

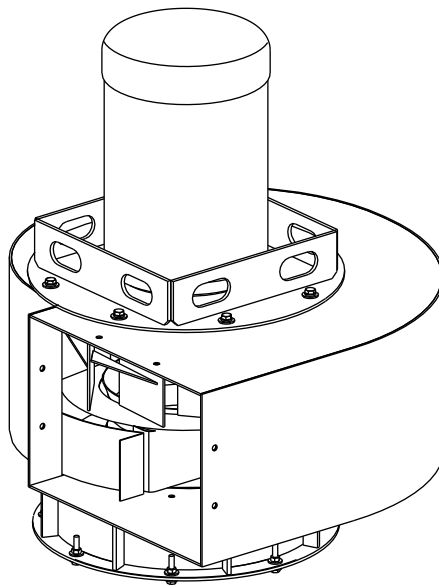


Torit Backward Inclined Fan

TBI-3 to 30 (60 and 50 Cycle)

Installation and Operation Manual

Installation, Operation, and Service Information



This manual contains specific precautions related to worker safety. The hazard alert image denotes safety related instructions and warnings in this manual. **DO NOT** operate or perform maintenance on this collector until you have read and understood the instruction and warnings contained within this manual.

IMPORTANT NOTES

This manual has been supplied to assist with the installation, operation and maintenance for the collector purchased. Please read the manual before installing, operating, or performing maintenance on the collector as it contains specific precautions for worker safety. It is the owner's responsibility to ensure that this manual is available for use by installers, operators and maintenance personnel that will be working with this collector. This manual is the property of the owner and should be left with the collector when installation has been completed. DO NOT operate this collector until you have read and understood the instructions and warnings located in the installation and operation manual.

For additional copies of this manual, contact Donaldson Torit



The Safety Alert Symbol indicates a hazardous situation which, if not avoided could result in death or serious injury. Obey all safety messages following this symbol to avoid possible injury or death. The possible hazards are explained in the associated text messages.



CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a potential situation or practice which is not expected to result in personal injury, but which if not avoided, may result in damage to equipment.

Contents

IMPORTANT NOTES	i	Duct Connections and Support.....	9
Safety Communication.....	1	Damper and Silencer Support Bracket	10
Description.....	2	Maintenance Information.....	11
Inspection on Arrival.....	2	Motor Maintenance.....	12
Installation Codes and Procedures	3	Grease Motors.....	12
Hoisting Information	3	Wheel Balance	12
Storage.....	3	Troubleshooting Guidelines.....	12
Electrical Wiring.....	4	Troubleshooting.....	13
Fan Installation	5	Product Information.....	15
Fan With Inlet Spool Piece Mounted to Clean Air Outlet With Weld Nuts	7	Service Notes.....	15
Fan With Inlet Spool Piece Mounted to Clean Air Outlet Without Weld Nuts.....	7	Donaldson Industrial Air Filtration Warranty	16
Motor Drain Hole Orientation (Side Mount Fans).....	8		
Fan with Inlet Spool Piece Mounted to Clean Air Outlet with Adapter.....	8		
Fan Without Spool Piece.....	9		

Safety Communication



Rotating blades can cause serious injury. Operate fan only when all guards are correctly and securely in place.

Turn power off and lock out all power before performing service or maintenance work. It is not unusual for the fan to be operated from a remote location, so fans may start unexpectedly.

Keep body, hands and foreign objects away from the inlet, the outlet and the other moving parts of the fan such as shafts, belts and pulleys.

This fan has moving parts that can cause serious bodily injury. Before operating or starting maintenance, read the installation and maintenance instructions provided with this manual and AMCA Publication 410 "Recommended Safety Practices for Air Moving Devices."

Combustible Dust Hazards

Among other considerations, the current NFPA standards require owners whose processes involve potentially combustible materials to have a current Dust Hazard Analysis, which can serve as the foundation for their process hazard mitigation strategy. Mitigation may include but is not limited to:

- Prevention of all ignition sources from entering any dust collection equipment.
- Selection and implementation of fire and explosion mitigation, suppression, and isolation strategies appropriate for the risks in their process.
- Development and use of work practices to maintain safe operating conditions, and to ensure combustible dust does not accumulate within their plant or process equipment.

Donaldson designs, manufactures, and sells industrial air filtration products for a wide variety of applications. Some applications may include processes or materials with inherent fire and explosion hazards. Donaldson is neither an expert nor a certified consultant in fire, spark, or explosion detection, suppression, or control. Donaldson does not provide engineering consulting services related to process or dust hazard analyses, or code and standard compliance. Complying with applicable codes and standards and managing the risks associated with the process or materials remains the responsibility of the process owner/operator. Donaldson may provide referrals to consultants, suppliers of equipment or services related to the detection and/or mitigation of sparks, fires and/or explosions, but Donaldson does not assume responsibility for any such referrals, nor does Donaldson assume any liability for the fitness of a mitigation strategy or product for a particular installation or application. The process owner's final selection of dust collectors and risk mitigation strategies should be based on the outcome of a Dust Hazard / Process Hazard Analysis performed by the process owner. Although early engagement of a dust collector supplier provides helpful insights on the availability and features of various products, process owners should consult with a combustible dust expert and/or a process safety expert before making actual product and mitigation strategy selections.

