TANIS
AIRCRAFT PRODUCTS

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

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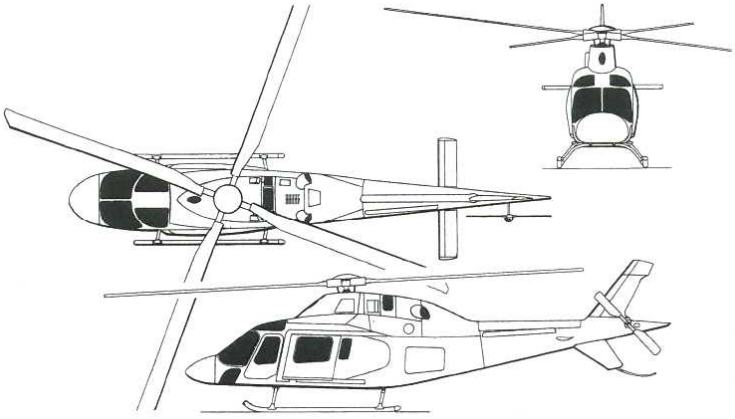
FOR
HELI-PREHEAT SYSTEMS
TSHAW119-2862-115 AND TSHAW119-2862-230
(115VAC and 230VAC SYSTEMS)
ON



AGUSTAWESTLAND
A119 AND AW119MKII
WITH
PT6B-37A ENGINE

Registration No._____ Serial No._____

This supplement must be attached to the applicable AgustaWestland (AGUSTA S.p.A) Approved Maintenance Manual when the Tanis Heli-Preheat System is installed in accordance with the applicable Supplemental Type Certificate (STC). 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
B	FEB-06-2015	Update instructions for LED light	GDO	Digitally signed by Dirk Ellis DN: cn=Dirk Ellis, o=Tanis Aircraft products, ou, email=Dirk@tanisaircraft.com, c=US
A	NOV-22-2012	Initial Release	DNE	DNE

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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TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 General Product Information

The Heli-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) is supplied by the operator. The system heats the engine, critical driveline components, fluids, and battery. 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.

1.2 Scope of ICA

These Instructions for Continued Airworthiness (ICA) contain the necessary information for carrying out the ongoing maintenance and inspections of the Tanis Preheat System. The purpose of the ICA is to aid the operator in creating an acceptable maintenance program that is in compliance with standard aviation processes and airframe/engine manufacturer's recommendations.

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.

2.0 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 other limitations associated with this system. The Airworthiness Limitations section of the FAA specifies inspections and other maintenance is required under §§ 43.16 and 91.403 of the Federal Aviation Regulations, unless an alternative program has been FAA approved.

3.0 RECORD OF REVISIONS

Required revisions to this ICA will be made by the STC holder, Tanis Aircraft Products.

For updates, see page 2 and Section 1.3 of this document. Revision updates and additional copies of this ICA may be obtained by contacting Tanis Aircraft, see page 2 for contact information. To register this system, complete and return the warranty/registration card supplied in the kit document package.

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.

4.0 DESCRIPTION

4.1 General Description

Individual component preheating is accomplished using 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 pad heat elements through a dedicated wiring assembly. Shore power door is equipped with micro switch for door open annunciation in cockpit.

