

TECHNICAL MANUAL

**AVIATION UNIT AND AVIATION INTERMEDIATE
MAINTENANCE MANUAL**

CH-47D HELICOPTER

This manual together with TM 55-1520-240-23-1, TM 55-1520-240-23-2, TM 55-1520-240-23-3, TM 55-1520-240-23-4, TM 55-1520-240-23-5, TM 55-1520-240-23-6, TM 55-1520-240-23-8, TM 55-1520-240-23-9, TM 55-1520-240-23-10, TM 55-1520-240-23-11, supersedes TM 55-1520-240-23-1, TM 55-1520-240-23-2, TM 55-1520-240-23-3, TM 55-1520-240-23-4, TM 55-1520-240-23-5, TM 55-1520-240-23-7, TM 55-1520-240-23-8, TM 55-1520-240-23-9, TM 55-1520-240-23-10, 10 May 1983, and TM 55-1520-240-23-6, 6 May 1983, including all changes.

AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL
CH-47D HELICOPTER**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our fax number is: DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028. For the World Wide Web use: <https://amcom2028.redstone.army.mil>.

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CHAPTER 8

INSTRUMENTS

SECTION I

ENGINE INSTRUMENTS DESCRIPTION AND OPERATION

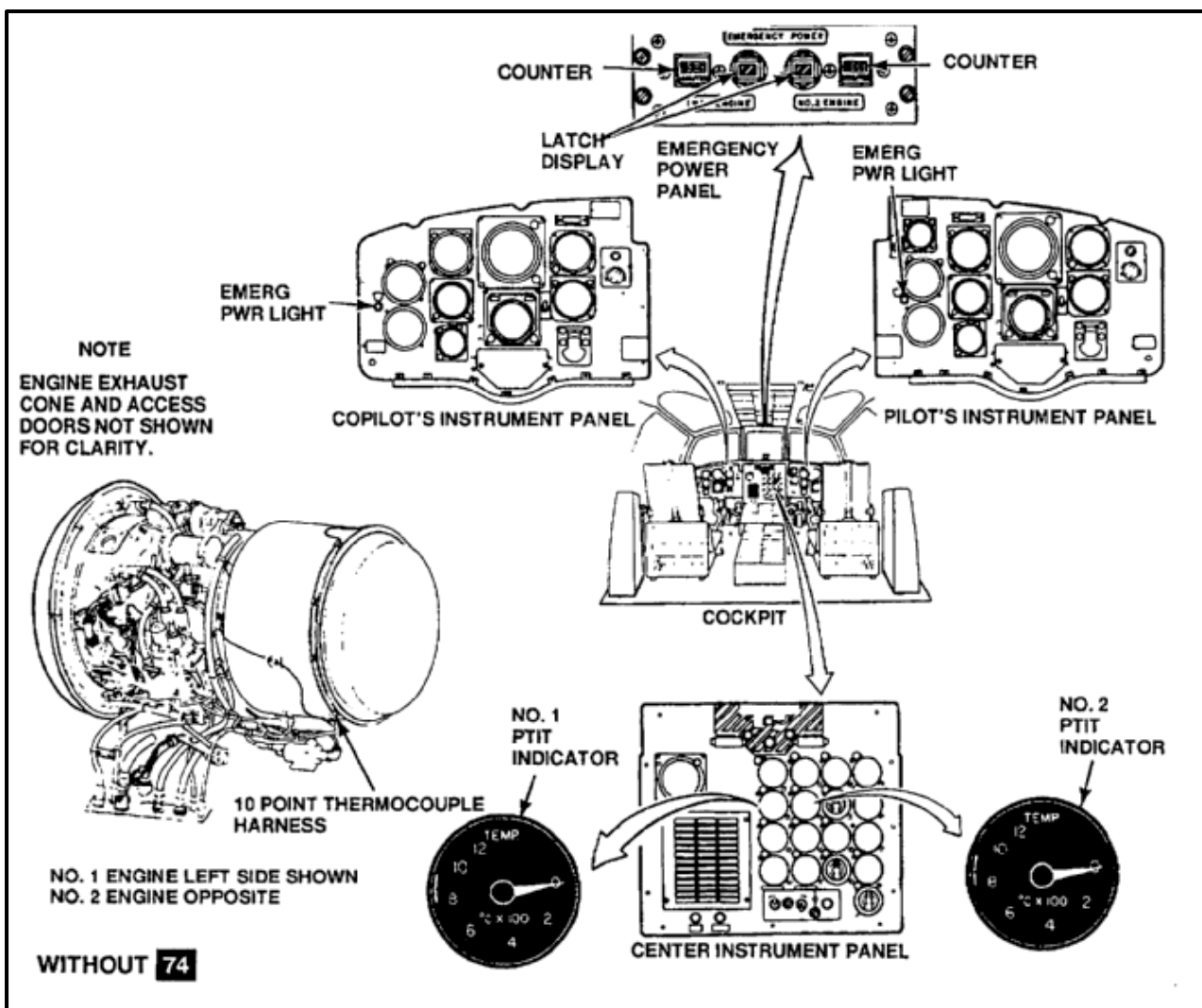
POWER TURBINE INLET TEMPERATURE (PTIT) AND EMERGENCY POWER INDICATING SYSTEM WITHOUT 74

