AIRCRAFT PRODUCTS
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INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

TICA2034

REV A, SEP-13-2013

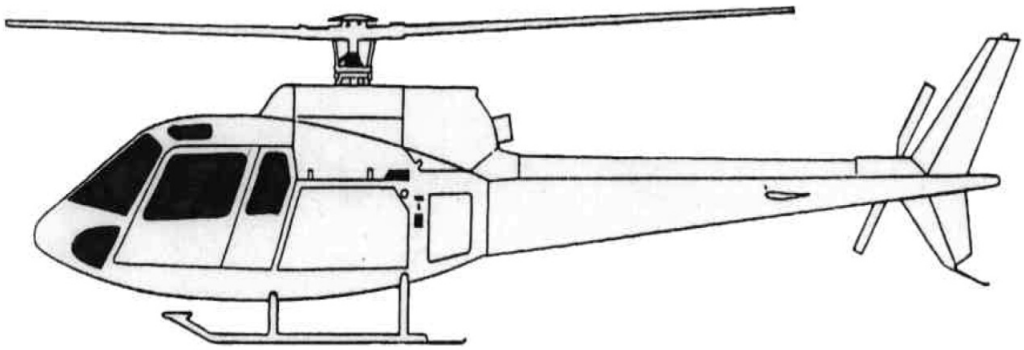
FOR

HELI-PREHEAT SYSTEMS

TSHAS350-2034-115 AND TSHAS350-2034-230

(115VAC and 230VAC SYSTEMS)

ON



EUROCOPTER

MODEL: AS350B1/B2/BA

WITH

ARRIEL 1D/1D1/1B

Registration No._____ Serial No._____

TITLE PAGE

This supplement must be attached to the applicable Approved Maintenance Manual when the Tanis Preheat System is installed. Information in this manual supplements or supersedes the basic manual only in those areas listed.

RECORD OF REVISIONS

When updated, this document is changed in its entirety.

REV	DATE	DESCRIPTION	BY	RELEASE
A	SEP-13-2013	Initial Release	DNE	Dirk Ellis Digitally signed by Dirk Ellis DN: cn=Dirk Ellis, o=Tanis Aircraft, ou=Engineering, email=Dirk@TanisAircraft.com, c=US Date: 2013.10.01 08:43:08 -05'00'

DOCUMENTATION SUPPORT

It is the responsibility of the user of this document to verify that this is the latest revision released by Tanis Aircraft Products. Use the information below to get the latest version of this and other documents.

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CONTENTS

1. INTRODUCTION

Preheating heats the engine, critical driveline components, fluids, and battery (when installed). Operation of the system for the prescribed time reduces torque oscillation, thermal stress, spool up, and launch times, while increasing reliability and safety of operations.

1.1 General Product Information

The preheat system is only operated on the ground while connected to a ground based AC power source. Power supply and shore power line (extension cord) are supplied by the operator.

1.2 Scope of ICA

The purpose of the ICA is to aid the operator in creating an acceptable maintenance program that complies with standard aviation processes and airframe/engine manufacturer's recommendations.

These Instructions for Continued Airworthiness (ICA) contain the necessary information for carrying out the ongoing maintenance and inspections of the Tanis Preheat System.

1.3 Distribution of ICA

From time to time, it may be necessary to revise or update information contained in this ICA. Best efforts will be made to distribute revisions and updates to the registered owner of the product. However, it is the responsibility of the current user to ensure the most current information available is being used. For revision information, refer to page 2 and Section 3.0 of this document.

2. AIRWORTHINESS LIMITATIONS

There are no "life limited" parts in the Tanis Preheat System. Part life is based on condition per inspection. The system is not used in flight, and there are no limitations associated with this system. The Airworthiness Limitations Section of the FAA specifies inspections and other maintenance required under §§ 43.16 and 91.403 of the Federal Aviation Regulations, unless an alternative program has been FAA approved.

3. RECORD OF REVISIONS

Required revisions to this ICA will be made by Tanis Aircraft Products.

