EUROCOPTER
DIRECTION TECHNIQUE SUPPORT
13725 MARIGNANE CEDEX FRANCE

EMERGENCY

ALERT SERVICE BULLETIN

DAUPHIN	NUMBER	VERSIONS	
EC155	05A007	Civil :	B, B1

SUBJECT: **TIME LIMITS - MAINTENANCE CHECKS**

Check of the MGB Planet Gear Carrier

ATA: 63

REVISION No.	DATE OF APPROVAL	DATE OF ISSUE
Revision 0	On: July 13, 2005	2005.08.04
Revision 1	On: November 12, 2007	2007.11.13
Revision 2	On: November 12, 2009	2009.11.16
Revision 3	On: December 08, 2011	2011.12.08

1. PLANNING INFORMATION

1.A. EFFECTIVITY

1.A.1. Helicopter / Installed equipment:

On Main Gearboxes (MGBs), all part numbers, which have not been modified per modification 07 63C52.

NOTE 1

The purpose of modification 07 63C52 is to promote the transmission of forces from the Main Rotor Head (MRH) via the upper cover of the main gearbox (MGB), so as to prevent dynamic overload in the epicyclic stage.

NOTE 2

Refer to the log card of the main gearbox (MGB) to identify its actual configuration.

1.A.2. Non-installed equipment:

Not applicable.

1.B. ASSOCIATED REQUIREMENTS

Not applicable.

1.C. REASON

To make sure that there is no crack in the web of the MGB planet gear carrier in the event of chip detection and to perform a borescope inspection at regular intervals.

The purpose of Revision 0 to this ALERT SERVICE BULLETIN which formed the subject of an Airworthiness Directive issued by the DGAC on behalf of the EASA, was to:
- Supersede ALERT TELEX No. 63A008 issued on November 10, 2004 and ALERT TELEX No. 05A007 issued on December 16, 2004.
- Incorporate the mandatory measures of both these ALERT TELEXES in this ALERT SERVICE BULLETIN with no change to compliance and accomplishment instructions.

The Airworthiness Directive mentioned above replaces Airworthiness Directives No. F-2004-182 and No. F-2004-194 which are canceled by their Revisions 1.

The purpose of Revision 1 of this ALERT SERVICE BULLETIN, which formed the subject of an EASA Airworthiness Directive, was to reduce the time limit for the first inspection of the planet gear carrier from 265 operating hours to 50 operating hours.

The purpose of Revision 2 of this ALERT SERVICE BULLETIN was to provide additional information concerning the borescope inspection procedure described in paragraph 2.B.2., in order to make the detection of cracks in planet gear carriers easier.

Revision 2 of this ALERT SERVICE BULLETIN did not form the subject of an EASA Airworthiness Directive.

Revision 2 of this ALERT SERVICE BULLETIN did not affect compliance with Revision 1.

The purpose of Revision 3 of this ALERT SERVICE BULLETIN is to limit its effectivity to helicopters which have not been modified per modification 07 63C52.

Revision 3 of this ALERT SERVICE BULLETIN will form the subject of Revision 1 of Airworthiness Directive No. 2007-0288-E.

Revision 3 of this ALERT SERVICE BULLETIN does not affect compliance with Revision 2.

1.D. DESCRIPTION

Revision 0:

EUROCOPTER informed you through ALERT TELEX No. 63A008, which was issued on November 10, 2004, of two cases of cracks which were discovered in the web of a planet gear carrier. The cracks were discovered upon removal of two MGBs subsequent to the detection of metal chips at the magnetic plug.

This phenomenon can be detected by metal chips at the magnetic plug. During the initial deterioration phase, the formation of particles can be below the currently applicable removal criteria defined in the documentation. (Criteria defined on MTC Work Card 20.08.01.601).

EUROCOPTER therefore issued the ALERT TELEX above, in order to introduce both a mandatory check of the magnetic plug of the MGB to be performed if the chip warning light comes on, and a check of the MGB planet gear carrier as soon as one or more chips are found.

Following the issue of the ALERT TELEX above, EUROCOPTER received a report of a first case of crack discovered in the planet gear carrier of an EC155 helicopter. The crack was detected during a borescope inspection of an MGB. However, no chips were found at the magnetic plug. Thereupon, EUROCOPTER issued ALERT TELEX No. 05A007 on December 16, 2004 in order to introduce a mandatory borescope inspection of the MGB planet gear carrier every 50 flying hours.

EUROCOPTER continued the investigations in order to establish the cause of these cracks, as soon as possible. Pending the results of these analyses, EUROCOPTER rendered a check of the magnetic plug and a periodic borescope inspection of the planet gear carrier mandatory, in order to enable early detection of any crack in the planet gear carrier.

Revision 1:

Since the issue of ALERT SERVICE BULLETIN No. 05A007 on August 4, 2005, a further case of crack in a planet gear carrier of a main gearbox installed on an EC155 helicopter was reported to EUROCOPTER. As in the previous case, the crack was discovered during the application of the measures defined in the above indicated ALERT SERVICE BULLETIN.

The examination of the crack revealed a progressive fatigue failure of the planet gear carrier initially caused by a machining non-conformity (scoring) in the blend radius between a crankpin and the web. A quality investigation of these parts was conducted on their manufacturer's premises to identify the cause of the non-conformity. The laboratory examination showed that this type of crack is first visible inside the pocket of the crankpin, and then grows across the web of the planet gear carrier. (See photos on Figure 6). In all cases, the current inspection interval guarantees the detection of such a crack when it becomes visible in the web.

The additional analysis, which was conducted subsequent to the above mentioned further case of crack, no longer guaranteed the time limit of 265 hours that was assigned to the first inspection of the planet gear carrier through previous revisions of this ALERT SERVICE BULLETIN. The established interval of this inspection was not invalidated as the analysis also showed that the non-conformity did not affect the crack growth rate.

EUROCOPTER therefore rendered mandatory compliance with the measures defined in this ALERT SERVICE BULLETIN irrespective of the number of operating hours logged by the planet gear carrier.

Revision 2:

Following the discovery of a chip at the magnetic plug of the main gearbox, a mechanic carried out a borescope inspection on the planet gear carrier, as instructed in Revision 1 of this ALERT SERVICE BULLETIN. A crack was found in the web of the planet gear carrier, and was confirmed after having removed the main rotor mast.