Donaldson recommends that all industrial air filtration system designs be reviewed and approved by an expert consultant who is responsible for the integrity of the system design and compliance with applicable codes and standards. It is the process owner's responsibility to understand the risks in their process and mitigate those risks in accordance with all applicable laws, regulations and standards, including those published by the NFPA. Donaldson also recommends that proper maintenance and housekeeping procedures and work practices be evaluated, developed, and followed to maintain any industrial air filtration products in safe operating condition.

Many factors beyond the control of Donaldson can affect the use and performance of Donaldson products in a particular application, including the conditions under which the product is used. Since these factors are uniquely within the user's knowledge and control, it is essential the user evaluate the Donaldson products to determine whether the product is fit for the particular purpose and suitable for the user's application. All products, product specifications, and data (airflow, capacity, dimensions, or availability) are subject to change without notice, and may vary by region or country.

Description

Torit Backward Inclined (TBI) Fans provide a convenient, cost-effective method of integrating a high efficiency fan with a Donaldson® Torit® dust collector. The TBI mounts directly to the clean-air outlet of the dust collector, eliminating costly transition ducts, and reducing the footprint of the system.

Operation

The TBI Fans feature a backward inclined fan wheel which provides high efficiency operation. It also has direct drive operation to eliminate maintenance of fan bearings and belts. TBI Fans have computer balanced fan and motor assemblies to ensure vibration-free operation. When mounted to a Donaldson Torit Dust collector, the fan is designed to pull air through the collector to be filtered. Cleaned air exits the collector via the outlet of the TBI Fan.

Inspection on Arrival

1. Inspect equipment and parts on delivery
2. Report any damage to the delivery carrier.
3. Request a written inspection report from the Claims Inspector to substantiate any damage claim.
4. File claims with the delivery carrier.
5. Compare equipment and parts received with description of product ordered.
6. Report incomplete shipments to the delivery carrier and your Donaldson Torit representative.
7. Remove crates and shipping straps. Remove loose components and accessory packages before lifting parts from truck.
8. Check for hardware that may have loosened during shipping.
9. Use caution removing temporary covers.
10. The fan and accessories should be inspected on receipt for any shipping damage. Turn the wheel by hand to see that it rotates freely and does not bind. If dampers are provided, check for free operation of all moving parts.

Installation Codes and Procedures

CAUTION

Codes may regulate recirculating filtered air in your facility.

Consult with the appropriate authorities having jurisdiction to ensure compliance with all national and local codes regarding recirculating filtered air.

Safe and efficient operation of the equipment depends on proper installation.

Authorities with jurisdiction should be consulted before installing to verify local codes and installation procedures. In the absence of such codes, install collector according to the National Electric Code, NFPA No. 70-latest edition and NFPA 91 (NFPA 654 if combustible dust is present).

A qualified installation and service agent must complete installation and service of this equipment.

All shipping materials, including shipping covers, must be removed from the collector prior to or during equipment installation.

NOTICE

Failure to remove shipping materials from the equipment will compromise performance.

Inspect parts to ensure all hardware is properly installed and tight prior to operating equipment.

Hoisting Information

CAUTION

Failure to lift the fan correctly can result in severe personal injury and/or property damage.

A crane or forklift and qualified operator are recommended for unloading, assembly, and installation of the fan.

Use all lifting points provided.

Fans should be lifted by the base, mounting supports, or lifting points only. Never lift a fan by the wheel, shaft, motor, motor bracket, housing inlet, outlet, or any fan part not designed for lifting.

Use clevis connectors, not hooks, on lifting slings.

Check the Specification Control drawing for weight and dimensions of the fan to ensure adequate crane capacity.

Refer to applicable OSHA regulations and local codes when using cranes, forklifts, and other lifting equipment.

Use drift pins to align holes in flanges during assembly.

Storage

Check dampers for free operation and lubricate moving parts prior to storage. Inspect the stored fan periodically. Rotate the wheel by hand every two weeks to redistribute grease on motor bearing parts.

Electrical Wiring



Electrical installation, service, or maintenance work must

be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

Do not look into fan outlet to determine rotation. Material may unexpectedly be discharged from the fan. View the fan rotation through the back of the motor.

To reverse rotation, three-phase power supply: switch any two leads on the output side of the motor starter.



Do not interchange a power lead with the ground wire. Severe

personal injury and/or property damage may result.

All electrical wiring and connections, including electrical grounding, should be made in accordance with the National Electric Code (NFPA No. 70-latest edition).

Check local ordinances for additional requirements that apply.

The appropriate wiring schematic and electrical rating must be used. See collector's rating plate for required voltage.

Refer to the wiring diagram for number of wires required for main power wiring and remote wiring.

Fan Installation

CAUTION

Electrical installation, service, or maintenance work must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out all power before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

Mounting a fan blower on the side of a collector requires a side power adapter to support the weight of the fan blower.

Poorly installed fan blowers may separate from the collector resulting in personal injury and/or property damage.

