

Step 1

Determine if the actuators need to be electric, pneumatic, or manual.

Step 2

If the actuators are to be electric, determine what voltage (120 Vac, 24 Vac, etc.) and what Hertz (50 or 60 cycles/sec.) are required. If the voltage requirement is not the same as the actuator, (i.e. the motor is 120 Vac and the requirement is 460 Vac) a transformer is needed. Pneumatic actuators require 20 psi supply.

Step 3

If the actuator is manual, then refer to the 'Manual Hand Quadrant' section on Page 3.

Step 4

If the actuator is either electric or pneumatic, then the operation type must be determined:

- | | |
|---|-------------------------------|
| 1) Two position – spring return | See tables on following pages |
| 2) Two position (power open – power closed) | See tables on following pages |
| 3) Floating (power open – power closed) | See tables on following pages |
| 4) Modulating – spring return | See tables on following pages |
| 5) Modulating (power open – power closed) | See tables on following pages |

- Two position – spring return:** This type of actuator will power to either the open or the closed position. When the power supply is removed (or turned off), the actuator will fail to the initial position by means of a spring.
- Two position (power open – power closed):** This type of actuator will power in either direction. When the power supply is removed (or turned off), the actuator will fail in place.
- Floating (power open – power closed):** This type of actuator is powered in both directions and will stop in any position. No spring is used.
- Modulating – spring return:** This type of actuator will power in either direction and will spring return upon power loss much like the two position actuators. The difference is that a control signal (4-20 mAdc, 0-10 Vdc, etc.) is used. The control signal acts much like a valve; as the signal is increased or decreased, the actuator will open or close or vice versa.
- Modulating (power open – power closed):** This type of actuator is the same as #3, except for its response to a control signal input (4-20 mAdc, 0-10 Vdc, etc.).

Step 5

If the actuator is pneumatic and needs to be modulating, a pilot positioner is required. A pilot positioner uses the control signal (usually 3-15 psi) to vary the amount of supply pressure entering the actuator. Please note that the use of a pilot positioner will decrease the square foot rating of the actuator by 20%. Consult factory.

Step 6

Once the actuator operation is determined, then the fail position must be known. There are two options:

- 1) Power open – fail close
- 2) Power close – fail open

* If a non-spring return actuator is required, then the fail positions above would become "fail in place."

Step 7

Auxiliary Switch – Separate switch in actuator which can be wired to either make a circuit (Normally Open) or break a circuit (Normally Closed) when actuated. Switch is at end of power stroke for Siebe (Barber-Colman); actuation point is adjustable in Belimo.



Step 8

Determine if the actuator is to be:

- 1) Internally mounted: The actuator is mounted in the airstream.
- 2) Externally mounted: The actuator is mounted out of the airstream at factory in a sleeve or external sidplate
- 3) External kit: The actuator is installed out of the airstream in the field.

Step 9

At this point there may be more than one actuator from which to choose. So the final step is to determine which actuator will best operate the damper sizes needed. An actuator selection table is found on the following pages. If you need assistance, contact your local representative or Greenheck.

