

# SERVICE BULLETIN

SERVICE BULLETIN NO: 24-019

REF NO: 156

MODIFICATION NO: 000298

ATA CHAPTER: 24

## ELECTRICAL POWER - DC GENERATION SYSTEM SECOND GENERATOR CONTROL UNIT - REPLACEMENT

### 1. Planning Information

#### A. Effectivity

All PC-12 and PC-12/45 aircraft from MSN 101 thru MSN 400 which have a Bosch Second Generator (Gen 2) (P/N 524.32.12.158) with an Electrodelta voltage regulator (P/N 988.21.15.101).

#### B. Concurrent Requirements

The following must be incorporated before or at the same time as this Service Bulletin:

- Service Bulletin 24-010 (Second Generator - Replacement)
- Service Bulletin 24-016 (Second Generator Brush Holder - Replacement)

#### C. Reason

##### (1) Problem

None. PILATUS recommends (as an option) the installation of a new Generator 2 control unit (GCU) for the reasons given below.

##### (2) Cause

The quantity of components in the Generator 2 voltage-regulator system causes unnecessary maintenance.

##### (3) Solution

Replace the Second Generator voltage-regulator system with a generator control unit (GCU). Although the voltage regulator (P/N 988.21.15.101) and related components function satisfactorily, the new GCU causes smoother generator output. It also gives increased protection from the effects of minor changes in the voltage output.

#### D. Description

This Service Bulletin gives the instructions and data necessary to:

- Remove the voltage regulator and related components as necessary
- Install the GCU
- Modify the related electrical cables and components as necessary

Revision 1 to this Service Bulletin changes the Part No. of the replacement GCU. GCU Part No. 988.21.15.102 is superseded by GCU Part No. 988.21.15.103.

  
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**E. Compliance**

Optional.

**F. Approval**

The technical aspects of this Service Bulletin are approved by the Federal Office for Civil Aviation (FOCA) of Switzerland.

PILATUS advises Operators/Owners to check with their local Airworthiness Authorities for any changes, local regulations or sanctions that can affect the embodiment of this Service Bulletin.

**G. Manpower**

	Total
Preparation	2.0
Changes	8.0
Close up	3.0
<b>TOTAL MAN-HOURS</b>	<b>13.0</b>

**NOTE:** Man-hours figures do not include the time required to cure sealants and adhesives.

**H. Weight and Balance**

**(1) Weight Change**

Not affected.

**(2) Moment Change**

Not affected.

**I. Electrical Load Data**

Not changed.

**J. Software**

Not changed.

**K. References**

Aircraft Maintenance Manual (AMM), 06-20-00, 20-20-01, 24-00-00, 24-30-06, 25-10-03, 25-21-05 and 71-00-00.

Structural Repair Manual (SRM), 51-40-01.

Service Bulletin, 24-015.

**L. Publications Affected**

AMM, 24-30-00.

Illustrated Parts Catalog, 24-50-00.

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**M. Interchangeability of Parts**

Pre-Service Bulletin 24-019 voltage regulators and Post Service Bulletin 24-019 GCUs are not interchangeable as single units.

**2. Material Information**

**A. Material - Price and Availability**

Operators should send orders for Service Bulletin modification kits, to their Authorized Pilatus Service Center, or to:

PILATUS AIRCRAFT LTD.,  
CUSTOMER LIAISON MANAGER,  
CH-6371 STANS,  
SWITZERLAND

General Aviation:  
Tel : + 41 41 619 6319  
Fax: + 41 41 619 6224  
eMail: pilga@pilatus-aircraft.com

Government:  
Tel : + 41 41 619 6509  
Fax. + 41 41 619 6224  
eMail: rpaterson@pilatus-aircraft.com

PILATUS BUSINESS AIRCRAFT LTD.,  
PRODUCT SUPPORT DEPARTMENT  
11755 AIRPORT WAY  
BROOMFIELD, CO 80021.  
UNITED STATES OF AMERICA

Tel : 303 465 9099  
Fax: 303 465 6040  
eMail: Productsupport@PilBal.com

PILATUS AUSTRALIA (Pty.) LTD.,  
PO BOX 732  
MARLESTON SA 5033  
AUSTRALIA

Tel : (08) 8234 4433  
Fax: (08) 8234 4499  
Free Call: 1800 445 007  
eMail: info@pilatus.com.au

**NOTE:** Operators are requested to advise Pilatus Aircraft Ltd, of the Manufacturer's Serial Number (MSN) and the flying hours of aircraft which are affected by this Service Bulletin.