NOTICE

When mounting fan in an outdoor or high humidity environment, mount the motor with drain holes facing down to extend motor life.

TBI fans are dynamically balanced and tested at operating speeds to check for conformance to vibration limits. All fans must be adequately supported for smooth operation.

Safe operating speed is a function of system temperature and wheel design. TBI fans should not be operated above 3,600 RPM.

CAUTION

Do not allow the fan wheel to come loose from the motor as it may cause severe injury or property damage. To ensure proper attachment of the fan wheel:

Tighten all setscrews in fan wheel.

Repeat after 8 hours of operation.

Repeat again after two weeks of operation.

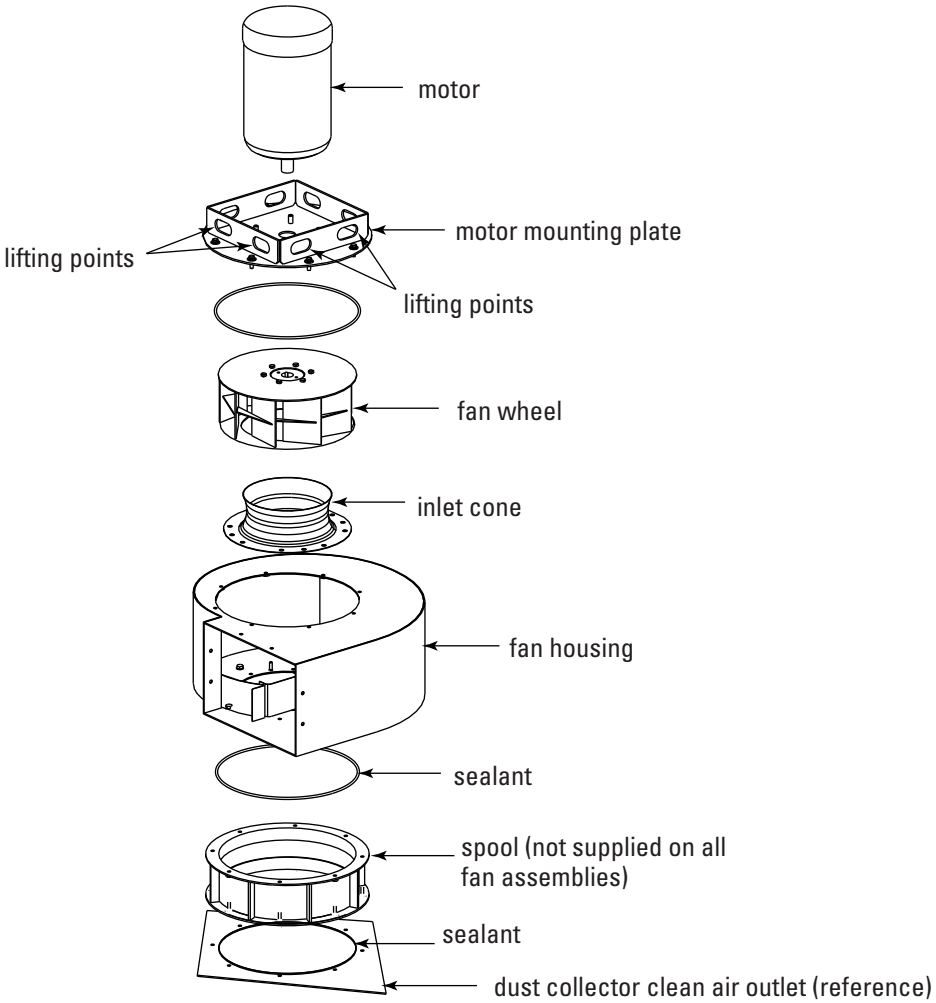
Reference Torque Value Table.

For additional information, contact the motor manufacturer.

Set screws should never be used more than once. If the set screws are loose, they must be replaced. Use only knurled, cup-point screws with a nylon locking patch.

Torque Values for TBI		
Setscrew Size Diameter	Carbon Steel Setscrew Torque*	
In.	TBI 3-10 Lb. - Ft.	TBI 15-30 Lb. - Ft.
1/4	6.2	6.2
5/16	12	12
3/8	21	22
7/16	33	30
1/2	50	55
5/8	97	100
3/4	168	150
7/8	267	165
1	400	250

*Stainless steel setscrews are not hardened and should not be tightened to more than half of the values shown.



Fan Installation

Fan With Inlet Spool Piece Mounted to Clean Air Outlet With Weld Nuts

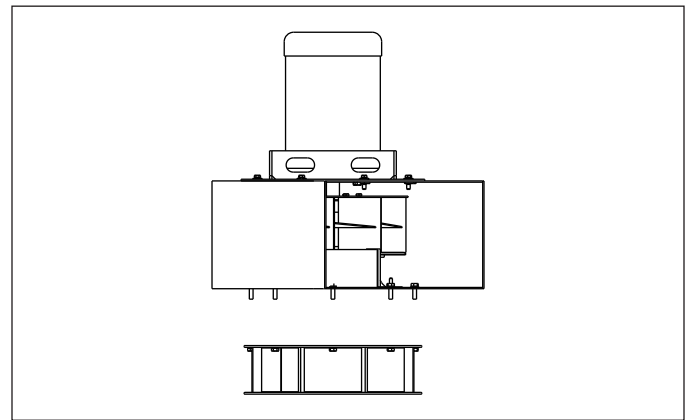
The following instructions are for a fan with an integrated inlet spool piece being mounted on collectors that have weld-nuts on the clean air outlet.