The investigations carried out at EUROCOPTER showed that this latest occurrence was comparable to those already experienced as regards the crack growth rate, which confirmed the precautionary measures defined in this ALERT SERVICE BULLETIN.

EUROCOPTER issued Revision 2 of this ALERT SERVICE BULLETIN, in order to provide additional information concerning the borescope inspection procedure and the different crack runs experienced so far.

Revision 3:

Modification 07 63C52 consists in:
- replacing the aluminium upper cover of the main gearbox by a reinforced cover with steel bush,
- replacing the planet gear carrier ball bearing by a barrel roller bearing with reduced radial play,
- modifying the upper cover/fixed ring gear link,
- replacing the planet gear vertical shaft.

The embodiment of this modification enables operators to waive compliance with the checks described in this ALERT SERVICE BULLETIN.

1.E. COMPLIANCE

The following measures are mandatory as from receipt of ALERT TELEX No. 63A008 issued on November 10, 2004 and ALERT TELEX No. 05A007 issued on December 16, 2004.

1.E.1. Compliance at the works

1.E.1.a. On helicopters / installed equipment: Comply with paragraph 1.E.2.a.

1.E.1.b. On non-installed equipment: Not applicable.

1.E.2. Compliance in operation: By the operator.

1.E.2.a. On helicopters / installed equipment:

1.E.2.a.1. On a main gearbox having logged operating hours (See the Equipment Log Card (FME))

a) Since receipt of ALERT TELEX No. 63A008 issued on November 10, 2004:

- After the MGB has logged 50 operating hours, if the chip warning light comes on,
  . Comply with paragraph 2.B.1. before resuming flights.

b) For main gearboxes equipped with a planet gear carrier having logged less than 35 flying hours since new or overhaul (See the Equipment Log Card (FME)) as counted from the date of receipt of Revision 1 to this ALERT SERVICE BULLETIN, indicated in the page footer,

- Comply with paragraph 2.B.2. at the latest when the planet gear carrier reaches 50 flying hours and then,
  . Comply with paragraph 2.B.2. at intervals not exceeding 50 flying hours.

c) For main gearboxes equipped with a planet gear carrier having logged more than 35 flying hours since new or overhaul (See the Equipment Log Card (FME)) as counted from the date of receipt of Revision 1 to this ALERT SERVICE BULLETIN, indicated in the page footer, and

1) Having never been brought into compliance with paragraph 2.B.2. through ALERT TELEX No. 05A007 issued on December 16, 2004:

- First comply with paragraph 2.B.2. within the next 15 flying hours,
  and then,
  . Comply with paragraph 2.B.2. at intervals not exceeding 50 flying hours.

2) Having already been brought into compliance with paragraph 2.B.2. through ALERT TELEX No. 05A007 issued on December 16, 2004:

- Comply with paragraph 2.B.2. at intervals not exceeding 50 flying hours.

1.E.2.b. On non-installed equipment: Before installation of a used MGB, equipped with a planet gear carrier having logged operating hours since new or overhaul (See the Equipment Log Card (FME)):
. Comply with paragraph 2.B.3.

1.F. APPROVAL

The technical information contained in this ALERT SERVICE BULLETIN Revision 0 was approved on July 13, 2005 under the authority of EASA Design Organisation Approval No. 21 J.056 for civil version helicopters subject to an Airworthiness Certificate.

The technical information contained in this ALERT SERVICE BULLETIN Revision 1 was approved on November 12, 2007 under the authority of EASA Design Organisation Approval No. 21 J.056 for civil version helicopters subject to an Airworthiness Certificate.

The technical information contained in this ALERT SERVICE BULLETIN Revision 2 was approved on November 12, 2009 under the authority of EASA Design Organisation Approval No. 21 J.056 for civil version helicopters subject to an Airworthiness Certificate.

The technical information contained in this ALERT SERVICE BULLETIN Revision 3 was approved on December 08, 2011 under the authority of EASA Design Organization Approval No. 21J.056 for helicopters of civil versions subject to an Airworthiness Certificate.

1.G. MANPOWER

Qualification: Mechanic.
Time: Approximately 15 minutes for compliance with paragraph 2.B.1.
Approximately 30 minutes for compliance with paragraph 2.B.2.

1.H. WEIGHT AND BALANCE

Weight: Not applicable.
Moment: Not applicable.

1.I. EFFECT ON ELECTRICAL LOADS

Not applicable.

1.J. SOFTWARE MODIFICATION EMBODIMENT STATE

Not applicable.

1.K. REFERENCES

Aircraft Maintenance Manual (AMM) Tasks: 05-50-01-211
05-50-02-211
12-20-00-211
62-21-00-061
63-20-00-061
63-40-02-721

Standard Practices Manual (MTC) Work Card: 20.08.01.601.

SAFETY INFORMATION NOTICE (SIN): 2075-S-63.

1.L. OTHER DOCUMENTS CONCERNED

Maintenance Program (MSM).

1.M. INTERCHANGEABILITY OR MIXABILITY OF PARTS

Not applicable.

2. ACCOMPLISHMENT INSTRUCTIONS

2.A. GENERAL

Not applicable.

2.B. OPERATIONAL PROCEDURE

2.B.1. Check of the magnetic plug

- Remove the magnetic plug as per AMM Task 12-20-00-211.
  . If no chips are found at the magnetic plug:
  - Check the electric line as per AMM Task 63-40-02-721.
  - Re-install the magnetic plug as per AMM Task 12-20-00-211 and resume flights.

  . If metal chips are found at the magnetic plug:
  - Collect all the chips and identify their origin (MGB or MRH) in compliance with AMM Tasks 05-50-01-211 and 05-50-02-211.

2.B.1.a. Result analysis:

2.B.1.a.1. The chips collected originate from the MRH:

. Comply with the currently applicable removal criteria (MTC Work Card 20.08.01.601, issued through Revision 0 of SAFETY INFORMATION NOTICE (SIN) No. 2075-S-63 of July 9, 2009), and if necessary, ensure associated monitoring at shorter intervals (as per AMM Tasks 05-50-01-211 and 05-50-02-211) if the removal criteria are not reached or exceeded.

