oil temp/ pressure vertical display or as "ENG 2 CHP" in the W/C/A window when on the secondary screen page 2.

"CHIP MAST BRG" or "XMSN CHP"

This caution appears when a chip detection event has been monitored by the transmission chip detector in the transmission assembly, and the CDPU. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN CHP" in the W/C/A window when on the secondary screen page 2.

"CHP L QUILL" or "XMSN CHP"

This caution appears when a chip detection event has been monitored by the transmission chip detector in the transmission assembly, and the CDPU. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN CHP" in the W/C/A window when on the secondary screen page 2.

"CHP R QUILL" or "XMSN CHP"

This caution appears when a chip detection event has been monitored by the transmission chip detector in the transmission assembly, and the CDPU. This caution appears below the xmsn oil temp/presssure vertical display or as "XMSN CHP" in the W/C/A window when on the secondary screen page 2.

"CHP COLL GR" or "XMSN CHP"

This caution appears when a chip detection event has been monitored by the transmission chip detector in the transmission assembly, and the CDPU. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN CHP" in the W/C/A window when on the secondary screen page 2.

"CHP PLTRY GR" "XMSN CHP"

This caution appears when a chip detection event has been monitored by the transmission chip detector in the transmission assembly, and the CDPU. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN CHP" in the W/C/A window when on secondary screen page 2.

"CHP SUMP PMP" or "XMSN CHP"

This caution appears when a chip detection event has been monitored by the transmission chip detector in the transmission assembly, and the CDPU.

This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN CHP" in the W/C/A window when on the secondary screen page .

"CHP TAIL RTR" or "XMSN CHP"

This caution appears when a chip detection event has been monitored by the tail rotor chip detector in the tail rotor gear box assembly, and the CDPU. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN CHP" in the W/C/A window when on the secondary screen page 2.

"C/FL SCAV" or "ENG 1 C/FL" (Engine 1)

This caution appears when a chip detection failure has been monitored by the CDPU in engine 1 oil outlet connection chip detector circuit. This caution appears below the engine 1 oil temp/pressure vertical display or as "ENG 1 C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL SCAV" or "ENG 2 C/FL" (Engine 2)

This caution appears when a chip detection failure has been monitored by the CDPU in engine 2 oil outlet connection chip detection circuit. This caution appears below the engine 2 oil temp/pressure vertical display or as "ENG 2 C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL SUMP" or "ENG 1 C/FL" (Engine 1)

This caution appears when a chip detection failure has been monitored by the CDPU in engine 1 gear box chip detection circuit. This caution appears below the engine 1 oil temp/pressure vertical display or as "ENG 1 C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL SUMP" or "ENG 2 C/FL" (Engine 2)

This caution appears when a chip detection failure has been monitored by the CDPU in engine 2 gear box chip detection circuit. This caution appears below the engine 2 oil temp/pressure vertical display or as "ENG 2 C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL MAST BRG" or "XMSN C/FL"

This caution appears when a chip detection failure has been monitored by the CDPU in the transmission mast bearing chip detection circuit. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL L QUILL" or "XMSN C/FL"

This caution appears when a chip detection failure has been monitored by the CDPU in the transmission left hand quill chip detector circuit. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL R QUILL" or "XMSN C/FL"

This caution appears when a chip detection failure has been monitored by the CDPU in the transmission right hand quill chip detector circuit. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL COLL GR" or "XMSN C/FL"

This caution appears when a chip detection failure has been monitored by the CDPU in the transmission collector gear chip detector circuit. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL PLTRY GR" or "XMSN C/FL"

This caution appears when a chip detection failure has been monitored by the CDPU in the transmission planetary chip detector circuit. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL SUMP PMP" or "XMSN C/FL"

This caution appears when a chip detection failure has been monitored by the CDPU in the transmission sump pump chip detector circuit. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN C/FL" in the W/C/A window when on the secondary screen page 2.

"C/FL TAIL RTR" or "XMSN C/FL"

This caution appears when a chip detection failure has been monitored by the CDPU in the tail rotor chip detector circuit. This caution appears below the xmsn oil temp/pressure vertical display or as "XMSN C/FL" in the W/C/A window when on the secondary screen page 2.

"CDPU"

This caution appears when the CDPU fails. This caution appears only into the W/C/A window.

"GEN" or "1 GEN" (Generator 1)

This amber caution appears when a faulty or unreliable D.C. power source from the engine 1 mounted starter/generator is detected by the No.1 voltage regulator.

This caution uses the generator 1 voltmeter/ammeter label as the annunciator by turning it amber and flashing or as "1 Gen" in the W/C/A window when on page 1.

When both generators are failed, the amber caution changes to red warning.

"GEN" or "GEN 2" (Generator 2)

This caution appears when a faulty or unreliable D.C. power source from the engine 2 mounted starter/generator is detected by the No.2 voltage regulator. This caution uses the generator 2 voltmeter/ ammeter label as the annunciator by turning it amber and flashing or as "GEN 2" in the W/C/A window when on page 1. When both generators are failed, the amber caution changes to red warning.

"HYD OIL" or "1 HYD" (System 1)

This caution, appears when system 1 hydraulic press decreases below 1000 psia.

This caution uses the system 1 hydraulic oil pressure/temperature label as the annunciator by turning it amber and flashing or as "1 HYD" in the W/C/A window when on page 1 or on the start page.

"HYD OIL" or "HYD 2" (System 2)

This caution, appears when system 2 hydraulic pressure decreases below 1000 psia. This caution uses the system 2 hydraulic oil press/temperature label as the annunciator by turning it amber and flashing or as "HYD 2" in the W/C/A window when on page 1 or on the start page.

"ECU" (Engine 1)

This white advisory appears when engine 1 FADEC/ECU sends its degraded mode signal over the ARINC 429 data bus. This advisory is enabled whenever a sensor failure will reduce the FADEC/ECU response capabilities such as:

1. ARINC 429 data bus failure
2. Nr beep fault
3. MGT sensor fault
4. Torque sensor fault
5. Nr sensor fault

This advisory appears above the engine 1 torque display on the primary screen.

"ECU" (Engine 2)

This white advisory appears when engine 2 FADEC/ECU sends its degraded mode signal over the ARINC 429 data bus. This advisory is enabled whenever a sensor failure will reduce the FADEC/ECU response capabilities such as:

1. ARINC 429 data bus failure
2. Nr beep fault
3. MGT sensor fault
4. Torque sensor fault
5. Nr sensor fault

This advisory appears above the engine 2 torque display on the primary screen.

"2 MIN OEI" (Engine 1)

This caution appears when the engine 1 FADEC/ECU sends it 2 minute OEI signal over the ARINC 429 data bus. This advisory appears on the top left hand side of the primary screen. In conjunction with this caution the engine 1 MGT and torque scale change their limit. This caution does not trigger the attention-getter. A flashing down counter is also provided on the left hand side of the No.1 MGT scale to indicate the last ten seconds of the OEI event. In the event that the ARINC 429 input becomes invalid, the IIDS will trigger this caution based on the parameter input.

"2 MIN OEI" (Engine 2)

This caution appears when the engine 2 FADEC/ECU sends its 2 minute OEI signal over the ARINC 429 data bus. This advisory appears on the top right hand side of the primary screen. In conjunction with this

caution, the engine 2 MGT and torque scales change their limit. This caution does not trigger the attention-getter. A flashing down counter is also provided on the right hand side of the No.2 MGT scale to indicate the last ten seconds of the OEI event. In the event that the ARINC 429 input becomes invalid, the IIDS will trigger this caution based on the parameter input.

"30 SEC OEI" (Engine 1)

This caution appears when the engine 1 FADEC/ECU sends its 30 second OEI signal over the ARINC 429 data bus. This advisory appear on the top left hand side of the primary screen. In conjunction with this caution the engine 1 MGT and torque scale change their limit. This caution does not trigger the attention-getter. A flashing down counter is also provided on the left hand side of the No.1 MGT scale to indicate the last ten seconds of the OEI event. In the event that the ARINC 429 input becomes invalid, the IIDS will trigger this caution based on the parameter input.

"30 SEC OEI" (Engine 2)

This caution appears when the engine 2 FADEC/ECU sends its 30 second OEI signal over the ARINC 429 data bus. This advisory appears on the top left hand side of the primary screen. In conjunction with this caution the engine 1 MGT and torque scale change their limit. This caution does not trigger the attention-getter. A flashing down counter is also provided on the left hand side of the No.2 MGT scale to indicate the last ten seconds of the OEI event. In the event that the ARINC 429 input becomes invalid, the IIDS will trigger this caution based on the parameter input.

"LDG GR UP"

This amber caution appears when the airspeed indication is below 55 kts and the landing gear is up. (An **audio warning horn** is also activated.) This caution appears only in the W/C/A window.

"BUS INT"

This caution appears when the electrical power bus interconnect relay is closed. This caution appears between the generator volt/amp digital readouts or as "BUS INT" in the W/C/A window when on the secondary screen page 1.

"FUEL INT"

This advisory appears when the fuel tank interconnect valve is fully open. This advisory appears as a closed blue line between the fuel quantity vertical scales or as a white "FUEL INT" in the W/C/A window when on the secondary screen page 2 or on the start page.

"START"

This white advisory appears when the start sequence of either engine is initiated. This advisory appears in the W/C/A window only.

"EXT PWR"

This white advisory appears when the access door of the external power receptacle is open. This advisory appears in the W/C/A window only.

"OPEN" or "A/FUEL OP"

This advisory appears when the auxiliary fuel system valve is open. This blue advisory appears below the auxiliary fuel quantity readout or as a white "A/FUEL OP" in the W/C/A window when on the secondary screen page 1 or on the start page.

"TRANSIT" or "A/FUEL XT"

This advisory appears when the auxiliary fuel system valve is in transition mode. This blue advisory appears below the auxiliary fuel quantity readout or as a white "A/FUEL XT" in the W/C/A window when on the secondary screen page 1 or on the start page.

"ENG FIRE"

This warning appears when either engine fire warning is triggered by the engine fire sensors. This warning appears into the W/C/A window in addition to the dedicated fire warning light/push-buttons on the glareshield panel.

"BAG FIRE"

This warning appears when the baggage fire warning is triggered by the baggage compartment smoke detector (7 to 10% below that of clean air). This warning appears into the W/C/A window in addition to the dedicated baggage fire warning light on the glareshield panel.

"FLTR" or "1 FLTR"

This caution appears when the sensor installed across the engine 1 fuel filter detects a pressure difference across either side of the filter. This caution appears on the right hand side of the fuel tank 1 vertical scale or as "FLTR 1" in the W/C/A window when on the secondary screen page 2 or on the start page.

"FLTR" or "FLTR 2"

This caution appears when the sensor installed across the engine 2 fuel filter detects a pressure difference across either side of the filter. This caution appears on the left hand side of the fuel tank 2 vertical scale or as "FLTR 2" in the W/C/A window when on the secondary screen page 2 or on the start page.

"LOW QTY" or "1 F/LOW"

This caution appears when the thermistor on the fuel tank 1 detects the remaining fuel quantity to be below 90±10 lbs. This caution appears on the right hand side of the fuel tank 1 vertical scale or as "1 F/LOW" in the W/C/A window when on the secondary screen page 2 or on the start page.

"LOW QTY" or "F/LOW 2"

This caution appears when the thermistor on the fuel tank 2 detects the remaining fuel quantity to be below 90±10 lbs. This caution appears on the left hand side of the fuel tank 2 vertical scale or as "F/LOW 2" in the W/C/A window when on the secondary screen page 2 or on the start page.

"VALVE" or "1 VALVE"

This caution appears when the engine 1 fuel valve has transitioned from the open to closed state and vice versa. Latching is provided for the indication on the screen until acknowledged by resetting the attention-getter. This caution appears on the right hand side of the fuel tank 1 vertical scale or as "1 VALVE " in the W/C/A window when on the secondary screen page 2 or on the start page.

"VALVE" or "VALVE 2"

This caution appears when the engine 2 fuel valve has transitioned from the open to the closed state and vice versa. Latching is provided for the indication on the screen until acknowledged by resetting the attention-getter. This caution appears on the left hand side of the fuel tank 2 vertical scale or as "VALVE 2" in the W/C/A window when on the secondary screen page 2 or on the start page

"L W/S HOT"

This caution appears when the left over temperature sensor detects an overheat (54.5°C/130°F) condition in the left windshield heater circuit. This caution appears only into the W/C/A window.

"R W/S HOT"

This caution appears when the right over temperature sensor detects an overheat (54.5°C/130°F) condition in the right windshield heater circuit. This caution appears only into the W/C/A window

"PARK BRK"

This caution appears when the parking brake is on. This caution appears only in the W/C/A window.

"FLTS ARM"

This white advisory appears when the float system is armed after pressing the float arm push-button switch on the center pedestal. This advisory appears only into the W/C/A window.

"C/HK ARM"

This white advisory appears when the cargo hook system is armed after pressing the cargo hook switch to the armed position. This advisory appears only into the W/C/A window.

"IIDS"

This caution appears when an internal fault within the IIDS has been detected by the continuous BIT. This caution appears only into the W/C/A window.

"OVSPD" (Ng engine 1)

This caution appears when an Ng overspeed has been detected by the engine 1 FADEC/ECU Ng > 106%. This caution appears above the engine 1 Ng digital readout.

"OVSPD" (Ng engine 2)

This caution appears when an Ng overspeed has been detected by the engine 2 FADEC/ECU Ng > 106%. This caution appears above the engine 2 Ng digital readout.

"OVSPD" (Np engine 1)

This caution appears when an Np overspeed has been detected by the engine 1 FADEC/ECU Np > 115%. This caution appears above the engine 1 Np digital readout.

"OVSPD" (Np engine 2)

This caution appears when an Np overspeed has been detected by the engine 2 FADEC/ECU Ng > 115%. This caution appears above the engine 2 Np digital readout.

"ALT"

This white advisory appears when either MGT, Ng, Np or engine torque is operating on its alternate input source (analog or ARINC 429). This advisory appears at the bottom of the related vertical scale. For Ng, the continuous line below the digital readouts changes to a dashed line since the display does not allow for the advisory.

"FAIL"

This caution appears when either MGT, Np, Nr, mast torque or engine torque input(s) are failed or unavailable. This caution appears at the bottom of the related vertical scale.

"A/RLT" (Engine 1)

This caution appears when engine 1 FADEC/ECU is performing an auto-relight sequence by powering the ignition exciters on engine 1. This caution appears above engine 1 torque display on the primary screen.

"A/RLT" (Engine 2)

This caution appears when engine 2 FADEC/ECU is performing an auto-relight sequence by powering the ignition exciters on engine 1. This caution appears above engine 2 torque display on the primary screen.

"SRT ABT" (Engine 1)

This caution appears when engine 1 FADEC/ECU has initiated a start abort sequence on engine 1. This caution appears above engine 1 torque display on the primary screen.

"SRT ABT" (Engine 2)

This caution appears when engine 2 FADEC/ECU has initiated a start abort sequence on engine 2. This caution appears above engine 2 torque display on the primary screen.

"1 M/OEI" (Engine 1)

This white advisory appears when engine 1 FADEC/ECU has recorded an OEI range usage and the PLA is below ground idle on engine 1. This advisory appears only into the W/C/A window.

"M/OEI 2" (Engine 2)

This white advisory appears when engine 2 FADEC/ECU has recorded an OEI range usage and the PLA is below ground idle on engine 2. This advisory appears only into the W/C/A window.

"1 M/ECU" (Engine 1)

This white advisory appears when engine 1 FADEC/ECU has detected a soft fault and the PLA is below ground idle on engine 1. This advisory appears only into the W/C/A window.

"M/ECU 2" (Engine 2)

This white advisory appears when engine 2 FADEC/ECU has detected a soft fault and the PLA is below ground idle on engine 2. This advisory appears only into the W/C/A window.

CHIP DETECTOR POWER UNIT (CDPU)

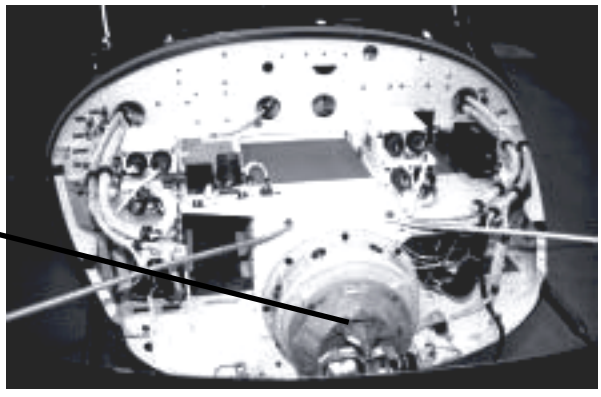
The Chip Detector Power Unit (CDPU) interfaces with 11 chip detectors and provides individual outputs to the Integrated Instrument Display System (IIDS) for annunciation. The CDPU continuously monitors each chip detector to ensure detector and wiring integrity. Any discontinuity will be annunciated by activating the related detector output and the single failure signal. Upon a chip signal, the CDPU will activate the related detector signal output and the single chip signal. Both the failure and chip signal will be active for 2 seconds only in order to be properly recorded by the IIDS. This will allow proper recognition of individual chip or failure signals by IIDS. The CDPU will sequentially send a failure signal or a chip signal to allow the IIDS to properly recognize a failure condition for the individual chip detector(s). The CDPU will keep the individual detector annunciation output active until the chip is cleared or the failure condition has disappeared. If an individual chip input changes state from a failure signal or chip signal, the CDPU will interrupt the individual signal and resend it with the proper recognition of the occurrence for the IIDS. The CDPU will either accept a ground input for system self test or be able to self test upon power-up. The test sequence will last about 6 seconds and trigger one chip signal for each engine and one for the transmission. The CDPU will accept a signal input from the IIDS to initiate chip **burn off** of the related chip detector. Upon CDPU failure, the chip detectors will be automatically transferred to the IIDS inputs for annunciation of chip signals. The CDPU will then output a continuous failure signal.

ELECTRICAL SYSTEM

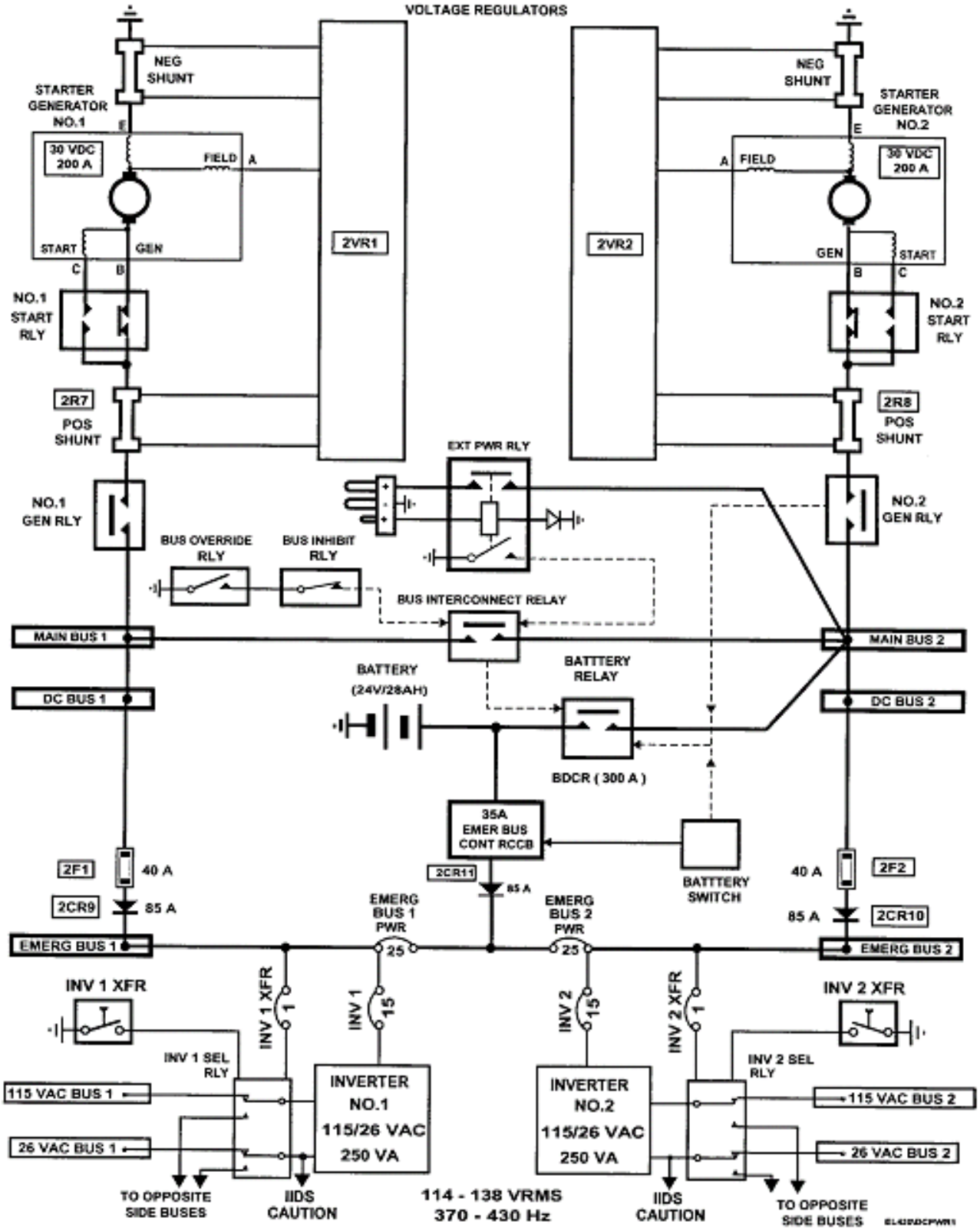
DUAL GENERATORS & BATTERY

The Bell 430 is equipped with a **28 volt DC** single conductor electrical system, using the helicopter structure as a negative ground. Electric power is supplied by **two** 30 volt, 200 ampere **starter generators [derated** to 180 amperes for continuous operation up to **5000 feet (1524 meters) pressure** altitude; with a further reduction of 2 amperes per 1000 feet [305 meters] increase in pressure altitude up to 20,000 feet (6096 meters)**]**, one mounted on each engine, and **one** 24 volt, 28 ampere-hour **nickel-cadmium battery** located in the **aft electrical compartment**, just aft of the baggage compartment door on the right side of the aircraft.

AMPLE SPACE FOR OPTIONAL AVIONICS EXISTS IN THE NOSE COMPARTMENT [SHOWN WITH **OPTIONAL** WEATHER RADAR]



ELECTRICAL POWER DISTRIBUTION SCHEMATIC

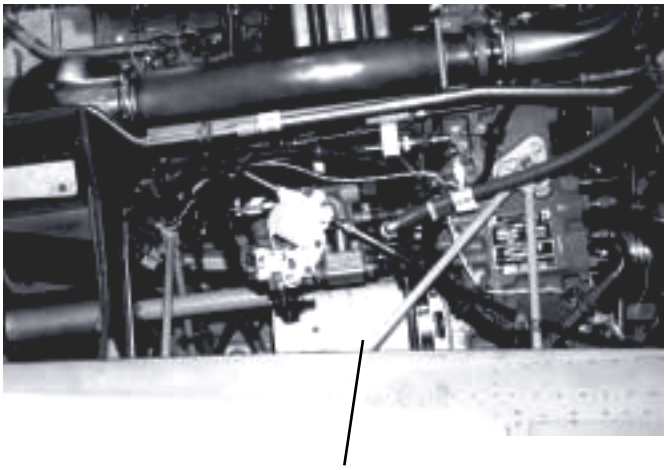


POWER DISTRIBUTION

Electrical power is distributed by **two independent subsystems**, which may be interconnected in the event of a generator failure. System protection is accomplished with relays, circuit breakers, fuses, and isolation diodes. In normal operation, **each** generator supplies 28 VDC power, controlled by individual fault sensing **voltage regulators**, to a DC bus, and an EMERGENCY bus. Items considered ESSENTIAL for flight are connected to the emergency buses, while items NONESSENTIAL for flight are connected to the DC buses. Loss of either generator will cause the loss of its' DC bus, but **not** the loss of its' emergency bus, which is **interconnected** to the **opposite** emergency bus. The failed DC bus may have power restored by activating the bus interconnect relay (BUS INTCON switch).

FAULT PROTECTION

The bus interconnect relay is inhibited from closing if a bus / feeder fault (short circuit) exists. This is to prevent connection of the operative generator to a faulty circuit. Diodes prevent reverse current flow from the emergency buses to the failed DC bus. The emergency buses are fault protected from each other by two EMER BUS PWR circuit breakers, while the DC buses are guarded from ground faults in an emergency bus by two 40 amp fuses.

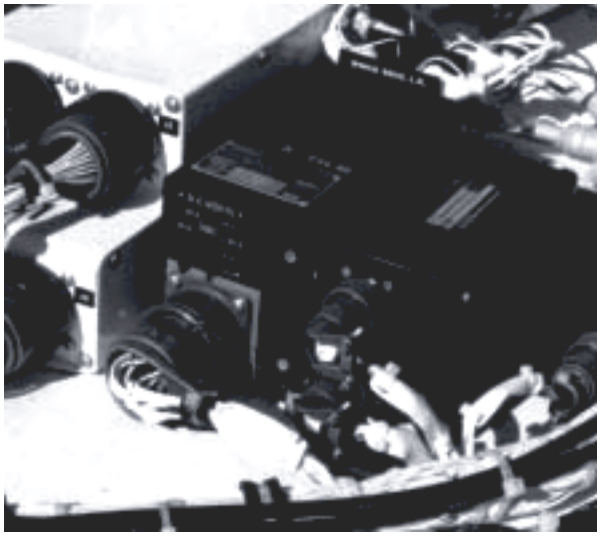


STARTER GENERATOR NO.2

VOLTAGE REGULATOR

Each starter-generator is controlled by a separate **solid state** voltage regulator, located in the aft electrical compartment. They monitor generator output voltage, control the generator relays, energize the DC GEN warning lights, and monitor shunt voltage for fault protection and to prevent overcurrent.

•EXAMPLE•



BATTERY POWER

If a **dual** generator failure occurs, the battery is sized to provide a **minimum** of 30 minutes operation, when powering **only** the two emergency buses. Power may be restored to the DC BUSES, using the battery as source, but a reduced operating time will result. The battery contains **three** temperature sensors; **two** provide input to the IIDS warning and caution displays, while **one** monitors temperature during external power operation (battery charging) and automatically opens the EXTERNAL POWER relay if an overtemperature occurs. The battery is attached to the helicopter electrical system with a standard quick-disconnect plug.

INVERTERS

Two 250 volt ampere, **solid state** inverters supply both 115 and 26 volt **AC** (alternating current). Each inverter [No.1 & No.2] is powered by respective EMERGENCY BUS 1and EMERGENCY BUS 2.

EXTERNAL POWER

A connector for standard 28 volt DC aircraft ground power unit **(GPU)** is located on the helicopter nose, protected by a small hinged cover. After a ground power start, both engines should be operating and the GPU unplugged prior to placing either generator on line, due to voltage incompatibility.

OVERHEAD CONSOLE

The overhead console, centered on the **cockpit ceiling**, contains most of the electrical switches and circuit breakers. The console has **two sides**, with the circuit breakers of Subsystem 1 on the **left**, and Subsystem 2 on the **right**. Five **rocker-type** switches at the consoles' central forward edge control the Battery, Generator 1 & 2, the Inverter, and the Emergency Light. The rocker switches are clearly labeled and internally illuminated with white light. Except for the DC bus control switches (white **illuminated**), the remaining **push-on / push-off** switches change illumination **color** from **white** to **green** when activated. The **internal lighting** controls are potentiometer knobs or rheostats. There is ample space reserved for circuit breakers and switches required by optional equipment.

LIGHTING

The Bell 430 in standard configuration is completely equipped for **night operations**. The following lights are provided:

One cockpit utility light, with red / white-spot / flood beam

Two map lights

One cockpit emergency light

Internal white instrument lights

Storm Lights (external instrument illumination)

Pedestal equipment lighting

Overhead console lighting

Four cabin dome lights, with integral battery powered emergency lights

Four luminescent panels (over each emergency exit)

Seat belt / No Smoking sign

Baggage compartment light

Position lights

Retractable Landing / Search light

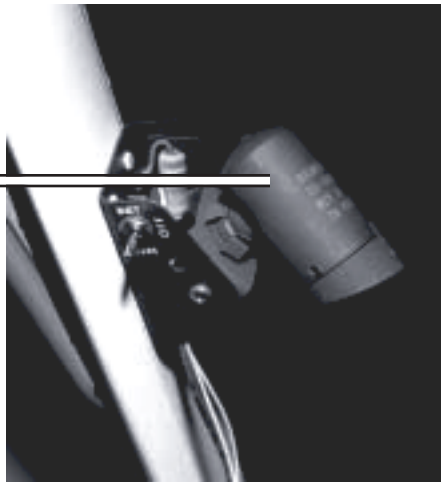
Two anticollision lights

COCKPIT LIGHTING

The instruments, information panels, panel mounted avionics, pedestal and overhead console are uniformly illuminated with integral blue / white lighting. Separate **dimming** rheostats are provided for the pilot's flight instruments, engine instruments, the map lights, pedestal mounted equipment, overhead console, and the cabin lights. Provisions are included for dimming the optional copilot instruments.

UTILITY LIGHT

EMERGENCY LIGHT



APPROACH PLATE/MAP LIGHT

UTILITY LIGHT

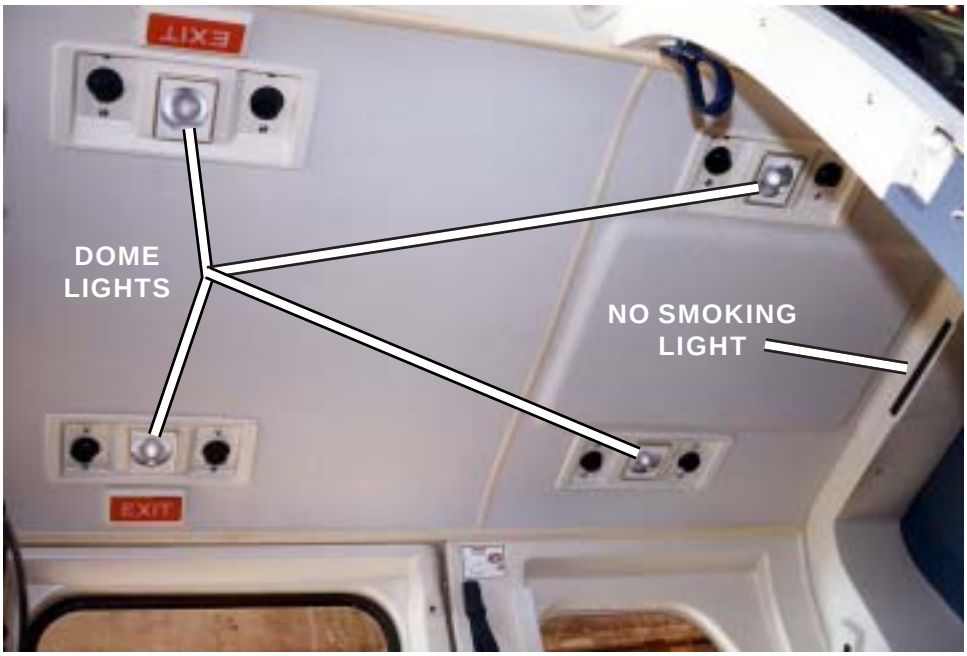
A single **dimable** utility light [GRIMES LIGHT] is provided just inboard of the roof window above the pilot. It may be pointed from its' bracket, or with the coiled cable, be removed and used anywhere in the cockpit. The light beam may be switched from **white** to **red** light, and adjusted from **spot** to **flood.**

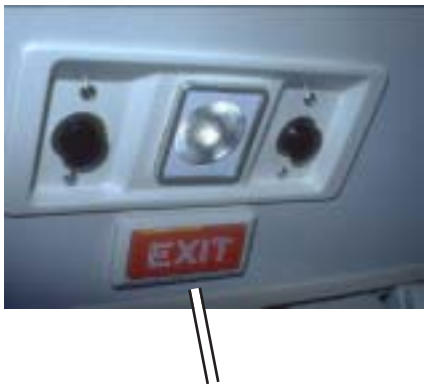
EMERGENCY LIGHT

A battery powered **emergency light** is mounted at the rear of the overhead console, directed toward the instrument panel. The batteries are kept fully charged by the helicopters electrical system (EMERG BUS 2), and when the EMERGENCY LIGHT SWITCH is armed, automatically turns on should both emergency buses fail. It will provide illumination for about **20 minutes**, and may be removed for use as a flashlight.

CABIN LIGHTING

Four cabin **dome lights** provide adjustable interior illumination. Controlled by a switch (CABIN & BAG LT) on the overhead console, their intensity can be adjusted by the pilot. Each dome light contains a separate battery powered **emergency light**, controlled by the EMERGENCY LIGHT SWITCH. Two Ni-Cad batteries (one each for the two left and two right lights) are kept fully charged by the electrical system. Activation is automatic when the system is armed and both emergency buses fail. The batteries are sufficient for 20 minutes of illumination.





BETA
LIGHT
DETAIL

EMERGENCY EXIT LIGHTS

Self illuminated BETA lights are mounted over each window in the crew / passenger doors to identify the emergency exits.

SEAT BELT / NO SMOKING SIGN

An illuminating sign with the international symbols for FASTEN SEAT BELTS and NO SMOKING is displayed at the rear of the overhead console, visible to the cabin occupants. Each sign segment is individually controllable by a switch above the pilot.

BAGGAGE COMPARTMENT LIGHT

The baggage compartment contains a single light mounted in its' ceiling, controlled by the same circuit which activates the cabin dome lights.

EXTERNAL LIGHTING

POSITION LIGHTS

Standard aviation position lights are provided; a green light on the right wing, a red light on the left wing, and a white light on the tail.

SEARCH / LANDING LIGHT

The search and landing light is a **single**, high intensity, **450 watt**, wide-beam, directionally controllable, retractable light located in the lower part of the fuselage. The ON / OFF / STOW power switch and four-way steering switch are located on the pilots' collective control box.

ANTI COLLISION LIGHTS

Two highly conspicuous red strobe lights serve to draw attention in flight or on the ground. One is located above the engine cowling, and another is found on the underside of the tail boom.

LOWER ANTICOLLISION LIGHT

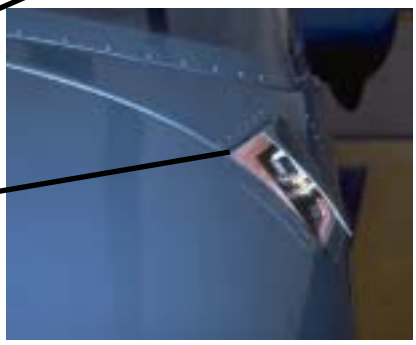
DIRECTIONALLY CONTROLLABLE
LANDING/SEARCH LIGHT

CREW VENTILATION / WINDSHIELD DEFOGGING

Two separate systems, pilot and forward passenger position, provide for crew ventilation and windshield defogging. Each system consists of an exterior plenum door (on one side of the nose), an electric blower, diverter valve, ducting, check valve, windshield defog nozzle, adjustable vent nozzle, and two control cable assemblies.

LOWER CREW AIR OUTLET

LEFT & RIGHT
COCKPIT
AIR INLETS
[DETAIL]

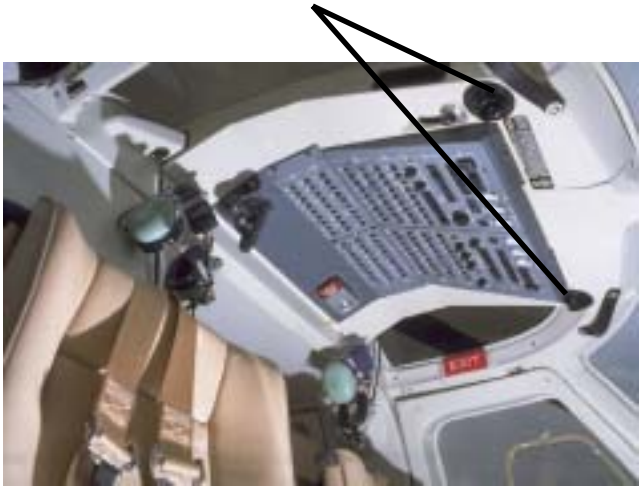


Provision is made for the defog nozzles connection to heated air ducts from the optional Environmental Control System, when installed.

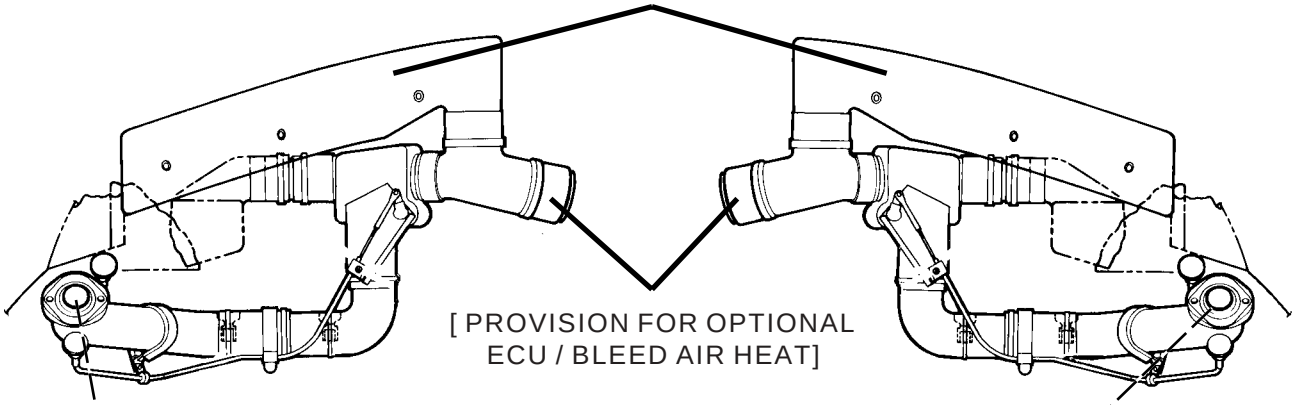
Additional cockpit ventilation is provided from two overhead outlets which receive air from the cabin ventilation system.

The two cable assembly control knobs located above and below each vent nozzle control the plenum door and the diverter valve. Pressing the center of each knob and sliding the cable out or in varies the door opening (upper knob), or diverts airflow (lower knob) to the defog nozzle. Releasing the center of the knob locks the cables position. The vent nozzles, located on either side of the instrument panel may be adjusted for direction and volume. Each system will function with ram air only, or for ground / hovering operation, with the vent blowers (PILOT VENT BLO & CPLT VENT BLO switches on the overhead console).

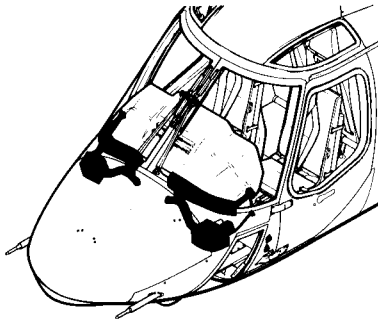
UPPER CREW AIR OUTLETS

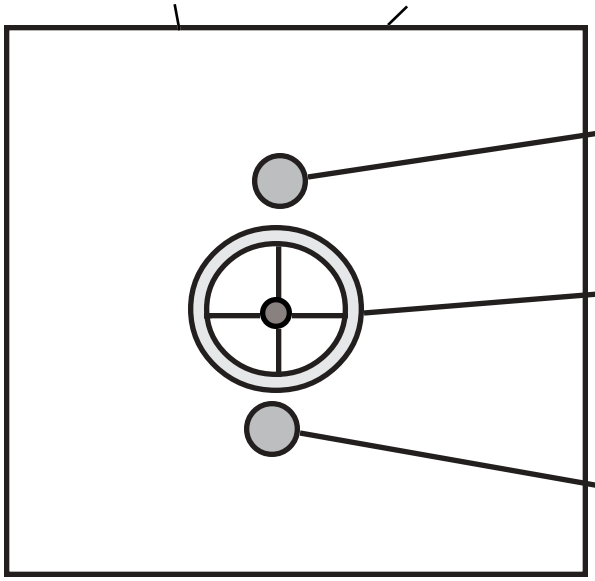


DEFOG NOZZLES



[PROVISION FOR OPTIONAL
ECU / BLEED AIR HEAT]





UPPER CABLE CONTROL
OPENS PLENUM DOOR

VENT OUTLET -ROTATE CLOCKWISE TO
CLOSE -COUNTER CLOCKWISE TO OPEN

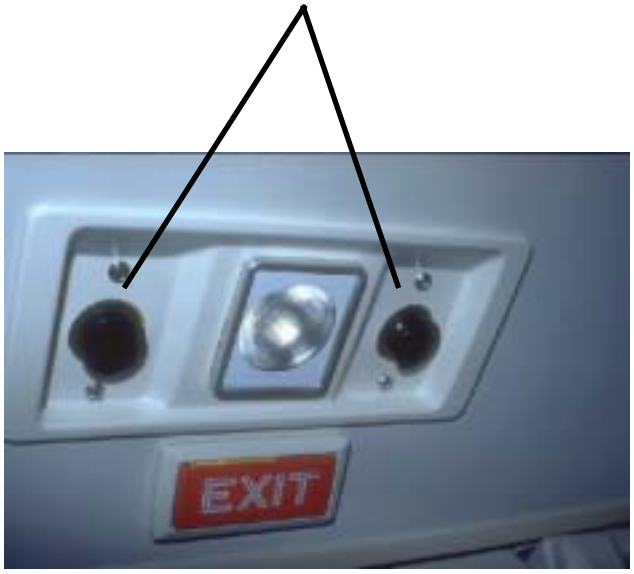
LOWER CABLE CONTROL
DIVERTS AIRFLOW TO DEFOG

CABIN VENTILATION

The cabin interior is ventilated with **ambient ram air**. The ram air enters an **inlet scoop** on the roof, which is controlled by a **lever** above the pilot's head, and is directed through a plenum into two parallel distribution ducts. **Four dual outlets** are installed in the passenger compartment headliner (combined with the four cabin lights), with **two** additional outlets just above the windshields in front of the pilot and forward passenger. Each of the outlets is separately **controllable** in direction and volume. Air **exhausts** from the cabin through **two ports**, left and right, near the floor, at the lower edge of the rear bench seat. The ports may be opened or closed by hand to help adjust the flow. The **minimum** cabin air exchange rate in cruise flight is 2.83 cubic meters per minute (100 cubic feet per minute).

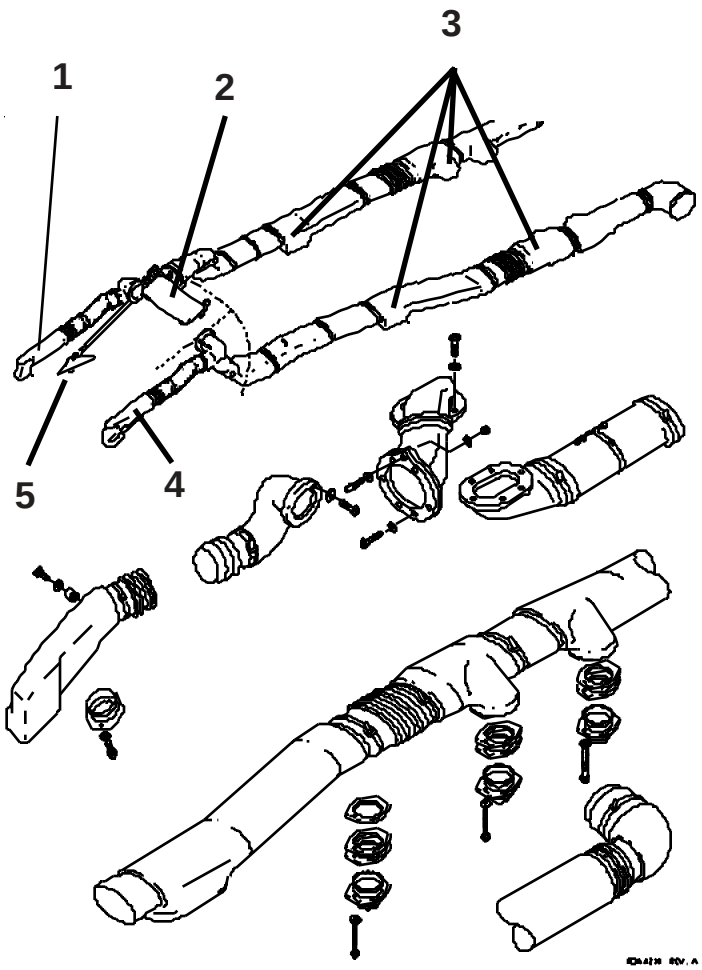
CABIN AIR SCOOP

ONE CABIN VENT AND LIGHT GROUP



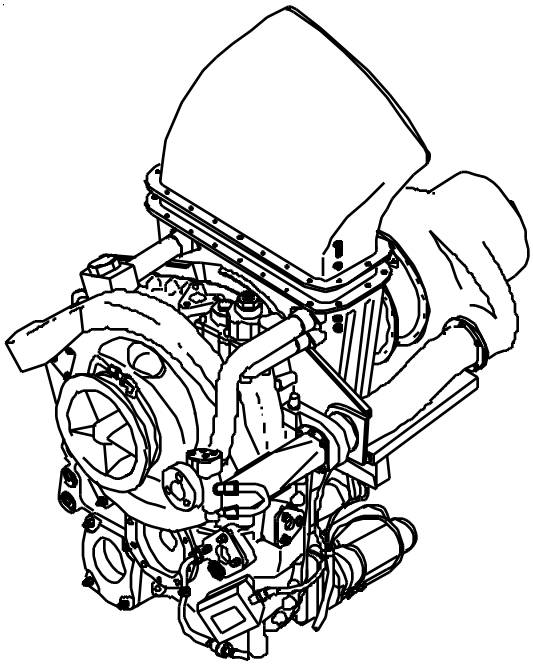
CABIN AIR DISTRIBUTION SYSTEM

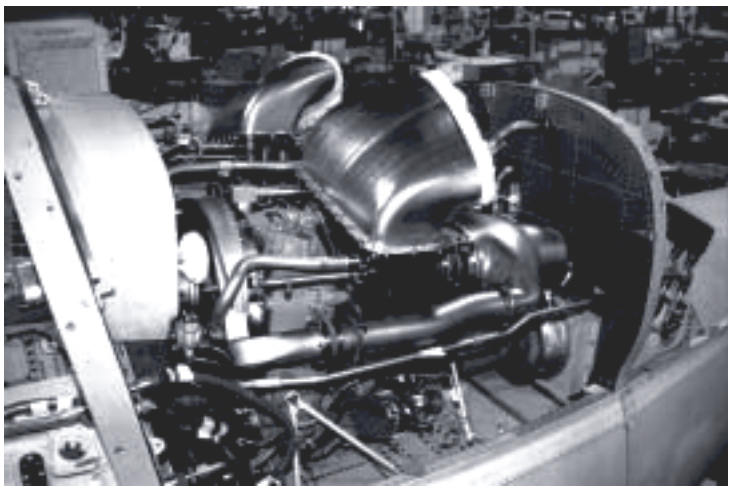
1. Pilots overhead vent duct
2. Passenger vent door
3. Passenger vent ducts
4. Copilots overhead vent duct
5. Vent control knob and lever



POWERPLANT

TWO ROLLS-ROYCE 250-C40B TURBOSHAFT ENGINES





The powerplant consists of **two** Rolls-Royce Gas Turbine Model 250-C40B turboshaft engines and their **independent** fuel, oil, and air management systems. The engines are mounted **side-by-side**, in individual fireproof compartments; the **left** side designated ENGINE NO. 1 and the **right** side as ENGINE NO. 2. Optimized for performance under hot day, high altitude conditions, there is ample reserve power contained in each compact **118 kilogram (260 pound)** unit.

ENGINE RATINGS:		***Uninstalled Thermodynamic Power***	***Engine Rated Power***
Rolls-Royce 250-C40B with Full Authority Digital Electronic Control (FADEC).			
Takeoff Power (5 Minutes)	***SHP(kW)***	***808(603)***	***747(557)***
Maximum Continuous Power	***SHP(kW)***	***695(518)***	***618(461)***
OEI (30 seconds)	***SHP(kW)***	***940(701)***	***844(629)***
OEI (2 minute)	***SHP(kW)***	***880(656)***	***811(605)***
OEI (30 minute)	***SHP(kW)***	***835(623)***	***789(588)***
OEI (Continuous)	***SHP(kW)***	***808(603)***	***747(557)***

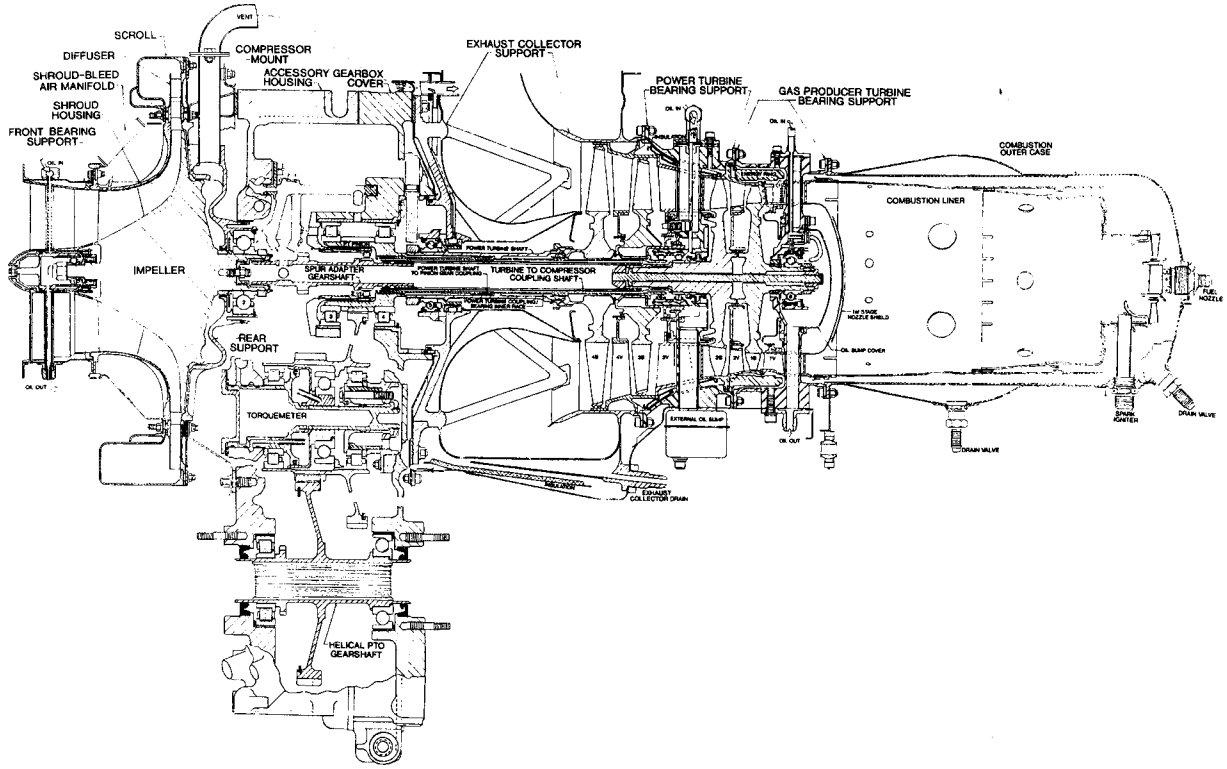
RELIABLE POWER

Manufactured by **Rolls Royce**, the **C40B** is one of the latest in the evolutionary Model 250 series, which has amassed over **100 million engine flight hours**. During this evolution, many improvements have been incorporated.
The engine is light weight and of compact. Easy to maintain, all engine adjustments and **almost all** inspections and routine maintenance can easily be performed while the engine remains installed on the helicopter.

MODULAR CONSTRUCTION

The Rolls-Royce 250-C40B turboshaft engine features **modular design** for easy access to the major components. One module can be replaced quickly without disturbing the others. Modular design offers substantial **direct operating cost advantages** because maintenance or overhaul of a single module can be accomplished independently. The compressor, for instance, may be removed for repair or overhaul while the remainder of the engine continues in service with a replacement (overhaul exchange unit / temporary leased) compressor.

ENGINE CUTAWAY SCHEMATIC



The two engines are **identical**, each consisting of **four** major modules; a **compressor** section, an **accessory gear box**, a **turbine** section and a **combustion** section. Some of the benefits of the modular concept are shown below.

COMPRESSOR MODULE

- READY FOR OVERHAUL OR REPAIR BY REMOVING SIX GEARBOX MOUNTING BOLTS.
- SIMPLE SINGLE STAGE IMPELLER.
- NO VARIABLE GEOMETRY.

GEARBOX MODULE

- RUGGED CONSTRUCTION, COMMON MOUNTING PADS FOR ALL MODEL 250 SERIES ENGINES.
- ALL LIP SEALS CHANGED EXTERNALLY.
- ROTATING ACCESSORIES USE COMMON NUTS.
- BOTH FRONT AND REAR DRIVE.
- EASY ACCESS TO THE ACCESSORIES FOR QUICK REMOVAL AND REPLACEMENT.

TURBINE MODULE

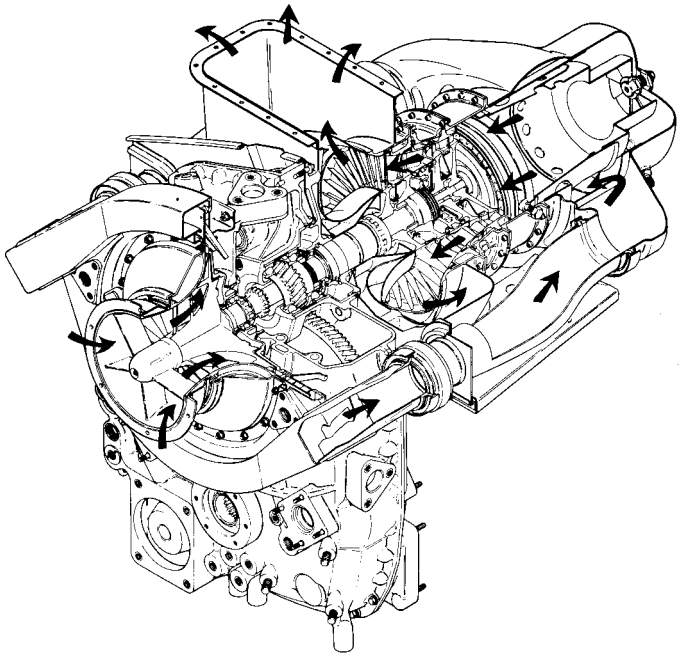
- MOUNTED TO THE REAR OF THE GEARBOX WITH FIVE NUTS.
- FIRST STAGE TURBINE ACCESSIBLE BY REMOVING THE COMBUSTOR MODULE.
- ALL ACCESSORIES AND SHAFTING REMAIN IN PLACE.

COMBUSTOR MODULE

- SIMPLE ONE PIECE OUTER COMBUSTOR, SINGLE COMBUSTOR LINER.
- SINGLE FUEL NOZZLE.
- SINGLE SPLIT LINE FOR REMOVAL FROM TURBINE.
- COMPLETE COMBUSTOR SYSTEM HARDWARE CAN BE INSPECTED BY REMOVAL OF COMBUSTOR MODULE.

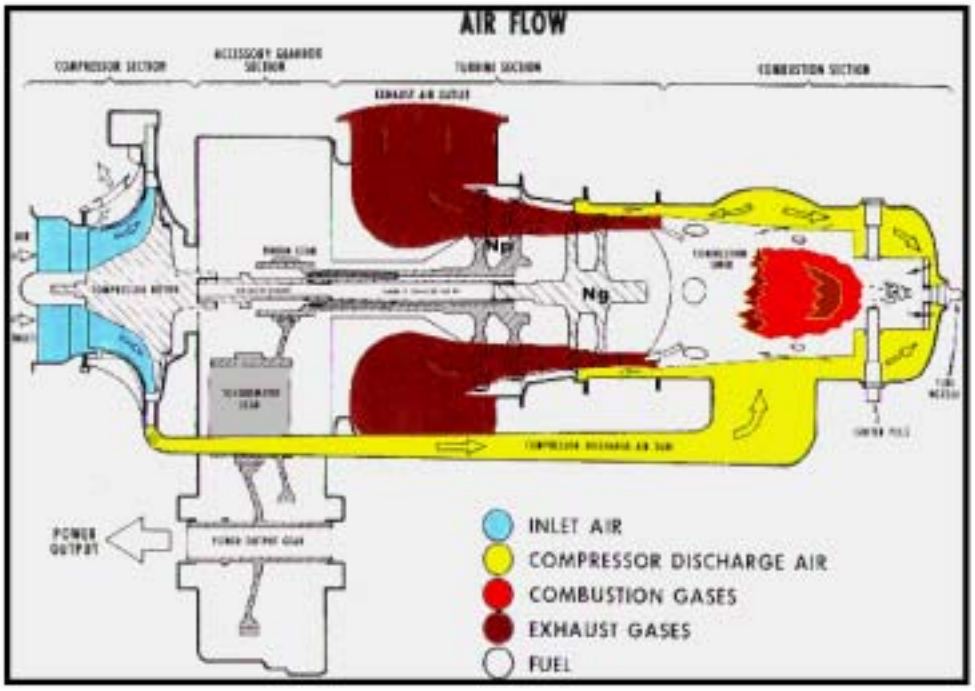
OPERATING PRINCIPLES

The basic principle of the C40B engine is quite simple; **continuous combustion** that produces a steady flow of efficient power. Air is supplied to each engine through **airscoops** on either side of the fuselage aft of the transmission cowling [Airflow at **takeoff power** is approximately 2.54 kilograms per second (5.6 pounds per second) for each engine]. Before the air enters the engine it passes through a **protective screen** to prevent the induction of large foreign matter.



Engine Air Flow

ENGINE AIR FLOW SCHEMATIC

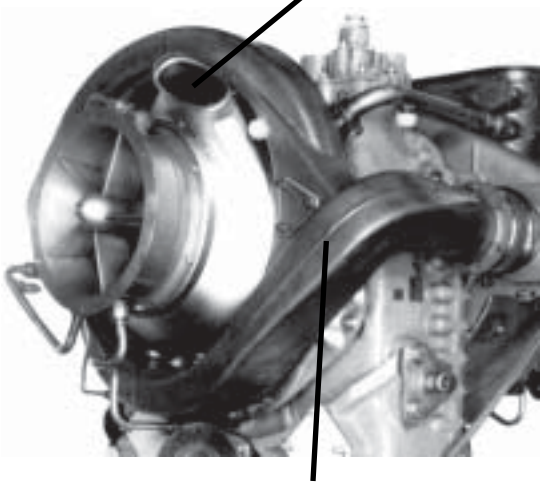


COMPRESSOR SECTION

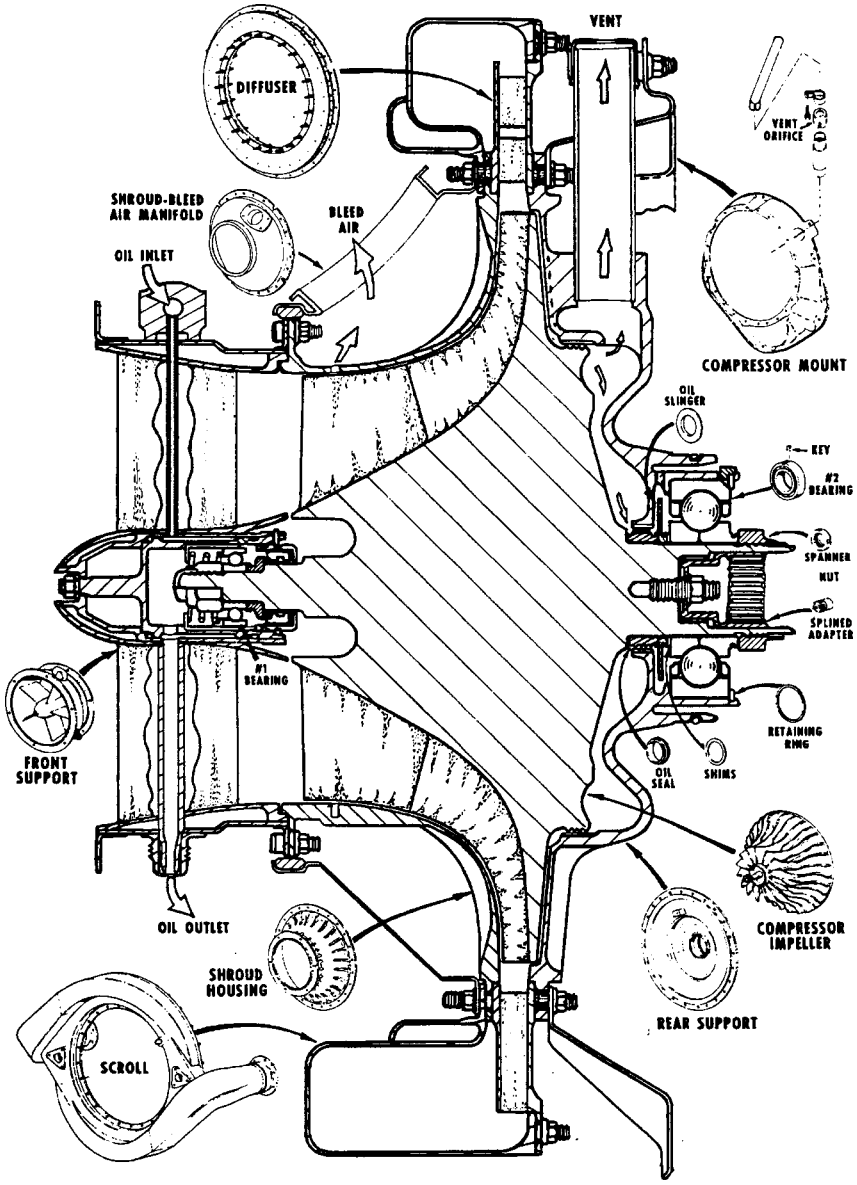
Clean air enters the compressor inlet. The compressor in the C40B is a **titanium** single -stage **centrifugal** impeller which compresses the entering air (**8.6** to **1** pressure ratio at takeoff power) and discharges it through a **diffuser assembly** and dual **scroll** collector into a pair of **external ducts.** The ducts carry the air directly to the **combustion section** at the aft end of the engine.

•EXAMPLE•

BLEED AIR VENT



SCROLL



BLEED SYSTEM

An **acceleration bleed air system** is incorporated in the compressor assembly. The system allows a portion of the compressed air to escape during the start/acceleration cycle to prevent stalls, power surges, and to assure rapid response to engine power demands. The system consists of a pneumatically operated **bleed valve**, and an inducer bleed assembly. As **NG** increases, the bleed valve gradually closes to reserve air for engine operation. The inducer bleed serves a similar function to enhance compressor efficiency when **NG** is above 96 %.

•EXAMPLE PHOTO•

BLEED AIR SOURCES

Four **ports** along the diffuser scroll are provided to supply **bleed air**. One provides air to the **engine fuel system**, a second is for to the **anti-icing system, and** the remaining two are available as **bleed air sources** to power airframe systems (**optional** environmental control system or **customized** bleed air heater).

ANTI-ICING SYSTEM

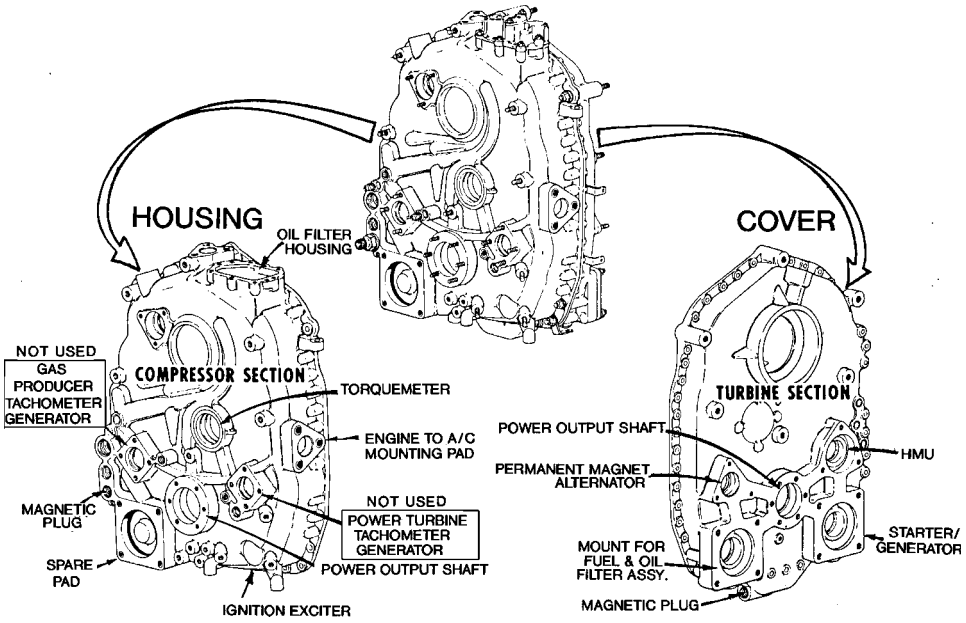
The **anti-icing system** directs hot compressor discharge air through the **inlet guide vanes** to prevent the ice formation on the hollow vanes. An electrically operated valve on the compressor scroll controls the air flow. Anti-icing ON is **required** when flying into visible moisture at temperatures below **4.5°C (40°F)**.

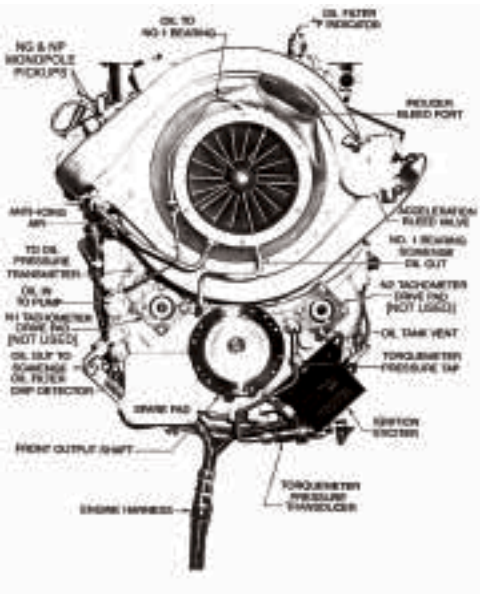
ENGINE CLEANING

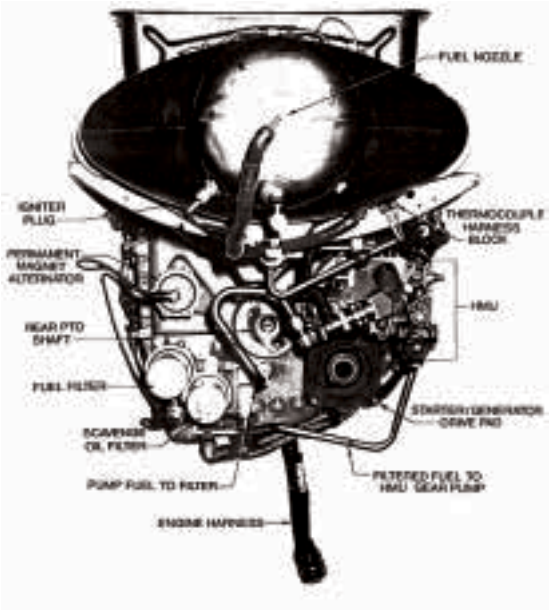
A **compressor wash / rinse fitting** is provided to facilitate the recommended daily compressor cleaning to remove airborne chemical contamination (such as when operating near salt water). A spray nozzle, connecting tubing, and threaded adapter are installed for **each engine** to allow quick conduct of the wash process without removal of cowlings (or the **optional** particle separator kit, if installed)

ACCESSORY GEARBOX SECTION

The accessory gearbox section includes a **gearbox housing** (FRONT or COMPRESSOR side), a **gearbox cover** (REAR or TURBINE side), **gas producer gear train**, **power turbine gear train**, **oil pump assembly**, **oil filter**, and the necessary **oil tubes** to provide pressure and scavenge oil for the system.

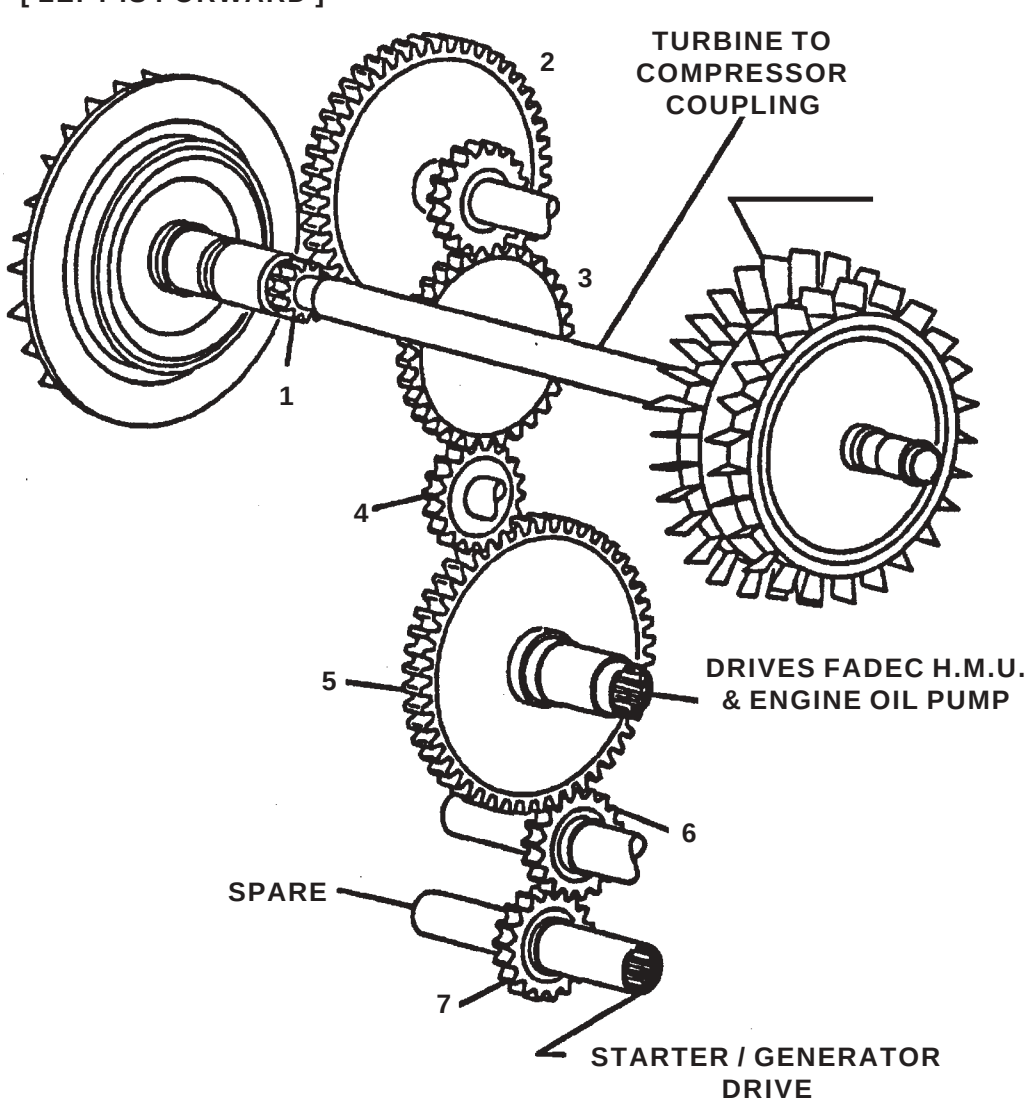






GAS PRODUCER GEARING

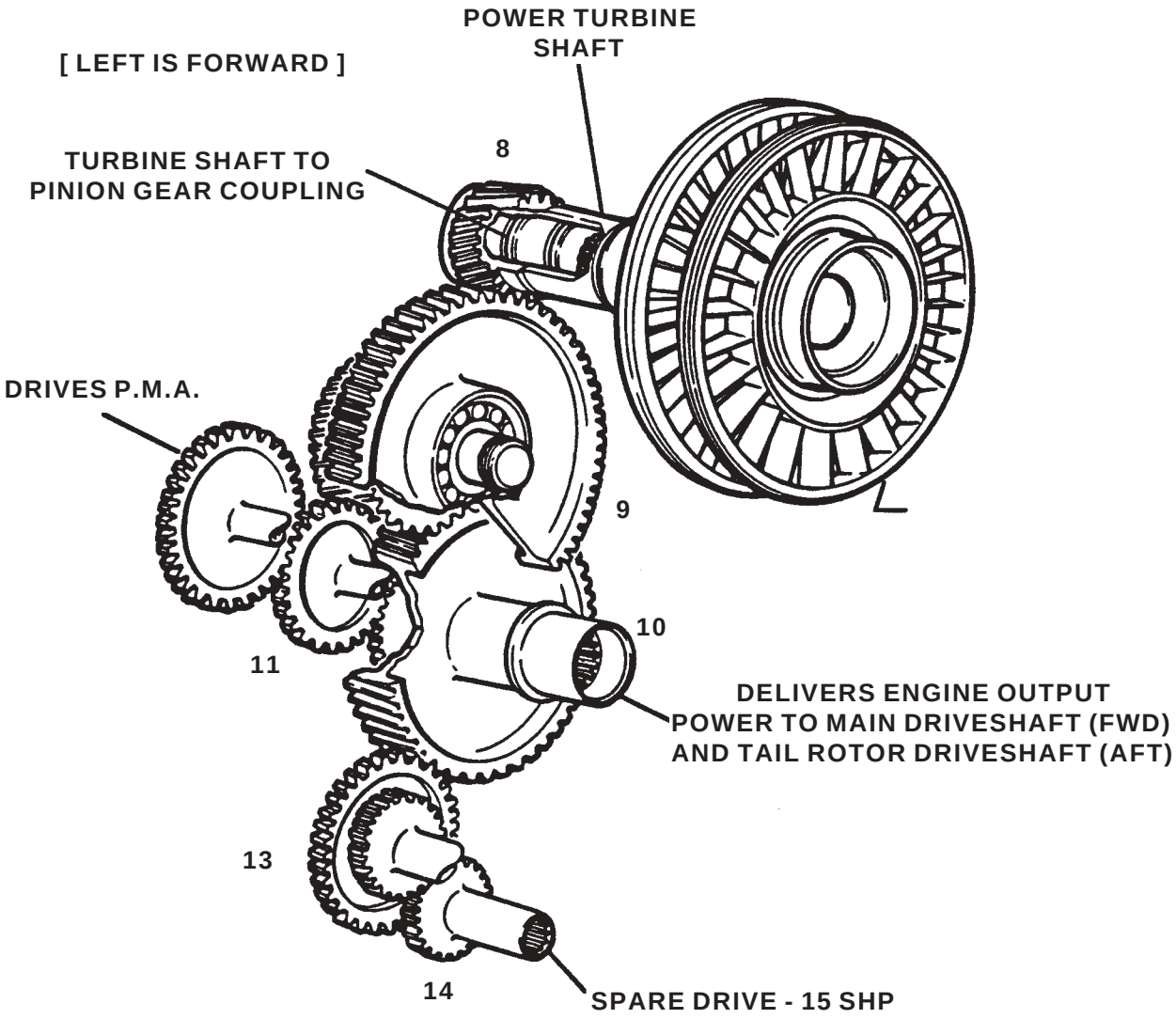
The **accessory drive train** is powered by the **gas producer turbine**. It drives / is driven by the **starter / generator**, and provides power for the **engine fuel pump**, **hydromechanical unit** and the **engine oil pump**.



