

Features and Benefits





EQUAL PERCENTAGE VALVE CHARACTERISTIC

In order to ensure good stability of control, it is essential for a control valve to have an equal percentage characteristic. This type of characteristic produces a linear variation in thermal output according to the amount of opening of the valve (also known as the system characteristic). Under normal testing conditions a conventional ball valve exhibits an S-shaped characteristic. When it is installed in a real system, however, this characteristic is seriously deformed because, compared with its nominal size, a ball valve possesses an extremely high flow coefficient. Whether used with or without pipe reducers or a reduced bore, they do not normally allow stable regulation of the thermal capacity.

Belimo's unique Characterized Control ValveTM (CCV) is very different. A special characterizing disc inside the valve gives it an equal percentage characteristic which is comparable with that of a globe valve of the same nominal size. The flow (the C_V value) is reduced to the required value by a combination of the hole in the ball and the shaped aperture in the disc. The increase in flow as the valve is opened is very slow and controlled.

This produces better part-load behavior and improved stability of control while also optimizing energy consumption.

FEATURES

 Thermal isolating adapter between flange and actuator.

life span of actuator and valve.

BENEFIT OF THE BELIMO CHARACTERIZING DISC

Excellent control stability assured with the characterizing disc.

Better control prevents "hunting" of the control loop, increasing

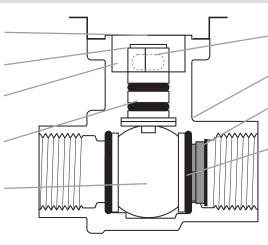
 C_v values equal to C_v values of globe values the same size.

The need for multiple pipe reduction is usually eliminated.

Equal percentage flow characteristic.

- Easy direct coupling of actuator with a single screw.
- Perpendicular mounting flange and square drive head eliminate lateral forces on the stem.
- Blow-out proof stem with thrust-bearing Teflon[®] disc and double O-ring design for long service life.*
- Non-corroding chrome-plated brass or stainless ball.

 * Designed for service life of over 100,000 full cycles. Teflon^ $^{\odot}$ and Tefzel^ $^{\odot}$ are both registered trademarks of Dupont.



- Vent holes reduce condensation build-up.
- Forged brass valve body no pin-hole leaks.
- Characterizing disc made of Tefzel[®] known for excellent strength and chemical resistance.
- Teflon[®] seats with O-rings provide constant seating force against the ball and reduce torque requirement.
- Actuator can be mounted in four different positions.

Feature / Benefits Characterized Control Valves™ (CCV)



COORDINATED MOTORIZED OPERATION

The optimum functionality of the Belimo CCV is assured by properly coordinating its actuation with MFT. Specially developed rotary actuators provide the necessary precision for modulating, floating-point, and on/off methods of control.

All CCVs are supplied with the appropriate rotary actuator to provide the close-off and operation desired.

OPTIMIZED FOR CONTROL

The Belimo CCV marries known technology with an innovative development – the unique characterizing disc.

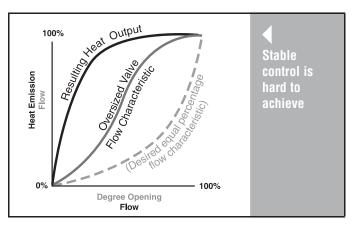
The marriage of CCV and MFT technologies has produced a range of valuable features which surpass the capabilities of globe valves at a very attractive price level:

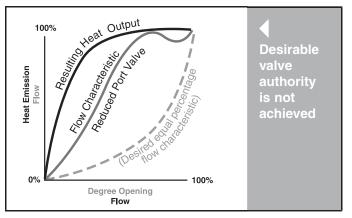
- An equal-percentage valve characteristic
- Unlike a globe valve, no sudden change in inlet flow upon opening
- Excellent stability of control
- C_v values comparable with those of globe valves of the same size or larger
- Higher close-off ratings than standard globe valves
- 100% tight shut-off on two-way valves means NO leak-by unlike globe valves that have ANSI IV shutoff (leakage rate of 0.01% of the C_v rating)
- Three-way valve can be piped in mixing or diverting application

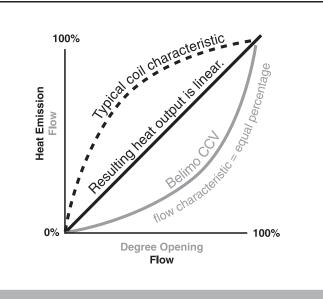
B2 Series	Two-way ½" to 3"
B3 Series	Three-way Mixing/Diverting ½" to 2"
B6 Series	Two-way Flanged 2½" to 6"

Service:	Chilled/hot water, 60% glycol
C _v Range	0.3-240
Material:	Stainless trim or Brass trim
Control:	On/Off, Floating, 2-10 VDC
	Multi-Function Technology®
	Spring Return or Non-Spring Return

Flow Characteristics of Conventional Ball Valves versus BELIMO CHARACTERIZED CONTROL VALVES







Desirable Equal Percent Flow and resulting heat output is achieved with linear results



2-Way Valve Flow Rate for Water Applications (Gallons Per Minute, GPM)

Cv		DN	2-Way	Pressure Drop Across the Valve									
Maximum Rating	Inches	mm	CCV	1 psi	2 psi	3 psi	4 psi	5 psi	6 psi	7 psi	8 psi	9 psi	10 psi
0.3	1⁄2"	15	B207(B)	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9
0.46	1⁄2"	15	B208(B)	0.5	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5
0.8	1⁄2"	15	B209(B)	0.8	1.1	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.5
1.2	1⁄2"	15	B210(B)	1.2	1.7	2.1	2.4	2.8	2.9	3.2	3.4	3.6	3.8
1.9	1⁄2"	15	B211(B)	1.9	2.7	3.3	3.8	4.2	4.7	5.0	5.4	5.7	6.0
3	1⁄2"	15	B212(B)	3.0	4.2	5.2	6.0	6.8	7.3	7.9	8.5	9.0	9.5
4.7	1⁄2"	15	B213(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
7.4	1⁄2"	15	B214(B)	7.4	10	13	15	17	18	20	21	22	23
10	1⁄2"	15	B215(B)*	10	14	17	20	22	24	26	28	30	32
14	1⁄2"	15	B216(B)*	14	20	24	28	31	34	37	40	42	44
4.7	3⁄4"	20	B217(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
7.4	3⁄4"	20	B218(B)	7.4	10	13	15	17	18	20	21	22	23
10	3⁄4"	20	B219(B)	10	14	17	20	22	24	26	28	30	32
14	3⁄4"	20	B220(B)*	14	20	24	28	31	34	37	40	42	44
24	3⁄4"	20	B221(B)*	24	34	42	48	54	59	63	68	72	76
7.4	1"	25	B222	7.4	10	13	15	17	18	20	21	22	23
10	1"	25	B223	10	14	17	20	22	24	26	28	30	32
19	1"	25	B224	19	27	33	38	42	47	50	54	57	60
30	1"	25	B225*	30	42	52	60	67	73	79	85	90	95
10	1¼"	32	B229	10	14	17	20	22	24	26	28	30	32
19	1¼"	32	B230*	19	27	33	38	42	47	50	54	57	60
25	1¼"	32	B231	25	35	43	50	56	61	66	71	75	79
37	11⁄4"	32	B232*	37	52	64	74	83	91	98	105	111	117
19	1½""	40	B238	19	27	33	38	42	47	50	54	57	60
29	1½"	40	B239	29	41	50	58	65	71	77	82	87	92
37	1½"	40	B240*	37	52	64	74	83	91	98	105	111	117
29	2"	50	B248	29	41	50	58	65	71	77	82	87	92
46	2"	50	B249	46	65	80	92	103	113	122	130	138	145
57	2"	50	B250*	57	81	99	114	127	140	151	161	171	180
65	2"	50	B251	65	92	113	130	145	159	170	194	195	206
85	2"	50	B252	85	120	147	170	190	208	225	240	255	269
120	2"	50	B253	120	170	208	240	268	294	318	339	360	380
240	2"	50	B254*	240	339	416	480	537	588	635	679	720	759
60	21⁄2"	65	B261	60	85	104	120	134	147	159	170	180	190
75	21⁄2"	65	B262	75	106	130	150	168	194	198	212	225	237
110	21⁄2"	65	B263	110	156	191	220	246	269	291	311	330	348
150	21⁄2"	65	B264	150	212	260	300	335	367	397	424	450	474
210	21⁄2"	65	B265*	210	297	364	420	470	514	556	594	630	664
70	3"	80	B277	70	99	121	140	157	172	185	198	210	221
130	3"	80	B278	130	194	225	260	290	318	344	368	390	411
170	3"	80	B280*	170	240	294	340	380	416	450	481	510	538
70	21⁄2"	65	B6250S-070	70	99	121	140	157	171	185	198	210	221
110	21/2"	65	B6250S-110	110	156	191	220	244	266	282	296	312	320
110	3"	80	B6300S-110	110	156	191	220	244	266	282	296	312	320
186	4"	100	B6400S-186	186	263	322	372	416	456	492	526	558	588
290	5"	125	B6500S-290	290	410	502	580	648	710	767	820	870	917
400	6"	150	B6600S-400	400	566	693	800	894	980	1058	1131	1200	1265

 $\begin{array}{l} GPM = C_v \; x \; \sqrt{\Delta p} \\ ^*Models \; with \; no \; characterizing \; disc. \end{array}$

The influence of the pipe geometry due to reduced flow is negligible for all valves 57 C_v and below with characterizing discs.

Sizing/Selection Characterized Control Valves™ (CCV)



3-Way Valve Flow Rate for Water Applications (Gallons Per Minute, GPM)

Cv		DN	3-Way	Pressure Drop Across the Valve									
Maximum Rating	Inches	mm	CCV	1 psi	2 psi	3 psi	4 psi	5 psi	6 psi	7 psi	8 psi	9 psi	10 psi
0.3	1⁄2"	15	B307(B)	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9
0.46	1⁄2"	15	B308(B)	0.5	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5
0.8	1⁄2"	15	B309(B)	0.8	1.1	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.5
1.2	1⁄2"	15	B310(B)	1.2	1.7	2.1	2.4	2.8	2.9	3.2	3.4	3.6	3.8
1.9	1⁄2"	15	B311(B)	1.9	2.7	3.3	3.8	4.2	4.7	5.0	5.4	5.7	6.0
3	1⁄2"	15	B312(B)	3.0	4.2	5.2	6.0	6.8	7.3	7.9	8.5	9.0	9.5
4.7	1⁄2"	15	B313(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
10	1⁄2"	15	B315(B)*	10	14	17	20	22	24	26	28	30	32
14	1⁄2"	15	B316(B)*	14	20	24	28	31	34	37	40	42	44
4.7	3⁄4"	20	B317(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
7.4	3⁄4"	20	B318(B)	7.4	10	13	15	17	18	20	21	22	23
14	3⁄4"	20	B320(B)*	14	20	24	28	31	34	37	40	42	44
24	3⁄4"	20	B321(B)*	24	34	42	48	54	59	63	68	72	76
7.4	1"	25	B222	7.4	10	13	15	17	18	20	21	22	23
10	1"	25	B223	10	14	17	20	22	24	26	28	30	32
30	1"	25	B325*	30	42	52	60	67	73	79	85	90	95
10	11⁄4"	32	B329	10	14	17	20	22	25	27	28	30	32
19	1¼"	32	B330	19	27	33	38	43	47	50	54	57	60
25	1¼"	32	B331	25	35	43	50	56	61	66	71	75	79
19	1½"	40	B338	19	27	33	38	43	47	50	54	57	60
29	1½"	40	B339	29	41	50	58	65	71	77	82	87	92
37	1½"	40	B340	37	52	64	74	83	91	98	105	111	117
46	1½"	40	B341	46	65	80	92	103	113	122	130	138	146
29	2"	50	B347	29	41	50	58	65	71	77	82	87	92
37	2"	50	B348	37	52	64	74	83	91	98	105	111	117
46	2"	50	B349	46	65	80	92	103	113	122	130	138	146
57	2"	50	B350	57	81	99	114	128	140	151	161	171	180
68	2"	50	B351	68	96	118	136	152	167	180	192	204	215
83	2"	50	B352	83	117	144	166	186	204	220	235	249	263

* = Models with no characterizing disc.

 $\label{eq:GPM} \begin{array}{l} \mathsf{GPM} = \mathsf{C}_v \ x \ \sqrt{\Delta p} & \ ^* = \mathsf{Models} \ \mathsf{with} \ \mathsf{no} \ \mathsf{characterizing} \ \mathsf{disc.} \\ \mathsf{The} \ \mathsf{influence} \ \mathsf{of} \ \mathsf{the} \ \mathsf{pipe} \ \mathsf{geometry} \ \mathsf{due} \ \mathsf{to} \ \mathsf{reduced} \ \mathsf{flow} \ \mathsf{is} \ \mathsf{negligible} \ \mathsf{for} \ \mathsf{all} \ \mathsf{valves} \ \mathsf{83} \ \mathsf{C}_v \ \mathsf{and} \ \mathsf{below} \ \mathsf{with} \ \mathsf{characterizing} \ \mathsf{discs.} \end{array}$



SET-UP

		2-WAY		3-WAY VALVE			
		SPECIFY UPO	IN ORDERING	SPECIFY UPO	IN ORDERING		
	TR24-3-T US TR24-3 US On/Off or Floating Point Actuators	Power to pin 2 will drive valve CCW. Power to pin 3 will drive valve CW.		Power to pin 2 will drive valve CCW. Power to pin 3 will drive valve CW.			
NON-SPRING RETURN Stays in Last Position	TR24-SR-T US TR24-SR US Proportional Type Actuators	NC: Closed A to AB, will open as voltage increases.	NO: Open A to AB, will close as voltage increases. (Can be chosen with switch inside terminal block of actuator.)	NC: Closed A to AB, will open as voltage increases.	NO: Open A to AB, will close as voltage increases. (Can be chosen with switch inside terminal block of actuator.)		
NON-S Stays	LRB24 (-3), MFT, SR LRX24 (-3), MFT, SR ARB24 (-3), MFT, SR ARX24 (-3), MFT, SR Floating Point or Proportional Type Actuators	Power to pin 2 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "1" position, to reverse select the "0" position.	NO: Open A to AB, will close as voltage increases or power applied. (Can be chosen with CW/CCW switch.)	Power to pin 2 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "1" position, to reverse select the "0" position.	NO: Open A to AB, will close as voltage increases or power applied. (Can be chosen with CW/CCW switch.)		
	TFRB24 LF24 US AFRB24	NO/FO Valve: Open A to AB will drive closed. Spring Action: Will spring open A to AB upon power loss.	NC/FC Valve: Closed A to AB will drive open. Spring Action: Will spring closed A to AB upon power loss.	NO/FO Valve: Open A to AB will drive closed. Spring Action: Will spring open A to AB upon power loss.	NC/FC Valve: Closed A to AB will drive open. Spring Action: Will spring closed A to AB upon power loss.		
SPRING RETURN Note Fail Position	TF (-3), MFT, SR LF (-3), MFT, SR AF SR AFR, MFT Floating Point or Proportional Type Actuators	NC/FO Valve: Closed A to AB will drive open. Spring Action: Will spring open A to AB upon power loss.	NC/FC or NO/FC Valve: Closed A to AB or Open A to AB. (Can be chosen with CW/CCW switch.) Spring Action: Will spring closed A to AB upon power loss.	NC/FO Valve: Closed A to AB will drive open Spring Action: Will spring open A to AB upon power loss.	NC/FC or NO/FC Valve: Closed A to AB or Open A to AB. (Can be chosen with CW/CCW switch.) Spring Action: Will spring closed A to AB upon power loss.		
			NO/FO Valve: Open A to AB Spring Action: Will spring open A to AB upon power loss. (NO action can be chosen with CW/CCW switch.)		NO/FO Valve: Open A to AB Spring Action: Will spring open A to AB upon power loss. (NO action can be chosen with CW/CCW switch.)		

