



United States of America
Department of Transportation
Federal Aviation Administration

Supplemental Type Certificate

Number: SA04400NY

This certificate issued to: TCW Technologies, LLC
2955 Main Road East
Emmaus, PA 18049

certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 23 of the Federal Aviation Regulations.

Original Product – Type Certificate Number: A3SO
Make: Piper Aircraft, Inc.
Model: PA-32-260, PA-32-300, PA-32S-300, PA-32R-300, PA-32RT-300, PA-32RT-300T, PA-32-301FT, PA-32-30 1XTC, PA-32R-301(SP), PA-32R-301(HP), PA-32R-301T, PA-32-301, PA-32-301T

Description of Type Design Change:

1. Installation of the Integrated Back-up Battery System (IBBS), models IBBS-12v-6ah-CRT and IBBS-12v-3ah-CRT, to be completed in accordance with TCW Technologies, LLC Master Document List, Document No. 760.0011, Rev 1.2, dated September 19, 2019.
2. Maintenance to be performed in accordance with TCW Technologies, LLC Instructions for Continued Airworthiness, Document No. 725.0008, Rev 1.3, dated June 26, 2018.
3. Operation to be performed in accordance with TCW Technologies, LLC Pilot's Operating Handbook Supplement, Document No. 725.0005, Rev 1.5, dated August 13, 2019.

Limitations and Conditions:

1. The installer must determine whether this design change is compatible with previously approved modifications.
2. If the holder agrees to permit another person to use this certificate to alter a product, the holder must give the other person written evidence of that permission.
3. Installation of Garmin GNS 430 equipment (STC SA01933LA-D) must be installed as a prerequisite for this modification.
4. The aircraft must be equipped with an FAA approved alternate source of Communications and Navigation information apart from the Garmin GNS 430 equipment powered by the IBBS.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, and revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of Application: May 5, 2017

Date Reissued:

Date of Issuance: September 26, 2019

Date Amended:

By Direction of the Administrator

Signature

Title

Anthony E. Gallo
Manager
New York ACO Branch

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).



United States of America
Department of Transportation
Federal Aviation Administration
Supplemental Type Certificate

INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Aircraft Certification Office of the transfer of this Supplemental Type Certificate. The FAA will reissue the certificate in the name of the transferee and forward it to him.

Transfer Endorsement

Transfer the ownership of Supplemental Type Certificate Number: SA04400NY

To (Name and address of transferee)

From (Name and address of grantor)

Extent of Authority (if licensing agreement):

Date of transfer:

Signature of grantor: _____

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).



United States of America
Department of Transportation
Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number: SA04400NY

Date of Issuance: September 26, 2019

Certification Basis:

Based on 14 CFR §§ 21.115 and 21.101, and the FAA policy for significant changes in FAA Order 8110.48, the certification basis for the Piper Model PA-32 series airplanes is as follows:

- a. The type certification basis for the Piper Model PA-32 series airplanes is shown on TCDS A3SO for parts not changed or not affected by the change.
- b. The certification basis for parts changed or affected by the change since the reference date of application, May 5, 2017, is based upon part 23 as amended by Amendment 23-62. Based on 14 CFR §§ 21.115 and 21.101, and the FAA policy for significant changes in FAA Order 8110.48, the certification basis for this modification was determined to be:

Regulations at the latest amendment 23-0 through 23-62

23.301, 23.303 - 23.307, 23.853, 23.863, 23.867, 23.1301, 23.1309, 23.1322, 23.1351 - 23.1359, 23.1365 - 23.1367, 23.1431, 23.1529 - 23.1541, 23.1559, 23.1581 - 23.1585

1. Compliance with Special Condition No. 23-290-SC dated July 25, 2018 for the Installation of Rechargeable Lithium Batteries

-----END-----

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. This certificate may be transferred or made available to third persons by licensing agreements in accordance with 14 CFR 21.47. Possession of this Supplemental Type Certificate (STC) document by persons other than the STC holder does not constitute rights to the design data nor to alter an aircraft, aircraft engine, or propeller. The STC's supporting documentation (drawings, instructions, specifications, flight manual supplements, etc.) is the property of the STC holder. An STC holder who allows a person to use the STC to alter an aircraft, aircraft engine, or propeller must provide that person with written permission acceptable to the FAA. (Ref. 14 CFR 21.120).



Integrated Back-up Battery System

**Models:
IBBS-12v-3ah-CRT
IBBS-12v-6ah-CRT**

Pilot Operating Handbook Supplement

In accordance with FAA AC 23-8C section 23.1581, this POH is the required aircraft flight manual (AFM) for the modification installed by this STC. This POH is FAA approved. The revision level of the FAA approved POH is 1.5 dtd 13 August 2019

FAA Approved: 9/6/2019

Manager, AIR-711
Northeast Flight Test Section
Burlington MA 01803

Revision History

Rev level	Details	Approval
1.0	Initial release	RCN
1.1	Limitation language addition	RCN 31 May 2018
1.2	Limitation language removed	RCN 29 June 2018
1.3	Add sections to match TC POH	RCN 10 July 2018
1.4	Remove STC #, fix typos, update limitations	RCN 18 July 2019
1.5	Harmonize terminology with install manual	RCN 13 August 2019

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Section 1 General Information

Applicable aircraft: PA-32(x)-xxx

The ***Integrated Back-up Battery System, IBBS***, is an electronic system that combines a Lithium-Iron-Phosphate (Li-Fe-PO₄) battery pack, a charger and switching logic in one convenient package. The IBBS provides an engineered solution to enable an endurance bus for critical loads found in aircraft. It simplifies the wiring and installation of a source of back-up power by integrating all of the key elements in a single enclosure. The ***IBBS*** provides back-up power to critical electronic loads.

Integral to the IBBS is a lithium-iron-phosphate battery pack and a matched charging system to ensure the battery is properly charged and maintained. The system also includes switching circuitry to provide a stable source of output power during normal and emergency operations. The IBBS also provides signals to other equipment such as EFIS systems or engine monitors to communicate the operating state of the main aircraft bus as well as the state of the battery.

The IBBS connects to the standard aircraft power bus and provides outputs to critical equipment that require back-up power. Additionally, the IBBS provides surge and sag protection for connected equipment, allowing operation of critical equipment during engine starting.

IBBS must be installed in accordance with an applicable STC.

IBBS products are covered by US Patent 8,189,305

Section 2 Limitations

The aircraft must be equipped with an alternate source of Comm and Nav information apart from the GNS430W powered by the IBBS back-up battery system. No other limitations apply except those identified in Section 2 of the original POH.

Section 3 Emergency Procedures

Emergency Procedure for loss of main aircraft electrical power:

- 1) Operate the Aircraft Master Power Switch per the Emergency Procedure checklist already established for the aircraft.
- 2) Ensure the Back-up Master Switch (labeled Back-up Enable) is in the ON position.
- 3) Land aircraft as soon as practical to resolve the loss of main electrical power.

Section 4 Normal Procedure

Normal Product Operation

For normal operation the following is the recommend operating procedure. These operating procedures are to be added to the aircraft operating check-list for standard procedures.

Start-up Procedure

- 1) Prior to turning on the Aircraft Master Switch or Avionics Master Switch, turn ON the IBBS Back-up Master Switch. (labeled Back-up Enable).
- 2) Turn on any equipment that derives back-up power from the IBBS product.
- 3) Ensure the connected equipment successfully boots-up and is operating properly. (During this period of time the equipment is running off of the back-up battery within the IBBS product. This test ensures the transfer circuit and back-up battery are working properly.)
- 4) Verify the low voltage LED indicator warning light is indicating a low voltage condition.
- 5) Turn on the Aircraft Master Switch and Avionics Master Switch as directed by the existing POH; ensure the connected equipment remains energized. The low voltage LED indicator warning light should go out.
- 6) Start and operate the aircraft according to all other normal operating procedures.

Shut-down Procedure

- 1) Shut down aircraft engine using normal procedures.
- 2) Shut down the Aircraft Master Switch and Avionics Master Switch.
- 3) Verify that equipment that derives back-up power from the IBBS product remains ON.
- 4) Turn-off Back-up Master Switch, ensure that equipment powers down.
(This procedure further ensures the operation of the transfer circuit in the IBBS product.)

Section 5 Performance

No changes to the basic performance provided by section 5 of the Pilot's Operating Handbook are necessary for this supplement

Section 6 Weight and Balance

IBBS-12v-3ah-CRT Weight 18 oz

IBBS-12v-6ah-CRT Weight 34 oz.

CG located at the center of the unit in all axes.

Section 7 Airplane & Systems Description

See Section 1 for general information and section 4 for normal procedures.

