

ALERT SERVICE BULLETIN **BO105**

Date: April 03, 2006
Rev. 4, June 21, 2010

Change Order
No 4 for ASB BO105-90-103

Please replace Revision 3 of Alert Service Bulletin ASB BO105-90-103 completely with Revision 4.

Reason for Revision 2:

Due to the IFR operation certification (instrument flight rules) the models BO105 D and BO105 DBS must be retrofitted with a new ground reference line. Revision 02 describes the retrofit of this new ground reference line. After accomplishment of Revision 02, the visual inspection required in Section 2.B.2 and its associated resistance measuring are no longer applicable for models BO105 D and BO105 DBS.

For all other helicopters affected by the Alert Service Bulletin ECD offers the retrofit of a new ground reference line with Service Bulletin BO105-90-104.

Reason for Revision 3:

With Revision 3 attention is drawn to the fact that the retrofit of a new ground reference line is only specified for models BO105 D and BO105 DBS **with IFR approval**. Additionally, the retrofit of a grounding bracket is described unless a grounding bar is part of the helicopter's standard equipment. If the previous issue of this Alert Service Bulletin has already been accomplished no further measures are required due to Revision 3.

Reason for Revision 4:

With Revision 4 it is pointed out that a new ground reference line must be retrofitted for **all** models **with IFR approval** given in Section 1.A.1. That means that a new ground reference line must now be retrofitted on the IFR approved helicopters BO105, models A, C, S which have been excluded from the retrofit up to now.

On IFR approved helicopters up to and including S/N 0160 it must be determined, whether a retrofit is necessary or not. If Revision 2 or Revision 3 of this Alert Service Bulletin has already been accomplished no further measures are required for this Revision.

ALERT SERVICE BULLETIN

BO105

Date: April 03, 2006
Rev. 4, June 21, 2010

No. ASB BO105-90-103

Subject: Starter-Generators - Inspection / Retrofit of a Ground Reference Connection

1. PLANNING

1.A. Effectivity

1.A.1. Helicopters affected: BO105 model A,
BO105 model C (C23, CB, CB-4)
BO105 model S (CS, CBS, CBS-4)
BO105 model D (DS, DB, DB-4, DBS, DBS-4,
DBS-5) excluding: helicopters on which ASB-
BO105-80-118, SB-BO105-80-119 or SB-BO105-90-104 has
already been accomplished.

Note: On BO105 CBS-5 KLH, BO105 CB(S)-5, partly on BO105, model D and on
helicopters on which ASB-BO105-80-118 or SB-BO105-80-119 has been
accomplished a voltage regulator with overvoltage protection has already
been installed and therefore these helicopters are not affected.

1.A.2. Components affected: Voltage regulator 51565-000
Voltage regulator 51565-000R
Voltage regulator 51509-002R

1.A.3. Spare Parts affected: Voltage regulator 51565-000
Voltage regulator 51565-000R
Voltage regulator 51509-002R

1.B. Reason

On one helicopter, a break occurred in the wire terminal attached at terminal E of the
starter-generator. As a result, the grounding connection to the generator voltage
regulator, needed for voltage control, was interrupted. As a consequence, overvoltage
occurred in the electrical power system and this caused damage to several items of
electronic equipment.

1.C. Description

EFFECTIVITY Affected BO105 helicopters with IFR approval and a ground reference
line connected to the starter-generator.

If grounding bar is not installed as standard item of equipment, retrofit grounding bracket.
Cap and stow wire on the starter-generator and on the generator voltage regulator.
Retrofit new ground reference line. Perform functional test.

EFFECTIVITY Affected BO105 helicopters without IFR approval and ground reference line connected to the starter-generator.

Accomplish visual inspection of grounding connection on starter-generator. Measure resistance between starter-generator and generator voltage regulator.

1.D. Compliance

EFFECTIVITY Affected BO105 helicopters **up to S/N 0160 with IFR approval.**

- 1.D.1. The determination i.a.w. Section 2.B.1 and, if necessary, the retrofit of the ground reference line i.a.w. Section 2.B.2 of this Alert Service Bulletin must be accomplished at the next PERIODICAL INSPECTION but not later than 6 months after receipt of Revision 4 of this Alert Service Bulletin.
- 1.D.2. When the starter-generator is removed and/or the wiring is disconnected from the starter-generator, the determination i.a.w. Section 2.B.1 must be immediately accomplished. If necessary, the check i.a.w. Section 2.A must be accomplished.

EFFECTIVITY Affected BO105 helicopters **starting with S/N 0161 with IFR approval.**

- 1.D.3. The retrofit of the ground reference line i.a.w. Section 2.B.2 of this Alert Service Bulletin must be accomplished at the next PERIODICAL INSPECTION but not later than 6 months after receipt of Revision 4 of this Alert Service Bulletin.
- 1.D.4. Until a new ground reference line is retrofitted, it is necessary to accomplish a check i.a.w. Section 2.A., in case the starter-generator is removed and/or the wiring to the starter-generator is disconnected.

EFFECTIVITY Affected BO105 helicopters **up to and including S/N 0160 without IFR approval.**

- 1.D.5. When the starter-generator is removed and/or the wiring is disconnected from the starter-generator, the determination i.a.w. Section 2.B.1 and, if necessary, the check i.a.w. Section 2.A must be accomplished.

EFFECTIVITY Affected BO105 helicopters **starting with S/N 0161 without IFR approval.**

- 1.D.6. When the starter-generator is removed and/or the wiring is disconnected from the starter-generator, a check i.a.w. Section 2.A must be accomplished.

1.E. Approval

The information or instructions contained in this document refer to change no. 1576. The technical content of this document is approved under the authority of DOA No. EASA.21J.034.

1.F. Manpower Requirement

For check of the wire terminals i.a.w. Section 2.A.: approx. 2 man-hours

For retrofit of a ground reference line: approx. 12 man-hours

1.G. Material, Cost and Availability

Cost and availability of required retrofit kits will be provided by ECD, Dept. Spares Order Administration.

1.H. Special Tools

(Not applicable)

1.I. Mass and Moment

If wire harness is retrofitted

Mass 0.175 kg

Moment 455 kgmm

1.J. Reference

MM BO105

1.K. Other Publications affected

This Alert Service Bulletin will be incorporated in the Wiring Diagram Manual WDM BO105 with one of the next revisions.

1.L. Electrical Load Data

(Not applicable)

2. ACCOMPLISHMENT INSTRUCTIONS

2.A. Inspections Required

2.A.1. Visual inspection of grounding connection on starter-generator:

NOTE The grounding connection on the starter-generator is identical for the RH and the LH side. Thus the accomplishment of the visual inspection is identical for the LH and RH side.

2.A.1.1. Disconnect battery and, if connected, the external power supply from the helicopter electrical system.

2.A.1.2. Remove engine cowling i.a.w. maintenance manual MBB-BO105, Section 22.

2.A.1.3. Using a torch and a mirror, inspect for damage, corrosion and cracks on wire terminal of wire P55F16N / P56F16N on terminal E of starter-generator.

2.A.1.4. If damage is found or suspected, the wire terminal must be replaced as follows:

- Remove nut from terminal E of the starter-generator and store for reuse.

- Remove wire terminal of the thin wire from terminal E.
Cut off wire at the wire terminal.
- Strip wire and crimp on new wire terminal (1, Figure 1).
- Attach wire terminal to terminal E of the starter-generator using a nut.
Torque-tighten nut to 25–26.5 Nm. Ensure that the wire terminal is centrally aligned and that the wire is installed without tension when the nut is tightened.
- Perform functional test i.a.w. MM, MBB-BO105, Kapitel 92-17.

