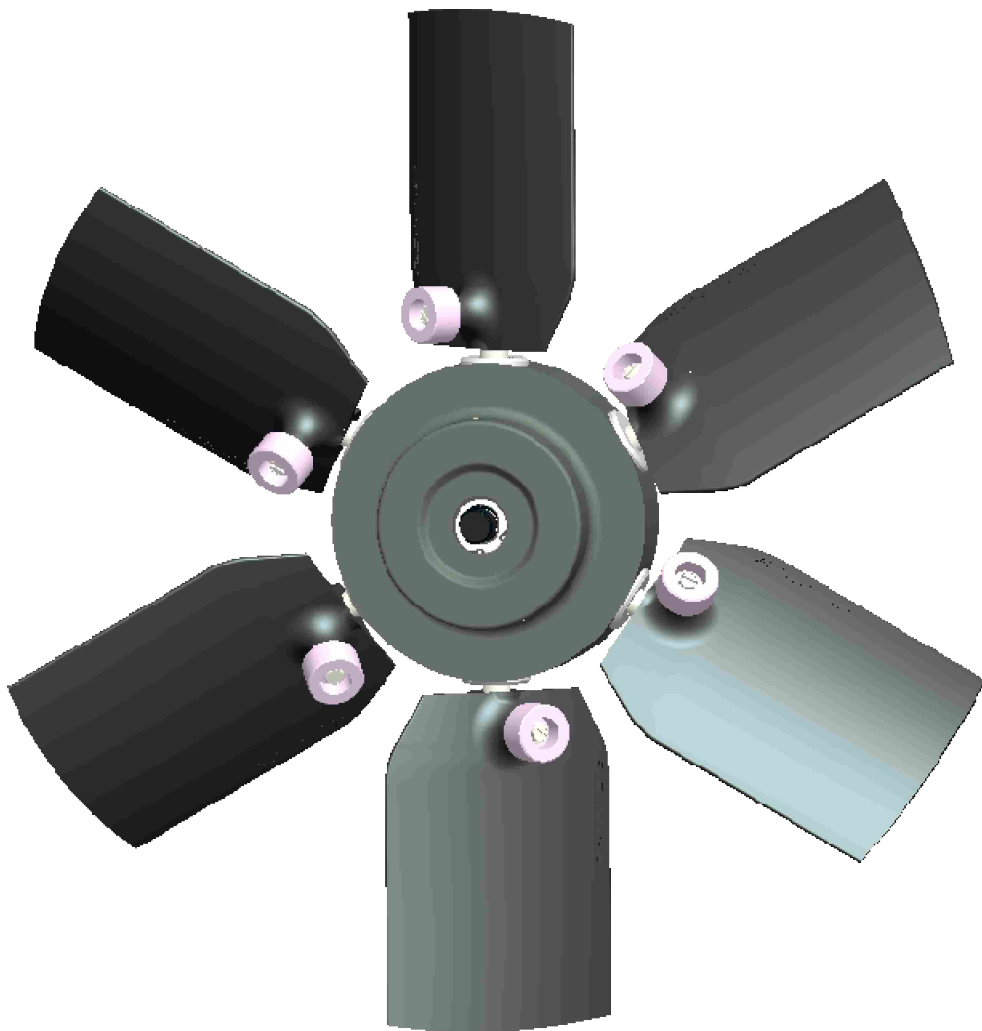




# FLEXXAIRE

**INSTALLATION AND SERVICE MANUAL FOR THE  
TAC1000-P FAN SERIES (PNEUMATIC CONTROL)  
TAC1000-H FAN SERIES (HYDRAULIC CONTROL)**



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## 1.1 INTRODUCTION

This manual (P/N 01553) is produced to assist in the installation, operation and maintenance of Flexxaire® TAC1000-P and TAC1000-H Series Fan Systems.

