

**UNICAGE FILTER COLLECTORS**

Installation, Operation and Maintenance Manual

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***FOREWORD***

This manual contains instructions for installation, operation and maintenance of Young Industries UNICAGE filter collectors. The care taken during receiving, storage, installation and continued maintenance will add to the reliable operation and long service life of this equipment.

This manual should be read and understood in its entirety by the operator and the director of plant safety before performing any work on or operating a UNICAGE filter collector. Contact Young Industries for additional copies which may be required to ensure the filter is being operated safely and according to the recommended procedures included in this manual.

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## ***SAFETY***

**READ AND FULLY UNDERSTAND THIS MANUAL Before OPERATING OR PERFORMING ANY WORK ON A YOUNG FILTER COLLECTOR.**

If you have previously received delivery of a Young filter collector and are just now receiving this manual, insist that both the filter operator and the director of plant safety read and fully understand this manual before continued use of and/or performing any maintenance on the filter collector.

Notify Young Industries if your filter collector does not include safety warning labels or devices recommended within this manual, which you believe may be important to improve the safe operation or maintenance of your filter installation. Contact the Engineering Manager for assistance at 570/546-3165 before continued use or maintenance.

Notify Young Industries if you have sold, leased, rented or given any Young filter collector to another user. Your assistance will allow Young Industries to contact the new user with updated safety and/or operational recommendations.

Safety is a fundamental factor that must be considered at all times in the operation and maintenance of mechanical equipment. Use of proper tools and methods can prevent serious accidents that may result in injury to you and your fellow workers.

A number of safety precautions are listed throughout this manual. Study them carefully and follow them; insist that those working with you do the same. Remember: an accident can easily be caused by someone's carelessness or negligence.

The various precautions and recommendations detailed within this manual are not necessarily all-inclusive. Young Industries has attempted to provide SAFETY AND OPERATIONAL GUIDANCE relating to typical installations with which we are familiar. We urge you to review your particular filter installation to determine whether there are potential hazards beyond the warnings of this manual.

If you have any safety or operational questions pertaining to the design or application of a Young filter collector as it relates to your particular installation, please contact the main office at 570\546-3165.

Failure to observe and follow the safety precautions may result in serious personal injury or property damage.

Young Industries looks to our customers to achieve a cooperative effort for the purpose of making each filter installation as safe for the operator as is reasonably possible and to insure proper maintenance and operating procedures are followed. Many times we do not have access to the installation; therefore, your participation in the safe installation, operation and maintenance of each filter collector is critical.

## ***INSTALLATION***

### **A. RECEIVING AND INSPECTION**

1. Upon receipt of equipment and material from Young Industries the following basic steps should be taken:
  - a. Use the packing list to determine that all the items shipped have been received. Your equipment order was carefully crated or packaged for safe shipment then given to the carrier. Check for damage.
    1. Damage in transit is the responsibility of the carrier. Be sure to have the driver sign a copy of the freight bill with a notation about any damage.
    2. If a shipment was sent to you by parcel post, have the postmaster complete a damage claim report.
    3. Concealed damage: If equipment or goods are discovered to be damaged by shipment at a later date, contact the carrier and Young Industries immediately.
    4. IN ALL CASES OF DAMAGE IN TRANSIT, CONTACT THE YOUNG INDUSTRIES MAIN OFFICE AT 570/546-3165 FOR ASSISTANCE IN DETERMINING WHETHER OR NOT THIS DAMAGE MAY IN ANY WAY

AFFECT SAFETY OR PROPER OPERATION OF A FILTER COLLECTOR.

5. If shipped UPS, DO NOT THROW ORIGINAL CARTON AWAY. Keep all evidence for the inspector.

NOTE:

YOUNG INDUSTRIES CANNOT ASSUME ANY LIABILITY FOR SHORTAGES OR DAMAGED GOODS. CLAIMS MUST BE NEGOTIATED WITH THE CARRIER. CONTACT THE YOUNG INDUSTRIES ENGINEERING MANAGER AT 570/546-3165 FOR ASSISTANCE IN RECTIFYING ANY SHORTAGE OR DAMAGE AS IT RELATES TO SAFE AND PROPER OPERATION OF YOUNG INDUSTRIES EQUIPMENT.