Revision updates and additional copies of this ICA may be obtained by contacting Tanis Aircraft Products, see page 2 for contact information.

When the latest update is received, the previous revision in its entirety should be discarded. Ensure that all pages of the document are marked as the latest revision.

4. DESCRIPTION

Consult the aircraft records and equipment list for any optional Tanis modification installed in conjunction with the preheat kit.

4.1 System

Aircraft preheating is accomplished through electrical resistance heat in the form of thin pads sized and shaped to fit various parts. The pads are surface mounted with a bonding adhesive. Heated items include engine reduction gearboxes, attached accessories, battery, main and tail rotor gearboxes, plus oil and hydraulic tanks. Power is routed to

the heat elements through a dedicated wiring assembly with power indication, and circuit overload protection. The system is self-regulating through design. Heated components reach an average state of thermal equilibrium in six hours.

4.2 Power Requirements

4.2.1 Power supply and shore power line (extension cord) are supplied by the operator.

4.2.2 Kits are available in two separate AC voltage configurations: 115 volt or 230 volt. Design is for operation at +/- 10% of the system voltage requirement. Circuit protection is in the form of 12 amps fusing.

4.2.3 The system does not operate in flight and is not connected to, or dependent on, aircraft systems.

4.2.4 Power requirement for parts are identified through part number and use the same installation procedures, locations, and cable kit.

4.3 Options

Depending on specific operational requirements, modifications or additional kits may be installed in conjunction with engine preheat kit. Modifications such as additional elements, twin engine interconnect, battery, and avionics heat, are acquired separately, and installed through separate approval. Total operational load per shore power plug is not to exceed 12 amps.

4.4 Installation

While the following figures and associated narratives describe the installation of a typical base kit, actual installation may vary. Consult aircraft records and equipment list for options and/or modifications that may have been installed in conjunction with the kit. Wire routing is to follow industry standards, acceptable methods, techniques and practices, airframe and engine manufacturer's procedures. Reference kit instructions for installation details.

4.4.1 For detailed installation documents, reference Section 6, Table 6-1.

4.4.2 Shore power plug and indicator light are mounted aft the rear door near the step or right/starboard side of the upper transmission deck in bracket (Figure 4-1).

4.4.3 Placard is located adjacent to the shore power plug (Figure 4-2). This can be the standard Tanis placard, or a placard that states, at a minimum, *Tanis* and the system voltage requirement, *115 Volt* or *230 Volt*.

4.4.4 Cable kit consists of 18 and 20 gauge 22759 two conductor white and black wire in red Teflon jacket, sealed connectors and two interconnected junctions (Figure 4-3).