Description

Except for component locations, the PTIT and emergency power indicating circuits are identical for each engine. The PTIT system uses a 10-probe thermocouple to measure temperature at the inlet to the engine power turbine section. This temperature is displayed on indicators, one for each engine, on the center instrument panel. The emergency power and indicating system includes a set-point circuit in each indicator, an EMERG PWR light for each engine, and an emergency power panel. The set-point circuit is factory adjusted to provide a signal when PTIT is **890° to 910°C**. This indicates the engine is providing emergency power. When an engine is operated at emergency power, the EMERG PWR light comes on.

The EMERG PWR lights are located on the pilot's and copilot's instrument panels. When PTIT exceeds **910°C** for at least **4 seconds**, a timer starts recording overtemperature duration. A striped latch display on the emergency power panel indicates that the engine was operated under emergency power and alerts maintenance personnel to record time and perform any necessary inspections or maintenance. The emergency power panel is located in the cockpit overhead panel, below the engine condition panel.

Thermocouple probes (10) are in tubes around the power turbine nozzle. The probes extend into the gas stream between the vanes of the third turbine nozzle. Heat from the combustion chamber causes the probes to generate a voltage proportional to the heat. This voltage is applied to the No. 1 PTIT indicator and the indicator displays the temperature on a scale calibrated **0 to 1,200°C**.