4.1.1 Shore power plug door location, starboard side, aft of the rear baggage door. (Figure 4.1).

4.1.2 System plug and placards, 115 Volt and 230 Volt (Figure 4.2).

4.1.3 Preheat system wiring is red with black connectors and junctions (Figure 4.3).

4.1.4 The pad heat elements are red/orange silicone pads, with black connectors and yellow labeling (Figure 4.4).

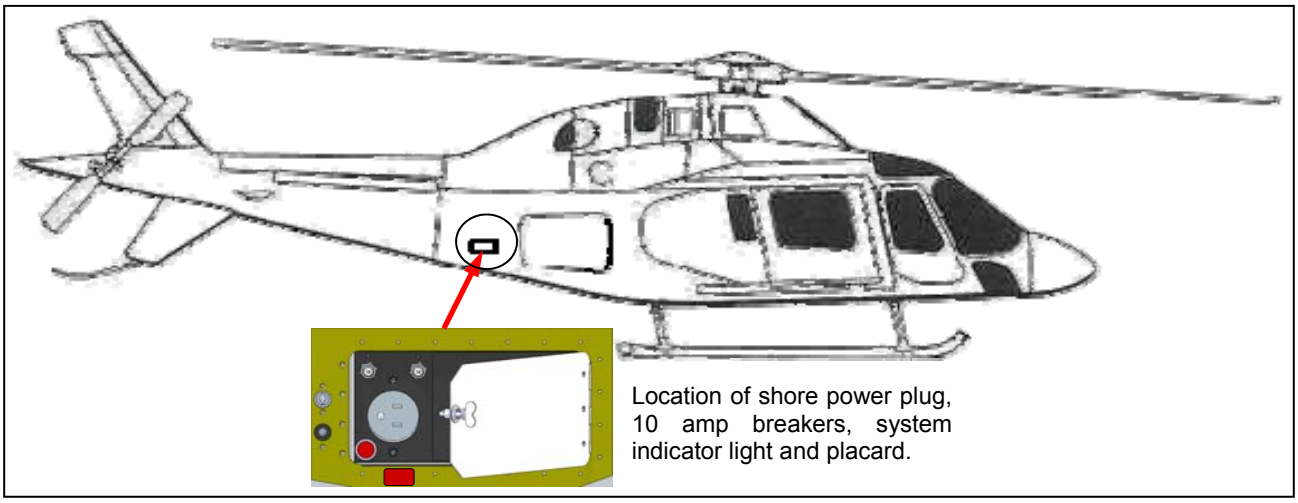

Figure 4.1 Shore power plug location

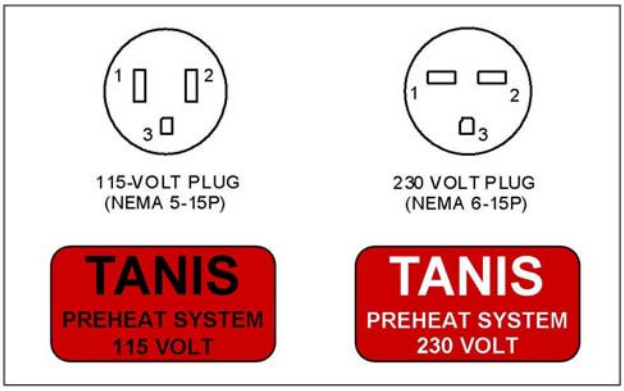

Figure 4.2 Shore power plug types and placards

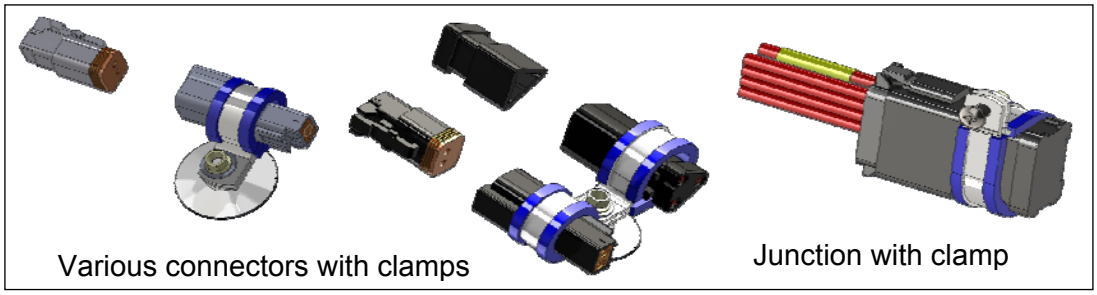

Figure 4.3 Connector and junction mounting

Figure 4.4 Example of element and part number label (TEP2653-115/40)

4.2 System Operation

The system is operated while the aircraft is on the ground in standby status connected to external AC power source of the appropriate voltage. It does not operate in flight and is not connected to, or dependent on, aircraft systems.

4.3 Power Requirements and Identification

Systems are available in two separate voltages, 115VAC and 230VAC. Voltage requirements are identified by placards, power plug type (Figure 4.2) and Flight Manual Supplements. Circuit protection is 10 amps.

Voltage dependent parts, 115 or 230 volt, use the same installation procedures, locations, and wiring kit. Voltage requirements for these parts are identified in the part number.

5.0 CONTROL AND OPERATION INFORMATION

5.1 Control

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

5.1.2 Heating is self-regulated through design. The battery heat portion of the system thermostatically limits the operation of the battery element to temperatures below 0˚C (32˚F).