Flexxaire has made every effort to ensure that the information contained in this manual is correct and complete at the time of printing. Flexxaire® will assume no responsibility for any errors or omissions. If you have any questions regarding this manual or any other document provided with your fan system, please contact:

**Flexxaire**

**Product Support Department**

**10430-180 Street**

**Edmonton, Alberta, Canada**

**T5S-1C3**

**Phone: 780-483-3267**

**Fax: 780-483-6099**

## 1.2 IMPORTANT SAFETY INFORMATION

The safety information in this publication is to be used in conjunction with the safety information supplied from the original machine manufacturer. Please refer to all safety information supplied, prior to doing any work on the fan assembly or any other component to assure safety.

**Improper operation, maintenance or repair of this product can be dangerous and could result in injury or death.**

Always use Flexxaire parts and components or Flexxaire approved parts and components. The use of unapproved parts and/or components may void the 1-year warranty.

**Do not operate or perform any maintenance on this product until you have read and understand the operation and maintenance information. Please contact Flexxaire or an approved dealer for any information that you may require.**

**The person(s) servicing the product may be unfamiliar with many of the systems or components on the product. This makes it important to use caution when performing any type of service work. A knowledge of the product and/or its components is important before the removal or disassembly of any component.**

## 1.2.1 PROTECTIVE EQUIPMENT

Always wear protective glasses, protective shoes and any other protective equipment as required by job conditions when working around this product.

## 1.2.3 SPRING LOADED FAN HUB

The hub assembly is spring loaded. If disassembly of the hub is required, take caution that you are well protected from the hub's release which may be sudden and pose an impact related injury. Also make sure that the internal pressure is released. Consult the pneumatic or hydraulic control instructions.

## 1.2.3 HOT FLUIDS AND PARTS

To avoid burns, be alert for hot parts on the assembly or the machine that have just been stopped and have hot fluid in lines, tubes and compartments.

## 1.3 PRODUCT SUPPORT

The Product Support Department provides technical support, information on fan installation and maintenance, parts, instruction manuals, and is responsible for warranty administration. Contact the Product Support Department for any problems that this technical manual does not address.

**Phone: 780-483-3267**

**Monday to Friday 8:00 a.m to 4:00 p.m. MST**

## 1.4 FAN SPECIFICATIONS

The following needs to be considered prior to the installation of the Flexxaire Fan System. If your situation is listed in this section, **DO NOT INSTALL THE FAN.** Damage and/or injury may occur.

### 1.4.1 MOUNTING

**WARNING:** This fan is not designed to be mounted onto a crank shaft or crank shaft pulley. Torsional vibration from crankshafts will damage the fan and could result in machine damage and serious injury.

### 1.4.2 FAN BLADE TIP SPEED

**WARNING:** The fan system must not exceed a blade tip speed of 20,000 feet/minute. Exceeding this speed may cause damage to and/or failure of the fan, which in turn may cause injury or death, or less importantly, damage to the radiator and surrounding equipment.

To calculate the blade tip speed, use the following formula:

$$\frac{\text{Fan Diameter (Inches)} \times 3.14 \times \text{Fan RPM}}{12}$$

If your calculated tip speed exceeds 20,000 ft/min, contact Flexxaire directly, prior to installation. **It is important to use Fan RPM and NOT engine RPM.**

### 1.5 FAN OVERVIEW

Flexxaire's TAC1000 fan systems are designed to minimize overheating caused by debris plugged radiators, screens and guards, and reduce overcooling in low ambient temperatures. The blades of the TAC1000 vary pitch, not speed, to control air flow and direction.

#### How your TAC1000 works:

The TAC1000-P is a pneumatically actuated variable pitch fan. The TAC1000-H is a hydraulically actuated variable pitch fan. The blades are held in full pitch by a heavy spring. As pneumatic (or hydraulic) pressure is applied to the control line, the pitch of the blade is reduced and then reversed. When the pressure is released, the fan blades return to their default position (**See below**). The TAC1000 has a number of inherent features:

1. Fail Safe Operation: The blades are spring loaded into the default full pitch position. If the fan loses pressure, the fan will default to full pitch and act like a fixed pitch fan giving maximum cooling.
2. Depending on the control kit ordered (see section 2.0), the fan can be run in a neutral pitch (or any pitch in between) to solve overcooling problems and save horsepower and fuel.

