

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 |

- 1) 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.
- 2) 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.
- 3) Floating (power open – power closed):** This type of actuator is powered in both directions and will stop in any position. No spring is used.
- 4) 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.
- 5) 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)	Manufacturer	VCD Actuator Limitations			Description	Actuator Part #	External Mount Actuator Kit # (includes actuator)
				Max. Damper Sq/Ft With Seals	Without Seals	VCDR Maximum Diameter			
Two-position Spring Return¹									
MP-3754	120	60	Multi Products	3.5	7	12"		381135	382973
ML4202/4302	120	60	Honeywell	7	12	24"		See Page 4	See Page 4
MS4120	120	60	"	25	50	24"		382823	ACT-MS4120-115V
MS4209/4309	120	60	"	12	20	24"		See Page 4	See Page 4
FSNF-120	120	50/60	Belimo	12	20	24"		382888	ACT-FSNF120
GGD221	120	50/60	Siemens	25	50	24"		382188	ACT-GGD221.1U-115V
LF-120	120	50/60	Belimo	7	12	24"		381722	ACT-LF120
LF-120S	120	50/60	" "	7	12	24"	Includes SPDT end switch	381723	ACT-LF120S
NF-120**	120	50/60	" "	12	20	24"		381519	ACT-NF120
NF-120S**	120	50/60	" "	12	20	24"	Includes SPDT end switch	381734	ACT-NF120S
AF-120**	120	50/60	" "	25	50	24"		381087	ACT-AF120
AF-120S**	120	50/60	" "	25	50	24"	Includes SPDT end switch	381151	ACT-AF120S
MA-405	120	60	Invensys	6	12	24"		380708	ACT-MA405-120V
MA-405-500	120	60	" "	6	12	24"	Includes SPDT end switch	380722	ACT-MA405-500-120V
MA-418	120	60	" "	25	50	24"		380709	ACT-MA418-120V
MA-418-500	120	60	" "	25	50	24"	Includes SPDT end switch	380723	ACT-MA418-500-120V
MA6-418-500	120	60	" "	25	50	24"	Explosion proof enclosure with end switch	380806	ACT-MA6418500-120V
M4182A-1004	120	50/60	Honeywell	25	50	24"		380948	ACT-M4182A1004-120
M4182B-1002	120	50/60	" "	25	50	24"	Includes SPDT end switch	380950	ACT-M4182B1002-120
MP-3756	24	60	Multi Products	3.5	7	12"		381136	382975
FSNF-24	24	50/60	Belimo	12	20	24"		382889	ACT-FSNF24
GGD121	24	50/60	Siemens	25	50	24"		382279	ACT-GGD121.1-24V
MA-305	24	60	Invensys	6	12	24"		380712	ACT-MA305-24V
MA-305-500	24	60	" "	6	12	24"	Includes SPDT end switch	380720	ACT-MA305-500-24V
MA-318	24	60	" "	25	50	24"		380713	ACT-MA318-24V
MA-318-500	24	60	" "	25	50	24"	Includes SPDT end switch	380721	ACT-MA318-500-24V
MA6-318-500	24	60	" "	25	50	24"	Explosion proof enclosure with end switch	381661	ACT-MA6318500-24V
M8182A-1005	24	50/60	Honeywell	25	50	24"		381526	ACT-M8182A1005-24V
ML8202/8302	24	50/60	" "	7	12	24"		See Page 4	See Page 4
MS8209/8309	24	50/60	" "	12	20	24"		See Page 4	See Page 4
MS8120	24	50/60	" "	25	50	24"		382824	ACT-MS8120-24V
LF-24	24	50/60	Belimo	7	12	24"		381724	ACT-LF24
LF-24S	24	50/60	" "	7	12	24"	Includes SPDT end switch	381725	ACT-LF24S
NF-24**	24	50/60	" "	12	20	24"		381520	ACT-NF24
NF-24S**	24	50/60	" "	12	20	24"	Includes SPDT end switch	381735	ACT-NF24S
AF-24**	24	50/60	" "	25	50	24"		381085	ACT-AF24
AF-24S**	24	50/60	" "	25	50	24"	Includes SPDT end switch	381152	ACT-AF24S
GGD321	240	50/60	" "	25	50	24"		382737	ACT-GGD321.1U-230V
MS4620	240	50/60	Honeywell	25	50	24"		382825	ACT-MS4620-230V
MS4709/4809	240	50	"	12	20	24"		See Page 4	See Page 4
MA-419	240	60	Invensys	25	50	24"		380813	ACT-MA419-230V
MA-419-500	240	60	" "	25	50	24"	Includes SPDT end switch	381593	ACT-MA419-500-240V
MA5-419	240	50	" "	25	50	24"		381205	ACT-MA5-419-220V
MA5-419-500	240	50	" "	25	50	24"	Includes SPDT end switch	381594	ACT-MA5419500-240V
MA6-419-500	240	60	" "	25	50	24"	Explosion proof enclosure with end switch	381595	ACT-MA6419500-240V
MA7-419-500	240	50	" "	25	50	24"	Explosion proof enclosure with end switch	381597	ACT-MA7419500-240V
AF-230**	240	50/60	Belimo	25	50	24"		381598	ACT-AF230
AF-230S**	240	50/60	" "	25	50	24"	Includes SPDT end switch	381599	ACT-AF230S