1. Apply the sealer, furnished in the installation hardware kit, around clean air outlet opening of the collector. Sealer should be applied in a Figure 8 type pattern around each bolt hole so that inlet is sealed from both the outside and the inside of the bolt hole.
2. Position TBI fan and spool assembly onto the collector surface. Align mounting holes.
3. Bolt the TBI fan and spool assembly to the collector clean air outlet by inserting hardware supplied through the inlet spool piece and into the weld nut in the clean air plenum. Be sure to position the discharge to be free of obstructions and locate so that the motor's electrical box will be positioned for wiring convenience.
4. Inspect the installation prior to starting the fan. Check for any loose items or debris that could be drawn into the fan or dislodged by the air discharged from the fan outlet. Check the interior of the fan as well. Turn the wheel by hand to check for binding.
5. Complete the electrical connections in accordance with NEC code and state and local codes. "Bump" the starter to make sure the motor is rotating in the proper direction. (Standard TBIs are clockwise rotation as viewed from the motor endbell.)

Fan With Inlet Spool Piece Mounted to Clean Air Outlet Without Weld Nuts

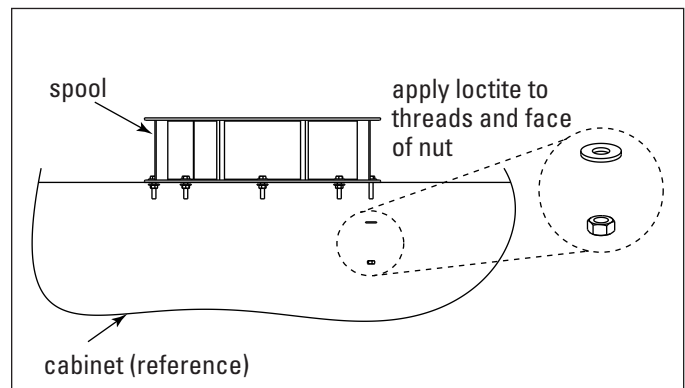
The following instructions are for a fan with an integrated inlet spool piece being mounted on collectors that do NOT have weld-nuts on the clean air outlet.

1. Apply the sealer, furnished in the installation hardware kit, around clean air outlet opening of the collector. Sealer should be applied in a Figure 8 type pattern around each bolt hole so that inlet is sealed from both the outside and the inside of the bolt hole.
2. Remove the inlet spool from fan. Retain the hardware to for use when fan is reattached to the spool in Step 5.



Step 2

3. Position the inlet spool piece onto the collector surface. Align mounting holes.
4. Bolt the inlet spool piece to the collector clean air outlet by inserting supplied hardware. Reach through to secure the nuts on the inside of the clean air plenum. Apply supplied Loctite on nut.



Steps 3-4

5. Apply sealer on the inlet spool piece and re-attach the TBI fan to the inlet spool piece. Be sure to position the discharge to be free of obstructions and locate so that the motor's electrical box will be positioned for wiring convenience.
6. Inspect the installation prior to starting the fan. Check for any loose items or debris that could be drawn into the fan or dislodged by the air discharged from the fan outlet. Check the interior of the fan as well. Turn the wheel by hand to check for binding.
7. Complete the electrical connections in accordance with NEC code and state and local codes. "Bump" the starter to make sure the motor is rotating in the proper direction. (Standard TBIs are clockwise rotation as viewed from the motor endbell.)

Motor Drain Hole Orientation (Side Mount Fans)

Motor drain holes must be oriented downward to prevent water accumulation in the motor and extend motor life.

Fan with Inlet Spool Piece Mounted to Clean Air Outlet with Adapter

The following instructions are for a TBI fan being mounted to a Donaldson Torit dust collector that has a side mount adapter.

1. Apply sealer, furnished in the installation hardware kit, around the clean air outlet opening of the collector. Sealer should be applied in a Figure 8 type pattern around each bolt hole so that inlet is sealed from both the outside and the inside of the bolt hole.
2. Bolt the TBI fan to the adapter by inserting the bolts on the TBI inlet into the appropriate holes of the adapter. Install the nuts that came with the fan. Be sure to position the discharge to be free of obstructions and locate so that the motor's electrical box will be positioned for wiring convenience.
3. Inspect the installation prior to starting the fan. Check for any loose items or debris that could be drawn into the fan or dislodged by the air discharged from the fan outlet. Check the interior of the fan as well. Turn the wheel by hand to check for binding.
4. Complete the electrical connections in accordance with NEC code and state and local codes. "Bump" the starter to make sure the motor is rotating in the proper direction. (Standard TBIs are clockwise rotation as viewed from the motor endbell.)