2.A.2. Measurement of resistance between starter-generator and generator voltage regulator:

NOTE The generator voltage regulator on the LH side is identical to the generator voltage regulator on the RH side. Thus the procedure for resistance measurement is identical for the LH and RH side.

- 2.A.2.1. Provide access to the electrical master box 1VE i.a.w. MM, MBB-BO105, chapter 92-22.
- 2.A.2.2. Disconnect plug from generator voltage regulator.
- 2.A.2.3. Measure the resistance using an ohmmeter. Preselect measuring mode “resistance” and a suitable measuring range.
Connect one probe of the ohmmeter to terminal E of the starter-generator and the other probe i.a.w. the following list:

Model	Plug	Contact
BO105 excluding model D	104Pa / 204Pa	G
BO105 model D	108Pa / 208Pa	F

- 2.A.2.4. The resistance reading must be 0.5 ohms or less.
- 2.A.2.5. Install engine cowling i.a.w. maintenance manual MBB-BO105, chapter 92-22.
- 2.A.2.6. Confirm accomplishment of this Alert Service Bulletin by an entry in the historical record of the helicopter.

2.B. Work Procedure

EFFECTIVITY All affected helicopters up to S/N 0160

- 2.B.1. Check, whether the ground reference line is not connected to the starter-generator:
 - 2.B.1.1. Remove engine cowling i.a.w. MM, MBB-BO105, Chapter 22.
 - 2.B.1.2. Remove nut from terminal E of the starter-generator and store for reuse.
 - 2.B.1.3. Disconnect all wires with their wire terminals from terminal E and position them so that the individual wire terminals are **not** electrically connected to each other.

NOTE

The generator voltage regulator on the LH side is identical to the generator voltage regulator on the RH side. Thus the procedure for resistance measurement is identical for the LH and RH side.

2.B.1.4. Provide access to the electrical master box 1VE i.a.w. MM, MBB-BO105, chapter 92-22.

2.B.1.5. Disconnect plug from generator voltage regulator.

2.B.1.6. Measure the resistance using an ohmmeter. Preselect measuring mode "resistance" and a suitable measuring range.

Connect one probe of the ohmmeter to the grounding bolt (9, Figure 4) and the other probe i.a.w. the following list:

Model	Plug	Contact
BO105 excluding model D	104Pa / 204Pa	G
BO105 model D	108Pa / 208Pa	F

2.B.1.7. If the resistance reading is 0.5 ohms or less:

- Install engine cowling i.a.w. maintenance manual MBB-BO105, chapter 92-22.
- Attach wire terminals to terminal E of the starter-generator using a nut and torque-tighten the nut to 25-26,5 Nm. Ensure that the wire terminals are centrally aligned and that the wires are installed without tension.
- Install engine cowling i.a.w. MM, MBB-BO105, chapter 22.

2.B.1.8. Evaluation of the measuring reading:

Measuring value	Note	Approval	Proceed with accomplishment i.a.w.
0.5 ohms or less	The ground reference line is not connected to the starter-generator. The helicopter is not affected by this Alert Service Bulletin	all	Section 2.B.5.
more than 0.5 ohms	The ground reference line is connected to the starter-generator. The ground reference line must be retrofitted	IFR	Section 2.B.2.
	Until the ground reference line is retrofitted, checks must be accomplished		Section 2.A.
more than 0.5 ohms	Checks must be accomplished. With accomplishment of SB BO105-90-104 the check will no longer be applicable	without IFR	Section 2.A.

EFFECTIVITY All affected helicopter with IFR approval.

2.B.2. Disconnect wire from the starter-generator and cap and stow wire on the generator voltage regulator:

NOTE The wire connection on the starter-generator and on the generator voltage regulator is identical for system I and II.

NOTE Some of the electrical identifications of the “BO105 model D” differ from the other BO105 models (see the table given below). In the accomplishment instructions the electrical identifications for the “BO105, excluding model D” are used. The electrical identifications for the “BO105 model D” are shown in italic letters
The electrical identifications for helicopters up to and including S/N 0160 may also differ from the others and are not described in this Service Bulletin.

Model	Electrical identifications BO105, excluding model D	Electrical identifications BO105, model D
Voltage regulator and plug	104Pa / 204Pa	<i>108Pa / 208Pa</i>
Wire to the starter-generator terminal E	P55F16N / P56F16N	<i>P28F16 / P27F16</i>
wire to the voltage regulator, contact location G / F	25-18N / 32-18N (contact location G)	<i>10-20 / 27-20</i> (<i>contact location F</i>)

- 2.B.2.1. Disconnect battery and external power supply from helicopter electrical system.
- 2.B.2.2. Remove engine cowling i.a.w. the MM MBB-BO105, chapter 22.
- 2.B.2.3. Loosen nut from terminal E of the starter-generator (see Figure 1) and store for reuse.
- 2.B.2.4. Disconnect wire P55F16N / P56F16N, (*P28F16 / P27F16*) (2, Figure 1) and, if necessary, the associated shield-grid lead from terminal E. Cut off wire P55F16N / P56F16N, (*P28F16 / P27F16*) and, if necessary, shield-grid lead immediately at the wire terminal. Slide heat-shrinkable sleeve onto wire ends and shrink on with a hot air blower.
- 2.B.2.5. Attach remaining wires to terminal E of the starter-generator using nut and torque-tighten to 25-26.5 Nm. While doing so, ensure that the wire terminals remain centrally aligned when they are tightened and that the wires are routed with a strain relief.
- 2.B.2.6. As needed, attach the capped and stowed wire P55F16N / P56F16N, (*P28F16 / P27F16*) and, if necessary, the shield-grid lead to installed wires using a lacing tape.
- 2.B.2.7. Install engine cowling i.a.w. MM MBB-BO105, chapter 22.
- 2.B.2.8. Loosen end ring from plug 104Pa / 204Pa, (*108Pa / 208Pa*) and disconnect plug from generator voltage regulator 104P / 204P, (*108P / 208P*) (Figure 2), (*Figure 7*) in the electrical master box.

2.B.2.9. Disconnect wire 25-18N / 32-18N, (10-20 / 27-20) from contact location "G", "F" (see Wiring Diagram, Figure 5, 6), (8, 9). Cut off wire immediately after the contact. Slide heat-shrinkable sleeve onto wire end and shrink on with a hot air blower.

2.B.3. Retrofit wire harness:

EFFECTIVITY All affected helicopters up to and including S/N 0160 with IFR approval

2.B.3.1. If necessary install grommet (3, Figure 2, 7) to a suitable position by drilling the installation hole in the electrical master box housing using a drill bit dia. 14 mm

EFFECTIVITY All affected helicopters with IFR approval

2.B.3.2. Route wire harness i.a.w. Figure 2, 3, (3, 7) and fix. If installed, route wire harness within attachment clamps and chafing protection.

2.B.3.3. Insert wire of wire connector SP1062VV / SP1063VV in plug 104Pa / 204Pa, (108Pa / 208Pa), contact location "G", "F" (see Wiring Diagram, Figure 5, 6, (8, 9)).

2.B.3.4. Screw end ring onto plug 104Pa / 204Pa, (108Pa / 208Pa). If necessary, fix wires.

2.B.3.5. If grounding bar (5, Figure 3) is installed as standard item of equipment:
Screw wire terminals (1, Figure 3) of wires P98A(B)16N / P99A(B)16N onto grounding bar (5) i.a.w. Detail A, Figure 3.