GENERAL WIRING INSTRUCTIONS

WARNING The wiring technician must be trained and experienced with electronic circuits. Disconnect power supply before attempting any wiring connections or changes. Make all connections in accordance with wiring diagrams and follow all applicable local and national codes. Provide disconnect and overload protection as required. Use copper, twisted pair, conductors only. If using electrical conduit, the attachment to the actuator must be made with flexible conduit.

Always read the controller manufacturer's installation literature carefully before making any connections. Follow all instructions in this literature. If you have any questions, contact the controller manufacturer and/or Belimo.

Transformer(s)

Belimo actuators require a 24 VAC class 2 transformer and draws a maximum of 10 VA per actuator. The actuator enclosure cannot be opened

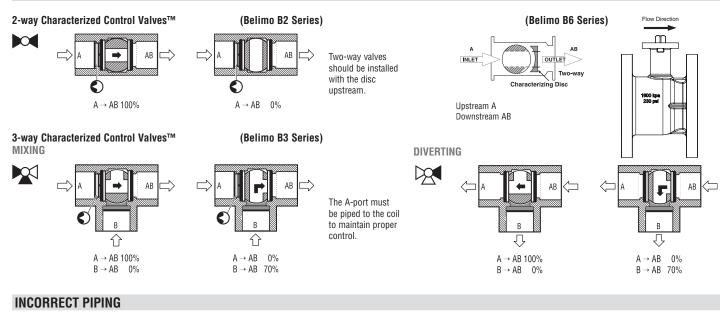
- in the field, there are no parts or components to be replaced or repaired. - EMC directive: 89/336/EEC

 - Software class A: Mode of operation type 1
 - Low voltage directive: 73/23/EEC

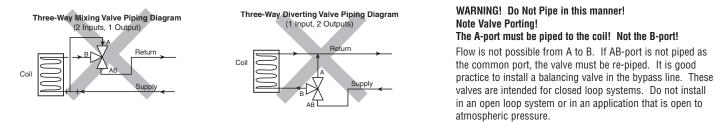
CAUTION It is good practice to power electronic or digital controllers from a separate power transformer than that used for actuators or other end devices. The power supply design in our actuators and other end devices use half wave rectification. Some controllers use full wave rectification. When these two different types of power supplies are connected to the same power transformer and the DC commons are connected together, a short circuit is created across one of the diodes in the full wave power supply, damaging the controller. Only use a single power transformer to power the controller and actuator if you know the controller power supply uses half wave rectification.



FLOW PATTERNS



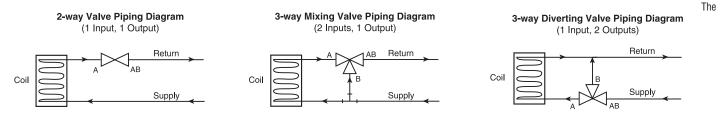
The A-port must be piped to the coil to maintain proper control.



OPERATION/INSTALLATION – CORRECT PIPING

2-way valves should be installed with the disc upstream. If installed with disc downstream, flow curve will be deeper. If installed "backwards" it is NOT necessary to remove and change. No damage or control problems will occur.

3-WAY VALVES MUST BE PIPED CORRECTLY. They can be mixing or diverting. Mixing is the preferred piping arrangement.



BELIMO Characterized Control Valve is a CONTROL valve, not a manual valve adapted for actuation. The control port is the A-port. It is similar to the globe valve in that the middle port is the B or bypass port. The common port AB is on the main opposite the A-port. These diagrams are for typical applications only. Consult engineering specification and drawings for particular circumstances.

REDUCED B-PORT FLOW

Note: The B-port flow of the 3-way CCV is lower than that of the A-port. In most applications this is beneficial since the reduced flow compensates for the inexistent pressure drop across the coil in the bypass mode. Therefore, proper sizing is important to avoid flow noise in particular when the system is designed with constant speed pumps. Please refer to our valve sizing and selection guidelines.

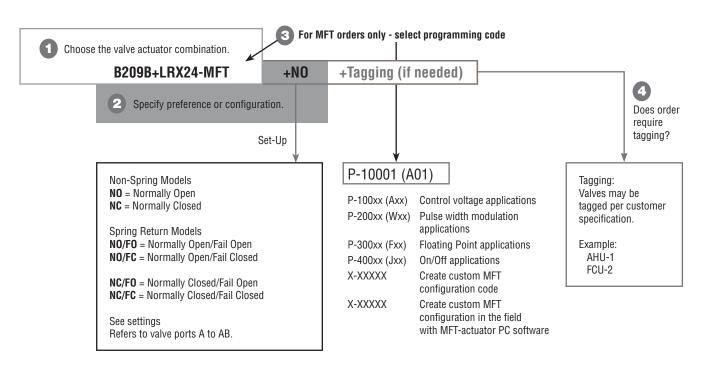
The flow velocity in the pipe upstream and downstream of the valve should be considered as well. The typical HVAC design maximum flow is 4 to 8 ft/s to avoid noise issues.

Also, the pipe reduction factor must be considered and can be found on pages 3 and 4. Pipe reducers decrease the C_V value of a valve and consequently increase the pressure drop across the valve, a situation that could lead to noise or a lower than designed flow.



B2	09	В	LRX	24	-MFT	
Valve B2 = 2-way B3 = 3-way B6 = 2-way Flanged	Valve Size 07-80 = ½"-3"	Trim Material B = Brass Blank = Stainless Steel Trim	Actuator Type Non-Spring Return TR LRB LRX ARB ARX LRQ NRQ Spring Return TFR LF AFR Electronic Fail-Safe GK	Power Supply 24 = 24 VAC/DC 120 = 120 VAC* 230 = 230 VAC	Control Blank = On/Off, Floating -3 = Floating Point -SR = 2-10 VDC -MFT = Multi-Function Technology -MFT95 = 0-135 Ω	-T = Terminal Strip -S = Built-in Auxiliary Switch N4 = NEMA 4X, UL Type 4X, IP 66/67 Enclosure
ORDERING EX	AMPI F					





5 Complete Ordering Example: B209B+LRX24-MFT+NO+A01

*TF, LR and AR Series has 100 to 240 VAC nominal power supply.





B2 Series, 2-Way, Characterized Control Valve Chrome Plated Brass Ball and Brass Stem



Application

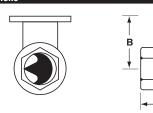
This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable flow.

Technical Data	
Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage
Controllable Flow Range	75°
Sizes	1/2", 3/4"
Type of end fitting	NPT female ends
Materials:	
Body	forged brass, nickel plated
Ball	chrome plated brass
Stem	nickel plated brass
Seats	PTFE
Characterizing disc	Tefzel®
Packing	2 EPDM O-rings, lubricated
Body pressure rating	600 psi
Media temp. range	0°F to 250°F [-18°C to 120°C]
Close off pressure	200 psi
Maximum differential	50 psi for typical applications
pressure (ΔP)	
Leakage	0% for A to AB
External leakage	according to EN 12266-1:2003
C _v rating	A-port: see product chart for values
Tefzel [®] is a registered trademark of DuPo	nt

	Valve Nor	ninal Size	Туре	5	Suitable Actuators			
Cv	Inches	DN [mm]	2-way NPT	Non-S	pring	Spr	ing	
0.3	1/2	15	B207B					
0.46	1/2	15	B208B					
0.8	1/2	15	B209B					
1.2	1/2	15	B210B					
1.9	1/2	15	B211B					
3	1/2	15	B212B					
4.7	1/2	15	B213B			ies	ies	
7.4	1/2	15	B214B			TF Series	LF Series	
10	1/2	15	B215B		Ľ	Ë	Ë	
14	1/2	15	B216B					
4.7	3⁄4	20	B217B					
7.4	3⁄4	20	B218B					
10	3⁄4	20	B219B					
14	3⁄4	20	B220B					
24	3⁄4	20	B221B*					
*Models with	out characterizir	na disc						

els without characterizing disc

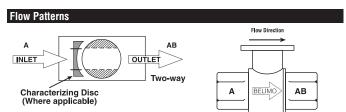
Dimensions



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Dimonoior	o (Inchoo [mm]

2WayValve-B207-B220

	Valve Nor	ninal Size	Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B207B-B211B	1⁄2"	15	2.38" [60.8]	1.39" [35.2]
B212B-B216B	1⁄2"	15	2.38" [60.8]	1.78" [45.2]
B217B-B221B	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
DETTO DEETD	/4	20	2.70 [00.0]	[ד.זד] וווי



B3 Series, 3-Way, Characterized Control Valve Chrome Plated Brass Ball and Brass Stem







Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

Technical Data					
Service	chilled or hot water, 60% glycol				
Flow characteristic	A-port equal percentage				
	B-port modified for constant common port				
	flow				
Controllable Flow Range	75°				
Sizes	1/2", 3/4"				
Type of end fitting	NPT female ends				
Materials:					
Body	forged brass, nickel plated				
Ball	chrome plated brass				
Stem	nickel plated brass				
Seats	PTFE				
Characterizing disc	Tefzel®				
Packing	2 EPDM O-rings, lubricated				
Body pressure rating	600 psi				
Media temp. range	0°F to 250°F [-18°C to 120°C]				
Close off pressure	200 psi				
Maximum differential	50 psi for typical applications				
pressure (ΔP)					
Leakage	0% for A to AB				
-	<2.0% for B to AB				
External leakage	according to EN 12266-1:2003				
C _v rating	A-port: see product chart for values				
	B-port: 70% of A to AB C _v				

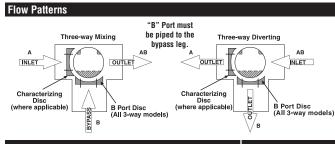
	Valve Nominal Size		Туре	5	Suitable	Actuators	
Cv	Inches	DN [mm]	3-way NPT	Non-S	Spring	Spr	ring
0.3	1⁄2	15	B307B				
0.46	1/2	15	B308B				
0.8	1/2	15	B309B				
1.2	1⁄2	15	B310B				
1.9	1/2	15	B311B				
3	1/2	15	B312B			ies	LF Series
4.7	1/2	15	B313B			TF Series	Ser
10	1/2	15	B315B		12	Ľ	5
14	1/2	15	B316B				
4.7	3⁄4	20	B317B				
7.4	3⁄4	20	B318B				
14	3⁄4	20	B320B				
24	3⁄4	20	B321B				
*Models with	ut characterizir	na disc					

*Models without characterizing disc

 $\mathsf{Tefzel}^{\circledast}$ is a registered trademark of DuPont

Dimensions

Valve Body	Inches	DN [mm]	Α	В	C
B307B-B311B	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312B-B316B	1⁄2"			1.78" [45.2]	
B317B-B321B	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]



800-543-9038 USA







2WayValve-B207-B220

Technical Data Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage
Controllable Flow Range	75°
Sizes	1/2", 3/4", 1", 11/4", 11/2", 2", 21/2", 3"
Type of end fitting	NPT female ends
Materials:	
Body	forged brass, nickel plated
Ball	stainless steel
Stem	stainless steel
Seats	PTFE
Characterizing disc	Tefzel®
Packing	2 EPDM O-rings, lubricated
Body pressure rating	
600 psi	1⁄2" - 11⁄4" (B230)
400 psi	1¼" (B231) - 3"
Media temp. range	0°F to 250°F [-18°C to 120°C]
Close off pressure	
200 psi	½" - 2" (B250)
100 psi	2" (B251) - 3"
Maximum differential	50 psi for typical applications
pressure (ΔP)	
Leakage	0% for A to AB
External leakage	according to EN 12266-1:2003
C _v rating	A-port: see product chart for values

Dimensions



	\sim	
$\left - \right $		
-	— A —	

	Valve Nor	ninal Size	Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	
B212-B216	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]	
B229-B230	11⁄4"	32	3.72" [94.6]	1.87" [47.4]	
B231-B232	1¼"	32	3.72" [94.6]	2.04" [51.9]	
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]	
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]	
B251-B254	2"	50	4.93" [125.2]	2.73" [69.5]	
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]	
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]	

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B2 Series, 2-Way, Characterized Control Valve Stainless Steel Ball and Stem

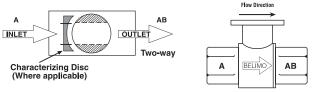
Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable flow.

