Cleanfix® REVERSIBLE FANS

Installation Instructions
"Rubber Airline"

1.1 INTRODUCTION

This manual is intended to assist in the installation, operation and maintenance of the Cleanfix® Reversible fan system.

NOVATRAX International Inc. has made every effort to ensure that the information contained in this manual is correct and complete at the time of printing. Novatrax will assume no responsibility for any errors or omissions. If you have any questions regarding this manual or any other documents in the Technical Support Package, please contact:

NOVATRAX International Inc.
1996679 19th Line
RR#1
Lakeside, Ontario, Canada
N0M 2G0
Tel: 519-349-2200 Fax: 519-349-2310

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(s) to assure total safety.

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

Always use Cleanfix approved parts and components. Failure to do so will result in voiding the 1-year parts warranty for the fan.

Do not operate or perform any maintenance on this product, until you have read and understood the operation and maintenance information. Please contact NOVATRAX International Inc., or their 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. Knowledge of the product and/or its components is important before the removal or disassembly of any component.

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: 519-349-2200
Monday to Friday 8:00am to 5:00pm EST

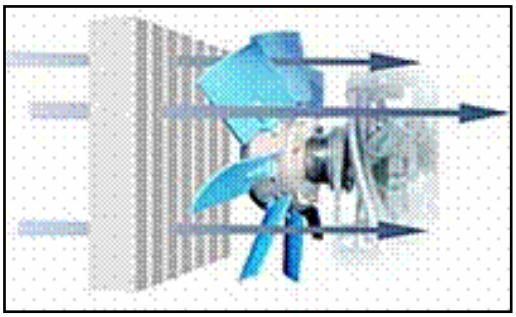
1.4 FAN SPECIFICATIONS

The following needs to be considered prior to the installation of the Cleanfix® Reversible Fan system. If your situation is listed in this section, do not install the fan. Damage and/or injury may occur.

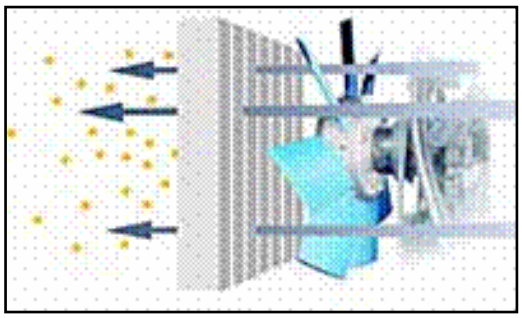
A. MOUNTING

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

Cleanfix® Reversible Fan



Cooling Mode



Cleaning Mode

How the *Cleanfix*® Reversible Fan works:

The *Cleanfix*® fan is a pneumatically actuated variable pitch fan. The blades are held in full pitch by spring pressure. As air pressure builds, the pitch of the blade changes to the reverse direction. When the pressure is released, the fan blades return to their default cooling position. The *Cleanfix*® fan has a number or inherent features:
- Fail Safe: The blades are spring returned to the cooling position. If air pressure is lost the fan will default to cooling position and act just like a fixed pitch fan giving maximum cooling.
- No oil or hydraulic fluid that can cause messy leaks that can clog your radiator or cooling system.

1.5 CONTROL KITS

Due to the variability of machines that the Cleanfix® fan can be installed on, there are several control possibilities including:

Machines without on-board air supply:
- Manual push button control system (SD compressor)
- Manual push button control system (HD compressor)
- Multi-timer control system (HD compressor)

Machines with on-board air supply:
- Manual push button control system
- Multi-timer control system

All of these control kits are available in 12V and 24V configurations. Contact NOVATRAX International Inc. or your dealer for availability.

1.6 PNEUMATIC SPECIFICATION

NOVATRAX International Inc. supplies a number of pneumatic control options, but the Cleanfix® fan can be operated using any air source that meets the general specifications listed below. If your machine has on-board air then this source will be available. If not, then a compressor kit will be required.

General Specifications

Full Pitch (default cooling position):	0 psi
Reverse pitch (purge position):	70-90 psi
Max intermittent pressure:	120 psi
Max continuous pressure:	100 psi

1.7 SERVICE AND MAINTENANCE

A. VISUAL INSPECTIONS

Under normal operating conditions, Cleanfix fans do not require scheduled maintenance, other than lubrication, 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 and/or other damage.