Modification Kit Number	Price	Availability
500.50.12.259	Contact address above	Contact address above

**B. Material Necessary for Each Aircraft**

**(1) Material to be Procured**

Modification Kit No. 500.50.12.259 consists these parts:

New Part No.	Description	Old Part No.	Qty	Disp. Code	Fig	Item
524.52.12.536	Bush - Distance	N/A	3	N	1	6

Disposition Codes: D - Discard / R - Return to Pilatus

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New Part No.	Description	Old Part No.	Qty	Disp. Code	Fig	Item
919.79.40.214	Wire - AWG20 (P68A20)	N/A	1500 mm	N	3	N/A
919.79.40.214	Wire - AWG20 (P29A20)	N/A	1500 mm	N	3	N/A
919.79.41.302	Wire - AWG22 (P79C22)	N/A	2500 mm	N	3	N/A
919.79.41.302	Wire - AWG22 (P79D22)	N/A	1000 mm	N	3	N/A
919.79.41.302	Wire - AWG20 (Link - Jumper)	N/A	300 mm	N	3	N/A
919.79.41.303	Wire - AWG20 (P110B20)	N/A	2500 mm	N	3	N/A
919.79.41.303	Wire - AWG20 (P109B20)	N/A	2500 mm	N	3	N/A
919.79.41.303	Wire - AWG20 (P112A20)	N/A	1500 mm	N	3	N/A
919.79.41.303	Wire - AWG20 (P71A20)	N/A	1500 mm	N	3	N/A
919.79.41.303	Wire - AWG20 (P69A20N)	N/A	2500 mm	N	3	N/A
919.79.41.305	Wire - AWG16 (P65D16)	N/A	2500 mm	N	3	N/A
919.79.41.305	Wire - AWG16 (P65C16)	N/A	1000 mm	N	3	N/A
919.79.41.305	Wire - AWG16 (P70B16)	N/A	1500 mm	N	3	N/A
919.79.41.305	Wire - AWG16 (P70A16)	N/A	1500 mm	N	3	N/A
935.63.11.065	Screw (MS35206-246)	935.63.11.062	3	D	1	16
971.19.26.105	Sleeve - Solder (D142-51)	N/A	3	N	3	N/A
971.31.18.526	Lug - Terminal (Yellow M6)	N/A	7	N	3	N/A
971.31.18.820	Lug - Terminal (AWG22-16, M4)	N/A	3	N	3	N/A
971.31.18.830	Lug - Terminal (AWG22-16, M5)	N/A	2	N	3	N/A
971.31.18.846	Lug - Terminal (AWG16-14, M6)	N/A	3	N	3	N/A
971.42.31.536	Pin - Contact (AWG20)	N/A	3	N	3	N/A

Disposition Codes: D - Discard / R - Return to Pilatus

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New Part No.	Description	Old Part No.	Qty	Disp. Code	Fig	Item
971.75.81.166	Pin - Contact (AWG20-24)	N/A	2	N	3	N/A
971.74.98.324	Strain Relief (P233 & P236)	N/A	2	N	3	N/A
971.75.16.112	Connector (P236)	N/A	1	N	3	N/A
971.75.16.114	Connector (P233)	N/A	1	N	3	N/A
971.75.16.820	Socket - Connector (AWG16)	N/A	4	N	3	N/A
971.75.16.822	Socket - Connector (AWG20)	N/A	11	N	3	N/A
971.75.18.913	Pin - Connector (AWG20)	N/A	5	N	3	N/A
978.87.24.110	Stud Assembly - GND (HED60GB13-Z05)	N/A	1	N	4	1