When purging, there are no horsepower spikes in fact the horsepower drops off as you pass through neutral pitch, then slowly builds as pitch increases.

### 2.0 CONTROL KITS

Due to the variability of machines that the TAC1000 fan may be installed on, the fan does not include any control components. All of Control Kits are available in 12V and 24V configurations. Contact Flexxaire or your dealer for availability.

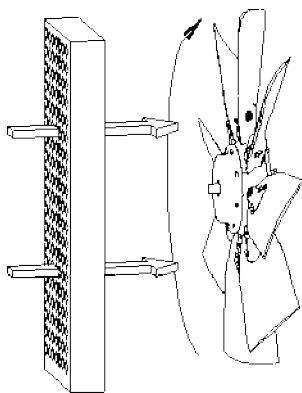
Flexxaire has a number of different control kits available to suit a wide range of applications:

#### 2.0.1 PNEUMATIC CONTROL:

- 2 Position kit (Manual Purge)
- 2 Position kit with timer (Manual and Auto Purge)
- Infinitely Variable Pitch Controller (IVP fan control)
- Each kit is available with or without an air compressor.

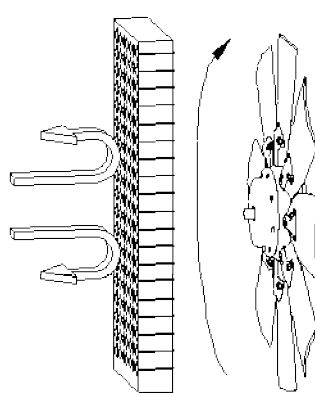
#### 2.0.2 HYDRAULIC CONTROL:

- 2 Position kit (Manual Purge)
- 2 Position kit with timer (Manual and Auto Purge)
- Infinitely Variable Pitch Controller (IVP fan control)



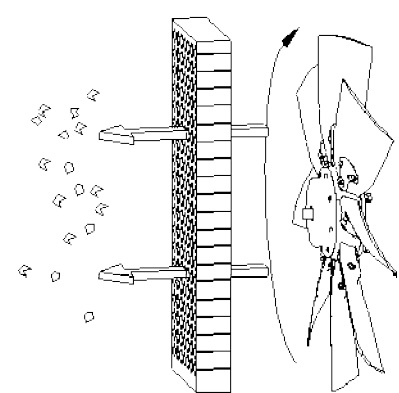
NORMAL OPERATION

EFFICIENT COOLING



NEUTRAL PITCH

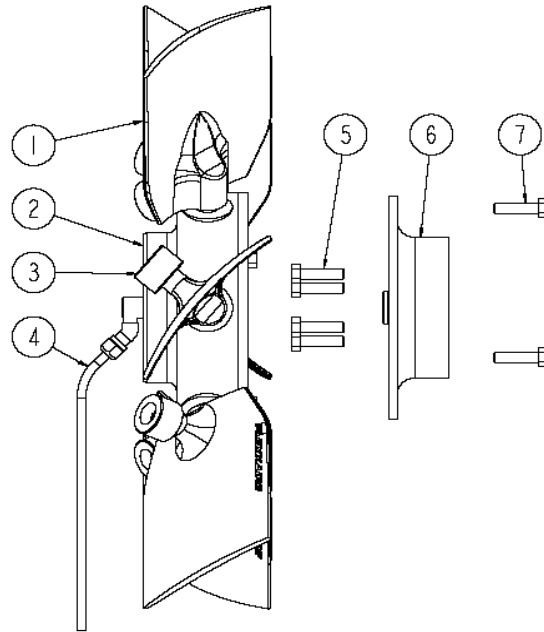
STOP AIR FLOW  
PREVENT OVERCOOLING  
SAVE HORSEPOWER



PURGE

CLEAN RADIATOR  
PREVENT OVERHEATING

## 2.1 MAJOR COMPONENTS



**Figure 1: Fan Components**

### MAJOR COMPONENTS:

- |   |                           |
|---|---------------------------|
| 1. Blade Assembly                         | 5. Mounting Adapter Bolts |
| 2. Hub Assembly                           | 6. Mounting Adapter       |
| 3. Blade Counter Weight                   | 7. Hub Mounting Bolts     |
| 4. Pressure line (Pneumatic or Hydraulic) |                           |

The TAC1000 Fan Assembly can be identified by several external components as shown in **Figure 1**. Use this diagram for terminology and major component identification. (This figure is of a TAC1000-P, but the major components are the same between the TAC1000-P and TAC1000-H fans.)