2.B.1.a.2. The chips collected originate from the MGB:

. If the currently applicable removal criteria (MTC Work Card 20.08.01.601, issued through Revision 0 of SAFETY INFORMATION NOTICE (SIN) No. 2075-S-63 of July 9, 2009) are reached or exceeded after compliance has been ensured with AMM Tasks 05-50-01-211 and 05-50-02-211:

- Remove the MGB and return it to an approved repair station for examination and repair.

. If the currently applicable removal criteria (MTC Work Card 20.08.01.601, issued through Revision 0 of SAFETY INFORMATION NOTICE (SIN) No. 2075-S-63 of July 9, 2009) are not reached:

- Before resuming flights, check in accordance with the procedures described in paragraph 2.B.2. that there is no crack in the web of the planet gear carrier.

2.B.2. Borescope inspection for absence of cracks in the planet gear carrier

- Tooling required: Borescope with a maximum diameter of 8 mm, fitted with a 45 to 90° adapter.

NOTE 1

Before applying the procedure described below, make sure that the rotor brake is released.

As per Figures 1 and 2:

- Remove nut (2) and oil jet (1) from the LH side of the MGB (on the opposite side to the oil filter). Should the electrical harness impede access to oil jet (1), remove the clamp to move the electrical harness away.
- Insert borescope (9) into the port of oil jet (1) so as to position borescope (9) above the top face of the web of the planet gear carrier (5).
- Pivot the borescope through approximately 30° about its axis, in the counter-clockwise direction so as to position it the best you can, in order to inspect the web and the inside of each crankpin in turn.

As per Figures 3, 4, 5 and 6:

- Whilst rotating the planet gear carrier one full turn by acting on the tail rotor, make sure that there is no crack in the area, shown in Figure 3 by the strip located between the circles depicted in white dotted lines.

The areas to be inspected more particularly, around the 5 crankpins, are:

- the area to the right of each crankpin on the web of the planet gear carrier up to the pocket (cases of cracks of the No. 1 and the No. 2-type, Figures 4 and 5).

- the inside of each crankpin, on the RH side, when looking onto the top face of the planet gear carrier (case of a crack of the No. 3-type, Figure 6).

NOTE 2

The crack starts from the bottom face of the web of the planet gear carrier and then runs across the material section of the web. When the crack opens on the top face, i.e. the face which is visible during the borescope inspection, it measures at least 60 mm.

- Analyze the result of the borescope inspection as per paragraph 2.B.2.a.

NOTE 3

Should any oil on the surface of the planet gear carrier make the check difficult, remove the oil with clean (dry) compressed air by inserting the end-fitting of the blower into the port of oil jet (1).

2.B.2.a. Result analysis of the borescope inspection of the planet gear carrier

2.B.2.a.1. If no crack is found:

- Fit oil jet (1) and nut (2) (if necessary, replace O-ring seals (3), (4) and nut (2) see paragraph 3.C.).
- Torque tighten nut (2), lubricated with G 361 grease, to between 0.2 and 0.26 m.daN.
- Run a PR sealant bead around the base of the oil jet.
- Install the clamp of the electrical harness, if it was removed.
- Resume flights:
  . if the borescope inspection is performed following the discovery of chips collected in the MGB:
    - resume flights and monitor the MGB at shorter intervals as per AMM Tasks 05-50-01-211 and 05-50-02-211

2.B.2.a.2. If one or more cracks are found:

- Fit oil jet (1) and nut (2).
- Before the next flight, remove the MGB as per AMM Task 63-20-00-061.
- Contact the EUROCOPTER Customer Service Technical Support Operations Department (STVM) at:
  . Tel: 33 (0)4.42.85.99.67
  . Fax: 33 (0)4.42.85.99.66
  . Email: DynComp.Technical-Support@eurocopter.com

2.B.2.a.3. If a doubt remains during the borescope inspection:

- Remove the rotor mast and visually check the planet gear carrier in accordance with paragraph 2.B.3.

2.B.3. Visual check for absence of cracks after removal of the rotor mast

As per Figure 7:

- Remove the rotor mast as per AMM Task 62-21-00-061.
- Remove the four nuts (8), the four spring tabs (6) and strainer (7).
- Using a light source, through the ports in the cover, inspect the area around each pocket of the crankpins of planet gear carrier (5) for absence of cracks whilst rotating the planet gear carrier using the tail rotor (release the rotor brake).

2.B.3.a Analysis of visual check results

2.B.3.a.1. If no cracks are found:

- Install strainer (7), the four spring tabs (6) and the four nuts (8).
- Torque tighten the four nuts (8).
- Install the rotor mast as per AMM Task 62-21-00-061.

2.B.3.a.2. If any crack(s) are found:

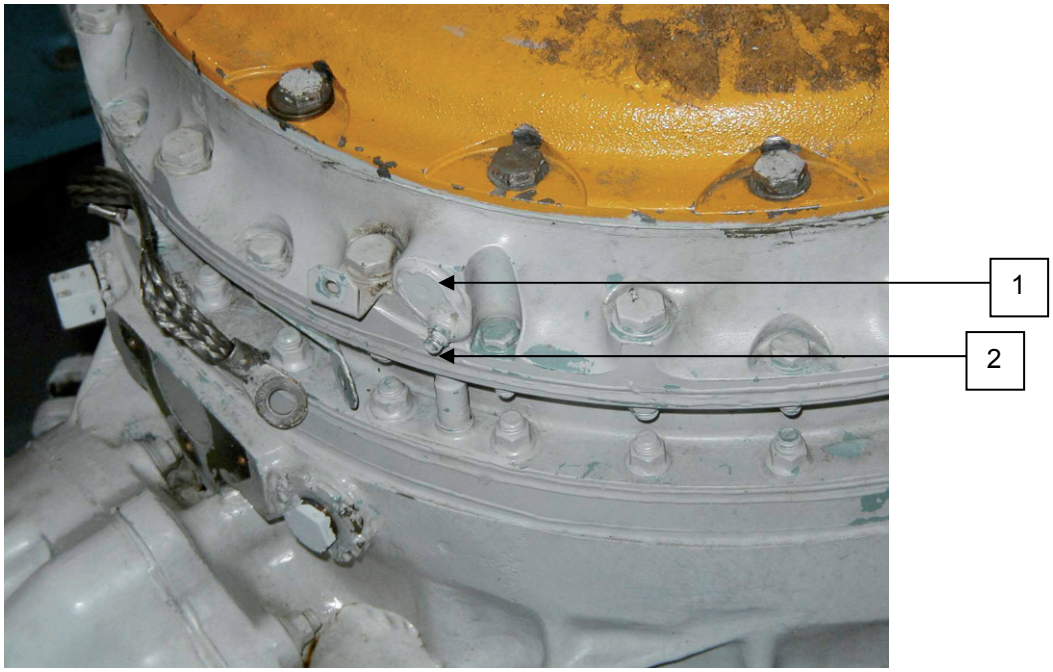
- Remove the MGB before the next flight as per AMM Task 63-20-00-062.
- Contact the EUROCOPTER Customer Service Technical Support Operations Department (STVM) at:
  . Tel: 33 (0)4.42.85.99.67
  . Fax: 33 (0)4.42.85.99.66
  . Email: DynComp.Technical-Support@eurocopter.com