Actuator Selection for Control Dampers

Electric												
Model	Volt.	Freq (Hz)	VCD Actuator Limitations			VCDR Maximum Diameter	Description	Actuator Part #	External Mount Actuator Kit # (includes actuator)			
			Max. Damper Sq/Ft With Seals	Without Seals								
Two-position Spring Return ¹												
Belimo												
TF-24	24	50/60	18	4.5	9	24 in.		384237				
TF-24S			18	4.5	9		includes auxiliary SPDT end switches	384238				
FSLF-24			30	7	12			383241	832778			
FSLF-24S			30	7	12		includes auxiliary SPDT end switches	383394	832779			
LF-24			35	7	12			381724	ACT-LF24			
LF-24S			35	7	12		includes auxiliary SPDT end switches	381725	ACT-LF24S			
FSNF-24			70	12	20			382889	ACT-FSNF24			
FSNF-24S			70	12	20		includes auxiliary SPDT end switches	382966	ACT-FSNF24S			
AF-24			133	25	50			381085	ACT-AF24			
AF-24S			133	25	50		includes auxiliary SPDT end switches	381152	ACT-AF24S			
FSAF-24	133	25	50		383413	383413						
TF-120	120	50/60	18	4.5	9	24 in.		384241				
TF-120S			18	4.5	9		includes auxiliary SPDT end switches	384236				
FSLF-120			30	7	12			383242	832776			
FSLF-120S			30	7	12		includes auxiliary SPDT end switches	383392	832777			
LF-120			35	7	12			381722	ACT-LF120			
LF-120S			35	7	12		includes auxiliary SPDT end switches	381723	ACT-LF120S			
FSNF-120			70	12	20			382888	ACT-FSNF120			
FSNF-120S			70	12	20		includes auxiliary SPDT end switches	382965	ACT-FSNF120S			
AF-120			133	25	50			381087	ACT-AF120			
AF-120S			133	25	50		includes auxiliary SPDT end switches	381151	ACT-AF120S			
FSLF-230	230	50/60	30	7	12	24 in.		383399	833249			
FSLF-230S			30	7	12		includes auxiliary SPDT end switches	383400	833250			
FSNF-230			70	12	20			382963	ACT-FSNF230			
FSNF-230S			70	12	20		includes auxiliary SPDT end switches	382964	ACT-FSNF230S			
AF-230			133	25	50			381598	ACT-AF230			
AF-230S			133	25	50		includes auxiliary SPDT end switches	381599	ACT-AF230S			
Honeywell												
ML8202F1006	24	50/60	30	7	12	24 in.		383264	See Page 4			
ML8302F1004			30	7	12			383265	See Page 4			
MS8105A1130			44	7	12			384189				
MS8209F1003			80	12	20			382733	ACT-MS8209-24V			
MS8309F1001			80	12	20			382734	ACT-MS8309-24V			
MS8110A1206			88	12	20		includes auxiliary SPDT end switches	383818				
MS8120F1002			175	25	50			382824	880349			
MS8120F1200			175	25	50		includes auxiliary SPDT end switches	383255	831682			
ML4202F1000			30	7	12			383260	See Page 4			
ML4302F1008			30	7	12			383261	See Page 4			
MS4209F1007	120	60	80	12	20	24 in.		382731	See Page 4			
MS4309F1005			80	12	20			382732	See Page 4			
MS4120F1006			175	25	50			382823	880347			
MS4120F1204			175	25	50		includes auxiliary SPDT end switches	383024	831681			
ML4702F1009			30	7	12			383262	829879			
ML4802F1007			30	7	12			383263	829878			
MS4709F1014	230	50/60	80	12	20	24 in.		382735	ACT-MS4709-230V			
MS4809F1012			80	12	20			382736	ACT-MS4809-230V			
MS4620F1005			175	25	50			382825	880348			
MS4620F1203			175	25	50		includes auxiliary SPDT end switches	383254	831683			
Invensys (TAC)												
MA-305			24	60	16		6	12	24 in.		380712	ACT-MA305-24V
MA-305-500	16	6			12	includes SPDT end switch	380720	ACT-MA305-500-24V				
MA-318	60	25			50		380713	ACT-MA318-24V				
MA-318-500	60	25			50	includes SPDT end switch	380721	ACT-MA318-500-24V				
MA6-318-500	60	25			50	Explosion proof enclosure with end switch	381661	ACT-MA6318500-24V				
MA-405	120	60			16	6	12	24 in.			380708	ACT-MA405-120V
MA-405-500			16	6	12	includes SPDT end switch	380722		ACT-MA405-500-120V			
MA-418			60	25	50		380709		ACT-MA418-120V			
MA-418-500			60	25	50	includes SPDT end switch	380723		ACT-MA418-500-120V			
MA6-418-500			60	25	50	Explosion proof enclosure with end switch	380806		ACT-MA6418500-120V			
MA-419			240	60	60	25	50		24 in.		380813	ACT-MA419-230V
MA-419-500	60	25			50	includes SPDT end switch	381593	ACT-MA419-500-240V				
MA5-419	50	60			25	50	381205	ACT-MA5-419-220V				
MA5-419-500	50	60			25	50	381594	ACT-MA5419500-240V				
MA6-419-500	60	60			25	50	381595	ACT-MA6419500-240V				
MA7-419-500	50	60			25	50	381597	ACT-MA7419500-240V				
Siemens												
GGD221.1U	120	50/60	142	25	50	24"		382188	ACT-GGD221.1U-115V			
GGD121.1U	24	50/60	142	25	50	24"		382279	ACT-GGD121.1U-24V			
GGD321.1U	240	50/60	142	25	50	24"		382737	ACT-GGD321.1U-230V			

