SERVICE BULLETIN

OPTIONAL

N° **139-573**

DATE: June 28, 2019

REV. : A - January 30, 2024

TITLE

ATA 31 – KIT HUMS COMPLETION

REVISION LOG

Helicopters already compliant with previous issues of this Service Bulletin do not need any additional action.

Revision A is issued to:

- Extend the effectivity to AW139 helicopter S/N 31367.

- Update weight and balance chart for Part III

Revision bars identify changes.

1. <u>PLANNING INFORMATION</u>

A. EFFECTIVITY

AW139 helicopters S/N 31328, S/N 31332 and S/N 31367.

B. COMPLIANCE

At Customer's option.

C. CONCURRENT REQUIREMENTS

N.A.

D. REASON

This Service Bulletin is issued in order to provide the necessary instructions to complete the installation of kit HUMS P/N 4G3130F00111.

LH issued this SB for the following reason:

Helicopter Reliability/Maintainability	
Product Improvement	
Obsolescence	
Customization	✓
Product/Capability Enhancement	

E. DESCRIPTION

Helicopters S/N 31328, S/N 31332 and S/N 31367 have been delivered with HUMS provision partially installed.

This Service Bulletin provides instruction to complete the Kit installation and is divided in three parts:

- Part I provides the instructions to complete HUMS provision;
- Part II provides all necessary instructions to perform HUMS fixed parts;
- Part III provides the instructions to perform the installation of EUTD camera.

A support for the installation of the EUTD camera is installed on the left side of the cockpit glareshield, while the camera itself is installed only temporarily, when it is necessary to measure the rotor track and lead/lag and must then be removed to restore the helicopter in-flight configuration.

F. APPROVAL

The technical content of this Service Bulletin is approved under the authority of DOA nr. EASA.21.J.005. For helicopters registered under other Aviation Authorities, before applying the Service Bulletin, applicable Aviation Authority approval must be checked within Leonardo Helicopters customer portal.

EASA states mandatory compliance with inspections, modifications or technical directives and related time of compliance by means of relevant Airworthiness Directives.

If an aircraft listed in the effectivity embodies a modification or repair not LHD certified and affecting the content of this Service Bulletin, it is responsibility of the Owner/Operator to obtain a formal approval by Aviation Authority having jurisdiction on the aircraft, for any adaptation necessary before incorporation of the present Service Bulletin.

G. MANPOWER

To comply with this Service Bulletin the following MMH are deemed necessary.

Part I: twenty-four (24) MMH;

Part II: twenty (20) MMH;

Part III: four (4) MMH.

MMH are based on hands-on time and can change with helicopter configuration, personnel and facilities available. MMH are not comprehensive of the overall hours necessary to get access to work areas and to remove all the equipment that interferes with the application of the prescribed instructions.

H. WEIGHT AND BALANCE

PART I

	WEIGHT (kg)	0.58	
		ARM (mm)	MOMENT (kg·mm)
LONGITUDINAL BALANCE		5450	3161
LATERAL BALANCE		118	68.4

PART II

	WEIGHT (Kg)	7.7	
		ARM (mm)	MOMENT (Kgmm)
LONGITUDINAL BALANCE		6645	51166.5
LATERAL BALANCE		433	3334.1

PART III

	WEIGHT (kg)		0.260	
		ARM (mm)		MOMENT (kg·mm)
LONGITUDINAL BALANCE		1958		509.1
LATERAL BALANCE		-847		-220.2

I. REFERENCES

I.1 PUBLICATIONS

Following Data Modules refer to AMP:

DATA MODULE		DESCRIPTION	PART
DM01	39-A-00-20-00-00A-120A-A	Helicopter on ground for a safe maintenance.	I, II, III
DM02	39-A-06-41-00-00A-010A-A	Access doors and panels - General data.	I, II, III
DM03	39-B-31-32-28-00A-720A-K	MT35/MT37 accelerometer support - Install procedure.	II
DM04	39-B-31-32-27-00A-720A-K	DAU rack - Install procedure.	II
DM05	39-B-31-32-01-00A-720A-K	Data acquisition unit (DAU) - Install procedure.	II
DM06	39-B-31-32-26-00A-720A-K	Vertical load accelerometer support - Install procedure.	II
DM07	39-B-31-32-25-00A-720A-K	Vertical load accelerometer support - Install procedure.	II
DM08	39-B-31-32-05-00A-720A-K	Accelerometer (MT40) - Install procedure.	II
DM09	39-B-31-32-04-00A-720A-K	Vertical load accelerometer (MT41) - Install procedure.	II
DM10	39-B-31-32-06-00A-720A-K	Accelerometer (MT35) - Install procedure.	II
DM11	39-B-31-32-07-00A-720A-K	Accelerometer (MT37) - Install procedure.	II
DM12	39-B-31-32-02-00A-720A-K	Cockpit display unit/data transfer unit (CDU/DTU) - Install procedure.	II
DM13	39-B-31-32-08-00A-720A-K	Accelerometer (MT23) - Install procedure.	II
DM14	39-B-31-32-09-00A-720A-K	Accelerometer (MT24) - Install procedure.	II
DM15	39-B-31-32-10-00A-720A-K	Accelerometer (MT25) - Install procedure.	II
DM16	39-B-31-32-11-00A-720A-K	Accelerometer (MT26) - Install procedure.	II
DM17	39-B-31-32-12-00A-720A-K	Accelerometer (MT27) - Install procedure.	II
DM18	39-B-31-32-13-00A-720A-K	Accelerometer (MT28) - Install procedure.	II

DATA MODULE		DESCRIPTION	PART
DM19	39-B-31-32-14-00A-720A-K	Accelerometer (MT29) - Install procedure.	II
DM20	39-B-31-32-15-00A-720A-K	Accelerometer (MT36) - Install procedure.	II
DM21	39-B-31-32-19-00A-720A-K	Accelerometer (MT30) - Install procedure.	II
DM22	39-B-31-32-16-00A-720A-K	Accelerometer (MT34) - Install procedure.	II
DM23	39-B-31-32-23-00A-720A-K	Interruptor bracket - Install procedure.	II
DM24	39-B-31-32-18-00A-720A-K	Interruptor - Install procedure.	II
DM25	39-B-31-32-24-00A-720A-K	Tachometer support – Install procedure.	II
DM26	39-B-31-32-17-00A-720A-K	Tachometer (MT33) – Install procedure.	II
DM27	39-B-31-32-03-00A-720A-K	Data transfer device (DTD) - Install procedure.	II

Following Data Modules refer to CSRP:

DATA MODULE		DESCRIPTION	PART
DM28	CSRP-A-51-21-02-02A-257A-D	Waterborne chromate free primer (AWMS28-002) - Paint and apply marking.	II
DM29	CSRP-A-51-21-01-02A-257A-D	Polyurethane paint (MIL-PRF-85285) - Paint and apply marking	II

I.2 ACRONYMS & ABBREVIATIONS

AMDI   Aircraft Material Data Information

AMP   Aircraft Maintenance Publication

AR   As Required

CMC   Central Maintenance Computer

CDU   Control Display Unit

CSRP   Common Structural Repair Publication

DAU   Data Acquisition Unit

DM   Data Module

DPD   Direct Parameter Display

DTD   Data Transfer Device

DTU   Data Transfer Unit

DOA   Design Organization Approval

EASA   European Aviation Safety Agency

EUTD   Enhanced Universal Tracking Device

HGS   HUMS Ground Station

HUMS   Health and Usage Monitoring System

IGB   Intermediate Gearbox

ITEP   Illustrated Tools and Equipment Publication

LHD   Leonardo Spa Helicopters

MGB   Main Gearbox

MMH   Maintenance-Man-Hours

OBSC   On Board System Configuration

PCMCIA   Personal Computer Memory Card International Association

RBT   Rotor Blade Tracking

RTB   Rotor Track and Balance

TGB   Tail Gearbox

TVM   Transmission Vibration Monitoring

I.3 ANNEX

Annex A   HUMS - Test and Configuration procedure

Annex B   HUMS - Operation and maintenance source data

J. PUBLICATIONS AFFECTED

N.A.

K. SOFTWARE ACCOMPLISHMENT SUMMARY

HUMS software to be uploaded.

2. MATERIAL INFORMATION

A. REQUIRED MATERIALS

A.1 PARTS

PART I

#	P/N	ALTERNATIVE P/N	DESCRIPTION	Q.TY	LVL	NOTE	LOG P/N
1	**4G3130F00111**		**KIT HUMS**	**REF**	.		**-**
2	**4G3130A00112**		**HUMS COMPLETE PROVISION**	**REF**	..		**-**
3	**4G3130A00311**		**HUMS MGB ELECTRIAL PROVISION**	**REF**	...		**-**
4	3G9F12B00411		HUMS MGB C/A (F2B4)	1	....		139-573L1
5	3G9F12B00511		HUMS MGB C/A (F2B5)	1	....	(4)	139-573L2
6	AS21919WCH02		Clamp	3	....	(4)	139-573L2
7	AS21919WCH04		Clamp	3	....		139-573L1
8	AS21919WCH05		Clamp	5	....		139-573L1
9	AS21919WCH06		Clamp	5	....		139-573L1
10	AS21919WCH08		Clamp	4	....		139-573L1
11	AS21919WDG10		Clamp	1	....		139-573L1
12	A630A51	AW001CL001-N6	Support	1	....		139-573L1
13	MS35207-263		Screw	3	....		139-573L2
14	NAS1802-3-18		Screw	3	....	(4)	139-573L2
15	NAS43DD3-18N		Spacer	3	....	(4)	139-573L2

PART II

#	P/N	ALTERNATIVE P/N	DESCRIPTION	Q.TY	LVL	NOTE	LOG P/N
16	**4G3130F00111**		**KIT HUMS**	**REF**	.		**-**
17	**3G3130A01411**		**HUMS FIXED PARTS**	**REF**	..		**-**
18	177035-01		Mounting tray	1	...		139-038L9
19	3001-01-100-4		Accelerometer	1	...		139-038L9
20	3062A1		Accelerometer	3	...		139-038L9
21	3G3130V00151		Hums control panel	1	...		139-038L9
22	3G3130V00251		HUMS DAU	1	...		139-038L9
23	AN3-5		Bolt	3	...		139-038L9
24	ED300A54		Decal	1	...		139-038L9
25	MS24694-S50		Screw	4	...		139-038L9
26	NAS1149D0332K		Washer	3	...		139-038L9
27	**3G5315A09411**		**HUMS SUPPORT INSTALLATION**	**REF**	...		**-**
28	3G5315A08831		Support accelerometer assy	1	....		139-038L10
29	3G5315A08951		Support HUMS accelerometer	1	....		139-038L10
30	3G5315A09051		Support HUMS tail accelerometer	1	....		139-038L10
31	3G5315A09231		Support DAU assy	2	....		139-038L10
32	A414A02V209A1		Connector support	1	....		139-038L10
33	AN3-3		Bolt	4	....		139-038L10
34	AN3H5A		Bolt	3	....		139-038L10
35	MS20470AD4		Rivet	32	....		139-038L10
36	MS27039-0805		Screw	3	....		139-038L10
37	NAS1149BN816H		Washer	2	....		139-038L10
38	NAS1149D0332K		Washer	7	....		139-038L10

#	P/N	ALTERNATIVE P/N	DESCRIPTION	Q.TY	LVL	NOTE	LOG P/N
39	NAS1149DN832K		Washer	3	….		139-038L10
40	NAS9301BNS-4-02	NAS9301B-4-02	Rivet	2	….		139-038L10
41	NAS43DD3-10N	NAS43DD3-10	Spacer	2	….		139-038L10
42	A428A08C09		Screw	2	….		139-038L10
43	**3G3130A00711**		**TAIL ROTOR PICK-UP INSTALLATION**	**REF**	…		**-**
44	3G3130A00431		Azimuth assy	1	….		139-038L11
45	3G3130A00552		Pick-up support	2	….		139-038L11
46	3G3130A00651		Chopper support	1	….		139-038L11
47	3G6493A02251		Chopper	1	….		139-038L11
48	AN4H7A		Bolt	1	….		139-038L11
49	MS17826-4		Nut	1	….		139-038L11
50	MS24665-155		Cotter pin	1	….		139-038L11
51	NAS1149C0416R		Washer	2	….		139-038L11
52	NAS1149C0432R		Washer	2	….		139-038L11
53	NAS1149C0632R		Washer	1	….		139-038L11
54	NAS509-6		Nut	1	….		139-038L11
55	NAS6606D15		Bolt	2	….		139-038L11
56	**3G3130A01211**		**MGB HUMS SENSORS INSTL**	**REF**	…		**-**
57	3062A1		Accelerometer	1	….		139-038L12
58	3G6320A15251		Adapter	1	….	(1)	-
59	3G6340V00151		Accelerometer	11	….	(5)	139-038L12
60	EA6300V083-001		Azimuth sensor	1	….		139-038L12
61	NAS1352C06H14	MS35265-33	Screw	11	….	(5)	139-038L12
62	M23053/5-203-C	M23053/8-003-C	Insulation sleeving	12	….		139-038L12
63	M83248/1-113	AS3209-113	O-ring	1	….	(2)	139-038L12
64	NAS1149F0332P		Washer	2	….	(2)	139-038L12

PART III

#	P/N	ALTERNATIVE P/N	DESCRIPTION	Q.TY	LVL	NOTE	LOG P/N
65	**4G3130F00111**		**KIT HUMS**	**REF**	.		**-**
66	**3G3130A01512**		**HUMS REMOVABLE PARTS**	**REF**	..		**-**
67	3G3130VO0001		OBSC-MGB	1	…	(3)	-
68	3G5315A20051		Support	1	…		139-038L16
69	3G5320A08431		Rod assy	1	…		139-038L16
70	3G5320A08651		Upper fitting	1	…		139-038L16
71	3G5320A08751		Lower fitting	1	…		139-038L16
72	A298A04TW02		Rivet	1	…		139-038L16
73	AN3-6A		Bolt	2	…		139-038L16
74	MS14145L5		Nut	2	…		139-038L16
75	MS21042L3		Nut	6	…		139-038L16
76	MS24665-172		Cotter pin	2	…		139-038L16
77	MS27039-1-10		Screw	2	…		139-038L16
78	MS27039-1-12		Screw	2	…		139-038L16
79	NAS1149C0332R		Washer	12	…		139-038L16
80	NAS1149D0532K		Washer	2	…		139-038L16
81	NAS1149D0563K		Washer	2	…		139-038L16
82	NAS6605D10		Bolt	2	…		139-038L16

Refer also to IPD for the spares materials required to comply with the AMP DMs referenced in the accomplishment instructions.

Refer also to Annex A for the spares materials required to comply with this Service Bulletin.

Refer also to Annex B for the spares materials required to comply with this Service Bulletin.

A.2 CONSUMABLES

The following consumable materials, or equivalent, are necessary to accomplish this Service Bulletin:

#	SPEC./LHD CODE NUMBER	DESCRIPTION	Q.TY	NOTE	PART
83	MIL-S-8802 Ty. II Cl. B4	Sealant	AR	(6)	I
84	A236A	Edging	AR	(6)	I
85	EN6049-006-08-5	Tubing braided	AR	(6)	I
86	199-05-152 Type II	RTV106 Adhesive (C142)	AR	(6)	I
87	ASTM D5363	Adhesive Loctite 222 (C029)	AR	(6)	I
88	MS20995C32	Lockwire	AR	(6)	I
89	MS20995C20	Lockwire	AR	(6)	I
90	DOD-PRF-85734	Oil (C366)	AR	(6)	II
91	MIL-PRF-680, Type II	Ardrox 5503 (C010)	AR	(6)	II
92	AWMS05-001, Type I, Class B, Grade 2	Sealing compound MC-780 (C465)	AR	(6)	II
93	67N19X15M-0	Tape	AR	(6)	I
94	AW001CK01HS	Strap	AR	(6)	I
95	AW001CK03HS	Strap	AR	(6)	I
96	AW001CK05HS	Strap	AR	(6)	I

Refer also to AMDI for the consumable materials required to comply with the AMP DM referenced in the accomplishment instructions.

Refer also to Annex A for the spares materials required to comply with this Service Bulletin.

Refer also to Annex B for the spares materials required to comply with this Service Bulletin.

A.3 LOGISTIC MATRIX

In order to apply this Service Bulletin, the following Logistic P/N can be ordered in accordance with the applicable notes:

LOGISTIC P/N	Q.TY (PER HELO)	NOTE	PART
139-573L1	1	-	I
139-573L2	1	(4)	
139-038L9	1	-	II
139-038L10	1	-	
139-038L11	1	-	
139-038L12	1	-	
139-038L16	1	-	III
3G3130VO0001	1	(3)	III

NOTES

(1) The adapter P/N 3G6320A15251 must be installed with the accelerometer P/N 3062A1 only in case the main gear box is equipped with bell

P/N 3G6320A01034 or oldest version.

(2) This item is already installed on the helicopter and it can be reinstalled after checking. If it is damaged, change it with a part with the same P/N.

(3) The CD contains OBSC file - MGB P/N 5534760504. Customers must contact the LHD HUMS Support Team (HUMS.mbx.aw@leonardocompany.com) to specify if the S/N of the helicopter is already present on the Heliwise ground station or it needs to be included. The communication needs to be raised at least one month in advance from the scheduled application of this Service Bulletin.

(4) Applicable only to AW139 helicopters S/N 31367.

(5) This item has to be ordered in q.ty 8 instead of q.ty 11 only for AW139 helicopter S/N 31367.

(6) Item to be procured as local supply.

B. SPECIAL TOOLS

The following special tools, or equivalent, are necessary to accomplish this Service Bulletin:

#	P/N	DESCRIPTION	Q.TY	NOTE	PART
97	PAG512-HR	PCMCIA card	2		III
98	29750000	EUTD camera	1		III
99	29751900	Sunshield	1		III

Refer also to ITEP for the special tools required to comply with the AMP DM referenced in the accomplishment instructions.

Refer also to Annex A for the special tools required to comply with this Service Bulletin.

Refer also to Annex B for the special tools required to comply with this Service Bulletin.

C. INDUSTRY SUPPORT INFORMATION

Customization.

3. ACCOMPLISHMENT INSTRUCTIONS

GENERAL NOTES

a) Place an identification tag on all components that are re-usable, including the attaching hardware that has been removed to gain access to the modification area and adequately protect them until their later re-use.

b) Shape the cables in order to prevent interference with the structure and the other existing installations, using where necessary suitable lacing cords and plastic cable tiedown.

c) Exercise extreme care during drilling operations to prevent instruments, cables and hoses damage.

d) After drilling, remove all swarf and sharp edges. Apply on bare metal a light film of primer unless the hole is used for ground connection.

e) During the installation of bonding braids or components requiring grounding, clean the surface structure in order to obtain a good ground contact.

f) Let adhesive cure at room temperature for at least 24 hours unless otherwise specified.

g) All lengths are in mm.

PART I

1. In accordance with AMP DM 39-A-00-20-00-00A-120A-A, prepare the helicopter on ground for a safe maintenance. Disconnect the battery, all electrical power sources and/or the external power supply.

NOTE

Use the edging P/N A236A on edges which are liable to cause damage to cable assemblies or where abrasion may occur.

NOTE

Use tubing braided P/N A582A08 where protection against chafing and prevention of contact with structure may occur.

NOTE

Primary supporting devices shall be of the size, which holds the wires (harnesses) in place without damaging the wire insulation or degrading the performance of optical or rf cables. If the called out clamp size is too large to properly grip the harness and the next smaller size would crush the harness, tapes type 67N19X15M-0 (or equivalent) may be used to provide a proper fit in the clamp or as filler under the clamp. Build up with tape only to the point that the original clamp provides grip.

2. In accordance with AMP DM 39-A-06-41-00-00A-010A-A and with reference to Figure 1 thru 4, gain access to the area affected by the installation and perform MGB electrical provision P/N 4G3130A00311 as described in the following procedure:

NOTE

Procedure from Step 2.1 to Step 2.10 are NOT applicable to AW139 helicopter S/N 31367.

2.1   With reference to Figures 1 thru 3, route the HUMS MGB C/A (F2B4) P/N 3G9F12B00411 on the existing routes as shown; secure the cable by means of existing hardware and lacing cords.

2.2   With reference to Figure 2 View A, install n°2 clamps P/N AS21919WCH04 on the C/A F2B4 by means of existing hardware.

2.3   With reference to Figure 2 View A, install the clamp P/N AS21919WCH05 on the C/A F2B4 by means of existing hardware.

2.4   With reference to Figure 2 View A, install n°2 clamps P/N AS21919WCH06 on the C/A F2B4 by means of existing hardware.

2.5   With reference to Figure 2 View A, install n°4 clamps P/N AS21919WCH08 on the C/A F2B4 by means of existing hardware.

2.6   With reference to Figure 3 View B, install the support P/N A630A51 in the indicated position by means of sealant MIL-S-8802 Ty. II Cl. B4.

2.7   With reference to Figure 3 View B, install the clamp P/N AS21919WCH04 on the C/A F2B4 by means of existing hardware and the screw P/N MS35207-263.

2.8   With reference to Figure 3 View B, install n°2 clamps P/N AS21919WCH05 on the C/A F2B4 by means of existing hardware and n°2 screws P/N MS35207-263.