2.C. IDENTIFICATION

Record initial compliance with this ALERT SERVICE BULLETIN on the Equipment Log Card (FME) of the MGB.

2.D. OPERATING AND MAINTENANCE INSTRUCTIONS

Refer to the Maintenance Program (MSM).



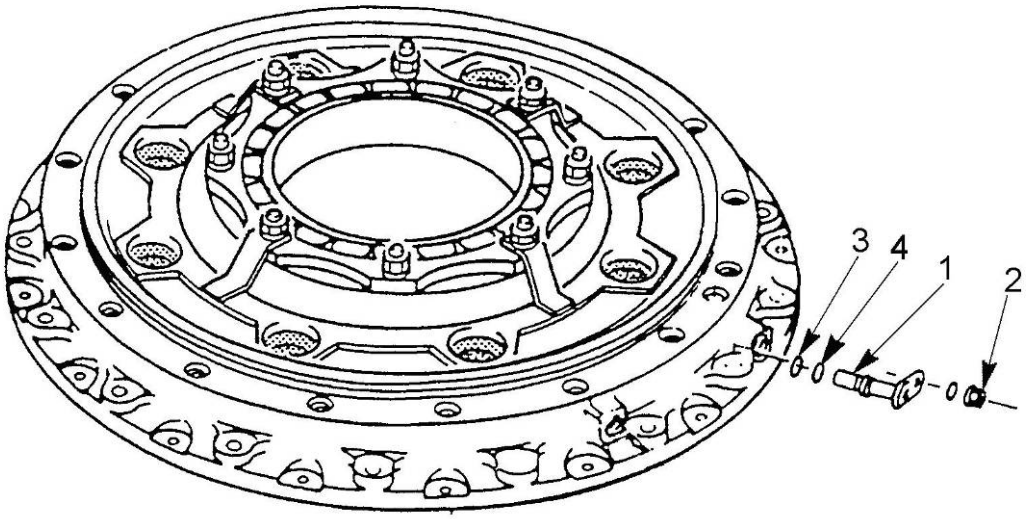
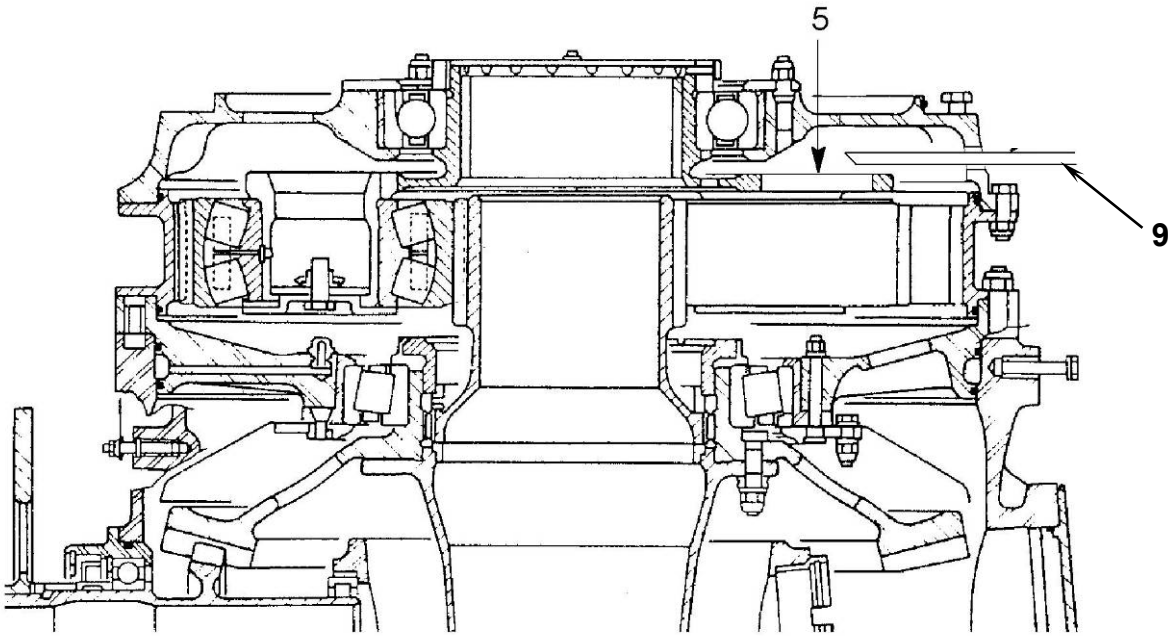
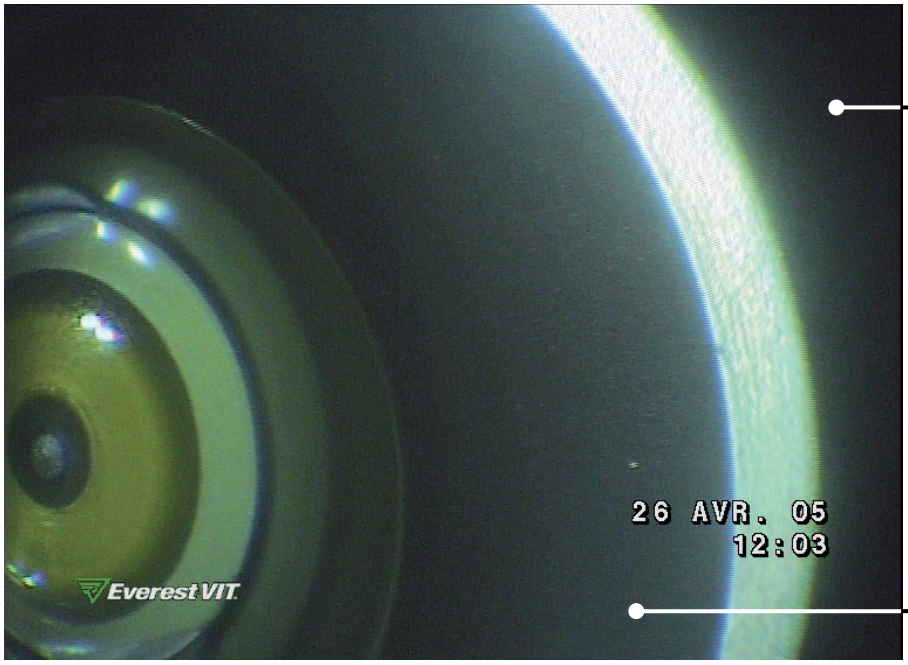


