

ALERT SERVICE BULLETIN

No. 76A003

SUBJECT: ENGINE CONTROLS

NR drop in flight - Slow drift in the XPC anticipator (collective pitch signal)

Corresponds to MOD 073443

REVISION No.	DATE OF APPROVAL	DATE OF ISSUE
Revision 0	On: March 13, 2009	2009.03.16

1. PLANNING INFORMATION

1.A. EFFECTIVITY

1.A.1. Helicopters/installed equipment

Helicopters that are not modified per MOD 073443 or MOD 350A085499.00.

NOTE

*Refer to the aircraft individual inspection record (MOD record)
or the aircraft log book to identify the actual configuration of the
helicopter.*

1.A.2. Non-installed equipment

Not applicable.

1.B. ASSOCIATED REQUIREMENTS

Not applicable.

1.C. REASON

To recondition the electrical harness that connects the engine computer (FADEC) to the engine (28K2) anticipator potentiometer, in order to eliminate any over-length and loops from this electrical harness, if any.

1.D. DESCRIPTION

EUROCOPTER has received two reports of significant rotor speed (NR) drop in flight. The information available to EUROCOPTER indicates that the reported occurrences were caused by a drift in the XPC anticipator signal (collective pitch position). These reports formed the subject of TELEX INFORMATION No. 469.

The investigation conducted by EUROCOPTER has shown that the reported occurrences were due to deterioration of the electrical harness that connects the XPC anticipator potentiometer to the FADEC. A potential over-length of the electrical cables is coiled near the anticipator potentiometer. The radii of curvature of these cable loops can lead to deterioration of the insulating material. That deterioration may allow contact between one of the three wires of the cable and the cable shielding due to compression, causing the XPC signal value to drift downward.

In particular, progressive drift in the XPC signal can occur in a stable collective lever position and leads to a gradual change in the governing set-point. If the drift is sufficiently slow, the FADEC will not detect the anomaly using the gradient test (test of the signal drift rate relative to time). The engine will then regulate to a lower NR value, which may finally trigger rotor "low rpm" warning. Although this is not an engine power loss, the flight crew may consider this phenomenon as such, which may lead them to wrongly carry out an autorotation.

For the reason mentioned above, although this phenomenon is not classified as an "unsafe condition", EUROCOPTER renders compliance with this ALERT SERVICE BULLETIN, which asks you to modify the XPC anticipator cable, mandatory.

1.E. COMPLIANCE

EUROCOPTER renders compliance with this ALERT SERVICE BULLETIN, mandatory.

1.E.1. Compliance at the works

1.E.1.a. On helicopters

Not applicable.

1.E.1.b. On non-installed equipment

Not applicable.

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

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

Comply with paragraph 2. at the latest within 220 flying hours but not exceeding 4 months following receipt of this ALERT SERVICE BULLETIN, issued on the date indicated at the foot of the page.

1.E.2.b. On non-installed equipment

Not applicable.

1.F. APPROVAL

Approval is limited to civil version helicopters subject to an Airworthiness Certificate.

1.F.1. Approval of modifications

The information or instructions relate to change: modification No. 073443 which was approved on December 03, 2008.

1.F.2. Approval of the Service Bulletin

The technical information given in this ALERT SERVICE BULLETIN was approved on March 13, 2009 under the authority of EASA Design Organisation Approval No. 21J.056.

1.G. MANPOWER

Qualification: 1 electrician.

Time for the operation: Approximately 4 hours to recondition the cable.

1.H. WEIGHT AND BALANCE

Not applicable.

1.I. EFFECT ON ELECTRICAL LOADS

Does not affect the electrical power breakdown of the helicopter.

1.J. SOFTWARE MODIFICATION EMBODIMENT RECORD

Not applicable.