4.4.5 Pad heat elements, are silicone pads, with 6-inch leads, sealed pin connectors, and labeling (Figure 4-4).

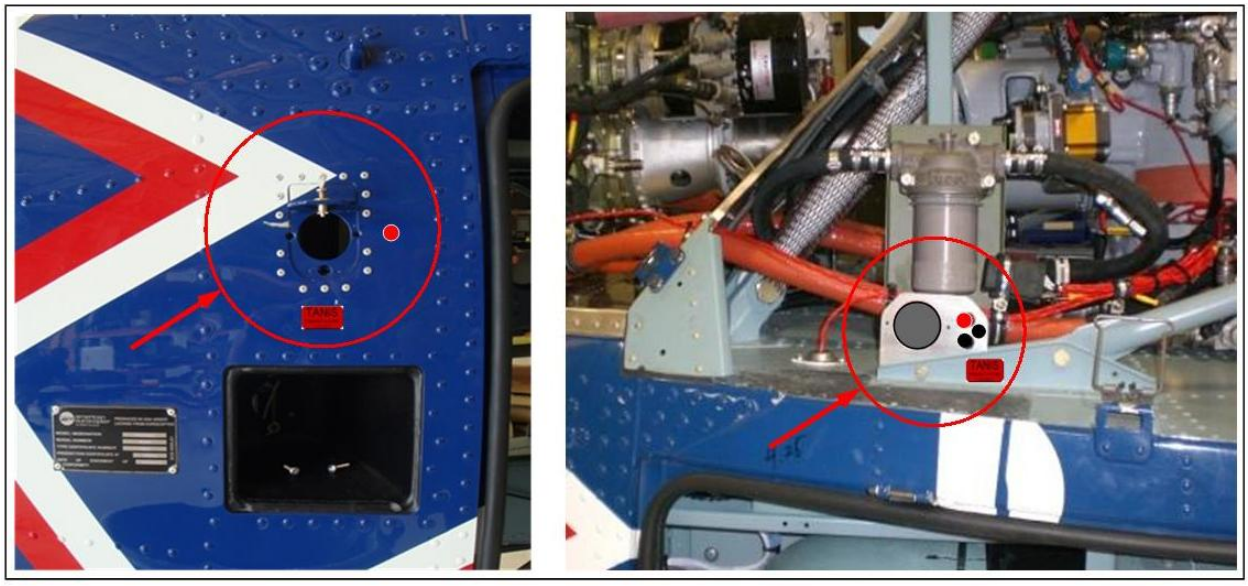

Figure 4-1 Locations: Shore power plug and power indicator (light).

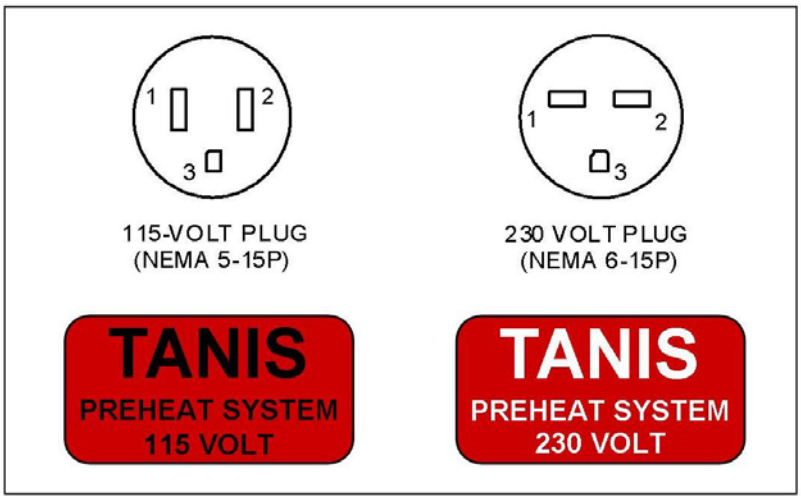

Figure 4-2 Shore power plug types and Tanis placards or placard that states, at a minimum, *Tanis* and the system voltage requirement, *115 Volt* or *230 Volt*.

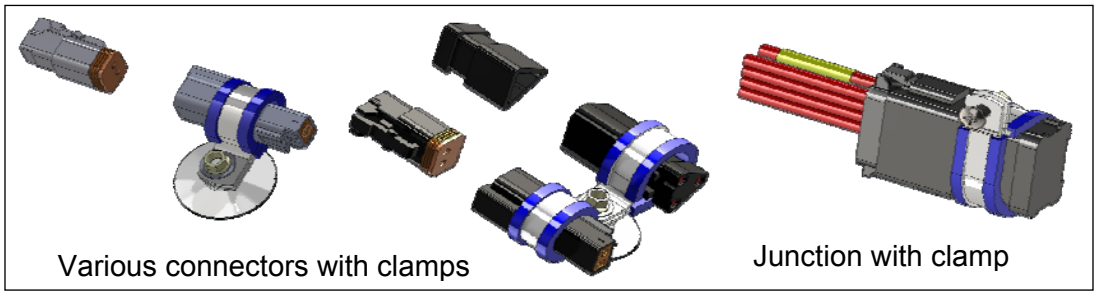

Figure 4-3 Connector and junction mounting using cushioned clamps..

