

Installation and Operation Manual

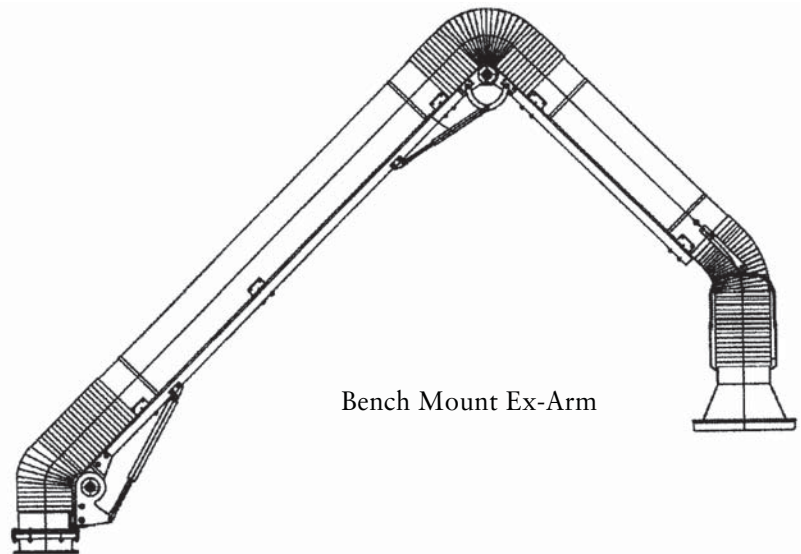
Ex-Arm Extraction Arms

Models Ex-Arm 4, 6, and 8 inch

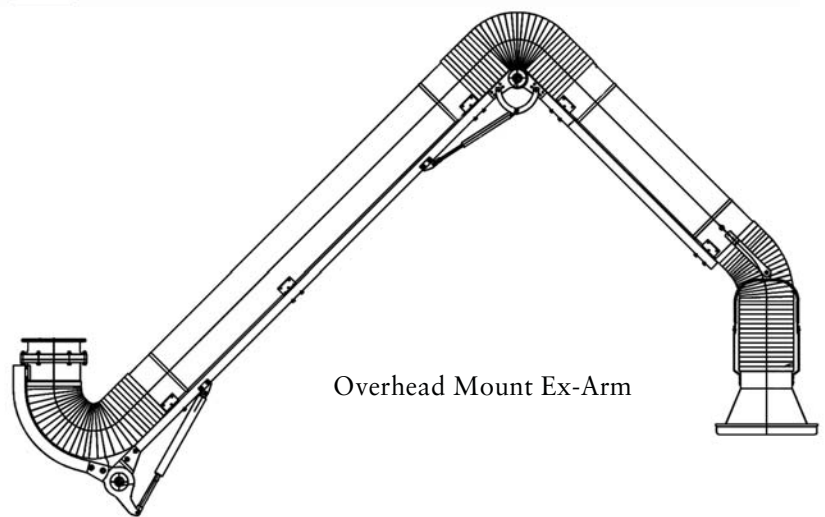
Bench Mount and Overhead Mount



Throughout this manual statements indicating precautions necessary to avoid equipment failure are referenced in a **Note**. Statements indicating potential hazards that could result in *personal injury* or *property damage* are referenced in a **Caution!** box.



Bench Mount Ex-Arm



Overhead Mount Ex-Arm

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.



CAUTION!

Application of Dust Control Equipment

- Combustible materials such as buffing lint, paper, wood, aluminum or steel dust, weld fume, or flammable solvents represent fire or explosion hazards. Use special care when selecting and operating all dust or fume collection equipment when combustible materials are present to protect workers and property from damage due to fire and/or explosion. Consult and comply with National and Local Codes relating to fire or explosion and all other appropriate codes when determining the location and operation of dust or fume collection equipment.
- When combustible materials are present, consult with an installer of fire extinguishing systems familiar with these types of fire hazards and local fire codes for recommendations and installation of fire extinguishing and explosion protection systems. Donaldson dust collection equipment is not equipped with fire extinguishing or explosion protection systems.
- DO NOT allow sparks, cigarettes or other burning objects to enter the hood or duct of any dust or fume control equipment as these may initiate a fire or explosion.
- For optimum collector performance, use only Donaldson replacement parts.

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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 representative. Instruct all personnel on safe use and maintenance procedures.

Data Sheet

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

Filter Type _____	
Accessories _____	
Other _____	

Description

The Ex-Arm extraction arm is designed to carry airborne contamination away from the operator's breathing zone. The Ex-Arm can operate with collectors, single extraction fans, and the main duct system where other extraction arms can be connected.

With its self-supporting features, the Ex-Arm is designed to maneuver easily allowing the inlet to be positioned accurately over the desired operation zone. Additionally, its special design allows maximum angle adjustment of the hood to guarantee the best extraction position possible without compromising the operator's field of view and movement capabilities.

The extraction arms are available in the following versions (see below table):

The Ex-Arm is available with the following options (see Optional equipment section for more details):

- Optional Hood with light: A hood with a halogen spotlight is offered for easier visibility of the work space.
- Optional Mounting Brackets: Wall mounting brackets are offered to allow the Ex-Arm to be mounted to an optional blower and motor.

Ex-Arm Extraction Arms Versions Table

Ex-Arm			Mounting Configuration	Extension (feet)	Typical Restriction and Airflow ("wg)	Arm Weight (lbs)
Diameter (inches)	Inlet Hole Size (inches)	Length (feet)				
4	3.5	6.5	Benchmount or Overhead	6.6	2.0 @ 350 cfm	28
4	3.5	10	Benchmount or Overhead	9.8	2.0 @ 350 cfm	31
6	6.3	6.5	Benchmount or Overhead	6.6	2.0 @ 800 cfm	36
6	6.3	10	Benchmount or Overhead	9.8	2.0 @ 800 cfm	41
6	6.3	13	Benchmount or Overhead	13.1	2.0 @ 800 cfm	46
8	7.9	10	Benchmount or Overhead	9.8	2.0 @1000 cfm	56
8	7.9	13	Benchmount or Overhead	13.1	2.0 @1000 cfm	78

Purpose and Intended Use

The Ex-Arm extraction arms are designed to carry dust, fume, and mist away from the worker's breathing zone. Typical pollutants include fume, vapor, metal dust, weed dust, and plastic dust.