Disposition Codes: D - Discard / R - Return to Pilatus

**(2) Additional Material to be Procured**

The Control Unit (988.21.15.103) is sold as an exchange item. A (core) deposit will be charged. Credit applies for 'off-core' Control Units returned to one of the following main Parts Distribution Centers within 60 days from the invoice date:

- PILATUS Aircraft Ltd, Stans, Switzerland
- PILATUS Business Aircraft Ltd, Broomfield CO
- PILATUS Australia

New Part No.	Description	Old Part No.	Qty	Disp. Code	Fig	Item
988.21.15.103	Control Unit (VR231) (Exchange Item)	988.21.15.101	1	R	1	15

Disposition Codes: D - Discard / R - Return to Pilatus

**(3) Operator Supplied Materials**

Part No.	Description	Qty	Remarks
908.40.32.251	Corrosion Preventative (Alodine 1200S)	A/R	Item No. P07-001
-	Loctite 270	A/R	Alternative to SUR-LOK 1270
-	SUR-LOK 1270	A/R	Alternative to Loctite 270

**C. Material Necessary for Each Spare**

Not applicable.

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**3. Accomplishment Instructions - Aircraft**

**WARNING:** BE CAREFUL WHEN YOU USE THE CONSUMABLE MATERIALS. OBEY THE MANUFACTURERS HEALTH AND SAFETY INSTRUCTIONS.

**A. Preparation**

- (1) Obey the electrical safety instructions given in Electrical Power - Maintenance Practices (Ref. AMM, 24-00-00, Page Block 201).
- (2) Open the access panel 43AL (Ref. AMM, 06-20-00, Page Block 1)
- (3) Open and safety the circuit breaker:  

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- (4) Remove the left bulkhead (Ref. AMM, 25-10-03, Page Block 401)
- (5) Remove the left storage cabinet (Ref. AMM, 25-21-05, Page Block 401). This step is only applicable to aircraft with executive passenger interiors.
- (6) Open the access panel 12AZ (Ref. AMM, 06-20-00, Page Block 1).

**B. Voltage Regulator and Related Components - Removal (Ref. Fig 1 and 2)**

- (1) Disconnect the connector (4) from the connector J233 (2).
- (2) Remove and discard the nut (12), washer (13), screw (14) holder (11) and cable tie (10) from the cover (1). This step is only applicable on post Service Bulletin 24-015 aircraft.
- (3) Remove the voltage regulator VR231 (9) (Ref. AMM, 24-30-06, Page Block 401). If applicable do this together with the cover (1). Discard the voltage regulator VR231, screws (8) and, if installed, the distance bushes (6).
- (4) Disassemble the connector J233 (2) from the bracket (3). Discard the connector.
- (5) Use the applicable diameter drill to remove the four rivets which attach the bracket (3) to the plate (5) (Ref. SRM, 51-40-01, Page Block 1). When you do this, hold a piece of steel sheet (or equivalent) behind the plate to give protection to the adjacent structure. Discard the bracket.
- (6) Obey the manufacturers instructions and apply layers of corrosion preventative (Item No. P07-001) on the bare surfaces of the open rivet holes.
- (7) Remove the three nuts (7, Fig. 4), washers (6) and the cover (5) from the Second Generator (1).

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(8) Remove the electrical components (Ref. Fig 2 and Table (Wire/Cable - Removal)).

**NOTE:** The data in Table (Wire/Cable - Removal) is shown in sequence by Wire/Cable identification number. It is not necessary to disassemble and remove the components in the same sequence.

(a) Disconnect or remove the wires as specified.

