December 20, 2013

Via fax

Mr. Eliott Simpson
NTSB

RE: Torsional Coupling

Dear Mr. Simpson,

Attached are copies of the IPL catalog pages showing the installation of the torsional coupling as well as two service documents that deal with the coupling. Service Bulletin 21-4 establishes the 5 year or 5,000 hour life limit based on the manufacturer's recommendation. This service life was not incorporated into the TCDS or ICA although it is my understanding that the manufacturer, Lord Corporation, requested this directly from the FAA when they released DS-6529 (the attachment to our SB).

There is one feature of the torsional coupling that is not readily apparent that I would like to mention as you may find it useful. The coupling design is an upper and lower metal plate are bonded together by a thick layer of elastomeric material between the plates. The plates have no direct mechanical attachment between them other than the elastomeric. The elastomeric acts to dampen the engine crankshaft vibrations and prevent them from being transferred to the upper powerplant. The entire output torque of the engine is transmitted through the torsional coupling. Imbedded in the elastomeric are lugs which protrude down from the upper plate and up from the lower plate. These lugs are offset with a small gap between them. In the event of an elastomeric failure, the rubber shears allowing these lugs to come into contact with each other thus preserving the drive torque to the upper powerplant. In other words, the torsional coupling fails safe so that drive power is maintained with an elastomeric failure.

Please let me know if I may be of further assistance.

Sincerely,

Hiller Aircraft Corporation

[redacted]

Steven L. Palm
General Manager

Enc.

