

Service Bulletin No: 21-016

Ref No: 449

Modification No: EC-22-0287

ATA Chapter: 21

**AIR CONDITIONING - COMPRESSOR CONDENSER MODULE  
MODIFICATION TO THE COMPRESSOR/CONDENSER BONDING****1. Planning Information****A. Effectivity**

Aircraft MSN 101 - 1942, excluding 1720, which have a Vapour Cycle Cooling System (VCCS) installed and which are fitted with the option for the large oxygen bottle in the right hand rear fuselage, or with a similar design introduced by local modification or STC.

The option with the large oxygen bottle on the RH, was installed during production on aircraft MSN 466, 467, 725, 861, 1032, 1052, 1082, 1115, 1232, 1411, 1428, 1439, 1530, 1541, 1663, 1725 and 1802.

**B. Concurrent Requirements**

None.

**C. Reason**

There has been a report from the crew of a PC-12/47E of a burning smell coming from the air conditioning vents during a climb.

Troubleshooting has identified insufficient grounding of the VCCS compressor/condenser at frame 37.

Due to the partial loss of the ground connection, electrical current travelled via the attachment bolts and composite base plate to the supporting structure. This caused heat damage to the base plate and the adjacent structure.

**Solution**

Inspect and modify the installation of the compressor/condenser grounding cables.

**D. Description**

This Service Bulletin gives the data and instructions necessary to:

- Inspect the condition of the power return and chassis grounding cable attachment point on the airframe at frame 37 and the composite base plate attachment parts
- Modify the installation of the VCCS compressor/condenser power return cables and install an additional isolated VCCS chassis ground cable.

**E. Compliance**

Mandatory.

This Service Bulletin must be embodied on all affected aircraft not later than 31 December 2022.

**F. Approval**

The technical content of this document is approved under the authority of the DOA ref. EASA.21J.357.

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

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**H. Manpower**

<b>Task</b>	<b>Man-hours</b>
Preparation	1.5
Inspection	1.5
Modification	3
Close up	2
<b>TOTAL MAN-HOURS</b>	<b>8</b>

**I. Weight and Balance****(1) Weight Change**

Weight change: +0.3 Kg.

**(2) Moment Change**

Moment change: +3.051 Kgm.

**J. Electrical Load Change Data**

None.

**K. Software**

Not changed.

**L. References**

Aircraft Maintenance Manual (AMM):

12-A-20-40-10-00A-901A-A

12-B-20-40-10-00A-901A-A

12-A-21-50-00-00A-902B-A

12-A-21-50-00-00A-902B-A

12-B-21-50-01-00A-902A-A

12-A-21-50-01-00A-920B-A

12-B-21-50-01-00A-920A-A

12-A-24-00-00-00A-901A-A

12-B-24-00-00-00A-901A-A

Tool and Equipment Manual (TEM):

12-A-00-00-00-00A-060A-A

12-B-00-00-00-00A-060A-A

**M. Publications Affected**

Aircraft Maintenance Manual (AMM)

Illustrated Parts Data (IPD)

Wire Diagram Manual (WDM)

**N. Interchangeability of Parts**

Not interchangeable.

**2. Material Information**
**A. Material - Price and Availability**

Operators that require additional information and/or Service Bulletin Material should contact their authorized Pilatus Service Center, or Pilatus Customer Support on [www.pilatus-aircraft.com](http://www.pilatus-aircraft.com) → contact us.

**NOTE:** Part Numbers given in this Service Bulletin are correct at the time of approval. Pilatus Aircraft Ltd reserves the right to change the part numbers as necessary. Part numbers of items delivered with a kit are correct when the kit is dispatched. This could lead to differences between those part numbers quoted in a Service Bulletin and the kit if parts are superseded. Operators are requested to check the IPD for delivered parts which differ from those listed in the Service Bulletin Materials Kit List.