1. SPUR ADAPTOR GEARSHAFT
2. SPUR CENTRIFUGAL BREATHER GEARSHAFT
3. SPUR IDLER GEARSHAFT
4. SPUR IDLER GEARSHAFT
5. SPUR HYDRO MECHANICAL UNIT & OIL PUMP
6. GENERATOR IDLER GEAR
7. STARTER GENERATOR GEARSHAFT

POWER TURBINE GEARING

The **power turbine gear train** supplies engine power to the **main** forward output drive at a design speed of **9,598 RPM**. In addition the rear side of the main output drive provides power to operate the airframe mounted oil cooler blower.



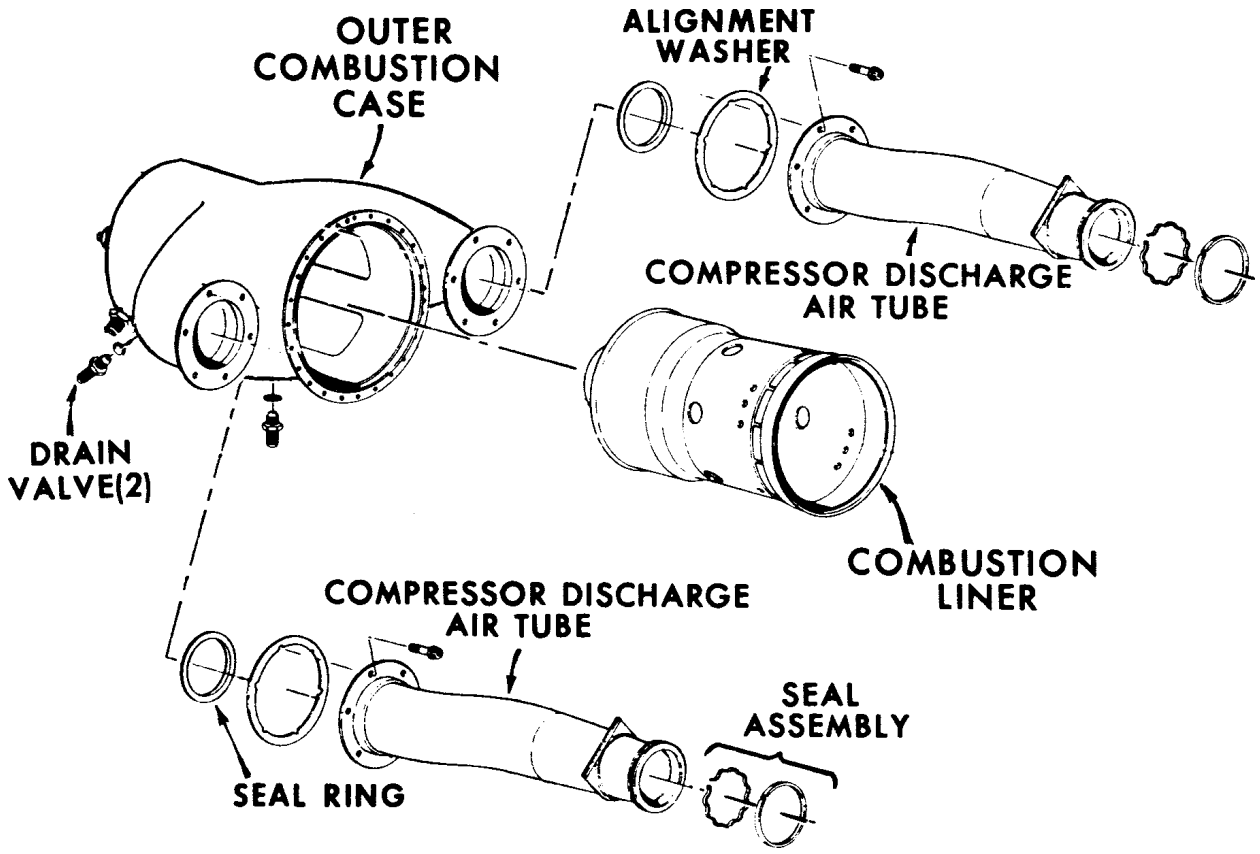
8. HELICAL POWERTRAIN DRIVE GEAR
9. HELICAL TORQUEMETER GEARSHAFT
10. HELICAL POWER TAKEOFF GEARSHAFT
11. SPUR POWERTRAIN IDLER GEAR
12. SPUR POWERTRAIN PERMANENT MAGNET ALTERNATOR
13. SPARE DRIVE IDLER HELICAL SPUR GEARSHAFT
14. SPARE SPUR DRIVE GEARSHAFT

SPARE DRIVE PADS

Each gear train has an additional drive pad location available for **limited** use as an accessory power source, one each on the **front** of the gearbox.

COMBUSTION SECTION

The combustion section consists of an outer case, a combustion liner, an igniter and a fuel injector. The prechamber combustion system is designed to burn fuel at peak efficiency and to minimize emissions. Fuel is sprayed into the chamber at a precisely controlled rate. The single igniter produces a constant spark while the start circuit is energized, until automatic starter disengage at 58% **N_G.** Gas flow moves forward out of the chamber to the first stage GP nozzle.



IGNITION & STARTING

Each engine has its' own separate ignition system exciter, shielded igniter plug cables and igniter plug. The engines are easy to start and require no warm-up. The **battery** is capable of starting engines in cold weather to **-32°C (-25° F)**. Starting capability with **external power** extends to temperatures as low as **-45°C (-49°F)**.

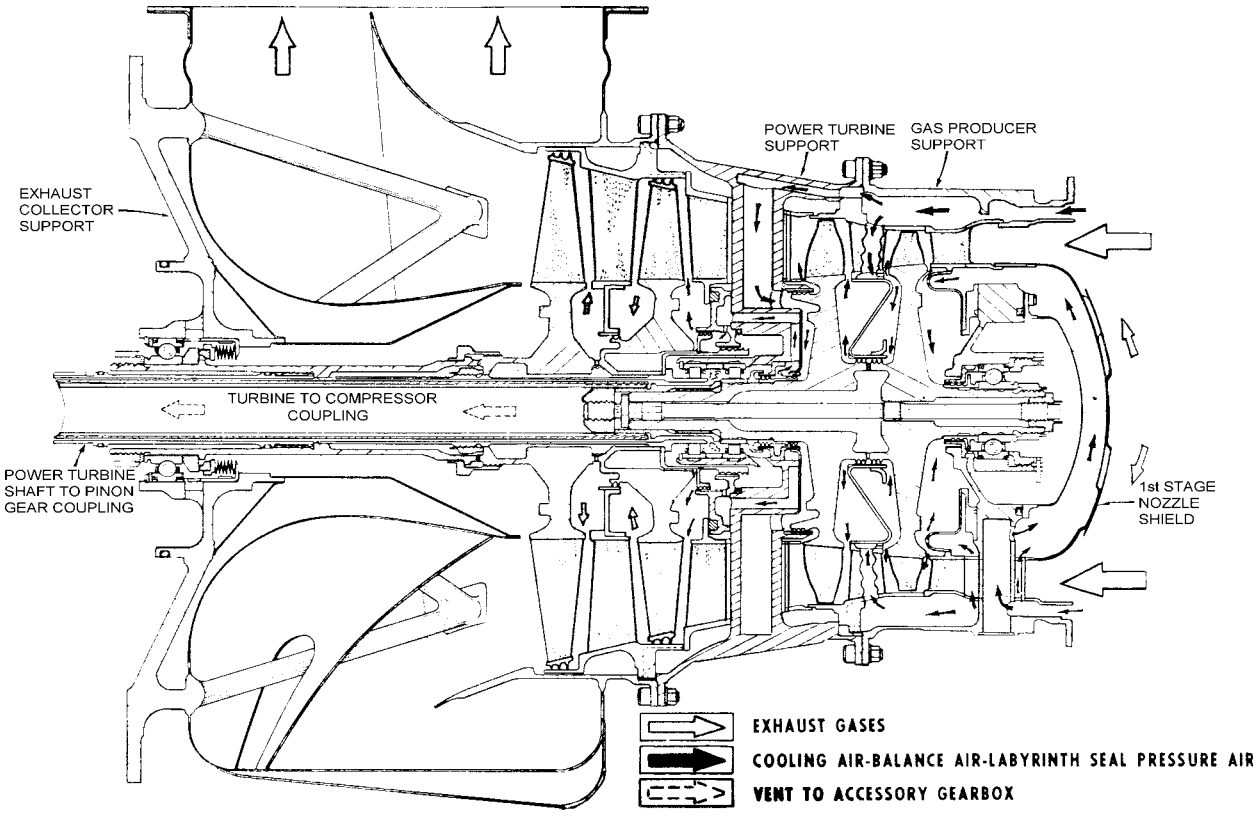
FUEL REQUIREMENTS

Combustion is continuous as long as the proper fuel / air mixture is maintained. The prechamber combustor provides reliable high altitude / cold starting; with **Jet A** (JP-5) at **0°C (32°F)** and **Jet B** (JP-4) at **-45°C (-49°F)**. For operations when temperatures are below **-12°C (10°F)**, an **anti-icing fuel additive** is required.

AIR COOLING

Approximately **20%** to **25%** of the air entering the combustion chamber is required to burn the fuel, while the remaining air is used for **engine cooling** and **thrust balance**. The cooling air is directed into the **combustion liner**, to prevent the flame from contacting the liner wall, and to **cooling air passages** in the gas producer turbine support, the turbine nozzles, and the first stage nozzle shield. Some of the **high-pressure** cooling air is delivered to the **thrust balance chamber** at the forward face of the second stage gas producer turbine rotor to **offset forward pressure** from combustion gas flow and reduce loads on the No.8 thrust bearing.

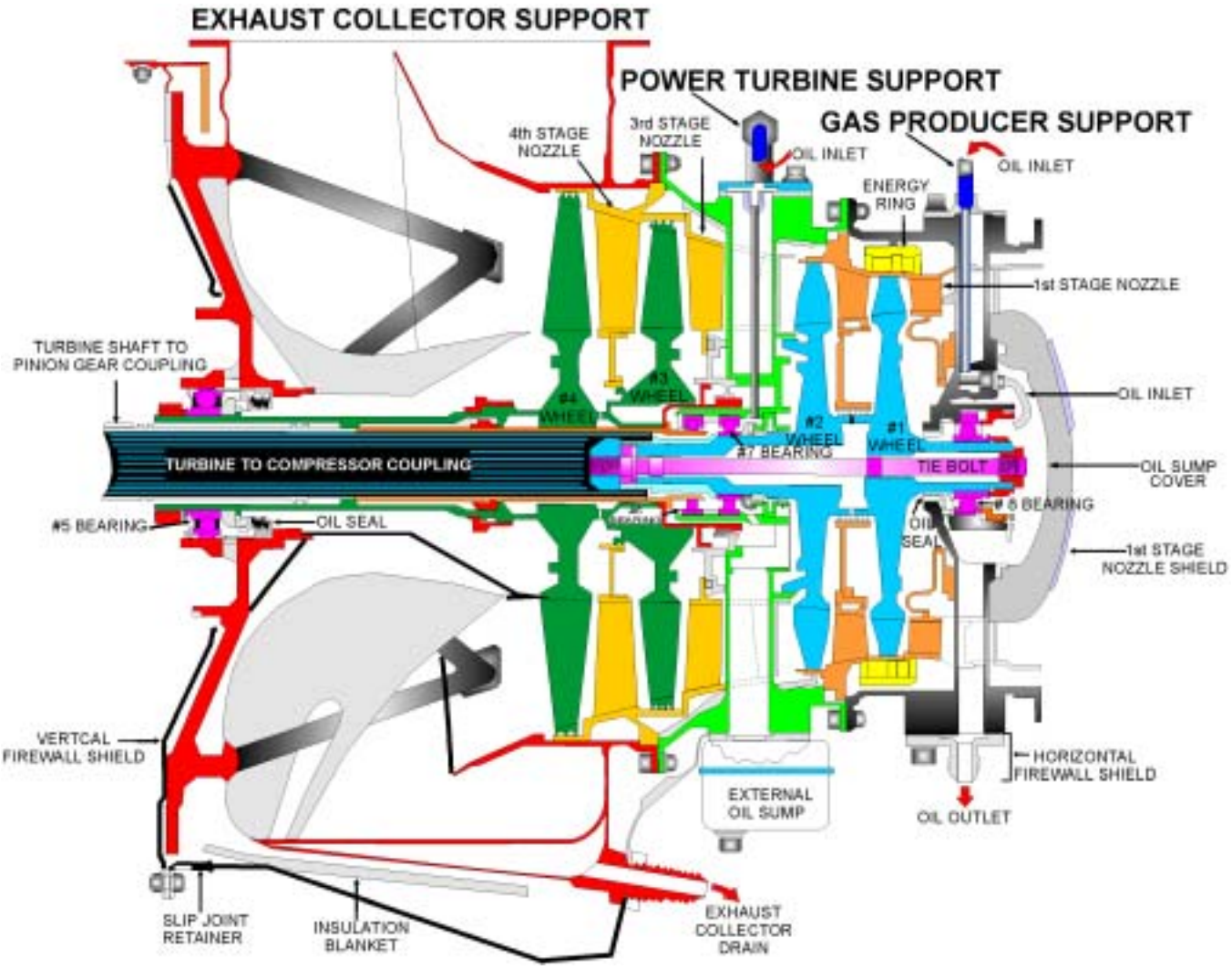
TURBINE COOLING & BALANCE AIR SCHEMATIC



TURBINE SECTION

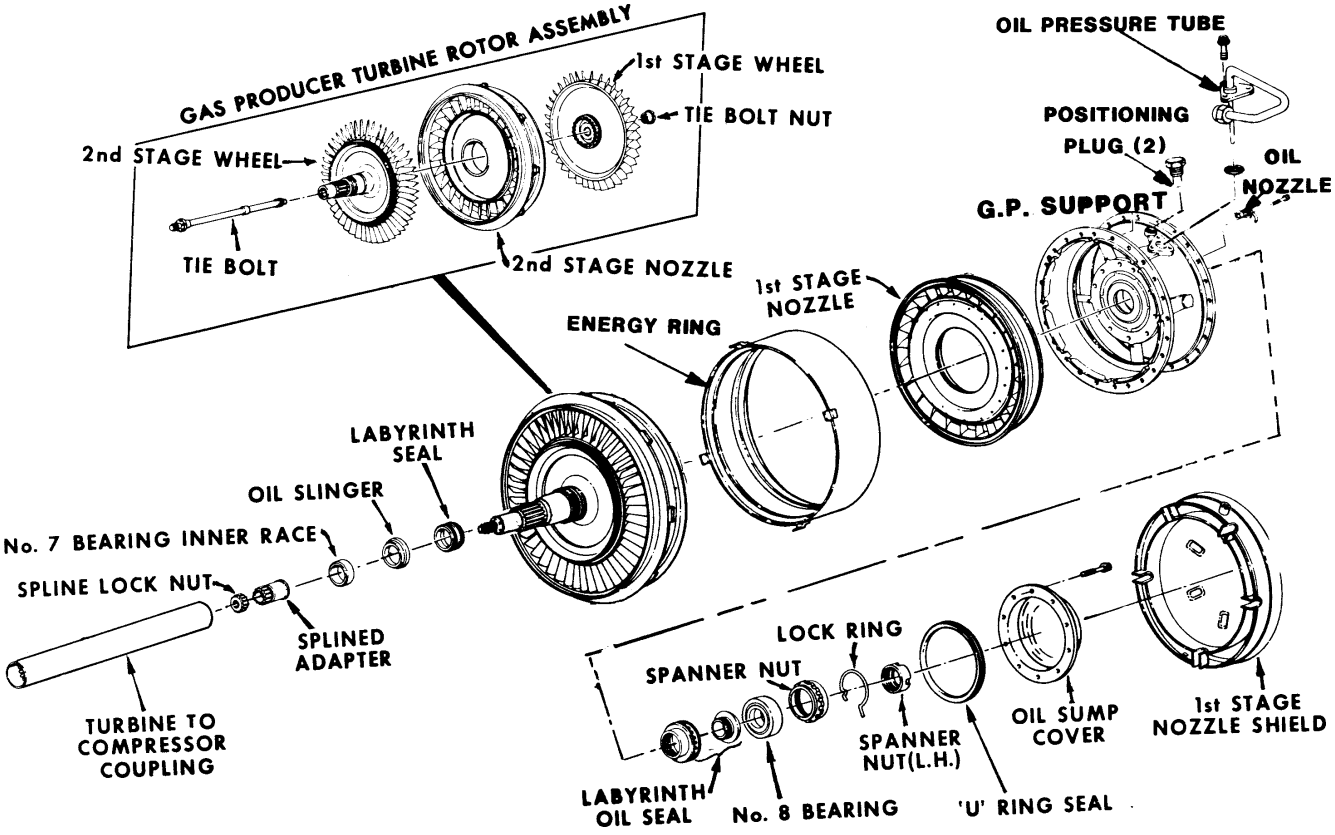
The **turbine section** consists of a gas producer turbine support, a power turbine support, an exhaust collector support, a **two-stage** gas producer turbine, and a **two-stage** power turbine. The gas producer, power turbine, and exhaust collector supports are high temperature resistant structures which house support and thrust bearings, oil and air seals, passages for lubrication, cooling air and thrust balance air, temperature sensing thermocouples, and the outer casings which connect the combustion section and the accessory gearbox. The two turbine units are free to revolve **independently** of one another. Each turbine stage consists of a **stator**, or **nozzle** (stationary guide vanes which direct the combustion gases) and a **rotor**, or **turbine wheel** (which is reaction driven by the combustion gases).

TURBINE SECTION SCHEMATIC



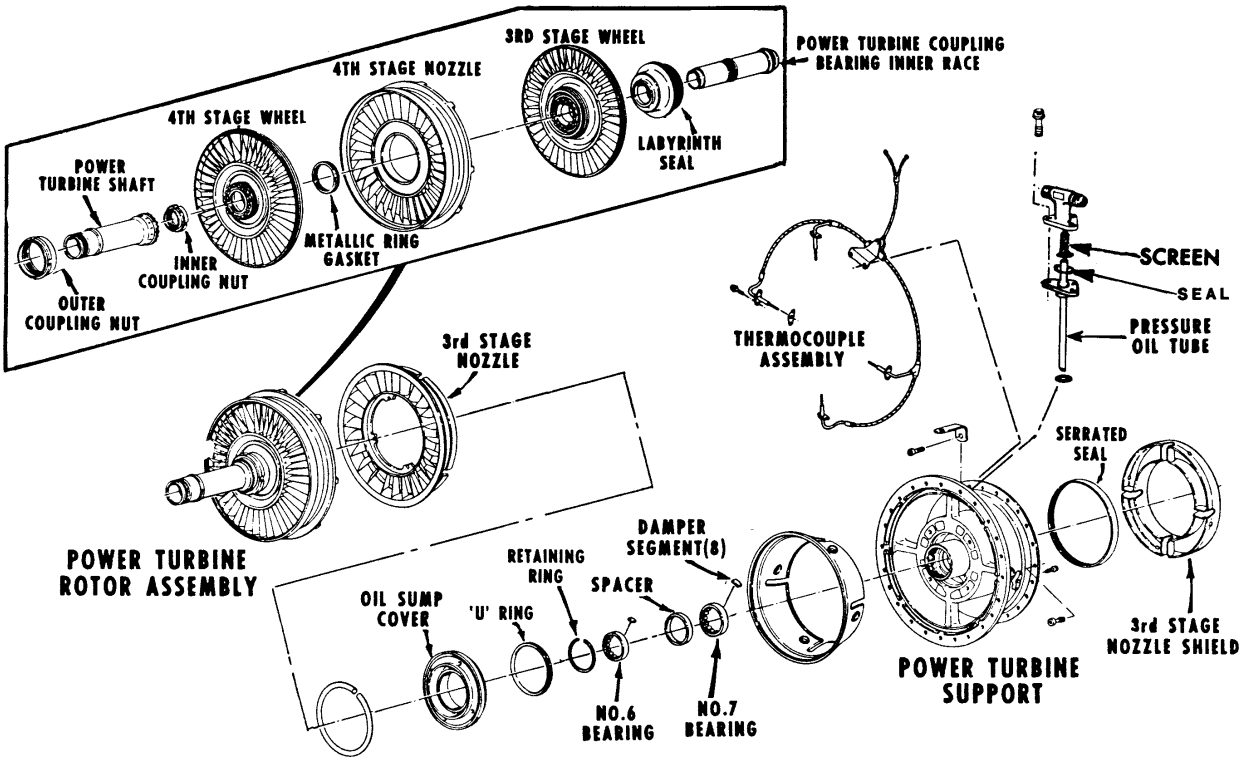
GAS PRODUCER TURBINE (NG)

The first two turbine stages are coupled to the compressor, and also power the gas producer gear train. At 100 % RPM they rotate at **51,000 RPM**. The **gas producer support** contains a protective **energy containment ring**, which surrounds the first stage gas producer turbine wheel. The energy ring guards against damage from ballistic fragments in the event of a turbine wheel failure.



POWER TURBINE (NP)

The final two turbine stages extract energy from the combustion gases to drive the power turbine. At 100 % RPM the power turbine rotates at **30,908 RPM.**

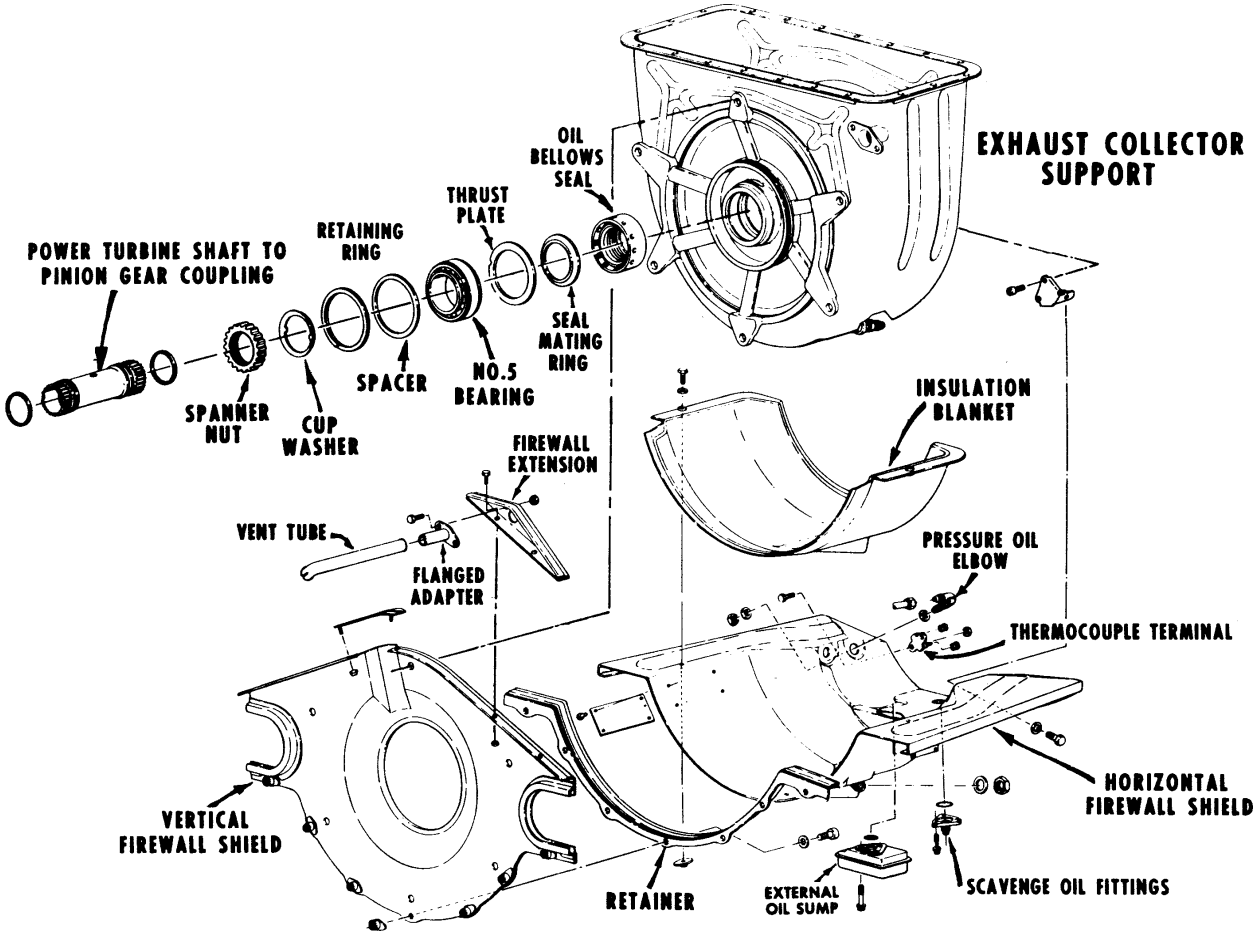


TEMPERATURE SENSING

The power turbine support incorporates a thermocouple assembly, which senses the temperature of the combustion gases as they exit the second stage gas producer rotor. Four ALUMEL-CHROMEL probes generate a DC current directly proportional to the temperature of the gas. The thermocouple harness averages the four voltages and transmits the resulting signal to the ARINC-429 databus and IIDS.

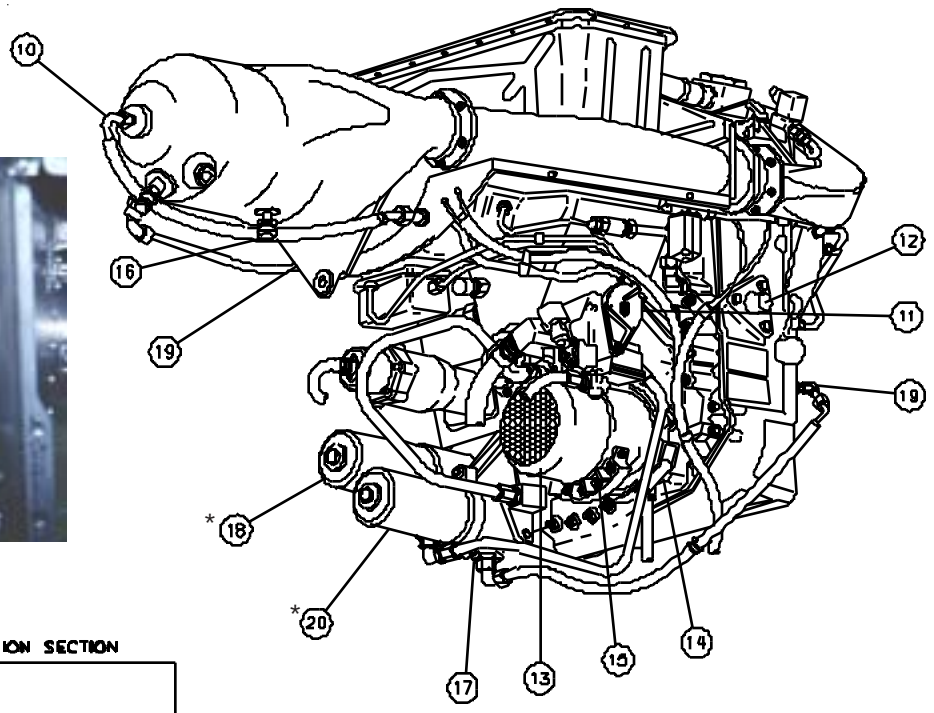
EXHAUST COLLECTOR SECTION

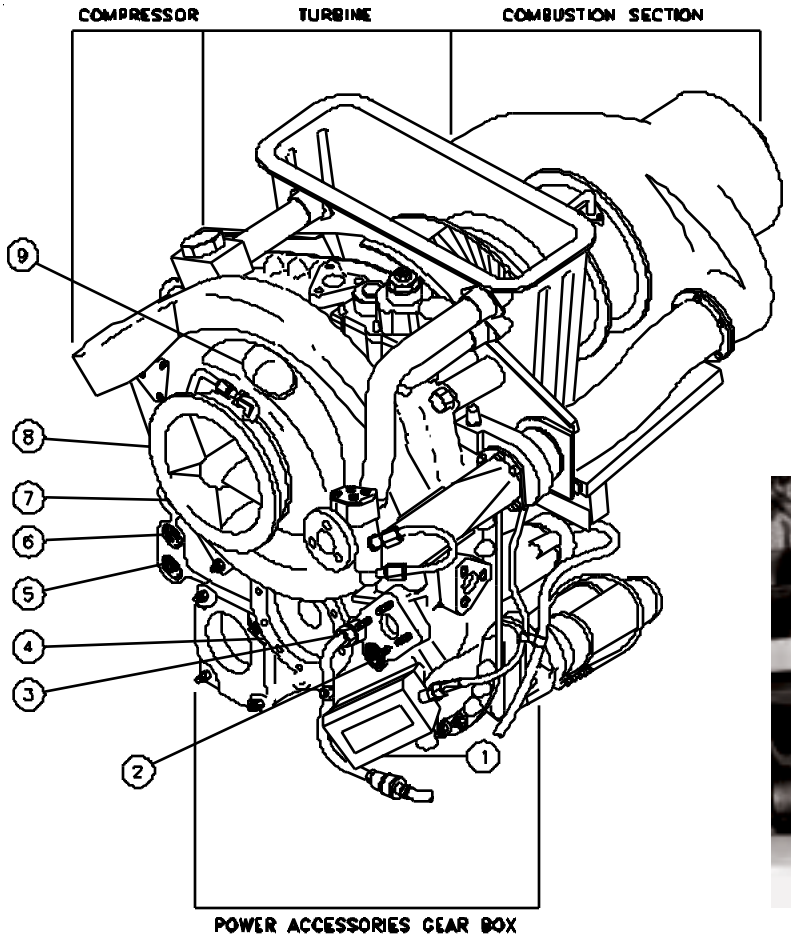
The **exhaust collector section** is fabricated of high temperature resistant **stainless steel** formed sheets and castings. The **exhaust collector support** holds the aft portions of the engine and is attached to the accessory gearbox cover with six studs. The **exhaust collector duct** incorporates a center tube and power turbine shaft shield which protects the power turbine shaft from the exhaust gas. The duct has a **single rectangular outlet** at its' top, which supports the **exhaust ejector stack**. The vertical **firewall shield** and horizontal **firewall shield** and **insulation blanket** protect accessories from radiant heat.



ENGINE ACCESSORIES & CONTROLS

PERMANENT MAGNET ALTERNATOR

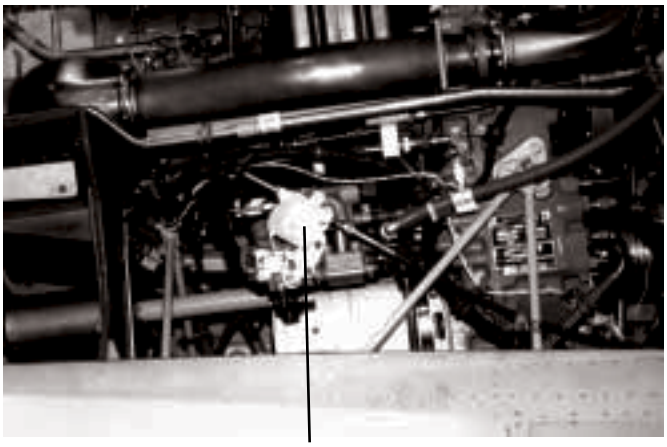




10. Fuel nozzle (ref)
11. Fuel control box assembly (ref)
12. Engine mount trunnion (ref)
13. Starter-generator (ref)
14. Starter-generator V-clamp (ref)
15. Starter-generator connections (ref)
16. Hose assembly, combustion chamber drain (ref)
17. Impending fuel filter bypass indicator (ref)
* 18. Scavenge oil filter (ref)
19. Aft engine mount support (ref)
* 20. Fuel filter (ref)

*CEFA (COMBINED ENGINE FILTER ASSEMBLY)

1. Ignition exciter box (ref)
2. Oil tank vent port (ref)
3. Torquemeter oil pressure port (ref)
4. Engine power output pad (ref)
5. Engine oil outlet port (ref)
6. Engine oil inlet port (ref)
7. Engine oil pressure port (ref)
8. Engine intake (ref)
9. Shroud bleed air manifold connection (ref)



HYDROMECHANICAL UNIT

STARTER / GENERATORS

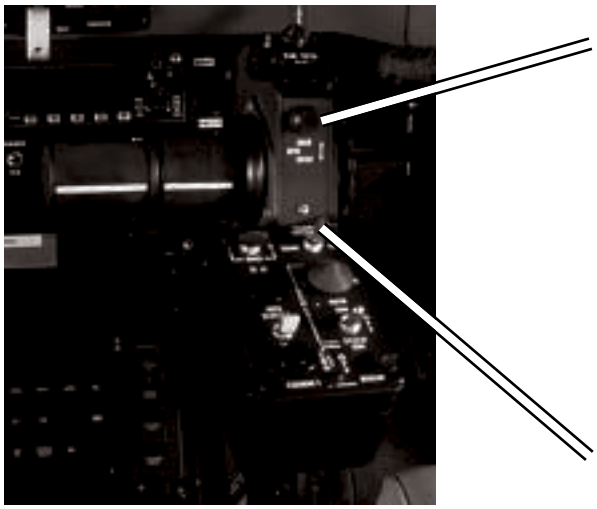
The starter / generators are mounted on the **lower right side** of each engines accessory gearbox cover, and **drive / are driven by** the gas producer turbine gear train. The drive shaft of each unit is oil lubricated **(wet spline system)** and has an engine protective **shear** point. Air cooling is accomplished with an **integral fan**, assisted by **dedicated air inlets** on the lower outboard engine cowlings.

EVENT RECORDING

The IIDS records the occurrence of an **engine start** in its nonvolatile memory, and if an **exceedance** occurs it also records the **date/time**, **duration** and **magnitude**. This allows maintenance personnel to confirm the helicopter logbook start count totals for transfer to the individual engine logs **cycle** record, and insure that any required maintenance action is performed.

ENGINE START CONTROL PANEL

Engine starting is controlled by three push/ push illuminated switches mounted above the engine instruments group. When the START 1 or START 2 switches are engaged, the starter is **continuously** motored until automatic disengagement occurs at **56% N_G** or the center START DISENG switch is depressed.



RPM SWITCH

A **two-way** "BEEP" switch mounted on the pilots' collective lever provides a signal to each FADEC ECU for fine adjustment of **N_P**. Forward / aft movement adjusts **N_P** of both engines **up / down.**

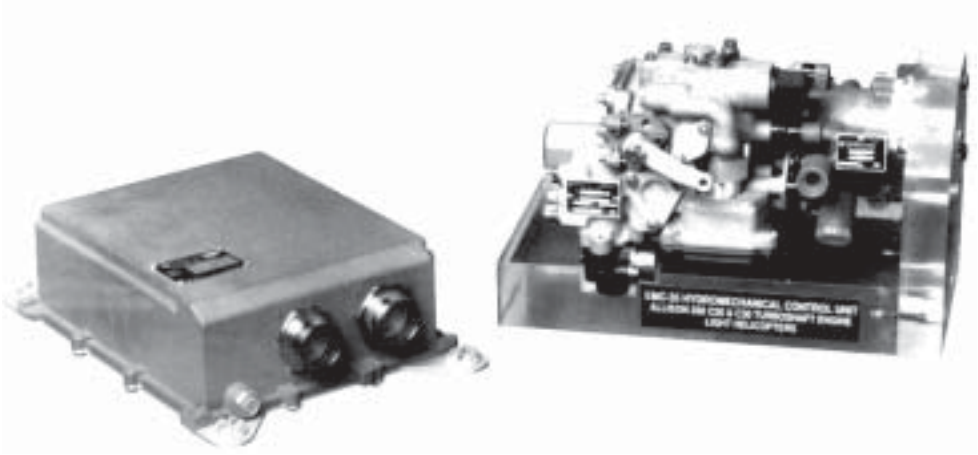
TEMP/TORQUE MATCHING

A two-way momentary switch mounted on the collective control box provides a signal to the IIDS which controls the mode for engine matching. Left or Right movement of the switch selects **either** same MGT mode, or same Q [engine torque] mode.

ENGINE CONTROL SYSTEM [FADEC]

A **Full Authority Digital Electronic Control** (FADEC) System is used on the 250-C40B engine, as well as on other 250 engine models.

System objectives are to : 1. Improve engine performance 2. Enhance flight safety 3. Reduce pilot work load 4. Increase mean time between removals/ overhauls 5. Reduce life cycle costs 6. Simplify engine maintenance and trouble shooting



The FADEC fuel and control system consists of :

1. Hydromechanical Unit (HMU) 2. Fuel filter-oil filter assembly (CEFA)
3. Electronic Control Unit (ECU) 4. Permanent Magnet Alternator (PMA)
5. Compressor inlet air temperature sensor, inlet duet mounted
6. P1 compressor air inlet pressure sensor in the ECU
7. Engine sensors of RPM, MGT and Torque 8. Aircraft supplied inputs

The HMU contains the following components :

1. Two element fuel pump 2. Fuel metering valve
3. Manual fuel control 4. Three solenoid valves
5. Two check valves 6. Fuel shut-off valve with a pilot valve (windmill bypass valve)
7. Bypassing type pressure differential regulator valve
8. Power lever input shaft 9. Two feedback potentiometers

ELECTRONIC CONTROL UNIT

The **Series IV 250-C40B** engine use a digital electronic control system, based upon a single-channel, Full Authority Digital Electronic Control (FADEC). It is also referred to as the Electronic Control Unit (ECU). The system controls, monitors and limits the engine while maintaining helicopter rotor speed. The control connection between the helicopter and the engine is **both** electrical and mechanical. This interface includes a combination of Power Lever Angle (PLA) [**twist-grip throttle]** input, hard wired discretes, analog signals, and a RS-423 data link for ground maintenance interrogation. An ARINC-429 **digital data link** is used to transmit information on engine and control status to the aircraft.

HYDROMECHANICAL CONTROL UNIT

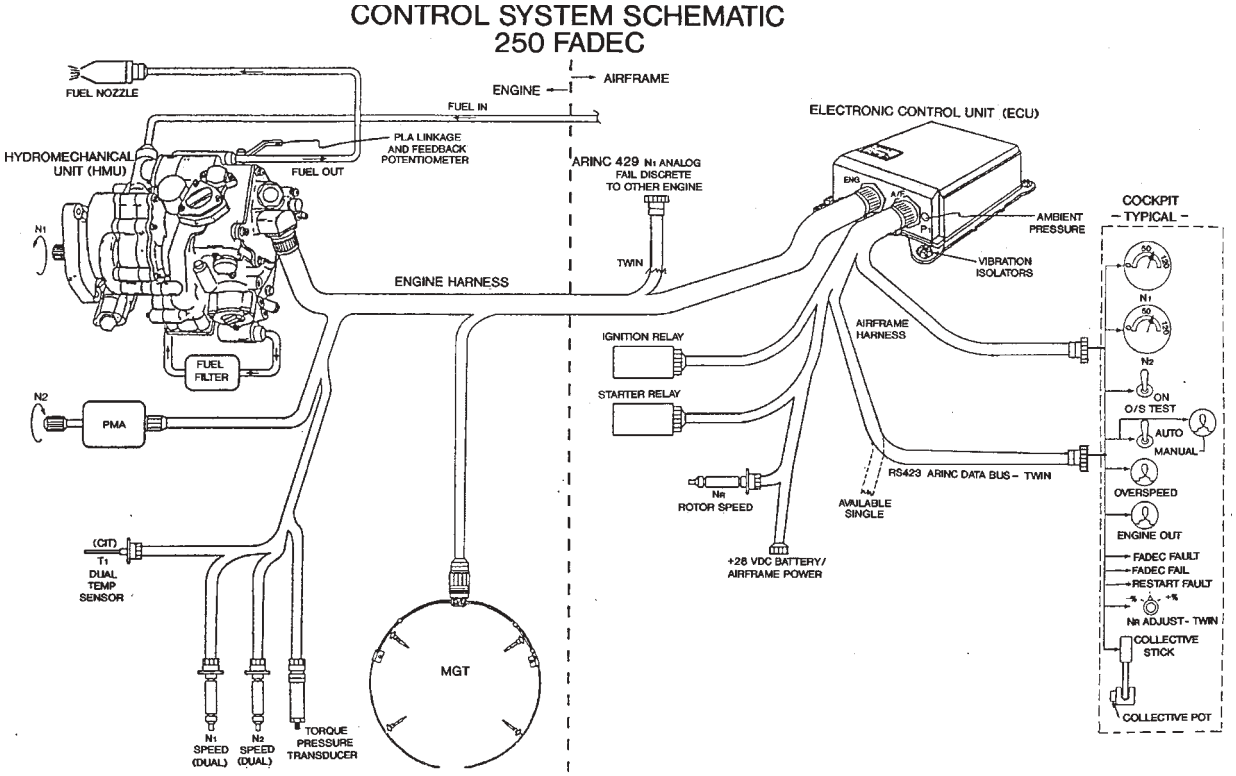
The **Hydromechanical Unit** consists of the dual element fuel pump, fuel metering valve, manual fuel control, three solenoid valves, two check valves, a fuel shutoff valve with a pilot valve (windmill bypass valve), bypassing type pressure differential regulator valve, power lever input shaft, and two feedback potentiometers.

During **automatic** operation of the FADEC, fuel metering by the HMU is controlled electronically by the ECU.

In the **manual mode** the pilot's throttle input is tied mechanically to the fuel flow metering window in the HMU. The manual mode is engaged by **deenergizing** a solenoid in the HMU via a cockpit switch. This allows the pilot to vary fuel flow to the engine by moving the **twist-grip** throttle.

This manual mode fuel flow is altitude compensated to allow a consistent throttle / horsepower relationship verses altitude. At 100% throttle travel, the manual mode will provide at least maximum continuous power. Additionally, the fuel flow slew rate is mechanically limited to avoid blowout and to provide proper responsiveness for aircraft operation.

FADEC SYSTEM SCHEMATIC



Advantages during starting include :

1. Faster and cooler starts 2. Improved cold weather and low battery starts

3. Overtemperature start abort

Advantages during operation include:

1. Improved power turbine governing 2. Torque limiting 3. MGT limiting

4. Constant transients, insensitive to fuel type, temperature and metering inconsistencies.

5. Improved autorotation recoupling minimizes rotor RPM droop 6. Surge detection, recovering, avoidance

Advantages regarding safety include:

1. Improved overall engine reliability 2. High reliability electronics 3. Dual channel NP overspeed shutoff, tested at shutdown by procedure 4. PMA electrical power 5. No pneumatics

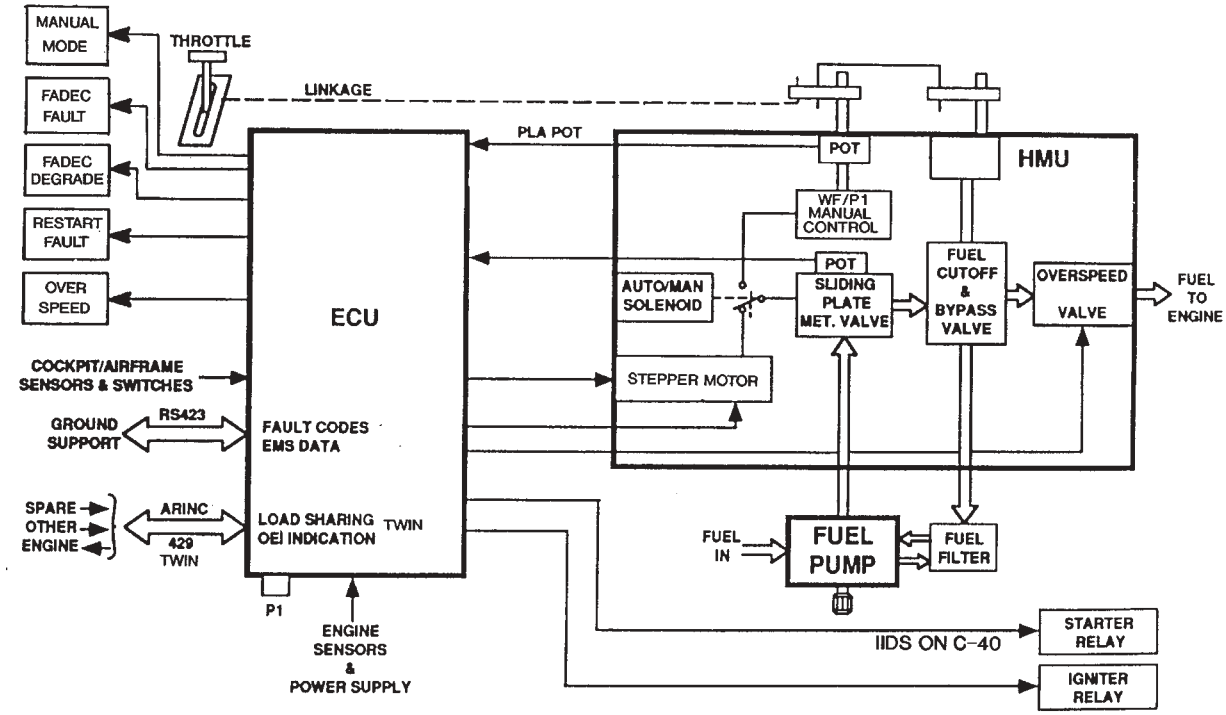
Advantages regarding maintainability include :

1. Supportable 2. No field adjustments 3. Exceedance recording

FADEC SYSTEM OPERATIONAL FEATURES

Features of the FADEC are listed below:

CONTROL SYSTEM BASIC DIAGRAM
250 FADEC SYSTEM



GAS GENERATOR (NG) GOVERNOR

In the auto mode the pilots PLA (throttle) controls the set point for the NG governor. This allows the pilot to limit engine power as desired and provides smooth transition from NG governing at ground idle to power turbine speed (NP) governing at flight idle. Normal flight operations shall be conducted with the throttle twist grip at 100% travel. If desired, the PLA (throttle) can be rolled back to force a power turbine speed/helicopter rotor speed (NP/NR) needle split for autorotation training.

POWER TURBINE (NP) GOVERNOR

The ECU governs NP to maintain helicopter rotor speed (NR) at the set point. The control utilizes isochronous speed governing with gains and compensation optimized for the engine installation. A collective pitch position analog input signal provided by the airframe provides load anticipation for the NP speed governor. This anticipation initiates NG acceleration after collective pitch movement prior to actual load increase, thus reducing rotor speed droop.

FADEC SYSTEM FEATURES OPERATION (continued)

EXCEEDANCE LIMITING

Automatic limiting functions accomplished by the FADEC include turbine temperature limiting, engine torque limiting, NG speed limiting, and NP speed limiting.

The FADEC system interfaces to the MGT harness to measure engine temperature. When the engine is approaching its steady state or transient temperature limit, the FADEC reduces fuel flow to prevent limit exceedance. A smooth, controlled transition between governing and temperature limiting is accomplished by the FADEC.

The FADEC system interfaces to the **TMOP (torque meter oil pressure)** torque sensor to measure output shaft torque. The FADEC reduces fuel flow in response to measured torque to prevent limit exceedance.

SURGE DETECTION AND RECOVERY

The FADEC detects engine surge by comparing the rate of change of NG speed to a predetermined boundary rate. If the boundary is exceeded and MGT is increasing, the surge will be detected and recorded by the internal ECU EMS. The surge will be recorded in the ECU's memory relative to the NG speed at which it occurred. Without pilot action, the FADEC will reduce fuel flow during the surge and reduce the maximum acceleration schedule during the current acceleration in order to quickly recover from the surge. The FADEC will then lower the acceleration schedule at the NG where the surge occurred to avoid subsequent surge. The acceleration schedule is reset to the original schedule at FADEC power up transition of the auto/manual switch from manual mode to auto mode.

AUTORELIGHT

The FADEC declares an engine flameout by detecting an NG deceleration rate greater than a predetermined flameout boundary rate. The engine flameout is enunciated to the aircraft via the ARINC-429 data bus. Without pilot action, the flamed out engine's FADEC will initiate a restart sequence, which includes scheduling the appropriate restart fuel flow as a function of operating and ambient conditions and activating the ignition system. Relight will be detected by the FADEC and the turbine temperature will be controlled. The engine will then smoothly accelerate back to the commanded operating condition. The Engine Out discrete will turn off after a minimum NDOT or increasing MGT is established. No pilot action is required unless the engine fails to relight by 50% gas generator speed (NG). In the event of an unsuccessful relight, the engine PLA (throttle) should be moved to cutoff.

AUTOMATIC START

The FADEC control system provides automatic start sequencing and engine control during the engine starting cycle. This involves controlling fuel flow until stabilized idle gas generator (NG) speed is reached. Starting is initiated by the pilot by placing the throttle in the ground idle position and activating the start switch. Once the required light off NG speed of 12% is achieved (10% if ambient temperature is less than 20°F), the FADEC introduces fuel to the engine. The engine fuel flow is then regulated to control the NG turbine rate of acceleration (NDOT) and to maintain a turbine temperature (MGT) limit while

accelerating to ground idle. Pilot fuel modulation is not required. Additionally, the control can prevent most overtemperature starts by automatically shutting fuel flow off should NG speed, battery voltage, or MGT exceed "boundary limits" during the start.

NP OVERSPEED SYSTEM

Power turbine overspeed limiting is provided by an analog electronic control that is integral to the ECU. The engine fuel flow is reduced to **zero flow** upon activation of the overspeed solenoid valve (**at 115%NP**). **The engine shuts down**. The overspeed limit control design incorporates **FOUR** analog speed sensing circuits driven by two NP speed signals. Two of the sensing circuits are independently capable of sourcing current to the overspeed solenoid valve in the HMU. Two are independently capable of providing a ground to the overspeed solenoid valve. False trips are unlikely since a false trip requires that two independent sensing circuits fail. Additionally, the availability of the overspeed protection is high since up to two sensing circuits failures can occur without affecting capability. The power turbine overspeed limiter operates while the ECU is in **either** the **automatic** or **manual mode**. Functionality of the overspeed system is evaluated by three methods, power up check, continuous checks, and an automatic overspeed test. The power supply for the power turbine overspeed limiting circuits is independent of the power supply for the remaining ECU circuits and is sourced by both the aircraft power bus and the engine mounted PMA.

POWER UP FUNCTION CHECK

The power up check occurs when the ECU is first turned on. This check ensures electrical continuity of the overspeed circuit and the ability of the ECU to power the overspeed solenoid. This test is performed by turning on each of the overspeed solenoid drivers and measuring the voltage and current draw across the overspeed solenoid valve. The measured voltage and current are then compared to limits.

SYSTEM BUILT IN TEST

The FADEC system incorporates logic and circuitry to perform a high level of self-diagnostics, some of which are described herein. In general all sensors are checked for continuity, rate, and range. Discrete inputs are checked for continuity. Output drivers are monitored for current demand to sense failed actuators. Output drivers are current limited. A FADEC power up check exercises all output drivers and actuators to ensure system functionality and readiness. All failure information is recorded by the FADEC EMS and is available to the maintenance crew via the RS-423 maintenance data bus.

CONTINUOUS FUNCTIONAL CHECK

Continuous checks occur during normal engine operation. These checks monitor the functionality of the NP speed signals, which supply the overspeed system. The two NP speed signals that supply the overspeed system are continuously compared for differences, and should a difference become larger than a predetermined limit, a fault is declared.

FADEC SYSTEM FEATURES OPERATION (continued)

NG OVERSPEED

In auto mode, a software implemented overspeed system is provided. Should the software detect an NG speed above the NG overspeed threshold, the ECU will activate the overspeed solenoid valve and reduce fuel flow to minimum flow. Once the NG speed drops below the overspeed threshold, the solenoid valve opens and normal operation may resume.

OVERSPEED FUNCTIONAL TEST

The overspeed test evaluates the ability of the overspeed solenoid valve to shut off fuel flow. This test is conducted at ground idle to shut the engine down.

The pilot activates the overspeed test switch. The FADEC energizes the overspeed solenoid valve which closes and shuts off the fuel. The overspeed light also comes on.

FAILURE ENUNCIATION

The operational status of the overspeed system is automatically and continually monitored by the other ECU circuits to detect latent failures that could result in false trips or nonoperation should one or more additional failures occur. Should a failure be detected by the automatic test or the continuous checks it will be annunciated to the pilot by the ECU fail or ECU degrade discretes. Any failure in a redundant component that leaves the system operational shall be annunciated as "ECU Degraded" failure. Any failure that disables the system completely shall be annunciated as "ECU Failure". This failure information will be recorded by the ECU's EMS feature.

ENGINE CONDITION MONITORING

The ECU contains a basic engine monitoring system to record and store engine and system fault information. The information is recorded in nonvolatile memory for retrieval by maintenance personnel via RS-423 digital data communication link to portable terminal. The recorded parameters include:

- engine running time
- compressor module running time
- turbine module running time
- number of engine starts
- highest peak value and time exceeding turbine speed limit (NG and NP)
- highest peak value and time exceeding turbine run temperature limit (MGT)
- highest peak value and time exceeding engine output shaft torque limit
- highest peak value and time exceeding engine start temperature limit (MGT)
- occurrence of engine surge

To permit transfer of engine ECU's from one aircraft to another, data may be read from and input to the ECU nonvolatile memory via the RS-423 digital data link. These data include:

- engine serial number
- ECU serial number
- compressor serial number
- NG turbine serial number
- NP serial number

AUTOMATIC ENGINE LOAD SHARING SYSTEM

The FADEC accomplishes automatic engine load sharing by comparing engine torque and/or MGT signals of the two engines via the ARINC 429 data link. Each FADEC contains the control logic to raise the lower powered engine's power level to match the higher engine's power level. Upon loss of the MGT signal, torque signal, or ARINC 429 bus, the load sharing will revert to NG data, which is shared as an analog signal between the engines through the electrical harnesses. The pilot may select either MGT or torque as the primary load sharing data with the FADEC TEMP TRQ switch located on the collective control box.

MANUAL MODE

In the manual mode the pilot's PLA input is tied mechanically to the fuel flow metering window in the HMU. The manual mode is engaged by deenergizing a solenoid in the HMU via a cockpit switch. This allows the pilot to vary fuel flow to the engine by moving the PLA. This manual mode fuel flow is altitude compensated to allow a consistent PLA horsepower relationship verses altitude. At 100% throttle travel, the manual mode will provide at least maximum continuous power. Additionally, the fuel flow slew rate is mechanically limited to avoid blowout and to provide proper responsiveness for aircraft operation.

ARINC-429 DATA BUS

The ECU provides a transmit only ARINC-429 data bus. This data bus contains engine parameters such as NG speed, NP speed, MGT, and torque.

ENGINE FAULT ANNUNCIATORS

There are **eleven warning/caution annunciations** included in the IIDS that are controlled by each FADEC. They are :

ECU (FAIL)

ECU (DEGRADED)

OVSPD (OVERSPEED)

30 SEC OEI (IN USE)

2 MIN OEI (IN USE)

FL HT (FUEL HOT)

FL CD (FUEL COLD)

A/RLT (AUTO RELIGHT)

SRT ABT (START ABORT)

ECU (DEGRADED)

M/OEI (OEI USE RECORDED)

M/ECU (SOFT FAULT)

The FADEC/ECU continuously monitors the FADEC system for faults and makes appropriate accommodations to continue operation. Fault codes have been preassigned to those parameters being monitored by the FADEC/ECU. When a fault is detected by the ECU the fault code is stored in the **permanent memory** of the ECU. Depending on the nature of the fault the ECU may **immediately** display the fault to the pilot via the IIDS and horn, or the fault may not be displayed until the **throttle** is placed in the **cutoff position**. The multiple fault codes potentially generated by the ECU have been assigned to specific annunciations and horn based on the affect of the fault to the operation of the helicopter. The **flight manual** provides the appropriate action required by the pilot for each annunciation/horn indication. For **more details** see the IIDS section of this book.

ENGINE MOUNTED ACCESSORIES

ENGINE FUEL PUMP

The **dual element** fuel pump is mounted on the right rear accessory gearbox drive pad. The drive shaft includes an integral seal runner for the carbon ring seal. Pump RPM is **4205** at **100% NG.** Output volume is approximately **4.5 GPM**. Fuel first reaches a centrifugal "liquid ring" boost pump. Boost pump output, called PBF (pressure before filter), flows out to the gearbox mounted filter. It returns to the inlet of the high pressure gear pump as PAF. Gear pump high pressure output (PF) is directed to the metering valve, the pressure differential (metering head) regulator valve, and the manual control components. A pressure relief valve limits pump output pressure to **900 PSI** above pump inlet pressure.

ENGINE MOUNTED FUEL/OIL FILTER [COMBINED ENGINE FILTER ASSEMBLY-CEFA]

The fuel filter is **combined** with the oil filter into a **single assembly**. The assembly is remotely mounted to the lower left rear side of the gearbox. The disposable, non-cleanable fuel element is rated at **25** microns. A bypass valve across the element is set at **3** to **3.4** psid. An impending bypass indicator will visually extend from an assembly attached to the filter assembly housing at **2.1** to **2.9** psid. The button is manually reset.

SPEED PICKUP SENSORS

The NG and NP speed pickups are the same as existing series IV designs, except with new connectors. Both sensors are located on top of the gearbox housing.

TORQUE METER OIL PRESSURE SENSOR

The sensor signal is used for torque limiting. It is tied in at the current **TMOP** location provided for aircraft torque sensing on the accessory gearbox.

COMPRESSOR INLET AIR TEMPERATURE SENSOR T1

The T1 sensor is mounted in the airframe inlet plenum. It is mounted so as to provide the best possible correlation to the actual engine air temperature, while providing for suitable protection against foreign object damage and ice build up.

PERMANENT MAGNET ALTERNATOR

The **PMA** is driven by the power turbine gear train at 4410 RPM on the C40 engine. It is mounted on the left rear drive pad. It provides the primary electrical power to the ECU above **85% NP**.

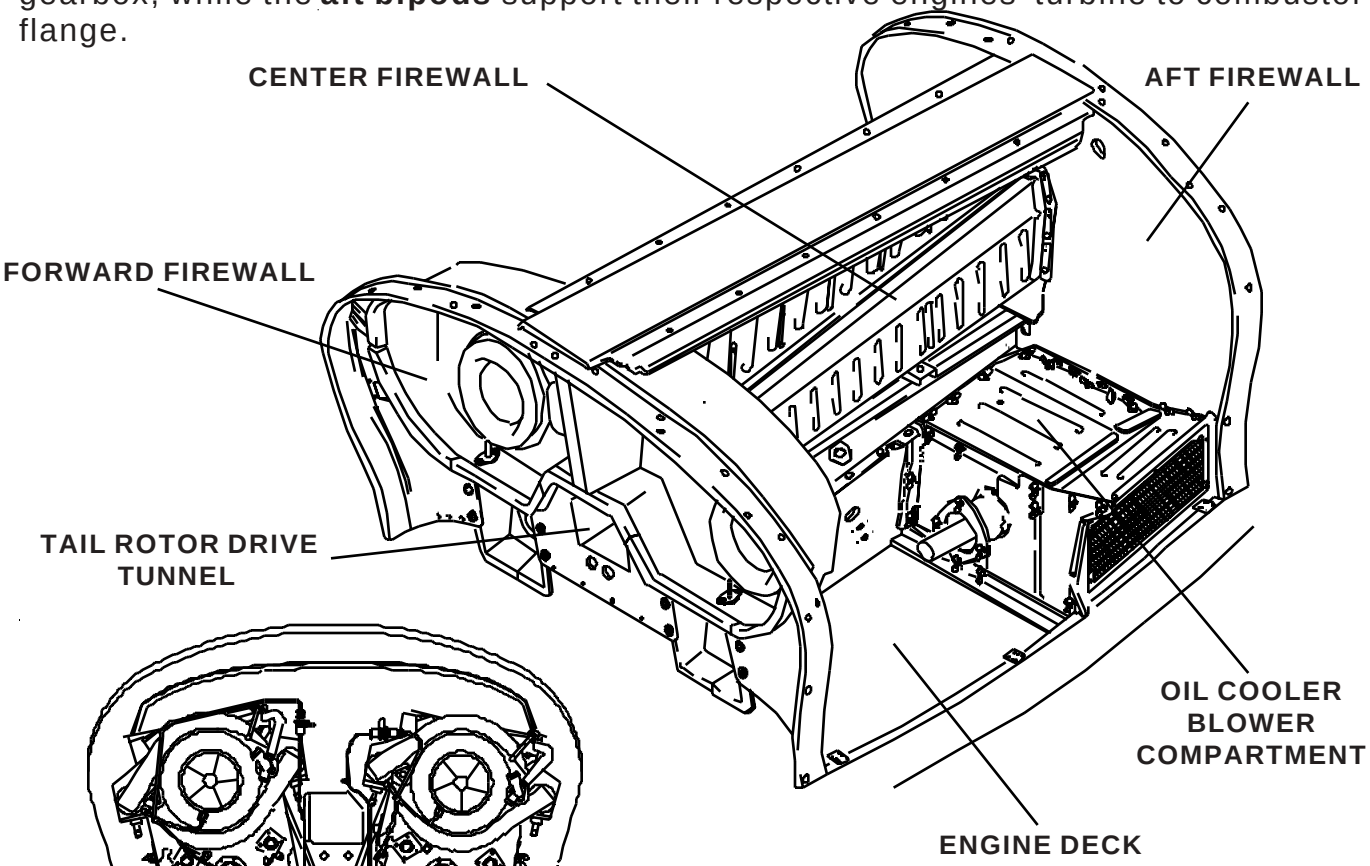
IGNITION EXCITER

The ignition exciter is a solid-state, high energy ignition unit. The unit is designed to have a constant spark rate of 300 to 330 sparks per minute throughout its operational temperature and voltage range. The exciter is energized when either :

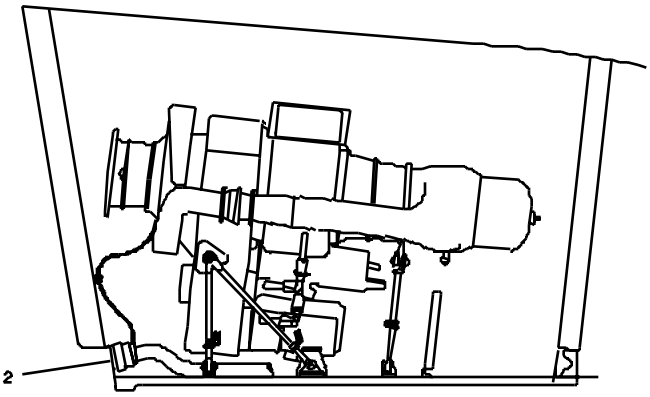
- the PLA is greater than 9% and NG is between 5% and 50%
- the anti-ice is selected
- a flameout is detected

ENGINE COMPARTMENTS

The engine compartments are located on **top** of the **aft fuselage section**. Each engine is attached by three **stainless steel** bipod mounts, which feature replaceable bearings and master shims for proper alignment. Each **forward bipod pair** supports one engine gearbox, while the **aft bipods** support their respective engines' turbine to combustor flange.



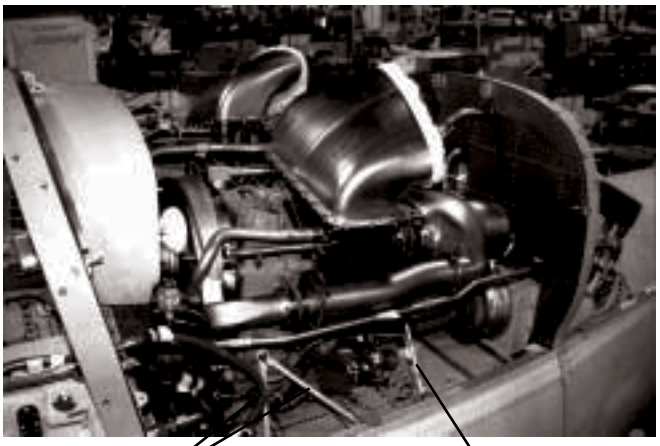
ENGINE NO. 2 ENGINE NO. 1



INBOARD VIEW-ENGINE NO. 1

1. FADEC/HMU connector
2. Starter-generator connector
3. Engine electrical connector

NO. 1 ENG

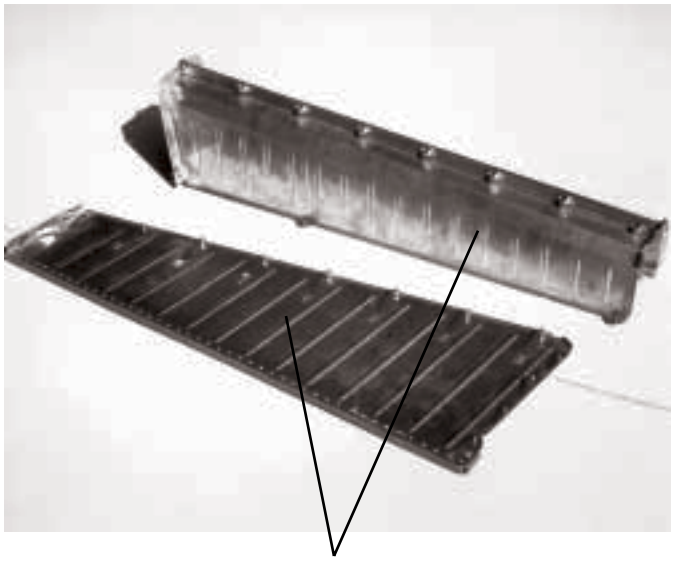


OUTBOARD FWD. BIPOD

AFT BIPOD

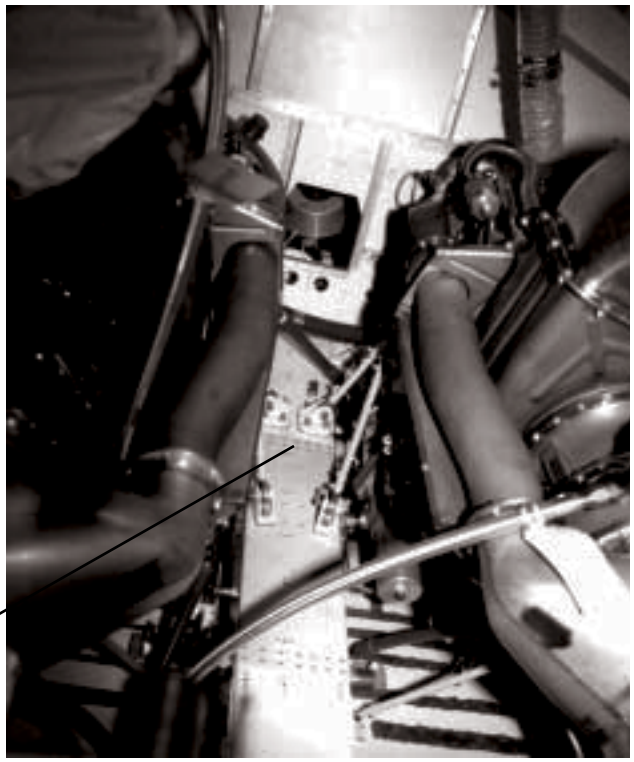
FIREWALL INSTALLATION

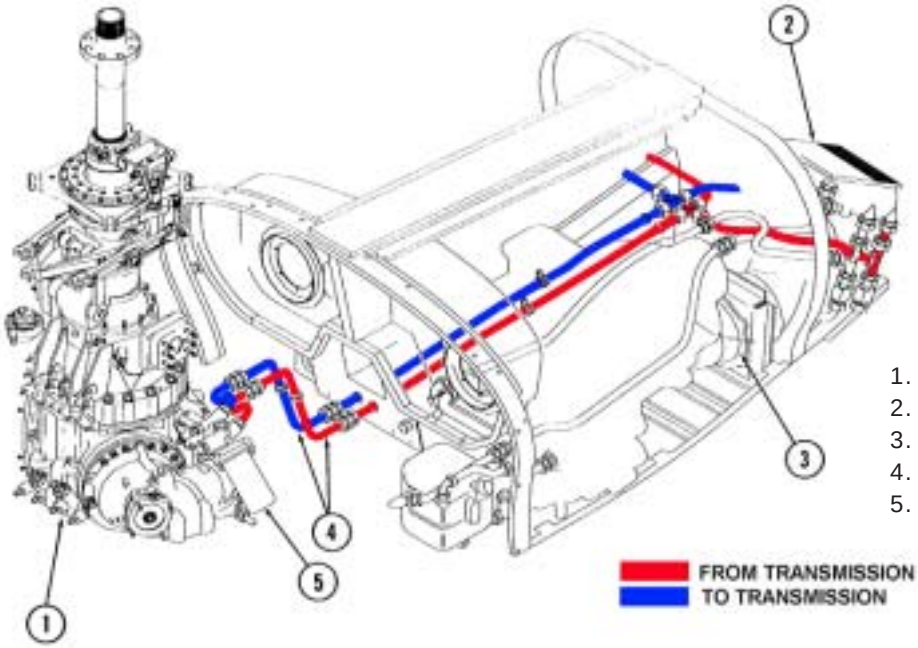
The three powerplant firewalls are constructed of hybrid materials and form the support structure for the engine cowlings. The forward firewall is **titanium**, reinforced with **fireproof composite** honeycomb, and with aluminum cowl frames. The center sections are titanium and provide a protective housing for the tail rotor drive shaft, the transmission oil lines, and are **easily removed** for access to the inboard sides of the engines.