1.K. REFERENCES

The following documents are necessary for compliance with this ALERT SERVICE BULLETIN:

- Standard Practices Manual (MTC): 20.02.01.415: Installation of electrical cable bundles.
- Aircraft Maintenance Manual (AMM): 24-00-00, 3-1: General instructions concerning electrical power.
- Wiring Diagram Manual (WDM): 80-11-00: Starting.

1.L. OTHER DOCUMENTS AFFECTED

Not applicable.

1.M. TOOLING AFFECTED

Not applicable.

1.N. INTERCHANGEABILITY AND MIXABILITY OF PARTS

Not applicable.

2. ACCOMPLISHMENT INSTRUCTIONS

2.A. GENERAL

- Read and comply with the general instructions concerning electrical power as per AMM Task 24-00-00, 3-1.
- Read and comply with the instructions concerning the installation of electrical cable bundles as per MTC Work Card 20.02.01.415.

2.B. OPERATIONAL PROCEDURE

2.B.1. Preliminary steps

- Set up appropriate access equipment.
- Open the RH side baggage compartment.
- Remove the baggage compartment bottom covering.
- Open the rear baggage compartment.

2.B.2. Procedure

NOTE 1

Do not route harnesses carrying high power (which may be the subject of an STC), along the XPC harness.

NOTE 2

Refer to the Appendix. It specifies the contact (table 1) and extension (table 2) crimping tools.

2.B.2.a. Elimination of XPC cable loops and over-length (Figures 1 and 2)

- Disconnect electrical connector P4 from the FADEC (Figure 1).
- Disconnect the electrical connector P1 from XPC anticipator (28K2) (Figure 1).
- In zone Z (Figure 2), cut and discard the binding clamps, then remove the spiral wrap tubing from electrical harness (L), in order to release the XPC cable over-length (M).
- Cut the XPC cable to eliminate any loops and potentially damaged areas.
- Unplug the contacts from the XPC connector.
- Retain connector (a), adapter (b) and marker sleeve (c) (Figure 1).
- Discard the previously cut cable.
- Check that the remaining length of the XPC cable (M) is sufficient to reconnect it to the XPC anticipator in accordance with the routing (Detail A) and curvature radius (Detail B), shown on Figure 2.
 - . If the remaining length is insufficient, comply with paragraphs 2.B.2.b. and 2.B.2.c.
 - . If the remaining length is sufficient, comply with paragraph 2.B.2.c.

2.B.2.b. Extending the cable (Figures 3 and 4)

- Prepare a length of cable P/N E0274UD24 required to extend the existing cable.
- Prepare a length of NOMEX sheath required to extend the existing cable.
- Push back the NOMEX sheath on the existing cable.
- Strip the cables over a length of 60 mm to access the shielding.
- Position heat-sealing braid (2) and heat-shrinkable sleeve (3) on one of both cables (Detail D, Figure 3).
- Push back the cable shielding.
- Strip the conductors over a length of 6 mm.
- Crimp the extensions (1) on one end of the conductors (Detail C, Figure 3).
- Position the insulating sleeves (4) of the extensions on each conductor.
- Crimp the other end of the extensions (1) as shown on (Detail E, Figure 3) and in accordance with WDM 80-11-00.
- Position the insulating sleeves (4) on the extensions (1), (Detail F, Figure 3).
- Shrink the insulating sleeves (4) using a hot air generator.

CAUTION

WHEN SHRINKING THE INSULATING SLEEVES (4), MAKE CERTAIN NOT TO HEAT THE HEAT-SEALING BRAID (2).

- Fit the cable shielding (Detail G, Figure 4).
- Fit the heat-sealing braid (2) (Detail H, Figure 4).
- Shrink the heat-sealing braid (2) with a hot air generator (Detail J, Figure 4).
- Position the heat-shrinkable sheath (3) on the splice, thus insulating it from the other wiring (Detail K, Figure 4).
- Shrink heat-shrinkable sheath (3) using a hot air generator.
- Push forward the NOMEX sheath.
- Insert a NOMEX sheath on the added piece of cable.
- Hold the NOMEX sheaths together with a binding clamp.