5.1.3 Design is for continual operation in all weather and temperature conditions while on the ground in stand-by status.

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 The system can be operated immediately after full engine shut down

5.2.5 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.

5.2.6 When operating at temperatures of -12°C (+10°F) and below, preheating effectiveness is increased by the use of insulated covers.

6.0 REMOVAL AND REPLACEMENT INSTRUCTIONS

The weight of individual components is negligible. Should an individual kit or system component require removal for repair, appropriately cap off, secure associated wiring, and then flag the Tanis system as inoperable.

For system and individual component installation and/or replacement, reference Table 6.1 for the proper documents as required.

Table 6.1 Reference Documents

02861	Drawing - Drawing Wire Diagram
02929	Drawing - Firewall Connector Kit
02933	Drawing - Tailboom Kit
02935	Drawing - Shore Power Kit
TNDC730	Instruction - Pad Bonding
TNH2862	Instruction - Preheat Installation
TN02070	Instruction - Shore Power Plug
TN02782	Instruction - Click bond
TN02793	Instruction - Connector
TN02829	Instruction – Receptacle (230 Volt only)
TN02991	Instruction - Door Switch
TN03039	Instruction - Indicator

7.0 SERVICING INFORMATION

7.1 Cleaning

Clean the system and individual 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.

7.3 Aircraft Parts Servicing

When aircraft parts with heat elements are removed, replaced, or serviced, new elements are required to be installed before the system can be put back into service.

7.4 Service Information

For guidance on other service information, see section 8.0 and Table 6.1.

8.0 MAINTENANCE AND INSPECTION INSTRUCTIONS

Inspections are the only form of 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.

For more information, see Table 6.1 Reference Documents.

8.1 Maintenance

8.1.1 Maintenance and inspections are to be recorded and performed under 14 CFR AC 43.13-1B Chapter 11 of the Federal Aviation Regulations (FAR), unless an alternative program has been approved.

8.1.2 Complete visual and operational check is to be accomplished by an appropriately rated mechanic assigned to the aircraft.

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

8.2 Inspection 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 1 check per 12-month cycle or 300 hours is required.

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

8.3 Preheat System Inspection

8.3.1 Clean all components as required prior to inspection.

8.3.2 Inspect the system installation for security of attachment by following cable leads to each element. Examine the system power plug, cable leads, and junctions. If any portion of the cabling shows signs of fatigue, chafing, flexing, airflow, or vibration, re-secure and repair as required to conform to applicable standards.

8.3.3 If any portion of a pad heat element comes loose, it may be re-bonded by following element Bonding Instruction (TNDC730).

8.3.4 Replace any element that has developed gray or yellow areas. This is an indication of a pad that has failed, or is failing, due to poor contact with the substrate.

8.4 Shore Power Indicator Light Test

Located with shore power plug (Figure 4.1)

8.4.1 Indicator light is a neon bulb and testing must be done with power.

8.4.2 When the system is connected to power, and circuit protection is functioning, the bulb will light.

8.5 Battery Heat System Test

8.5.1 Verify operation of the thermostatic controller by disconnecting the element and cooling the thermostat to below 0° C (32° F). This may be done using an ice pack, circuit cooler spray, or other appropriate means.

8.5.2 When the thermostat is below 0° C (32° F), the circuit is closed and the ohmmeter should read resistance across the power contacts (battery element *would be* operational).

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

8.6 Preheat System Functional System Test

⚠ Caution: Energized elements can burn bare skin.

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

8.6.2 Plug the system into an appropriate power source and check to see that the indicator light is on.

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

8.7 Shore Power Door Switch (External power door)

8.7.1 Clean area as required prior to inspection

8.7.2 Inspect the switch for signs of corrosion or contaminates in areas of wire leads, switch attachment and actuator.

8.7.3 Examine switch wiring. If any portion shows signs of fatigue or chafing, re-secure and repair as required to conform to applicable standards.

8.7.4 Verify switch operation by latching the door closed. Turn on aircraft power verify that the door cockpit display caution message is not on. Then open the door and verify that the caution “EXT PWR ON” is on. Turn off aircraft power and secure door using 1/4 turn locking fastener.

8.7.5 If required adjust switch to function correctly with door actuation by following the guidance in TN02991 Instruction.

9.0 LIST OF SPECIAL TOOLS

Ohmmeter certified to traceable standard is required for proper inspection.