**B. Warranty**

Not applicable

**C. Material Necessary for Each Aircraft**
**(1) Material to be ordered from Pilatus Aircraft Ltd**

Modification Kit P/N 500.50.12.002 has the parts that follow:

New Part No.	Description	Old Part No.	Qty	Disp. Code	Fig	Item
511.30.12.109	Placard	-	1	N	1	13
511.36.12.647	Placard, GS 373	-	1	N	2	12
521.51.12.012	Bonding Strap	-	1	N	3	33
521.51.12.065	Stop Angle	- 521.51.12.059	1	N D	2	7 4
591.30.12.030	Ground Stud	-	1	N	2	11
931.54.41.728	Screw, Pan HD, ST, CD-PL, 4.0*7.0	-	1	N	2	8
938.07.31.106	Nut, Hex, ST, CD-PL, 6.0*7.2	-	1	N	3	35
938.07.68.304	Nut, Hex, ST, CD-PL, 4.8*6.4	-	1	N	2	13
938.07.68.305	Nut, Hex, ST, CD-PL, 6.4*8.3	-	1	N	3	40
938.77.11.110	Washer, ST, CD-PL, 4.2*0.4	-	1	N	2	9
938.77.11.112	Washer, ST, CD-PL, 4.8*0.8	-	1	N	2	14

Disposition Code: N - New / D - Discard / R - Return to Pilatus / E - Exchange part

New Part No.	Description	Old Part No.	Qty	Disp. Code	Fig	Item
938.77.11.114	Washer, ST, CD-PL, 6.4*0.8	-	2	N	3	34 39
971.32.18.108	Cable, Spacer, Cross, CSCS-M	-	1	N	3	37
971.32.18.106	Harness spacer	-	1	N	1	12
974.03.38.192	Attachment, Bolt, Isolated	-	1	N	2	10

Disposition Code: N - New / D - Discard / R - Return to Pilatus / E - Exchange part

**(2) Operator supplied materials (refer to AMM 12-A-20-31-00-00A-070A-A or 12-B-20-31-00-00A-070A-A)**

Material No.	Description	Qty	Remarks
P01-010	Solvent	AR	-
P02-016	Abrasive Pads	AR	Scotch-Brite (fine)
P02-031	Absorbent Paper	AR	-
P07-001	CCC	AR	-
P07-007	Primer	AR	-
P07-032	Paint	AR	-
P08-017	Adhesive	AR	Loctite grade 241
P08-070	Sealant, interfay, Electrically-conductive	AR	P/N 907.10.11.274
P08-071	Sealant, interfay	AR	P/N 907.10.11.233
P09-004	Koroseal binding	AR	-
P09-005 P09-008 P09-014	Cable tie	AR	P/N 971.32.51.105 P/N 971.32.51.104 P/N 971.32.51.101
P09-013	Armaflex tape	AR	-
P10-013	CPC	AR	AV 40, (P/N 908.18.12.086)
P10-021	Refrigeration lubricant	AR	Emkarate RL 100H

**D. Material Necessary for Each Spare**

Not applicable.

**E. Re-identified Parts**

Not applicable.

**F. Tooling - Cost and Availability**

<b>Material No.</b>	<b>Description</b>	<b>Qty</b>	<b>Remarks</b>
T12-030	Safety clip	AR	-
Local supply	Bonding tester	1	-

**3. Accomplishment Instructions**

**WARNING:** BE CAREFUL WHEN YOU DO WORK ON THE ELECTRICAL SYSTEM OR A SYSTEM THAT USES THE ELECTRICAL POWER. MAKE SURE THAT IT IS SAFE BEFORE YOU APPLY ELECTRICAL POWER TO THE AIRCRAFT OR ENERGIZE THE AIRCRAFT ELECTRICAL SYSTEMS. THE ELECTRICAL POWER CAN CAUSE DEATH OR INJURY TO PERSONNEL AND CAUSE DAMAGE TO EQUIPMENT.

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

**WARNING:** THE COMPRESSOR/CONDENSER UNIT IS HEAVY. IT WEIGHS APPROXIMATELY 50 LB (23 KG). USE THE CORRECT TOOLS AND EQUIPMENT TO LIFT AND LOWER IT.

**WARNING:** THE REFRIGERANT IN THE VAPOUR-CYCLE COOLING SYSTEM CAN BE DANGEROUS. OBEY THE MANUFACTURERS HEALTH AND SAFETY INSTRUCTIONS AND ALL APPLICABLE LOCAL INSTRUCTIONS.

**NOTE:** To identify the consumables used in this procedure refer to the list of consumable items, refer to AMM 12-A-20-31-00-00A-070A-A or 12-B-20-31-00-00A-070A-A.