CENTER FIREWALLS [REMOVED]

INBOARD ENGINE BIPOD MOUNTS



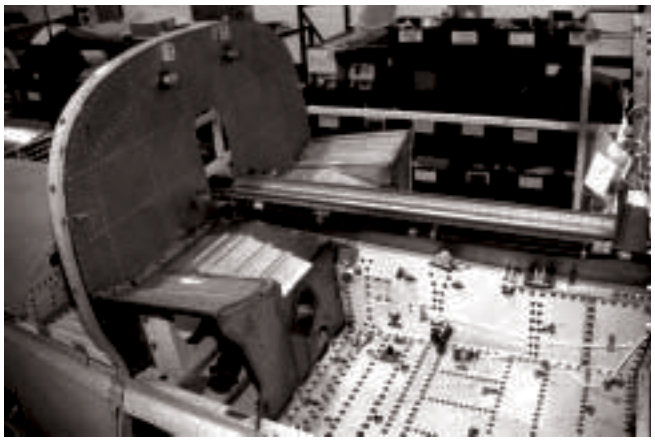


TRANSMISSION OIL LINES
[AND TAIL ROTOR D/S]
ENCLOSED BY
CENTER FIREWALL

1. TRANSMISSION
2. OIL COOLER [ENG & XMSN-LEFT SIDE]
3. BLOWER
4. OIL LINES
5. XMSN FILTER & MANIFOLD

ENGINE DECK

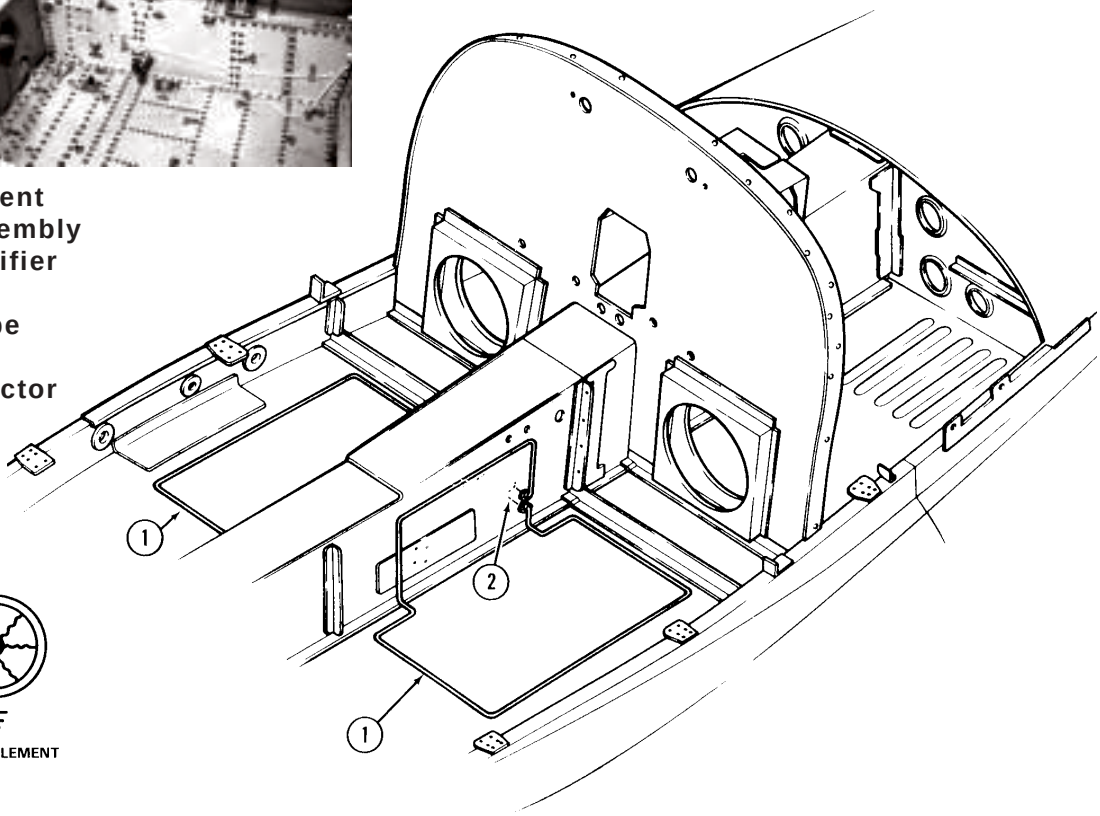
The engine compartment decks are constructed of **titanium**, with aluminum alloy support beams and serve as the lower firewalls.

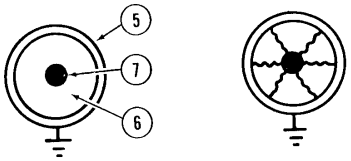


ENGINE FIRE DETECTION

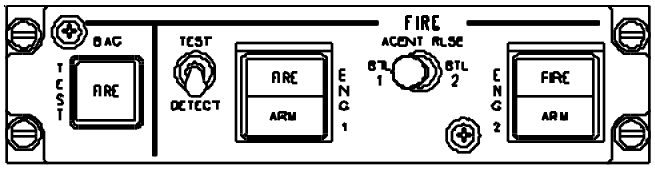
Powerplant fire detection is accomplished by **two** independent continuous loop detection systems, one on each engine compartments' engine deck. Each system has a warning light and test switch. Resistance of the semi-conductor detection element decreases with temperature rise, which allows current to flow between the wire conductor and the stainless steel tube, illuminating the engine fire warning light.

1. Fire detector element
2. Flexible cable assembly
3. Fire detector amplifier
4. Fire warning light
5. Stainless steel tube
6. Semi-conductor
7. Center wire conductor





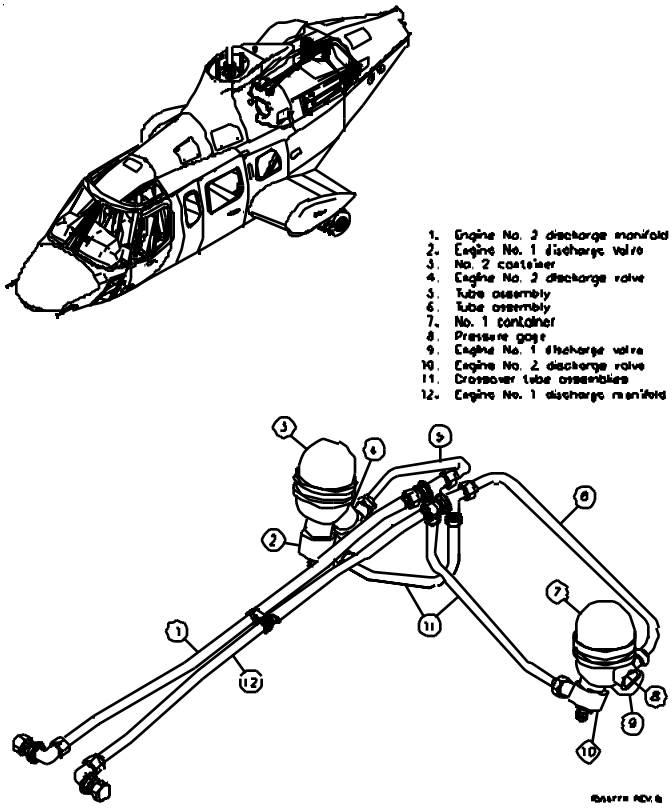
CROSS SECTION OF FIRE DETECTION ELEMENT

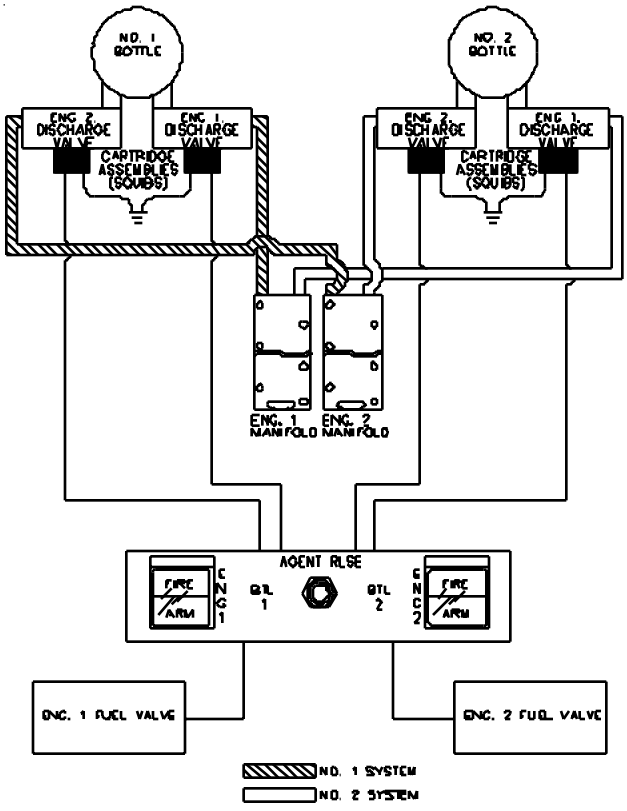


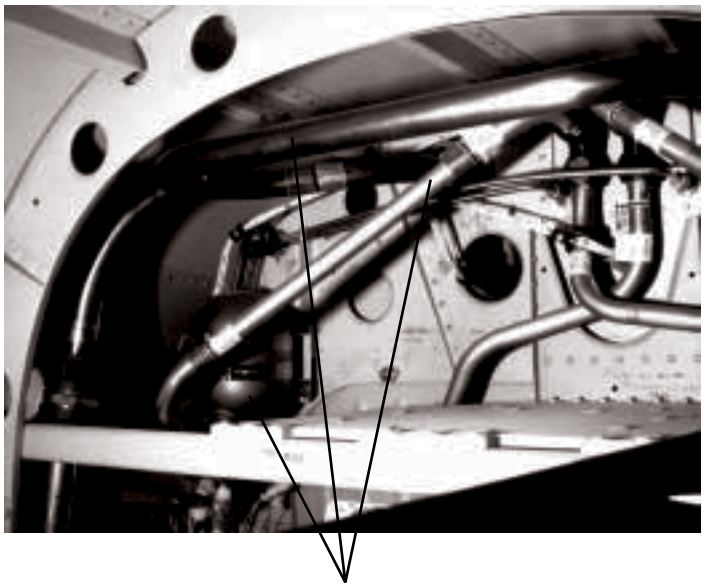
FIRE DETECTION AND EXTINGUISHING PANEL

ENGINE FIRE EXTINGUISHERS

Two fire extinguisher containers are located on the aft side of the baggage compartment rear bulkhead. The **No.1** and **No.2** bottles have discharge tubes connected to both engine compartments. Each container holds approximately **0.983** liters (**60** cubic inches) of **Halon** charged with 4,134 kPa (600 psi) nitrogen. Electrically activated **squibs** permit each bottles' contents to be directed into **either** engine compartment. In the event of an engine fire warning indication, ARMING that engines' system will **automatically close** the selected engines' fuel shut-off valve and bleed air valve, and connect the AGENT RELEASE switch to **both** bottles' discharge valve for that engine. Either or both bottles may then be discharged to the affected engine compartment. A transparent port on either side of the aft fuselage allows inspection of the bottles pressure gages.







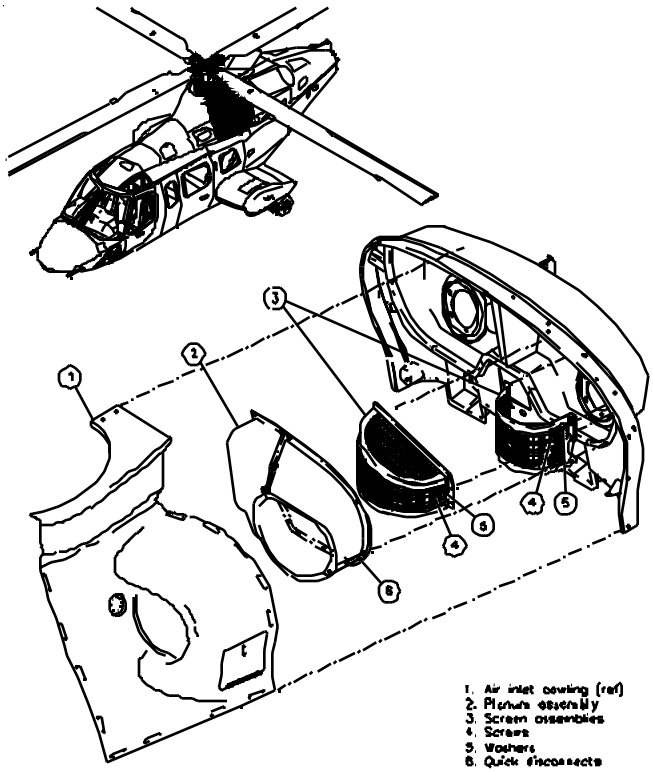
ENGINE FIRE BOTTLE AND
DISTRIBUTION LINES
[INSIDE AFT EQUIPMENT CMPT]

ENGINE AIR MANAGEMENT

ENGINE AIR INTAKES

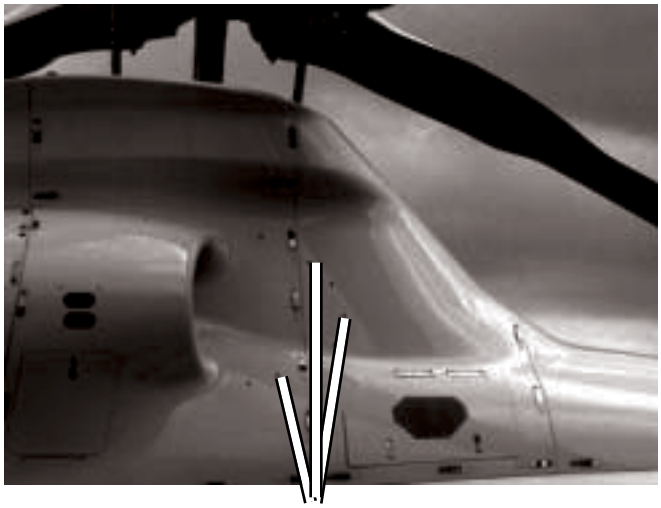
Air intakes are provided for engine operation, engine compartment cooling, and for engine / transmission oil cooling. Two engine air intakes are located at the top of the air induction cowling, one on either side of the transmission. Cooling air for the engine compartments and oil coolers is inducted through two recessed scoops located on the left and right lower engine cowls.

THREE AIR INTAKES



SNOW BAFFLE PROVISIONS

The forward cowling group includes as standard equipment, the mounting provisions for the **optional** snow baffle kit, which is **required** for operations in falling or blowing snow.

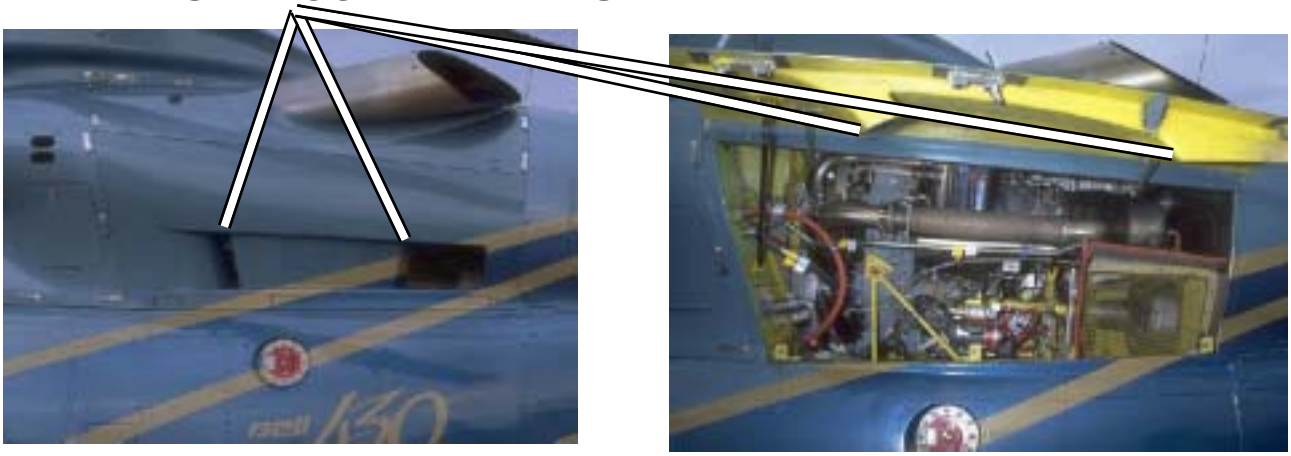


SNOW BAFFLE PROVISIONS

PLENUMS & SCREENS

Inside each engine air intake, there is a **plenum chamber** which stabilizes and directs the airflow to the engines' air inlet. **Protective screens** are mounted to the front side of the forward firewall to prevent ingestion of debris. There is adequate space inside the plenums to replace the screens with the **optional** engine air particle separator kit when operations are conducted in dusty environments.

LOWER ENGINE COWL INTAKES

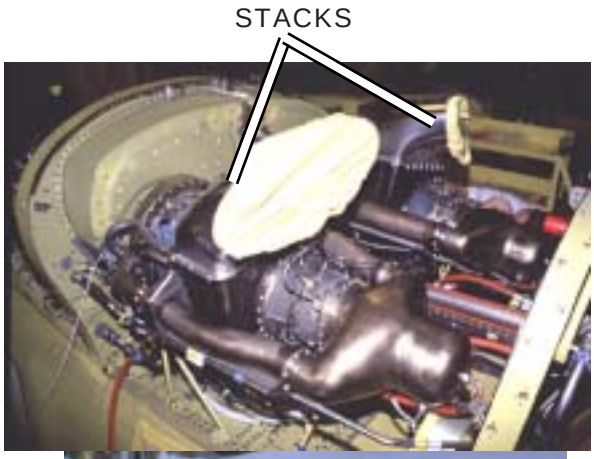


ENGINE COMPARTMENT COOLING

Two air intakes are built into **each** lower engine cowl, to provide air for cooling. The **rear inlets** supply air to the oil cooler blowers, while the **forward** inlets direct ambient air onto the engine gearbox cover mounted accessories. Airflow through each engine compartment is provided by the action of the exhaust ejection system.

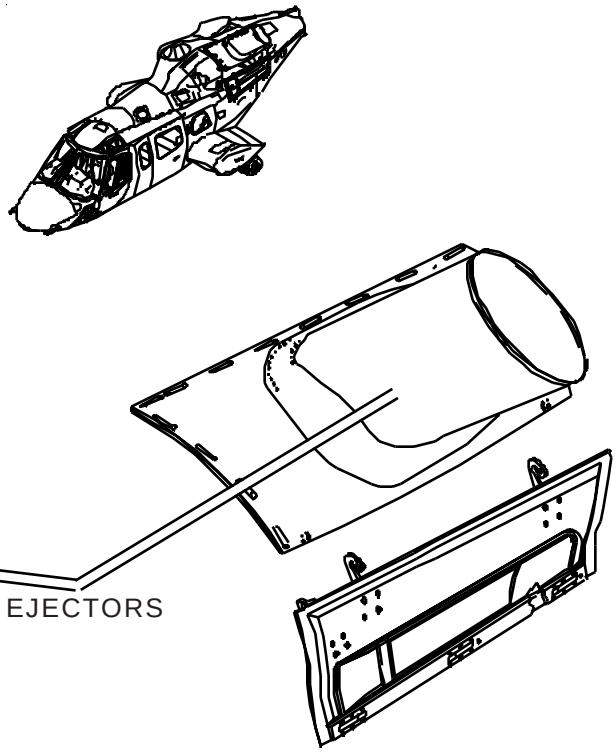
EXHAUST STACKS

The engine exhaust stacks mount to the top of the exhaust collector, and direct engine exhaust gas upward and rearward, into the exhaust ejectors.



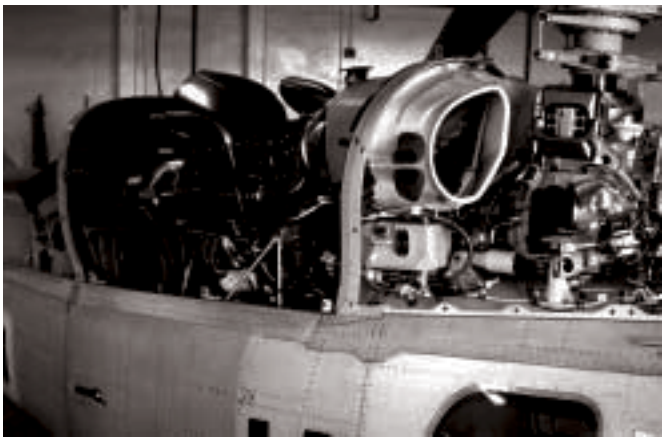
EXHAUST EJECTORS

The exhaust ejectors are part of the upper engine cowling, and receive and direct the exhaust gases rearward. Through **venturi action**, 5% of the total flow through the ejectors is cooling air drawn from the engine compartments.

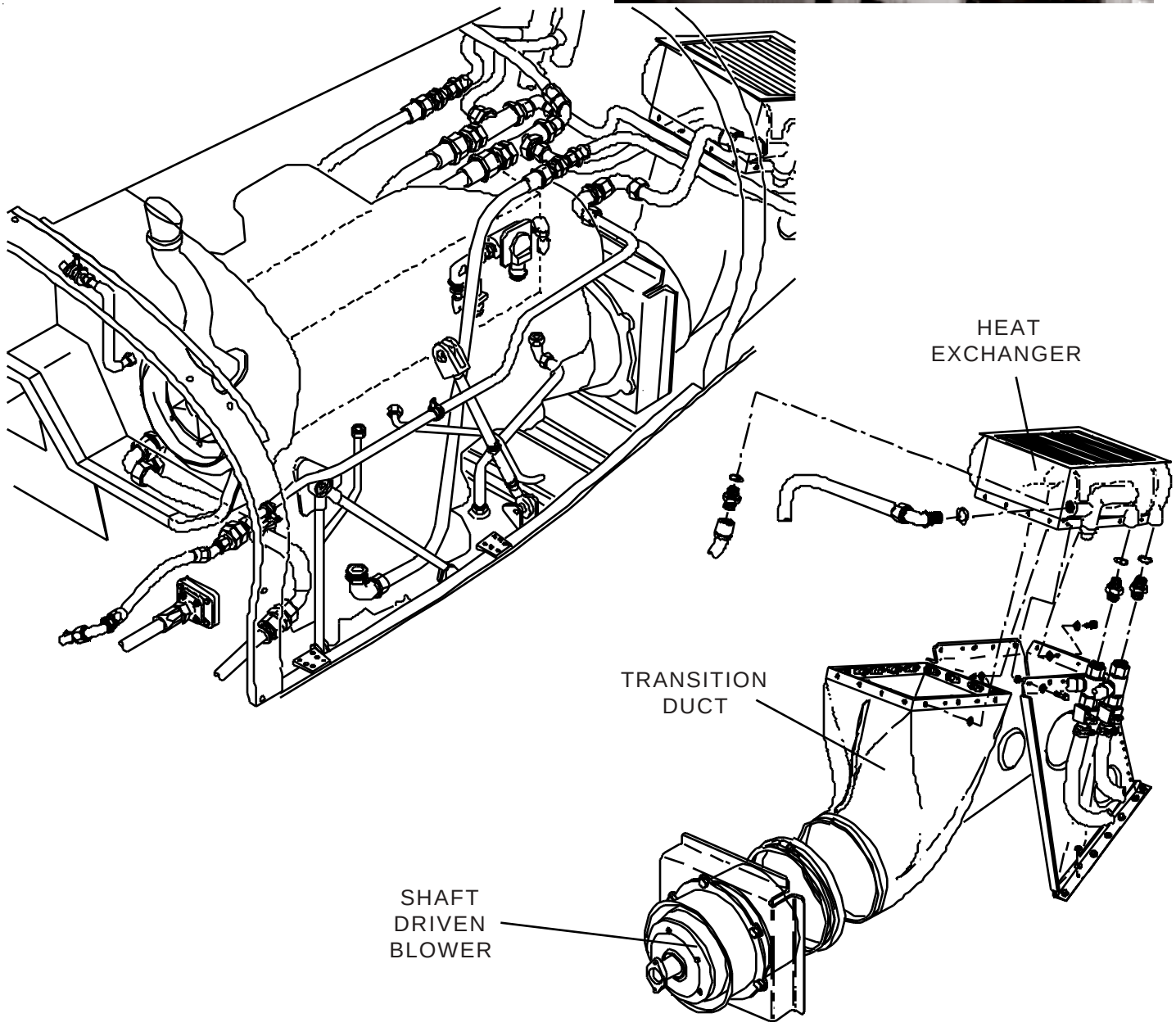


ENGINE OIL SYSTEM

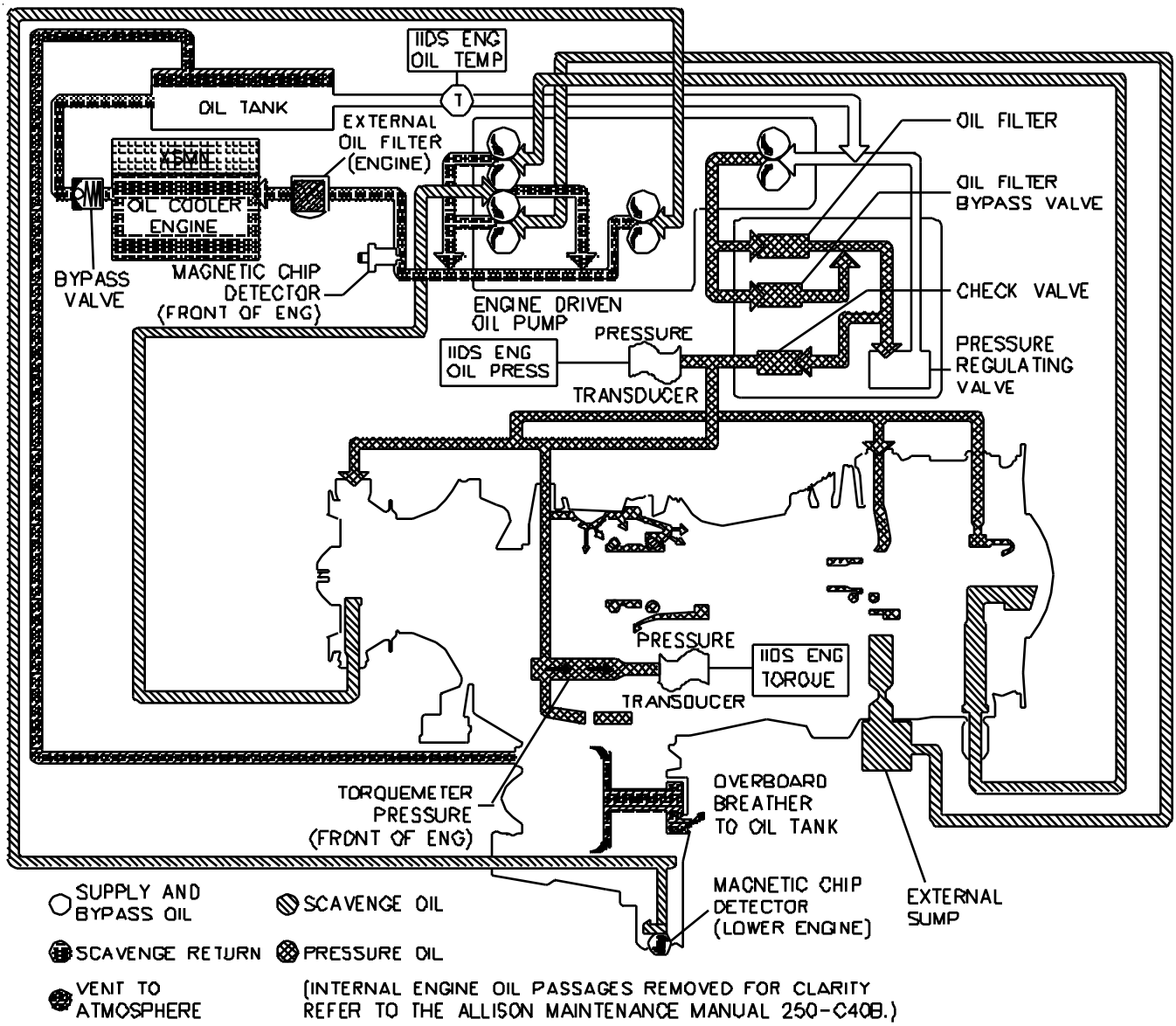
A separate and independent oil system is installed for each engine. Each system is comprised of a cooler, an oil tank, two engine chip detectors, and an engine mounted oil filter. Cooling of engine oil is accomplished by two engine driven axial blowers.



EACH ENGINE
HAS INDEPENDENT
OIL SYSTEMS



ENGINE OIL SYSTEM SCHEMATIC DIAGRAM [ROLLS-ROYCE 250-C40B]

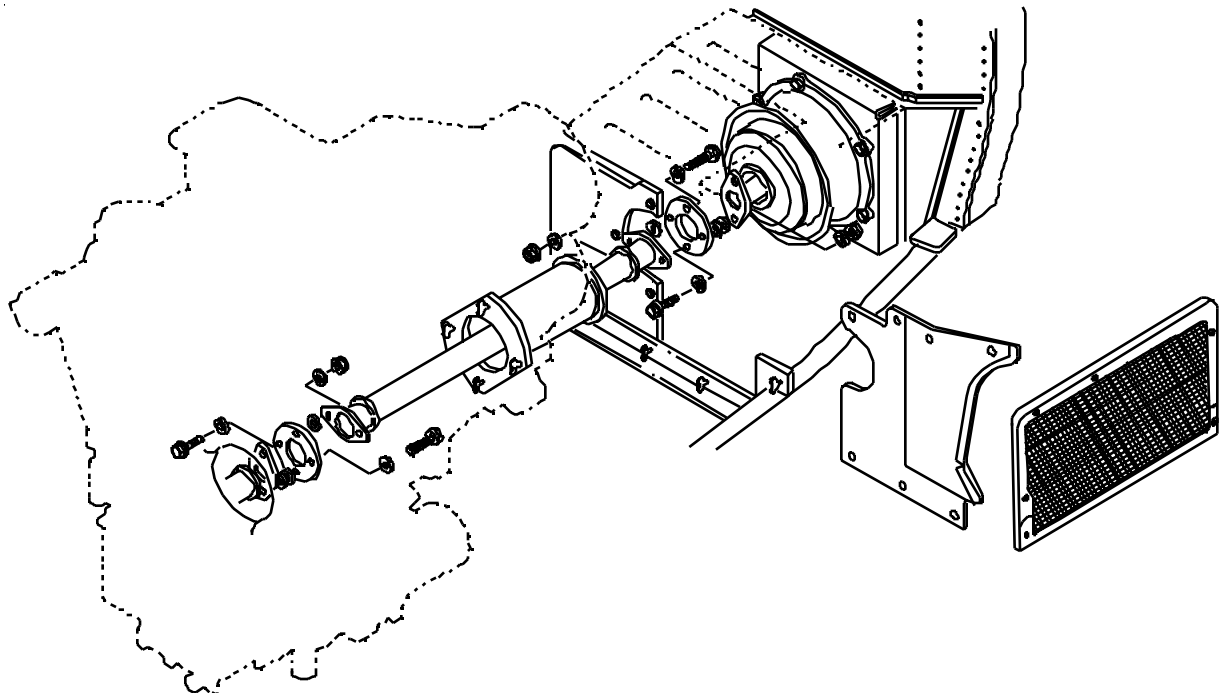


OIL TANKS

The engine oil tanks are located on the front side of the forward firewall, one on each side, just below the engine air inlets. Each tank has a **fluid level indicator** and **filler cap** which are easily accessible through a hinged panel, for inspection and servicing. Each system has a capacity of **6.44 quarts (6.09 liters)**. A **temperature bulb** and **pressure transducer** in each oil subsystem provides information to the IIDS. An **oil pressure switch** on each engine activates the warning/caution indicator of the IIDS.

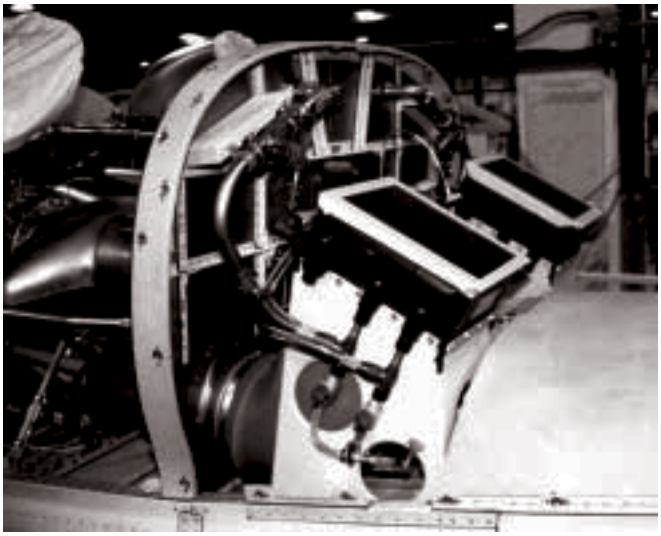
OIL COOLER BLOWER

The oil cooler blowers are mounted at the **aft end** of each engine compartment. Each has its' own **inlet** for cooling air. The high-speed blowers are driven from the rear main power take off of each engine. The blowers are isolated from the engine compartment by their own firewalls.

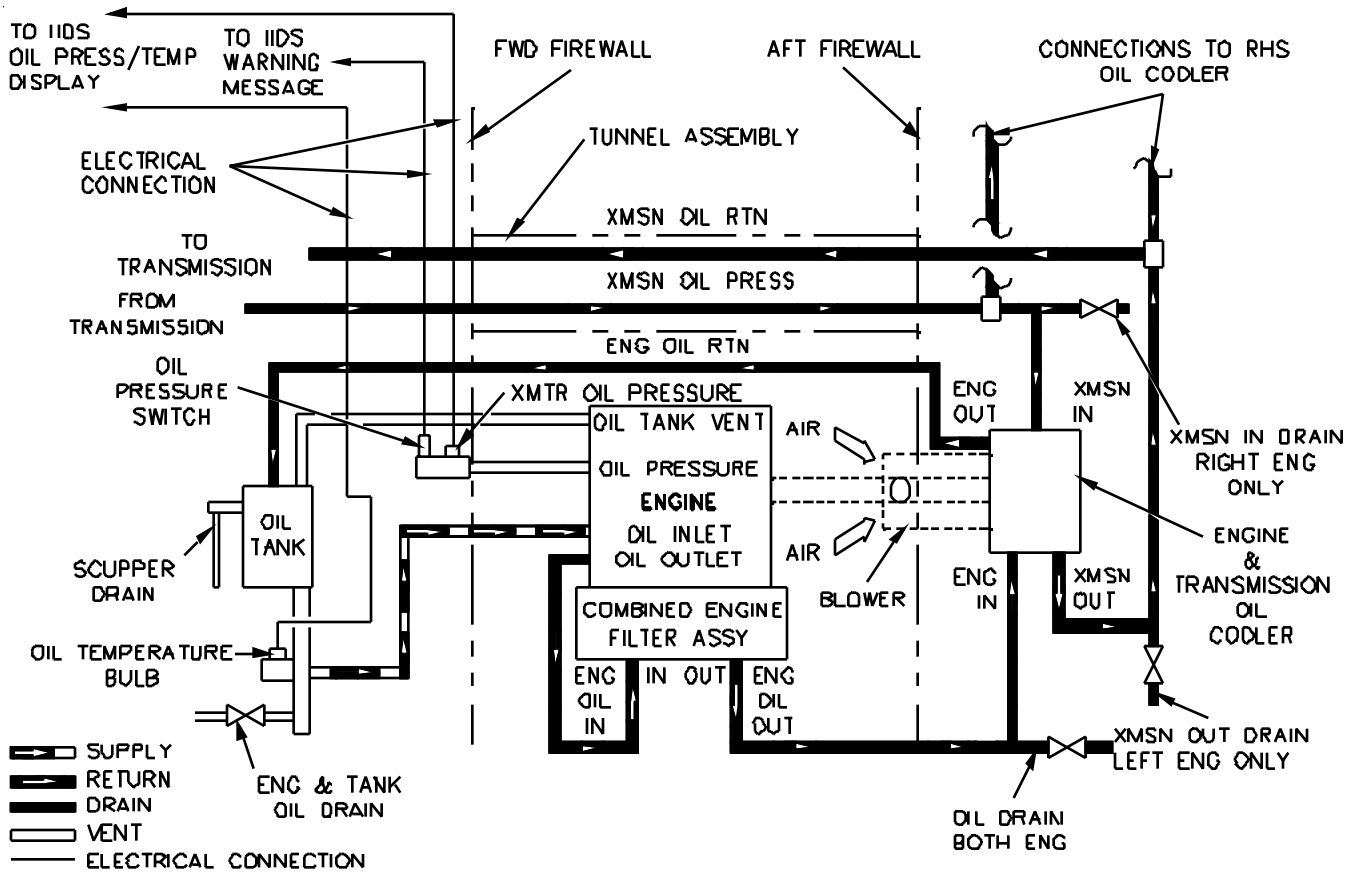


OIL COOLER

The oil cooler and external filter for each engine is located behind the aft firewall. The coolers' oil inlet incorporates a thermostatic valve which allows the oil to bypass the cooler until optimum operating temperature is reached. A separate portion of the heat exchange core also receives transmission oil for cooling. One half of the transmission oil is cooled by each heat exchanger.



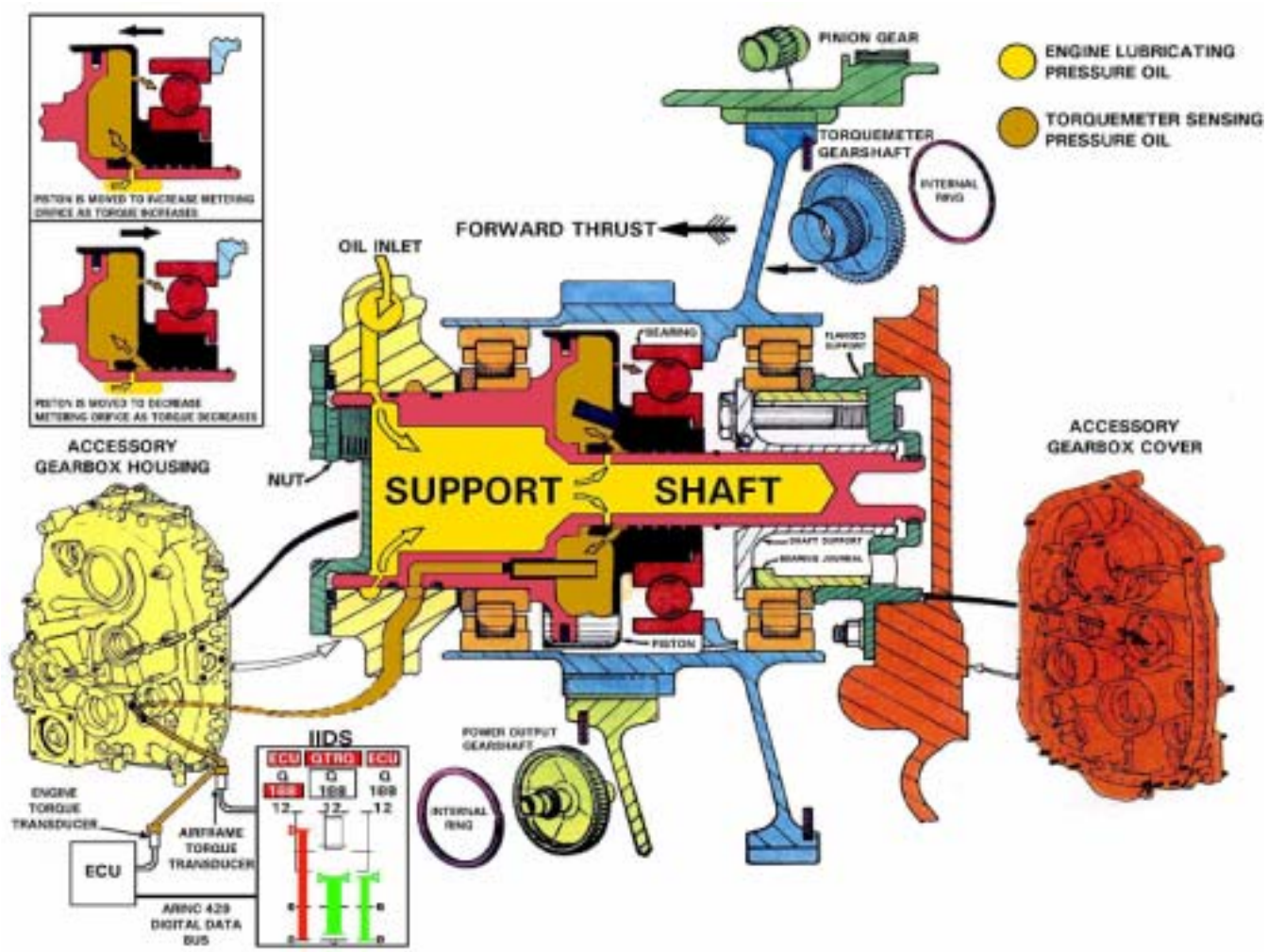
ENGINE [& TRANSMISSION] OIL COOLING SCHEMATIC



LHS ENGINE OIL SYSTEM SCHEMATIC
(RHS ENGINE OIL SYSTEM IDENTICAL)

ENGINE TORQUE MEASUREMENT

Engine lubricating oil is used by the **engine torquemeter** to provide power sensing for instrument engine torque indication and total torque limiting. Each engines' torquemeter is an oil filled chamber pressurized from the thrust generated by the torquemeter gear shaft. A **pressure transducer** provides information to the AIRINC 429 databus, which is used by the IIDS to indicate engine torque on the respective scale of the triple torque display, and in engine torque matching.



CHIP DETECTION

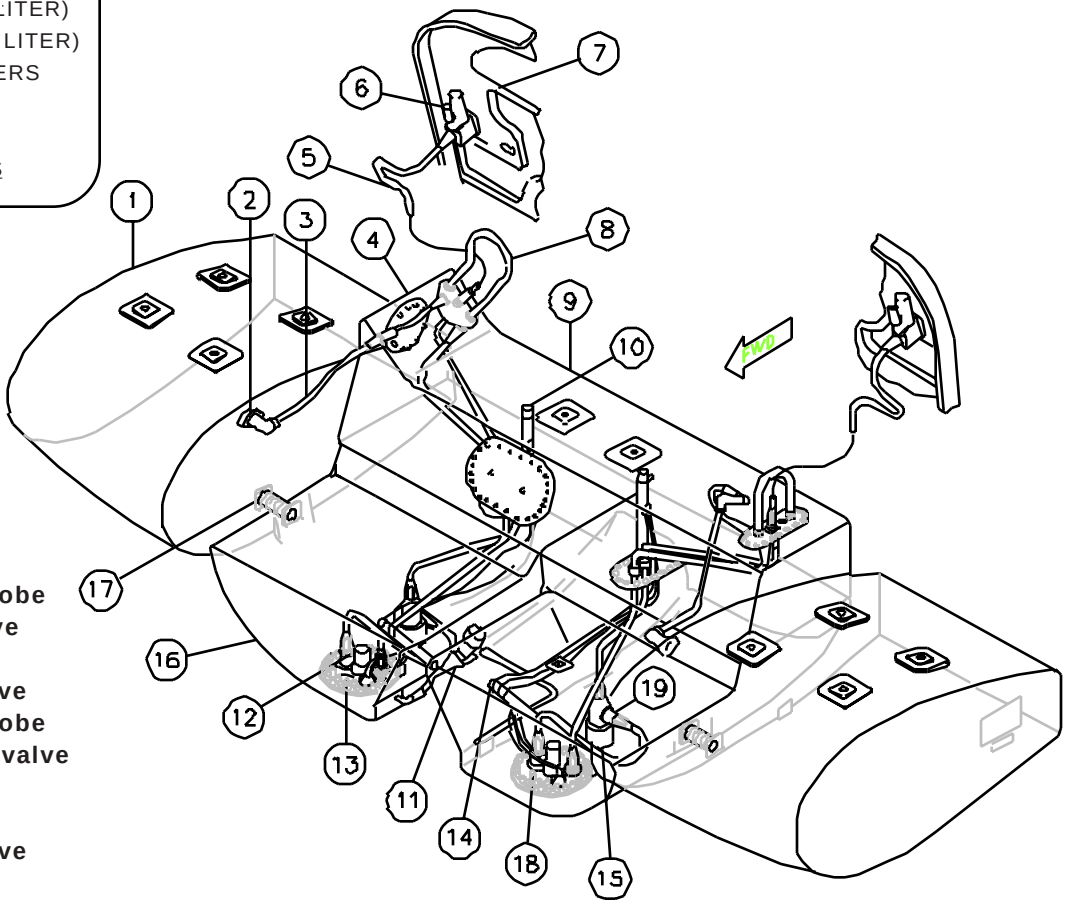
Each engines' oil is monitored in **two places** for metal particles by **electric/magnetic** detectors. The ENG SUMP plugs monitor the accessory gearbox bearings, while the ENG SCAV plugs monitor the main bearings of the gas producer and power turbines. The detectors interface with the CDPU and the IIDS for display and "FUZZ BURN" control, as well as continuous circuit continuity testing.

FUEL SYSTEM CONSTRUCTION

The Bell 430 has a fuel capacity of **935 liters (247 U.S. Gallons)**. Fuel is contained in **five** interconnected cells, located near the helicopters' center of gravity to eliminate the need for fuel management. **Gravity** transfers fuel between the cells automatically, eliminating the need for transfer pumps. The three cells contained within the fuselage are enclosed by structural panels which form the rear seat base, internal bulkheads, and the outer skin. The two outboard **(wing mounted)** cells are surrounded by fiberglass panels and aluminum alloy skin. **Interconnect** and **vent lines** between the wing cells and those in the fuselage are designed to **break-away** and **self-seal** to prevent fuel spillage should the wing become separated from the fuselage, while those fuel lines within the fuselage are designed to **stretch** up to 50%. Each fuel compartment is **lined** with a **flexible bladder** constructed of a multilayered sandwich-type lamination of rubber, cement, nylon, and woven fabric. All cells have met **rupture resistant standards** by being drop-tested from **15 meters (50 feet)** while **75%** full with no subsequent leakage. The **E 1622-2** cell liner material features a 16 gauge gum rubber inner liner and a high strength 0.5 kg/m^2 (15 oz/yd^2) rubberized fabric outer ply for tear and puncture resistance.

STANDARD SKID CONFIGURATION FUEL QUANTITIES

CENTER 41.0 US GAL / 155.2 LITER
FEED **2** X (28.7 US GAL / 108.6 LITER)
WINGS **2** X (74.4 US GAL / 281.6 LITER)
(PLUS 2.35 US GAL / 8.9 LITERS
TOTAL TRAPPED FUEL)
USABLE FUEL =
247 US GAL / **935** LITERS



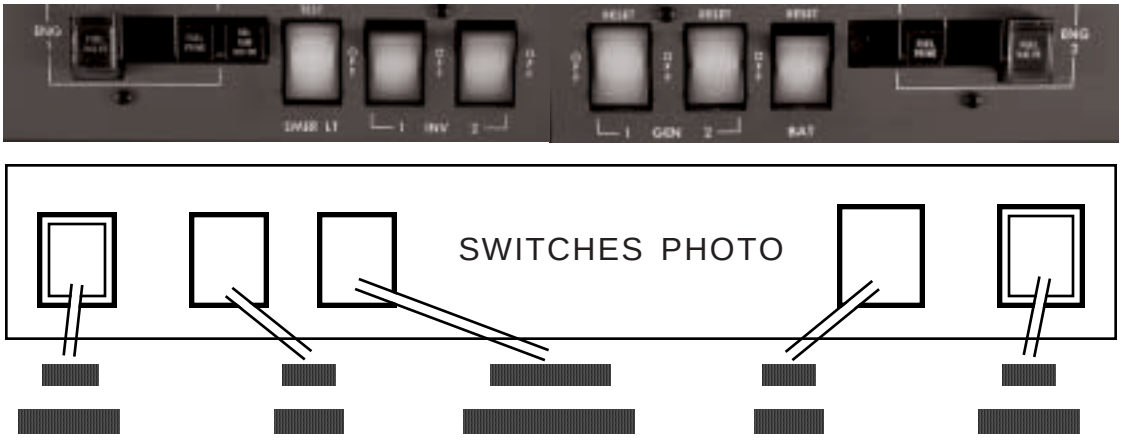
1. **Wing fuel cell**
2. **Vent breakaway valve.**
3. **Vent hose**
4. **Fill port**
5. **Engine fuel hose**
6. **Fuel shutoff valve**
7. **Forward firewall**
8. **FCU vapor return**
9. **Fuselage fuel cell**
10. **Upper fuel quantity probe**
11. **Fuel interconnect valve**
12. **Prime pump assembly**
13. **Sump drain/defuel valve**
14. **Lower fuel quantity probe**
15. **Fuel inlet check/relief valve**
16. **Under seat fuel cell**
17. **Fuel breakaway valve**
18. **Sump drain/defuel valve**
19. **Fuel temp probe**

DUAL SYSTEMS

In **normal** operation, each engine draws fuel from its' own **feed tank**, by the action of the engine driven suction fuel pumps. The two under seat tanks are **isolated** from one another to insure that one fuel leak will not affect both engines. An **interconnect valve** assures that all fuel is available for single engine operation. An electrical **fuel shutoff valve** for each engine is located on the forward firewall. A thermal **relief valve** permits the return of fuel to the feed tanks after shutdown, removing internal pressure from the engine fuel controls. Each feed tank incorporates a **sump drain** and **prime pump** assembly. The prime pumps are used **only** during engine starting, to purge air from the fuel system, and are deactivated when the start cycle has been completed. The **sump drains** are electrically activated by environmentally sealed **push-button** switches located low on the fuselage, just ahead of the wings, and also serve as manual **defuel valves**.

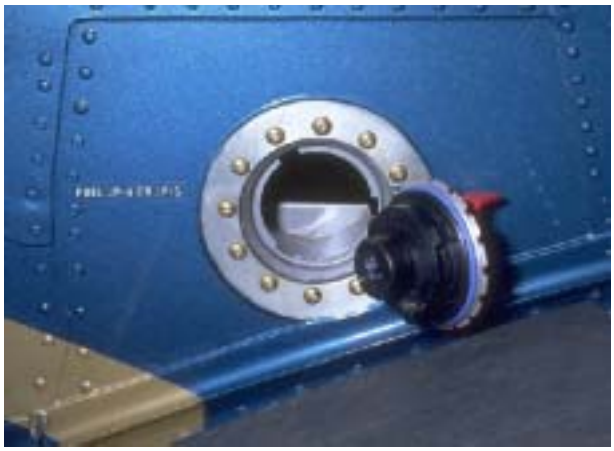
FUEL SYSTEM CONTROLS

All **fuel system switches** are mounted on the overhead console. The **fuel shutoff switches** are protected by transparent covers.



FUEL FILLER

The **fuel system filler port** is located on the right side of the helicopter, above the wing, and an **electrical ground receptacle** for the fuel nozzle is provided nearby. The filler cap is attached to the port by a **hinge** to prevent its loss. The "Lift and Turn" operating mechanism features an extended lever which reduces the effort required to open and close the cap. A raised **internal lip**, just inside the fill port, aids in the prevention of spillage. Any fuel overflow is directed to the rear by a **gutter** just above the wing / fuselage joint.

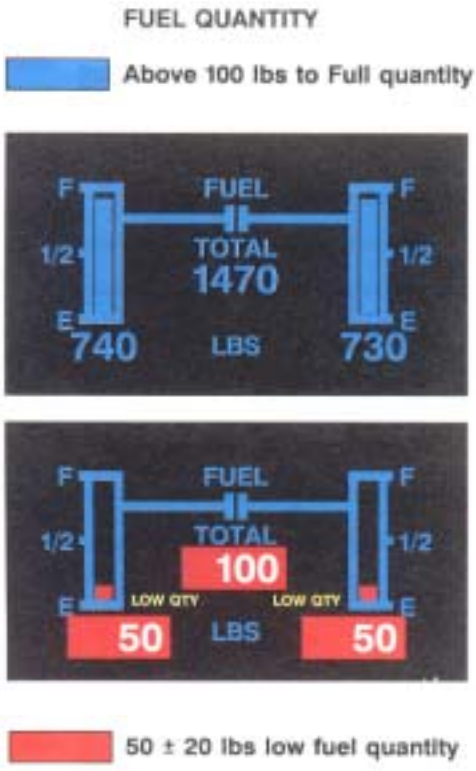


REFUELLING

The Bell 430 basic fuel system can be refuelled through its' **single filler port** at the maximum flow rate of 114 liters per minute (30 U.S.Gallons per minute).

FUEL QUANTITY

There is a fuel quantity **probe** in each feed tank, and in each side of the center tank. The combined signals of the **four** probes are provided to the **IIDS**, which displays the left, right and total quantity. The quantity indicating system is self compensating for JET-A or JET-B type fuel.



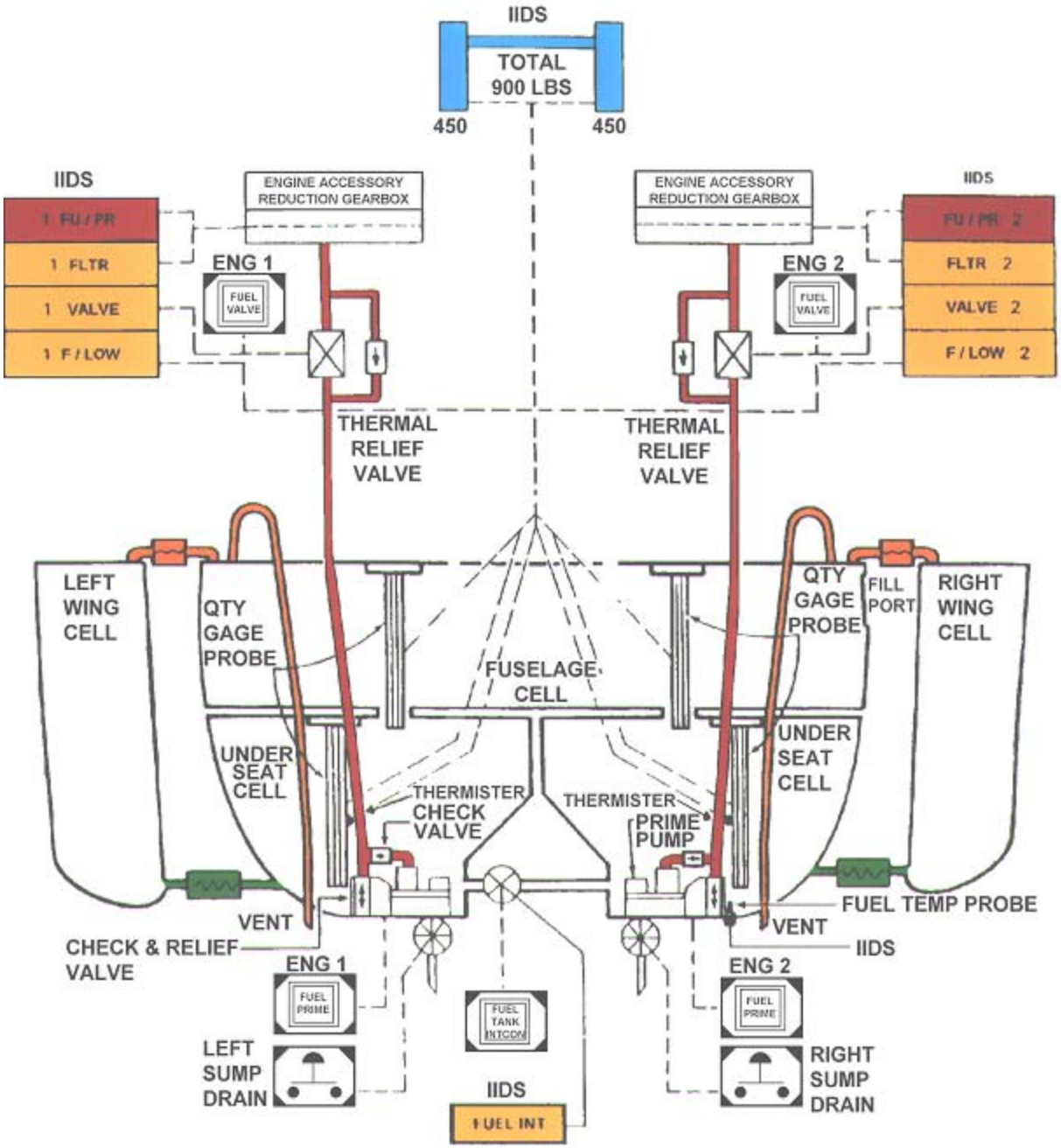
FUEL TEMPERATURE

A fuel temperature sensor is located in the No.2 (left) prime pump assembly. The sensor provides data to the IIDS, which displays fuel temperature on the START PAGE. The display indicates across a range of 27 to 60°C (80 to 140°F). The use of alternate fuels at various pressure altitudes and temperatures is subject to limitations specified in the approved flight manual.

FUEL WARNING INDICATIONS

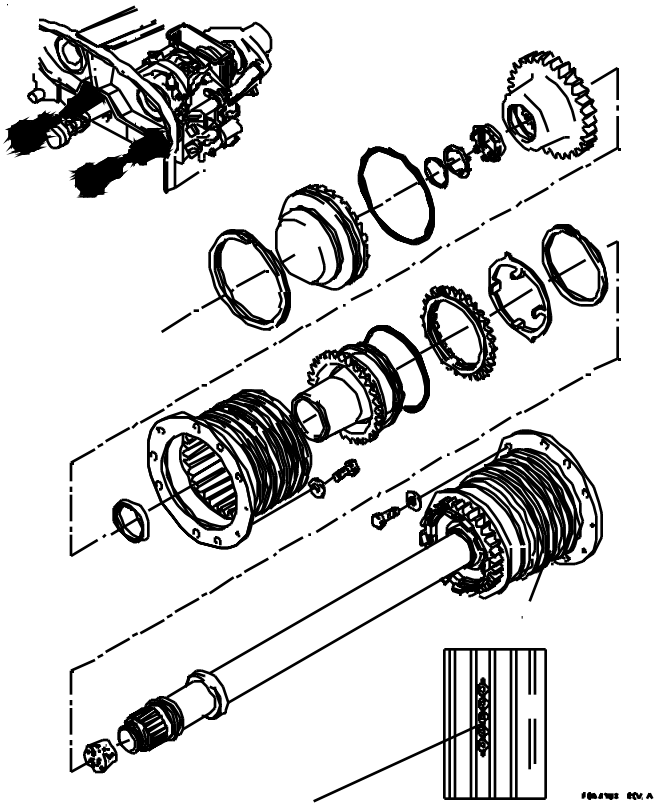
Fuel system warning indications [displayed on the IIDS warning caution window] indicate **low pressure** at the engine driven pumps, engine mounted **filter** clogged, **fuel shutoff valve** malfunction (**on** when valve and switch disagree), **fuel tank interconnect valve** position (**on** for open) and **low fuel quantity** in either / both feed tanks **(less than 41±4.5 kilograms [90±10 pounds])**. **Two** thermistors (one in each sump assembly) control the **two** LOW FUEL indications.

FUEL SYSTEM SCHEMATIC



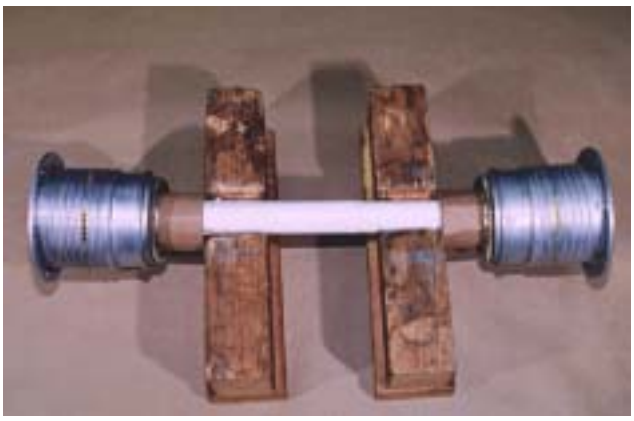
POWER TRAIN

MAIN DRIVE SHAFTS

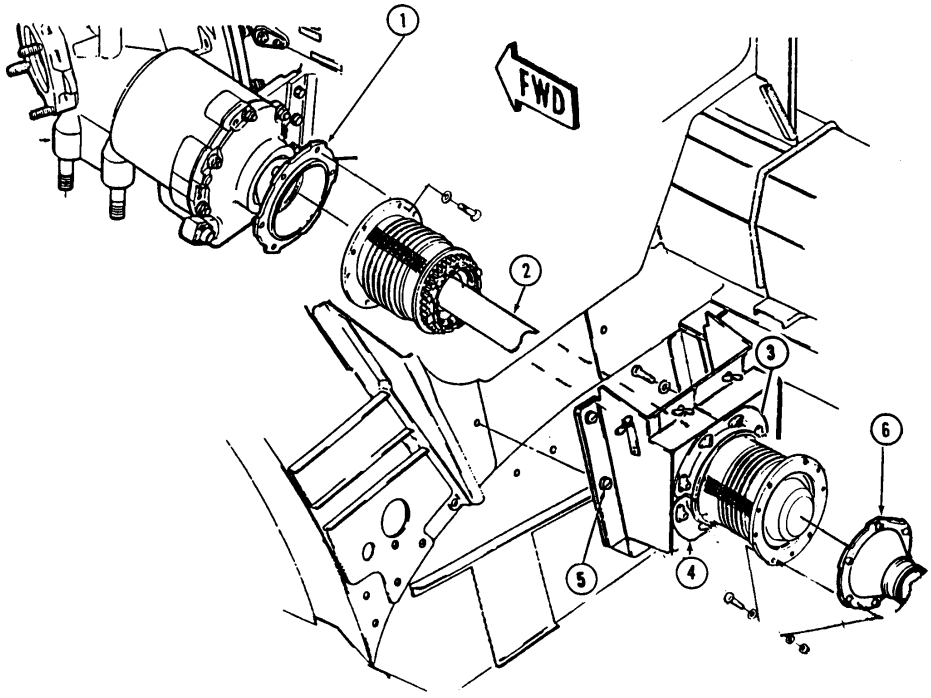


OVERTEMPERATURE INDICATORS

Power is supplied to the transmission through **two** main drive shafts. Each shaft has a **flexible splined coupling** at either end, which allows for variations in alignment caused by normal motions of the transmission. The dynamically balanced shafts pass through the forward firewall inside quick-disconnect baffle assemblies which maintain the required isolation of the engine compartment. **Overtemperature indicators** are found on each coupling, and will change color if the coupling has exceeded operational limits.



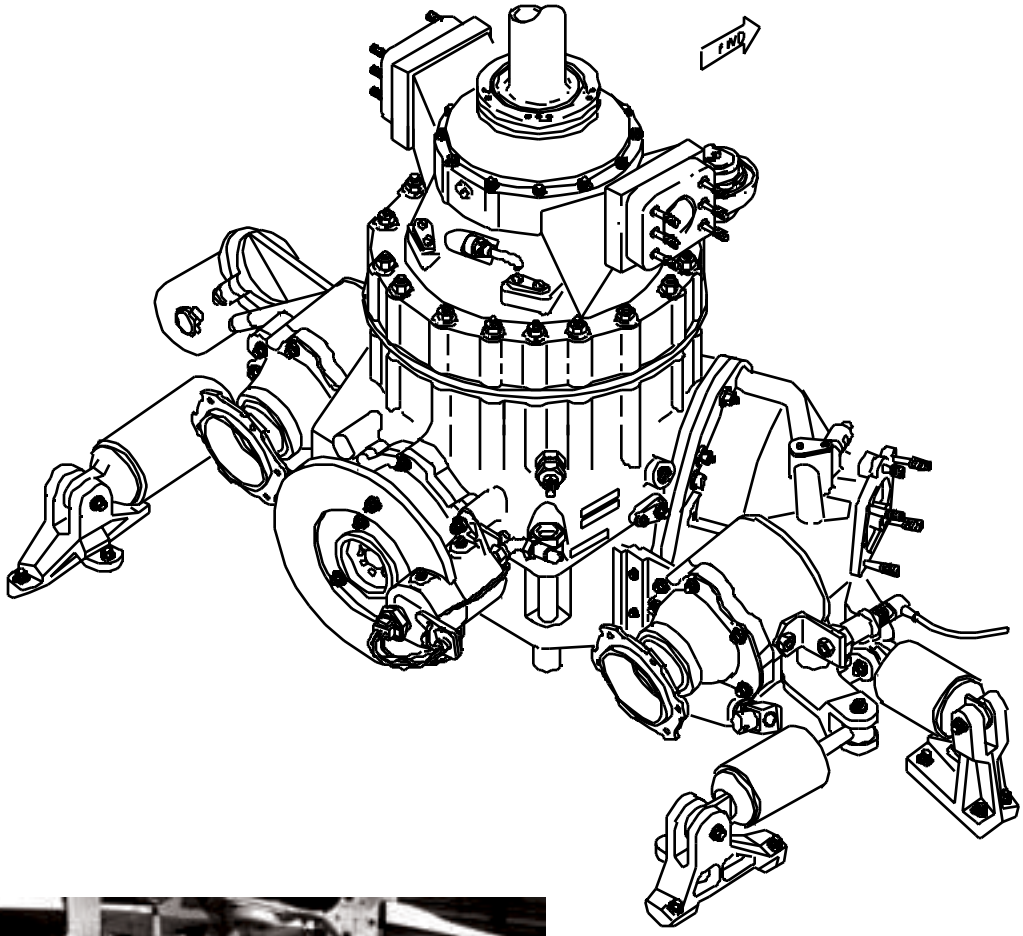
MAIN DRIVESHAFT INSTALLATION

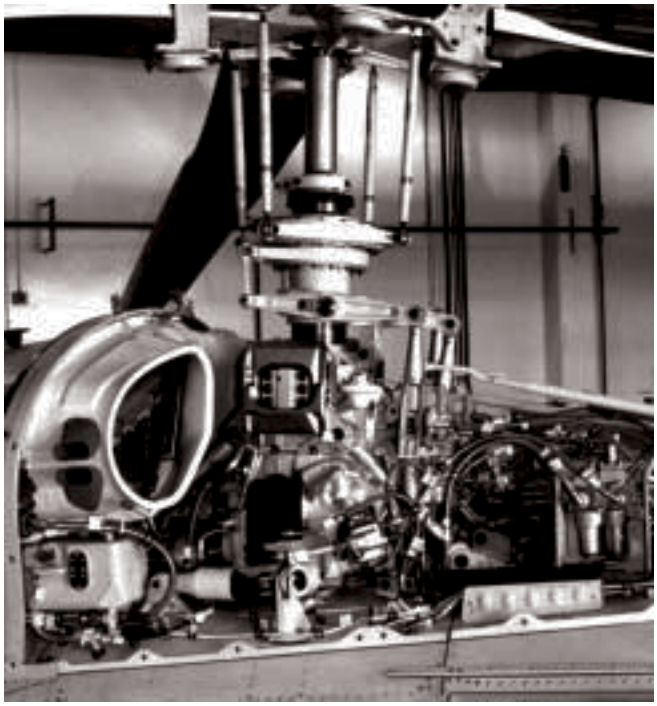


1. Outboard Quill Adapter
2. Main Driveshaft
3. C-shaped Half (upper)
4. C-shaped Half (lower)
5. Quick Disconnect
6. Engine Output Adapter

TRANSMISSION

The transmission is an upgraded version of the Bell 230 transmission. The cases have been machined to accept wider face width gears and larger capacity bearings.

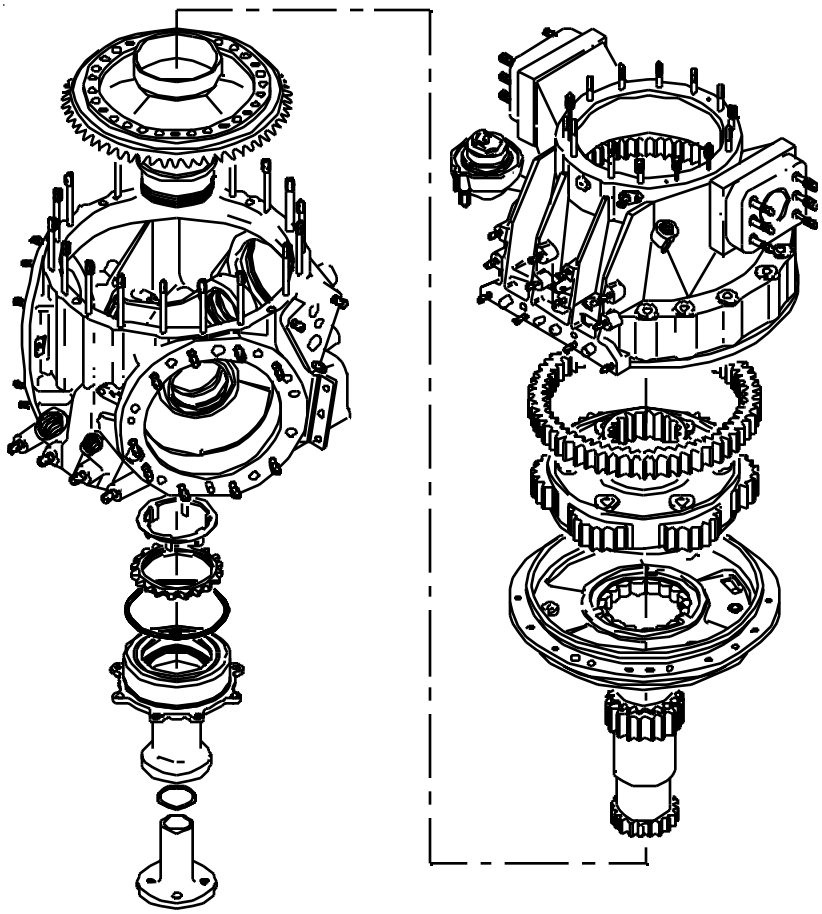




The transmission is mounted on the **cabin roof** just forward of the power plant. It accepts and combines power from the two engines to drive the **main** and **tail** rotors. Each **outboard power input quill** (sometimes referred to as "KNUCKLE") incorporates a sprag-type **freewheeling clutch** to permits single engine operation. An inoperative engine does not become a burden as the other engine takes automatic action to compensate for the loss of power. Additionally, the clutches **insure** continued operation of the **tail rotor** and transmission mounted accessories **(hydraulic pumps)** during **autorotation** or **single engine flight**.

TRANSMISSION OPERATION

The transmission converts the **engine output speed** to a usable main rotor and tail rotor speed. The reduction is accomplished in **three stages**, beginning with the **outboard gear assemblies** (high-speed spiral bevel gear sets), which are driven by the left / right input pinion gears. The outboard gear assemblies incorporate the **freewheeling clutches (sprag clutches)**, whose internal shafts connect to and drive the hydraulic pumps. The **second reduction** stage is through the **main spiral bevel collector gear**, which combines the power from both inputs, **and also** powers the tail rotor output gear. The **third** reduction stage is through a **high contact ratio planetary gear set**, where the collector gears' shaft drives the **sun gear**, which turns the planetary gears inside their case **(ring gear)**, revolving the planetary carrier, which is spline-mated to the main rotor mast.



