Publication No. CSP-009

Illustrated Parts List and Maintenance Instructions with Initial Installation Instructions

FOR

DIRECTIONAL GYRO INDICATOR

Part No. 369H90039-501 and 369H90039-503

USED ON HUGHES 500D AND 500H (MODEL 369D AND 369H HELICOPTERS)

THIS REISSUE SUPERSEDES ALL PREVIOUS ISSUES OF THIS PUBLICATION

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HUGHES HELICOPTERS TECHNICAL MANUAL RECOMMENDED CHANGE REPORT

This manual has been prepared and distributed by the Commercial Service Publications Department and is intended for use by personnel responsible for the maintenance of Hughes Helicopters. Periodic revision of this manual will be made to incorporate the latest information. If, in the opinion of the reader, any information has been omitted or requires clarification, please direct your comments to this office via this form (or a duplicate). An endeavor will be made to include such information in future revisions.

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Remarks/Recommendations -

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FOREWORD

F-1. PURPOSE AND CONTENTS OF THIS MANUAL.

F-2. This manual supplements information contained in HMI - Vol 1 and 369D and 369H - IPC, and contains instructions for initial installation and continuing maintenance for the directional gyro indicator. Weight and balance data is included. This manual also contains parts list for procuring replacement parts for the directional gyro indicator.

F-3. APPLICABILITY.

F-4. The directional gyro indicator is applicable for use on any Hughes 500D and 500H (Model 369D and 369H) helicopter.

F-5. COMPATIBILITY OF COMBINED OPTIONAL EQUIPMENT.

F-6. For compatibility information on which optional equipment may or may not be used in combination at the same time, refer to section 21, HMI - Vol 1.

F-7. ORGANIZATION OF CONTENTS.

F-8. The contents of this manual are grouped into sections as outlined in the Table of Contents. Each section is organized to provide comprehensive coverage of entire systems, major equipment groupings, and major components that are similar or associated. Procedures for each of these are presented in sequence as defined in section 1, HMI - Vol 1.

F-9. USE OF THIS MANUAL.

F-10. This manual is for use by operators of the Model 369D and 369H helicopter equipped with the directional gyro indicator. Although this manual is a separate publication, it should be kept with HMI - Vol 1, HMI - Vol 2, 369D and 369H - IPC and other handbooks listed in section 1, HMI - Vol 1 that form the primary information file for the helicopter.

F-11. RELATED PUBLICATIONS.

F-12. Reference is made to applicable portions of HMI - Vol 1 and 369D and 369H - IPC as required to accomplish instructions contained herein.

F-13. LITERATURE CHANGES AND REVISIONS.

F-14. Changes and revisions to contents of this manual are made as defined in section 1, Vol 1.

SECTION 1
ILLUSTRATED PARTS LIST

1-1. SCOPE AND CONTENTS.

1-2. This illustrated parts list provides, by means of text (parts lists) and companion illustrations, a complete parts definition of the 369H90039-501 and 369H90039-503 Directional Gyro Indicator Installation, manufactured by Hughes Helicopters, Culver City, California.

NOTE: The illustrated parts list is organized and presented in the same manner as the 369D Series Illustrated Parts List (369D and 369H - IPC). (For information on use, refer to 369D and 369H - IPC.)

1-3. GROUP ASSEMBLY PARTS LIST.

1-4. The parts lists furnish information for procuring replacement parts for the directional gyro indicator, and shall not be used for any other purpose.

1-5. ILLUSTRATIONS.

1-6. Illustrations are provided for each group assembly parts list. Each illustration is exploded to the extent necessary to show parts relationship for the complete directional gyro indicator installation.

1-7. USABLE ON CODE.

1-8. The USABLE ON CODE column located at the right-hand side of the Group Assembly Parts List pages indicates the effectivity of parts by aircraft serial number. In many cases two different parts are listed, one representing the original installation and another representing an improved replacement item. Alphabetic codes are used to indicate the aircraft serial number applications of a given part. When no USABLE ON CODE is listed, items are understood to have full effectivity.