### 2.2 EXISTING FAN REMOVAL

The following is a general description for the removal of an existing fan and the installation of a Flexxaire TAC1000 Fan.

- Remove fan guards and safety equipment to gain access to the existing fan.
- Loosen belt(s) and remove existing fan hardware as required.
- Clean mounting surface of fan drive

## 2.3 INSTALLATION

### 2.3.1 Mounting Adapters

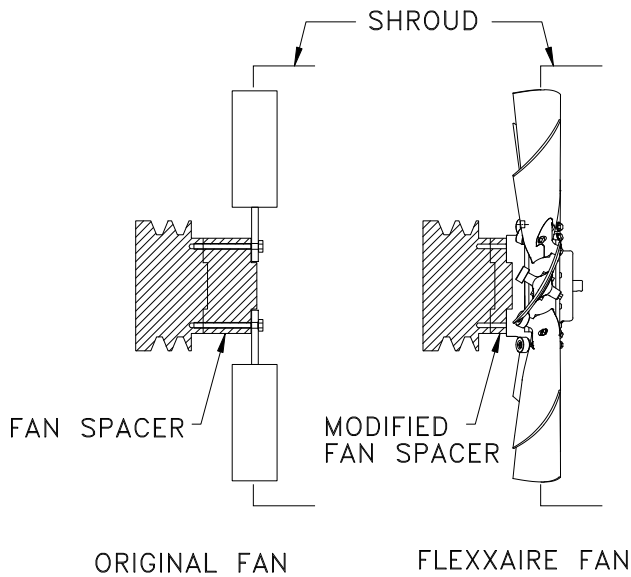
The TAC1000 is supplied with a pre-machined mounting adapter. Pre-machined mounting adapters are machined for your pilot and bolt circle.

For some applications, a wider 2-piece adapter may be used, and the necessary hardware for assembling the 2 parts together will be included. This 2-piece adapter may be pre-assembled.

### 2.3.2 Fan Position

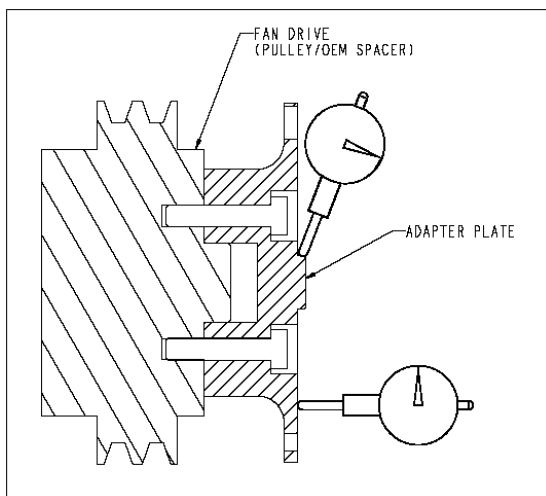
Ideally the fan should be centered in the shroud (30-70% immersion is acceptable). Optimum placement varies with each application. This may require modification or removal of the fan spacer or modification of the shroud.

See **Figure 2**.