2.9   With reference to Figure 3 View B, install n°2 clamps P/N AS21919WCH05 on the C/A F2B4 by means of existing hardware.

2.10   With reference to Figure 3 View B, install n°3 clamps P/N AS21919WCH06 on the C/A F2B4 by means of existing hardware.

<div align="center">

<u>NOTE</u>

Steps 2.11 and 2.12 are applicable only to AW139 helicopter S/N 31367.

</div>

2.11   With reference to Figure 4 View C, route the HUMS MGB C/A (F2B5) P/N 3G9F12B00511 on the existing routes as shown; secure the cable by means of existing hardware and lacing cords.

2.12   With reference to Figure 4 View C, remove existing screws and install n°3 clamps P/N AS21919WCH2 on the C/A F2B5 by means of n°3 new screws P/N NAS1802-3-18 and n°3 spacers P/N NAS43DD3-18N.

3.   In accordance with weight and balance changes, update the Chart A (see Rotorcraft Flight Manual, Part II, section 6).

4.   Return the helicopter to flight configuration and record for compliance with Part I of this Service Bulletin on the helicopter logbook.

5.   Gain access to My Communications section on Leonardo WebPortal and compile the "Service Bulletin Application Communication".

      As an alternative, send the attached compliance form to the following mail box:

<div align="center">

engineering.support.lhd@leonardo.com

</div>

      and (for North, Central and South America) also to:

<div align="center">

AWPC.Engineering.Support@leonardocompany.us

</div>

PART II

1. In accordance with AMP DM 39-A-00-20-00-00A-120A-A, prepare the helicopter on ground for a safe maintenance. Disconnect the battery, all electrical power sources and/or the external power supply.

2. In accordance with AMP DM 39-A-06-41-00-00A-010A-A and with reference to Figure 5 thru 13, gain access to the area affected by the installation and perform the HUMS fixed parts installation P/N 3G3130A01411 as described in the following procedure:

    2.1   With reference to Figures 5 thru 8, perform HUMS support installation P/N 3G5315A09411 as follows:

        2.1.1   With reference to Figure 5 and Figure 6 View A and in accordance with AMP DM 39-B-31-32-26-00A-720A-K, install the support HUMS accelerometer P/N 3G5315A08951 on the right lower panel.

        2.1.2   With reference to Figure 7 View B and in accordance with AMP DM 39-B-31-32-25-00A-720A-K, install the support accelerometer assy P/N 3G5315A08831 on the rear lower panel.

        2.1.3   With reference to Figure 5 and Figure 6 View E, gain access to the upper rear panel P/N 3P5333A01531 (ref. STA 5819.0 and RH BL 138.5).

        2.1.4   With reference to Figure 6 View E, remove the front insulating cover assy P/N 3G5340A01031.

        2.1.5   With reference to Figure 6 View E, drill hole Ø30.00 thru the structure of the upper rear panel P/N 3P5333A01531.

        2.1.6   With reference to Figure 6 View E, execute the cutout on the front insulating cover assy P/N 3G5340A01031.

        2.1.7   With reference to Figure 6 View E, seal the contour of the cutout performed at previous step with adhesive RTV-106.

        2.1.8   With reference to Figure 6 View E, reinstall the front insulating cover assy P/N 3G5340A01031 on the upper rear panel P/N 3P5333A01531.

        2.1.9   With reference to Figure 5 and Figure 7 View L, gain access to the STA 7200.0 frame.

        2.1.10 With reference to Figure 7 View L, temporarily locate n°2 support DAU assy P/N 3G5315A09231 on the STA 7200.0 frame and countermark n°34 rivet holes.

        2.1.11 With reference to Figure 7 View L, drill n°34 holes in the previously countermarked positions.

        2.1.12 With reference to Figure 7 View L and View C, install n°2 support DAU assy P/N 3G5315A09231 on the frame by means of n°32 rivets P/N MS20470AD4 and n°2 rivets P/N NAS9301BNS-4-02.

2.1.13   With reference to Figure 5, Figure 8 View D and View P and in accordance with AMP DM 39-B-31-32-28-00A-720A-K, install the support HUMS tail accelerometer P/N 3G5315A09051 on the FWD longeron.

2.2   With reference to Figure 7 View C and View M and in accordance with AMP DM 39-B-31-32-27-00A-720A-K, install the mounting tray P/N 177035-01 on the two support DAU assy P/N 3G5315A09231.

2.3   With reference to Figure 5, Figure 7 View C and in accordance with AMP DM 39-B-31-32-01-00A-720A-K, install the HUMS DAU P/N 3G3130V00251 on the mounting tray P/N 177035-01.

2.4   With reference to Figure 7 View C, install the decal P/N ED300A54 in the indicated position on the support DAU assy P/N 3G5315A09231.

2.5   With reference to Figure 6 View G and in accordance with AMP DM 39-B-31-32-05-00A-720A-K, install the accelerometer MT40 P/N 3062A1 on the support HUMS accelerometer P/N 3G5315A08951.

2.6   With reference to Figure 5, Figure 7 View H and in accordance with AMP DM 39-B-31-32-04-00A-720A-K, install the accelerometer MT41 P/N 3001-01-100-4 on the support accelerometer assy P/N 3G5315A08831.

2.7   With reference to Figure 8 View D and View N and in accordance with AMP DM 39-B-31-32-06-00A-720A-K, install the accelerometer MT35 P/N 3062A1 on the support HUMS tail accelerometer P/N 3G5315A09051.

2.8   With reference to Figure 8 View D and View N and in accordance with AMP DM 39-B-31-32-07-00A-720A-K, install the accelerometer MT37 P/N 3062A1 on the support HUMS tail accelerometer P/N 3G5315A09051.

2.9   With reference to Figure 8 View P, safety the head of the bolts P/N AN3H5A with lockwire.

2.10   With reference to Figure 5, Figure 8 Detail F and in accordance with AMP DM 39-B-31-32-02-00A-720A-K, install the HUMS control panel P/N 3G3130V00151 on the interseat console.

2.11   With reference to Figure 9 thru 12, gain access to the MGB and perform MGB HUMS sensors installation P/N 3G3130A01211 as follows:

      2.11.1   With reference to Figures 9, Figure 10 Detail A, remove the screw P/N MS35265-28 and the washer P/N 3G6320A10051 from the accelerometer 1 (A1 location indicator) on the MGB.

      2.11.2   With reference to Figures 9 thru 12 and Figure 10 Detail A, repeat step 2.11.1 for all accelerometer positions (A2, A3, A4, A5, A6, A7, A8, A9, A10 and A11 location indicators).

2.11.3   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-08-00A-720A-K, install the accelerometer MT23 P/N 3G6340V00151 on the MGB (A1 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.4   With reference to Figure 10 Detail A, secure the head of the screw P/N NAS1352C06H14 by means of lockwire P/N MS20995C20.

2.11.5   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-09-00A-720A-K, install the accelerometer MT24 P/N 3G6340V00151 on the MGB (A2 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.6   With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT24.

2.11.7   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-10-00A-720A-K, install the accelerometer MT25 P/N 3G6340V00151 on the MGB (A3 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.8   With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT25.

2.11.9   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-11-00A-720A-K, install the accelerometer MT26 P/N 3G6340V00151 on the MGB (A4 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.10   With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT26.

2.11.11   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-12-00A-720A-K, install the accelerometer MT27 P/N 3G6340V00151 on the MGB (A5 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.12   With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT27.

2.11.13   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-13-00A-720A-K, install the accelerometer MT28 P/N 3G6340V00151 on the MGB (A11 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.14   With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT28.

2.11.15   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-14-00A-720A-K, install the accelerometer MT29 P/N 3G6340V00151 on the MGB (A10 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.16   With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT29.

2.11.17   With reference to Figure 9, Figure 10 Detail A and in accordance with AMP DM 39-B-31-32-19-00A-720A-K, install the accelerometer MT30 P/N 3G6340V00151 on the MGB (A6 location indicator) and apply insulation sleeving P/N M23053/5-203-C.

2.11.18   With reference to Figure 10 detail A, repeat step 2.11.4 for accelerometer MT30.

NOTE

The o-ring P/N M83248/1-113 and the two washers P/N NAS1149F0332P can be reinstalled at step 2.11.20 after accurate checking.

2.11.19   With reference to Figure 9 and Figure 10 Detail B, remove the flange P/N 3G6320A10151, the o-ring P/N M83248/1-113, n°2 nuts P/N MS21042L3, n°2 washers P/N NAS1149D0332K and n°2 washers P/N NAS1149F0332P from the MGB.

2.11.20   With reference to Figure 9, Figure 10 Detail B and in accordance with AMP DM 39-B-31-32-16-00A-720A-K, install the azimuth sensor MT34 P/N EA6300V083-001 on the MGB.

2.11.21   With reference to Figure 9, Figure 10 Detail C, remove the screw P/N MS35266-79 and the washer P/N 3G6320A15351 from the MGB.

NOTE

In case the main gear box is equipped with bell P/N 3G6320A01034 or oldest version, the accelerometer P/N 3062A1 must be installed with adapter P/N 3G6320A15251 as shown in Figure 10 Detail C.

2.11.22   With reference to Figure 9, Figure 10 Detail C and in accordance with AMP DM 39-B-31-32-15-00A-720A-K, install the accelerometer MT36 P/N 3062A1 on the MGB (A21 location indicator) and apply insulation sleeving P/N M23053/5-203-C. Secure the accelerometer to the adjacent oil filler cap by means of lockwire P/N MS20995C20.

NOTE

Steps 2.11.23 thru 2.11.49 are applicable only to AW139 helicopter S/N 31328 and S/N 31332.

WARNING

THE MATERIALS THAT FOLLOW ARE DANGEROUS.
BEFORE YOU PERFORM THE INSTALLATION OF ACCELEROMETER MT38, MAKE SURE THAT YOU KNOW ALL THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS FOR THESE MATERIALS:

- SEALANT (C465);
- OIL (C366);
- CLEANING SOLVENT (C010).

2.11.23   With reference to Figure 11, gain access to the tail drive shaft bearing support P/N 3T6510A00443.

2.11.24   Clean the accelerometer MT38 P/N 3G6340V00151 and the related mating area on the bearing support P/N 3T6510A00443 with the cloth and the Cleaning solvent (C010).

WARNING

BE CAREFUL WHEN YOU USE THE COMPRESSED AIR. DUST AND PARTICLES CAN CAUSE INJURY TO YOUR EYES. ALWAYS USE APPLICABLE PROTECTIVE GOGGLES.

2.11.25   Dry the parts you cleaned with the compressed air until you remove all the solvent.

2.11.26   With reference to Figure 11 Detail D and Figure 10 Detail A, put the accelerometer MT38 P/N 3G6340V00151 in its position (location indicator A7) on the bearing support P/N 3T6510A00443.

2.11.27   Lubricate the screw P/N NAS1352C06H14 with the Oil (C366).

2.11.28   With reference to Figure 11 Detail D and Figure 10 Detail A, install the screw P/N NAS1352C06H14 that attaches the accelerometer MT38 P/N 3G6340V00151 to the bearing support P/N 3T6510A00443 and apply insulation sleeving P/N M23053/5-203-C. Torque the screw to 2.0 thru 2.4 Nm.

2.11.29   With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT38.

2.11.30 Apply the sealing compound (C465) to the mating edge between the accelerometer MT38 P/N 3G6340V00151 and the bearing support P/N 3T6510A00443. Use the spatula (plastic) to apply the sealing compound.

2.11.31 With reference to Figure 4 View C and Figure 18 wiring diagram, connect the connector MT38P1 to the accelerometer MT38.

WARNING

THE MATERIALS THAT FOLLOW ARE DANGEROUS. BEFORE YOU PERFORM THE INSTALLATION OF ACCELEROMETER MT39, MAKE SURE THAT YOU KNOW ALL THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS FOR THESE MATERIALS:

- SEALANT (C465);
- OIL (C366);
- CLEANING SOLVENT (C010).

2.11.32 With reference to Figures 11 and 12, gain access to the IGB.

2.11.33 Clean the accelerometer MT39 P/N 3G6340V00151 and the related mating area on the IGB with the cloth and the Cleaning solvent (C010).

WARNING

BE CAREFUL WHEN YOU USE THE COMPRESSED AIR. DUST AND PARTICLES CAN CAUSE INJURY TO YOUR EYES. ALWAYS USE APPLICABLE PROTECTIVE GOGGLES.

2.11.34 Dry the parts you cleaned with the compressed air until you remove all the solvent.

2.11.35 With reference to Figure 11 and Figure 12 Detail E, put the accelerometer MT39 P/N 3G6340V00151 in its position (location indicator A8) on the IGB.

2.11.36 Lubricate the screw P/N NAS1352C06H14 with the Oil (C366).

2.11.37 With reference to Figure 12 Detail E and Figure 10 Detail A, install the screw P/N NAS1352C06H14 that attaches the accelerometer MT39 P/N 3G6340V00151 to the IGB and apply insulation sleeving P/N M23053/5-203-C. Torque the screw to 2.0 thru 2.4 Nm.

2.11.38 With reference to Figure 10 detail A, repeat step 2.11.4 for accelerometer MT39.

2.11.39 Apply the sealing compound (C465) to the mating edge between the accelerometer MT39 P/N 3G6340V00151 and the IGB. Use the spatula (plastic) to apply the sealing compound.

2.11.40 With reference to Figure 20 wiring diagram, connect the connector MT39P1 to the accelerometer MT39.

WARNING

THE MATERIALS THAT FOLLOW ARE DANGEROUS.
BEFORE YOU PERFORM THE INSTALLATION OF ACCELEROMETER MT31, MAKE SURE THAT YOU KNOW ALL THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS FOR THESE MATERIALS:

- SEALANT (C465);
- OIL (C366);
- CLEANING SOLVENT (C010).

2.11.41 With reference to Figure 11 and Figure 12 Detail F, gain access to the TGB.

2.11.42 Clean the accelerometer MT31 P/N 3G6340V00151 and the related mating area on the TGB with the cloth and the Cleaning solvent (C010).

WARNING

BE CAREFUL WHEN YOU USE THE COMPRESSED AIR. DUST AND PARTICLES CAN CAUSE INJURY TO YOUR EYES. ALWAYS USE APPLICABLE PROTECTIVE GOGGLES.

2.11.43 Dry the parts you cleaned with the compressed air until you remove all the solvent.

2.11.44 With reference to Figure 11 and Figure 12 Detail F, put the accelerometer MT31 P/N 3G6340V00151 in its position (location indicator A9) on the TGB.

2.11.45 Lubricate the screw P/N NAS1352C06H14 with the Oil (C366).

2.11.46 With reference to Figure 12 Detail F and Figure 10 Detail A, install the screw P/N NAS1352C06H14 that attaches the accelerometer MT31 P/N 3G6340V00151 to the TGB and apply insulation sleeving P/N M23053/5-203-C. Torque the screw to 2.0 thru 2.4 Nm.

2.11.47 With reference to Figure 10 Detail A, repeat step 2.11.4 for accelerometer MT31.

S.B. N°139-573 OPTIONAL
DATE: June 28, 2019
REVISION: A - January 30, 2024

2.11.48 Apply the sealing compound (C465) to the mating edge between the accelerometer MT31 P/N 3G6340V00151 and the TGB. Use the spatula (plastic) to apply the sealing compound.

2.11.49 With reference to Figure 20 wiring diagram, connect the connector MT31P1 to the accelerometer MT31.

NOTE

Do not apply paint in the area shown in Figure 10 Detail A, Detail B and Detail C.

2.11.50 Restore the external painting on the MGB, IGB and TGB structure where necessary, as follows:

- in accordance with CSRP-A-51-21-02-02A-257A-D, apply a layer of epoxy primer (C596);
- in accordance with CSRP-A-51-21-01-02A-257A-D, apply two layers of polyurethane paint (C358).

2.12 With reference to Figure 13, perform tail rotor pick-up installation P/N 3G3130A00711 as follows:

2.12.1 With reference to Figure 13, remove n°2 bolts P/N NAS6606D12, the washer P/N NAS1149C0632R, the washer P/N A162A0632, n°2 nuts P/N MS17825-6 and n°2 cotter pins P/N MS24665-302 from the tail rotor structure.

2.12.2 With reference to Figure 13 and in accordance with AMP DM 39-B-31-32-23-00A-720A-K, install the chopper support P/N 3G3130A00651 on the tail rotor structure.

2.12.3 With reference to Figure 13 and in accordance with AMP DM 39-B-31-32-18-00A-720A-K, install the chopper P/N 3G6493A02251 on the chopper support P/N 3G3130A00651.

2.12.4 With reference to Figure 13 Detail A, remove n°2 nuts P/N MS21042L4 and n°2 washers P/N NAS1149C0432R from the TGB.

2.12.5 With reference to Figure 13 and in accordance with AMP DM 39-B-31-32-24-00A-720A-K, install the pick-up support P/N 3G3130A00552 on the tail rotor structure.

2.12.6 With reference to Figure 13 and in accordance with AMP DM 39-B-31-32-17-00A-720A-K, install the azimuth assy P/N 3G3130A00431 on the pick-up support P/N 3G3130A00552.

2.12.7 Perform duplicate inspections to check the correct bolts installation, safety, security, final torque and locking.

2.13 With reference to Figure 2 View A and Figure 18 wiring diagram, perform the electrical connection of C/A F2B4 to the connector P244.

2.14 With reference to Figure 3 View B and Figure 21 wiring diagram, perform the electrical connection of C/A F2B4 to the connector P244.

2.15 With reference to Figures 16 thru 21 wiring diagram, perform a pin-to-pin continuity check of all the electrical connections made.

2.16 In accordance with Annex A and Annex B, perform HUMS test and configuration procedure.

3. In accordance with weight and balance changes, update the Chart A (see Rotorcraft Flight Manual, Part II, section 6).

4. Return the helicopter to flight configuration and record for compliance with Part II of this Service Bulletin on the helicopter logbook.

5. Gain access to My Communications section on Leonardo WebPortal and compile the "Service Bulletin Application Communication".

As an alternative, send the attached compliance form to the following mail box:

engineering.support.lhd@leonardo.com

and (for North, Central and South America) also to:

AWPC.Engineering.Support@leonardocompany.us

PART III

1. In accordance with AMP DM 39-A-00-20-00-00A-120A-A, prepare the helicopter on ground for a safe maintenance. Disconnect the battery, all electrical power sources and/or the external power supply.

2. In accordance with AMP DM 39-A-06-41-00-00A-010A-A and with reference to Figure 14 and 15, gain access to the cockpit LH and perform HUMS removable parts P/N 3G3130A01512 as described in the following procedure:

    2.1   With reference to Figure 14 View A, put in its correct position EUTD support P/N 3G5315A20051 on the shell assy.

    2.2   With reference to Figure 14, temporarily install the EUTD camera P/N 29750000 and the sunshield P/N 29751900 on the EUTD support P/N 3G5315A20051. Adjust the position of the support P/N 3G5315A20051, if necessary.

    2.3   With reference to Figure 14 View A, countermark n°4 holes on the fairing using EUTD support P/N 3G5315A20051 as a template.

    2.4   With reference to Figure 14 Section C-C and Figure 15 Section D-D, remove the EUTD camera P/N 29750000, the sunshield P/N 29751900 and the EUTD support P/N 3G5315A20051 and drill n°4 holes Ø5.20÷5.50 on the fairing.

    2.5   With reference to Figure 14 and Figure 15 Section D-D, install the EUTD support P/N 3G5315A20051 on the fairing by means of n°2 screws P/N MS27039-1-10, n°2 nuts P/N MS21042L3 and n°4 washers P/N NAS1149C0332R.

    2.6   With reference to Figure 14 Section C-C and Figure 15 View B, install the upper fitting P/N 3G5320A08651 on the fairing and EUTD support by means of n°2 screws P/N MS27039-1-12, n°2 nuts P/N MS21042L3 and n°4 washers P/N NAS1149C0332R.

    2.7   With reference to Figure 14, Figure 15 View B and Section E-E, connect the rod assy P/N 3G5320A08431 to the upper fitting P/N 3G5320A08651 by means of the bolt P/N AN3-6A, the nut P/N MS21042L3 and n°2 washers P/N NAS1149C0332R.

    2.8   With reference to Figure 15 View B, View H and Section G-G, install the rod assy P/N 3G5320A08431 to the lower fitting P/N 3G5320A08751 by means of the bolt P/N AN3-6A, the nut P/N MS21042L3 and n°2 washers P/N NAS1149C0332R.

    2.9   With reference to Figure 14 and Figure 15 Section F-F, move the rod assy P/N 3G5320A08431 to put in position the lower fitting P/N 3G5320A08751 on the shell assy P/N 3G5320A02133 and, using the lower fitting as a template, countersign n°2 holes on the shell assy P/N 3G5320A02133.

    2.10 With reference to Figure 15 View B, remove the lower fitting P/N 3G5320A08751 from the rod assy P/N 3G5320A08431.

2.11   With reference to Figure 14 and Figure 15 Section F-F, drill n°2 rivet holes on the shell assy P/N 3G5320A02133 and countersink on the other side to 100° to allow rivets installation.