Wire/Cable - Removal			
Wire	Terminal/Connector	Terminal/Connector	Remarks
AWG20	A250 POS	K234, pin 6	Remove and discard
AWG20	A250, NEG	PG090 pin H	Remove and discard
AWG20	K231, 1	CB234	Remove and discard
AWG20 (Link)	TB181-05, pin A	TB181-09, pin B	Remove and discard
AWG20 (Link)	TB181-05, pin B	TB181-10, pin B	Remove and discard
AWG20 (Link)	TB181-05, pin H	TB181-10, pin A	Remove and discard
P100B20	TB181-09, pin A	N/A	Disconnect at specified end
AWG20 (Link)	TB093-01, pin G	TB093-02, pin A	Remove and discard
P109A20	CB234	TB093-01, pin C	Remove and discard
P109B20	PB002, pin U	TB093-01, pin E	Remove and discard
P109D20	K233, pin 7	TB093-01, pin D	Remove and discard
P109E20	K233, pin 2	CB234	Remove and discard
P110B20	PB002, pin X	TB093-01, pin F	Remove and discard
P110C20	K234, pin 3	TB093-01, pin A	Remove and discard
P110D20	J233, pin C	TB093-01, pin B	Remove and discard
P111A20	K234, pin 8	TB093-02, pin B	Remove and discard
P111B20	G231, D+	K234, pin 4	Remove and discard
P112A20	J233, pin J	K234, pin 2	Remove and discard
P117B20	JB002, pin Y	TB181-05, pin F	Disconnect at each end (Cap and stow)
P117C20	PB002, pin Y	K234, pin 7	Remove and discard
P118A20N	K233, pin 3	J233, pin G	Remove and discard
P119A20	K233, pin 4	K231, pin A	Remove and discard
P120A20N	PG090 pin H	K234, pin 5	Remove and discard
P27A22	TB181-05, pin E	N/A	Disconnect at specified end
P29A20	J233, pin B	N/A	Disconnect at specified end
P65B22	J233, pin A	N/A	Disconnect at specified end
P68A20	J233, pin K	N/A	Disconnect at specified end
P69A20N	P29A20	PG090 pin M	Remove and discard
P71A20N	J233, pin L	G231, B-, GND	Remove and discard
P79C22	P231, pin D	PB002, pin S	Remove and discard
R232	TB181-05, pin K	TB181-05, pin D	Remove and discard

(b) Remove and discard the:

- Relays (K233) and (K234)
- Suppression filter (A250)
- Terminal block assemblies (TB093-01, TB093-02 and TB181-09/10)
- Circuit breaker (CB234)

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**C. GCU - Installation (Ref. Fig. 1, 3 and 4)**

- (1) Make sure the static bond area on the plate (5, Fig 1) is clean.
- (2) Assemble the GCU VR231 (15), three new distance bushes (6), washers (7) and new screws (16). If applicable, include the cover (1) when you do this.
- (3) Fully install the screws (16).
- (4) Install the stud (2, Fig 4).

**NOTE:** The nut (4) and washer (3) are supplied with the stud (2) as an assembly.

- (a) Obey the manufacturers instructions and apply a thin layer of the adhesive (Loctite 270 or equivalent alternative). Do this on the threads of the hole in the GND position on the housing of the Second Generator (1). Remove unwanted adhesive from the surfaces of the housing adjacent to the hole.
- (b) Make sure that the applicable (faying) surfaces are clean and dry (to make good electrical contact) around the:
  - Hole in the GND position on the housing of the Second Generator (1)
  - Hexagonal part of the stud (2)
- (c) Install the shorter threaded part of the stud (2) in the GND position on the housing of the Second Generator (1).
- (d) Torque the stud (2) to 25.0 lbf in. (2,8 Nm) (Ref. AMM, 20-20-01, Page Block 1).
- (5) Assemble and Install the cable assemblies and wires (Ref. Fig. 3, 4 and the Table (Wire/Cable - Assembly and Installation)).

**NOTE:** The data in Table (Wire/Cable - Assembly and Installation) is shown in sequence by Wire/Cable identification number. It is not necessary to assemble and install the components in the same sequence.

