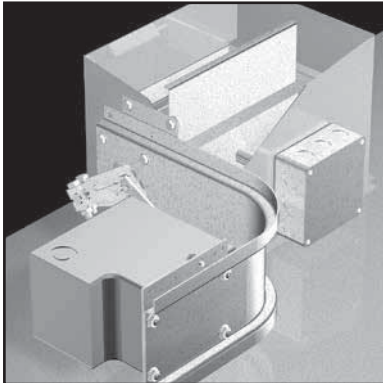


Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage!

Automatic Fire Damper Function



- Designed to close in fire situations
- Reset by activating the reset switch
- UL Listed
- Constructed in accordance with NFPA 96

The automatic fire damper is a thermostatically controlled, resettable fire damper designed to prevent the spread of fire into the kitchen exhaust ductwork. The thermostat is designed to provide automatic closure in the event of a fire where duct temperatures exceed 280°F. These conditions would typically exist after the first line fire suppression system failed to extinguish the fire. The damper will then close and shut off the exhaust fan along with any make-up air equipment, preventing the fire from entering the duct. The damper is reset by activating the reset switch after the thermostat has cooled to a temperature less than 280°F. When the damper is fully open, power to the exhaust fan and make-up air will be restored.

Testing the damper requires activating the test switch, typically mounted on the face of the hood, or in a separate control panel. The damper will then close, as if the thermostat had reached 280°F. To return to normal operation simply activate the reset switch.

The automatic fire damper is not intended to function as an air controller. All fire dampers connected to a common fan will function simultaneously allowing the fan to be on only when all dampers are fully open.

Many local code authorities do not recommend or allow the use of fire dampers. For this reason, consult your local code authorities for specific requirements.

DANGER

Always disconnect power before working on or near any electrical components in the hood. If necessary, lock and tag the breaker servicing this equipment to prevent accidental power up. Only qualified personnel should install and service this system and they should be aware of general safety precautions.

NOTE

Follow all local electrical and safety codes, as well as the National Electrical Code (NEC), and the latest edition of the National Fire Protection Agency Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations (NFPA 96). Follow the Canadian Electrical Code (CEC) and ULc-S650 if installing this product in Canada.

CAUTION

It is the responsibility of the installer to make sure both electrical and gas appliances shut down in the event of a fire or in the event of a power loss to the building when this sequence is required by the authority having jurisdiction.

Table of Contents

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System Components

Damper, Actuator, and Linkage Assembly

The damper, actuator, and linkage assembly will be factory installed. The damper is located in each exhaust collar, its actuator and linkage assembly just outside the collar.

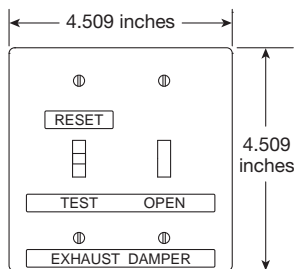
Damper Control Panel

The damper control panel will include at least a three-position momentary reset/test switch and an open indicator light inside a two-gang electrical junction box. RESET controls the opening of the damper and TEST controls the closing of the damper under daily conditions. The indicator light illuminates when the damper is completely open, and power is restored to the exhaust fan and make-up air.

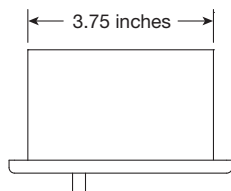
Mounting options:

- Hood mounted (face of hood)
- Utility cabinet mounted
- Shipped loose (for remote mounting)
- Mounted on UDS (Utility Distribution System)
- Mounted on XFCC (Kitchen Fan Control Center) door

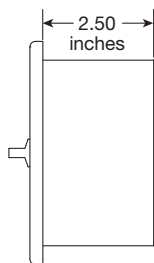
Dimensional details:



FRONT VIEW



TOP VIEW



SIDE VIEW

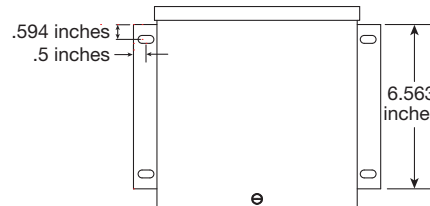
Control Box

The control box will include relays and terminal blocks for field wiring connections. This 8 x 8 x 4-inch (203.2 x 203.2 x 101.6 mm) NEMA 3R box will be painted. Figure 1 on page 3 shows the typical placement of the hood mounted control box.