2.12   With reference to Figure 14 and Figure 15 Section F-F, fix the lower fitting P/N 3G5320A08751 on the shell assy P/N 3G5320A02133 by means of n°2 rivets P/N A298A04TW02.

2.13   With reference to Figure 15 View B, install the rod assy P/N 3G5320A08431 on the lower fitting P/N 3G5320A08751 as described in step 2.8.

NOTE

Hardware must be removed when EUTD is not installed on the helicopter.

NOTE

The EUDT is installed in the helicopter only temporarily. The EUTD is installed when it is necessary to measure the rotor track and lead/lag.

2.14   With reference to Figure 14, install the EUTD camera P/N 29750000 on the support EUTD P/N 3G5315A20051 by means of n°2 bolts P/N NAS6605D10, n°2 washers P/N NAS1149D0532K, n°2 washers P/N NAS1149D0563K, n°2 nuts P/N MS14145L5 and n°2 cotter pins P/N MS24665-172.

3.   In accordance with weight and balance changes, update the Chart A (see Rotorcraft Flight Manual, Part II, section 6).

4.   Return the helicopter to flight configuration and record for compliance with Part III of this Service Bulletin on the helicopter logbook.

5.   Gain access to My Communications section on Leonardo WebPortal and compile the "Service Bulletin Application Communication".

As an alternative, send the attached compliance form to the following mail box:

engineering.support.lhd@leonardo.com

and (for North, Central and South America) also to:

AWPC.Engineering.Support@leonardocompany.us

Figure 1

CLAMP

NUT (REF)

WASHER (REF)

SPACER (REF)

CLAMP (REF)

SPACER (REF)

CLAMP (REF)

△4 (MOUNT ON EXISTING HARDWARE)

SPACER

SCREW (REPLACE EXISTING SCREW)

CLAMP

△3

CLAMP

CLICK BOND (REF)

SCREW (REF)
WASHER (REF)

CLAMP (REF)

△2 (MOUNT ON EXISTING HARDWARE)

MS35207-263 SCREW (REPLACE EXISTING SCREW)

CLAMP

CLAMP (REF)

CLAMP (REF)

△1 (MOUNT ON EXISTING HARDWARE)

CLAMP (REF)

CLAMP

△5 (MOUNT ON EXISTING HARDWARE)

F2B5 HUMS MGB C/A (REF)

C
(SEE FIGURE 4)

A
(SEE FIGURE 2)

B
(SEE FIGURE 3)

F2B4 HUMS MGB C/A

HUMS MGB ELECTRICAL PROVISION
4G3130A00311

Figure 2

MT28P1 CONNECTOR
F2B4 HUMS MGB C/A

MT24P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS2919WCH05 CLAMP
REPLACE EXISTING CLAMP
USE F2B2 ROUTING

INSTALL:
AS2919WCH04 CLAMP
REPLACE EXISTING CLAMP
USE F2B2 ROUTING

FWD

UP

INBRD

INSTALL:
AS2919WCH04 CLAMP
REPLACE EXISTING CLAMP
USE F2B2 ROUTING

MT26P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS2919WCH06 CLAMP
REPLACE EXISTING CLAMP
USE F2B2 ROUTING

INSTALL:
AS2919WCH08 CLAMP
REPLACE EXISTING CLAMP
USE F2B2 ROUTING

INSTALL:
AS2919WCH08 CLAMP
MOUNT EXSISTING HARDWARE
USE F1B1 ROUTING

VIEW A
(REFER TO FIGURE 1)
OMITTED PARTS FOR CLARITY

4

MT34P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS2919WCH06 CLAMP
MOUNT EXSISTING HARDWARE

P244 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS2919WCH08 CLAMP
MOUNT EXSISTING HARDWARE
USE F1B1 ROUTING

INSTALL:
AS2919WCH08 CLAMP
MOUNT EXSISTING HARDWARE
USE F1B1 ROUTING

2

S.B. N°139-573 OPTIONAL
DATE: June 28, 2019
REVISION: A - January 30, 2024

Figure 3

MT27P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS21919WCH06 CLAMP
REPLACE EXSISTING CLAMP
USE F2A2 ROUTING

MT30P1 CONNECTOR
F2B4 HUMS MGB C/A

P244 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS21919WCH06 CLAMP
MOUNT EXISTING HARDWARE

VIEW B
(REFER TO FIGURE 1)
OMITTED PARTS FOR CLARITY

MT36P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
A630A51 SUPPORT

STA	BL	WL
5094	-251	3257

MT25P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS21919WCH04 CLAMP

MT29P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS21919WCH05 CLAMP

MT23P1 CONNECTOR
F2B4 HUMS MGB C/A

INSTALL:
AS21919WCH05 CLAMP
REPLACE EXISTING CLAMP
USE F2A2 ROUTING

INSTALL:
AS21919WCH05 CLAMP
REPLACE EXISTING CLAMP
USE F2A2 ROUTING

INSTALL:
AS21919WCH05 CLAMP
REPLACE EXSISTING CLAMP
USE F2A2 ROUTING

FWD

UP

INBRD

MT38P1 CONNECTOR
F2B5 HUMS MGB C/A

P362 CONNECTOR
F2B5 HUMS MGB C/A

REMOVE:
EXISTING SCREW
INSTALL:
AS21919WCH2 CLAMP
F2B5 C/A
NAS1802-3-18 SCREW
NAS43DD3-18N SPACER
(TYP 3 PLCS)

STA 8700

VIEW C
(REFER TO FIGURE 1)
OMITTED PARTS FOR CLARITY

F2B5 HUMS MGB C/A
INSTALL ON AND FOLLOWING EXISTING
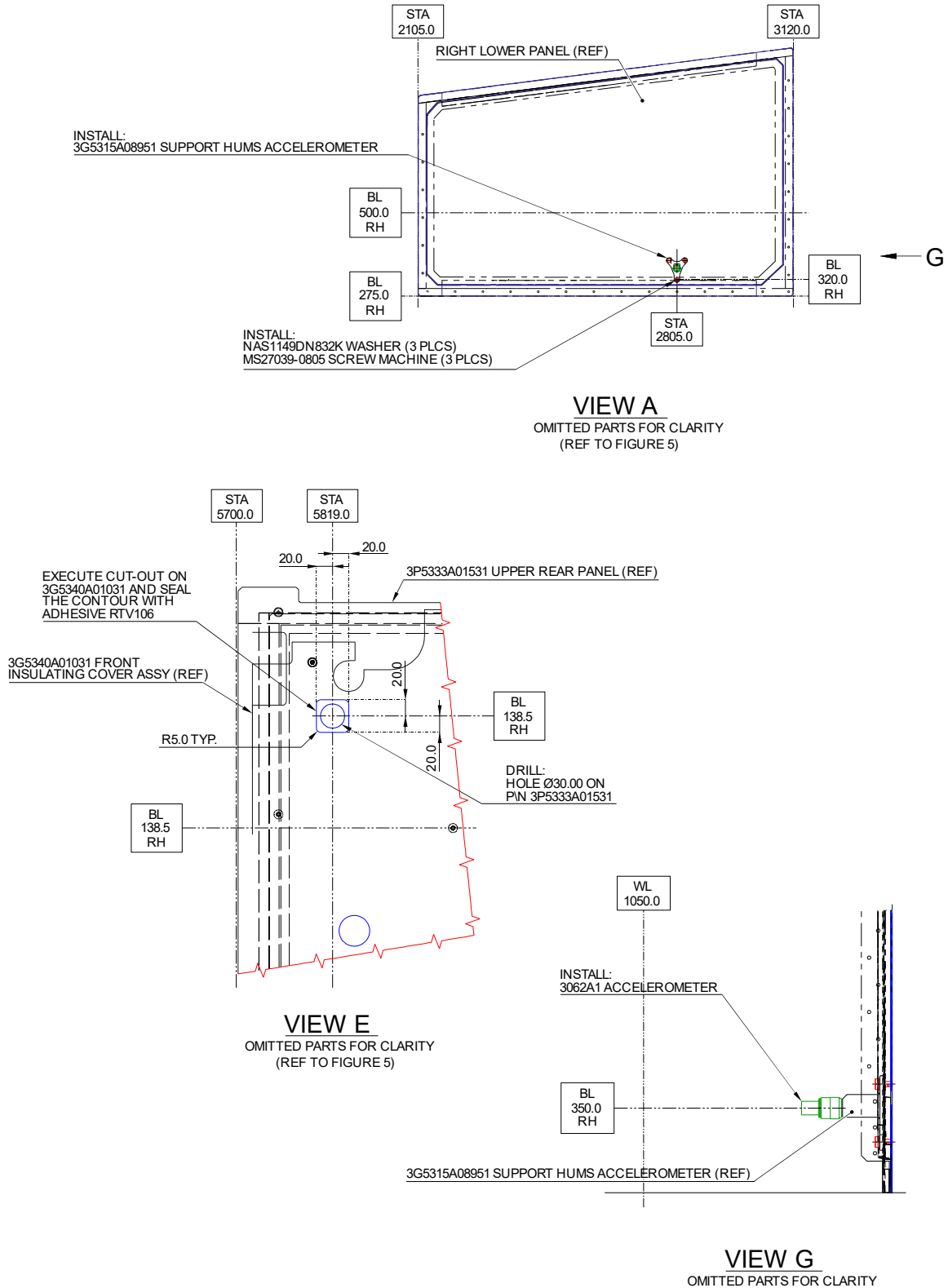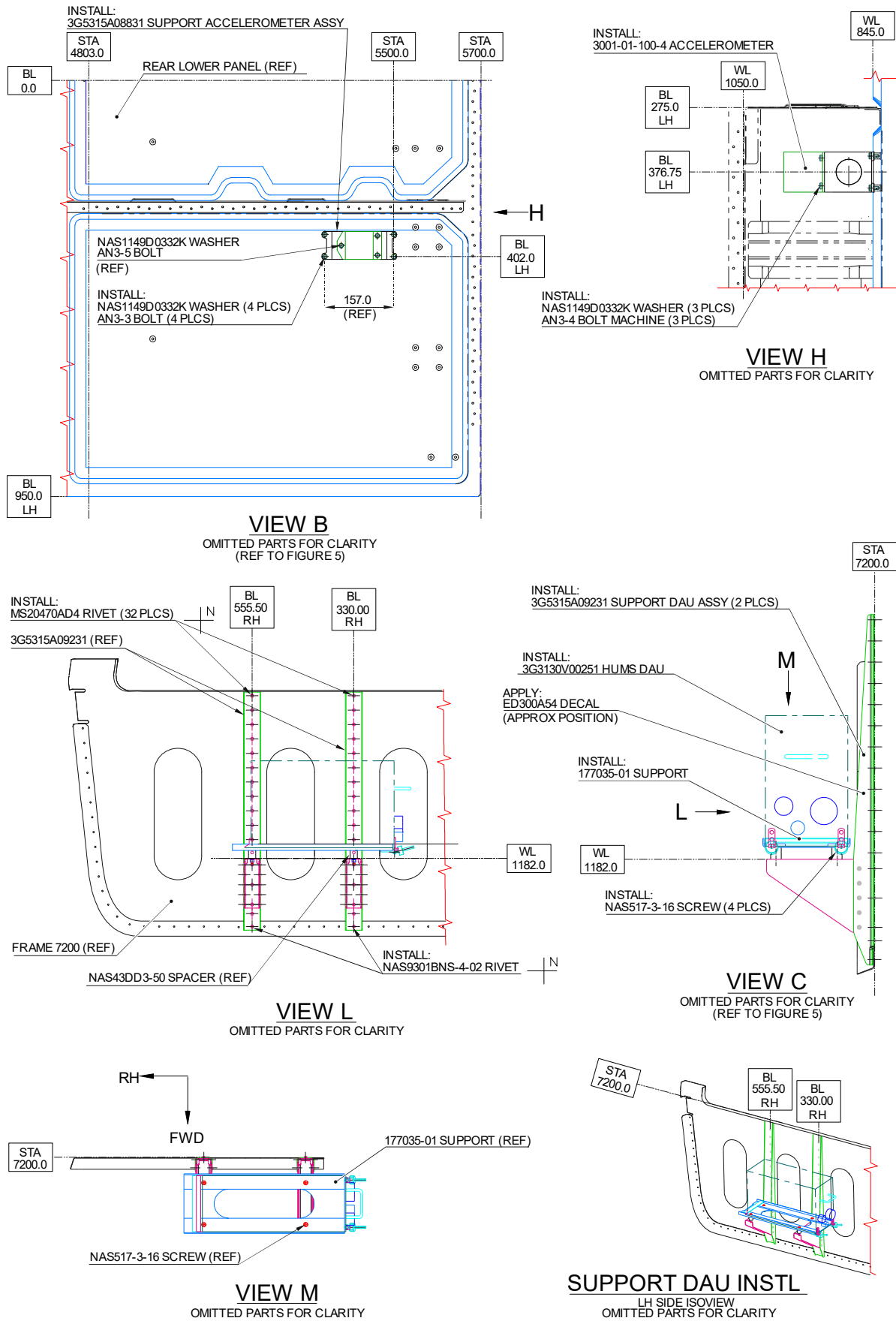ROUTE UNLESS OTHERWISE INDICATED

STA 8160

UP
INBRD
FWD

Figure 4

S.B. N°139-573 OPTIONAL
DATE: June 28, 2019
REVISION: A - January 30, 2024

3G3130A01411 HUMS FIXED PARTS
3G5315A09411 HUMS SUPPORT INSTL
3G3130A01211 MGB HUMS SENSORS INSTL
3G3130A00711 TAIL ROTOR PICK-UP INSTL

SUPPORT HUMS TAIL ACCELEROMETER INSTL
TAIL ROTOR PICK-UP INSTL

SUPPORT DAU INSTL

D
(SEE FIGURE 8)

STA 13000.0

STA 7000.0

STA 5000.0

STA 3000.0

STA 1500.0

E
(SEE FIGURE 6)

B
(SEE FIGURE 7)

C
(SEE FIGURE 7)

A
(SEE FIGURE 6)

SUPPORT HUMS ACCELEROMETER INSTL

SUPPORT HUMS ACCELEROMETER INSTL

MGB HUMS SENSORS INSTL

WL 3900.0

DETAIL F
(SEE FIGURE 8)

EUTD INSTL

WL 1000.0

LATERAL VIEW
OMITTED PARTS FOR CLARITY

Figure 5

VIEW A
OMITTED PARTS FOR CLARITY
(REF TO FIGURE 5)

STA 2105.0

STA 3120.0

RIGHT LOWER PANEL (REF)

INSTALL:
3G5315A08951 SUPPORT HUMS ACCELEROMETER

BL 500.0 RH

BL 275.0 RH

BL 320.0 RH

G

STA 2805.0

INSTALL:
NAS1149DN832K WASHER (3 PLCS)
MS27039-0805 SCREW MACHINE (3 PLCS)

VIEW E
OMITTED PARTS FOR CLARITY
(REF TO FIGURE 5)

STA 5700.0

STA 5819.0

20.0

20.0

20.0

20.0

EXECUTE CUT-OUT ON
3G5340A01031 AND SEAL
THE CONTOUR WITH
ADHESIVE RTV106

3P5333A01531 UPPER REAR PANEL (REF)

3G5340A01031 FRONT
INSULATING COVER ASSY (REF)

BL 138.5 RH

R5.0 TYP.

DRILL:
HOLE Ø30.00 ON
P\N 3P5333A01531

BL 138.5 RH

VIEW G
OMITTED PARTS FOR CLARITY

WL 1050.0

INSTALL:
3062A1 ACCELEROMETER

BL 350.0 RH

3G5315A08951 SUPPORT HUMS ACCELEROMETER (REF)

Figure 6

S.B. N°139-573 OPTIONAL
DATE: June 28, 2019
REVISION: A - January 30, 2024

INSTALL:
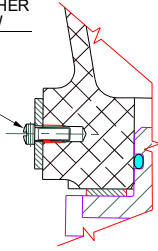3G5315A08831 SUPPORT ACCELEROMETER ASSY

STA 4803.0
REAR LOWER PANEL (REF)
STA 5500.0
STA 5700.0
BL 0.0

NAS1149D0332K WASHER
AN3-5 BOLT
(REF)

H

BL 402.0 LH

INSTALL:
NAS1149D0332K WASHER (4 PLCS)
AN3-3 BOLT (4 PLCS)

157.0 (REF)

BL 950.0 LH

VIEW B
OMITTED PARTS FOR CLARITY
(REF TO FIGURE 5)

INSTALL:
3001-01-100-4 ACCELEROMETER

WL 845.0
WL 1050.0
BL 275.0 LH
BL 376.75 LH

INSTALL:
NAS1149D0332K WASHER (3 PLCS)
AN3-4 BOLT MACHINE (3 PLCS)

VIEW H
OMITTED PARTS FOR CLARITY

INSTALL:
MS20470AD4 RIVET (32 PLCS)

3G5315A09231 (REF)

BL 555.50 RH
BL 330.00 RH

WL 1182.0

FRAME 7200 (REF)

NAS43DD3-50 SPACER (REF)

INSTALL:
NAS9301BNS-4-02 RIVET

N

VIEW L
OMITTED PARTS FOR CLARITY

INSTALL:
3G5315A09231 SUPPORT DAU ASSY (2 PLCS)

INSTALL:
3G3130V00251 HUMS DAU

APPLY:
ED300A54 DECAL
(APPROX POSITION)

STA 7200.0

M

INSTALL:
177035-01 SUPPORT

L

WL 1182.0

INSTALL:
NAS517-3-16 SCREW (4 PLCS)

VIEW C
OMITTED PARTS FOR CLARITY
(REF TO FIGURE 5)

RH

FWD

STA 7200.0

177035-01 SUPPORT (REF)

NAS517-3-16 SCREW (REF)

VIEW M
OMITTED PARTS FOR CLARITY

STA 7200.0

BL 555.50 RH
BL 330.00 RH

SUPPORT DAU INSTL
LH SIDE ISOVIEW
OMITTED PARTS FOR CLARITY

Figure 7

TAIL ROTOR AXIS

PARALLEL AXIS (REF)

VIEW P
OMITTED PARTS FOR CLARITY

INSTALL:
WIRING BOLTS HEAD

PARALLEL AXIS
(REF)

BL
14.60
LH

TAIL ROTOR AXIS

PARALLEL AXIS
(REF)

INSTALL:
3062A1 DYTRAN

N

INSTALL:
3G5315A09051 SUPPORT HUMS TAIL ACCELEROMETER

BL
0.0

VIEW D
OMITTED PARTS FOR CLARITY
(REF TO FIGURE 5)

FWD LONGERON (REF)

P

INSTALL:
NAS1149D0332K FLAT WASHER (3 PLCS)

INSTALL:
3062A1 ACCELEROMETER (2 PLCS)

WL
3866.0

TAIL GERABOX FITTING (REF)

INSTALL:
AN3H5A BOLT (3 PLCS)

FOR NUT INSTALLATION SEE
"STRUCTURAL PROVISION FOR HUMS"

REAR LONGERON (REF)

VIEW N
OMITTED PARTS FOR CLARITY

INSTALL:
3G3130V00151 HUMS CONTROL PANEL

INTERSEAT CONSOLE (REF)

DETAIL F
OMITTED PARTS FOR CLARITY
(REF TO FIGURE 5)

Figure 8

Figure 9

REMOVE:
3G6320A10051 WASHER
MS35265-28 SCREW

REMOVE

INSTALL:
3G6340V00151 ACCELEROMETER SENSOR
NAS1352C06H14 SCREW
LOCKING TORQUE 2.0-2.4 NM
MS20995C20 LOCKWIRE
M23053/5-203-C INSULATION SLEEVE
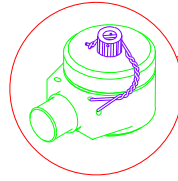
NO PAINT AREA

INSTALL

DETAIL A
(REFER TO FIGURE 9,11,12)
TYPICAL 11 PLACES
OMITTED PARTS FOR CLARITY

INSTALL:
3G6320A10151 FLANGE
M83248/1-113 O-RING
MS21042L3 NUT (TYP 2 PLACES)
NAS1149F0332P WASHER (TYP 2 PLACES)
NAS1149D0332K WASHER (TYP 2 PLACES)
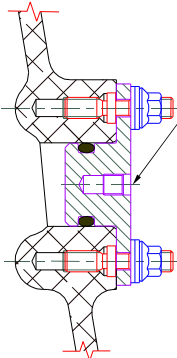
REMOVE

AIRGAP
1.00
1.50 RIF.