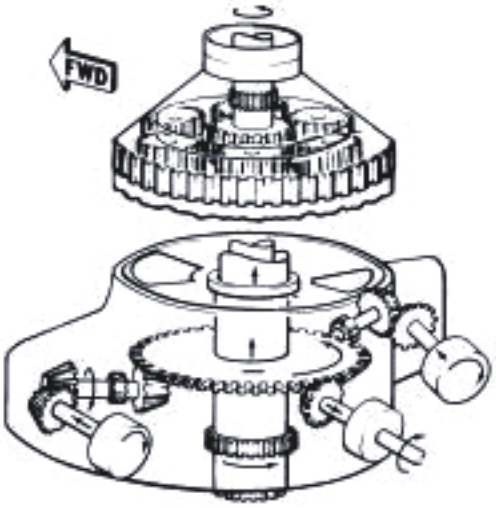
HIGH SPEED SPIRAL BEVEL GEAR SET

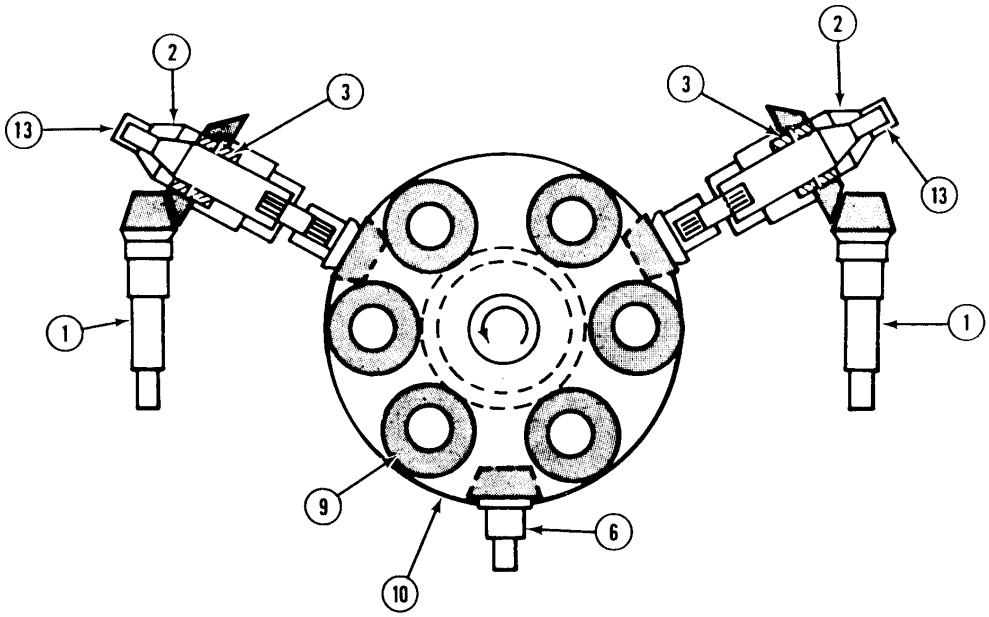
MAIN SPIRAL BEVEL COLLECTOR GEAR

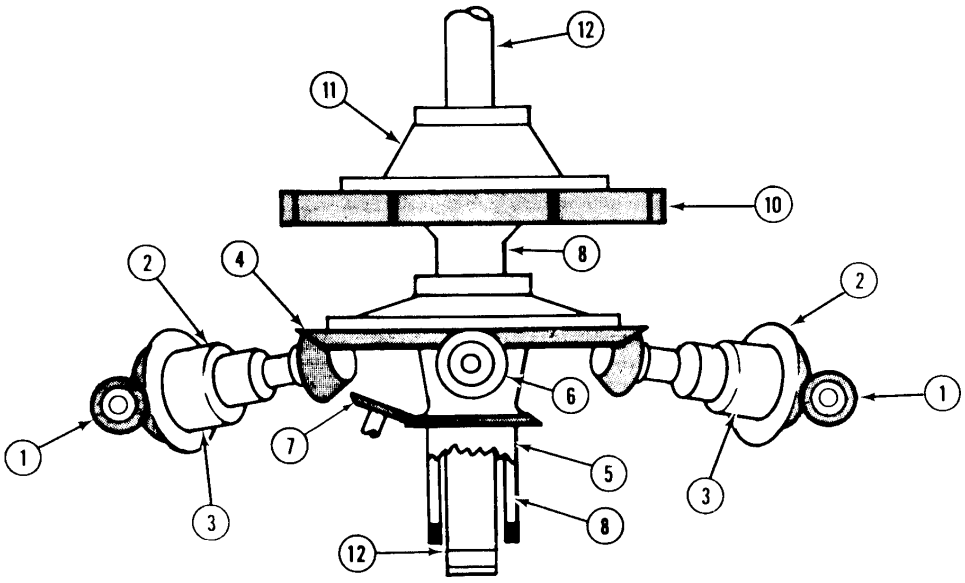
PLANETARY & RING GEAR SET

TRANSMISSION SCHEMATIC

1. Input pinion gear (2)
2. Outboard gear assembly (2)
3. Freewheeling clutch (2)
4. Spiral bevel collector gear
5. Collector gear shaft
6. Tail rotor drive gear
7. Oil pump drive gear
8. Sun gear
9. Pinion gear (6)
10. Ring gear
11. Planetary carrier
12. Main rotor mast
13. Hydraulic pump drive (2)

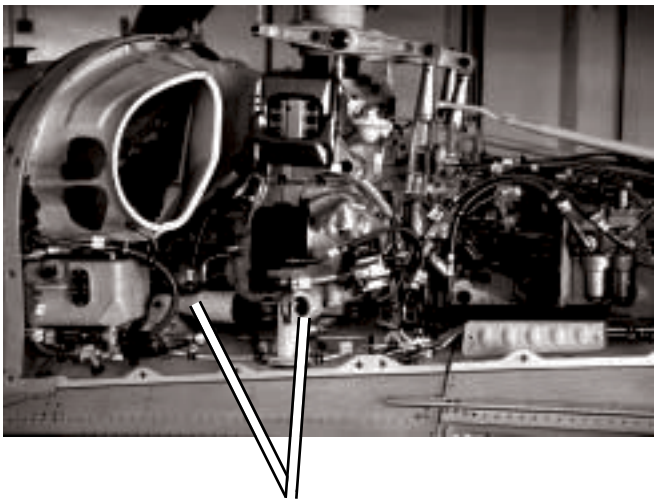






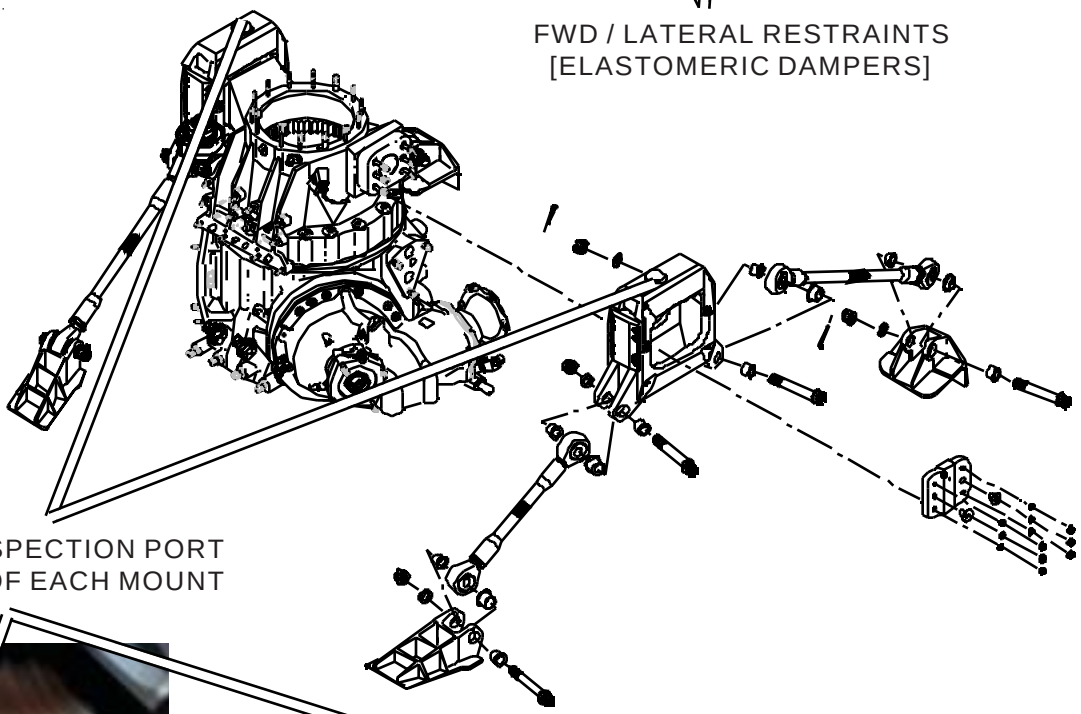
TRANSMISSION INSTALLATION

The transmission attaches to the airframe through TWO **fluid filled** [a highly viscous synthetic silicone liquid] **mounts** to reduce airframe vibrations. The elastomeric pads at the transmission fittings provide vertical softness. Transmission pitch and roll restraint and the allowable motion envelope are controlled by dual FWD/AFT and LATERAL elastomeric dampers. Each isolation mount has a **visual inspection port** which permits observation of the correct fluid level within the sealed assembly.



FWD / LATERAL RESTRAINTS
[ELASTOMERIC DAMPERS]

LIVE® PYLON INSTALLATION



FLUID INSPECTION PORT
ON TOP OF EACH MOUNT

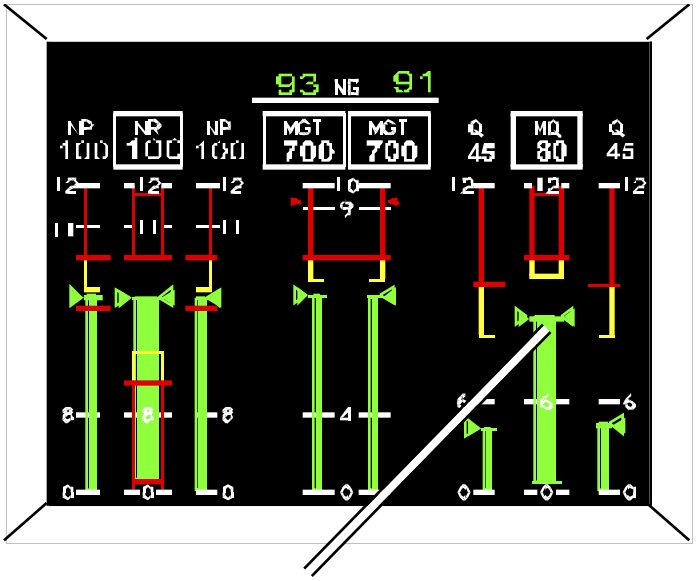
This transmission mounting system is the first commercial application of Bells' LIVE® [Liquid Inertia Vibration Elimination] technology which was developed on the original Model 680 Rotor System Test Aircraft.

TRANSMISSION ISOLATION MOUNT

MAST TORQUE INDICATION

The mast torque measuring system was selected in order to **optimize** the performance capability of the Bell 430 transmission, enabling the pilot to use the **maximum power** to the main rotor for whatever ambient situational conditions exist (i.e., pressure altitude, temperature, relative wind, etc.). Sensing elements [strain gages] are incorporated in each of the transmission lift links. Measurement is accomplished by comparing the difference between each lift link's electronic signal. The four signals are conditioned, processed, and displayed on the IIDS [**Integrated Instrument Display System**].

TRANSMISSION LIFT LINK [ONE OF FOUR]



MAST TORQUE INDICATION

TRANSMISSION POWER RATING

The primary reference to power levels is through torque based loads in the transmission struts with both engines operating. When one engine is inoperative, the reference is to transmission input power.

Transmission power ratings at 100% rotor speed (9598 rpm N2) are:

One Engine Inoperative (OEI)
(transmission input limit)

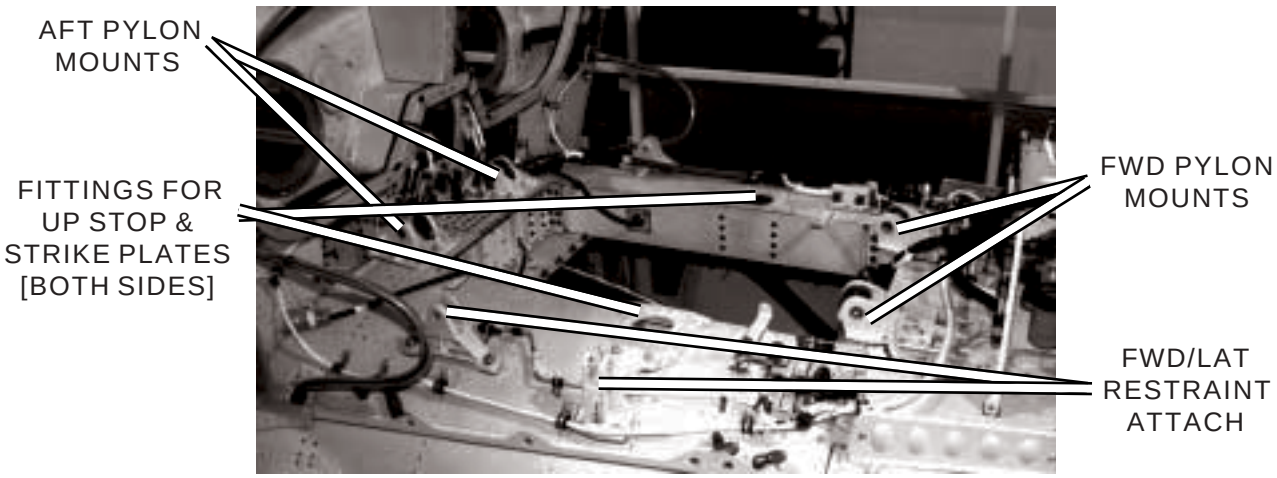
30 seconds	844 shp[629 kW]
2.0 minutes	811 shp[605 kW]
continuous	714 shp[532 kW]

All Engines Operating (AEO)
(main rotor mast limit)

takeoff (5 minutes)	1045 rhp[779 kW]
maximum continuous	989 rhp[738 kw]

REDUNDANT RETENTION

Two **"spike"** and **"up-stop"** assemblies are located on the isolation mount fittings on either side of the transmissions' base. The spikes extend into the upper fuselage through aluminum alloy rings **("striker plates")** mounted to the left / right main roof beams with low-shear rivets. Any transmission motion outside specified limits will **mark** the interior of the rings, or **shear** the rivets, indicating the need for system inspection. The bottom of the spikes are attached to stop fittings which provide **two** additional redundant load paths for transmission retention.

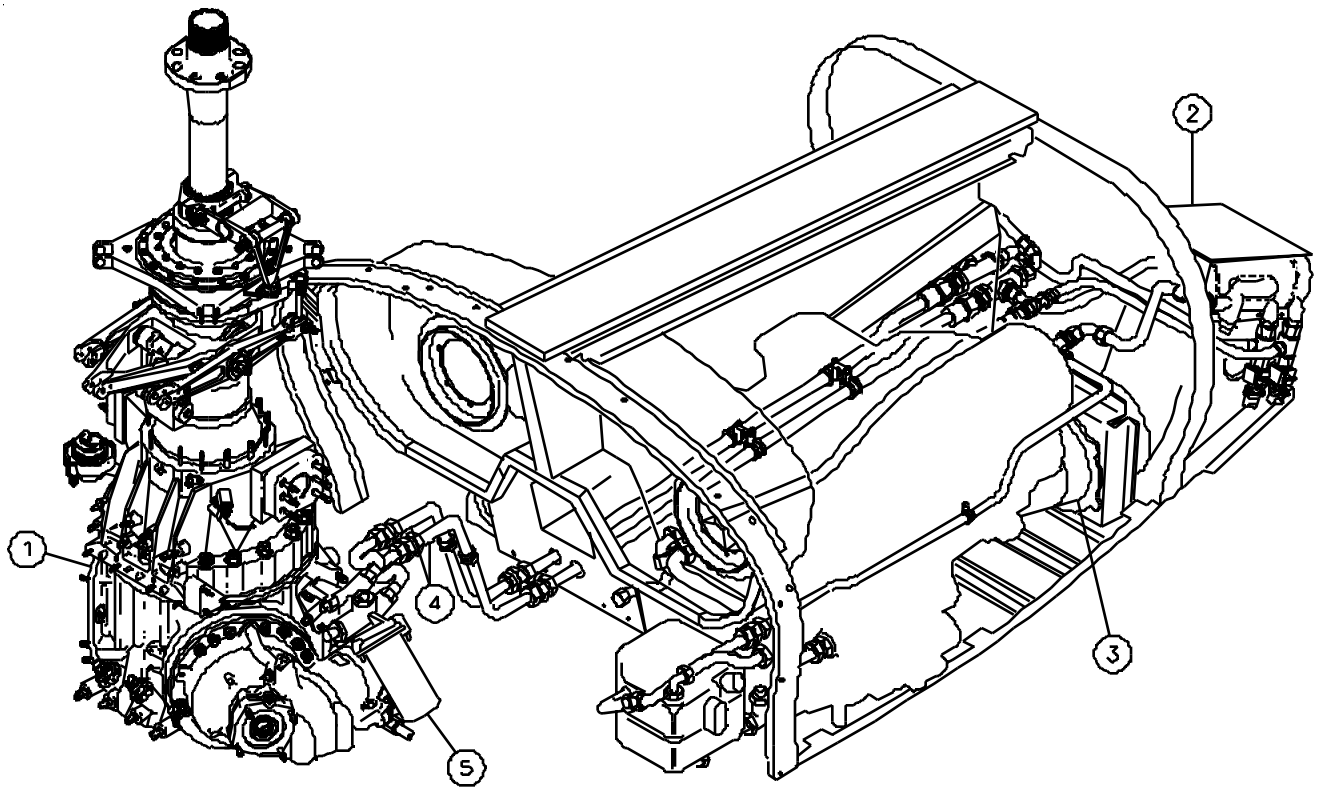


SYSTEM ACCESS

The LIVE® suspension system is engineered for **on condition maintenance**, with easy access to all components for inspections or any necessary actions. All of the components within the system are **sized** to limit stress, and have been carefully designed to be **field replaceable**, without removing the transmission. Static loading (when the helicopter is parked) of the pylons and isolation mounts is minimal to insure long in-service life. The system is accessible by **decowling** and through a **removable panel** in the interior cabin roof.

TRANSMISSION LUBRICATION

The transmission oil system is completely **independent**. It has its own internal oil reservoir, internal oil pump, filter, oil coolers, and monitoring system. Oil passes through a portion of **both** engine heat exchange cores to insure transmission cooling during one engine operation. Oil capacity is **9.8 liters (10.4 U.S. quarts)**. An oil **level sight glass** is located on the left side of the transmission.



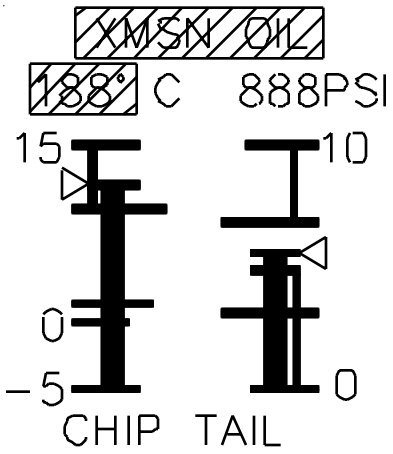
230-035-500

1. Transmission
2. Engine and transmission oil cooler (left side shown)
3. Oil Cooler fan
4. Oil lines
5. Transmission oil filter and manifold

The transmission oil system **lubricates** and **cools** the transmission. A **gear driven pump**, with a screened inlet is mounted in the sump case. Oil is pumped through an internal line to the **main oil manifold** and **filter**, located on the left side of the transmission. A **thermostatic valve** then directs the oil to either the **oil cooler** or **pressure regulator**, depending on the temperature. Oil is then routed to the **eight main jets** for delivery to the gears and bearings. Each of the removable jets are **internally screened** to prevent foreign material from blocking the oil spray. The filter incorporates a **bypass valve**, which opens if back pressure occurs due to cold temperature or clogged filter. The oil manifold contains an **oil temperature switch** and **bulb**, and an **oil pressure transmitter.**

PRESSURE & TEMPERATURE MONITORING

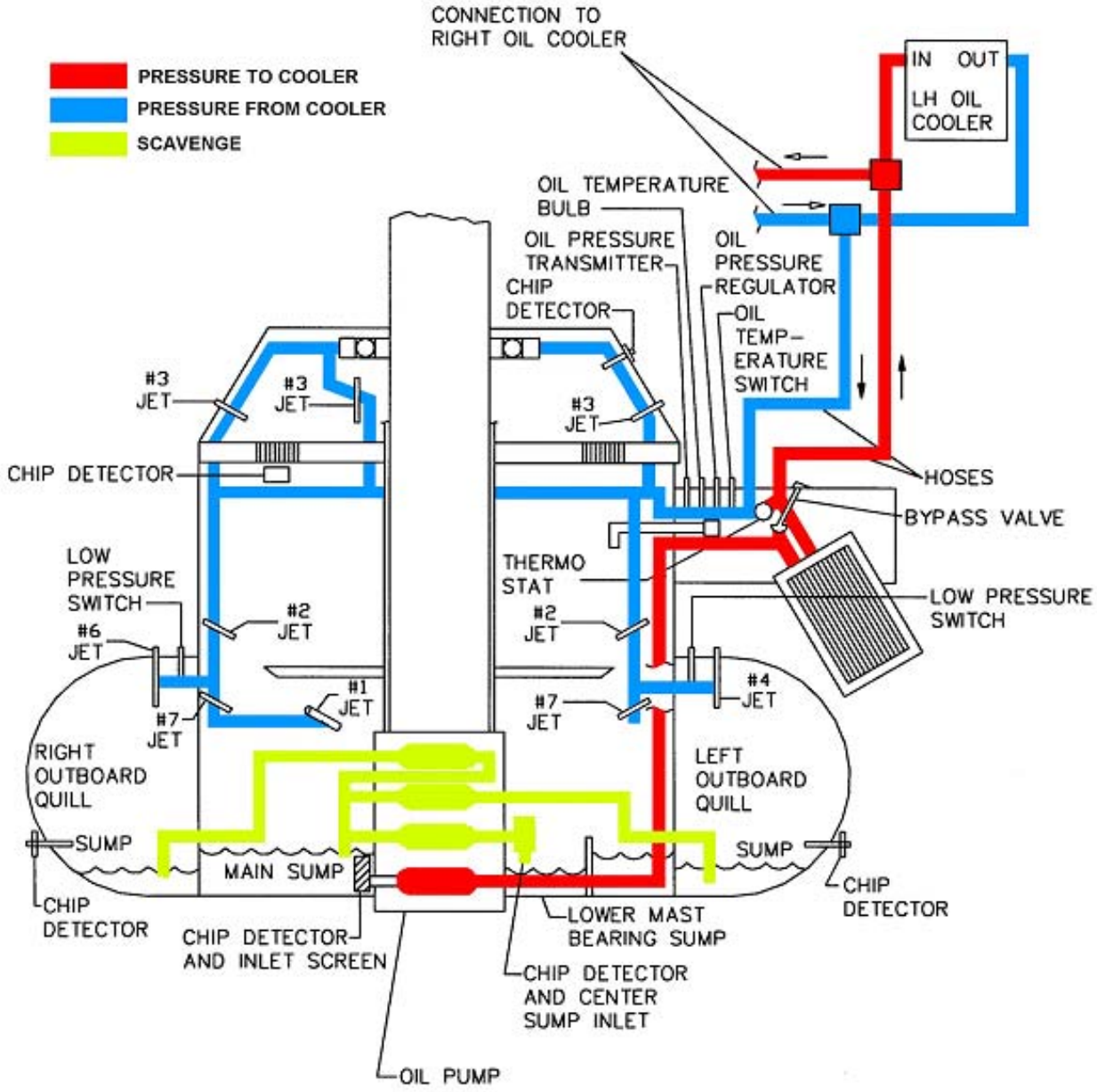
A **low pressure switch** is located in **each** of the outboard quill assemblies, and an **oil temperature warning switch** is located in the main oil manifold. If **either** low pressure switch senses transmission oil pressure **below 30 PSIG,** or if the temperature switch senses temperature **above 110°C**, then the RED warning/ caution indication XMSN OIL (along with the MASTER CAUTION light) in the **IIDS** is illuminated. An **oil temperature bulb**, and an **oil pressure transducer** provide temperature and pressure signals to the **IIDS**.



CHIP DETECTION

Six chip detectors are located in the transmission to provide both warning and diagnostic information. The **two** upper detectors monitor the **upper mast bearings** and the **planetary gears and bearings**. Chip **collectors** prevent secondary contamination of the transmission and isolate sources of debris. The **four** lower detectors monitor the **left and right input gears**, **freewheeling units**, **lower mast bearings** and **sump / pump inlet.** The four lower detectors are installed in **self closing fittings**, to prevent oil spillage when removed for inspection. The detectors interface with the CDPU and IIDS to provide chip indications, "**FUZZ BURN**" control, and continuous continuity test of the system circuits.

TRANSMISSION OIL SCHEMATIC



OIL COOLER

Transmission oil cooling takes place in **both** of the engine oil coolers heat exchange cores. This insures than even with **only one** engine operating, the transmission oil will be cooled. The **oil lines** from the transmission to the coolers pass along the **central firewall tunnel** of the engine compartment.

SERVO ATTACHMENT

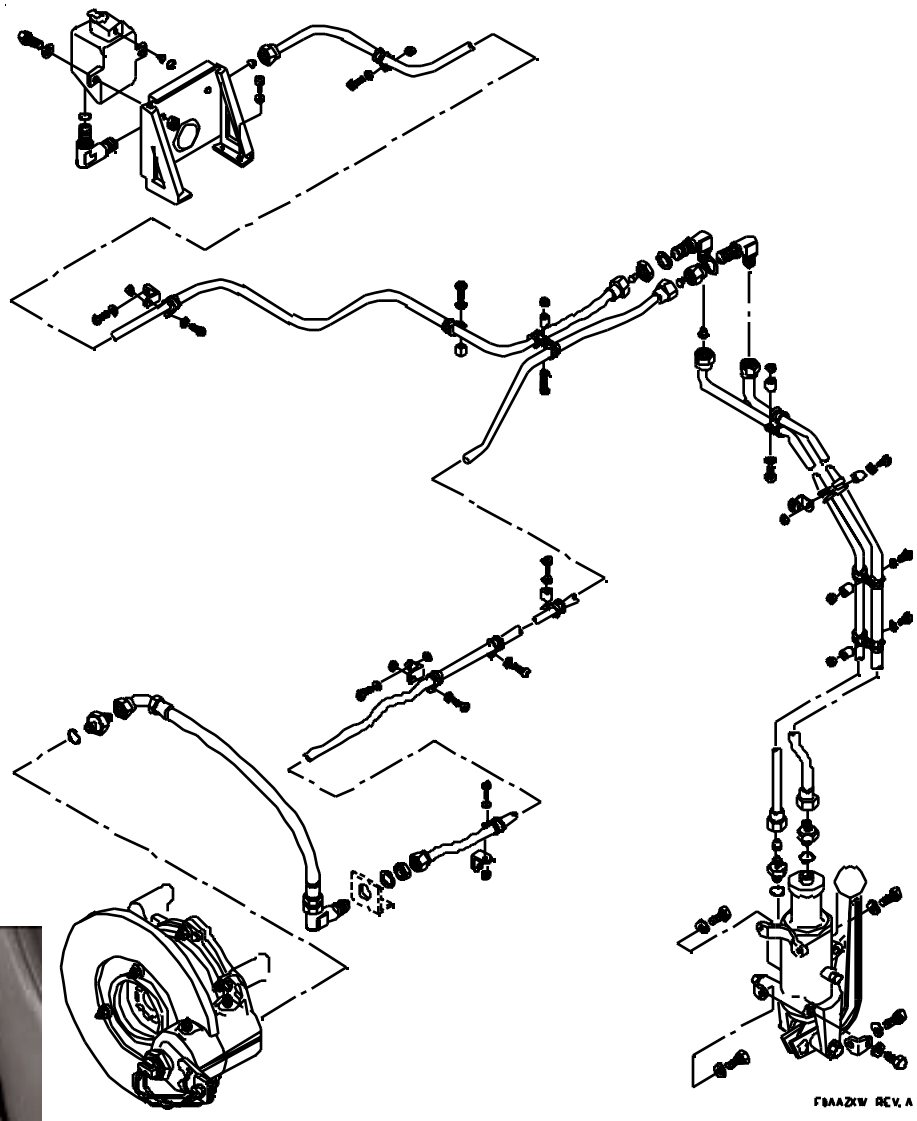
The forward side of the transmission incorporates mounting attachments which support the three hydraulic servo actuators of the main rotor flight control system. This isolates the cyclic and collective servos from any inputs caused by the normal range of pylon motion.

ROTOR BRAKE

The rotor brake shortens the time required to stop the rotor after shut down. A **disc brake assembly** is mounted on the tail rotor output quill, and consists of a **rotor brake disc** attached to the tail rotor drive adapter, and a **dual caliper brake** attached to the transmission case.

ROTOR BRAKE OPERATION

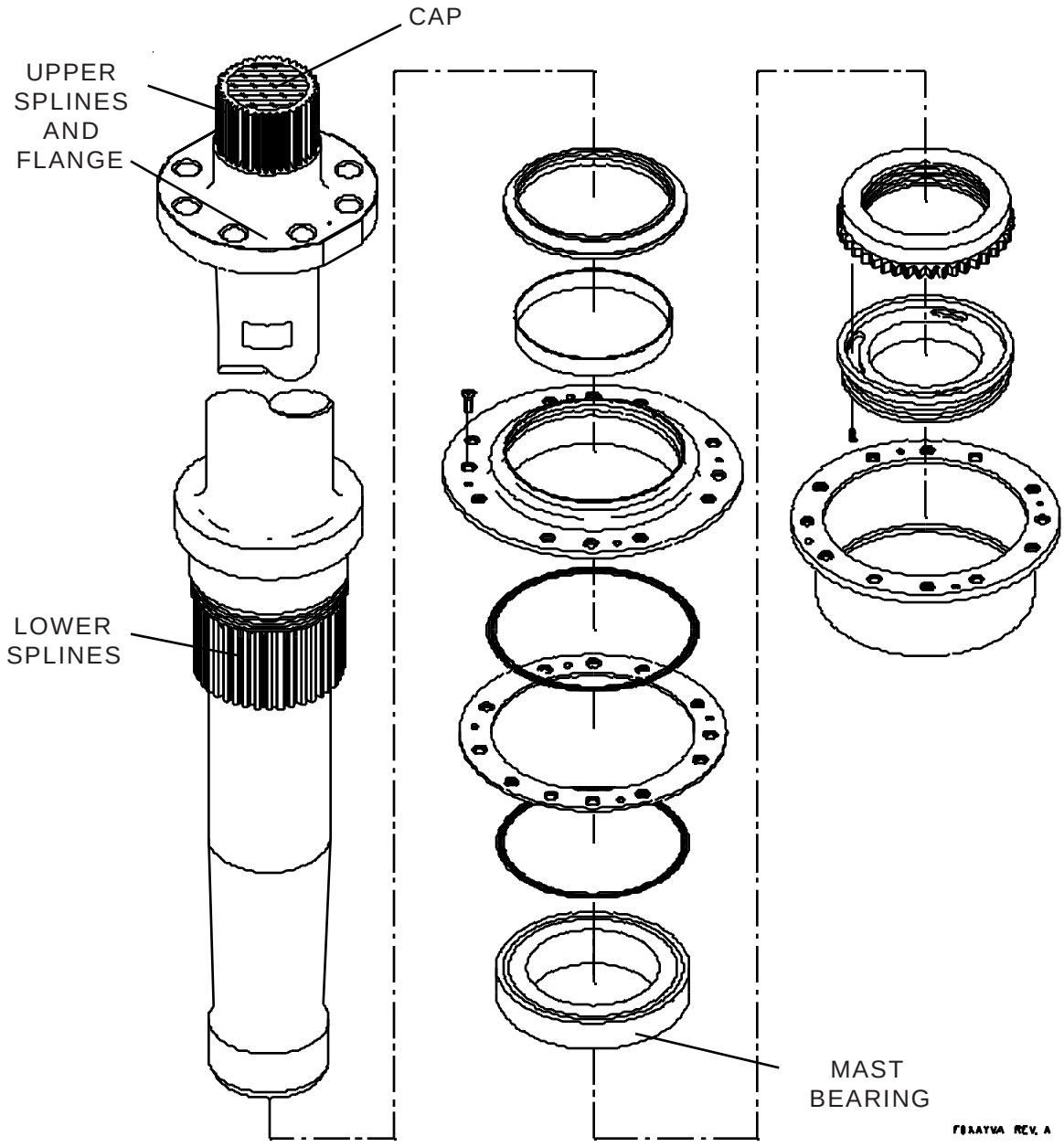
The rotor brake is activated by its' own **independent** hydraulic system. The **handle and cylinder** are located on the control tunnel wall to the right of the pilot, while the system **fluid reservoir** is located on the cabin roof. When engaged, **two** RED **caution lights** in the main caution panel illuminate, controlled by switches in each caliper which sense displacement of the **brake pads** (pucks).



The rotor brake may only be **engaged** when **both engines** are shut down, and rotor **RPM** has decreased to **55%**. Stops have been demonstrated in winds up to **111 km / hr (60 knots)**.

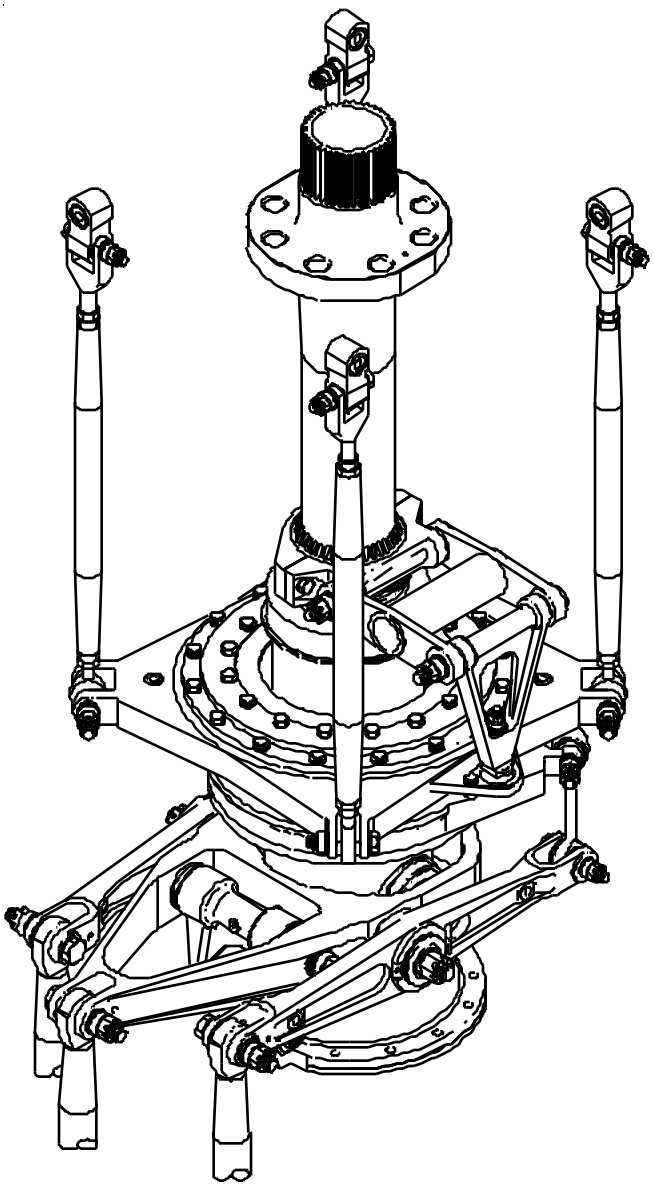
MAIN ROTOR MAST

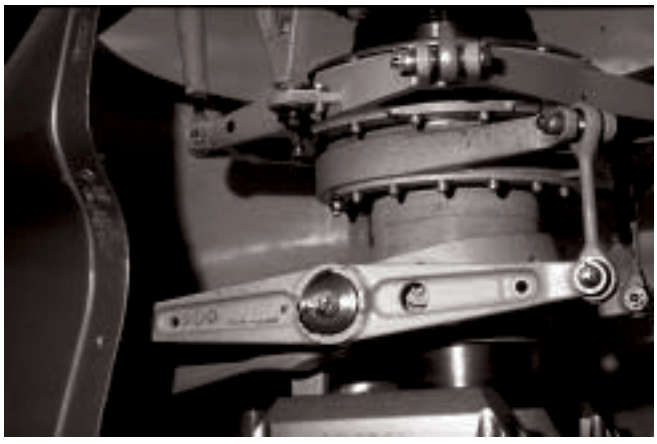
The main rotor mast is a hollow steel tube that transmits rotary motion from the transmission to the main rotor. The mast has **three sets of splines**, and a **flange**. The lower splines fit into the transmission planetary carrier to provide the mast drive source. The center splines are master splined and drive the rotating portion of the swashplate. The upper splines and flange drive the main rotor. The mast is mounted to the top of the transmission and extends downward through the transmission into the mast alignment bearing. The mast is supported in the transmission by a single ball bearing, bearing liner, and retainer. The lower end of the mast is machined to a finish that serves as the lower mast alignment bearing inner race. The mast alignment bearing is a roller bearing mounted in the lower mast bearing case.



MAIN ROTOR CONTROLS

The main rotor controls consist of a swashplate and levers assembly, a drive assembly, and four pitch links. The **fixed (non-rotating)** portion of the controls are the **swashplate and levers**, which are mounted on top of the transmission and receive control input from the servo actuators. **Collective** servo input, through the collective levers, raises or lowers the swashplate ball sleeve, which results in an **equal** increase or decrease in the pitch of the blades. The **left and right (cyclic)** servo actuators input tilts the swashplate, to effect **differential** pitch in each of the rotor blades, causing the rotor system to tilt in the direction desired. The **rotating** controls are the **drive assembly** which is spline adapted to and driven by the main rotor mast. The **drive assembly** follows the vertical and tilting motion of the swashplate, and transfers it to the main rotor through the **pitch links.**



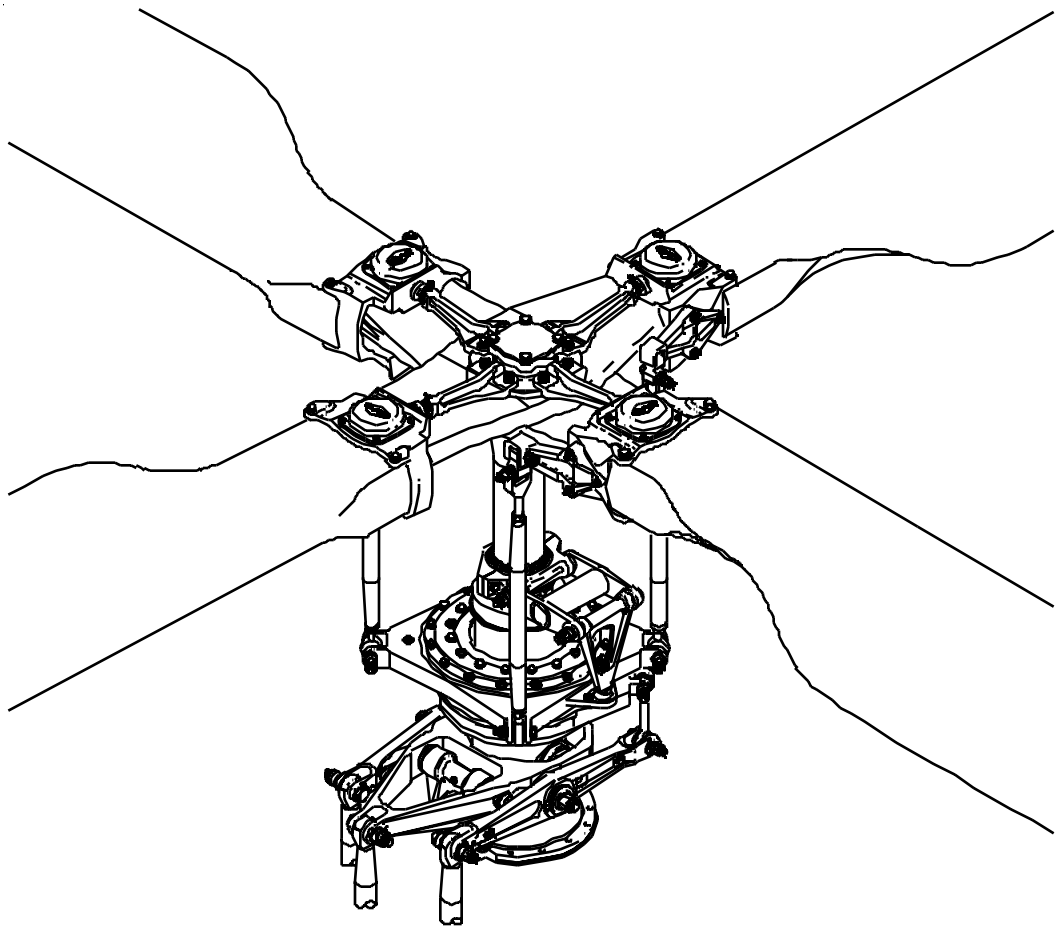


MAIN ROTOR SYSTEM

The main rotor is a **four-bladed, semi-rigid, bearingless** rotor system. This **simplicity of design reduces maintenance by eliminating mechanical hinges, and eliminating lubrication requirements.** The main rotor assembly includes two **composite yoke flexures** and damper assemblies along with **four composite blade assemblies**. The two yokes **stack** on top of each other and are indexed to each other by means of a dowel pin in the mast flange and the mast drive adapter. Four upper damper stops and four lower damper stops limit the flapping of the rotor system. **Pitch horns** are attached to adapters which also mount the **fluid filled lead and lag dampers**, and are attached to the main rotor blades by four bolts. The main rotor carries centrifugal and bending loads (flapping and lead/lag) through the sets of composite yokes. They are designed as flexures to reduce loads and vibrations. Each yoke flexure will independently allow flapping, with flapping stops on the upper surface to limit upward movement, and on the lower surface to limit downward movement. A **nickel plated** leading edge **wear strip** is **cold bonded** on the **stainless steel leading edge** of each main rotor blade, and is easily replaced by an approved support facility in the event that it becomes damaged or worn.

FLANGED MAST

Coning and flapping stops are provided to prevent yoke damage in gusty wind conditions. Anti-fretting pads and coatings are used to improve durability. The pair of yokes are bolted to an integral flange on the mast. This arrangement is simple and makes it easier to maintain the quality of the ride.



STACKED YOKES - PITCH CHANGE ADAPTER & PITCH HORN

MAIN ROTOR BLADES

The composite main rotor blade is hollow at the root [inboard] end which permits the blade to fit over the yoke, with two attaching pins on the outboard end of the yoke to carry the centrifugal loads. The blade spar is made of carbon/epoxy torque wraps around fiberglass spar caps. The cuff that attaches to the blade at the bolt holes and extends inboard to the pitch change adapter is also made from carbon and fiberglass. The afterbody is a nomex core covered with fiberglass skin. Two trim tabs are bonded to each trailing edge (one inboard and one outboard) to adjust for a out of track condition. The main rotor blades have a rectangle planform with thickness that tapers down to 6% at the tip to reduce noise. This thickness tapering reduces noise almost as much as a swept tip does while retaining the simplicity of design and construction that helps control the cost of a blade.

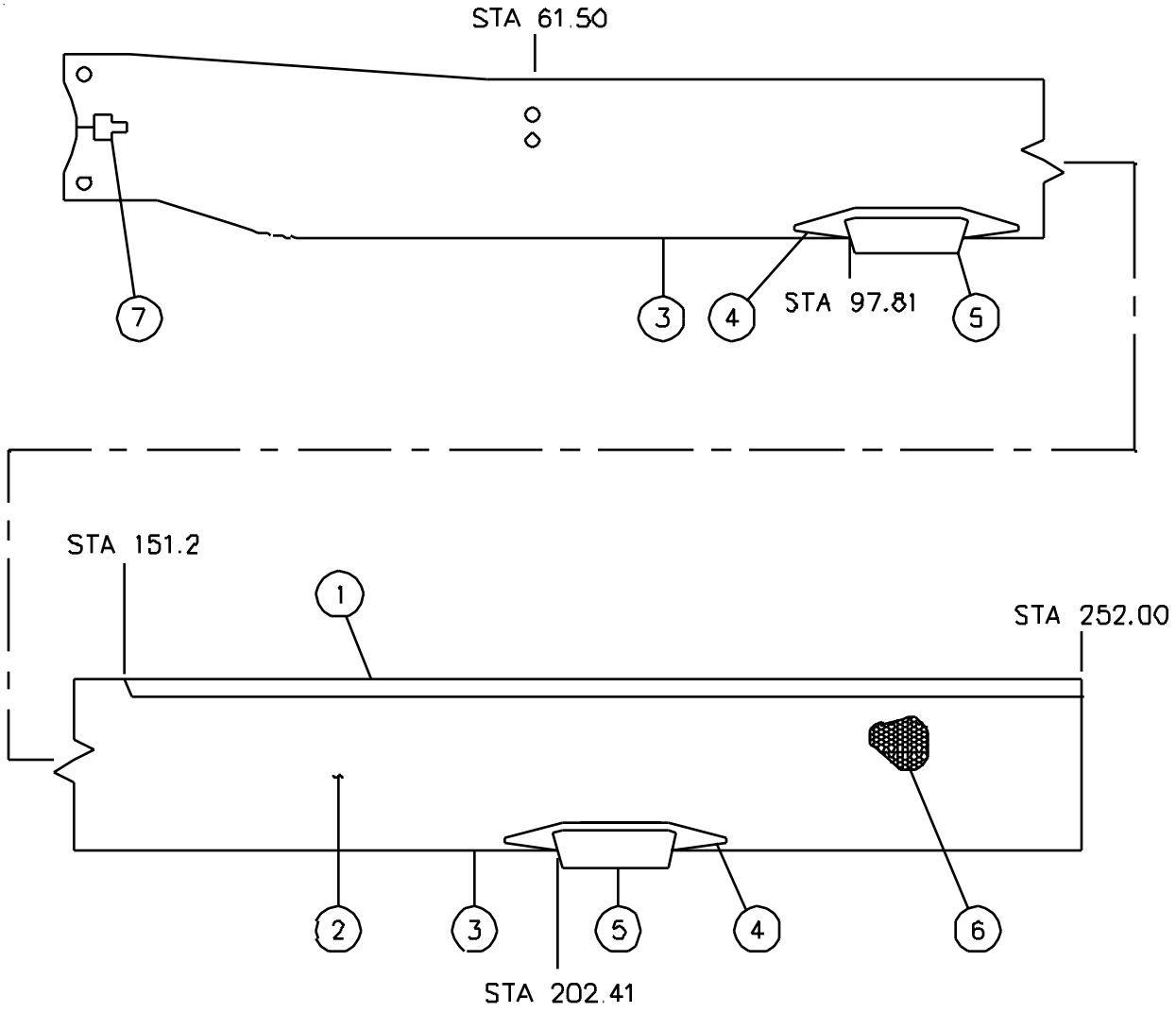
Parameters of the main rotor are:

Diameter	**42 feet**	**[12.8 meters]**
Blade chord	**14.2 inches**	**[0.36 meters]**
Tip speed	**765 ft/sec**	**[233 m/s]**
Rotor speed	**348 rpm**	

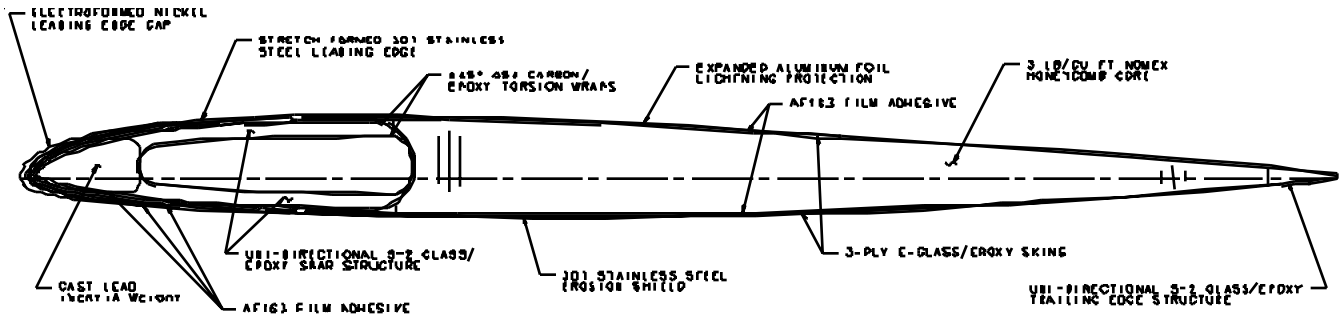
MAIN ROTOR BLADE CONSTRUCTION

Each blade has a **stainless steel leading edge abrasion strip** with a **nickel cap** to protect against erosion. The nickel cap, can be removed and replaced without removing the stainless steel strip. **Trim tabs** are bonded to a sacrificial fiberglass strip so the tab can be replaced in the field without damaging the blade skin. Provisions are made for **track and balance** adjustments after repairs with access to the balance weight through the blade tip. Balance weight pocket covers on the upper surface have been eliminated to reduce corrosion and to enhance aerodynamics.

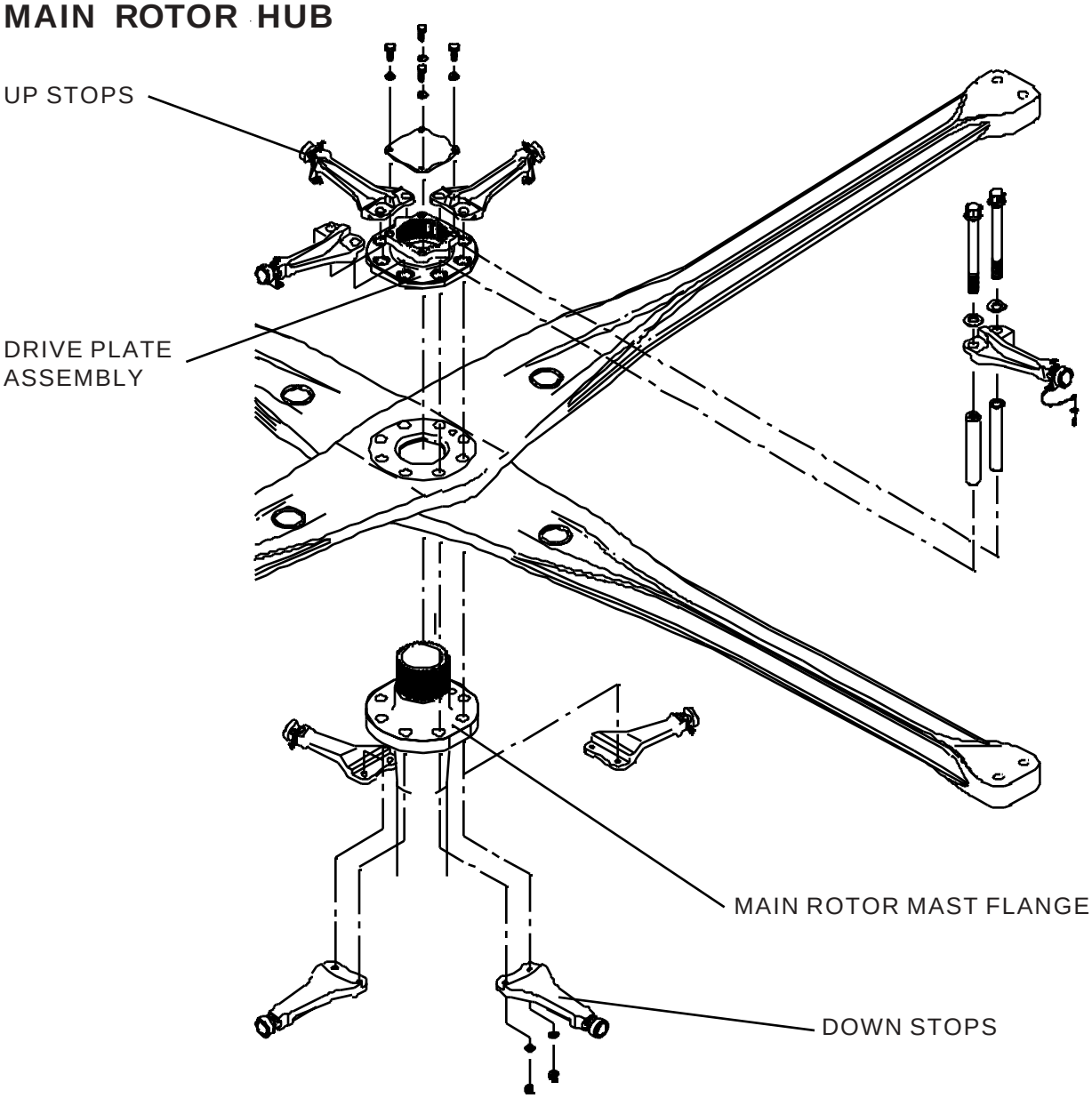
MAIN ROTOR BLADE CONSTRUCTION FEATURES



1. Abrasion strip
2. Skin
3. Trailing edge
4. Doubler
5. Trim tab
6. Core
7. Identification plate

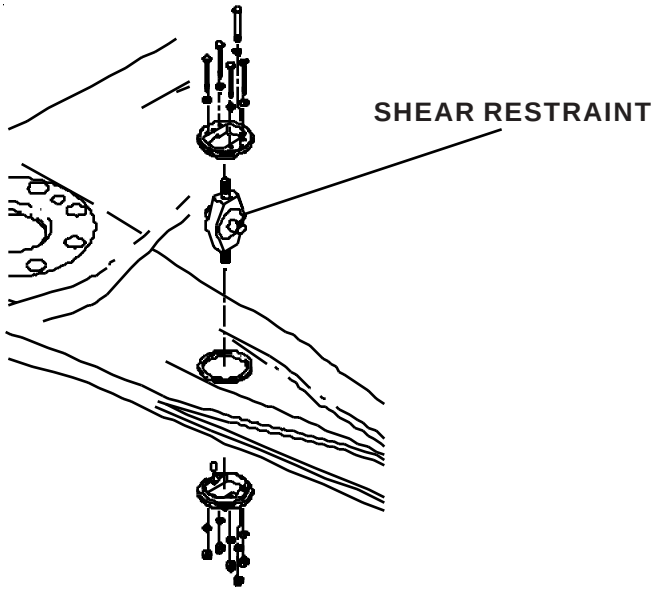


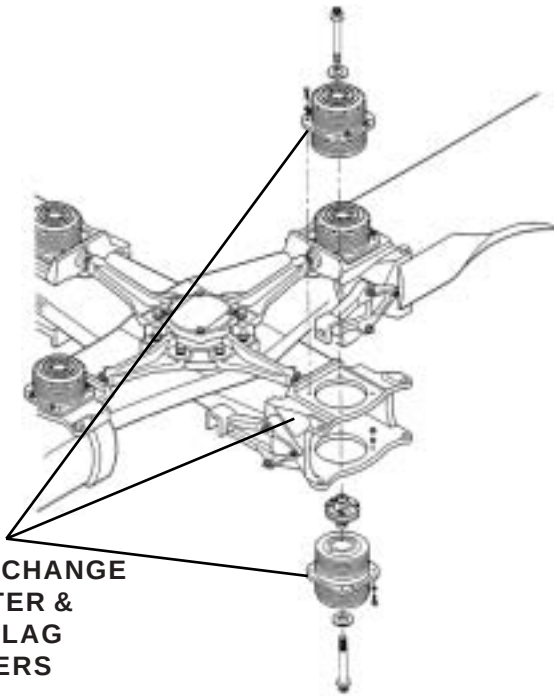
MAIN ROTOR HUB



The main rotor yoke is made of composite **fiberglass** materials. Its unique design allows the yoke to take shear loads, bending loads (forward, rearward, up and down), and twisting loads. There are **no bearings** used for feathering or flapping. This simple design eliminates the need for lubrication. The two yoke flexures are mounted on top of each other to form a **stacked** four bladed rotor system. The yokes are mounted directly to the **mast flange**, with a dowel pin located on the flange to position the lower yoke. The upper yoke will then mount 90° on top of the lower yoke. The **drive plate assembly** mates with **splines** on top of the mast aligned with a match mark on the top of the mast. A dowel pin located in the drive plate will align with a hole in the upper yoke to secure the yoke alignment. Bolts passing through the mast flange and the drive plate will secure the plates [and the up/down stops] to the mast flange.

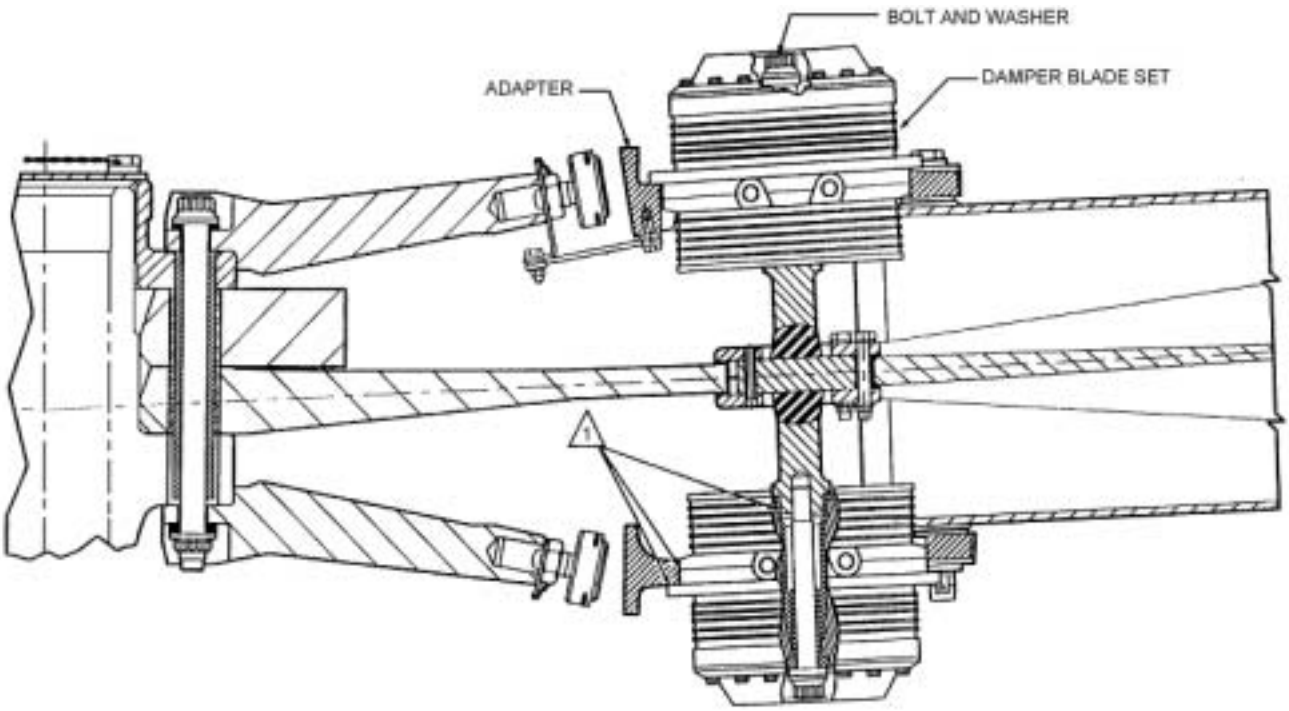
ELASTOMERIC DAMPERS & SHEAR RESTRAINTS

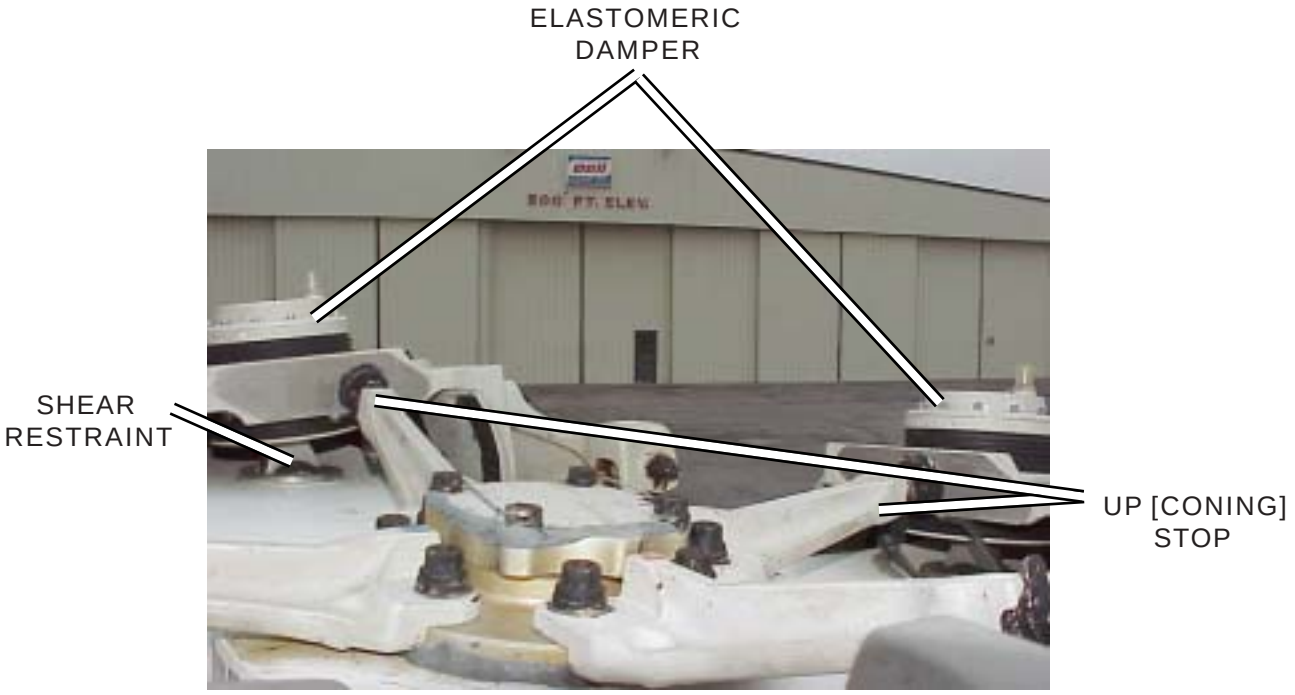




A pitch change adapter at the inboard end of each yoke houses an elastomeric shear restraint and two elastomeric lead-lag dampers. Lord has designed the elastomeric components for on-condition replacement and a 5000 hour fatigue life. Dampers can be replaced without disconnecting the pitch links or removing the blades. No measurement or shimming is required.

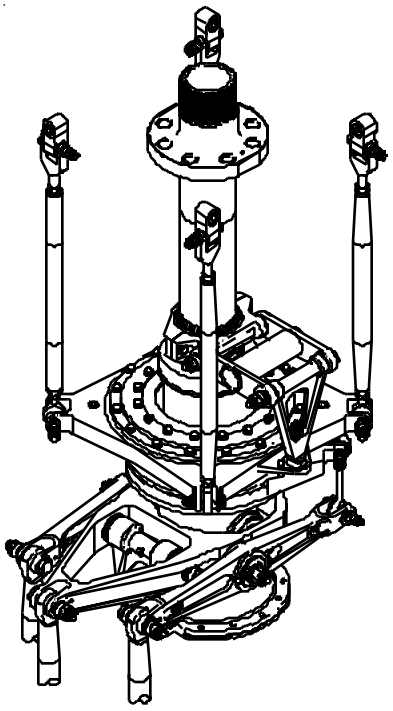
YOKE / PITCH CHANGE ADAPTER / SHEAR RESTRAINT CROSS SECTION





PITCH LINKS

The pitch link is a solid corrosion resistant steel rod, two clevises, and a universal bearing assembly. The pitch link may be adjusted to correct out-of-track and **autorotation** rotor R.P.M. It transmits movement from the driven assembly of the swashplate, to the main rotor hub pitch horns to regulate the pitch angle of the main rotor blades. The pitch links are repairable by replacement of the universal bearing and/or clevises. A lubrication fitting is provided in upper end of link and should be lubricated at scheduled intervals.



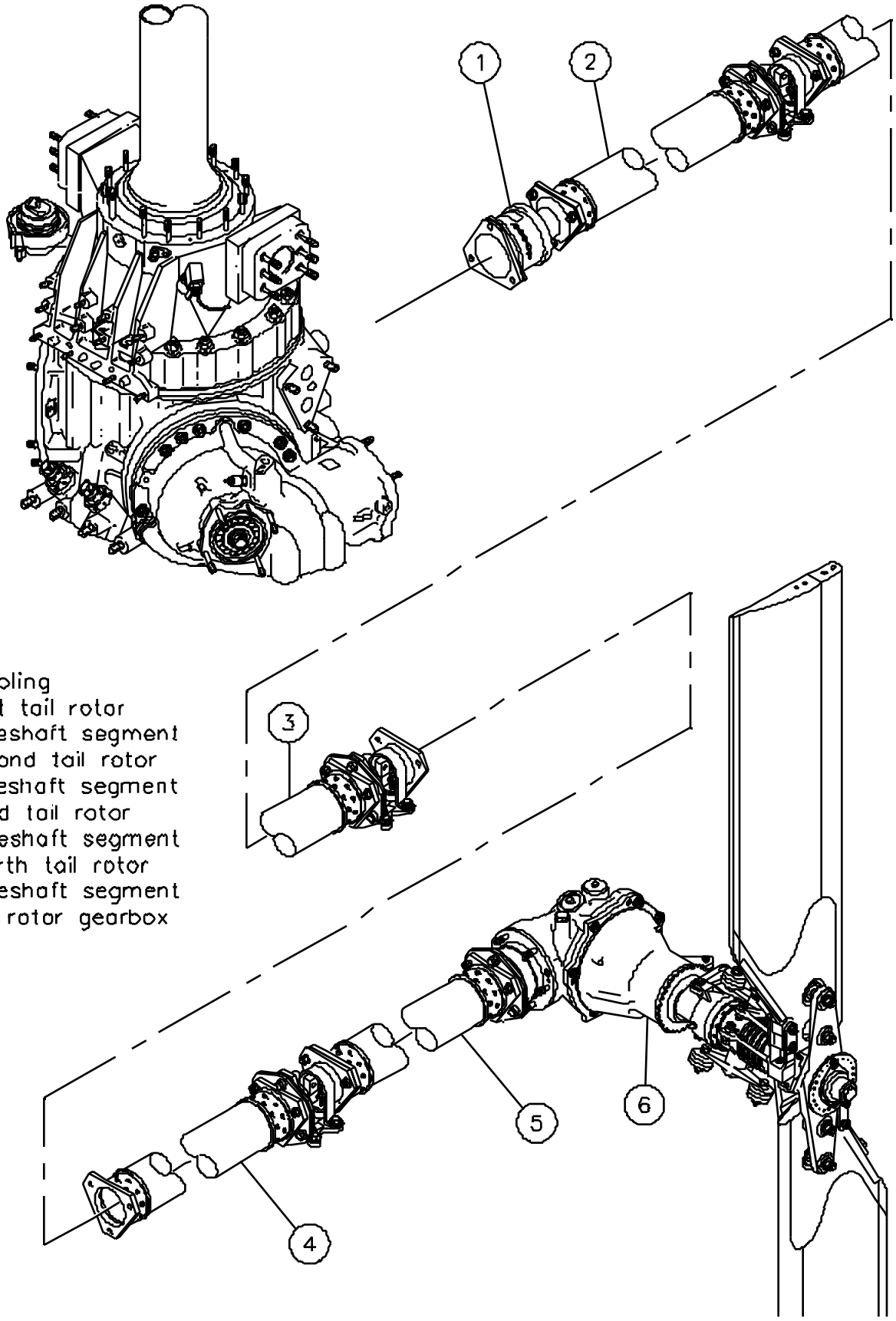
ANTI-TORQUE SYSTEM

The tail rotor drive system consists of **four shafts, three hanger bearing assemblies, and a 90° gearbox** connected in line between the transmission and the tail rotor. Each **tail rotor driveshaft** consists of an aluminum alloy tube with an attachment adapter riveted to each end. All shafts are **dynamically spin balanced** to provide minimum vibration at operating RPM. The three drive shafts are **interchangeable**.

The tail rotor drive shafts are supported and interconnected by **three hanger bearing assemblies**. Each assembly consists of two attachment adapters on a short splined shaft through a single row sealed ball bearing in a ring shaped hanger equipped with four mounting lugs for attachment to their support fitting. Each hanger bearing has a redundant **safety strap retainer** which maintains alignment in the event of bearing failure.

The **No.1** driveshaft is connected to the transmission by a **crowned-tooth spline coupling** which accommodates the normal motion of the transmission. The remaining shaft sections and the gearbox are connected by **Thomas-type** flexible plate couplings. These couplings feature high strength redundant load paths, and are not subject to misalignment, overheating, or uneven wear.