Fan Without Spool Piece

The following instructions are for a TBI fan without a spool piece being mounted to a Donaldson Torit dust collector.

1. Apply the sealer, furnished in the installation hardware kit, around clean air outlet opening of the collector. Sealer should be applied in a Figure 8 type pattern around each bolt hole so that inlet is sealed from both the outside and the inside of the bolt hole.
2. If the fan does not already have match marking arrows, match-mark the motor mounting plate with the fan housing so they can be reassembled in the original position later in Step 6.
3. Remove the motor/wheel assembly from the fan housing. Do not remove the wheel from the motor shaft.
4. Position the fan housing onto the collector surface with the fan inlet against the collector. Align the mounting holes. Position the discharge to be free of obstructions and locate so that the motor's electrical box will be positioned for wiring convenience.
5. Bolt the fan housing to the collector surface using the hardware supplied. Put Loctite on the nut surface that will come in contact with the inside surface of the clean air plenum.
6. Apply sealer on the fan housing. Reinstall the motor/wheel assembly onto the housing in the original position as indicated in Step 2.
7. Inspect the installation prior to starting the fan. Check for any loose items or debris that could be drawn into the fan or dislodged by the air discharged from the fan outlet. Check the interior of the fan as well. Turn the wheel by hand to check for binding
8. Complete the electrical connections in accordance with NEC code and state and local requirements. "Bump" the starter to make sure motor is rotating in the proper direction. (Standard TBIs are clockwise rotation as viewed from the motor endbell.)

Duct Connections and Support

Any duct or attenuator/silencer should have independent support. Do not use the fan to support duct or attenuator/silencer. Isolating the fan from duct with flex connections reduces transmission of vibration.

Fans handling hot gases must be rated for operation at the gas temperature and require expansion joints at both the inlet and discharge to prevent excessive loads caused by thermal growth.

Damper and Silencer Support Bracket

Side and Top Mount

1. Attach the damper to the fan exhaust outlet using the supplied hardware.
2. Attach the silencer adapter flange to the damper using the bolts, washers and hex nuts supplied.
3. Apply sealant to the silencer adapter flange and attach silencer to flange. Tighten all hardware.