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

****Should you require NEMA 4X, a ZS-300 housing is needed.
Should you require NEMA 7, a ZS-260 housing is needed.**

Note: Unless otherwise specified, actuators will be mounted internally in the airstream and generally located in the lower left hand corner of a single section damper. In the absence of other instructions, Greenheck will use its best judgement as to actuator location. If you have specific requirements, provide details.

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	Volt.	Freq. (Hz)	Manufacturer	VCD Actuator Limitations			Description	Actuator Part #	External Mount Actuator Kit # (includes actuator)
				Max. Damper Sq/Ft With Seals	Without Seals	VCDR Maximum Diameter			
Two-position NON Spring Return									
MC431	120	60	Invensys	50	100	24"	Requires SPDT 3 wire controller	381149	ACT-MC431-120V
Modulating Spring Return¹									
LF24-SR	24	50/60	Belimo	7	12	24"	0-10 volts DC	381737	ACT-LF24SR
NF24-SR**	24	50/60	" "	12	20	24"	0-10 volts DC	381736	ACT-NF24SR
AF24-SR**	24	50/60	" "	25	50	24"	0-10 volts DC	381150	ACT-AF24-SR
AF24-MFTS**	24	50/60	" "	25	50	24"	0-10 volts DC with end switch	381600	ACT-AF-24-MFT-S
M9185D-1012	24	50/60	Honeywell	25	50	24"	Series 90 (135 ohm slidewire)	380949	ACT-M9185D1012-24V
Modulating NON Spring Return									
LM-24 SR	24	50/60	Belimo	7	12	24"	0-10 volts DC	381728	ACT-LM24SR
NM-24 SR	24	50/60	Belimo	10	20	24"	0-10 volts DC	381138	ACT-NM24-SR
AM-24 SR**	24	50/60	Belimo	25	50	24"	0-10 volts DC	381153	ACT-AM24-SR
Floating PO/PC									
LM-24	24	50/60	Belimo	7	12	24"		381726	ACT-LM24
NM-24	24	50/60	Belimo	10	20	24"		381601	ACT-NM24
AM-24 **	24	50/60	Belimo	25	50	24"		381602	ACT-AM24
Transformers									
AE-201			Invensys	Plate mounted transformer - Primary 120 Vac, Secondary 24 Vac Compatible on any 24 Vac Actuator				381477	Not Applicable (N/A)
AE-249			Invensys	Plate mounted transformer - Primary 480/277/240/208 Vac, Secondary 120 Vac. Compatible on any 120 Vac Actuator.				380842	N/A
198162AA			Honeywell	Transformer (mounted within actuator) to convert Honeywell model M9185D-1012 modulating actuator to 120, 208, or 240 Vac.				381043	N/A
Manual Hand Quadrant									
	1/2" dia. shaft - For use on all VCDs 48" wide and less (or 96" wide if height is 24" or less)							N/A	811518
	1" dia. shaft - For use on all VCDs over 48" wide and over 24" high (for use on all VCDs over 96" wide)							N/A	813938
Pneumatic									
Two-position Spring Return¹									
331-4551			Siemens	10	20	24"	#3 Actuator	454130	ACT-331-4551-P
331-2976			Siemens	25	50	24"	#4 Actuator	454129	ACT-331-2976-P
331-2856			Siemens	42	84	24"	#6 Actuator	451919	ACT-331-2856-P
MK2-7121			Invensys	42	84	24"		454138	ACT-MK2-7121-P
MK4-7121			Invensys	42	84	24"		382845	N/A
Modulating Spring Return¹									
332-4551			Siemens	8	16	24"	#3 Actuator with pilot positioner	457043	ACT-332-4551-P
332-2976			Siemens	20	40	24"	#4 Actuator with pilot positioner	457384	ACT-332-2976-P
332-2856			Siemens	35	70	24"	#6 Actuator with pilot positioner	457407	ACT-332-2856-P
Miscellaneous Parts									
	1/2" Extension pin kit							809735	N/A
	1/2" Crankarm (with bolt and nut)							812097	N/A
	1" 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
	6" long, 1/2" diameter control shaft							452509	N/A
	8.5", 1/2" diameter control shaft							455064	N/A
	Retaining clip used to hold control shaft on axle pin (required with control shaft)							451738	N/A