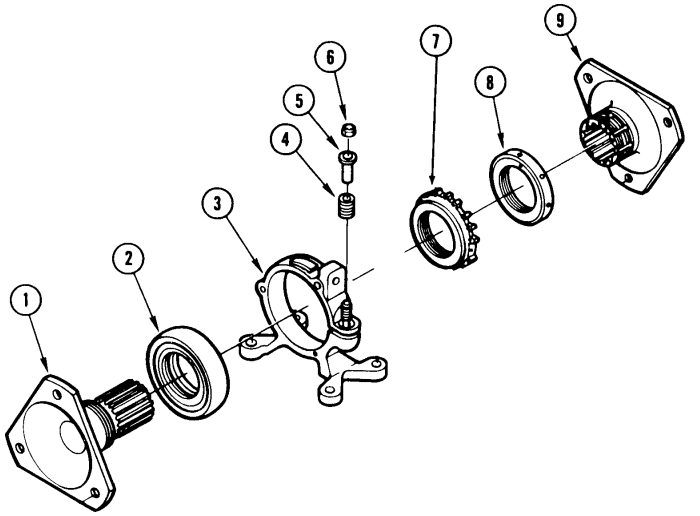
TAIL ROTOR DRIVE INSTALLATION



1. Coupling
2. First tail rotor driveshaft segment
3. Second tail rotor driveshaft segment
4. Third tail rotor driveshaft segment
5. Fourth tail rotor driveshaft segment
6. Tail rotor gearbox

HANGER BEARING & THOMAS COUPLING INSTALLATION

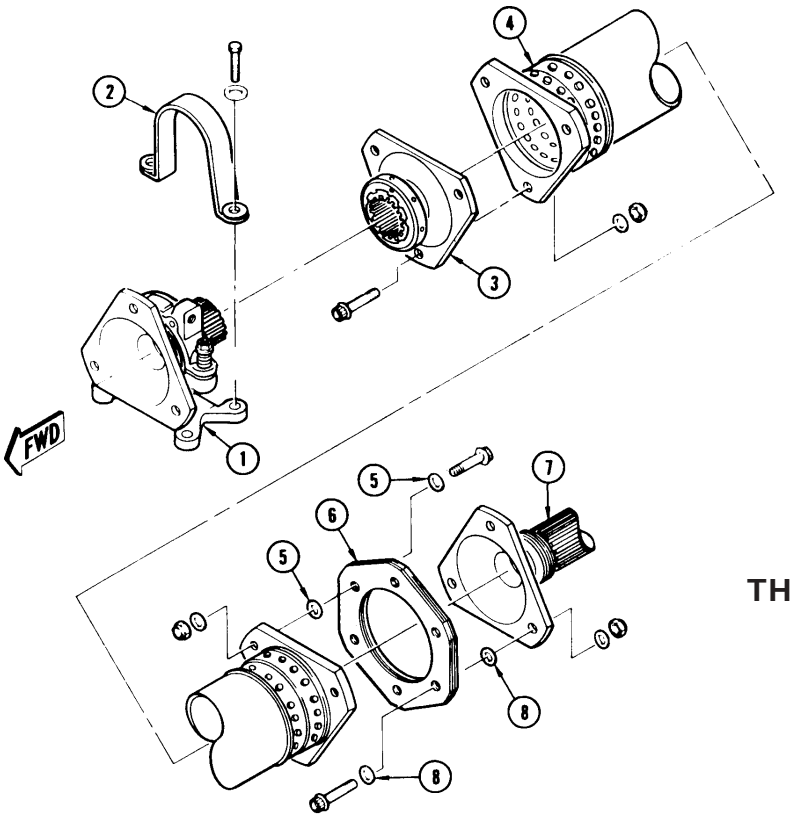
•EXAMPLE ILLUSTRATION•



HANGER BEARING ASSEMBLY

1. Forward adapter
2. Bearing
3. Hanger
4. Spring
5. Spacer
6. Nut
7. Nut
8. Locknut
9. Aft adapter

•EXAMPLE PHOTO•



THOMAS COUPLING INSTALLATION

1. Hanger Support
2. Safety strap retainer
3. Hanger adapter
4. Driveshaft segments (2,3,&4)
5. Radius washer
6. Disc assembly
7. Hanger adapter
8. Radius washer

NINETY DEGREE GEARBOX

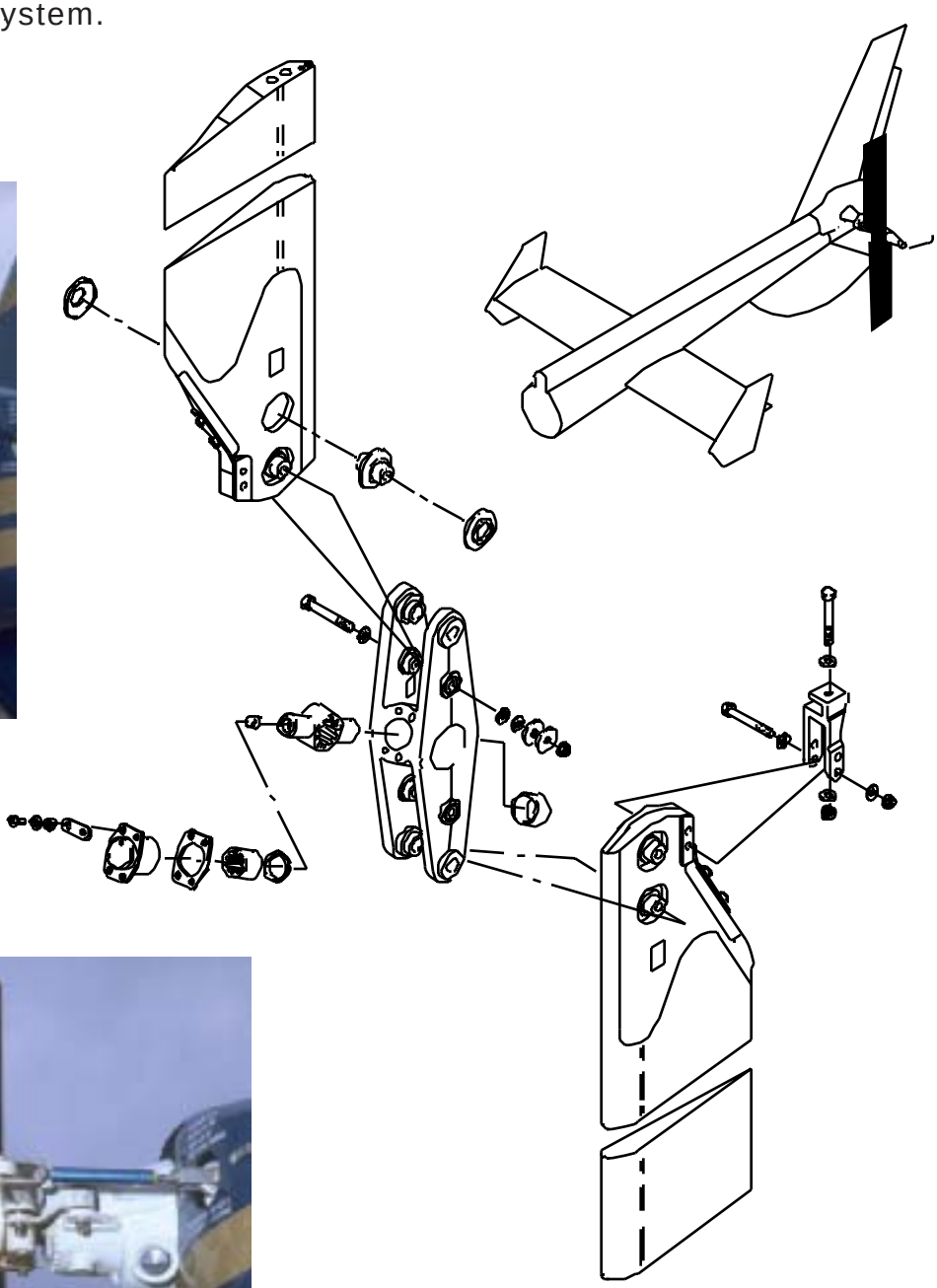
The **tail rotor gearbox** is mounted at the end of the tail boom and provides a reduction of the driveshaft speed and a 90° change of direction. The gearbox supports the tail rotor and its' pitch controls. It contains an integral splash-type lubrication system. The gearbox is also equipped with a vented **oil filler cap**, an **oil level sight glass**, and a **drain plug / chip detector** ("FUZZ" burning) for ease of maintenance and inspection.

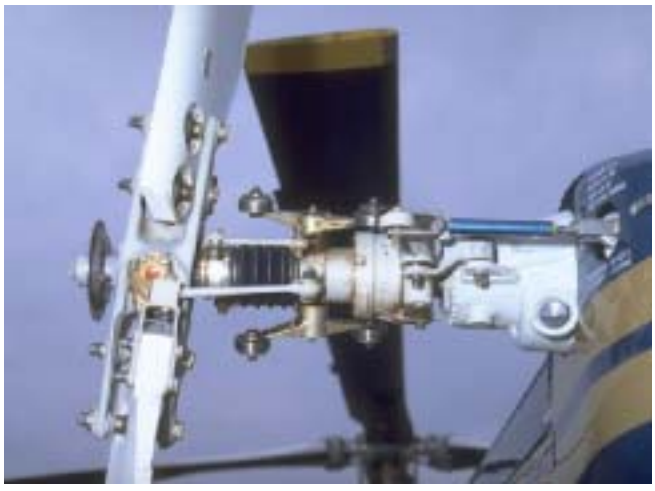
TAIL ROTOR

The tail rotor counteracts the torque of the main rotor, and functions to maintain or change the helicopters' heading by means of the control linkage from the pilot's directional control pedals. The tail rotor consists of a pair of **interchangeable** stainless steel blades, a tail rotor hub, and a pitch change mechanism. The simple two bladed semi-rigid rotor features integral balancing provisions to allow easy tracking/balancing for minimized vibration at operating RPM.

TAIL ROTOR HUB

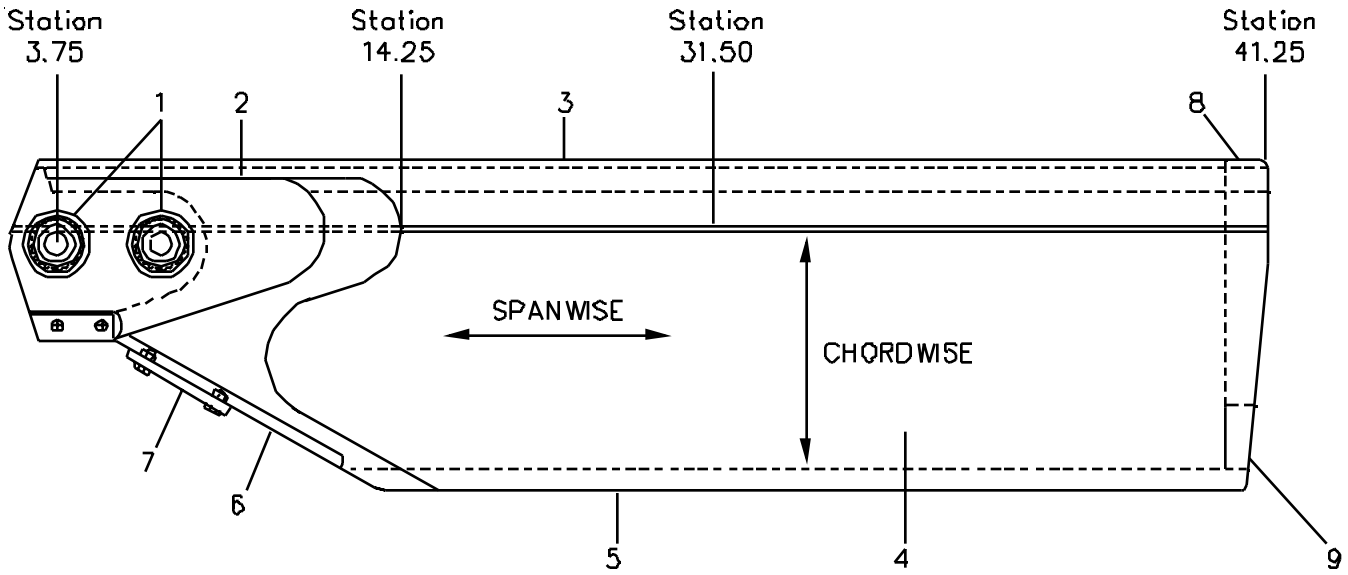
The tail rotor hub consists of a yoke, a splined trunnion, a flapping stop, a balance wheel, and **two** pitch links. Upper and lower extensions on either side of the yoke serve as **blade grips**. The hub attaches to the tail rotor output shaft by means of the **trunnion** which is roller bearing mounted about the flapping axis. The tail rotor has **collective** pitch control only. Control inputs enter the rotating system by an annular contact bearing set on the gearbox output shaft. **Active counterweights** minimize control forces transmitted to the fixed system.





TAIL ROTOR BLADE

The tail rotor blades are **bonded** assemblies consisting of shaped **stainless steel spars**, with an **aluminum honeycomb core**, covered by **stainless steel skin**. Two spherical **non-lubricated** bearings at the base of each blade are used for blade retention and pitch change. The high efficiency airfoil permits a low operating speed (**1881 RPM**) which keeps noise to a minimum and reduces the erosion effect of operations in a sandy environment.



1. Blade retention bearing
2. Doubler
3. Spar
4. Skin
5. Trailing edge
6. Root closure
7. Balance weight
8. Tip block
9. Tip closure

222-016-001H

AIRFRAME

Six major component subassemblies comprise the 430 airframe:

Forward fuselage

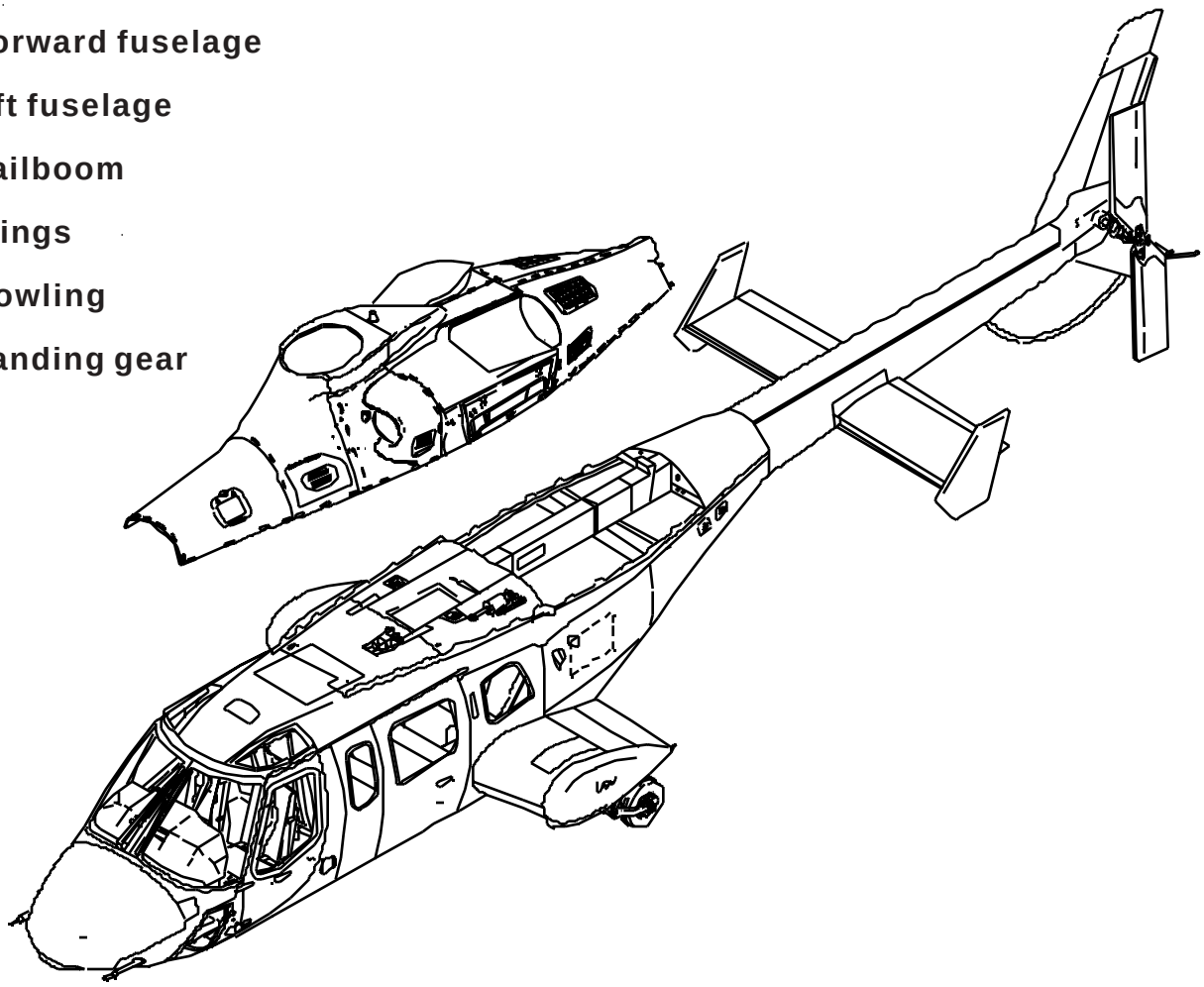
Aft fuselage

Tailboom

Wings

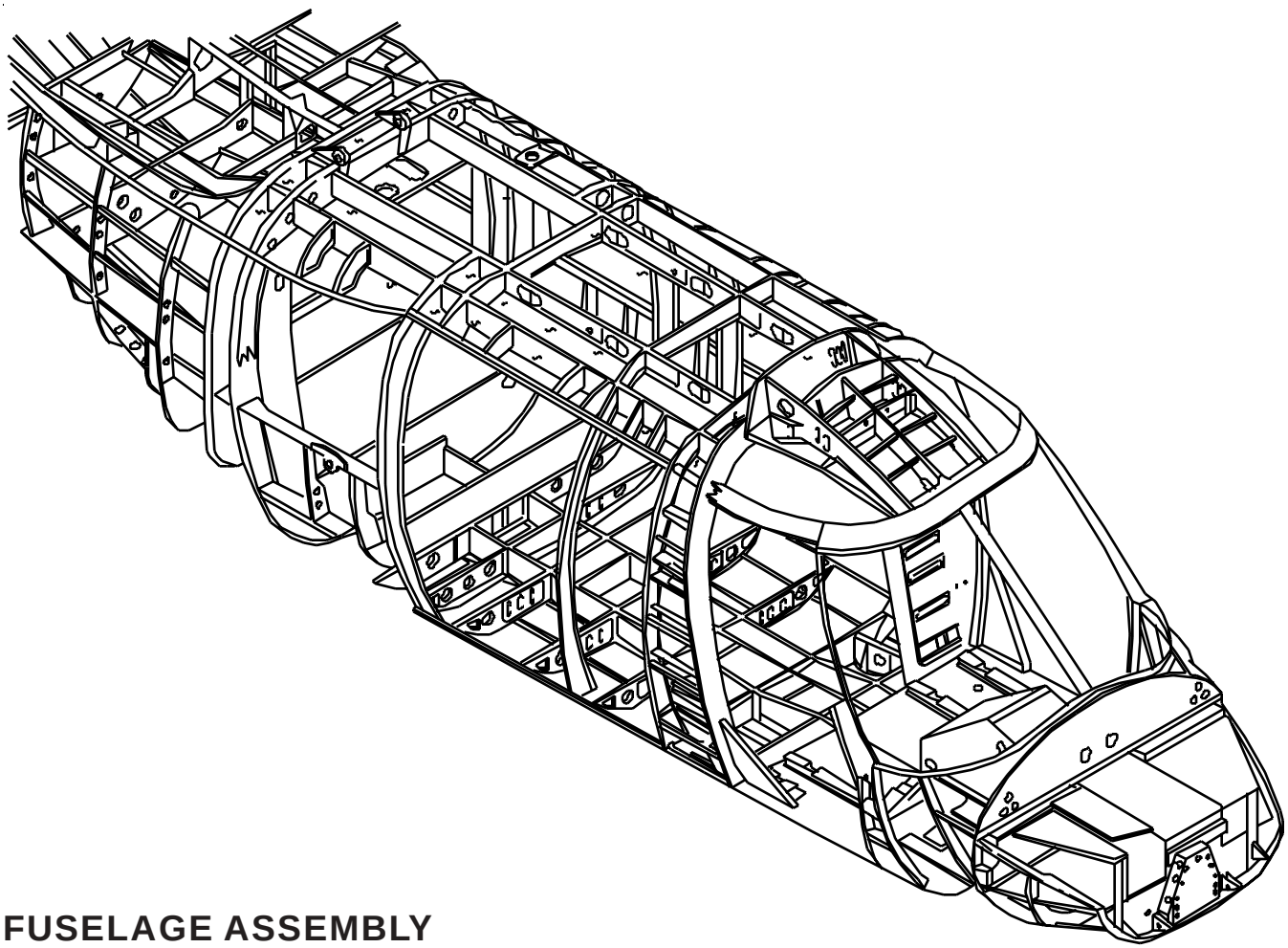
Cowling

Landing gear



CONSTRUCTION FEATURES

The airframe is a conventional **semi-monocoque** structure of bulkheads, support beams, stringers, and cast and machined fittings, which are held together by intercostals and covered with an external skin. The primary construction material is **corrosion resistant aluminum alloy**. It features extensive use of high temperature **bonded** honeycomb panels with long life, high strength, and light weight. Non-structural fiberglass molded panels are also used. These reduce maintenance requirements and enhance the overall appearance of the helicopter by presenting smooth contours. Protection against corrosive elements and galvanic action is provided by a coating of **epoxy polyamide primer**. All panel edges and fiberglass surfaces are **sealed** and spot welding is NOT used. The exterior surface of the helicopter is further protected by very durable **polyurethane paint**.

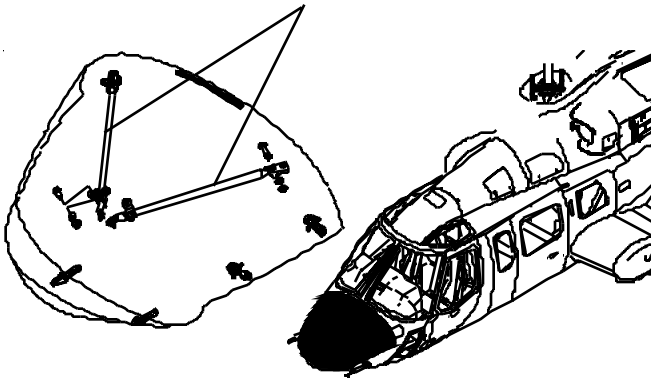


FUSELAGE ASSEMBLY

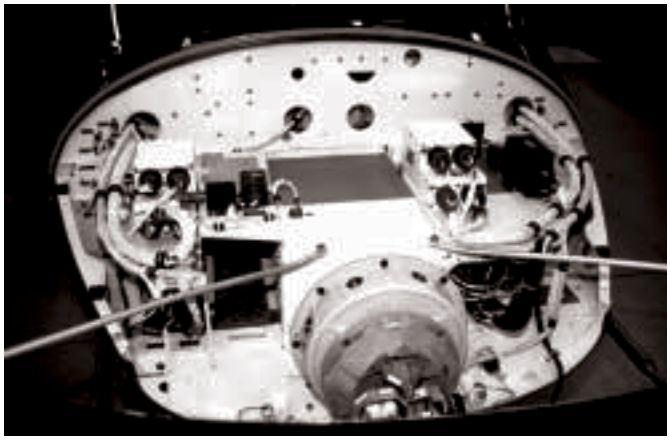
The fuselage assembly consists of three major components; the **forward fuselage,** the **aft fuselage,** and the **tail boom. The three sections** of the fuselage assembly are **fixture (JIG) mated** into one integral unit. A tunnel extends along the centerline of the fuselage to house and protect the electrical wiring that goes aft, and the flight control mechanical linkage and hydraulic lines which operates the tail rotor. This permits ready access without disturbing any of the interior.

FORWARD FUSELAGE

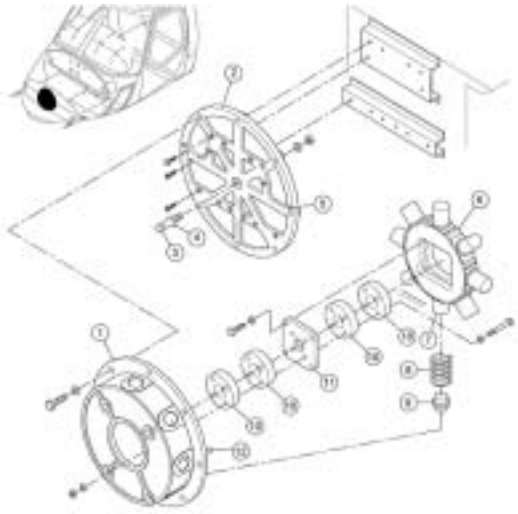
NOSE DOOR
W/ SUPPORT STRUTS



NOSE FRAHM SERVES AS MOUNT FOR
OPTIONAL RADAR ANTENNA



NOSE COMPARTMENT



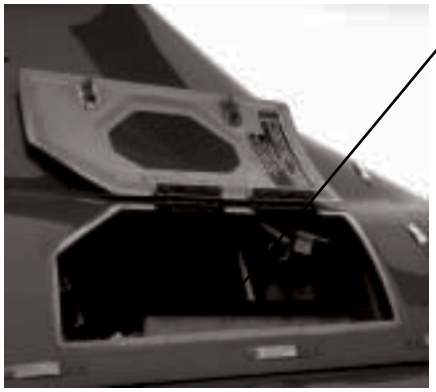
The **forward fuselage** includes the nose (avionics / radar compartment), the crew and cabin area, windshields, windows, and the crew and passenger doors. The forward fuselage structure supports the **instrument panel** and **radio pedestal.** The **overhead console** fits up in the roof between the two main longitudinal **"I"** beams. Tracks are provided for the pilot and forward passenger seats in the **crew compartment. The passenger cabin** begins immediately to the rear, separated from the crew area only by the **vertical control tunnel**. Large areas are provided for the **windshields**, **chin windows**, **sky lights**, and **doors**. A **main** and an **interface bulkhead** ,where the aft structures attach, give the cabin **rollover protection**. The forward cross tube of the **skid landing gear** mounts to the bottom of the main bulkhead. The bulkheads are of the box type which permits their use for duct and wiring installation without encroaching on passenger space. The **nose** forms the **avionics/radar compartment**. The nose section **door** opens forward and down for inspection and may be removed for maintenance. A **Frahm Damper** is mounted at the front of the avionics shelf, and absorbs any residual **4-per-rev** vibrations from the main rotor. The Frahm also acts as a mount for optional radar antennas. The nose is made of radar transparent **fiberglass**, and is sized and shaped to receive a standard **25.4 centimeter (10 inch)** antenna at its front. There is ample room for additional **optional avionics** in the compartments **two shelves.**

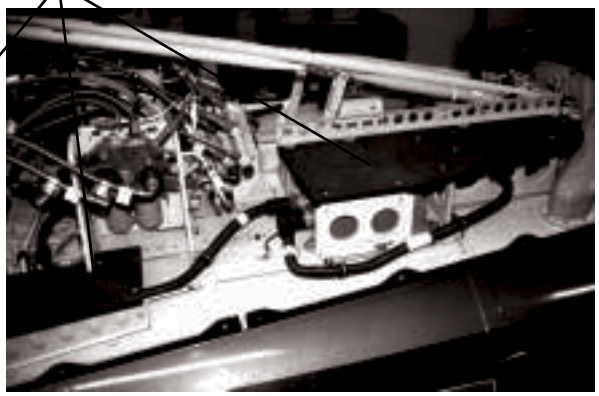
AFT FUSELAGE

The **aft fuselage** is spliced to the forward fuselage at the **interface bulkhead**. It includes the rear passenger seat /main fuel cell enclosure, the baggage compartment, aft electric, and lower equipment compartment, and **mounts** for the transmission, engines, and their cowlings, along with **mounts** for the wings and the aft cross tube of the **skid landing gear**. The **fuel cells** are enclosed by fiberglass faced **honeycomb panels** and are surrounded and protected by a high strength box type **rollover bulkhead**. The **aft rollover bulkhead** incorporates mounts for the aft pylon supports, the forward engine firewall and deck, along with the aft wing attach hard points, and the aft cross tube attach fittings.

SIDE STEP

WORK PLATFORMS



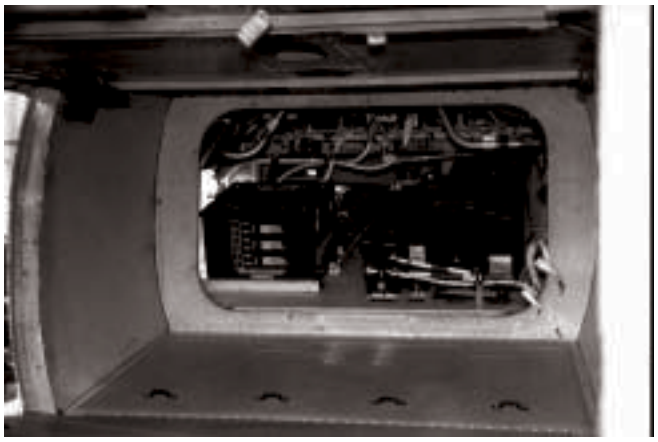


The roof of the cabin includes a space between the main longitudinal beams to attach the transmission pylon mounts. The bottom of the transmission may be accessed through a removable closeout panel in the headliner. **Maintenance platforms** are located on the cabin roof just above each passenger door, and may be reached by way of the wing surface and **convenient fold out steps** located between the cabin windows. A **kick in step** is found aft of each rear cabin window for easy access to the engine compartments. The large **baggage area** has an **external door** on the right side of the helicopter just behind the wing. It has a **handle** and **keyed lock** which are identical to those on the cabin doors. There is a hinged / removable **partition** at the front of the baggage compartment which may be lifted up and locked in position, or removed when large cargo is transported.

EQUIPMENT BAYS

Space is provided **under** the baggage compartment floor for installation of the **optional** environmental control system, or the **customized** bleed air heater. The fuselages' bulkheads and doors have space provision for the required cooled or heated air ducting. There is an additional space located behind the aft baggage compartment wall, which may be used for optional avionics components.

AFT ELECTRIC COMPARTMENT



LOWER EQUIPMENT COMPARTMENT
W/ **OPTIONAL** ENVIRONMENTAL CONT. UNIT

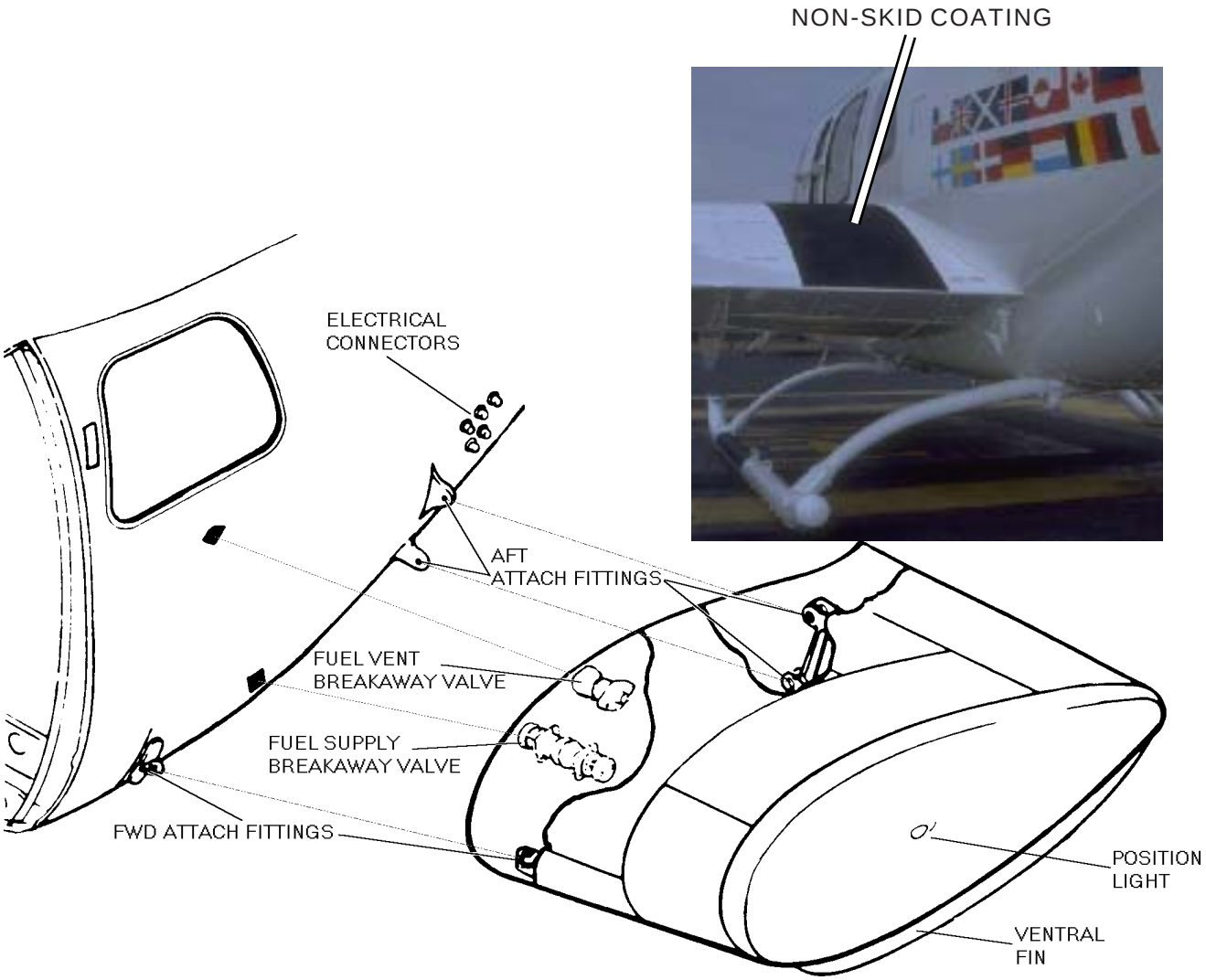
FLOOR FRAHM DAMPERS

Two vibration absorbers (FRAHM DAMPERS) are located in the fuselage. They are positioned on the cockpit floor, one outboard of each crew seat. The sealed units consists of an oscillating weight **dampened** by springs, and limited in travel by snubbing bumpers. In operation, the weight oscillate against the natural frequency of the impulses transmitted to the airframe from the main rotor, cancelling out the vibration.

FLOOR MOUNTED FRAHM DAMPERS

WINGS

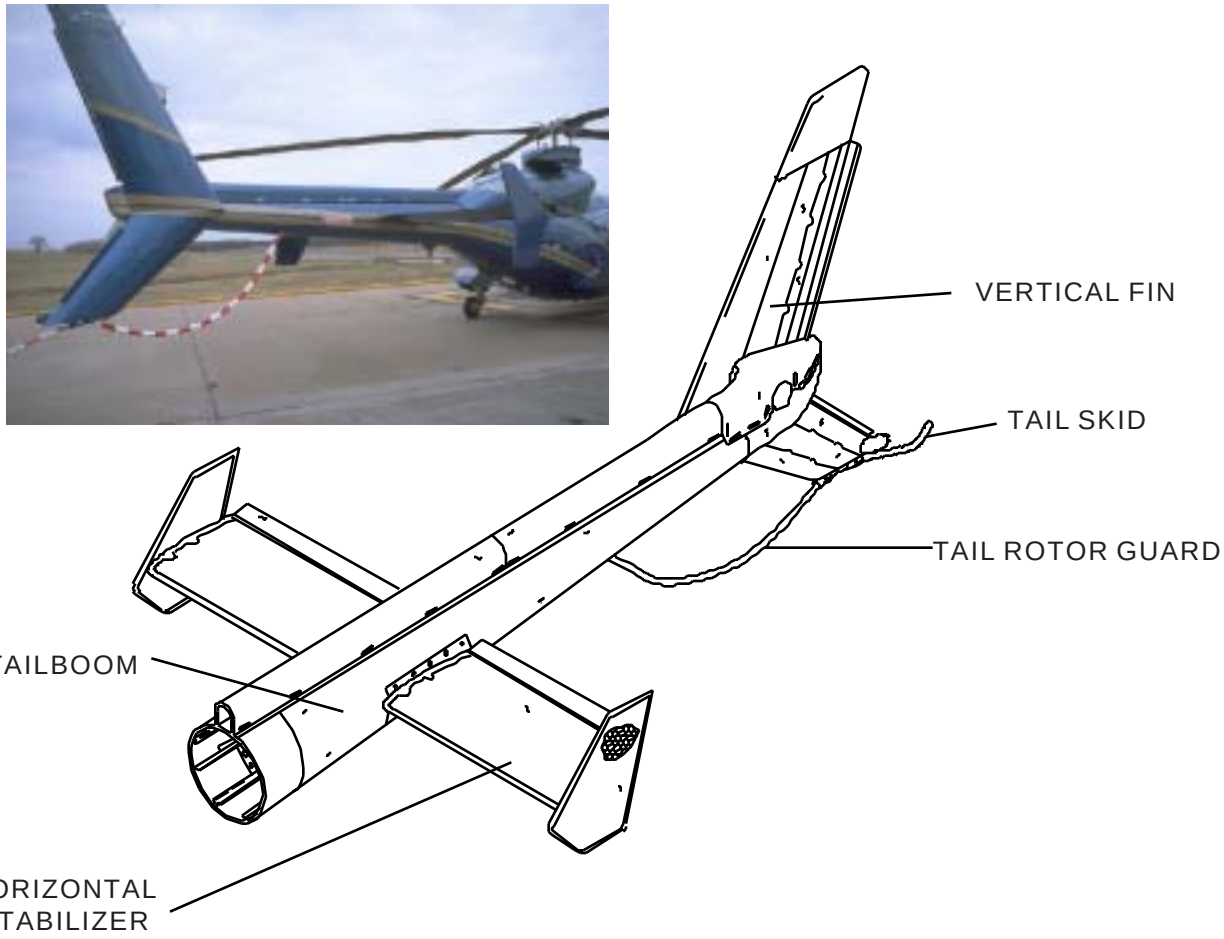
The two **wings** are bolted to the aft fuselage using three hard point fittings on each side of the helicopter. The wings are aluminum alloy skins over a spar and rib framework. A small **fin** is attached to the underside of the outboard end of the main wing structures. An aerodynamic shaped, **plastic cap** encloses the end of each wing, with a **position** (RED / GREEN) light centrally located on the outboard surface. Both wings include **structural provisions** for mounting the **optional** emergency flotation systems float assemblies, which fit beneath the wing caps when installed. Each wing contains a **rupture resistant** fuel cell, which is connected to the internal fuel cell feed and vent lines through **self-sealing** break-away fittings.



A portion of the **upper surface** of each wing serves as a step surface from which the maintenance platforms on the roof of the helicopter may be reached. Unless ordered deleted by the customer, a **30 centimeter (12 inch)** wide band of BLACK **non-slip** protective coating is applied to the step area as a safety measure. The wings may be removed to allow fitting the fuselage into a shipping container for air or sea transport.

TAILBOOM ASSEMBLY

The **tailboom assembly** includes the horizontal stabilizer assembly, driveshaft and gearbox covers, vertical fin, and tail rotor guard and tail skid. The assembly is riveted to the aft end of the aft fuselage, making it an **integral** part of the airframe. The semi monocoque structure is made of longerons and circular bulkheads covered by aluminum alloy skin. The tail rotor drive shafting is routed along the top surface of the tail boom to the tail rotor gearbox. The anti-torque flight controls are enclosed inside the tail boom. **Access doors** allow easy inspection.



The **vertical fin** sweeps back, both above and below the end of the tail boom. It is **canted** to the right to reduce the tail rotor thrust required for forward flight. A dual surface **trailing edge flap** (Gurney flap) is attached to the fin to prevent washout of the vertical surface when bank angle exceeds 30°, and to increase efficiency in normal flight without increasing the fins' area or weight. A steel tubular **tail skid** attaches to the bottom of the fin and acts as an energy attenuating bumper to protect the tail rotor in the event of a tail low landing. A t**ail rotor guard** connects the bottom of the fin to the tail boom and creates a **protective arc** just outside the rotation path of the tail rotor. It is also painted in a **contrasting striped pattern** to make it more visible to passengers/ bystanders.

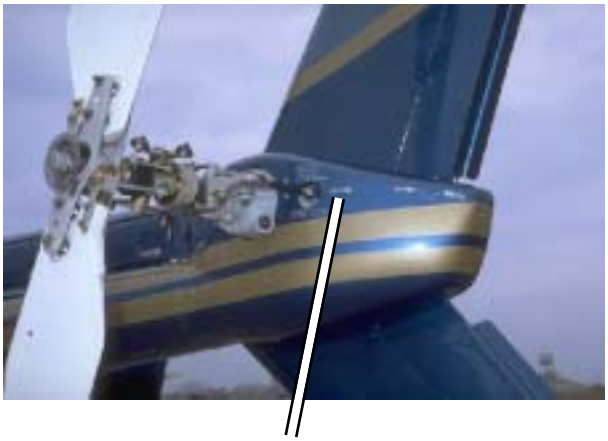
HORIZONTAL STABILIZER

The **horizontal stabilizer assembly** is mounted through the tail boom to increase the center of gravity range of the helicopter. It consists of a **fixed stabilizer** with an inverted airfoil and **vertical end plates**. A fixed **leading edge slat** and trailing edge trimtab along the complete length of the stabilizer increases its' effectiveness. The horizontal stabilizer is a one piece airfoil surface mounted 9 degrees nose down through the tail boom. The stabilizer provides pitch stability for the helicopter. Leading edge slats are incorporated for improved pitch stability. Auxiliary vertical fins are attached to the outboard tips of the stabilizer which provide improved directional stability for small yaw angles and improved dihedral stability.

FIXED SLAT END PLATE

TAIL ROTOR GUARD

TWO PIECE COVER



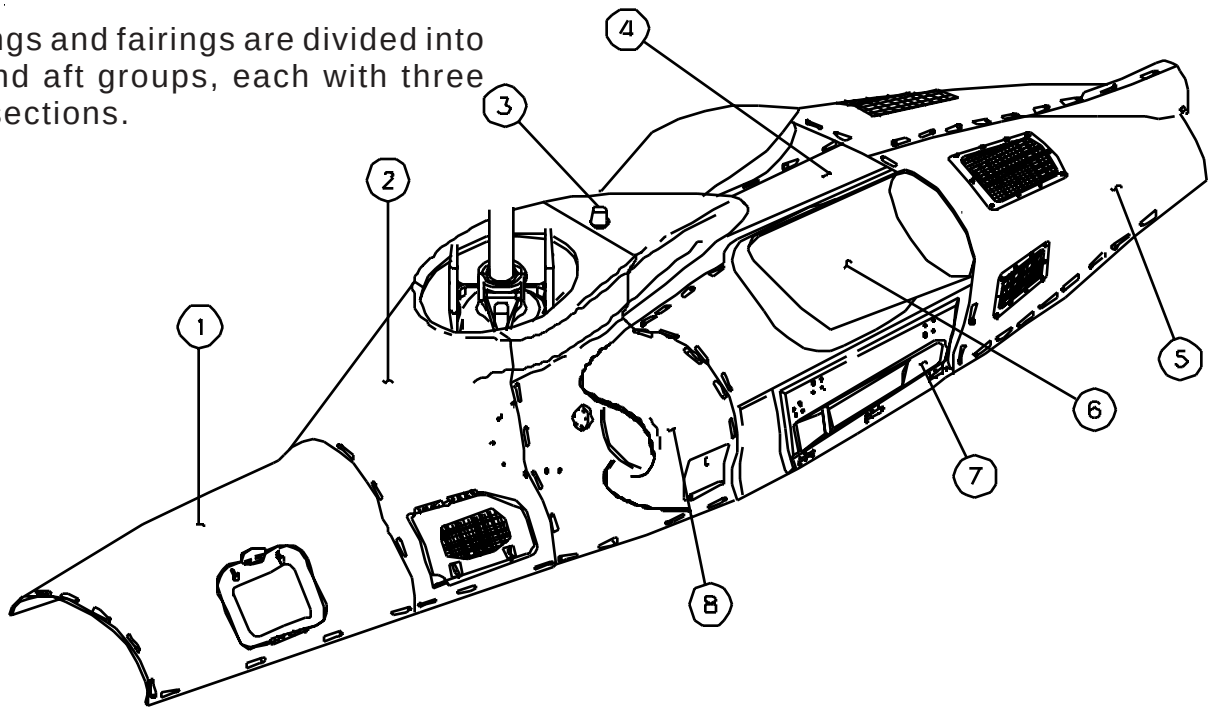
GEARBOX COVER

DRIVESHAFT & GEARBOX COVER

A two section **cover** extends along the top surface of the tail boom to **protect** the driveshafts. It is attached to fittings with quick release DZUS screws, for easy inspection. A two piece **gearbox cover** encloses the aft end of the tail boom. An **anticollision light** mounts beneath the forward end of the tail boom, and the rear (white) **position light** is located at the bottom of the vertical fin. The fin and horizontal stabilizer are **removable** for shipping of the helicopter.

TRANSMISSION & ENGINE COWLINGS

The cowlings and fairings are divided into forward and aft groups, each with three separate sections.



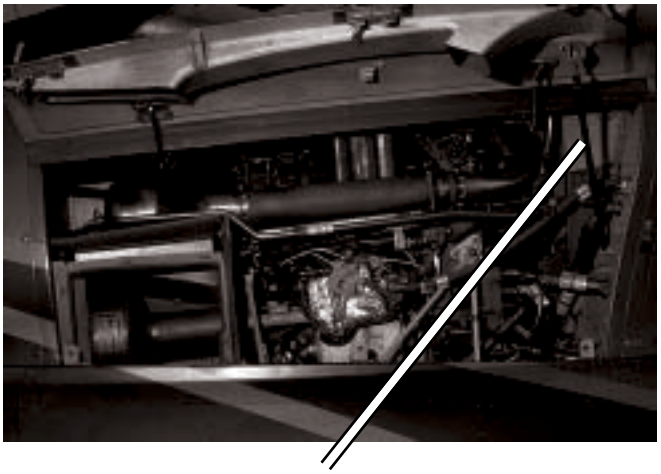
1. Forward fairing (ref)
2. Transmission cowling (ref)
3. Anticollision light mount assembly (ref)
4. Beam assembly (ref)
5. Aft cowling assembly (ref)
6. Upper engine cowling ejector assembly (ref)
7. Lower engine cowling assembly (ref)
8. Air inlet cowling (ref)

FORWARD COWL GROUP

The forward cowl group consists of the **forward fairing,** the **transmission cowling**, and **two air induction cowlings** (left and right). The forward fairing is a single piece assembly, with access / inspection doors on each side, which is fabricated of light weight aluminum alloy. The transmission cowling is a single piece aluminum / honeycomb alloy unit, which is attached to the fuselage by quick-release DZUS fastener screws. Access doors located on each side, just above the cabin doors, allow inspection of the hydraulic system modules and access to the maintenance platforms on the roof. The air induction cowlings are made of light weight composite honeycomb covered by fiberglass. They are attached to the airframe by DZUS fasteners for rapid removal. Clear inspection ports near the air inlets allow for a visual check of hydraulic fluid level without de-cowling.

AFT COWL GROUP

The **aft cowl group** includes the upper engine cowlings, the lower engine cowlings, and the aft fairing. The **left and right upper engine cowlings** are formed from **titanium**, and attach to the engine firewalls with DZUS type fasteners, to form part of the engines **exhaust ejector system**. The **left and right lower engine cowlings** are light weight fireproof graphite composite assemblies, hinged at the top, and secured at the bottom with **positive locking** latches. When **opened**, the lower cowlings are supported at a 100° position by tubular **gust-lock** struts. The two section **aft fairing** covers the oil cooler heat exchangers, and is constructed from special high temperature resin fiberglass and reinforced honeycomb.



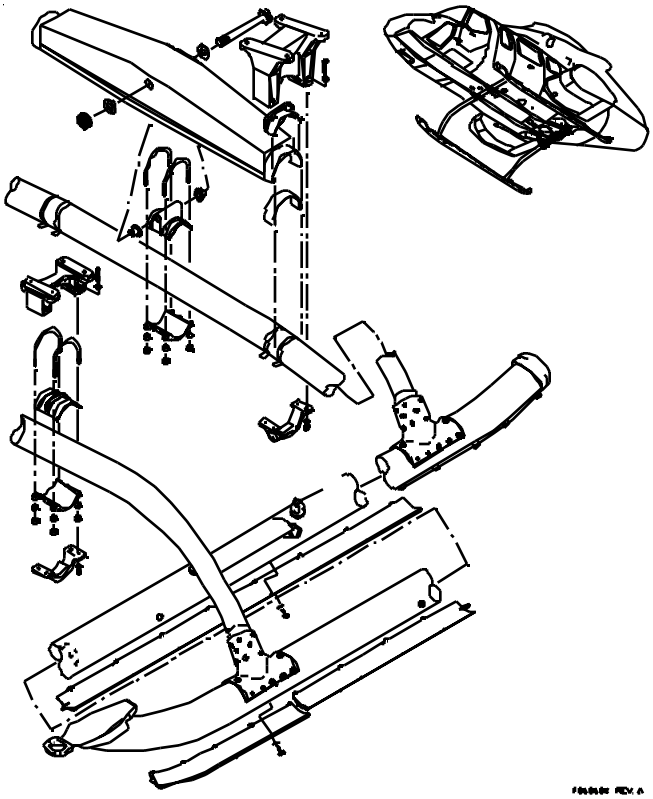
LANDING GEAR

STANDARD SKID LANDING GEAR

The 430 standard skid landing gear is **simple**, **light weight**, and practically **maintenance free**. It is designed to **absorb energy** and to preclude damage to the airframe in the event of a hard landing. The gear is designed for **energy attenuation** of descent speeds up to **2.0 meters per second** (6.55 feet per second) by **elastic deflection** of the forward and aft cross tubes. **Yielding** of the crosstubes, beyond normal operating limits, in combination with elastic deflection, further attenuates energy up to **2.44 meters per second** (8.02 feet per second).

1. Skid tube
2. End cap
3. Aft crosstube support beam
4. Support
5. Aft crosstube
6. Aft saddle
7. Eyebolt fitting
8. Skid shoe (aft)
9. Skid shoe (center)
10. Skid shoe (fwd)
11. Fwd saddle
12. Tow fitting
13. Crew step

The landing gear consists of **two** cross tubes securely attached to the underside of the fuselage, and **two** skid tubes attached to the ends of the cross tubes with saddle assemblies. The cross tubes are retained on the fuselage by four straps, which bolt to **fittings** located on the **two main bulkheads**. A **step** is provided at the forward end of each skid, along with a **tow ring** for ground handling. Two **eyebolts** are provided on each skid, near the helicopters center of gravity, for attachment of the dual **ground handling wheels**. Each skid is fitted with a three section **replaceable wear shoe assembly**, which protects the skid tube from abrasion. The entire skid landing gear assembly may be removed for shipping.



AFT CROSSTUBE SUPPORT BEAM

The **aft crosstube** has a **support beam** located between the two aft retention straps and the fuselage structure. The support beam is **attached** to [and is **free to rock** from side to side on] a single fitting at the mid point of the aft crosstube. The function of the support beam is to reduce the possibility of ground resonance.

OPTIONAL HIGH SKID LANDING GEAR

The 430 may be equipped with optional HIGH SKID LANDING GEAR. Increased ground clearance is provided for operations in areas of rough terrain.

OPTIONAL WHEEL LANDING GEAR

The 430 in its basic **skid landing gear** configuration, includes all the **structural**, **hydraulic,** and **electrical** provisions for installation of the **optional** tricycle wheel **retractable** landing gear. Regardless of the delivery configuration of a Bell 430, the provisions included in the basic airframe and systems, permit modification of the helicopter to it's **alternate landing gear** configuration.

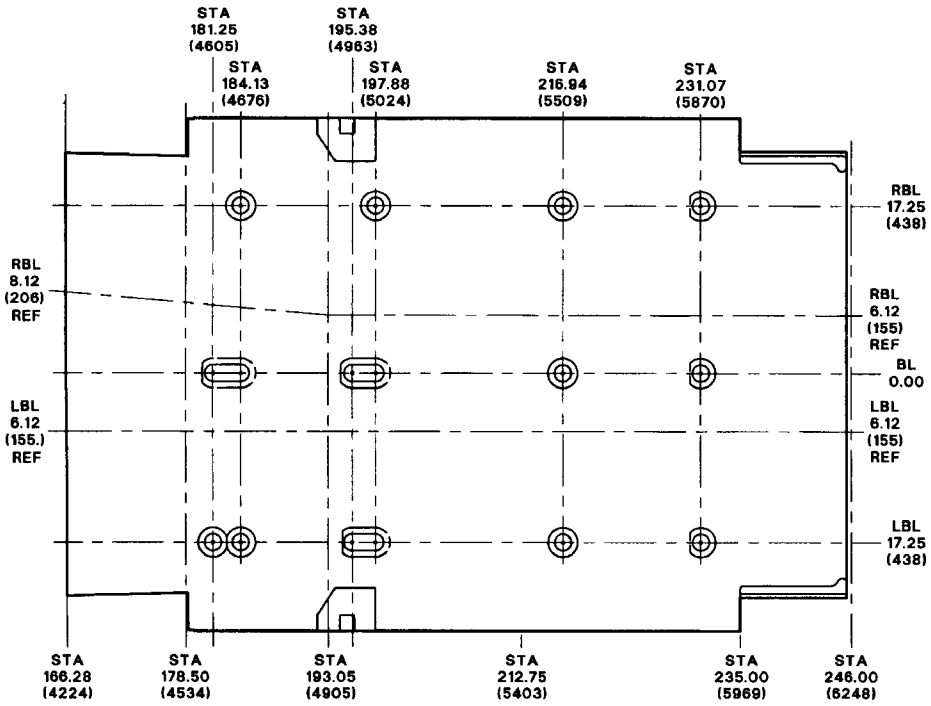
AIRFRAME FEATURES
STEPS AND GRIPS

Access to the top of the helicopter is quick and easy with the steps and grips provided on both sides of the fuselage. All the steps are coated with a non-slip material for secure footing.

WORK PLATFORMS

The work platforms located on the cabin roof, and the wing surfaces allow rapid and easy completion of the pilots' preflight inspection.

INTERNAL SEAT /CARGO TIE DOWN FITTINGS

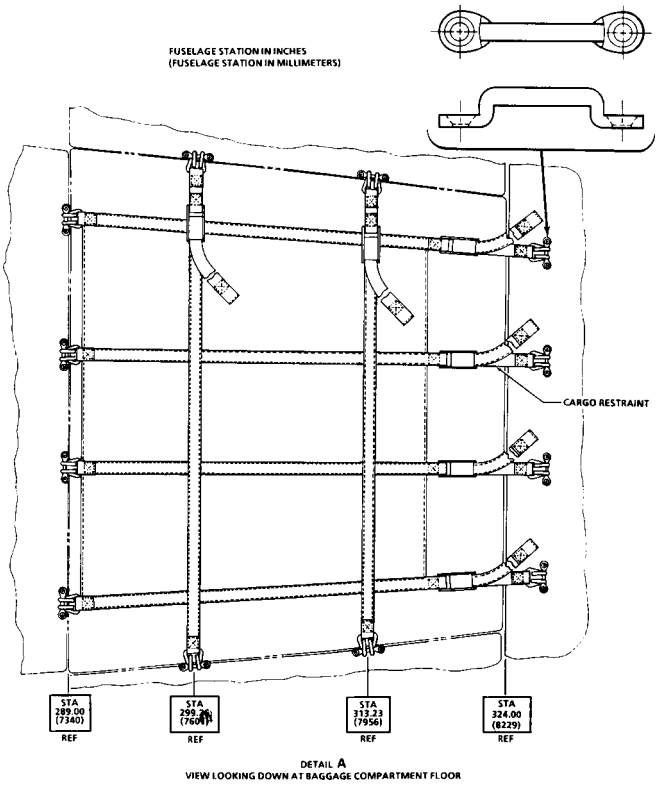


Seat attachment fittings in the floor of the cabin may be used to secure cargo when the seats are removed. There are **16 recessed studs** imbedded in the floor panels, which provide for the various seat configurations. They accept attachment of either the **seat frame collets** or optional stud adapters which may be fitted with cargo **tie down rings**. Each of the recessed studs is stressed for ultimate loading of **2155 kilograms (4750 pounds) vertical**, and **700 kilograms (1545 pounds) horizontal**. The normal **floor loading limit** is 488 kilograms / meter² (100 pounds / foot²), with a **maximum floor load** of 930 kilograms (2050 pounds). The **rear bench** maximum load is 272 kilograms (600 pounds).

BAGGAGE STORAGE

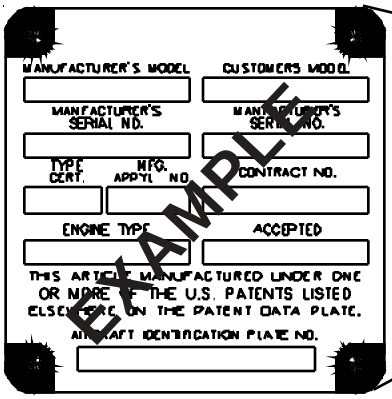
Within the baggage compartment, there are **12 Footman loops** (tie downs) located around the perimeter of the load bearing panel. They are stressed for an ultimate load limit of 499 kilograms (1100 pounds) in any direction. The baggage compartment **structural maximum load** is 227 kilograms (500 pounds), with a deck loading limit of 448.2 KG/M²(100 LBS/FT²).

OPTIONAL BAGGAGE COMPARTMENT
CARGO RESTRAINT NET



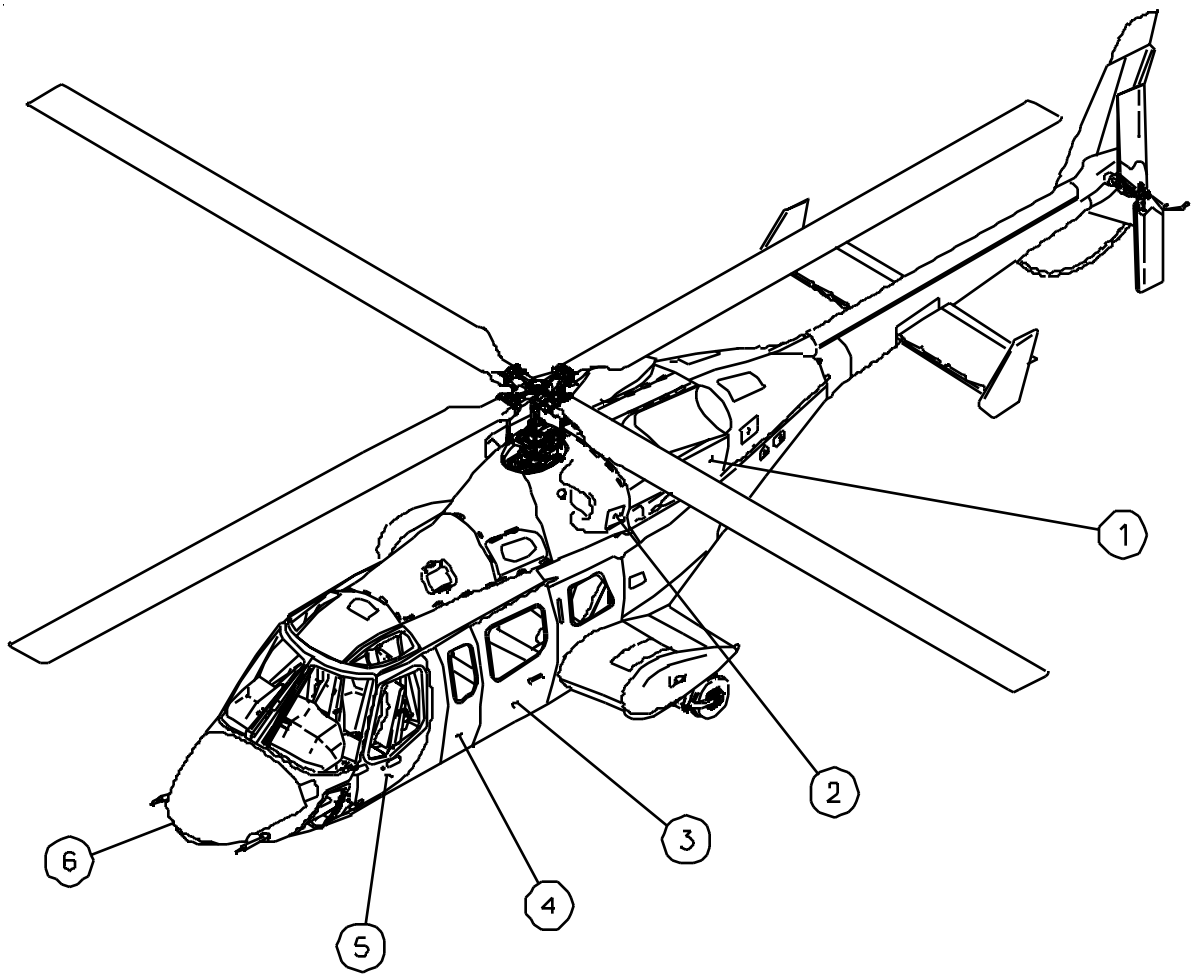
AIRCRAFT DATA PLATE

The manufacturers data plate is located on the right side of the helicopter, near the fuel filler cap.



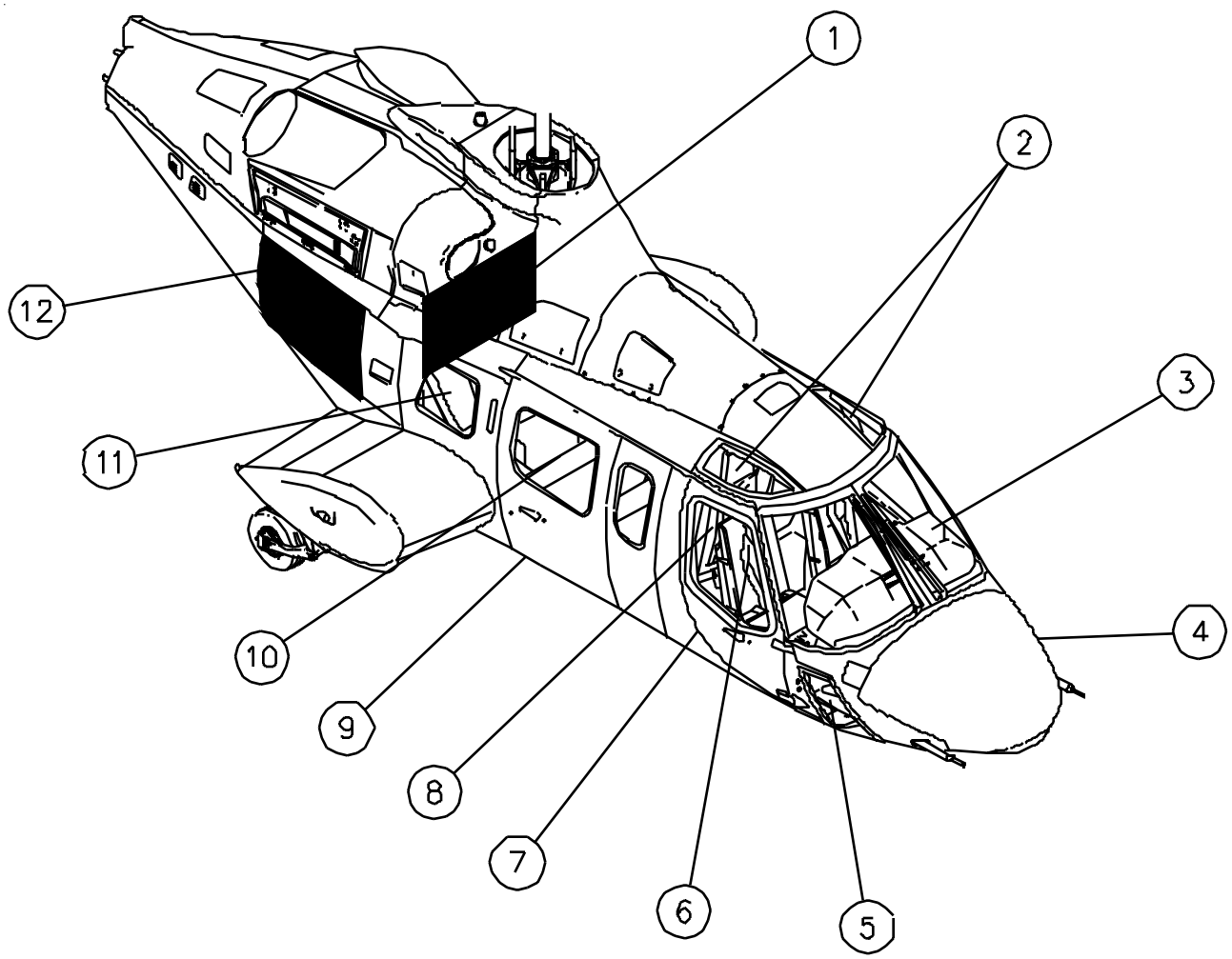
MAIN ACCESS DOORS & PANELS

Various doors and panels are located throughout the fuselage to allow access for maintenance and servicing of the helicopters systems. **Some** panels are structural (load carrying) members and are **required** for ground run and / or flight.



1. Engine side cowling
2. Oil reservoir access door
3. Passenger door
4. Litter door (OPTIONAL KIT)
5. Crew door
6. Nose radar/electrical door

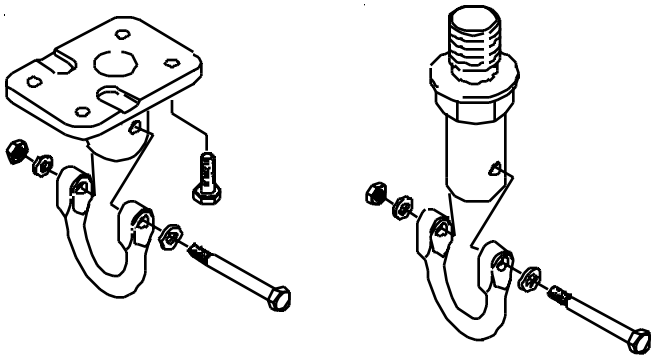
Additional equipment access locations within the interior of the helicopter and under the fuselage may be found in the **430 Maintenance Manual.**



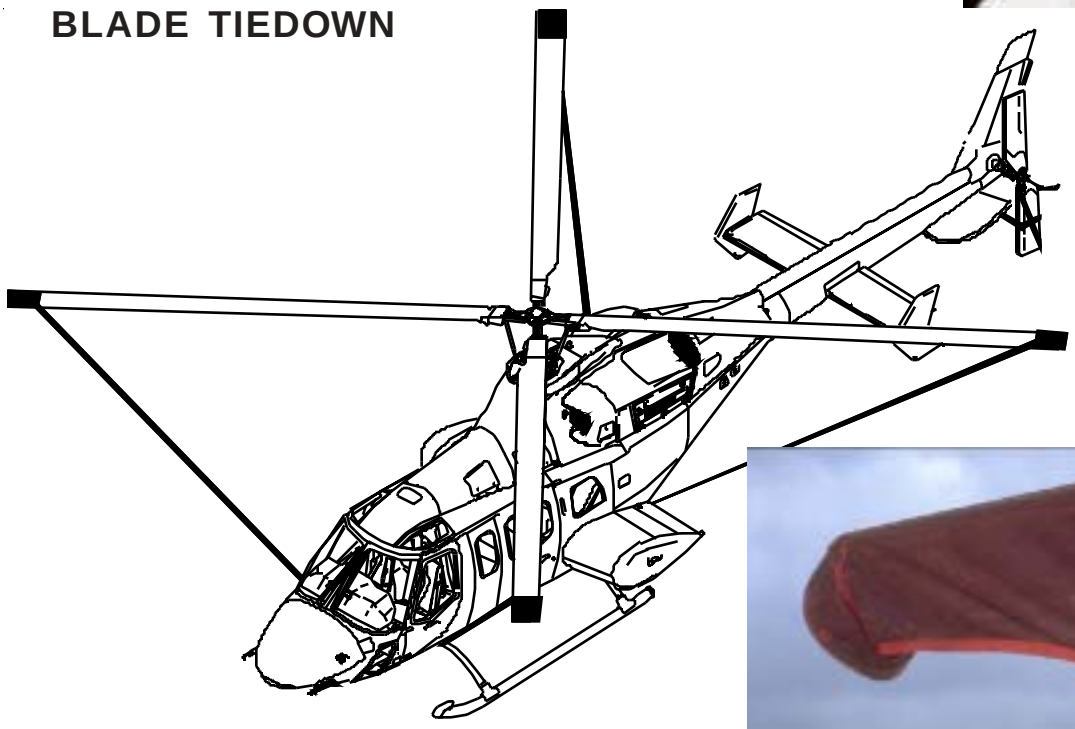
1. Interior baggage compartment door
2. Cabin roof window
3. Windshield
4. Nose radar/electrical compartment door
5. Lower window
6. Clear vision window
7. Crew door
8. Crew door window
9. Passenger door
10. Passenger door window
11. Passenger window
12. Passenger baggage compartment door

PARKING AND MOORING

Provisions are provided for main and tail rotor **blade tiedown** and **mooring** of the helicopter. Standard loose equipment includes **four main rotor** tiedown assemblies, and a **tail rotor** tiedown strap. **Three fittings** are located on the underside of the helicopter for the attachment of **a clevis** and **tiedown lines**. It is **recommended** that the helicopter be moored to prevent damage during periods of **high wind** and **turbulent weather**, or whenever the forecast wind velocity exceeds **93 km / hr (50 knots)**. If the forecast wind velocity exceeds **134 km / hr (75 knots)** the aircraft should be hangared or removed to a safe location.



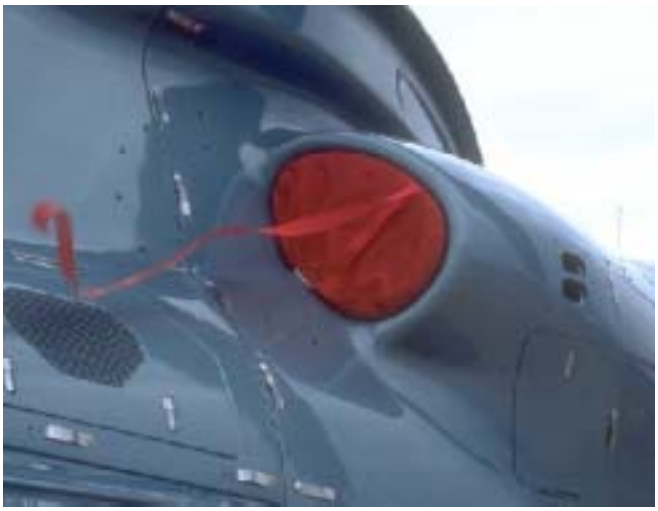
BLADE TIEDOWN



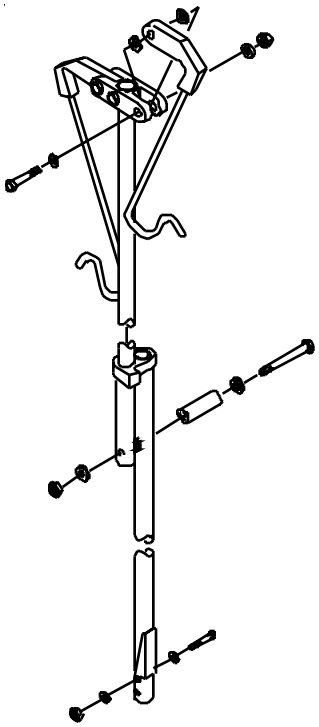
A **folding wand** is provided to assist in positioning the blade socks over the tips of the main rotor blades.

COVERS AND PLUGS

Covers for the **engine air** and **oil cooler blower** inlets, **engine exhausts**, and the **pitot tubes** are included in loose equipment. Use of covers whenever the helicopter is left unattended is recommended to prevent foreign object damage.

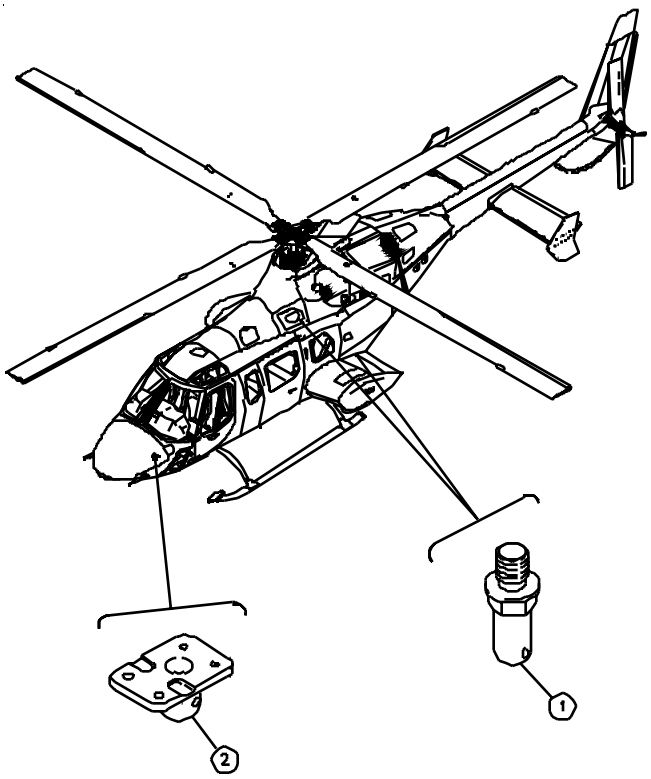


FOLDING BLADE SOCK WAND

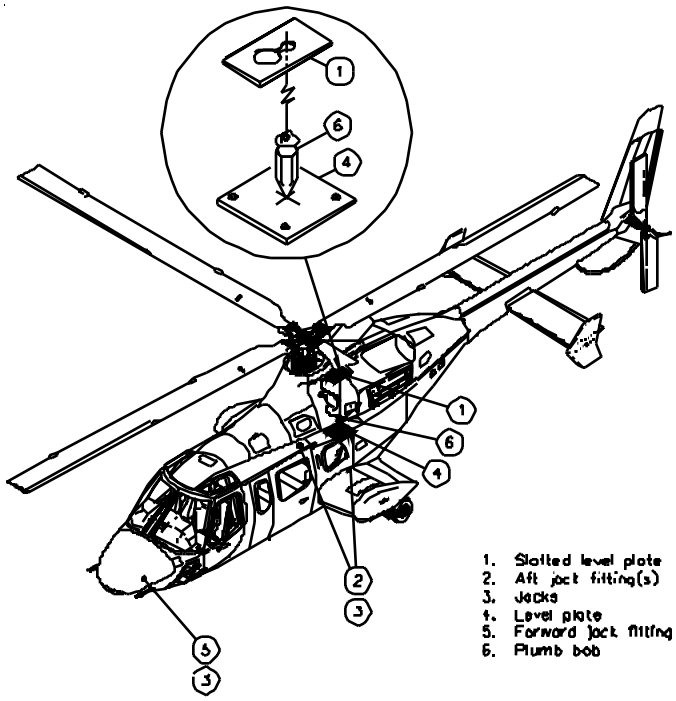


HOISTING, JACKING, AND LEVELING

The entire helicopter can be lifted by attaching a hoisting clevis to the eye of the hoisting adapter, and using a suitable hoist that is capable of lifting the entire helicopter. An additional procedure is listed in the Maintenance Manual for lifting the helicopter with the transmission removed. MAXIMUM Gross Weight for lifting the helicopter is limited to **6900 pounds.**



1. Aft jack fitting
2. Fwd jack fitting

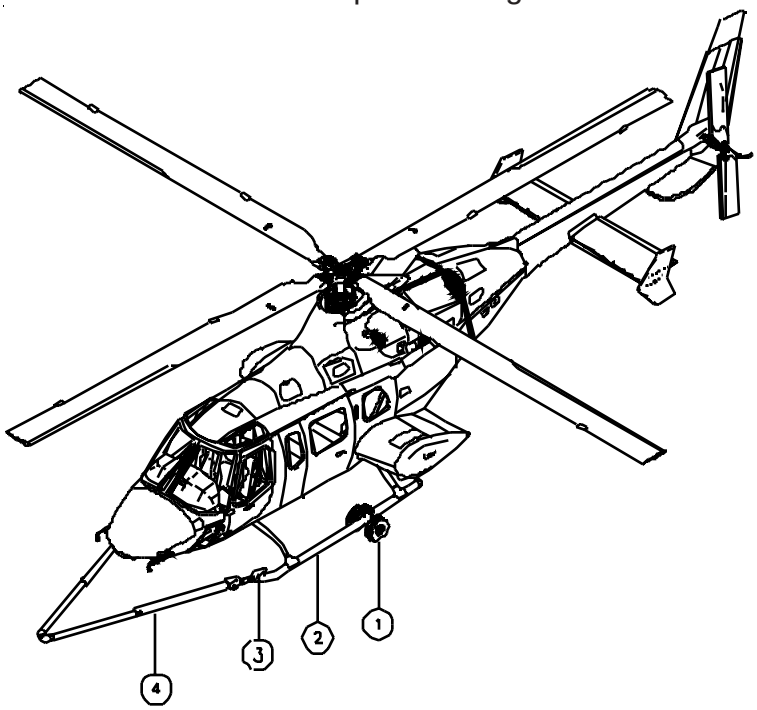


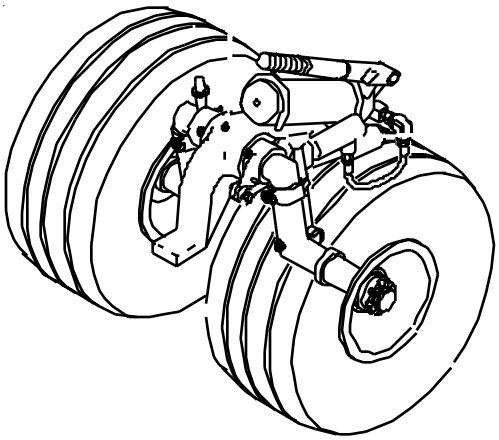
1. Slotted level plate
2. Aft jack fitting(s)
3. Jacks
4. Level plate
5. Forward jack fitting
6. Plumb bob

The helicopter is fitted with three **jack pads**, and a **leveling plate**, which are used to measure aircraft **weight and center of gravity**. The leveling plate is located just inside the baggage compartment lower door frame. A slotted hole is positioned above the plate to hold a plumb bob.