B. FAN BLADES

The fan blades are designed to provide thousands of hours of life and typically will last for the life of the fan. Blade wear is largely dependant upon operating conditions. In highly abrasive environments increased blade wear will occur.

C. MAINTENANCE CHECK LIST

This check list is to provide some basic information to be used at time of machine delivery and at regular maintenance intervals.

CHECK	YES	NO
Does fan rotate from the Cooling mode to Cleaning mode without obstruction?	❑	❑
Are any of the blades damaged?	❑	❑
Are blades installed in the correct orientation for your application? (clockwise/counter clockwise)	❑	❑
Are correct blades installed? Suction Fan - Blue Blades Blower Fan - Black Blades VP-Series Fan- Red Blades VP-Series Fan CC – Yellow Blades	❑	❑
Are all screens and guards secure?	❑	❑
Are all air lines secured?	❑	❑

! CAUTION ! ! CAUTION ! ! CAUTION !

BEFORE STARTING THE MACHINE CHECK THE FOLLOWING:

1. **CHECK THE AIR TUBE INLET** on the front of the fan to ensure that it has proper amount of clearance to allow for a non restricted rotation of the fan blades during the pitch change of the fan from Cooling Mode into Cleaning Mode. This can be done with the fan belt still loose. Use the shop air to turn the fan blades into the cleaning mode position. Slowly release the air from the fan hub until the fan blades are exactly half way back to the cooling mode. With the fan blades in this mid position, rotate the fan blades and makes sure that there is at least 5/8" (15-mm) clearance between the air tube inlet and the base of the fan blades (maximum width of blades). If the clearance is less than 5/8" (15-mm) remove the fan from the mounting flange and bend the air tube assembly to provide the clearance required. NOTE: THE AIR TUBE INLET MAY BECOME BENT DURING SHIPPING AND WILL NEED TO BE EXAMINED BEFORE INSTALLATION TO ENSURE THAT CLEARANCE IS AVAILABLE. PLACE THE DRAWING OF THE AIR TUBE INLET ON TOP OF THE FAN HUB AND CHECK TO SEE THAT THE AIR TUBE MATCHES THE PROFILE OF THE DRAWING.

2. **MAKE SURE ALL ELECTRICAL WIRES, RADIATOR OVERFLOW TUBES, HYDRAULIC HOSES, ETC.** are firmly secured with tie straps and cannot come in contact with the Cleanfix® Fan or operating area.

3. **MAKE SURE THE RUBBER AIR TUBE SUPPLY LINE** is secured where it enters into the fan shroud. It should not be possible for additional lengths of air tube to enter into the fan shroud where it can be sucked into the rotating fan. If necessary, clamp or tie strap the air supply tube to the shroud.

4. **MAKE SURE THAT THE RUBBER AIRLINE IS PRESSED SECURELY** onto the steel air tube inlet by giving it a strong pull. The tube and clamp when installed correctly will not come back off of the air tube without first cutting the clamp to loosen the tension.

5. **MAKE SURE ALL TOOLS HAVE BEEN REMOVED** from engine compartment including the topside of the radiator and inside of the shroud before the fan guards are installed. Obstacles in the path of rotation can interfere with the movement of the fan and can result is damage to the fan blades, fan hub and/or the radiator core.

6. **CHECK THE WATER PUMP BEARING OR FAN MOUNTING BEARING.** Check to ensure that this bearing is in good condition. If the bearing does not turn freely or if there is transverse movement of the bearing, it should be replaced before the Cleanfix® Fan is installed to prevent any imbalance of the fan during operation.

7. **CHECK THE RADIATOR MOUNTING BOLTS AND SHROUD MOUNTING BOLTS** to ensure that the radiator and shroud are firmly secured and unable to move during the operation of the machine. Loose shroud bolts can allow the fan shroud to move into the path of the rotating blades and loose radiator mounting bolts can allow the radiator to flex in position allowing the shroud to come into contact with the rotating fan blades.

8. **MAKE SURE ALL FAN GUARDS HAVE BEEN INSTALLED** and firmly secured into place. The Cleanfix® Reversible fan creates a lot of airflow in both the cooling and cleaning mode operation. The result of this airflow is a strong vacuum effect that can suck items/obstacles that are located inside or around the engine compartment or fan.