Figure 4-4 Example of element and part number label (TEP2653-115/40).

5. CONTROL AND OPERATION INFORMATION

5.1 Control

5.1.1 Reference Tanis FMS (TFMS2034) for more information.

5.1.2 The preheat system is not connected to or controlled by aircraft systems.

5.1.3 Heating is self-regulated through design. Should the system be equipped with battery heater, this portion of the system thermostatically limits the operation of the battery element to temperatures below 0˚C (32˚F).

5.1.4 Design is for continual operation in all weather and temperature conditions while in stand-by status. Follow specific instruction provided by airframe and or engine manufacturer.

5.1.5 For cold weather aircraft operations and engine starting procedures, refer to the appropriate aircraft manufactures operating procedures, Service Information Letters (SIL) Service Instruction (SI), Flight Manual Supplements (FMS), and FAA Advisory Circulars (AC).

5.2 Operation

5.2.1 Operation is controlled by plugging the system into an appropriate AC ground power source.

5.2.2 Do not fuel or operate aircraft systems with the preheat system plugged in.

5.2.3 Only operate the system with fluids at operational levels.

5.2.4 When operating at -12°C (+10°F) and below, the use of insulated engine cover(s) increases the efficiency of preheating operation, retaining heat and acting as a windbreak.

5.2.5 The system can be operated immediately after full engine shut down.

5.2.6 For the system to be of maximum benefit when temperatures are at or below 0°C (32°F), it should be in continual use for a minimum of 6 hours before engine start.

6. REMOVAL AND REPLACEMENT INSTRUCTIONS

Should the engine, gearbox or part supporting a preheat component require removal for replacement or repair, remove the heat element(s) and appropriately cap off and secure associated wiring. Placard inoperative IAW applicable regulations if eligible, or defer IAW approved MEL/NEF if applicable.

Transfer of the STC to a replacement requires the written consent of Tanis Aircraft Products.

For preheat kit and individual component installation and/or replacement, reference below (Table 6-1). Contact Tanis Aircraft products or go to www.TanisAircraft.com (Section3) for latest revisions.

Table 6-1 Reference Documents.

2034	Preheat Kit - Item List
02613	Cable Kit - Wire Diagram
TNH2034	Instruction - Preheat Installation
TN01026	Instruction - Indicator
TN01056	Instruction - Fireproof Grommet
TN02070	Instruction - Shore Power Plug
TN02782	Instruction - Click Bond
TN02788	Instruction - Pad Bonding
TN02793	Instruction - Connector
TN02840	Instruction - Plug door

7. SERVICING INFORMATION

7.1 Cleaning

Clean the components in accordance with standard aviation processes and airframe/engine manufacturer's recommendations.

7.2 Part Replacement

Components are to be repaired or replaced upon failure or damage. (Reference Section 6 and Table 6-1).

7.3 Aircraft Parts Servicing

When aircraft parts with heat elements are removed for servicing, re-install new elements or kits on the replaced or serviced part. Perform functional system check (Section 8.6) before returning to system to service.

7.4 Service Information

For guidance to other service information, see Section 6 and 8.

8. MAINTENANCE AND INSPECTION INSTRUCTIONS

Inspections are the only form of scheduled maintenance required under normal flight conditions and operations. Maintenance and repairs are to be carried out in response to operational concerns and/or inspection discrepancies (Reference Section 6, Table 6-1).

8.1 Maintenance

8.1.1 Maintenance is to be recorded under 14 CFR Part 43.9, unless an alternative program has been approved. Repairs are to conform to applicable standards, reference 43.13 1-b, 11.

8.1.2 Visual and operational check is to be accomplished by an appropriately rated maintenance/repair facility.

8.1.3 Cleaning is to be performed in accordance with aircraft airframe, engine, and appliance manufacturer's recommendations.