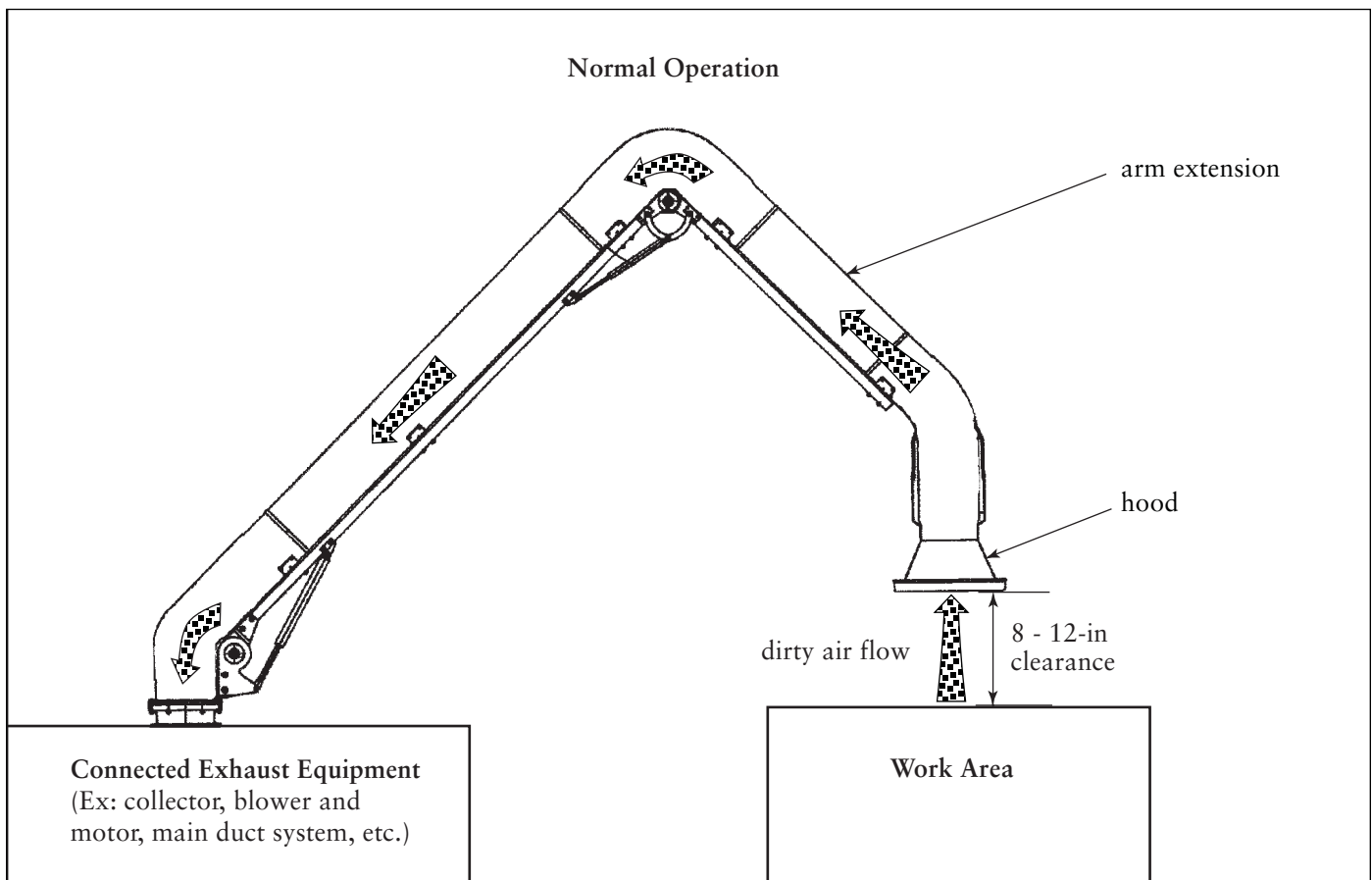


CAUTION!

- Misuse or modification of this equipment may result in personal injury.
- Do not misuse or modify.

Operation

The Ex-Arm hood is positioned 8 to 12 inches above the work area. Contaminated air is then drawn into the hood of the Ex-Arm flowing through the arm extension and exhausting out of the work area via the connected equipment (collector, fan, main duct system).



Unit Operation, Bench Mount Arm shown

Structure and Function

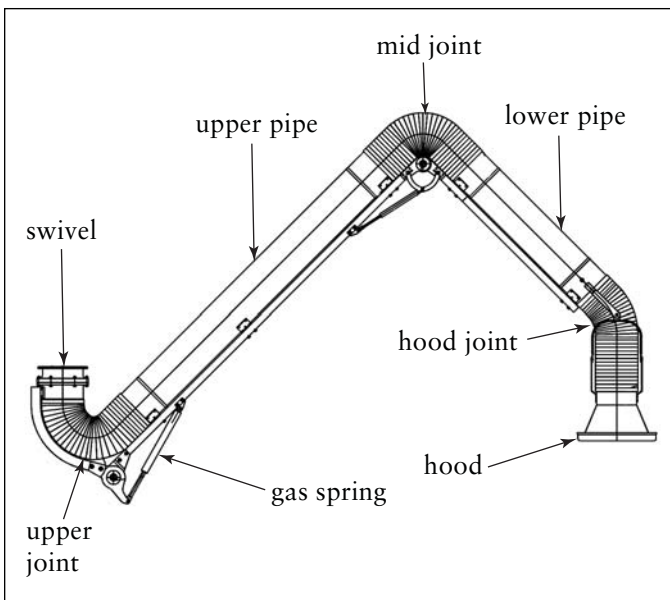
Ex-Arm extraction arm major components:

- Swivel
- Joints (connector, hose section, clamps)
- Upper pipe and lower pipe (with damper, handle, and outer joint for hood maneuver)
- Hood
- Gas spring

The swivel allows the arm to rotate 360° around its vertical axis - easing hood handling and arm positioning.

Note: To limit 360° arm rotation, remove bolts and nuts from the swivel base and flip upside down and reinstall in swivel base. Fasteners will act as a stopper to limit arm rotation.

The swivel and upper pipe and lower pipe are connected together with flexible hose sections (hose clamps), which along with the hood creates a ventilation duct for air extraction. The air intake volume can be adjusted with the damper located in the lower pipe.



Ex-Arm Components, Overhead Mount Arm shown

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 representative.
7. Remove crates and shipping straps. Remove loose components and accessory packages before lifting unit from truck.

Installation Codes and Procedures



CAUTION!

OSHA may have requirements regarding recirculating filtered air in your facility. Consult with the appropriate local authorities to ensure compliance with all codes regarding recirculating filtered air.

1. Safe and efficient operation of the unit depends on proper installation.
2. Authorities with jurisdiction should be consulted before installing to verify local codes and installation procedures. In the absence of such codes, install unit according to the National Electric Code, NFPA No. 70-latest edition.
3. A qualified installation and service agent must complete installation and service of this equipment.
4. All shipping materials, including shipping covers, must be removed from the unit prior to, or during unit installation.

Note: Failure to remove shipping materials from the unit will compromise unit performance.

Installation

Site Selection, Grade-Mounted Units

1. Provide clearance from heat sources and utilities when selecting the location for suspended units? Reference the Rating and Specification Information.
2. Two persons may be required to install Ex-Arm to blower and motor or mounting brackets.