INSTALL:
EA6300V083-001 AZIMUTH SENSOR
M83248/1-113 O-RING (REF)
MS21042L3 NUT (REF, TYP. 2 PLACES)
LOCKING TORQUE 3.43-4.51 NM
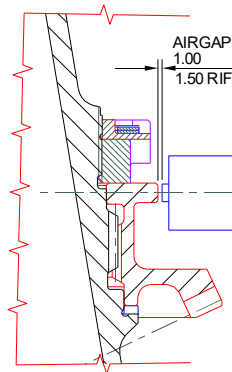
NO PAINT AREA

INSTALL

DETAIL B
(REFER TO FIGURE 9)
OMITTED PARTS FOR CLARITY

REMOVE:
3G6320A15351 WASHER
MS35266-79 SCREW
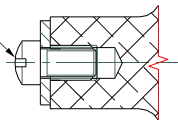
REMOVE

NO PAINT AREA

INSTALL:
3062A1 ACCELEROMETER SENSOR
LOCKING TORQUE 2.0-2.4 NM
MS20995C20 LOCWIRE
M23053/5-203-C INSULATION SLEEVE
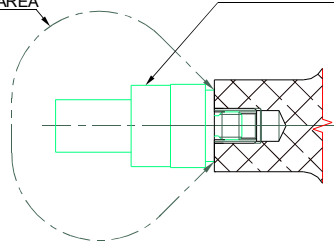
INSTALL

INSTALL:
3062A1 ACCELEROMETER SENSOR
LOCKING TORQUE 2.0-2.4 NM
MS20995C20 LOCWIRE
M23053/5-203-C INSULATION SLEEVE

ASSEMBLY ALTERNATIVE

REMOVE:
3G6320A15251 ADAPTER
LOCKING TORQUE 2.0-2.4 NM
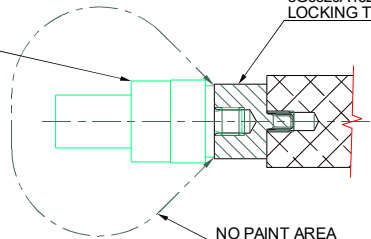
NO PAINT AREA

DETAIL C
(REFER TO FIGURE 9)
OMITTED PARTS FOR CLARITY

Figure 10

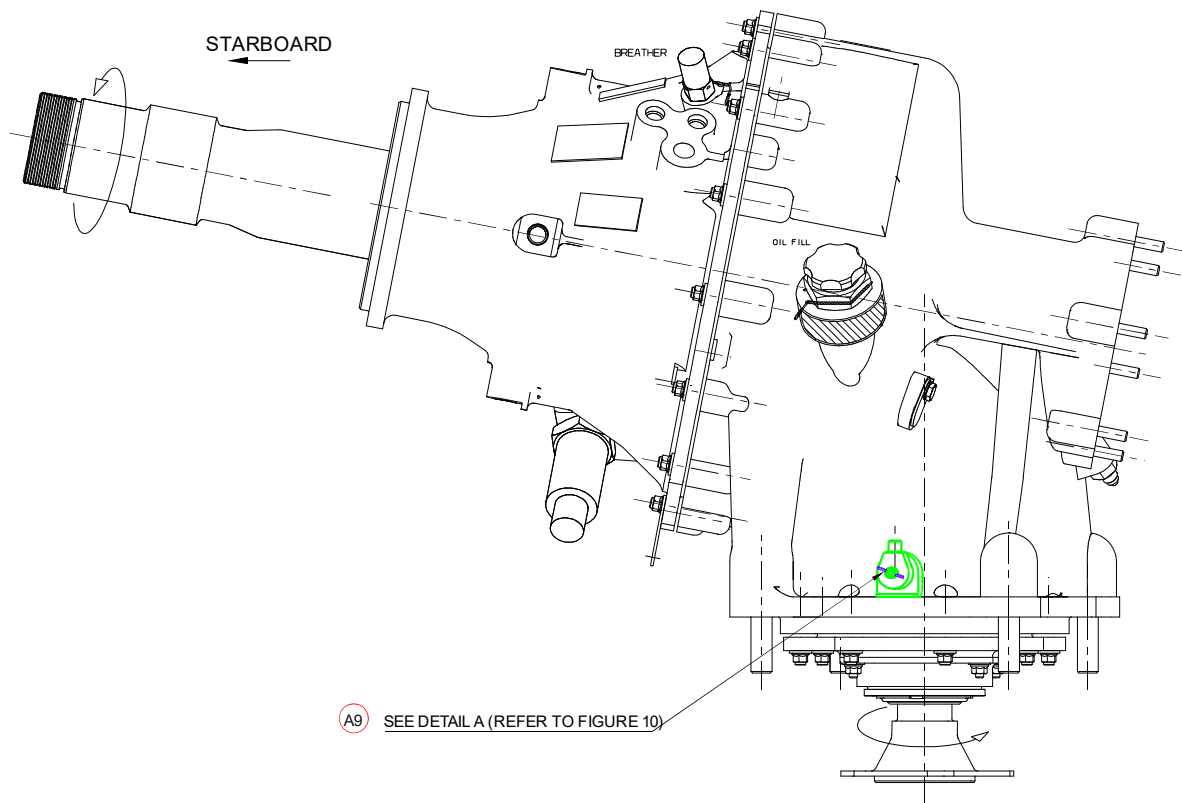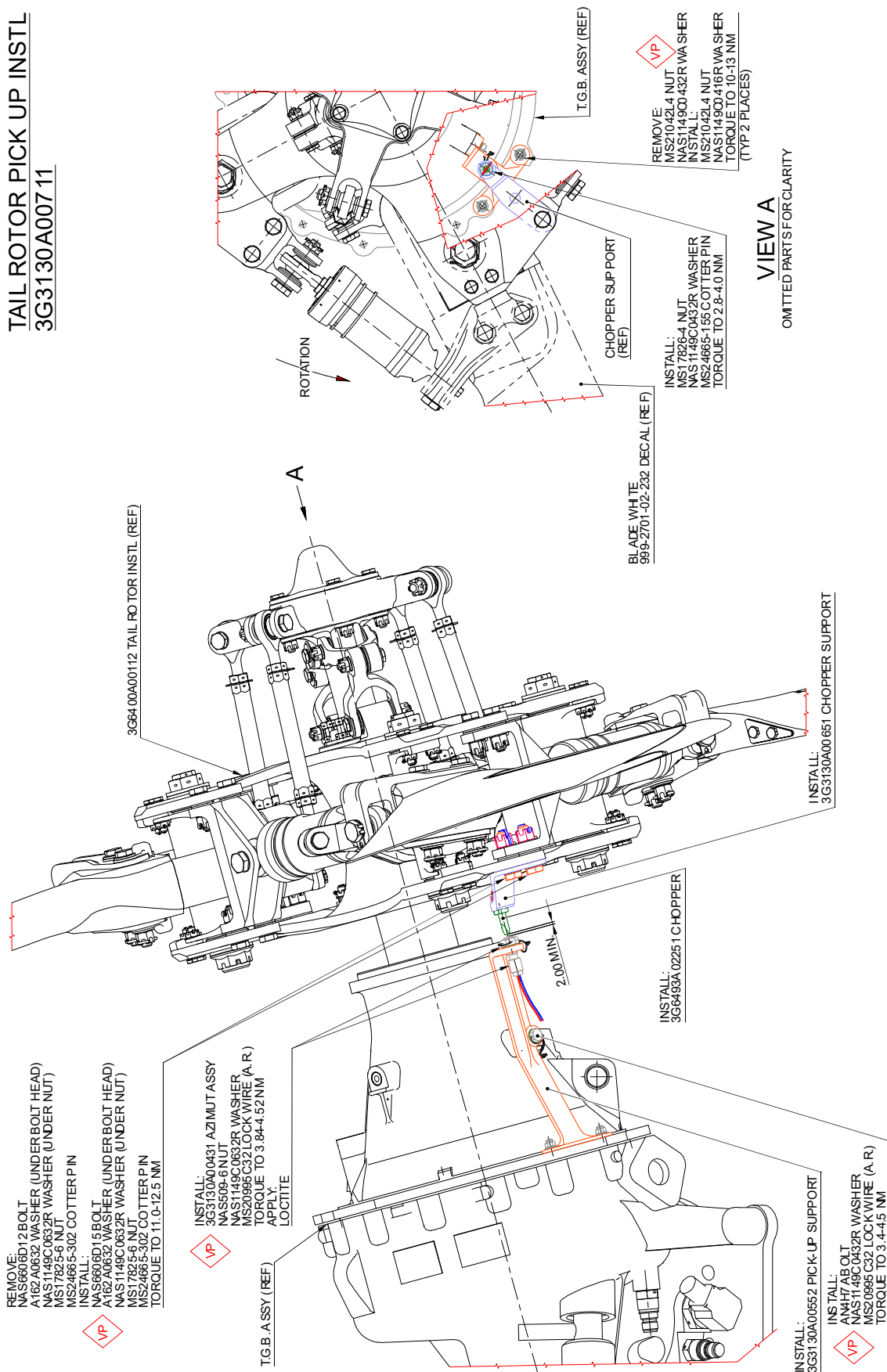S.B. N°139-573 OPTIONAL
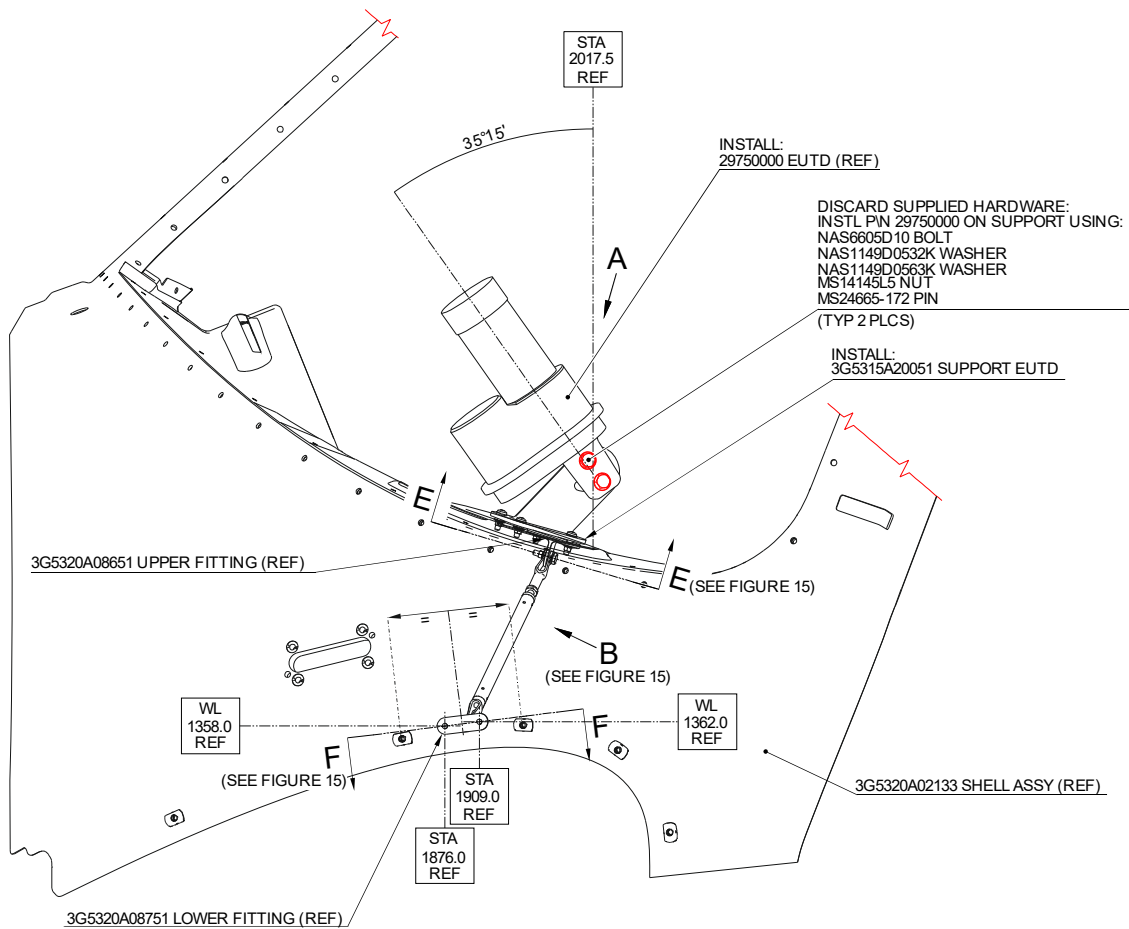DATE: June 28, 2019
REVISION: A - January 30, 2024
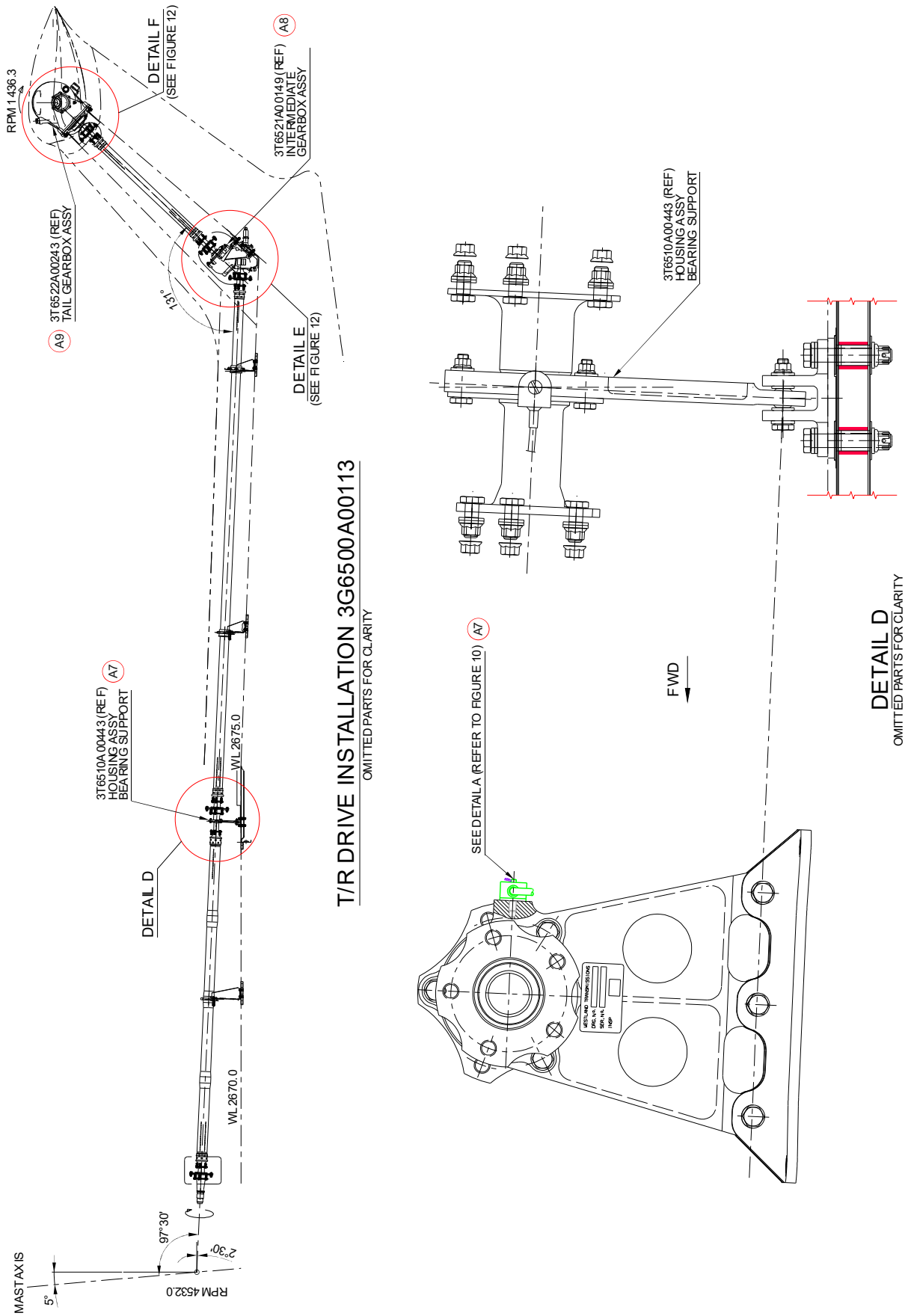
T/R DRIVE INSTALLATION 3G6500A00113
OMITTED PARTS FOR CLARITY

Figure 11

SEE DETAIL A (REFER TO FIGURE 10) (A8)

FWD →
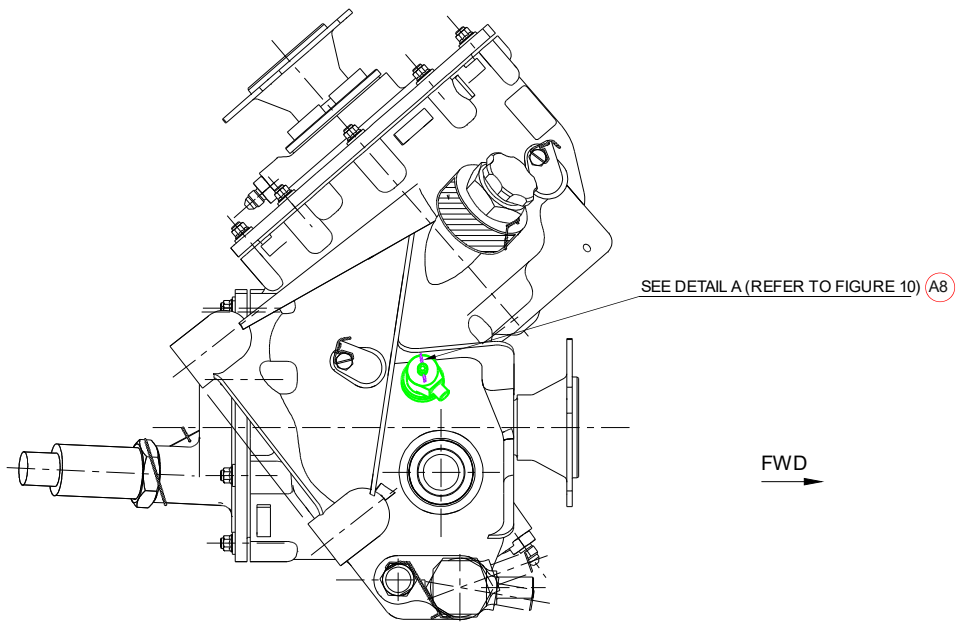
DETAIL E
(REFER TO FIGURE 11)
OMITTED PARTS FOR CLARITY

STARBOARD ←

BREATHER

OIL FILL

(A9) SEE DETAIL A (REFER TO FIGURE 10)

DETAIL F
(REFER TO FIGURE 11)
OMITTED PARTS FOR CLARITY

Figure 12

TAIL ROTOR PICK UP INSTL
3G3130A00711

REMOVE:
MS21042L4 NUT
NAS1149C0432R WASHER
INSTALL:
MS21042L4 NUT
NAS1149C0416R WASHER
TORQUE TO 10-13 NM
(TYP 2 PLACES)

VP

VIEW A
OMITTED PARTS FOR CLARITY

INSTALL:
MS17826-4 NUT
NAS1149C0432R WASHER
MS24665-155 COTTER PIN
TORQUE TO 2.8-4.0 NM

T.G.B. ASSY (REF)

CHOPPER SUPPORT
(REF)

BLADE WHITE
999-2701-02-232 DECAL (REF)

ROTATION

A

3G6400A00112 TAIL ROTOR INSTL (REF)

INSTALL:
3G3130A00651 CHOPPER SUPPORT

INSTALL:
3G6493A02251 CHOPPER

2.00 MIN

REMOVE:
NAS6606D12 BOLT
A162A0632 WASHER (UNDER BOLT HEAD)
NAS1149C0632R WASHER (UNDER NUT)
MS17825-6 NUT
MS24665-302 COTTER PIN
INSTALL:
NAS6606D15 BOLT
A162A0632 WASHER (UNDER BOLT HEAD)
NAS1149C0632R WASHER (UNDER NUT)
MS17825-6 NUT
MS24665-302 COTTER PIN
TORQUE TO 11.0-12.5 NM

VP

INSTALL:
3G3130A00431 AZIMUT ASSY
NAS509-6 NUT
NAS1149C0632R WASHER
MS20995C32 LOCK WIRE (A.R.)
TORQUE TO 3.84-4.52 NM
APPLY:
LOCTITE

VP

T.G.B. ASSY (REF)

INSTALL:
3G3130A00552 PICK-UP SUPPORT

INSTALL:
AN4H7A BOLT
NAS1149C0432R WASHER
MS20995C32 LOCK WIRE (A.R.)
TORQUE TO 3.4-4.5 NM

VP

VIEW LOOKING THE HELICOPTER FROM THE REAR
OMITTED PARTS FOR CLARITY

Figure 13

INSTALL:
29750000 EUTD (REF)

DISCARD SUPPLIED HARDWARE:
INSTL P\N 29750000 ON SUPPORT USING:
NAS6605D10 BOLT
NAS1149D0532K WASHER
NAS1149D0563K WASHER
MS14145L5 NUT
MS24665-172 PIN
(TYP 2 PLCS)

INSTALL:
3G5315A20051 SUPPORT EUTD

STA 2017.5 REF

35°15'

A

E

E (SEE FIGURE 15)

3G5320A08651 UPPER FITTING (REF)

B (SEE FIGURE 15)

WL 1358.0 REF

WL 1362.0 REF

F

F

(SEE FIGURE 15)

STA 1909.0 REF

STA 1876.0 REF

3G5320A02133 SHELL ASSY (REF)

3G5320A08751 LOWER FITTING (REF)