8.1.4 When equipped with modifications or options such as avionics heaters, reference individual maintenance documents.

8.2 Intervals

8.2.1 Inspection intervals called out are the maximum allowable and are not to be exceeded.

8.2.2 Inspections are to be performed at each annual or equivalently scheduled inspection.

8.2.3 Minimum of one (1) check per 12-month cycle is required.

8.2.4 In addition, it is recommended that the system operational status be checked seasonally.

8.3 Inspection

8.3.1 Clean prior to inspection (Section 7). Inspect the system installation for security of attachment by following cable leads from the shore power plug to each element and the indicator light. Examining the system power plug, indicator light, cable leads, junction, and elements. If any portion of the cabling shows signs of fatigue, chafing, flexing, or vibration, re-secure. (Reference 43.13-1b, Chapter 11 Sections 1, 3, 4, and 8 for additional electrical inspection and repair information, and cable kit wire diagram (02613) wiring/harness configuration).

8.3.2 If any portion of the pad heat element comes loose, it may be re-bonded or replaced (TN02788 Instruction - Bonding).

8.3.3 Replace pad element developing areas of gray/yellow. These are signs indicating that a pad has failed, or is in the process of failing, due to poor contact with the substrate.

8.3.4 Perform replacement and/or repairs as required (Reference Section 6, Table 6-1 for more information).

8.4 Functional System Test

⚠ Caution: Energized elements can burn bare skin.

8.4.1 Perform a function test once system inspection has been completed.

8.4.2 Plug the system into an appropriate power source.

8.4.3 Indicator light is a non-filament bulb, testing must be done with power.

8.4.4 When the system is connected to power and circuit protection is functioning, the light is on.

8.4.5 In about 30 minutes, the area next to the elements should feel warm.

8.4.6 Optional battery heater. Due to the commonality of the installation, a brief inspection is listed. Battery heat kit is installed through separate approval (8.1.4).

8.4.7 Verify operation of thermal control by cooling it to below 0° C (32° F).

8.4.8 When the thermo control is below freezing, the circuit is closed and the circuit should read *resistance* (battery element *would be operational*).

8.4.9 When the thermo control is in a condition above freezing, the circuit should read *open* (battery element *would not be operational*).

9. LIST OF SPECIAL TOOLS

- Ohmmeter that is certified to traceable standard is required for proper inspection.
- Frozen ice pack or circuit cooling spray.

Suggested tools for cable and connector repairs include:

- Deutsch contact remover tool: DT-RT1
- Tanis 4 way indent crimp tool: TU02793 or Alt DMC crimp tool: AF8-TH163

10. TROUBLESHOOTING

⚠ Caution: Do not touch hot elements, they can burn bare skin.

Before proceeding, verify system is not powered, or connected, to a power source.

Verify that all elements are properly connected and bonding sealant is cured.

Follow in sequence, record as indicated, and check off when completed.

If a discrepancy is found, correct before proceeding to the next step (Reference Section 6 Table 6-1, for component document if needed).

** Skip this procedure if optional battery heat kit is not installed, or connected, with this kit.

[√] Check the system as follows:

1. [ ] Verify system components are installed in accordance with kit installation instructions.
2. [ ] Verify engine to airframe bonding is as per OEM requirements.
3. [ ] Verify Tanis system ground by checking for continuity between shore power plug ground, pin 3 (Figure 4-1), engine, and airframe.
4. [ ] Using an ohmmeter, verify there is no continuity between shore power plug power pins 1 and 2, and the ground pin 3.
5. [ ] Using an ohmmeter, measure and record resistance between the plug power pins 1 and 2. Preheat system resistance: _____, (Table 3-1)

   ** For total resistance testing with battery element connected, freeze battery thermo control, and record. Total systems resistance with battery heater: _____.
6. [ ] Connect the system to appropriate AC power source.
7. [ ] System Indicator light on.
8. [ ] In about 30-minutes the area next to the elements should feel warm. Check each element individually. **While the system is warming up, freeze (0°C) the battery thermo control and test battery heat element for heat. This element can be touched, as wattage density is low.