2. Moving the Filter Collector

- a. Moving and installation should always be performed by trained, experienced personnel, using safe and accepted rigging practices.

CAUTION:

WHEN MOVING A FILTER COLLECTOR OR COMPONENT PARTS, BE SURE THAT MOVING PRACTICES USED ARE SAFE FOR BOTH PERSONNEL AND EQUIPMENT. CONTACT THE YOUNG INDUSTRIES ENGINEERING MANAGER IF THERE ARE ANY QUESTIONS RELATING TO WHAT CONSTITUTES SAFE AND ACCEPTED RIGGING PRACTICES FOR MOVEMENT AND/OR INSTALLATION OF A FILTER COLLECTOR.

- b. Care and caution should be exercised to prevent damaging the housing, flanges, filter tubes, tube cages, air piping and electrical components.

3. Storing the Filter Collector

- a. If moved to storage, the equipment should be located in a dry area, preferably inside. Outside storage will require adequate protection from the weather.
- b. The filter collector equipment has been shipped with temporary guards or covers. Do not remove these covers while the filter collector is in storage.
- c. After prolonged storage and before start-up, the filter collector shall be inspected by a qualified person. Contact Young Industries Engineering Manager at 570/546-3165 for assistance.

CAUTION:

USE CAUTION TO PROTECT AGAINST OBJECTS OR DEBRIS FROM ENTERING OR DAMAGING THE FILTER COLLECTOR.

B. SUPPORTS

1. A Young Industries filter collector is designed to be supported and anchored to a rigid support base.
  - a. A filter collector with a hopper is supplied with four support legs, support lugs or support flange with anchor bolt holes.
  - b. A filter collector without a hopper is supplied with a support flange for bolting directly to another machine.

2. Securely anchor the filter collector by bolting.
  - a. The support for a filter collector must be structurally adequate to support an operating filter with the housing full of product.

#### C. ASSEMBLY

1. Locate the filter collector with provisions for sufficient clearance at the top to allow withdrawal of the tube assemblies.
2. The filter tubes and support cages over 60" in length are shipped separately and require assembly. Assemble and install the filter tube and cage assemblies so they are positioned properly and clamped securely with the included hold down clamps.

#### D. ELECTRICAL INSTALLATION

1. Refer to the wiring diagram furnished as a separate document for your filter collector.
2. Typically, the timer board controller is mounted and pre-wired from the solenoid coils to the timer board output terminals. If the timer board is being mounted remotely, mount the timer in a suitable location and make the electrical connections as shown on the wiring diagram.
  - a. The timer is suitable for an input of 105 to 125 volts AC, 50/60 Hz or 24 VDC and will operate at a temperature from -55° C to +125° C. The input is protected by a fuse located on the timer board.

#### DANGER

DISCONNECT POWER, SHUT OFF AND BLEED AIR OR GAS SYSTEM BEFORE SERVICING.

#### E. COMPRESSED AIR OR GAS INSTALLATION

1. Connect the plant compressed air or gas supply to the filter collector.
  - a. The compressed air or gas supply must be clean and dry with a minimum pressure of 90 PSI at the filter. Use a minimum 1" PS supply line.
2. Examine each solenoid pilot valve and ensure the exhaust port to permit the valve to exhaust to atmosphere.
3. If a pressure gauge has been installed in the compressed air or gas line in the vicinity of the filter, the gauge will dip 20 to 40 PSI each time a solenoid is energized, indicating the cleaning air or gas valve has opened and is operating properly.

#### CAUTION

COMPRESSED GAS/AIR-SHUT OFF AND BLEED SYSTEM BEFORE SERVICING.