2.B.2.c. Installing the connector (Figure 1)

- Adjust the length of both the cable and the NOMEX sheath (d):

NOTE

The adjusted cable length shall provide for a 15 mm (.6 in.) bending radiu: see Figure 2.

- Push back the NOMEX sheath (d) to uncover the cable.
- Produce the shielding stop.
- Protect the shielding stop with a piece of KYNAR sheath shrunk using a hot air generator.

- Strip the conductors.
- Crimp contacts (5) to the conductors.
- Cover the cable with NOMEX sheath (d).
- Adjust the length of NOMEX sheath (d).
- Fit marker sleeve (c).
- Fit connector adapter (b).
- Insert contacts (5) into connector (a) in accordance with WDM 80-11-00.
- Tighten adapter (b) on connector (a).
- Conduct an electrical continuity test.
- Test the insulation between each of the three wires, then between each wire and the ground connection.
- Connect the electrical connector P1 of potentiometer XPC.
- Connect the electrical connector P4 on the FADEC side.
- Fit the spiral-wrap tubing that was removed previously, again round electrical harness (L).
- Secure electrical harness (L) with binding clamps.

2.B.3. Tests

- Energize the aircraft electrical power systems.
- Check for progressive and consistent change in the "COLL. PITCH" parameter value on the VEMD "FADEC DATA" maintenance page, by moving the collective lever from the full low to the full high pitch position.

2.B.4. Final steps

- Close the rear baggage compartment.
- Install the baggage compartment bottom covering.
- Close the RH side baggage compartment.
- Remove the access equipment.

2.C. IDENTIFICATION

Record embodiment of MOD 073443 and compliance with this ALERT SERVICE BULLETIN in the helicopter documents.

2.D. OPERATING AND MAINTENANCE INSTRUCTIONS

Not applicable.

