Process owners/operators have important responsibilities relating to combustible hazards. Process owners/operators must determine whether their process creates combustible dust, fume, or mist. If combustible dust, fume, or mist is generated, process owners/operators should at a minimum:

- Comply with all applicable codes and standards. Among other considerations, current NFPA standards require owners/operators whose processes involve potentially combustible materials to have a current Hazard Analysis, which can serve as the foundation for their process hazard mitigation strategies.
- Prevent all ignition sources from entering any dust collection equipment.
- Design, select, and implement fire and explosion mitigation, suppression, and isolation strategies that are appropriate for the risks associated with their application.
- Develop and implement maintenance work practices to maintain a safe operating environment, ensuring that combustible dust, fume, or mist does not accumulate within the plant.

Donaldson recommends process owners/operators consult with experts to insure each of these responsibilities are met.

As a manufacturer and supplier of Industrial Filtration Products, Donaldson can assist process owners/operators in the selection of filtration technologies. However, process owners/operators retain all responsibility for the suitability of fire and explosion hazard mitigation, suppression, and isolation strategies. Donaldson assumes no responsibility or liability for the suitability of any fire and/or explosion mitigation strategy, or any items incorporated into a collector as part of an owner/operators hazard mitigation strategy.

Improper operation of a dust 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 collection equipment is properly selected and sized for the intended use.

DO NOT operate this equipment until you have read and understand the instruction warnings in the Installation and Operations Manual. For a replacement manual, contact Donaldson Torit.

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

Data Sheet

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ship Date</th>
<th>Installation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Filter Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
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.
Description

Torit Bin Vents (TBVs) apply cartridge technology to a continuous-duty dust collection system, offering significant advantages. They are designed specifically for silo, storage bin and conveyor transfer applications. Standard models include both the Insertable-mounted cabinet and the Plenum-mounted cabinet, with each available in three filter configurations: a two (2) filter collector (TBV-2), a four (4) filter collector (TBV-4) and a six (6) filter collector (TBV-6). All standard Bin Vents include Donaldson Torit® Ultra-Web® filters with continuous air pulse-jet cleaning. This provides for a highly efficient self-cleaning filtration system ensuring long filter life and a reduced maintenance schedule. The Bin Vent was designed for simple filter service and maintenance with a “tool-less” approach. The collector incorporates top-side (clean air plenum) filter removal and replacement, making it unnecessary to enter the silo or storage container. No tools are needed for the quick release pipe couplers when replacing filters. This reduces the risk of contamination of the customer product stored in the silo/storage container.

The filters in the Bin Vent are the key to efficient, long life operation. With the high efficiency filtration from this dust collector, exhaust air can often be recirculated to the factory. To ensure high efficiency operation, always use genuine Donaldson replacement filters.
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.

Standard Donaldson Torit equipment is not equipped with fire extinguishing or explosion protection systems.

The Torit Bin Vent is used to vent displaced air and contain valuable and/or harmful products in bins or silos. As materials are conveyed to a bin by various means (mechanical, gravity, and pneumatic), air inside the enclosed bin is displaced. The process by which excess air is removed is called bin venting. The most common industries for the Bin Vent are food/agriculture such as grain and process/manufacturing such as chemical/pharmaceutical, cement, wood, foundries (clay, sand, additives), and waste treatment. The most common dusts are lime, cement, carbon, plastics, and wood.
**Operation**

During normal operation, contaminated or dust-laden air enters the Bin Vent through the cabinet opening at the bottom of the collector, which is fastened to the silo or storage container. The dust-laden incoming air is collected on the outside surface of the filters. As the dust cake collects on the outside filter surface, gravity and air pulse-jet cleaning force the dust to drop back into the storage bin. The clean, filtered air flows up through the center of the filter elements and passes through the venturi into the clean air plenum, where it finally exits through the clean air outlet. The clean air outlet can be configured with a blower fan or a weather hood side-mounted to the rear of the collector. Another option, depending on the customer product being stored, is to recirculate the clean air back into the work area via duct work.

Filters are cleaned automatically and continuously during operation. Only a few filters are off-line for pulse-jet cleaning at any given time. A solid state timer controls the cycle of pulse-jet cleaning. Solenoid-operated diaphragm valves open in sequence, introducing jets of high pressure air into venturis located above the filter element cartridges. The resulting reverse airflow initiates the cleaning cycle, which dislodges the dust accumulated on the outside of the filter media, while the remaining filters in the collector continue the filtration process.
**Inspection on Arrival**

1. Inspect collector upon 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 collector 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 collector from truck.
8. Check for hardware that may have loosened during shipping.
9. Use caution removing temporary covers.