Cv Inches DN (mm] 2-Way NPT Non-Spring Spring 0.3 ½ 15 B207 B207 B207 B208 B207 B208 B211 B211 B211 B211 B211 B211 B214 B215 B214 B215 B216 B218 B217 FM B218 B220 B221 FM B220 B221 FM B220 B221 FM FM B220 B220 B214 B200 B221 FM B220 B220 B214 B200 B221 FM B200 B211 FM B200 B214 B200 B221 FM FM B200 B214 B200 B200 B214 B200 B200 B214 B200 B200 B214 B200 B200 B200 B200 B200 B200 B200 B200			ninal Size	Туре				Actuat	tors	
0.466 ½ 15 B208 B209 B209 B209 B211 B209 B211 B211 B211 B211 B211 B211 B211 B212 B211 B212 B211 B212 B213 B212 B213 B214 B215 B216 B217 FM B218 B210 B217 FM B218 B210 B217 FM B218 B220 B221* FM		Inches	DN [mm]	2-Way NPT	No	n-Spr	ing		Spring)
0.8 ½ 15 B209 1.2 ½ 15 B211 3 ½ 15 B212 4.7 ½ 15 B213 7.4 ½ 15 B216 10 ½ 15 B216 4.7 ¼ 20 B217 7.4 ¼ 20 B218 10 ¾ 20 B220 24 ¾ 20 B221* 7.4 ½ 25 B223 19 1 25 B223 19 1 25 B223* 19 1 25 B231 37 1¼ 32 B231 37 1¼ 32 B232* 19 1 40 B239 37 1¼ 32 B231 37 1¼ 40 B239 37 1½ 40 B239 37 1½ 40 B231 85 2 50 B251 <	0.3			B207						
1.2 ½ 15 B210 B211 B212 B212 B213 B212 B214 B215 B215 B215 B215 B215 B216 B217 FS B218 B217 FS B222 B217 FS B223 B217 FS B223 FS B213 B214 B200 B221* FS B218 FS B213 FS B214 B200 B221* FS B214 B200 B221* FS B223 FS B213 FS B223 FS FS B233 FS FS B233 FS FS <t< td=""><td>0.46</td><td>1/2</td><td>15</td><td>B208</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	0.46	1/2	15	B208						
1.9 ½ 15 B211 B212 B213 B213 B213 B213 B213 B213 B213 B214 B215 B215 B215 B215 B215 B215 B215 B215 B216 B217 B218 B219 B219 B219 B220 B221 B221 B223 B221 B223 B221 B223 B223 B223 B223 B223 B223 B223 B223 B231 B233 B				B209						
3 ½ 15 B212 B213 B213 B213 B213 B213 B213 B213 B213 B214 B215 B216 B217 B218 B219 B219 B220 B221* FNT: CN B213 B221 FNT: CN B213 B221 FNT: CN B213 B219 B220 B221* FNT: CN B215 B222 B221* FNT: CN B215 B223 B221 B223 B223 B223 B223 B223 B223 B223 B223 B223 B231 B232 B231 B250<				B210						
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70 3 80 B277 130 3 80 B278										
130 3 80 B278										
170 3 80 B280*		3								

*Models without characterizing disc

Flow Patterns



B3 Series, Three Way, Characterized Control Valve Stainless Steel Ball and Stem



Cuitable Astustars





Application

Value Naminal Cine

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

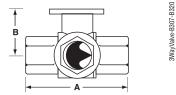
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Technical Data	
Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage
	B-port modified for constant common port
	flow
Controllable Flow Range	75°
Sizes	1/2", 3/4", 1", 11/4", 11/2", 2"
Type of end fitting	NPT female ends
Materials:	
Body	forged brass, nickel plated
Ball	stainless steel
Stem	stainless steel
Seats	PTFE
Characterizing disc	Tefzel®
Packing	2 EPDM O-rings, lubricated
Body pressure rating	
600 psi	1⁄2" - 1"
400 psi	1¼" - 2"
Media temp. range	0°F to 250°F [-18°C to 120°C]
Close off pressure	
200 psi	1⁄2" - 2"
Maximum differential	50 psi for typical applications
pressure (ΔP)	
Leakage	0% for A to AB
-	<2.0% for B to AB
External leakage	according to EN 12266-1:2003
C _v rating	A-port: see product chart for values
-	B-port: 70% of A to AB C _v
Tefzel [®] is a registered trademar	k of DuPont

Tefzel® is a registered trademark of DuPont

Dimensions

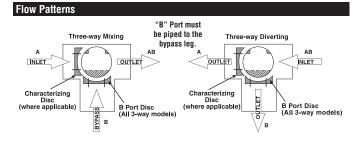




	Valve Nominal Size			Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C		
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]		
B312-B316	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]		
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]		
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]		
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]		
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]		
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]		

		ninal Size	Туре		Sui	table	Actua	tors	
Cv	Inches	DN [mm]	3-Way NPT	No	n-Spr	ing		Sprinç]
0.3	1⁄2	15	B307						
0.46	1⁄2	15	B308						
0.8	1⁄2	15	B309						
1.2	1/2	15	B310						
1.9	1/2	15	B311				s		
3	1/2	15	B312				erie		
4.7	1/2	15	B313			NRN4 Series	TF Series	ŝ	
10	1/2	15	B315		LR Series	s t	F	LF Series	
14	1/2	15	B316		E S	Ż		Т S	
4.7	3⁄4	20	B317			<u> </u>			
7.4	3⁄4	20	B318						
14	3⁄4	20	B320						
24	3⁄4	20	B321						
7.4	1	25	B322						
10	1	25	B323						
30	1	25	B325*						
10	11⁄4	32	B329						
19	11⁄4	32	B330						
25	11⁄4	32	B331						
19	1½	40	B338						
29	1½	40	B339			ies			
37	1½	40	B340		AR Series	ARN4 Series			AF Series
46	1½	40	B341		Se	N			Sei
29	2	50	B347		AR				AF
37	2	50	B348			AR			
46	2	50	B349						
57	2	50	B350						
68	2	50	B351						
83	2	50	B352						

*Models without characterizing disc





B6 Series, Two Way, Characterized Control Valve Stainless Steel Ball and Stem





Application

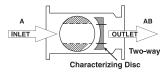
This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

Technical Data	
Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage
Controllable Flow Range	75°
Sizes	21⁄2", 3", 4", 5", 6"
Type of end fitting	pattern to mate with ANSI 125 flange
Materials:	
Body	cast iron - GG25
Ball	stainless steel
Stem	stainless steel
Seats	PTFE
Characterizing disc	stainless steel
Packing	2 EPDM O rings, lubricated
Body pressure rating	according to ANSI 125, standard class B
Media temp. range	0°F to 248°F [-18°C to +120°C]
Close off pressure	100 psi
Maximum differential	50 psi
pressure (ΔP)	
Leakage	0% for A to AB
C_{v} rating	A-port: see product chart for values

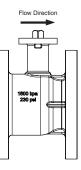
		lominal ze	Туре	Suitable Actua		itors
Cv	Inches	DN [mm]	2-way Flange	Non-Spring	Spring	Electronic Fail-Safe
70	21⁄2"	65	B6250S-070	ş	%	
110	21⁄2"	65	B6250S-110	AR Series	AR Series AFR Series	
110	3"	80	B6300S-110	Ō	~ ŵ	
186	4"	100	B6400S-186			
290	5"	125	B6500S-290	GR Series		GKR Series
400	6"	150	B6600S-400	Se		Se

Flow Pattern

2-way B6250 to B6600 Characterized Control Valves™

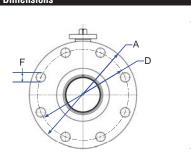


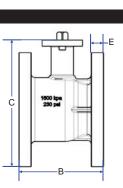
Upstream A Downstream AB



Bolt Circle Diameter	Flange Thickness Minimum	Bolt Hole Diameter	Number of Bolt Holes
D	E	F	
5.50" [139.7]	0.75" [19.05]	0.75" [19.05]	4
6.00" [152.4]	0.75" [19.05]	0.75" [19.05]	4
7.50" [190.5]	0.94" [23.88]	0.75" [19.05]	8
8.50" [215.9]	0.94" [23.88]	0.88" [22.35]	8
9.50" [241.3]	1.00" [25.40]	0.88" [22.35]	8

Dimensions





Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6250S	2½" [65]		7.50" [190.5]	5.50" [139.7]	8.10" [205.4]
B6300S	3" [80]		8.00" [203.2]	6.60" [167.6]	8.40" [213.1]
B6400S	4" [100]	F05	9.00" [228.6]	8.30" [210.8]	9.30" [235.9]
B6500S	5" [125]		10.00" [254.0]	10.30" [261.6]	10.50" [266.4]
B6600S	6" [150]		11.00" [279.4]	12.50" [317.5]	11.70" [296.9]

NOTES:

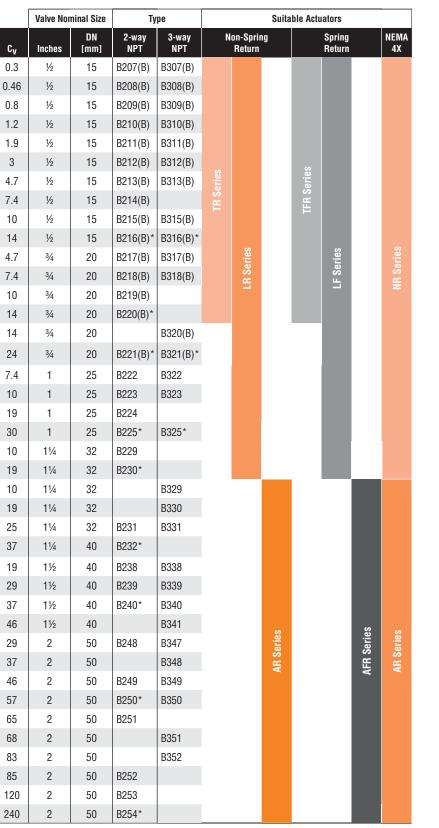
1) Flange bolt pattern matches ANSI class 125 flanges (not ANSI/ASME rated)

2) Maximum allowable working pressure: 100 PSIG

3) It is not recommended to connect raised-face flanges to flat-faced flanges

13

Characterized Control Valve Product Range Overview B2.., B3.., 2-way, 3-way, Stainless Steel Ball and Stem





BELI

Mode of Operation

The Characterized Control Valve is operated by a rotary actuator. The actuators are controlled by a standard voltage for on/off control or a proportional signal or 3-point control system which move the ball of the valve to the position dictated by the control system.

Product Features

The equal-percentage characteristic of the flow is ensured by the integral characterizing disc. This characteristic provides linear heating or cooling output from the coil improving energy efficiency and comfort.

	on/off, floating point, 2-10 VDC, multi-function technology (MFT)		
Manual override	TR, LR, AR, NR, AFR series		
Electrical connection	3 ft [1m] cable with ½" conduit fitting or covered screw terminal strip		
Valve Specifications			
Service	chilled or hot water, 60% glycol		
Flow characteristic	A-port equal percentage B-port modified for constant common port flow		
Controllable flow range	75°		
Sizes	1⁄2" - 2"		
Type of end fitting	NPT female ends		
Materials Body Ball Stem Seats Characterizing disc	forged brass, nickel plated stainless steel or chrome stainless steel or chrome Teflon® PTFE		
½"-1 ½" (2-way) ½"-1" (3-way) 2" (2-way) 1¼"- 2" (3-way) Packing	Tefzel [®] Tefzel [®] stainless steel stainless steel 2 EPDM 0-rings, lubricated		
Media temp range	0°F to 250°F [-18°C to 120°C]		
Body pressure rating ½" - 11⁄4" (B230) 11⁄4"(B231) - 2"(B251)	600 psi 400 psi		
Close-off pressure	200 psi		
Maximum differential pressure (ΔP)	50 psi		
Leakage	0% for A to AB < 2.0% for B to AB		
C _V rating/GPM	A port: see product chart above for values B port: 70% of A to AB Cy		

Tefzel® and Teflon® are registered trademarks of DuPont

* Models without characterizing discs.

(B) Models with chrome plated brass ball and brass stem



Characterized Control Valve Product Range Overview B6.., 2-way, Stainless Steel Ball and Stem

	Valve Nor	ninal Size	Туре	Suita	ble Actuat	ors
Cv	Inches	DN [mm]	2-way NPT	-Spring eturn	Spring Return	Electronic Fail-Safe
70	21⁄2	65	B6250S-070			
110	21⁄2	65	B6250S-110		AFR	
110	3	80	B6300S-110			
186	4	100	B6400S-186			
290	5	125	B6500S-290	GR		GKR
400	6	150	B6600S-400			





Applications

Water-side control of heating and cooling systems for AHU supply, cooling towers and chillers.

Mode of Operation

The Characterized Control Valve is operated by a rotary actuator. The actuators are controlled by a standard voltage for on/off control or a proportional signal or 3-point control system which move the ball of the valve to the position dictated by the control system.

Product Features

The equal-percentage characteristic of the flow is ensured by the integral characterizing disc. This characteristic provides linear heating or cooling output from the coil improving energy efficiency and comfort.

Actuator Specification			
Control type	On/Off, Floating Point, 2-10 VDC, Multi-Function Technology (MFT)		
Manual override	AR, GR, AFR and GKR series		
Electrical connection	3 ft [1m] cable with ½" conduit fitting or covered screw terminal strip		
Valve Specifications			
Service	chilled or hot water, 60% glycol		
Flow characteristic	A-port equal percentage		
Action	max 90° rotation		
Sizes	21⁄2", 3", 4", 5:, 6"		
Type of end fitting	ANSI 125 flange pattern		
Materials			
Body	cast iron (painted)		
Ball	stainless steel		
Stem	stainless steel		
Seats	PTFE		
Characterizing disc	stainless steel		
Packing	2 EPDM O-rings, lubricated		
Body pressure rating	According to ANSI 125, standard class B		
Media temp range	0°F to 250°F [-18°C to +120°C]		
Close-off pressure	100 psi		
Maximum differential			
pressure (ΔP)	50 psi		
Leakage	0% for A to AB		

TR24-3 Actuators, On-Off, Floating Point







Models

TR24-3-T US

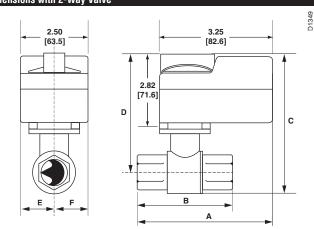
TR24-3 US TR24-3/300 US TR24-3/500 US

TR24-3-T US with 3 ft plenum rated cable TR24-3-T US with 10 ft plenum rated cable TR24-3-T US with 16 ft plenum rated cable

Technical Data	on/off, floating point
	24 VAC 50/60 Hz
Nominal voltage	19.228.8 VAC
Nominal voltage range	
Power consumption	1 W
Transformer sizing	1VA (class 2 power source)
Electrical connection	screw terminals accessible after removal of
	small cover (3 ft, 10 ft, 16 ft cables optional)
Input impedance	0.36 kΩ
Angle of rotation	90°
Position indication	integrated into handle
Manual override	push down handle
Running time	90 seconds @ 60 hz, 108 seconds @ 50 hz
Humidity	5 to 95% non-condensing
Ambient temperature	-22°F to 122°F (-30°C to 50°C)
Storage temperature	-40°F to 176°F (-40°C to 80°C)
Housing	NEMA 1/IP40
Housing rating	UL94-5V(B)
Agency listing [†]	cULus according to UL 60730-1A/-2-14, CAN/
	CSA E60730-1:02, CE according to 2004/108/
	EC and 2006/95/EC for line voltage and/or -S
	versions
Noise level	max. 35 db (A)
Quality standard	ISO 9001
+ Rated impulse voltage 330V	Control pollution degree 2 Type of action 1

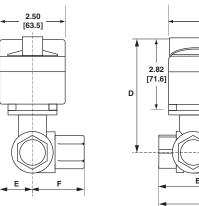
† Rated impulse voltage 330V, Control pollution degree 2, Type of action 1

Dimensions with 2-Way Valve



	Valve Nor	ninal Size	Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	А	В
B207(B)-B211(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212(B)-B215(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217(B)-B221(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]

Dimensions with 3-Way Valve



		3.25 [82.6] →	D1350
	2.82		
D	[71.6]	c	

	Valve Nominal Size		Dimen	[mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]



TR24-3 Actuators, On-Off, Floating Point

Wiring Diagrams

🔀 INSTALLATION NOTES

The common connection from the actuator must be /2\

connected to the Hot connection of the controller.