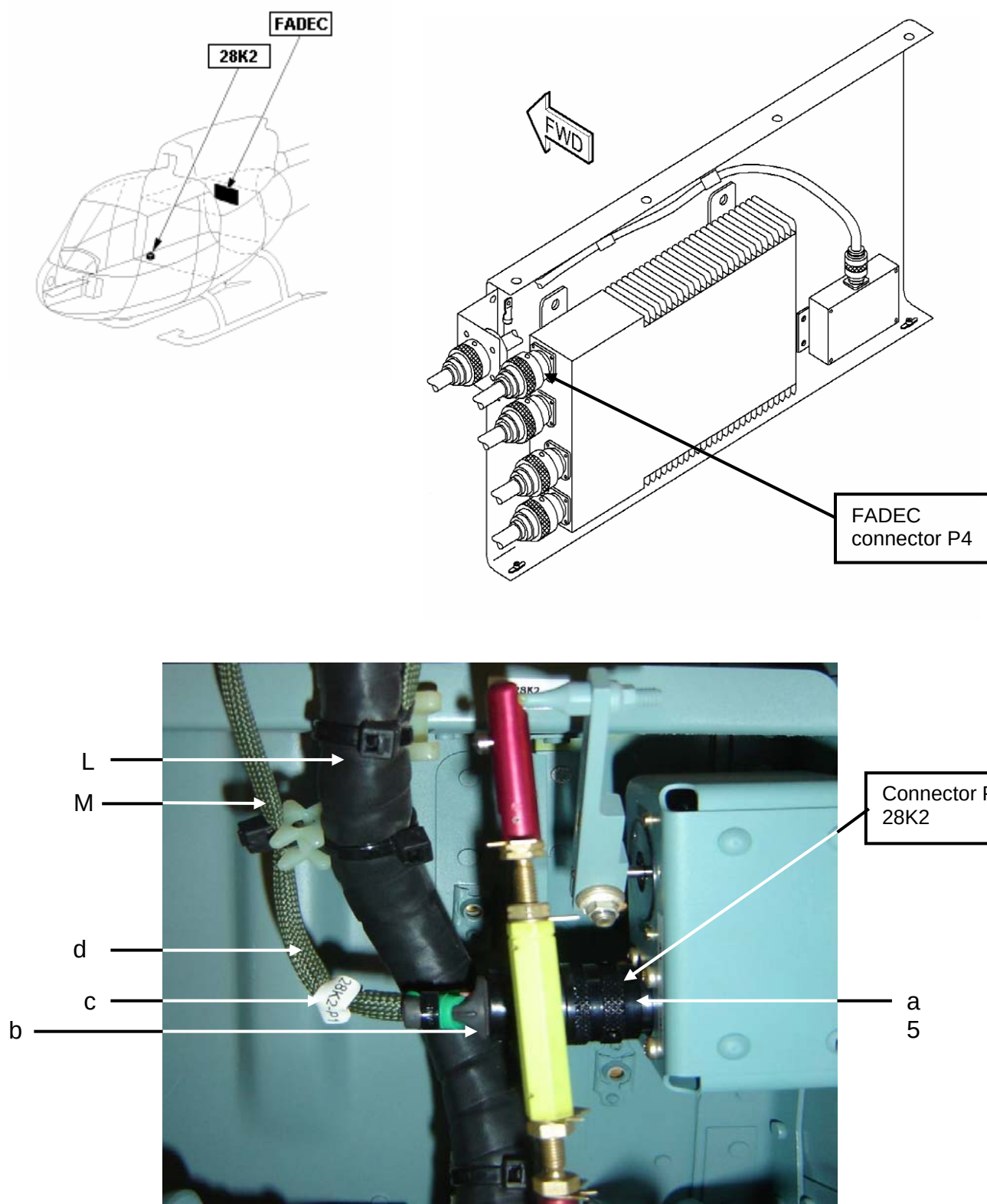


Figure 1

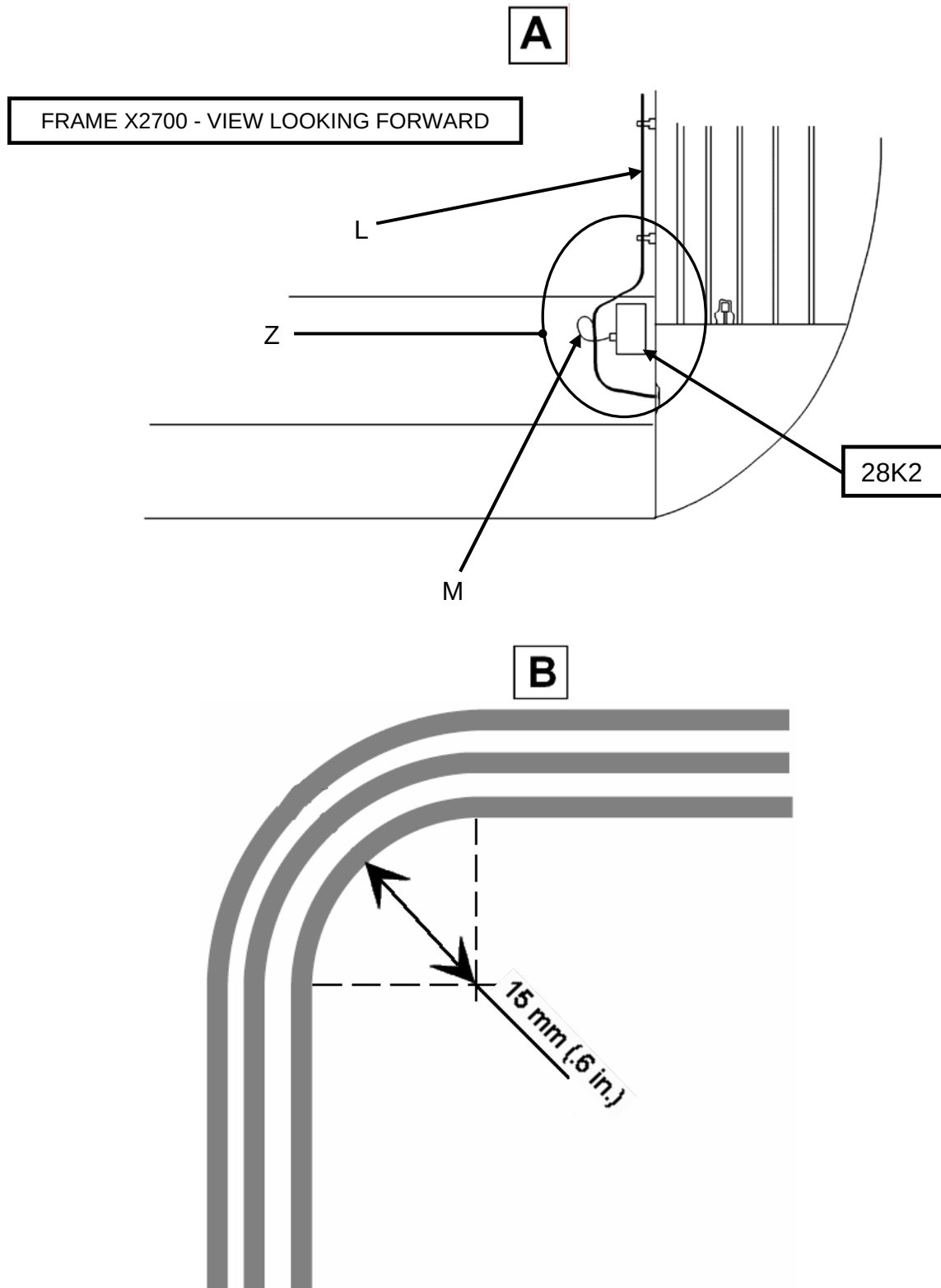


Figure 2