**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 collector 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 collector installation.

**NOTICE**

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

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

**Installation**

**WARNING**

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.

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

**CAUTION**

Site selection must account for wind, seismic zone, and other load conditions when selecting the location for collectors. Codes may regulate acceptable locations for installing dust collectors. Consult with the appropriate authorities having jurisdiction to ensure compliance with all national and local codes regarding dust collector installation. Collectors must be anchored in a manner consistent with local code requirements. Anchors must be sufficient to support dead, live, seismic, and other anticipated loads. Consult a qualified engineer for final selection of anchorage.

**NOTICE**

Do not set compressed-air pressure above 100-psig as component damage can occur. All compressed air components must be sized to meet the system requirements of 90-100-psig supply pressure.

The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure, or poor collector performance.

Purge compressed air lines to remove debris before connecting to the collector’s compressed air manifold.
The collector can be located on the top of storage silos and bins, or integrated into hoods for material handling equipment such as belt conveyors or process equipment such as blenders and crushers.

Mounting flanges and hood supports must be capable of supporting the entire weight of the collector plus the weight of the collected material and piping. Reference the Rating and Specification Information.

Foundations or Support Framing

Prepare the foundation or support framing in the selected location. Foundation or support framing must comply with local code requirements and may require engineering.

Foundation and support framing must be capable of supporting dead, live, wind, seismic and other applicable loads. Consult a qualified engineer for final selection of foundation or support framing.

Collector Location

**WARNING** Donaldson Torit equipment is not designed to support site installed ducts, interconnecting piping, or electrical services. All ducts, piping, or electrical services must be adequately supported to prevent severe personal injury and/or property damage.

When hazardous conditions or materials are present, consult with local authorities for the proper location of the collector.

**CAUTION** Dust collection equipment may reach peak sound pressure levels above 80 dB (A). Noise levels should be considered when selecting collector location.

Locate the collector to ensure easy access to electrical and compressed air connections, to simplify solids collection container handling and routine maintenance, and to ensure the straightest inlet and outlet ducts.

Rigging Instructions

**Suggested Tools & Equipment**
- Clevis Pins and Clamps
- Crane or Forklift
- Drift Pins
- Drill and Drill Bits
- End Wrenches
- Adjustable Wrench
- Torque Wrench (inch/lbs, 9/16-in Socket)
- Lifting Slings
- Pipe Sealant
- Pipe Wrenches
- Screwdrivers
- Socket Wrenches
- Spreader Bars

Hoisting Information

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

Use appropriate lifting equipment and adopt all safety precautions needed for moving and handling the equipment.

A crane or forklift is recommended for unloading, assembly, and installation of the collector.

Location must be clear of all obstructions, such as utility lines or roof overhang.

Use all lifting points provided.

Use clevis connectors, not hooks, on lifting slings.

Use spreader bars to prevent damage to collector’s casing.

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

Allow only qualified crane or forklift operators to lift the equipment.

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

Lift collector and accessories separately and assemble after collector is in place.

Use drift pins to align holes in section flanges during assembly.

Foundations or Support Framing

Prepare the foundation or support framing in the selected location. Foundation or support framing must comply with local code requirements and may require engineering.

Foundation and support framing must be capable of supporting dead, live, wind, seismic and other applicable loads. Consult a qualified engineer for final selection of foundation or support framing.

**Collectors Location**

**WARNING** Donaldson Torit equipment is not designed to support site installed ducts, interconnecting piping, or electrical services. All ducts, piping, or electrical services must be adequately supported to prevent severe personal injury and/or property damage.

When hazardous conditions or materials are present, consult with local authorities for the proper location of the collector.

**CAUTION** Dust collection equipment may reach peak sound pressure levels above 80 dB (A). Noise levels should be considered when selecting collector location.

Locate the collector to ensure easy access to electrical and compressed air connections, to simplify solids collection container handling and routine maintenance, and to ensure the straightest inlet and outlet ducts.
Standard Equipment

Torit Bin Vents are shipped without the blower/motor packs installed. Filters are shipped installed in the Bin Vent plenum models. In the Bin Vent insertable models, the filter cartridges are shipped loose to avoid crushing the portion of the filters that extend below the bottom of the cabinet.

Pre-Installation

The Bin Vent is not designed as a “stand alone” collector. Rather, it is designed to be a filtration/ventilation component of a larger system, such as a silo or bin container. The open bottom of the bin vent is intended for roof mounting applications. Some preparation work is required before installing the collector. A hole must be cut into the silo or storage bin to the correct dimensions.

WARNING Ensure the silo or storage bin is reinforced to properly support the weight of the Bin Vent. Failure to do so may result in a collapse causing personal injury and/or property damage.