#### F. PRECOMMISSIONING

1. Before operating or test running the filter collector and with the power and compressed air or gas shut off, check internally for cleanliness, using caution to avoid physical harm to personnel and equipment.

2. Inspect the installation to assure the filter collector is installed properly and mounted securely.
3. Open the plenum chamber door and inspect the filter tube and cage assemblies to assure they are positioned properly and clamped securely.
4. Determine that electrical power and compressed air or gas supplies are properly installed and operative. Compressed air piping to the equipment shall be blown clean prior to operation.
5. Factory recommendation and preset values for the sequence timer “off time” to open each valve once per minute. Set the “on time” at 100 milliseconds.
6. Inspect the filter collector to assure that all guards, covers and safety equipment are in place and working properly.
7. We urge the installation crew to notify the plant safety committee and/or the plant engineer when installation is complete and before initial operation. Those in your plant responsible for plant safety should review your filter collector installation before operation for safety in light of the extensive operating recommendations made within this manual. Contact the Engineering Manager at Young Industries, telephone 570/546-3165, if this review results in additional questions or uncertainty.

## OPERATION

### A. START-UP

1. Before actual operation, the operator must familiarize himself with the method of starting and stopping the filter collector and the status of the supporting utilities.
2. The general appearance of the filter collector and surrounding area should be visually inspected to determine that the filter can be operated safely and without damage.

#### CAUTION

DISCONNECT POWER, SHUT OFF COMPRESSED AIR OR GAS AND BLEED SYSTEM BEFORE SERVICING.

3. If your particular installation has an unsafe condition unforeseen by Young Industries and beyond typical operating conditions, CEASE FURTHER OPERATION of the filter collector and immediately notify both your safety committee and the Engineering Manager at Young Industries, telephone 570/546-3165. The Young Industries Engineering Manager can assist you in speeding the return of your filter collector to a recommended operating condition.

### B. CONTINUOUS OPERATION

1. During filter operation the operator should recognize and report any unusual noise or vibration. If an unusual noise or vibration is noted, immediately shut off the filter collector. Notify your maintenance personnel or call Young Industries for assistance or additional guidance in defining these conditions. Refer also to the maintenance section of this manual.
2. Guards, covers and safety equipment shall be in place whenever the filter collector is in service.

#### CAUTION

DISCONNECT POWER, SHUT OFF COMPRESSED AIR AND BLEED SYSTEM BEFORE SERVICING.

3. After a period of continuous operation, there may be a noticeable decrease in the filter's ability to

control the dust at the system inlet. Dust control may be improved by resetting the cleaning air sequence timers.

- a. Off time (rate) controls the amount of time between each cleaning air pulse. Reset the time to reduce the off time to open each valve at a rate faster than once per minute.
- b. On time (duration) controls the duration time of the cleaning air or gas pulse. Adjust the time to a setting between 75 to 100 milliseconds. 100 milliseconds is the maximum recommended setting.

4. The filter collector is designed and selected to meet specific operating conditions. Care shall be exercised to assure that the filter is operated within safe limits. The filter should be used only for the purpose for which it is designed. Refer to Young Industries quotation to determine the application for which this filter was intended. Contact the Sales Manager at Young Industries, Painter Street, Muncy, Pa 17756, if you need assistance in determining the proper application of this Young Industries filter collector.

#### C. SHUT-DOWN

1. When shutting down a filter collector, shut off supporting utilities in accordance with plant operating procedures.
2. When cleaning or servicing is required on the filter collector, proper lock-out of electrical, compressed air or gas and mechanical equipment must be completed before the work is started.  
CAUTION

DISCONNECT POWER, SHUT OFF COMPRESSED AIR OR GAS AND BLEED SYSTEM BEFORE CLEANING OR SERVICING.

