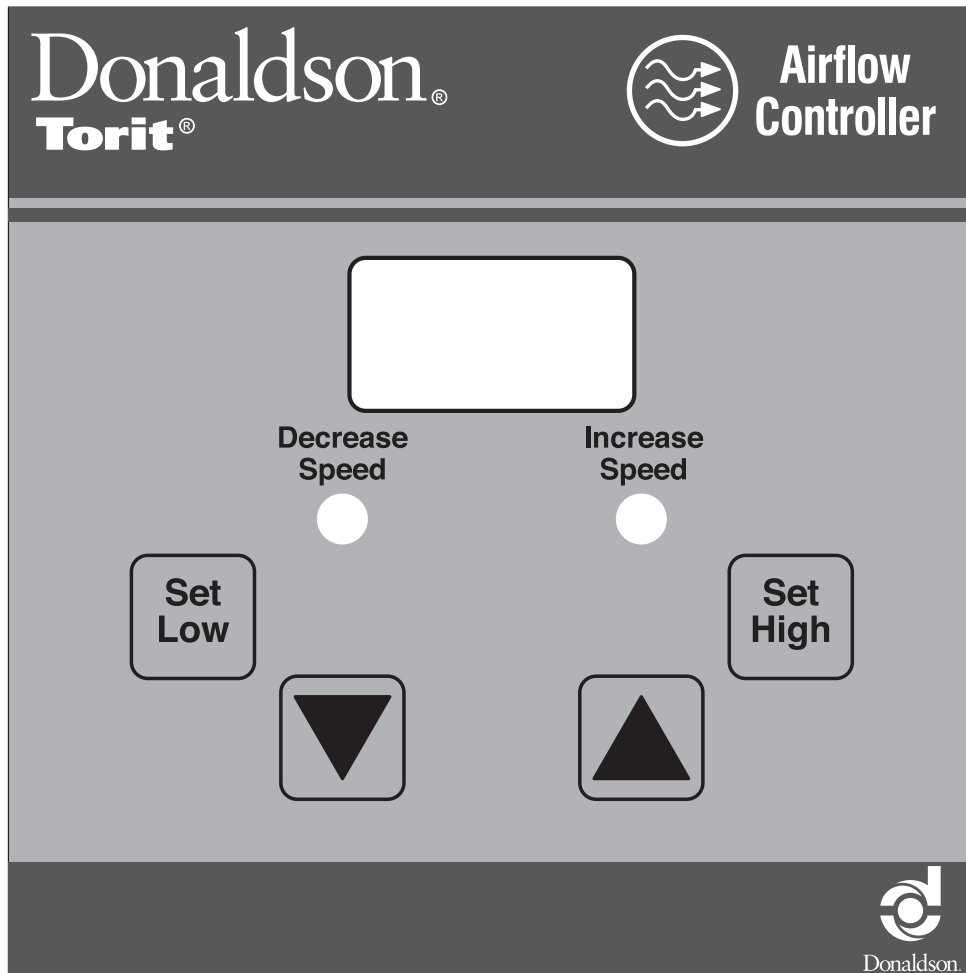




Airflow Controller

Installation and Operation Manual

Installation, Operation, Service and Replacement Parts Information



This manual is property of the owner. Leave with the unit when set-up and start-up are complete. Donaldson Company reserves the right to change design and specifications without prior notice.

Illustrations are for reference only as actual product may vary.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



WARNING

APPLICATION OF DUST CONTROL EQUIPMENT

Combustible materials such as buffing lint, paper, wood, metal dusts, weld fume, or flammable coolants or solvents represent potential fire and/or explosion hazards. Use special care when selecting, installing, and operating all dust, fume, or mist collection equipment when such combustible materials may be present in order to protect workers and property from serious injury or damage due to a fire and/or explosion.

Consult and comply with all National and Local Codes related to fire and/or explosion properties of combustible materials when determining the location and operation of all dust, fume, or mist collection equipment.

When combustible materials are present you must consult with an expert in fire extinguishing and/or explosion protection systems, who is also familiar with the local codes, for support and guidance on the selection and installation of an appropriate fire and/or explosion protection system.

DO NOT allow sparks, cigarettes or other burning objects to enter the hood or duct of any dust, fume, or mist collection equipment as these may initiate a fire or explosion of any combustible materials accumulated in the collector.

Portions of dust, mist, and fume-collection equipment, including the clean- and dirty-air plenums may be considered "OSHA Confined Spaces." Refer to the appropriate OSHA regulations to determine if a specific installation should be considered a confined space and if a permit program is required.