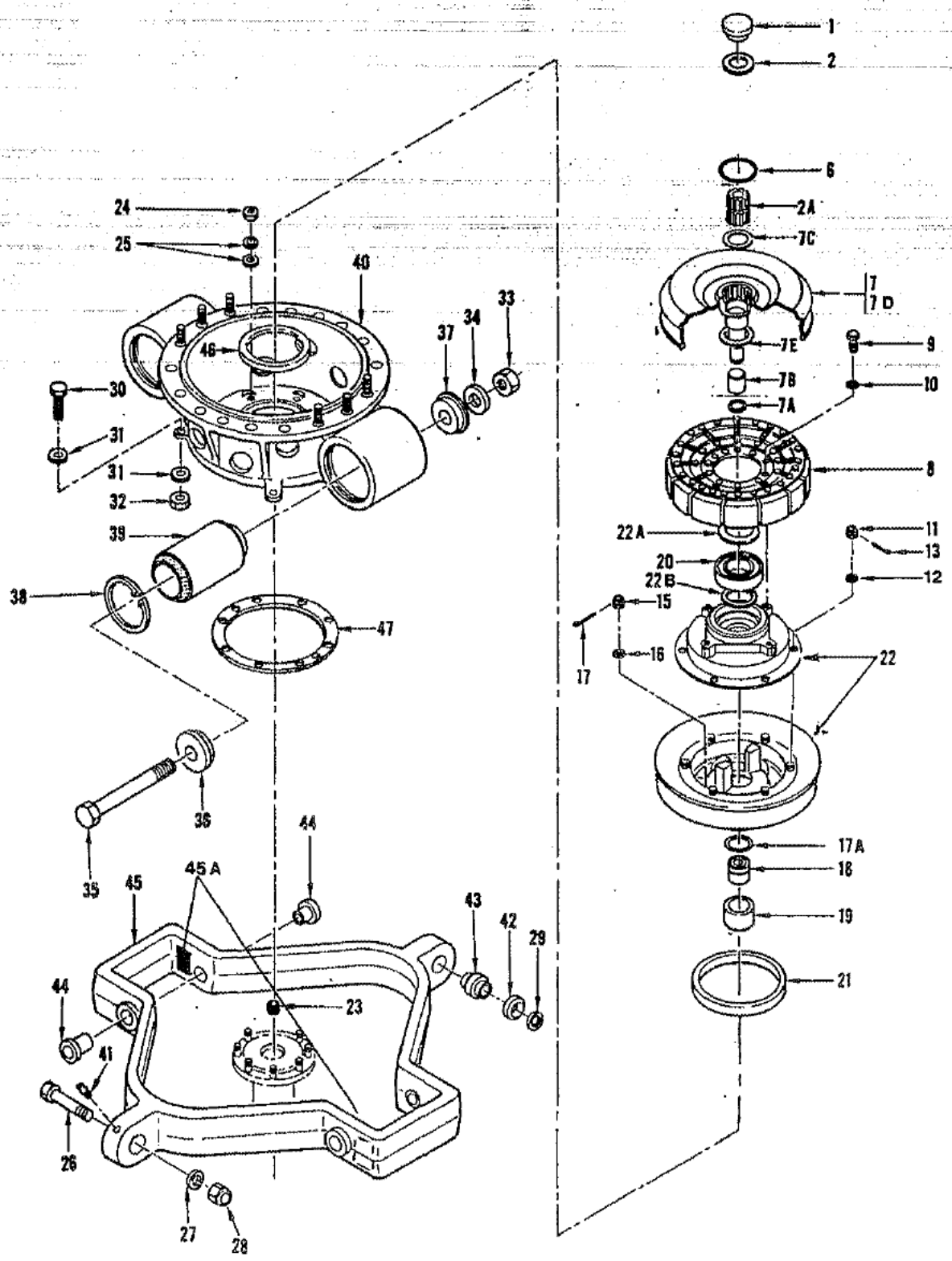


FIGURE 70-06A. SHEET 1 OF 1
MAIN DRIVE CLUTCH AND ENGINE GIMBAL RING WITH TORSIONAL COUPLING

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
		1234567		
		/ENTIRE LIST IAW S.B. 2027A/		
70-06A	NO NUMBER	CLUTCH AND GIMBAL RINGS ASSY, W/TORSION COUPLING, SEE INDEX 5, FIG 70-1 FOR NEXT HIGHER ASSY	REF	BF
1	21053	.BUMPER	1	AR
2	AN960C1616	.WASHER	AR	AR
	AN960C1616L	.WASHER	AR	AR
2A	21071-3	.SHAFT, ENGINE TO XMSN CONNECTING/SEE NOTE 1/	1	
3	DELETED			
4	DELETED			
5	DELETED			
6	5713-574012	.O-RING PACKING	1	
7	21042	.HOUSING, TORSIONAL COUPLING/REPLACED BY 21059-1 TORSIONAL COUPLING FOR SPARES/	1	BG
	21059-1	.HOUSING, TORSIONAL COUPLING/REPLACES 21042 TORSIONAL COUPLING FOR SPARES/	1	AR
	21070-11	.HOUSING ASSY, TORSIONAL COUPLING/SEE NOTE 1/	1	
	21070-31	.HOUSING ASSY, TORSIONAL COUPLING/SEE NOTE 2/	1	
	21070-35	.HOUSING ASSY, TORSIONAL COUPLING/ALTERNATE FOR 21070-11/	ALT	
7A	RSN-81	..RETAINING RING/SEE NOTE 1/	1	
7B	MS51962-7	..BEARING/SEE NOTE 1/	1	
7C	21072-3	..SPACER, TORSIONAL COUPLING/SEE NOTE 1/	1	
7D	21070-21	..HOUSING, TORSIONAL COUPLING/SEE NOTE 1/	1	
7E	21073-3	..WASHER/SEE NOTE 2/	1	
8	4692-6-P	.CLUTCH ASSY/SAME AS CLUTCH ASSY 4578-6 EXCEPT TIE BOLTS A-4417 ARE INSTALLED WITH HEADS UP FOR USE WITH TORSIONAL COUPLING/SEE FIG. 70-6 FOR BREAKDOWN/	1	BF
	4692-6-0	.CLUTCH ASSY/SEE NOTE 1/	1	
		ATTACHING PARTS		
9	21041	.BOLT	4	BF
10	AN960-716L	.WASHER	4	BF
		---X---		
	21047	.COUPLING ASSY, TORSION/REPLACED BY 21047-5/ /W/O S.B. 2038/	1	
	21047-3	.COUPLING ASSY, TORSION/REPLACED BY 21047-5/ /W/O S.B. 2038/	1	
	21047-5	.COUPLING ASSY, TORSION/REPLACES 21047 AND 21047-3 FOR SPARES/IAW S.B. 2038/	1	
	21047-9	.COUPLINGS ASSY, TORSION/REPLACES 21047, 21047-3 + 21047-5 FOR SPARES/	1	
	21047-11	.COUPLINGS ASSY, TORSION/REPLACES 21047, 21047-3, 21047-5 + 21047-9 FOR ALL MODELS WHEN USED WITH 21070-21/SEE NOTE 1/	1	
		ATTACHING PARTS		
11	J2217-8	.NUT, CASTELLATED, SHEAR	6	
12	J2218-59	.WASHER	6	
13	MS24665-153	.PIN, COTTER	6	
14	DELETED			
15	AN310-6	.NUT, CASTELLATED	8	
16	AN960-616L	.WASHER	8	
17	MS24665-155	.PIN, COTTER	8	
		---X---		
17A	RRN-150	..RETAINING RING/USED WITH 21047-9 + -11 COUPLING/	1	
18	HPP-BR-190	..BEARING/USED WITH 21047-5 COUPLING/	1	
	SJ7194-RR	..BEARING/USED WITH 21047-9 + -11 COUPLING/	1	
	BR-8-G	..BEARING/USED ONLY WITH 21047 COUPLING/	1	
	HPP-BR-171	..BEARING/USED WITH 21047-3 COUPLING/	1	
19	HPP-BR-172	..BEARING, SLEEVE/USED WITH 21047-3 + 21047-5 COUPLING/	1	
20	HPP-BR-99	..BEARING	1	
21	J-1155	..WEAR SLEEVE	1	
22	21046	..COUPLING, TORSION/COUPLING HALVES ARE A MATCHED SET/USE WITH 21047, 21047-3 + 21047-5 COUPLING/	1	
	21046-5	..COUPLING, TORSION/COUPLING HALVES ARE A MATCHED SET/USE WITH 21047-9 AND 21047-11 COUPLINGS/	1	
22A	21047-13	..SPACER/USE WITH 21047-9 COUPLING/	1	
22B	21046-7	...SPACER/USE WITH 21047-9 COUPLING/	1	