2.B.4. If the grounding bar is not a standard item of equipment:

2.B.4.1. If grounding bar is not installed as standard item of equipment:

Loosen installed grounding bolt (9, Figure 4). Note installation sequence of the individual parts for their later re-installation.
Drill out installed rivets. Position grounding bracket (3) and copy using drill bit dia. 5.2 mm (1, Figure 4).
Remove insulating surface protection layer from both sides of the contact surfaces (2).
Position grounding bracket (3) to structure. Re-install old grounding bolt (9) as noted (see Figure 4).
Install new grounding bolt i.a.w. Figure 4 with wire terminals of wires P98A(B)16N / P99A(B)16N.
Seal both grounding bolts using sealing compound CM 6056 (3, Figure 4).

2.B.4.2. Apply PU-lacquer (CM 478, CM 479, CM 480) onto bare metal surfaces of the grounding connection (Figure 3, 4).

2.B.5. Perform functional test:

2.B.5.1. Accomplish check and adjustment of the generator voltage i.a.w. MM MBB-BO105, chapter 92-17.

2.B.5.2. Confirm accomplishment of this Alert Service Bulletin with an entry in the historical record of the helicopter.

2.C. Conclusions

(Not applicable)

3. MATERIAL INFORMATION

(Not applicable)

3.1. Required Parts per helicopter if replacement is necessary:

3.1.1 Retrofit kit SB-105-90A-103-3.1.1

No.	Qty	Nomenclature	Part No.
1	a.n.*	Wire terminal **	320564
1	a.n.*	Grommet ***	LN9240-10X2

EFFECTIVITY Helicopter BO105 Serie D

3.1.2 Retrofit kit SB-105-90A-103-3.1.2

No.	Qty	Nomenclature	Part No.
1	1	Wire harness Retro GCU BO105 Serie D	105-90085
2	a.n.*	PU lacquer	CM 478
3	a.n.*	Hardener	CM 479
4	a.n.*	Thinner	CM 480

EFFECTIVITY Additional for helicopter, if grounding bar is not installed as standard item of equipment.

3.1.3 Material kit SB-105-90A-103-3.1.3

No.	Qty	Nomenclature	Part No.
1	1	Grounding bracket	105-90079.01
2	1	Hexagon heade screw	LN9038K05018
3	1	Washer	LN9016-05K
4	1	Washer	LN9166-5,3N
5	1	Nut	LN29790M5
6	a.n.*	PU lacquer	CM 478
7	a.n.*	Hardener	CM 479
8	a.n.*	Thinner	CM 480
9	a.n.*	Sealing compound	CM 6056

EFFECTIVITY Helicopters BO105, excluding Model D.

3.1.4 Material kit SB-105-90A-103-3.1.4

No.	Qty	Nomenclature	Part No.
1	1	Wire harness Retro GCU BO105	105-90081
2	a.n.*	PU lacquer	CM 478
3	a.n.*	Hardener	CM 479
4	a.n.*	Thinner	CM 480

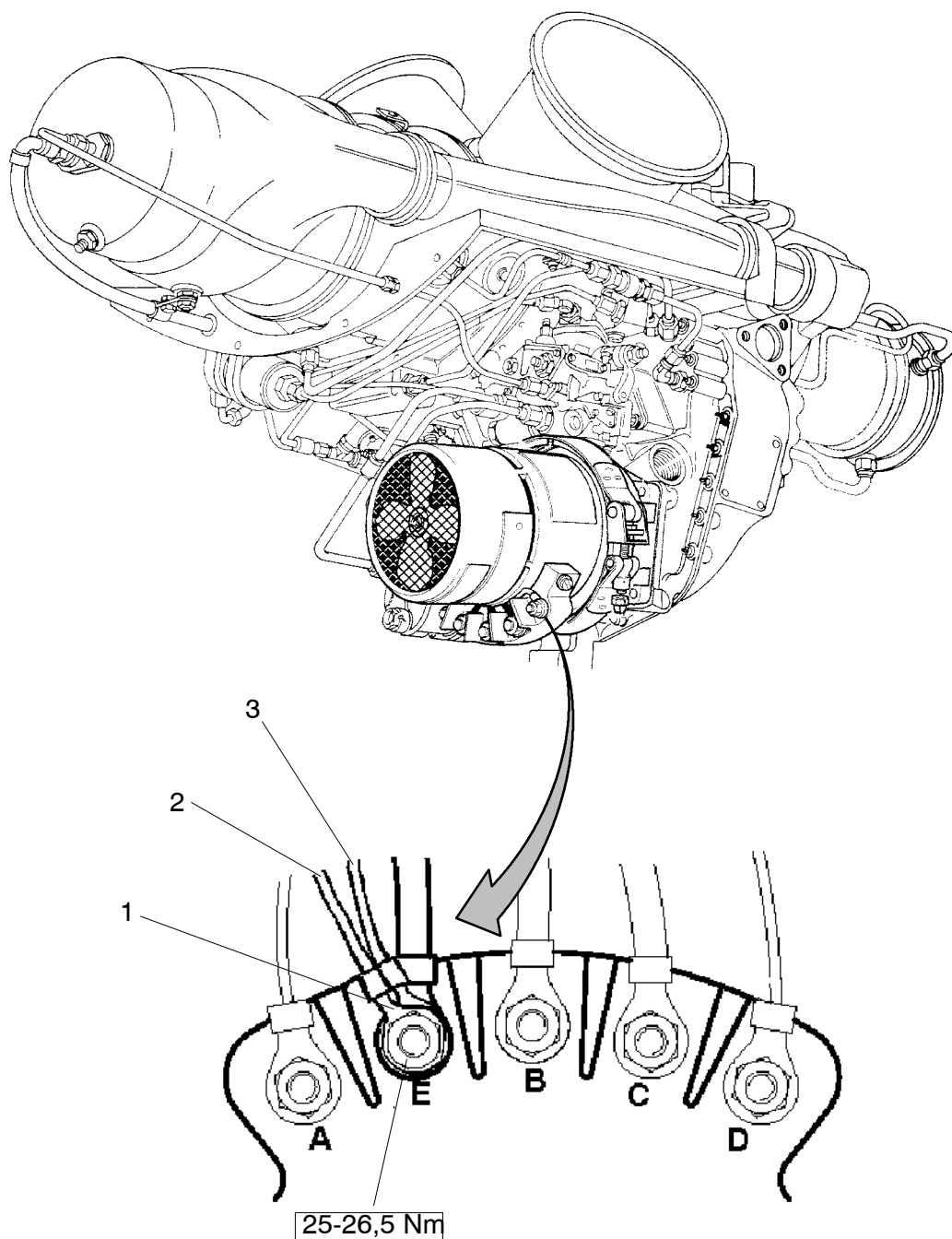
* a.n. = as needed.

** If this item is needed, a separate order has to be placed for it.

*** This item is needed for the retrofit of the ground reference line up to helicopters S/N 0160 and must be ordered separately.