USABLE ON CODE LETTER	AIRCRAFT EFFECTIVITY
A	3D thru subsequent
B	411H thru subsequent

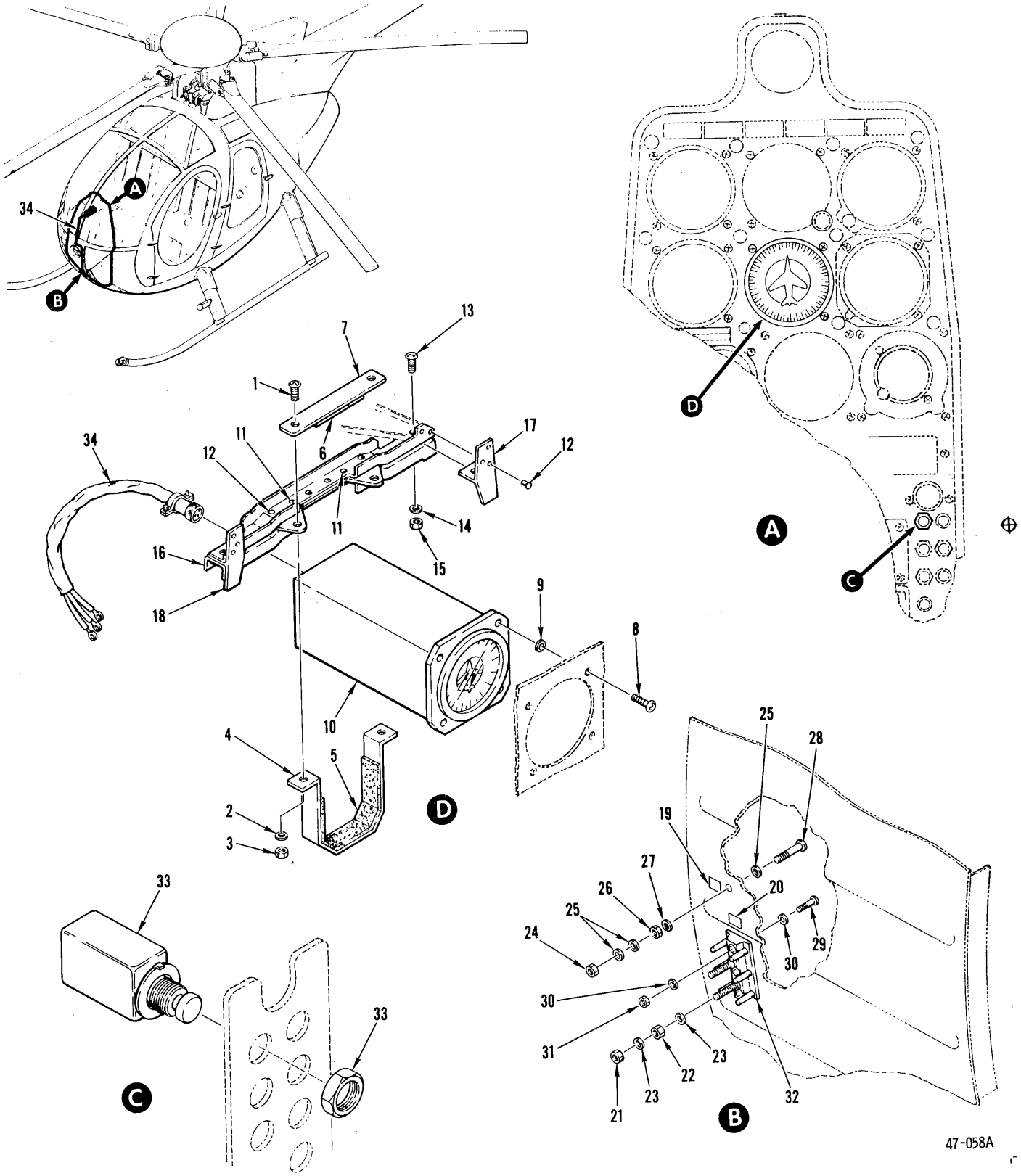


Figure 1-1. Directional gyro indicator installation

FIG. & INDEX NO.	PART NO.	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
1-1-	369H90039-501	DIRECTIONAL GYRO INDICATOR KIT . . . . . INSTALLATION	1	A
	369H90039-503	DIRECTIONAL GYRO INDICATOR KIT . . . . . INSTALLATION (Field Installation)	1	B
-1	NAS1635-3-7	. SCREW	2	
-2	AN960C10L	. WASHER	2	
-3	MS21043-3	. NUT	2	
-4	369H6455-21	. CLAMP ASSY	1	
-5	369H6455-15	. STRIP	A/R	
-6	369H6455-19	. STRIP	A/R	
-7	369H6455-41	. STRAP ASSY	1	
-8	MS35214-26	. SCREW	3	
-9	AN960PD6L	. WASHER	3	
-10	369H92832	. INDICATOR, DIRECTIONAL GYRO	1	
-11	MS20470AD3	. RIVET	A/R	B
-12	MS20470A4	. RIVET	A/R	B
-13	NAS1635-3-7	. SCREW	2	B
-14	AN960C10L	. WASHER	2	B
-15	MS21043-3	. NUT	2	B
-16	369H6455-11	. SUPPORT ASSY	1	B
-17	369H4220-1	. BRACKET	1	B
-18	369H4220-2	. BRACKET	1	B
-19	369H6615-161	. DECAL	1	
-20	369H6615-163	. DECAL	1	
-21	NAS671C6L	. NUT	2	
-22	MS21083C06	. NUT	2	
-23	AN960C6L	. WASHER	4	
-24	NAS671-8	. NUT	1	
-25	AN960C8L	. WASHER	4	
-26	MS21083C08	. NUT	1	
-27	MS35338-42	. WASHER, LOCK	1	
-28	NAS1096-2-10	. SCREW	1	
-29	NAS1635-04-7	. SCREW	2	
-30	AN960PD4L	. WASHER	4	
-31	MS21043-04	. NUT	2	
-32	MS27212-1-2	. TERMINAL BOARD, (TB103)	1	
-33	2TC13-5	. CIRCUIT BREAKER, (CB105)	1	
-34	369H90039-3	. WIRE HARNESS ASSY	1	

SECTION 2
MAINTENANCE INSTRUCTIONS

2-1. GENERAL INFORMATION.

2-2. SCOPE. This section provides description and maintenance information for the directional gyro indicator. This information is intended for user-level (field) and service and repair.

2-3. REFERENCE DATA. Where directed in the following procedures, refer to the Handbook of Maintenance Instructions (HMI - Vol 1) and to the publication listed in table 2-1 for troubleshooting and repair of components beyond the scope of this manual.

Table 2-1. Reference documents

Source	Document title
R. C. Allen, Inc. Instrument Div. Grand Rapids, Mich. 49501	Overhaul manual with Illustrated Parts List Electrical Directional Gyroscope Indicator, RCA15B, Publication 1318

