



COLD WEATHER MODIFICATION

OPERATING GUIDE

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FOR

**TSTPW100-2209 SERIES
PREHEAT SYSTEMS**

ON

**PRATT AND WHITNEY
PW100 TURBOPROP ENGINES
118/120/121/123**

Aircraft Registration: _____

Installed Preheat System Electrical Specifications:

Voltage: _____ Wattage: _____ Amperage: _____

(This page and Appendix completed at time of installation)

PROPRIETARY DATA

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RECORD OF REVISION

When updated, this document is changed in its entirety.

REV	DATE	DESCRIPTION	BY	APPROVAL
B	SEP-05-2014	Document title change Operating Guide	DNE	
A	NOV-20-2013	Initial Release	DNE	DNE

DOCUMENTATION SUPPORT

It is the responsibility of the user of this, and other document, to verify the latest revision is being used. Revision updates may be obtained by contacting:

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A. PURPOSE AND SCOPE

The purpose of this guide is to provide instruction for the proper and safe use of the Tanis Engine Preheat Systems installed on this aircraft, and to aid the operator in complying with standard aviation and airframe/engine manufacturer's procedures.

For specific instructions relating to engine starting and cold weather operations, refer to applicable AFM (Airplane Flight Manual), FAA Advisory Circular - Cold Weather Operation of Aircraft AC No: 91-13C, and procedures set in place by the operator,

Instructional reference to other cold weather modifications, such as interior heaters, covers and cowl plugs, are not part of this cold weather modification and are not included in this Operating Guide. Weather planning and aircraft preparation are the responsibility of the operator.

This system does not change existing environmental flight restrictions.

B. GENERAL INFORMATION

Aircraft engine preheating is recommend at temperatures at/or below 0.0°C / 32°F. Engine manufacturers require engine preheat when an engine has been cold soaked or exposed to a temperature with a wind chill factor of -6.7°C / 20°F° or below, for a period of 2 hours or more.

The Tanis Preheat Kit installed on this aircraft is for the engines, and battery system when installed. Consult the aircraft equipment list for options that may be installed in conjunction with the main preheat kit.

A cold soaked engine may start only to cause damage that shows up later. Rapid heating after a cold start coupled with rapid expansion of parts and poor lubrication can damage or cause excessive wear that can lead to poor engine operation, premature engine repairs, overhaul, or failure. Single point, inadequate, or superficial application (forced air) of heat does not evenly heat internal engine parts or de-congeal oil throughout the engine.

The system installed on these engines applies a thorough even application of heat to all engine parts, increasing reliability and safety of operations, reducing thermal stress, torque oscillations, warm-up, and launch times.

1. Engine Preheating

Preheating is accomplished using electrical resistance elements that heat entire engine, fluids, and attached accessories. Heated components reach an average state of thermal equilibrium in six hours, with a temperature rise of approximately 33.33°C ± 5.56 / 60° F ± 10, over ambient air temperature. The preheat system is self-regulating by design; it is not to be cycled on and off, timers and thermostats are not to be used.

Power is routed to the heat elements through a dedicated wiring assembly with circuit protection (listed in Section F), and red power indicator light.

2. Power Requirement

Voltage requirement is +/- 10% of placarded voltage. Shore power plug and placard (Figures 1 and 2) identify system voltage.

System wattage, and amperage draws are listed on the cover page.

A ground based power source capable of supplying or producing required voltage and load for the duration of operation is required. This is commonly AC (alternating current).

3. Power Connection

⚠ Caution: Undersized cord will cause a drop in line voltage and loss of power, with possible overheating of cord.

Shore power and connection (extension cord), are the responsibility of the operator. Extension cord is to be in good condition and of adequate gauge to carry the total current draw of the system. A wire gauge of at least 16 is recommended for an extension cord 50 feet or less in length (Table 1). A cord exceeding 100 feet is to be 10 gauge or heavier; if in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.

Table 1 - Extension cord specifications

Conductor gauge/wires:	Maximum amps:	Maximum length:
16/3	13 A	50'
14/3	15 A	50'
	13 A	100'
12/3 10/3	15 A	100'
	15 A	100'

(Circuit protection 12-Amp fuses)

Note: For global standardization, the preheat systems power connection point (shore power plug), is configured with a non-locking blade type NEMA connector, reference Figure 1. Corresponding receptacle connector is required on power supply (extension cord), and are commonly supplied with the 230-volt kits. Approved receptacles are available though Tanis (TP02872-115, TP02829-230).