TOWING & GROUND HANDLING

Two rings are provided at the forward end of the skids for attachment of a universal **T101808-101** tow bar. The helicopter is towed on **dual pneumatic tire ground handling wheels** which can be quickly attached to the **eye bolts** located on each skid. The wheels are extended into the moving position by means of a hand operated **hydraulic pump** in the supporting cradle of each unit. The wheels weigh a total of **70 kilograms (154 pounds)** and must be removed prior to flight.





1. Ground handling wheels
2. Skid gear
3. Towing fitting
4. Tow bar

The **maximum** approved weight for towing the **standard skid gear** equipped helicopter is **3175 kilograms (7000 pounds).** Towing the helicopter over an unprepared surfaces or across hanger door tracks, etc., at gross weights in excess of the limit may cause permanent set in the aft crosstube. In an **emergency**, the helicopter may be towed up to a gross weight of **4091 kilograms (9000 pounds)** by securing the skid tubes together (near the aft crosstube) to prevent spreading of the landing gear.

CERTIFICATED FAR PART 36 STAGE 2
EXTERNAL NOISE LEVELS

The Bell 430 is certificated as a Stage 2 helicopter as prescribed in FAR Part 36, Subpart H, for gross weights up to and including the maximum takeoff and landing weight of **4091 kilograms (9000 pounds)**. There are **NO** operating limitations in meeting the **takeoff**, **flyover**, or **approach** noise limit requirements.

(STANDARD SKID GEAR CONFIGURATION)

FLIGHT CONDITION	EPNL (EPN DB)
TAKEOFF	92.4
FLYOVER	91.6
APPROACH	93.8

SECTION TWO

OPTIONAL EQUIPMENT

FACTORY INSTALLED

BHTC & VENDOR STC KITS

OPTIONAL EQUIPMENT CONTENTS

INTRODUCTION

OPTIONAL EQUIPMENT

Bell maintains a wide variety of optional kits for the 430. **Most** of these kits are suitable for installation either at the factory or at the customer's facility. A **few** require installation during initial production. The weights shown for each kit are **approximate** additions to the standard configuration weight after installation has been completed. Depending on final helicopter configuration and ballast required, the **actual weight** increase may be more or less. In addition to the Bell kits listed in this section as factory or customer installed optional equipment, several FAA approved optional kits have been built by other companies. Normally, customers desiring installation of these kits deal directly with the kit supplier or independent installation facility; however, Bell may be able to arrange for their purchase and installation. See the table at the end ot his chapter for listing of **customizing vendors.**

EXAMPLES OF SOME OPTIONAL AVIONICS SHOW BELOW

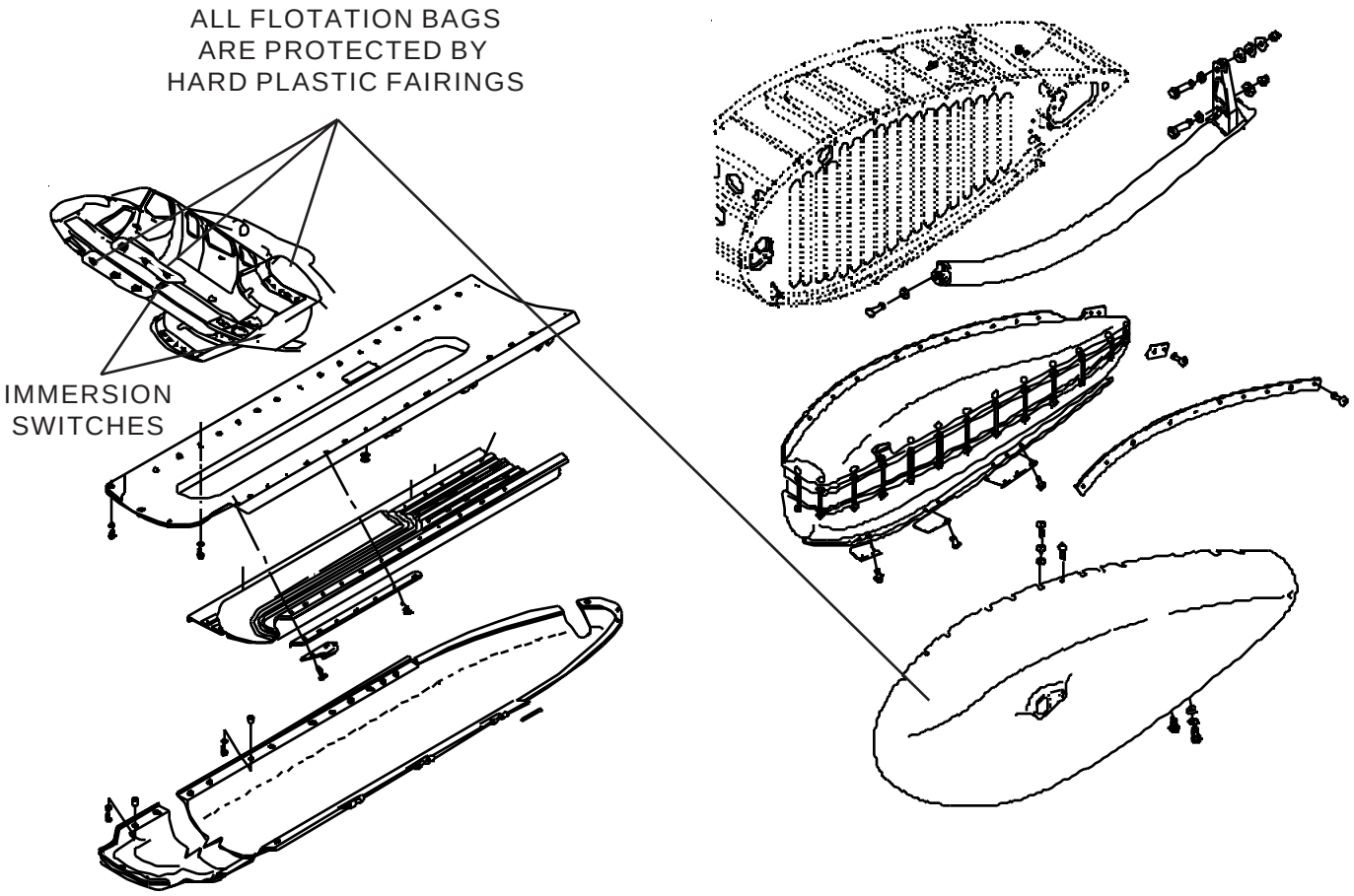
EMERGENCY FLOTATION
[SKIDS / WHEELS]
NO. 222-706-093-XXX/XXY

FWD. FLOAT COVER

FLOAT BOTTLE BAG. CMPT.[STANDARD]

The Emergency Flotation Kit is recommended when operations are to be conducted **over water**. The float kit is designed to provide flotation and stability of the helicopter on the waters surface in the event of emergency ditching. **Two** kits are available, one for the SKID landing gear configuration, and one for the WHEEL landing gear configuration. Each kit consists of **four** multi-compartment float assemblies, an inflation system, an **electrical** actuation system, a **mechanical** (back-up) actuation system, **tailboom sealing** modifications to make it watertight, **provisions** for underseat stowage of life jackets and stowage of a life raft *[not included]*, and the wiring and hardware necessary to complete the kits' installation.

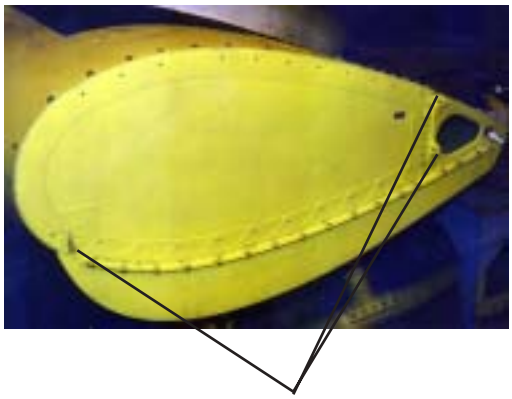
Each of the float assemblies, two on each side of the helicopter, are stowed **deflated** and **folded** in compact packages attached to the airframe. The stowed floats are **aerodynamically covered** with hard plastic fairings for protection and to minimize drag, and cause **no airspeed penalty**. **Two** floats are mounted under the forward cabin, and **two** are attached at the ends of the wings. Compressed dry nitrogen gas stored in a composite bottle can be released by a dual action valve (**electrical / mechanical**) into a manifold piping system to inflate all four floats. The **standard location for the gas bottle** is the aft end of the baggage compartment.



The **primary** (electrical) actuation system consists of **four** immersion switch assemblies mounted on the belly of the helicopter. Activation will occur when the system is **armed**, and **any two** of the switches are submerged in water, a solenoid valve releases the compressed nitrogen gas, to **"pop out"** and inflate each of the floats. Arming of the system is accomplished with a **pedestal mounted switch** EMER FLOATS, which illuminates the FLOATS ARMED **IIDS** advisory message. Arming is required whenever conducting take off or landings over water, or when operating in close proximity to the waters surface. A **back up** mechanical release **"T"** handle EMER FLOATS PULL is located on the pedestal for manual pilot activation if the electrical system should fail. This system is not dependent on electric power, and to prevent accidental activation, the EMER FLOATS PULL handle is **guarded** by a spring loaded transparent plastic cover.

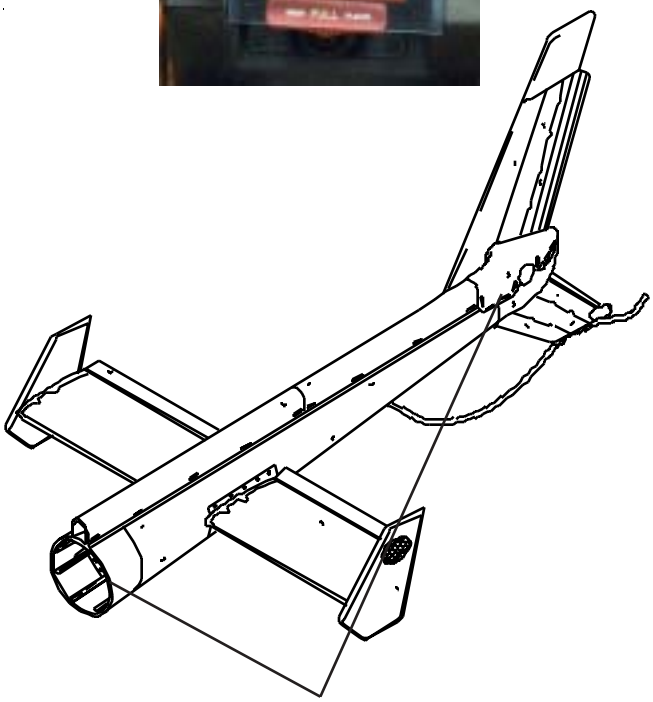
The Emergency Float Kits provide a **minimum buoyancy** (four floats plus watertight tailboom and fuel cells) of **125%** of the maximum gross weight in 6 seconds after activation. When the float system is inflated, the helicopter should generally be stable in the water up to **Sea State 6** with a 25 knot wind. Sea State 6 is defined as a condition where wind speed is between 24.5 and 28 knots with average wave heights of between 2.5 meters and 3.4 meters (8.2 feet and 11 feet). The forward floats are divided into two compartments, while the wing floats each contain five compartments. With any one float compartment deflated, the helicopter should generally be stable in the water up to **Sea State 2** with wind at 12 knots. Sea State 2 is defined as a condition where wind speed is between 10 and 13.5 knots with average wave heights between 0.2 and 1.0 meters (0.8 and 3.3 feet).

WINGTIP FLOAT(PACKED)



FLOAT ATTACHMENT FITTINGS
AT EACH WINGTIP

FLOAT ARM/EMER. INFLATE PULL



TAILBOOM IS SEALED AT EACH
END FOR ADDITIONAL BOUYANCY

Operating procedures for the Emergency Float Kit are found in the FAA Approved Flight Manual Supplement **BHT-430-FMS-13.** The increase in empty weight with the **optional** (SKID ONLY) kit [**bottle in nose**] installed is **93.8 kilograms (206.8 pounds).** The increase in empty weight with the **standard** (WHEEL or SKID) kit [**bottle in bag. cmpt.**] kit installed is **96.3 kilograms (212.4 pounds).** There is **no** separate provisions kit for emergency flotation. The **non-removable** portions of the kits weigh approximately **20 kilograms (45 pounds)**.

181.7 LITER [48 U.S.GALLON] AUXILIARY FUEL

NO. 222-706-204-XXX [PROVISIONS]

NO. 222-706-204-XXY [EQUIPMENT]

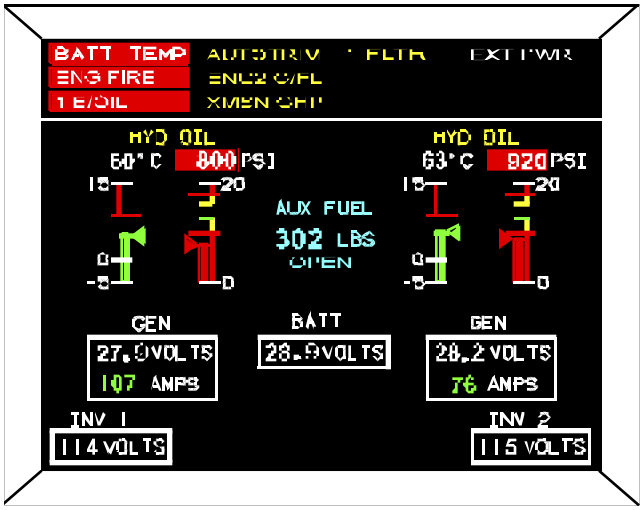
The auxiliary fuel kit provides an additional 181.7 liters (48 U.S.Gallons) of usable fuel for **either** the standard skid configuration or the optional wheel landing gear configuration, whenever extended range or increased fuel reserves are required. The complete kit consists of a fuel tank, selector switch, tubing, electrical wiring, and hardware necessary to complete the installation. The **provisions** portion of the kit comprise those items which are not readily removable once installed. The **equipment** portion of the kit consists primarily of the tank, filler connection, drain / transfer lines, and attaching hardware. The fuel tank mounts in the forward portion of the **baggage compartment. The filler cap** is located on the upper left-hand side of the fuselage. The auxiliary fuel tank incorporats an electric sump drain valve, which is connected to the left main fuel tank drain button, to permit pre-flight removal of any moisture condensation or to collect fuel samples.

AUX TANK

AUX TANK VIEWED FROM
BAGGAGE COMPARTMENT DOOR

AUX TANK FUEL FILLER PORT

An **auxiliary fuel control panel** located on the center pedestal, has a **three position switch** labeled AUTO, OFF, and ORIDE (override). In the OFF position, the interconnect valve is powered to the **closed** position. In the ORIDE position the valve is powered to the **open** position. In the AUTO position, the IIDS determines when 190 liters (50 U.S.Gallons) have been used from the main tanks, and **automatically opens** the interconnect valve to transfer the fuel. When the transfer is completed the valve **automatically closes**. When refuelling is conducted the switch must be in the off position. Auxilliary fuel system information is shown on the IIDS secondary page 2 display, and includes fuel quantity in the tank(pounds) and status of the fuel transfer valve [open, closed, or in transit]. When the IIDS secondary page 1 display is active the total fuel quantity shown will include the fuel in the auxilliary tank.



Operating procedures are contained in the FAA approved Flight Manual Supplement **BHT-430-FMS-13**. When installed, if the auxiliary tank contains fuel, the minimum crew station weight shall be **90.7 kilograms (200 pounds).** The weight increase with the **provisions only** installed is **8.1 kilograms (17.9 pounds).** The weight increase for the **complete kit** installed is **35.8 kilograms (78.9 pounds).**

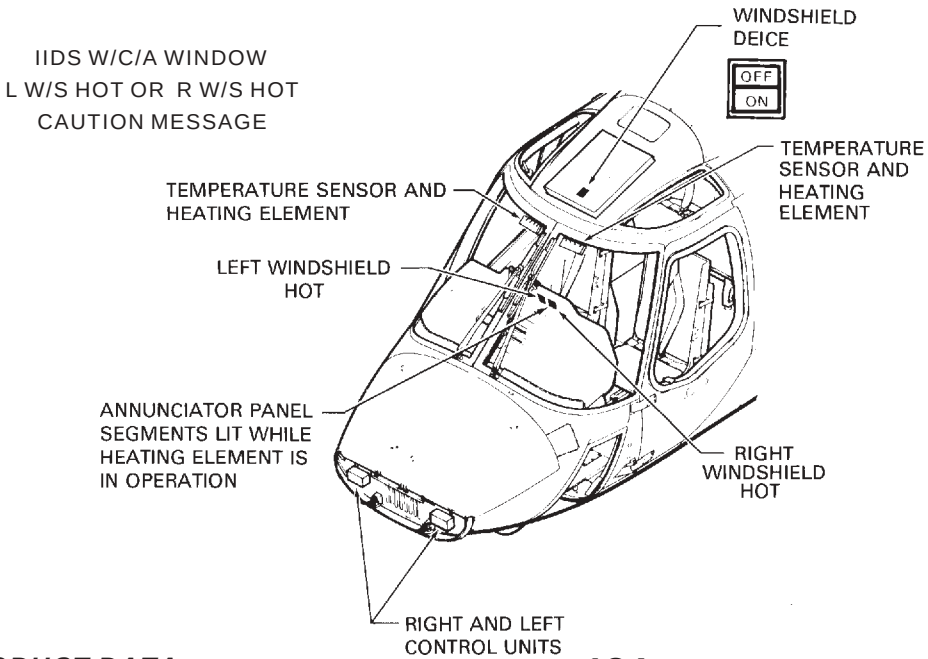
HEATED WINDSHIELDS

No. 222-706-206-XXX (HEATED)

No. 222-706-404-XXX (HEATED BIRDPROOF)

The Heated Windshield Kits allows the crew to electrically **defog** or **defrost** both windshields. The kit consists of two 28 Volt DC electrically heated windshields (which replace the standard ones), four circuit breakers, two control units (left and right), and a WSHLD DEICE ON OFF switch. When the system is operating, an overtemperature sensor protects each windshield against overheating. If either windshield becomes too hot **[above 54°C(130°F)],** the IIDS provides a **warning/caution** message, and interrupts heating power the hot windshield until the temperature falls **[below 49°C(120°F)]**. The only pilot action required is to reset the MASTER CAUTION light. Each windshield consists of an **outer** layer of tempered **glass**, a **middle** layer of **PPG®-112** plastic, and an **inner** layer of acrylic plastic (**plexiglass**) with embedded electrical heating elements. The heated portion is confined to that area at the average pilots' optimum eye level, and is approximately **18 centimeters (7 inches)** in height, extending from the windshield centerpost to either crew door post. Electrical connectors, power distribution, and heat sensing elements are located at the top inboard edge of each windshield. The heated **birdproof** windshield has been tested and can withstand a **0.9 kilogram (2 pound)** bird strike at sea level V_{NE}. In operational temperatures below **minus 17.8°C(0°F)**, the heating elements must be on in order to retain structural capabilities (impact resistance) of the windshield. Operating procedures are found in the FAA Approved Flight Manual Supplement **BHT-430-FMS-5**.The weight increase for the Heated Windshield installed is **4.9 kilograms (10.8 pounds),** and for the Heated Birdproof Windshield installed is **6.7 kilograms (14.7 pounds).**

BOTH WINDSHIELDS ARE ACTIVATED WITH
ONE BUTTON ON THE OVERHEAD PANEL



RETRACTABLE WHEEL LANDING GEAR

NO. 430-705-005-XXX

The Retractable Wheel Landing Gear option provides **improved ground mobility** for the helicopter, when conducting operations on **improved surfaces** (airport taxiways ,ramps, and aprons), while taxing under power, or while being towed. The conventional **tricycle-type** landing gear is fully retractable, with a self-centering 360° swiveling nosewheel. The nose wheel retracts forward into the lower fuselage and the main gear retracts forward into the outboard portion of each wing. The nose wheel is enclosed within doors when in the retracted position. The **main wheels** are equipped with an independent hydraulic braking system actuated by pedals mounted on the pilots' anti-torque pedals. Each wheel has an independent shock strut, downlock mechanism, and a hydraulic actuator cylinder. The wheel configuration 230's wings are divided into two compartments with the inboard position enclosing fuel cells with a capacity of **151 liters (40 U.S. Gallons)** each, and an outboard compartment containing the main landing gear wheelwells. The wings' fuel cell construction and connection fittings meet the same **rupture-resistant drop-tested** standard as the skid landing gear 230. The basic airframes' fuel system remains unchanged, however the total **usable** fuel capacity of the wheel gear configuration is **709.7 liters (187.5 U.S. Gallons).**

While the Retractable Wheel Landing gear configuration is described in the Kit Section, it is a PRODUCTION LINE OPTION, and not presently approved for in the field installation. Principal **dimensions** of the wheel landing gear configuration, and **tire footprints** and **ground loads** are shown in **Section 3.**

NOSE GEAR

MAIN GEAR / BRAKE

GAER CONTROL PANEL

PROX. SWITCHES [EXAMPLE]

Each landing gear has downlock and proximity switches to indicate landing gear position and status through the landing gear control panel. The gear cannot be retracted when the weight of the helicopter is on the wheels.

The **Landing Gear Control Panel** is located on the instrument panel and contains the LDG GEAR switch, UNSAFE light, three gear condition lights (L,N,R), TEST switch, and AUDIO MUTE switch. The three condition lights illuminate (**green**) when all three wheels are fully extended and the downlock plungers are positioned properly. The UNSAFE light illuminates when the landing gear is in transit or if the weight switch or nose gear centered switch are failed.

Pressing TEST on the ground illuminates the UNSAFE light, LANDING GEAR UP caution light, and activates the landing gear warning horn. Pressing TEST in flight (above 55 knots) illuminates all three landing gear condition lights, and the UNSAFE light. The AUDIO MUTE switch is used to silence the landing gear warning horn (below 55 knots).

Retraction of the landing gear is accomplished by power provided from Hydraulic System 2 (PC2), which also powers the upper half of the cyclic and collective servoactuators.

Placing the LDG GEAR switch in the UP position causes hydraulic pressure to be ported to the downlock plungers and the retract side of the actuator cylinders, causing the wheels to retract. The DOWN position relieves pressure from the retract side of each actuator and ports pressure to the extend sides, forcing the gear to the extended position. As the gears reach full extension, fluid forced from the retract side of the actuators is ported to the downlock plungers, temporarily retracting them until the wheels are fully extended and locked.

If PC2 should fail, the wheels may be extended by the EMER PULL GEAR handle, located on the right front of the pedestal. When the handle is pulled, hydraulic pressure to the retract side of the cylinders is relieved, which allows gravity, air loads, and spring pressure (nose gear only) to force the landing gear to the extended position.

The spring loaded downlock plungers lock the gear into position.

TOE BRAKES ↑ / ↓ PITOT-STATIC SWITCHES

EMER. GEAR RELEASE ↑ / ↓ PARKING BRAKE

Differential braking is provided by hydraulic actuated disc brakes within each main wheel, controlled by master cylinders mounted on the pilots' directional control pedals. The pedals may be pressed individually or simultaneously to apply brakes to the left, right, or both main wheels. The castering nose wheel does not contain a brake assembly.

The PARKING BRAKE handle is located at the base of the pedestal, and is actuated by pressing both brake pedals and pulling the handle. This action traps pressure in the brake valve, locks the brakes, and illuminates the BRAKES caution light. The parking brake is released by pressing the pedals and allowing the handle to retract.

The **landing gear up** warning system includes the warning horn pressure differential switch, an auxiliary pitot-static system control panel, and an audio mute control. The pressure differential switch is installed in the pitot static system, and activates the audio warning horn and LDG GEAR UP caution light when airspeed is below 55 knots, and the landing gear is not fully extended and locked. The warning horn may be disabled by the AUDIO MUTE switch on the landing gear control panel. The mute function is reset when airspeed increases above 55 knots, or if EMER BUS 2 power is lost. The AUX SYS PITOT-STATIC control switches are located on the instrument panel, and provide isolation / disabling of the warning horn pressure differential switch in the event of a malfunction of the primary pitot-static system / associated plumbing. Operational procedures for the Retractable Landing Gear configuration are found in the FAA Approved Flight Manual Supplement **BHT-430-FMS-1**. Contained within the Flight Manual Supplement is **Manufacturers Data** which specifies servicing instructions for the wheel brakes, and tire and oleo-strut inflation, as well as information on ground handling and parking.

The wheel configuration is approved for towing at a maximum gross weight of **4218 kilograms (9300 pounds),** by installation of a universal aircraft tow bar (P/N 2-642 or equivalent). When **parked**, it is recommended that the wheels be chocked, the parking brake is engaged, and that the ground lock pins be inserted into the down lock plungers. The weight increase for the wheel landing gear configuration is **15.2 kilograms (33.4 pounds).**

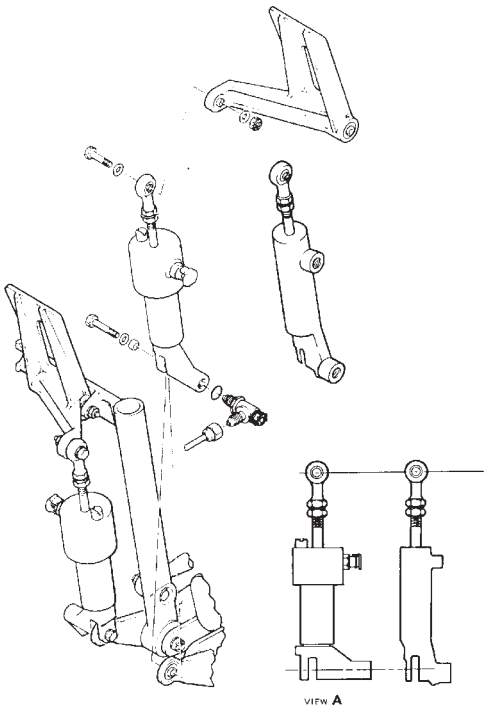
WHEEL GEAR CONFIGURATION FUEL QUANTITIES
CENTER 41.1 US GAL / 155.6 LITER
FEED **2** X (28.7 US GAL / 108.6 LITER)
WINGS **2** X (44.5 US GAL / 168.5 LITERS)
(PLUS 2.35 US GAL / 8.9 LITERS
TOTAL TRAPPED FUEL)
USABLE FUEL =
187.5 US GAL / **710** LITERS

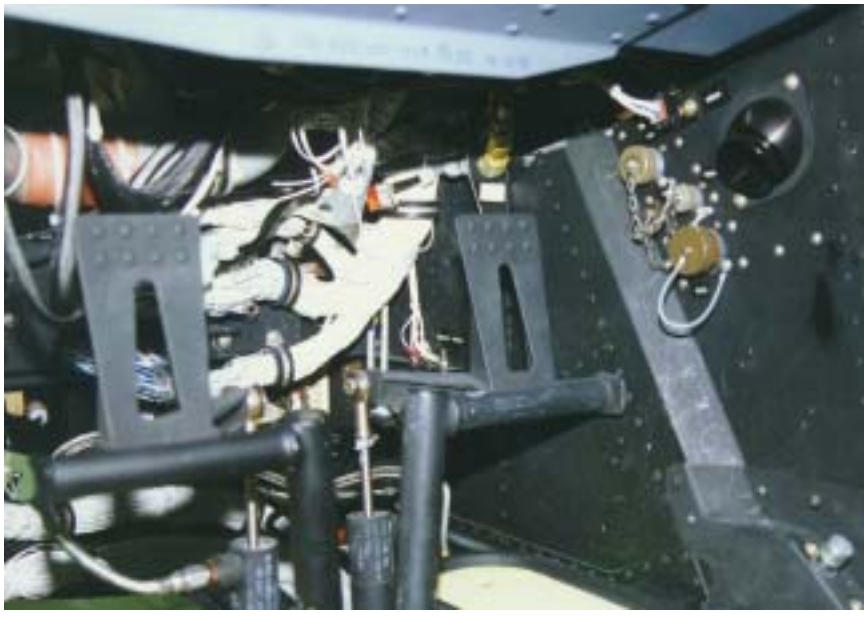
COPILOT BRAKES

NO. 222-706-014-XXX

The Copilot Brakes Kit provides differential braking control of the wheel landing gear at the copilot station when the Dual Control Kit is installed. The copilot brakes operate in exactly the same manner as the pilots'. They consist of a set of hydraulic cylinders mounted to the copilot directional control pedals, and the plumbing necessary to connect to the braking system hydraulic lines.

The weight increase with the copilot brakes installed is **1.8 kilograms (4 pounds).**





HIGH SKID GEAR

NO. 430-705-005-XXX

"U" STEP

"J" STEP

The **High Skid Gear Kit** provides an additional **30 centimeters (12 inches)** of ground clearance for the underside of the fuselage. The High Skids are especially suited for operations where terrain is rough, or when camera pods, FLIR, NightSun®, or other external equipment require increased ground clearance. The High Skid Gear Kit consists of the a replacement skid gear assembly, and fuselage mounted steps for the crew **(2 x J steps)** and passenger doors **(2 x U steps)**. A small **platform step** is also mounted to each skid tube just below the passenger door steps. The High Skids may be interchanged with the Standard Gear as required by mission conditions. Ground positioning of the helicopter is accomplished with the Standard Ground Handling Wheels. The weight increase for the High Skid Gear is **19.8 kilograms (43.6 pounds).**

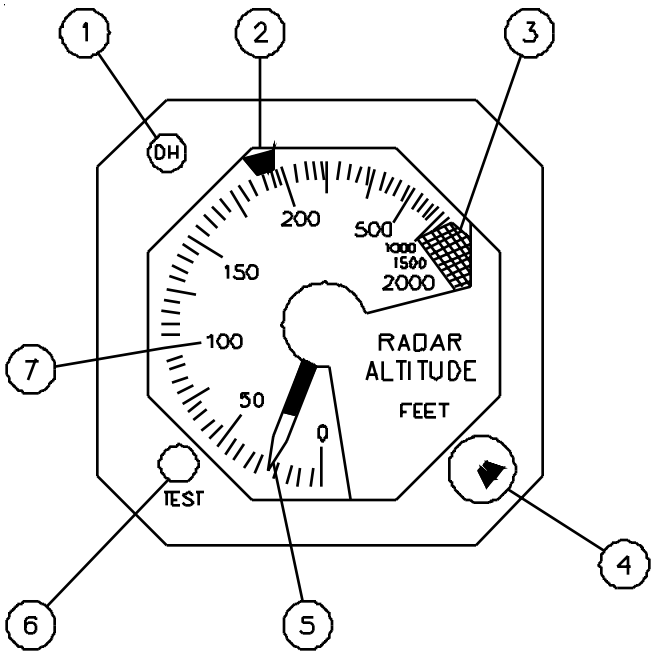
EMERGENCY WINDOW AFT PAX R/H & L/H

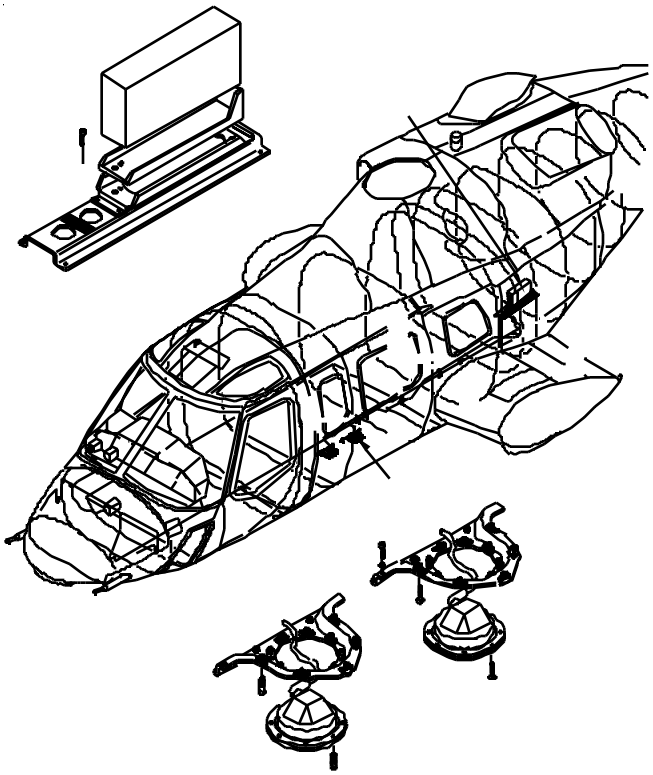
NO. 430-705-722-XXX

The Emergency Aft Passenger Exit Window Kit provides **two additional** paths of emergency egress from the helicopter (the standard cabin door windows are also emergency exits) . The entire transparency of each unit is designed to "POP-OUT" from inside or outside the cabin. Each unit is securley mounted in synthetic rubber channel, and requires a two step process for manual activation. This kit is recommended when conducting **frequent overwater operations**, and when the **high density seating** configurations (10 or 11 place) are installed. The weight increase for the Emergency Window Kit is **0.6 kilograms (1.4 pounds).**

RADAR ALTIMETER
NO. 430-705-502-XXX[E/M-skids]
No. 430-705-502-XXY[E/M-wheels]

The Radar Altimeter System provides an **absolute altitude** display (height above the GROUND) from 0 to 2000 feet. The Radar Altimeter [EFIS] is **included** for IFR configurations equipped with KFC-500 **and** FLIGHT DIRECTOR. The **King KRA-405B** system includes the remote mounted transmitter/receiver unit, two KA- 54 antennas, and the KNI-416 indicator. The instrument features a **red** OFF flag, a TEST button, a decision height (DH) adjust knob, a DH indicator light (white), and a indicator needle for altitude, with a DH bug (decision height select indicator). The weight increase with the Radar Altimeter E/M kit installed is **7.3 kilograms (16.0 pounds).**





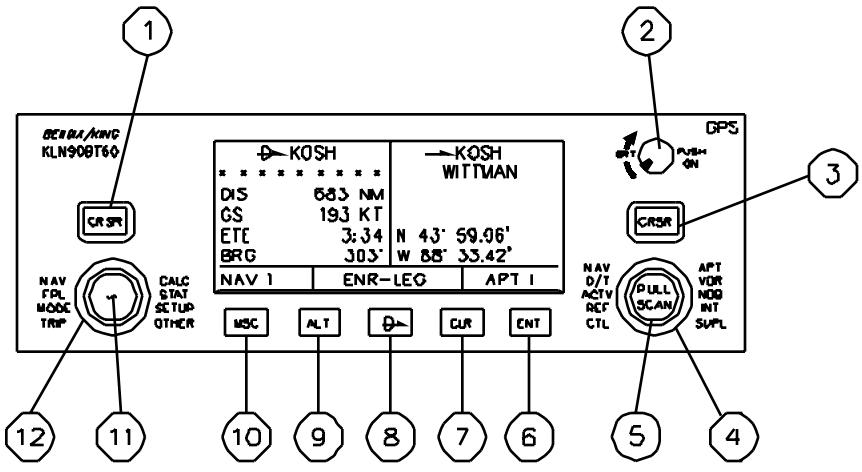
1. DH lamp
2. DH Setting
3. Flag
4. DH knob
5. Indicator needle
6. Self–test button
7. Altitude scale

GLOBAL POSITIONING SYSTEM
BENDIX-KING KLN-90B
No. 430-705-503-XXX[Basic SCAS/ATT-E/M INST.]
No. 430-705-503-XYY[1 or 2 AFCS/KFC500-4T/EFIS]

The Bendix-King **KLN-90B** is a panel-mounted **GPS**-based Navigation System with a pilot-updatable database. The KLN-90B provides navigation information suitable for **VFR** and **IFR** operations, as well as database information, including; Airport Data; Communication Frequencies; Navaid Data; Airspace Information; ARTCC Information; and Minimum Safe Altitudes. The installation consists of the panel-mounted unit, a database cartridge, an altitude input, and a KA 91 antenna. Additional components may be added to increase the KLN 90's capabilities. Some of the optional interfaces include: an external course deviation indicator (CDI) or HSI; some Shadin, Sheltech or ARNAV fuel management systems; several moving map displays; and certain models of Bendix/King or Shadin air data systems.
The approximate increase in weight with the KLN-90B installed is shown below;

- Basic SCAS/ATT with E/M instruments-**6.8 kilograms(15.1 pounds)**
- 1 or 2 AFCS/KFC500 with 4 tube EFIS-**6.6 kilograms(14.5 pounds)**

1. Left cursor button
2. Power/Brightness knob
3. Right cursor button
4. Right outer knob
5. Right inner knob
6. Enter button
7. Clear button
8. Direct button
9. Altitude button
10. Message button
11. Left inner knob
12. Left outer knob



EMERGENCY LOCATOR TRANSMITTER

POINTER 4000

No. 430-705-509-XXX

The ELT installation provides an automatic locator beacon, which in the event of a crash, sends a radio signal on the internationally assigned VHF and UHF distress frequency. The **Pointer 4000** is specifically designed for helicopter use. It activates at 6+ G loads 360° in azimuth as well as full vertical components. Mounted inside the baggage compartment the ELT is a completely self contained, battery powered unit with antenna connections which attach to an external fuselage mounted antenna. The ELT has a switch for manual operation and testing. The battery has a three year shelf life, and provides the transmitter with a range up to 480 kilometers (260 Nautical Miles) for eight days. The increase in weight with the ELT installed is approximately **2.2 kilograms (4.8 pounds).**

AFT VIEW OF BAGGAGE COMPARTMENT
ELT LOCATION

CATEGORY A VNE COMPUTER & WARNING AUDIO No. 430-705-509-XXX

The Category A Vne Computer and Warning Audio Kit **must be installed and functional** for the Bell 430 to conduct Category A Operations [Cat A - Takeoff & Landing]. The kit consists of the Vne Computer, Air Data System, a Variable Vne Airspeed Indicator, and the wiring and equipment necessary to complete the installation. When the kit is installed, the Vne Computer continuously calculates the **Vne** for ambient conditions, and drives the **"barber pole"** needle to that value. When the airspeed needle reaches the same point as the barber pole, the warning audio is activated to alert the pilot to impending exceedance. Detailed information for the kit and other operating requirements for Category A Operations are found in the FAA Approved Flight Manual Supplement **BHT-430-FMS-2.** The increase in weight with the kit installed is approximately **4.4 kilograms (9.8 pounds).**

INSTRUMENT FLIGHT RULES CONFIGURATIONS

The Bell 430 is **FAA** certificated for **operation** under **IFR** conditions, when equipped with an **automatic flight control system / autopilot** and the appropriate communication and navigation avionics. Configurations are available for **dual pilot operation**, with a SINGLE AFCS,either ***with*** *or* ***without*** *a flight director*, **or single & dual pilot operation**, with a DUAL AFCS, ***with*** *a flight director*. ***PLEASE NOTE!*** **All Flight Director configurations require EFIS and Radar Altimeter.**

The number of crew members and systems/equipment requirements for IFR flight are governed by aircraft seating capacity, the type of operation (i.e.; **Part 135**-Air Taxi/ Charter; **Part 91**-General Aviation [Corporate/Private]), and in some cases impose the addition of specific equipment (i.e.; Cockpit Voice Recorder, Flight Data Recorders, and Emergency Locators, etc.).
The following **factory configurations** address the majority of IFR applications in the FAA airspace environment.

Equipment included in each configuration and installed weights (which is variable depending on E/M Instruments or Flight Director/EFIS configuration) may be found in the tables which follow. **Additional IFR configurations** are available as *CUSTOMIZING* and can be developed to meet individual customer requirements.

DUAL PILOT IFR
AFCS SCAS/ATT
with E/M Instruments, No Flight Director

	(lb)	(Kg)
Single AFCS, SCAS	104.5	47.4
CoPilot Instruments Gold Crown	19.7	8.9
Standby Attitude Indicator	8.8	4.0
Dual Controls	20.2	9.2
CoPilot ICS	2.0	0.9
Gold Crown Harness (ElectroMech)	26.6	12.1
KTR-908 VHF Comm #2	6.0	2.7
KNR-634A NAV #1 (ElectroMech)	10.8	4.9
KNR-634A NAV #2 (ElectroMech)	6.8	3.1
KDF-806 ADF (Wheel)	8.2	3.7
KDM-706 DME (ElectroMech)	7.2	3.3
Transponder Mode S*	12.4	5.6
Gyro (ElectroMech)	12.1	5.5
Installed Weight (Wheel Gear)**	**245.3**	**111.3**

KDF-806 ADF (Wheel) Remove	-8.2	-3.7
ADF KDF 806 (Skid) Add	9.5	4.3
Installed Weight (Skid Gear)**	**246.6**	**111.9**

Notes:

*Customer responsible for obtaining aircraft ID code for Mode S.

**Total installed weight approximate, depending on other installed equipment and ballast.

DUAL PILOT IFR
SINGLE AFCS/KFC-500
EFIS (4 Tube)
with Flight Director

	(lb)	(Kg)
Single AFCS, EFIS (4 Tube)	114.8	52.1
Standby Attitude Indicator	8.8	4.0
Dual Controls	20.2	9.2
CoPilot ICS	2.0	0.9
Pilot EFIS (4 Tube, AP)	11.8	5.4
CoPilot EFIS	62.5	28.3
Gold Crown Harness (EFIS)	24.0	10.9
KTR-908 VHF Comm #2	6.0	2.7
KNR-634A NAV #1 (EFIS)	10.0	4.5
KNR-634A NAV #2 (EFIS)	6.8	3.1
KDF-806 ADF (Wheel)	8.2	3.7
KDM-706 DME (EFIS)	6.3	2.9
Transponder Mode S* (Flight Director)	11.6	5.3
Rad Alt KRA 405 (EFIS)	12.6	5.7
Gyro (4 EFIS)	14.9	6.8
Installed Weight (Wheel Gear)**	**320.5**	**145.4**

KDF-806 ADF (Wheel) Remove	-8.2	-3.7
ADF KDF 806 (Skid) Add	9.5	4.3
Installed Weight (Skid Gear)**	**321.8**	**146.0**

Notes:

*Customer responsible for obtaining aircraft ID code for Mode S.

**Total installed weight approximate, depending on other installed equipment and ballast.

DUAL PILOT w/SINGLE PILOT IFR

Dual AFCS/KFC-500

EFIS (4 Tube)

with Flight Director

	(lb)	(Kg)
Dual AFCS, EFIS (4 Tube)	137.7	62.5
Standby Attitude Indicator	8.8	4.0
Dual Controls	20.2	9.2
CoPilot ICS	2.0	0.9
Pilot EFIS (4 Tube, AP)	11.8	5.4
CoPilot EFIS	62.5	28.3
Gold Crown Harness (EFIS)	24.0	10.9
KTR-908 VHF Comm #2	6.0	2.7
KNR-634A NAV #1 (EFIS)	10.0	4.5
KNR-634A NAV #2 (EFIS)	6.8	3.1
KDF-806 ADF (Wheel)	8.2	3.7
KDM-706 DME (EFIS)	6.3	2.9
Transponder Mode S* (Flight Director)	12.8	5.8
Rad Alt KRA 405 (EFIS)	12.6	5.7
Gyro (4 EFIS)	14.9	6.8
Installed Weight (Wheel Gear)**	**344.6**	**156.3**

KDF-806 ADF (Wheel) Remove	-8.2	-3.7
ADF KDF 806 (Skid) Add	9.5	4.3
Installed Weight (Skid Gear)**	**345.9**	**156.9**

Notes:

*Customer responsible for obtaining aircraft ID code for Mode S.

**Total installed weight approximate, depending on other installed equipment and ballast.

ELECTRONIC FLIGHT INSTRUMENT SYSTEM

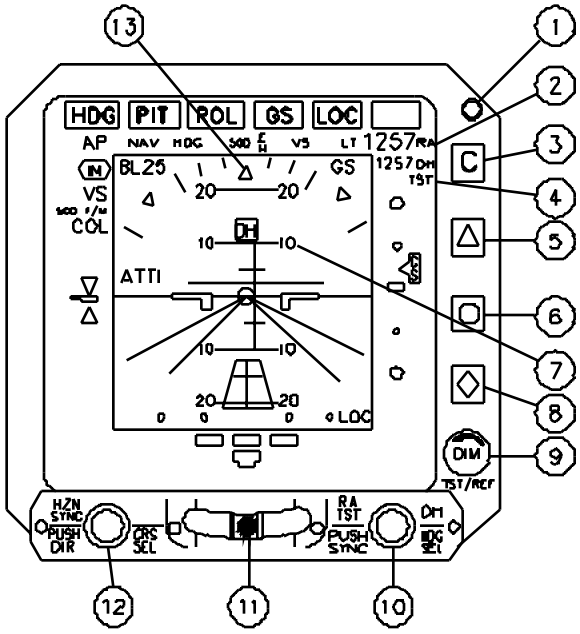
ROGERSON KRATOS NEOAV 500H

NOTE: DETAILED SYSTEM INFORMATION MAY BE FOUND IN THE

ATTACHED DOCUMENT; LINK (RK-EFIS-PHB10-97.PDF)

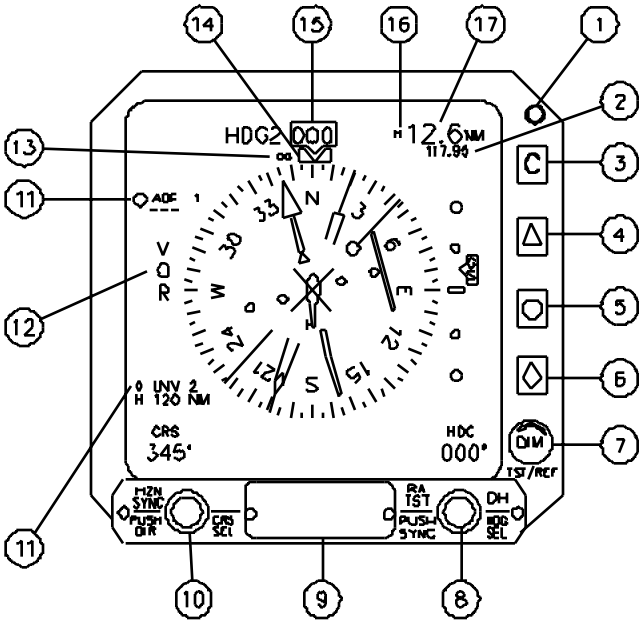
The Electronic Flight Instrument System [EFIS], provides easy visualization of aircraft attitude and navigation information and permits a modular approach to aircraft systems integration. The EFIS consists of two (or four) programmable, self-contained 5 inch color Active Matrix Liquid Crystal Display [AMLCD] indicators, the Electronic Attitude Director Indicator (EADI) and the Electronic Horizontal Situation Indicator (EHSI). These AMLCD indicators are configured as one EHSI and one EADI or two EHISs and two EADIs. They display aircraft heading and attitude along with navigational and AFCS information. The EADI and EHSI have the same bezel configuration. Each bezel is split in two sections, a vertical section and a horizontal section. The bezel vertical section contains four softkeys ("C", "▲", "●" and "◆") and a rotary/push-button switch ("DIM"). The bezel horizontal section contains two rotary push-button switches ("CRS SEL" and "DH/HDG SEL") and an inclinometer. The inclinometer on the EHSI is covered by a blanking plate.

EADI DISPLAY AND CONTROLS LEGEND



1. Display brightness ctl photocell
2. Radar altimeter
3. Composite mode selector
4. Radar test
5. Primary NAV source select (course pionter)
6. Bearing select (#1 pointer)
7. Attitude pitch
8. Bearing select (#2 pointer)
9. Dispay dim knob and display test
10. DH knob and RA test
11. Inclinometer
12. Horizon sync
13. Roll indication

EHSI DISPLAY AND CONTROLS LEGEND



1. Display brighness ctl photocell
2. DME hold frequency
3. Composite mode select
4. Primary nav source select
5. Bearing select (#1 pointer)
6. Bearing select (#2 pointer)
7. Display dim knob and display test
8. Hdg select and push to sync to push button
9. Inclinometer cover
10. Course select knob and push to direct
11. Bearing pointer source annunciation
12. Active NAV system
13. Free DG
14. Heading bug
15. Heading readout
16. DME hold
17. Distance

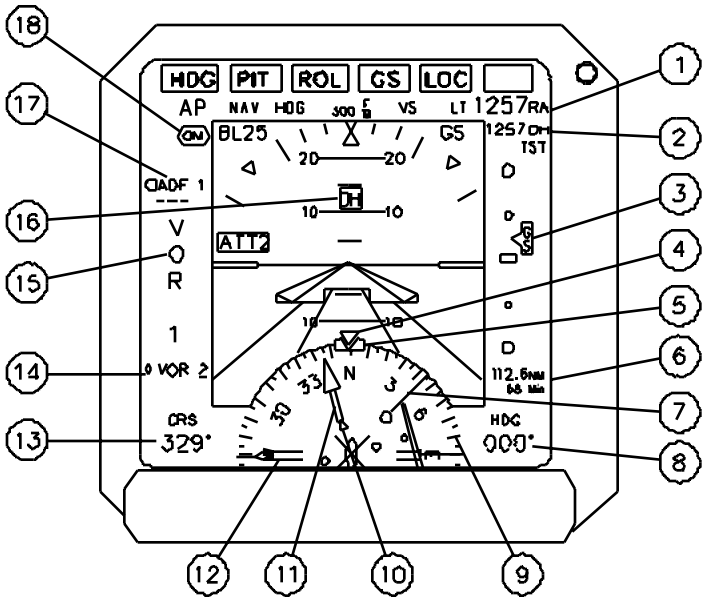
Each EFIS unit will interface to one Rate Gyro (RG) unit. Each EFIS unit allows for attitude source inputs from two gyros. Only one attitude source (VG1 or VG2) is displayed at once. Each EFIS unit allows for heading source inputs from two gyros. Only one heading source (DG1 or DG2) is displayed at once. Each EFIS unit allows for bearing source inputs from two ADF systems.
Each EFIS unit allows for ARINC 429 LNV source inputs from two LNV systems.

The AFCS interfaces with EFIS through an ARINC 429 communication bus. The EFIS provides the AFCS with selected course (or desired track), selected heading, magnetic variation, radio altitude, lateral deviation, DME distance, pitch attitude, roll attitude and equipment ID.

The AFCS provides the EFIS with course ref, selected heading, altitude ref, VS ref, Bank Angle limit, FD roll command and equipment ID. The AFCS annunciates on the EFIS display both ARM phase and capture phase for those modes having both phases.

The AP/FD functions are displayed on the EADI. The FD engagement is annunciated on the EADI display by the presence of the flight director pitch and roll command bars.

COMPOSITE MODE DISPLAY AND CONTROLS LEGEND



1. Radar Altimeter Display
2. Decision Height Display
3. Glideslope Display
4. Heading Index
5. Heading Select Bug
6. DME Display
7. Bearing Pointer No. 1
8. Heading Select Digital Display
9. Compass Card
10. To Pointer
11. Course Select Pointer
12. Bearing Pointer No. 2
13. Course Select Digital Display
14. Bearing Pointer No. 1 Source Annunciator
15. Navigation Source Annunciator
16. DH Annunciator
17. Bearing Pointer No. 2 Source Annunciator
18. Marker Beacon Annunciator

EFS 40 EADI / EHSI FEATURES

The EFS 40 displays are an **integral** part of the KFC-500 System, and provide the pilot with all the information which would be normally presented by conventional instrumentation, as well as unique composite views which combine heading/navigation and attitude display on only one of the units.

Each EFS 40 display normally operates individually as an Electronic Attitude Director Indicator (EADI) or an Electronic Horizontal Situation Indicator (EHSI).

The EADI display modes include normal APPROACH and ENROUTE, Composite APPROACH and ENROUTE, and Test, Maintenance, and System Configuration. It also displays Turn Rate and incorporates an inclinometer on its outer face for Slip (TRIM) coordination.

The EHSI display modes include 360° MODE or Sector (ARC) Mode, with the provisions to integrate Weather Radar information, Stormscope®, and Moving Map data. All navigation source information is shown surrounding the compass rose (or arc).

DUAL PILOT IFR with BASIC SCAS/ATT

with E/M Instruments -No Flight Director

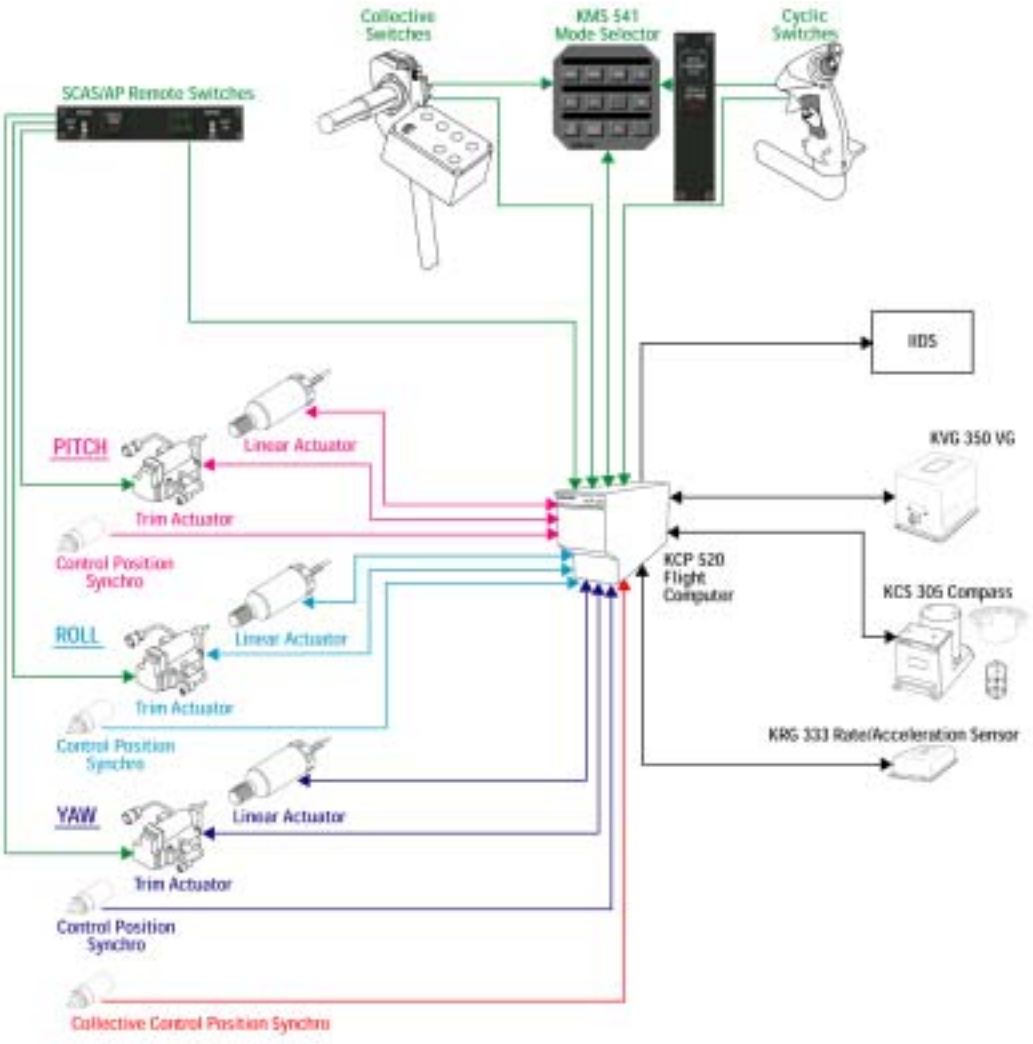
The **Basic Dual Pilot IFR** factory configuration consists of a **digital**, three-axis (**pitch, roll, and yaw), dual** electronic channel flight control system, with yaw damper. System components and architecture are shown in the block diagram below. Detailed system description and operational information may be found in the attached document; **link(KFC500PG-single.PDF.)**

System Components

- ***KFC 500 Flight Controls***
  - ***KCP 520 Flight Computer***
  - ***KLA 575 Linear Actuators***
  - ***KSA 572 Trim Actuators***
  - ***KRG 333 Accelerometer/Rate Gyro***
  - ***Position Transducers***
- ***Iron Gyros - Electromechanical Instruments***

Operating Parameters:

- ***3-Axis: Pitch, Roll and Yaw***
- ***SCAS Engage on ground***
- ***Autopilot engage above 50 knots***
- ***Modes: Attitude Hold***



DUAL PILOT IFR with Single AFCS/KFC500
EFS-40 (FOUR TUBE) with Flight Director

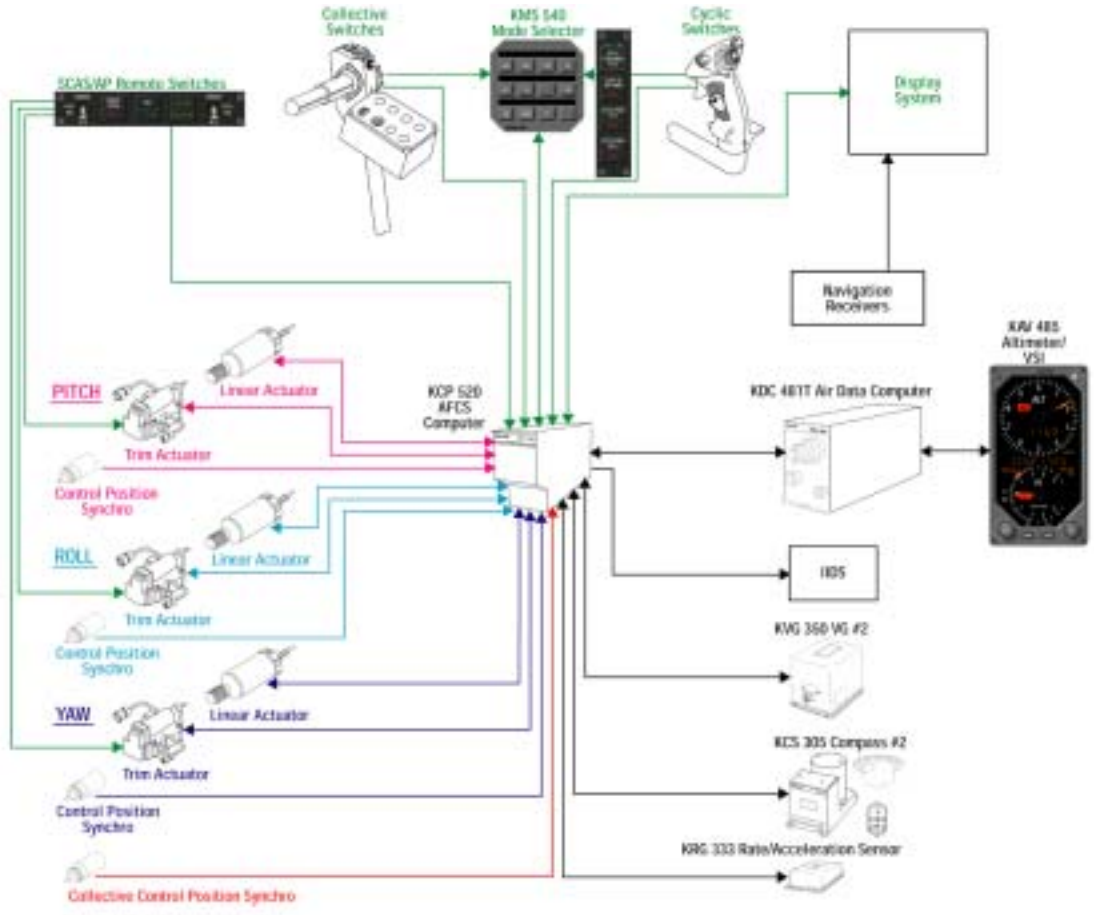
The Dual Pilot IFR with Single AFCS/ KFC500 configuration consists of a completely integrated, **digital**, three-axis (**pitch, roll**, **and yaw) dual** electronic channel flight control system, with yaw damper, coupled Flight Director, and a four tube Electronic Flight Instrument System (EFIS). The Single AFCS installation replaces the Attitude Indicator and HSI with **four** four inch **EFS-40** displays, and then adds the **KFC-500** Flight Control System. System components and architecture are shown in the block diagram below. Detailed system description and operational information may be found in the attached document; **link(KFC500PG-single.PDF.)**

System Components

- ***KFC 500 Flight Controls***
  - ***KCP 520 Flight Computer***
  - ***KLA 575 Linear Actuators***
  - ***KSA 572 Trim Actuators***
  - ***KRG 333 Accelerometer/Rate Gyro***
  - ***Position Transducers***
- ***KAD 480 Air Data System***
- ***Iron Gyros - 4 Tube EFIS***

Operating Parameters:

- ***3-Axis: Pitch, Roll and Yaw***
- ***SCAS Engage on ground***
- ***Autopilot engage above 50 knots***
- ***Modes: HDG, NAV, APR, ALT HOLD/SELECT, VS, IAS, VNAV***



SINGLE PILOT & DUAL PILOT IFR with Dual AFCS/KFC500

with EFS-40 (FOUR TUBE) with Flight Director

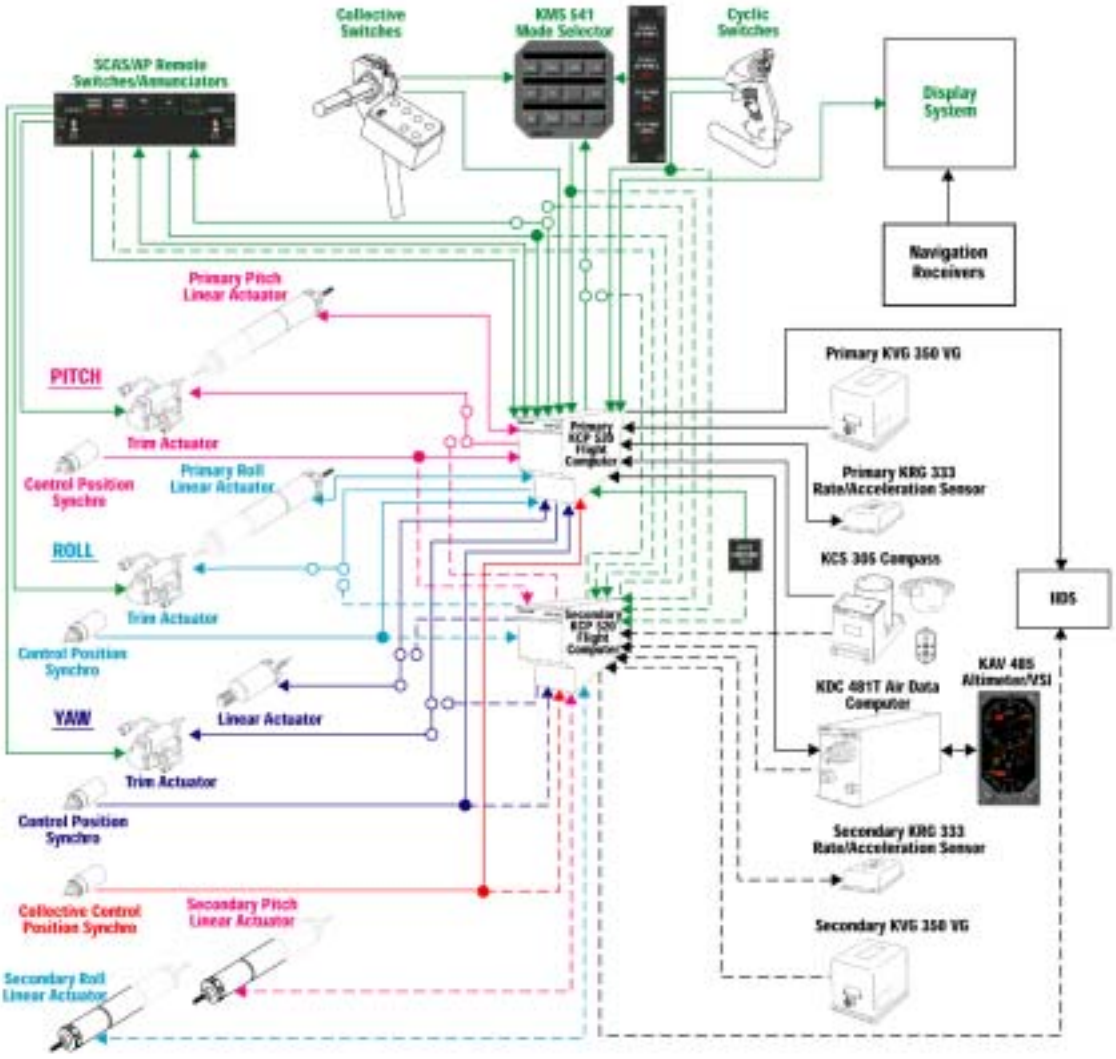
The Single & Dual Pilot IFR with Dual AFCS/KFC500 configuration consists of a **two** completely integrated, **digital**, three-axis (**pitch, roll, and yaw) dual** electronic channel flight control systems, with yaw damper, coupled Flight Director**(System 1 only)**, and a four tube Electronic Flight Instrument System (EFIS). The Dual AFCS installation replaces the Attitude Indicator and HSI with **four** four inch **EFS-40** displays, and then adds the **KFC-500** Flight Control Systems. System components and architecture are shown in the block diagram below. Detailed system description and operational information may be found in the attached document; **link(KFC500PG-dual.PDF.)**

System Components

- ***KFC 500 Flight Controls***
  - ***Two KCP 520 Flight Computers***
  - ***KLA 575 Linear Actuators***
  - ***KSA 572 Trim Actuators***
  - ***Two KRG 333 Accelerometer/Rate Gyros***
  - ***Position Transducers***
- ***KAD 480 Air Data System***
- ***Iron Gyros - 4Tube EFIS***

Operating Parameters:

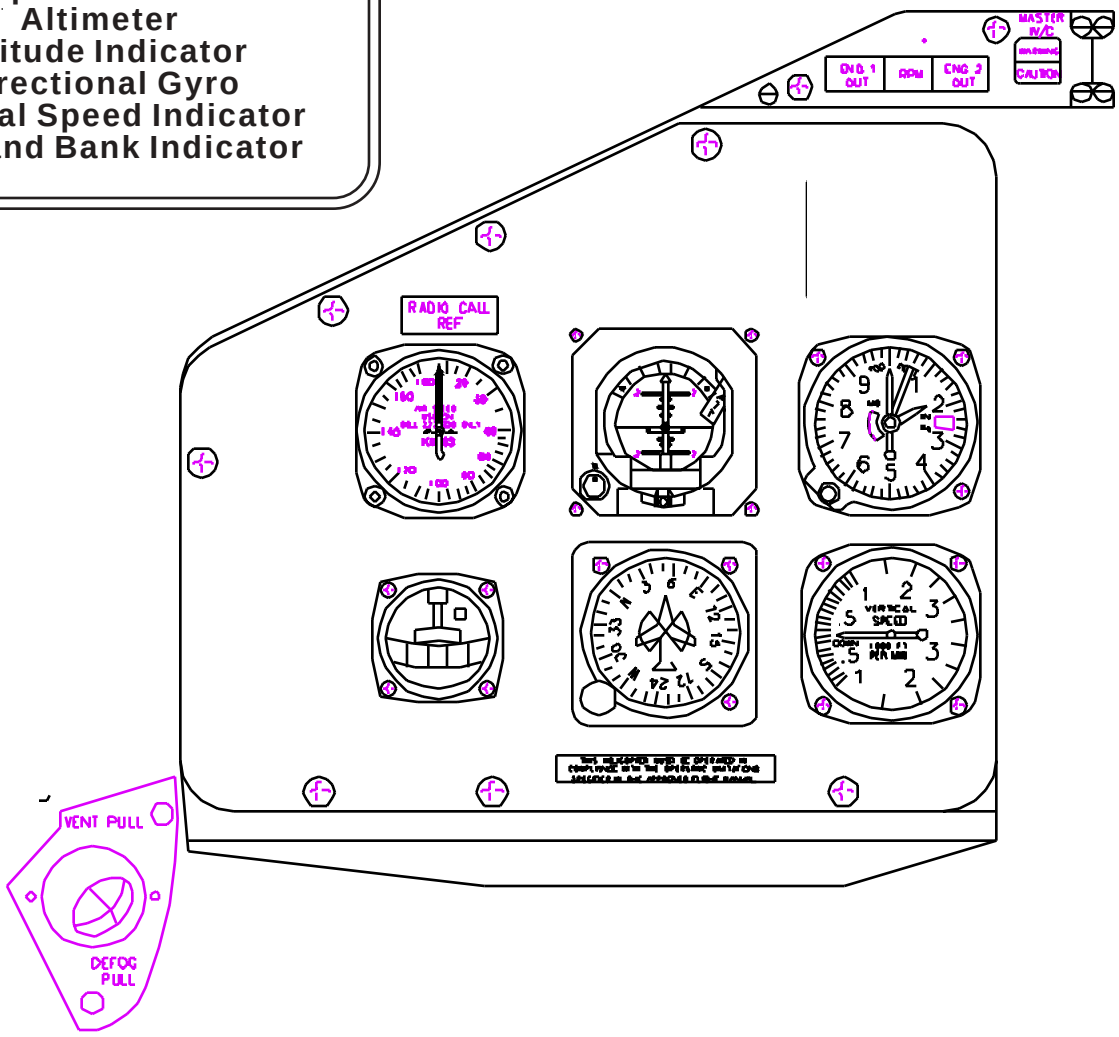
- ***3-Axis: Pitch, Roll and Yaw***
- ***SCAS Engage on ground***
- ***Autopilot engage above 50 knots***
- ***Modes: HDG, NAV, APR, ALT HOLD/SELECT, VS, IAS, VNAV***



COPILOT INSTRUMENTS

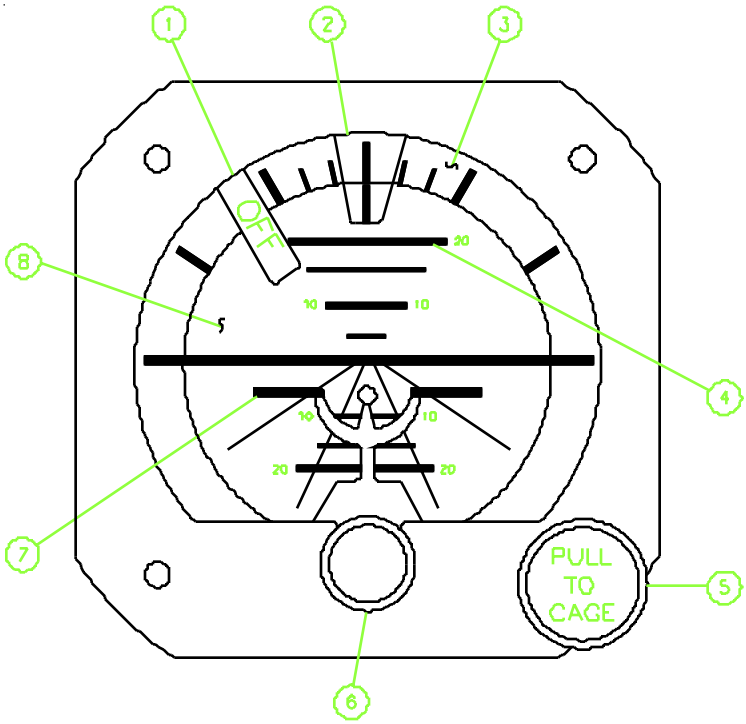
The Bell 430 is certified and equipped for **single pilot operation** in it's standard configuration. Instruments for a **second pilot** may be added to the left side of the instrument panel by the addition of the Copilot Instrument Kit. When EFIS is installed the Atitude Indicator and directional Gyro are replaced by the Electronic displays.This kit is **required** when the **dual control kit** is installed.
The kit consists of the following principal items:

Airspeed Indicator
Altimeter
Attitude Indicator
Directional Gyro
Vertical Speed Indicator
Turn and Bank Indicator



STANDBY ATTITUDE INDICATOR

The Standby Attitude Indicator is a backup attitude indicator with a self-contained, electrically isolated, DC electric powered gyro. This three inch instrument is required by FAA regulation for Instrument Flight Rules (**IFR**) operations.