FIGURE AND INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
		1234567		
70-06A 23	AN932U2	.PLUG, CRANKSHAFT	1	
	63312	.GIMBAL RINGS ASSY/REPLACES 70006-7/	1	
		ATTACHING PARTS		
24	AN355-7	.NUT	8	
25	AN960-716	.WASHER	16	
26	AN180-40A	.BOLT, CLOSE TOLERANCE	2	
27	AN960-1016	.WASHER	2	
28	MS20365-1018	.NUT, SELF LOCKING	2	
29	AN960-1016L	.WASHER	AR	
	AN960PD1016L	.WASHER	AR	
30	AN3-6A	.BOLT	2	
31	AN960PD10L	.WASHER	4	
32	MS21042L3	.NUT	2	
		---X---		
33	MS20364-1018	.NUT, SELF LOCKING	2	
34	AN960-1016L	..WASHER	2	
35	AN10-80A	..BOLT	2	
	63310-3	..SPACER ASSEMBLY, ISOLATION MOUNT, INNER	2	
36	63310-7	...SPACER	1	
36A	NAS75-10-026	...BUSHING	1	
	63310-5	..SPACER ASSEMBLY, ISOLATION MOUNT, INNER GIMBAL	2	
37	63310-9	...SPACER	1	
37A	NAS75-10-018	...BUSHING	1	
38	RR400C	..RING	2	
39	J-6950-2	..MOUNT	2	
40	63307	..GIMBAL ASSEMBLY, INNER ENGINE MOUNTING	1	
	63309	..GIMBAL ASSEMBLY, OUTER ENGINE MOUNTING	1	
41	MS15001-4	...FITTING, LUBRICATION	2	
42	63311	...LOCKING RING, GIMBAL BEARING	2	
43	HPP-BR-75	...BEARING	2	
44	NAS77-10-133	...BUSHING	4	
45	63309-3	...GIMBAL, ENGINE MOUNTING, OUTER	1	
45A	63309-7	...PAD RUBBER	4	
46	HPP-SL-22-5	...SEAL, OIL	1	
47	63313	.GASKET, GIMBAL ASSEMBLY	1	BF
		NOTE 1: PARTS ADDED AS A GROUP MAY BE USED AS SPARES TO REPLACE PARTS REMOVED AS A GROUP. (IAW S.L. UH-12E-21-1)		
		NOTE 2: USE WITH 21073-3 WASHER USED WITH 21070-31 FOR STANDARD REPAIR OF 21070-11/ALSO USED WITH 21070-35/.		

HILLER AVIATION

TELEX 682454

2075 W. SCRANTON AVE. • [redacted] • PORTERVILLE, CA 93257

HILLER AVIATION

ISSUED DATE

AUGUST 4, 1982

FAA APPROVED

SERVICE BULLETIN

UH-12 SERIES

MECHANICAL DRIVE SYSTEMS

NO. 21-3

FLORESCENT PENETRANT INSPECTION

OF TORSIONAL COUPLING ASSEMBLY

1. PLANNING INFORMATION

A.	Effectivity Models UH-12E Series UH-12L Series, OH-23G and OH-23F helicopters	Manufacture's Serial Numbers: All 21047-9 21047-11 and 21047-15 torsional coupling assemblies. Helicopter S/N's 5183, 5189 thru 5192, 5194, 5195, 5197, 5198, 5200 and subsequent have been inspected prior to delivery.
B.	Reason	To check for possible cracks caused by hydrogen embrittlement during plating.
C.	Description	This Service Bulletin contains the inspection procedures to determine serviceability of the torsional coupling assembly.

D.	Compliance	Within 10 operating hours after receipt of this Service Bulletin and every 50 operating hours thereafter inspect P/N 21047-9 and 21047-11 torsional coupling assemblies, S/N 704 and subsequent, plus all 21047-15 torsional coupling assemblies. P/N 21047-9 and 21047-11 torsional coupling assemblies, S/N 703 and below are to be inspected one time, accomplishment shall be at the next regular clutch inspection or torsional coupling inspection but not to exceed 600 hrs. of operation after receipt of this bulletin.
E.	Approval	FAA Approval Date August 4, 1982 Engineering [redacted] Service [redacted]
F.	Manpower	Approximately (8) man-hours will be required.
G.	Material Cost and Availability	If required, new torsional coupling assemblies may be obtained through our Spare Parts Sales Department or the distributor in your area.
H.	Tooling	No special tools required.
I.	Weight and Balance	No change.
J.	Reference	Service Manual Parts Catalog

2. ACCOMPLISHMENT INSTRUCTIONS

NOTE: To determine approximate S/N of coupling, without removing transmission, view rubber area of coupling through holes in aft side of gimble P/N 63307. Rotate engine until cure date appears through holes in gimble. Refer to Figure 1 for location of cure date. Cure date is in raised letters. Cure dates of 12-80 or later correspond with S/N 704 and up on P/N 21047-9 and 21047-11 couplings and all 21047-15 couplings. Cure dates prior to 12-80 correspond with S/N 703 and below on P/N 21047-9 and 21047-11 couplings.