Suggested tools for cable and connector repairs include:

- Deutsch contact remover tool: DT-RT1
- Tanis 4 way indent crimp tool: TU02793
- Alternate crimper, DMC crimp tool: AF8-TH163

(For cable and connector procedures, reference instruction TN02793)

10.0 FUNCTIONAL SYSTEM CHECK - 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.

Detailed installation and operation documents listed in Table 1.

For assistance in correcting discrepancy, refer to Troubleshooting table listed in Table 3.

[√] Check the system as follows:

1) [ ] Verify system is installed in accordance with preheat 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 4.2), 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) [ ] Calculate total system wattage by adding up the wattages for each individual element recorded in Table 12.1
6) [ ] Freeze (0°C) battery thermostat, for full system resistance. (This element can be touched, wattage density is low).
7) [ ] Using an ohmmeter, measure and record resistance between plug pins 1 and 2, and record resistance: _____.
8) [ ] Calculate wattage using resistance from step 5 (Volts^2 / Resistance = Watts):_____wattage. Compare with calculated wattage from Table 12.1, Verify within +/- 10%.
9) [ ] Connect the system to appropriate power source.
10) [ ] Verify power indicator light is on (illuminated).
11) [ ] In about 30-minutes the area next to the elements should feel warm. Check each element individually.

Table 10.1 Troubleshooting

SYMPTOM	PROBABLE CAUSE	MAINTENANCE ACTION
Indicator light doesn't light when attached to shore power.	Circuit protection "blown".	Reset breaker or replace fuse.
	Voltage too far out of range.	Connect to better AC power source.
System does not produce any heat.	Circuit protection "blown".	Reset breaker or 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 minimally, but one component or more is not heating properly.	Bad 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 on pad).	Disconnect power. Then remove and replace heat element. Check the rest of the system for proper installation.
	Heat element dirty.	Remove power and clean element.
Circuit protection or GFI on ground shore power continually trips.	Damaged system (shorted wire).	Check entire 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.

11.0 TABLES AND DIAGRAMS

For a complete list of reference documents containing tables and diagrams see, Table 6.1 of this document, for quick reference during maintenance or troubleshooting procedures see Section 10.0 and 12.0.

12.0 DATA

System and element electrical values. Parts are tagged with yellow label (Figure 4.0).

*Note: Battery Heat Element varies by battery installed.

Table 12.1 Electrical Values +/- 10%.

115 Volt System 802 Watts 7.0 Amps 16.5 Ohms

Qty	Element P/N:	Wattage	Ohms
1	TEP2650-115/120	120	110.2
1	TEP2653-115/40	40	330.6
1	TEP2653-24-115/40	40	330.6
2	TEP2658-115/7.5	7.5	1763.3
1	TEN2715-36-115/18	18	734.7
1	TEP2865-115/120	120	110.2
1	TEP2866-115/70	70	188.9
1	TEN2867-60-115/75	75	176.3
1	TEN2868-36-115/120	120	110.2
1	TEP2869-115/110	110	120.2
*(1)	TBS2646-31-115/60	60	220.4
*(1)	TBS2648-38-115/74	74	178.7

230 Volt System 802 Watts 3.5 Amps 66.0 Ohms

Qty	Element P/N:	Wattage	Ohms
1	TEP2650-230/120	120	440.8
1	TEP2653-230/40	40	1322.5
1	TEP2653-24-230/40	40	1322.5
2	TEP2658-230/7.5	7.5	7053.3
1	TEN2715-36-230/18	18	2938.9
1	TEP2865-230/120	120	440.8
1	TEP2866-230/70	70	755.7
1	TEN2867-60-230/75	75	705.3
1	TEN2868-36-230/120	120	440.8
1	TEP2869-230/110	110	480.9
*(1)	TBS2646-31-230/60	60	881.7
*(1)	TBS2648-38-230/74	74	714.9

13.0 SPECIAL INSPECTION REQUIREMENTS

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

230 Volt kits are supplied with plug adapter receptacle (TP02829-230), field installed on extension cord supplied by the operator following instructions TN02829.

14.0 RECOMMENDED OVERHAUL INTERVALS

No recommended overhaul intervals exist for this system.

15.0 FOR COMMUTER CATEGORY AIRCRAFT

No changes are required.

16.0 APPLICATION OF PROTECTIVE TREATMENTS

No protective treatments required.

***** END *****