POWER TURBINE INLET TEMPERATURE AND CONTINGENCY POWER INDICATING SYSTEM WITH

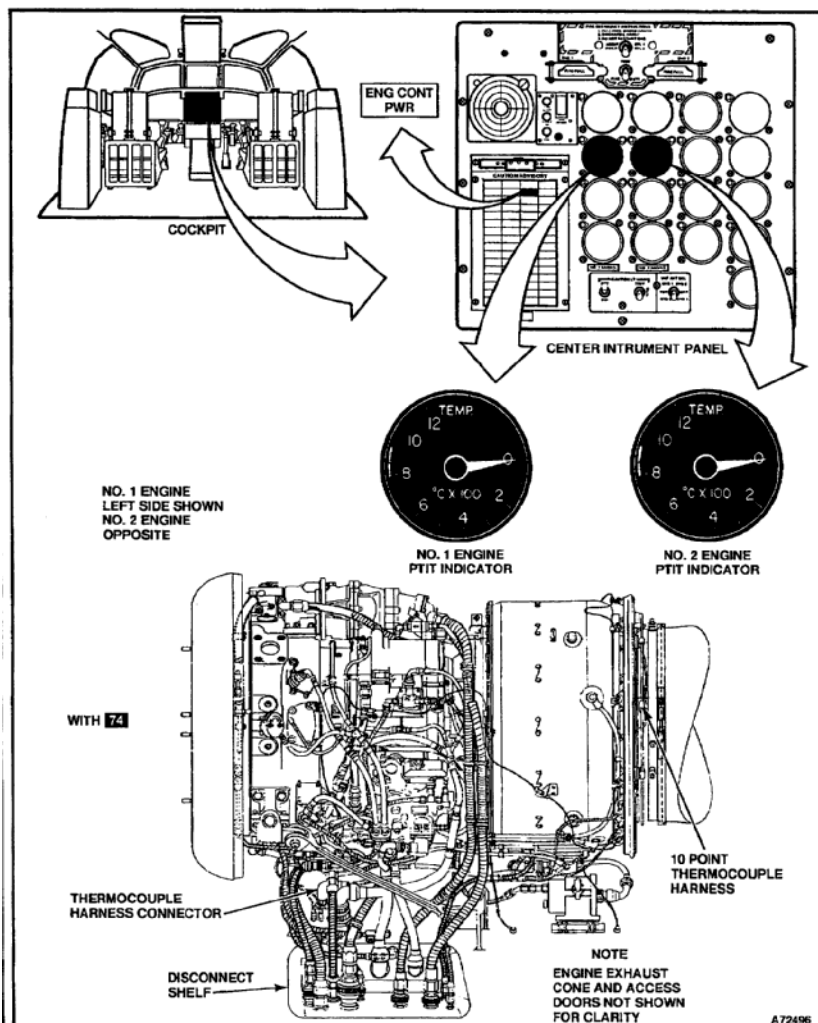
74

Description

Except for component locations, the power turbine inlet temperature (PTIT) and contingency power indicating circuits are the same for both engines. The PTIT system uses ten T4.5 thermocouples and a harness to measure the temperature at the inlet to each engine power turbine section. The power turbine inlet temperature signal is sent to the digital electronic control unit (DECU). An output signal is sent from the DECU to the PTIT indicators on the center instrument panel. The indicators are hermetically sealed and powered by **28 vdc**. The indicator has a high impedance so that the wiring harness resistance does not have an effect on the indication of the PTIT.