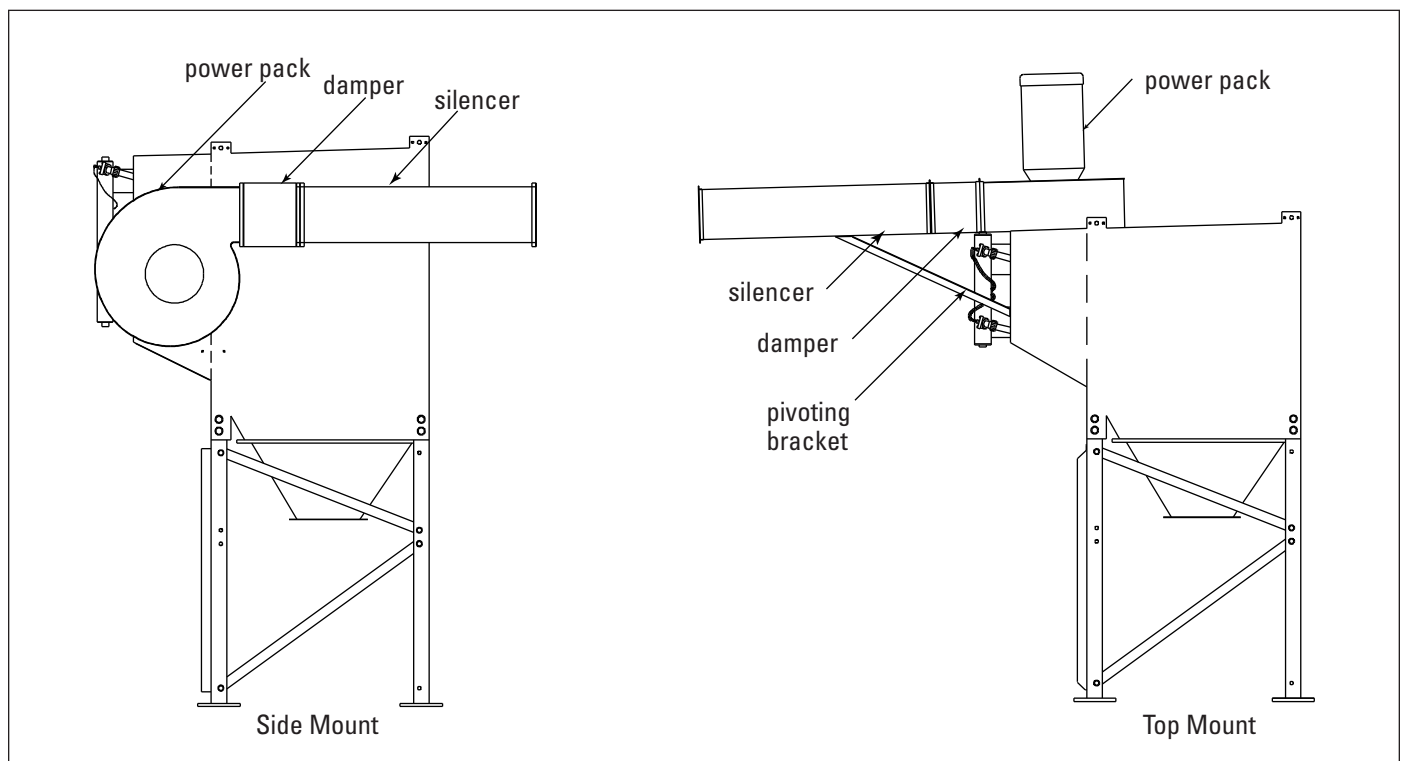
Top Mount Support Brackets

1. Loosely assemble the silencer support brackets.
 - a. Align the pivoting support brackets to extend a minimum of 30-inches from the collector and mark the drill locations.
 - b. Drill pilot holes with a 0.339-in bit.
 - c. Screw brackets using 3/8-in thread-forming bolts.

Side Mount Support Brackets

Note: Side mount silencer support brackets require modification in the field.

1. Loosely assemble the silencer's support brackets from silencer pack following procedure on the silencer pack drawings.
 - a. Align the support bracket to the underside of the silencer, flush with the cabinet wall and mark the drill locations.
 - b. Drill pilot holes with a 0.339-in bit.
 - c. Secure brackets using 3/8-in thread forming bolts.
2. Loosen the wing nut on the damper and adjust position to restrict flow to design air volume.



Typical Side and Top-Mount Silencer and Damper Installation

Maintenance Information

Instruct all personnel on safe use and maintenance procedures.

CAUTION

Use proper equipment and adopt all safety precautions needed for servicing equipment.

Electrical service or maintenance work must be performed by a qualified electrician and comply with all applicable national and local codes.

Turn power off and lock out electrical power sources before performing service or maintenance work.

Do not install in classified hazardous atmospheres without an enclosure rated for the application.

NOTICE

When mounting fan in an outdoor or high humidity environment, mount the motor with drain holes facing down to extend motor life.

For additional information, contact the motor manufacturer.

Donaldson Torit TBI fans are manufactured to high standards with quality materials and components. Proper maintenance will ensure a long and trouble-free service life.

The key to good fan maintenance is regular and systematic inspection of all fan parts. Inspection frequency is determined by the severity of the application and local conditions. Strict adherence to an inspection schedule is essential.

NOTICE

Regular fan maintenance should include the following:

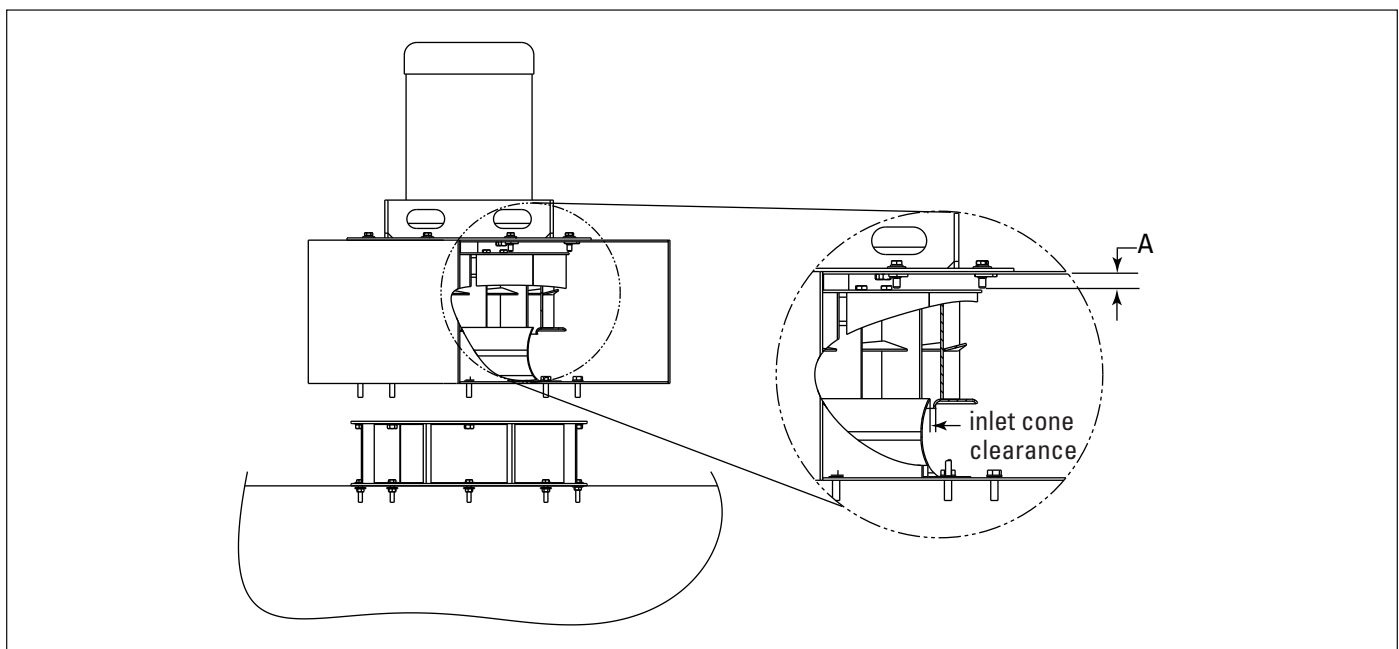
Check the fan wheel for any wear or corrosion, as either can cause catastrophic failures. Check also for the build-up of material which could cause unbalance resulting in vibration, bearing wear and serious safety hazards. Clean or replace the wheel as required.