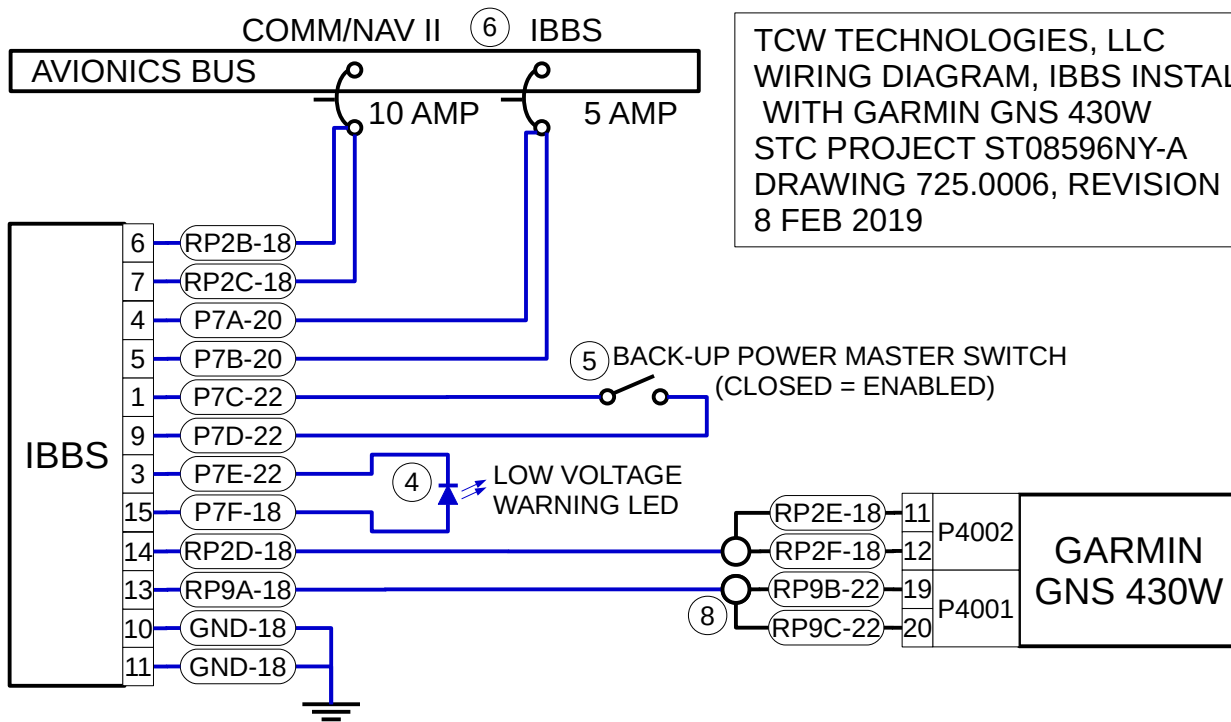
Section 8 Airplane Handling, Service and Maintenance

For service and maintenance, see the Instructions for Continued Airworthiness, p/n 725.0008.

For additional information regarding the IBBS product refer to the specific equipment documentation:

IBBS-12v-3ah-CRT P/N 725.0002

IBBS-12v-6ah-CRT P/N 725.0001



TCW TECHNOLOGIES, LLC
 WIRING DIAGRAM, IBBS INSTALLATION
 WITH GARMIN GNS 430W
 STC PROJECT ST08596NY-A
 DRAWING 725.0006, REVISION 1.8
 8 FEB 2019

NOTES:

1. UNLESS OTHERWISE SPECIFIED, STANDARD WIRING PRACTICES SHALL BE IAW SAE-AS50881, REVISION F OR LATER REVISION.
2. WIRES SHOWN IN **BLUE** ARE NEW, EXISTING WIRES SHOWN IN **BLACK**.
3. ALL WIRES SHALL CONFORM TO SAE AS22759/16 SPECIFICATION.
- ④ LOW VOLTAGE WARNING LED IS BLUE, TCW PNR 350.0015 (MFR DAILIGHT, PNR 249-4167-3734-504F).
- ⑤ BACK-UP POWER MASTER SWITCH IS SPST TOGGLE, TCW PNR 370.0004 (MFR HONEYWELL, PNR 1NT1-2).
- ⑥ EXISTING CIRCUIT BREAKERS ARE PS50120-1-5 OR EQUIVALENT (10A RATING) AND PS50120-1-2 OR EQUIVALENT (5A RATING). MARK CIRCUIT BREAKER WITH SAME SIZE IDENTIFIERS AS USED ON EXISTING CIRCUIT BREAKER PANEL.
7. ALL WIRE MARKING ACCORDING TO PIPER CHEROKEE SIX SERVICE MANUAL, OEM PNR 753-690, TABLE X-IV. MARKING FORMAT: CNS-GG, WHERE
 C=CIRCUIT TYPE (P=POWER, RP=RADIO POWER)
 N=WIRE NUMBER (1 THRU 9)
 S=WIRE SEGMENT (A THRU Z)
 GG=WIRE GAUGE (18 THRU 22)
- ⑧ WIRE SPLICE TO BE WITHIN 3 INCHES OF GNS 430W CONNECTOR.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
STATEMENT OF COMPLIANCE WITH AIRWORTHINESS STANDARDS

1. DATE
August 27, 2019

AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION

2. MAKE Piper Aircraft Inc.	3. MODEL NO. PA-32	4. TYPE (Aircraft, Engine, Propeller, etc.) Aircraft	5. NAME OF APPLICANT TCW Technologies LLC
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LIST OF DATA


6. IDENTIFICATION	7. TITLE
725.0006 Rev 1.8 Dated 02/08/2019	Wiring Diagram for Installation of an Integrated Back-up Battery System On Piper PA-32 Series Aircraft
*****	*****End of Data*****

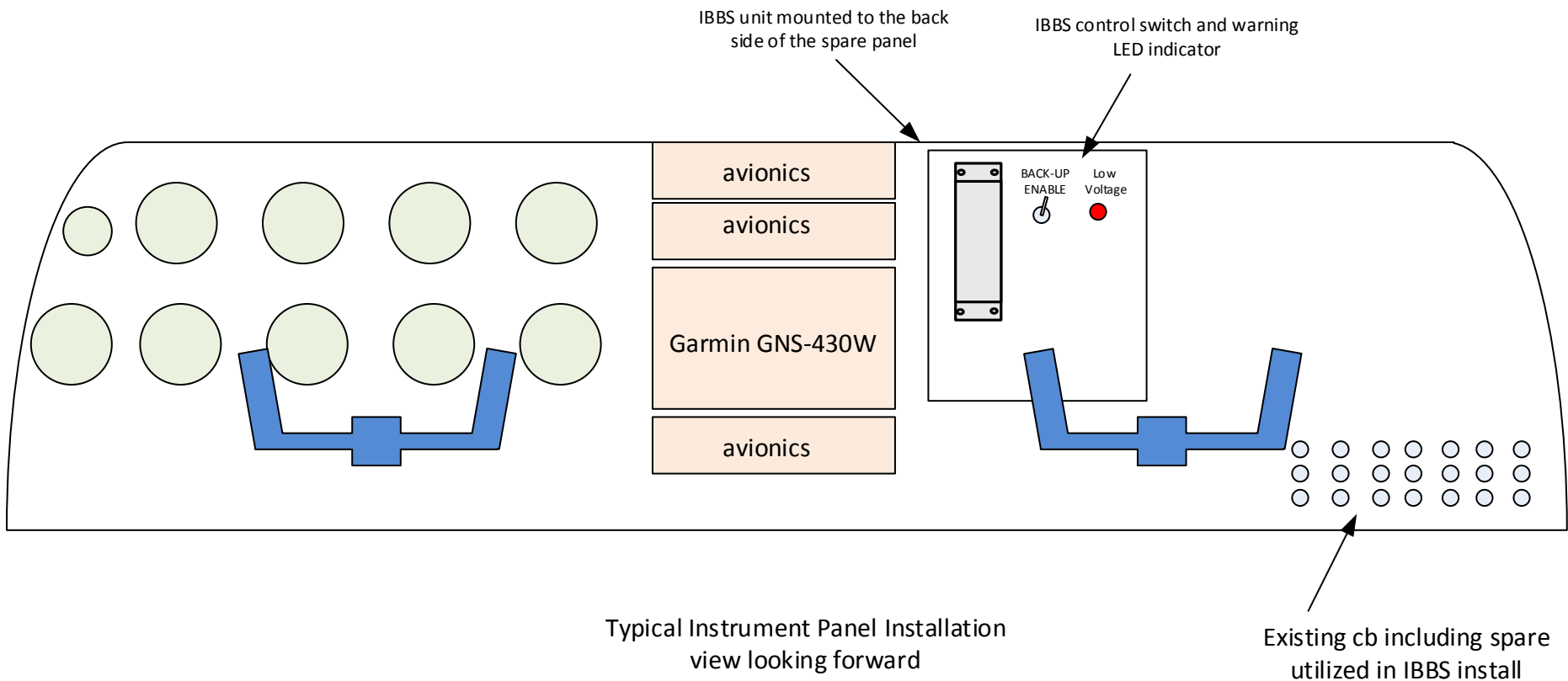
8. PURPOSE OF DATA
In support of supplemental type certification for Installation of an IBBS on Piper PA-32 Series Aircraft (FAA Project Number ST08596NY-A).

9. APPLICABLE REQUIREMENTS (List specific sections)
14 CFR Parts 23.1301(c) (Amdt 23-62), 23.1359(c) (Amdt 23-49) and 23.1365(a)(d)(c) (Amdt 23-49).

10. CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under 14 CFR Part 183, data listed above and on attached sheets numbered n/a have been examined in accordance with established procedures and found to comply with applicable requirements of the Airworthiness Standards listed.