Figure 1





Top face of the web of the planet gear carrier

Inside of the crankpin

Figure 2

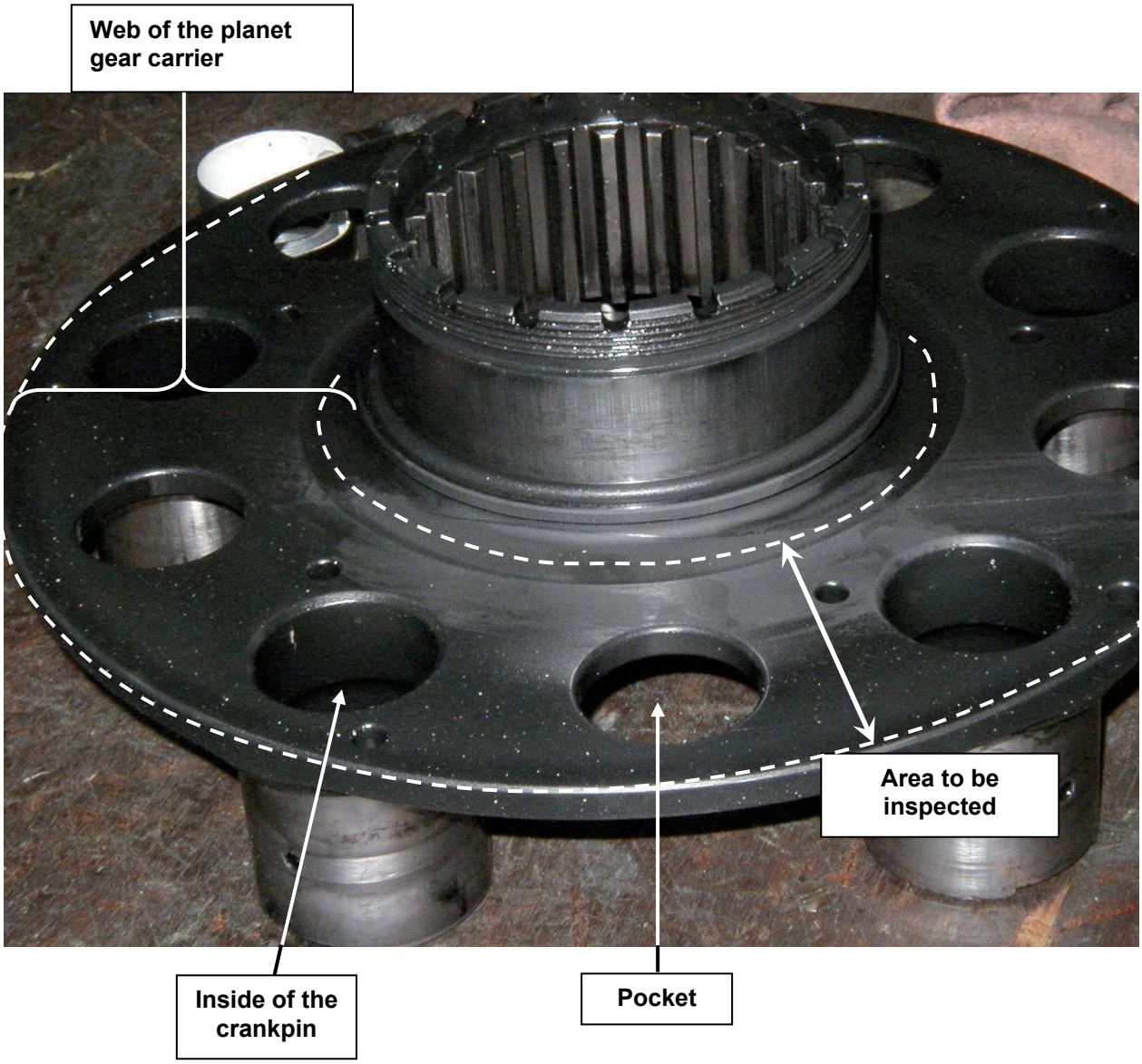
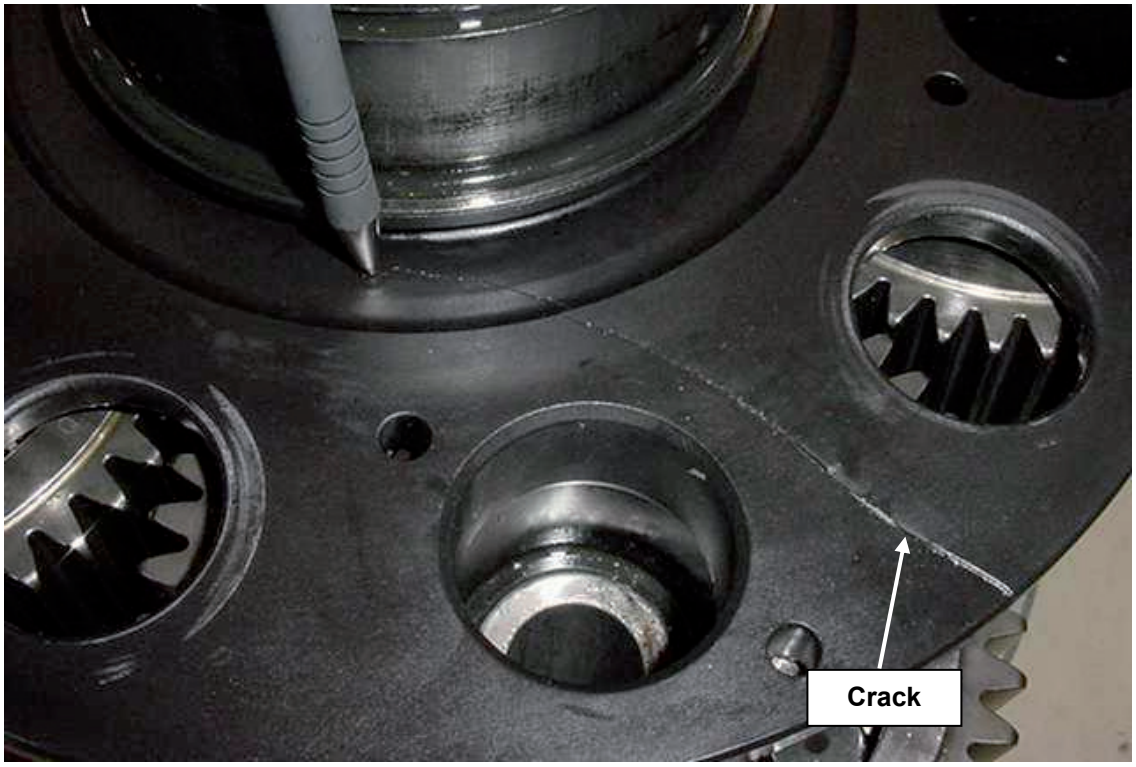