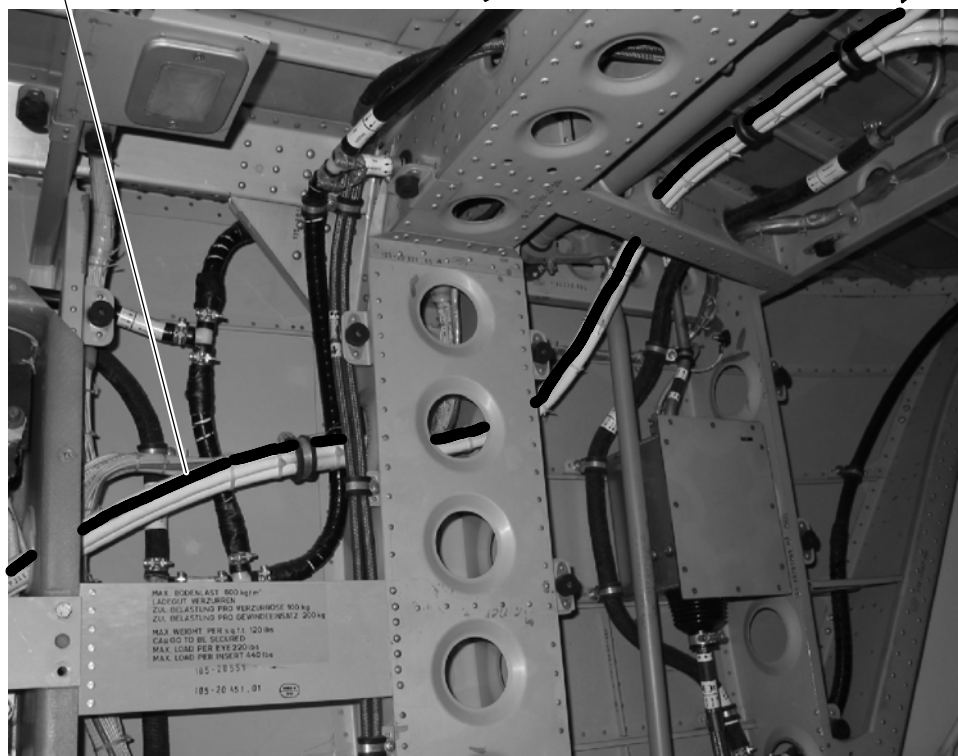
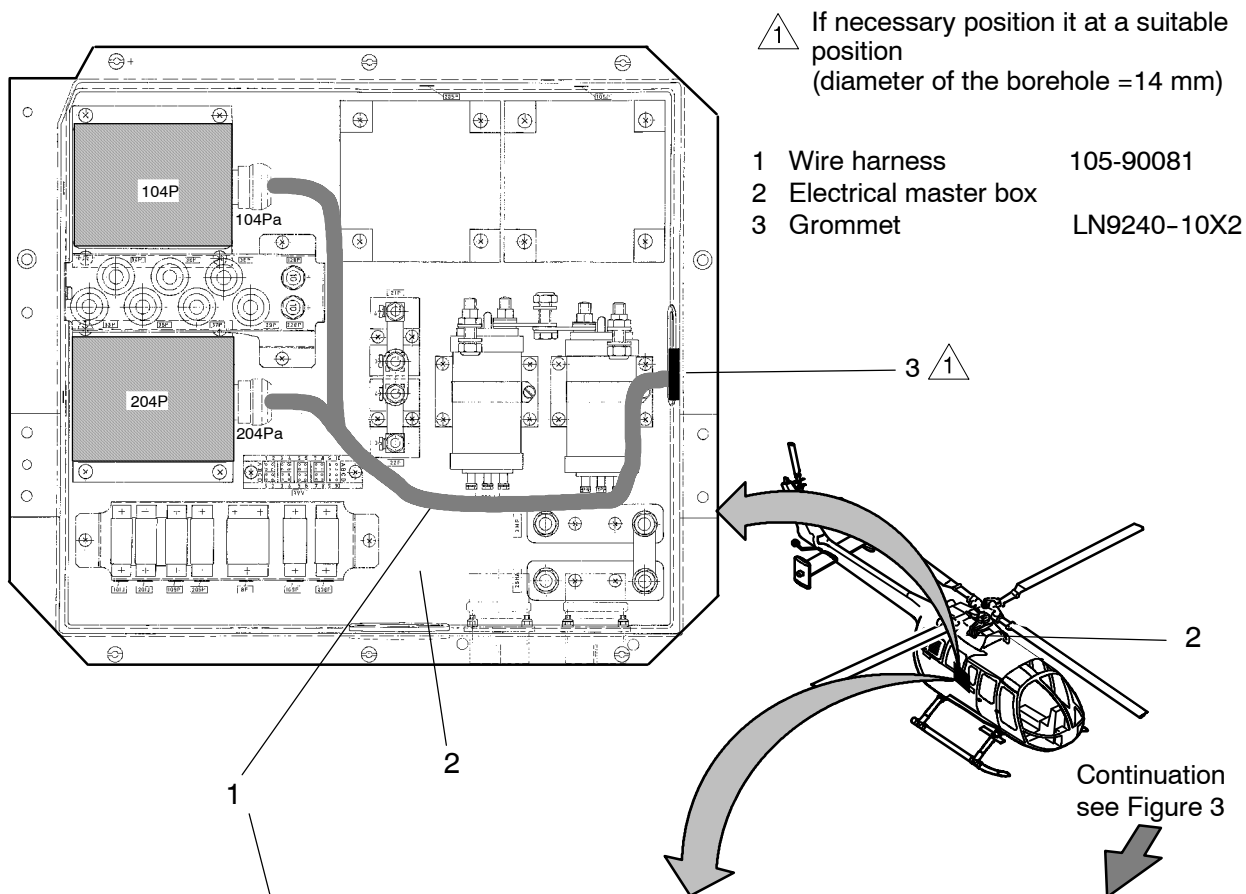
3.2. Discarded Parts per helicopter if replacement is necessary:

(Not applicable)

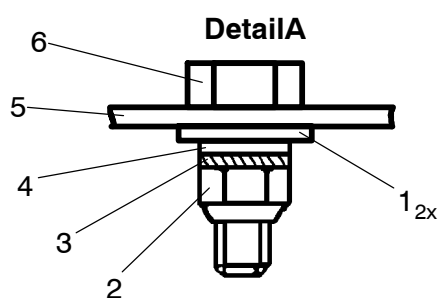
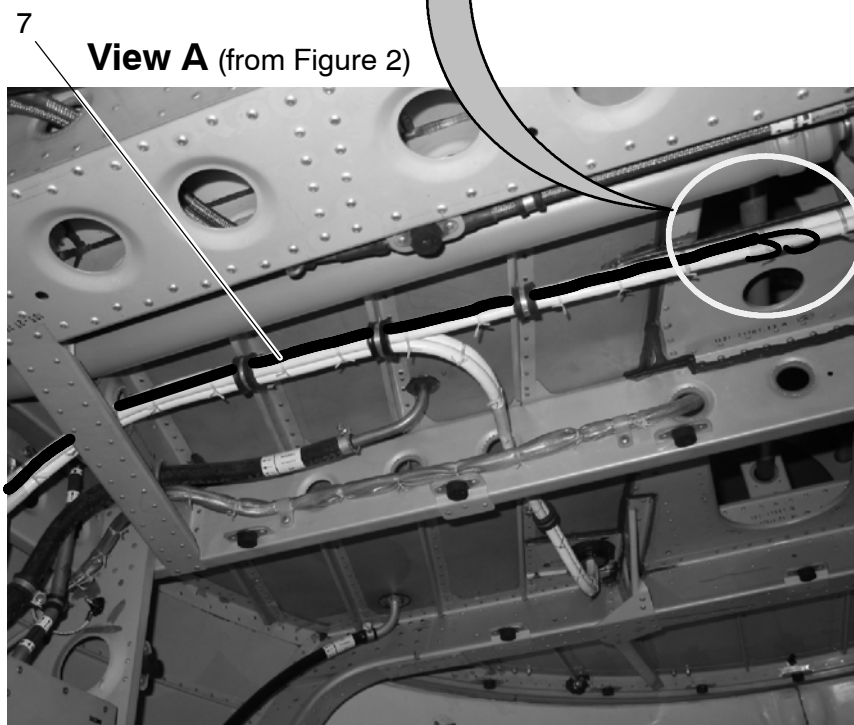
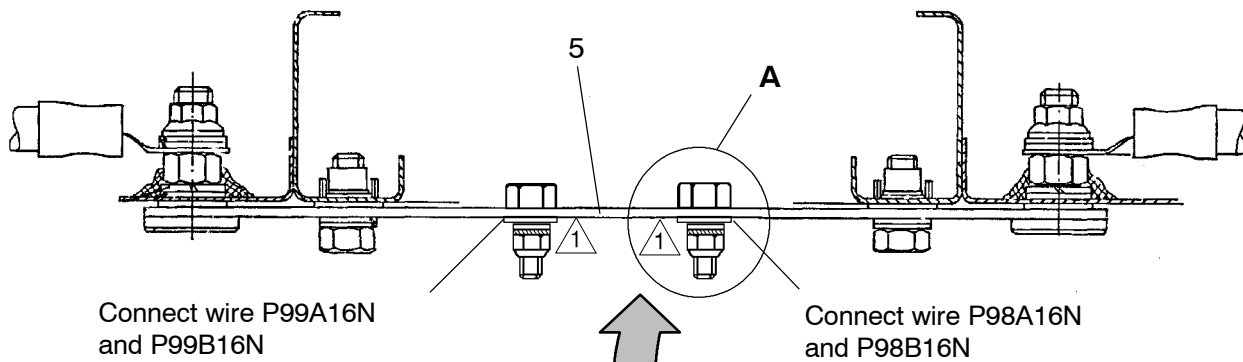