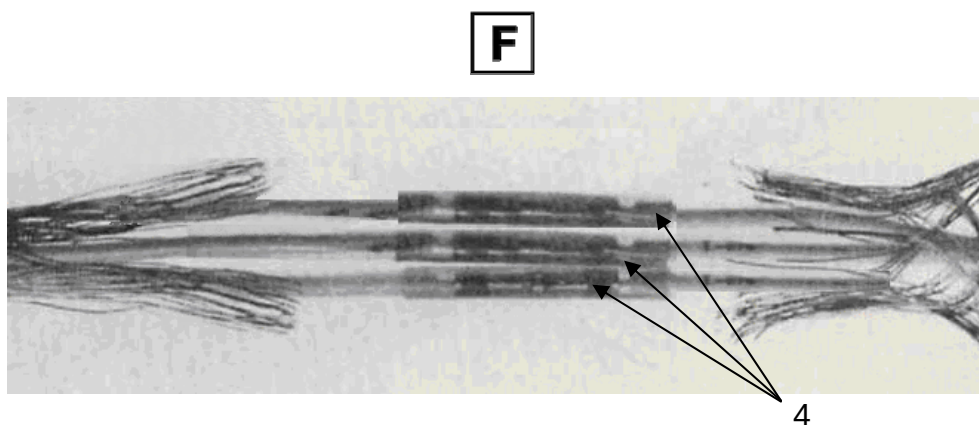
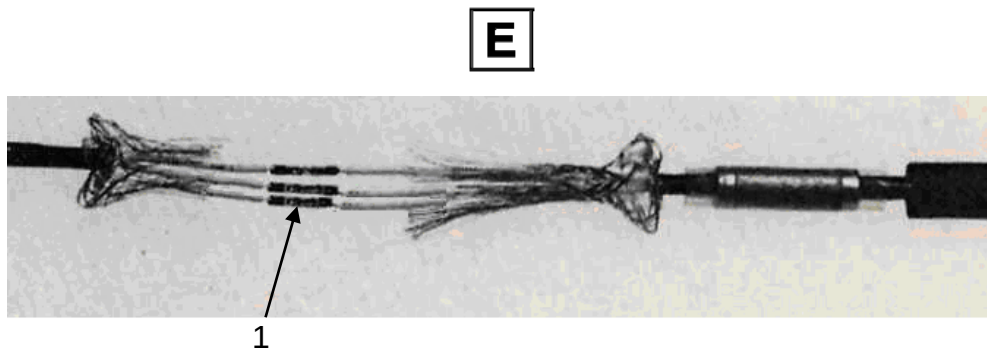
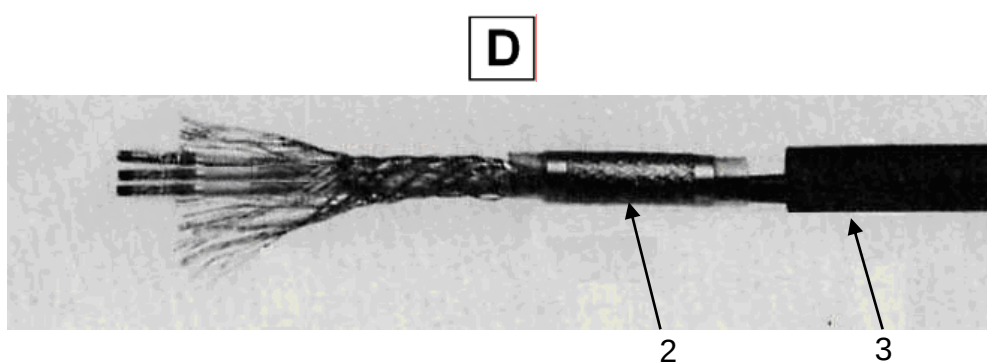