Lubricate the bearings, but do not over lubricate.

Periodically inspect the shaft for dirt buildup, corrosion and signs of excess stress or fatigue.

During any routine maintenance, all setscrews and bolts should be checked for tightness. See Torque Value Table.

When installing a new wheel or cone, the proper wheel-to-drive side plate must be maintained as shown in Side Plate Clearance Table. Inlet cone clearance should be uniform around the circumference.



Wheel to Drive Side Plate Clearances

Side Plate Clearance		
TBI	"A" Dimension (inches)	
Size	60 hz	50 Hz
3	1-1/4	1-1/4
5	7/8	2-1/4
7.5	7/8	2-3/4
10	1/2	3-1/4
15	1-1/8	3/4
20	1-5/16	2-3/16
25	2-7/16	2-7/16
30	2-11/32	1-5/16

Tolerance ± 1/8"

Motor Maintenance

TBI Fans typically use motors with greaseable bearings, but other types of motors may have been selected for your fan.

Grease Motors

Use the following steps for greaseable motors only:

1. Inspect the motor at approximately every 500 hours of operation or every 3 months, whichever occurs first.
2. Keep the motor clean and the ventilation openings clear. If the motor is not properly ventilated overheating can occur.
3. Use an electrical insulation tester to periodically ensure that the integrity of the winding insulation has been maintained. Investigate any significant drop in resistance.

4. Grease the motor bearings using a high grade bearing grease. For standard service conditions ExxonMobil Polyrex™ EM grease is recommended. Under standard conditions, grease every 5,500 hours. In severe dirt and abrasive dust conditions, grease every 2750 hours. Under extreme conditions, such as an environment with iron dust, grease every 550 hours.

Wheel Balance

Airstreams containing particulate or chemicals can cause abrasion or corrosion of the fan parts. This is often uneven and can lead to wheel imbalance over time. When such wear is discovered, a decision must be made to rebalance or replace the wheel.

The soundness of all parts should be determined making sure there is no hidden structural damage. The airstream components should also be cleaned to remove any build-up of foreign material. Specialized equipment can be used to rebalance a cleaned wheel that is considered structurally sound.

Balance weights should be rigidly attached at a point that will not interfere with the housing nor disrupt airflow.

Troubleshooting Guidelines

Use current safety practices when investigating fan or system performance problems. General safe practices and performance troubleshooting guidelines can be found in AMCA Publications 410 and 202, respectively. Fan application and field measurement procedures can be found in AMCA Publications 201 and 203.

Troubleshooting

Problem	Probable Cause	Remedy
Fan blower and motor do not start	Improper motor wire size	Rewire using the correct wire gauge as specified by national and local codes.
	Not wired correctly	Check and correct motor wiring for supply voltage. See motor manufacturer's wiring diagram. Follow wiring diagram and the National Electric Code.
	Collector not wired for available voltage	Correct wiring for proper supply voltage.
	Input circuit down	Check power supply to motor circuit on all leads.
	Electrical supply circuit down	Check power supply circuit for proper voltage. Check for fuse or circuit breaker fault. Replace as necessary.
	Damaged motor	Replace damaged motor.
Fan blower and motor start, but do not stay running	Incorrect motor starter installed	Check for proper motor starter and replace if necessary.
	Access doors are open or not closed tight	Close and tighten access doors. See Filter Installation.
	Hopper discharge open	Check that dust container is installed and properly sealed.
	Damper control not adjusted properly	Check airflow in duct. Adjust damper control until proper airflow is achieved and the blower motor's amp draw is within the manufacturer's rated amps.
	Electrical circuit overload	Check that the power supply circuit has sufficient power to run all equipment.
Insufficient airflow	Fan rotation backwards	Proper fan rotation is clockwise when viewed from the motor side or counterclockwise when viewed through the inlet cone. See Preliminary Start-Up Check.
	Access doors open or not closed tight	Check that all access doors are in place and secured. Check that the hopper discharge opening is sealed and that dust container is installed correctly.
	Fan exhaust area restricted	Check fan exhaust area for obstructions. Remove material or debris. Adjust damper flow control.
	Filters need replacement	Remove and replace using genuine Donaldson replacement filters. See Filter Removal and Installation.
Excessive vibration	Loose mounting bolts or set screws	Tighten loose bolts or set screws.
	Misalignment or excessive wear of wheel	Align wheel and balance fan.
	Misaligned or unbalanced motor	Balance fan.
	Bent shaft due to mishandling or material impact	Replace motor with bent shaft and rebalance fan.