Provisional Anchor Bolt Recommendations

1. Consider Hilti HIT-HY 200 Anchor System or equivalent. Quantity of anchor bolts should match the number of holes provided in the base plates.
2. Anchor diameter is typically 1/8-in less than baseplate hole diameter.
3. Corrosive environment or outdoor installation may require stainless steel anchors.

Anchor should project a minimum of 1 3/4-in and account for nut, washer, base plate and shims/grout.

Embedment depth

Typical Foundation Anchor

Collector Anchoring

**WARNING** Anchors must comply with local code requirements and must be capable of supporting dead, live, wind, seismic, and other applicable loads.

Anchor sizes shown are provisional, as final anchor sizing will depend on jobsite load conditions, collector location, foundation/framing design variables and local codes.

Consult a qualified engineer for final selection of suitable anchors.

**CAUTION** Tighten all hardware before removing crane to prevent personal injury and/or property damage.

Prepare the foundation or support framing in the selected location. Locate and install anchors.
Compressed Air Installation

**WARNING**  
Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.  
A safety exhaust valve should be used to isolate the compressed air supply. The safety exhaust valve should completely exhaust pressure in the collector manifolds when closed, should be capable of being interlocked with fire or explosion mitigation equipment and should include provisions to allow closed-position locking.

**NOTICE**  
Do not set compressed-air pressure above 100-psig as component damage can occur.

All compressed air components must be sized to meet the system requirements of 90-100-psig supply pressure.

The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure, or poor collector performance.

Purge compressed-air lines to remove debris before connecting to the collector's compressed-air manifold.

1. Remove the plastic pipe plug from the collector's air manifold and connect the compressed-air supply lines. Use thread-sealing tape or pipe sealant on all compressed-air connections.

2. Install a customer-supplied shut-off valve, bleed-type regulator with gauge, filter, and automatic condensate valve in the compressed-air supply line.

3. Set compressed-air supply to 90-psig. The pulse-cleaning controls are factory set to clean one or more filters every 10-seconds during a cleaning cycle.

Electrical Wiring

**WARNING**  
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 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 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.
**WARNING**

Turn power off and lock out electrical power sources.

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

---

Compressed Air and Component Installation
Solid-State Timer Installation

**WARNING**

Electrical installation, service or maintenance work during 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 installation, service, or maintenance work.

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

A solid-state 4-pin timer is used to control the filter cleaning system.

1. Using the wiring diagram supplied, wire the fan motor, fan-motor starter, solid-state timer, and solenoid valves. Use appropriate wire gauge for rated amp load as specified by local codes.

2. Plug the program lug into the pin that corresponds with the number of solenoid valves controlled.

3. With power supply ON, check the operation of the timer and valves. The valves should open and close sequentially at factory set 10-second intervals.

4. If a gauge or similar device is used to control the solid-state timer, the jumper on the pressure switch portion of the timer should be removed. The solenoid valves pulse only when the differential pressure reaches the high-pressure setpoint. The valves will continue to pulse until the low-pressure setpoint is reached.

**NOTICE**

The solid-state timer voltage must match the voltage of the rating of the timer provided (typically 120 VAC, 240 VAC also available).

Do not mount the solid-state timer directly to the collector as mechanical vibration can damage the timer.

Solenoid Connection

The collector is equipped with electric solenoid valves (typically 120V) that controls the pulse-cleaning valves, which in turn clean the filters.

Solenoid enclosures are mounted near or on the collector’s compressed-air manifold.

Wire the solenoids to the solid-state timer following the wiring diagram supplied with the collector. Filter life and cleaning operation will be affected if not wired correctly.

Timer and Solenoid Specifications

Power to the solid-state timer is supplied to Terminals L1 and L2, which are intended to operate in parallel with the fan starter’s low-voltage coil. On fan start-up, power is supplied to the timer and the preset OFF time is initiated. At the end of the OFF time, the timer energizes the corresponding solenoid valve to provide the ON time cleaning pulse for one diaphragm valve and then steps to the next until all filters have been cleaned.

To pulse when the fan is OFF, install a toggle switch as shown on the Solid-State Timer Wiring Diagram. When the toggle switch is ON, the timer receives power and energizes the solenoid valves’ pulse-cleaning operation even though the fan is turned OFF.
Input  
105-135V/50-60Hz/1Ph

Output Solenoids  
The load is carried and turned ON and OFF by the 200 watt maximum-load-per-output solid-state switch.

Pulse ON Time  
Factory set at 100-milliseconds, or 1/10-second.  

**NOTICE**  
Do not adjust pulse ON time unless the proper test equipment is available. Too much or too little ON time can cause shortened filter life.