EUTD INSTALLATION
VIEW LOOKING INBOARD FROM LEFT SIDE

C

D

STA 1966.0 REF

STA 1996.0 REF

BL -792.0 REF

BL -814.5 REF

D

(SEE FIGURE 15)

C

3G5320A08331 OUTLET FAIRING ASSY (REF)

VIEW A
OMITTED PARTS FOR CLARITY

3G5320A08651 UPPER FITTING (REF)

DRILL:
HOLES IN THE FAIRING Ø 5.20 ÷ 5.50
ACCORDING SUPPORT (2 PLCS)

INSTALL:
MS27039-1-12 SCREW
NAS1149C0332R WASHER (2 PLCS)
MS21042L3 NUT
(TYP 2 PLCS)

3G5315A20051 SUPPORT EUTD (REF)

3G5320A08331 OUTLET FAIRING ASSY (REF)
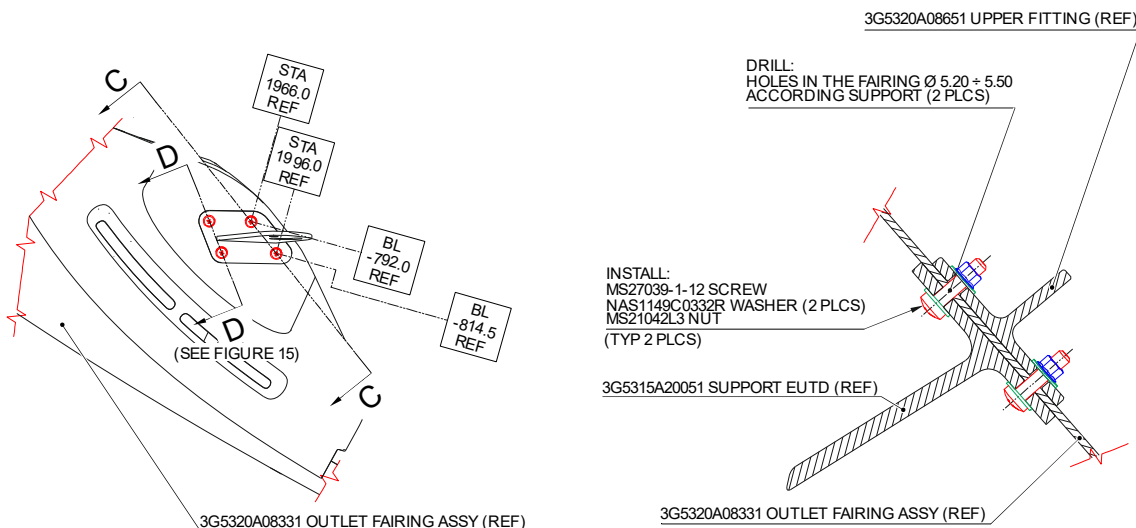
SECTION C-C
OMITTED PARTS FOR CLARITY

Figure 14

DRILL:
HOLES IN THE FAIRING Ø 5.20 ÷ 5.50
ACCORDING SUPPORT (2 PLCS)

INSTALL:
MS27039-1-10 SCREW
NAS1149C0332R WASHER (2 PLCS)
MS21042L3 NUT
(TYP 2 PLCS)

3G5315A20051 SUPPORT EUTD (REF)

3G5320A08331 OUTLET FAIRING ASSY (REF)
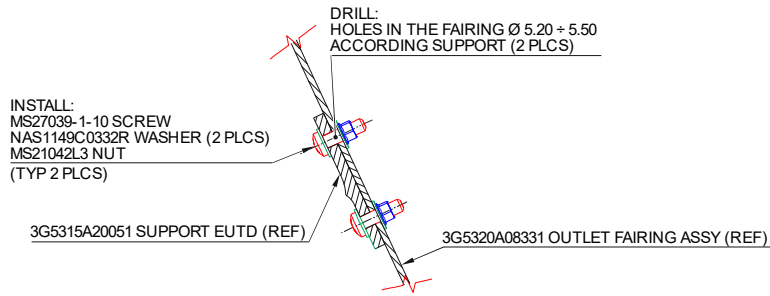
SECTION D-D
OMITTED PARTS FOR CLARITY
(REFER TO FIGURE 14)

3G5320A08751 LOWER FITTING (REF)

VIEW H
OMITTED PARTS FOR CLARITY

INSTALL:
3G5320A08651 UPPER FITTING

INSTALL:
3G5320A08431 ROD ASSY

H

INSTALL:
3G5320A08751 LOWER FITTING

VIEW B
OMITTED PARTS FOR CLARITY
(REFER TO FIGURE 14)

INSTALL:
AN3-6A BOLT
NAS1149C0332R WASHER (2 PLCS)
MS21042L3 NUT

3G5320A08431 ROD ASSY (REF)

3G5320A08651 UPPER FITTING (REF)
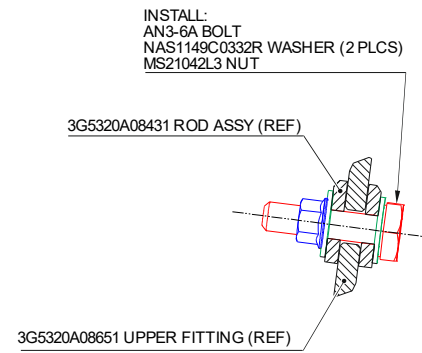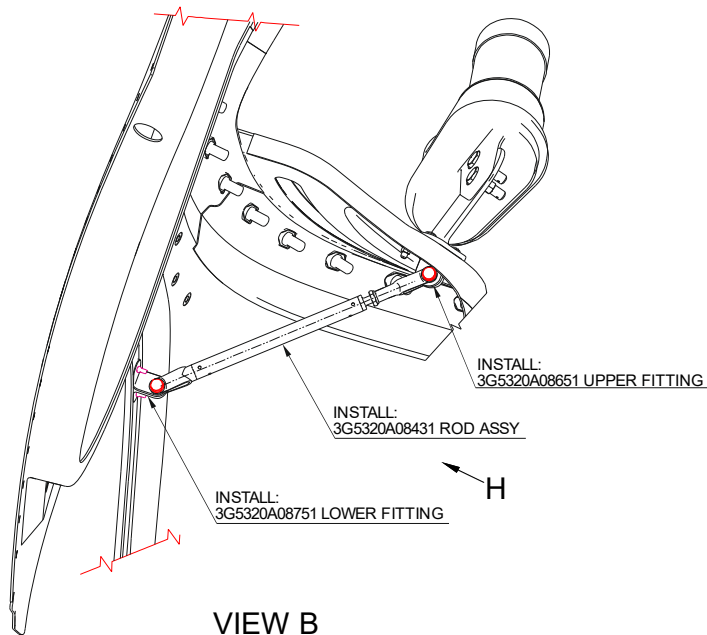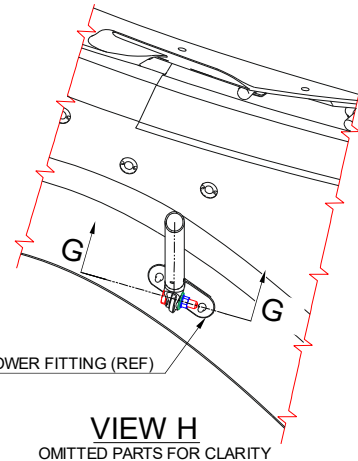
SECTION E-E
OMITTED PARTS FOR CLARITY
(REFER TO FIGURE 14)

3G5320A02133 SHELL ASSY (REF)

3G5320A08751 LOWER FITTING (REF)

3G5320A08751 LOWER FITTING (REF)

AN3-6A BOLT
NAS1149C0332R WASHER (2 PLCS)
MS21042L3 NUT

3G5320A08431 ROD ASSY (REF)
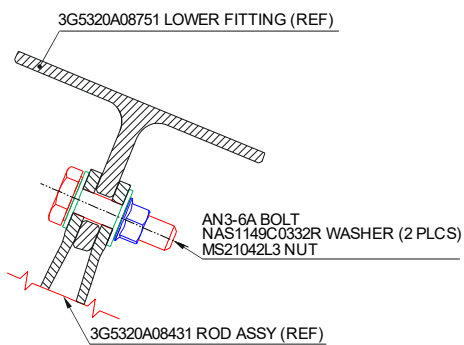
SECTION G-G
OMITTED PARTS FOR CLARITY

INSTALL:
A298A04TW02 RIVET
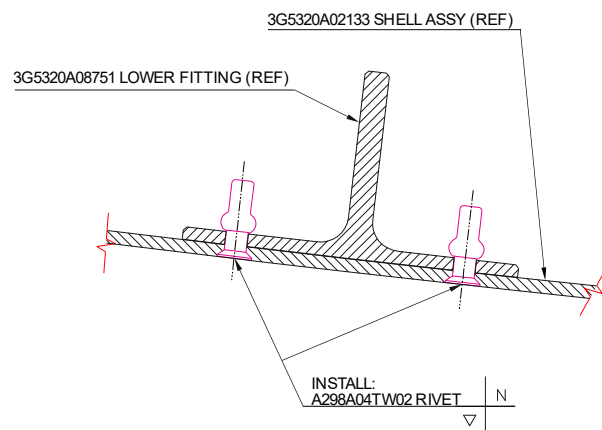
SECTION F-F
OMITTED PARTS FOR CLARITY
(REFER TO FIGURE 14)

Figure 15
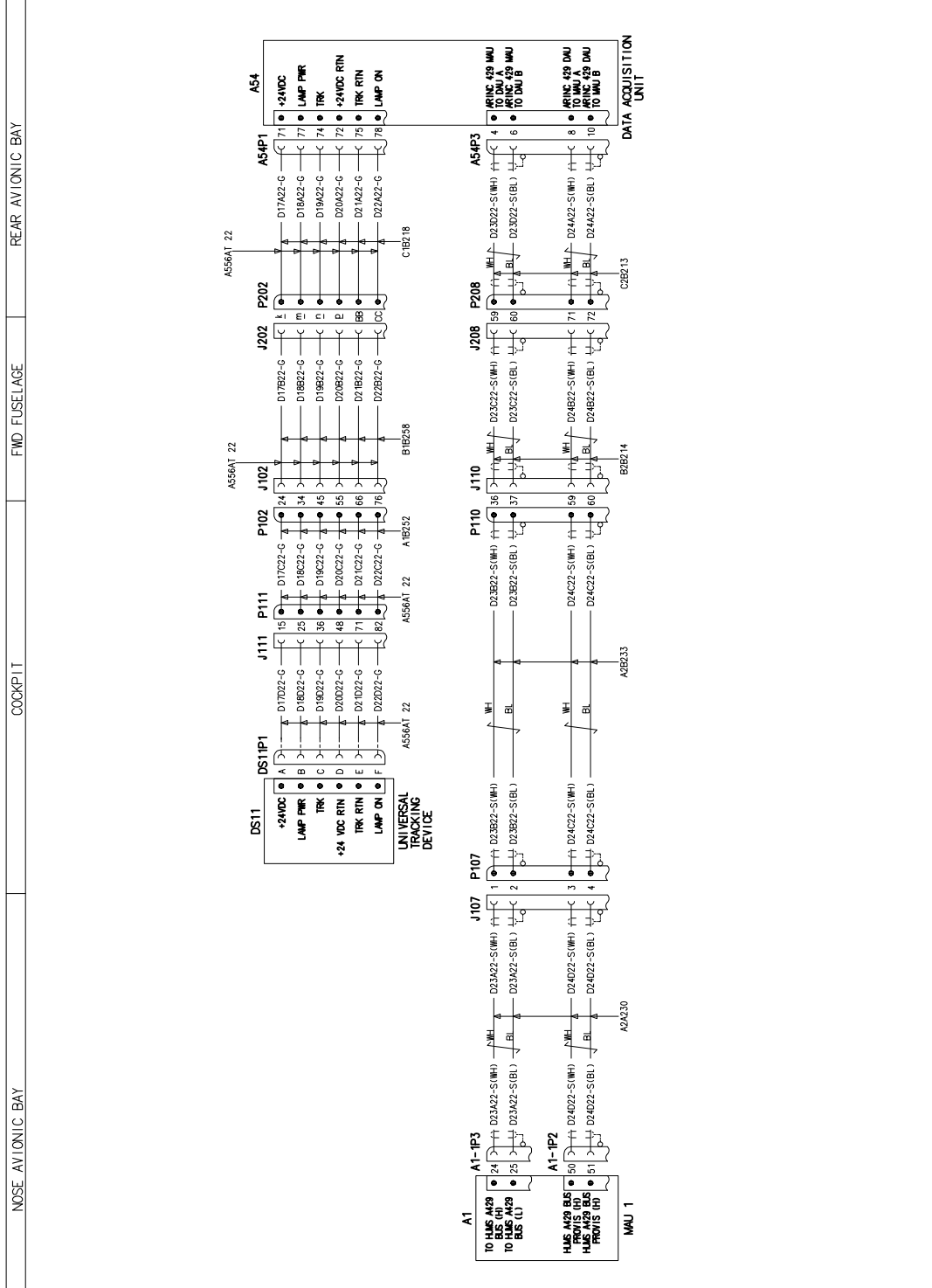
Figure 16
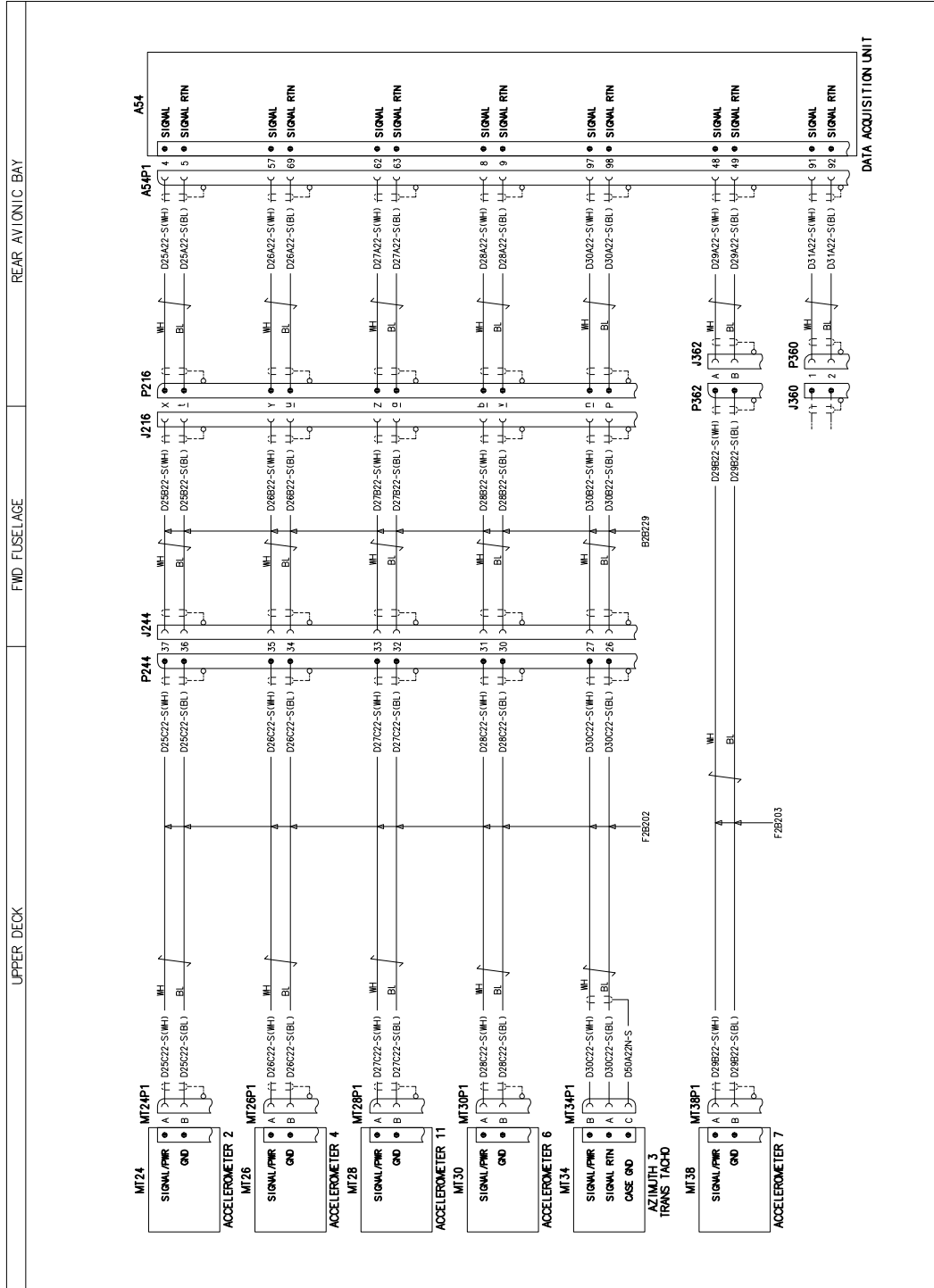
S.B. N°139-573 OPTIONAL
DATE: June 28, 2019
REVISION: A - January 30, 2024

Figure 17

Figure 18

S.B. N°139-573 OPTIONAL
DATE: June 28, 2019
REVISION: A - January 30, 2024
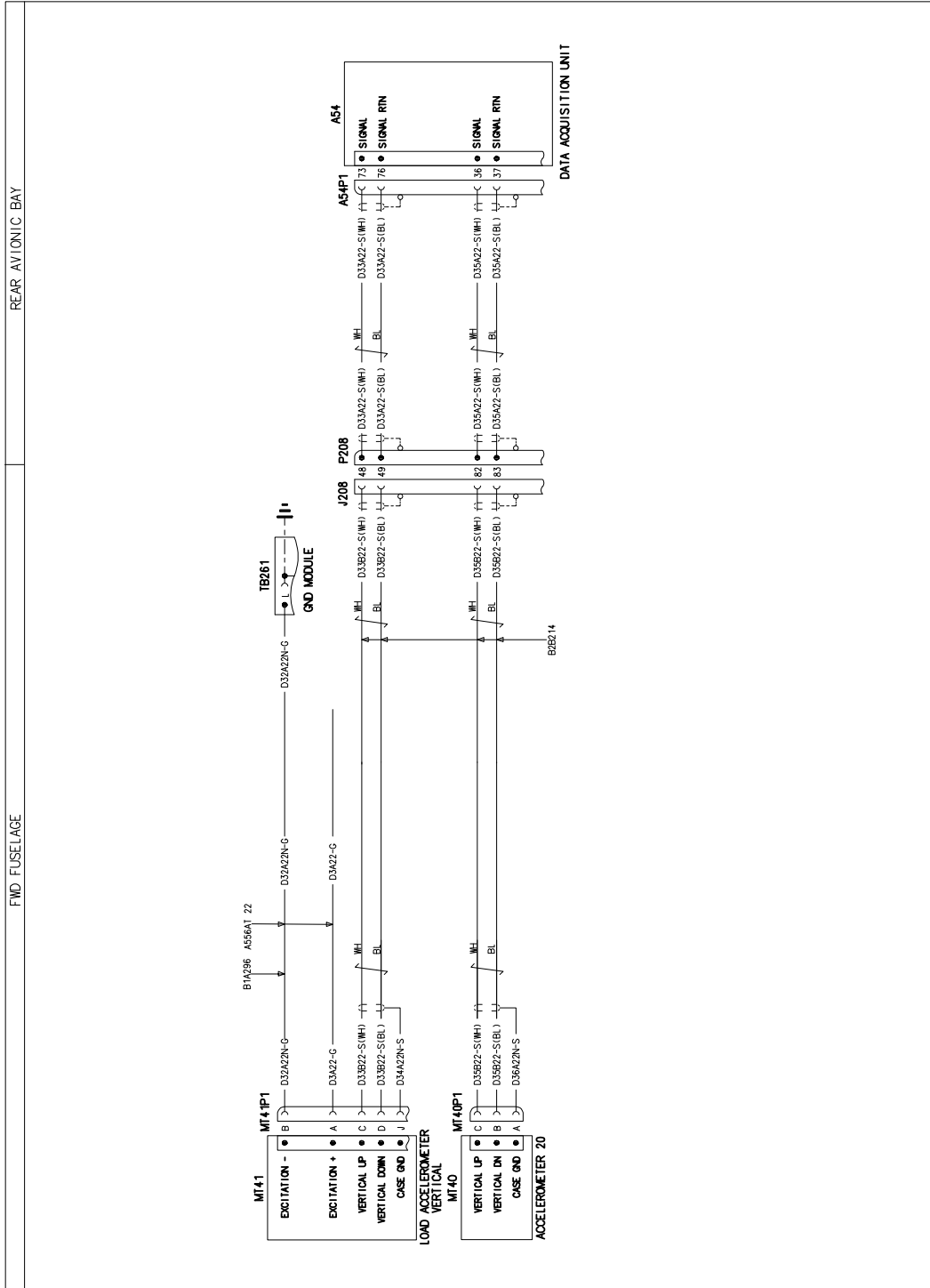
Figure 19

