TANIS
AIRCRAFT PRODUCTS

COLD WEATHER MODIFICATION

OPERATING GUIDE

Document No: TPG0001, Rev. F
Dated: APR-11-2014

FOR

PISTON ENGINE
PREHEAT SYSTEM

Aircraft Registration: N98819

Installed Preheat System Electrical Specifications:

Voltage: 120 VAC Wattage: 1800 watt Amperage: 15 amps

(This page and Appendix completed at time of installation)

RECORD OF REVISION

When updated, this document is changed in its entirety.

REV	DATE	DESCRIPTION	BY	APPROVAL
F	APR-11-2014	Add water cooled description Section B 1.	DNE	Dirk Ellis
E	FEB-21-2014	Section A callout titles of AC, SIL, and SI	DNE	DNE
D	FEB-12-2014	Title change to Operating Guide	DNE	DNE
C	JUL-19-2012	Formatting change	DNE	RCK

CONTENTS

A. PURPOSE AND SCOPE

The purpose of this guide is to provide instruction for the proper and safe use of the Tanis Engine Preheat System 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 POH (Pilots Operating Handbook) and/or AFM (Airplane Flight Manual), FAA Advisory Circular - Cold Weather Operation of Aircraft AC No: 91-13C, and per make and model, Continental Service Information Letter - Engine Preheating SIL 03-1, and Lycoming Service Instruction - Cold Weather Starting No. 1505.

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.

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 of engine preheat does not evenly heat internal engine parts or de-congeal oil throughout the engine.

The multi-point engine preheat system installed on this aircraft engine properly applies a thorough even application of heat to all engine parts, increasing reliability and safety of operations, reducing thermal stress, run-up, and launch times.

1. Engine Preheating

Preheating is accomplished using electrical resistance elements that heat the entire engine, all fluids, and attached accessories. Horizontally opposed piston engines have elements located in each cylinder assembly, and on the crankcase/sump. Liquid-cooled piston engines have elements located in the crankcase water jacket, sump, and propeller reduction gearbox. 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 if installed.

2. Power Requirement

The system does not operate in flight, is not connected to or dependent on aircraft systems, and is only capable of operation when connected to a ground based power source.

System design is for operation at plus or minus 10% of system voltage requirement.

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).

The shore power plug and placard (Figures 1 and 2) identify system voltage. Specific voltage and amperage requirements for the system installed on this aircraft are recorded on the cover page. For detailed electrical values and maintenance information, reference recorded documents in Appendix.

3. Power Connection

Shore power and connection (extension cord), are the responsibility of the operator. 230-volt systems are supplied with receptacle plug adapter (TP02829-230), for field installation on extension cord supplied by 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 not recommended; if in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord. Note that an undersized cord will cause a drop in line voltage and loss of power, along with possible overheating of 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	15 A	100'
10/3	15 A	100'

(Circuit protection 12-Amp fuses)

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).

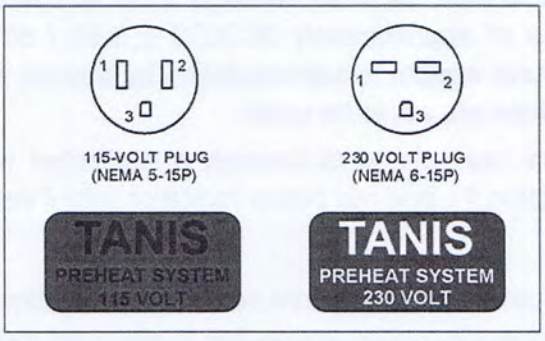

Figure 1 - Plugs and placards. Alternate placard stating "TANIS" and voltage requirement is acceptable.