Recirculating filtered air in your facility can be a hazard. Consult with OSHA to ensure compliance with all codes regarding recirculating filtered air.

Improper operation of a dust, fume, or mist control system may contribute to conditions in the work area or facility that could result in severe personal injury and product or property damage. Check that all dust, fume, or mist collection equipment is properly selected, installed, and operated for its intended use.

This manual contains specific precautionary statements relative to worker safety. Read this manual thoroughly and comply as directed. Instruct all personnel on the safe use and maintenance procedures related to this equipment. Discuss any questions on the application, use, or maintenance of this equipment with a Donaldson Torit representative.

For optimum collector performance, use only Donaldson Torit replacement parts.

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DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



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



NOTICE is used to address practices not related to personal injury that may result in damage to equipment.

Data Sheet

Model Number _____	Serial Number _____
Ship Date _____	Installation Date _____
Customer Name _____	
Address _____	

Filter Type _____	
Accessories _____	
Other _____	

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 unit on delivery.
2. Report any damage to the delivery carrier.
3. Request a written inspection report from the Claims Inspector to substantiate claim.
4. File claims with the delivery carrier.
5. Compare unit received with description of product ordered.
6. Report incomplete shipments to the delivery carrier and your Donaldson Torit representative.

Electrical Wiring



Electrical installation 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.

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 ordinance for additional requirements that apply.

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

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. Minimizing the averaging and increasing the fan acceleration/deceleration times will likely be necessary to establish stable operation of the Airflow Controller.

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 inside and 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. Confirm the Airflow Controller averaging time is set to 2 seconds (0.1 on readout) using the Resetting the Averaging Time procedure.

Note: See Resetting the Averaging Time on the next page for further instruction.
6. Set the auto/manual selector switch on the control panel to "manual".
7. Start the system airflow fan and use VFD controls 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.
8. 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 = Recorded system static pressure
 - b. High = Recorded system static pressure + 0.5" w.g.
9. Stop the system airflow fan. If VFD shows an error code reference the VFD manual or contact the manufacturer.
10. Set the auto/manual selector switch on the control panel to "auto".
11. 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) see Stabilizing Airflow Controller Operation.
12. Stop the system airflow fan. If VFD shows an error code reference the VFD manual or contact the manufacturer.

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).

1. Stop the system airflow fan.
2. Make sure the difference between the Low and High limit set points is at least 0.3" w.g.
3. Increase VFD acceleration and deceleration times by 30-45 seconds.
4. 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) continue with following steps.
5. Stop the system airflow fan. If VFD shows an error code reference the VFD manual or contact the manufacturer.
6. Increase the High limit set point by an additional 0.2" w.g.
7. 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 controller "hunts" and/or overshoots for several minutes (constantly changing speed) continue with following steps.
8. Stop the system airflow fan. If VFD shows an error code reference the VFD manual or contact the manufacturer.

9. Increase VFD acceleration and deceleration times by an additional 30-45 seconds.
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 Airflow Controller "hunts" and/or overshoots for several minutes (constantly changing speed), shut down the system airflow fan and contact your Donaldson Torit representative for assistance

Resetting the Averaging Time

1. Start with the system airflow fan, Airflow Controller, and unit control panel off.
2. Press and hold the Set Low and Set High pushbuttons while powering up the panel and controller (do not start the system airflow fan).
3. Hold the Set Low and Set High pushbuttons and adjust the averaging time by pressing the up/down arrow buttons.

The minimum level is 0 and the maximum is 10.0 with each numerical unit (0.1) being equal to 2 seconds (for example: a setting of 1.5 equals 30 seconds of averaging).