Pulse OFF Time  
Factory set at 10-seconds, adjustable from 1 to 1.5-sec minimum to maximum 60 to 66-seconds.

Operating Temperature Range  
-20° F to 130° F

Transient Voltage Protection  
50 kW transient volts for 20-millisecond duration once every 20 seconds, 1% duty cycle.

Solenoid Valves  
115-Volt at 19.7 watts each

Compressed-Air  
Set compressed-air supply at 90-psig. The timer is factory set to clean one filter or set of filters every 10-seconds.  

**NOTICE**  
Do not increase supply pressure above 100-psig as component damage can occur.

---

Solid-State Timer Typical Wiring Diagram

---

Disconnect, fuses, low voltage blower starter, and 1TGS switch are customer-supplied.  
Use wiring diagram provided with collector.
Filter Installation for Bin Vent Insertable

The filter cartridges in the Bin Vent insertable model extend past the bottom of the cabinet when installed. The filter cartridges would be crushed and damaged under the weight of the collector if they were shipped installed; therefore, they are shipped loose and installed at the customer site once the collector has been installed into a permanent location.

Unpack the filters from each box, which contains a filter, a filter crank rod, a rubber-backed washer and a steel grounding tab.

See the Filter Installation section for plenum models.

The Bin Vent insertable-model must already be installed in a permanent location before the installation of the filters into the collector.

Preliminary Start-Up Check

Instruct all personnel on safe use and maintenance procedures.

Electrical work during installation, service or maintenance 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.

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

Check that the collector is clear and free of all debris before starting.

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

Optional fans over 600 lbs must be independently supported.

1. Check all electrical connections for tightness and contact.
2. Check for proper rotation as noted on the fan and/or hopper discharge device housing.
   To reverse rotation, single-phase power supply: Follow manufacturer’s instructions on the motor’s nameplate.
   To reverse rotation, three-phase power supply: Switch any two leads on the motor junction box.

   **WARNING** Do not interchange a power lead with the ground wire. Severe personal injury and/or property damage may result.

3. All access panels should be sealed and secure.
4. Check that fan exhaust damper is set to the fully-closed position.
5. Check and remove all loose items in or near the inlet and outlet of the collector.
6. Check that all remote controls and solenoid enclosures (if applicable) are properly wired and all service switches are in the OFF position.
7. Check that all optional accessories are installed properly and secured.
8. Turn power ON at source.
9. Turn the compressed-air supply ON. Adjust pressure regulator for 90-100 psig.
10. Turn fan motor ON.

   **WARNING** Do not look into fan outlet to determine rotation. View the fan rotation through the back of the motor.
   Check that the exhaust plenum is free of tools or debris before checking blower/fan rotation.
   Stand clear of exhaust to avoid personal injury.

11. Adjust airflow with the exhaust damper.

   **NOTICE** Excess airflow can shorten filter life, cause electrical system failure and fan motor failure.

12. Turn powered hopper discharge devices ON.
Maintenance Information

Instruct all personnel on safe use and maintenance procedures.

**WARNING**

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

Use appropriate access equipment. The standard collector is not equipped with access platforms unless noted on specification drawings.

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.

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

**NOTICE**

Do not set compressed-air pressure above 100-psig as component damage can occur.

All compressed air components must be sized to meet the system requirements of 90-100 psig supply pressure.

The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure, or poor collector performance.

Purge compressed air lines to remove debris before connecting to the collector’s compressed air manifold.

Operational Checklist

1. Monitor the physical condition of the collector and repair or replace any damaged components.

Routine inspections will minimize downtime and maintain optimum system performance. This is particularly important on continuous-duty applications.

2. Periodically check the compressed air components and replace compressed air filters.

Drain moisture following the manufacturer’s instructions. With the compressed air supply ON, check the cleaning valves, solenoid valves, and tubing for leaks. Replace as necessary.


Abnormal changes in pressure drop may indicate a change in operating conditions and possibly a fault to be corrected. For example, prolonged lack of compressed air will cause an excess build-up of dust on the filters resulting in increased pressure drop. Cleaning off-line with no flow usually restores the filters to normal pressure drop.


Filter Removal and Installation

**WARNING**

Use proper safety and protective equipment when removing contaminants and filters.

Dirty filters may be heavier than they appear.

Use care when removing filters to avoid personal injury and/or property damage.

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

Turn compressed air supply OFF, bleed and lock out lines before performing service or maintenance work.

**CAUTION**

Do not operate with missing or damaged filters.
Filter Removal

1. After compressed air supply and electrical power have been turned off, open the roof access door of the Bin Vent collector to its fully open position. Make sure that the small notch on the roof support slide bar drops down and locks into position, securing the roof access panel.