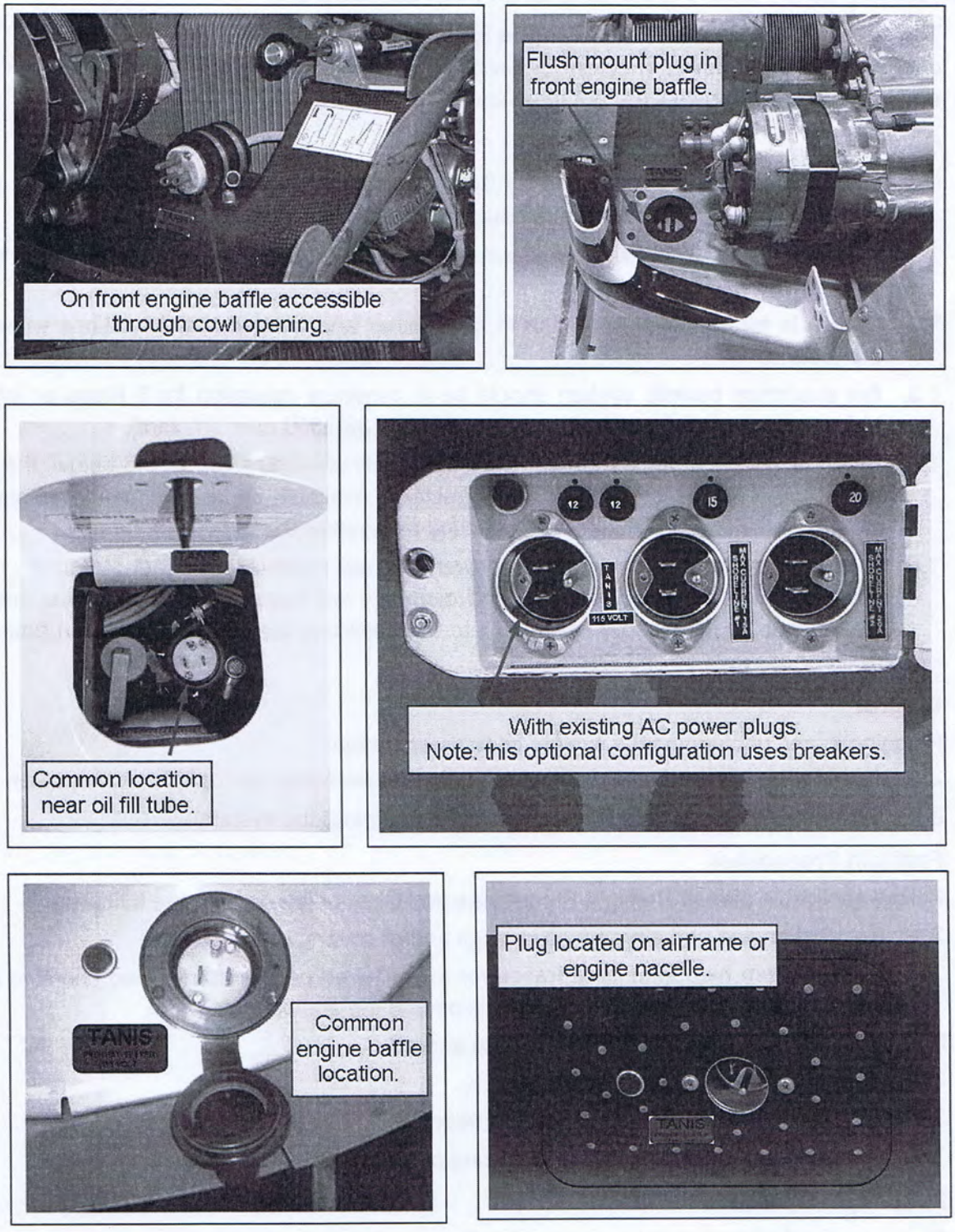

Figure 2 - Shore power plug and placard locations vary by installation. The shore power plug is accessible through oil door or cowl opening or located with other ground plugs.

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 (not standard on all systems) 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 on both the cylinder assemblies and crankcase.

2. Control

Plugging in and unplugging the system 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

Engine preheat system may be plugged in after full engine shut down.

4.1. Once the aircraft is secured, plug the system in and verify the system is operating.

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 applicable regulations if eligible, or defer IAW approved MEL/NEF if applicable, and inspect before flight. Repairs are to be conducted by appropriately rated and certified technician or maintenance/repair facility. For trouble shooting, inspection and repairs refer specific installation instructions and ICA listed below.

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 are Bussmann ABC-12 or AGC-12.

APPENDIX - INSTALLATION LOG

Date of Installation: 1/09/2017

Installed Preheat Kit(s): _____

Installation Instruction: APR-11-2014
Document - Revision - Date

Instructions for
Continued Airworthiness (ICA): to be entered at later date
Document - Revision - Date

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

***** NOTHING FOLLOWS ****