NOTE: Serial numbers are stamped or vibro etched near one of the attachment studs for the upper half of the coupling

A. Remove the transmission in accordance with instructions in Section 23 of the Service Manual.

B. Remove torsional coupling assembly in accordance with instructions contained in Section 21 of Service Manual.

C. Florescent penetrant inspect lower half of torsional coupling for cracks in area adjacent to wear sleeve. Refer to Figure 1. Do not allow penetrant to contact bearing races.

D. If cracks are found, replace coupling with serviceable one.

E. If no cracks are found reinstall items removed in order to perform inspection. Refer to Sections 21 and 23 of Service Manual.

F. After compliance, make log book entry and fill out attached sheet and forward to Service Manager, Hiller Aviation, 2075 West Scranton Ave., Porterville, CA 93257.

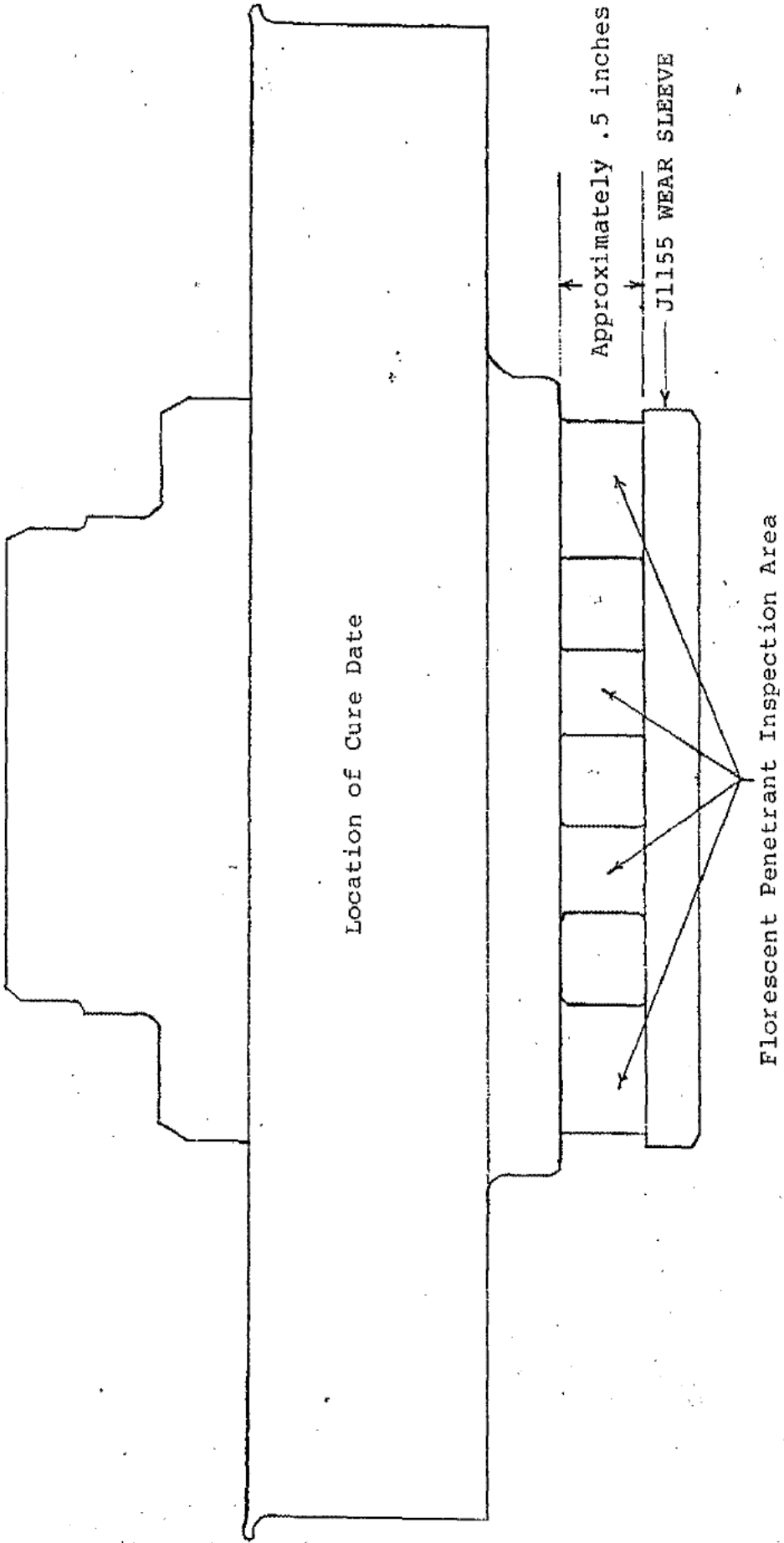

Approximately .5 inches
J1155 WEAR SLEEVE
Location of Cure Date
Florescent Penetrant Inspection Area

FIGURE I

HILLER AIRCRAFT

SERVICE BULLETIN
UH-12E SERIES
MECHANICAL DRIVE SYSTEMS
DATE APPROVED: 9/29/98
NO. 21-4, REVISION 1

TORSIONAL COUPLING - FINITE SERVICE LIFE AND INSPECTIONS

1. PLANNING INFORMATION

(A). EFFECTIVITY

Lord Mechanical Products Torsional Couplings P/N J-10114, Hiller Assy. P/N 21047, all dash numbers and all serial numbers.