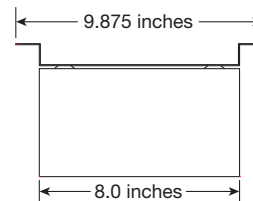
Mounting options:

- Hood mounted (on top of hood)
- Shipped loose (for remote mounting)

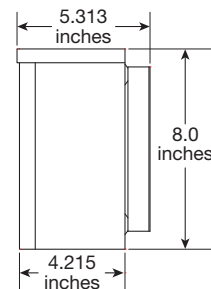
Dimensional details:



FRONT VIEW



TOP VIEW



SIDE VIEW



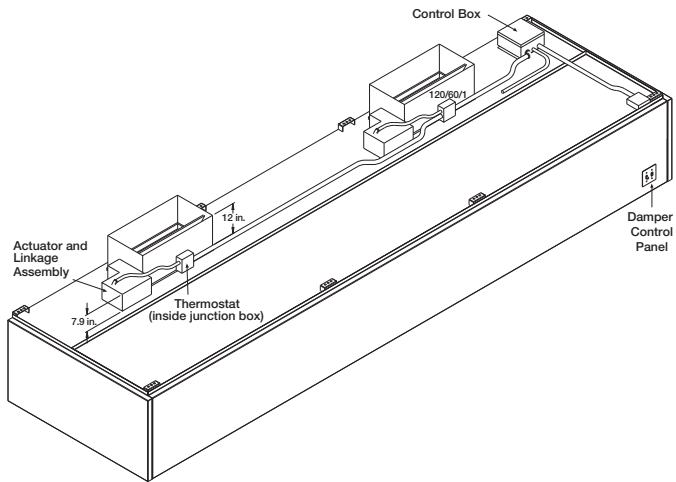


FIGURE 1: Hood Mounted Control Box with Hood Mounted Damper Control Panel

Installation

If shipped loose, mount the control box and/or damper control panel. Access to the control box, thermostat, actuator and linkage must be available for possible maintenance.

NOTE

For hoods with fire dampers in the exhaust (and/or supply) duct collars, an access panel for cleaning and inspection shall be provided in the duct. This panel shall be as close to the hood as possible and not exceed 18 inches from any hood damper. (Factory recommendation).

The damper control panel must be mounted so that it is accessible for daily use and its location may need to comply with ADA Standards for Accessible Design. For any readjustment on the linkage, refer to the actuator field installation instructions on beginning on page 8.

Electrical Requirements

NOTE

All wiring must be in accordance with National Electrical Code (NEC) NFPA 70 guidelines and local building codes.

Standard electrical requirements assume one hood per fan. A special wiring diagram may be needed if there are multiple hoods exhausted by one fan or if interfacing with other items such as a fan control center. Consult the factory if a special wiring diagram is needed, or if the correct wiring diagram is missing. A control box wiring diagram can be found on page 5.

The table below indicates which wiring diagram to use for each situation that would normally occur with the automatic fire damper assuming one hood per fan.

When selecting the drawing, take into account these options:

- Control Box (Control Cabinet)
- Damper Control Panel (Damper Switches)
- Hood Switches for Light(s), Fan(s), Tempering (Heating or Cooling Supply Air)
- Number of Ducts(s) = Number of Damper(s)

Drawing Numbers

Control Box	Control Panel (Damper Switches)	Hood Switches	One Damper (Drawing #)	Two Dampers (Drawing #)
***	***	***	M24778	M24782
***	***	---	M24777	M24781
***	---	---	M24776	M24780
---	---	---	M24775	M24779

*** Hood Mounted Control
 --- Remote Mounted Controls

Conditions:

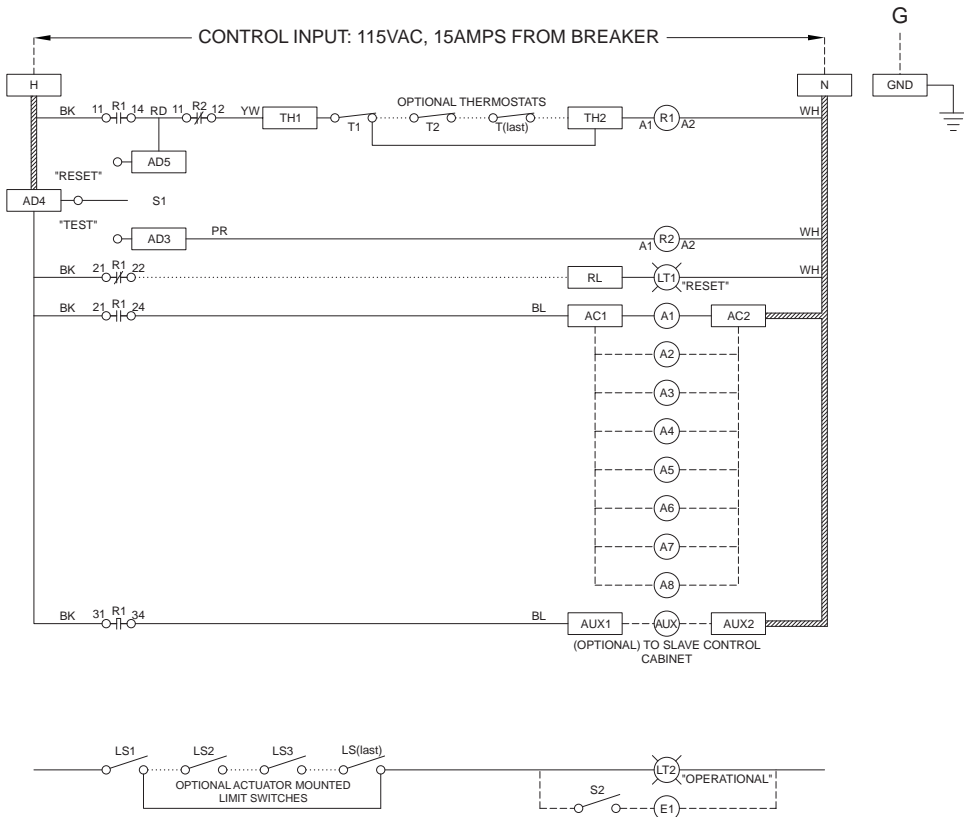
1. If Control Box, Damper Control Panel (Damper Switch(s)), and Control Panel (Hood Switches) are all hood mounted use drawing:
 - For one Exhaust Damper - M24778
 - For two Exhaust Damper(s) - M24782
2. If Control Box and Damper Control Panel (Damper Switch(s)) are hood mounted, but the Hood Control Panel (Hood Switch(s)) are remote mounted use drawing:
 - For one Exhaust Damper - M24777
 - For two Exhaust Damper(s) - M24781
3. If the Control Box is hood mounted but both the Control Panel(s) are remote mounted use drawing:
 - For one Exhaust Damper - M24776
 - For two Exhaust Damper(s) - M24780
4. If the Control Box, Damper Control Panel (Damper Switch(s)), Hood Control Panel (Hood Switch(s)) are all remote mounted use drawing:
 - For one Exhaust Damper - M24775
 - For two Exhaust Damper(s) - M24779

NOTE

All field connections must use UL Listed conduit and fittings.



Control Box Wiring Diagram



LABEL	DESCRIPTION
T1, T2, T3,...	Thermostats
R1	Relay 3PDT 120VAC Coil
R2	Relay DPDT 120VAC Coil
S1	Test/Reset Switch
AUX	Auxiliary Device
E1	Exhaust Fan Circuit
LS1, LS2,...	Actuator Mounted Limit Switches
S2	Fan Switch
A1, A2, A3,...	Damper Actuators
LT1	Optional Red Reset Light
LT2	Green Operational Light