Figure 20

S.B. N°139-573 OPTIONAL
DATE: June 28, 2019
REVISION: A - January 30, 2024
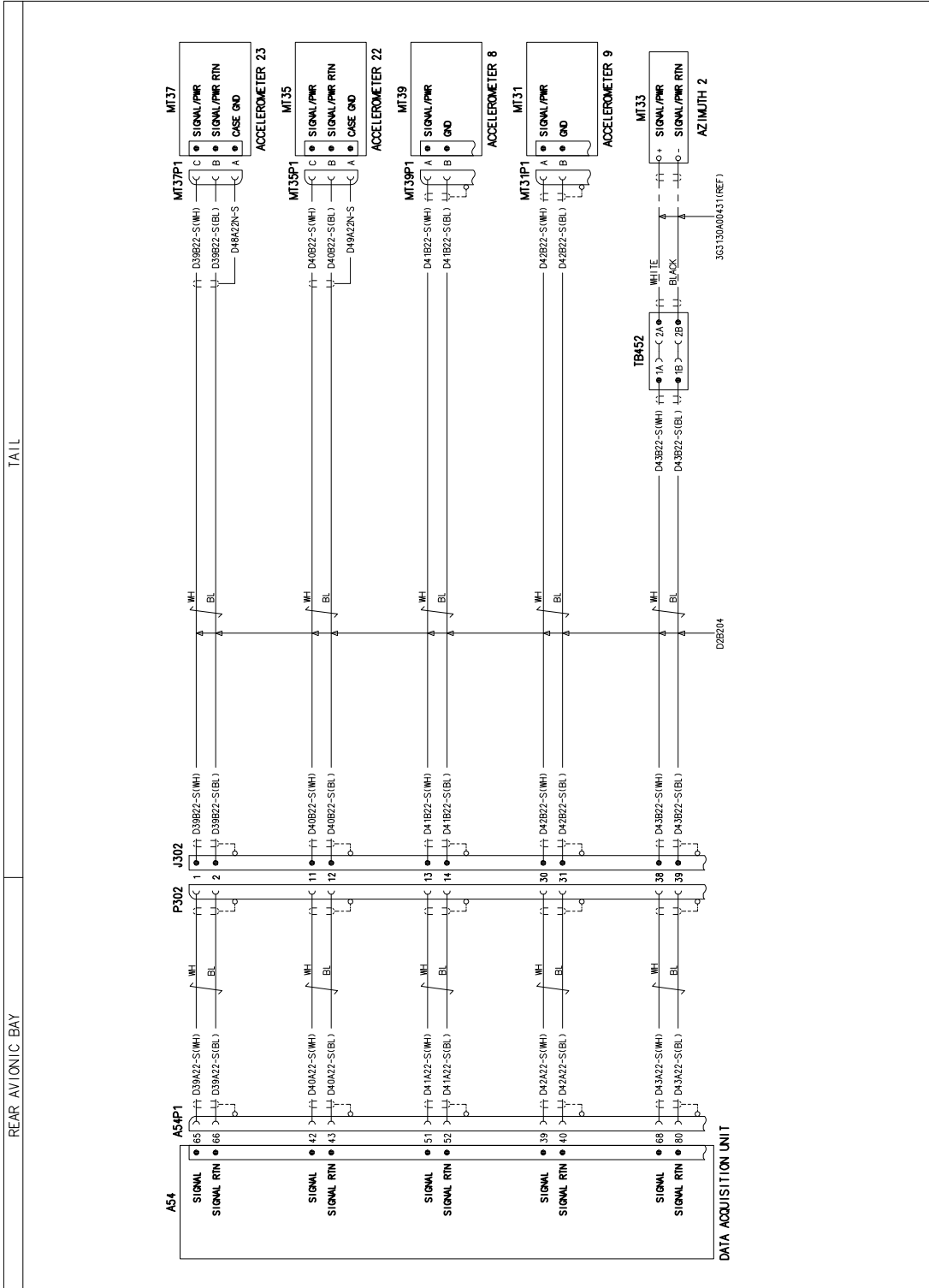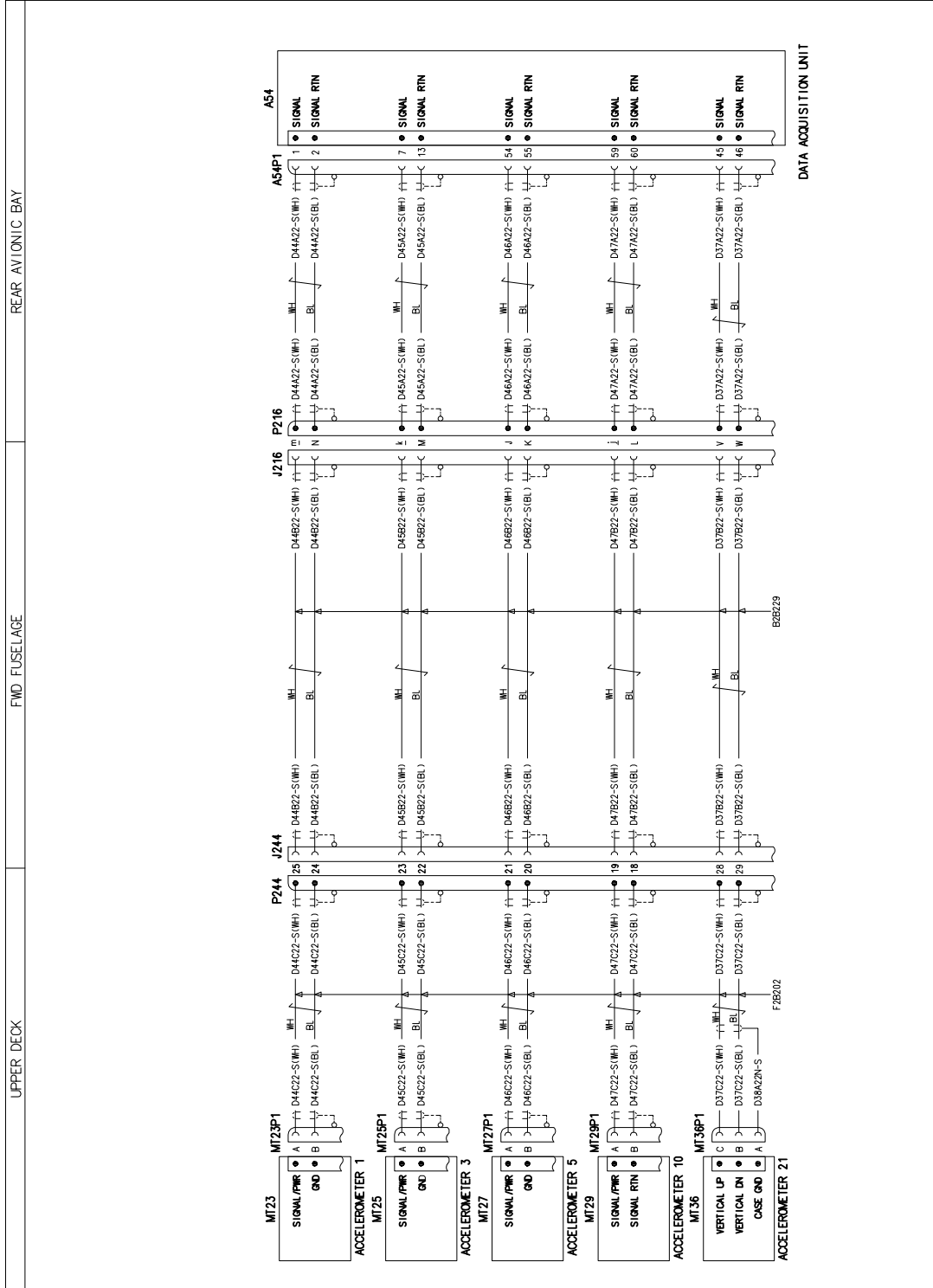
Figure 21

ANNEX A

HUMS - TEST AND CONFIGURATION PROCEDURE

1. Perform the HUMS test procedure as described in the tables that follows:

PHASE	OPERATIONS	CDU RESULTS	NOTES
1	CB69 "HUMS" push IN	\<COMM FAIL>	Wait 1 minute before the message is displayed on CDU.
2	-Pull OUT CB69 -Reconnect A54P2 DAU connector	No indication	
3	CB69 "HUMS" push IN	\<SBIT IN PROGRESS> during built in test.	
4		\<DTD NOT INSTALLED>	When the test is executed DTD is not installed. Once SBIT has confirmed communication between the DAU and the DTU, a check is done of the DTD.
5		\<MAINT DTD STS TRKR ↓XXMSGXXX>	After the completion of SBIT the Top-Level menu page is displayed.
6	Push PAGE key on the CDU	\<LOGBK SETUP BIT ↓XXMSGXXX>	The second page of the Top-Level menu should be displayed.
7	Push DOWN key on the CDU	The cursor moves downward	
8	Select \<BIT> by pressing ENT	A new page should be displayed	
9	Select \<IBIT> by pressing ENT	\<IBIT IN PROGRESS>	The CDU will display this message for approximately 20 - 30 seconds.
10		\<PUSH ANY SWITCH CLR ENDS TEST>	After the test.
11	Push EVENT key on the CDU	\<EVENT KEY CLR ENDS TEST>	

12	Push PAGE key on the CDU	<PAGE KEY CLR ENDS TEST>	
13	Push ENTER key on the CDU	<ENTER KEY CLR ENDS TEST>	
14	Push RIGHT key on the CDU	<RIGHT KEY CLR ENDS TEST>	
15	Push DOWN key on the CDU	<DOWN KEY CLR ENDS TEST>	
16	Push CLR key on the CDU	Top-Level menu	

NOTE

DPD allows the user to view the dynamic values of certain acquired and computed parameters. The displayed values are updated at an approximate rate of 1 Hz.

NOTE

The parameter values indicated in the following tables may vary depending on helicopter status, configuration and setup. A series of <"> indicates that the parameter datum is unavailable and the check is failed.

PHASE	OPERATIONS	CDU RESULTS	NOTES
1	Select <DPD> from the A/C Maintenance menu	<A/C DRV SYS ENGINE>	
2	Select <A/C> by pressing ENT	CDU will display the aircraft parameters. A/C ID is displayed	
3	Press PAGE button	The same <BARO ALT> indicated on the copilot PFD	
4	Press PAGE button	Current date	
5	Press PAGE button	<DENS ALT> known for the place where the test is executed	
6	Press PAGE button	<GND>on the bottom row	
7	Press PAGE button	Current time	

8	Press PAGE button	The same HEADING indicated on the copilot PFD (arc mode visualization)	
9	Press PAGE button	<TAS> displayed is <0 KTS>	
10	Press PAGE button	<LOAD FACTOR> displayed is <1 G>	
11	Press PAGE button	The same OAT indicated on the MFD	
12	Press PAGE button	<PITCH ANGLE> displayed is <0 DEG>	
13	Press PAGE button	<PITCH RATE> displayed is <0 DEG/S>	
14	Press PAGE button	<RAD ALT> displayed is <0 FT>	
15	Press PAGE button	<ROLL ANGLE> displayed is <0 DEG>	
16	Press PAGE button	<ROLL RATE> displayed is <0 DEG/S>	
17	Press PAGE button	<VERT SPD> displayed is <0 FPM>	
18	Press PAGE button	<VNE> displayed is <167 KTS>	
19	Press PAGE button	<YAW RATE> displayed is <0 DEG/S>	
20	Press CLR button	DPD menu with the cursor on <A/C>	
21	Select <ENGINE> by pressing ENT after the cursor shifted down	<ENG1 ITT> > displayed is <XXX DEG C>	Also negative value are acceptable when engine is off.
22	Press PAGE button	<ENG1 NF> the same displayed on MFD power plant (0 %)	
23	Press PAGE button	<ENG1 NG> the same indicated on MFD power plant (0 %)	
24	Press PAGE button	<ENG1 TQ> the same displayed on MFD power plant (0 %)	
25	Press PAGE button	<ENG2 ITT> > displayed is <XXX DEG C>	Also negative value are acceptable when engine is off.

26	Press PAGE button	<ENG2 NF> the same displayed on MFD power plant (0 %)	
27	Press PAGE button	<ENG2 NG>. Check the value displayed is the same indicated on MFD power plant (0 %)	
28	Press PAGE button	<ENG2 TQ> the same displayed on MFD power plant (0 %)	
29	Press CLR button	DPD menu with the cursor on <ENGINE>.	
30	Select <DRV SYS> by pressing ENT after the cursor shifted up and right	<IGB OIL TEMP> the same displayed on MFD power plant	CDU will display the drive system parameters.
31	Press PAGE button	<MGB OIL PRESS>. the same indicated on MFD power plant (0 %)	
32	Press PAGE button	<MGB OIL TEMP> the same displayed on MFD power plant	
33	Press PAGE button	<MAIN RTR TQ> displayed is <****** Nm>	
34	Press PAGE button	<ROTOR SPEED> the same displayed on MFD power plant (0 %)	
35	Press PAGE button	<TGB OIL TEMP> the same displayed on MFD power plant	
36	Press PAGE button	<TR PDL POS> displayed is <45 DEG>	
37	Press PAGE button	<TAIL RTR TQ> displayed is <****** Nm>	
38	Press PAGE button	<YAW ACT1 POS> displayed is <0 mm>	
39	Press PAGE button	<YAW ACT2 POS> displayed is <0 mm>	
40	Press CLR button	DPD menu with the cursor on <DRV SYS>.	
41	Press CLR button	A/C Maintenance menu: <RT&B DPD EPA>	
42	Press CLR button	Top-Level menu	

2. Verify the correct HUMS configuration as follows:

NOTE

Refer to document TDM2128 chapters 1.7 and 1.8 provided in Annex B to navigate through the CDU/DTU pages.

2.1 Check the "CONFIG P/N" loaded in the DAU as described in Smiths doc nr TDM2128 (Annex B) chapter 1.8 par. 2.4, and verify that it matches with the criteria expressed in Table 1:

GEARBOX P/N FITTED ON A/C	APPLICABLE OBSC P/N
3G6320A00132 3G6320A00133 3G6320A00134 3G6320A00135	3G3130VO0001 (OBSC file - MGB P/N 5534760504)
4G6320A00131 4G6320A00132 4G6320A00133	3G3130VO0002 (OBSC file - AGB P/N 553476AGB5)

Table 1

2.2 If the configuration part number does not match or is not uploaded, the user must copy the "config.hsd" file into the DTD.

2.3 After that, upload the new configuration by inserting the DTD into the CDU/DTU panel, and follow the instructions described in the chapter 1.7 par. 10.1.2 of Annex B.

2.4 Delete the "config.hsd" file from the DTD.

2.5 Refer to HGS User Guide (doc. nr. H796(4), chapter 11.10) to create an A/C profile on the HGS Database.

2.6 Refer to the HGS User Guide (doc. nr. H796(4), chapter 7.2) to upload the A/C profile into the DTD. The HGS will create the file init.hsd into the DTD.

NOTE

All the data required to create the A/C profile on the HGS are available from the CMC and from the A/C Logbook.

2.7 In accordance with AMP DM 39-B-31-32-03-00A-720A-K, insert the DTD into the CDU/DTU panel and upload the initialization file "init.hsd". Follow the instructions described in the chapter 1.7 par. 10.1.1 of Annex B.

2.8 Verify that all the values related to the A/C present into the HGS now are uploaded

into the DAU navigating on the CDU/DTU.

2.9 Delete the "init.hsd" file from the DTD.

2.10 Initialize the DTD using the HGS, refer to the HGS User Guide (doc. nr. H796, chapter 7.1).

2.11 Insert the DTD on the CDU/DTU.

ANNEX B

SMITHS DOCUMENT TDM2128

<<HUMS-OPERATION AND MAINTENANCE SOURCE DATA>>

CHAPTERS 1.7 AND 1.8

Chapter 1.7

Display pages

Table of contents

List of figures

List of tables

1   Menu tree

Figure 1 shows the menu structure in a tree format.
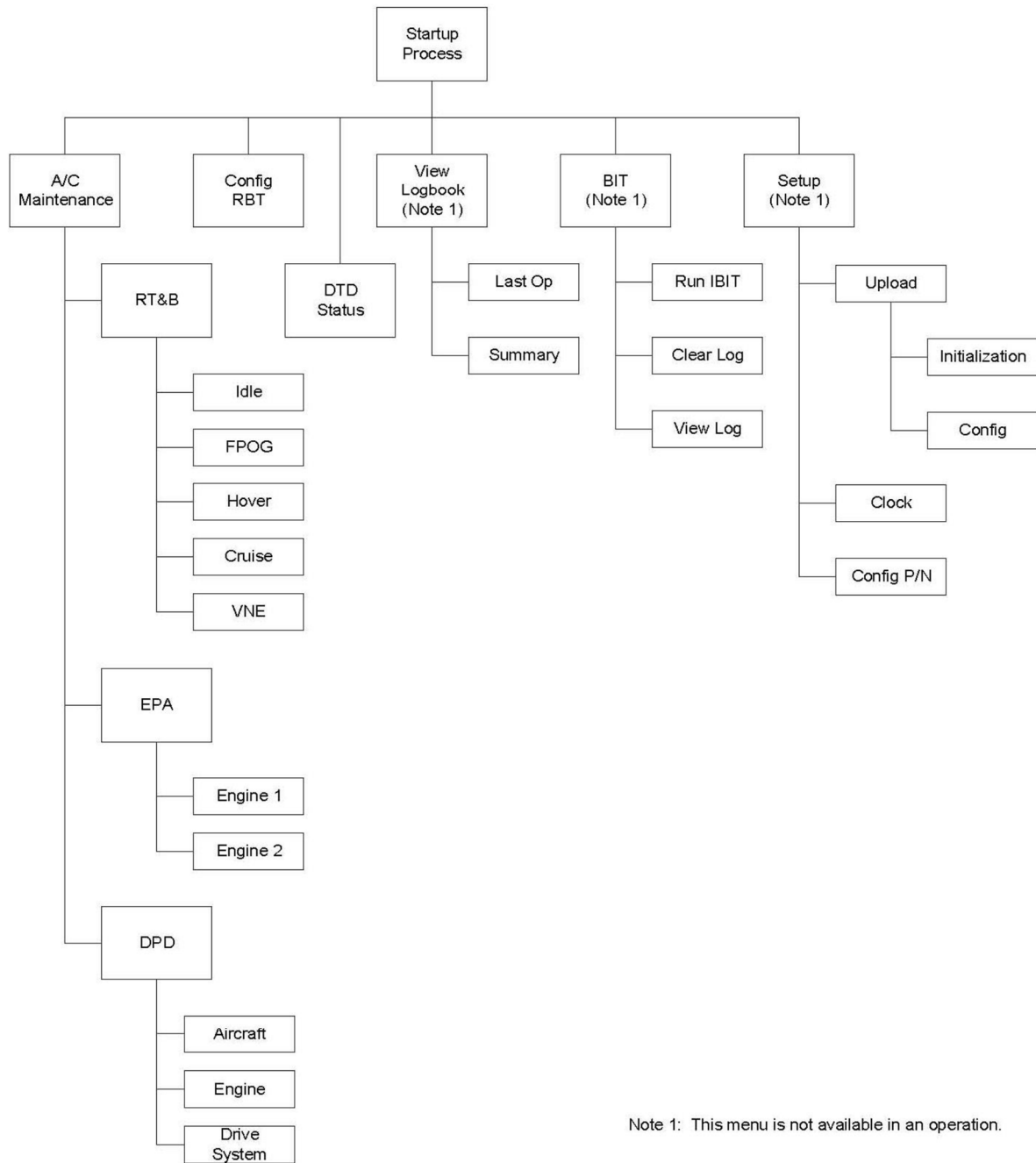
2   Detailed displays

The detailed displays are organized by function as follows:

- Startup
- Top-Level Menu
- A/C Maintenance
- Configure RBT
- DTD Status
- View Logbook
- BIT
- Setup
- Event Mark
- Pop-Up Displays

Flashing is indicated by an underlined position in the display pages that follow.

Figure 1. Display tree

Note 1: This menu is not available in an operation.

3   Startup

The initial screen on power up is:

```
         S B I T
  I N   P R O G R E S S
```

Once SBIT has confirmed communication between the Data Acquisition Unit (DAU) and the Data Transfer Unit (DTU), a check is done of the DTD. This check can result in one of the following displays:

```
      D T D   N O T
  I N S T A L L E D
```
Or
```
  C O N F I G U R A T I O N
  D T D   I N S T A L L E D
```
Or
```
  I N V A L I D   D T D
  I N S T A L L E D
```

These displays will change to reflect the new status if the DTD is removed and/or installed. These displays can also be cleared by starting an operation or pressing the "CLR" key. However, the system will not write data to either a configuration DTD or an invalid DTD. If a valid DTD is installed, the system will check the allocated space remaining in each file. If a file reached 80% of its allocated capacity, the CDU will display:

```
        f i l e i d
  F I L E   X X X %   F U L L ↓
```

where "fileid" is the name of the file exceeding the limit and XXX is the actual percentage of the allocated capacity used. The user can view all files more than 80% full by depressing the "PAGE" key. The full list of "fileid"s is the same as in the DTD status menu. If a file reaches 100% of its allocated capacity and is not configured to wrap when full, the CDU displays the same message where "fileid" is the name of the file exceeding the limit and XXX is the actual percentage of the allocated capacity used. This list is cleared by pressing the "CLR" key or starting an operation.