9. **CHECK TO ENSURE THE CONTROL BOX IS CONNECTED TO A DEDICATED (SEPARATE) POWER SOURCE** and that the correct amperage & voltage is available. (9-11 amps 24-volt sys., 16-18 amps 12-volt sys.)

10. **DO NOT DISGARD THE FAN SHIPPING BOX.** Keep the box that the fan was shipped in. This box was designed for the fan and can be used in the event that the fan needs to be returned or serviced at the factory.

11. **TO ENSURE MAXIMUM EFFICENCY OF YOUR NEW CLEAN FIX FAN.** Make sure to start with a clean cooling system, free of debris paying particular attention to the stacked cooler core(s).

Cleanfix® Fans - Assembly Instructions

The Cleanfix Fan Kit is designed specifically for your machine; therefore components may vary from Fig. 1.
Generally the kit includes a control system & all of the following components required to install or replace the original equipment fan; Control Box/System 12V or 24V (with or without automatic timer or compressor), 20ft 3/16" rubber airline, 2x ear hose clamps, 2 x rubber grommet, 6 x M8-1.25 hex bolts, flange mounting bolts, adapter flange to suit fan drive pulley or jack shaft, 8 black tie straps, 3x Tie Re Rad with push on button, and one push button (if required).

It is important to check the condition of your equipment's fan belt prior to installing the Cleanfix Fan. Worn or damaged fan belts should be replaced at this time for ease of access during assembly.

Figure 1 – Generic components required for installing the Cleanfix Reversible Fan

FAN POSITION
The ideal fan position for the Cleanfix Reversible fan is listed below:
- Suction Fan: 2/3 of blade tip into shroud & 1/3 out of shroud.
-Blower Fan: 1/3 of blade tip into shroud & 2/3 out of shroud.
This may vary depending on the application

STEP 1 - Before installing the fan, be sure that the engine is turned off and the positive battery terminal is disconnected.

STEP 2 - Remove the original OEM fan. Refer to the manufacturer's equipment manual. Check the water pump or fan mounting bearing to ensure that it is in good condition, replace it if necessary.

STEP 3 - Clean the pulley surface if necessary with sandpaper to create a smooth and clean mounting surface for the Cleanfix Fan adapter flange.

NOTE: There should be not dirt or debris remaining on the pulley including inside the center mounting stud as shown (Figure 2).

FIGURE 2

STEP 4 - Place the adapter flange onto the fan drive pulley locating it using the center pilot hole (Figure 3).

FIGURE 3

STEP 5 – Set up dial indicator gauge to measure axial and radial deviation. Rotate the flange clockwise taking readings from both the front face and the top edge of the flange (Figure 4). The maximum variance must not exceed **0.004 inch.** or **0.10 mm.** If you are unable to obtain suitable results remove the flange and clean the pulley surface with sandpaper again. Repeat STEPS 3 to 5 again until correct.

FIGURE 4

STEP 6 – Install the adapter flange to the pulley, using bolts supplied with kit. Tighten to the maximum torque as indicated in the manufacturers' equipment manual. **NOTE:** Use **Blue Loctite** on each bolt to fasten the flange to the fan drive pulley, to prevent the bolts from coming loose during operation.

STEP 7 – Check the curvature on the air tube supply line. Using the gauge supplied, follow the directions to ensure that the fan inlet has not been bent during shipping (Figure 5A). NOTE: The air inlet tube must match or exceed the minimum curvature shown for safe operation of the Cleanfix Fan. In the event that the curvature is less than the curvature shown on the gauge, carefully grasp the tube with both hands while securing the base of the air tube inlet with your palm at the center of the fan hub (Figure 5B). Apply force to bend the tube to the required curvature. Re-check the curvature with the gauge until correct.