**CAUTION**  Failure to open the door properly could result in personal injury and/or property damage. Ensure the door is in the correct open position.

2. Reach inside the clean air plenum of the collector and disconnect the blowpipes by pulling back the levers of the quick-disconnect pipe couplers. Stow the blowpipes in the upright position by inserting them into the slots provided at the rear of the collector.

3. Reach down inside the clean air plenum of the collector and halfway unscrew all the black hold-down knobs. Reach down inside the venturi and grasp the collar bracket; twist it to the right (clockwise) until the filter hold-down collar clears all four screw studs. Pull up and out to remove the filter assembly from the collector.

4. Carefully turn the filter assembly upside down (venturi-side down). Turn the filter crank counterclockwise until completely unscrewed from the quick-nut assembly located in the center of the collar bracket. Once loosened, pull the filter crank out through the filter end cap until clear of the filter assembly.

5. Turn the filter assembly venturi-side up again and grasp the filter hold-down collar. Pull the filter hold-down collar up to break the gasket seal between the filter and collar. The filter is now free and can be replaced with a new filter.

Filter Installation

**NOTICE** See the Filter Installation for Bin Vent for first time filter installation for insertable models.

1. Place the new filter end-cap down (gasket-side up). Slide the filter hold-down collar inside the open of the filter until it stops.

2. Slide the steel grounding tab through the filter crank rod, followed by the rubber-backed washer, rubber side up and away from the crank handle.

3. Slide the filter crank rod through the hole in the filter end cap and up through the filter cartridge. Align the filter crank rod end with the quick-nut assembly located in the center of the hold-down collar bracket and screw together until the filter forms an air-tight seal against the filter hold-down collar.

4. Insert the complete filter/venturi assembly back into the clean air plenum until the hold-down collar is flush with bottom of the clean air plenum (tubesheet). Rotate the assembly to the left (counterclockwise) until all four (4) screw studs are engaged.

5. Tighten all black hold-down knobs until secure. Reconnect the blowpipes using the quick release pipe couplers.

6. Grasp the roof access door with one hand and pull up on the bottom of the roof support slide bar with the other to disengage the locked position. Lower the roof access door until closed and secure by twisting the latches on the top of the roof.

Filter / Venturi Assembly
Filter Removal and Installation

collar bracket
hold down knob

filter/venturi
assembly

roof support
slide bar

Bin Vent door/hood
access

notch

blow pipe

clean air
plenum

tool-less
quick
release
pipe
coupler

blowpipe slot
Optional Equipment

Fan Blower

**WARNING**

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

Use appropriate lifting equipment and adopt all safety precautions needed for moving and handling the fan.

A crane or forklift is recommended for unloading, assembly, and installation of the fan.

Location must be clear of all obstructions, such as utility lines or roof overhang.

The collector has an off-center, high center of gravity when the fan blower is assembled to the collector. Careful handling is required to avoid overturning the collector during movement.

**CAUTION**

To avoid personal injury and/or damage to equipment, ensure fan blowers are properly attached to equipment.

**NOTICE**

The use of a damper or variable fan drive (VFD) is required to control airflow through the collector. Lack of a control damper or VFD will shorten filter life.

The Torit Radial Blade (TRB) fan blower can be mounted to the side of the collector.

The fan blower can be installed at any time during installation of the Bin Vent. If the Bin Vent needs to be moved or lifted after the fan blower has been installed, special precautions and careful handling need to be observed to prevent overturning.

For complete information, see the most current version of the TRB Fan Installation, Operation and Maintenance manual.

Magnehelic® Gauge

The Magnehelic is a differential pressure gauge used to measure the pressure difference between the clean-air and dirty-air plenums and provides a visual display of filter change requirements. The high-pressure tap is located in the dirty-air plenum and the low-pressure tap is located in the clean-air plenum.

1. Choose a convenient, accessible location on or near the collector for mounting that provides the best visual advantage.

2. Plug the pressure ports on the back of the gauge using two, 1/8-in NPT pipe plugs supplied. Install two, 1/8-in NPT male adapters supplied with the gauge into the high- and low-pressure ports on the side of the gauges.

3. Attach the mounting bracket using three, #6-32 x 1/4-in screws supplied.

4. Mount the gauge and bracket assembly to the supporting structure using two, self-drilling screws.

5. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge’s high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge’s low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.