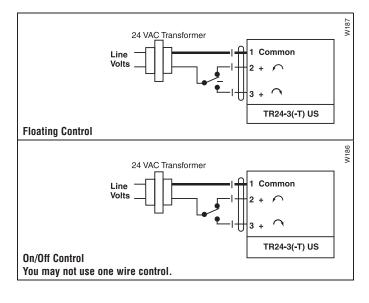
Actuators with plenum rated cable do not have numbers on wires; ∕3∖ use color codes instead.

/4\ The actuator Hot must be connected to the control board Hot.

WARNING Live Electrical Components!

MAKNING LIVE Electrical components. During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

NOTE: TR24-3(-T) US cannot be wired in parallel with themselves or any other actuator.



TR24-SR Actuators, Proportional



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D1349





Models

TR24-SR-T US

TR24-SR US TR24-SR/300 US TR24-SR/500 US TR24-SR-T US with 3 ft plenum rated cable TR24-SR-T US with 10 ft plenum rated cable TR24-SR-T US with 16 ft plenum rated cable

Technical Data	
Control	proportional
Nominal voltage	24 VAC 50/60 Hz, 24 VDC
Nominal voltage range	19.228.8 VAC, 21.628.8 VDC
Power consumption	0.5 W
Transformer sizing	1VA (class 2 power source)
Electrical connection	screw terminals accessible after removal of small cover (3 ft, 10 ft, 16 ft cables optional)
Input impedance	100 kΩ
Angle of rotation	90°
Direction of rotation	reversible with switch under cover
Position indication	integrated into handle
Manual override	push down handle
Running time	90 seconds
Humidity	5 to 95% non-condensing
Ambient temperature	-22°F to 122°F (-30°C to 50°C)
Storage temperature	-40°F to 176°F (-40°C to 80°C)
Housing	NEMA 1/IP40
Housing rating	UL94-5V(B)
Agency listing†	cULus according to UL 60730-1A/-2-14, CAN/ CSA E60730-1:02, CE according to 2004/108/ EC and 2006/95/EC for line voltage and/or –S versions
Noise level	max. 35 db (A)
Quality standard	ISO 9001

† Rated impulse voltage 500V, Control pollution degree 2, Type of action 1

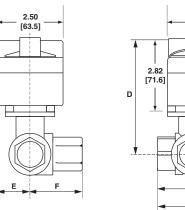
NOTE: Response sensitivity is 75mV

	Valve Nor	ninal Size	Dimensions (Inches [mm		
Valve Body	Inches	DN [mm]	Α	В	
B207(B)-B211(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	
B212(B)-B215(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	
B217(B)-B221(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	

Α

Dimensions with 3-Way Valve

Dimensions with 2-Way Valve



3.25 [82.6] 2.82 [71.6] B A

	Valve Nominal Size		Dimen	[mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]

TR24-SR Actuators, Proportional



Wiring Diagrams

🔀 INSTALLATION NOTES

Actuators with color coded wires are optional. ∕2∖

Wire numbers are provided for reference.

CAUTION Equipment damage!

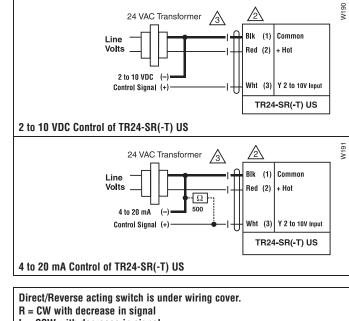
Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

∕3∖ Actuators may also be powered by 24 VDC.

WARNING Live Electrical Components!

Ľ During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



L = CCW with decrease in signal

No feedback

LR...24-3 Actuators, On/Off, Floating Point



В

1.39" [35.2]

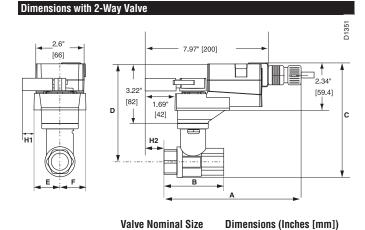
1.87" [47.4]

1.87" [47.4]

1.87" [47.4]

1.78" [45.2]





DN [mm]

15

15

20

25

32

A

1.39" [35.2]

1.78" [45.2]

1.87" [47.4]

1.87" [47.4]

1.87" [47.4]

Inches

1⁄2"

1⁄2"

3⁄4"

1"

11⁄4"

Valve Body

B207(B)-B211(B)

B212(B)-B215(B)

B217(B)-B221(B)

B222-B225

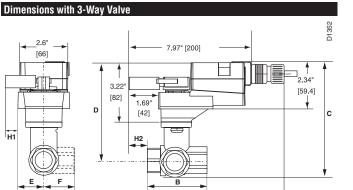
B229-B231

Models

LRB24-3-T	LRX24-3-T	w/Terminal Block
LRB24-3	LRX24-3	w/3 ft. cable
LRB24-3-S	LRX24-3-S	w/built-in Aux. Switch

Control		on/off floating point
Control		on/off, floating point
Power supply		24 VAC ± 20% 50/60 Hz
P		24 VDC ± 10%
Power consumption	running	1.5 W
	holding	
Transformer sizing		2 VA (class 2 power source)
Electrical connection		1/2" conduit connector
		18 GA, plenum rated cable
LRB24-3		3 ft [1m]
LRX24-3		3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection		electronic throughout 0° to 95° rotation
Input impedance		600 Ω
Angle of rotation		90°, adjustable with mechanical stop
Direction of rotation		reversible with protected γ/γ switch
Position indication		handle
Manual override		external push button
Running time		
LRB24-3		90 seconds, constant independent of load
LRX24-3		150, 95, 60, 45, 35 seconds,
		constant independent of load
Humidity		5 to 95% RH, non-condensing (EN 60730-1)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		NEMA 2/IP54
Housing material		UL94-5VA
Agency listings†		cULus according to UL 60730-1A/-2-14, CAN/
		CSA E60730-1:02, CE according to 2004/108/
		EC and 2006/95/EC for line voltage and/or –S
		versions
Noise level		less than 35 dB (A)
Quality standard		ISO 9001
LR24-3-T		
Electrical connection		screw terminal (for 26 to 14 GA wire)
		protected (NEMA 2, IP20)
LR24-3-S		
Auxiliary switch		1 SPDT, 3A (0.5A) @ 250 VAC, UL Listed,
AuAmary SWILON		adjustable 0° to 100°
+ Dated impulse voltage 9	101/ Contro	I pollution degree 3, Type of action 1

(1.B for -S models)



	Valve Nominal Size		Dimen	[mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.06" [52.2]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



LR...24-3 Actuators, On/Off, Floating Point



🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2\ Actuators may be connected in parallel. Power consumption and input impedance must be observed. Actuators are provided with color coded wires. ∕3∖ Wire numbers are provided for reference.

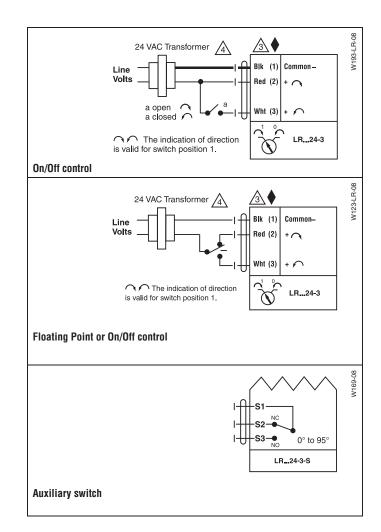
Actuators may also be powered by 24 VDC. /4\

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

/? During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LR...24-SR Actuators, Proportional



D1351

с



2.6" 7.97" [200] [66] . 2.34 T 3.22 [59.4] [82] . 1.69' ŧ D [42] H1 H2 F F

Models

LRB24-SR-T LRX24-SR-T LRB24-SR LRX24-SR

w/Terminal Block w/3ft. cable

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption runr	ing 1.5 W
hold	ling 0.4 W
Transformer sizing	3 VA (class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA, plenum rated cable
LRB24-SR	3 ft [1m]
LRX24-SR	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA
Feedback output U	1 to 10 VDC, max 0.5 mA
Input impedance	100 kΩ (0.1 mA), 500 Ω
Angle of rotation	90°, adjustable with mechanical stop
Direction of rotation	reversible with protected γ/γ switch
Position indication	handle
Manual override	external push button
Running time	constant independent of load
LRB24-SR	90 seconds
LRX24-SR	150, 95, 60, 45, 35 seconds
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<35 dB(A)
Quality standard	ISO 9001

LR...24-SR-T

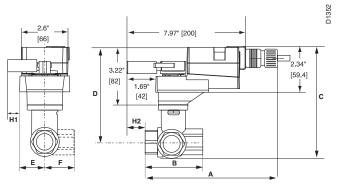
Electrical connection screw terminal (for 26 to 14 GA wire) protected (NEMA 2/IP20)

† Rated impulse voltage 800V, Control pollution degree 3, Type of action 1 (1.B for -S models)

Valve Nominal Size		Dimensions (Inches [mm])
Inches DN [mm]		Α	В
1⁄2"	15	2.41" [61.1]	1.39" [35.2]
1⁄2"	15	2.38" [60.4]	1.78" [45.2]
3⁄4"	20	2.73" [69.3]	1.87" [47.4]
1"	25	3.09" [78.4]	1.87" [47.4]
1¼"	32	3.72" [94.6]	1.87" [47.4]
	Inches ½" ½" ¾" 3¼" 1"	Inches DN [mm] ½" 15 ½" 15 ¾" 20 1" 25	Inches DN [mm] A ½" 15 2.41" [61.1] ½" 15 2.38" [60.4] ¾" 20 2.73" [69.3] 1" 25 3.09" [78.4]

Dimensions with 3-Way Valve

Dimensions with 2-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.06" [52.2]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]

LR...24-SR Actuators, Proportional



Wiring Diagrams

∕5∖

🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2\ Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

∕3∖ Actuators may also be powered by 24 VDC.

Only connect common to neg. (-) leg of control circuits.

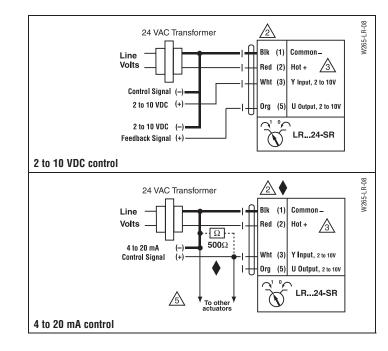
APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

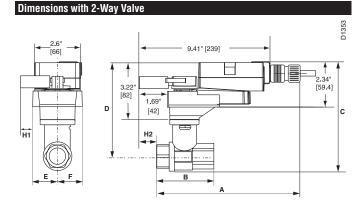
Æ During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a gualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LR...120-3 Actuators, On/Off, Floating Point







Models

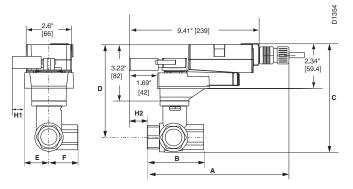
LRB120-3 LRX120-3

Technical Data	
Control	On/Off, Floating Point
Power supply	100 to 240 VAC, 50/60 Hz (nominal)
	85 to 265 VAC, 50/60 Hz (tolerance)
Power consumption running	2 W
holding	0.5 W
Transformer sizing	4 VA (class 2 power source)
Electrical connection	½" conduit connector
	18 GA, plenum rated cable
LRB120-3	3 ft [1m]
LRX120-3	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	600 Ω
Angle of rotation	90°, adjustable with mechanical stop
Direction of rotation	reversible with protected n/n switch
Position indication	handle
Manual override	external push button
Running time	
LRB120-3	90 seconds, constant independent of load
LRX120-3	150, 95, 60, 45, 35 seconds,
	constant independent of load
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<35 dB(A)
Quality standard	ISO 9001

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Valve Nominal Size Dimensions (Inches [mm]) Valve Body Inches DN [mm] B A B207(B)-B211(B) 1⁄2" 15 2.41" [61.1] 1.39" [35.2] 1⁄2" 1.78" [45.2] B212(B)-B215(B) 15 2.38" [60.4] B217(B)-B221(B) 3⁄4" 20 2.73" [69.3] 1.87" [47.4] 1.87" [47.4] 1" B222-B225 25 3.09" [78.4] 3.72" [94.6] 11⁄4" 1.87" [47.4] B229-B230 32

Dimensions with 3-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.06" [52.2]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



LR...120-3 Actuators, On/Off, Floating Point

Wiring Diagrams

X INSTALLATION NOTES

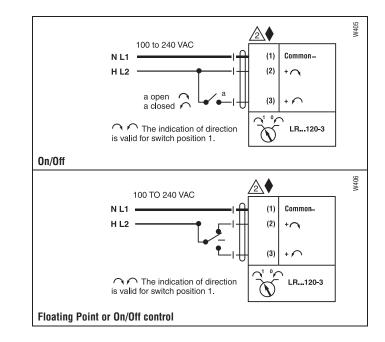
Actuators may be connected in parallel. Power consumption and input impedance must be observed.

7 APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LR...120-SR Actuators, Proportional





Dimensions with 2-Way Valve D1353 2.6" [66] 9.41" [239] Î 2.34" [59.4] 3.22 [82] Π 1.69" ŧ D + [42] с H1 H2

Models LRB120-SR

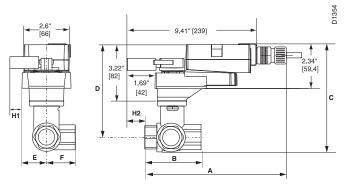
LRX120-SR

Technical Data	
Power supply	100 to 240 VAC, 50/60 Hz (nominal)
	85 to 265 VAC, 50/60 Hz (tolerance)
Power consumption running	2.5 W
holding	1 W
Transformer sizing	4.5 VA (class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA, plenum rated cable
LRB120-SR	3 ft [1m]
LRX120-SR	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA
Feedback output U	1 to 10 VDC, max 0.5 mA
Input impedance	100 kΩ (0.1 mA), 500 Ω
Angle of rotation	90°, adjustable with mechanical stop
Direction of rotation	reversible with protected $\alpha/\!$
Position indication	handle
Manual override	external push button
Running time	constant independent of load
LRB120-SR	90 seconds
LRX120-SR	150, 95, 60, 45, 35 seconds
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<35 dB(A)
Quality standard	ISO 9001

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

	Valve No	ninal Size	Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В
B207(B)-B211(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212(B)-B215(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217(B)-B221(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	1¼"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]

LR...120-SR Actuators, Proportional



Wiring Diagrams

∕6∖

/15

X INSTALLATION NOTES

Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Only connect common to neg. (-) leg of control circuits.