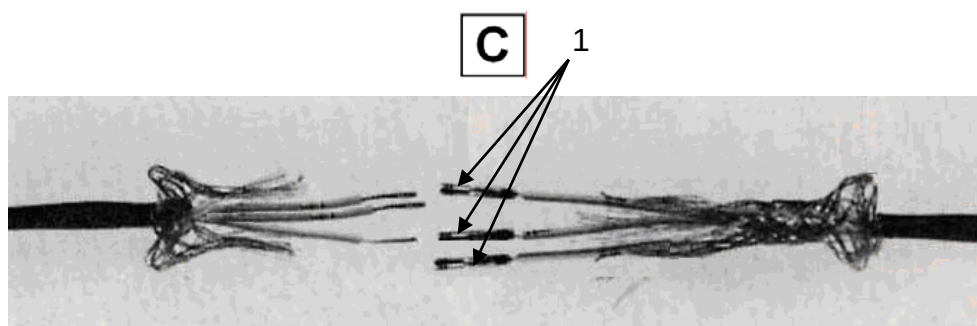
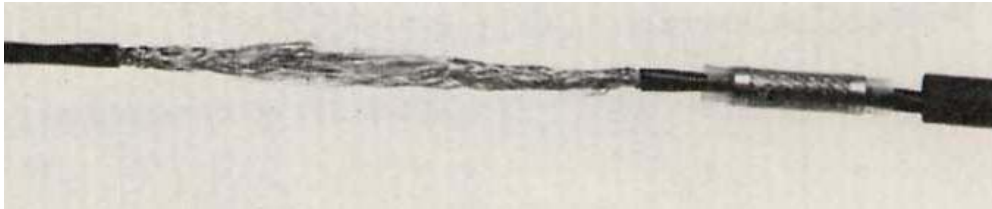