6. Zero and maintain the gauge as directed in the manufacturer’s Operating and Maintenance Instructions provided.

Side Mount TRB Fan Blower

For complete information, see the most current version of the TRB Fan Installation, Operation and Maintenance manual.
Magnehelic Gauge Installation

- Clean-air plenum pressure tap location
- Plenum tap location
- 3/8-in flat washer
- 1/8-in NPT coupling
- Support structure
- Mounting surface
- #6-32 x 1/4-in mounting screws
- Mounting bracket
- 1/8-in NPT x 90° male elbow
- 1/8-in NPT adapter
- Magnehelic gauge
- High-pressure port
- Low-pressure port
- Two, 1/8-in NPT adapters
- Plastic tubing
- Two, 1/8-in NPT pipe plugs
- Two, self-drilling screws
- 1/8-in NPT x 90° male elbow
- 1/8-in NPT adapter
- Dirty-air plenum pressure tap location
- 3/8-in flat washer
- 1/8-in NPT adapter
- 1/8-in NPT x 90° elbow
- Static pressure tee
Photohelic® Gauge

**WARNING** 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 electrical power sources before performing service or maintenance work.

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

The Photohelic combines the functions of a differential pressure gauge and a pressure-based switch. The gauge function measures the pressure difference between the clean-air and dirty-air plenums and provides a visual display of filter condition. The high-pressure tap is located in the dirty-air plenum and a low-pressure tap is located in the clean-air plenum. The pressure-based switch function provides high-pressure ON and low-pressure OFF control of the filter cleaning system.

1. Choose a convenient, accessible location on or near the collector for mounting that provides the best visual advantage.

2. Mount the gauge to the remote panel or door using the mounting ring, retaining ring, and four #6-32 x 1 1/4-in screws. Do not tighten screws. Connect two, 1/8-in NPT x 1/4-in OD male adapters to the gauge's high- and low-pressure ports. Tighten screws.

3. On the back of the gauge, remove four #6-32 x 5/16-in screws and plastic enclosure. Set aside. Add two jumper wires supplied by customer. Remove the jumper from the pressure switch located on the timer board, if equipped. Using the 3/4-in conduit opening, wire the gauge as shown. Reassemble and fasten enclosure securely.

4. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge’s high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge’s low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.

5. Zero and maintain the gauge as directed in the manufacturer’s Operating and Maintenance Instructions provided.

6. To install the Photohelic Gauge mounted in a NEMA 4, Weatherproof Enclosure, follow Steps 4 and 5.

---

**Note:** For use with solid-state timer only. All parts, except the mounting bracket shown in the Photohelic Gauge Standard Installation drawing are included with the NEMA 4, Weatherproof Enclosure.
Photohelic Gauge Installation

- NPT male adapter
- 1/8-in NPT male adapter
- Clean air plenum pressure tap location
- Dirty air plenum pressure tap location
- Plastic tubing
- Two 1/8-in NPT adapters
- Static pressure tee
- Photohelic gauge high-pressure port
- Low-pressure port
Delta P Control

For complete information, see the most current version of the Delta P Installation, Operation, and Maintenance manual.

Description

The Delta P Controller monitors the differential pressure between the clean-air and dirty-air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it manages the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure On, Low Pressure Off, and Alarm. The first two, High Pressure On and Low Pressure Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

Operation

Normal

The Delta P Controller monitors the pressure in the clean-air and dirty-air air plenums while the collector is running. The blower draws air through the filters, creating a pressure drop. The Delta P Controller measures the pressure drop and provides a visual display in inches water gauge or metric (SI) collectors of daPa.

Filter Cleaning

When the pressure drop across the filters reaches the High Pressure On setpoint, the controller closes an output relay allowing a timer to trigger the cleaning valves sequentially. When the controller senses that the pressure drop has decreased to the Low Pressure Off setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.

Alarm

The Alarm setpoint is set to a higher setting than the High Pressure On setpoint used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter’s useful life. There is a time delay prior to setting the Alarm to prevent nuisance trips. The Delta P Controller also provides an input connection for a remote alarm reset.

Delta P Control Display
Delta P Plus Control

For complete information, see the most current version of the Delta P Plus Installation, Operation, and Maintenance manual.

Description

The Delta P Plus Controller monitors the differential pressure between the clean-air and dirty-air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it manages the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure On, Low Pressure Off, and Alarm. The first two, High Pressure On and Low Pressure Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

The user can program the Delta P Plus Controller to pulse while the collector is running, to maintain a relatively constant pressure drop across the filters, pulse only after the collector is shut down (after-shift cleaning), or a combination of both, cleaning while running as well as end of the shift.

Operation

Normal

The Delta P Plus Controller monitors the pressure on both sides of the tubesheet while the collector is running. As air flows through the filters, the resistance of the media and collected dust creates a pressure difference or “drop” between the dirty and clean air plenums. The Delta P Plus Controller measures the pressure drop and provides a visual display in inches water gauge or metric (SI) collectors of daPa.