I (We) Therefore Recommend approval of these data
 Approve these data

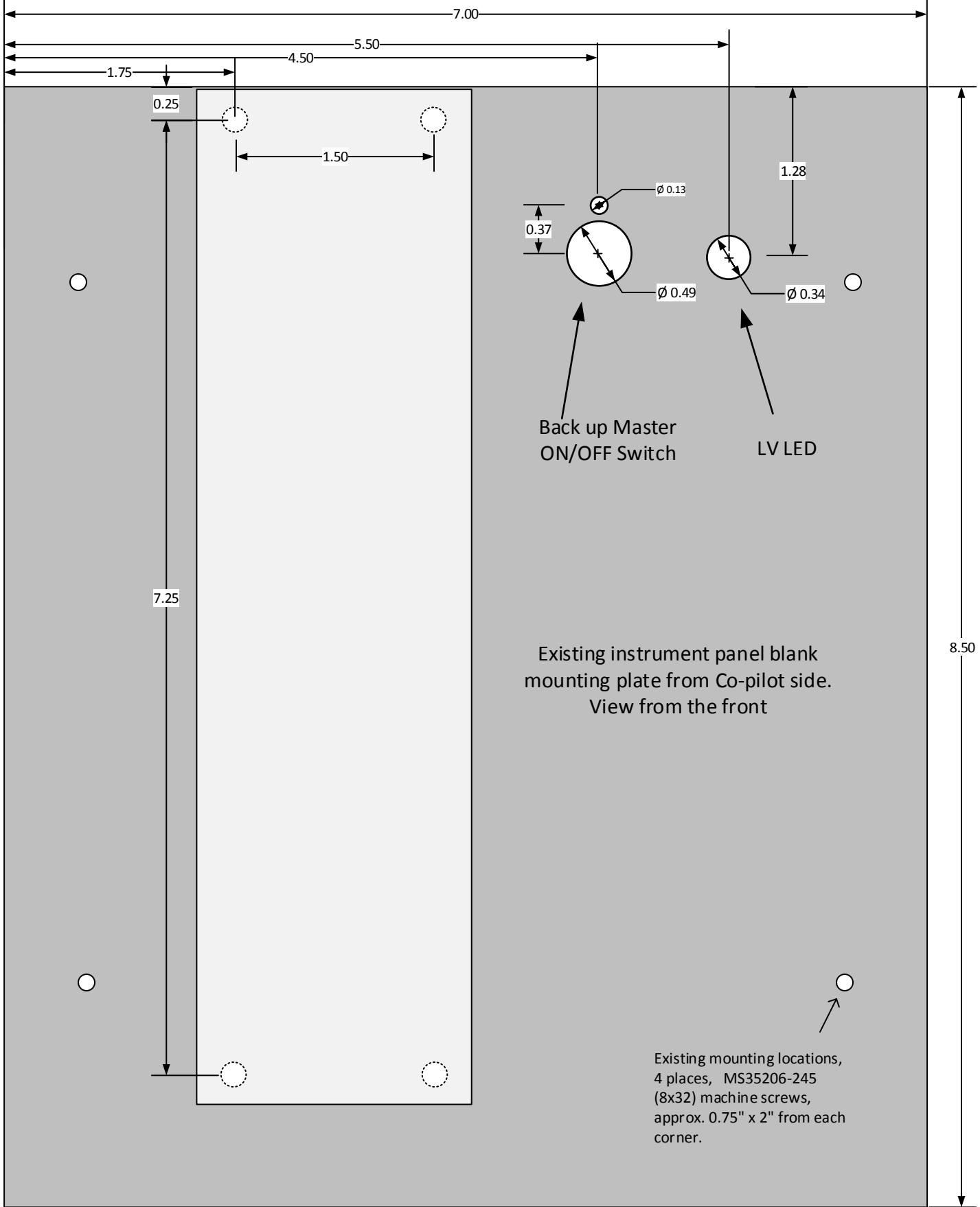
11. SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S) Earl J. Kinsley Jr. 	12. DESIGNATION NUMBERS(S) DETR-833874-NE	13. CLASSIFICATION(S) Systems & Equipment, Electrical



PA-32 install of IBBS-12v-3(6)ah-CRT

725.0007 Rev 1.5
Mounting location

TCW Technologies, LLC.



Mount IBBS unit with the following hardware:

- 4x MS35207-263 10x32 Machine screw
- 4x AN960-10L Thin Washer
- 4x AN365-1032a Lock nut

Note: Aluminum mounting plate from 6061-T6 or 2024-T3 or equivalent 0.060" thick, exterior dimensions approximate for fit to exiting airframe instrument panel. Corrosion protection via paint or plating as required.

PA-32 install of IBBS-12v-3(6)ah-CRT

725.0007 Rev 1.5
Mounting plate detail

TCW Technologies, LLC.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
STATEMENT OF COMPLIANCE WITH AIRWORTHINESS STANDARDS

1. DATE
August 27, 2019

AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION

2. MAKE Piper Aircraft Inc.	3. MODEL NO. PA-32	4. TYPE (Aircraft, Engine, Propeller, etc.) Aircraft	5. NAME OF APPLICANT TCW Technologies LLC
---------------------------------------	------------------------------	--	---

LIST OF DATA


6. IDENTIFICATION	7. TITLE
725.0007 Rev 1.5 Dated 04/11/2019 *****	Mounting Diagram for Installation of an Integrated Back-up Battery System On Piper PA-32 Series Aircraft *****End of Data*****

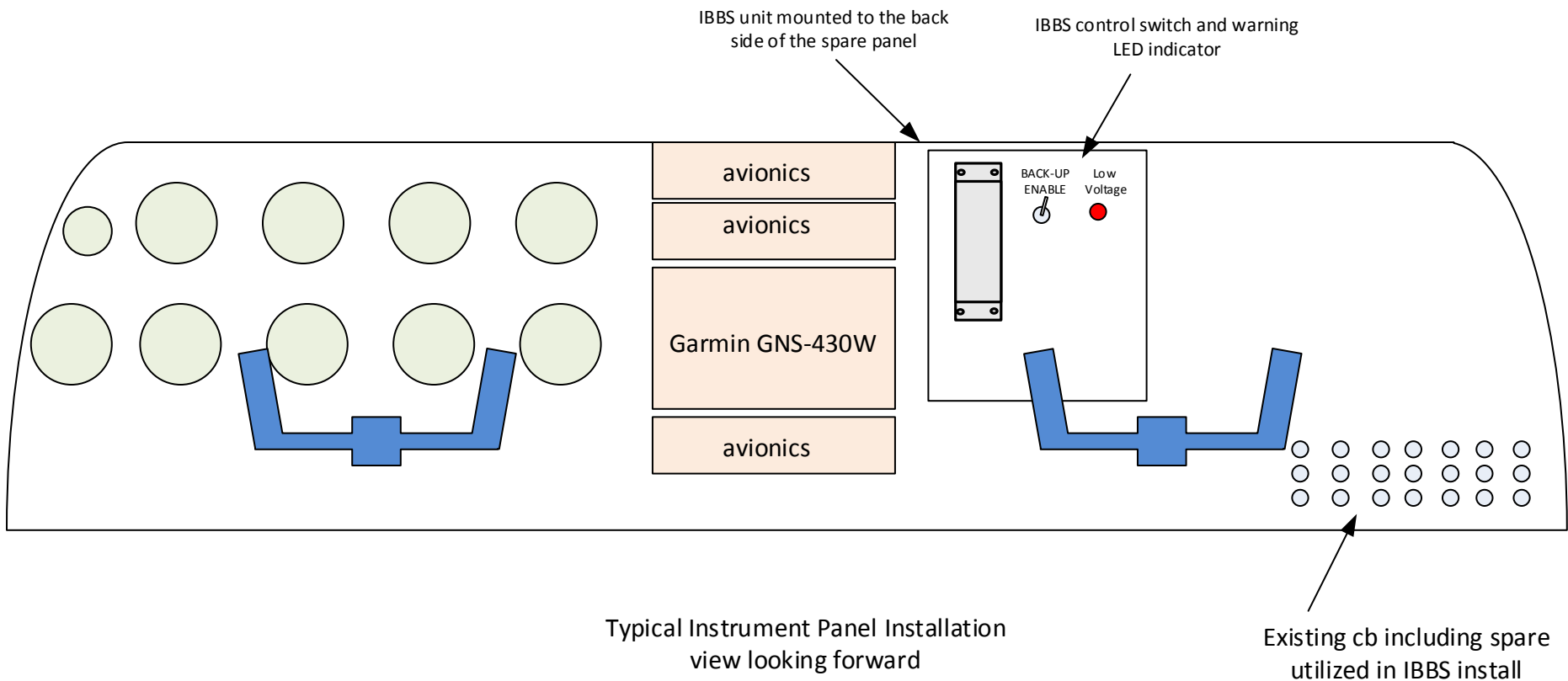
8. PURPOSE OF DATA
In support of supplemental type certification for Installation of an IBBS on Piper PA-32 Series Aircraft (FAA Project Number ST08596NY-A).