Figure 3

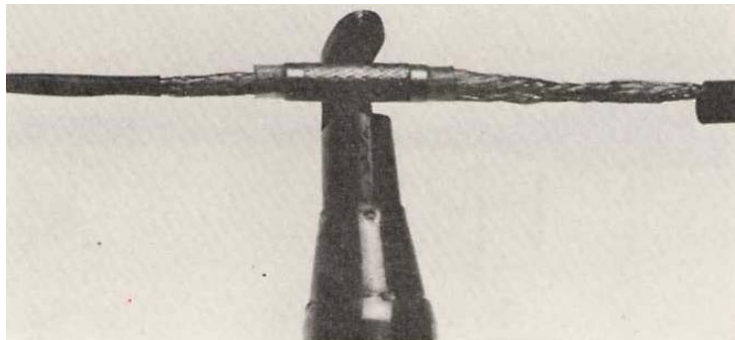
G



H



J



K

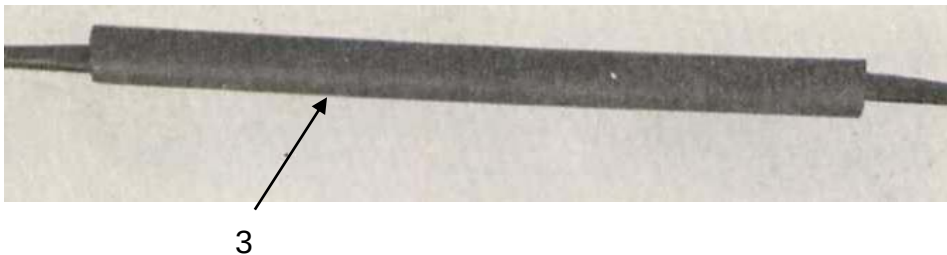


Figure 4

3. MATERIAL INFORMATION

3.A. MATERIAL: PRICE - AVAILABILITY

3.A.1. Cost

The kits and/or components will be delivered free of charge for 4 months following the date of issue of this ALERT SERVICE BULLETIN, indicated at the foot of the page.

3.A.2. Availability

The kits and/or components will be delivered on Customer's order.

3.B. INFORMATION CONCERNING INDUSTRIAL SUPPORT

Not applicable.

3.C. MATERIAL REQUIRED FOR EACH HELICOPTER/ENGINE/COMPONENT

3.C.1. Kit(s) or component(s) to be ordered for one helicopter or one assembly

Material Part number	Qty	Item	Key Word	Former Part Number	Instructions
EN3155019F2020	3	5	Contact	EN3155019F2020	If necessary

Material required for extending the cable:

D-150-0235	1		Splice including:		If necessary
		1	3 extensions		
		2	1 heat-sealing braid		
		4	3 insulating sleeves		

3.C.2. Items to be ordered separately

Material Part number	Qty	Item	Key Word
EC0043-3C0	A/R		Binding clamp
DHS271-611-05	A/R	3	Heat-shrinkable sleeve
DHS271-315-04	A/R		Kynar sheath
E0274UD24	A/R		Cable
EN6049-003-06-5	A/R		NOMEX sheath

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 company:

Website: <http://www.itlogistics.de>

Phone: +49.41.91.809.300

AOG: +49.41.91.809.444.

3.D. PROCUREMENT CONDITIONS

Order the required quantity (unless otherwise specified)

from

EUROCOPTER
Etablissement de Marignane
Direction Ventes et Relation 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 specify the mode of transport,
the destination and the serial numbers of the helicopters to be
modified.*

4. APPENDIX

Detailed information concerning the tools required:

- to crimp, insert and extract contacts or equivalent,
- to crimp extensions.

Item	Contact P/N	Size	Gage	Stripped length	Pliers M22520/				Extractor M81969	
					2-01	Setting	7-01	Setting	Ref.	Color
5	EN3155-019F2020	20	24	4.5 ($\pm$ 0.5)	2.02	5	7.02	4	14.11	Red/White

Table 1: Part number of contact crimping pliers

Item	Extension P/N	Color	Theoretical stripping length	Pliers AD-1377 Crimping nest:
1	E0541-10	Rouge	6 mm	Red 21-26

Table 2: Part number of extension crimping pliers