Filter Cleaning

The Delta P Plus Controller offers three filter cleaning options.

1. Differential Pressure Cleaning (DFF) - When the pressure drop across the filters reaches the Controller’s High Pressure On setpoint, the Controller closes an output relay allowing a sequential timer to trigger the cleaning valves. When the Controller senses that the pressure drop has decreased to the Low Pressure Off setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.

2. Downtime Cleaning (DTC) - The Delta P Plus Controller monitors the collection system. When the pressure drop exceeds the Low Pressure Off set point and then approaches zero again, the Delta P Plus Controller runs a delay timer to allow the blower to come to a stop and then engages the cleaning mechanism for a preselected time.

3. Combined Differential and Downtime Cleaning (ALL) - The Delta P Plus Controller combines the two functions described above; maintaining the pressure drop in a narrow band and downtime cleaning the filters when the collector is shut down. The downtime cleaning function can be toggled On or Off from the keyboard.

Alarm

The Alarm setpoint is set to a higher setting than the High Pressure On used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter’s useful life. There is a time delay prior to setting the Alarm to prevent nuisance trips. The Delta P Plus Controller also provides an input connection for a remote Alarm reset.

Delta P Plus Control Display
Weather Hood

The weather hoods keep rain, snow and birds from entering the collector, all of which can cause the Bin Vent to function improperly. It is strongly recommended for collectors that are not powered or ducted. To install the weather hood, place 1/4-in diameter sealer between the cabinet side and the weatherhood. Position the weather hood over the outlet hole and attach to the cabinet using the eight (8) 5/16-in bolts provided. The bolts must be inserted from inside the clean air plenum, since the weather hood has a bird screen covering the weather hood outlet.
Plenum Silencer

Plenum silencers are available for the blower/motor assemblies. The plenum silencers are designed to be mounted on the side of the Bin Vent in line with the selected blower/motor assembly. The plenum silencers are equipped with an exhaust damper for flow control, making it unnecessary to select a separate damper assembly for the selected blower/motor assembly. It is important to note that for the Bin Vent plenum models, only TWO (2) plenum silencer mounting configurations will work without interfering with roof opening procedures. For the Bin Vent insertable models, only ONE (1) possible plenum silencer mounting configuration will work.