2-4. DESCRIPTION.

2-5. The directional gyro indicator is a gasket sealed, direct reading instrument which provides a visual display of helicopter heading. For other leading particulars refer to manufacturer's document (table 2-1).

2-6. TROUBLESHOOTING.

2-7. Refer to table 2-2 for troubleshooting information. This information is provided to aid in isolation faults found during operational check on normal operation of system. The fault is then removed by repair or replacement to return the system to trouble free operation. For troubleshooting and repair of internal components of the directional gyro indicator beyond the scope of this manual refer to reference documents (table 2-1).

Table 2-2. Troubleshooting directional gyro indicator

Symptom	Probable trouble	Corrective Action
Off indication with system energized.	Disconnected electrical wiring.	Reconnect electrical wire.
	Defective electrical wiring.	Repair or replace electrical wire.
	Disconnected or defected system circuit breaker.	Connect or replace circuit breaker, as required.
Off and/or incorrect.	Heading indicator defective.	Replace heading indicator.

2-8. REMOVAL OF DIRECTIONAL GYRO INDICATOR.

2-9. Removal of the directional gyro indicator is accomplished by the following operations; (refer to fig. 2-1).

a. Insure that all electrical power is OFF.

b. Remove instrument panel hood and left and right fairings. Refer to section 17, HMI - Vol 1.

c. Remove attaching hardware. Remove clamp assembly, disconnect wire harness plug (P507) and remove directional gyro indicator.

d. Disconnect terminals from terminal board (TB103) and ground screw (E28) by removing attaching hardware.

e. Remove terminal board (TB103) and ground screw (E28) by removing attaching hardware.

2-10. REPAIR.

2-11. Repair of directional gyro indicator is limited to replacement of defective or damaged parts as follows:

a. Replace damaged or frayed wiring and terminals.

b. Replace defective circuit breaker (33, fig. 1-1) and terminal board (34).
c. Replace defective directional gyro indicator (10).

2-12. INSTALLATION OF DIRECTIONAL GYRO INDICATOR.