NOTES:	
1) ONE THERMOSTAT REQUIRED FOR EACH FIRE DAMPER	
2) SHORT CIRCUIT AND OVERLOAD PROTECTION PROVIDED BY OTHERS	
—————	FACTORY WIRING
—————	FACTORY INSTALLED TERMINAL JUMPER CLIP
.....	OPTIONAL FACTORY WIRING
-----	OPTIONAL FIELD WIRING

TORQUE:	
TERMINAL BLOCKS = 8 LB.IN	ALL WIRING 90°C 14 GA. UNLESS SPECIFIED
GROUNDING BLOCKS = 8 LB.IN	
FIELD WIRING:	
USE MINIMUM 60° Copper Wire	

WIRE COLOR	
BK - black	
BL - blue	
BR - brown	
OR - orange	
PR - purple	
RD - red	
YW - yellow	
WH - white	

UNLISTED



Start-Up

- Check the wiring connections to ensure proper installation.
- Open the damper by pressing the reset switch in the control panel.
- Allow 20 seconds for the damper to fully open.
- Make sure both the indicator light and fan are on.
- Visually verify that the damper behind the filters is open.
- Activate the test switch.
- Make sure the indicator light and the fan are off.
- Visually verify that the damper is closed.

Maintenance

The automatic fire damper is designed to be a maintenance-free damper (there is no link to replace). Testing the damper at least once a week is recommended to ensure proper function in the event of a fire. Visually verify that the damper is opening and closing when testing. If the damper isn't functioning properly, refer to the Troubleshooting section on page 7.

WARNING

If damper will not open after testing, do not continue to use cooking appliances until this is fixed.

Operation

Fire

1. At a thermostat temperature of 280°F, the damper will close, and any exhaust fan(s) and make-up air connected to the damper(s) will shut off.
2. The damper will remain closed until the reset switch is activated and the thermostat has cooled to less than 280°F.

Reset

1. The damper(s) will open when the reset switch is activated.
2. When the damper is fully open the indicator will light and power will be provided to the exhaust fan and connected make-up air.

Test

1. The damper will close when the test switch is activated.
2. The indicator light will shut off.
3. The power to the exhaust fan and the connected make-up air will be disconnected.
4. The damper(s) will open when the reset switch is activated.
5. The indicator will light and power will be provided to the exhaust fan and connected make-up air when the damper is fully open.

Daily

1. Fan control and operation will not affect the open damper(s).
2. The indicator light will signify normal operation of the system with an open damper(s).
3. The user may test the damper nightly to shut off all fans and close the damper(s), eliminating nightly drafts of air through the ductwork.

WARNING

The main purpose of the automatic fire damper is to close off the exhaust ductwork in the event of a fire under the hood. If the user activates the test switch at night (closes the damper), but fails to reset the switch in the morning and proceeds to cook/use the appliances under the hood, this can cause heat build-up. Eventually this can start a fire and/or dump the fire suppression system. Consult your local code official for what is and is not allowed with respect to the functionality of the automatic fire damper and the appliance interfacing with this product. Make sure all kitchen staff who will be working with this product fully understand its function.



Troubleshooting

Problem: Automatic fire damper is not opening.

Is the damper reset?	Activate the reset switch and visually verify that the damper is opening.
Is the power being supplied to the damper circuit?	To verify power is being supplied to the damper circuit, measure the voltage across terminals 1 and 2 in the control box to be sure the proper line voltage is being supplied.
Are the relays and switch working properly?	Relays are located in the control box. R1 will engage when the reset switch is actuated, R2 will engage momentarily when the test switch is activated, disengaging R1. If the relays are not functioning properly, the problem may be a faulty relay or reset/test switch.
Is the damper stuck?	Check the damper to make sure it is free from obstruction.
Is the actuator getting power?	Proper line voltage should exist across terminals L1 and L2 on the back of the actuator when the power is on and the reset switch is activated. The actuator may be faulty if it is receiving power and not in the open position. If the actuator is not receiving power verify the thermostat is providing contact.

Problem: Indicator light is not on.