- 1 Wire terminal 320564
- 2 Wire P28F16 / P27F16 (BO105 model D)
P55F16N / P56F16N (BO105 excluding model D)
- 3 Shield-grid lead

Starter-Generator
Figure 1



Typical Installation of Wire Harness (BO105, excluding Model D)
Figure 2

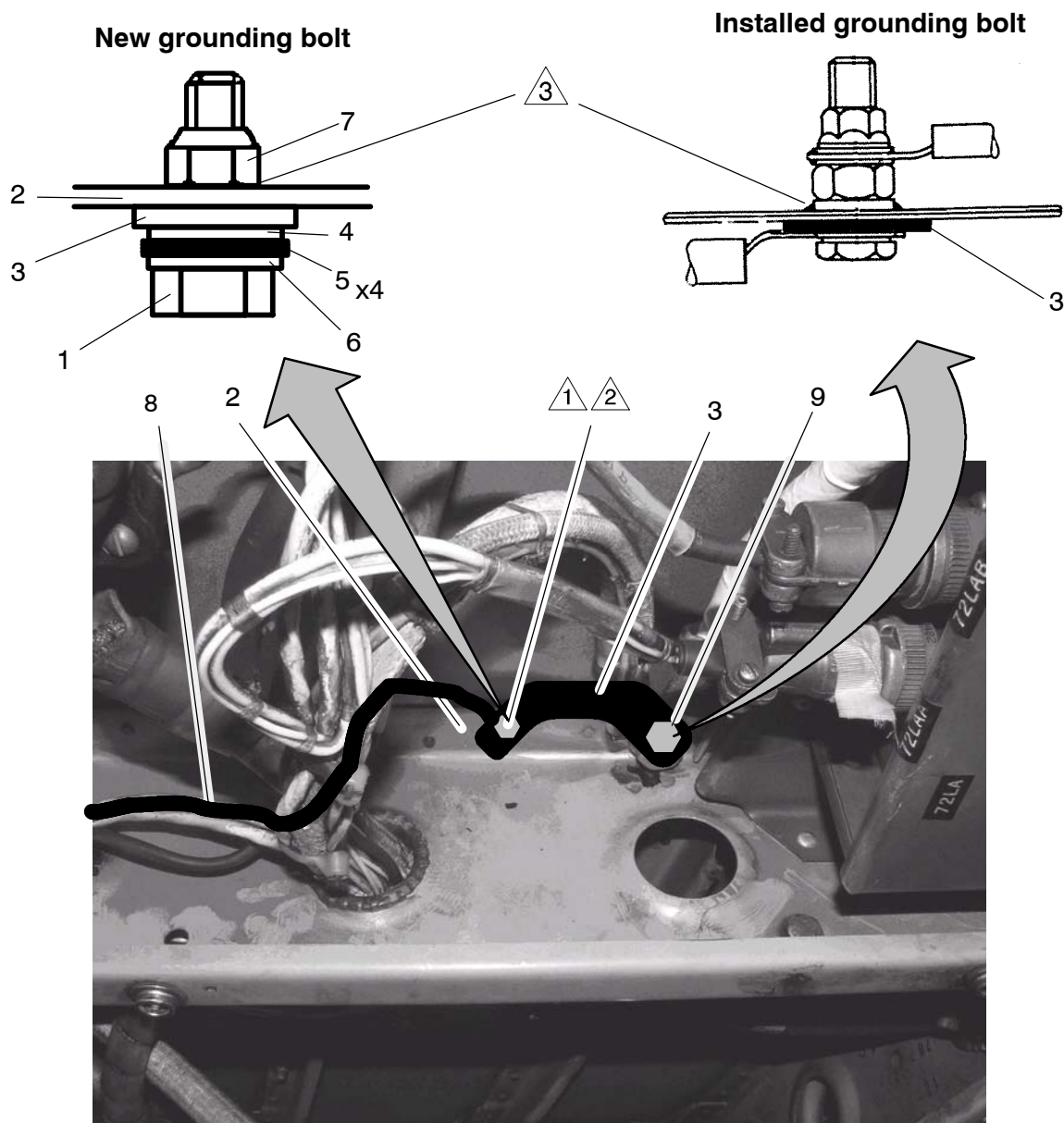


- 1 Wire terminal
- 2 Nut (LN9348-05)
- 3 Spring washer (DIN137A5B3C)
- 4 Washer (LN9016-05K)
- 5 Grounding bar
- 6 Screw (LN9038-05018)
- 7 Wire harness 105-90081 BO 105 excluding model D
105-90085 BO 105 model D

△ 1 Faying surface free from insulating surface protection layer. Apply PU lacquer (CM 478, CM 479, CM 480) onto bare metal surfaces after assembly.

Positions 2-6 are already installed on the helicopter.

Typical Installation of Wire Harness with Grounding Bar installed as Standard Equipment
Figure 3



△1 Drill out installed rivets. Position grounding bracket and drill using drill bit dia. 5.2 mm.

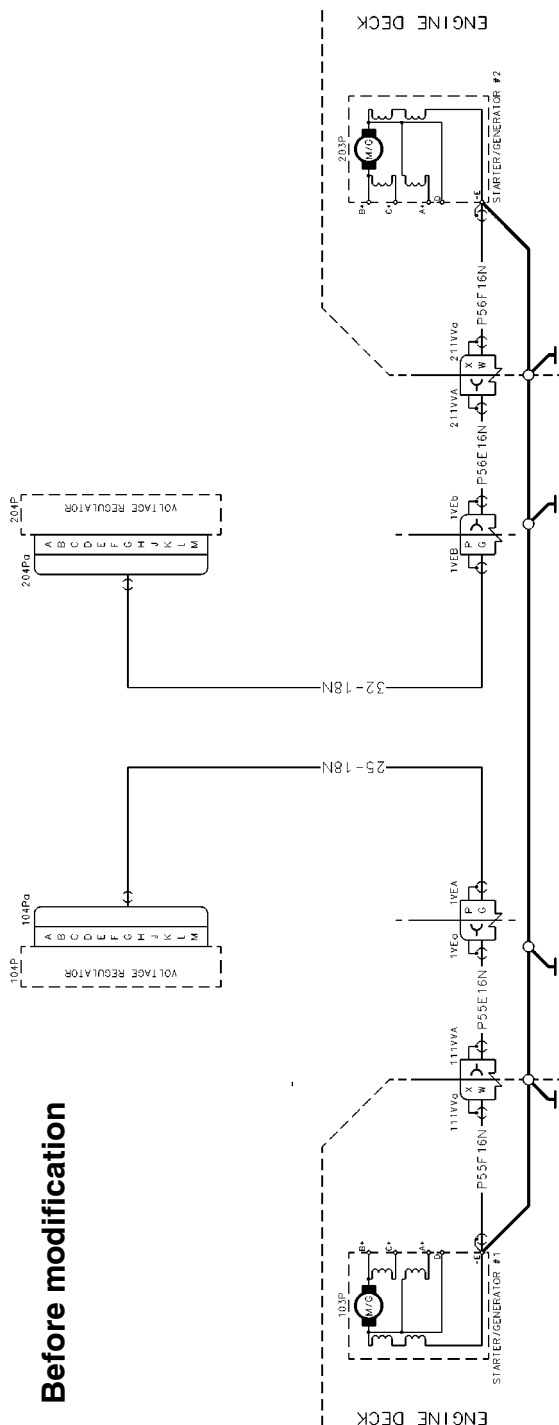
△2 Faying surface free from insulating surface protection layer. Apply PU lacquer (CM 478, CM 479, CM 480) onto bare metal surfaces after assembly.