Electrical Wiring

1. All electrical wiring and connections, including electrical grounding, should be made in accordance with the National Electric Code, NFPA No. 70-latest edition.
2. Check local ordinances for additional requirements that apply.
3. The appropriate wiring schematic and electrical rating must be used. See unit's rating plate for required voltage.
4. If the unit is not furnished with a factory mounted disconnect, 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 unit's rating plate for voltage and amperage ratings.
5. Refer to the wiring diagram for the number of wires required for main power wiring and remote wiring.

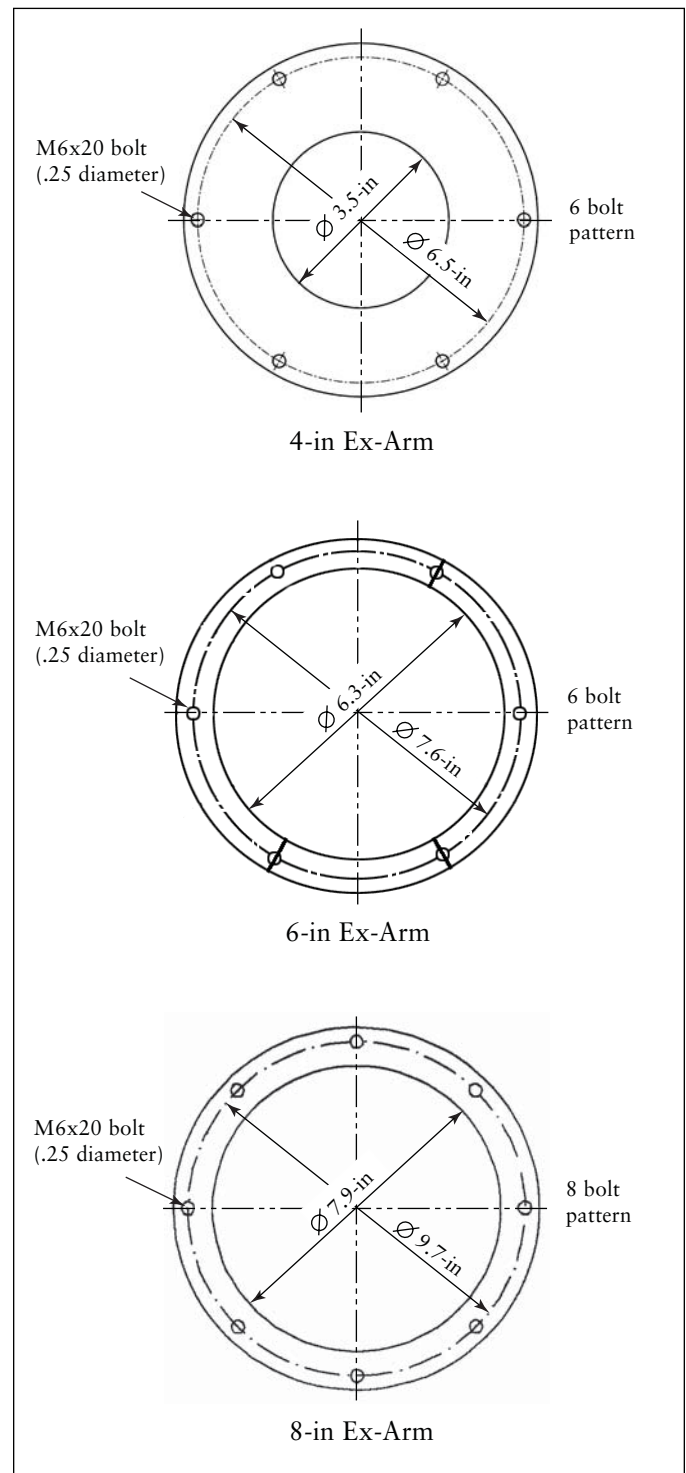


CAUTION!

- Electrical installation must be performed by a qualified electrician and comply with all applicable national and local codes.
- 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.

Technical Data

The following bolt hole patterns by arm diameter will assist in the assembly of the Ex-Arm.