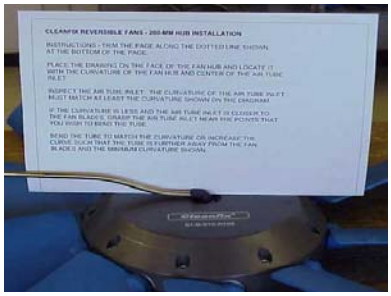


FIGURE 5A

FIGURE 5B

STEP 8 – Place an ear clamp on the end of the rubber hose, then connect the rubber hose to the steel intake air line ensuring that the rubber hose overlaps the steel air line by at least 1-inch. Use pliers to crimp both tabs on the clamp to place tension on the rubber hose. NOTE: The clamp should be crimped tight enough to ensure that the rubber hose will not come off the steel air line (see figure 6).

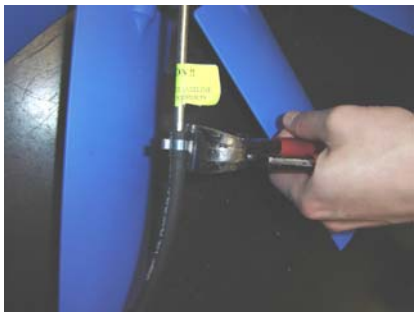


FIGURE 6

STEP 9 – Rotate the ear clamp and hose such that the ear tabs are parallel to the radiator core. This will provide extra room between the fan blades and the clamp, and will also prevent the ear clamp tab from pressing into the radiator core (see figure 7)

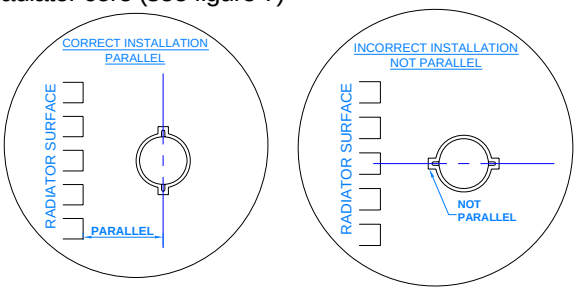


FIGURE 7

STEP 10 - Inspect the fan shroud to determine where you plan to have the **rubber air tube penetrate** through the fan shroud. Drill a hole through the shroud which is large enough for the supplied grommet. This location is best set at 3, 6 or 9 o'clock positions in order to allow for ease of installation. Ensure that the hole is large enough to allow the air tube to move freely into the shroud when the engine is torqued without getting caught.

NOTE: The rubber air tube should be secured with tie straps such that it cannot be excessively pulled into the shroud where it will become entangled with the rotating fan (see STEP 16).

STEP 11 – Secure the rubber airline to the frame between the radiator cores using the supplied tie straps. Drill a hole in the steel frame that will be used to secure the tie strap and rubber airline against the frame. Depending on the diameter of your fan you will need to do this in at least 2 or 3 locations to keep the rubber hose secure and away from the fan blades.

NOTE: The first radiator tie strap should be placed approximately 1" - 2" from the end of the steel air intake tube. In some cases the steel tube will be quite far away from the radiator core, in which case you should route the hose on a 45-degree angle towards the radiator core and place a radiator tie strap where the rubber tube meets the radiator surface. Place each additional tie strap 6-inches or less apart.

If no radiator frame is present you will need to use the specialty radiator tie strap (3x supplied). Route the end through the radiator core starting from the engine side of the radiator (See figure 8). Once the tie is through the radiator, place the tie button over the end of the strap and pull tight against the grill side of the radiator. Using a standard black tie strap, loop it through the two holes in the radiator tie mount and then place the rubber hose inside the tie strap and pull tight (See figure 8).

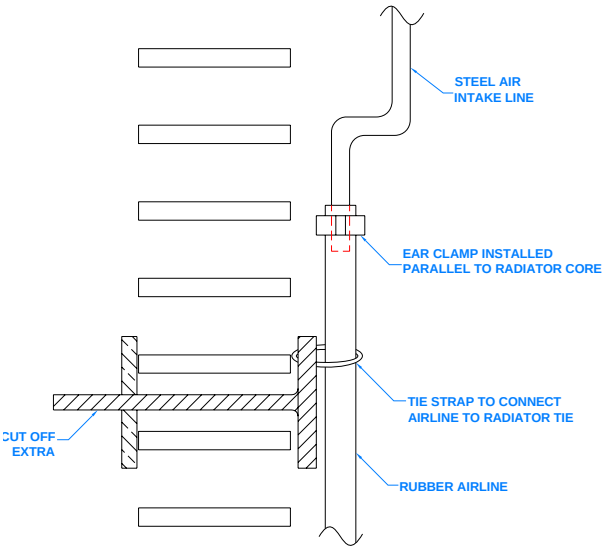


FIGURE 8

Warning: Take care to ensure there is no force, leverage or tension placed on the steel line as it will damage the intake bearing causing it to fail. This could cause damage to the fan housing and or fan blades.

