Boeing CH-47
Eaton is a recognized leader in the aerospace industry and is a key supplier of hydraulics, fuel, conveyance and actuation products on the CH-47. With this cutting edge technology, Eaton provides a broad array of products including the electric pump for the Utility System Hydraulic Accumulator (EPUSHA) system.

Eaton’s contribution to the EPUSHA system consists of two main components: an electric motor pump (EPUSHA pump) and a control box. These components, bundled with a wiring harness, mounting plate, and miscellaneous hardware, are available as a modification kit that can be installed to eliminate the need for hand-pressurizing the hydraulic accumulators required to start the CH-47 Auxillary Power Unit (APU). Although this system is intended to replace a dual-action, single piston, hand operated hydraulic pump, the hand operated pump remains in the circuit as a back-up. The EPUSHA system significantly reduces the man power and time needed to start the CH-47.

The CH-47’s 3000 psi (20684 kPa) hydraulic system incorporates three transmission driven pumps, power transfer units, main engine starters, rescue hoist drive motor, cargo winch drive motor, APU starter/pump and hydraulic accumulator and brake master cylinder assembly.

Eaton also offers pressure switches and transducers, chip detectors, and an oil filler assembly.

In addition to systems and components for the CH-47 community, Eaton also provides customer service and support worldwide. Eaton is committed to servicing, supporting and enhancing the products supplied to customers and end users. Eaton’s Army contacts in the Aerospace Group are:

Charlie King  
Tel: 610-522-4089  
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Jeff Baker  
Tel: 616-831-8372  
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JeffreyABaker@eaton.com

The Boeing CH-47 is a tandem rotor, medium-lift helicopter that meets tactical and combat support mission requirements for military forces around the globe. The Chinook is the world’s most reliable and efficient transport helicopter, capable of handling useful loads up to 24,000 lbs. (10,886kg) and a maximum gross weight of up to 50,000 lbs. (22,688 kg). Its tandem rotor configuration also provides exceptional handling qualities that enable the CH-47 to operate in extreme climatic, altitude and crosswind conditions that typically keep other helicopters from flying.

The Chinook has been in the U.S. Army service since 1962. The CH-47F and MH-47G modernization programs are now in full-rate production and will ensure the Chinook remains in the Army fleet at least through the 2030s. It is conceivable that Chinooks will be Army Aviation assets for a century or more. In addition, Chinooks have served the armed forces of more than 15 international customers and performed in commercial service around the world.

The CH-47F is an advanced multi-mission helicopter for the U.S. Army and international defense forces. It contains a fully integrated, digital cockpit management system, Common Aviation Architecture Cockpit and advanced cargo handling capabilities that complement the aircraft’s mission performance and handling characteristics.

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AS1339, MIL-DTL-25579 and AS620/AS1227 standards. Other conveyance type products power the T55 engine on the CH-47, including Eaton’s carbon main bearing seals and gearbox seals.

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Boeing CH-47 System Components

**Engine Solutions**
1. Oil Filler Assembly
2. Chip Detector
3. Pressure Switch
4. Seals
5. Pressure Transducer

**Motion Control**
15. Cargo Winch Drive Motor
16. External Cargo Hook Actuating Cylinder
17. Rescue Hoist Drive Motor

**Hydraulic Systems**
7. Power Assisted Master Hydraulic Brake Cylinder
8. Hydraulic Brake Transfer Valve
10. Transmission Driven Pump
11. Power Transfer Unit (PTU)
12. APU Starter/Pump
13. Hose Assemblies
14. Self-Sealing Quick Disconnect Couplings
External Cargo Hook Actuating Cylinder

P/N 51980

The external cargo hook actuating cylinder allows, in the case of an emergency, a means of releasing the cargo or payload attached to the center cargo hook. The center cargo hook is installed on a beam suspended under the center cabin floor in the center of the helicopter. In emergency mode, when activated by a cockpit switch, the energized release of a 28 VDC solenoid on the center hook allows pneumatic pressure from a chamber in the hook actuating cylinder to flow to an auxiliary piston in the cylinder. Motion of this piston raises the cylinder to open the hook. When the solenoid is de-energized (after 10 seconds), the directed pressure is vented to atmosphere. The remaining pressure in the pressurized chamber moves the cylinder to close the hook.