(B). REASON

To prevent total loss of power to the main rotor.

(C). DESCRIPTION

This Service Bulletin establishes a Finite Life determined by the manufacturer for the Torsional Coupling and a 300 hour - 1200 hour inspection requirement.

(D). COMPLIANCE

PART A. Torsional Couplings with more than 5000 hours and five years time in service should be replaced within 100 hours additional time in service. Torsional Couplings with less than 5000 hours in service but five years or more in service, must be replaced within 300 hours additional time in service.

PART B. Next 300 hour inspection and every subsequent 300 hours in service until retirement.

PART C. Each 1200 hours

(E). APPROVAL

FAA APPROVAL DATE N/A

HILLER ENGINEERING [redacted]

HILLER SERVICE [redacted]

(F). MANPOWER

Approximately eight (8) man-hours will be required to change a torsional coupling. Approximately one (1) man-hour will be required to inspect the coupling during the existing 300 hour clutch inspection. Approximately three (3) man-hours will be required for each 1200 hour inspection.

(G). MATERIAL

Torsional Couplings P/N 21047-19 assys., may be purchased from **HILLER AIRCRAFT CORP.** Contact: **CUSTOMER SUPPORT DEPT.** for price and lead time.

(H). TOOLING

No special tools required.

(I). WEIGHT & BALANCE

No change.

(J). REFERENCE

UH-12E Service Manual & Parts Catalog. Lord Service Data Bulletin DS-6529b (See Page 4, 5, 6 & 7).

(2). ACCOMPLISHMENT INSTRUCTIONS

PART A. See Finite Service Life Requirements, Page 1, Lord DS6529b or later Revision Level.

NOTE: Lord P/N J-10114-18 of -19 must first comply with the configuration requirements of Hiller assy. 21047-19. REF: Parts Catalog for complete assy. details.

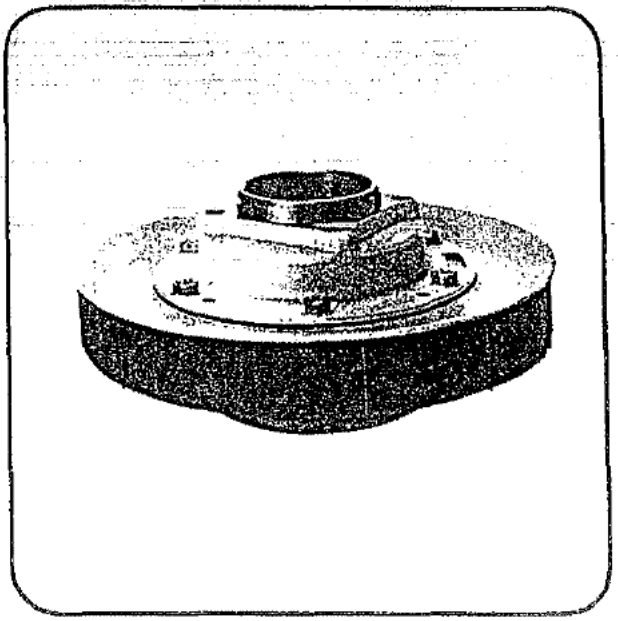
PART B. During the 300 hour clutch inspection, separate the coupling upper and lower components and conduct a detailed inspection of the interior surfaces of the torsional coupling paying particular attention to the bond area between the interior diameter of the metal and elastomer components. Damage and delamination limits are the same as those established in the Hiller Service Manual, Paragraph 21-2-4 and DS-6529b, Section I. (REF: Inspection Guide for existing 100 hour inspection requirements). Torque six retaining nuts in accordance with DS-6529b, Section IV.

PART C. 1200 hour overhaul. Accomplish in accordance with DS-6529b, Section II, III and IV except both components (upper and lower portions) of the coupling should be removed. REF: Service Manual, Paragraph 21-2-10 & 10A for removal and installation. After compliance, mark coupling in accordance with DS-6529b, Note 5.

Torsional Coupling

DS-6529b

(J-10114 Series)



Lord Part Number	Application
J-10114-1	Used on UH-12 and OH-23G Model Helicopters.
J-10114-2	Used on OH-23D Model Helicopters.
J-10114-6	Same as J-10114-1 except coupling length and bore dimensions change.
J-10114-9	Same as J-10114-2 except coupling bore dimensions change.
J-10114-15	Same as J-10114-6, a chromate treatment (bronze color) over the cadmium plating was added.
J-10114-17	Same as J-10114-15 except polyamide epoxy primed (yellow-green) surfaces instead of cadmium plating.
J-10114-18*	Same as J-10114-17 except for some metal component dimensional modifications (not affecting function).
J-10114-19*	Dimensionally and functionally identical to the J-10114-18.