If a valid aircraft (A/C) identification (ID) is not available from the ARINC 429 bus, the system will then display:

```
       A / C   I D
  U N A V A I L A B L E
```

While this message is displayed, the system will continue to monitor the ARINC 429 bus for a valid A/C ID. This display will clear automatically if a valid A/C ID is received. It can also be cleared by pressing the "CLR" key or starting an operation. However, either of these actions will invalidate logbook data.

If the A/C ID received over the ARINC 429 bus does not match the A/C ID stored in nonvolatile memory (NVM), the following message will be displayed:

```
       A / C   I D
  M I S M A T C H
```

While this message is displayed, the system will continue to monitor the ARINC 429 bus for a new A/C ID. If a new A/C ID is received which matches the A/C ID stored in NVM, this display

will clear automatically. It can also be cleared by pressing the "CLR" key or starting an operation. However, either of these actions will invalidate logbook data.

If all the processing defined above has completed but the Vibration Acquisition Unit (VAU) has not completed its CSBIT, the initial screen will be displayed until the VAU CSBIT is complete or times out.

4 Top-level menu

The Top-Level menu contains two pages as shown below:

```
> M A I N T      D T D   S T S
  T R K R      ↓ X X M S G X X X
```

```
> L O G B K         S E T U P
  B I T        ↓ X X M S G X X X
```

The first page of the Top-Level menu is the default display. It is automatically displayed under the following conditions:
    Completion of SBIT after power-up,
    Completion of user-commanded IBIT,
    Start of an operation,
    End of an operation, and
    After an Event Mark acquisition.

The "XXMSGXXX" field displays the top-level status of the system based on filtered BIT status, A/C ID validity, operation number validity, cumulative logbook validity, and failure of either the Enhanced Digital Processing Unit (EDPU) or VAU configurations. This field is not a selectable option (i.e. the cursor cannot be positioned on that field). The highest priority message will be displayed. Refer to Chapter 1.6 for a list of possible messages displayed in this field and the condition that sets each message.

The message will be centered in the 8-character field with the extra space to the left of the message for messages with an odd number of characters.

The second page of the Top-Level menu is not available during an operation. During an operation, the Top-Level menu will appears as:

```
> M A I N T      D T D   S T S
  T R K R        X X M S G X X X
```

5 A/C maintenance menu

Selecting "MAINT" from the Top-Level menu will display the A/C Maintenance menu as shown below:

```
> R T & B           D P D
  E P A
```

5.1 RT&B

Selecting "RT&B" from the A/C Maintenance menu will display the RT&B menu below:

```
> I D L E
  F P O G          ↓
```

```
> H O V E R
  S   C R Z        ↓
```

```
> C R U I S E
  V N E              ↓
```

Note that the number of acquisitions and the displayed name of each acquisition are defined in the EDPU configuration and may differ from what is displayed above. The limitations on the configuration are no more than eight acquisitions and a maximum length of six characters for the name.

5.1.1 Running an acquisition

Acquisitions are run by selecting the desired regime from the RT&B menu. When an acquisition is selected, the display will change to:

```
A C Q U I S I T I O N
  I N   P R O G R E S S
```

Pressing the "CLR" key while this display is present will abort the acquisition and return to the "RT&B" menu with the cursor on the aborted acquisition.

RT&B acquisitions can result in display of a list of one or more of the following error messages:

```
    M A I N   R O T O R
    T A C H   F A I L        ↓
```

```
    M A I N   R O T O R
T A C H   U N D E R S P D    ↓
```

```
    M A I N   R O T O R
T A C H   O V E R S P D      ↓
```

```
    T A I L   R O T O R
    T A C H   F A I L        ↓
```

```
    T A I L   R O T O R
T A C H   U N D E R S P D    ↓
```

```
    T A I L   R O T O R
T A C H   O V E R S P D      ↓
```

```
        R B T
        F A I L              ↓
```

These error messages are displayed at the end of the acquisition. Pressing the "Down Arrow" key will scroll through the list of errors. Pressing the "CLR" key returns to the RT&B menu with the cursor on the initiated regime.

If the acquisition completes without any tachometer or tracker failures, the CDU will display:

```
A C Q U I S I T I O N
  C O M P L E T E
```

An initiated RT&B acquisition can also fail to return any status, which will result in the following CDU display:

```
A C Q U I S I T I O N
  T I M E O U T
```

Pressing the "CLR" key will return to the RT&B menu with the cursor on the failed acquisition. In this case, there will be no "DATA" indication to the right of the acquisition.

Pressing the "CLR" key will return to the RT&B menu with the cursor on the initiated regime. The word "DATA" will be displayed on the right side of the display on the same line as the regime, if any data was collected. For example, if an "FPOG" acquisition is run successfully, the return display will look like:

```
   I D L E
 > F P O G        ↓       D A T A
```

5.1.2 Viewing data

If an acquisition has been successfully completed, there will be a "DATA" indication on the right side of the display on the same line as the regime, as shown below:

```
   I D L E
 > F P O G        ↓       D A T A
```

Selecting the "DATA" indication for a particular regime will display the last 1/Rev values for the RT&B accelerometers configured for that regime as shown below:

```
 M R    L A T    1 R
        1 2 . 3 4     I P S        ↓
```

```
 M R    V E R T    1 R
        1 2 . 3 4     I P S        ↓
```

```
 T R    L A T    1 T
        1 2 . 3 4     I P S        ↓
```

```
 T R    V E R T    1 T
        1 2 . 3 4     I P S        ↓
```

Note that the number of CIs and the name for each is defined in the configuration for each acquisition and may be different than shown above. The limitations on the configuration are no more than four CIs per acquisition and a maximum of 16 characters in the name. Missing or invalid data will be indicated by asterisks (*) in the data field. The user must press the "CLR" key to return to the RT&B menu. The cursor on the return display will be on the regime from which the data was viewed.

5.2 EPA

Selecting "EPA" from the A/C Maintenance menu will display the EPA menu below:

```
 > E N G 1
   E N G 2
```

5.2.1 Running an Acquisition

Acquisitions are run by selecting the desired engine from the EPA menu. When an acquistion is run, the system will first verify that all inputs required to calculate EPA are valid. If any EPA input parameter is invalid, the CDU will display:

```
      I N V A L I D
        I N P U T
```

Pressing the "CLR" key while this display is present will abort the acquisition and return to the "EPA" menu with the cursor on the last attempted acquisition.

If all EPA inputs are valid, the system will then verify that the aircraft is in a proper regime for collecting EPA data. If the aircraft is not in a valid regime, the CDU will display:

```
    I  N  V  A  L  I  D
    R  E  G  I  M  E
```

Pressing the "CLR" key while this display is present will abort the acquisition and return to the "EPA" menu with the cursor on the last attempted acquisition.

If the aircraft is in a valid regime, the system will then verify that the engine is properly configured for EPA for the regime. If the configuration is not valid, the CDU will display:

```
    I  N  V  A  L  I  D
    S  E  T  U  P
```

Pressing the "CLR" key while this display is present will abort the acquisition and return to the "EPA" menu with the cursor on the last attempted acquisition.

The above three tests are running continuously throughout the acquisition. For example, if all required parameters are valid at the outset of an acquisition, but halfway through the acquisition a required parameter goes invalid, the acquisition will abort and the "INVALID DATA" message will be displayed.

If all required parameters, and the regime and configuration are valid, the CDU will display:

```
    A  C  Q  U  I  S  I  T  I  O  N
    I  N     P  R  O  G  R  E  S  S
```

Pressing the "CLR" key while this display is present will abort the acquisition and return to the "EPA" menu with the cursor on the last attempted acquisition.

Upon completion of the acquisition, the system performs a stability check of the calculated margins. If the stability check fails, the CDU will display:

```
          D  A  T  A
       U  N  S  T  A  B  L  E
```

If the stability test passes, the CDU will display the calculated Ng and ITT margins as shown:

```
  N  G     M  A  R  G  I  N
       1  2  .  3     %              ↓
```

```
  I  T  T     M  A  R  G  I  N
       1  2  .  3     D  E  G     C  ↓
```

Pressing the "CLR" key while either display is present will return to the "EPA" menu with the cursor on the completed acquisition.

5.3   DPD

Direct Parameter Display (DPD) allows the user to view the dynamic values of certain acquired and computed parameters. The displayed values are updated at an approximate rate of 1 Hz. Selecting "DPD" from the A/C Maintenance menu will display the DPD menu shown below:

```
> A  /  C           D  R  V     S  Y  S
  E  N  G  I  N  E
```

5.3.1 Aircraft parameters

Selecting "A/C" from the DPD menu will display the following:

```
A / C    I D
         1 2 3 4 5                    ↓
```

```
B A R O    A L T
         - 9 0 0      F T             ↓
```

```
D A T E    ( D D / M M / Y Y )
3 1 / 1 2 / 9 9                       ↓
```

```
D E N S I T Y    A L T
         - 9 0 0      F T             ↓
```

```
F L T / G N D    S T A T U S
              F L T                   ↓
```

```
T I M E    ( H H : M M : S S )
2 3 : 5 9 : 5 9                       ↓
```

```
H E A D I N G
         - 1 7 9      D E G           ↓
```

```
T A S
              1 2 0      K T S        ↓
```

```
L O A D    F A C T O R
         - 1 2 . 3      G             ↓
```

```
O A T
              - 5 5    D E G    C      ↓
```

```
P I T C H    A N G L E
         - 1 7 9      D E G           ↓
```

```
P I T C H    R A T E
              - 1 7      D E G / S     ↓
```

```
R A D    A L T
         4 9 9 9      F T             ↓
```

```
R O L L    A N G L E
         - 1 7 9      D E G           ↓
```

```
R O L L    R A T E
              - 1 7      D E G / S     ↓
```

```
V E R T    S P D
         - 1 9 9      F P M           ↓
```

```
VNE
            120   KTS        ↓
```

```
YAW   RATE
            -17   DEG / S    ↓
```

Missing or invalid data will be indicated by asterisks (*) in the data field. Pressing the "CLR" key while displaying any parameter will return to the DPD menu with the cursor on "A/C".

5.3.2   Engine parameters

Selecting "Engine" from the DPD menu will display the following:

```
ENG 1    I T T
            -69   DEG    C    ↓
```

```
ENG 1    N F
            147   %            ↓
```

```
ENG 1    N G
            112   %            ↓
```

```
ENG 1    T Q
            166   %            ↓
```

```
ENG 2    I T T
            -69   DEG    C    ↓
```

```
ENG 2    N F
            147   %            ↓
```

```
ENG 2    N G
            112   %            ↓
```

```
ENG 2    T Q
            166   %            ↓
```

Missing or invalid data will be indicated by asterisks (*) in the data field. Pressing the "CLR" key while displaying any parameter will return to the DPD menu with the cursor on "ENGINE".

5.3.3   Drive system parameters

Selecting "DRV SYS" from the DPD menu will display the following:

```
I G B   O I L    T E M P
            149   DEG    C    ↓
```

```
M G B   O I L    P R E S S
            11    BARS        ↓
```

```
M G B   O I L    T E M P
            149   DEG    C    ↓
```

```
┌──────────────────────────────────────┐
│ M A I N    R T R    T Q              │
│         9 6 2 2 8    N m           ↓ │
└──────────────────────────────────────┘

┌──────────────────────────────────────┐
│ R O T O R     S P E E D              │
│          1 4 0     %               ↓ │
└──────────────────────────────────────┘

┌──────────────────────────────────────┐
│ T G B    O I L    T E M P            │
│          1 4 9    D E G    C       ↓ │
└──────────────────────────────────────┘

┌──────────────────────────────────────┐
│ T R    P D L    P O S                │
│           8 5    D E G             ↓ │
└──────────────────────────────────────┘

┌──────────────────────────────────────┐
│ T A I L    R T R    T Q              │
│         3 7 2 0    N m             ↓ │
└──────────────────────────────────────┘

┌──────────────────────────────────────┐
│ Y A W    A C T 1    P O S            │
│         - 8 . 4    m m             ↓ │
└──────────────────────────────────────┘

┌──────────────────────────────────────┐
│ Y A W    A C T 2    P O S            │
│         - 8 . 4    m m             ↓ │
└──────────────────────────────────────┘
```

Missing or invalid data will be indicated by asterisks (*) in the data field. Pressing the "CLR" key while displaying any parameter will return to the DPD menu with the cursor on "DRV SYS".

6 Configure RBT

Selecting "TRKR" from the Top-Level menu displays the current status of the RBT as shown below:

```
┌──────────────────────────────────────┐
│ > T R A C K E R           O F F      │
│                                      │
└──────────────────────────────────────┘
```

6.1 Modification of RBT status

Selecting "TRACKER" from the RBT Status display will cause the RBT status to flash as shown:

```
┌──────────────────────────────────────┐
│ > T R A C K E R           O F F      │
│                           ‾ ‾ ‾      │
└──────────────────────────────────────┘
```

Pressing the "Down Arrow" key will cycle through the allowed states of the RBT, i.e. OFF, DAY, and NIGHT. When the desired status is displayed, the "ENT" key is pressed to accept the change and return to the RBT Status display with the new status shown.

7   DTD status

Selecting "DTD STS" from the Top-Level menu will display the current status of the Data Transfer Device (DTD).

If a properly formatted DTD is installed, this option will display the space available on the DTD for each file as shown below:

```
              f i l e i d
  F I L E    X X X %    F U L L ↓
```

```
    E N D    O F    L I S T
                              ↓
```

The complete list of fileids displayed is listed in Table 1. Pressing the "CLR" key will return to the Top-level menu with the cursor on "DTD STS".

Table 1. FILEID definition

File ID	File Name
SUM DATA	sum.hsd
TUM DATA	tum.hsd
EXCEEDANCE	exceed.hsd
LOGBOOK	usage.hsd
FLIGHT DATA	flight.hsd
DISC EVNT	discev.hsd
EPA DATA	engpa.hsd
MAINT EVNT	mainev.hsd
IDENT	ident.hsd
AUTO ENG CI	engaci.hsd
AUTO ENG VIB	engavib.hsd
MAN ENG CI	engmci.hsd
MAN ENG VIB	engmvib.hsd
AUTO AIRFRM CI	frmaci.hsd
AUTO AIRFRM VIB	frmavib.hsd
MAN AIRFRM CI	frmmci.hsd
MAN AIRFRM VIB	frmmvib.hsd
AUTO RTB CI	rtbaci.hsd
AUTO RTB VIB	rtbavib.hsd
MAN RTB CI	rtbmci.hsd
MAN RTB VIB	rtbmvib.hsd
AUTO XMSN CI	trnaci.hsd
AUTO XMSN VIB	trnavib.hsd
MAN XMSN CI	trnmci.hsd
MAN XMSN VIB	trnmvib.hsd
VIB ABORT	vibabort.hsd
VIB LOG	viblog.hsd

If there is no DTD installed, the display will appear as:

```
      D T D    N O T
    I N S T A L L E D
```

If a DTD is installed and contains a "config.hsd" file, the CDU will display:

```
C O N F I G U R A T I O N
D T D   I N S T A L L E D
```

A configuration DTD is only used to update the DAU with a new configuration. The DAU will not write to a configuration DTD.

If the installed DTD is not correctly formatted, i.e. does not contain the required files, the CDU will display:

```
I N V A L I D   D T D
I N S T A L L E D
```

On each of these displays, the user must press the "CLR" key to return to the Top-Level menu.

8   View logbook

Selecting "LOGBK" from the Top-Level menu will display the View Logbook menu as shown below:

```
> L A S T   O P
  T O T A L
```

8.1   Last operation

Selecting "LAST OP" from the View Logbook menu will display the logbook data from the last completed operation as shown below:

```
O P   N U M B E R
    1 2 3 4 5                    ↓
```

```
O P   T I M E
        1 . 2   H R S            ↓
```

```
R O T O R   S T A R T S
        1 2                      ↓
```

```
R O T O R   T U R N   T I M E
        1 . 2   H R S            ↓
```

```
N R   F A I L   T I M E
        1 . 2   H R S            ↓
```

```
F L I G H T   T I M E
        1 . 2   H R S            ↓
```

```
F L T   F A I L   T I M E
        1 . 2   H R S            ↓
```

```
L A N D I N G S
        1 2                      ↓
```

```
O E I   T I M E
        1 . 2   H R S            ↓
```

Missing or invalid data will be indicated by asterisks (*) in the data field. Pressing the "CLR" key return to the View Logbook menu with the cursor on "LAST OP".

8.2 Cumulative totals

Selecting "TOTAL" from the View Logbook menu will display the cumulative logbook data as shown below:

```
O P   N U M B E R
      1 2 3 4 5                      ↓
```

```
O P   T I M E
  1 2 3 4 5 . 6     H R S            ↓
```

```
R O T O R   S T A R T S
      1 2 3 4 5                      ↓
```

```
R O T O R   T U R N   T I M E
  1 2 3 4 5 . 6     H R S            ↓
```

```
N R   F A I L   T I M E
  1 2 3 4 5 . 6     H R S            ↓
```

```
F L I G H T   T I M E
  1 2 3 4 5 . 6     H R S            ↓
```

```
F L T   F A I L   T I M E
  1 2 3 4 5 . 6     H R S            ↓
```

```
L A N D I N G S
      1 2 3 4 5                      ↓
```

```
O E I   T I M E
  1 2 3 4 5 . 6     H R S            ↓
```

Missing or invalid data will be indicated by asterisks (*) in the data field. Pressing the "CLR" key will return to the View Logbook menu with the cursor on "TOTAL".

9 BIT

Selecting "BIT" from the Top-Level Menu will display the following BIT menu:

```
> I B I T         C L R   L O G
  V W   L O G
```

Pressing the "CLR" key will return to the Top-Level menu with the cursor on "BIT".

9.1 Initiate IBIT

Selecting "IBIT" from the BIT menu will initiate IBIT. This test runs the same tests run at power-up plus some additional interactive CDU tests. The CDU will display the following for approximately 20 - 30 seconds:

```
            I B I T
      I N   P R O G R E S S
```

The CDU will then display a checkerboard pattern in each character of the top row for five seconds followed by the reverse checkerboard pattern in each character for another five seconds. Next, the CDU will display a checkerboard pattern in each character of the bottom row for five seconds followed by the reverse checkerboard pattern in each character for another five seconds.

The CDU will then display the following:

```
P U S H   A N Y   S W I T C H
C L R   E N D S   T E S T
```

The user can then press keys in any order to verify key operation, except the "CLR" key. The CDU will display the following, depending on the key pressed.

```
E V E N T
C L R   E N D S   T E S T
```

```
P A G E
C L R   E N D S   T E S T
```

```
E N T E R
C L R   E N D S   T E S T
```

```
R I G H T
C L R   E N D S   T E S T
```

```
D O W N
C L R   E N D S   T E S T
```

Pressing the "CLR" key ends the test and the system returns to the Top-Level menu.

9.2   Viewing BIT results

Selecting "VW LOG" will display the current filtered BIT status. Below is an example of a possible filtered BIT status display.

```
D A U   F A I L
E D P U   O F P   C H K S U M ↓
```

```
A C C E L   A 1 5   F A I L
B I A S                       ↓
```

```
E N D   O F   R E S U L T S
                              ↓
```

The "END OF RESULTS" display marks the end of the list. Pressing the "PAGE" key with "END OF RESULTS" displayed will cause the first message in the list to be re-displayed. Pressing the "CLR" key will display the BIT menu with the cursor on "VW LOG". For a list of the possible messages displayed in this field and the condition that sets each message refer to Chapter 1.6.

9.3 Clearing BIT results

Selecting "CLR LOG" will clear the current BIT log and display the following on the CDU:

```
        B  I  T      L  O  G
        C  L  E  A  R  E  D
```

Pressing the "CLR" key will return to the BIT menu with the cursor on "CLR LOG".

10 Setup

Selecting "SETUP" from the Top-Level menu will display the Setup menu as shown below:

```
>  U  P  L  O  A  D          C  L  O  C  K
   C  O  N  F      P  N
```

Pressing the "CLR" key on the Setup menu will return to the Top-Level menu with the cursor on "SETUP".

10.1 Upload

Selecting "UPLOAD" from the Setup menu will display the Upload menu as shown below:

```
>  I  N  I  T
   C  O  N  F  I  G
```

Pressing the "CLR" key will return to the Setup menu with the cursor on "UPLOAD"

10.1.1 Initialization upload

Selecting "INIT" from the Upload menu will cause the system to attempt to upload an initialization file from the DTD. If a valid initialization file is present, the CDU will display:

```
        U  P  L  O  A  D
  I  N      P  R  O  G  R  E  S  S
```

It should be noted that if the DTD containing the initialization file (init.hsd) isn't formatted correctly an "Invalid DTD Installed" message will appear, but the system will still allow the initialization file to be uploaded. Pressing the "CLR" key will abort the upload and return to the Upload menu with the cursor on "INIT". Upon completion of the upload, the CDU will display:

```
        U  P  L  O  A  D
        C  O  M  P  L  E  T  E
```

or

```
        U  P  L  O  A  D
        F  A  I  L
```

depending on whether the upload is successful or not. Pressing the "CLR" key will return to the Upload menu with the cursor on "INIT".