Is the light bulb burned out?	Remove the control panel switch cover to confirm that the light bulb is functional.
Is power being supplied to the exhaust fan?	Power supplying the fan starter supplies the indicator light. It is possible the fan overload breakers have tripped.
Is the limit switch making contact?	Verify that the actuator limit switch (terminals C and N.O. in back of the actuator) is making contact when the damper is open.
Is the damper linkage adjusted properly?	Refer to the actuator installation instructions..

Problem: Automatic fire damper is not closing.

Is the damper linkage adjusted properly?	Refer to the actuator installation instructions.
Is the damper blade clear of obstructions?	
Has the actuator's internal spring failed?	The actuators internal spring should rotate its shaft to the normal position when power is not being applied. (Contacts L1 and L2).

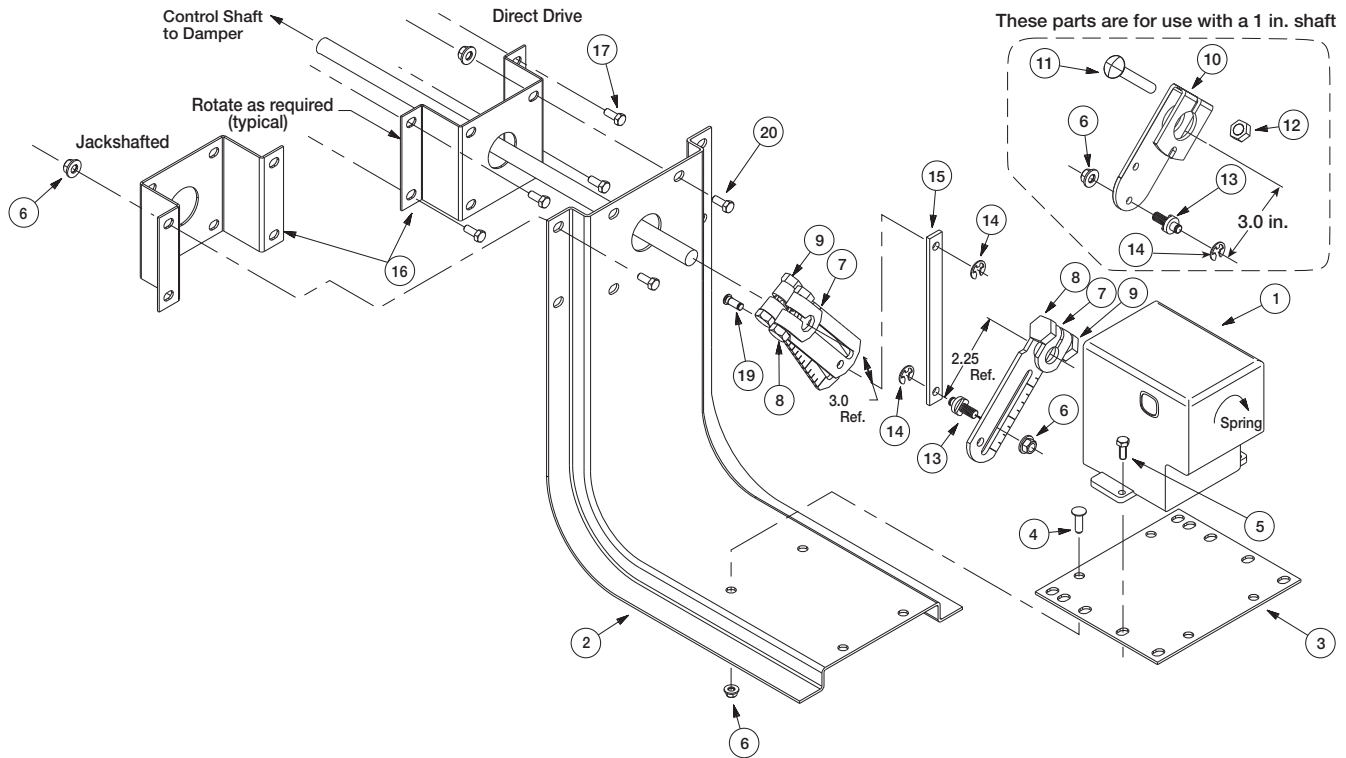
Problem: Hood is not exhausting effluent properly.