The contingency power indicating system is operated from the PTIT indicators. When the power turbine inlet reaches a temperature of greater than **894°C** on either engine, a switched ground circuit is completed at the indicator. This causes the amber ENG CONT PWR light on the Master Caution Panel to come on. When the PTIT drops below the contingency level, the ENG CONT PWR light goes out.

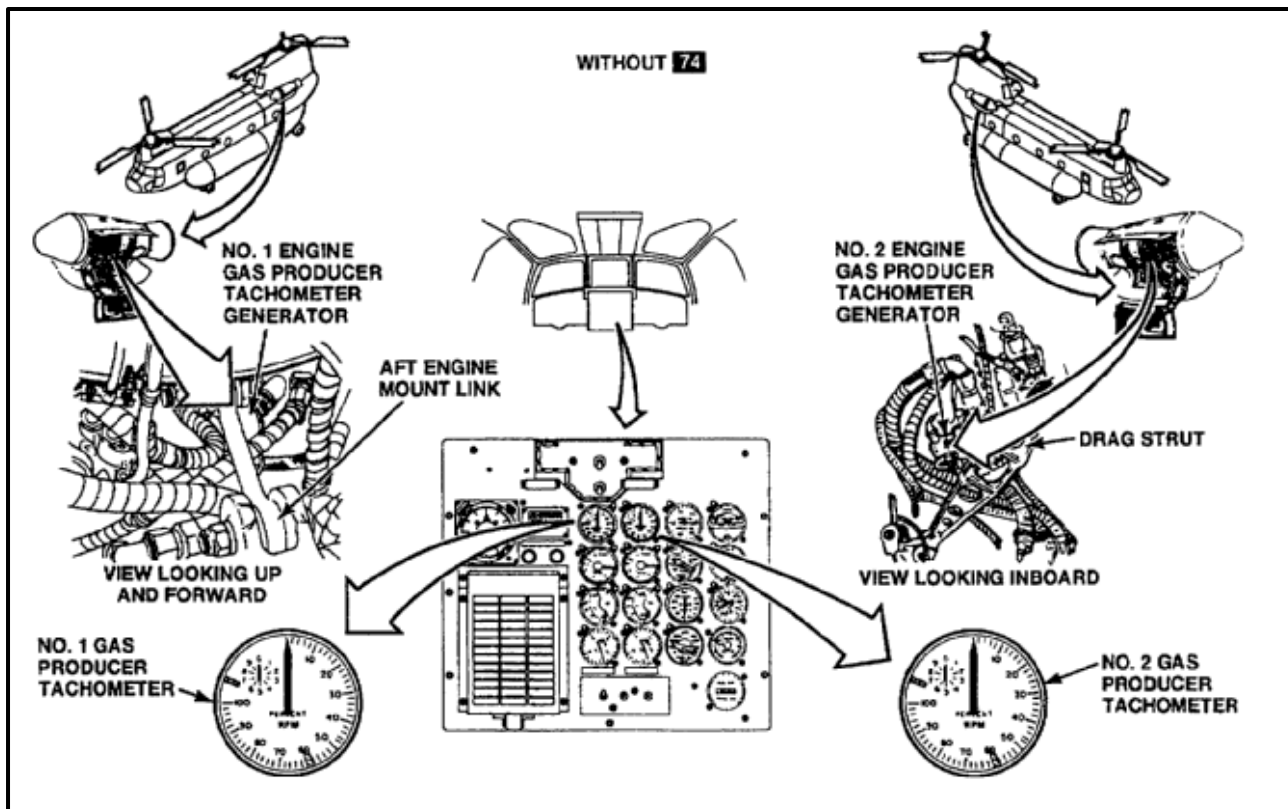
Ten T4.5 thermocouple probes are mounted in tubes around the power turbine nozzle. The probes extend into the gas stream between the vanes of the third turbine nozzle. The probes are connected to a harness. Heat at the power turbine inlet causes the probes to generate a voltage proportional to the heat. The voltage is sent to the DECU and then to the PTIT indicator. The indicator displays the temperature on a scale calibrated **0 to 1,200°C**.