The following error displays are possible when "INIT" is selected from the Upload menu:

```
            N  O
            D  T  D
```

```
              N O
      I N I T   F I L E
```

```
        I N V A L I D
      I N I T   F I L E
```

```
            O L D
      I N I T   F I L E
```

Pressing the "CLR" key will return to the Upload menu with the cursor on "INIT".

10.1.2   Configuration upload

Selecting "CONFIG" from the Upload menu will cause the system to attempt to upload a configuration file from the DTD. If a valid configuration file is present, the CDU will display:

```
        U P L O A D
    I N   P R O G R E S S
```

Pressing the "CLR" key will abort the upload and return to the Upload menu with the cursor on "CONFIG". Upon completion of the upload, the CDU will display:

```
        U P L O A D
      C O M P L E T E
```

or

```
        U P L O A D
        F A I L
```

Depending on whether the upload is successful or not. Pressing the "CLR" key will return to the Upload menu with the cursor on "CONFIG".

The following error displays are possible when "CONFIG" is selected from the Upload menu:

```
              N O
          D T D
```

```
              N O
      C O N F I G   F I L E
```

Pressing the "CLR" key will return to the Upload menu with the cursor on "CONFIG".

10.2   Date/Time

Selecting "CLOCK" from the Setup menu will display the current date and time settings as shown:

```
  > D A T E       3 0 / 1 2 / 0 2
    T I M E       1 6 : 4 5 : 5 1
```

Pressing the "CLR" key will return to the Setup menu with the cursor on "CLOCK". If both time and date are available to the DAU over the ARINC 429 bus, the date and time values cannot be changed by the user. This will be indicated by the lack of a cursor in the first character position on the Date/Time display as shown below:

```
    D A T E       3 0 / 1 2 / 0 2
    T I M E       1 6 : 4 5 : 5 1
```

10.2.1   Modification of date setting

Selecting "DATE" from the Date/Time display will cause the tens digit in the day field to flash as shown below:

```
> D A T E       3 0 / 1 2 / 0 2
  T I M E       1 6 : 4 5 : 5 1
```

Pressing the "Down Arrow" key will cycle the digit through its allowable values. Depressing the "Right Arrow will cause the units digit in the day field to flash. Again, pressing the "Down Arrow" will cycle the digit through its allowable values. This process is repeated until all required characters have been changed. Pressing the "Right Arrow" from the units digit in the year field will cause the tens digit of the day field to flash. When the date has been set to the desired value, the "ENT" key is depressed to accept the changes. This will cause the CDU to return to the Date/Time display with the new value of date displayed and the cursor on "DATE". If an invalid date is entered (i.e. 31/11/01), the date displayed will be the closest valid date prior to the entered date.

10.2.2   Modification of time setting

Selecting "TIME" from the Date/Time display will cause the tens digit in the hour field to flash as shown below:

```
  D A T E       3 0 / 1 2 / 0 2
> T I M E       1 6 : 4 5 : 5 1
```

Pressing the "Down Arrow" key will cycle the digit through its allowable values. Depressing the "Right Arrow will cause the units digit in the hour field to flash. Again, pressing the "Down Arrow" will cycle the digit through its allowable values. This process is repeated until all required characters have been changed. The seconds field is not modifiable. Pressing the "Right Arrow" from the units digit in the minutes field will cause the tens digit of the hour field to flash. When the time has been set to the desired value, the "ENT" key is depressed to accept the changes. This will cause the CDU to return to the Date/Time display with the new value of time displayed and the cursor on "TIME".

10.3   Configuration P/N

Selecting "CONF PN" from the Setup menu will display the current configuration P/N as shown:

```
  C O N F I G   P / N
  5 5 3 4 7 6 0 1 0 1
```

Pressing the "CLR" key will return to the Setup menu with the cursor on "CONF PN".

11   Event mark

If the HUMS configuration parameters have been set up to allow manual vibration acquisitions, pressing the "EVNT" key from any display will pre-empt any current manual or automatic acquisition and run a general vibration scan. When the "EVNT" key is depressed, the CDU will display:

```
  A C Q U I S I T I O N
  I N   P R O G R E S S
```

Pressing the "CLR" key while this display is present will abort the acquisition and return to the first page of the Top-Level menu with the cursor on "MAINT".

An event mark acquisition can result in display of a list of one or more of the following error messages:

```
+--------------------------------+
|      M A I N   R O T O R        |
|      T A C H   F A I L      ↓   |
+--------------------------------+
```

```
+--------------------------------+
|      M A I N   R O T O R        |
|  T A C H   U N D E R S P D  ↓   |
+--------------------------------+
```

```
+--------------------------------+
|      M A I N   R O T O R        |
|  T A C H   O V E R S P D    ↓   |
+--------------------------------+
```

```
+--------------------------------+
|      T A I L   R O T O R        |
|      T A C H   F A I L      ↓   |
+--------------------------------+
```

```
+--------------------------------+
|      T A I L   R O T O R        |
|  T A C H   U N D E R S P D  ↓   |
+--------------------------------+
```

```
+--------------------------------+
|      T A I L   R O T O R        |
|  T A C H   O V E R S P D    ↓   |
+--------------------------------+
```

```
+--------------------------------+
|          X M S N                |
|      T A C H   F A I L      ↓   |
+--------------------------------+
```

```
+--------------------------------+
|          X M S N                |
|  T A C H   U N D E R S P D  ↓   |
+--------------------------------+
```

```
+--------------------------------+
|          X M S N                |
|  T A C H   O V E R S P D    ↓   |
+--------------------------------+
```

These error messages are displayed at the end of the acquisition. Pressing the "Down Arrow" key will scroll through the list of error messages. Pressing the "CLR" key returns to the Top-Level menu with the cursor on "MAINT".

If the acquisition completes without any tachometer failures, the CDU will display:

```
+--------------------------------+
|    A C Q U I S I T I O N        |
|        C O M P L E T E          |
+--------------------------------+
```

Pressing the "CLR" key will return to the Top-Level menu with the cursor on "MAINT.
If the acquisition fails to return any status, the following will be displayed on the CDU:

```
+--------------------------------+
|    A C Q U I S I T I O N        |
|        T I M E O U T            |
+--------------------------------+
```

Pressing the "CLR" key will return to the Top-Level menu with the cursor on "MAINT.

12   Pop up displays

These are displays that will pop-up without any action by the user. These messages are typically informational messages to alert the crew of a condition that will require some action to correct.

12.1 CDU/DAU communication failure

If the CDU does not receive a command from the DAU for 1 minute, the CDU will display the following:

```
C O M M   F A I L
```

This display can only be cleared by re-establishment of communication between the CDU and the DAU. While "COMM FAIL" is displayed, all keys are disabled. Upon the re-establishment of communication between the CDU and the DAU, the CDU will display whatever display is required by the current state of the system. This will generally be the display prior to the pop-up. However, if the system was running a manually commanded acquisition or an operation was started or stopped while the pop-up was active, the display could be different.

12.2 File 80% full indication

If a file reaches 80% of its allocated capacity, the CDU will display:

```
          f i l e i d
F I L E   X X X %   F U L L
```

where "fileid" is the name of the file exceeding the limit and XXX is the actual percentage of the allocated capacity used. The full list of "fileid"s is the same as in the DTD Status menu. Pressing the "CLR" key will return the CDU to the display required by the current state of the system. This will generally be the display prior to the pop-up. However, if the system was running a manually-commanded acquisition or an operation was started or stopped while the pop-up was active, the display could be different. Also, if a manually-commanded acquisition was running at the time that a file exceeded 80% full, the display of the 80% full indication will be delayed until all displays associated with the manual acquisition are complete.

12.3 File 100% full indication

If a file reaches 100% of its allocated capacity and is not configured to wrap when full, the CDU will display:

```
          f i l e i d
F I L E   X X X %   F U L L
```

where "fileid" is the name of the file exceeding the limit and XXX is the actual percentage of the allocated capacity used. The full list of "fileid"s is the same as in the DTD Status menu. Pressing the "CLR" key will return the CDU to the display required by the current state of the system. This will generally be the display prior to the pop-up. However, if the system was running a manually-commanded acquisition or an operation was started or stopped while the pop-up was active, the display could be different. Also, if a manually-commanded acquisition was running at the time that a file reached 100% full, the display of the 100% full indication will be delayed until all displays associated with the manual acquisition are complete.

12.4 File Overwrite Indication

If a file reaches 100% of its allocated capacity and is configured to wrap when full, the CDU will display:

```
          f i l e i d
F I L E   O V E R W R I T E
```

where "fileid" is the name of the file exceeding the limit. The full list of "fileid"s is the same as in the DTD Status menu. Pressing the "CLR" key will return the CDU to the display required by the current state of the system. This will generally be the display prior to the pop-up. However,

if the system was running a manually-commanded acquisition or an operation was started or stopped while the pop-up was active, the display could be different. Also, if a manually-commanded acquisition was running at the time that a file reached 100% full, the display of the overwrite indication will be delayed until all displays associated with the manual acquisition are complete.

Chapter 1.8

Operating procedures

Table of contents

1 Data entry methods and guidelines

Data entry is allowed for certain fields on the HUMS display pages. Some data is entered on a character-by-character basis while other types of data are entered by entering a complete field.

1.1 Character data entry.

1 Using the two arrow keys (DOWN, RIGHT), the cursor (> or <) is moved adjacent to the desired field for data entry.
2 Pressing the ENT key causes the first character of the field to begin flashing.
3 With the character flashing, the DOWN arrow key is now used for data entry and the RIGHT arrow key is used to move right through each enterable character in the data field. The DOWN arrow key is used to cycle forward through each allowable value for the character, starting with the current value.
4 After cycling to the desired value, pressing the RIGHT arrow key causes the character to cease flashing and causes the next character position to begin flashing. Pressing the ENT key after all characters have been set to the desired values causes the system to accept the data values entered.
5 Not all character positions have to be updated during data entry in order for the system to accept the values. If only one character needs to be updated move to that position using the RIGHT arrow key, cycle through the allowable values using the DOWN arrow key and then press the ENT key to complete the entry.

1.2 Field data entry

1 Using the two arrow keys (DOWN, RIGHT), the cursor (> or <) is moved adjacent to the desired field for data entry.
2 Pressing the ENT key causes the entire field to begin flashing.
3 With the field flashing, the DOWN arrow key is now used for data entry. The RIGHT arrow key has no affect. The DOWN arrow key is used to cycle forward through each allowable value (DAY, NIGHT, OFF, etc.).
4 After the desired selection has been made, pressing the ENT key causes the system to accept the value.

2 Operating procedures

The following HUMS operating procedures are used for normal ground maintenance operations. Refer to data entry methods and guidelines to support these procedures.

2.1 OBS initialization

On-Board System (OBS) initialization instructions allow the operator to upload a HUMS initialization file from a DTD. Uploading initialization data to the HUMS should only have to be performed when a DAU has been replaced or if the initialization data set up on the ground station has changed. Initialization requires that a properly initialized DTD prepared on the ground station for that aircraft serial number be inserted into the CDU/DTU at power up.

1   Ensure operational DTD is in the CDU/DTU.
2   On the CDU/DTU, access the Top Level Menu.
3   Press the PAGE key. Main menu page 2 is displayed.
4   Using the arrow keys, place the cursor next to SETUP and press the ENT key. Setup menu page is displayed.
5   Using the arrow keys, place the cursor next to UPLOAD and press the ENT key. Upload menu page is displayed.
6   Using the arrow keys, place the cursor next to INIT and press the ENT key. UPLOAD IN PROGRESS message is displayed while file is being uploaded. When completed, UPLOAD COMPLETE message will be displayed.
7   Press CLR key to return to UPLOAD menu page.

2.2 OBS configuration uploading

Configuration uploading instructions allow the operator to transfer HUMS configuration data from the DTD to the DAU. Uploading configuration data to the HUMS requires that a configuration DTD be inserted into the CDU/DTU at power up.

1   Ensure configuration DTD is in the CDU/DTU.
2   On the CDU/DTU, access the Top Level Menu.
3   Press the PAGE key. Main menu page 2 is displayed.
4   Using the arrow keys, place the cursor next to SETUP and press the ENT key. Setup menu page is displayed.
5   Using the arrow keys, place the cursor next to UPLOAD and press the ENT key. Upload menu page is displayed.
6   Using the arrow keys, place the cursor next to CONFIG and press the ENT key. UPLOAD IN PROGRESS message is displayed while file is being uploaded. When completed, UPLOAD COMPLETE message will be displayed.
7   Press CLR key to return to UPLOAD menu page.
8   Remove configuration DTD from CDU/DTU.

2.3 Setting system date/time

The following instructions allow the operator to view and change system date and system time.

1   On the CDU/DTU, access the Top Level Menu.
2   Press the PAGE key. Main menu page 2 is displayed.
3   Using the arrow keys, place the cursor next to SETUP and press the ENT key. Setup menu page is displayed.
4   Using the arrow keys, place the cursor next to CLOCK to and press the ENT key. Date and Time page is displayed with current values.

Note

If cursor is not displayed next to DATE, system is receiving valid date and time values from ARINC 429 data bus and values cannot be changed.

5   Using the arrow keys, place the cursor next to desired value to change and press the ENT key. The first digit of the selected field begins flashing.

Note

When changing system time, the seconds field cannot be changed.

6   With the character flashing, the down arrow key is used to sequentially increment the flashing digit through all allowable values. Continue to press the down arrow key until desired digit is displayed.

7   Press the RIGHT ARROW key. Second digit is flashing.

8   Repeat steps 6 and 7 for remaining digits. Selected data field is as desired.

9   Once the desired data is entered, press the ENT key to make the entry.

10   Press the CLR key to return to the SETUP menu.

2.4   Viewing configuration part number

The following instructions allow the operator to view the current HUMS configuration part number.

1   On the CDU/DTU, access the Top Level Menu.

2   Press the PAGE key. Main menu page 2 is displayed.

3   Using the arrow keys, place the cursor next to SETUP and press the ENT key. Setup menu page is displayed.

4   Using the arrow keys, place the cursor next to CONF PN to and press the ENT key. Configuration page is displayed with current value.

5   Press the CLR key to return to the SETUP menu.

2.5   BIT initiation and viewing of BIT results

BIT initiation and viewing of BIT results instructions allow the operator to initiate system IBIT and CDU/DTU IBIT and review BIT results. Operator initiated BIT is only available prior to engine start. If engine(s) are started, only viewing of BIT results is allowed.

1   On the CDU/DTU, access the Top Level Menu.

2   Press the PAGE key. Main menu page 2 is displayed.

3   Press the down arrow key to place the cursor next to BIT and press the ENT key. BIT menu is displayed.

4   With cursor next to IBIT, press the ENT key. IBIT IN PROGRESS is displayed for approximately 20-30 seconds. Each character position on the top line of the display is displayed as a checkerboard pattern for 5 seconds followed by a reverse checkerboard pattern for 5 seconds. Each character position on the bottom line of the display is displayed as a checkerboard pattern for 5 seconds followed by a reverse checkerboard pattern for 5 seconds. PUSH ANY SWITCH is displayed on top line of CDU.

5   Press each key on CDU/DTU keyboard except CLR key. Name of key pressed is displayed on top line of CDU display.

6   Press the CLR key. HUMS top level menu is displayed and SYS VAL is displayed on bottom right side of CDU/DTU display.

7   Press the PAGE key. Main menu page 2 is displayed.

8   Press the down arrow key to place the cursor next to BIT and press the ENT key. BIT menu is displayed.

9   Press the down arrow key to place the cursor next to VW LOG and press the ENT key. First page of BIT log is displayed.

10   Press PAGE key to cycle through messages or press CLR key to return to BIT menu page.

2.6 Clearing BIT log

The following procedure allows the HUMS BIT log to be cleared. It should be cleared anytime a DAU has been replaced or as directed in HUMS troubleshooting.

1 On the CDU/DTU, access the Top Level Menu.
2 Press the PAGE key. Main menu page 2 is displayed.
3 Press the down arrow key to place the cursor next to BIT and press the ENT key. BIT menu is displayed.
4 Using the arrow keys, place the cursor next to CLR LOG and press the ENT key. BIT LOG CLEARED message will be displayed after log file data has been cleared from DAU memory.
5 To ensure the BIT log is cleared, perform IBIT in accordance with paragraph 2.5.
6 Press the CLR key to return to BIT menu.

2.7 Direct parameter display viewing

Direct Parameter Display (DPD) viewing instructions allow the operator to view parameters associated with the aircraft, engine, and drive train system.

1 On the CDU/DTU, access the Top Level Menu.
2 Using the arrow keys, place the cursor next to MAINT and press the ENT key. Aircraft maintenance menu is displayed.
3 Using the arrow keys, place the cursor next to DPD and press the ENT key. DPD menu page is displayed.
4 Using the arrow keys, place the cursor next to desired category of parameters and press the ENT key. First parameter page of desired category is displayed.
5 Press the PAGE key to view the next page. Next parameter page is displayed.
6 Repeatedly press the PAGE key to continue viewing additional parameters.
7 Press the CLR key to return to DPD menu page for selection of different category of parameters to view.

2.8 Checking DTD status

The DTD status instructions allow the operator to view the available space left for each of the required operational files on the DTD. A properly formatted DTD must be inserted in CDU/DTU.

1 On the CDU/DTU, access the Top Level Menu.
2 Using the arrow keys, place the cursor next to DTD STS and press the ENT key. First DTD file status page is displayed.
3 Press the PAGE key to view the next page. Next DTD file status page is displayed.
4 Repeatedly press the PAGE key to continue viewing status of remaining DTD files.
5 Press the CLR key to return to HUMS top level menu page.

2.9 DTD insertion

Note
An operational DTD must be inserted into the CDU/DTU prior to the start of a HUMS operation to avoid the loss of HUMS data.

1 Slide door latch to the left. Door springs open.
2 With label side facing up, insert the memory card into the slot.
3 Seat memory card by pushing it towards the rear of the case until all motion stops. Ejector button is in the extended position.
4 Close door until it latches.

2.10 DTD removal

Note

Removal of an operational DTD during a HUMS operation may result in the loss of HUMS data.

1 Slide door latch to the left. Door springs open.

2 Press ejector button. Card ejects.

3 Remove card.

4 Close door until it latches.

2.11 Log book data viewing

Log book data viewing instructions allow the operator to view either the last operations log book data or the cumulative log book totals for all operations.

1 On the CDU/DTU, access the Top Level Menu.

2 Press the PAGE key. Main menu page 2 is displayed.

3 Using the arrow keys, select LOGBK and press the ENT key. Logbook menu is displayed.

4 Using the down arrow key, select the desired type of log book values to be displayed and press ENT key. First log book value will be displayed.

Note

If any of the log book values are missing or invalid, the CDU/DTU will display asterisks (*) in the data field for that value.

5 Press the PAGE key to view the next page. Next log book page is displayed.

6 Repeatedly press the PAGE key to continue viewing additional log book values.

7 Press the CLR key to return to log book menu page.

2.12 Configuring rotor blade tracker

To set the configuration of the temporary fit rotor blade tracker perform the following:

Note

If using HUMS top-level software P/N 553477-01-01, do not enable the tracker to DAY or NIGHT mode until both engines have been started. Enabling the tracker prior to engine start may cause RBT BIT errors to be displayed upon engine start. See paragraph 10.2 of Chapter 1.5 for additional information.

1 On the CDU/DTU, access the Top Level Menu.

2 Using the down arrow key select TRKR and press the ENT key. Tracker current status is displayed.

3 To change tracker status, press ENT key. Current status will begin flashing.

4 Repeatedly press down arrow key to cycle through available values.

5 Press ENT key to accept value selected.

6 Press CLR key to return to HUMS top level menu page.

2.13 Performing a manual acquisition (Event mark)

If the HUMS configuration parameters have been set up to allow manual vibration acquisition an acquisition can be initiated manually by pressing the EVNT key on the CDU/DTU. Maintenance personnel can perform a manual data acquisition on the ground as part of maintenance when checking HUMS sensors. To initiate a manual acquisition perform the following:

Note

HUMS must be in a normal operation to perform the following procedure.

1. Press CDU/DTU EVNT key. ACQUISITION IN PROGRESS will be displayed until all data has been collected.

2. Once ACQUISITION COMPLETE is displayed, press CLR key to return to top level menu.

LEONARDO

HELICOPTERS

Please send to the following address: ## LEONARDO S.p.A. **CUSTOMER SUPPORT & SERVICES - ITALY** **PRODUCT SUPPORT ENGINEERING & LICENSES DEPT.** Via Giovanni Agusta, 520 21017 Cascina Costa di Samarate (VA) - ITALY Tel.: +39 0331 225036 Fax: +39 0331 225988	**SERVICE BULLETIN COMPLIANCE FORM** Date: Number: Revision:

Customer Name and Address:	Telephone:
	Fax:
	B.T. Compliance Date:

Helicopter Model	S/N	Total Number	Total Hours	T.S.O.

Remarks:

Information:

We request your cooperation in filling this form, in order to keep out statistical data relevant to aircraft configuration up-to-date. The form should be filled in all its parts and sent to the above address or you can communicate the application also via Technical Bulletin Application Communication Section placed in Leonardo AW Customer Portal - MyCommunications Area. We thank you beforehand for the information given.