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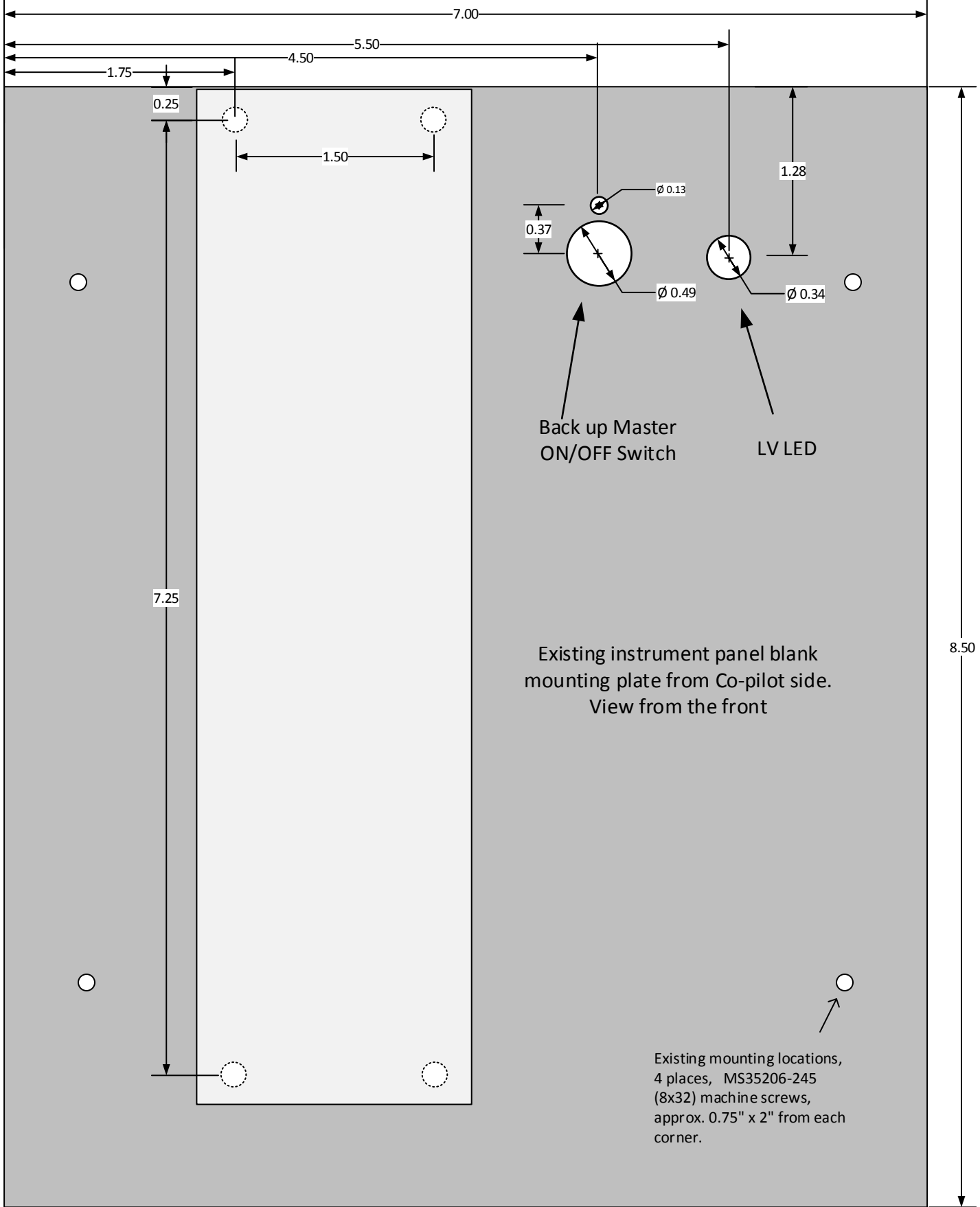
11. SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S)	12. DESIGNATION NUMBER(S)	13. CLASSIFICATION(S)
Earl J. Kinsley Jr. 	DERT-833874-NE	Systems & Equipment, Electrical



PA-32 install of IBBS-12v-3(6)ah-CRT

725.0007 Rev 1.5
Mounting location

TCW Technologies, LLC.



Mount IBBS unit with the following hardware:

- 4x MS35207-263 10x32 Machine screw
- 4x AN960-10L Thin Washer
- 4x AN365-1032a Lock nut

Note: Aluminum mounting plate from 6061-T6 or 2024-T3 or equivalent 0.060" thick, exterior dimensions approximate for fit to exiting airframe instrument panel. Corrosion protection via paint or plating as required.

PA-32 install of IBBS-12v-3(6)ah-CRT

725.0007 Rev 1.5
Mounting plate detail

TCW Technologies, LLC.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
STATEMENT OF COMPLIANCE WITH AIRWORTHINESS STANDARDS

1. DATE
August 27, 2019

AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION

2. MAKE Piper Aircraft Inc.	3. MODEL NO. PA-32	4. TYPE (Aircraft, Engine, Propeller, etc.) Aircraft	5. NAME OF APPLICANT TCW Technologies LLC
---------------------------------------	------------------------------	--	---

LIST OF DATA

6. IDENTIFICATION	7. TITLE
725.0007 Rev 1.5 Dated 04/11/2019 *****	Mounting Diagram for Installation of an Integrated Back-up Battery System On Piper PA-32 Series Aircraft *****End of Data*****


8. PURPOSE OF DATA
In support of supplemental type certification for Installation of an IBBS on Piper PA-32 Series Aircraft (FAA Project Number ST08596NY-A).

9. APPLICABLE REQUIREMENTS (List specific sections)
14 CFR Parts 23.1301(c) (Amdt 23-62).

10. CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under 14 CFR Part 183, data listed above and on attached sheets numbered n/a have been examined in accordance with established procedures and found to comply with applicable requirements of the Airworthiness Standards listed.

Recommend approval of these data
 Approve these data

I (We) Therefore

11. SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S) Earl J. Kinsley Jr. 	12. DESIGNATION NUMBERS(S) DERT-833874-NE	13. CLASSIFICATION(S) Systems & Equipment, Electrical



*Integrated Back-up Battery System (IBBS)
Models IBBS-12V-6ah-CRT and IBBS-12V-3ah-CRT
Instructions for Continued Airworthiness
As Installed in
Piper Aircraft PA-32 Series Aircraft*

*Supplemental Type Certificate (STC)
Project ST08596NY-A*

*Document Number: 725.0008
Revision: 1.3*

Revision History

Revision Level	Change Details	Approval
1.0	Initial Release	RCN / 18 Apr 2018
1.1	Rearranged sections and updated Airworthiness Limitations Section.	RCN / 8 Jun 2018
1.2	Added section for revision notification	EJK / 9 June 2018
1.3	Incorporated AEG comments.	EJK / 26 Jun 2018

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1 General Introduction

1.1 Scope

This document identifies the Instructions for Continued Airworthiness for the modification of the PA-32 Series aircraft for the installation of the Integrated Back-up Battery System, IBBS, installed under the Supplemental Type Certificate ST08596NY-A. The installed IBBS provides back-up power to the Garmin GNS430(W) VHF Communication Transceiver / VOR/ILS Receiver / GPS Receiver, with or without WAAS Navigation, installed on the aircraft under a separate STC.

1.2 Integrated Back-up Battery System Description

The IBBS is an electronic system that combines a Lithium-Iron-Phosphate (Li-Fe-PO₄) battery pack, a charger and switching logic in one convenient package. The IBBS provides an engineered solution to enable an endurance bus for critical loads found in aircraft. It simplifies the wiring and installation of a source of back-up power by integrating all of the key elements in a single enclosure.

Integral to the IBBS is a lithium-iron-phosphate battery pack and a matched charging system to ensure the battery is properly charged and maintained. The system also includes switching circuitry to provide a stable source of output power during normal and emergency operations.

The IBBS is available in two models:

- IBBS-12v-6ah-CRT – six (6) ampere-hour model
- IBBS-12v-3ah-CRT - three (3) ampere-hour model

Both models have identical case dimensions and electrical connections. They are mounted in an identical manner. The electrical voltage and current ratings are identical for both models. The only difference between the two models is the number of battery cells internal to the equipment, which determines the battery capacity and weight of the equipment. Either can be installed in the aircraft according to the STC, based on the operator's need for back-up power.

IBBS products are covered by US Patent 8,189,305

1.3 IBBS Installation Description

The IBBS connects to the standard aircraft power bus and provides outputs to connected equipment identified in Section 1.1. Additionally, the IBBS provides surge and sag protection for connected equipment, allowing operation of connected equipment during engine starting.

The IBBS output is controlled by a Back-up Power Master toggle switch on the instrument panel which directly commands the IBBS to enable or disable output power to connected equipment. The IBBS also provides a signal to a Low Voltage Warning LED on the instrument panel to communicate the operating state of the aircraft avionics bus as well as the state of the battery. Representations of these interfaces are shown in Figure 1 and Figure 2.

1.4 IBBS Control and Operation

The IBBS is designed to operate with minimal input from the aircraft crew. If aircraft power is available on the IBBS input, the IBBS will activate its battery charger as necessary to keep the internal batteries fully charged. The IBBS may also pass through aircraft power to the connected equipment. If aircraft power is not available on the IBBS input, the IBBS will deactivate its battery charger and may supply back-up power to the connected equipment. The Back-up Power Master toggle switch enables the crew to enable or disable the power output from the IBBS. The normal and emergency operating procedures for the IBBS are explained in Sections 3.0 and 4.0 of the document 725.0005, Pilot Operating Handbook Supplement. The basic operating procedures are as follows:

IBBS Start-up

1. Set the Back-up Power Master Switch to ON (Up Position). Ideally, this should be done prior to turning on the Aircraft Master Switch or Avionics Master Switch to verify that the IBBS is able to power the connected equipment.
2. Power on the Garmin GNS 430(W) connected equipment. The connected equipment should operate normally. The Back-up Power Low Voltage Warning LED will indicate a low voltage condition exists on the aircraft avionics bus (LED Illuminated).
3. Set the Aircraft Master Switch and Avionics Master Switch to ON as directed by the existing POH/AFM. The connected equipment will continue to operate normally. The Back-Up Power Low Voltage Warning LED should indicate normal voltage condition (LED extinguished).
4. Start and operate the aircraft according to all other normal operating procedures.