△3 Seal with sealing compound VM 6056.

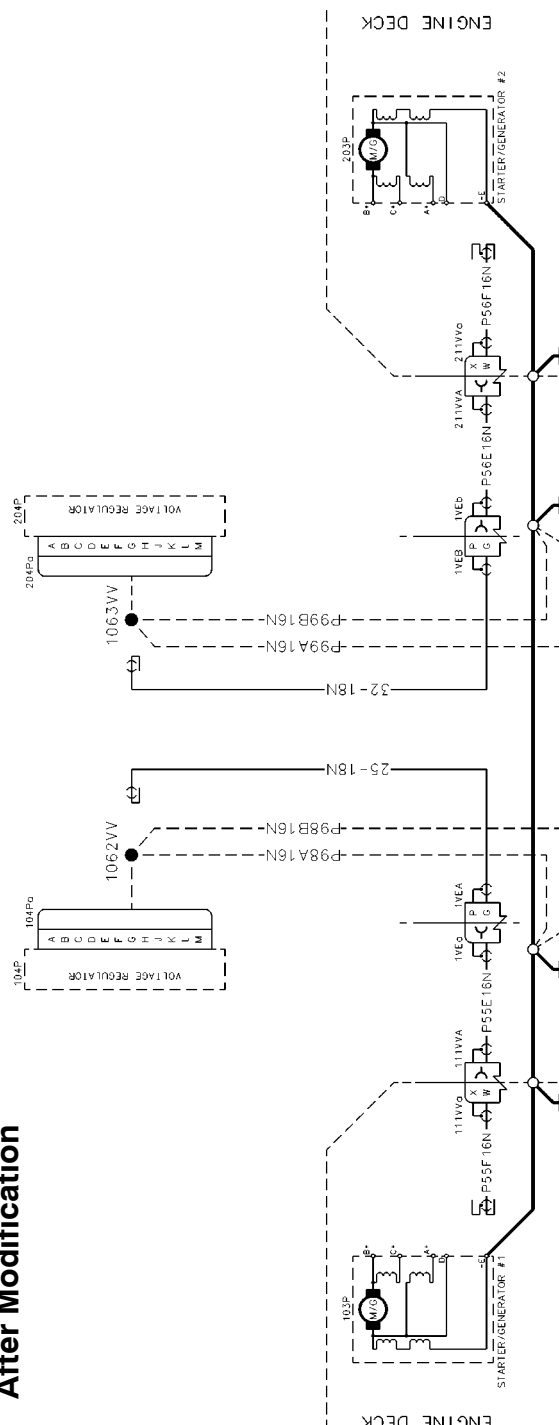
- | | | |
|---|---------------------------|--|
| 1 | Hexagon head screw | LN9038K05018 |
| 2 | Structure | |
| 3 | Grounding bracket | 105-90079.01 |
| 4 | Washer | LN9166-5,3N |
| 5 | Wire terminal | |
| 6 | Washer | LN9016-05K |
| 7 | Nut | LN29790M5 |
| 8 | Wire harness | 105-90081 BO 105 excluding model D
105-90085 BO 105 model D |
| 9 | Installed grounding bolts | |

Installation of Wire Harnesses without Grounding Bar installed as Standard Equipment
Figure 4

Before modification

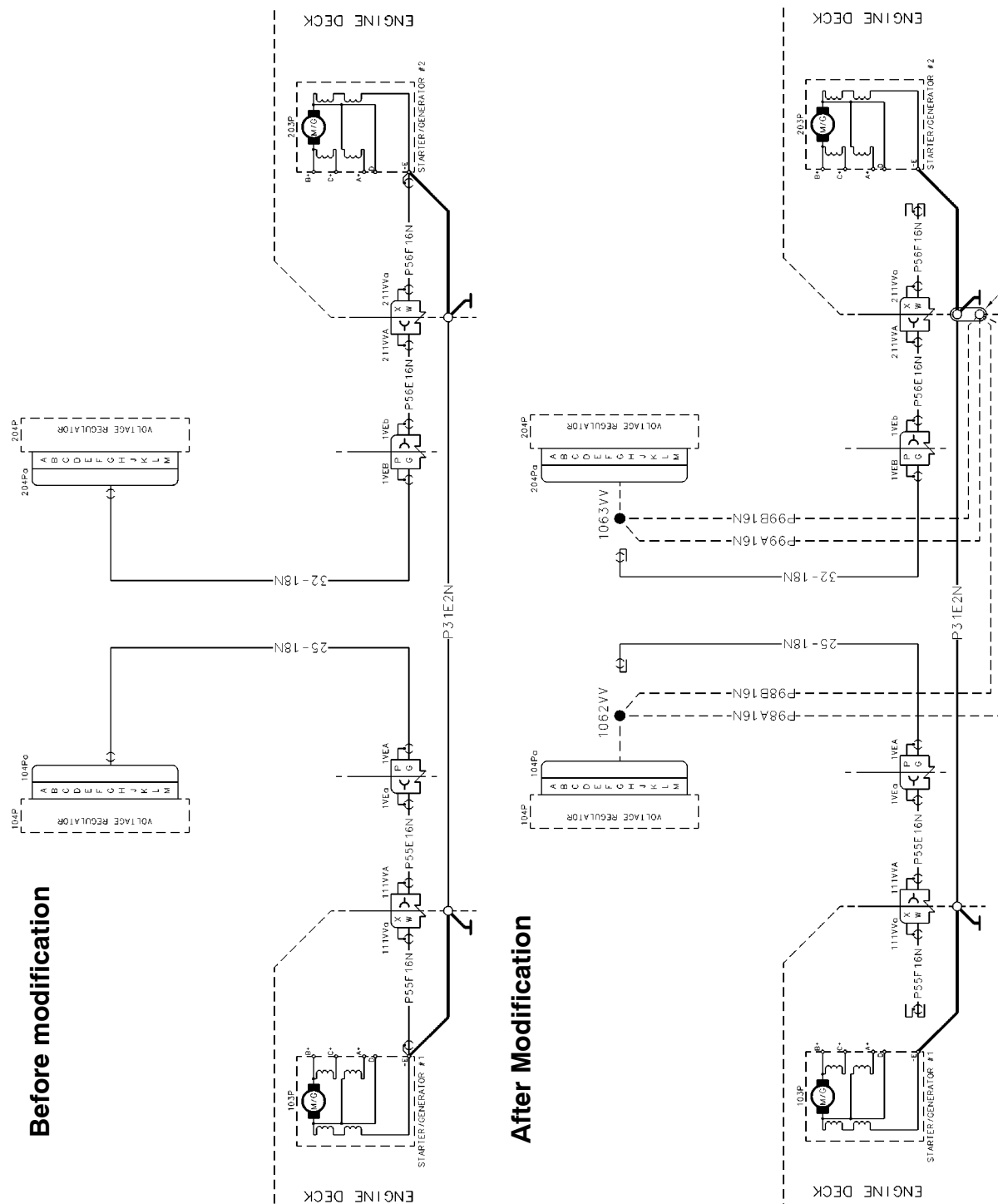


After Modification



Valid S/N 0161-S/N 9999

Wiring Diagram with Grounding Bars as Standard Item of Equipment
(BO105 excluding model D)
Figure 5