4. Plug and Placard

The shore/ground power connection point on aircraft is the Shore Power Plug. Locations vary by installation; however, the most common location is on the engine or near the oil filler tube. Placard with voltage requirement is located adjacent to the shore power plug (Figures 1 and 2).

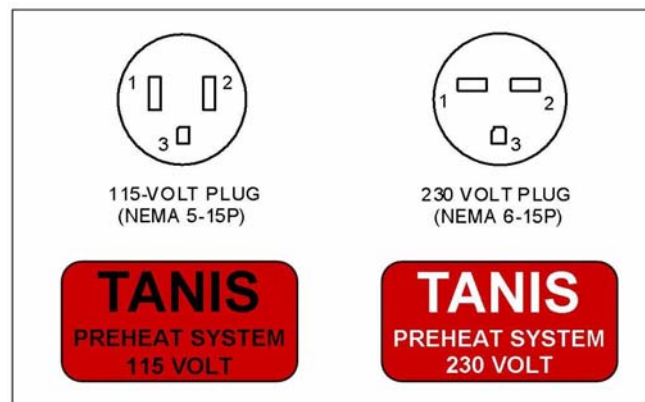


Figure 1 - Plugs and placards. Alternate placard stating *Tanis* and *voltage* requirement is acceptable.

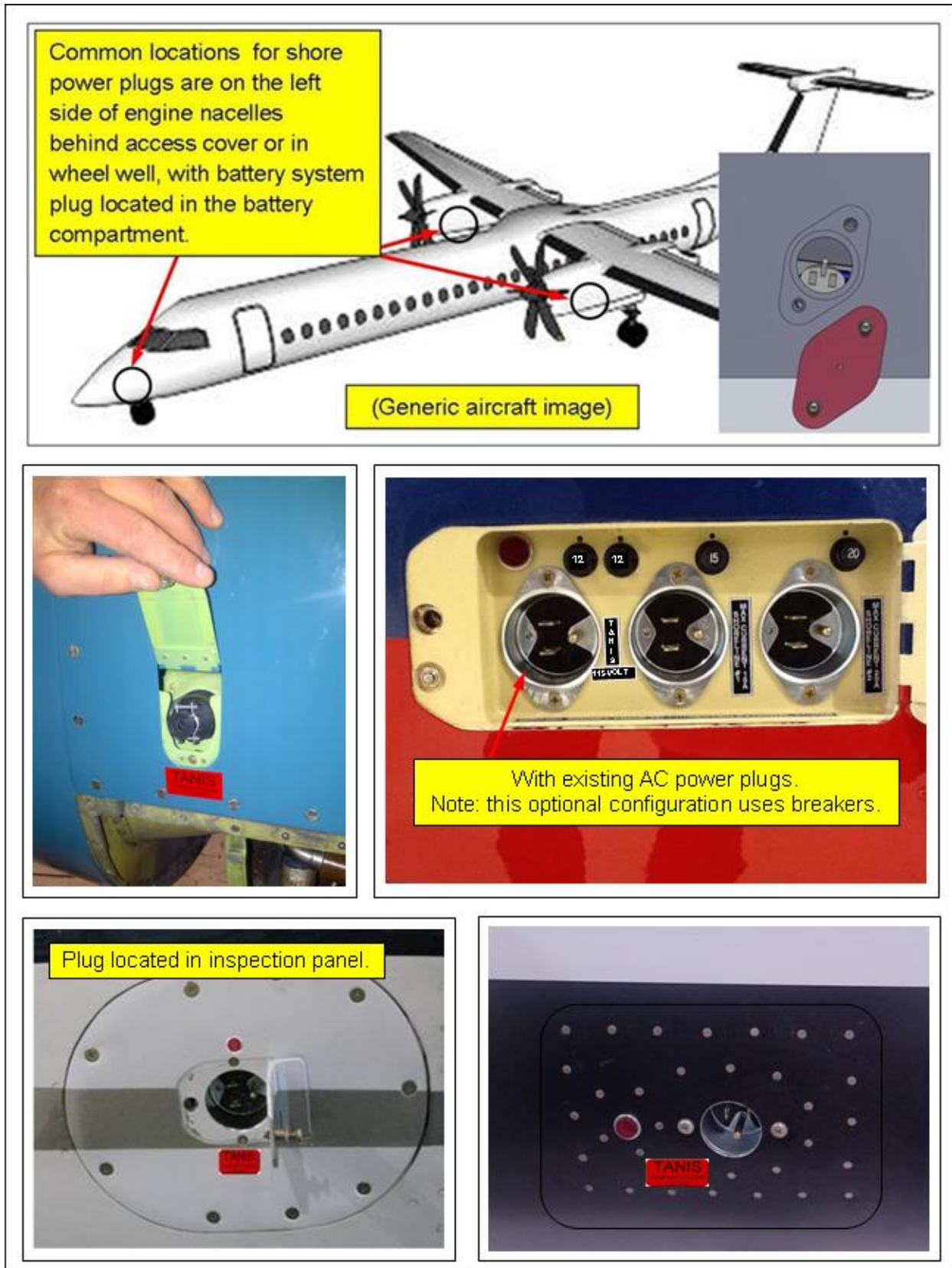


Figure 2 - Generic example of plug locations individual installations may vary.

C. SYSTEM OPERATION

 **Caution:** Do not touch hot elements as they can burn bare skin.

The aircraft is not to be fueled and engine is not to be operated while the system is connected to shore power or extension cord (plugged in). System is not to be cycled on and off (timers and thermostats are not to be used).

1. Guidelines

Use fluids and oils as recommended by the manufacturer for conditions of flight, and only operate the preheat system with aircraft fluids at operational levels.

- 1.1. When available, follow specific preheat instruction provided by airframe and/or engine manufacturer.
- 1.2. Design is for continual operation in all weather and temperature conditions while on the ground.
- 1.3. For maximum benefit, system should be in continual operation for 6 hours or longer before engine start (approx. temp. rise of 60°F / 33.33°C over ambient).
- 1.4. When operating at temperatures with a wind chill of -12°C / +10°F and below, the use of insulated engine cowl cover is suggested. Available separately, insulated covers increase efficiency by insulating and acting as windbreak.
- 1.5. When the system is connected to power, the red indicator light will turn on (illuminate), and elements will begin to heat. Verify operation after about 30 minutes by reaching into the cowl and feeling for warmth.

2. Control

Connection to ground/shore power controls operation.

- 2.1. Activate the system by connecting (plugging) system into appropriate shore power.
- 2.2. Deactivate the system by disconnecting (unplugging) the system.

3. Preflight Procedures