- (a) Use the applicable crimp tools to install end contacts on the wires as specified. Do this at one end of each wire only.
- (b) Put the wires in their correct routing positions and install cable ties as necessary.
- (c) Use the applicable crimp tools to install contacts on the remaining ends of the wires as specified.

Wire/Cable - Assembly and Installation							
Component From & Terminal Ident		End Connector	Wire/ Cable	End Connector	Component To & Terminal Ident		Remarks
P233	K	971.19.26.106	AWG20	971.19.26.106	B	P233	Screen link. Install with solder sleeve, P68A20, P29A20 & P69A20N
TB181-05	A	971.42.31.536	P100B20	N/A	N/A	N/A	Connect at specified end
PB002	U	971.75.18.913	P109B20	971.75.16.822	A	P233	-
PB002	X	971.75.18.913	P110B20	971.75.16.822	C	P233	-
P233	J	971.75.16.822	P112A20	971.31.18.820	D+	G231	Terminal lug M4
TB181-05	K	971.42.31.536	P27A22	N/A	N/A	N/A	Connect at specified end

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Wire/Cable - Assembly and Installation (Continued)							
Component From & Terminal Ident		End Connector	Wire/Cable	End Connector	Component To & Terminal Ident		Remarks
P233	B	971.19.26.106	P29A20	971.31.18.830	W	G231	Install with solder sleeve, P68A20, AWG20 & P69A20N
P231	A	971.75.16.822	P65B22	N/A	N/A	N/A	Connect at specified end
K231	1	971.31.18.846	P65C16	971.75.16.820	B	P236	-
K231	1	971.31.18.846	P65D16	971.75.16.820	C	P236	-
P233	K	971.75.16.822	P68A20	971.31.18.820	FLD	G231	Install with solder sleeve, AWG20, P29A20 & P69A20N
P233	K	971.19.26.106	P69A20N	971.75.81.166	M	PG090	Screen ground. Install with solder sleeve, P68A20, AWG20 & P29A20
P236	D	971.75.16.820	P70A16	971.31.18.526	GND	G231	Terminal lug M6
P236	E	971.75.16.820	P70B16	971.31.18.526	GND	G231	Terminal lug M6
P233	L	971.75.16.822	P71A20	971.31.18.526	B-	G231	Terminal lug M6
PB002	S	971.75.18.913	P79C22	971.75.16.822	D	P233	-
P231	D	971.75.16.822	P79D22	971.75.16.822	M	P233	-

- (6) Put the cover (5) in position on the Second Generator (1) and install the washers (6) and nuts (7).

**D. Close up**

- (1) Remove all tools and materials. Make sure the work areas are clean.
- (2) Close the access panel 12AZ (Ref. AMM, 06-20-00, Page Block 1).
- (3) Install the left storage cabinet (Ref. AMM, 25-21-05, Page Block 401). This step is only applicable to aircraft with executive passenger interiors.
- (4) Install the left bulkhead (Ref. AMM, 25-10-03, Page Block 401)
- (5) Close the circuit breaker:

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- (6) Close the access panel 43AL (Ref. AMM, 06-20-00, Page Block 1).
- (7) Do an adjustment/test of the DC generating system (Ref. AMM, 71-00-00, Page Block 501).