IMPORTANT - Take care to ensure that the rubber tube does not become pinched when the tie strap is pulled tight.

STEP 12 - Mount the Cleanfix Fan onto the adapter flange using the 6- M8 hex bolts that are supplied while ensuring that the rubber air tube penetrates through the shroud in the hole that was previously made in STEP 10. **IMPORTANT -** Be sure to install and torque the mounting bolts using Blue Loctite to 15N.m, and be sure the belt(s) are in place before mounting the fan.

STEP 13 - Drill a hole in any shields that may prevent you from running the rubber air tube to the control box. The hole should be large enough to fit the rubber grommet that is supplied. Insert the rubber grommet into the hole that you have drilled. Insert the hose through the rubber grommet to prevent the hose from wearing through the surface where it contacts the shield.

STEP 14 – Install the control box where space will allow, and as close to the fused power source as possible. Accessibility to the control box is important, as some control systems have a manual ON/OFF toggle switch mounted on the outside of the box. This should be accessible to the operator. If engine location is necessary, **DO NOT Locate the control box near the exhaust manifold or turbo charger where temperatures are excessive & will damage the internal electrical components.** The installation location should be solid to prevent unnecessary vibration and allow for good connection of the control box to the surface. **Blue Loctite** should be used on each of the mounting bolts to help ensure that the bolts do not come loose during operation.

FIGURE 9

STEP 15 – Place an ear clamp over the end of the rubber airline and then connect the rubber hose to the hose barb on the side of the control box. Use pliers to crimp both tabs on the clamp to place tension on the rubber hose. Test the connection by pulling on the rubber tube to make sure that it does not come loose.

STEP 16 - Secure the rubber tube with the supplied tie straps. All air lines, hydraulic hoses, radiator overflow tubes and electrical wires that are in the area of the fan must be secured in order to prevent them from being sucked into the fan blades when the fan reverses the

airflow direction. Failure to do so may result in damage to the Cleanfix Fan or the equipment's cooling system.

STEP 17 - Run the power supply wire into the operator's compartment and connect the supply to switched battery power using a 12V 20amp or 24V 15amp fuse. Ensure the power supply is connected to a dedicated separate key powered source & correct amperage and voltage is available during operation. (Where applicable using the same electrical cable, connect the override push button as shown in the supplied electrical schematic).

STEP 18 - Before tightening the fan belts or starting the engine, cycle the fan to ensure that it will operate without restrictions or interference from the surrounding components. Obstacles such as the dampener on the crankshaft, the belt tension pulley, or the air tube inlet on the front of the fan may create interfere and prevent the fan from rotating into the Cleaning position. Connecting the air inlet tube to the shop air supply can allow you to move the blades back and forth through the cleaning and cooling position. With the fan belt(s) loose, rotate the fan with the blades in the mid stroke position to ensure that no obstacles will come in contact with the fan blades during the pitch change from the cooling position into the cleaning position. There should be a minimum of 5/8" (15-mm) clearance between the fan blades in mid position and any obstacles for safe operation of the Cleanfix Fan (Figure 9). If an obstacle will touch the fan blades or is too close, contact NOVATRAX International prior to completing the installation. Failure to check for this clearance can result in damage to the Cleanfix fan and your equipment's cooling system.

FIGURE 9

STEP 19 - Also check to see that the timer is functioning correctly by waiting for a cycle to occur. Re-connecting the battery terminal and turning the ignition key to the accessory power position only can do this check**.**

DO NOT START THE ENGINE until all fan shields and guards have been replaced and the fan is securely installed. All tools should be removed from the fan shroud and engine compartment. If the timer is not functioning correctly, check the installation of the push button & all external electrical wire connections to the control box. Check to ensure that the voltage to the control system does not drop 1.2V or more below the necessary 12V or 24V required for electrical operation. Standard settings on the automatic timer have a purge cycle every 30 minutes, with a purge duration of approximately 20 seconds. Requested custom timer settings may range from 6 min to 66min & are specific to the machine on which the fan is installed & the customers requirements.