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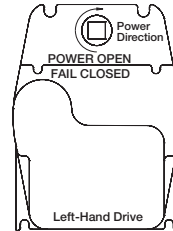
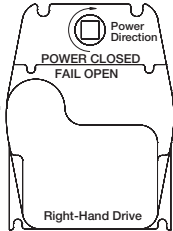




Honeywell, ML Series External Actuator Kits

Voltage	Actuator Model	Actuator Kit	Actuator Part #	Spring Return Action	Driving Torque
115 Vac	ML4302F1008	829876	383261	CCW	50 in.lb.
	MS4309F1005	ACT-MS4309-115V	382732		80 in.lb.
24 Vac	ML8302F1004	829880	383265	CCW	50 in.lb.
	MS8309F1001	ACT-MS8309-24V	382734		80 in.lb.

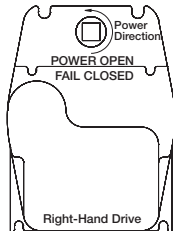
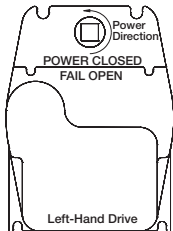
The ML-XXXX & MS series actuators can be mounted as shown here.



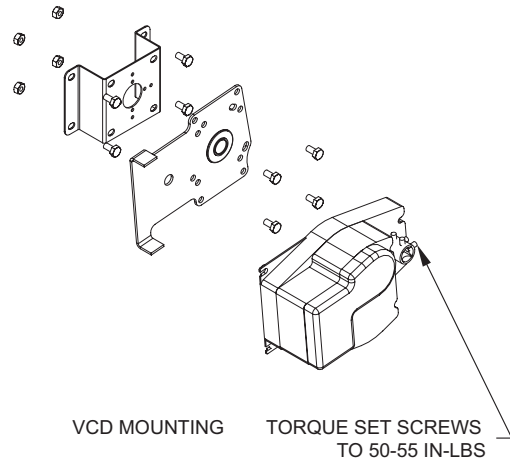
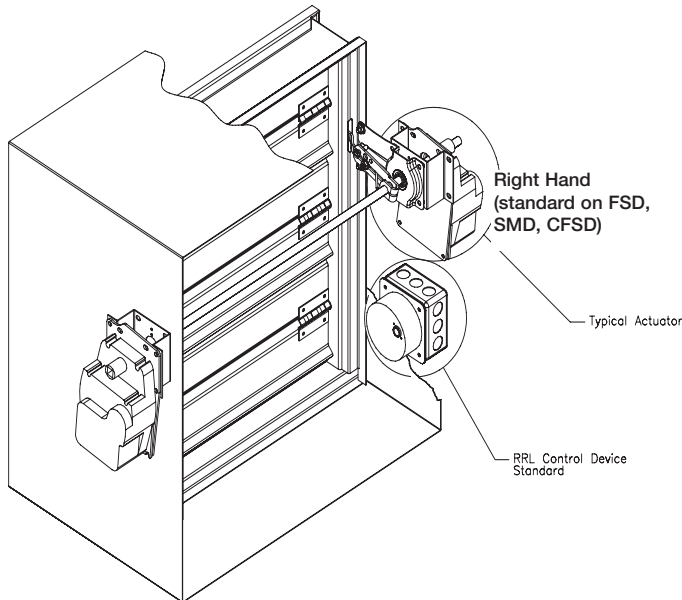
Default in CAPS for VCD

Voltage	Actuator Model	Actuator Kit	Actuator Part #	Spring Return Action	Driving Torque
115 Vac	ML4202F1000	829877	383260	CW	50 in.lb.
	MS4209F1007	ACT-MS4209-115V	382731		80 in.lb.
24 Vac	ML8202F1006	829881	383264	CW	50 in.lb.
	MS8209F1003	ACT-MS8209-24V	382733		80 in.lb.

The ML-XXXX & 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