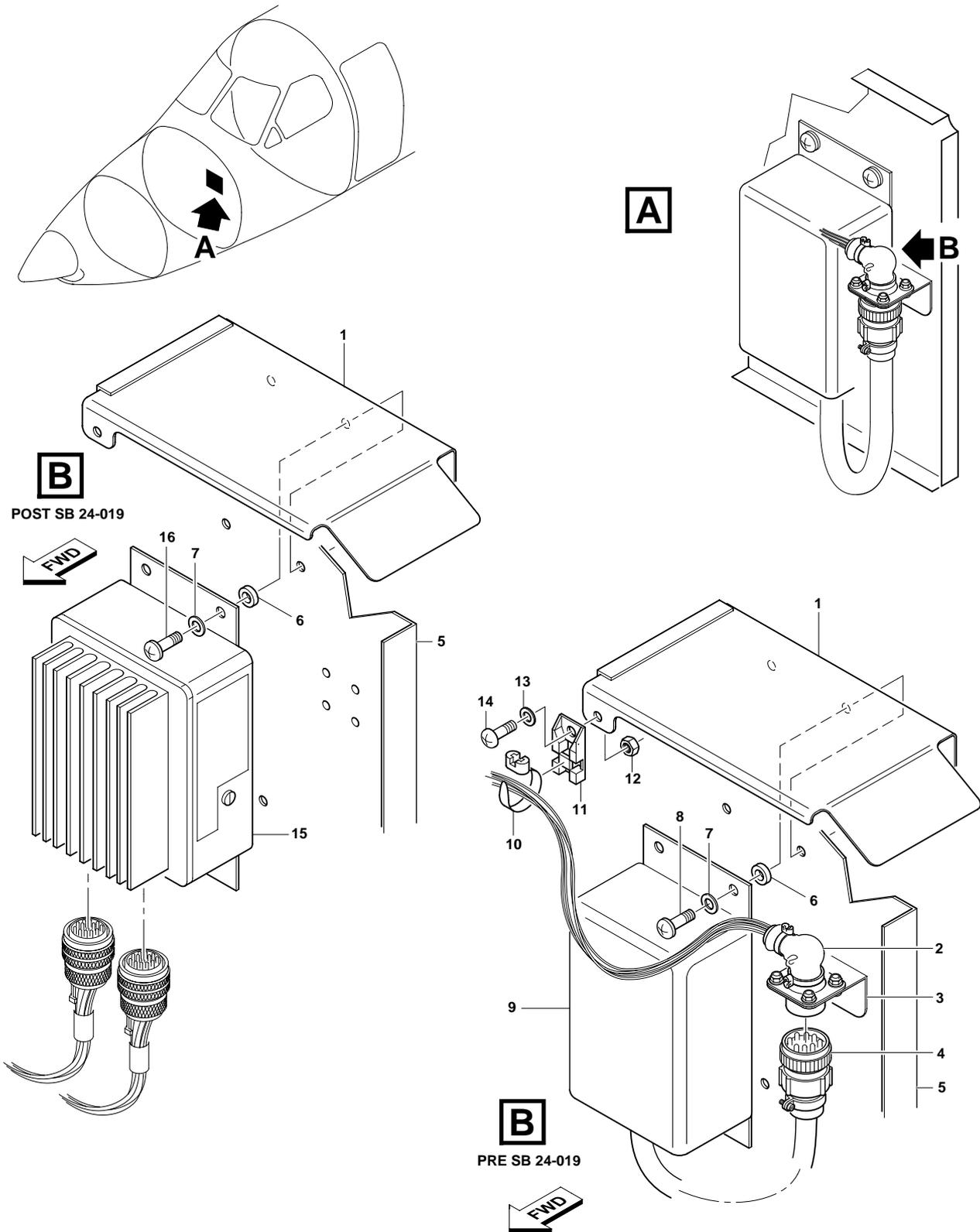
**E. Documentation**

- (1) Make an entry in the Aircraft Logbook that this Service Bulletin has been incorporated.
- (2) Use the Service Bulletin Evaluation Sheet to report your results and the serial number of the modified aircraft to PILATUS.

**F. Accomplishment Instructions - Spares**

Not applicable.