Individual elements are tested measuring resistance across the element contacts, values are located in installation manual, and section 12.0 Data.

Table 10-1 Troubleshooting.

SYMPTOM	PROBABLE CAUSE	MAINTENANCE ACTION
Indicator light doesn't light when attached to shore power.	Circuit protection "blown".	Remove power and replace fuse.
	Voltage too far out of range.	Connect to appropriate AC power source.
System does not produce any heat.	Circuit protection "blown".	Remove power and replace fuse.
	Ground shore power cord not providing power.	Connect cord and check power at source (wall).
	Wire broken to junction A.	Check connections and wire junction.
	Shore power plug damaged.	Repair and/or replace plug.
System preheats some, but one component or more is not heating properly.	Defective element(s).	Check element with Ohmmeter. See Section 12 "Data" for values.
	Voltage too far out of range.	Connect to better AC power source.
	Wire broken.	Check connections and wire to element.
Smoke or odor occurs on newly installed system.	Off gassing occurs normally on newly installed system.	Check system for proper install.
Smoke or odor occurs on system that has been installed for at least a month.	Heat element failing. (Yellow/grey area appearing on pad).	Disconnect power. Remove and replace heat element, check rest of system for proper installation.
	Heat element dirty/oily.	Disconnect power and clean element.
Circuit protection or GFI for ground shore power supply trips.	Damaged system (Shorted wire).	Check extension cord and system for damage or short.
Battery heat element does not heat.	Temperature is above freezing.	None. Battery heater is thermostatically controlled to not heat if ambient air is above freezing.
	Thermostat is broken.	Check function of thermostat by cooling to below freezing. If not functioning, replace.

Individual elements are tested measuring resistance across the element contacts, values are located in Section 12.0 Data.

11. TABLES AND DIAGRAMS

For a complete list of reference documents containing tables and diagrams see, Table 6-1. For quick reference during maintenance or troubleshooting procedures, see Section 10.0 and 12.0.

12. DATA

Preheat system and individual element values are listed below (Table 3-1).

Table 12-1 System Values +/- 10%. *Note: Battery Heat Element varies and may not be contained below, reference applicable battery kit documents for values if required.

115 Volt System 604 or w/battery 664 Watts 5.3 or 5.8 Amps 17.9 - 24.1 Ohms

Qty	Element P/N:	Wattage	Ohms
2	TEP2650-115/120	120	110.2
1	TEP2652-115/50	50	264.5
2	TEP2658-115/7.5	7.5	1763.3
1	TEP2667-115/37	37	357.4
1	TEP2672-115/37	37	357.4
1	TEP2738-115/45	45	293.9
1	TEP2739-115/120	120	110.2
*(1)	TBP2647-31-115/60	60	220.4
*(2)	TBP2966-28-115/60	60	220.4

230 Volt System 604 or w/battery 664 Watts 2.6 or 2.9 Amps 71.7 - 96.4 Ohms

Qty	Element P/N:	Wattage	Ohms
2	TEP2650-230/120	120	110.2
1	TEP2652-230/50	50	1058.0
2	TEP2658-230/7.5	7.5	1763.3
1	TEP2667-230/37	37	1429.7
1	TEP2672-230/37	37	1429.7
1	TEP2738-230/45	45	1175.6
1	TEP2739-230/120	120	110.2
*(1)	TBP2647-31-230/60	60	220.4
*(2)	TBP2966-28-230/60	60	220.4

13. SPECIAL INSPECTION REQUIREMENTS

In addition to special inspection events, as defined by aircraft maintenance manual and this ICA, an inspection needs to take place in the event of a hard landing, lighting strike, or water immersion.

14. RECOMMENDED OVERHAUL INTERVALS

No recommended overhaul intervals exist for this system.

15. FOR COMMUTER CATEGORY AIRCRAFT

No changes are required.

16. APPLICATION OF PROTECTIVE TREATMENTS

No protective treatments required.

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