**NOTE:** To identify the AGE and tools used in this procedure refer to the list of AGE and tools, TEM 12-A-00-00-00-00A-060A-A or 12-B-00-00-00-00A-060A-A

**A. Preparation**

- (1) Obey the electrical system safety precautions, refer to AMM 12-A-24-00-00-00A-901A-A or 12-B-24-00-00-00A-901A-A.
- (2) De-energize the aircraft electrical system, refer to AMM 12-A-24-00-00-00A-901A-A or 12-B-24-00-00-00A-901A-A.
- (3) Remove the compressor/condenser unit:
  - for PC-12 and PC-12/45 aircraft with refrigerant R134A, refer to AMM 12-A-21-50-01-00A-920B-A
  - for PC-12/47E aircraft, refer to AMM 12-B-21-50-01-00A-920A-A.

**B. Inspection**

- (1) Inspect the compressor/condenser power return/chassis grounding cable (17) and the attachment point at frame 37 (GS 372), refer to Figure 2, view D, for:
  - Security of attachment
  - Correct sealing.
- (2) Remove and retain the grounding cable (17) from GS 372 as follows, refer to Figure 2, view D:
  - (a) If necessary, remove the sealant from the GS 372.
  - (b) Remove the nut (15), the two washers (16) and (18) from the bolt (19).
  - (c) Disconnect the bonding lead (17) from the GS 372.

- (3) Inspect the compressor/condenser power return/chassis grounding cable (17) and the attachment point at frame 37 (GS 372), refer to Figure 2, view D, for:
  - Physical damage (loose wire strands, kinks, and tight radius bends)
  - Signs of corrosion
  - Heat damage.
- (4) Inspect the compressor/condenser composite base plate (1) and attachment fittings, refer to Figure 2 for security of attachment.
- (5) Remove the composite base plate (1) as follows, refer to Figure 2:
  - (a) Remove and retain the four bolts (2) from the structure and the composite base plate (1).
  - (b) Carefully remove the composite base (1) plate from the aircraft.
- (6) Inspect the compressor/condenser composite base plate (1) and attachment fittings, refer to Figure 2 for:
  - Signs of corrosion on attachment fittings
  - De-lamination
  - Heat damage.
- (7) Record all inspection findings.
- (8) If any damage is found, contact Pilatus Aircraft Ltd.



**C. Modification**

- (1) Disconnect the compressor/condenser power return cables (8) and (9), and the relay return cable (7) from the relay (10), as follows. Refer to Figure 1:
  - (a) Remove the two nuts (1 and 4) and the two washers (2) and (3) from the bolt (5).
  - (b) Remove the bolt (5) and the washer (6) and disconnect the two black motor return wires (8) and (9) and the relay return wire (7) from the inside of the compressor/condenser chassis (11) and the relay (10).
  - (c) Clean the bonding point on the chassis (11) and the relay (10) with absorbent paper (Material No. P02-031) made moist with solvent (Material No. P01-010).
  - (d) Install the bolt (5) and the washer (6) in the chassis (11) and the relay (10).
  - (e) Install the nut (4) on the bolt (5).
  - (f) Loosely install the two washers (2) and (3) and the nut (1) on the bolt (5).
  - (g) Carefully pull the two black motor return wires (8) and (9) and the relay return wire (7) forward, from the inside of the compressor/condenser chassis (11) and over the relay (10).
  - (h) Make sure distance X is more than 20mm.
  - (i) Install the harness spacer (P/N 971.32.18.106) (12) with cable ties (Material No P09-005, P09-008, P09-014) between the two black motor return wires (8) and (9) and the relay return wire (7).
  - (j) Install the new SB 21-016 placard (P/N 511.30.12.109) (13) on the chassis (11) as follows:

**NOTE:** For the approximate position of the placard, refer to Fig 1, view C.

- 1 Clean the area where the new placard is to be installed with absorbent paper (Material No. P02-031) made moist with solvent (Material No. P01-010).
      - 2 Let the solvent dry.
      - 3 Remove the backing strip from the new placard (13).
      - 4 Install the new placard (13) in position. Make sure that there are no air bubbles between the placard and the surface.
- (2) Remove and discard the stop angle (P/N 521.51.12.059) (4) from the composite base plate (1), as follows. Refer to Figure 2, view A:
  - (a) Remove and retain the two nuts (6), the two washers (5), and the two bolts (3) from the stop angle (4) and the composite base plate (1).
  - (b) Remove and discard the stop angle (4) from the composite base plate (1).
- (3) Install the new stop angle (P/N 521.51.12.065) (7) on the composite base plate (1) with the two bolts (3), the two washers (5), and the two nuts (6). Refer to Figure 2, view A.