Follow applicable aircraft Preflight Procedures and Check Lists, adding the following:

- 3.1. Remove engine and airframe cowl plugs and/or covers, if used.
- 3.2. Verify system has been in operation for the required period of time, and check to see that the power indicator light (if used) is on and the engine feels warm.
- 3.3. Unplug/disconnect extension cord from aircraft.
- 3.4. Latch any access doors that were open.
- 3.5. Stow extension cord in appropriate location.
- 3.6. Start the aircraft following normal starting procedures.

4. Post Flight Operation

Preheat system may be plugged in after full engine shut down.

- 4.1. Once the aircraft is secured, plug the system in and check to see that the power indicator light is on (illuminated).
- 4.2. If used, install engine cowl plugs and/or covers per manufacturer's instructions.

D. WEIGHT AND BALANCE

Equipment List and Weight & Balance figures recalculated at time of system installation.

E. HANDLING, SERVICING, AND MAINTENANCE

For detailed information regarding maintenance, installation and electrical values, refer to specific installation instructions and ICA listed in the Appendix.

F. MALFUNCTION PROCEDURES

Should a malfunction be detected, such as tripped circuit protection (blown fuse), smoke, or lack of heat, disconnect the system from power and placard (flag) as inoperative IAW (In Accordance With) applicable regulations if eligible, or defer, IAW approved MEL/NEF (Minimum Equipment List / Nonessential Equipment Furnishings) if applicable, and inspect before flight. Repairs are to be conducted by appropriately rated and certified technician or maintenance/repair facility.

For fuse replacement, disconnect system from power and replace fuses. For direct replacement use Tanis part number TU02848, 12-Amp 1.25x.25 ceramic tube fuse. Acceptable alternates: Bussmann ABC-12 or AGC-12.

APPENDIX - INSTALLATION LOG

Date of Installation: _____

Installed Preheat Kit(s): _____

Installation Instruction: _____

Document - Revision - Date

Instructions for
Continued Airworthiness (ICA): _____

Document - Revision - Date

(This page and the cover page completed at the time of installation)

***** NOTHING FOLLOWS *****