Refer to the hood Installation, Operation and Maintenance manual for troubleshooting tips on improving hood performance.

Installation of Actuator

MA & MC Series, UL Listed electric actuators with two position control.

These instructions apply to the external field installation of Invensys actuators. Invensys actuators rotate to their energized position when power is applied and spring return to their fail position when power is interrupted, except for the MC-431 which drives under power in both directions.



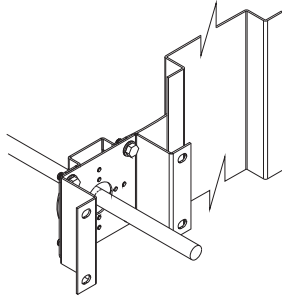
Item	Qty	Description
1	1	Actuator
2	1	Mounting Bracket
3	1	Mounting Plate
4	4	1/4 - 20 x 1/2 in. Thread Stud
5	3	1/4 - 20 x 3/4 in. Thread Cutting Screw
6	10	1/4 - 20 Spinlock Nut
7	3	1/2 in. Crankarm
8	3	5/16 - 18 x 1-1/2 in. Bolt
9	3	5/16 - 18 Spinlock Nut
10	1	1 in. Crankarm
11	1	3/8 - 16 x 2-1/2 in. Carriage Bolt
12	1	3/8 - 16 Spinlock Nut
13	2	Linkage Adjustment Pin
14	2	1/4 in. E-ring
15	1	Drive Link
16	1	Stand-Off Bracket
17	4	1/4 - x 20 x 1/2 in. Thread Cutting Screw
18	1	Ball Bearing
19	1	1/4 x 1/2 in. Knurl Pin
20	4	1/4 - 20 x 1/2 in. Hex Bolt
21	2	#10 Tek Screw



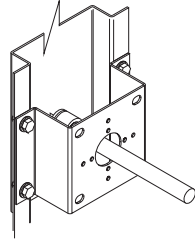
TOOLS REQUIRED

Wrenches: (1) 3/8, (2) 1/2, (1) 7/16, and (1) 9/16 in. and a hammer.

1. Install the stand-off bracket to the damper.



Orientation of stand-off bracket for a jackshaft driven damper.



Orientation of stand-off bracket for a directly driven damper.

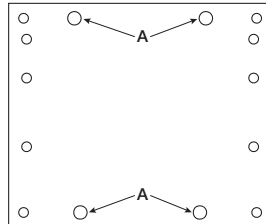
Dampers with a jackshaft

- 1a. Mount the stand-off bracket onto the jackshaft bracket with four 1/4 - 20 x 1/2 in. thread cutting screws. Use the orientation shown on this page.

Dampers without a jackshaft (shaft extension)

- 1b. Mount the stand-off bracket spanning across the damper frame flanges positioned over the control shaft. Use the orientation shown on this page. The damper shaft must be centered in the stand-off bracket. Fasten to the damper frame with four #14 Tek screws or equal, supplied by others. Be sure not to run the screws into the damper linkage which is between the flanges.

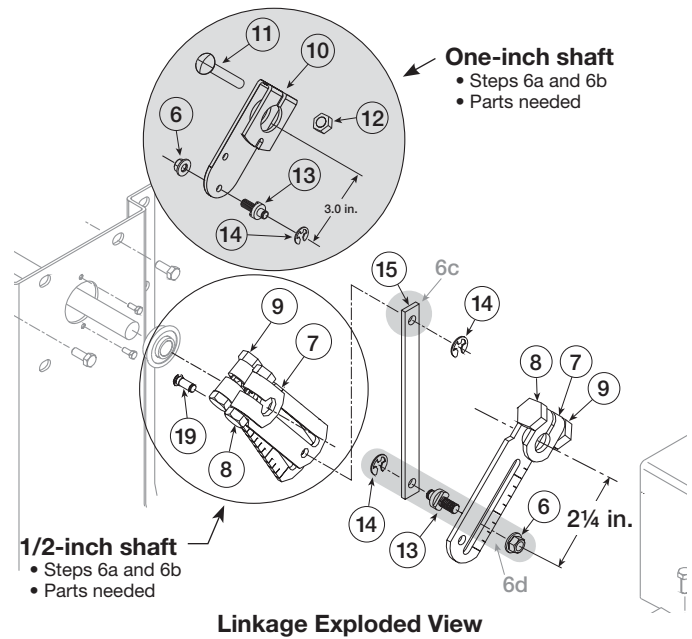
2. Fasten the mounting plate to the mounting bracket using four 1/4 - 20 x 1/2 in. thread studs and four 1/4 - 20 spinlock nuts through the matching four hole pattern on the mounting bracket labeled 'A' on the illustration. Note that the mounting plate has only one pattern that will match the mounting plate pattern.