- (4) Apply a layer of Adhesive (Material No. P08-017) to the threads of the screw (P/N 931.54.41.728) (8). Refer to Figure 2.
- (5) Install the isolated attachment bolt (P/N 974.03.38.192) (10) on the stop angle (7) with the screw (8) and the washer (P/N 938.77.11.110) (9). Refer to Figure 2.
- (6) Install the new ground stud (GS 373) (P/N 591.30.12.030) (11) on frame 37 between stringers 20 and 21, as follows. Refer to Figure 2:
  - (a) At GS 373 use an abrasive pad (Material No. P02-016) to remove the primer to a diameter of 25.4 mm (1 in), refer to Figure 2, view B.
  - (b) Clean the area with absorbent paper (Material No. P02-031) made moist with solvent (Material No. P01-010).
  - (c) Apply CCC (Material No. P07-001) to any bare metal, refer to AMM A-20-40-10-00A-901A-A or 12-B-20-40-10-00A-901A-A.
  - (d) Let the CCC dry.
  - (e) Apply a layer of sealant, electrically-conductive (Material No. P08-070) to the mating surfaces of the GS 373 (11) and frame 37.
  - (f) Install the GS 373 (11) on frame 37 with the washer (P/N 938.77.11.112) (14) and the nut (P/N 938.07.68.304) (13).
  - (g) Install the new GS 373 placard (P/N 511.36.12.647) (12) on the FWD side of frame 37 as follows:

**NOTE:** For the approximate position of the placard, refer to Fig 2, view B.

    - 1 Clean the area where the new placard is to be installed with absorbent paper (Material No. P02-031) made moist with solvent (Material No. P01-010).
    - 2 Let the solvent dry.
    - 3 Remove the backing strip from the new placard.
    - 4 Install the new placard in position. Make sure that there are no air bubbles between the placard and the surface.
  - (h) Apply CPC (Material No. P10-013) to the nut (13) and the threads of the GS 373 (11) on the aft side of frame 37.
- (7) Install the bonding lead (17) on GS 372 as follows, refer to Figure 2, view D:
  - (a) Clean the area with absorbent paper (Material No. P02-031) made moist with solvent (Material No. P01-010).
  - (b) Put the bonding lead (17) in position on the GS 372.
  - (c) Install the two washers (16) and (18), the nut (15) and the bolt (19) on the GS 372 and the bonding lead (17).
  - (d) Apply a layer of CPC (Material No. P10-013) to the end of the bonding lead (17) and the attachment fittings.

- (8) Install the composite base plate (1) as follows, refer to Figure 2:
- (a) Clean the installation area with absorbent paper (Material No. P02-031) made moist with solvent (Material No. P01-010).
  - (b) Put the composite base plate (1) in position.
  - (c) Install the composite base plate (1) with the four screws (2).

- (9) Install the compressor/condenser unit as follows. Refer to Figure 3:

**NOTE:** The parts used in this procedure were retained when the compressor/condenser was removed.

- (a) Carefully put the compressor/condenser unit (24) on the composite base plate (41).
- (b) Attach the compressor/condenser unit (24) to the composite base plate (41) with the four bolts (21) and four washers (22).

**CAUTION:** DO NOT APPLY THE ADHESIVE TO THE FLARED SURFACES OF THE UNIONS AND PIPES.

- (c) Carefully apply a thin layer of adhesive (Material No. P08-017) to the threads of the union (18), the adaptor (16), and the two pipes (17) and (19).
- (d) Apply a thin layer of Refrigeration Lubricant (Material No. P10-021) to the flared surfaces of the union (18), the adaptor (16), and the two pipes (17) and (19).
- (e) Install the adaptor (16) on the compressor/condenser unit (24).