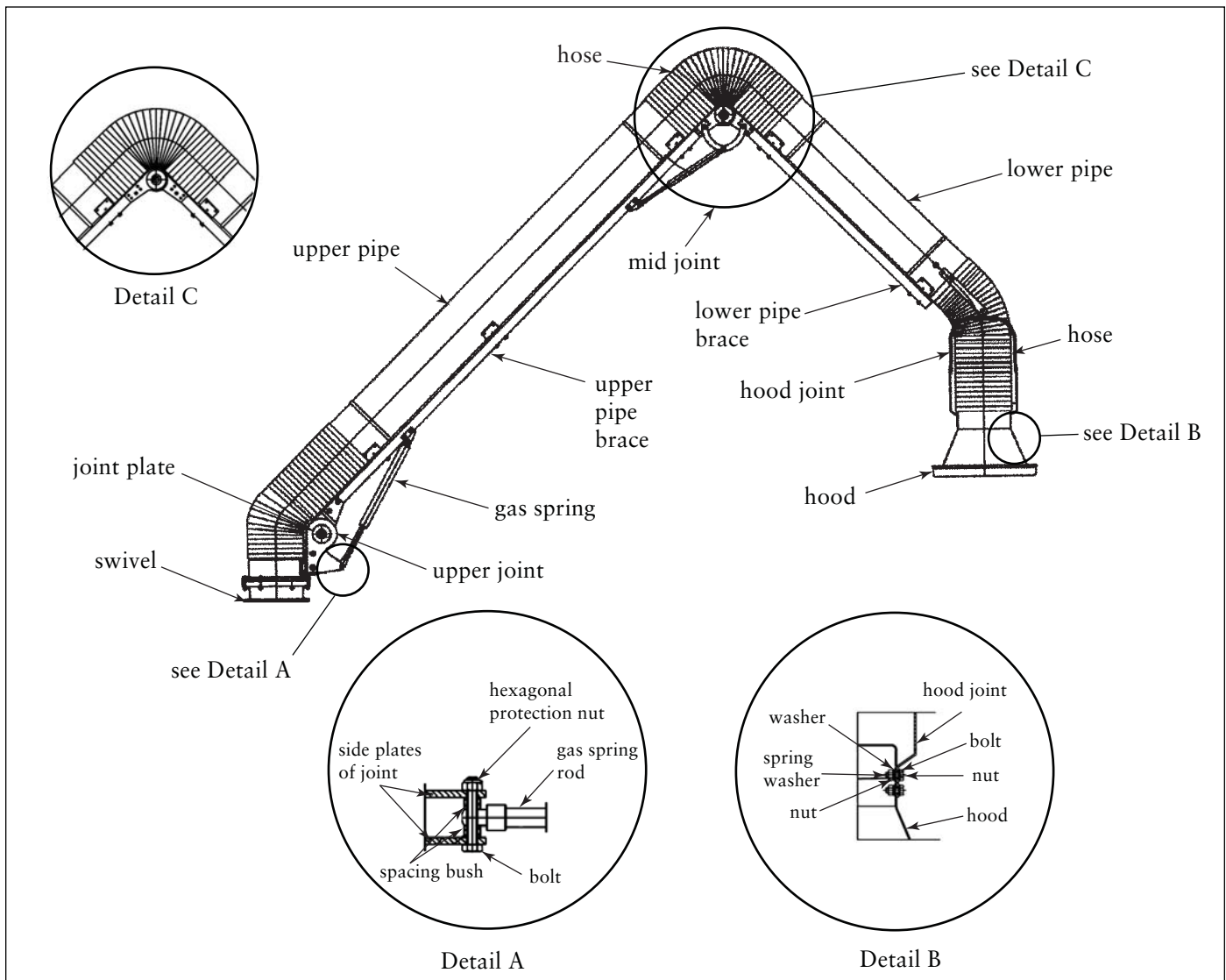


Bolt Hole Patterns

Standard Equipment

Bench Mount Arm Assembly

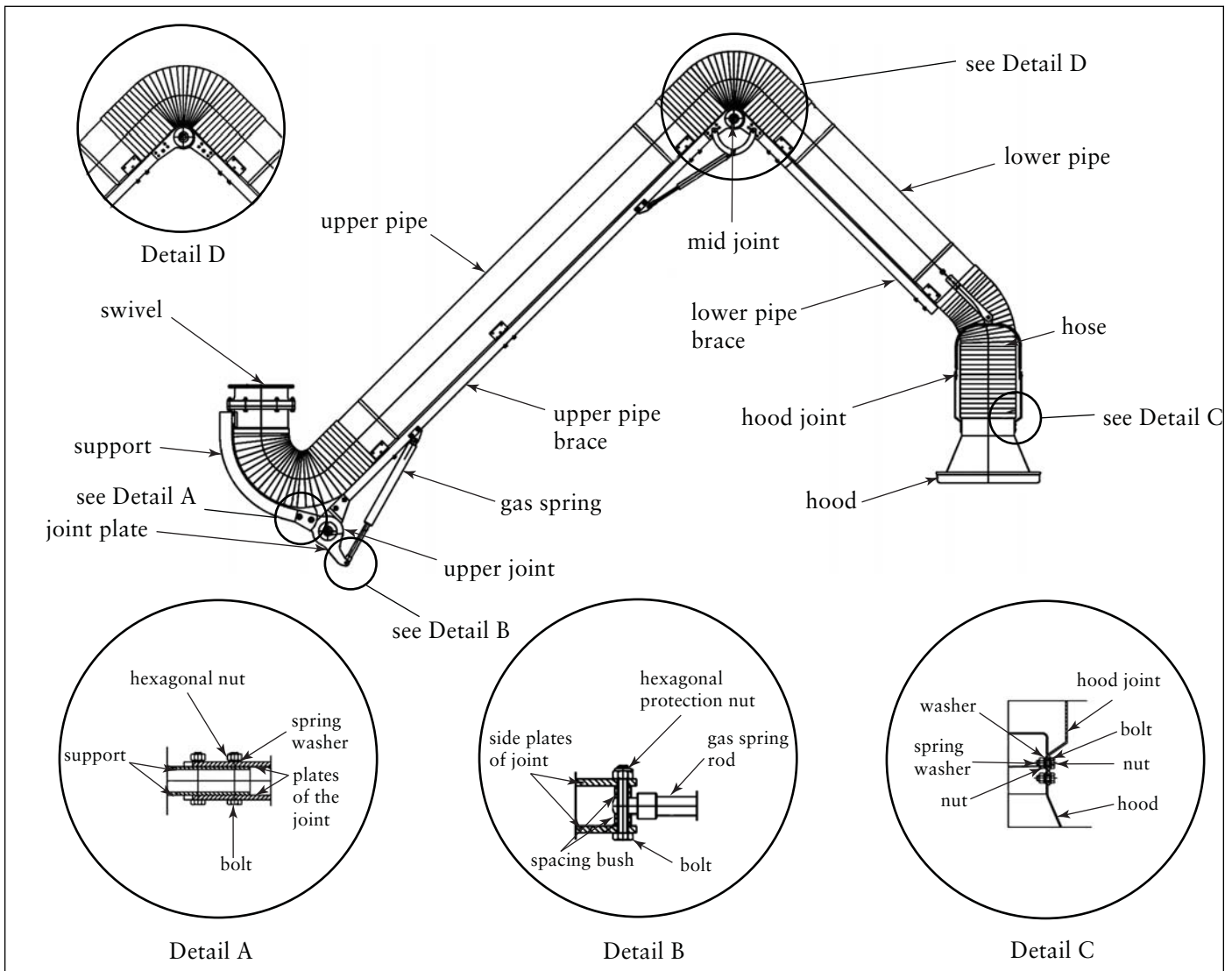
1. Remove Ex-Arm extraction arm from packaging and place on even surface.
2. Expand the arm segments at a 45° angle.
3. Tucking in loose fabric at end of the flex hose, slip flex hose over the swivel and secure with hose clamp.
4. Bolt end of gas spring to the plate of the upper joint (see Detail A).
5. Connect mid joint hose to upper pipe and lower pipe (following step 4).
6. Bolt the hood joint to the hood (see Detail B). If hood is equipped with a light, follow Hood Light and Switch Installation instructions in Optional Equipment section.
7. Connect the lower pipe hose to the hood (following step 4).
8. The Ex-Arm is ready to be mounted on wall bracket or collector.



Bench Mount Arm Assembly

Overhead Mount Arm Assembly

1. Remove Ex-Arm extraction arm from packaging and place on even surface.
2. Expand the arm segments at a 45° angle.
3. Attach the swivel and support to the plate of the upper joint (see Detail A).
4. Tucking in the loose fabric at the end of the flex hose, slip flex hose over the swivel and secure with hose clamp.
5. Bolt end of the gas spring to the plate of the upper joint (see Detail B).
6. Connect mid joint hose to upper pipe and lower pipe (following step 5).
7. Bolt the hood joint to the hood (see Detail C). If hood is equipped with a light, follow Hood Light and Switch Installation instructions in Optional Equipment section.
8. Connect the lower pipe hose to the hood (following step 5).
9. The Ex-Arm is ready to be mounted on a wall bracket or collector.



Overhead Mount Arm Assembly

Optional Equipment

The optional wall mounting brackets allow the extraction arm to be mounted to an optional blower and motor or directly to ductwork (duct outlet required).

Overhead Mount Installation



CAUTION!