Consult factory for actuator applications on UL rated fire and smoke dampers.

NEMA 4, 4X & NEMA 7 housing are available.

¹ Unless otherwise specified, spring return actuators will be linked "power open - fail closed" which is also called "normally closed" or "NC". If "power closed - fail open" operation is desired, be sure to indicate this requirement. "Power closed - fail open" is also referred to as "normally open" or "NO".

Actuator Selection for Control Dampers

Electric

Model	Voltage	Freq. (Hz)	Manufacturer	Torque (in. lbs.)	VCD Actuator Limitations		VCDR Maximum Diameter	Description	Actuator Part #	External Mount Actuator Kit # (includes actuator)
					Max. Damper Sq/Ft With Seals	Without Seals				
Two-position NON Spring Return										
MC431	120	60	Invensys	220	50	100	24 in.	Requires SPDT 3 wire controller	381149	ACT-MC431-120V
Modulating Spring Return¹										
TF24-SR	24	50/60	Belimo	18	4.5	9	24 in.	2 to 10 volts DC	384239	--
TF24-SR-S	24	50/60	Belimo	18	4.5	9	24 in.	2 to 10 volts DC with end switch	384240	--
LF24-SR	24	50/60	Belimo	35	7	12	24 in.	0-10 volts DC	381737	ACT-LF24SR
LF24-SR-S	24	50/60	Belimo	35	7	12	24 in.	0-10 volts DC with end switch	383011	833253
NF24-SR	24	50/60	Belimo	60	12	20	24 in.	0-10 volts DC	381736	ACT-NF24SR
NF24-SR-S	24	50/60	Belimo	60	12	20	24 in.	0-10 volts DC with end switch	383012	--
AF24-SR	24	50/60	Belimo	133	25	50	24 in.	0-10 volts DC	381150	ACT-AF24-SR
AF24-MFT-S	24	50/60	Belimo	133	25	50	24 in.	0-10 volts DC with end switch	381600	ACT-AF-24-MFT-S
MS7505A2008	24	50/60	Honeywell	44	7	12	24 in.	0 or 2-10 volts DC	383740	--
MS7505A2130	24	50/60	Honeywell	44	7	12	24 in.	0 or 2-10 volts DC with end switch	384133	--
MS7505A2030	24	50/60	Honeywell	44	7	12	24 in.	0 or 2-10 volts DC	384187	--
M9185D-1004	24	50/60	Honeywell	60	12	20	24 in.	Series 90 (135 ohm slidewire)	380949	ACT-M9185D1012-24V
MS7510A2206	24	50/60	Honeywell	88	12	20	24 in.	0 or 2-10 volts DC with end switch	383213	--
MS7510A2008	24	50/60	Honeywell	88	12	20	24 in.	0 or 2-10 volts DC	383739	--
MS7520A2007	24	50/60	Honeywell	175	25	50	24 in.	0 or 2-10 volts DC	383214	--
MS7520A2015/B	24	50/60	Honeywell	175	25	50	24 in.	0 or 2-10 volts DC	383785	--
MS7520A2205	24	50/60	Honeywell	175	25	50	24 in.	0 or 2-10 volts DC with end switch	383738	--
MS7520A2213	24	50/60	Honeywell	175	25	50	24 in.	0 or 2-10 volts DC with end switch	383784	--
Modulating NON Spring Return										
LMB24-SR	24	50/60	Belimo	45	7	12	24 in.	0-10 volts DC	381728	833286
NMB24-SR	24	50/60	Belimo	60	10	20	24 in.	0-10 volts DC	381138	833288
AMB-24 SR	24	50/60	Belimo	180	25	50	24 in.	0-10 volts DC	382131	833290
Floating PO/PC										
LMB24-3	24	50/60	Belimo	45	7	12	24 in.		381726	ACT-LM24
NMB24-3	24	50/60	Belimo	90	10	20	24 in.		381601	ACT-NM24
AMB24-3	24	50/60	Belimo	180	25	50	24 in.		381602	ACT-AM24
M6184D1035	24	50/60	Honeywell	150	25	50	24 in.		381715	--
Transformers										