Mounting Plate

3. Mount the mounting bracket to the stand-off bracket using four 1/4 - 20 x 1/2 in. bolts and four 1/4 - 20 spinlock nuts included with this kit. Use the outer four holes of the mounting bracket for jackshafed models and the inner four holes for directly-driven models.
4. If the damper has a 1/2 in. diameter damper shaft, mount the ball bearing into the mounting bracket with two #10 Tek screws. The Tek screws are required to keep the thrust forces from pushing the bearing out of the mounting bracket. If the damper shaft is one-inch in diameter, then no ball bearing is required.
5. Mount the actuator to the mounting plate in the corresponding holes using three 1/4 - 20 x 3/4 in. thread cutting screws. Note that the actuator must be mounted with the shaft in the horizontal position.

6. Assemble the linkage.



Parts needed for dampers with 1/2 in. shaft

Item	Qty	Description
6	1	1/4 - 20 Spinlock Nut
7	3	1/2 in. Crankarm
8	3	5/16 - 18 x 1-1/2 in. Bolts
9	3	5/16 - 18 Spinlock Nuts
13	1	Linkage Adjustment Pin
14	2	1/4 in. E-ring
15	1	Drive Link
19	1	1/4 x 1/2 in. Knurl Pin

Parts needed for dampers with 1 in. shaft

Item	Qty	Description
6	2	1/4 - 20 Spinlock Nut
7	1	1/2 in. Crankarm
8	1	5/16 - 18 x 1-1/2 in. Bolt
9	1	5/16 - 18 Spinlock Nut
10	1	1 in. Crankarm
11	1	3/8 - 16 x 2-1/2 in. Carriage Bolt
12	1	3/8 - 16 Spinlock Nut
13	2	Linkage Adjustment Pin
14	2	1/4 in. E-ring
15	1	Drive Link

- 6a. Assemble the shaft crankarms.

For dampers with 1/2 in. shaft

The crankarms must be placed as mirror images of each other, meaning the like sides face each other. The bolts and nuts are to be positioned as in the linkage exploded view drawing.

For dampers with 1 in. shaft

The 1 in. crankarm, item 10, must be in the position shown in the shaded encircled exploded view above. Position the bolt and nut as shown in the same diagram.



6b. For dampers with 1/2 in. shaft

Insert the knurl pin through both of the small holes in the crankarms and tap it into place using a hammer.

For dampers with 1 in. shaft

Insert the linkage adjustment pin, item 13, into the crankarm slot. Position it 3 in. from the center of the damper shaft hole and fasten with a 1/4 - 20 spinlock nut (see shaded encircled diagram).

6c. Attach the drive link, item 15 to the damper shaft crankarm(s).

For dampers with 1/2 in. shaft

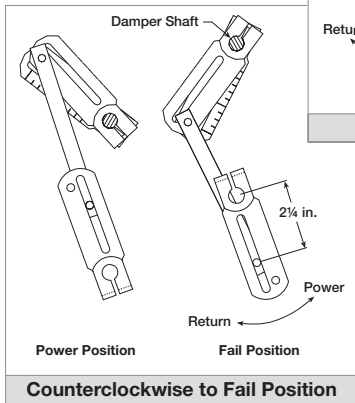
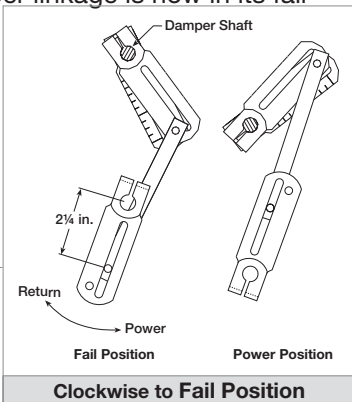
Insert the knurl pin through one of the drive link holes. Fasten with an E-ring.