Use appropriate lifting equipment and adopt all safety precautions needed for moving and handling the equipment or personal injury and/or property damage may ensue. A forklift is recommended for unloading, assembly, and installation of the extraction arm. Location must be clear of all obstructions, such as utility lines or roof overhang.

1. Leveling the wall bracket with the floor, fasten the wall bracket using customer-supplied anchor bolts. Anchor bolts must be sized to support loads up to 500 lb.



CAUTION!

Failure to mount the wall bracket properly can result in arm assembly collapse and cause personal injury and/or property damage. Anchor bolts must be sized to support loads up to 500 lb.

2. Fasten the Ex-Arm assembly to the wall bracket using supplied hardware.
3. Ground the arm by connecting the points of contact with copper-strand wire with a suitable cross-sectional area. Attach to the equipment to ensure electrical continuity.



CAUTION!

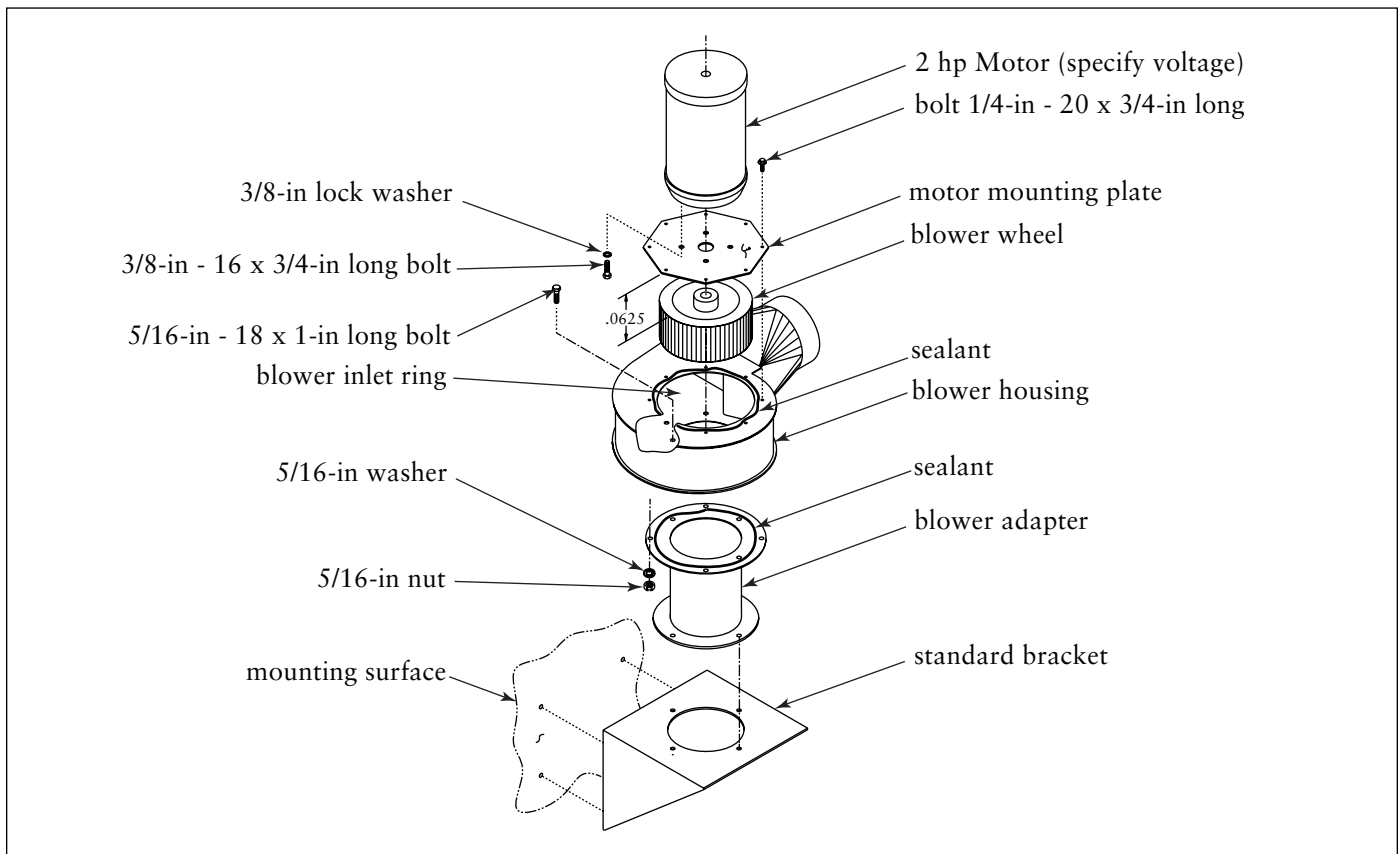
Failure to ground the arm properly can result in electrical shock. Install a proper ground to ensure personal safety.

Bench Mount Installation

1. Fasten adapter ring to the collector using the hardware provided.
2. Attach arm to adapter ring using hardware provided.
3. If hood is equipped with a light, follow Hood Light and Switch Installation instructions in Optional Equipment Section.

Blower and Motor Installation

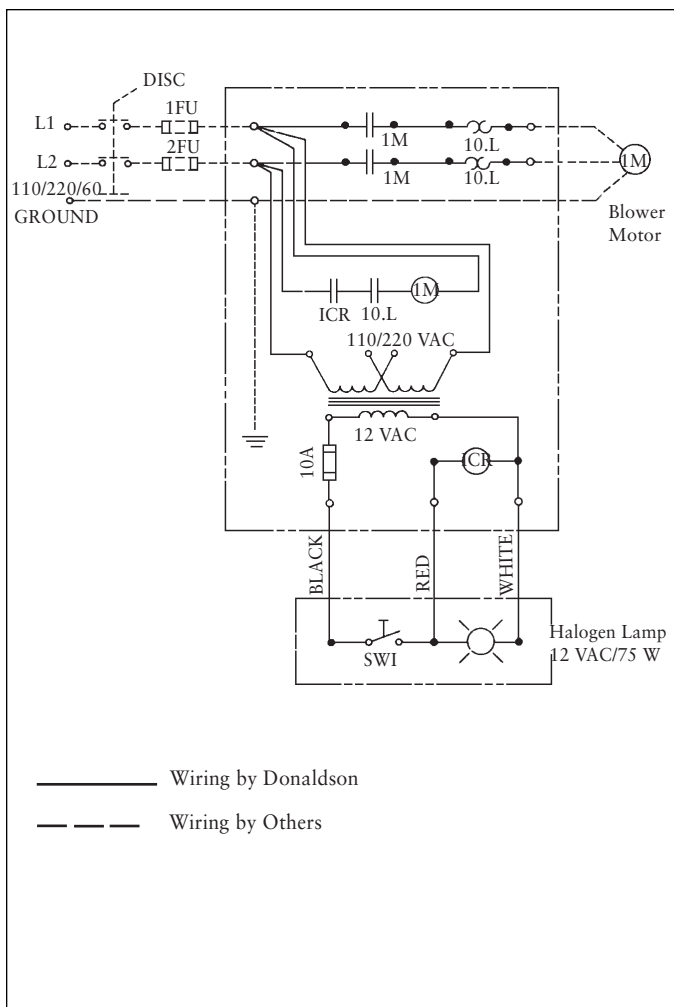
1. Place the blower adapter on the wall bracket.
2. Position the blower adapter ring on the opposite side of the wall bracket.
3. Align the bolt patterns of the blower adapter and the wall bracket to the adapter ring weld nuts and secure using four 5/16-18 x 1-in bolts.
4. Position the blower housing on the top of the blower adapter using four 5/16-18 x 1-in bolts, lock washers, and hex nuts.
5. Apply sealant onto the blower housing's motor mount surface.
6. Attach the motor mount plate to the motor and fasten using four 3/8-16 x 3/4-in bolts and lock washers. Torque to 20 ft/lbs.
7. Position the blower wheel on the motor shaft.
8. Position the blower wheel so there is 1/16-in clearance between the blower wheel and the blower inlet ring located inside the blower housing.
9. Insert the key into the blower wheel and motor shaft key slot. Tighten the two setscrews to secure the blower wheel to the motor shaft.
10. Install the motor, blower wheel, and motor mount plate assembly on the blower housing by aligning the bolt patterns. Fasten using eight, 1/4-20 x 3/4-in screws.