4. Let the controller sit idle until the display reverts to 0.0 and it is ready to operate.

VFD Parameter Change Procedure

1. Refer to either the included 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.

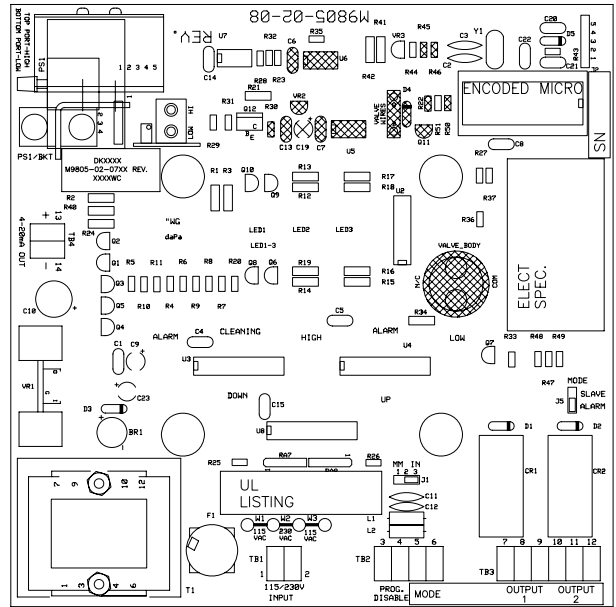
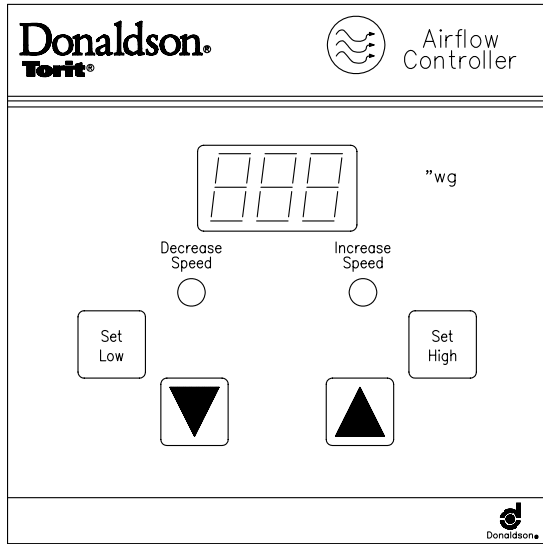
Parameter	Model(s)	Default	Min. Value	Max. Value	Units
Differential Pressure	20"		-0.5	24.0	in W.C.
	+/- 5"		-6.0	6.0	
Low Set Point Must be at least 0.2 lower than the High Set Point	20"	2.0	0.0	19.8	in W.C.
	+/- 5"	2.0	-5.5	4.8	
High Set Point Must be at least 0.2 higher than the Low Set Point	20"	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.
Airflow Controller "hunts" and/or overshoots for several minutes (constantly changing motor speed)	Inadequate VFD acceleration and deceleration times for system	See "Stabilizing Airflow Controller Operation" instructions.
	Inadequate high limit setpoint	See "Stabilizing Airflow Controller Operation" instructions.
	Inadequate averaging time parameter setting	See "Resetting the Averaging Time" instructions.
	Inadequate VFD parameter setting	Reference VFD manufacturer manual or contact the manufacturer 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

1 Keypad and Printed Circuit Board



Airflow Controller

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

The Donaldson Torit Warranty

Donaldson warrants to the original purchaser that the major structural components of the goods will be free from defects in materials and workmanship for ten (10) years from the date of shipment, if properly installed, maintained and operated under normal conditions. Donaldson warrants all other 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 twelve (12) months from date of shipment. Donaldson warrants Donaldson built filter elements to be free from defects in materials and workmanship for eighteen (18) months from date of shipment. Donaldson does not warrant against damages due to corrosion, abrasion, normal wear and tear, product modification, or product misapplication. Donaldson also makes no warranty whatsoever as to any goods manufactured or supplied by others including electric motors, fans and control components. After Donaldson has been given adequate opportunity to remedy any defects in material or workmanship, Donaldson retains the sole option to accept return of the goods, with freight paid by the purchaser, and to refund the purchase price for the goods after confirming the goods are returned undamaged and in usable condition. Such a refund will be in the full extent of Donaldson's liability. Donaldson shall not be liable for any other costs, expenses or damages whether direct, indirect, special, incidental, consequential or otherwise. The terms of this warranty may be modified only by a special warranty document signed by a Director, General Manager or Vice President of Donaldson. Failure to use genuine Donaldson replacement parts may void this warranty. THERE EXIST NO OTHER REPRESENTATIONS, WARRANTIES OR GUARANTEES EXCEPT AS STATED IN THIS PARAGRAPH AND ALL OTHER WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHETHER EXPRESS OR IMPLIED ARE HEREBY EXPRESSLY EXCLUDED AND DISCLAIMED.



Donaldson
FILTRATION SOLUTIONS

Parts and Service

For genuine Donaldson replacement filters and parts, call the Parts Express Line. For faster service, have unit's model and serial number, quantity, part number, and description available.

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Minneapolis, MN 55440-1299
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800-343-3936 within Mexico
www.donaldsontorit.com

Donaldson Company, Inc. is the leading designer and manufacturer of dust, mist, and fume collection equipment used to control industrial-air pollutants. Our equipment is designed to help reduce occupational hazards, lengthen machine life, reduce in-plant maintenance requirements, and improve product quality.

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