AE-201			Invensys (TAC)					Plate mounted transformer - Primary 120 Vac, Secondary 24 Vac Compatible on any 24 Vac Actuator	381477	Not Applicable (N/A)
T-249			Invensys (TAC)					Plate mounted transformer - Primary 480/277/240/208 Vac, Secondary 120 Vac. Compatible on any 120 Vac Actuator.	380842	--
50017460-001			Honeywell					Transformer (mounted within actuator) to convert Honeywell model M9185D-1012 modulating actuator to 120, 208, or 240 Vac.	381043	--
Manual Hand Quadrant										
								1/2 in. dia. shaft - For use on all VCDs 48 in. wide and less (or 96 in. wide if height is 24 in. or less)	N/A	811518
								1 in. dia. shaft - For use on all VCDs over 48 in. wide and over 24 in. high (for use on all VCDs over 96 in. wide)	N/A	813938
Pneumatic										
Two-position Spring Return¹										
331-4551			Siemens	10	10	20	24 in.	#3 Actuator	454130	ACT-331-4551-P
331-2968			Siemens	30	25	50	24 in.	#4 Actuator	451918	--
331-2976			Siemens	30	25	50	24 in.	#4 Actuator	454129	ACT-331-2976-P
331-2856			Siemens	50	42	84	24 in.	#6 Actuator	451919	ACT-331-2856-P
MK2-7121			Invensys	67.5	42	84	24 in.		454138	ACT-MK2-7121-P
MK4-7121			Invensys	67.5	42	84	24 in.		382845	--
Modulating Spring Return¹										
332-4551			Siemens	10	8	16	24 in.	#3 Actuator with pilot positioner	457043	ACT-332-4551-P
332-2976			Siemens	30	20	40	24 in.	#4 Actuator with pilot positioner	457384	ACT-332-2976-P
332-2856			Siemens	50	35	70	24 in.	#6 Actuator with pilot positioner	457407	ACT-332-2856-P
Miscellaneous Parts										
								1/2 in. Extension pin kit	809735	N/A
								1/2 in. Crankarm (with bolt and nut)	812097	N/A
								1 in. Crankarm (with bolt and nut)	816252	N/A
								Standoff bracket with ball bearing (for volume control dampers)	815027	N/A
								Standoff bracket without ball bearing (for manual balancing dampers)	651812	N/A
								16 in. long, 1/2 in. diameter control shaft	452509	N/A
								8.5 in., 1/2 in. diameter control shaft	455064	N/A
								Retaining clip used to hold control shaft on axle pin (required with control shaft)	451738	N/A

Consult factory for actuator applications on UL rated fire and smoke dampers.

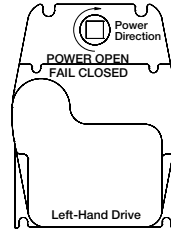
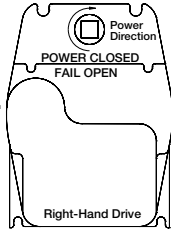
NEMA 4, 4X & NEMA 7 housing are available.

¹ Unless otherwise specified, spring return actuators will be linked "power open - fail closed" which is also called "normally closed" or "NC". If "power closed - fail open" operation is desired, be sure to indicate this requirement. "Power closed - fail open" is also referred to as "normally open" or "NO".

Honeywell, ML Series External Actuator Kits

Voltage	Actuator Model	Actuator Kit	Actuator Part #	Spring Return Action	Driving Torque
115 Vac	ML4302F1008 MS4309F1005	829876 ACT-MS4309-115V	383261 382732	CCW	30 in.lb. 80 in.lb.
24 Vac	ML8302F1004 MS8309F1001	829880 ACT-MS8309-24V	383265 382734		30 in.lb. 80 in.lb.