**CAUTION:** REMOVE ALL THE BLANKING CAPS ONLY IMMEDIATELY BEFORE YOU CONNECT THE PIPES.

- (f) Connect the pipe (17) to the adapter (16), and the pipe (19) to the union (18).
- (g) Install the washer (12), the bonding lead (13), the washer (14), and nut (15) on the compressor/condenser unit (24).
- (h) Use a bonding tester (Local supply) to do a bonding check between the compressor/condenser unit (24) and the aircraft structure. The maximum resistance is 2.5mΩ.
- (i) Install the washer (3), the electrical cables (4) and (5), the washer (6), the lock washer (7), and the nut (8) on the relay (2).
- (j) Connect the connectors (27).
- (k) Put the connector cover (26) over the connectors (27). Install the cable tie (Material No. P09-014) (25) on the connector cover (26).
- (l) Install the hose (11) on the compressor/condenser unit (24) and the duct (9).
- (m) Tighten the clamps (10).
- (n) Install the Koroseal binding (Material No. P09-004) (20) on the pipes (17) and (19).

- (10) Install the relay return wire (30), the two black motor return wires (31) and (32), and the new bonding strap (P/N 521.51.12.012) (33) as follows. Refer to Figure 1 and Figure 3:
  - (a) Connect the relay return wire (30), the two black motor return wires (31) and (32), and the new grounding cable (33) to the isolated ground stud (29) on the stop angle (28), refer to Figure 3.
  - (b) Make sure that the wires are connected in the order given in the previous step.
  - (c) Install the washer (P/N 938.77.11.114) (34) and the nut (P/N 938.07.31.106) (35) on the isolated ground stud (29).
  - (d) Connect the new bonding strap (33) to the new GS 373 (38) with the washer (P/N 938.77.11.114) (39) and the nut (P/N 938.07.68.305) (40).
  - (e) Secure the bonding strap (33) to the adjacent wire (36) with the cable spacer (P/N 971.32.18.108) (37) and cable ties (Material No P09-005, P09-008, P09-014).
  - (f) Make sure that the relay return wire (7), the two black motor return wires (8) and (9) do not touch the relay (10). Refer to Figure 1, view C.
  - (g) Use a bonding tester (Local supply) to do a bonding check between the ground stud nut (35) and the aircraft structure, refer to Figure 3. The maximum resistance is 2.5mΩ.
  - (h) Apply a layer of CPC (Material No. P10-013) to the attachment fittings of the compressor/condenser unit grounding point and the isolated ground stud (29). Refer to Figure 3, views D and F.
  - (i) Apply a layer of CPC (Material No. P10-013) to the new GS 373 (38) and the end of the bonding strap (33).

**D. Close-up**

- (1) Remove all tools and materials. Make sure that the work areas are clean.
- (2) Do the servicing of the VCCS, refer to AMM 12-A-21-50-00-00A-902B-A or 12-B-21-50-01-00A-902A-A
- (3) Wind the Armaflex tape (Material No. P09-013) on to the connection of the union (18) and the pipe (19). Refer to Figure 3.
- (4) Install the bulkhead protection net (1) in the aircraft. Refer to Figure 3.
- (5) Remove the safety clip and close these circuit breakers:

PC-12/45 and PC-12/47 aircraft:

- CPRSR PWR (POWERLINE BUS) (BATTERY COMPARTMENT)
- COND CTL (NON ESSENTIAL BUS).