**Figure 2**

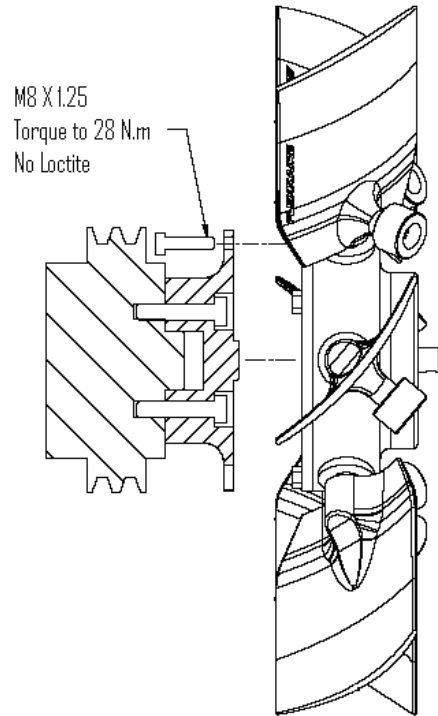
- A. Install the Flexxaire supplied adapter plate using bolts from the original fan. If the bolt length needs to be changed, use an equivalent or better grade of bolt. Follow original equipment manufacturers torque and thread locking specifications when installing the mounting adapter to the fan drive.
- B. Measure axial and radial runout of the installed adapter. Runout should not exceed 0.005" (0.127 mm) in either direction. Refer to **Figure 3**.



**Figure 3: Adapter Plate Mounting**

- C. Remove the shipping plug from the rear of the fan. Place the TAC1000 fan onto the adapter plate and torque the M8 bolts, supplied loose in fan kit, to 21 Ft-Lbs (28 N.m). Do not use thread locking compound. Refer to **Figure 4**.

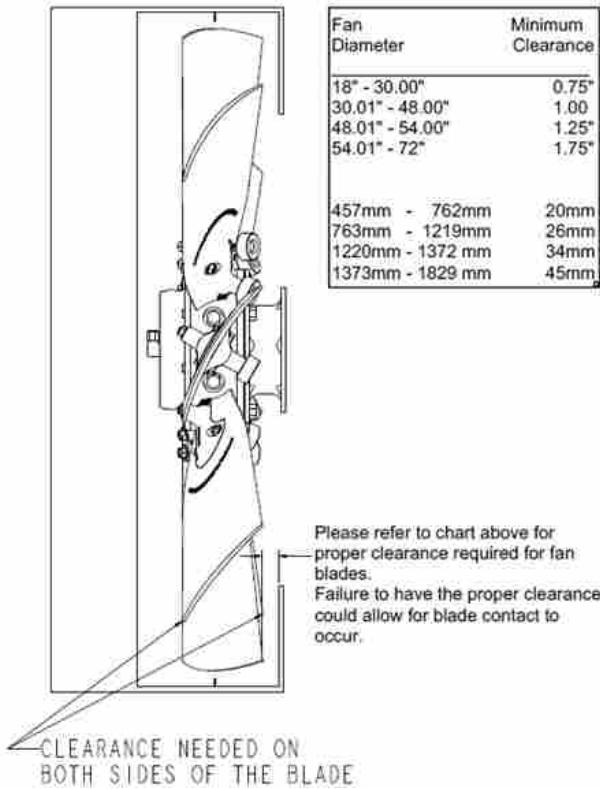
**WARNING:** Do not remove the three M8 bolts from the rear of the Flexxaire Fan. The TAC1000 fan is spring loaded; improper removal of these bolts could result in injury.



**Figure 4: Fan Mounting**

Refer to **Figure 5** on page 5 for proper clearance for fan rotary union and blade clearance.

BLADE CLEARANCE FOR ALL TAC FAN SERIES:



ROTARY UNION CLEARANCE FOR TAC P OR H

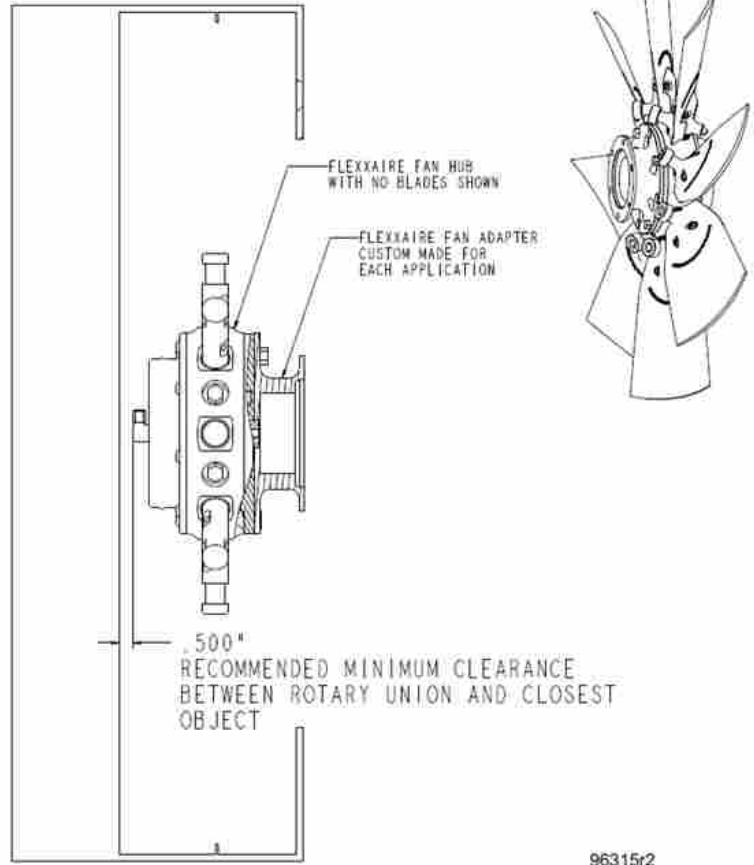


Figure 5

**WARNING:** Failure to have correct blade clearance could result in blade contact that can cause extensive damage to people and equipment.

**WARNING:** Failure to have the correct clearance for the rotary union could result in premature failure of the rotary union and/or damage to objects contacting the rotary union.

3.0 PNEUMATIC LINE INSTALL

- A. Drill a hole in the fan shroud to allow the flexible nylon hose to be routed into the engine compartment. Secure the hose using hose clamps.
- B. Attach the incoming 1/4" O.D. air line to the front of the fan.
- C. Ensure that the hose clears all parts of the fan. If possible, secure the hose away from the fan. Common ways to do this are to zip tie the hose to the radiator core, or to attach it to the radiator frame or the bolted flanges between the radiator cores.

**WARNING:** Do not secure the air line so tight as to cause a side load on the rotary union. Failure of the bearings could result.

**WARNING:** Do not secure the air line so loose that the hose could contact the blades due to sudden air reversal, vibration, etc...

- D. Ensure you have proper clearance for the rotary union and blades to nearest contact point(s). Please refer to **Figure 5** for more information.
- E. Install the pneumatic control. Follow the instructions included with the control kit. If you did not purchase a kit from Flexxaire, see section 3.2 for pneumatic specifications.
- F. Rotate the fan by hand and check for obstructions. A final check will be required once the air supply has been connected to the fan. A minimum of 90 PSI (620 kPa) will be required to fully reverse the blade pitch. Spin the fan by hand with the blade pitch reversed and check for obstructions.
- G. Tighten the fan belts and replace all the fan guards and safety equipment.
- H. Attach the "WARNING" label to the machine, on a housing, guard, or any location near the fan where it can be easily seen.

### 3.2 PNEUMATIC SPECIFICATIONS

Flexxaire supplies a number of pneumatic control options, but the TAC1000-P can be operated using any air source that meets the general specifications listed below. If your machine has air on board then this source will be available. If not, then a compressor will be required.