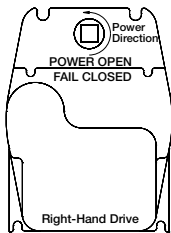
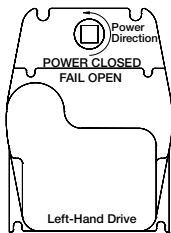
The ML-XXXXA & MS series actuators can be mounted as shown here.



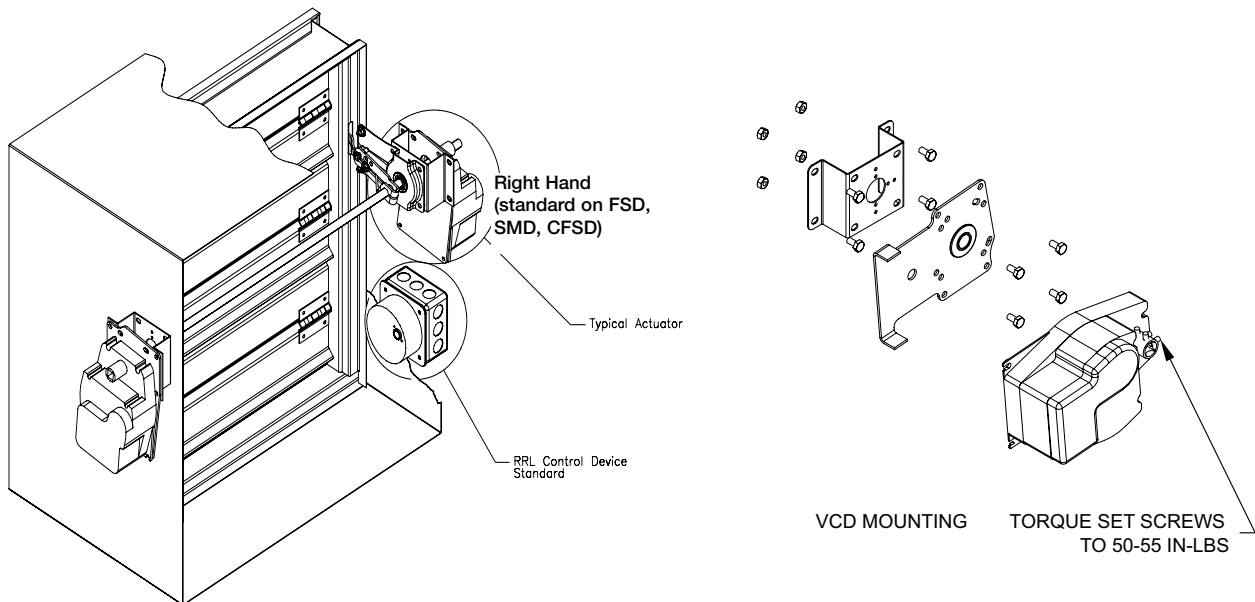
Default in CAPS for VCD

Voltage	Actuator Model	Actuator Kit	Actuator Part #	Spring Return Action	Driving Torque
115 Vac	ML4202F1000 MS4209F1007	829877 ACT-MS4209-115V	383260 382731	CW	30 in.lb. 80 in.lb.
24 Vac	ML8202F1006 MS8209F1003	829881 ACT-MS8209-24V	383264 382733		30 in.lb. 80 in.lb.

The ML-XXXXB & MS series actuators can be mounted as shown here.