  
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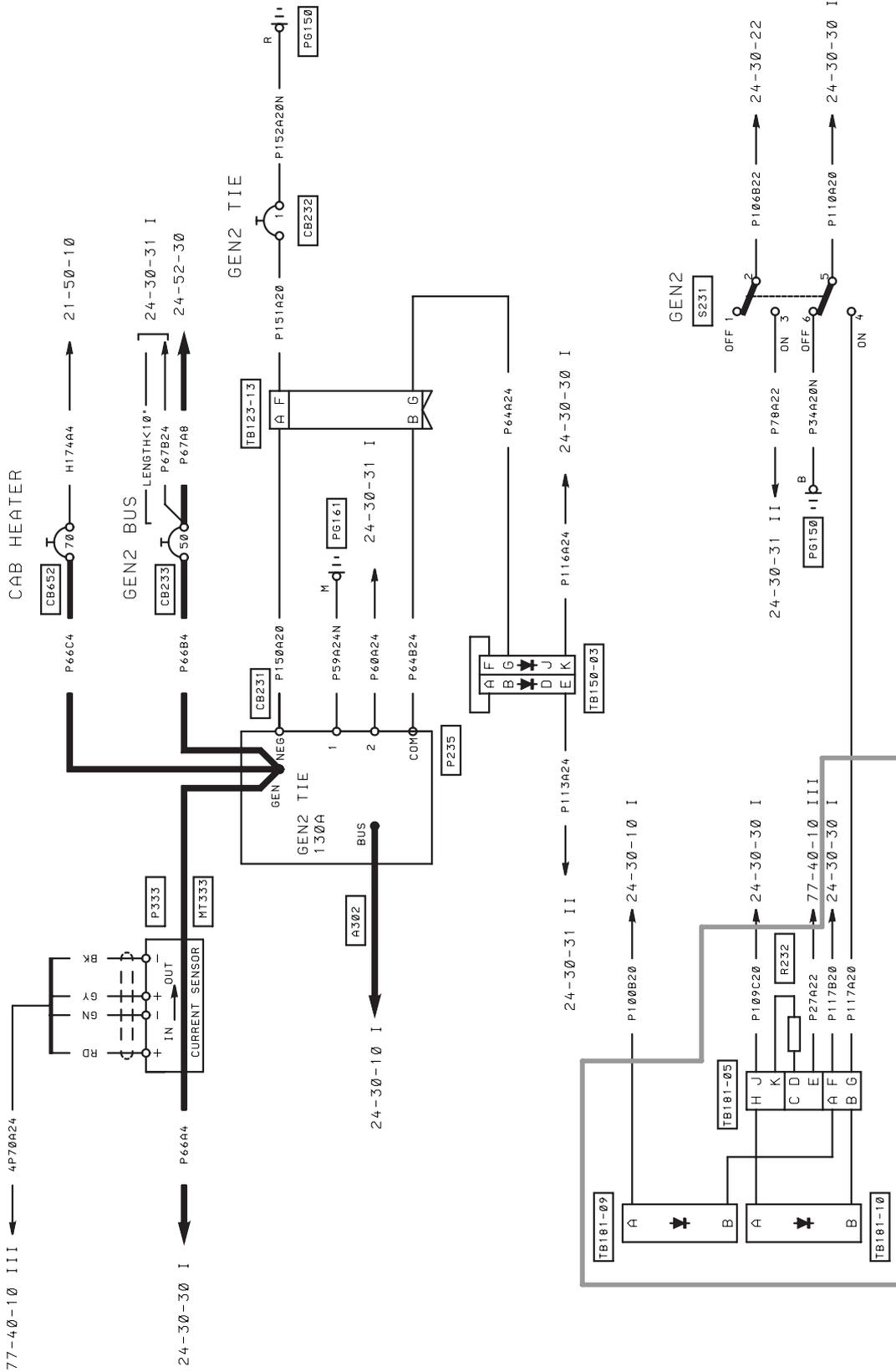


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Removal of Voltage Relay and Installation of GCU  
Figure 1



# PILATUS PCI2 SERVICE BULLETIN



Gen 2 Schematic (Pre-SB 24-019)  
Figure 2 (Sheet 2 of 2)