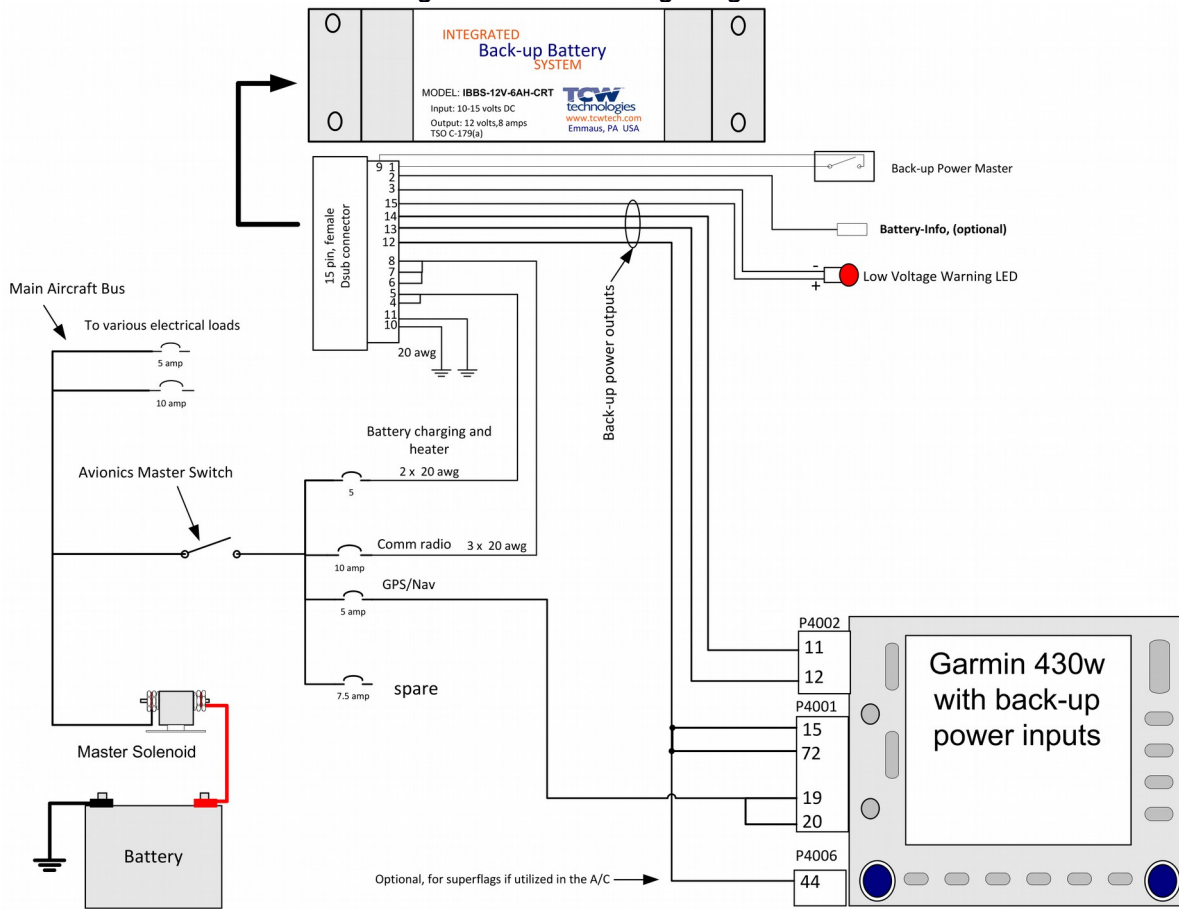
IBBS Shut-down

1. Shut down aircraft engine using normal procedures.
2. Set the Aircraft Master Switch and Avionics Master Switch to OFF as directed by the existing POH/AFM. The connected equipment will continue to operate normally.
3. Set the Back-up Power Master Switch to OFF (Down Position). The connected equipment will power down.

If the installed equipment does not function as expected in the above procedures, it is possible that either the IBBS is not functioning properly, or there is a problem with the installation. Refer to Section 2.2 IBBS Troubleshooting.

**Instructions for Continued Airworthiness for
IBBS-12V-6ah-CRT and IBBS-12V-3ah-CRT
STC Project ST08596NY-A**

Figure 1: IBBS Wiring Diagram



2 Airworthiness Limitations

This Airworthiness Limitations Section is FAA approved and specifies maintenance required under 14 CFR §§ 43.16 and 91.403 unless an alternative program has been FAA approved.

FAA Approved By _____ Date
Manager
New York ACO Branch
Federal Aviation Administration

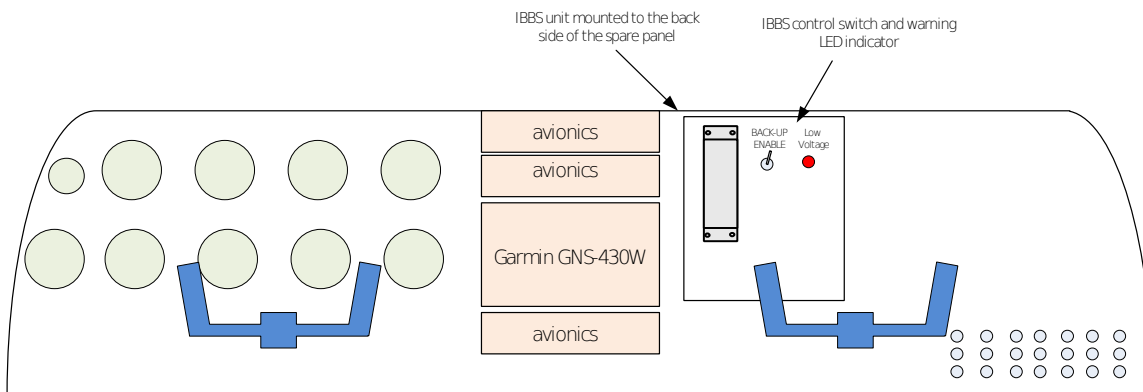
2.1 IBBS Inspection

Expected service life for the internal battery pack is greater than 500 discharge cycles. Operational performance must be checked at least annually.

The IBBS is mounted on the backside of a panel installed on the instrument panel, as shown in Figure 2. To gain access to the IBBS, remove the (4) four 8-32 screws from the panel's corners. Carefully remove the panel to reveal the IBBS.

Operational performance shall be confirmed by successful completion of the endurance test procedure described in Section 4 Operational Performance Test Procedure.

Figure 2: Access to IBBS



2.2 IBBS Troubleshooting

If the functionality of the installed back-up power equipment cannot be confirmed using the normal procedures in Section 1.4 IBBS Control and Operation, the installation should be inspected for defects. Using Figure 1 and Figure 2 as guidance, inspect the wiring between the aircraft electrical bus and the IBBS, and between the IBBS and the Garmin GNS 430(W) and other installed equipment (e.g., Back-up Power Master Switch and Low Voltage Warning LED). Replace any worn or damaged wire and components per Advisory Circular 43.13-1B.

Once the installation has been confirmed to be in proper order, repeat the normal operating procedures from Section 1.4. If the installed equipment is functioning properly, the aircraft can be returned to service.

**Instructions for Continued Airworthiness for
IBBS-12V-6ah-CRT and IBBS-12V-3ah-CRT
STC Project ST08596NY-A**

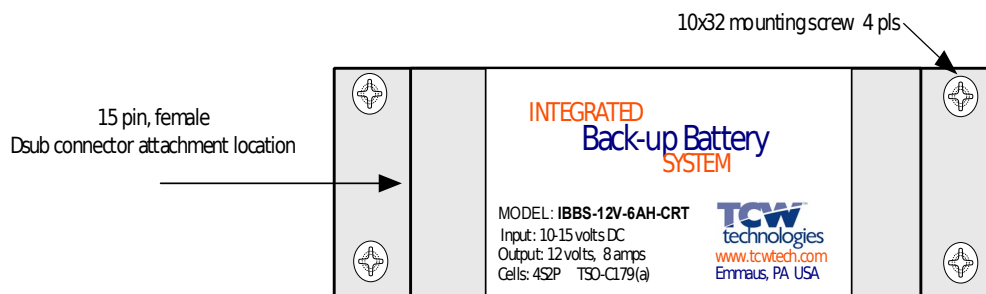
If the installed equipment still appears to be not functioning, confirm that the IBBS itself is functioning properly by successful completion of the endurance test procedure described in Section 4 Operational Performance Test Procedure. If the installed IBBS does not pass the endurance performance test, the IBBS should be replaced.

2.3 IBBS Replacement

At the end of 72 months of service the IBBS must be replaced.

To replace the IBBS disconnect the wiring harness connector via the two thumb screws on the connector and remove the (4) four #10 mounting screws which secure the IBBS base plate to the mounting panel, as shown in Figure 3.

Figure 3: Removal/Installation of IBBS



3 Required Test Equipment

A DC voltmeter is connected to pin 2 of the IBBS unit under test to monitor the internal battery voltage during the test if pin 2 is not already connect to a ship mounted voltmeter.

4 Operational Performance Test Procedure

On at least an annual basis the endurance capability of the IBBS shall be confirmed and compared against a minimum run time of 60 minutes for the operation of the connected equipment when operated in back-up mode.

As an alternative to this test, the IBBS may be returned to the manufacturer for a loaded endurance test. See Section 6 Service Contact Information for return instructions.

Prior to the start of test, ensure the IBBS is fully charged by operating the aircraft with the Aircraft Master Switch in the ON and the Back-up Master Switch in the ON position for a minimum of 120 minutes. See Section 5 Ground-Based Charging for details on recharging the IBBS prior to starting this test.