Default in CAPS for FSD, SMD, and CFSD



Left Hand
(standard on VCD)

WD Damper Series Actuator Selection			
New Part #	Old Part #	Description	Dampers Used On
same as old part #	851038	End Switch Kit	All WDs
826848	MP100A-24V	MP-100 24 V motorpack kit	WD-100 series
826840	MP100A-115V	MP-100 115 V motorpack kit	WD-100 series
826840	MP100A-208V	MP-100 208V motorpack kit	WD-100 series
826840	MP100A-230V	MP-100 230V motorpack kit	WD-100 series
826855	MP100A-380V/50HZ	MP-100 380V/50HZ motorpack kit	WD-100 series
826844	MP100A-460V	MP-100 460V motorpack kit	WD-100 series
826840 with #380711	MP100A-115V with #380711	MP-100 575/600V w/ Micron Transformer	WD-200 series
Replaced with 826851	MP200-24V	MP-200 24V motorpack kit	WD-200 series
Replaced with 826842	MP200-115V	MP-200 115V motorpack kit	WD-200 series
Replaced with 826842	MP200-208V	MP-200 208V motorpack kit	WD-200 series
Replaced with 826842	MP200-230V	MP-200 230V motorpack kit	WD-200 series
Replaced with 826857	MP200-380V/50HZ	MP200-380V/50HZ motorpack kit	WD-200 series
Replaced with 826847	MP200-460V	MP-200 460V motorpack kit	WD-200 series
Replaced with 826842 plus #380711	MP200-115V with #380711	MP-200 575/600V w/ Micron Transformer	WD-200 series
826851	MP210-24V	MP-210 24 V motorpack	WD-200 series
826842	MP210-115V	MP-210 115 V motorpack	WD-200 series
826842	MP210-208V	MP-210 208 V motorpack	WD-200 series
826842	MP210-230V	MP-210 230 V motorpack	WD-200 series
826857	MP210-380V/50HZ	MP210-380V/50HZ motorpack	WD-200 series
826847	MP210-460V	MP-210 460 V motorpack	WD-200 series
826842 with #380711	MP210-115V with #380711	MP-210 575/600V w/ Micron Transformer	WD-200 series
826858	MP220A-24V	MP-220A-24V motorpack	WD-200 series
826860	MP220A-115V	MP-220A-115V motorpack	WD-200 series
826860	MP220A-230/460V	MP-220A-240V motorpack	WD-200 series
826860	MP220A-208V	MP-220A-208V motorpack	WD-200 series
826865	MP-220A-380V/50HZ	MP-220A-308V motorpack	WD-200 series
826860 with #380711	MP220A-115V with 380711	MP-220A-115V motorpack w/ Transformer	WD-200 series
826861	MP-220A-230/460V	MP-220-460V motorpack	WD-200 series
Replaced with 826850	MP300-24V	MP-300 24V motorpack kit	WD-300 series
Replaced with 826841	MP300-115V	MP-300 115V motorpack kit	WD-300 series
Replaced with 826841	MP300-208V	MP-300 208V motorpack kit	WD-300 series
Replaced with 826841	MP300-230V	MP-300 230V motorpack kit	WD-300 series
Replaced with 826856	MP-300-380V/50HZ	MP-300 380V/50HZ motorpack kit	WD-300 series
Replaced with 826846	MP300-460V	MP-300 460V motorpack kit	WD-300 series
Replaced with 826841 plus #380711	MP300-115V with #380711	MP-300 575/600V w/ Micron Transformer	WD-300 series
826850	MP310-24V	MP-310 24V motorpack kit	WD-300 series
826841	MP310-115V	MP-310 115V motorpack kit	WD-300 series
826841	MP310-208V	MP-310 208V motorpack kit	WD-300 series
826841	MP310-230V	MP-310 230V motorpack kit	WD-300 series
826856	MP310-380V/50HZ	MP-310-380V/50HZ motorpack kit	WD-300 series
826846	MP310-460V	MP-310 460V motorpack kit	WD-300 series
826841 with #380711	MP310-115V with #380711	MP-310 575/600V w/ Micron Transformer	WD-300 series
826849	MP323-24V	MP-323 24V motorpack kit	WD-323
826843	MP323-115V	MP-323 115V motorpack kit	WD-323
826843	MP323-208V	MP-323 208V motorpack kit	WD-323
826843	MP323-230V	MP-323 230V motorpack kit	WD-323
826845	MP323-460V	MP-323 460V motorpack kit	WD-323
826843 with #380711	MP323-115V with #380711	MP-323 575/600V w/ Micron Transformer	WD-323