Web of the planet gear carrier
Area to be inspected
Inside of the crankpin
Pocket

Figure 3



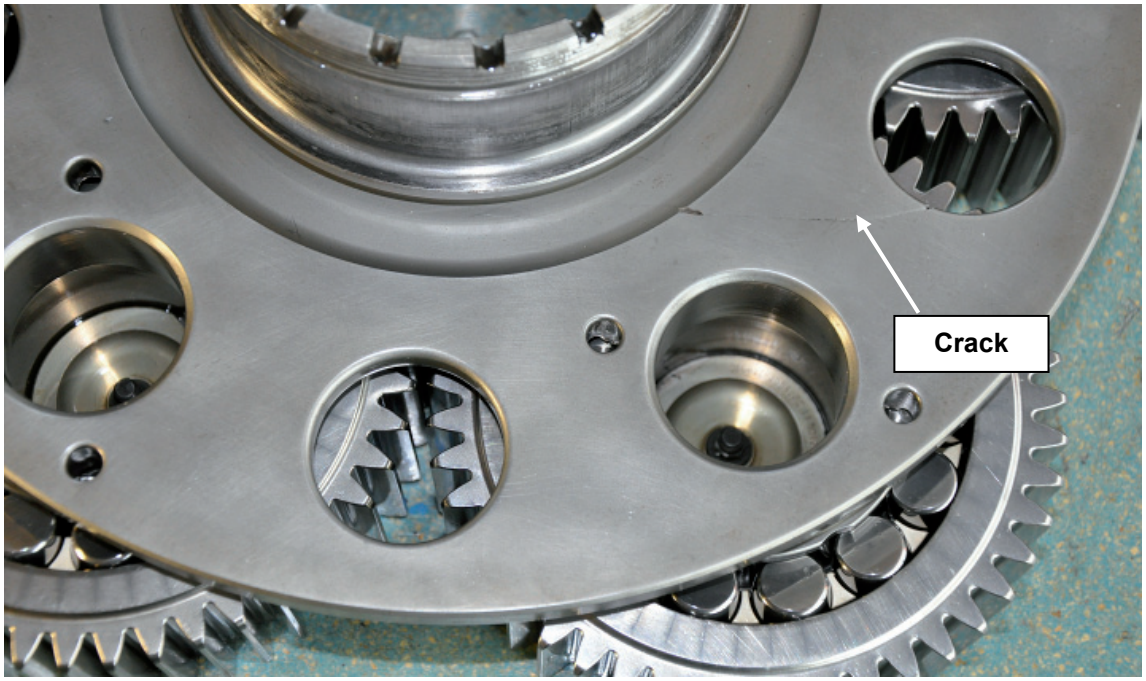