GAS PRODUCER TACHOMETER SYSTEM WITHOUT**74****Description**

The gas producer tachometer system is a synchronous system that measures engine compressor rpm. There is a separate system for each engine. Each system consists of an indicator and a tachometer generator. The generator is on the engine. The indicator is on the center instrument panel. The gas producer tachometer indicator indicates compressor rpm as a percentage of maximum rated speed.

The indicator is calibrated **0 to 110 percent rpm**. Electrical connections are made through a connector at the rear of the clamp mounted instrument. The gas producer tachometer generator is a three phase ac generator mounted on the engine at the **5 o'clock** position. It supplies voltage to the tachometer indicator at a frequency proportional to the speed of the engine compressor. Electrical connections are made through a connector in the side of the generator.



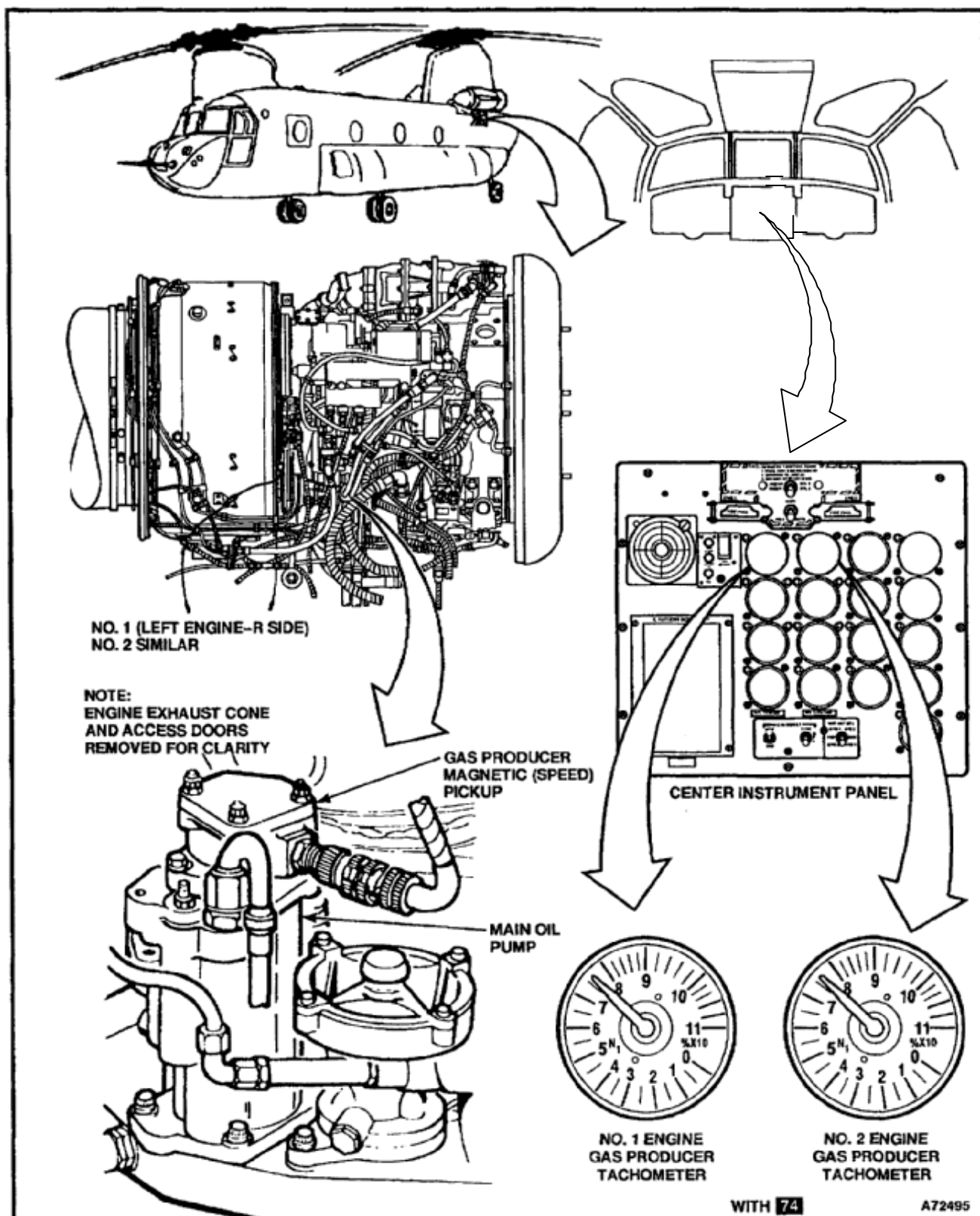
GAS PRODUCER TACHOMETER SYSTEM WITH 74**Description**

The gas producer tachometer indicating (N1) system measures engine compressor rpm. There is a separate system for each engine. Each system consists of an indicator and a magnetic (speed) pickup. The magnetic pickup is mounted on the engine. The indicator is mounted on the center instrument panel.

The gas producer tachometer (N1) indicator shows compressor rpm as a percentage of maximum rated

speed. The indicator is calibrated **0 to 110 percent** rpm. Electrical connections are made through a connector at the rear of the instrument.

The only powerplant-mounted equipment is a magnetic pickup. The magnetic pickup gives a signal frequency that is proportional to gas producer speed. Electrical connections are made through a connector on the side of the magnetic pickup.



ENGINE OIL PRESSURE INDICATING SYSTEM**Description**

The engine oil pressure indicating system is a differential pressure synchro system. It measures and indicates the pressure of oil circulating within the engine. There is a separate system for each engine. Each system consists of an indicator and a pressure transmitter synchro. The transmitter is located in the engine nacelle. The indicator is on the center instrument panel.

The engine oil pressure indicator, a synchro receiver, indicates oil pressure as psi. The indicator is calibrated

from 0 to 200 psi. Electrical connections are made through a connector at the rear of the clamp mounted instrument.

The transmitter, a synchro transmitter, is linked to the engine oil system through a flexible hose, coupling and snubber. Pressure is applied to a diaphragm in the transmitter causing the transmitter rotor to turn. This causes a change in the stator voltage in the indicator, that causes the stator rotor to turn, moving the pointer to the correct pressure indication. The snubber reduces the effect of pressure surges on the system. A zero adjustment is included on the transmitter.