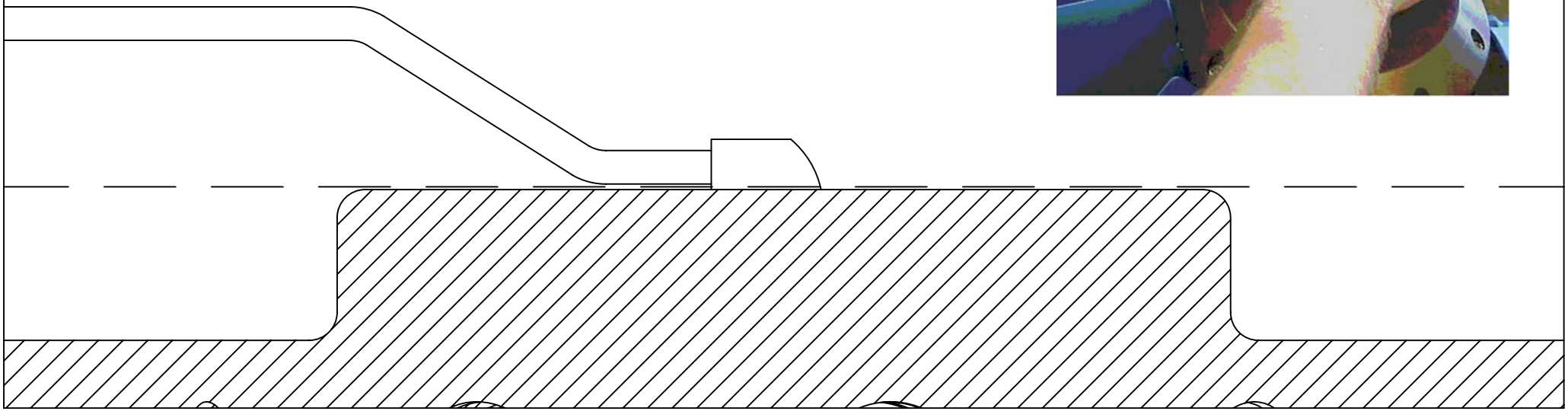
INSTALLATION CHECKLIST	
❑	Check flange with dial indicator for radial & axial deviation. (Step 5)
❑	Check air intake tube for correct curvature & clearance. (Step 7)
❑	Check to make sure rubber air line comes through the shroud using the supplied rubber grommet. (Step 10)
❑	Check that all bolts are installed using blue loctite. (Step 12)
❑	Check that control box is mounted in a position that will not cause it to overheat. (Step 14)
❑	Check that all airlines, hoses, wires and hydraulic hoses are tied down & as short as possible (do not loop) to prevent them from being sucked into the rotating fan. (Step 16)
❑	Check to ensure the control box is connected to a dedicated (separate) power source and correct amperage & voltage is available (9-11amps 24-volt sys., 16-18 amps 12-volt sys. (Step 18)
❑	Check for min. of 5/8" clearance between the fan blades in mid position & closest obstacles (Step 19)
❑	Verify tip clearance is equal at all points around the fan perimeter
❑	Verify Cleanfix fan diameter matches OEM fan

AIR TUBE CHECK FOR 300mm HUB INSTALLATION

- BASED ON WIDTH OF BLADES AT BASE = 130MM
- TRIM THE PAGE ALONG THE DOTTED LINE SHOWN AT THE BOTTOM OF THE PAGE.
- PLACE THE DRAWING ON THE FACE OF THE FAN HUB AND LOCATE IT WITH THE CENTER OF THE AIR TUBE INLET.
- INSPECT THE CURVATURE OF THE AIR TUBE, AGAINST THE DIAGRAM.
- IF THE CURVATURE IS SIGNIFICANTLY DIFFERENT, THE AIR TUBE WILL HAVE TO BE MANUALLY BENT TO THE CORRECT POSITION.