#### **General Specifications:**

<b>Full Pitch</b> (default position):	<b>0 psi (0 kPa)</b>
<b>Neutral Pitch</b> (Stop air position):	<b>~60 psi (413 kPa)</b>
<b>Reverse Pitch</b> (Purge position):	<b>90 psi (620 kPa)</b>
<b>Max intermittent pressure:</b>	<b>110 psi (758 kPa)</b>
<b>Max continuous pressure:</b>	<b>90 psi (620 kPa)</b>

### 4.0 HYDRAULIC LINE INSTALL

- A. Drill a hole in the fan shroud to allow the flexible hydraulic hose to be routed into the engine compartment. Secure the hose using hose clamps.
- B. No exterior bracing should be used to prevent the rotary union from rotating. It is imperative that a flexible connection be used.
- C. The fan is supplied with the hydraulic line attached. Connect the line to the hydraulic source that will be used to operate the fan. Use thread sealant on all connections.
- D. Ensure that the hose clears all parts of the fan. If possible, secure the hose away from the fan. Common ways to do this are to zip tie the hose to the radiator core, or to attach it to the radiator frame or the bolted flanges between the radiator cores.
- E. Rotate the fan by hand and check for obstructions. A final check will be required once the hydraulic hose has been connected to the hydraulic source. A minimum of 450 PSI (3 MPa) will be required to fully reverse the blade pitch. Spin the fan by hand with the blade pitch reversed and check for obstructions. Use Figure 5 on Page 5 for clearance between the blades and any stationary objects.
- F. Tighten the fan belts and replace all the fan guards and safety equipment.
- G. Attach the "WARNING" label to the machine, on a housing, guard, or any location near the fan where it can be easily seen.

**WARNING:** Do not secure the hydraulic hose so tight as to cause a side load on the rotary union. Failure of the bearings could result.

**WARNING:** Do not secure the hydraulic hose so loose that the hose could contact the blades due to sudden air reversal, vibration, etc..

- H. Install the hydraulic control valve. Follow the instructions included with the control kit. If you did not purchase a kit from Flexxaire, see section 4.1 for hydraulic specifications.

### 4.1 HYDRAULIC SPECIFICATIONS

Flexxaire supplies a number of hydraulic control options, but the TAC1000-H can be operated using any hydraulic source that meets the general specifications listed below. If your machine has hydraulics on board then this source will be available.

#### **General Specifications:**

<b>Full Pitch</b> (default position):	<b>0 psi (0 MPa)</b>
<b>Neutral Pitch</b> (Stop air position):	<b>~250 psi (1.7 MPa)</b>
<b>Reverse Pitch</b> (Purge position):	<b>450 psi (3 MPa)</b>
<b>Maximum allowable pressure:</b>	<b>1000 psi (6.9 MPa)</b>

### 5.0 SERVICE AND MAINTENANCE

Flexxaire's TAC1000 fan hub is fully sealed with o-rings, and contains a small quantity of grease. (EP00 semi-fluid grease) As a result, the fan itself should not require any maintenance.

#### 5.1 VISUAL INSPECTIONS

Under normal operating conditions TAC1000 fans do not require any scheduled maintenance and are built to provide thousands of hours of trouble free service. In moderate to extreme operating conditions a visual inspection of the moving parts is recommended from time to time to safeguard against fan blade damage which could lead to equipment downtime and/or other damages.

## 5.2 MECHANICAL REVIEW

Ensure that the fan fully reverses pitch. Check for air leaks in the rotary union. Check that the rotary union bearings rotate smoothly.

CHECK	YES	NO
Does fan rotate in default and full reverse pitches?	<input type="checkbox"/>	<input type="checkbox"/>
Is the pressure line secured away from the blades?	<input type="checkbox"/>	<input type="checkbox"/>
Has the side load on the pressure line been minimized?	<input type="checkbox"/>	<input type="checkbox"/>
Is the pressure line flexible enough to accommodate relative movement between the radiator and engine?	<input type="checkbox"/>	<input type="checkbox"/>
Are any of the blades damaged?	<input type="checkbox"/>	<input type="checkbox"/>
Does the rotary union rotate freely?	<input type="checkbox"/>	<input type="checkbox"/>
Are there any pressure leaks in the system?	<input type="checkbox"/>	<input type="checkbox"/>
Are all screens and guards secured?	<input type="checkbox"/>	<input type="checkbox"/>
Have you recorded the fan S/N for future reference? <b>S/N</b> _____	<input type="checkbox"/>	<input type="checkbox"/>