2-13. Installation of directional gyro indicator is accomplished by the following operations; (refer to fig. 1-1).
a. Install termal board (TB103) (32) using screws (29), washers (30) and nuts (31).
b. Install ground screws (28) using washer (27) and nut (26).
c. Install circuit breaker (CB105) (33) on instrument panel.
d. Attach wire harness (34) and terminals (2, 3 and 4, table 3-1), to terminal board (34, fig. 1-1), circuit breaker (33) and ground screw (28) using nuts (21, 22 and 24) and washers (23 and 25) (refer to fig. 2-2).
e. Install directional gyro indicator (10, fig. 1-1), clamp assy (4) using screws (1 and 8), washers (2 and 9) and, nuts (3).
f. Install instrument panel hood and left and right fairing. Refer to section 17, HMI - Vol 1.

2-14. INSPECTION.

2-15. Inspect components of directional gyro indicator in accordance with the following:
a. Inspect wire harness (34, fig. 1-1) and wire terminals at circuit breaker (33) and terminal board (34) for proper connection.
b. Inspect clamp assembly (4) and directional gyro indicator (10) for proper installation.

2-16. WIRING DIAGRAM.

2-17. See fig. 2-2 for the directional gyro indicator wiring diagram.

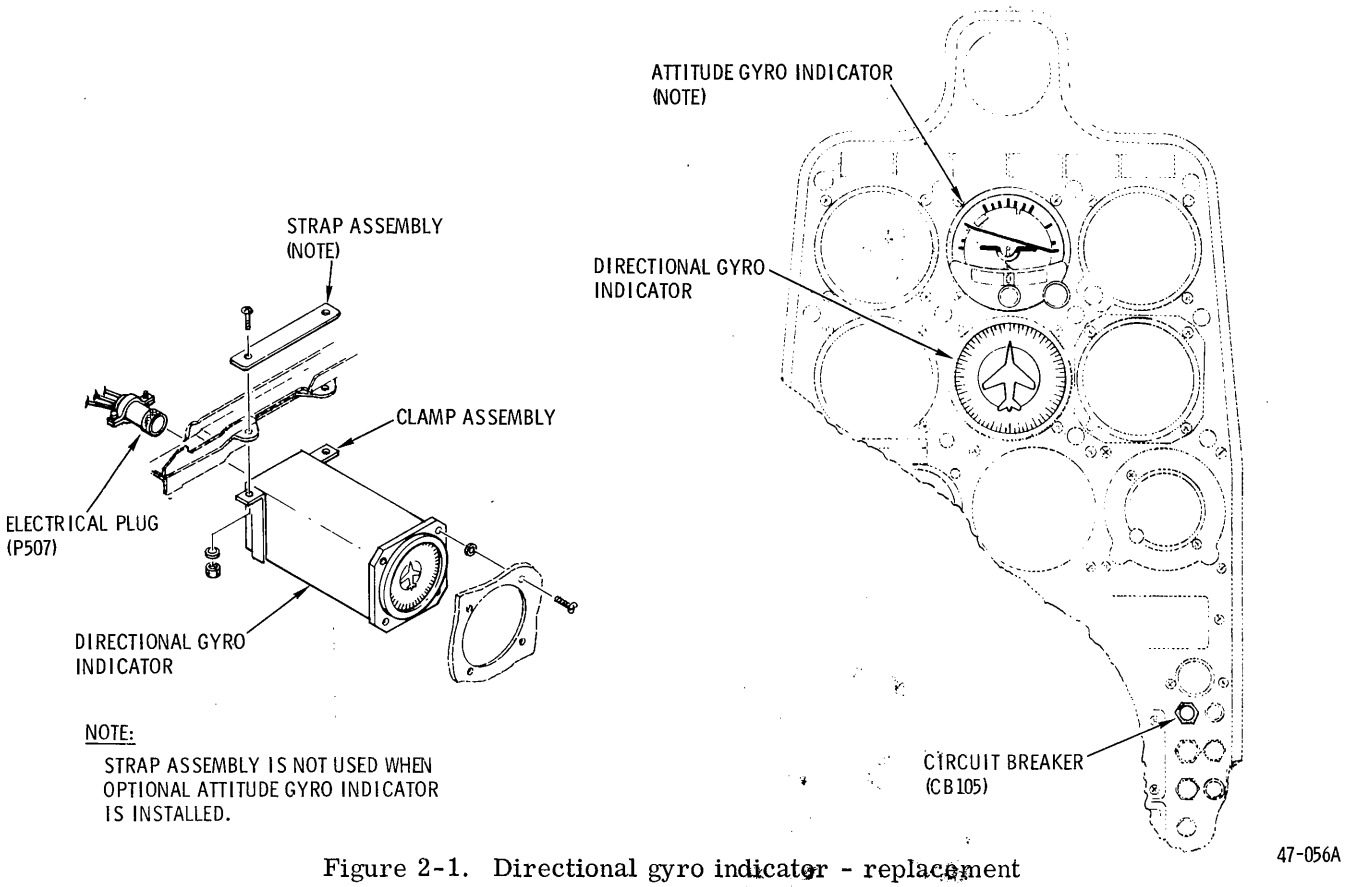
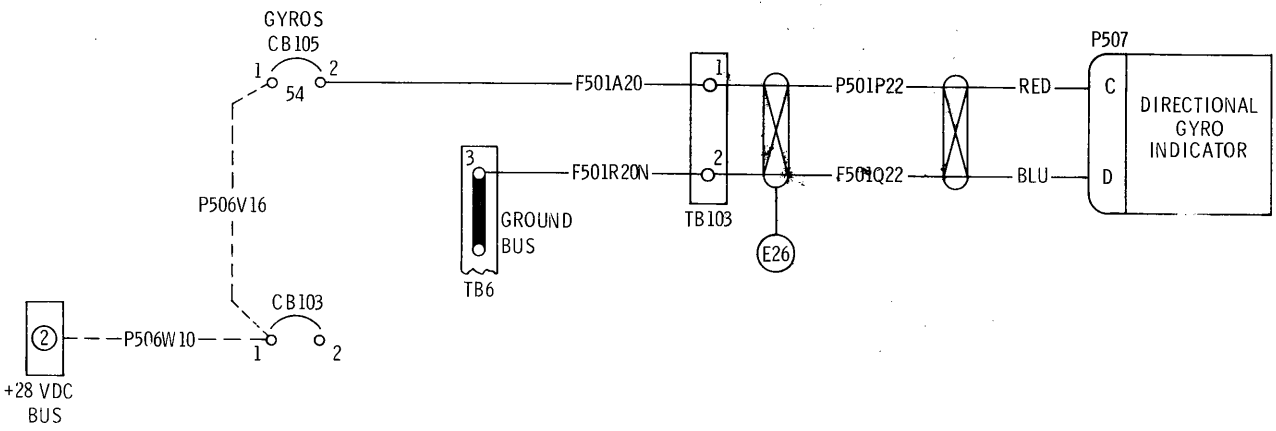