CORRECTION METHOD:

1. PLACE HAND OVER AIR INTAKE BEARING ASSEMBLY AT BASE OF AIR TUBE (*THIS WILL MINIMIZE STRESS ON THE BEARING ASSEMBLY*)
2. USE OTHER HAND TO BEND AIR TUBE EITHER UP OR DOWN TO SPECIFIED POSITION (AS PER PHOTO)



AIR TUBE CHECK FOR 220mm HUB INSTALLATION

- BASED ON WIDTH OF BLADES AT BASE = 130MM
- TRIM THE PAGE ALONG THE DOTTED LINE SHOWN AT THE BOTTOM OF THE PAGE.
- PLACE THE DRAWING ON THE FACE OF THE FAN HUB AND LOCATE IT WITH THE CENTER OF THE AIR TUBE INLET.
- INSPECT THE CURVATURE OF THE AIR TUBE, AGAINST THE DIAGRAM.
- IF THE CURVATURE IS SIGNIFICANTLY DIFFERENT, THE AIR TUBE WILL HAVE TO BE MANUALLY BENT TO THE CORRECT POSITION.

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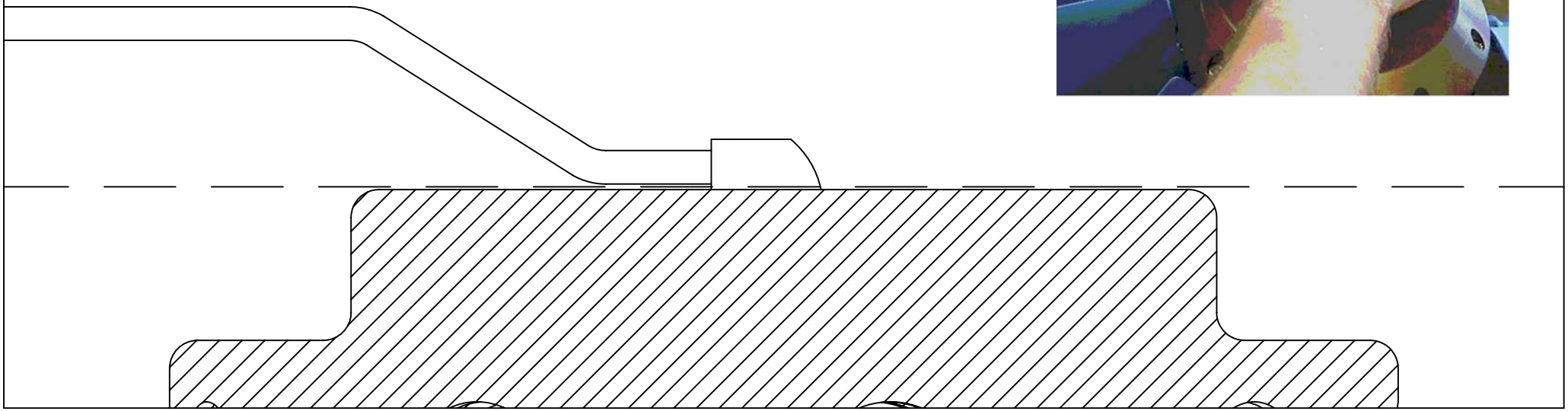

AIR TUBE CHECK FOR 200mm HUB INSTALLATION

- BASED ON WIDTH OF BLADES AT BASE = 110MM
- TRIM THE PAGE ALONG THE DOTTED LINE SHOWN AT THE BOTTOM OF THE PAGE.
- PLACE THE DRAWING ON THE FACE OF THE FAN HUB AND LOCATE IT WITH THE CENTER OF THE AIR TUBE INLET.
- INSPECT THE CURVATURE OF THE AIR TUBE, AGAINST THE DIAGRAM.
- IF THE CURVATURE IS SIGNIFICANTLY DIFFERENT, THE AIR TUBE WILL HAVE TO BE MANUALLY BENT TO THE CORRECT POSITION.

CORRECTION METHOD:

1. PLACE HAND OVER AIR INTAKE BEARING ASSEMBLY AT BASE OF AIR TUBE (*THIS WILL MINIMIZE STRESS ON THE BEARING ASSEMBLY*)
2. USE OTHER HAND TO BEND AIR TUBE EITHER UP OR DOWN TO SPECIFIED POSITION (AS PER PHOTO)