Although the plenum silencer primarily reduces noise levels, it is also equipped with a built-in exhaust damper. The plenum silencer mounting configuration varies between the Bin Vent plenum and insertable models. For the Bin Vent plenum model, there are two possible mounting configurations. For the Bin Vent insertable model, there is only ONE possible mounting configuration. The blower/motor plenum silencers are shipped loose and must be assembled and installed concurrently with the blower/motor assembly. Mount the plenum silencer to the side of the cabinet by drilling holes into the cabinet using the existing holes in the silencer adapter mounting plate as a guide. Fasten down using the 1/4-in thread cutting screws provided. Refer to the below illustration and the installation drawing shipped with the plenum silencer instructions.
## Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fan blower and motor do not start</strong></td>
<td>Improper motor wire size</td>
<td>Rewire using the correct wire gauge as specified by national and local codes.</td>
</tr>
<tr>
<td></td>
<td>Not wired correctly</td>
<td>Check and correct motor wiring for supply voltage. See motor manufacturer’s wiring diagram. Follow wiring diagram and the National Electric Code.</td>
</tr>
<tr>
<td></td>
<td>Collector not wired for available voltage</td>
<td>Correct wiring for proper supply voltage.</td>
</tr>
<tr>
<td></td>
<td>Input circuit down</td>
<td>Check power supply to motor circuit on all leads.</td>
</tr>
<tr>
<td></td>
<td>Electrical supply circuit down</td>
<td>Check power supply circuit for proper voltage. Check for fuse or circuit breaker fault. Replace as necessary.</td>
</tr>
<tr>
<td></td>
<td>Damaged motor</td>
<td>Replace damaged motor.</td>
</tr>
<tr>
<td><strong>Fan blower and motor start, but do not stay running</strong></td>
<td>Incorrect motor starter installed</td>
<td>Check for proper motor starter and replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Access doors are open or not closed tight</td>
<td>Close and tighten access doors. See Filter Installation.</td>
</tr>
<tr>
<td></td>
<td>Electrical circuit overload</td>
<td>Check that the power supply circuit has sufficient power to run all equipment.</td>
</tr>
<tr>
<td><strong>Clean-air outlet discharging dust</strong></td>
<td>Filters not installed correctly</td>
<td>See Filter Installation.</td>
</tr>
<tr>
<td></td>
<td>Filter damage, dents in the end caps, gasket damage, or holes in media</td>
<td>Replace filters as necessary. Use only genuine Donaldson replacement parts. See Filter Installation.</td>
</tr>
<tr>
<td></td>
<td>Access cover(s) loose</td>
<td>Tighten access doors securely. See Filter Installation.</td>
</tr>
<tr>
<td><strong>Insufficient airflow</strong></td>
<td>Fan rotation backwards</td>
<td>Proper fan rotation is clockwise from the top of the collector. The fan can be viewed through the back of the motor. See Preliminary Start-Up Check.</td>
</tr>
<tr>
<td></td>
<td>Access doors open or not closed tight</td>
<td>Check that all access doors are in place and secured.</td>
</tr>
<tr>
<td></td>
<td>Fan exhaust area restricted</td>
<td>Check fan exhaust area for obstructions. Remove material or debris. Adjust damper flow control.</td>
</tr>
<tr>
<td></td>
<td>Filters need replacement</td>
<td>Remove and replace using genuine Donaldson replacement filters. See Filter Removal and Installation.</td>
</tr>
<tr>
<td>Problem</td>
<td>Probable Cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Insufficient airflow continued</td>
<td>Lack of compressed air</td>
<td>See Rating and Specification Information for compressed air supply requirements.</td>
</tr>
<tr>
<td></td>
<td>Pulse cleaning not energized</td>
<td>Use a voltmeter to check the solenoid valves in the control panel. Check pneumatic lines for kinks or obstructions.</td>
</tr>
<tr>
<td></td>
<td>Pulse valves leaking compressed air</td>
<td>Lock out all electrical power to the collector and bleed the compressed air supply. Check for debris, valve wear, pneumatic tubing fault, or diaphragm failure by removing the diaphragm cover on the pulse valves. Check for solenoid leaks or damage. If pulse valves or solenoid valves and tubing are damaged, replace.</td>
</tr>
<tr>
<td></td>
<td>Solid-State timer failure</td>
<td>Using a voltmeter, check supply voltage to the timer board. Check and replace the fuse on the timer board if necessary. If the fuse is good and input power is present but output voltage to the solenoid is not, replace the timer board. See Solid-State Timer Installation.</td>
</tr>
<tr>
<td></td>
<td>Solid-State timer out of adjustment</td>
<td>See Solid-State Timer and Solid-State Timer Wiring Diagram.</td>
</tr>
<tr>
<td>No display on the Delta P Controller</td>
<td>No power to the controller</td>
<td>Use a voltmeter to check for supply voltage.</td>
</tr>
<tr>
<td></td>
<td>Fuse blown</td>
<td>Check the fuse in the control panel. See wiring diagram inside the control panel. Replace if necessary.</td>
</tr>
<tr>
<td>Display on Delta P Controller does not read zero when at rest</td>
<td>Out of calibration</td>
<td>Recalibrate as described in Delta P Maintenance Manual.</td>
</tr>
<tr>
<td></td>
<td>With collector discharging outside, differential pressure is present from indoor to outdoor</td>
<td>Recalibrate with the pressure tubing attached as described in the Delta P Maintenance Manual.</td>
</tr>
<tr>
<td>Delta P Controller ON, but cleaning system does not start</td>
<td>Pressure tubing disconnected, ruptured, or plugged</td>
<td>Check tubing for kinks, breaks, contamination, or loose connections.</td>
</tr>
<tr>
<td></td>
<td>Not wired to the timing board correctly</td>
<td>Connect the pressure switch on the timer board to Terminals 7 and 8 on TB3.</td>
</tr>
<tr>
<td></td>
<td>Faulty relay</td>
<td>Using a multimeter, test relay for proper closure. Replace if necessary.</td>
</tr>
</tbody>
</table>
Service Notes

<table>
<thead>
<tr>
<th>Date</th>
<th>Service Performed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Service Performed</td>
<td>Notes</td>
</tr>
<tr>
<td>------</td>
<td>-------------------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Service Notes

<table>
<thead>
<tr>
<th>Date</th>
<th>Service Performed</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.

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.

Donaldson Company, Inc.
Torit
PO Box 1299
Minneapolis, MN 55440-1299
U.S.A.

800-365-1331 USA
800-343-3639 within Mexico
+52 (449) 300 24 42 Latin America
donaldsontorit@donaldson.com
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.

© 1996 Donaldson Company, Inc. IOM 4939000 (ENG), Revision 7 Printed in USA August 2015

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 and Donaldson built Afterfilters 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. To ensure proper operational performance of the equipment, use only genuine Donaldson replacement parts. 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.