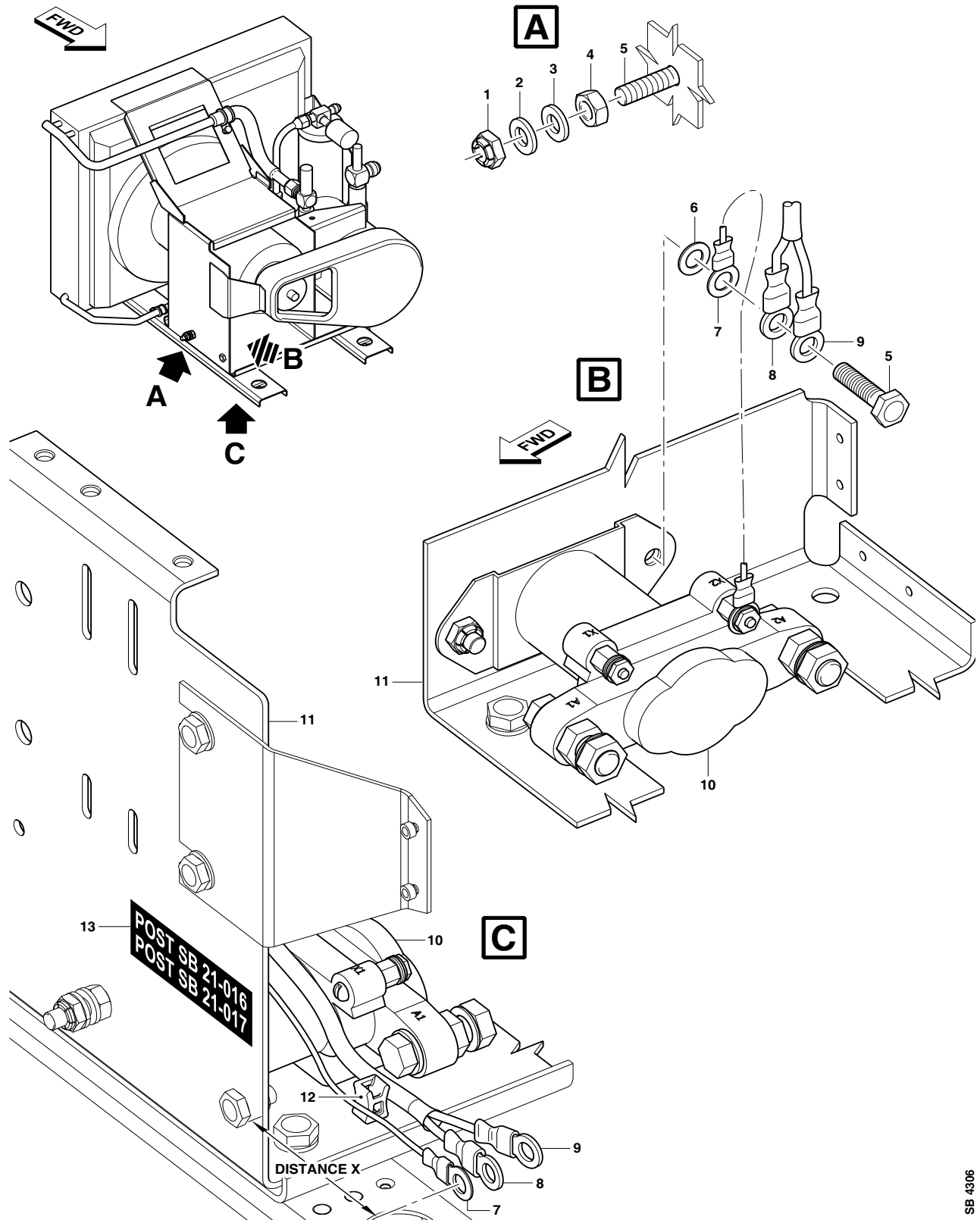
PC-12/47E aircraft:

- CPRSR (BATTERY AND EXTERNAL POWER JUNCTION BOX)
- COND HTR CTL (NON ESSENTIAL BUS).