*The J-10114-18 and -19 versions are the latest and recommended configurations. They are equivalent to Rogerson-Hiller P/N 21075-1 and supersede all previous parts. Earlier configurations not meeting the inspection or finite service life criteria should be replaced with P/N J-10114-18 or -19.

Description:

The Lord torsional couplings for use with the Hiller UH-12 and OH-23 series helicopters have been designated the J-10114 series. The coupling connects the engine to the mercury clutch. Several slightly different torsional coupling configurations may be in service and are listed above.

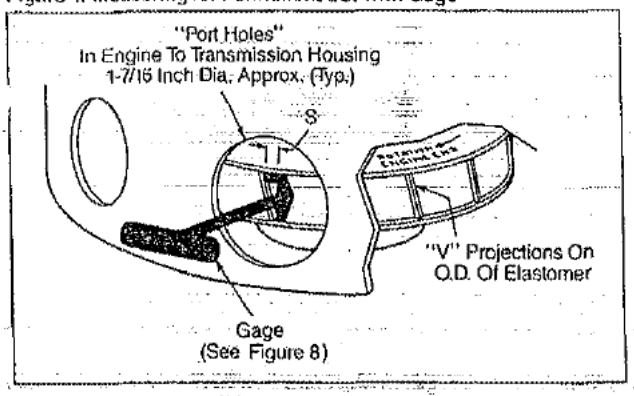
FINITE SERVICE LIFE

Prior to installation in the aircraft, parts should be stored in accordance with MIL-STD-1523 for a maximum of sixty (60) months. Couplings stored for more than twenty-four (24) months shall be inspected for ozone/flex cracks in accordance with Section I.A.2 (b) of this Service Data. After installation in the aircraft, the J-10114 series coupling operates on a FINITE SERVICE LIFE basis: 5000 hours maximum or five (5) years maximum from date of installation or until the limits of the maintenance manual are met, whichever occurs first. NO WARRANTY REGARDING SERVICE LIFE IS EXPRESSED OR IMPLIED. Couplings attaining these requirements, regardless of their condition found at inspection, must be replaced with a J-10114-18 or -19 coupling which has been determined to meet the inspection and finite service life criteria. Up to 5000 hours/5 years the couplings operate on an on-condition basis using the established inspection criteria contained in this Service Data.

LORD® Mechanical Products

A Division of Lord Corporation

Figure 1. Measuring for Permanent Set with Gage



I. Inspect Installed Coupling. (See Figure 1)

A. The following visual inspections should be performed after approximately 100 hours of operation by viewing the coupling through the holes in the engine to transmission housing.

CAUTION

During any inspection period when cleaning engine or transmission area, protect coupling from contamination by cleaning fluids and solvents. Wipe contaminants from coupling with a clean dry cloth.

1. Visually inspect coupling metal components for any evidence of cracks or damage which, if present, require immediate replacement.

2. Visually inspect elastomer section for evidence of excessive cuts, cracks, bond separation or permanent set as follows:

(a) If metal-to-bond separation exceeds 0.15 inch deep, replace coupling.

(b) If flex cracks (surface failure of rubber due to flexing) exceed 0.15 inch deep (of any length), replace coupling.

(c) Inspect for permanent set using gage as shown in Figure 1. If "S" dimension exceeds 0.25 inch, coupling should be replaced. Gage can be made using material and dimensions shown on Figure 8.

CAUTION

Do not use sharp instruments to inspect for bond separations or cracks. Use only blunt or round edged instruments.

II. Disassemble Coupling (See Figure 6).

A. In order to perform a thorough inspection of the coupling using dye penetrant, the coupling must be disassembled.

B. Remove cotter pins (3), nuts (4) and washers (5), then separate the housings (1) and (2). When applicable, use the four (4) 1/4-28 UNF jackscrew holes with AN4-10A cap screws (not supplied) to separate the clutch and engine ends. Separate slowly and equally, using a cross tightening sequence on the cap screws. Remove the jackscrews from housing (1) after disassembly. Do not remove locating pin.

III. Inspect Coupling During Engine/Drive System Overhaul, Or Clutch Maintenance.

A. With coupling disassembled, follow same inspection procedures as were outlined under paragraph I and sub-paragraphs, together with the following additional procedures.

B. The clutch end and the engine end of the coupling should be checked for excessive wear of the critical dimensions indicated in Figure 2. If dimensions are not within allowable tolerances, replace the coupling.

C. Inspect for cracks in the metals using dye penetrant only and exercise care not to allow penetrant to spill on elastomer portion of coupling. Special attention should be given when inspecting for cracks in the metals at bottom of safety lugs, around coupling at radii "R_1", "R_2" and completely around rectangular "cut outs" (See Figure 3) in eight places. (See bold lines on Figure 2 for critical areas.) Replace the coupling if cracked or bent lugs are evident.

