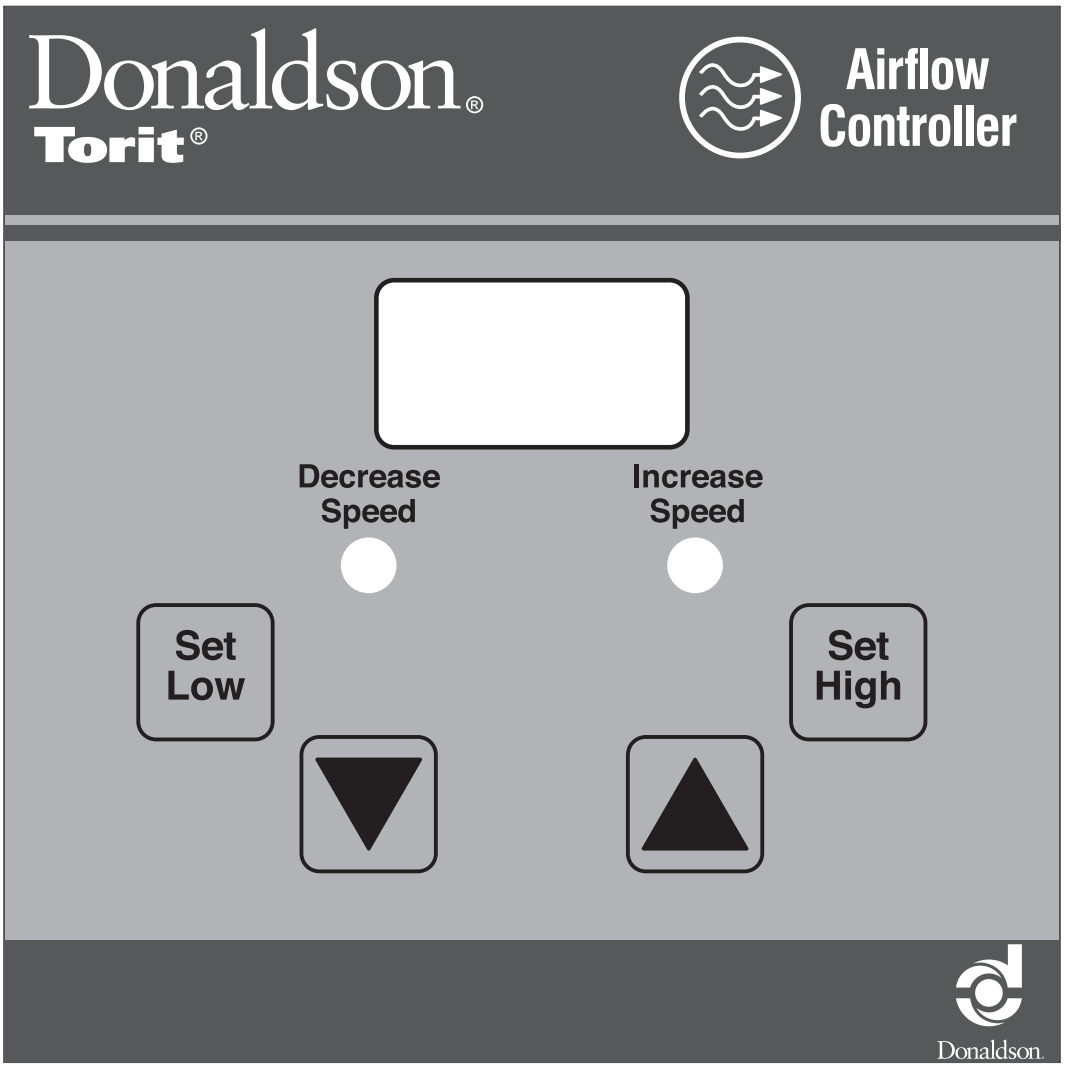
Donaldson
Torit®

Airflow Controller

Installation and Operation Manual

Installation, Operation, Service and Replacement Parts 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.

English
Master Language

IOM AD3898101 (ENG)
Revision 2

IMPORTANT NOTES

This manual has been supplied to assist with the installation, operation and maintenance for the dust collector accessory purchased. Please read the manual before installing, operating, or performing maintenance on the accessory 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 dust collector accessory. This manual is the property of the owner and should be left with the collector when the accessory installation has been completed. DO NOT operate the 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 **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.**

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Safety Communication

Improper operation of dust collectors and/or dust control systems may contribute to conditions in a work area or facility which could result in severe personal injury, and product or property damage. All dust collection equipment should be used only for its intended purpose and should be properly selected and sized for its intended use.