Power Assisted Master Hydraulic Brake Cylinder

P/N 18050-10

Eaton’s master brake cylinder helps control braking on the CH-47. On either side of the cockpit, four identical master brake cylinders are mounted in the chin bubble area and are attached to each of the pilot’s pedals. The four wheels of the forward landing gear, and two wheels of the aft landing gear, are equipped with self adjusting disk brakes. Both forward and aft brakes can be applied and brake pressure maintained by depressing the pedals. Hydraulic pressure is supplied by the utility hydraulic system. The left side landing gear wheel brakes operate independently from the right side. Pressing either the pilots or co-pilots left pedal to depress the left master cylinder will operate the left side wheel brakes. Pressing either right side pedal to depress the right master cylinder will operate the right side wheel brakes.

Hose Assemblies

(contact rep for complete listing)

Eaton’s hose assemblies are utilized extensively throughout the CH-47 aircraft. The assemblies can be found in the hydraulic system, the oxygen system, the fuel system and lube oil system. Eaton provides 3,000 psi (20684 kPa) stainless steel braided Teflon® hose assemblies per AS1339, 1500 psig (10342 kPa) rated Teflon® hose assemblies per MIL-DTL-25579, 601/AE701 fuel hose assemblies per MIL-DTL-83797 and the AE602 ballistic self-sealing hose assemblies. Eaton’s designation of product for the hydraulic system is the AE246 and 666 series hose assemblies. The suction side of the hydraulic system also uses AE641 convoluted Teflon hose per AS620/AS1227. The extended range fuel tanks, standard on the CH-47F, uses Nomex Braided convoluted Teflon hose, AE645 type hose, inside the fuel cell.

Seals

P/Ns 60471, 61006, 74092A, 79024A, 79024B, 79024C

Eaton is the source for all carbon main bearing seals and gearbox seals for the Honeywell T55 engine powering the CH47.

Rescue Hoist Drive Motor

P/N 00-416570

Eaton’s rescue hoist drive motor is a bent-axis hydraulic motor providing bi-directional mechanical shaft power to drive the rescue hoist reel.

Self-Sealing Quick Disconnect Couplings

3200 Series

Eaton’s 3200 series self-sealing quick disconnect couplings are 3000 psi (20684 kPa). This allows for a quick connect and disconnect, positive action with valves opening simultaneously with locking action, no fluid loss during connection or disconnection, and has no cavity to trap air, dirt or moisture.

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Cargo Winch Drive Motor

P/N 114913

Eaton’s cargo winch drive motor is a bent-axis hydraulic motor providing bi-directional mechanical shaft power to drive the cargo winch.
Eaton’s transmission driven pumps provide hydraulic power to the CH-47’s primary and secondary hydraulic systems.

Eaton’s PTU provides hydraulic power between hydraulic systems without the transfer of system fluid.

Eaton’s main engine starter is a clutched hydraulic motor that rotates the T55 engine by utilizing hydraulic power provided by the APU starter/pump.

Eaton’s APU starter/pump functions as a hydraulic motor to start the APU and then converts to a pump when the APU maintains sustainable speed. The pump recharges the utility accumulators and powers the main engine starters.

Eaton’s electric pump for utility system hydraulic accumulator (EPUSHA) is a DC electric motor-powered pump (motorpump) that is installed as a primary source for recharging the utility system hydraulic accumulators required to start a CH-47 APU.

Eaton’s chip detectors provide remote sensing of the presence of ferro-magnetic wear particles in lube systems of the engines, transmissions and auxiliary power units.

Eaton’s easy “flip open cap” oil filler assembly filters media in the cap to prevent oil from splashing out of the reservoir.

Eaton’s pressure switches are used for main engine and APU pump pressure indication/monitoring.

Eaton’s pressure transducers monitor the oil inlet pressures of the five transmissions on the CH47 and allow them to be displayed in the cockpit.
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<th>Location</th>
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