For dampers with 1 in. shaft

Insert the linkage adjustment pin, item 13, through one of the drive link holes. Fasten with an E-ring.

6d. Attach the drive link to the actuator crankarm with the linkage adjustment pin, a spinlock nut and an E-ring. Set the linkage adjustment pin at 2-1/4 in. on the crankarm and secure it there with the spinlock nut. Fasten the other end through the empty drive link hole with the E-ring.

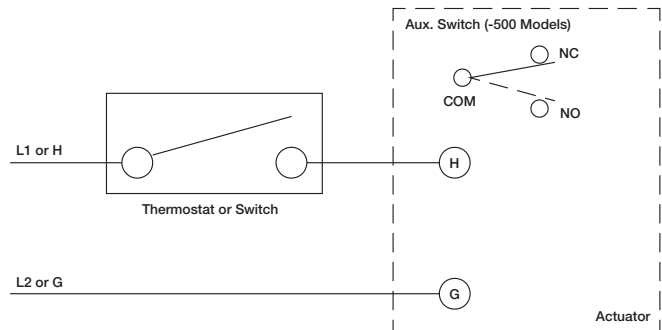
7. Note the damper shaft rotation for fail direction and orient the linkage appropriately as shown in the illustrations. The damper linkage is now in its fail position. Position the damper blades to their proper position (open or closed). Tighten the bolts.



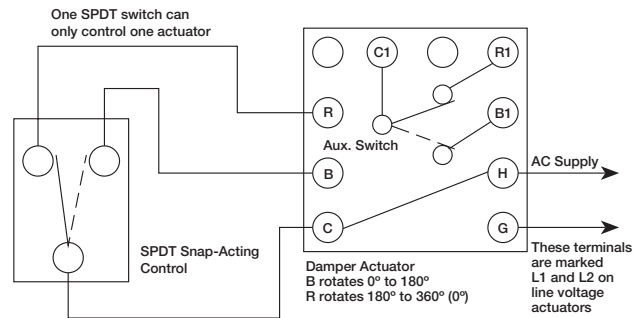
- Orient the actuator crankarm so that it will rotate through the full stroke of the actuator with the shaft crankarms rotating only 90 degrees without power. Adjust the position as necessary. Tighten all of the crankarms.
- Wire the actuator according to the appropriate wiring diagram that identifies the actuator's electrical connections. Wiring should be per an approved project or job wiring diagram and must comply with all applicable electrical codes.

NOTE

While the MC series actuator installs and links the same as the MA series, the wiring is different. A three wire control circuit is required because the actuator runs under power to both open and close the actuator. This actuator does not spring return.



Wiring Diagram for MA Series Actuators



Wiring Diagram for MA Series Actuators

- Apply power to the actuator. The damper blades should fully open or close and return to the fail position when power is disconnected. If they do not, adjustments can be made by resetting the crankarm position on the damper or actuator shaft, or adjusting the 2-1/4 in. dimension as discussed in Step #6d.

NOTE

Motors in models MA-318 and MA-418 switch to a holding winding at the end of their stroke. Motor may overheat if stalled before cycling to the end of the power stroke.

Actuator Part Number	Power Supply	Aux. Switch	VA Running	Holding
MA-305	24	No	56	56
MA-305-500	24	Yes	56	56
MA-405	120	No	48	48
MA-405-500	120	Yes	48	48
MA-318	24	No	92	32
MA-318-500	24	Yes	92	32
MA-418	120	No	108	42
MA-418-500	120	Yes	108	42
MC-431	120	Yes	96	-



Maintenance Log

Date _____ Time _____ AM/PM
Notes: _____

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Our Commitment

As a result of our commitment to continuous improvement, Accurex reserves the right to change specifications without notice.

Specific Accurex product warranties are located on accurex.com within the product area tabs and in the Library under Warranties.



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