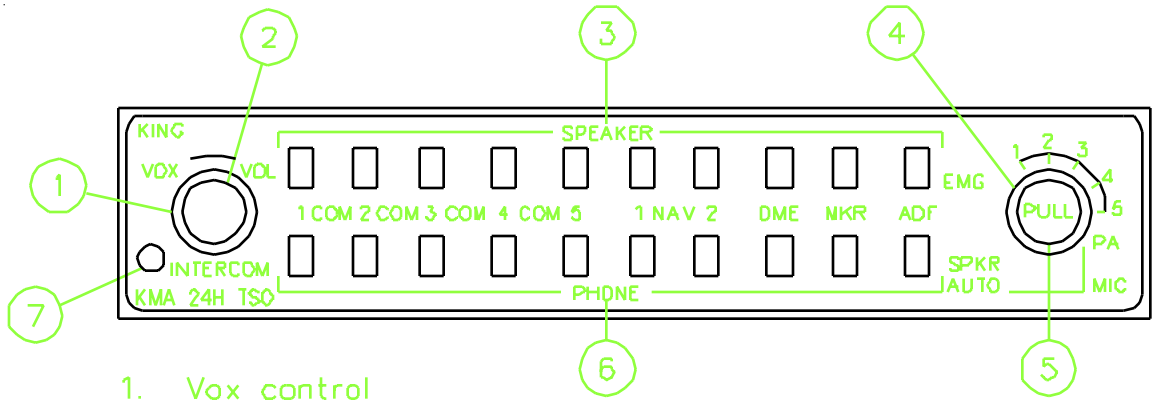
1. OFF warning flag
2. Roll index pointer
3. Roll index scale
4. Pitch index scale
5. Manual gimbal gaging
6. Pitch trim knob
7. Miniature aircraft symbol
8. Artificial horizon display

DUAL CONTROLS

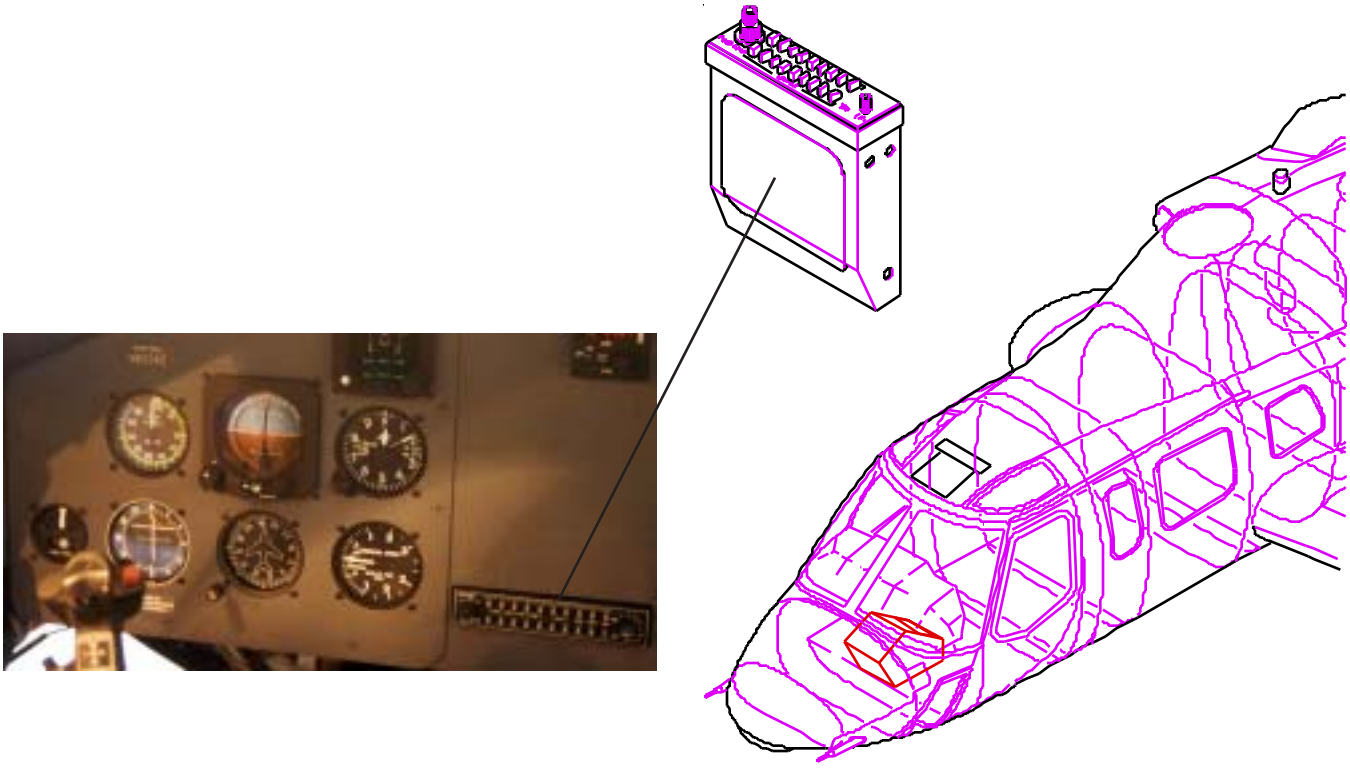
The dual control kit provides the capability for copilot operation or pilot training. Full **flight control** functions are available from the left front / copilot seat with this kit installed (engine governor "**beep**" trim is not provided). The kit consists of a **cyclic control stick**, a **collective control lever** with twist grip dual throttle control, and **anti-torque pedals** and interconnecting linkages. Similar to the pilots' controls in appearance, they provide all the **major functions** as well as identical control **"feel"**. Provisions are incorporated in all Bell 430 airframes to accept the dual control kit, and they may be added or removed as required. If the dual controls are installed, however, the **copilot instrument kit** must also be installed. A **quick disconnect** feature enables the removal of the copilot cyclic stick and collective lever without the use of tools, to facilitate ingress and egress of non-pilot occupants of the copilot station.

COPILOT INTERCOM SYSTEM

The Copilot Intercom System provides the copilot or forward passenger the same radio transmit and receive functions as the pilot, as well as the same radio monitoring capability. The **King KMA-24H-71** control panel mounts on the lower edge of the instrument panel. The Copilot ICS is required when Dual Controls are installed.



1. Vox control
2. Volume control
3. Speaker pushbutton switches (not used)
4. Microphone rotary select switch
5. Speaker auto switch (not used)
6. Phone pushbutton switches
7. Vox delay adjustment



KING GOLD CROWN III PROVISIONS

The wiring provision kit for **King Gold Crown III** equipment provides a **standard harness assembly** which will accommodate **all** the **factory option** King communication and navigation avionics, instruments and displays. The benefits of a complete provision kit are future **flexibility** in installation or removal of some avionics without extensive modifications to the existing configuration, **minimum** electromagnetic compatibility interference, and **optimum** antenna location / energy radiation pattern / reception. The provisions include **all** wiring, connectors, and mounting provisions (space and dedicated fasteners for component mount/ racks), along with the **provisions** for circuit breakers, switches, and required controls.

NOTE: THE INSTALLED WEIGHT OF THE KING GOLD CROWN III HARNESS VARIES DEPENDING ON IFR CONFIGURATION [E/M INSTRUMENTS OR EFIS]

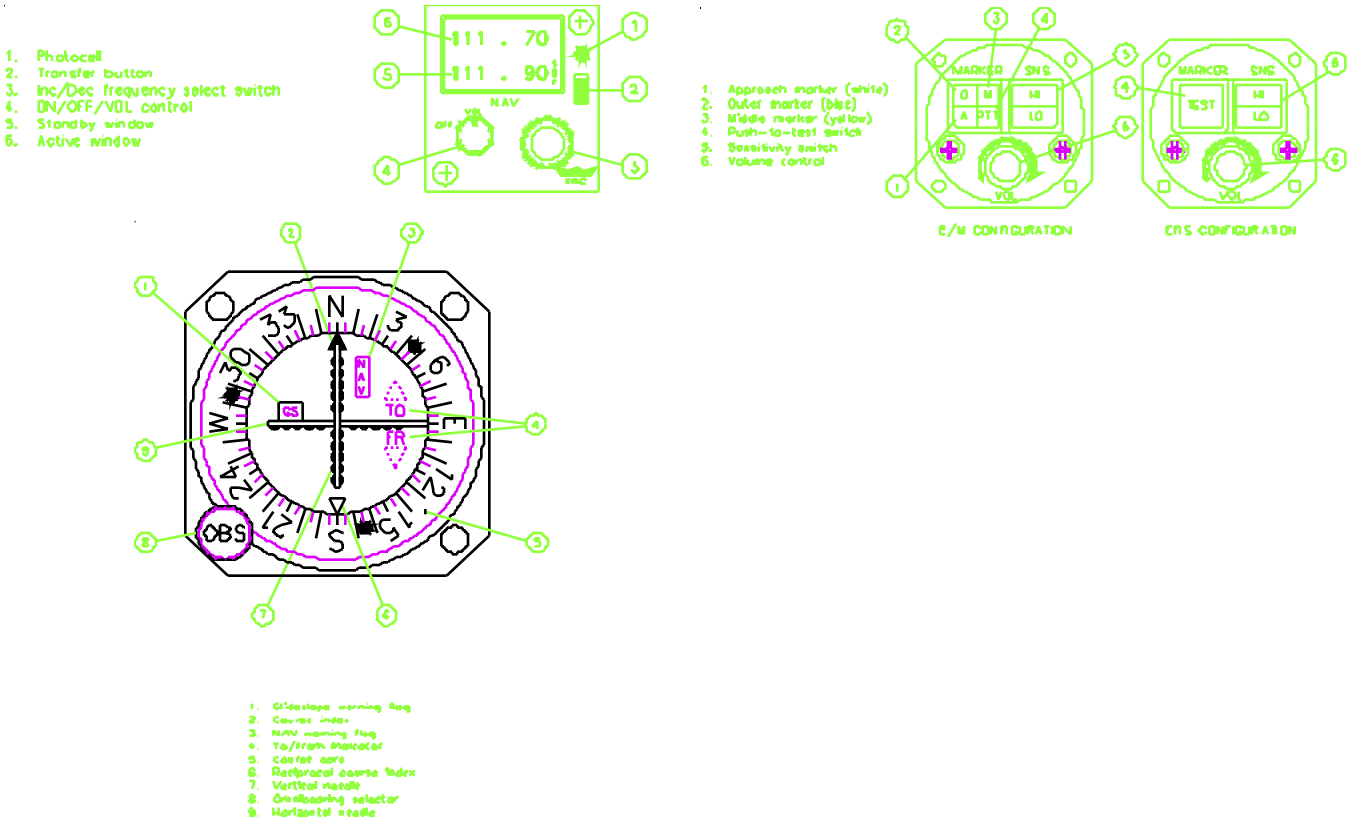
NO.2 VHF-AM COMMUNICATION TRANSCEIVER

The VHF-AM communications transceiver No. 2, **King KTR-908**, is a lightweight airborne radio providing two-way, amplitude-modulated communications within the frequency range of 118.0 to 135.975 MHz. The kit consists of the remote mounted transceiver unit, mounting rack, the control panel, and the antenna. The second control panel is mounted at the top of the instrument panel. Internal audio leveling provides constant audio volume for both weak and strong signal reception.

1. Transmit indicator
2. Photocell
3. Transfer button
4. Inc/Dec frequency switches
5. ON/OFF/VOL squelch test
6. Standby window
7. Active window

NO.1 NAV/ILS/MARKER BEACON RECEIVER
NO.2 NAV/ILS/COURSE DEVIATION INDICATOR

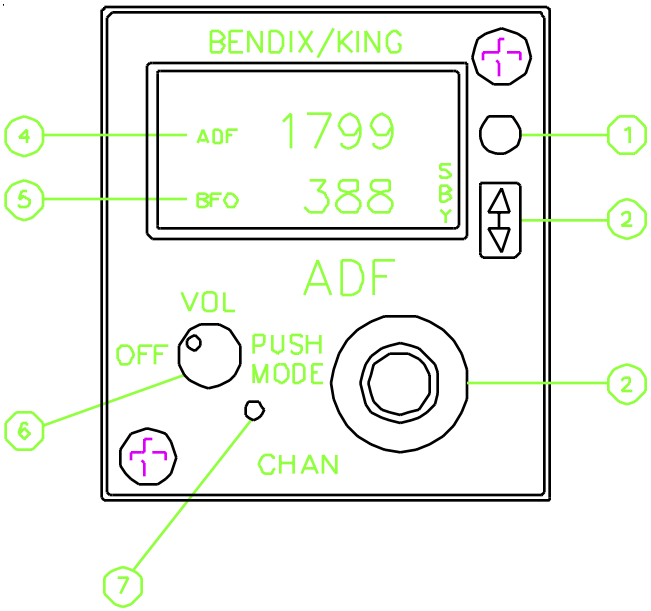
The **No. 1 NAV / ILS** Marker Beacon Receiver, **King KNR-634**, is a navigational receiver with **VOR** (Variable Omni Range) and **LOC** (Localizer / Glideslope) capabilities covering 200 channels, which supplies navigation data to the Horizontal Situation Indicator (**HSI**) bearing pointer and course deviation indicator. It also supplies navigation audio to the Intercommunications System (ICS) headset when the NAV 1 switch is in the ON position. The glideslope receiver covers 40 channels and provides data to the glideslope indicator of the HSI. The system senses marker beacons, providing both visual and audio signals to indicate station passage. The kit consists of the remote mounted receiver unit, the control panel, the marker beacon control, the mounting rack, and three antennas. The **main control panel** mounts at the top of the instrument panel.



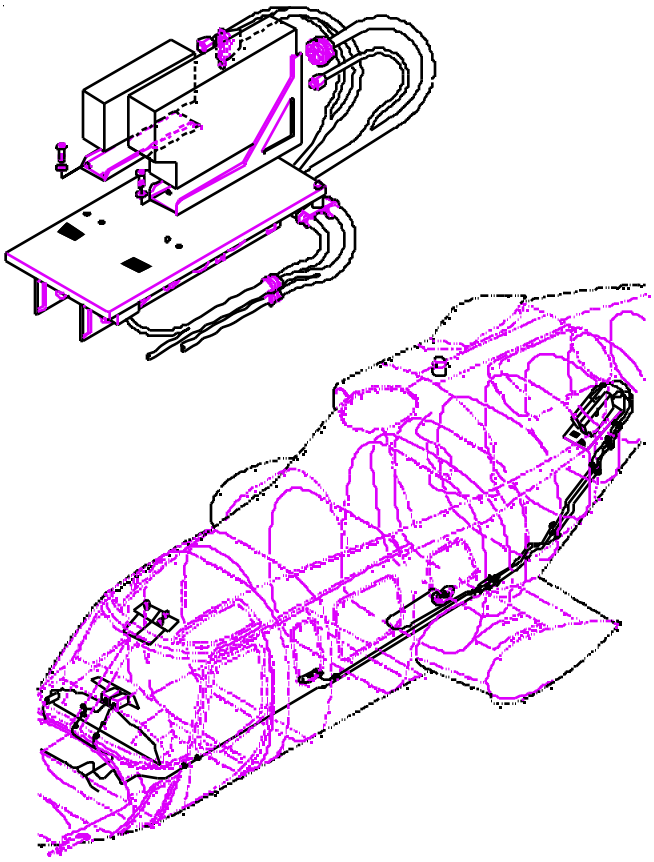
The **No. 2 NAV / ILS** receiver provides the same VOR / LOC functions as the No. 1 system. However, there is no marker beacon receiver, and a separate CDI (Course Deviation Indicator) is required. The kit consists of the remote mounted receiver unit, the control panel, the mounting rack, the CDI, and two antennas. The control panel is located at the top of the instrument panel, next to the NAV No. 1 control, and the CDI is located below the airspeed indicator.

AUTOMATIC DIRECTION FINDER

The Automatic Direction Finder (**ADF**), **King KDF-806**, supplies magnetic bearing information on the tuned station to the bearing pointer of the HSI. It also provides ADF audio to the Intercommunication System (ICS) headset when the ADF switch is in the ON position. The kit consists of the remote mounted receiver, the control panel, the mounting rack, a combined loop and sensing antenna. The control panel is located at the top of the instrument panel. The antenna is on the helicopters' belly.



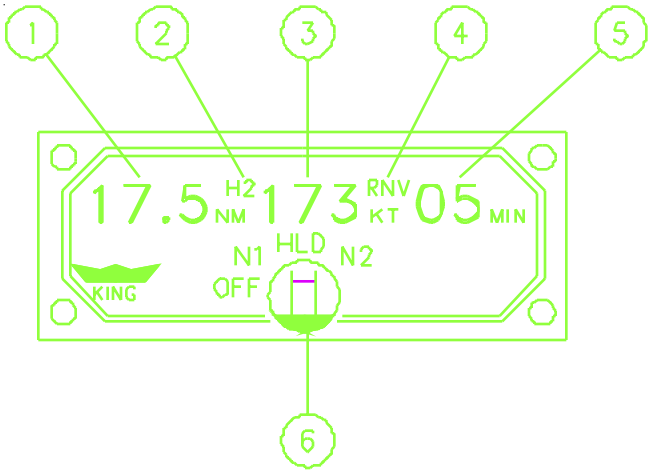
1. Photocell
2. Transfer button
3. Increment/decrement switch
4. Active window
5. Standby window
6. Control switch
7. Channel button



DISTANCE MEASURING EQUIPMENT

The Distance Measuring Equipment (**DME**), **King KDM-706**, works **in conjunction** with the NAV 1 and NAV 2 receivers, to display the **range** to station in nautical miles, the **course rate** (ground speed along a direct bearing) to station in knots, and the **time** to station in minutes, for VOR / DME navigation transmitters. The kit consists of the remote mounted receiver / transmitter unit, the mounting rack, the display panel (**KDI-572**), and the antenna. For non-EFIS configuration, the display panel is located on the instrument panel below the HSI, and contains the ON-OFF control, and NAV 1, NAV 2, and HOLD functions.

NOTE: FOR EFIS CONFIGURATIONS DME CONTROL PANEL IS NOT INSTALLED. ALL DME FUNCTIONS ARE CONTROLLED BY EFIS.

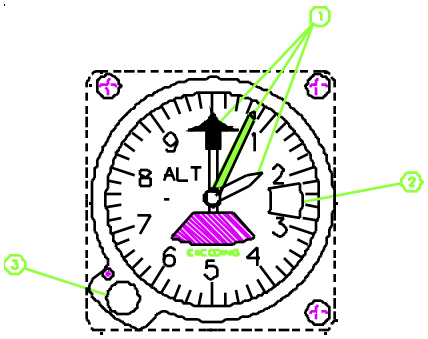


1. Range
2. Channel source
3. Ground speed
4. RNAV indicator
5. Time to station
6. Function switch

TRANSPONDER [MODE S]
& ENCODING ALTIMETER

The Air Traffic Control Transponder (Mode S), **King MST- 67A**, with Encoding Altimeter, **King KEA-129**, provides Mode A and Mode C identification, recognition, and altitude reporting capability for use with the **existing** Air Traffic Control Radar Beacon System (ATCRBS), as well as additional capability for use with the FAA Traffic Alert and Collision Avoidance System (TCAS II), and **future** compatibility with ATCRBS Mode S ground stations. **FAA** regulations **require** that transponders installed in U.S. registered aircraft with **ten or more** seats, and which are engaged in **sometypes** of Air Transport Operations **must** be MODE S compatible. Each Mode S transponder installation is assigned a **unique address code** (consisting of eight digits), which will enable Mode S ground stations to **selectively interrogate** specific aircraft, even in high-density traffic situations. In addition to enhanced air traffic control functions it is fully TCAS II compatible.

1. Reply indicator
2. Transponder 1 or 2
3. Transponder code and flight level display
4. Photocell
5. Identification button
6. Identification indication
7. Identification code select
   push: advance cursor
   push/hold
8. Function select
9. Transponder select
10. ON/OFF switch
11. Transponder mode
12. Mode S flight level



1. Pointers
2. Barometric pressure scale readout
3. Barometric pressure setting knob

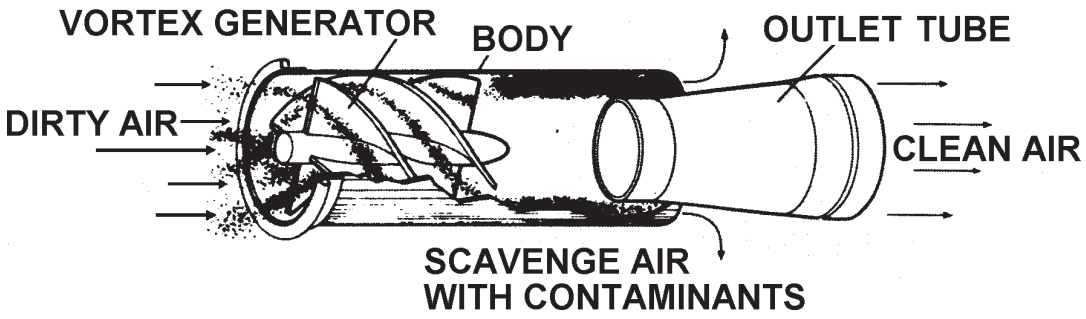
NOTE: ENCODING ALTIMETER IS ONLY USED WITH E/M IFR CONFIGURATION, KFC500 EFIS CONFIGURATIONS USE THE KAV85 ALTIMETER/VSI

PARTICLE SEPARATOR

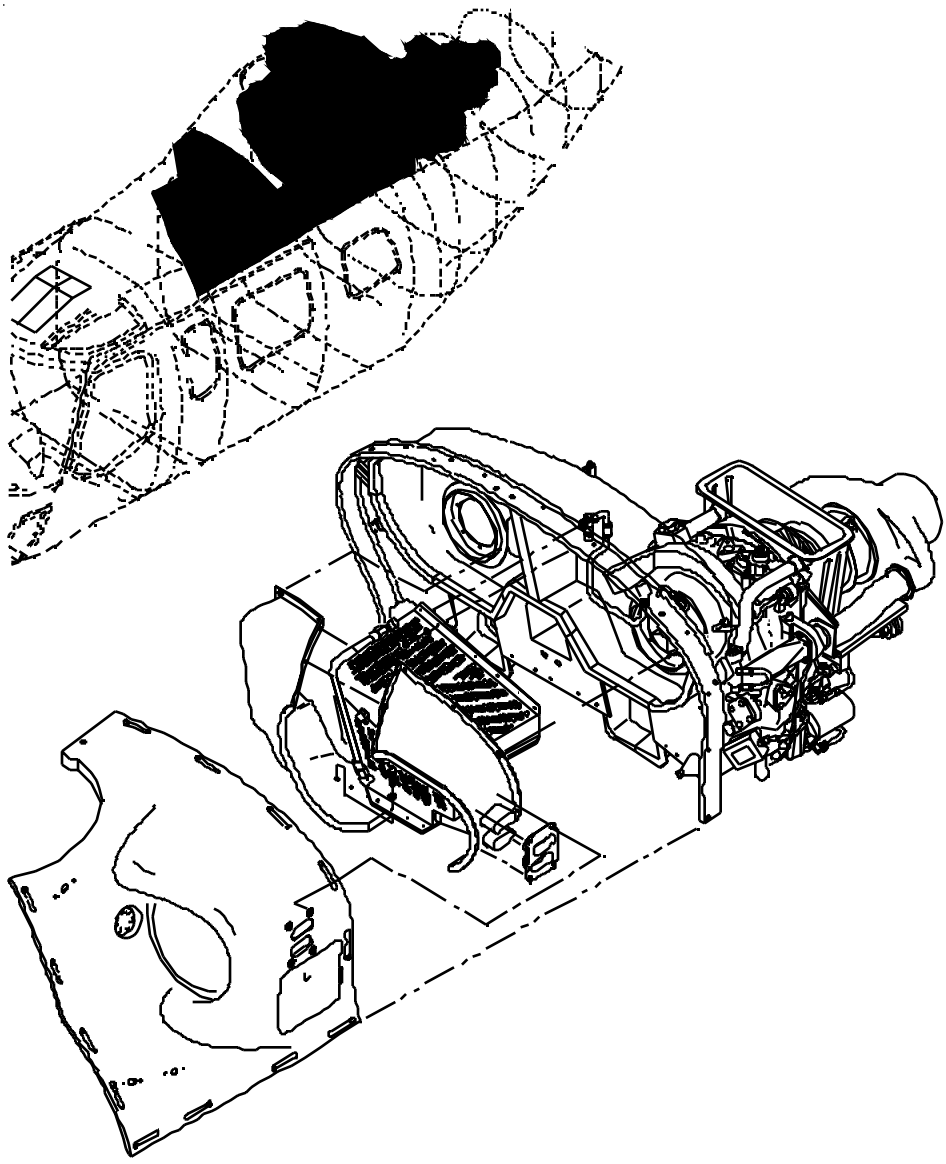
NO. 230-706-501-XXX

The particle separator **engine air induction system** provides protection of the engine against the ingestion of **sand, dirt,** and other **foreign debris**, with a minimum loss of engine power. The particle separator kit, when installed, allows conduct of takeoff and landing operations from unprepared areas. The **particle separator kit** is compatible with the **snow deflector kit,** which is **required** for conduct of operations in falling or blowing **snow**. The kit consists of the separator assemblies, bleed-air tubing and hoses, purge switches, and other hardware required to complete the installation. The separators are installed **within** the left and right air induction cowlings, and cause no aerodynamic change to the helicopter. Each of the **530** filter elements (**tube assemblies**) in **each** of the separators, through which all inlet air must pass, consists of a **vortex generator** bonded into an inlet tube, and a second smaller tube which forms a **scavenge chamber.** The vortex generators are 1.7 centimeters (5/8 inch) in diameter. When operating, foreign particles which enter the filter elements are spun in the vortex generator and directed centrifugally into the scavenge chamber. The debris within the scavenge chamber is ejected overboard by the effect of bleed-air directed through venturis located at the side and base of each separator assembly. The scavenge flow which carries the debris with it accounts for about 8% of the total inlet air flow.

VORTEX TUBE OPERATION



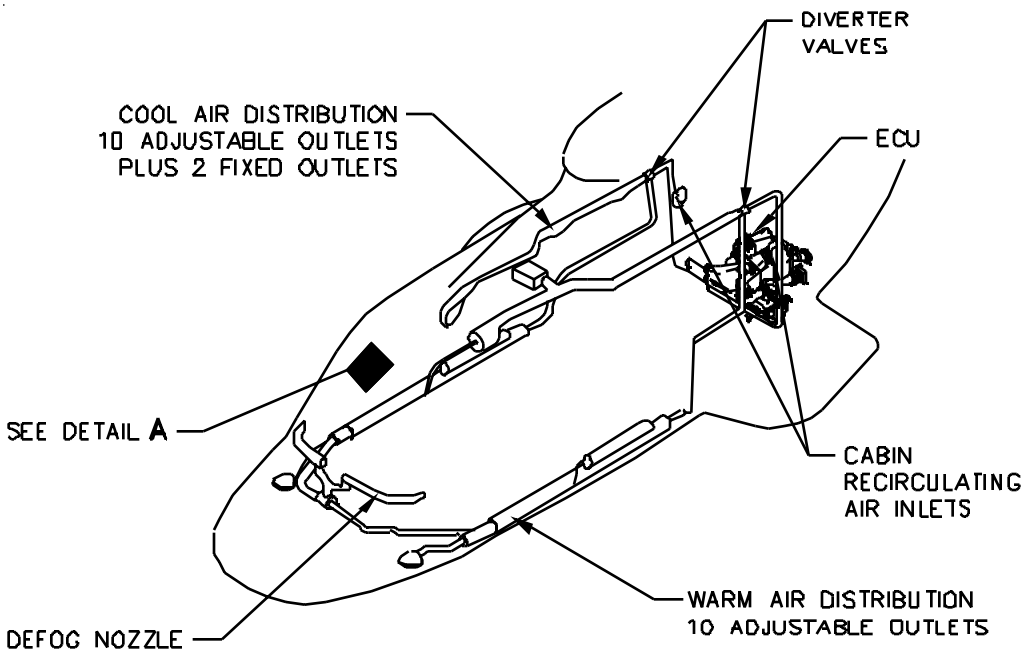
The particle separator has a tested efficiency of **85%** by weight for standard size AC coarse particles (27 micron nominal). Due to the inertial (centrifugal) action of the tubes, the separator is more efficient for particles larger than 27 microns, and less efficient for particles which are smaller. Other debris such as grass or leaves which are too large to enter the tubes are stopped at the face of the separator. However, the numerous filter elements are placed so that there will be sufficient air flow by-passing the blocked elements for flight to be continued. The **purge action** of the **bleed-air venturis** may be **turned off** when additional engine power is required. A **purge switch** for each engine is located in the overhead console. When purge is **off**, the separators continue to direct particles into the scavenge chambers, where they collect until purge is restored. Helicopter performance charts are provided in the **FAA** approved Flight Manual Supplement **BHT-430-FMS-11** for operation with purge ON and OFF. The **compressor wash system** allows the conduct of regular engine cleaning without removal of the separator assemblies. The increase in weight with the kit installed is **12.7 kilograms (28 pounds).**



ENVIRONMENTAL CONTROL SYSTEM
[HEATED & REFRIGERATED AIR]
NO. 222-706-018-XXX

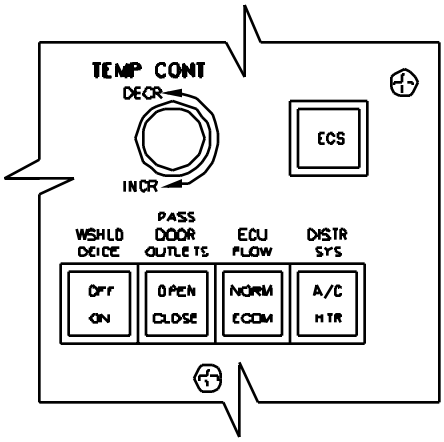
The Environmental Control System **(ECS)** provides a comfortable environment for the pilot and passengers when operating the helicopter under severe climatic conditions.

The installation is a completely integrated **heating** and **cooling** system which when in use, automatically maintains a precisely controlled cabin temperature, and also improves the comfort level by removing moisture from the circulating air. The ECS kit is designed to interface with the existing crew and cabin ventilation air distribution / windshield defogging system, and with provisions in the airframe and passenger doors for air ducts and outlets. The **engine bleed-air** powered heating / cooling unit is located beneath a removable panel in the baggage compartment floor. System operation is controlled by overhead console switches.

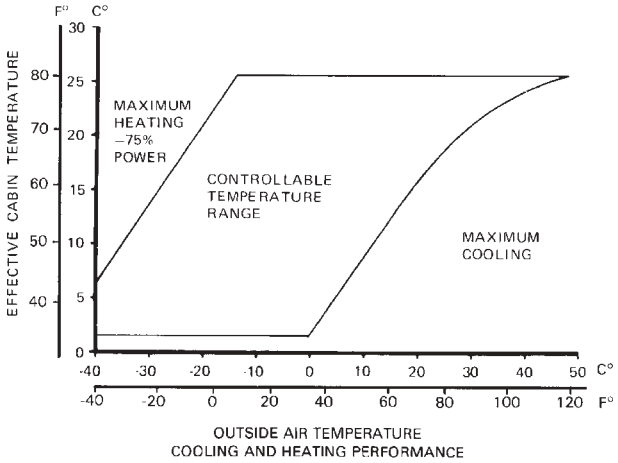


Two separate air distribution systems provide conditioned de-humidified air to the cabin. The COOL air system is located in the cabin roof, and feeds into the standard air distribution outlets in the cabin and crew compartment. The WARM air system is located beneath the cabin floor, and inside the doors. The WARM air system also defogs the windshield and the lower nose windows. **Ten** adjustable outlets provide warm air to the cabin; four in each aft cabin door and one on each side of the center console. Direction of conditioned air to the respective distribution systems is accomplished by remotely operated **diverter valves**. Heated dry air is directed to the windshield defog system when HEAT is selected and the pilot actuates the DEFOG lever, located on the right side of the console.

The nominal heating capacity of the ECU is 37,500 BTUs per hour. In it's cooling mode the ECU capacity is 16,000 BTUs per hour for standard HOT / WET day conditions (39°C[103°F] with 130 grains of H_2O / LB of dry air).



DETAIL A



Four "**push on-push off**" buttons and a temperature increase / decrease knob are located on the overhead console. The ECS button activates the system, directing bleed air from both engines to the conditioning unit. The TEMP CONT knob controls the **mode** (HEAT / COOL) of operation and **sets** the desired cabin temperature. The DISTR SYS (distribution system) button controls the **diverter valves** which direct air to the upper or lower outlets. The PASS DOOR OUTLETS button is selected when **maximum defogging** is required. The ECU FLOW button acts to provide either the **maximum** (NORM) or a **reduced** (ECON) bleed air supply from the engines. The ECON position may be selected after the cabin temperature has stabilized or when a lower volume of conditioned air is desired. The ECS system automatically **shuts off** when only one engine is operating to preclude a power drain on the operative engine.

Operating procedures and limitations are found in the FAA approved Flight Manual Supplement **BHT-430-FMS-4.** The total weight increase withe the ECS system installed is **44.7 kilograms (98.6 pounds).**

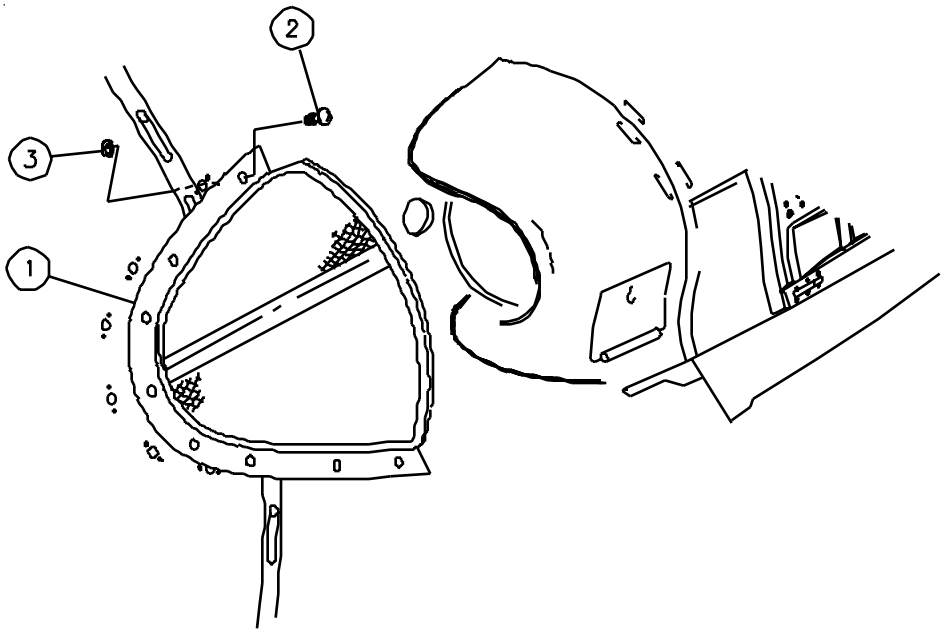
ECU EQUIPMENT
[UNDER BAGGAGE COMPARTMENT FLOOR]

ECU AIR RETURN IN AFT CABIN

SNOW BAFFLES

NO. 230-706-502-XXX

The **snow baffle kit**, when installed alone or with the **particle separator kit**, permits operations in **falling or blowing snow**. The kit consists of a deflector shell for each engine air inlet. Provisions for installation of the baffles are part of the standard configuration, and are located on the transmission fairing in front of each air inlet. Operating procedures are found in the FAA approved Flight Manual Supplement **BHT-430-FMS-20**. The baffles are approved for operation at temperatures up to **+20°C (68°F),** above which they shall be removed. The Weight increase with the baffle kit installed is **1.7 kilograms (3.8 pounds).**



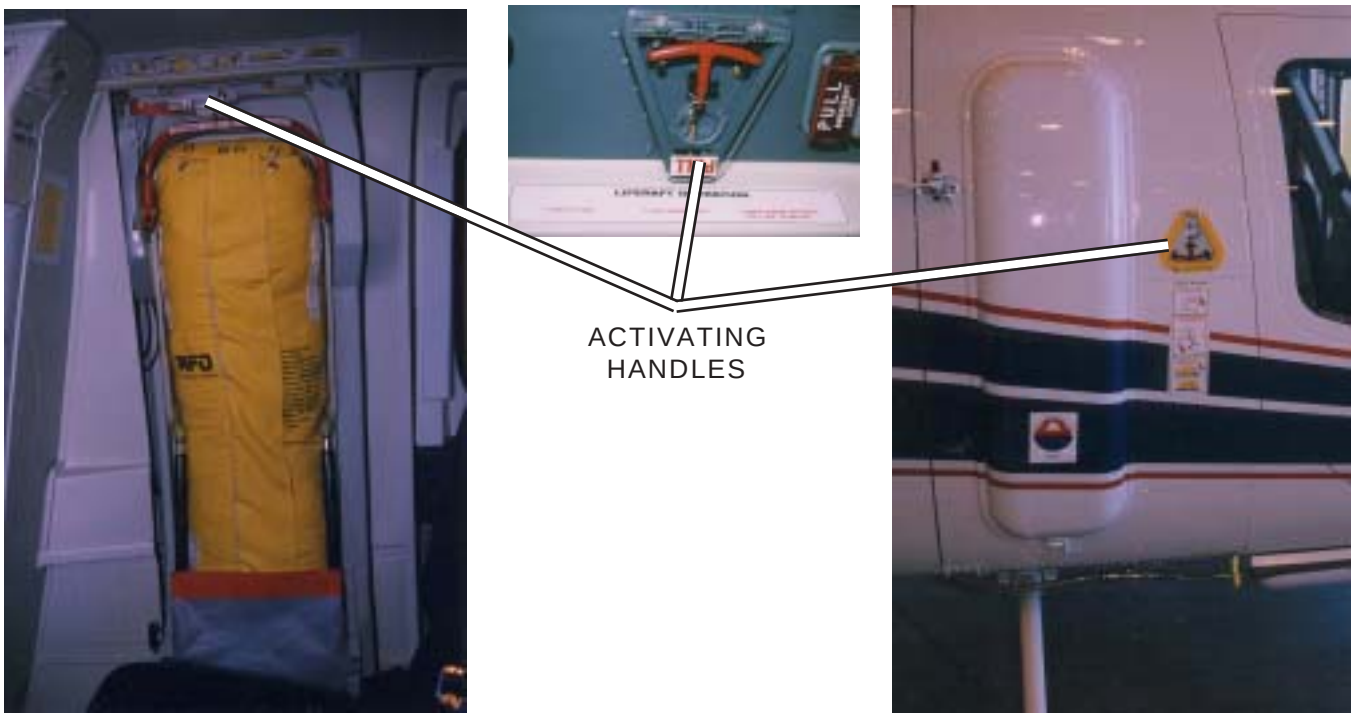
1. Snow baffle
2. Stud assembly
3. Retainer ring

EXTERNAL LIFE RAFT
[WITH DEPLOYMENT SYSTEM]
NO. 430-705-006-XXX

The External Life Raft Kit [with deployment system] provides secure stowage of for 10-place life raft without reducing the interior volume of the passenger cabin. The kit consists of a mount and deployment system which is built into the fuselage bulkhead just forward of the right hand passenger cabin door. In the event of a water landing there are three separate means of activating the deployment system. Activating handles are located in the cockpit (aft of the overhead console), the passenger cabin (above the raft), and on the R/H forward exterior fuselage. Each handle is protected by a transparent break away cover.

INTERIOR VIEW

EXTERIOR VIEW

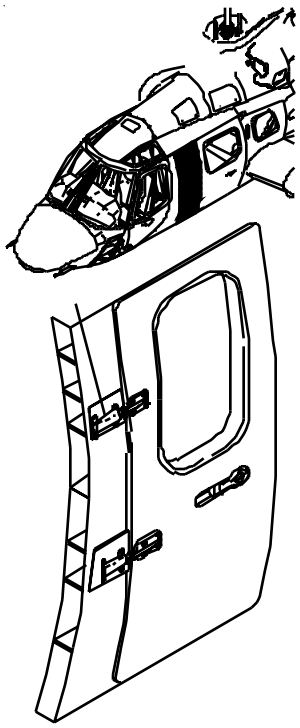


PASSENGER DEPLOYMENT INSTRUCTIONS

Operating limitations for the External Life Raft Kit are found in the **FAA** approved Flight Manual Supplement **BHT-430-FMS-19.** The Weight increase with the kit installed is **46.4 kilograms (102.2 pounds).**

LITTER DOOR

No. 430-705-020-XXX



LITTER DOOR
54 INCHES [1.37 METERS]
WIDE ACCESS

The standard left and right cabin doors open to an unobstructed area of **3 feet, 92 centimeters**, wide by **4 feet, 122 centimeters**, high. The **optional** hinged panel [Litter] door kit consists of an additional panel door on the **left hand forward** side of the cabin. The standard main door is attached with a hinge to the panel door in a manner similar to the Bell LongRanger series. This panel door also is hinged, and both doors can swing open to give a **54 inch, 137 centimeter**, access to the cabin to facilitate litter or bulky cargo loading. The Weight increase with the L/H litter door kit installed is **6.4 kilograms (14.1 pounds).**

SECOND LANDING LIGHT

NO. 430-706-002-XXX

The second landing light is a **single**, high intensity, **450 watt**, wide-beam, retractable light located in the lower part of the fuselage. The ON / OFF / STOW power switch is located on the pilots' collective control box. The second landing light kit is **required** for the conduct of **night category A operations.** The Weight increase with the second landing light kit installed is **1.9 kilograms (4.2 pounds).**

RESCUE HOIST

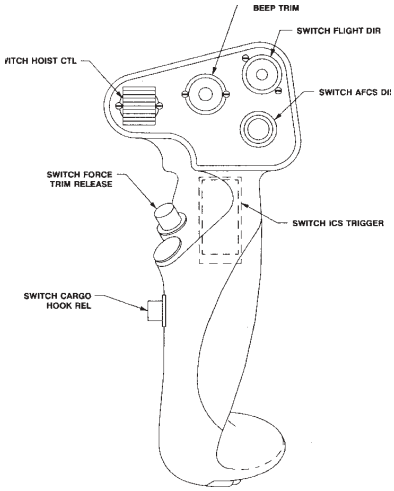
NO.430-706-005-XXX[PROVISIONS]

NO.430-706-005-XXY[EQUIPMENT]

NO.430-706-008-XXX[SKID GUARD]

The Hoist Kit is designed for **Class B** external loads, and consists of a **600 pounds (272.2 kilograms)** hoist assembly, junction box, pendant assembly, mounting structure, associated wiring, a revised miscellaneous control panel, and a replacement cyclic grip assembly. The Lucas Aerospace Hoist assembly contains **250 feet (76.2 meters)** of deployable cable; the first and last **20 feet (6.1 meters)** of cable is colored international orange as a cable position indicator during hoist operation. The winch assembly has an average rate of travel of **150 feet (45.7 meters) per minute** under its design load of **600 pounds (272.2 kilograms)**. Pilot controls, located on the cyclic, instrument panel, center pedestal, and overhead console are edgelit and consist of a three position HOIST PWR I OFF I RESET switch, a HOIST power annunciator, a CABLE CUT ARM / OFF switch, a C/C ARM caution annunciator, and a guarded HOIST CABLE CUT switch connected to MK44 MOD 0 **explosive cartridge** for emergency cable release. Pilot HOIST CTL switch is located on top of the cyclic grip. Pilot hoist controls **override** hoist operator controls. The Crewmember Control Pendant contains CAUTION and OVERTEMP annunciators, a variable speed control thumbwheel labelled; OUT — REEL — IN, an ICS switch, and a digital cable extension meter. A secondary (manual) cable cutter for use by crewmember is stowed in a pouch on fuselage bulkhead aft of cabin door and forward of hoist mounting support. A single station **aft ICS** position is provided at the right hand aft cabin wall to facilitate communication between crewmember and pilot. ICS communication is accomplished by **either trigger** on control pendant or push to talk button on crewmember extension cord. A door opening device is used to open, close, and secure the door for hoisting operations.

PILOT'S CYCLIC HOIST CONTROL



CREWMEMBER'S CONTROL PENDANT

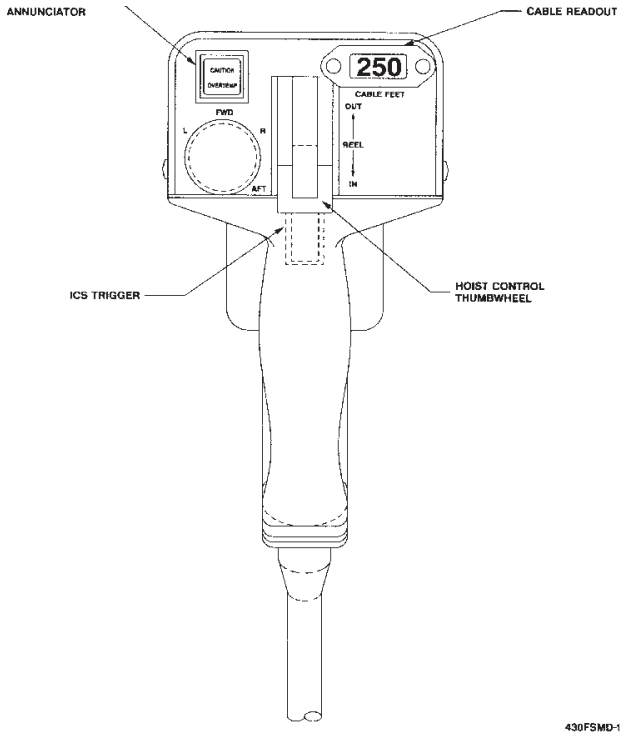
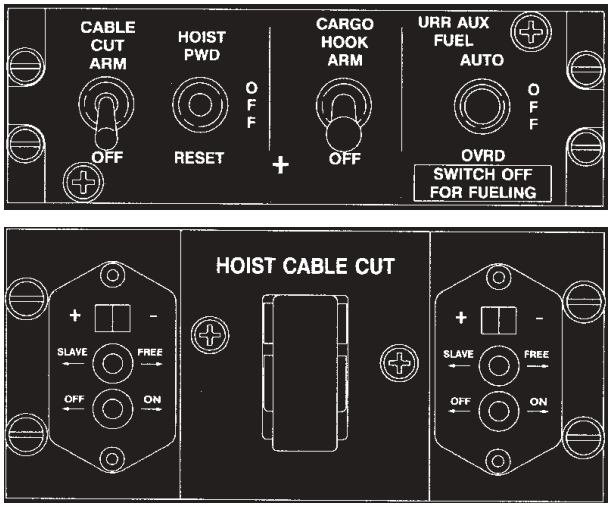


Figure 1-1. Crewmember hoist operating controls (typical)

PEDESTAL HOILS CONTROL PANELS



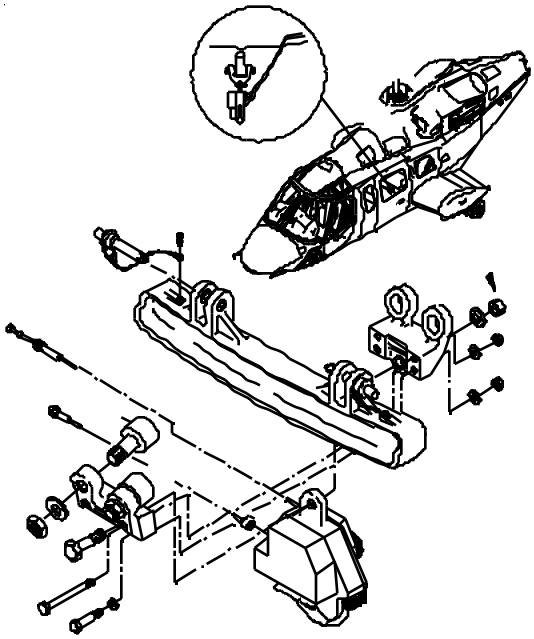
Operating procedures and limitations are found in the FAA Approved Rororcraft Flight Manual Supplement **BHT-430-FMS-31**. The Lucas Aerospace hoist **does not** have any duty-cycle (down-up operations) limitations. It is the responsibility of the aircraft operator to seek and receive approval from the appropriate regulatory agency to conduct Class D-Rotorcraft/Load operations (Human External Load).

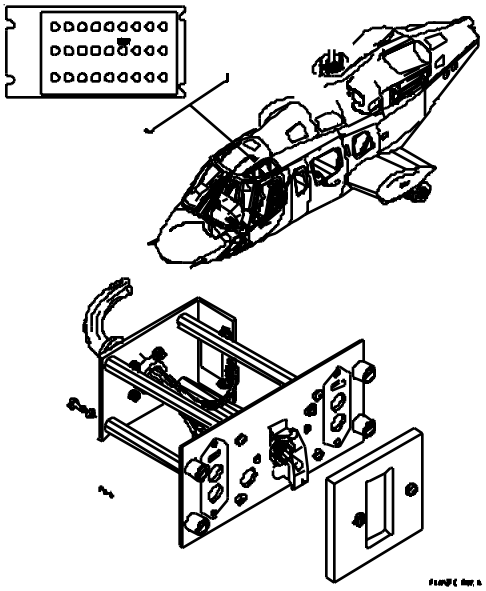
The weight increase with the **provisions only** installed is **12.9 kilograms (28.4 pounds).** The weight increase for the **hoist equipment** installed is **68.9 kilograms (152.0 pounds).** The weight increase for the **skid guard** installed is **0.4 kilograms (0.8 pounds).**

CARGO HOOK

NO. 222-706-905-XXX [PROVISIONS]

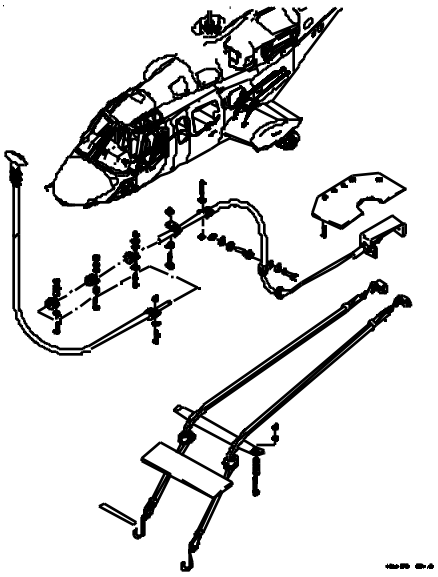
NO. 222-706-904-XXX [EQUIPMENT]

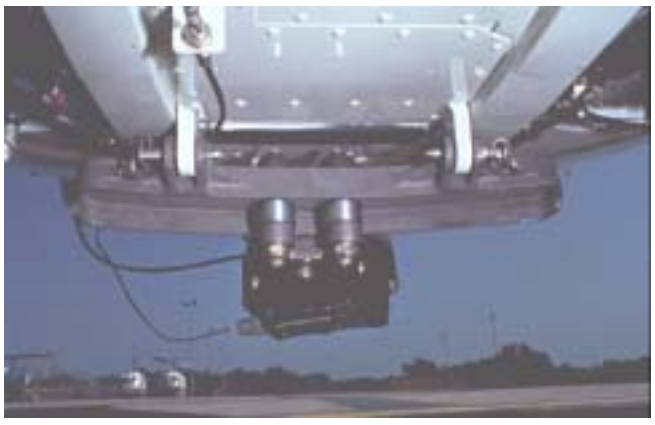




The Cargo Hook Kit provides the capability for external load operations. The maximum approved cargo hook load is **1270 kilograms (2800 pounds),** with a maximum external gross weight limit (combination of rotorcraft and load) of **4218 kilograms (9300 pounds).** The Cargo Hook Kit consists of the **provisions** (structural, electrical, and mechanical release), and the **removable equipment** (cargo hook and suspension assembly). The **provisions**, which may be ordered alone (for future use), are comprised of two suspension fittings on the belly (near the center of gravity), electrical release switch, arming switch, circuit breaker, caution panel segment, mechanical release handle and cable, and the electrical wiring and hardware to complete the installation. The **removable equipment** consists of the self-centering suspension and cargo hook assembly (with bungee cord retainer).

The cargo hook **arm switch**, located on the pedestal, is a two position ON OFF switch with a guarded cover. When armed, the IIDS W/C/A window displays the message C/H ARM, and the CARGO RELEASE switch **on the cyclic** may be used to disengage the cargo load. The EMER CARGO RELEASE PULL handle, located on the pedestal, is used to disengage the cargo load in the event of a failure of the electrical release switch. The suspension assembly is **quickly detachable** if desired, however operation of the helicopter with no load on the cargo hook is authorized under standard airworthiness certificate for both VFR and IFR conditions without removing the unit from the helicopter. When there is no load attached to the cargo hook, an elastic bungee cord retainer prevents the pivoting and rolling motion of the suspension assembly, and pulls the unit up against the belly to provide ground clearance. Operating procedures are found in the **FAA** Approved Flight Manual Supplement **BHT-430-FMS-10.** The increase in weight with the **provisions** installed is **1.4 kilograms (3 pounds).** The increase in weight with the **complete kit** installed is **18.6 kilograms (41 pounds).**





WIRE STRIKE PROTECTION SYSTEM®
AERONAUTICAL ACCESSORIES
P/N 965-35901-001

The Wire Strike Protection System® [**WSPS®**] is designed to provide a significant measure of protection for the helicopter in the event of **inadvertent flight** into **horizontally strung** mechanical, electrical transmission and communication wires and cables. The **WSPS®** is designed to **reduce** the possibility of wires entering the cockpit area, damage to the flight controls during a wire strike, or of wires becoming entangled in the landing gear. In actual cases, this system has proven effective against **multiple** wire strikes. The WSPS® consists of an **upper** cutter/deflector, a **windshield** deflector, and **two lower** cutter/deflectors. **Each cutter** is equipped with a high tensile steel cutting blade. The FAA/PMA approved kit may be installed at the factory or at any approved Bell 430 airframe service facility. The approximate increase in empty weight with the kit installed is **10.4 kilograms (23 pounds).**

LOWER CUTTERS
FOLD UP FOR
GROUND HANDLING

COCKPIT VOICE RECORDER
LORAL A100
No. 430-705-004-XXX

The requirement for a Cockpit Voice Recorded is defined by the helicopter seating configuration and the type of operation (Part 135; Part 91; etc.). When installed the CVR continuously records on **three** separate channels the last **30 minutes** of audio input from the pilot's intercommunication system(ICS), the copilot's ICS (if installed), and a cockpit "area" microphone.
The Loral A100 CVR consists of a recorder unit, CVR control/test panel with integral area microphone, impact switch, and the racks and mounts required for installation.

In operation, the system shuts down (ceases recording), after activation of the impact switch by a hard landing, to prevent over-recording of the previous 30 minutes of audio input. The approximate weight increase with the kit installed is **13.6 kilograms (30 pounds).**

EIGHT PLACE UTILITY SEATING

No.230-705-700-XXX

The Eight Place UTILITY Seating Kit provides **two rows** of fabric upholstered seats for **three passengers each** (**6 passengers total**) in the main cabin, which face each other in the traditional club car arrangment. The first row passenger seats (aft facing) include padded head rests. The aft row passenger seats feature fold down backs to provide easy access to the baggage compartment. The seating is available in four standard fabric color coordinated styles (DARK RED, BLUE, BROWN, or GRAY). All vinyl or leather is available as an option. The weight decrease with the Eight Place Utility Seating installed is **-2.7 kilograms (-6.0) pounds.**

SEVEN PLACE CORPORATE SEATING
w/ BLANK FOR OPTIONS
No.230-705-700-XYY

The Seven Place CORPORATE Seating Kit provides **two rows** of richly upholstered, deeply bolstered seats for **two** and **three passengers** (**5 passengers total**) in the main cabin, which face each other in the traditional club car configuration. The first row of two individual passenger seats (aft facing) include padded head rests, and the space between them is suitable for installation of a refreshment/entertainment system console. The aft row of three passenger seats feature fold down backs for access to the baggage compartment. The seating is available in any of eight fabric and leather color coordinated styles as specified in the CORPORATE INTERIOR TRIM KIT 430-705-850-XXX. The weight decrease with the Seven Place Corporate Seating installed is **-9.6 kilograms (-21.2 pounds).**

EIGHT PLACE CORPORATE SEATING

No.230-705-700-XYY

The Eight Place CORPORATE Seating Kit provides **two rows** of richly upholstered, deeply bolstered seats for **three passengers each** (**6 passengers total**), which face each other in the traditional club car arrangment. The first row passenger seats (aft facing) include padded head rests, and the center seat back folds down to form a tray with receptacles for refreshments. The aft row passenger seats feature fold down backs for access to the baggage compartment. The seating is available in any of eight fabric and leather color coordinated styles as specified in the CORPORATE INTERIOR TRIM KIT 430-705-850-XXX. The weight increase with the Eight Place Corporate Seating installed is **5.7 kilograms (12.6 pounds).**

NINE PLACE UTILITY SEATING

No.230-705-720-XXX [w/o Folding Backs]

No.230-705-725-XXX [w/ Folding Backs]

The Nine Place UTILITY Seating Kit provides **seven** fabric covered high-backed **energy attenuating** seats with individual seat belts and **single strap** shoulder harness and inertia reel, arranged with **two rows of two**, and **one row of three** forward facing seats in the main cabin. The two forward rows (**two seats each**) may be specified with either **folding** or **non-folding** seatbacks. The aft row passenger seats feature fold down backs to provide easy access to the baggage compartment. The seating is available in four standard fabric color coordinated styles (DARK RED, BLUE, BROWN, or GRAY). All vinyl or leather seat covering is available as an option. The weight increase with the Nine Place Utility **Non-Folding** Seating installed is **5.5 kilograms (12.2) pounds.** The weight increase with the Nine Place Utility **Folding** Seating installed is **8.7 kilograms (19.1) pounds.**

TEN PLACE UTILITY SEATING

No.230-705-730-XXX [w/ Folding Backs]

The Ten Place UTILITY Seating Kit provides **eight** fabric covered high-backed **energy attenuating** seats with individual seat belts and **single strap** shoulder harness and inertia reel, arranged with **one row of two** , and **two rows of three** forward facing seats in the main cabin. The two forward rows have **folding** seatbacks. The middle row outboard seats have **fold-forward seat bottoms** to provide easy entry to the aft row of seats. The aft row passenger seats feature fold down backs to provide easy access to the baggage compartment. When this seating configuration is used for overwater operations, the Emergency Aft Passenger Exit Window Kit is recommended. The seating is available in four standard fabric color coordinated styles (DARK RED, BLUE, BROWN, or GRAY). All vinyl or leather seat covering is available as an option. The weight increase with the Ten Place Utility Seating installed is **19.6 kilograms (43.1) pounds.**

ELEVEN PLACE UTILITY SEATING

No.430-705-003-XXX [w/ Folding Backs]

The Eleven Place UTILITY Seating Kit provides **nine** fabric covered high-backed **energy attenuating** seats with individual seat belts and **single strap** shoulder harness and inertia reel, arranged with **one row of three** aft facing seats, and **two rows of three** forward facing seats in the main cabin. The first row passenger seats (aft facing) include padded head rests. The middle row has **folding** seatbacks and the middle row outboard seats have **fold-forward seat bottoms** to provide easy entry to the aft row of seats. The aft row passenger seats feature fold down backs to provide easy access to the baggage compartment. When this seating configuration is used for overwater operations, the Emergency Aft Passenger Exit Window Kit is recommended. This seating configuration is **not compatible** with the External Life Raft Kit. The seating is available in four standard fabric color coordinated styles (DARK RED, BLUE, BROWN, or GRAY). All vinyl or leather seat covering is available as an option. The weight increase with the Eleven Place Utility Seating installed is **32.6 kilograms (71.8) pounds.**

STANDARD SOUNDPROOFING

NO. 430-706-022-XXX [MAIN CABIN]

NO. 430-706-022-XXY [w/o AUX FUEL]

NO. 430-706-022-XXZ [w/ AUX FUEL]

The Standard Soundproofing Kit reduces the noise entering the cabin from the engine and transmission compartments. The kit consists of a heavy duty blanket which fits between the headliner and interior trim panels, and the airframe. The blanket is constructed from alternating layers of sound-attenuating composite foam, lead foil, and vinyl covered fiberglass batting. Access panels and bulkhead passages for wiring, ducting, and plumbing are sealed to eliminate extraneous sound paths. The Standard Soundproofing Kit is ONLY compatible with the Standard UTILITY Interior Trim. A complete instalation requires the -XXX Kit plus either the -XXY or -XXZ kit, depending on installation of the Aux Fuel Kit.

The Standard Soundproofing Kit is added to the standard configuration at **no additional cost**, unless the customer **declines** the installation.

The kit is **not compatible** with highly customized interior completions (such as "COCOON" isolation-type interiors).

The total increase in weight with the kit installed **without Aux Fuel** is **43.1 kilograms (95.0pounds)**.

The total increase in weight with the kit installed **with Aux Fuel** is **43.2 kilograms (95.3 pounds)**.

CORPORATE INTERIOR TRIM

NO. 430-705-850-XXX

The Corporate Interior Trim Kit (CORPORATE INTERIOR) provides a higher grade of material and wider range of styles and color (eight vs. four) choices for factory completion of the 430 cabin furnishings. While primarily intended to enhance the **optional** seven and eight place **corporate** seating arrangements, the corporate interior trim may also be applied to the **standard** nine place **utility** (basic aircraft), and **optional** ten place **utility** seating choices.

The corporate trim package covers all the **seats** with fine wool fabric in a deeply bolstered styling. All leather seats are available as an option. The **sidewall armrests** are covered with color coordinated leather. Inset into the face of each armrest is an **accent trim** of fine hardwood. Lower sidewall panels are also leather covered with carpet inserts near the floor. Upper sidewall panels (window surrounds) are in an off white color. The **floor covering** is a tightly woven wool carpet. The **headliner** is covered with off white synthetic leather. **Seat belts** are color coordinated polyester webbing. Exposed metal is satin finished aluminum color. The **crew seat shells** and **passenger seat backs** are covered in color coordinated leather. A decorative accent fabric covers the aft cabin bulkhead and the small control column bulkhead.

Selection of the Corporate Trim also **requires** the specification of Corporate Soundproofing. **Selection** of an interior floor plan, and **viewing** of available choices for interior styles, and material and color samples may be made through consultation with your authorized Bell Helicopter Textron Sales Representative.

The approximate increase in empty weight when the kit is installed is **4.7 kilograms (10.3 pounds).**

CORPORATE SOUNDPROOFING

NO. 430-706-021-XXX [MAIN CABIN]

NO. 430-706-021-XXY [w/o AUX FUEL]

NO. 430-706-021-XXZ [w/ AUX FUEL]

The Corporate Soundproofing Kit reduces the noise entering the cabin from the engine and transmission compartments. The kit consists of a heavy duty blanket which fits between the headliner and interior trim panels, and the airframe. The blanket is constructed from alternating layers of sound-attenuating composite foam, lead foil, and vinyl covered fiberglass batting. Access panels and bulkhead passages for wiring, ducting, and plumbing are sealed to eliminate extraneous sound paths. The Corporate Soundproofing Kit is ONLY compatible with the CORPORATE Interior Trim, and is required when the CORPORATE Trim is specified. A complete instalation requires the -XXX Kit plus either the -XXY or -XXZ kit, depending on installation of the Aux Fuel Kit.

The kit is **not compatible** with highly customized interior completions (such as "COCOON" isolation-type interiors).

The total increase in weight with the kit installed **without Aux Fuel** is **40.7 kilograms (89.8 pounds)**.

The total increase in weight with the kit installed **with Aux Fuel** is **40.9 kilograms (90.2 pounds)**.

HIGH VISIBILITY MAIN ROTOR BLADES
No. 430-015-001-XXX

The High Visibility Main Rotor Blade Paint Option provides increased safety when operating in congested airspace. The upper surface of the main rotor blades is painted in alternating bands of White and International Orange. There is no increase in empty weight when this option is chosen.

CUSTOMIZING

Customer desired equipment which is **not** available as a **factory installed kit** may be added to the Bell 430 through **customizing**. Bell Helicopter maintains an **in house** customizing capability to meet the needs of the most demanding operator. A wide selection of additional aircraft equipment and avionics items are available to enhance the operational effectiveness of your 430, to include; Sliding Passenger Doors, Weather and Search Radars, Moving Map Displays, Flight Management Systems, TCAS equipment, Electronic Flight Publications Database & Printer, and Airborne Radio-Telephone and Satellite Communications Systems. Bell's **FAA Approved** customized installations are engineered, integrated and tested to the same standards **(FAR 27 and FAR 29)** as the basic helicopter. Each Bell factory customized installation is **recorded**, and with the addition of limited nonrecurring engineering for individual helicopter configuration compatibility, they may be economically repeated. Bell also delivers "GREEN" helicopters to select aftermarket completion centers for customizing done **under separate contract** with the purchaser. The Bell Regional Account Coordinator who administers the sales process can provide the customer with advice and assistance in selecting special avionics or mission equipment which will best suit a particular requirement.