### ***MAINTENANCE***

#### A. LUBRICATION

1. Refer to the proper IOM manual for lubrication instructions of auxiliary equipment used with the filter collector.
2. Contact the Engineering Manager at Young Industries, telephone 570/546-3165, if you need additional assistance to set up an ongoing lubrication and preventative maintenance schedule.
3. Equipment that is out of service for extended periods of time (30 days or longer) or equipment that is placed in storage (inside or outside) should have all unpainted carbon steel surfaces coated with a rust preventative (Gulf No. Rust C or equivalent).

#### B. FILTER TUBE CLEANING

1. Filter tubes may be cleaned in place by pulsing off line. Turn on compressed air and sequence timer with the fan stopped (if equipped).

#### CAUTION

DO NOT OPERATE OFF LINE WITH COVERS OR DOORS OPEN.

2. Filter tubes may be brushed lightly with a camel hair brush or other type of non-abrasive brush. Use

care not to damage the tube surface or drive smaller particles deeper into the fabric. With Gore-Tex or PTFE coated bags, use special care not to damage the membrane.

3. Air pressure cleaning or vacuuming.
  - a. When either of these methods are used, the cleaning air should travel from the clean air side to the product side of the filter tube.
  - b. Use care not to damage the tube fabric.
  - c. This method of cleaning is not recommended for PTFE membrane/Gore-Tex filter tubes.

CAUTION

DUST HAZARD-USE RESPIRATOR AND EYE PROTECTION.

4. Wool and cotton.
  - a. All natural fabrics are subject to shrinkage when wet with water. If washed in water, the filter tubes will not fit properly. Dry cleaning is required.
  - b. The use of pure cleaning solvent is advised. Dry cleaning detergents and additives that permit addition of water to solvent can cause shrinkage of wool felt.
  - c. Dry by hanging in a drying room.

5. Polyester/Dacron, Acrylic/Orlon, Nomex and Polypropylene.

- a. These filters are not subject to shrinkage by water and may be washed in warm water. Some products can be removed better by dry cleaning.
- b. Wash in soft water with a water temperature between 120 and 140° F.
- c. If water is heated by injection of live steam, it is extremely important to avoid contact between live steam and the filter tubes.
- d. Use a 0.05% (20 grams/10 gallons of water) solution of a non-toxic detergent.

Examples: Pluronic L-62  
Wyandotte Chemical Corporation, Wyandotte, MI

Cerfac 400  
E. F. Houghton and Company, Philadelphia, PA

Igelal CO-630  
Antara Chemicals Company, New York, NY

- e. Avoid acid materials.
- f. Washing procedure.
  1. Wash for 30 minutes.
  2. Double rinse in soft water (temperature below 140° F).
  3. Do not tumble dry; hand in drying room.



4. Dry at temperature below 200° F.
- g. Dry cleaning.
  1. In most cases, any standard commercially available dry cleaning solvent may be used without harming the tubes. Examples: Carbon-tetrachloride (Carbena), Stoddard solvent (Stod-Sol), trichloroethylene, perchloroethylene (Perclene).
  2. Gasoline, kerosene, naphtha or turpentine can be used, but are not recommended because of the extreme fire hazards involved.
  3. Some fibers are subject to swelling or dissolve in certain organic solvents. If this is unknown, then a small sample of the fabric should be tested in the solvent in question before proceeding.
  4. Dry by hanging in a drying room.
6. PTFE Membrane/Gore-Tex.
  - a. PTFE membrane filter tubes can be washed, but do not use any solvent.
  - b. Do not put tubes in any type of industrial washing machine or any type of machine which uses an agitator. Agitation may cause creases, damaging the membrane.
  - c. Lightly brush the tubes while in a trough or hose them down while still in the filter, using a low pressure water hose (standard home variety). Use an indirect water spray. Run fan until tubes are completely dry.
  - d. Line dry tubes; do not use any industrial type of dryer. When hanging tubes to dry, open them to allow the inside to dry.
7. After cleaning, the tubes should be inspected for broken seam stitches, small holes, tears, etc.
  - a. Small holes can be sewn with the correct thread, cemented or patched. We do not recommend patching holes larger than 3/4" diameter.
  - b. Typical patching adhesives:
    1. Low temperature to 250° F.  
Mixture of 50% EC1300 (3M Company) and 50% Weldwood (U.S. Plywood Corporation). For use with appropriate fabric patch only.
    2. Temperature to 350° F for long periods (months or 500° F for shorter periods (weeks)).  
Dow Corning 780 building sealant, RTC silicone rubber adhesive. For use with appropriate fabric patch or for sealing small holes without patch.