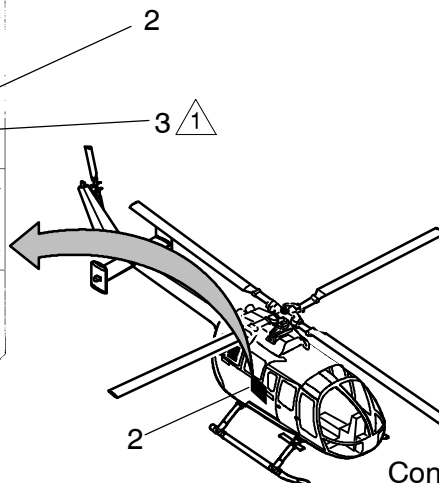
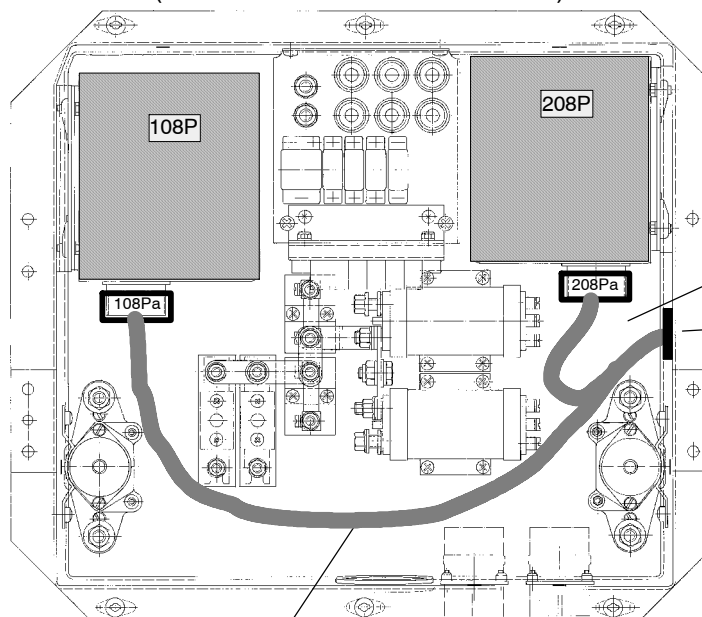


Valid S/N 0161-S/N 9999

Wiring Diagram without Grounding Bar as Standard Item of Equipment
(BO105 excluding model D)
Figure 6

- 1 If necessary, position it at a suitable position
(diameter of the borehole=14 mm)

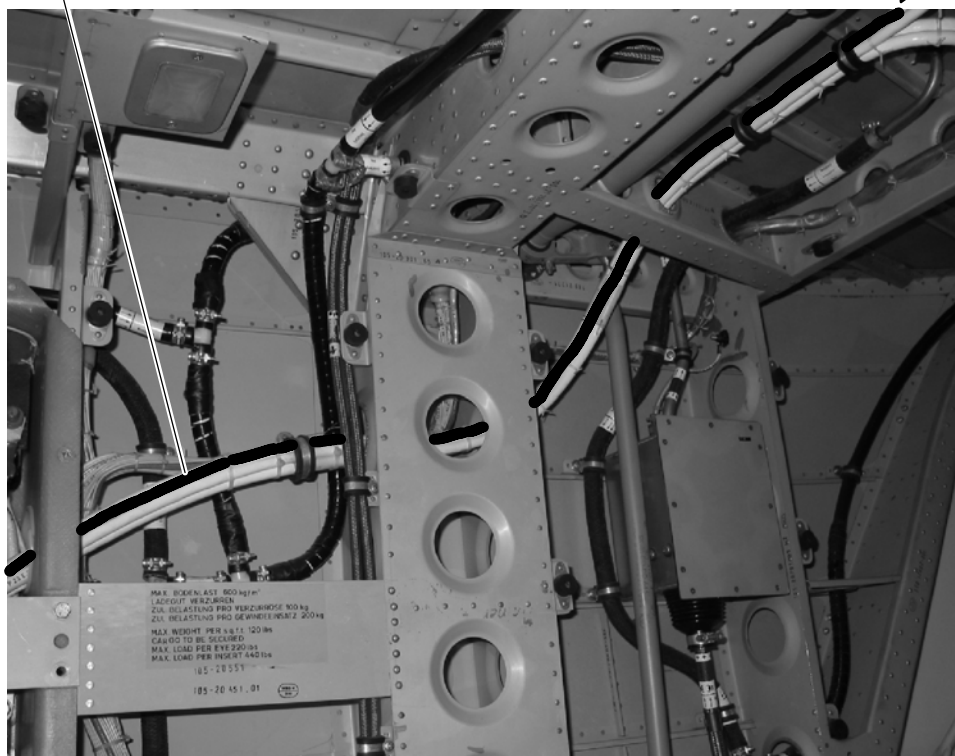
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|---|-----------------------|-------------|
| 1 | Wire harness | 105-90085 |
| 2 | Electrical master box | |
| 3 | Grommet | LN9240-10X2 |