D. Inspect for nicks or gouges in the metals and if they exceed 0.03 inch depth, replace coupling. Nicks or gouges less than 0.03 inch deep may be polished out except in critical areas of safety lugs, at fillet radius of bottom of "A" diameter ("R_1"), in "R_2" or all around rectangular "cut outs" (in area of "A" diameter, "R_1" and "R_2").

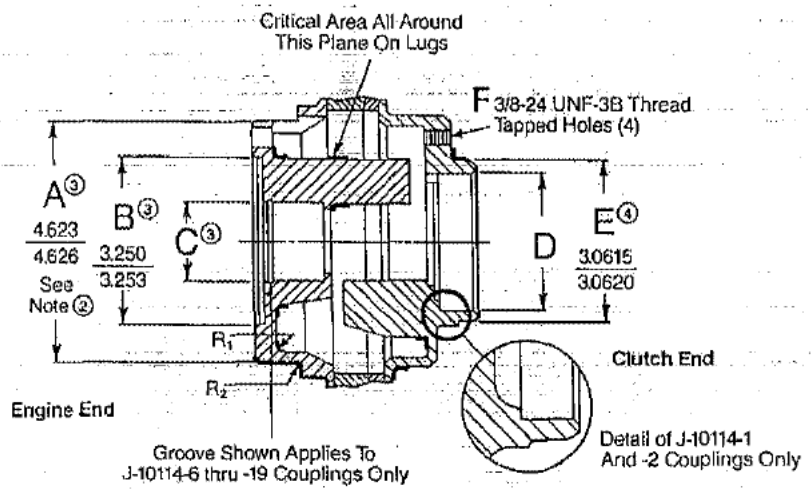
NOTE ①

Touch-up bare metal areas where nicks or gouges have been polished out with polyamide epoxy primer per MIL-P-23377 for part numbers J-10114-17 through J-10114-19.

E. Inspect housing (1) (clutch end housing plate) for possible wear or elongated stud holes. See Figure 4. If the "G" dimension for one or more holes (across the worn area) is .001 inch greater than the "H" dimension (hole diameter), replace the coupling.

F. Inspect housing (2) (engine end housing plate) for possible wear resulting in worn studs. See Figure 5. If the "J" dimension for one or more studs (stud diameter) is .001 inch greater than the "I" dimension (across worn area), or there is any sign of localized wear of one or more studs, replace the coupling.

Figure 2. Critical Inspection Dimensions/Area



Lord Part Number	C③	D④
J-10114-1 J-10114-2	1.6875 1.6880	2.6772 2.6779
J-10114-6 J-10114-9 J-10114-16 J-10114-17 J-10114-18 J-10114-19	1.4989 1.4996	2.6759 2.6775

Notes:
② Dimension "A" applies if wear ring (not furnished by Lord) has been removed for replacement. Otherwise may be disregarded.
③ Dimensions A and B shall be concentric with dimensions in column C within 0.001 inch TIR.
④ Dimensions in column D shall be concentric with dimensions in E within 0.002 inch TIR.

Figure 3. Rectangular "Cut-Outs"

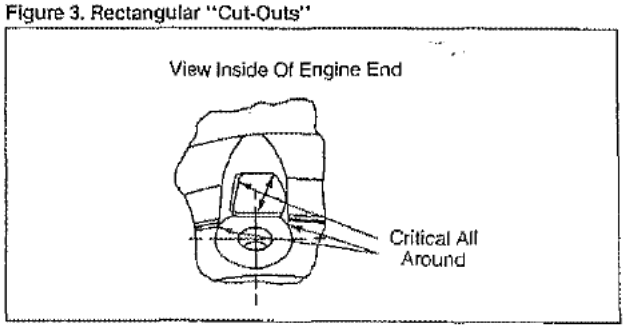


Figure 4. Inspection For Elongated Stud Holes

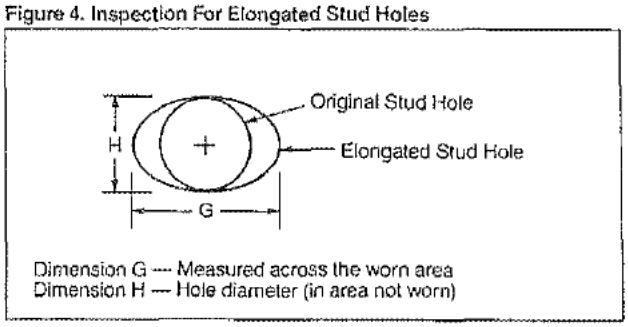
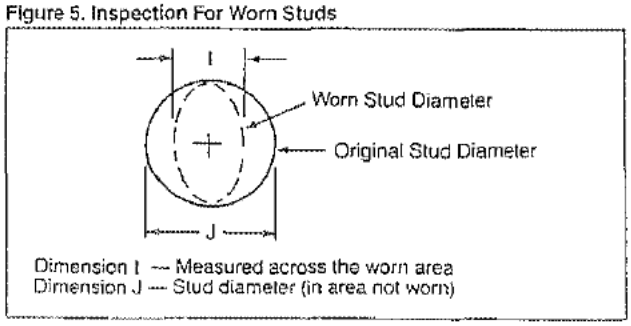


Figure 5. Inspection For Worn Studs



IV. Assemble Coupling. (See Figure 6)

CAUTION

Coupling is manufactured as a matched serial numbered set. Clutch end and engine end parts shall not be interchanged with other coupling parts.