1. Remove access panel as shown in Figure 2 to access the IBBS.
2. Connect a DC volt meter to pin 2 of the IBBS to monitor the internal battery voltage if this voltage is not already available on a ship mounted voltage monitor (EFIS system or engine monitor or discrete volt meter). Verify the voltage on pin 2 is between 13.6 and 14.7 VDC. If this voltage is not achieved, the IBBS does not meet the minimum operational performance requirement, and must be replaced.
3. Turn OFF the Aircraft Master Switch.
4. Turn ON the Back-up Power Master Switch. Record the start time for the test.
5. Turn ON all equipment connected to and supplied with back-up power from the IBBS.
6. Monitor the connected equipment and the voltage on pin 2. When the first piece of connected equipment no longer functions, or the voltage on pin 2 drops below 9.5 VDC (which comes first), record the stop time for the test and the voltage on pin 2. Note: The voltage on pin 2 should not be allowed to go below 9 VDC at any time during this test.
7. If the recorded time for this test is at least 60 minutes, the IBBS meets the minimum operational performance requirement and may be returned to service. Allow the IBBS to be fully charged, using one of the methods described at the beginning of this section.
8. If the recorded time for this test is less than 60 minutes, the IBBS does not meet minimum operational performance, and must be replaced.
9. Record the results of the endurance test in the aircraft log book.

5 Ground-Based Charging

As an alternative to charging using aircraft power, the IBBS may be charged using a ground-based method. To accomplish this, connect an approved battery charger or DC power source (set to 14 volts) to the main aircraft battery and energize the main aircraft power bus by turning ON the aircraft master switch, set all other aircraft loads in their OFF state. Allow the ground-based power source to charge the IBBS for a minimum of 120 minutes.

Note: The ground-base power source must be able to supply the load current of all devices that cannot be turned off in this nominal state, plus the 4 amps of IBBS charge current.

TCW Technologies LLC offers a direct charger for the IBBS, under model number IBBS-12v-CHARGER-LI-FE. This charger may be used to charge the IBBS directly through its connector (not through main aircraft battery as above), in preparation of the endurance test procedure. It can also be used to keep the IBBS fully charged during long term product storage (9 months or longer)

6 Service Contact Information

To receive future updates of these Instructions for Continued Airworthiness (ICA), please contact TCW Technologies, LLC at the following address:

TCW Technologies, LLC
Attn: Service Department
2955 Main Rd. E.
Emmaus, PA 18049
USA

The service department may also be contacted via email (support@tcwtech.com), telephone (610-928-3420), or website (www.tcwtech.com).

The above information may also be used to contact TCW Technologies about IBBS product returns and factory endurance testing.

6.1 Revisions

Revisions to this document shall be coordinated through the New York Aircraft Certification Office, the Kansas City AEG, and the STC holder. If you would like to be notified of future revisions to this manual please furnish the information listed below:

Name
Address
City, State, and ZIP Code
Part Number of Manual
Current Revision Status of the Manual
E-mail address
Phone Number

Please submit this information to the service contact in Section 6 above.



Integrated Back-up Battery System

**Models:
IBBS-12v-3ah-CRT
IBBS-12v-6ah-CRT**

**Installation Instructions for
PA-32(x)-xxx**

**26 August 2019
Rev 1.2**

Revision History

Rev level	Details	Approval
1.0	Initial release	RCN 17 July 2019
1.1	Added document table	RCN 12 August 2019
1.2	Removed project number	EJK 26 August 2019

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Section 2	Mounting Details	4
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Section 4	Labeling	5
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Section 6	Weight and Balance	6

Section 1 General Information

Applicable aircraft: PA-32(x)-xxx

The ***Integrated Back-up Battery System, IBBS***, is an electronic system that combines a Lithium-Iron-Phosphate (Li-Fe-PO₄) battery pack, a charger and switching logic in one convenient package. The IBBS provides backup electrical power to operate the connected electrical load in the event of main power failure in the aircraft. In this application the IBBS is utilized to provide back-up power to a Garmin GNS-430W Navigator/Communication unit.

IBBS must be installed in accordance with this document.

In this installation the IBBS is mounted to the back of the instrument panel and wired into the existing aircraft electrical system to provide power to the installed Garmin GNS-430W Navigator/Communication unit.

This installation is to be accomplished utilizing the install kit p/n 500.0027 available from TCW Technologies. This kit includes mounting hardware, a wiring harness, a panel mount switch and LED and supporting documentation.

Description	TCW Technologies Part Number
PA-32 install kit	500.0027
PA-32 install mounting drawing	725.0007
PA-32 wiring harness	500.0028
PA-32 wiring details	725.0006

For additional information regarding the IBBS product refer to the specific equipment documentation:

IBBS-12v-3ah-CRT	P/N 725.0002
IBBS-12v-6ah-CRT	P/N 725.0001

Section 2 Mounting

See drawing p/n 725.0007 for details of mounting location. Remove the existing instrument panel blank-out panel, OEM p/n 68851-00, as shown in the drawing and modify by drilling holes as indicated for the IBBS mounting locations, the switch and LED. After completion of the wiring modifications install the IBBS unit, switch and LED into the panel and reinstall the blank-out panel. Utilize practices and techniques found in FAA Advisory Circular (AC) 43.13-1B for electrical and mechanical installations. Mount the IBBS unit to the blank-out panel with the 4 supplied machine screws, washers and nuts included in the 500.0027 install kit. The supplied hardware is required for compliance with the bonding requirements of AC 43.13-1B, Sections 11-187 & 11-188. Additionally, a bond test in accordance with Section 11-188 is recommended.

Section 3 Electrical

The existing aircraft electrical harness has to be modified to add the IBBS. See drawing p/n 725.0006 for details.

The two existing aircraft circuit breakers utilized for the Garmin GNS-430W are repurposed for this installation. A 10-ampere circuit breaker utilized for the Comm function of the GNS-430W is to be relabeled as, "GNS COMM/NAV." This breaker is re-wired to feed pins 6&7 of the IBBS unit. The 5-ampere circuit breaker previously utilized to power the GNS-430W Navigation and Display functions is repurposed to power pins 4&5 of the IBBS unit. This breaker is to be relabeled as, "IBBS CHARGE."

The wire(s) utilized to provide power to the Garmin GNS-430W on connector P4002, pins 11 and 12, are moved from the previously installed circuit breaker to pin 14 of the IBBS unit.

The wire(s) utilized to provide power to the Garmin GNS-430W on connector P4001, pins 19 and 20, are moved from the previously installed circuit breaker to pin 13 of the IBBS unit.

The new wiring harness provided in the install kit, p/n 500.0028, accommodates these changes. Additionally, the wiring of the back-up master switch and low voltage warning lamp are directly connected to the IBBS unit via the new wiring harness.

Complete all electrical connections and secure wires per AC 43.13-1B.

Section 4 Labeling

Apply indelible marking to each of the following items to ensure the identification of the function of each item is understood. The following must be labeled at the completion of the installation, see below for recommended indicia:

Device	Label
The 10 amp circuit breaker re-purposed to drive pins 6,7 of the IBBS	GNS COMM/NAV
The 5 amp circuit breaker re-purposed to drive pins 4,5 of the IBBS	IBBS CHARGE
Back-up Master Switch	BACK-UP ENABLE
LED indicator	LOW VOLT WARN

Section 5 Post Install Test

Start-up Procedure

- 1) Prior to turning on the Aircraft Master Switch or Avionics Master Switch, turn ON the IBBS Back-up Enable switch.
- 2) Turn on any equipment that derives back-up power from the IBBS product.
- 3) Ensure the connected equipment successfully boots-up and is operating properly. (During this period of time the equipment is running off of the back-up battery within the IBBS product. This test ensures the transfer circuit and back-up battery are working properly.)
- 4) Verify the low voltage warning light is indicating a low voltage condition.
- 5) Turn on the Aircraft Master Switch and Avionics Master Switch as directed by the existing POH; ensure the connected equipment remains energized. The low voltage warning light should go out.
- 6) Start and operate the aircraft according to all other normal operating procedures.

Shut-down Procedure

- 1) Shut down aircraft engine using normal procedures.
- 2) Shut down the Aircraft Master Switch and Avionics Master Switch.
- 3) Verify that equipment that derives back-up power from the IBBS product remains ON.
- 4) Turn-off Back-up Enable switch, ensure that equipment powers down.

(This procedure further ensures the operation of the transfer circuit in the IBBS product.)

Section 5 Weight & Balance

IBBS-12v-3ah-CRT Weight 18 oz

IBBS-12v-6ah-CRT Weight 34 oz

Switch and LED Weight 1.5 oz

Wiring harness weight 8 oz

CG located at the center of the unit in all axes.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
STATEMENT OF COMPLIANCE WITH AIRWORTHINESS STANDARDS

1. DATE
August 27, 2019

AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION

2. MAKE Piper Aircraft Inc.	3. MODEL NO. PA-32	4. TYPE (Aircraft, Engine, Propeller, etc.) Aircraft	5. NAME OF APPLICANT TCW Technologies LLC
---------------------------------------	------------------------------	--	---

LIST OF DATA


6. IDENTIFICATION	7. TITLE
725.0011 Rev 1.2 Dated 08/26/2019	Installation instructions for PA-32(x)-xxx
	NOTE: This approval is for engineering aspects of the above listed engineering data (design, descriptive, substantive, service). It indicates the data listed above demonstrates compliance only with the regulations specified below in Applicable Requirements. Other FAA approvals and other engineering data are needed for substantiation of any related alteration to an aircraft that uses this data.
*****	*****End of Data*****

8. PURPOSE OF DATA
In support of supplemental type certification for Installation of an IBBS on Piper PA-32 Series Aircraft (FAA Project Number ST08596NY-A).

9. APPLICABLE REQUIREMENTS (List specific sections)
14 CFR Parts 23.1301(b)(c) (Amdt 23-62), 23.1309(d) (Amdt 23-62), 23.1322 (Amdt 23-43), 23.1357(a)(1)(2)(c) (Amdt 23-43), 23.1365(a) (Amdt 23-49), 23.1365(d)(e) (Amdt 23-49), 23.1367(a)(b) (No Amdt)

10. CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under 14 CFR Part 183, data listed above and on attached sheets numbered n/a have been examined in accordance with established procedures and found to comply with applicable requirements of the Airworthiness Standards listed.