Figure 2-1. Directional gyro indicator - replacement



NOTES:

1. THIS WIRING DIAGRAM SHOULD BE USED WITH ELECTRICAL SYSTEM WIRING DIAGRAM IN HMI-VOL 1 FOR COMPLETE CIRCUIT IDENTIFICATION.
2. DASHED LINE (- - - -) ITEMS ARE PART OF HELICOPTER BASIC ELECTRICAL SYSTEM.
3. TERMINAL NUMBERS ARE FOR REFERENCE ONLY AND MAY NOT BE ON COMPONENTS.
4. CASE ELECTRICALLY BONDED TO STRUCTURE (SECTION 19, HMI-VOL 1).

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Figure 2-2. Wiring diagram - directional gyro indicator installation

SECTION 3
INSTALLATION INSTRUCTIONS

3-1. GENERAL INFORMATION.

3-2. SCOPE. Procedures in this section may be performed at operator's discretion and provide complete instructions for initial installation of the directional gyro indicator system. Information in the installation instructions is presented as additional procedures to those for maintenance of standard instruments in HMI - Vol 1. Reference is made in instructions to applicable data in HMI - Vol 1 to accomplish installation of the directional gyro indicator.

3-3. REFERENCE DATA. Table 3-1 lists consumable materials and expendable items required for the installation. Items listed in the consumable materials and expendable items table are recommended items and are of a commercial nature that should be procurable locally. Alternate, but equivalent, items are acceptable.

3-4. PREPARATION FOR INSTALLATION.

3-5. Preparation for installation of the directional gyro indicator system includes the following.

a. Identify all components, including attaching hardware, or components removed for access to work areas. Protect components from damage and foreign matter until installed.

b. Check all cockpit electrical switches for OFF condition.

NOTE: Make sure that BATT-OFF-EXT switch is OFF.