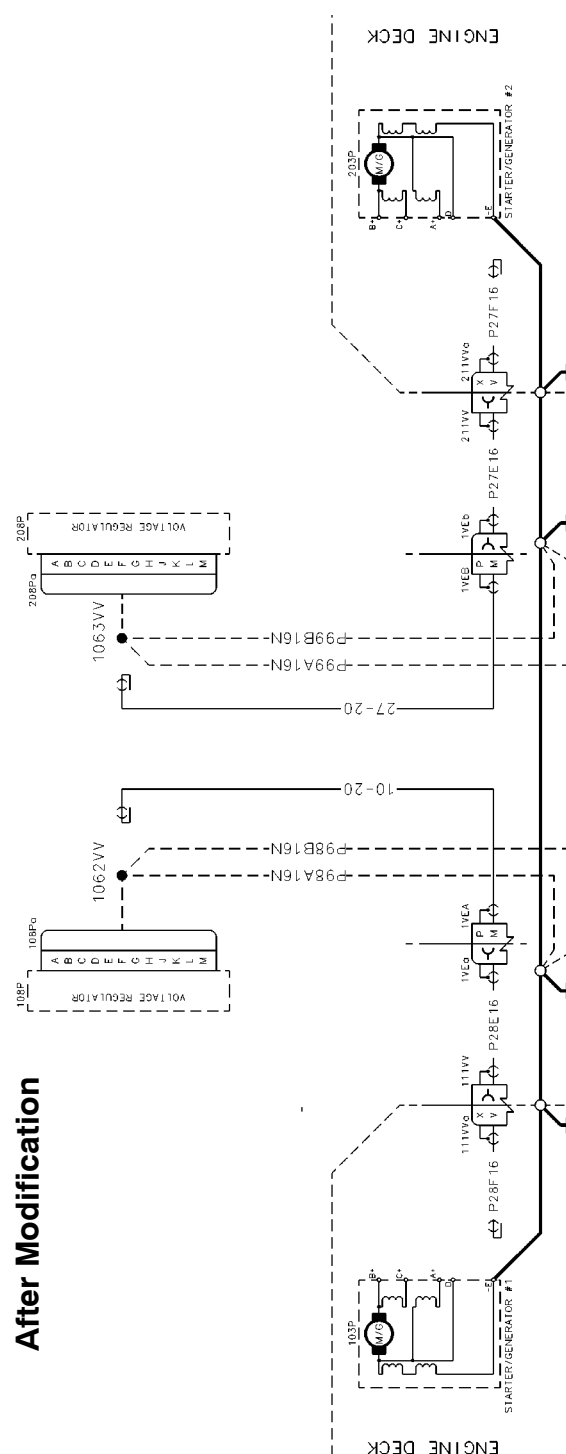
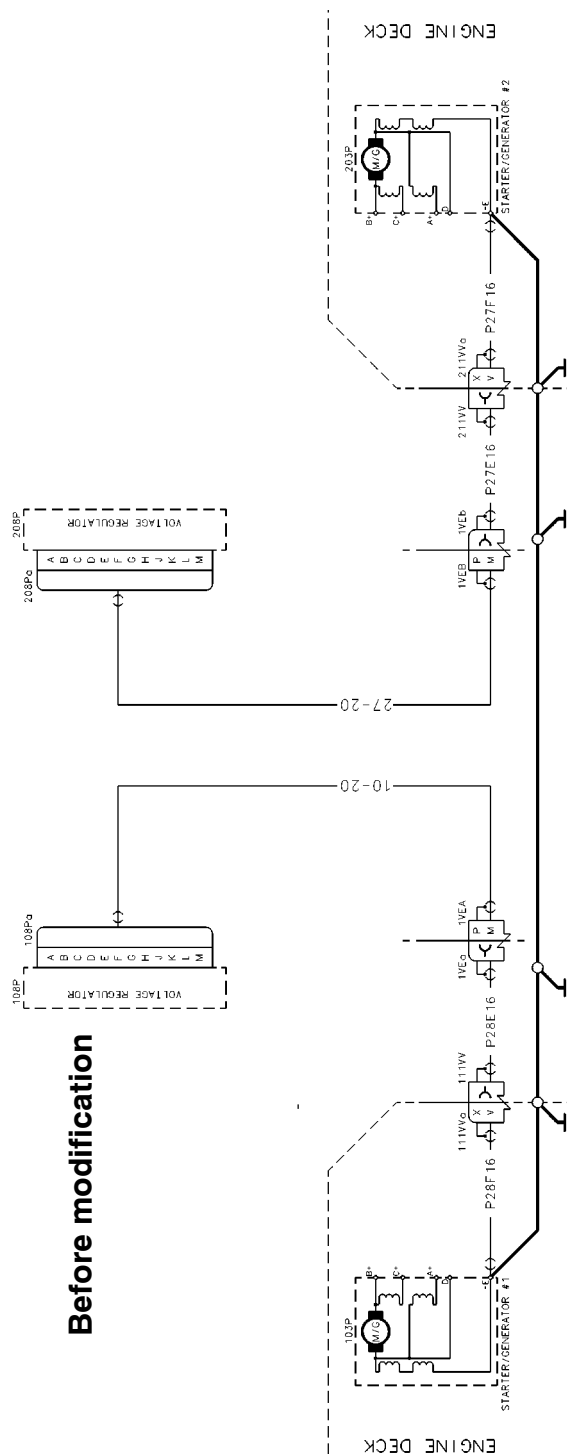
Continuation
see Figure 3

View A

A

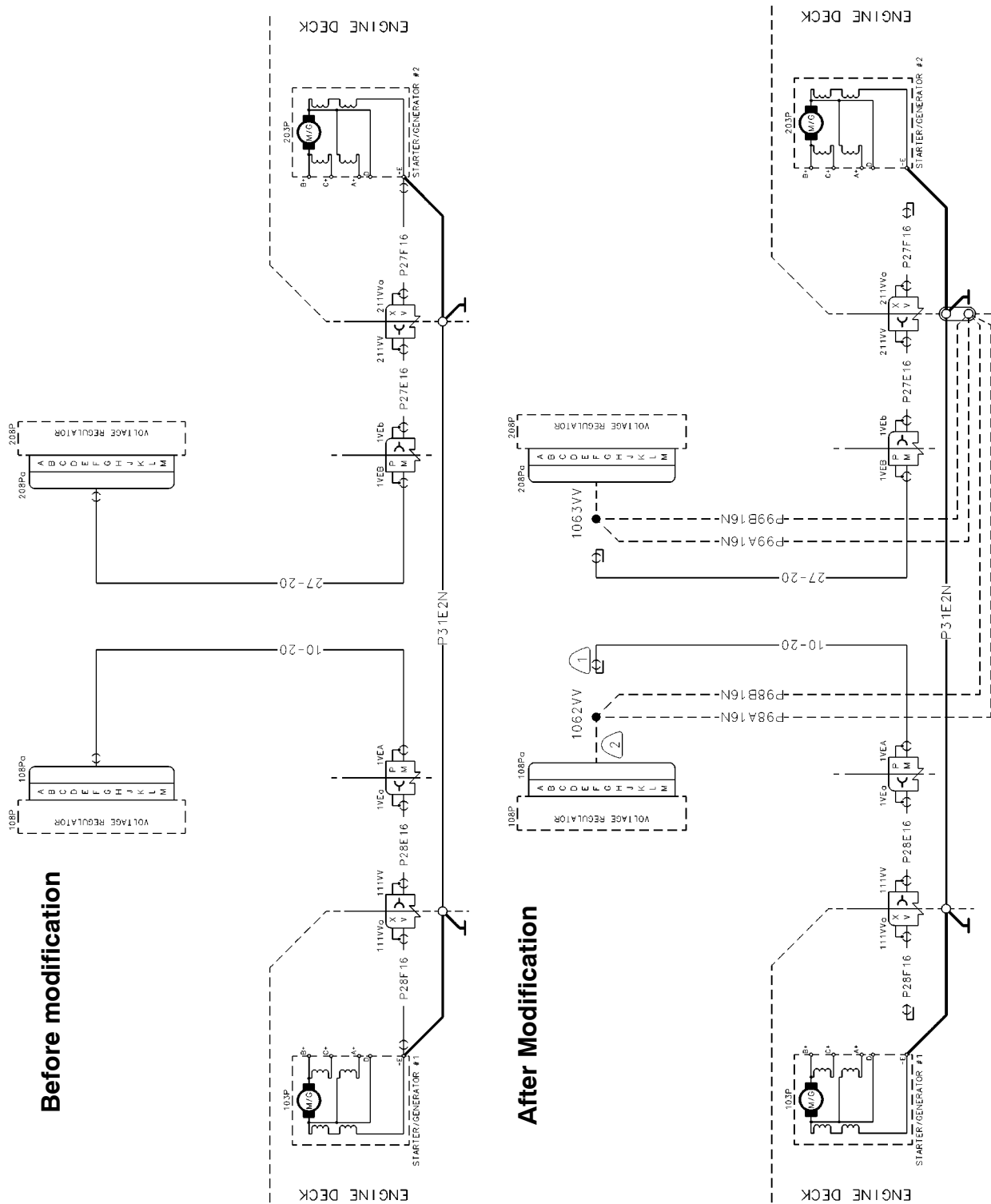


Typical Installation of Wire Harness (BO105 model D)
Figure 7



Valid S/N 0161-S/N 9999

Wiring Diagram with Grounding Bar installed as Standard Equipment (BO105 model D)
Figure 8



Before modification

After Modification

Valid S/N 0161-S/N 9999

Wiring Diagram without Grounding Bar installed as Standard Equipment (BO105 model D)
Figure 9