#### C. REPLACING FILTER TUBES

1. Remove all filter tubes and cages from tube sheet.
2. Thoroughly clean all cages, tube sheet and plenum chamber.
3. Deliver new tubes to the filter in original shipping container to avoid handling damage.

4. When an insertion sleeve is furnished with the tubes (always with Gore-Tex), insert the sleeve through the tube sheet opening to protect the tube when being inserted through the opening in the tube sheet.
5. Remove each filter tube individually from the shipping container and assemble into the tube sheet opening. Use special care when handling Gore-Tex to prevent damage to the membrane.
6. Remove the insertion sleeve.
7. Assemble the cage into the filter tube ensuring the cage is properly seated within the sock flange wire.
8. Use caution to when inserting the filter tube through the tube sheet opening to avoid damaging the sock.

#### D. GENERAL INSPECTION

1. Observe the air cleaning valves and piping for any unusual noise or vibration.
2. Check pipe connections for tightness and air leaks.
3. Check filter collector support.
4. Inspect all safety equipment, guards, covers and labels to assure the filter collector and auxiliary equipment can be operated safely. If an unsafe condition is observed, cease further operation of the filter collector and immediately notify both your safety committee and the Engineering Manager at Young Industries, telephone 570/546-3165.

#### DANGER

DISCONNECT POWER, SHUT OFF AND BLEED AIR OR GAS SUPPLY BEFORE SERVICING.

#### E. TROUBLESHOOTING

1. When properly installed, operated and maintained your Young Industries filter collector will give years of service. Table One, "Troubleshooting UNICAGE Filter Collectors", gives symptoms, causes and remedies for most problems that may be encountered.

#### F. SPARE PARTS

1. A nameplate is furnished with each filter collector. The necessary information for ordering spare parts is found on this nameplate. When ordering, please provide (a) SHOP NUMBER and (b) SERIAL NUMBER. Contact the Spare Parts Department Manager at Young Industries, telephone 570/546-3165, for assistance.

TABLE ONE - TROUBLESHOOTING UNICAGE FILTER COLLECTORS

<u>SYMPTOM</u>	<u>CAUSE</u>	<u>REMEDY</u>
Insufficient dust control	Poor filter tube cleaning	Adjust sequence timer. See paragraph B3, CONTINUOUS OPERATION.
		No compressed air or gas supply or low pressure.
		Sequence timer or valve solenoids not operating.
		Filter tubes need to be cleaned or replaced.
Dust at clean air outlet.	Filter tube and cage not clamped properly.	Check tube and cage position and clamp securely.
	Small holes in filter tube(s).	Repair or replace filter tube(s).
	Dirty filter tubes.	Check timer and solenoids for proper operation. Clean or replace filter tubes.
Sequence timer not operating.	Lack of power.	Check power source. Check 3 amp fuse on timer board
	Timer burned out	Replace timer.
Pilot valve (solenoid) not operating.	Lack of power.	Check sequence timer.
	Solenoid burned out.	Replace valve.
	Exhaust port plugged.	Remove plug.
Diaphragm valve not operating.	Diaphragm damaged.	Replace valve.

CAUTION

DO NOT OPERATE WITH GUARDS OR COVERS REMOVED.

DANGER

DISCONNECT POWER BEFORE SERVICING.

CAUTION

COMPRESSED GAS OR AIR-SHUT OFF AND BLEED SYSTEM BEFORE SERVICING.