Process owners have important responsibilities relating to identifying and addressing potential hazards in their processes. When the potential for handling combustible dust exists within a process the process owner should include combustion hazards in their risk management activities and should comply with applicable codes and standards related to combustible dust.

Electrical installation must be performed by a qualified electrician.

This equipment is not designed to support site ducts, piping, or electrical services. All ducts, piping, or electrical services must be adequately supported to prevent injury and/or property damage.

Site selection must account for wind, seismic zone, and other load conditions.

Equipment may reach peak sound pressure levels above 80 dB (A). Noise levels should be considered when selecting collector location.

Most dusts present safety and health hazards that require precautions. Wear eye, respiratory, head and other protection equipment suitable for the type of dust.

Some components may be heavier than they appear. Use appropriate lifting methods to avoid personal injury and/or property damage.

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

The Airflow Controller is designed to maintain a constant airflow in a dust collection system by adjusting the speed of the system airflow fan using a Variable Frequency Drive (VFD) in response to changes in system static pressure. The Airflow Controller offers two user set points (Low and High) and displays the current system static pressure at the static pressure sampling point. Typical system results of the Airflow Controller operation are more consistent dust collection airflow, reduced fan energy consumption, and longer dust collector filter life.

Operation

The Airflow Controller monitors the system static pressure at a specific point in the dust collection system (see Static Pressure Tap Location). Based on the system static pressure reading, the controller will adjust the speed of the fan appropriately until the system static pressure falls between the Low and High set points set by the customer (see Start-up Instructions).

The Airflow Controller controls air volume relative to the amount of system static pressure at a specific customer selected location in the dust collection duct system. If the dust collection duct system physically changes (for example adjusting blast gates at hoods, or adding or removing duct), the set points must be reset in order to maintain the desired air volume in the remaining system. Typically, once the set points are adjusted with new filters to maintain a desired air volume, they should not need to be readjusted.

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.

Electrical Wiring

⚠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.

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.

An electric disconnect switch having adequate amp capacity shall be installed in accordance with Part IX, Article 430 of the National Electrical Code (NFPA No. 70-latest edition). Check collector's rating plate for voltage and amperage ratings.

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

Standard Equipment

NOTICE

For new installations the Airflow Controller is generally mounted inside a control enclosure with a VFD controller. The enclosure may also include a timer board, Delta P Plus Controller, additional motor starters, and/or additional control components. Stand-alone Airflow Controllers for retrofit to existing VFD driven fans are mounted in a separate NEMA 12 control enclosure.

For complete installation instruction information, see the most current version of the dust collector and Delta P Plus Control Installation, Operation, and Maintenance manual.

1. Mount the control enclosure using appropriate hardware.

NOTICE

Always mount the Airflow Controller indoors.

Do not mount the Airflow Controller in a high vibration area.

2. Install conduit between the control enclosure, and the motor enclosure on the fan.
3. Using the wiring diagram provided with the control enclosure, make wiring connections to all components.

NOTICE

Use proper grounding and handling procedures to prevent permanent damage to this device. Handle the printed circuit board by the edges only. Do not touch the socketed E2PROM pins.

4. Plastic tubing is supplied with the control enclosure and may be cut in two sections.

Static Pressure Tap Location

The Airflow Controller works by adjusting the VFD Controller speed of the system airflow fan to maintain a constant system static pressure at a customer determined point in the dust collection system duct layout. The location of the static pressure tap is critical to ensure the system static pressure monitored by the Airflow Controller is only impacted by changes in system airflow. For most systems, it is recommended to measure system static pressure in the Dirty Air Plenum using the Low pressure tap on the sensor. The High Pressure tap on the sensor is open to atmosphere. However, this will only work if:

- The system has no prefilters
- The system has no additional variables that impact airflow.
- The system operates under negative pressure (system airflow fan is downstream on the clean air side of the collector).

Optional static pressure tap locations include measuring system static pressure in the inlet duct (7-10 duct diameters from any variable source and past any branches) or any other critical airflow volume control point that is not subject to physical changes in the duct system (no flex hose).

An alternate method is to use velocity pressure in the outlet duct for the Airflow Controller, using a pitot tube. If the velocity pressure approach is used, it is necessary to have at least 7-10 diameters of straight duct before the pitot tube, and it is necessary to perform a pitot tube traverse to confirm the validity of the single velocity pressure measurement. Failure to confirm the validity of the single point velocity pressure reading may compromise the ability to stabilize flow.