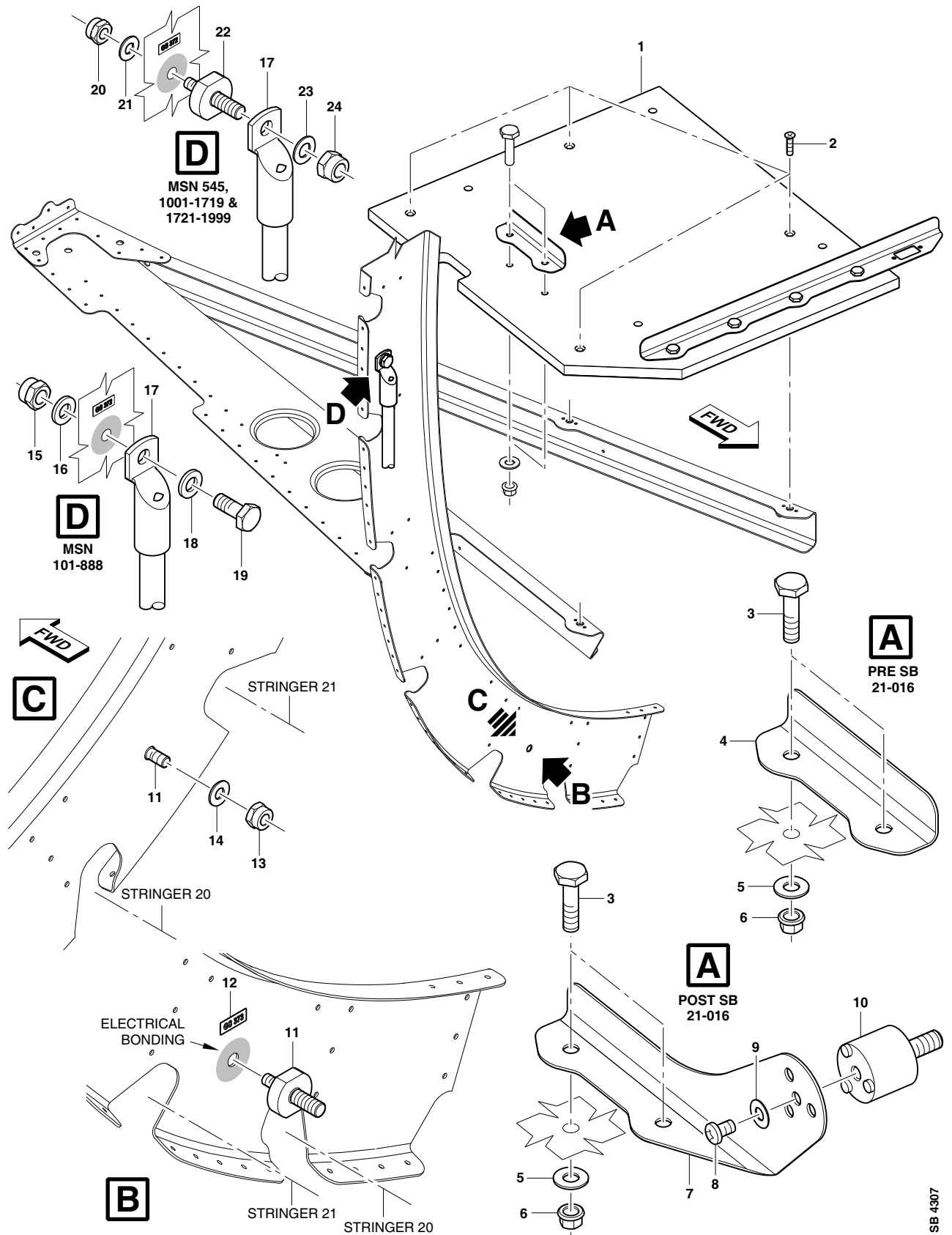
- (6) Close the access panel 31AB.