 $/\gamma$ A 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.

LRB(X) can be supplied with both 120 VAC and 230 VAC.

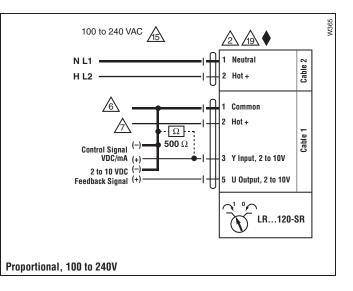
All 120 VAC and 230 VAC actuators use appliance rated cables.

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

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LR...24-MFT Actuators, Multi-Function Technology





Dimensions with	2-Way Valve	
	2-Way Valve	D1353
		•

Models LRX24-MFT

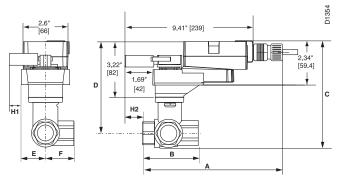
Flexible Version

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	1
holding	
Transformer sizing	6 VA (class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA, plenum rated cable
LRX24-MFT	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC (default)
	4 to 20 mA
	variable (VDC, PWM, floating point, on/off)
Feedback output U	2 to 10 VDC, 0.5mA max
	VDC variable
Input impedance	100 kΩ (0.1 mA), 500 Ω
	1500 Ω (PWM, floating point, on/off)
Angle of rotation	90° electronically variable
	adjustable with mechanical stop
Direction of rotation	reversible with protected α/\sim switch
Position indication	handle
Manual override	external push button
Running time	150 seconds (default)
	Variable (35 to 150 secs)
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<35 dB(A)
Quality standard	ISO 9001
† Rated impulse voltage 800V, Con	rol pollution degree 3,

Type of action 1 (1.B for -S models)

	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212-B215	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	11⁄4"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve



Valve Nominal Size		Dime	nsions (Inches	[mm])	
Valve Body	Inches	DN [mm]	А	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



LR...24-MFT Actuators, Multi-Function Technology

Wiring Diagrams

🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2\ Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC. /3\

Position feedback cannot be used with Triac sink controller.

The actuator internal common reference is not compatible.

- Control signal may be pulsed from either the Hot (source) ∕6∖
- or the Common (sink) 24 VAC line.
- Contact closures A & B also can be triacs. /8\
 - A& B should both be closed for triac source and open for triac sink.
 - For triac sink the common connection from the actuator

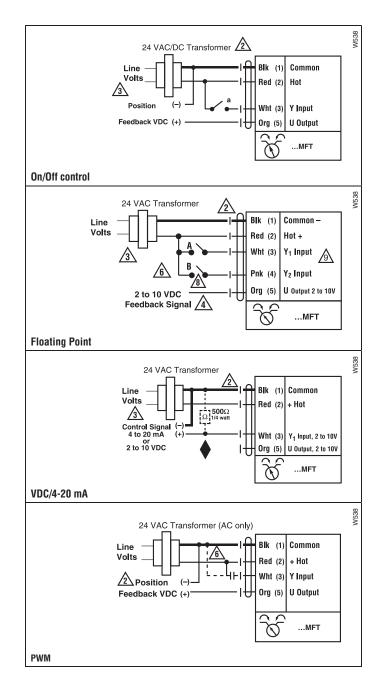
must be connected to the hot connection.

APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

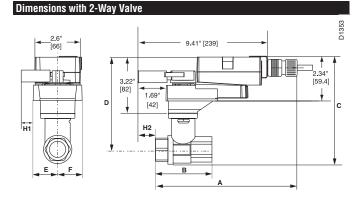
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LRX24-PC Actuators, 0 to 20V Phasecut, Proportional







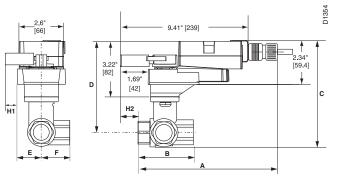
Models

LRX24-PC

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	2 W
holding	1.2 W
Transformer sizing	5 VA (Class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA plenum rated cable
	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0 to 95° rotation
Operating range Y	0 to 20V phasecut
Feedback output U	2 to 10 VDC, 0.5mA max
Input impedance	8 kΩ (50 mW)
Angle of rotation	90°, adjustable with mechanical stop
	electronically variable
Direction of rotation	reversible with α/\sim switch
Position indication	handle
Manual override	external push button
Running time	150 seconds (default)
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<35 dB(A)
Quality standard	ISO 9001

Valve Nominal Size Dimensions (Inches [mm]) Valve Body Inches DN [mm] A B B207-B211 1⁄2" 15 2.41" [61.1] 1.39" [35.2] B212-B215 1⁄2" 2.38" [60.4] 1.78" [45.2] 15 3⁄4" 20 2.73" [69.3] 1.87" [47.4] B217-B221 1" 25 3.09" [78.4] 1.87" [47.4] B222-B225 11⁄4" 3.72" [94.6] B229-B230 32 1.87" [47.4]

Dimensions with 3-Way Valve



	Valve No	minal Size	Dime	nsions (Inches	[mm])
Valve Body	Inches	DN [mm]	А	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



LRX24-PC Actuators, 0 to 20V Phasecut, Proportional

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required. /1\

CAUTION Equipment damage! /2\

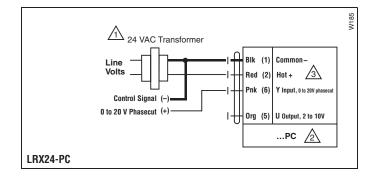
Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

/3 Actuators may also be powered by 24 VDC.

WARNING Live Electrical Components!

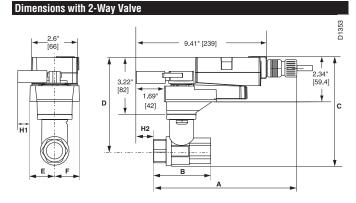
WARNING LIVE Electrical components! During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LRX24-MFT95 Actuators, 0 to 135 $\Omega\text{,}$ Proportional







Models

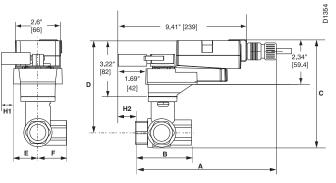
LRX24-MFT95

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz
		24 VDC ± 10%
Power consumption r	running	2 W
	holding	
Transformer sizing		5 VA (Class 2 power source)
Electrical connection		1/2" conduit connector
		18 GA plenum rated cable
		3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection		electronic throughout 0 to 95° rotation
Operating range WRB		0 to 135 Ω Honeywell Electronic
		Series 90, 0 to 135 Ω input
Feedback output U		2 to 10 VDC, 0.5mA max
Input impedance		100 kΩ (0.1 mW)
Angle of rotation		90°, adjustable with mechanical stop
		electronically variable
Direction of rotation		reversible with γ/\sim switch
Position indication		handle
Manual override		external push button
Running time		150 seconds (default)
		variable (35 to 150 seconds)
Humidity		5 to 95% RH non-condensing
		(EN 60730-1)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2/IP54
Housing material		UL94-5VA
Agency listings†		cULus according to UL 60730-1A/-2-14,
		CAN/CSA E60730-1:02, CE according to
		2004/108/EC and 2006/95/EC for line voltage
		and/or –S versions
Noise level		<35 dB(A)
Quality standard		ISO 9001
+Rated Impulse Voltage 800	W Type c	of action 1. Control Pollution Degree 3

†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

	Valve No	ninal Size	Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	А	В
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212-B215	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	1¼"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve



	Valve No	minal Size	Dime	nsions (Inches	[mm])
Valve Body	Inches	DN [mm]	А	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



LRX24-MFT95 Actuators, 0 to 135 Ω , Proportional

Wiring Diagrams

X INSTALLATION NOTES

21 Provide overload protection and disconnect as required.

Actuators and controller must have separate transformers.

Consult controller instruction data for more detailed information.

24

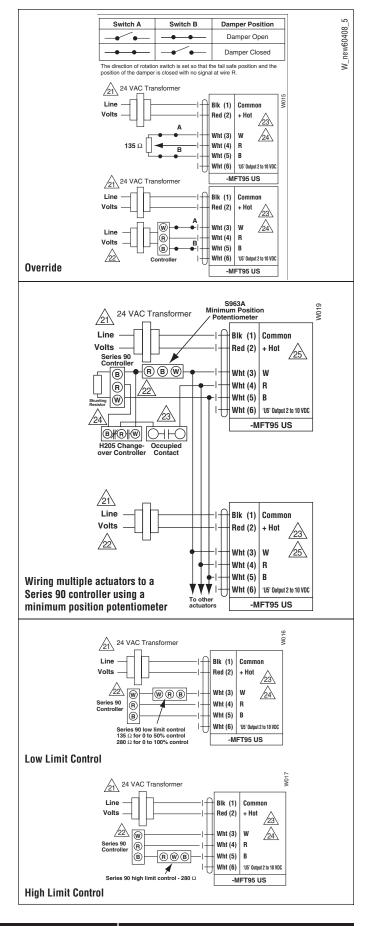
⁴ number of actuators. No resistor is used for one actuator. Honeywell® resistor kits may also be used.

Resistor value depends on the type of controller and the



To reverse control rotation, use the reversing switch.2524232221

WARNING Live Electrical Components! During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LRQ...24-1 Quick Running Actuators, On/Off



D1355

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Models

LRQB24-1 LRQX24-1

4-1 Flexible Version

Basic Version

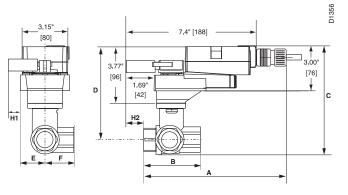
Technical Data	
Control	on/off
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	
. holding	1.5 W
Transformer sizing	18 VA (Class 2 power source)
Ū.	20A @ 5ms max
Electrical connection	½" conduit connector
	18 GA plenum rated cable
LRQB24-1	3 ft [1m]
LRQX24-1	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0 to 95° rotation
Input impedance	600 Ω
Angle of rotation	max 95°, adjustable with mechanical stop
Direction of rotation	reversible with α/\sim switch
Position indication	handle
Manual override	external push button
Running time	
LRQB24-1	5 seconds
	constant of independent load
LRQX24-1	5 or 10 seconds
	constant of independent load
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<52 dB(A)
Quality standard	ISO 9001

Dimensions with 2-Way Valve 3.15" 7.4" [188] [80] 1 3.00" (T) 3.7 ΗĽ [76] [96] 1.69 ł D ł [42] H2 Ē H1

	Valve Nominal Size		ominal Size Dimensions (Inches [mr	
Valve Body	Inches	DN [mm]	Α	В
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212-B215	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	1¼"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve

ΕĒF



	Valve No	minal Size	Dime	nsions (Inches	[mm])
Valve Body	Inches	DN [mm]	А	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



LRQ...24-1 Quick Running Actuators, On/Off

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required.

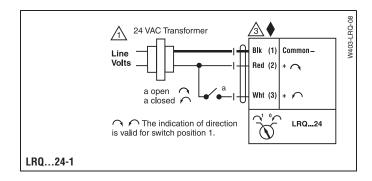
Actuators may also be powered by 24 VDC. /3\

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

/? During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LRQ...24-MFT Quick Running Actuators, Multi-Function Technology





Dimensions with 2	-Way Valve	
3.46" [88]	7.4° [188]	

Models
LRQB24-MFT

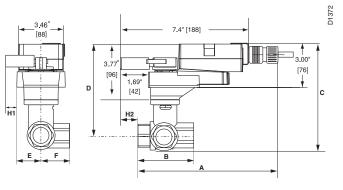
Basic Version LRQX Version

24-MFT	Flexible

Technical Data			
Power supply	24 VAC ± 20% 50/60 Hz		
	24 VDC ± 10%		
Power consumption running	12 W		
holding	1.5 W		
Transformer sizing	18 VA (Class 2 power source)		
	20A @ 5ms max		
Electrical connection	1/2" conduit connector		
	18 GA plenum rated cable		
LRQB24-MFT	3 ft [1m]		
LRQX24-MFT	3 ft [1m], 10 ft [3m], 16 ft [5m]		
Overload protection	electronic throughout 0 to 95° rotation		
Operating range Y	2 to 10 VDC, 4 to 20 mA (default)		
	variable (VDC, on/off)		
Feedback output U	2 to 10 VDC, 0.5mA max		
	VDC variable		
Input impedance	100 kΩ (0.1 mA), 500 Ω		
	1500 Ω (on/off)		
Angle of rotation	max 95°, adjustable with mechanical stop		
Direction of rotation	reversible with α/\sim switch		
Position indication	reflective visual indicator (snap-on)		
Manual override	external push button		
Running time			
LRQB24-MFT	5 seconds		
	constant of independent load		
LRQX24-MFT	5 or 10 seconds		
	constant of independent load		
Humidity	5 to 95% RH non-condensing		
	(EN 60730-1)		
Ambient temperature	-22°F to 122°F [-30°C to 50°C]		
Storage temperature	-40°F to 176°F [-40°C to 80°C]		
Housing	NEMA 2/IP54		
Housing material	UL94-5VA		
Agency listings†	cULus according to UL 60730-1A/-2-14,		
	CAN/CSA E60730-1:02, CE according to		
	2004/108/EC and 2006/95/EC for line voltage		
	and/or –S versions		
Noise level	<52 dB(A)		
Quality standard	ISO 9001		

	Valve Nominal Size		Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	А	В
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212-B215	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	11⁄4"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	А	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



Wiring Diagrams

/2`

/3`

/5`

X INSTALLATION NOTES

Provide overload protection and disconnect as required.

CAUTION Equipment damage! Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC.