Figure 4

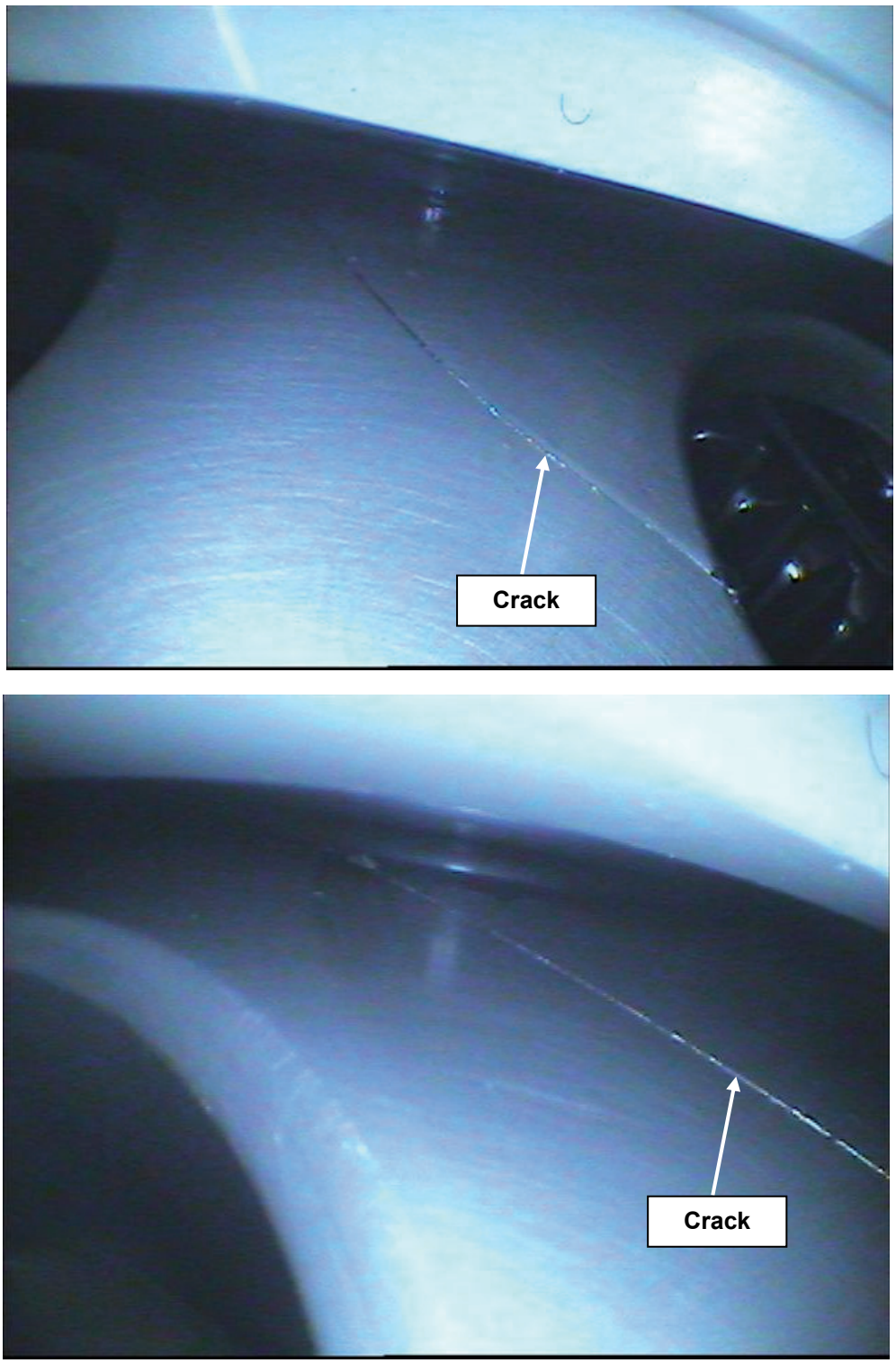
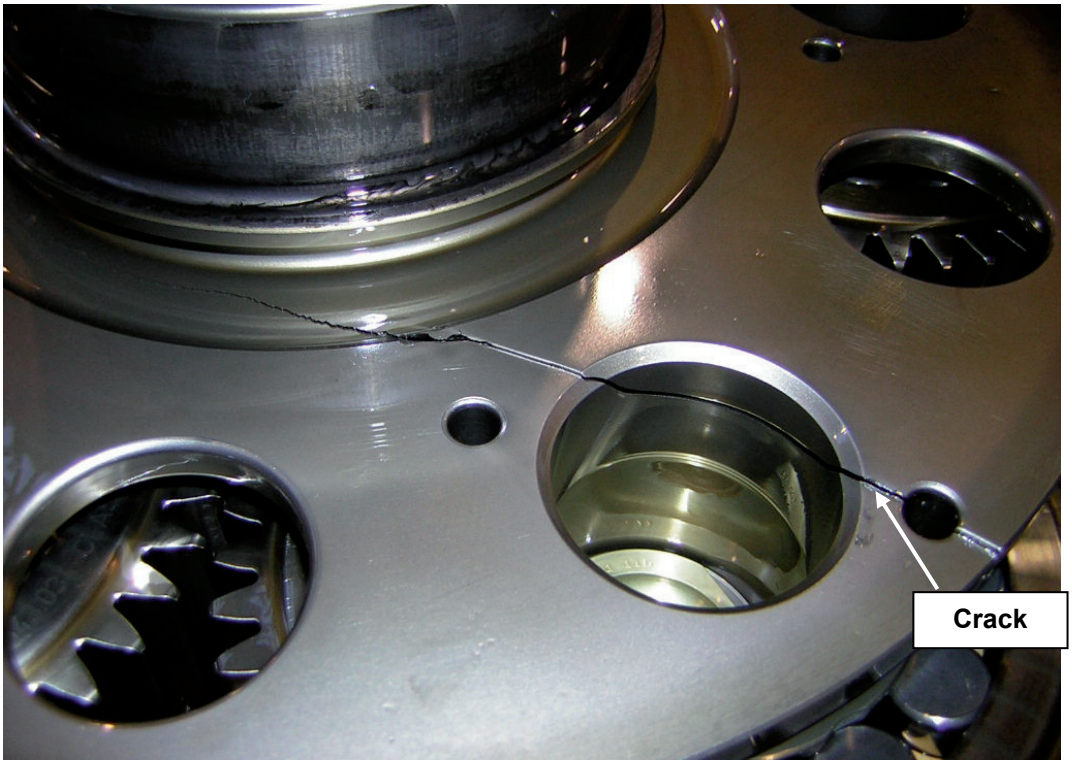