**E. Documentation**

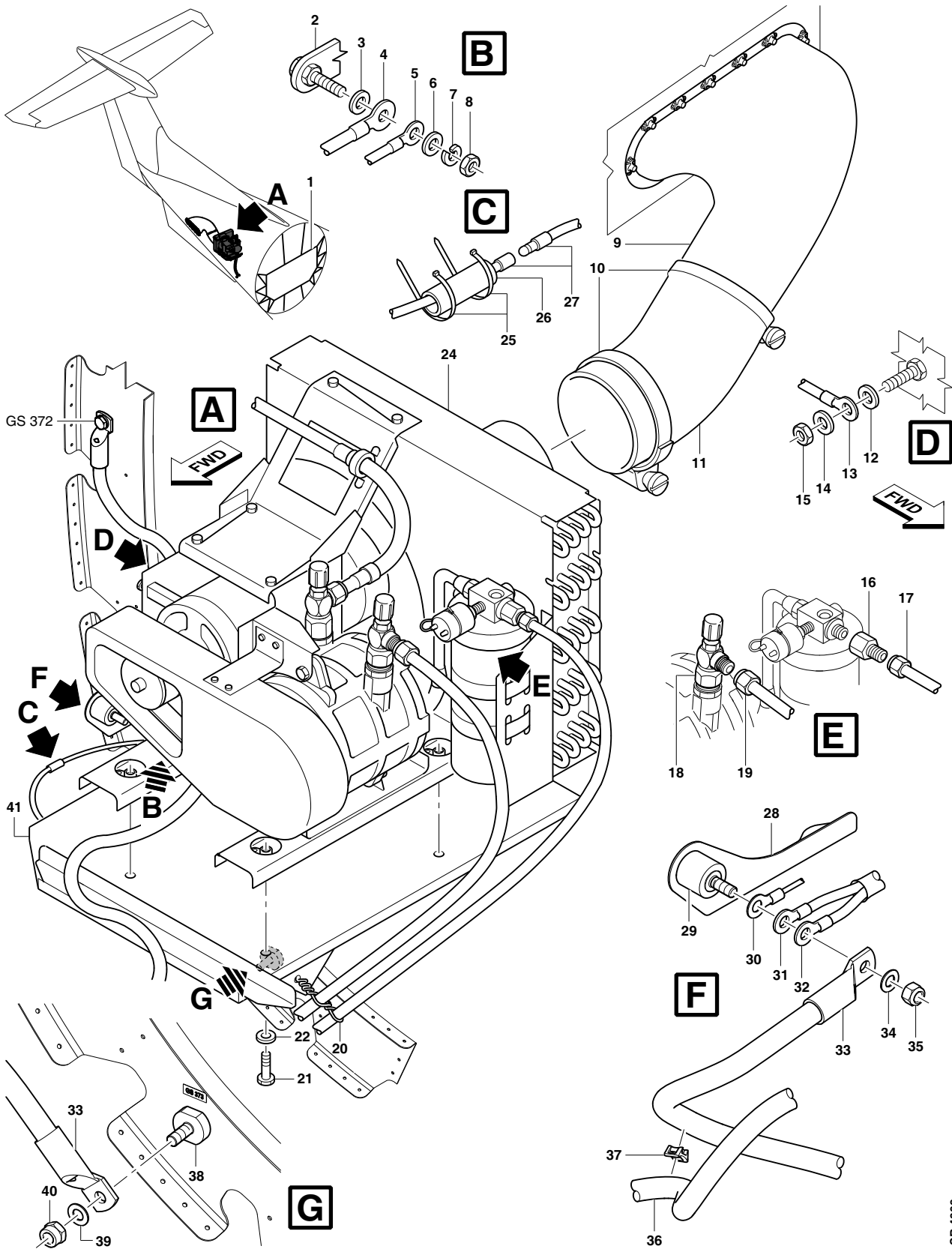
- (1) Make an entry in the Aircraft Logbook to record the incorporation of this Service Bulletin.
- (2) Make sure that the Aircraft Logbook shows any new Pilatus Part Number(s) and/or Serial Number(s), as applicable.
- (3) Inform CAMP of the incorporation of this Service Bulletin and any new Pilatus Part Number(s) and/or Serial Number(s), as applicable. Send the completed feedback sheet to: [fax@campsystems.com](mailto:fax@campsystems.com)



VCCS Compressor - Modification  
 Figure 1 (Sheet 1 of 1)



VCCS Compressor - Structural bonding modification  
Figure 2 (Sheet 1 of 1)



VCCS Compressor - Post modification installation  
Figure 3 (Sheet 1 of 1)

SB 4308



## Feedback Sheet for the Accomplishment of SB 21-016

The purpose of this feedback sheet is to provide CAMP  
with the current information on each individual PC-12 aircraft.

Please complete the grey cells as appropriate using black ink and block letters.

**Print out and send the completed feedback sheet to: [fax@campsystems.com](mailto:fax@campsystems.com)**

<b>Aircraft MSN</b>		<b>Aircraft Registration</b>		<b>Total Airframe Hours</b>	
Owner				<b>Total Landings</b>	
Operator					
Service Center					

### SB Accomplishment Information

We have embodied/accomplished this SB	<input type="checkbox"/>	Fully	<input type="checkbox"/>	Partially
<b>The undersigned confirms the accomplishment of this Service Bulletin</b>				
Date of accomplishment	Name		Signature	
<b>Comments (procedure, kit quality, suggested improvements etc.)</b>				

Feedback Sheet

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