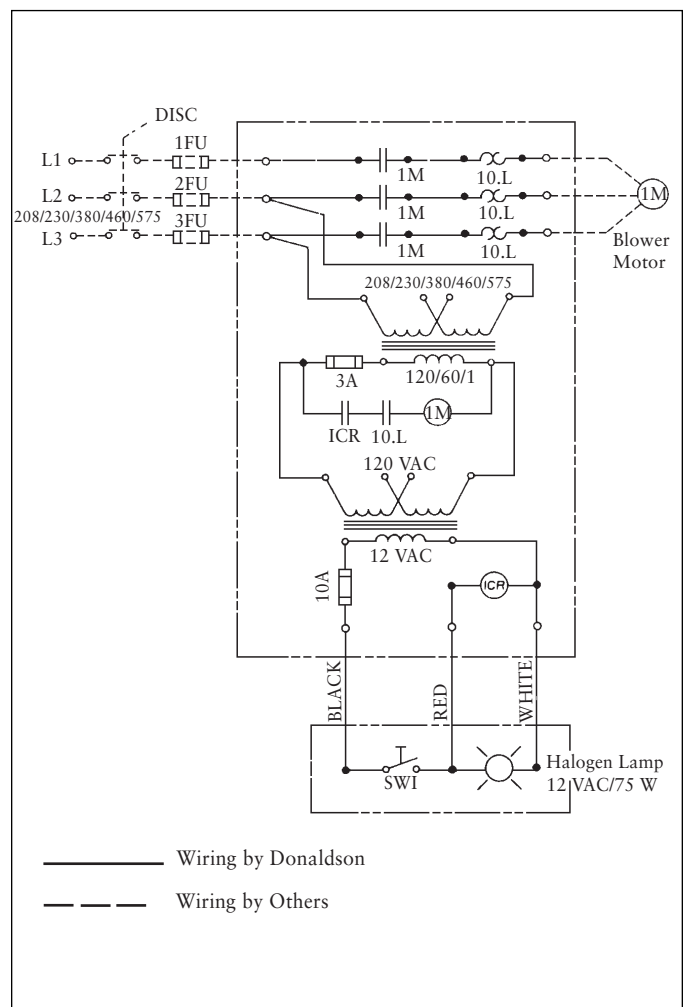
Blower and Motor

Electrical Connection

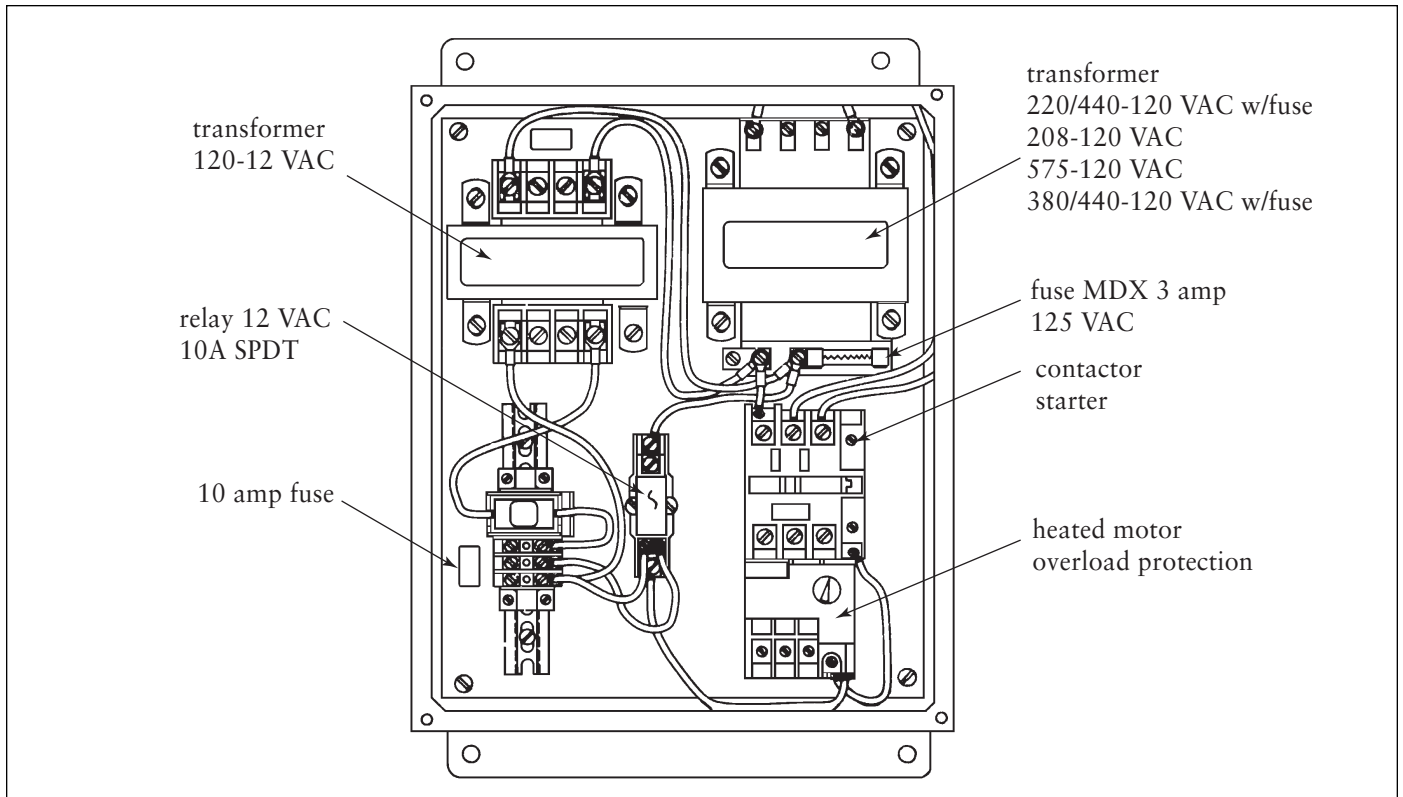
1. A fused-disconnect with fuses and electrical connections of adequate capacity are customer supplied.
2. Mount the control box in a convenient location.
3. Install conduit and wire from the power source to the extraction arm.
4. Using the below wiring diagram or referencing the electrical control box, make wiring connections to the blower motor and the light and switch cable.
5. In grounded systems, connect neutral to control box to L2 in the electrical control box. See Single Phase Wiring, Three-Phase Wiring, and Control Box Component Layout.