I (We) Therefore Recommend approval of these data
 Approve these data

11. SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S) Earl J. Kinsley Jr. 	12. DESIGNATION NUMBERS(S) DETR-833874-NE	13. CLASSIFICATION(S) Systems & Equipment, Electrical



*Master Data List for
Supplemental Type Certificate (STC)
Project ST08596NY-A*

Models: IBBS-12V-6ah-CRT and IBBS-12V-3ah-CRT

*Document Number: 760.0011
Revision: 1.2
Release Date: 19 September 2019
STC Project: ST08596NY-A*

Prepared by:

Robert Newman

Approved by:

Revision History

Revision Level	Change Details	Date	Author/ Approver
1.0	Initial Release	08/16/2019	RCN
1.1	Replaced IBBS install documents with STC install guide. Updated document revisions.	08/27/2019	RCN
1.2	Corrected table references in Sections 2.1.1 and 2.1.2. Removed “or later FAA-approved revisions” from Sections 2.1.1, 2.1.2, 2.2, and 2.3.	See Cover	See Cover

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1 Introduction

1.1 Purpose

The purpose of this document is to list the data required to support STC installation of the Integrated Back-Up Battery System (IBBS), Models IBBS-12v-6ah-CRT and IBBS-12v-3ah-CRT, in accordance with STC ST08596NY-A requirements, and to list other data associated with the STC which is not required for installation.

This document applies to the installation of the IBBS units when installed IAW the data listed in this document on the Piper Aircraft Inc. Model PA-32 aircraft as defined for this STC. This document includes general installation requirements, special installation instructions, and it provides an index of STC data including both data required for installation and data associated with the STC, but not required for installation.

1.2 Compliance Summary

This document shows compliance per the Certification Plan, document 710.0008 Rev 1.0, to the following regulations/amendments:

- 14 CFR 21.31(a), Amdt 21-92

1.3 Abbreviations and Acronyms

Abbrev.	Description	Abbrev.	Description
AC	Advisory Circular	IP	Issue Paper
CFR	Code of Federal Regulations	LED	Light Emitting Diode
CIP	Conformity Inspection Plan	MDL	Master Data List
CP	Certification Plan	NYACO	New York Aircraft Certification Office
CR	Compliance Report	OEM	Original Equipment Manufacturer
ELA	Electrical Load Analysis	POHS	Pilot’s Operating Handbook Supplement
FAA	Federal Aviation Administration	SSA	System Safety Analysis
FHA	Functional Hazard Assessment	STC	Supplemental Type Certificate
GTP	Ground Test Plan	TC	Type Certificate
GTR	Ground Test Report	TCDS	Type Certificate Data Sheets
IBBS	Integrated Back-Up Battery System	TSO	Technical Standard Order
ICA	Instructions for Continued Airworthiness	TSOA	Technical Standard Order Authorization
INSTL	Installation		

Table 1: Abbreviations and Acronyms

2 Data and Equipment List Required for Installation

2.1 Data Required for Installation

2.1.1 IBBS-12v-6ah-CRT Installation Data

All documents listed in Table 2 are required for installation purposes for installations of the IBBS-12v-6ah-CRT equipment. All documents must be at the revision listed below.

Manufacturer	Document No.	Revision	Description
TCW Technologies	760.0011	1.2	Master Data List for STC Project ST08596NY-A (This document)
TCW Technologies	725.0011	1.2	Installation Instructions for PA-32(x)-xxx
TCW Technologies	725.0005	1.5	Pilot’s Operating Handbook Supplement (POHS)
TCW Technologies	725.0006	1.8	Wiring Diagram, IBBS Installation with Garmin GNS 430W
TCW Technologies	725.0007	1.5	Mounting Location, PA-32 Install of IBBS-12v-3(6)ah-CRT
TCW Technologies	725.0008	1.3	Instructions for Continued Airworthiness

Table 2: STC Data, IBBS-12v-6ah-CRT

2.1.2 IBBS-12v-3ah-CRT Installation Data

All documents listed in Table 3 are required for installation purposes for installations of the IBBS-12v-3ah-CRT equipment. All documents must be at the revision listed below.

Manufacturer	Document No.	Revision	Description
TCW Technologies	760.0011	1.2	Master Data List for STC Project ST08596NY-A (This document)
TCW Technologies	725.0011	1.2	Installation Instructions for PA-32(x)-xxx
TCW Technologies	725.0005	1.5	Pilot’s Operating Handbook Supplement
TCW Technologies	725.0006	1.8	Wiring Diagram, IBBS Installation with Garmin GNS 430W
TCW Technologies	725.0007	1.5	Mounting Location, PA-32 Install of IBBS-12v-3(6)ah-CRT
TCW Technologies	725.0008	1.3	Instructions for Continued Airworthiness

Table 3: STC Data, IBBS-12v-3ah-CRT

2.1.3 Continued Airworthiness

Instructions for continued airworthiness are found in the IBBS Instructions for Continued Airworthiness, document number 725.0008. See Table 2 or Table 3 for document revision.

2.2 Substantiating Data

The documents listed in Table 4 contain information related to this STC but are not required for follow-on installations.

Document No.	Revision	Description
710.0008	1.0	IBBS-12v-6(3)ah-CRT Installation in Piper PA-32 Series Aircraft STC Certification Plan (CP)
710.0009	1.8	IBBS-12v-6(3)ah-CRT Installation in Piper PA-32 Series Aircraft STC Functional Hazard Assessment (FHA)
710.0010	1.5	IBBS-12v-6(3)ah-CRT Installation in Piper PA-32 Series Aircraft STC System Safety Assessment (SSA)
720.0006	1.0	Electrical Load Analysis (ELA) for STC Project ST08596NY-A
720.0009	1.0	Ground Test Plan/Procedure (GTP) for Installation of an Integrated Back-up Battery System on Piper PA-32 Series Aircraft
720.0011	1.0	Conformity Inspection Plan (CIP) for Installation of an Integrated Back-up Battery System on Piper PA-32 Series Aircraft
760.0010	1.1	IBBS-12v-6(3)ah-CRT Integrated Backup Battery System Compliance Report (CR)
760.0012	1.0	Ground Test Report (GTR) for Installation of an Integrated Back-up Battery System on Piper PA-32 Series Aircraft
760.0021	1.0	Engineering Coordination Memo (ECM) – RTCA/DO-347 Qualification Test Data
P2230-IBBS-Panel-Substantiation.pdf	11 Apr 2019	Structural Substantiation of the IBBS Support Panel in Support of ST08596NY-A

Table 4: STC Substantiating Data for ST08596NY-A

2.3 Equipment List

All equipment must have the Part Numbers contained in Table 5.

Model	Description	Part Number	Revision	Manufacturer
IBBS, 3A-hr	Integrated Back-Up Battery System, 3 ampere-hour	IBBS-12v-3ah-CRT	C	TCW Technologies
IBBS, 6A-hr	Integrated Back-Up Battery System, 6 ampere-hour	IBBS-12v-6ah-CRT	C	TCW Technologies
500.0027	Installation Kit for Installation of an Integrated Back-up Battery System on Piper PA-32 Series Aircraft, ST08596NY-A	See Table 6	A	See Table 6

Table 5: Equipment List for ST08596NY-A

The STC installation kit, 500.0027, is available which contains the components shown in Table 6 required for installation of either the 6Ahr or 3Ahr IBBS into the PA-32 Series aircraft.

TCW Part Number	Description	Quantity	Manufacturer Part Number	Manufacturer
350.0015	Panel Mount Indicator, Blue LED	1	249-4167-3734-504F	Dialight
370.0004	Toggle Switch, SPST	1	1NT1-2	Honeywell
500.0028	Wire Harness, IBBS for PA-32 Series Aircraft	1	500.0028	TCW Technologies
350.0016	Machine Screw, Cross Recessed, Cadmium-Plated, 10-32 x 1/2"	4	MS35207-263	Aircraft Spruce
350.0017	Flat Washer, Cadmium-Plated, #10	4	AN960-10L	Aircraft Spruce
350.0018	Stop Nut, Cadmium-Plated, 10-32	4	AN365-1032A	Aircraft Spruce

Table 6: Installation Kit, Part Number 500.0027 (Revision A)

3 General Installation Requirements

The installation must be done in accordance with all applicable FARs. The installation shall conform to the data listed in Section 2.1, Data Required for Installation, with exception of special instructions as defined in Section 4, Special Installation Instructions, which shall have precedence over the data listed in Section 2.1.

3.1 Prerequisite

This STC installation of the IBBS requires that the Garmin GNS 430W equipment has already been installed into the PA-32 Series aircraft, in accordance with the STC SA01933LA requirements. This STC does not support mounting installation or operation of the Garmin equipment, except for operational checks to show the Garmin equipment receives electrical power through the IBBS.

3.2 Mechanical

Mechanical installation, wiring, cable bundling and routing, and connections to existing aircraft systems must conform to those specific instructions or requirements found in the STC data. Those aspects of the STC where specific installation instructions or requirements are not provided in the STC data, the installer shall conform to the recommended practices and procedures found in Advisory Circular (AC) 43.13-1B, Chapter 11, Electrical Systems, Section 3, 4, and 7.

3.3 Hardware

Hardware not supplied with the equipment, or otherwise specified in the appropriate installation manuals or other STC data (ie screws, nuts, tie wrap.... etc) shall be from standard aircraft hardware as described by AC 43.13-1B, Chapter 7, Aircraft Hardware, Control Cables and Turnbuckles.