Please contact your Donaldson Torit representative for help determining a proper system static pressure tap location.

Start-up Instructions

NOTICE

Duct systems with long runs and/or high pressure drops will respond slowly to fan speed changes due to the inertia of the air mass within the duct.

Setup should be with new filters. If this is not the case, the High and Low settings may need to be reset after new filters are installed.

1. Turn power to dust collector and the control enclosure OFF.
2. Confirm the static pressure sensor tubing connections outside of the electrical enclosure are correct. Standard configuration is:
   a. Low static pressure port of Airflow Controller board transducer connected to collector Dirty Air Plenum (DAP).
   b. High static pressure port of Airflow Controller board transducer connected to atmosphere (vent).
3. Power up the control enclosure panel. (System airflow fan should be OFF.)
4. Confirm the Airflow Controller readout is “0.0”. Airflow Controller readout is the system static pressure. If readout is not “0.0”, contact your Donaldson Torit representative.
5. Set the auto/manual selector switch on the control panel to “manual”.
6. Start the system airflow fan and use Up and Down arrows to adjust fan speed to obtain the minimum desired airflow in the system. Note and record both the system static pressure on the Airflow Controller and the VFD output frequency at this acceptable minimum airflow rate.
7. Set the Low and High limit set points by holding each button separately and using the up/down arrows to change the settings.
   a. Low = 2” w.g. below recorded system static pressure
   b. High = recorded system static pressure + 0.2” w.g.
8. Stop the system airflow fan. If VFD shows an error code reference the VFD manual or contact the manufacturer.
9. Set the auto/manual selector switch on the control panel to “auto”.
10. Restart the system airflow fan and monitor the Airflow Controller.
    a. If the Airflow Controller stabilizes between the Low and High limit settings, speed setup is complete.
    b. If the Airflow Controller “hunts” and/or overshoots for several minutes (constantly changing speed) contact your Donaldson Torit representative.
11. Stop the system airflow fan. If VFD shows an error code reference the VFD manual or contact your Donaldson Torit representative.

Stabilizing Airflow Controller Operation

NOTICE

Multiple start-up and shutdowns may cause the motor to overheat and create an error code. Please reference the VFD manual or contact the VFD manufacturer for instructions on how to clear these error(s).

Before proceeding with the following steps, ensure the pressure tubing is free and clear, not pinched, no splices and not exceeding 100-ft in length.

1. Stop the system airflow fan.
2. Make sure the difference between the Low and High limit set points is as least 0.4" w.g.
3. Increase VFD acceleration and deceleration times by 30-45 seconds.
4. Restart the system airflow fan and monitor the Airflow Controller.

   If the Airflow Controller stabilizes between the Low and High limit settings, speed setup is complete.
5. If the Airflow Controller "hunts" and/or overshoots for several minutes (constantly changing speed) contact your Donaldson Torit representative with the control panel serial number located on the inside of the control panel door.

VFD Parameter Change Procedure

1. Refer to either the VFD manual or online version for further instructions on how to change VFD parameters.
2. A list of parameter settings for specific VFD's can be found on the supplied print.

Parameter	Model(s)	Default	Min. Value	Max. Value	Units
Differential Pressure	20”		-0.5	24.0	in W.C.
	+/- 5”		-6.0	6.0	
Low Set Point Must be at least 0.2 lower than the High Set Point	20”	2.0	0.0	19.8	in W.C.
	+/- 5”	2.0	-5.5	4.8	
High Set Point Must be at least 0.2 higher than the Low Set Point	20”	4.0	0.2	20	in W.C.
	+/- 5”	4.0	-4.8	5.0	
Filtering Level (P1)	All	0	1	100	Each numerical level is equal to 2 seconds. For example, a Filtering Level of 15 is equal to 30 seconds of averaging.
On Time (P2)	All	0.1	0.1	25.5	Seconds to remain on.
Off Time (P3)	All	0	0	255	Seconds to remain off.
Inverse Operation (P4)	All	0	0	1	0 indicates normal operation where high pressure decreases fan speed and 1 indicates inverse operation where high pressure increases fan speed.
Zero Now (P5)	All	0	0	1	Setting this parameter to 1 will zero out the pressure gauge, SETUP MODE will be exited and 0.0 will be displayed.