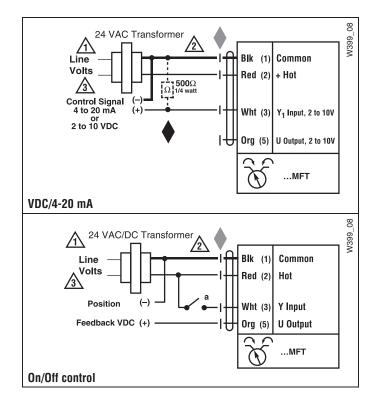
Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

APPLICATION NOTES

The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



NRQ...24-1 Quick Running Actuators, On/Off



Dimensions (Inches [mm])

В

A



∢ — ^{3.46"} →	◄ 8.03" [204] →	D1357
H1 H1		c

Dimensions with 2-Way Valve

Valve Body

Models	

NRQB24-1 NRQX24-1

Basic Version Flexible Version

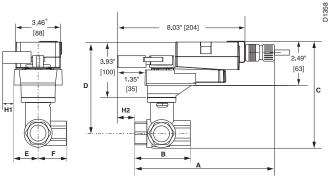
Technical Data	
Control	on/off
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	12 W
holding	1.5 W
Transformer sizing	18 VA (Class 2 power source)
Electrical connection	1⁄2" conduit connector,
	18 GA plenum rated cable
NRQB24-1	3 ft [1m]
NRQX24-1	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0 to 95° rotation
Input impedance	600 Ω
Angle of rotation	max 95°, adjustable with mechanical stop
Direction of rotation	reversible with γ/\sim switch
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time	constant of independent load
NRQB24-1	5 seconds
NRQX24-1	5, 10 or 15 seconds
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<52 dB(A)
Quality standard	ISO 9001

B231-B232 11⁄4" 32 3.72" [94.6] 2.04" [51.9] B238-B240 1½" 40 3.88" [98.5] 2.04" [51.9] B248-B250 2" 50 4.21" [107] 2.27" [57.7] **Dimensions with 3-Way Valve**

DN [mm]

Valve Nominal Size

Inches



Valve Nominal Size		Dime	nsions (Inches [[mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]

Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.



NRQ...24-1 Quick Running Actuators, On/Off

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required.

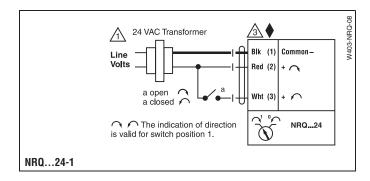
Actuators may also be powered by 24 VDC. /3\

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

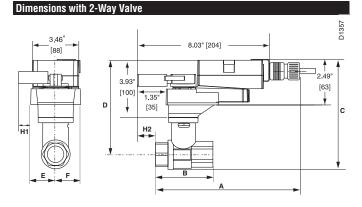
Æ During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



NRQ...24-MFT Quick Running Actuators, Multi-Function Technology







Models

NRQB24-MFT NRQX24-MFT

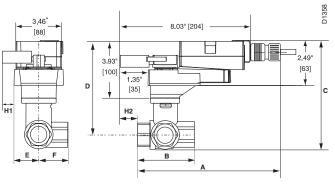
MFT Basic Version MFT Flexible Version

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
Tower suppry	24 VDC ± 10%
Power consumption running	
holding	
Transformer sizing	18 VA (Class 2 power source)
Electrical connection	1/2" conduit connector,
	18 GA plenum rated cable
NRQB24-MFT	3 ft [1m]
NRQX24-MFT	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0 to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA (default)
	variable (VDC, on/off)
Feedback output U	2 to 10 VDC, 0.5mA max
	VDC variable
Input impedance	100 kΩ (0.1 mA), 500 Ω, 1500 Ω
	(on/off)
Angle of rotation	max 95°, adjustable with mechanical stop
	electronically variable
Direction of rotation	reversible with \sim/\sim switch
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time	constant of independent load
NRQB24-MFT	5 seconds
NRQX24-MFT	5, 10 or 15 seconds
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<52 dB(A)
Quality standard	ISO 9001
Rated Impulse Voltage 800V Type of	faction 1 Control Pollution Degree 3

Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Valve Nominal Size Dimensions (Inches [mm]) Valve Body Inches DN [mm] А B B231-B232 11⁄4" 32 3.72" [94.6] 2.04" [51.9] 3.88" [98.5] 2.04" [51.9] B238-B240 1½" 40 2" B248-B250 50 4.21" [107] 2.27" [57.7]

Dimensions with 3-Way Valve



Valve Nominal Size		Dime	nsions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	1¼"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]



Wiring Diagrams

/2`

/3`

/5`

X INSTALLATION NOTES

ig< Provide overload protection and disconnect as required.

CAUTION Equipment damage! Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC.

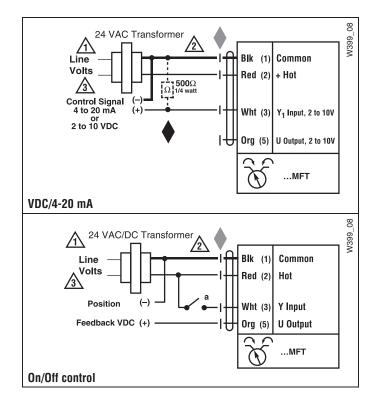
Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

APPLICATION NOTES

The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



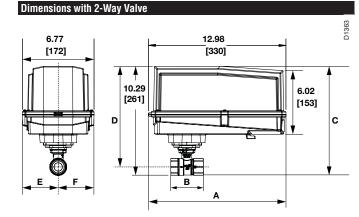
NRB24-3-T N4 NEMA 4X Actuators, On/Off, Floating Point



Dimensions (Inches [mm])







Models NRB24-3-T N4 Ν

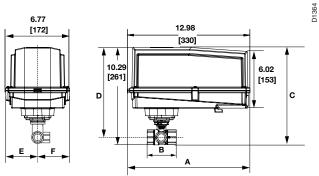
IRB24-3-T N4H	w/built in heater	

Control		on/off, floating point
Power supply		24 VAC ± 20% 50/60 Hz
		24 VDC ± 10%
Power consumption	running	2.0 W / heater 24 W
	holding	0.2 W
Transformer sizing		4 VA (class 2 power source) / heater 19 VA
Electrical connection		screw terminal (for 26 to 14 GA wire)
Overload protection		electronic throughout 0° to 95° rotation
Input impedance		600 Ω
Angle of rotation		90°, adjustable with mechanical stop
Direction of rotation		reversible with $\overline{\frown}/\overline{\frown}$ switch
Position indication		visual pointer
Manual override		external push button
Running time		90 seconds constant independent of load
Humidity		100% RH
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4X/NEMA 4X/IP66 & IP67
Housing material		Polypropylene
Agency listings†		cULus according to UL 60730-1A/-2-14,
		CAN/CSA E60730-1, CSA C22.2 No. 24-93,
		CE according to 89/336/EEC.
Quality standard		ISO 9001

Cannot be used with the CCV-EXT-KIT † Rated impulse voltage 800V, Control pollution degree 3, Type of action 1.

Valve Body	Inches	DN [mm]	Α	В
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212-B215	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	1¼"	32	3.72" [94.6]	1.87" [47.4]
Dimensions with 3-W	ay Valve			
				964
6.77				D1364

Valve Nominal Size



	Valve Nominal Size		Dime	nsions (Inches	[mm])
Valve Body	Inches	DN [mm]	А	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



NRB24-3-T N4 NEMA 4X Actuators, On/Off, Floating Point

Wiring Diagrams

🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2Actuators may be connected in parallel. Power consumption and input impedance must be observed. Actuators are provided with color coded wires. ∕3∖ Wire numbers are provided for reference.

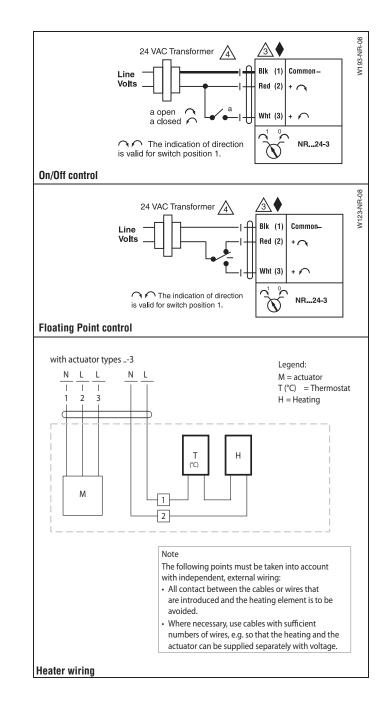
Actuators may also be powered by 24 VDC. /4\

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

Ŀ During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





D1363





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Dimensions with 2-Way Valve

6.77

6.77	12.98		5
[172]	[330]		
		6.02 [153]	c

12.98

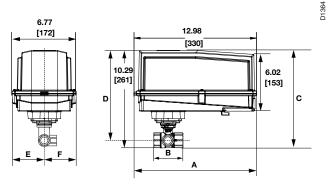
Models NRB24-SR-T N4 NRB24-SR-T N4H

w/built in heater

Technical Data		
Control	2 to 10 VDC, 4 to 20 mA	
Power supply	24 VAC ± 20% 50/60 Hz	
	24 VDC ± 10%	
Power consumption running	2.5 W / heater 24 W	
holding	0.4 W	
Transformer sizing	5 VA (class 2 power source) / heater 20 VA	
Electrical connection	screw terminal (for 26 to 14 GA wire)	
Overload protection	electronic throughout 0° to 95° rotation	
Input impedance	100 kΩ (0.1mA), 500Ω	
Angle of rotation	90°, adjustable with mechanical stop	
Direction of rotation	reversible with α/\sim switch	
Position indication	visual pointer	
Manual override	external push button	
Running time	90 seconds constant independent of load	
Humidity	100% RH	
Ambient temperature	-22°F to 122°F [-30°C to 50°C]	
Storage temperature	-40°F to 176°F [-40°C to 80°C]	
Housing type	UL Type 4X/NEMA 4X/IP66 & IP67	
Housing material	Polypropelene	
Agency listings†	cULus according to UL 60730-1A/-2-14,	
	CAN/CSA E60730-1, CSA C22.2 No. 24-93,	
	CE according to 89/336/EEC.	
Quality standard	ISO 9001	
	of action 1, Control Pollution Degree 3	
*Cannot be used with the CCV-EXT-KIT		

Valve Nominal Size Dimensions (Inches [mm]) Valve Body Inches DN [mm] A В B207-B211 1⁄2" 15 2.41" [61.1] 1.39" [35.2] 2.38" [60.4] 1.78" [45.2] B212-B215 1⁄2" 15 3⁄4" 2.73" [69.3] 1.87" [47.4] B217-B221 20 B222-B225 1" 25 3.09" [78.4] 1.87" [47.4] 1¼" 3.72" [94.6] B229-B230 32 1.87" [47.4]

Dimensions with 3-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	А	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



NRB24-SR-T N4 NEMA 4X Actuators, Proportional

Wiring Diagrams

∕5∖

X INSTALLATION NOTES

CAUTION Equipment damage! Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC.

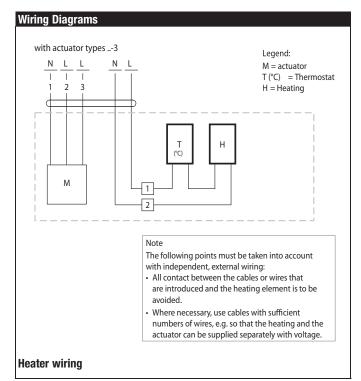
Only connect common to neg. (-) leg of control circuits.

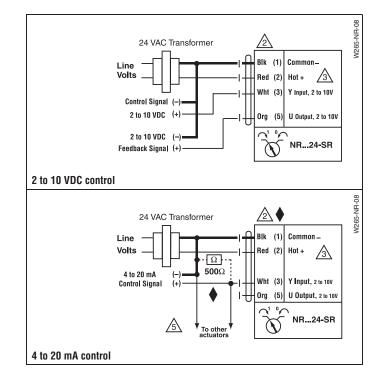
APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





NRX24-MFT-T N4 NEMA 4X Actuators, Multi-Function Technology







D1363 6.77 12.98 [172] [330] Å 10.29 6.02 [261] [153] D c F F в Α

Models NRX24-MFT-T N4 NRX24-MFT-T N4H w/built in heater

Technical Data Control 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating poir

Control		Z IO TO VDG, 4 IO ZO ITIA (detauit)
Dowor ownhy		variable (VDC, PWM, floating point, on/off)
Power supply		24 VAC ± 20% 50/60 Hz
Device exercise the second		24 VDC ± 10%
		3.5 W (1.25 W) / heater 24 W
	lding	1.25 W
Transformer sizing		6 VA (class 2 power source) / heater 21 VA
Electrical connection		screw terminal (for 26 to 14 GA wire)
Overload protection		electronic throughout 0° to 95° rotation
Input impedance		100 kΩ (0.1 mA), 500 Ω
		1500 Ω (PWM, floating point, on/off)
Angle of rotation		95°, adjustable with mechanical stop
		electronically variable
Direction of rotation		reversible with \sim/\sim switch
Position indication		visual pointer
Manual override		external push button
Running time		150 seconds (default)
		constant independent of load
		variable (75 to 350 seconds)
Humidity		100% RH
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4X/NEMA 4X/IP66 & IP67
Housing material		Polypropelene
Agency Listings†		cULus according to UL 60730-1A/-2-14, CAN/
5 5 5 1		CSA E60730-1, CSA C22.2 No. 24-93, CE ac-
		cording to 89/336/EEC.
Quality standard		ISO 9001
+Pated Impulse Veltage 900	V Tuno	of action 1 Control Pollution Degree 2

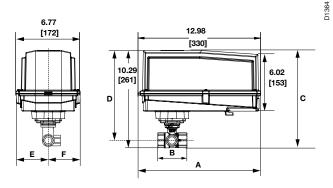
†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3

*Cannot be used with the CCV-EXT-KIT

	Valve Nominal Size		Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212-B215	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	1¼"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve-

Dimensions with 2-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317-B321	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]



NRX24-MFT-T N4 NEMA 4X Actuators, Multi-Function Technology

Wiring Diagrams

🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2\ Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC. /3\

Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.

Control signal may be pulsed from either the Hot (source) ∕6∖ or the Common (sink) 24 VAC line.

Contact closures A & B also can be triacs. /8\

A& B should both be closed for triac source and open for triac sink.

For triac sink the common connection from the actuator

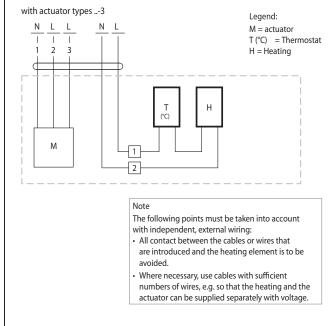
must be connected to the hot connection.