3.4 Wiring

All wire used in the installation shall be of appropriate standard aircraft quality grade and size as described in AC 43.13-1B, Chapter 11, Sections 5-20.

3.5 Circuit Protection

All circuits modified by this STC shall be protected in accordance with AC 43.13-1B, Chapter 11, Section 4, Circuit Protection Devices.

3.6 Electrical Load Analysis

An electrical load analysis shall be performed on each aircraft, as described in AC 43.13-1B, Chapter 11 Section 3. The Electrical Load Analysis for STC Project ST08596NY-A, document 720.0006, provides specifications on the IBBS power requirements.

4 Special Installation Instructions

The installation of the IBBS requires the modification of an existing cover assembly in the cockpit instrument panel. This cover assembly is not included in the STC installation kit, however the instructions for modifying the cover assembly, as well as all of the hardware required to complete the equipment installation is included in the kit.

The location of the cover assembly is on the copilot's instrument panel, to the right and above the copilot's control yoke, as shown in Figure 1 below. The cover assembly, OEM part number 68851-00, is an aluminum plate, 6½ inches wide by 8.5 inches tall by 0.060" thick. The IBBS is installed on the back side of the cover assembly using the metal flanges located at either end of the IBBS. The backup power master switch and low-voltage warning light emitting diode (LED) are installed on the front side of the cover assembly.

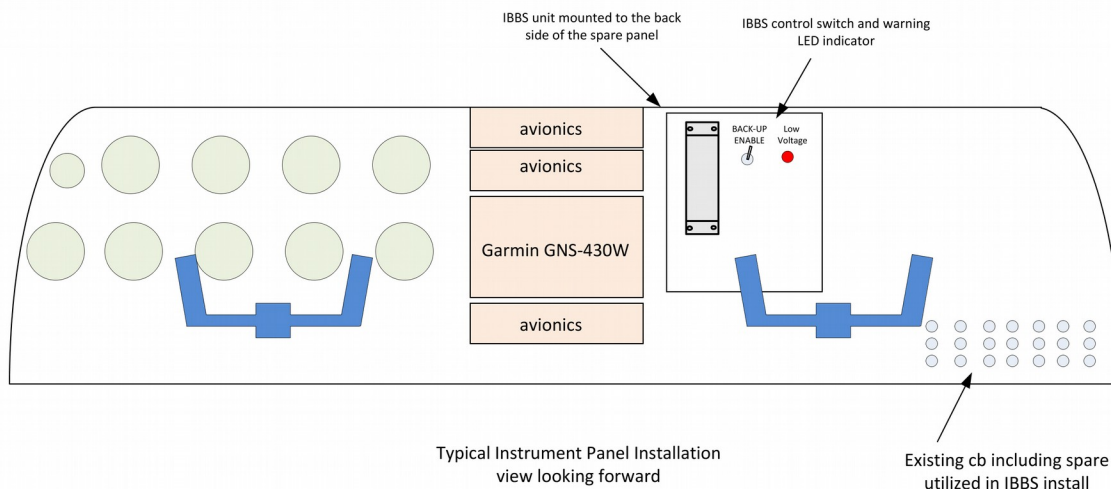
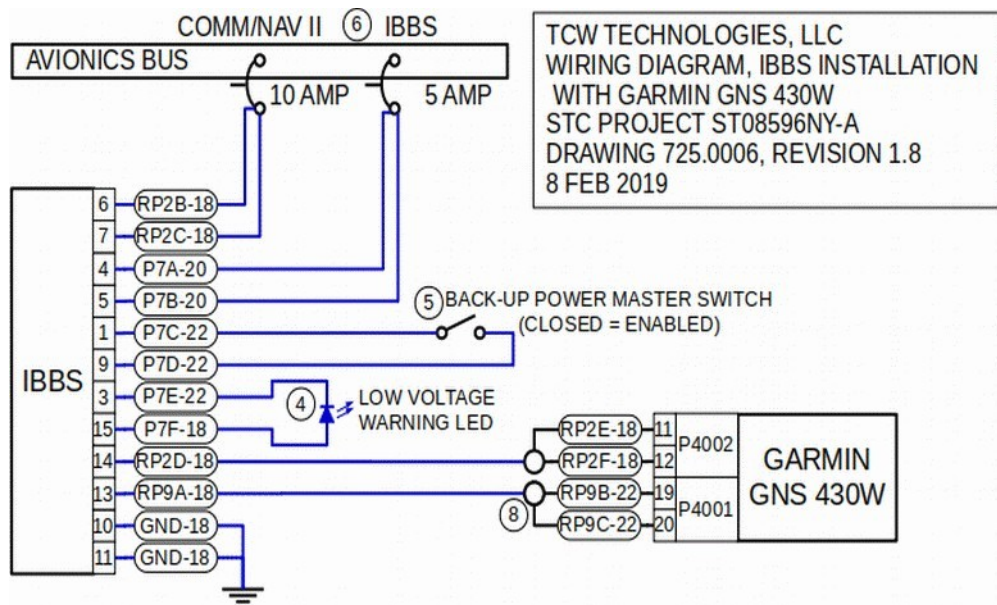


Figure 1: IBBS Mounting Diagram for PA-32 (from 725.0007, Revision 1.5)

This installation of the IBBS requires the modification of existing wiring which provide electrical power to the Garmin GNS 430W equipment. The STC installation kit includes a pre-built wire harness which must be spliced into the existing wiring on the Garmin GNS 430W. Figure 2



TCW TECHNOLOGIES, LLC
WIRING DIAGRAM, IBBS INSTALLATION
WITH GARMIN GNS 430W
STC PROJECT ST08596NY-A
DRAWING 725.0006, REVISION 1.8
8 FEB 2019

- NOTES:
1. UNLESS OTHERWISE SPECIFIED, STANDARD WIRING PRACTICES SHALL BE IAW SAE-AS50881, REVISION F OR LATER REVISION.
 2. WIRES SHOWN IN **BLUE** ARE NEW, EXISTING WIRES SHOWN IN **BLACK**.
 3. ALL WIRES SHALL CONFORM TO SAE AS22759/16 SPECIFICATION.
 - ④ LOW VOLTAGE WARNING LED IS BLUE, TCW PNR 350.0015 (MFR DAILIGHT, PNR 249-4167-3734-504F).
 - ⑤ BACK-UP POWER MASTER SWITCH IS SPST TOGGLE, TCW PNR 370.0004 (MFR HONEYWELL, PNR INT1-2).
 - ⑥ EXISTING CIRCUIT BREAKERS ARE PS50120-1-5 OR EQUIVALENT (10A RATING) AND PS50120-1-2 OR EQUIVALENT (5A RATING). MARK CIRCUIT BREAKER WITH SAME SIZE IDENTIFIERS AS USED ON EXISTING CIRCUIT BREAKER PANEL.
 7. ALL WIRE MARKING ACCORDING TO PIPER CHEROKEE SIX SERVICE MANUAL, OEM PNR 753-690, TABLE X-IV. MARKING FORMAT: CNS-GG, WHERE
C=CIRCUIT TYPE (P=POWER, RP=RADIO POWER)
N=WIRE NUMBER (1 THRU 9)
S=WIRE SEGMENT (A THRU Z)
GG=WIRE GAUGE (18 THRU 22)
 - ⑧ WIRE SPLICE TO BE WITHIN 3 INCHES OF GNS 430W CONNECTOR.

Figure 2: IBBS Wiring Diagram for PA-32 (from 725.0006, Revision 1.8)

5 Additional System Notes

The IBBS has been authorized under Technical Standard Order (TSO) C179a, Permanently Installed Rechargeable Lithium Cells, Batteries, and Battery Systems. The TSO Authorization (TSOA) was completed under a separate certification project, FAA Project PT10025NE.



U.S. Department
of Transportation

Federal Aviation
Administration

OCT 02 2019

Aircraft Certification Service
Compliance & Airworthiness Division

New York ACO Branch
1600 Stewart Avenue, Suite 410
Westbury, NY 11590
(516) 228-7300, Fax: (516) 794-5531

Mr. Robert C. Newman Jr.
Owner
TCW Technologies, LLC
2955 Main Road East
Emmaus, PA 18049

Subject: Issuance of Supplemental Type Certificate (STC) - FAA STC No. SA04400NY

Dear Mr. Newman:

This letter refers to your application for Supplemental Type Certificate for the Installation of an Integrated Back-up Battery System on a Piper PA-32 series aircraft. The corresponding FAA Project Number is ST08596NY-A.

We have reviewed the information submitted by your office and approve the installation in accordance to TCW Technologies, LLC Master Data List, Document No. 760.0011 Rev 1.2, dated September 19, 2019. Also, approved is the TCW Technologies, LLC Pilot's Operating Handbook Supplement, Document No. 725.0005, Rev 1.5, dated August 13, 2019.

We also accept the Instructions for Continued Airworthiness (ICA), Document No. 725.0008 Rev. 1.3, dated June 26, 2018.

Please find enclosed the following documents:

1. STC No. SA04400NY issued September 26, 2019
2. FAA approved Pilot's Operating Handbook Supplement, Document No. 725.0005, Rev 1.5, dated August 13, 2019.

A copy of the STC and required documents should accompany the installation. Also, your attention is directed to the limitations and conditions specified on the STC, and to the enclosed copy of "Information Concerning Your Responsibility as a Holder of a Supplemental Type Certificate."

If you have any questions relating to the above information, please contact Mr. John DeLuca at (516) 228-7369.

Sincerely,

Anthony E. Gallo
Manager, New York ACO Branch
Compliance & Airworthiness Division

for
Enclosures