Figure 5



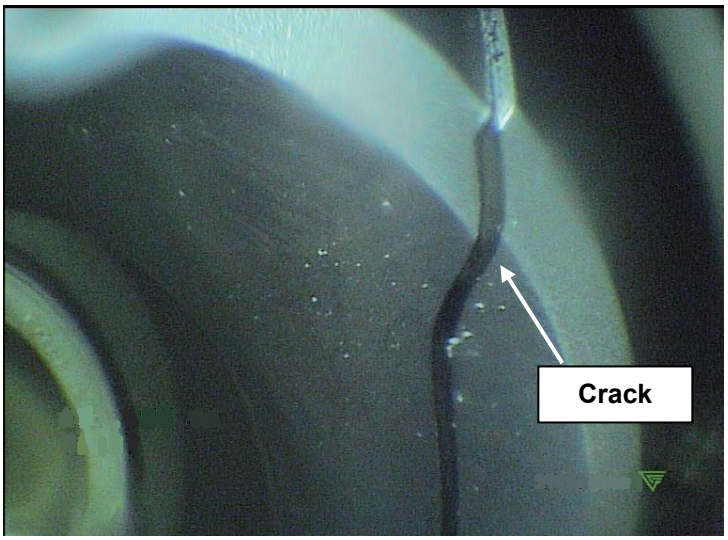


Figure 6

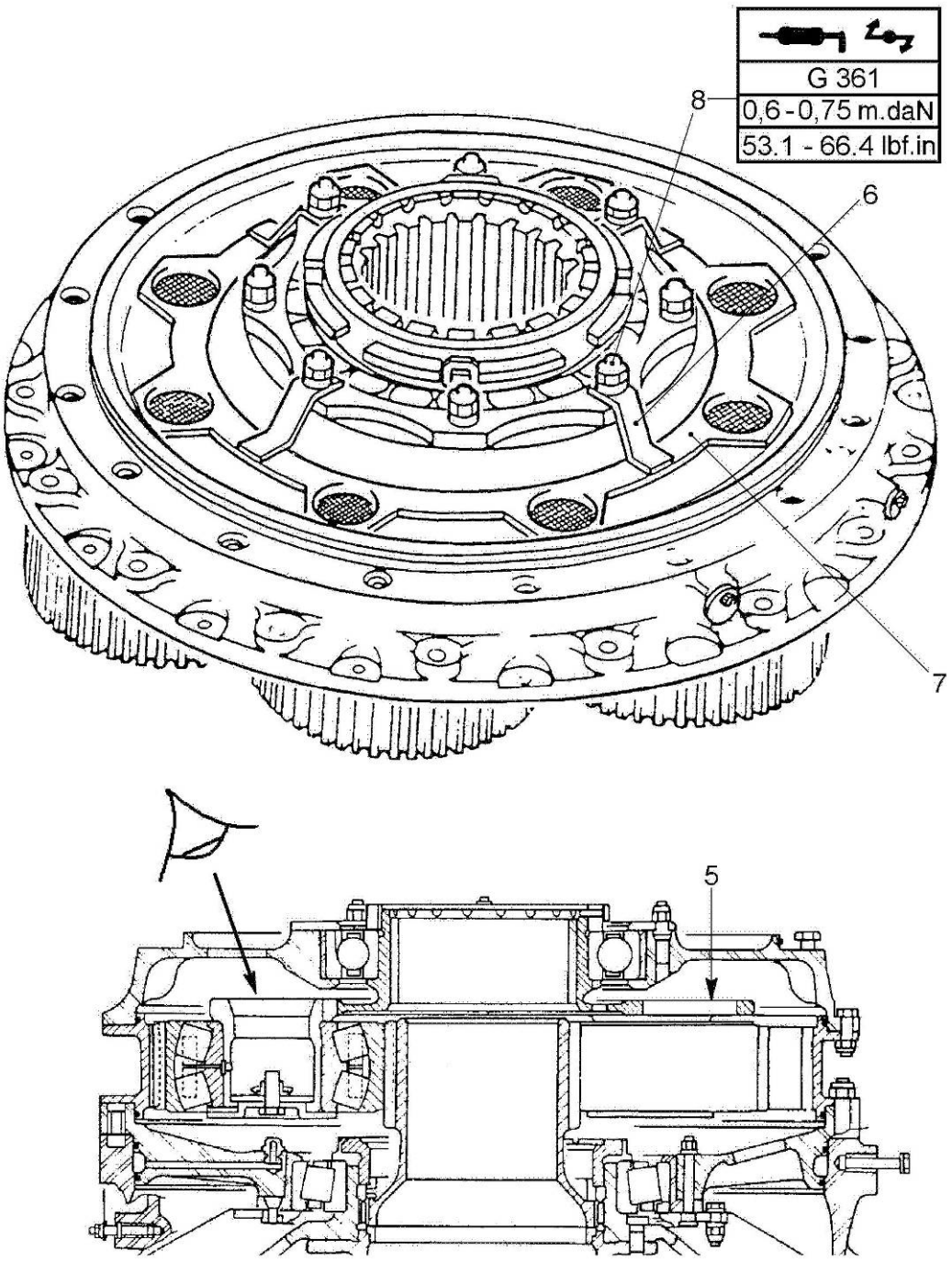


Figure 7

3. MATERIAL INFORMATION

3.A. MATERIAL: COST – AVAILABILITY

For any information, contact the Customer Service Sales Department.

3.B. INFORMATION CONCERNING INDUSTRIAL SUPPORT

Not applicable.

3.C. MATERIAL REQUIRED FOR EACH AIRCRAFT, ENGINE/COMPONENTS

3.C.1. Component(s):

New P/N	Qty	Item	Key Word	Former P/N	Instructions Disposition
ASN52320BH050N	1	2	Nut		
PS701-6006-001	1	3	O-ring		
PS701-6006-002	1	4	O-ring		

3.C.2. Material to be ordered separately:

The materials identified by an asterisk "*" or required for compliance with the tasks and/or work cards listed in paragraph 1.K., can be ordered from the INTERTURBINE AVIATION LOGISTICS company,
Website: http://www.interturbine.com
Phone: +49.41.91.809.300
AOG: +49.41.91.809.444

3.D. MATERIAL REQUIRED FOR EACH SPARE PART

Not applicable.

3.E. RE-IDENTIFIED PARTS

Not applicable.

3.F. TOOLING: COST – AVAILABILITY

For any information, contact the Customer Service Sales Department.

3.G. PROCUREMENT CONDITIONS

Order the required quantity (unless otherwise specified)

from

EUROCOPTER
Etablissement de Marignane
Direction Ventes et Relations Client
ECR
13725 MARIGNANE CEDEX
FRANCE

NOTE 1

For ALERT SERVICE BULLETINS, order by:
Telex: HELICOP 410 969F
Fax: +33 (0)4 42 85 99 96

NOTE 2

On the purchase order, please always specify the mode of transport, the destination and the serial numbers of the aircraft to be modified.

4. APPENDIX

Not applicable.