APPLICATION NOTES

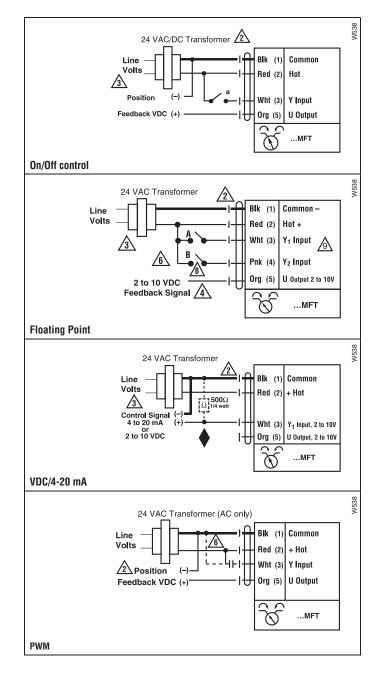
The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Heater wiring



AR...24-3 Actuators, On/Off, Floating Point







Models

ARB24-3	
ARB24-3-S	w/built-in Aux. Switch
ARX24-3	Flexible
ARX24-3-S	Flexible w/built-in Aux. Switch
ARB24-3-5-14	
ARX24-3-5-14	

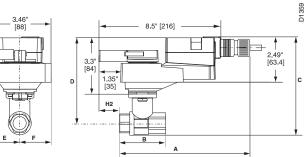
Technical Data	on/off, floating point
Power supply	24 VAC ± 20% 50/60 Hz
Power supply	24 VDC ± 10%
Power consumption running	
holding	
Transformer sizing	5.5 VA (class 2 power source)
Flectrical connection	1/2" conduit connector
Electrical connection	18 GA plenum rated cable
ABB24-3	3 ft. [1m]
ARX24-3	3 ft. [1m] 10 ft. [3m] 16 ft. [5m]
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	600Ω
Angle of rotation	90°, adjustable with mechanical stop
Direction of rotation	reversible with protected γ/γ switch
Position indication	handle
Manual override	external push button
Running time	
ABB24-3	90 seconds
ARX24-3	300, 150, 90 seconds,
AIM24 0	constant independent of load
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
Agency istings	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<45 dB(A)
Quality standard	ISO 9001
AR24-3-S	
Auxiliary switch (-S models)	1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed,
	adjustable 0 to 00%

adjustable 0 to 90°

m

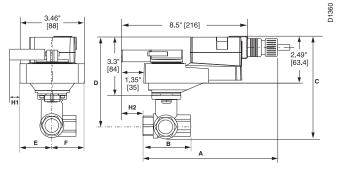
Dimensions with 2-Way Valve

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	Valve Nominal Size		Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В
B231-B232	11⁄4"	32	3.72" [94.6]	1.98" [50.4]
B238-B240	1½"	40	3.88" [98.5]	1.98" [50.4]
B248-B250	2"	50	4.21" [107.0]	2.21" [56.2]
B251-B254	2"	50	4.93" [125.2]	2.68" [68.0]
B261-B265	21⁄2"	65	5.55" [140.9]	2.68" [68.0]
B277-B280	3"	80	5.82" [147.9]	2.68" [68.0]

Dimensions with 3-Way Valve



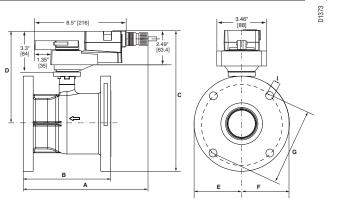
	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]
B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]

† Rated impulse voltage 800V, Control pollution degree 3, Type of action 1

(1.B for -S models)



Dimensions



Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
	_		Α	В	C
B6250	2½" [65]		7.50" [190.5]	5.50" [139.7]	8.10" [205.4]
B6300	3" [80]	F05	8.00" [203.2]	6.60" [167.6]	8.40" [213.1]
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]

Wiring Diagrams

🔀 INSTALLATION NOTES

CAUTION Equipment damage!

Actuators may be connected in parallel. Power consumption and input impedance must be observed. For end position indication, interlock control, etc.,

ARB24-3-S incorporates one built-in auxiliary switches: 1 x SPDT, 3A (0.5A) @250 VAC, UL listed, adjustable 0° to 95°.

Actuators may also be powered by 24 VDC.

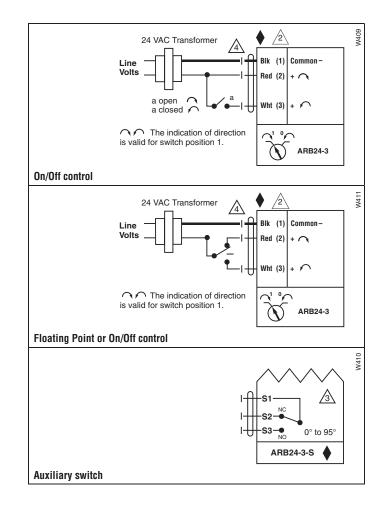
APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

nood of an offormal ground connoction.

WARNING Live Electrical Components! During installation, testing, servicing and troubleshooting of this product, it may

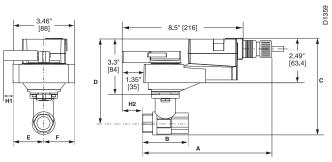
be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.







Dimensions with 2-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]
B248-B250	2	50	4.21 [107.0]	2.27 [57.7]

Models Arb24-Sr

ARX24-SR Flexible Version

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	2.5 W
holding	0.4 W
Transformer sizing	5 VA (class 2 power source)
Electrical connection	½" conduit connector
	18 GA plenum rated cable
	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA
Feedback output U	1 to 10 VDC, max 0.5 mA
Input impedance	100 kΩ (0.1 mA), 500 Ω
Angle of rotation	90°, adjustable with mechanical stop
Torque	180 in-lb [20 Nm]
Direction of rotation	reversible with protected \sim/\sim switch
Position indication	handle
Manual override	external push button
Running time	
ARB24-SR	90 seconds
ARX24-SR	300, 150, 90 seconds,
	constant independent of load
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<45 dB(A)
Quality standard	ISO 9001
+ Bated impulse voltage 800V Contr	ol pollution degree 3. Type of action 1

 \dagger Rated impulse voltage 800V, Control pollution degree 3, Type of action 1

(1.B for -S models)

Dimensions with 3-Way Valve D1360 3.46" [88] 8.5" [216] ⊒__ [¶] 2.49" [63.4] m 3.3" [84] ¥ 1.35" [35] c D . * ha the H1 H2 в

Valve Nominal Size		Dimensions (Inches [mm])		
Inches	DN [mm]	Α	В	C
11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]
	11/4" 11/2"	Inches DN [mm] 1¼" 32 1½" 40	Inches DN [mm] A 1¼" 32 3.96" [100.6] 1½" 40 4.39" [111.6]	Inches DN [mm] A B 1¼" 32 3.96" [100.6] 2.27" [57.7] 1½" 40 4.39" [111.6] 2.51" [63.7]





Wiring Diagrams

🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2\ Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

∕3∖ Actuators may also be powered by 24 VDC.

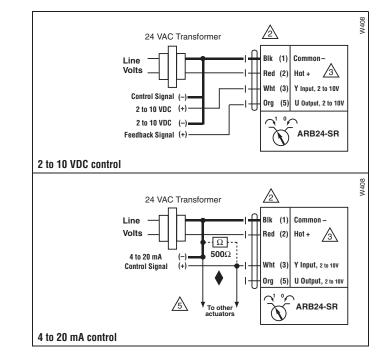
∕5∖ Only connect common to neg. (-) leg of control circuits.

APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

MAKINING LIVE Electrical components. During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



AR...120-3 Actuators, On/Off, Floating Point



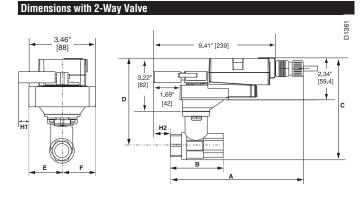


Models ARB120-3

ARX120-3 Flexible Version

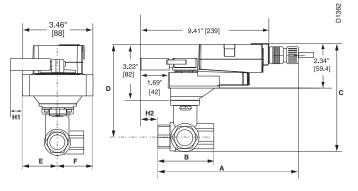
Technical Data	
Control	on/off, floating point
Power supply	100 to 240 VAC, 50/60 Hz (nominal)
	85 to 265 VAC, 50/60 Hz (tolerance)
Power consumption running	
. holding	
Transformer sizing	7 VA (class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA appliance rated cable
ARB120-3	3 ft [1m]
ARX120-3	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	600 Ω
Angle of rotation	90°, adjustable with mechanical stop
Direction of rotation	reversible with protected $\sim/\!\!\sim$ switch
Position indication	handle
Manual override	external push button
Running time	
ARB120-3	90 seconds
ARX120-3	300, 150, 90 seconds,
	constant independent of load
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<45 dB(A)
Servicing	maintenance free
Quality standard	ISO 9001
+ Rated impulse voltage 4kV. Contro	pollution degree 3. Type of action 1

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1



	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	А	В
B231-B232	11⁄4"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]
B251-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve

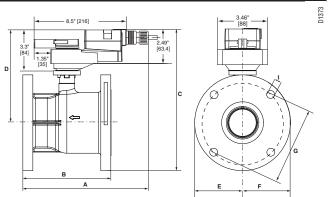


Valve Nominal Size			Dime	nsions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	1 1⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]



AR...120-3 Actuators, On/Off, Floating Point

Dimensions



Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6250	2½" [65]	F05	7.50" [190.5]	5.50" [139.7]	8.10" [205.4]
B6300	3" [80]		8.00" [203.2]	6.60" [167.6]	8.40" [213.1]
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]

Wiring Diagrams

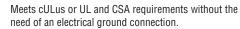
🗡 INSTALLATION NOTES

Provide overload protection and disconnect as required.

CAUTION Equipment damage!

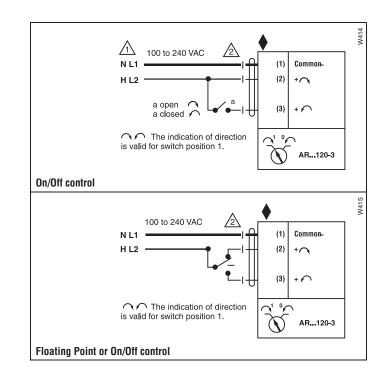
Actuators may be connected in parallel.
 Power consumption and input impedance must be observed.

APPLICATION NOTES



WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



AR...120-SR Actuators









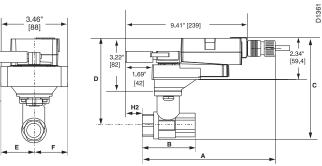
Models

ARB120-SR ARX120-SR **Flexible Version**

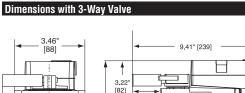
Technical Data		and the floor of the second second
Control		on/off, floating point
Power supply		100 to 240 VAC, 50/60 Hz (nominal)
		85 to 265 VAC, 50/60 Hz (tolerance)
Power consumption	running	
	holding	
Transformer sizing		7.5 VA (class 2 power source)
Electrical connection		1⁄2" conduit connector
		18 GA plenum rated cable
ARB120-SR		3 ft [1m]
ARX120-SR		3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection		electronic throughout 0° to 95° rotation
Feedback output U		1 to 10 VDC, max 0.5 mA
Input impedance		600 Ω
Angle of rotation		90°, adjustable with mechanical stop
Direction of rotation		reversible with protected γ/γ switch
Position indication		handle
Manual override		external push button
Running time		
ARB120-SR		90 seconds
ARX120-SR		300, 150, 90 seconds,
		constant independent of load
Humidity		5 to 95% RH non-condensing
		(EN 60730-1)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2/IP54
Housing material		UL94-5VA
Agency listings†		cULus according to UL 60730-1A/-2-14,
rigeney neurige		CAN/CSA E60730-1:02, CE according to
		2004/108/EC and 2006/95/EC for line voltage
		and/or –S versions
Noise level		<45 dB(A)
Servicing		maintenance free
Quality standard		ISO 9001
	V Control	nollution degree 3 Type of action 1

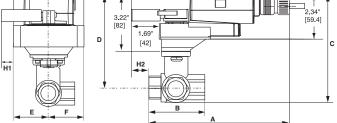
† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Dimensions with 2-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	11⁄2"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]





	Valve Nominal Size		Valve Nominal Size Dimensions (Inches			[mm])
Valve Body	Inches	DN [mm]	А	В	C	
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]	
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]	
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]	
2011 2002	-	00		2.1.0 [00.0]		

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AR...120-SR Actuators



Wiring Diagrams

∕6∖

/15

X INSTALLATION NOTES

Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Only connect common to neg. (-) leg of control circuits.

/7 A 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.

ARB(X) can be supplied with both 120 VAC and 230 VAC.

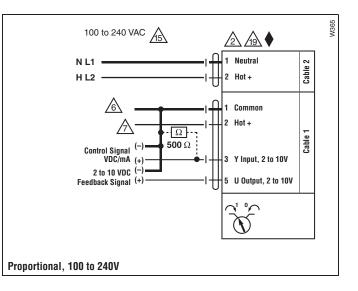
All 120 VAC and 230 VAC actuators use appliance rated cables.