Single Phase Wiring Diagram



Three Phase Wiring Diagram



Control Box Assembly

Hood Light and Switch Installation

The optional hood with 12 V halogen light is controlled by a switch on the Ex-Arm hood.

1. Discard wiring included with hood.
2. Replace with supplied wiring assembly.
3. Install light bulb in hole (socket) located in the hood impacter plate.
4. Squeeze and release metal retention ring over bulb to secure in place.
5. Connect lamp to lamp socket.
6. Attach connectors to switch.
7. Feed wire through ex-arm by entering the hood and exiting through the hole in the swivel.
8. Attach hood to lower pipe hood joint hose.

Preliminary Start-Up Check

1. Check all electrical connections for tightness and contact.
2. Check for and remove all loose items in or near the inlet and outlet of the unit.
3. Check that all remote controls are wired into the control system, and all service switches are in the OFF position.
4. Check that all optional accessories are installed properly and secured.
5. Turn power ON at source.
6. Turn the blower motor ON then OFF to check for proper rotation by referencing the rotation arrow located on the motor's mounting plate.



CAUTION!

- Do not look into blower outlet to determine rotation.
- Check that the exhaust plenum is free of tools or debris before checking blower rotation.
- Stand clear of exhaust to avoid personal injury.
- Do not operate without proper Donaldson filters.

7. Check that the exhaust plenum is free of tools or debris before checking blower outlet rotation.
8. Stand clear of exhaust to avoid personal injury.

To reverse rotation, single-phase power supply:
Follow manufacturer's instructions on the motor's nameplate.

To reverse rotation, three-phase power supply:
Turn electrical power OFF at source and switch any two leads on the output-side of the fan motor starter.

Start-Up

1. Set the hood into position within 8 to 12-in from the welding arc.
Note: Welding chippings could affect the hood and the hood suction could interrupt the gas-coating (CO₂, argon). It is important that the hood effectively captures the fume without obstructing the user and is within 8 - 12 inches of the welding arc.
2. Adjust the air intake volume with the damper lever to control the efficiency of dust and fume extraction without causing excessive draught.
3. Adjust the position of the hood and the damper during operation to meet the current need.
4. After the work is completed, reposition the extraction arm in the operational position or the home (folded) position if obstruction is a problem.
5. Stop the extraction fan, (if the device works in a ventilation system — close the appropriate damper).

Service

Monthly Maintenance:

1. Check arm tension
2. Check flexible duct connections
3. Check joint and friction pads for wear
4. Check bearing sand pivot for wear
5. Check damper and damper handle for wear

General Maintenance

- Lubricate the swivel every 3 months with solid grease (lubrication nipple in the swivel flange).
- Periodically sprinkle the hood with anti-splatter fluid to prevent welding chippings from gluing to hood.
- After 1 year of use, submit the device to a technical revision and repair or replace the faulty element.

Arm Adjustment

The Ex-Arm is designed for safe and reliable operation without continuous servicing and special handling. The adjustment of the Ex-Arm is done by regulating the frictional brakes. The frictional brakes placed in each joint give balance and self-supporting properties and easy handling during operation.

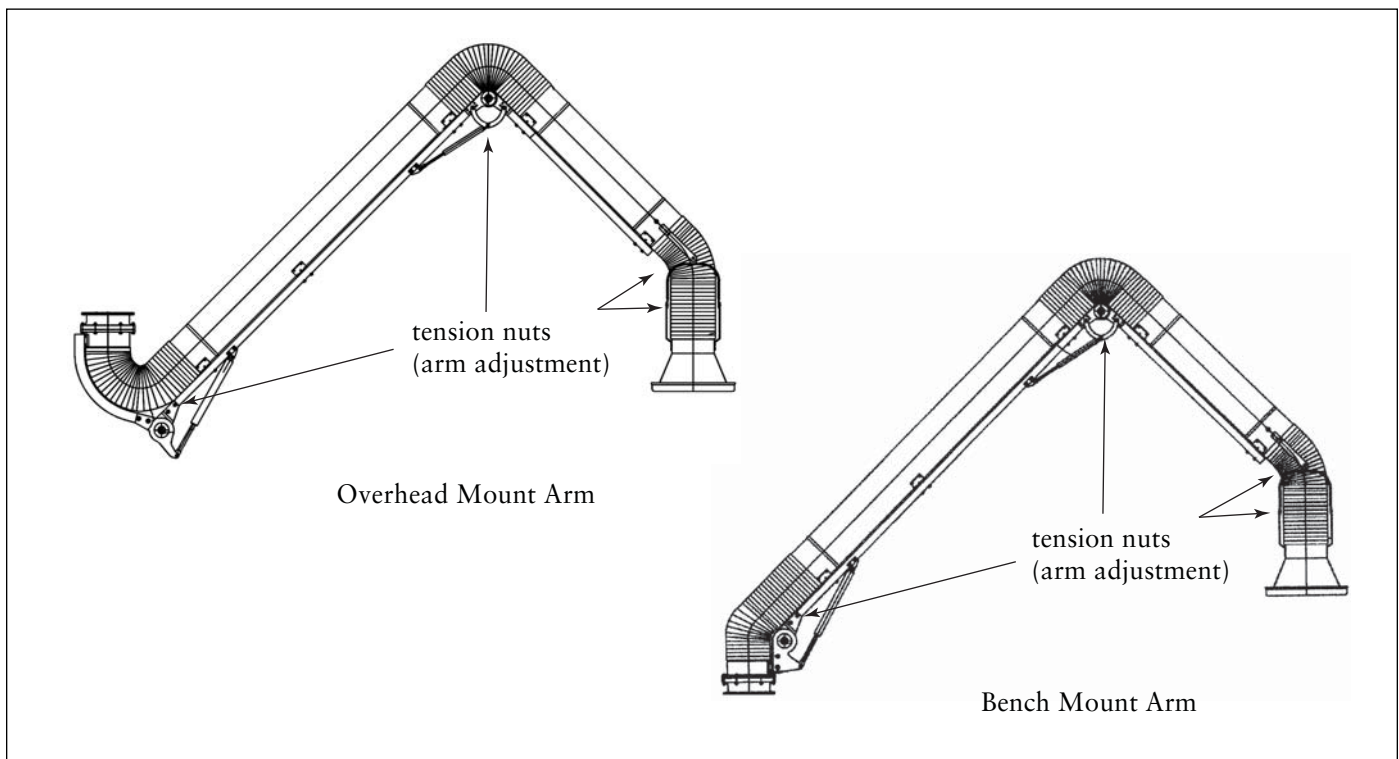
The frictional brakes can be adjusted by increasing or reducing the tension of the nuts on the frictional elements. Tighten the nuts to increase the frictional movement and release the nuts to reduce the tension using a 17 or 13 mm wrench where appropriate. The friction brake adjustment must be performed as mentioned above to ensure arm stability and self-supporting. Proper adjustment keeps the arm stable and prevents excessive resistance during arm position changes.