SPECIAL VIP INTERIORS WITH CABIN ISOLATION CUSTOM SOUNDPROOFING
& MANUAL OR AUTOMATIC LIMOUSINE DIVIDER WINDOWS

CABIN WINDOW SHADE SYSTEMS OR POLARIZED WINDOWS
ENTERTAINMENT SYSTEMS & REFRESHMENT CABINETS

SPECIAL TRIM PACKAGES [PRECIOUS METAL PLATING FOR FITTINGS]

SLIDING PASSENGER CABIN DOOR (LH)
& SPECTROLAB SX-5 STARBURST® SEARCHLIGHT

RETRACTABLE PASSENGER STEPS

SPECIAL PURPOSE WINDOWS
[EXP; 3 PANEL CAMERA WINDOW]

HOSPITAL BASED EMS INTERIOR SYSTEMS

ELECTRONIC NEWS & LAW ENFORCMENT
SENSOR SUITES WITH DATA DOWNLINK

COMPLETION CENTERS

AIR METHODS CORPORATION
7301 S. PEORIA ST.
DENVER/CENTENNIAL AIRPORT
ENGLEWOOD, CO 80112, USA
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FAX: 303-790-0499
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products division@airmethods.com

EDWARDS & ASSOCIATES, INC.
137 INDUSTRIAL PARK RD.
PINEY FLATS, TN 37686
OR
P.O.BOX 3689
BRISTOL, TN 37625
PHONE: 800-251-7094
423-538-5111
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WEB SITE
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PAUL SCHREUDER-pschreuder@edwards-assoc.com
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DAN POTTER-dpotter@edwards-assoc.com

HAS CORP
TEXAS OFFICE (SALES)
1131 SOUTH AIRPORT CIRCLE, SUITE 130
EULESS, TX 76040
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PENNSYLVANIA OFFICE
(BELL CSF AND CUSTOMIZING)
P.O. BOX 1117, MT. PLEASANT AIRPORT
MT. PLEASANT, PA 15666
VOICE: 724-887-4413 FAX: 724-887-3977
WEB SITE
has-corp.com
VICE PRESIDENT NEW BUSINESS DEVELOPMENT-CHUCK HALLET-chuck@has-corp.com

HELI-DYNE SYSTEMS, INC.
AN AFFILIATE OF CORPORATE JETS, INC
9000 TRINITY BLVD.
HURST, TX 76053
817-282-9804
FAX 817-282-8329
GENERAL MANAGER
J.M.MULLINS-jmmullins@heli-dyne.com
MARKETING
M. MCCURLEY-mmccurley@heli-dyne.com

TEXAS AVIATION SERVICES
PARENT: TEXAS AVIATION SERVICES, INC.
FT. WORTH MEACHAM INT'L AIRPORT
FORT WORTH, TX 76106
OR
3901 NORTH MAIN ST.
HANGAR 2S
FORT WORTH, TX 76106
PHONE: 800-272-2022
817-625-0192
FAX: 817-625-0195
VICE PRESIDENT
TIM WOODARD-woodardt@flash.net

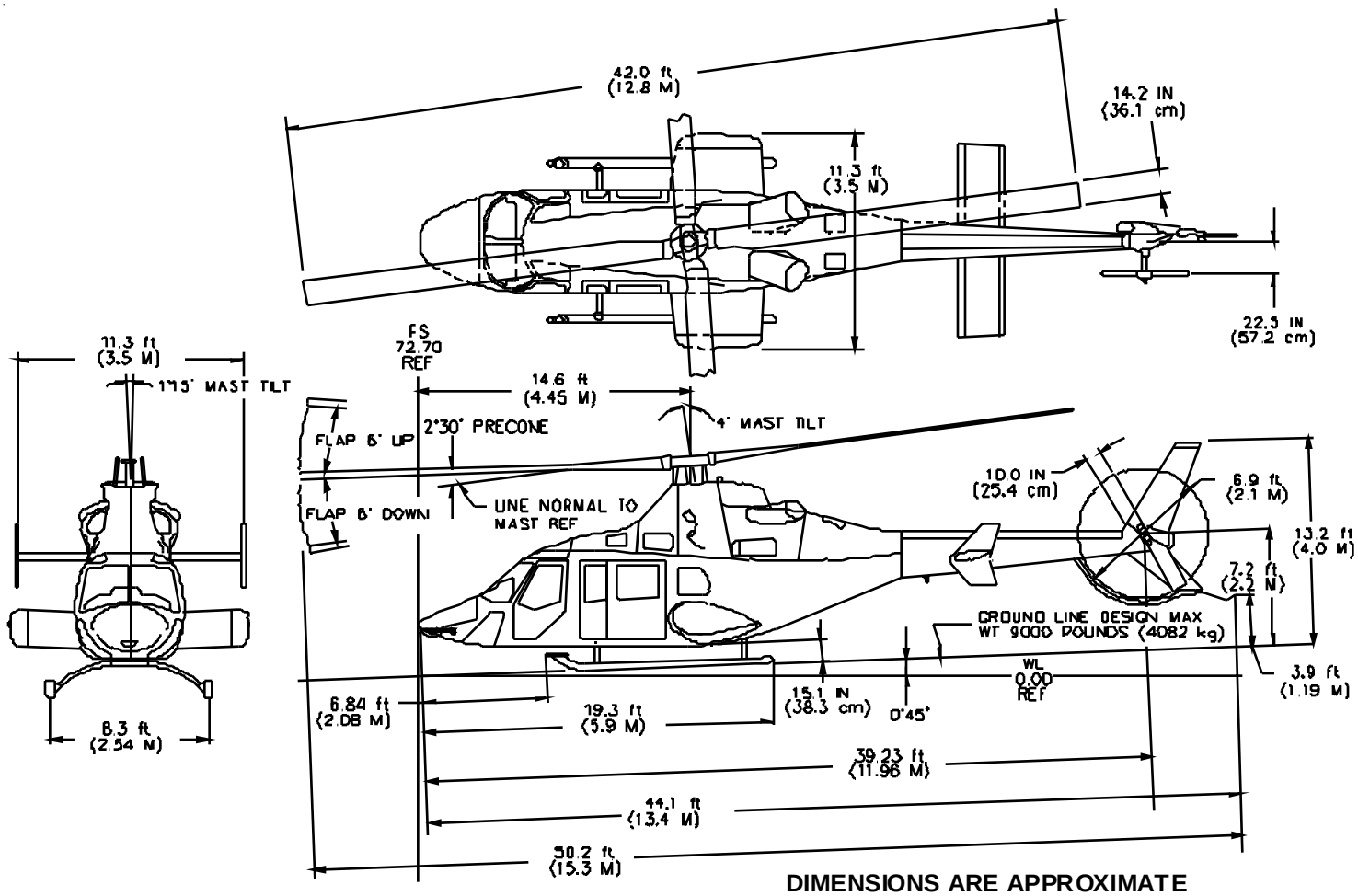
SECTION THREE

DIMENSIONS, DESIGN SPECIFICATIONS AND WEIGHTS

CONTENTS

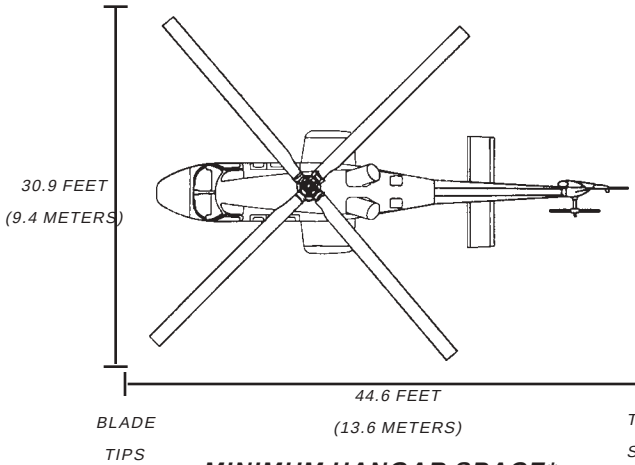
EXTERIOR DIMENSIONS [SKID GEAR]

feet (meters)



DIMENSIONS ARE APPROXIMATE

[DIMENSIONS ARE ROUNDED TO THE NEXT HIGHEST TENTH FOOT(METER)]



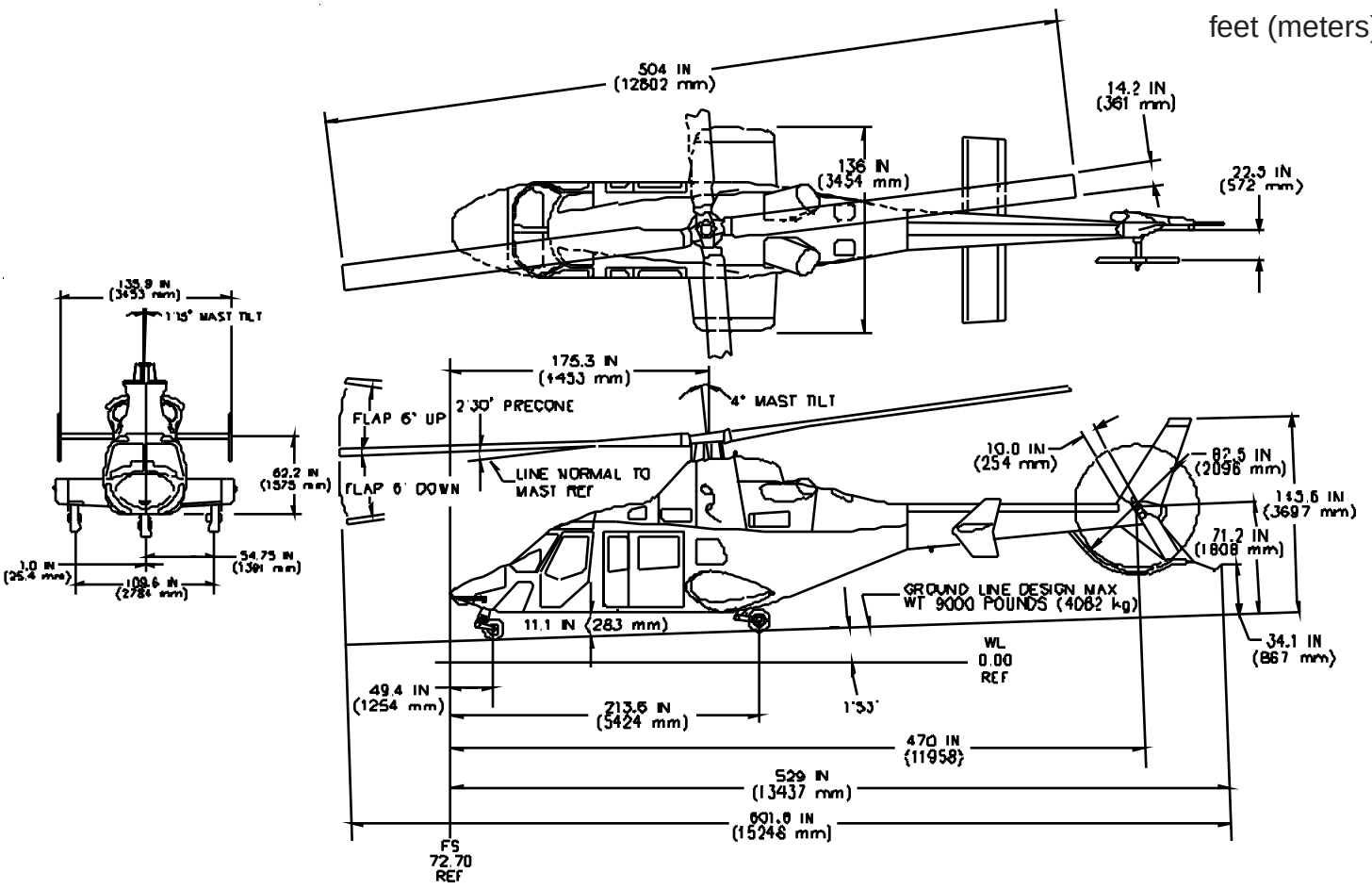
MINIMUM HANGAR SPACE*
30.9 FT X 44.6 FT
[9.4 M X 13.6 M]

****ALLOWANCE SHOULD BE MADE FOR HIGH SKID GEAR AND / OR GROUND WHEELS AND DOOR LIP WHEN CONSIDERING HANGAR DOOR WIDTH AND HEIGHT***

	ENGLISH	METRIC
OVERALL HEIGHT		
STANDARD SKIDS	13.2 FT	4.0 M
HIGH SKIDS	14.2 FT	4.3 M
OVERALL LENGTH		
FUSELAGE	44.1 FT	13.5 M
ROTOR TURNING	50.2 FT	15.3 M
ROTOR IN "X"	44.6 FT	13.6 M
MAXIMUM WIDTH		
FUSELAGE	11.3 FT	3.5 M
ROTOR TURNING	42.0 FT	12.8 M
ROTOR IN "X"	30.9 FT	9.4 M
MAIN ROTOR DIAMETER	42.0 FT	12.8 M
MAIN ROTOR CHORD	14.2 IN	0.361 M
NUMBER OF BLADES	4	4
TAIL ROTOR DIAMETER	6.9 FT	2.1 M
TAIL ROTOR CHORD	10.0 IN	0.254 M
NUMBER OF BLADES	2	2

EXTERIOR DIMENSIONS [RETRACTABLE WHEELS]

feet (meters)



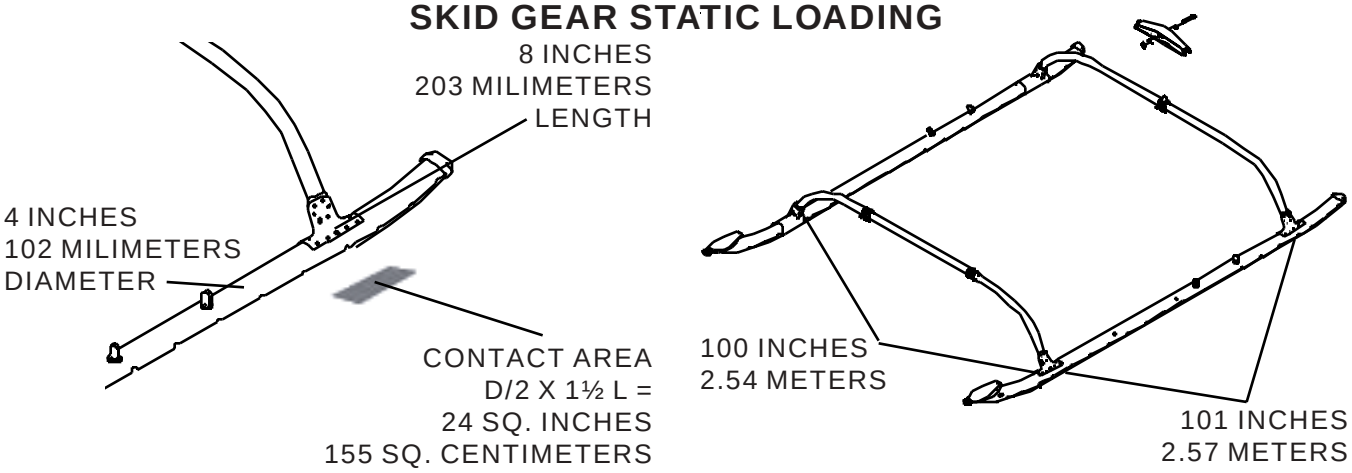
DIMENSIONS ARE APPROXIMATE

[DIMENSIONS ARE ROUNDED TO THE NEXT HIGHEST TENTH FOOT(METER)]

	ENGLISH	METRIC
OVERALL HEIGHT	12.2 FT	3.7 M
OVERALL LENGTH		
FUSELAGE	44.1 FT	13.5 M
ROTOR TURNING	50.2 FT	15.3 M
ROTOR IN "X"	44.6 M	13.6 M
MAXIMUM WIDTH		
FUSELAGE	11.3 FT	3.5 M
ROTOR TURNING	42.0 FT	12.8 M
ROTOR IN "X"	30.9 FT	9.4 M
MAIN ROTOR DIAMETER	42.0 FT	12.8 M
MAIN ROTOR CHORD	14.2 IN	0.361 M
NUMBER OF BLADES	4	4
TAIL ROTOR DIAMETER	6.9 FT	2.1 M
TAIL ROTOR CHORD	10.0 IN	0.254 M
NUMBER OF BLADES	2	2

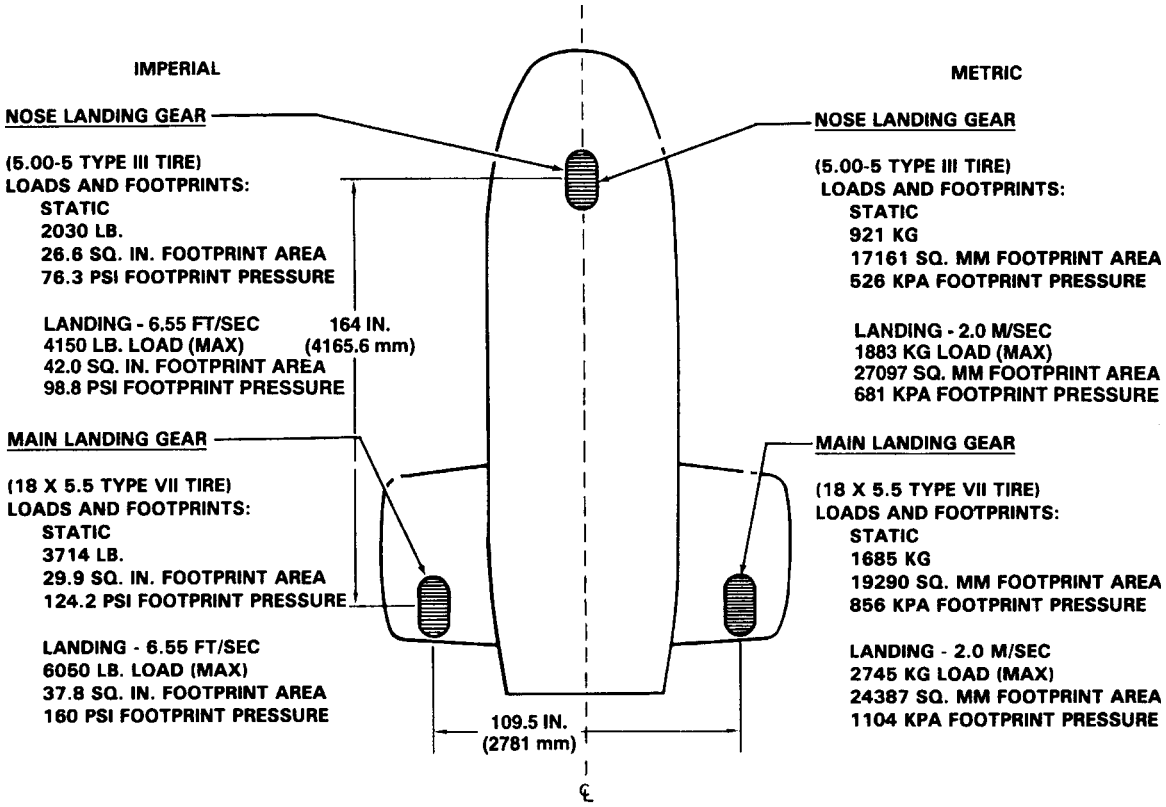
HELIPORT LOADING DATA

SKID GEAR STATIC LOADING



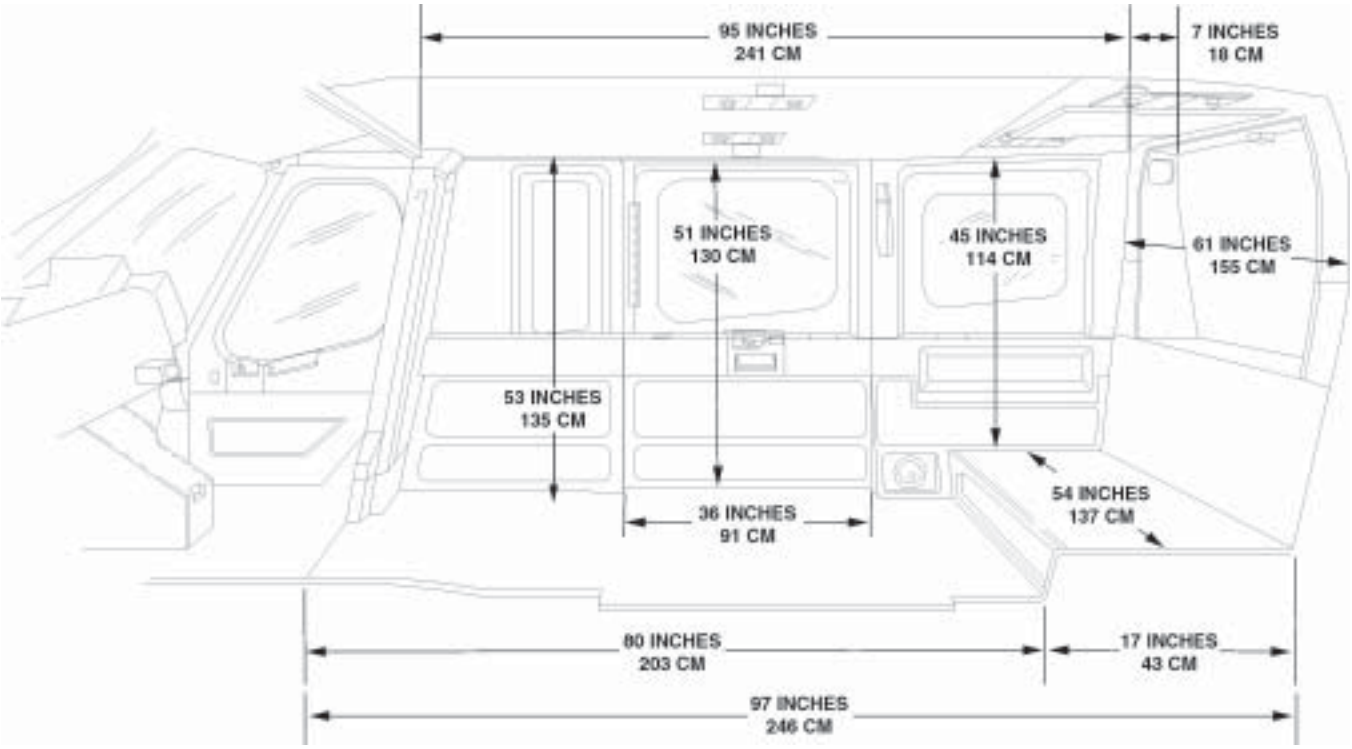
SKID LANDING GEAR STATIC LOADING						
MAX GROSS WEIGHT	LOADING		CONTACT AREA		CONTACT PRESSURE	
9000 LB/4082 KG	FORWARD	AFT	FORWARD	AFT	FORWARD	AFT
ENGLISH	2688 LBS	6312 LBS	48 SQ. INCHES	48 SQ. INCHES	56 PSI	132 PSI
METRIC	1219 KG	2863 KG	310 SQ. CM.	310 SQ. CM.	3.94 KG/SQ. CM.	9.28 KG/SQ. CM.

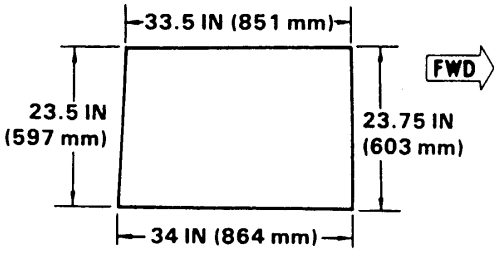
WHEEL GEAR STATIC LOADING



PRESSURE AT MAX. G.W. 9000 LB. (4091 KG)

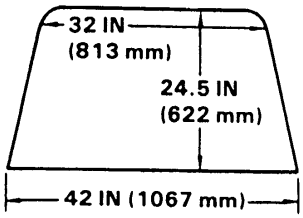
INTERIOR DIMENSIONS





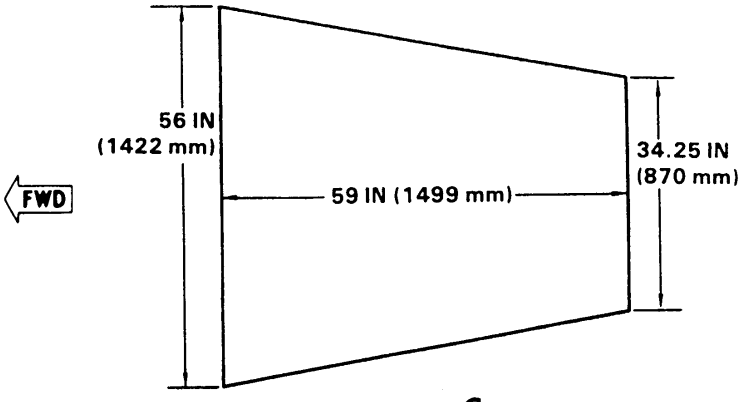
DETAIL A

BAGGAGE COMPARTMENT
EXTERNAL ACCESS DOOR
VIEW LOOKING INBOARD



DETAIL B

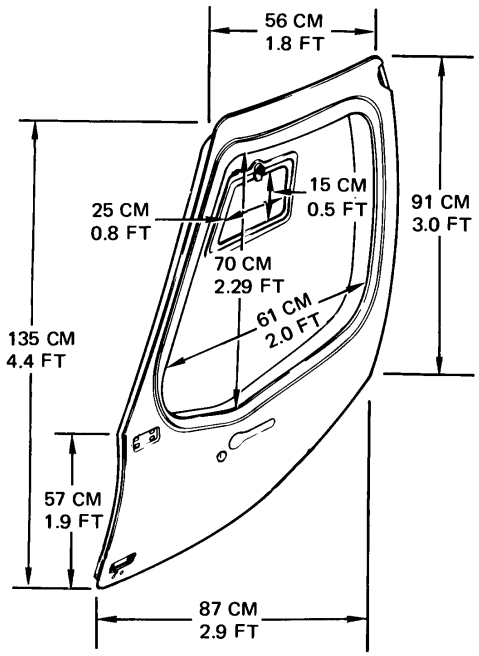
BAGGAGE COMPARTMENT
INTERNAL ACCESS DOOR
VIEW LOOKING AFT



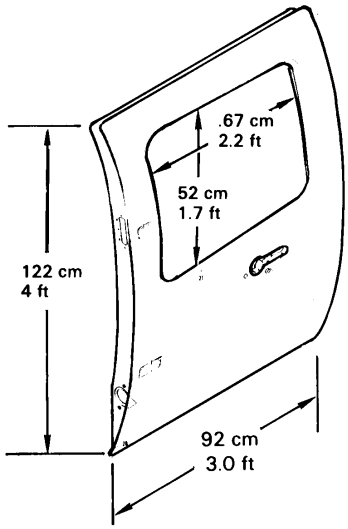
DETAIL C

BAGGAGE COMPARTMENT FLOOR
VIEW LOOKING DOWN

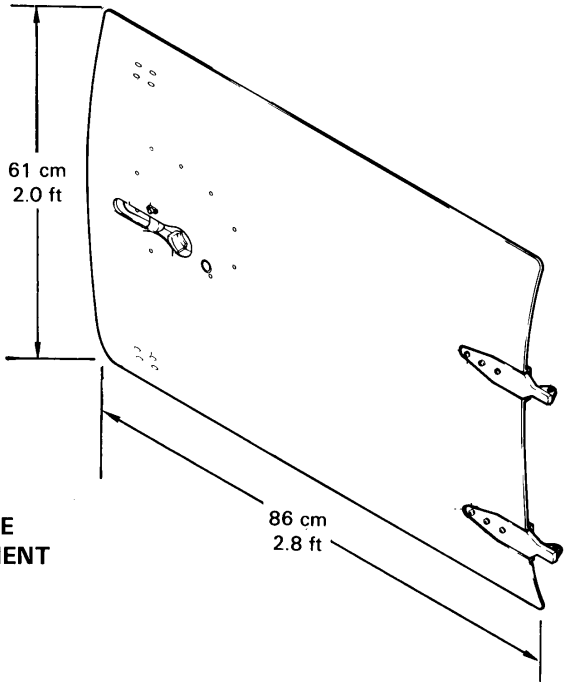
DOOR DIMENSIONS



FRONT DOOR

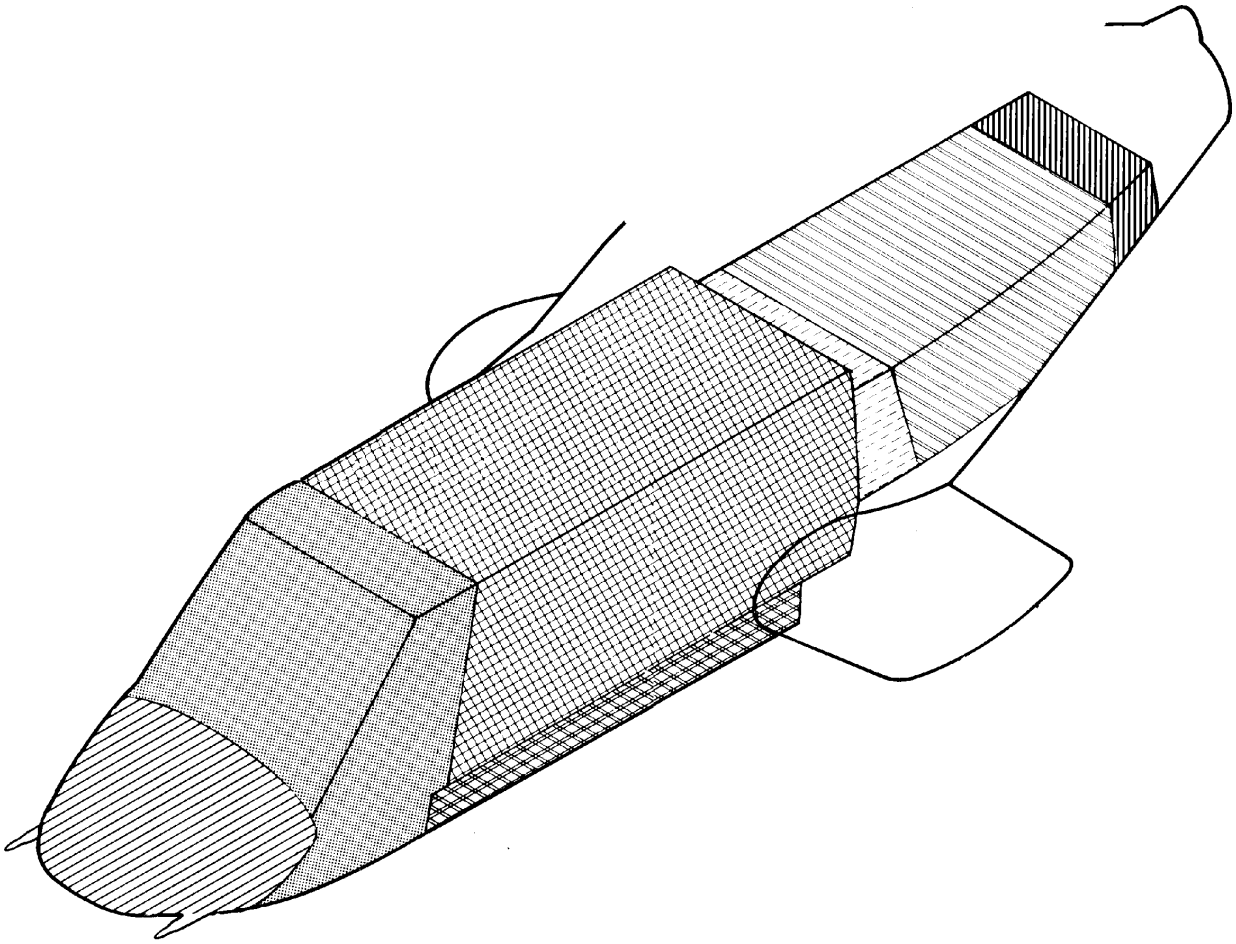


AFT DOOR



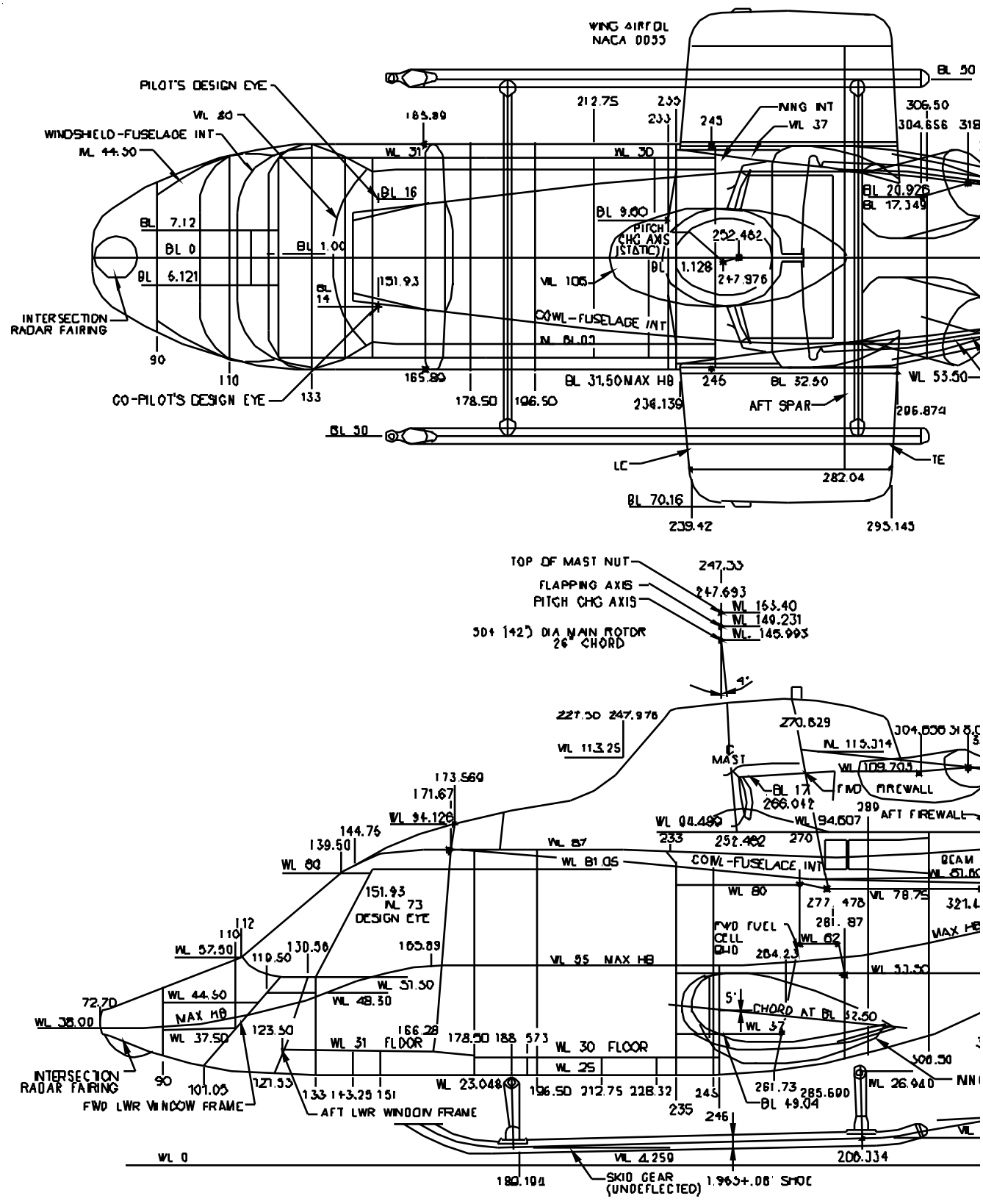
BAGGAGE
COMPARTMENT
DOOR

INTERNAL VOLUMES

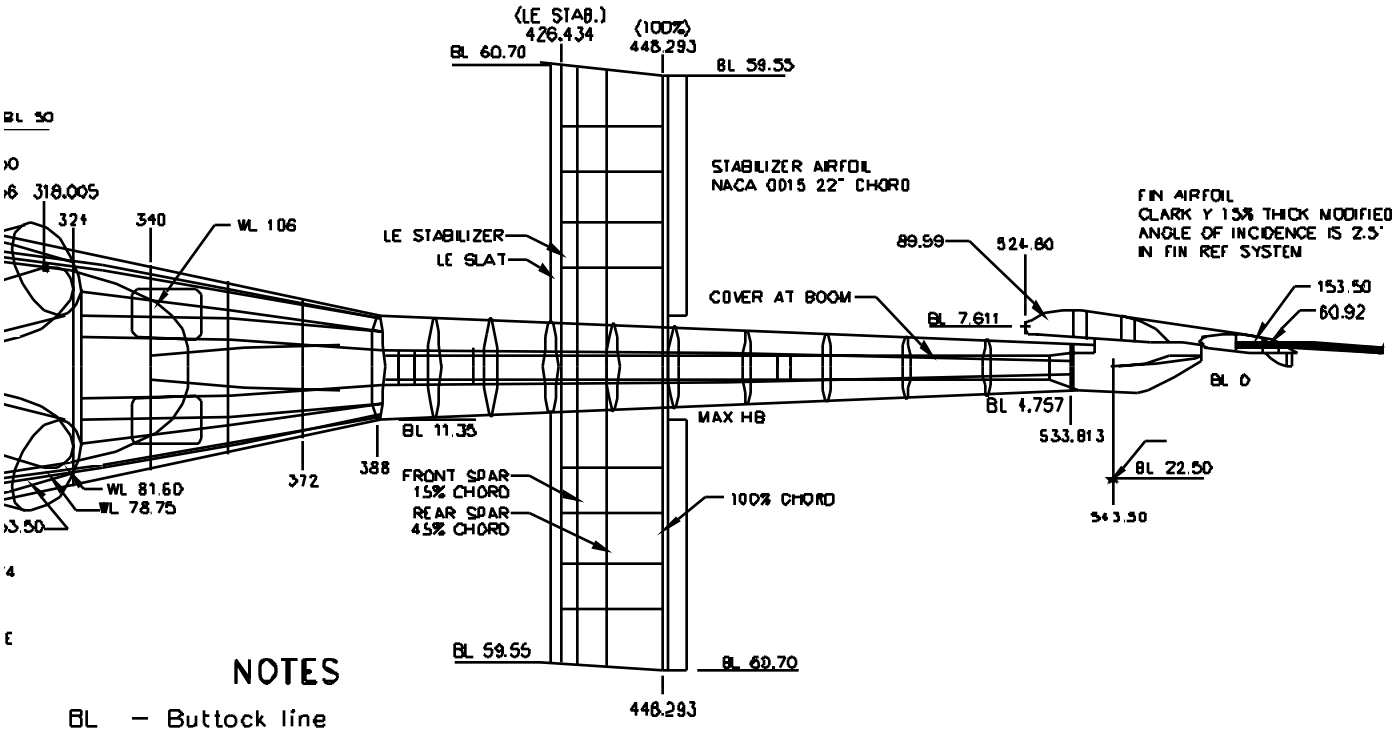


NOSE	O.40M³(14.2FT³)
CREW COMPARTMENT	1.87M³(65.9FT³)
CABIN-SEAT TO ROOF [CABIN LOAD LIMIT (STRUCTURAL)]	3.9 M³(139 FT³) 1252 KG(2760LB)
CABIN-SEAT TO FLOOR [CABIN FLOOR LOAD LIMIT]	0.6 M³(19 FT³) 488.20KG/M²(100LB/FT²)
PARCEL SHELF	0.17M³(6.0FT³)
BAGGAGE COMPARTMENT [COMPARTMENT LOAD LIMIT] [COMPARTMENT FLOOR LOAD LIMIT]	1.05M³(37.2FT³) 226.80KG(500.0LB) 488.2KG/M²(100LB/FT²)
AFT AVIONICS COMPARTMENT	0.10M³(3.7FT³)

STATION DIAGRAM [SKID GEAR]

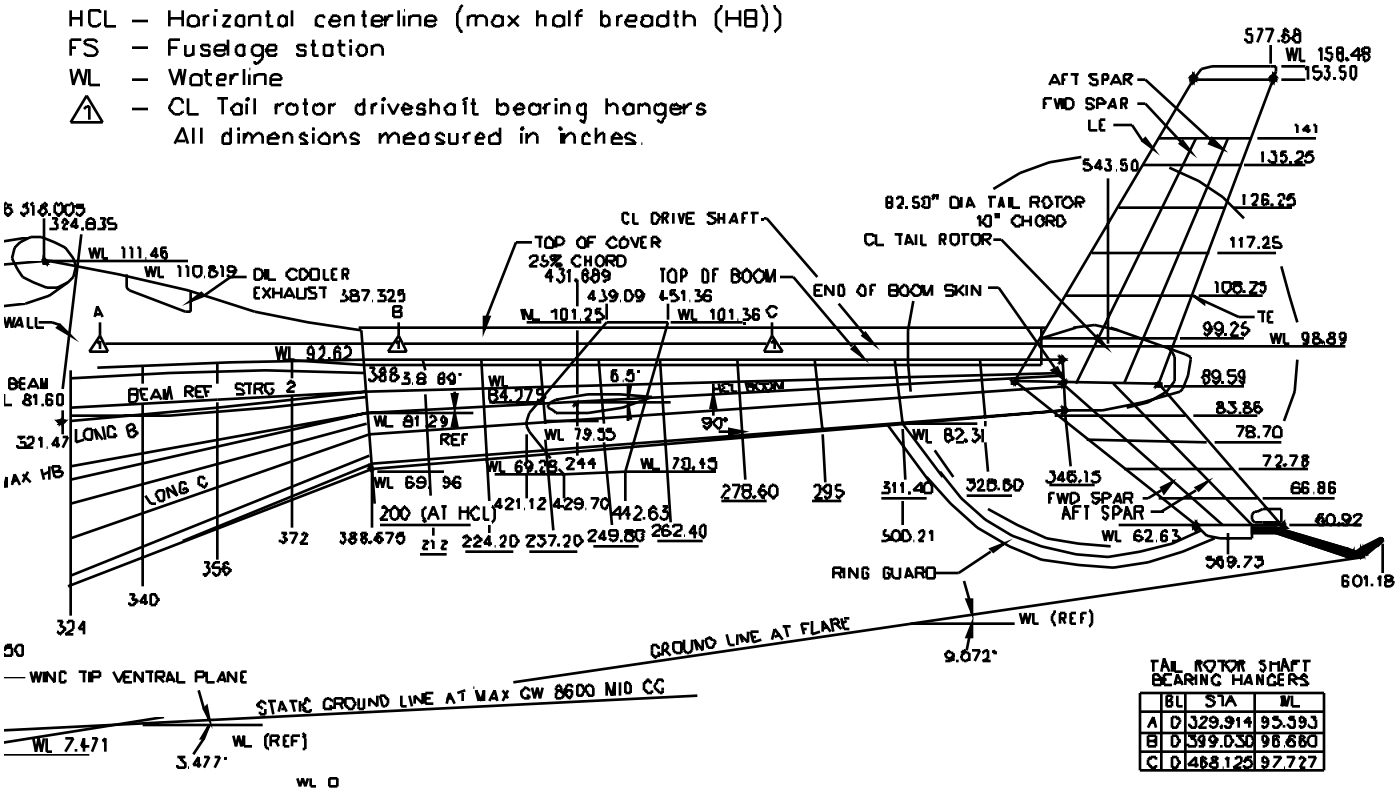


STATION DIAGRAM [SKID GEAR]



NOTES

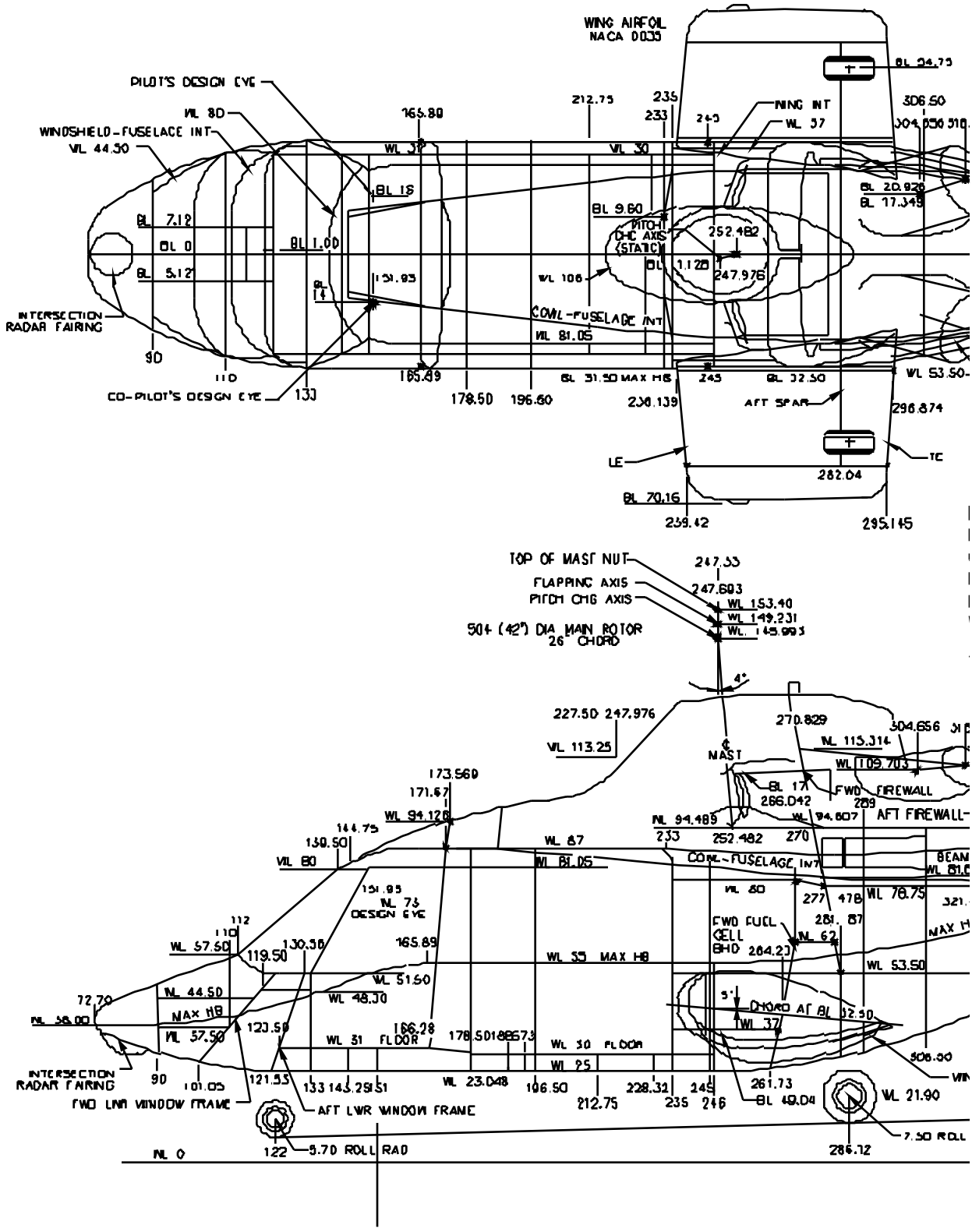
BL – Buttock line
BS – Boom station
CL – Centerline
HCL – Horizontal centerline (max half breadth (HB))
FS – Fuselage station
WL – Waterline
△1 – CL Tail rotor driveshaft bearing hangers
All dimensions measured in inches.



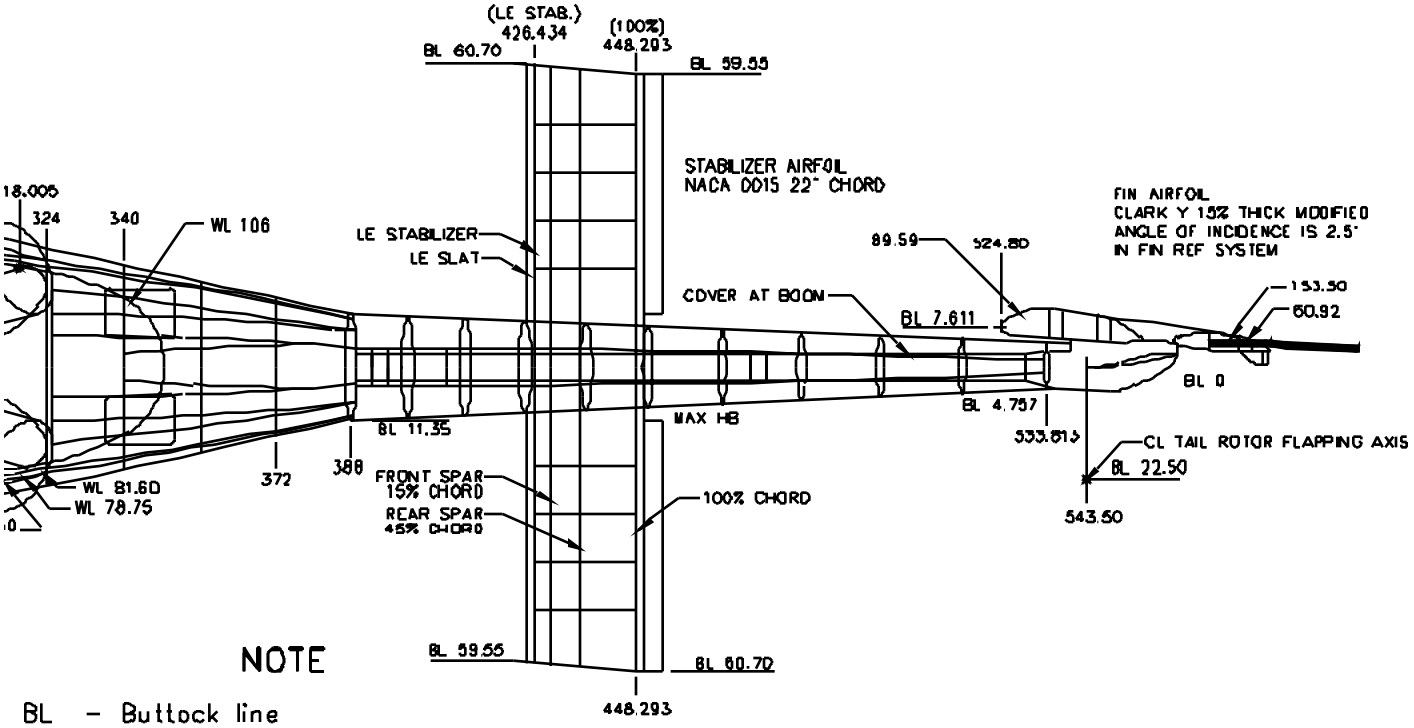
TAIL ROTOR SHAFT BEARING HANGERS

	BL	STA	WL
A	D	329.914	95.393
B	D	399.050	98.660
C	D	468.125	97.727

STATION DIAGRAM [RETRACTABLE WHEELS]

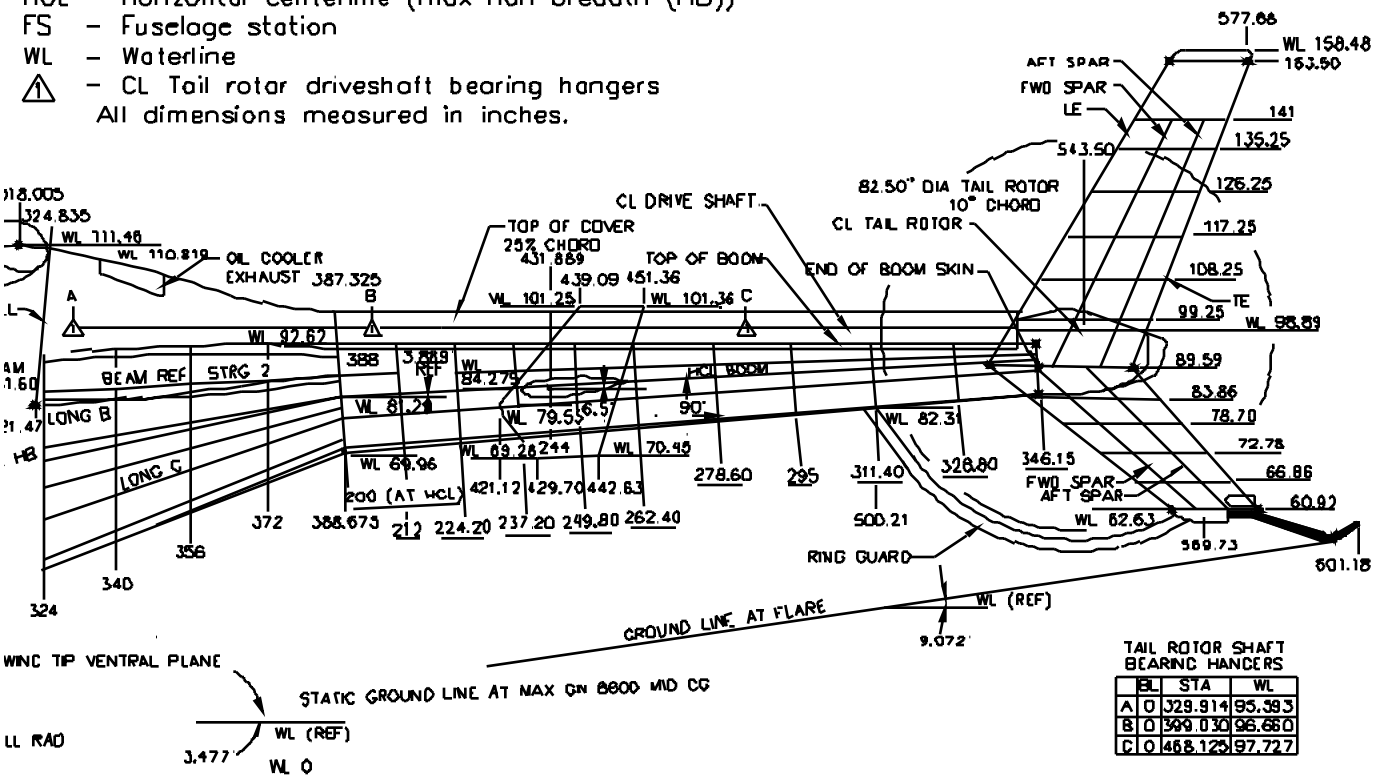


STATION DIAGRAM [RETRACTABLE WHEELS]



NOTE

BL – Buttock line
BS – Boom station
CL – Centerline
HCL – Horizontal centerline (max half breadth (HB))
FS – Fuselage station
WL – Waterline
⚠ – CL Tail rotor driveshaft bearing hangers
All dimensions measured in inches.



TAIL ROTOR SHAFT BEARING HANGERS

	BL	STA	WL
A	0	329.914	95.393
B	0	399.030	96.660
C	0	468.125	97.727

DESIGN SPECIFICATIONS

	METRIC	ENGLISH
MAIN ROTOR		
Number of Blades	4	4
Diameter	12.8 meters	42 feet
Chord	36.1 centimeters	14.2 inches
RPM (100%)	348	348
TAIL ROTOR		
Number of Blades	2	2
Diameter	2.1 meters	6.9 feet
Chord	25.4 centimeters	10 inches
RPM (100%)	1881	1881
ENGINES-TWO ROLLS-ROYCE 250-C40B (Engine Rated Shaft Horsepower)		
Twin Engine Power (Each)		
5 Minute	557 kW	747 SHP
Maximum Continuous	461 kW	618 SHP
Single Engine Power		
30 Second	629 kW	844 SHP
2 Minute	605 kW	811 SHP
30 Minute	588 kW	789 SHP
TRANSMISSION RATINGS (@100%RPM)		
5 Minute @ Main Rotor Mast	779 kW	1045 SHP
MCP @ Main Rotor Mast	738 kW	989 SHP
Single Engine @ Input		
30 Second	629 kW	844 SHP
2 Minute	605 kW	811 SHP
Continuous	532 kW	714 SHP

	METRIC	ENGLISH
SEATING		
Crew	1	1
Passengers	8/9	8/9
FUEL CAPACITY (USABLE)		
Skid Gear	935 liters	247 US gallons
Retractable Wheels	710 liters	187.5 US gallons
OPERATING CONDITIONS	-40°C to 51.7°C	-40°F to 125°F

WEIGHTS

	kilograms	pounds
STANDARD SKID GEAR		
Empty Weight (Note 1)	2415	5325
Useful Load	1803	3975
Maximum Gross Weight	4218	9300
RETRACTABLE WHEELS (*OPTIONAL*)		
Empty Weight (note 1)	2430	5358
Useful Load	1788	3942
Maximum Gross Weight	4218	9300
(Internal)		
EXTERNAL LIFT		
Maximum Gross Weight	4218	9300
Maximum External Load	1270	2800

NOTE: 1. The empty weight includes thirty five pounds of engine oil. Ballast is not included in the standard configuration weight (ballast is a function of installed equipment).

SPECIFICATION SUMMARY (ENGLISH) - SKID GEAR

WEIGHTS (Serial No. 49088 & Subsequent)	**LBS**
Standard Configuration Weight (Note 1)	5325
Normal Gross Weight	9300
External Gross Weight	9300
Standard Configuration Useful Load (Normal Gross Wt - Standard Configuration Wt)	3975
Maximum External Load [Cargo Hook Limit]	2800

Note 1: Includes thirty-five pounds of engine oil. Ballast is not included in standard configuration weight (ballast is function of installed equipment).

PERFORMANCE SUMMARY: (INTERNATIONAL STANDARD DAY EXCEPT AS NOTED)

• • • REFER TO DEMONSTRATED TAKEOFF & LANDING AND MAXIMUM OPERATING ALTITUDE NOTES ON THE PERFORMANCE CHARTS • • •

TAKEOFF, GROSS WEIGHT		Lbs	7500	8000	8500	9000	9300
IGE Hovering Ceiling	ISA	ft	17,200	15,200	13,200	11,400	10,100
	ISA+20C	ft	13,400	11,000	9000	6900	5600
OGE Hovering Ceiling	ISA	ft	14,600	12,600	10,650	8800	6200
	ISA+20C	ft	10,900	8700	6500	4300	3000
Service Ceiling (MCP) - AEO	ISA	ft	20,000	20,000	18,650	17,000	16,180
(30-minute) - OEI	ISA	ft	14,150	12,450	10,700	9200	8300
(continuous) - OEI	ISA	ft	13,590	11,840	10,190	8630	7740
Cruise @ Sea Level ISA							
Maximum Continuous Speed		ktas	143	142	141	140	139
Long Range Cruise Speed (average)		ktas	130	130	131	131	131
Range at LRC, No Reserve		nm	367	364	360	355	353
Category A Takeoff and Landing Ceiling (Note 2)							
Ground Level or Elevated Helipad							
	ISA	ft	8000	6000	3600	1200	(Note 2)
	ISA+20C	ft	5300	3100	900	8730 lbs @SL	(Note2)
Endurance, @ Loiter 65 kts	ISA	hr					3.8

Note 2: Maximum approved weight for Category A operations is 9000 pounds(4082 Kg).

ENGINE RATINGS:		Uninstalled Thermodynamic Shaft Horsepower	Engine Rated Shaft Horse-power
Rolls-Royce 250-C40B with Full Authority Digital Electronic Control			
Takeoff Power (5 Minutes)	SHP	808	747
Maximum Continuous Power	SHP	695	618
OEI (30 seconds)	SHP	940	844
OEI (2 minute)	SHP	880	811
OEI (30 minute)	SHP	835	789
OEI (Continuous)	SHP	808	747

TRANSMISSION RATING:	OEI (@ Input)		AEO (@ Mast)	
30 Second	SHP	844		
2 Minutes	SHP	811		
Takeoff Power (5 Minutes)			RHP	1045
Continuous	SHP	714	RHP	989

FUEL CAPACITY (USABLE):	
Skid Landing Gear	247 US Gallons
Auxiliary(Optional)	48 US Gallons

THE DATA SET FORTH ON THIS DOCUMENT ARE GENERAL IN NATURE AND MAY VARY WITH CONDITIONS. FOR PERFORMANCE DATA AND OPERATING LIMITATIONS FOR ANY SPECIFIC FLIGHT MISSION, REFERENCE MUST BE MADE TO THE APPROVED FLIGHT MANUAL.

SPECIFICATION SUMMARY (METRIC) - SKID GEAR

WEIGHTS (Serial No. 49088 & Subsequent)

	KG
Standard Configuration Weight (Note 1)	2415
Normal Gross Weight	4218
External Gross Weight	4218
Standard Configuration Useful Load (Normal Gross Wt - Standard Configuration Wt)	1803
Maximum External Load [Cargo Hook Limit]	1270

Note 1: Includes sixteen kilograms of engine oil. Ballast is not included in standard configuration weight (ballast is function of installed equipment).

PERFORMANCE SUMMARY: (INTERNATIONAL STANDARD DAY EXCEPT AS NOTED)

• • • REFER TO DEMONSTRATED TAKEOFF & LANDING AND MAXIMUM OPERATING ALTITUDE NOTES ON THE PERFORMANCE CHARTS • • •

TAKEOFF, GROSS WEIGHT		Kg	3400	3625	3850	4080	4218
IGE Hovering Ceiling	ISA	m	5243	4632	4023	3475	3078
	ISA+20C	m	4084	3383	2743	2103	1707
OGE Hovering Ceiling	ISA	m	4450	3840	3246	2682	1890
	ISA+20C	m	3322	2652	1981	1311	914
Service Ceiling (MCP) - AEO	ISA	m	6096	6096	5685	5212	4932
(30-minute) - OEI	ISA	m	4313	3795	3261	2804	2530
(continuos) - OEI	ISA	m	4142	3609	3106	2630	2359
Cruise @ Sea Level ISA							
Maximum Continuous Speed		km/h	265	263	261	259	258
Long Range Cruise Speed (average)		km/h	241	241	243	243	243
Range at LRC, No Reserve		km	680	675	667	658	654
Category A Takeoff and Landing Ceiling (Note 2)							
Ground Level or Elevated Helipad							
	ISA	m	2438	1829	1097	366	(Note 2)
	ISA+20C	m	1615	945	274	3960 Kg @SL	(Note 2)
Endurance, @ Loiter 120 km/h	ISA	hr					3.8

Note 2: Maximum approved weight for Category A operations is 9000 pounds(4082 Kg).

ENGINE RATINGS:		Uninstalled Thermodynamic Kilowatts	Engine Rated Kilowatts
Rolls-Royce 250-C40B with Full Authority Digital Electronic Control			
Takeoff Power (5 Minutes)	kW	603	557
Maximum Continuous Power	kW	518	461
OEI (30 seconds)	kW	701	629
OEI (2 minute)	kW	656	605
OEI (30 minute)	kW	623	588
OEI (Continuous)	kW	603	557

TRANSMISSION RATING:	OEI (@ Input)		AEO (@ Mast)	
30 Second	kW	629		
2 Minutes	kW	605		
Takeoff Power (5 Minutes)			kW	779
Continuous	kW	532	kW	738

FUEL CAPACITY (USABLE):

Skid Landing Gear	935 Liters
Auxiliary(Optional)	182 Liters

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SPECIFICATION SUMMARY (ENGLISH) - WHEEL GEAR

(Serial No. 49088 & Subsequent)

WEIGHTS	LBS
Standard Configuration Weight (Note 1)	5358
Normal Gross Weight	9300
External Gross Weight	9300
Standard Configuration Useful Load (Normal Gross Wt - Standard Configuration Wt)	3942
Maximum External Load [Cargo Hook Limit]	2800

Note 1: Includes thirty-five pounds of engine oil. Ballast is not included in standard configuration weight (ballast is function of installed equipment).

PERFORMANCE SUMMARY: (INTERNATIONAL STANDARD DAY EXCEPT AS NOTED)

• • • REFER TO DEMONSTRATED TAKEOFF & LANDING AND MAXIMUM OPERATING ALTITUDE NOTES ON THE PERFORMANCE CHARTS • • •

TAKEOFF, GROSS WEIGHT		Lbs	7500	8000	8500	9000	9300
IGE Hovering Ceiling	ISA	ft	17,200	15,200	13,200	11,400	10,100
	ISA+20C	ft	13,400	11,000	9000	6900	5600
OGE Hovering Ceiling	ISA	ft	14,600	12,600	10,650	8800	6200
	ISA+20C	ft	10,900	8700	6500	4300	3000
Service Ceiling (MCP) - AEO	ISA	ft	20,000	20,000	18,650	17,000	16,180
(30-minute) - OEI	ISA	ft	14,15012,450	10,700	9200	8300	
(continuous) - OEI	ISA	ft	13,590	11,840	10,190	8630	7740
Cruise @ Sea Level ISA							
Maximum Continuous Speed		ktas	147	146	145	144	143
Long Range Cruise Speed (average)		ktas	133	134	134	135	135
Range at LRC, No Reserve		nm	286	283	280	277	275
Category A Takeoff and Landing Ceiling (Note 2)							
Ground Level or Elevated Helipad							
	ISA	ft	8000	6000	3600	1200	(Note 2)
	ISA+20C	ft	5300	3100	900	8730 lbs @SL	(Note 2)
Endurance, @ Loiter 65 kts	ISA	hr					2.8

Note 2: Maximum approved weight for Category A operations is 9000 pounds(4082 Kg).

ENGINE RATINGS:		Uninstalled Thermodynamic Shaft Horsepower	Engine Rated Shaft Horse-power
Rolls-Royce 250-C40B with Full Authority Digital Electronic Control			
Takeoff Power (5 Minutes)	SHP	808	747
Maximum Continuous Power	SHP	695	618
OEI (30 seconds)	SHP	940	844
OEI (2 minute)	SHP	880	811
OEI (30 minute)	SHP	835	789
OEI (Continuous)	SHP	808	747

TRANSMISSION RATING:	OEI (@ Input)		AEO (@ Mast)	
30 Second	SHP	844		
2 Minutes	SHP	811		
Takeoff Power (5 Minutes)			RHP	1045
Continuous	SHP	714	RHP	989

FUEL CAPACITY (USABLE):	
Wheel Landing Gear	187.5 US Gallons
Auxiliary(Optional)	48 US Gallons

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SPECIFICATION SUMMARY (METRIC) - WHEEL GEAR

(Serial No. 49088 & Subsequent)

WEIGHTS	KG
Standard Configuration Weight (Note 1)	2430
Normal Gross Weight	4218
External Gross Weight	4218
Standard Configuration Useful Load (Normal Gross Wt - Standard Configuration Wt)	1788
Maximum External Load [Cargo Hook Limit]	1270

Note 1: Includes sixteen kilograms of engine oil. Ballast is not included in standard configuration weight (ballast is function of installed equipment).

PERFORMANCE SUMMARY: (INTERNATIONAL STANDARD DAY EXCEPT AS NOTED)

• • • REFER TO DEMONSTRATED TAKEOFF & LANDING AND MAXIMUM OPERATING ALTITUDE NOTES ON THE PERFORMANCE CHARTS • •

TAKEOFF, GROSS WEIGHT		Kg	3400	3625	3850	4080	4218
IGE Hovering Ceiling	ISA	m	5243	4632	4023	3475	3078
	ISA+20C	m	4084	3383	2743	2103	1707
OGE Hovering Ceiling	ISA	m	4450	3840	3246	2682	1890
	ISA+20C	m	3322	2652	1981	1311	914
Service Ceiling (MCP) - AEO	ISA	m	6096	6096	5685	5212	4932
(30-minute) - OEI	ISA	m	4313	3795	3261	2804	2530
(continuous) - OEI	ISA	m	4142	3609	3106	2630	2359
Cruise @ Sea Level ISA							
Maximum Continuous Speed		km/h	272	271	269	267	265
Long Range Cruise Speed (average)		km/h	246	248	248	250	250
Range at LRC, No Reserve		km	530	524	519	513	510
Category A Takeoff and Landing Ceiling (Note 2)							
Ground Level or Elevated Helipad							
	ISA	m	2438	1829	1097	366	(Note 2)
	ISA+20C	m	1615	945	274	3960 Kg @SL	(Note 2)
Endurance, @ Loiter 120 km/h	ISA	hr					2.8

Note 2: Maximum approved weight for Category A operations is 9000 pounds(4082 Kg).

ENGINE RATINGS: Rolls-Royce 250-C40B with Full Authority Digital Electronic Control		Uninstalled Thermodynamic Kilowatts	Engine Rated Kilowatts
Takeoff Power (5 Minutes)	kW	603	557
Maximum Continuous Power	kW	518	461
OEI (30 seconds)	kW	701	629
OEI (2 minute)	kW	656	605
OEI (30 minute)	kW	623	588
OEI (Continuous)	kW	603	557

TRANSMISSION RATING:	OEI (@ Input)		AEO (@ Mast)	
30 Second	kW	629		
2 Minutes	kW	605		
Takeoff Power (5 Minutes)			kW	779
Continuous	kW	532	kW	738

FUEL CAPACITY (USABLE):	
Wheel Landing Gear	710 Liters
Auxiliary(Optional)	182 Liters

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OPTIONAL ACCESSORIES

Part Number	Kit Description	Wt (lbs)	Wt (Kg)	Notes
AIRFRAME				
222-706-093-161	EMERGENCY FLOATS (WHEELS), BOTTLE IN BAG CMPT.	212.4	96.3	
222-706-093-163	EMERGENCY FLOATS (SKIDS), BOTTLE IN NOSE	211.5	95.9	(2
222-706-204-113	AUX. FUEL EQUIPMENT (48 GAL.)	61.0	27.7	
222-706-204-141	AUX. FUEL PROVISIONS (48 GAL.)	17.8	8.1	
222-706-206-115	HEATED WINDSHIELD	10.3	4.7	(1
222-706-404-113	HEATED WINDSHIELD, BIRDPROOF	14.1	6.4	(1
430-705-001-111	RETRACTABLE WHEEL LDG. GEAR **[PRODUCTION OPTION]**	33.4	15.2	(1, 3
430-705-005-107	HIGH SKID LANDING GEAR	40.7	18.5	
430-705-722-103	EMERGENCY WINDOWS AFT PASSENGER R/H AND L/H	1.5	0.7	
AVIONICS				
430-705-502-115	RAD. ALT. KRA-405B w/INDICATOR(E/M and SKIDS)	16.0	7.3	
430-705-502-119	RAD. ALT. KRA-405B w/INDICATOR(E/M and WHEELS)	16.0	7.3	
430-705-503-107	GPS - Basic SCAS/ATT-no Flt. Dir., E/M (KLN 90B)	15.1	6.8	
430-705-503-111	GPS - AFCS/KFC500 w/Flt. Dir., 4-TUBE EFIS (KLN 90B)	14.5	6.6	
430-705-509-103	ELT POINTER 4000	4.8	2.2	
430-706-004-103	VNE COMPUTER & ASSOCIATED HORN	10.1	4.6	(4
ENGINE				
230-706-501-107	PARTICLE SEPARATOR	28.0	12.7	(1
ENVIRONMENT				
222-706-018-119	ENVIRONMENTAL CONTROL SYSTEM	98.5	44.7	
EQUIPMENT				
222-706-014-103	CO-PILOT WHEEL BRAKES	4.3	2.0	
430-706-905-103	CARGO HOOK PROVISIONS	2.9	1.3	
222-706-904-107	CARGO HOOK EQUIPMENT (2800 LBS CAP.)	38.1	17.3	
230-706-502-115	SNOW BAFFLES	3.8	1.7	
430-705-006-103	EXTERNAL LIFE RAFT w/DEPLOY SYSTEM	102.4	46.4	(5
430-705-020-103	L/H LITTER DOOR	14.2	6.4	
430-706-002-101	SECOND LANDING LIGHT	4.3	2.0	(4
430-706-005-103	RESCUE HOIST EQUIPMENT (600 lbs/272kg capacity)	152.0	68.9	(5, 6
430-706-005-105	RESCUE HOIST PROVISIONS	28.4	12.9	
430-706-008-103	SKIDGUARD FOR HOIST	0.8	0.4	(6
INSTRUMENT				
430-705-004-105	COCKPIT VOICE RECORDER	30.0	13.6	
INTERIOR				
230-705-700-109	8 PLACE UTILITY SEATING	-6.0	-2.7	(1, 6
230-705-700-111	7 PLACE CORPORATE SEATING W/ BLANK FOR OPTIONS	-22.6	-10.3	(1
230-705-700-113	8 PLACE CORPORATE SEATING	12.6	5.7	(1
230-705-720-103	9 PLACE UTILITY SEATING W/O FOLDING BACKS	12.2	5.5	(1, 5, 6
230-705-725-103	9 PLACE UTILITY SEATING W/ FOLDING BACKS	19.1	8.7	(1, 5, 6
230-705-730-103	10 PLACE UTILITY SEATING W/ FOLDING BACKS	43.1	19.6	(1, 5, 6
430-705-003-101	11 PLACE UTILITY SEATING	71.8	32.6	(1, 5, 6
222-705-801-111	CREW SEATS CORPORATE	0.0	0.0	(1
430-705-850-103	CORPORATE INTERIOR	12.1	5.5	(1

Specifications subject to change without notice.

OPTIONAL ACCESSORIES (continued)

Part Number	Kit Description	Wt (lbs)	Wt (Kg)	Notes
INTERIOR (continued)				
430-706-022-101	STANDARD SOUNDPROOFING	80.1	36.3	(7
430-706-022-103	STANDARD SOUNDPROOFING W/O AUX. FUEL	14.9	6.8	(7
430-706-022-105	STANDARD SOUNDPROOFING W/ AUX. FUEL	15.2	6.9	(7
430-706-021-101	CORPORATE SOUNDPROOFING	75.0	34.0	(7
430-706-021-103	CORPORATE SOUNDPROOFING W/O AUX FUEL	14.8	6.7	(7
430-706-021-105	CORPORATE SOUNDPROOFING W/ AUX. FUEL	15.2	6.9	(7
PAINT				
HIGH VISIBILITY	MARKINGS FOR HIGH VIS. M/R BLADES (WHITE & ORANGE)	0.0	0.0	(8
STC's				
EQUIPMENT				
WPSP	WIRE STRIKE - **RECOMMENDED KIT - SEE NOTE**	23.4	10.6	(9
Credits				
INTERIOR				
230-705-710-103	UPHOLSTERED NINE PLACE UTIL SEATS	-108.6	-49.3	
430-705-800-105	STANDARD UTILITY INTERIOR	-89.3	-40.5	
430-705-800-107	STANDARD UTILITY INTERIOR - LITTER	-89.3	-40.5	
PAINT				
NO EXTERIOR	NO EXTERIOR PAINT	-35.0	-15.9	
WHITE	WHITE PAINT ONLY	0.0	0.0	

Notes: **All Equipment Kits require Provision Kits prior to installation**

1) Price and / or Weight includes credit for basic ship hardware removed.

(90.8 kg).

3) PRODUCTION OPTION, NOT A KIT.

4) VNE Computer & Horn is REQUIRED for ALL Category A Operations; The Second Landing Light is REQUIRED for ANY NIGHT Category A Operation; Additional Cat A equipment and crew requirements are specified in the Instrument Flight Rules & AFCS Configurations Pages (immediately following).

5) The External Life Raft Kit is ONLY compatible with the ALL forward facing cabin seating configurations (the 9 place utility configurations, with or without folding seatbacks, or the 10 place utility configuration with folding seatbacks). NOT compatible with the External Rescue Hoist.

6) When the Hoist Equipment is installed, the forward facing two place modules of basic seating must be located on the opposite side of the cabin from the hoist (left). If high density seating is installed, the center forward facing three place module must be removed. Standard or High Skid Landing Gear REQUIRES the Skid Cable Guard.

7) Standard Soundproofing is not included in the Std. Config. Weight, but is installed in ALL ships, at no charge, unless customer requests deletion. Complete installation of either Standard or (optional at extra cost) Corporate Soundproofing requires a -101 kit plus either a -103 or -105 kit.

8) Rework of standard blades is required to incorporate this feature.

9) The Wire Strike Kit is a RECOMMENDED **extra cost** option. The customer must specify on the Purchase Agreement for the WSPS Kit NOT to be installed.

Specifications subject to change without notice.

SPECIAL NOTE: THE BELL 430 IS OFFERED IN THREE FACTORY INSTALLED FAA IFR CONFIGURATIONS. EACH OF THE IFR CONFIGURATIONS INCLUDES A COMPLETE SUITE OF COMMUNICATIONS AND NAVIGATION RADIOS, AND A FLIGHT CONTROL SYSTEM. ITEMIZED LISTS OF EACH CONFIGURATIONS EQUIPMENT AND TOTAL INSTALLED WEIGHT ARE FOUND IN THE KIT SECTION OF THIS BOOK.

INSTRUMENT FLIGHT RULES CONFIGURATIONS

*The Bell 430 is **FAA Certificated** for **IFR operation** when equipped as specified in the Factory IFR Configurations listed below;*

DUAL PILOT IFR (with Basic SCAS/ATT) - No Flight Director - Electromechanical Instruments (No EFIS)

DUAL PILOT IFR & AUTOPILOT (w/ 4 tube EFIS) - Single AFCS / KFC-500 w/ Flight Director

DUAL PILOT IFR WITH SINGLE PILOT IFR CAPABILITY (w/ 4 tube EFIS) - Dual AFCS / KFC-500 w/ Flight Director

Equipment included in each configuration and installed weights may be found in the Tables located on the following pages.

Category A Operations requires the addition of the OPTIONAL Category A VNE Computer & Warning Audio. NIGHT Category A Operations reguires the addition of the OPTIONAL Second Landing Light.

Additional IFR configurations or available as customizing or can be developed to meet individual customer requirements.

INDEX

ALPHABETICAL LISTING OF FEATURES AND BENEFITS

SYMBOLS

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

X

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The data set forth in this brochure are general in nature and may vary with conditions. For performance data and operating limitations for any specific flight mission reference must be made to the approved flight manual.

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