Problem	Probable Cause	Remedy
Excessive vibration	Externally transmitted vibration	Isolate collector from external vibration.
	Accumulation of foreign material on the wheel	Clean the wheel.
	Excessive system pressure or restriction of airflow due to closed dampers	Open dampers far enough for fan to operate in stable flow regime.
Inadequate performance	Fan running too slowly	Check power frequency against fan motor design frequency.
	Fan wheel rotating in wrong direction or installed backwards on shaft	Proper fan rotation is clockwise from the top of the fan. The fan can be viewed through the back of the motor.
	Poor system design, closed dampers, air leaks or clogged filters	Check system for damper positions leak points. Check filter Delta P.
	Sharp deflection of airstream at fan outlet	Do not place fan discharge next to a wall.
	Missing discharge fittings	Install discharge fittings.
Excessive noise	Fan operating near "stall" due to incorrect system design or installation	Correct system or replace with correctly sized fan.
	Vibration originating elsewhere in the system	Vibration isolate collector from the system.
	Loose accessories or components	Tighten accessories or components.

Donaldson Industrial Air Filtration Warranty

Donaldson warrants to the original purchaser only that the Goods will be free from defects in material and manufacture for the applicable time periods stated below: (1) Major structural components for a period of ten (10) years from the date of shipment; (2) Non-Structural, Donaldson-built components and accessories including Donaldson Airlocks, TBI Fans, TRB Fans, Fume Collector products, Donaldson built electrical control components, and Donaldson-built Afterfilter housings for a period of twelve (12) months from date of shipment; and (3) Donaldson-built filter elements for a period of eighteen (18) months from date of shipment.

Buyer is solely responsible for determining if goods fit Buyer's particular purpose and are suitable for Buyer's process and application. Seller's statements, engineering and technical information, and recommendations are provided for the Buyer's convenience and the accuracy or completeness thereof is not warranted. If, after Seller receives written notice, within the warranty period, that any goods allegedly do not meet Seller's warranty, and Seller, in its sole discretion, determines that such claim is valid, Seller's sole obligation and Buyer's exclusive remedy for breach of the foregoing warranty or any Seller published warranty, will be, at Seller's option, either: (i) repair or replacement of such goods or (ii) credit or refund to Buyer for the purchase price from Seller. In the case of repair or replacement, Seller will be responsible for the cost of shipping the parts but not for labor to remove, repair, replace or reinstall the allegedly defective goods. Refurbished goods may be used to repair or replace the goods and the warranty on such repaired or replaced goods shall be the balance of the warranty remaining on the goods which were repaired or replaced. Any repair or rework made by anyone other than Seller is not permitted without prior written authorization by Seller, and voids the warranty set forth herein. Seller warrants to Buyer that it will perform services in accordance with the Sales Documents using personnel of required skill, experience and qualifications and in a professional and workmanlike manner in accordance with generally recognized industry standards for similar services. With respect to any services subject to a claim under the warranty set forth above, Seller shall, in its sole discretion, (i) repair or re-perform the applicable services or (ii) credit or refund the price of such services at the pro rata contract rate and such shall be Seller's sole obligation and the exclusive remedy for breach of the foregoing warranty on services. Products manufactured by a third party ("Third Party Product") may constitute, contain, be contained in, incorporated into, attached to or packaged together with, the goods. Buyer agrees that: (a) Third Party Products are excluded from Seller's warranty in this Section 7 and carry only the warranty extended by the original manufacturer, and (b) Seller's liability in all cases is limited to goods of Seller's design and manufacture only. EXCEPT FOR SELLER'S WARRANTY OF TITLE TO THE GOODS, SELLER EXPRESSLY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES WHATSOEVER, WHETHER, EXPRESSED OR IMPLIED, ORAL, STATUTORY, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY AND ANY WARRANTIES ARISING FROM TECHNICAL ADVICE OR RECOMMENDATIONS, COURSE OF DEALING OR OF PERFORMANCE, CUSTOM OR USAGE OF TRADE. Seller's obligations do not cover normal wear and tear or deterioration, defects in or damage to any goods resulting from improper installation, accident or any utilization, maintenance, repair or modification of the goods, or any use that is inconsistent with Seller's instructions as to the storage, installation, commissioning or use of the goods or the designed capabilities of the goods or that, in its sole judgment, the performance or reliability thereof is adversely affected thereby, or which is subjected to abuse, mishandling, misuse or neglect or any damage caused by connections, interfacing or use in unforeseen or unintended environments or any other cause not the sole fault of Seller, and shall be at Buyer's expense. Seller's warranty is contingent upon the accuracy of all information provided by Buyer. Any changes to or inaccuracies in any information or data provided by Buyer voids this warranty. Seller does not warrant that the operation of the goods will be uninterrupted or error-free, that the functions of the goods will meet Buyer's or its customer's requirements unless specifically agreed to, or that the goods will operate in combination with other products selected by Buyer or Buyer's customer for its use.

The terms of this warranty may only be modified by a special warranty document signed by a Director, General Manager or Vice President of Donaldson. To ensure proper operational performance of your equipment, use only genuine Donaldson replacement parts.

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