Table 3-1. Consumable materials and expendable items

Item No.	Material	Specification No. (1)	Commercial Product (2) Name/No.	Commercial Product (2) Manufacturer
1	Compound sealant	MIL-S-750L	EP711 or Pro-Seal 247 PR1221	Coast Pro-Seal Compton, California Product Research Burbank, California
2	Terminal	MS25036-101		
3	Terminal	MS25036-103		
4	Terminal	MS25036-149		
5	Grommet	MS21266-1		
6	Tie strap base		TC112	Thomas and Betts Co. Elizabeth, N.J.
7	Tie strap, nylon	MS17821-1-9	(3)	
8	Washer	AN960C6L		
9	Rivet	MS20470A4		

NOTES:
(1) Numbers are U.S.A. Specifications and Standards. The prefix symbols are defined as follows: AMS - American Material Standard; MS - Military Standard; MIL - Military Specification; Single, double, or triple alpha prefix of the same letter - Federal Specification; AN - Air Force-Navy Aeronautical Standard; NAS - National Aerospace Standard.
(2) Primary selection. Any equivalent material may be used as an alternate selection.
(3) Use the best comparable grade material when the conformity of available materials of the same type with the listed Specification No. cannot be determined.

3-6. REMOVAL OF EQUIPMENT.

3-7. Prior to installation of the directional gyro indicator the following items must be removed:

a. Remove instrument panel hood and left and right instrument panel fairings. Refer to section 17, HMI - Vol 1.

b. Remove attaching hardware for blank panel located in upper center of instrument panel. Retain washers for use in installation of directional gyro indicator.

NOTE: On 500H (model 369H) helicopters removal of one or both center windshield panels may be required.

3-8. MODIFICATION OF EQUIPMENT.

3-9. Prior to installation of the directional gyro indicator the following modifications must be preformed:

a. Locate and drill two .112/.116 diameter holes for mounting terminal board (TB103), (view A, fig. 3-1).

b. Locate and drill one .168/.175 diameter hole for mounting of ground screw (E26), (view A, fig. 3-1).

c. Locate angles and rework as shown in view B, figure 3-1.

NOTE: If the attitude gyro is installed rework of the angles may not be required.

d. On 500H (model 369H) helicopters the following modification to the instrument panel structure may be required

(1) Locate existing stiffener as shown in view C, figure 3-1, and drill out attaching rivets as required.

3-10. INSTALLATION OF DIRECTIONAL GYRO INDICATOR.

3-11. Refer to figure 1-1 and preform the following:

a. Position wire harness assembly (34) on instrument panel structure at existing tooling holes. Secure wire harness assembly to instrument panel using tie strap base (4, table 3-1), washers (6) nylon tie strap (5) and rivets (7) as required.

b. Install circuit breaker (CB105) (33, fig. 1-1).

c. Position terminal board (TB103) (32) and install using screws (29), washers (30) and nuts (31).

d. Install screw (28) using washer (27) and nut (26).

e. Attach wire harness (34) and terminals (2, 3 and 4, table 3-1) to terminal board (TB103) (32, fig. 1-1), circuit breaker (33), and screw (28) using nut (21 and 22), washers (23) and washer (25) and nut (24).

f. Apply decals (19 and 20) as shown in fig. 1-1.

g. Position brackets (17 and 18) and support assembly (16) on instrument panel and install using rivets (11 and 12) as required. Install screw (13), washer (14) and nut (15).

h. Install directional gyro indicator (10) using screw (8), and washer (9). Install strap assembly (7), strip (5 and 6) as required. Install clamp assembly (4) using screw (1), washer (2) and nut (3).

NOTE: Strap assembly (7) is not used if optional attitude gyro indicator is installed. Apply strip (6) using sealant compound (1, table 3-1) in place of strap assembly (7).

i. Attach wire harness (P507) to directional gyro indicator at (J507) location.

3-12. INSTALLATION OF REMOVED EQUIPMENT.

3-13. After installation of directional gyro indicator, the following equipment must be reinstalled.

a. Reinstall instrument panel hood and left and right instrument panel fairings. Refer to section 17, HMI - Vol 1.

b. Reinstall center windshield panels as required.

3-14. COMPLETION OF INSTALLATION.

a. Inspect all attaching hardware to ensure components are secured.

b. Check all electrical wire to ensure correct attachment.

c. Clean all foreign material from instrument panel and areas around terminal board installation.

3-15. WEIGHT AND BALANCE.