A. Place clutch end (1) over engine end (2) and align with locating pin.

B. Install washers (5) and replace **old** nuts with **new** nuts (4). Tighten nuts finger-tight, then tighten alternately to the sequence shown in Figure 7 so as to draw Item 1 uniformly down to contact Item 2.

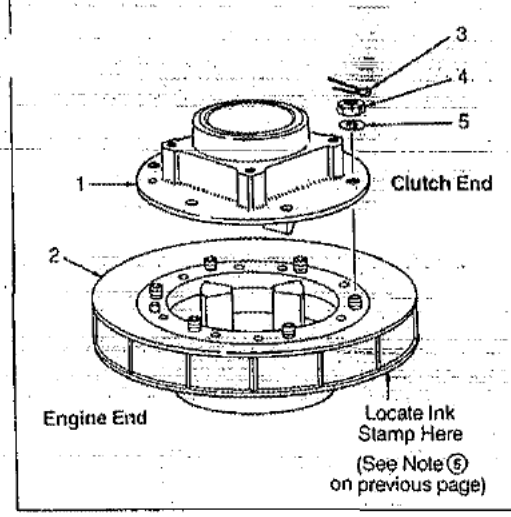
It is possible slots in nuts will not align with holes in the studs with a final torque of 60-85 inch-pounds. DO NOT EXCEED 85 INCH-POUNDS. If this occurs, back off to zero torque; then re-tighten to 60-85 inch-pounds and determine if cotter pin can be installed. If not, repeat this procedure using a different combination of nuts and studs until cotter pins can be installed with a tightening torque of 60-85 inch-pounds.

C. Replace **old** cotter pins with **new** cotter pins (3); install cotter pins (3) and secure.

NOTE ⑤ (See Figure 6)

To maintain a record of the number of times coupling has been inspected at engine, clutch or transmission overhaul, mark the date of engine, clutch or transmission overhaul and the number of service hours on the coupling since last inspection. Use an ink stamp or suitable paint to mark the data on the face of the engine end as shown in Figure 6.

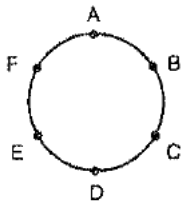
Figure 6. Exploded View of Typical J-10114 Series Coupling



Index Number	Lord Part Number	Description	Units Per Ass'y
	J-10114-1	Coupling Assy, Torsional	1
	J-10114-2	Coupling Assy, Torsional	1
	J-10114-6	Coupling Assy, Torsional	1
	J-10114-9	Coupling Assy, Torsional	1
	J-10114-15	Coupling Assy, Torsional	1
	J-10114-17	Coupling Assy, Torsional	1
	J-10114-18	Coupling Assy, Torsional	1
	J-10114-19	Coupling Assy, Torsional	1
1	*	• Housing, Bonded (Clutch End)	1
2	*	• Housing Assy, Bonded (Engine End)	1
3	J-2214-3 (MS24665-153)	• Pin, Cotter	6
4	J-2217-8 (AN320-5)	• Nut	6
5	J-2218-59	• Washer	6

*Note: Parts are not furnished for individual replacement. If either part requires replacement, order the complete torsional coupling assembly.

Figure 7. Nut Tightening Sequence

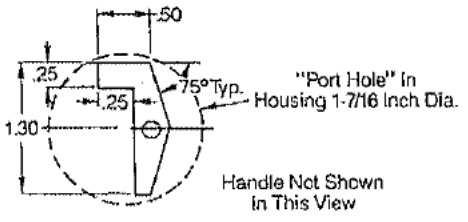


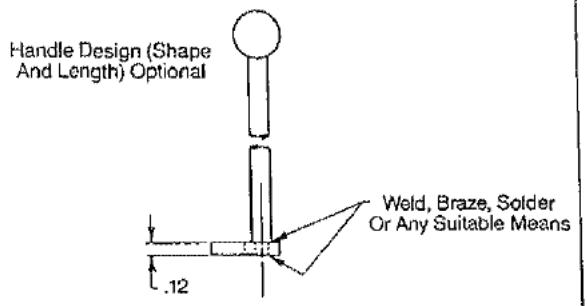
Sequence:
1. A-D-B-E-C-F to 20 inch-pounds
2. A-D-B-E-C-F to 40 inch-pounds
3. A-D-B-E-C-F to 60-85 inch-pounds

WARNING

Improper use or maintenance of this coupling could lead to loss of life or serious damage to the helicopter. Operator must follow the flight and maintenance manuals, with particular attention to:
1) Proper engine RPM levels during start-up and idle; and
2) Mandatory replacement of coupling at 5000 service hours or 5 years from date embossed on rubber, or in accordance with maintenance manual requirements for the couplings, whichever occurs first.

Figure 8. Dimensions for Making Permanent Set Gage





Material: Optional

For more information or engineering assistance, call [redacted] or write:

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