Adjust tension in locations shown below.



CAUTION!

The Ex-Arm extraction arms will not pose any safety concerns if correctly mounted to the wall or another building element. Follow proper installation guidelines in this manual. Improper installation could cause detachment and/or serious personal injury and/or property damage. Leave the extraction arm in the last operational position or in the folded position.



Arm Adjustment

Troubleshooting

Problem	Probable Cause	Remedy
Extraction arm is falling (out of position)	Improperly adjusted frictional brake	Increase the tension upon frictional discs of the brake in the joint by tightening the adjustment nuts.
Drop in the air suction rate at the increased noise level	Improper impeller rotation of the extraction fan	Change the phase connection sequence (3-phase motor).
Blower and motor do not start	Electrical supply circuit down	Check the electrical supply circuit for proper output voltage or fuse, circuit breaker fault.
	Fuses have blown in the control box	Carefully disconnect the electrical power to the Ex-Arm. Remove the electrical control box cover to access fuse(s) on the control panel. With a volt ohm meter, check for blown fuses in the electrical control box and disconnect. If fuses are blown, replace fuse or fuses. See Electrical Connection section.
	Failed transformer for 1 phase system	Using a volt ohm meter check the input voltage on terminals H1 and H4, (it should be 120 volts AC.) Next check output voltage on X1 and X2 terminals, (it should be 12 volts AC). If there is no output voltage, replace the transformer. See Electrical Connection section and the Replacement Parts List.
Failed transformer for 3 phase system	Using a volt ohm meter check the input voltage on terminals H1 and H4 on the primary transformer feedlines. Look at the voltage rating on the transformer that is rated for the input voltage. Check that the proper shorting bars or jumper wires have been installed per input voltage requirements. Next check the fuse on the X1 terminal, and if it is blown out, replace with a MDX 3 amp fuse. Then check the output voltage on X1 and X2 terminals (it should be 120 volts AC). If there is no output voltage, replace the transformer. See Electrical Connection section.	

Problem	Probable Cause	Remedy
Blower and motor start but do not start (cont).	Relay 12 volt AC failure	With the Ex-Arm hood switch on, check with a volt ohm meter for 12 volts AC input to the relay. Next check for 120 volts AC input and output on the relay socket terminals. If there is no voltage output, replace the 12 volt AC relay. See Electrical Connection section and the Replacement Parts List.
	Heater motor overload protection failure	With the Ex-Arm hood switch on, check with a volt ohm meter for voltage inputs and outputs on contactor through the heater terminals. Be sure before testing that the heater thermal protection has cooled to reset. If there is no voltage output, replace the heater overload relay. See Electrical Connection section and the Replacement Parts List.
	Starter contactor failure	With the Ex-Arm hood switch on, check with a volt ohm meter for 120 volts AC input to starter coil. If there is no input, check the thermal overload protection. Next check for supply voltage input and output out of the contactor terminals. If 120 volt AC input to coil relay is okay on starter contactor and it still does not function, replace the starter contactor. See Electrical Connection section and the Replacement Parts List.
	Inadequate supply circuit	Check for sufficient amperage to run the Ex-Arm. Reference motor manufacturer's nameplate for amperage and voltage requirements. Also check to see that there is not too much other equipment on the supply circuit.
Starter kicks out	Excessive airflow for blower and motor	Check that all the flexible ducting is installed onto the joint assemblies and that it is not torn or damaged. If ducting is damaged, replace it. See Service section and the Replacement Parts List.

Troubleshooting, continued

Problem	Probable Cause	Remedy
Starter kicks out (cont).	Incorrect wire size on the supply circuit	Check for proper wire size on electrical supply lines. Too small of a supply wire will cause motor overload. Rewire per local and national codes.
	Incorrectly wired motor	Wiring is incorrect per motor manufacturer's wiring diagram. Reference motor manufacturer's wiring diagram and correct wiring per supply voltage.
Insufficient airflow at hood.	Incorrect blower and motor rotation	Check blower motor rotation by looking down from the top of the motor. The rotation should be clockwise. Also reference rotation sticker on the blower housing. To correct blower rotation (3 phase only), change any two of the three phase wire supply leads. On the single phase motors, reference the motor manufacturer's wiring diagram.
	Ex-Arm damper is closed	Locate the Ex-Arm damper control handle and move the handle to be in line with the rigid ducting. This will be the wide open setting.
	Obstruction in ducting or hood	Check the Ex-Arm, hood, ducting, flex duct, and exhaust ducting (if used) for blockage. Remove any debris that is blocking airflow. See the Service section.
	Flexible ducting is torn or collapsed, or the rigid ducting is broken or collapsed	Check the flexible ducting and replace any damaged parts. Check the rigid ducting on the Ex-Arm or exhaust ducting (if applied) for cracks or collapsed section(s). See the Replacement Parts List.
	To much ducting, elbows applied to the exhaust of the Ex-Arm	Consult with your local Donaldson representative.
	Friction joints not adjusted properly(too loose or tight) or are damaged	Adjust tension nuts on arm per Arm Adjustment section.
Ex-Arm light does not light.	Light bulb burned out or there are loose wire connections	See Service section and the Replacement Parts List. Note: Do not touch the halogen light bulb when performing service work, as it will significantly shorten the bulb life.

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 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.**

Parts and Service

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and parts, call the Parts Express Line

800-365-1331 USA
800-343-3639 within Mexico

www.donaldsontorit.com

For faster service, have unit's model and serial number,
part number, description, and quantity available.



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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.