3-16 Weight and balance data changes that result from installation of directional gyro are listed in Table 3-2. After installation of directional gyro, incorporate changes to helicopter weight and balance record as instructed in HMI - Vol 2.

Table 3-2. Weight and balance data

	Weight (lb)	Arm (in.)	Moment (in. -lb/100)
Added	3.1	43.0	1.3
Removed	0.0	-	0.0
Changed	+3.1	43.0	+1.3

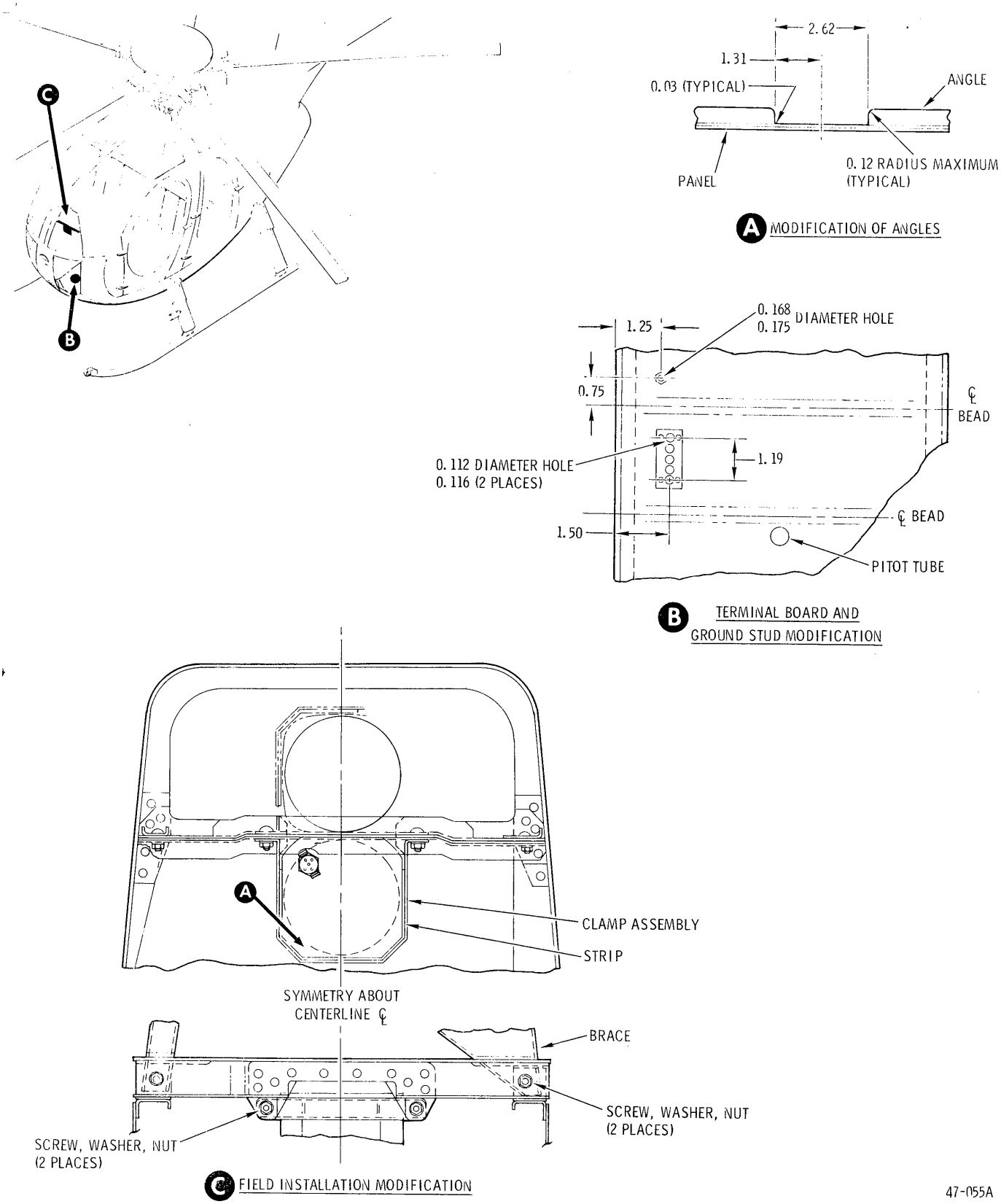

Figure 3-1. Directional gyro indicator - modification