Troubleshooting

Problem	Probable Cause	Remedy
No display on the Airflow Controller	No power to the controller.	Use a voltmeter to check for voltage at terminal TB1 and TB2.
	Fuse blown	Check the fuse in the F1 fuse tower. Replace if necessary.
Display on the Airflow Controller does not read zero when at rest	Differential pressure is present from static pressure tap location to ambient	Contact your Donaldson representative for assistance.
	Out of calibration	Contact your Donaldson representative for assistance.
Display reads "OR" or ---	Pressure out of the allowable range	Check that high and low pressure tubing is attached and not leaking. Use differential pressure measurement device to verify that the actual pressure does not exceed the maximum static pressure capacity of the supplied gauge.
Changing motor speed	Reference VFD manufacturer manual or contact the manufacturer with control panel serial number for instructions.	
Airflow Controller indicates Increase/ Decrease Speed, but no change in VFD is observed	Airflow Controller set to "manual"	Set the auto/manual selector switch on the control panel to "auto".
	Not correctly wired to all components	Follow wiring diagram and the National Electric Code.
	Pressure tubing disconnected, ruptured, or plugged.	Check tubing for kinks, breaks, contamination, or loose connections.
No change in Airflow Controller reading despite system static pressure changes	Pressure tubing disconnected, ruptured, or plugged	Check tubing for kinks, breaks, contamination, or loose connections.
	Improper static pressure tap location	See "Static Pressure Tap Location" instructions.
VFD display reads Error	Motor overheat due to multiple start-up and shutdowns.	Reference VFD manufacturer manual or contact the VFD manufacturer for instructions.
	Inadequate VFD parameter setting	Reference VFD manufacturer manual or contact the VFD manufacturer for instructions.

Replacement Parts

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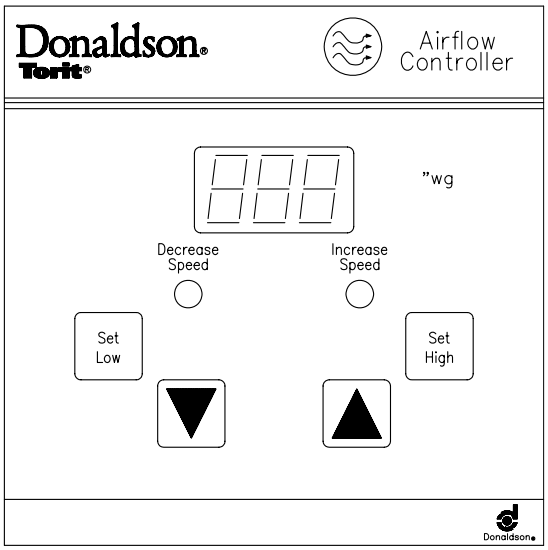

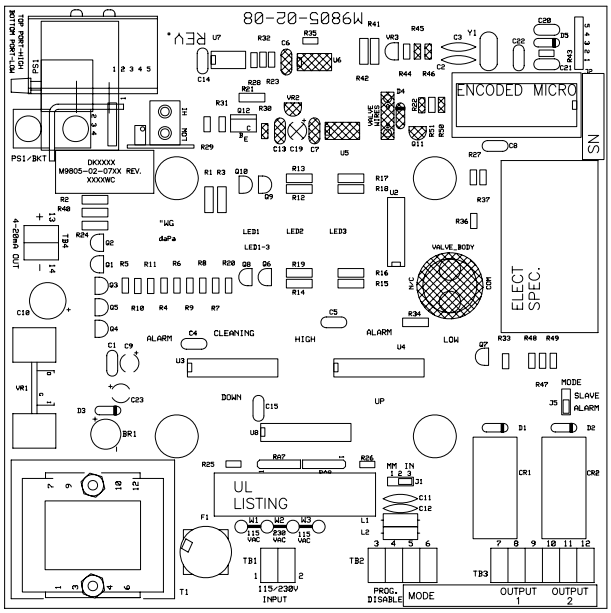

Airflow Controller Keypad and Printed Circuit Board

Item	Part Number	Description	Model
1	AG8007401	Airflow Controller Keypad and Printed Circuit Board	All

Product Information (Process Owner to complete and retain for your records)

Model Number _____ Serial Number _____

Ship Date _____ Installation Date _____

Filter Type_____

Collected Dust _____

Dust Properties: Kst _____Pmax_____ MIE _____MEC _____

Accessories _____

Other _____

_____

Service Notes

Date	Service Performed	Notes

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.

Significantly improve the performance of your collector with genuine Donaldson Torit replacement filters and parts.

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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 products to determine whether the product is fit for the particular purpose and suitable for the user's application. All products, product specifications, availability and data are subject to change without notice, and may vary by region or country.

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