2 2 24-30-30 I  
SECOND GENERATOR

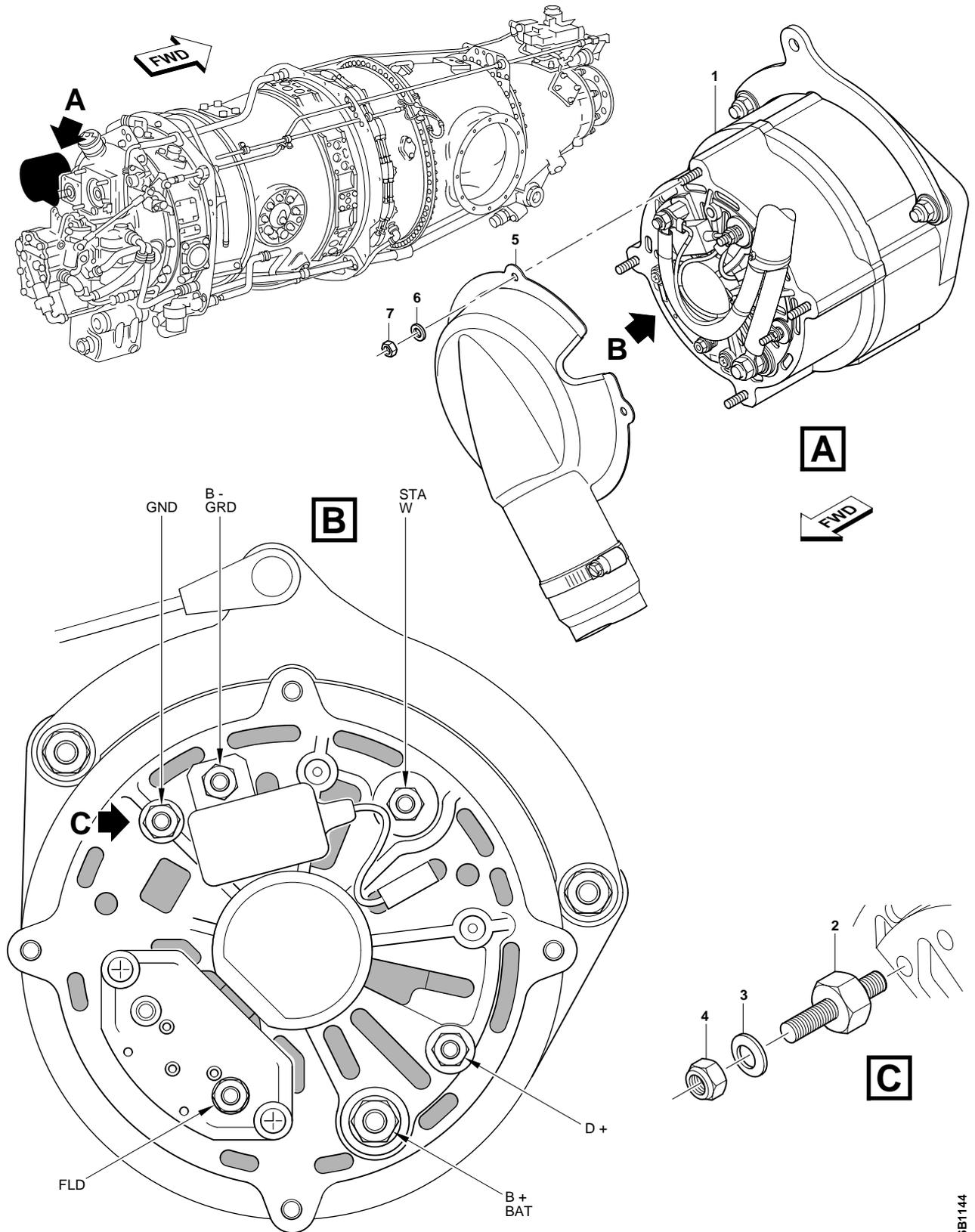
\* BUILD IN SEPARATE WIRE WITH LENGTH ≤ 7"

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Gen 2 Electrical Connections and Terminals (Post SB 24-019)  
Figure 4