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

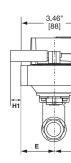
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



AR...24-MFT Actuators, Multi-Function Technology







Dimensions with 3-Way Valve

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3.22 [82]

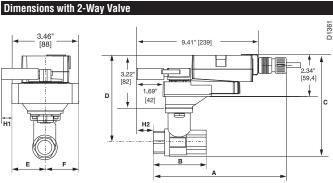
D ļ [42]

. 1.69'

3.46' [88]

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t



	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	А	В
B231-B232	1¼"	32	3.72" [94.6]	1.98" [50.4]
B238-B240	1½"	40	3.88" [98.5]	1.98" [50.4]
B248-B250	2"	50	4.21" [107.0]	2.21" [56.2]
B251-B254	2"	50	4.93" [125.2]	2.68" [68.0]
B261-B265	21⁄2"	65	5.55" [140.9]	2.68" [68.0]
B277-B280	3"	80	5.82" [147.9]	2.68" [68.0]

9.41" [239]

ARX24-MFT ARX24-MFT-5-14

Models

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption runni	ing 4 W
	ing 1.25 W
Transformer sizing	6 VA (class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA plenum rated cable
ARX24-MFT	3 ft. [1m], 10 ft. [3m], 16 ft. [5m]
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA (default)
	variable (VDC, PWM, floating point, on/off)
Feedback output U	2 to 10 VDC, 0.5 mA max
-	VDC variable
Input impedance	100 kΩ (0.1 mA), 500 Ω
	1500 Ω (PWM, floating point, on/off)
Angle of rotation	95° electronically variable
Direction of rotation	reversible with protected $\gamma/\!$
Position indication	handle
Manual override	external push button
Running time	
ARB24-MFT	150 seconds
ARX24-MFT	variable (90 to 350 seconds)
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according
	to 2004/108/EC and 2006/95/EC for line
	voltage and/or –S versions
Noise level	<45 dB(A)
Quality standard	ISO 9001
+ Rated impulse voltage 4kV, Contr	rol pollution degree 3. Type of action 1

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

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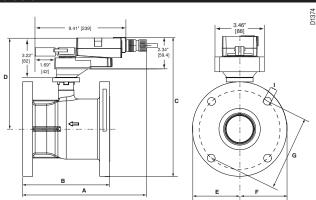
H	F	, , , , , , , , , , , , , , , , , , ,		A	
	Valve No	minal Size	Dime	nsions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В	C
D000 D001	41/"	20	2.00" [100.0]	0.04" [50.0]	0 1 4" [5 4 0]

Valve Nominal Size			ninal Size	Dime	nsions (Inches [_mm])
	Valve Body	Inches	DN [mm]	Α	В	C
	B329-B331	11⁄4"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]
	B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]
	B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]



AR...24-MFT Actuators, Multi-Function Technology

Dimensions



Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6250	2½" [65]		7.50" [190.5]	5.50" [139.7]	8.10" [205.4]
B6300	3" [80]	F05	8.00" [203.2]	6.60" [167.6]	8.40" [213.1]
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]

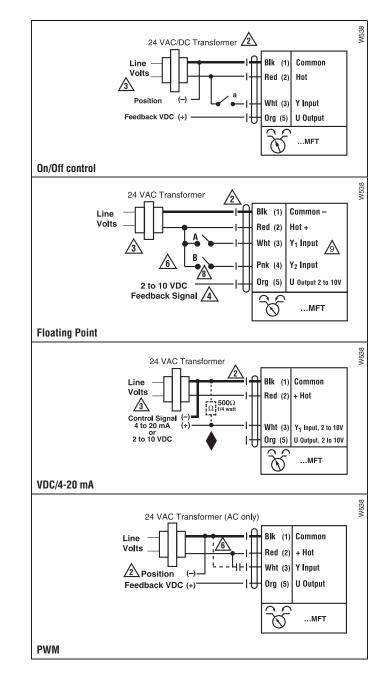
Wiring Diagrams

📈 INSTALLATION NOTES

- **CAUTION** Equipment damage! Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- ∕3∖ Actuators may also be powered by 24 VDC.
 - Position feedback cannot be used with Triac sink controller.
 - The actuator internal common reference is not compatible.
- Control signal may be pulsed from either the Hot (source)
- ∕6∖ or the Common (sink) 24 VAC line.
- Contact closures A & B also can be triacs. /8\
 - A& B should both be closed for triac source and open for triac sink.
- For triac sink the common connection from the actuator <u>/</u>9` must be connected to the hot connection.
 - **APPLICATION NOTES**
 - The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





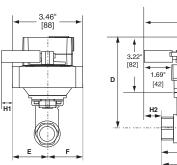


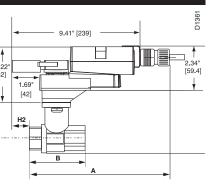
Models ARX24-PC

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	4 W
	1.25 W
Transformer sizing	5.5 VA (Class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA plenum rated cable
	3 ft. [1m], 10 ft. [3m], 16 ft. [5m]
Overload protection	electronic throughout 0 to 95° rotation
Operating range Y	0 to 20V phasecut
Feedback output U	2 to 10 VDC, 0.5mA max
	VDC variable
Input impedance	8 kΩ (50 mW)
Angle of rotation	90°, adjustable with mechanical stop
	electronically variable
Direction of rotation	reversible with α/\sim switch
Position indication	handle
Manual override	external push button
Running time	150 seconds (default)
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
<u></u>	and/or –S versions
Noise level	<45 dB(A)
Quality standard	ISO 9001
+Rated Impulse Voltage 800V. Type (of action 1. Control Pollution Degree 3.

†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

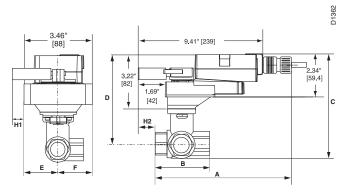
Dimensions with 2-Way Valve





	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B231-B232	11⁄4"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]
B251-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve



	Valve Nominal Size		Dime	nsions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]



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Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required. /1\

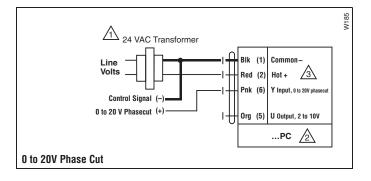
CAUTION Equipment damage! /2\

Actuators may be connected in parallel. Power consumption and input impedance must be observed.

/3 Actuators may also be powered by 24 VDC.

WARNING Live Electrical Components!

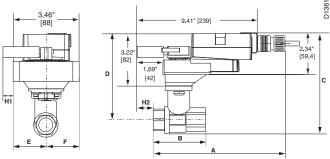
WAHNING LIVE Electrical Components! During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





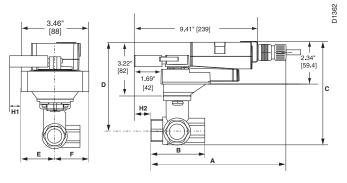


Dimensions with 2-Way Valve



	Valve Nominal Size		Size Dimensions (Inches [mm]	
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]
B251-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve



Valve Nominal Size		Dime	nsions (Inches [[mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]

Models ARX24-MFT95

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	4 W
holding	1.25 W
Transformer sizing	6 VA (Class 2 power source)
Electrical connection	1/2" conduit connector
	18 GA plenum rated cable
	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0 to 95° rotation
Operating range WRB	0 to 135 Ω Honeywell Electronic
	Series 90, 0 to 135 Ω input
Feedback output U	2 to 10 VDC, 0.5mA max
Input impedance	100 kΩ (0.1 mW)
Angle of rotation	90°, adjustable with mechanical stop
-	electronically variable
Direction of rotation	reversible with γ/\sim switch
Position indication	handle
Manual override	external push button
Running time	150 seconds (default)
	variable (90 to 350 seconds)
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<45 dB(A)
Quality standard	ISO 9001
†Rated Impulse Voltage 800V, Type	of action 1.AA, Control Pollution Degree 3.

800-543-9038 USA



ARX24-MFT95 Actuators, 0 to 135 Ω

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required. /1\

/2\ **CAUTION** Equipment damage!

Actuators and controller must have separate transformers.

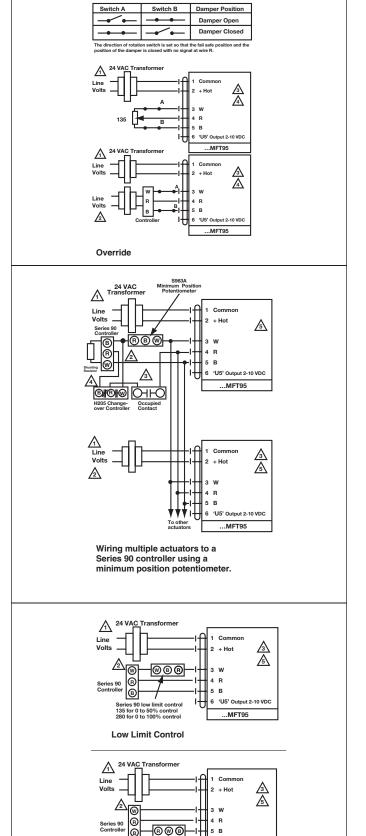
Consult controller instruction data for more detailed installation 3 information.

Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell resistor <u>/4</u> kits may also be used.

∕5∖ To reverse control rotation, use the reversing switch.

WARNING Live Electrical Components!

WARNING Live Electrical Components! During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



415

.MFT95

200

Series 90 high limit

High Limit Control

10 VDC

ARB24-3-T N4 NEMA 4X Actuators, On/Off, Floating Point







D1363 12.98 6.77 [172] [330] 4 10.29 6.02 [261] [153] D c F F в Α

w/built in h

heater

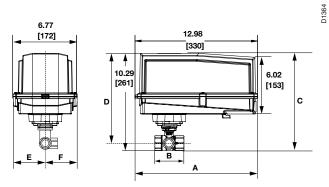
Technical Data	
Control	on/off, floating point
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	2.5 W / heater 23 W
holding	0.5 W
Transformer sizing	5.5 VA (class 2 power source) / heater 20.5 VA
Electrical connection	screw terminal (for 26 to 14 GA wire)
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	600 Ω
Angle of rotation	90°, adjustable with mechanical stop
Direction of rotation	reversible with γ/\sim switch
Position indication	visual pointer
Manual override	external push button
Running time	90 seconds constant independent of load
Humidity	100% RH
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4X/NEMA 4X/IP66 & IP67
Housing material	Polypropelene
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1, CSA C22.2 No. 24-93,
	CE according to 89/336/EEC.
Quality standard	ISO 9001
+Bated Impulse Voltage 800V Type (of action 1 Control Pollution Degree 3

†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3 *Cannot be used with the CCV-EXT-KIT

	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]
B251-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve

Dimensions with 2-Way Valve



Valve Nominal Size		Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]



ARB24-3-T N4 NEMA 4X Actuators, On/Off, Floating Point

Wiring Diagrams

X INSTALLATION NOTES

CAUTION Equipment damage!
 Actuators may be connected in parallel.
 Power consumption and input impedance must be observed.
 For end position indication, interlock control, etc.,

ARB24-3-S incorporates one built-in auxiliary switches: 1 x SPDT, 3A (0.5A) @250 VAC, UL listed, adjustable 0° to 95°.

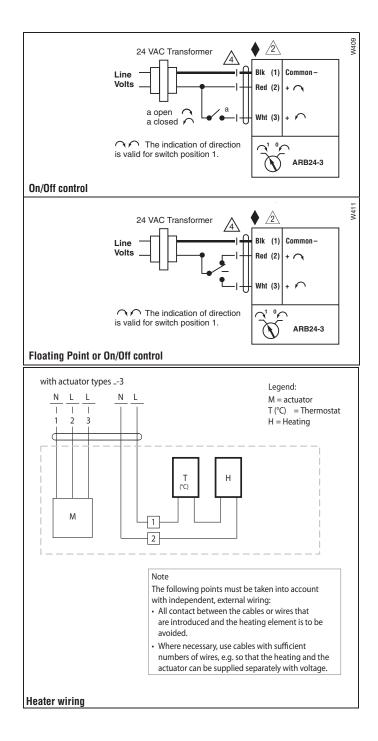
Actuators may also be powered by 24 VDC.

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

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ARB24-SR-T N4 NEMA 4X Actuators, Proportional







D1363 12.98 6.77 [172] [330] 4 10.29 [261] 6.02 [153] D c ۷ F F в Α

w/built in h

heater

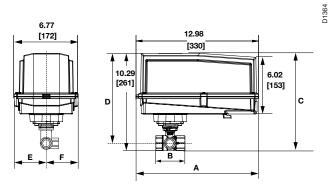
Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz
		24 VDC ± 10%
Power consumption	running	2.5 W / heater 23 W
	holding	0.4 W
Transformer sizing		5 VA (class 2 power source) / heater 20 VA
Electrical connection		screw terminal (for 26 tp 14 GA wire)
Overload protection		electronic throughout 0° to 95° rotation
Operating range Y		2 to 10 VDC, 4 to 20 mA
Input impedance		600 Ω
Angle of rotation		90°, adjustable with mechanical stop
Direction of rotation		reversible with \sim/\sim switch
Position indication		visual pointer
Manual override		external push button
Running time		90 seconds constant independent of load
Humidity		100% RH
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4X/NEMA 4X/IP66 & IP67
Housing material		Polypropelene
Agency listings†		cULus according to UL 60730-1A/-2-14,
		CAN/CSA E60730-1, CSA C22.2 No. 24-93,
		CE according to 89/336/EEC.
Quality standard		ISO 9001
+Rated Impulse Voltage 8	OOV. Type o	of action 1. Control Pollution Degree 3

†Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3 *Cannot be used with the CCV-EXT-KIT

	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]
B251-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve

Dimensions with 2-Way Valve



Valve Nominal Size		Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]



ARB24-SR-T N4 NEMA 4X Actuators, Proportional

Wiring Diagrams

∕5∖

X INSTALLATION NOTES

<u>CAUTION Equipment damage!</u> Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

3 Actuators may also be powered by 24 VDC.

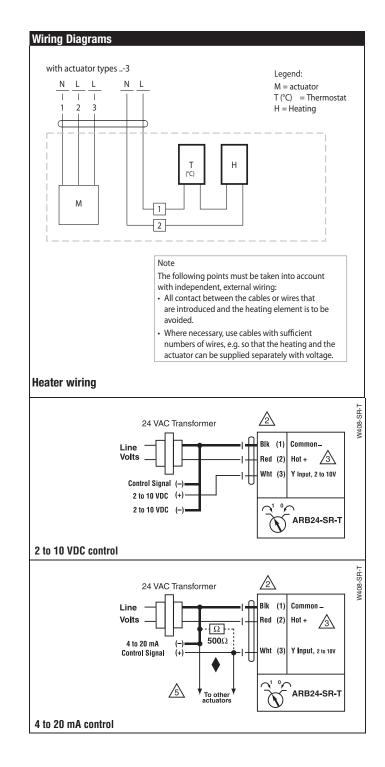
Only connect common to neg. (-) leg of control circuits.

APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

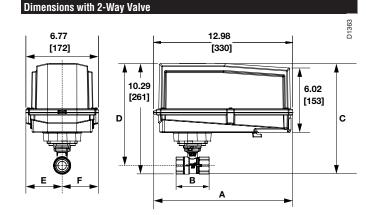


ARX24-MFT-T N4 NEMA 4X Actuators, Multi-Function Technology









Models ARX24-MFT-T N4 ARX24-MFT-T N4H w/built in heater

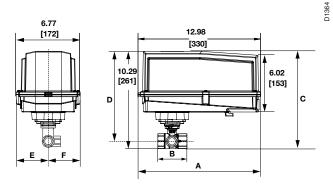
Technical Data Control 2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off) 24 VAC ± 20% 50/60 Hz Power supply 24 VDC ± 10% Power consumption running 3.5 W / heater 24 W holding 1.25 W Transformer sizing 6 VA (class 2 power source) / heater 21 VA screw terminal (for 26 tp 14 GA wire) Electrical connection electronic throughout 0° to 95° rotation Overload protection 100 k Ω for 2 to 10 VDC (0.1 mA) Input impedance 500 Ω for 4 to 20 mA 1500 Ω for PWM, floating point and on/off control Angle of rotation 95°, adjustable with mechanical stop electronically variable Direction of rotation reversible with γ/γ switch Position indication visual pointer Manual override external push button Running time 150 seconds (default) constant independent of load variable (75 to 350 seconds) Humiditv 100% RH Ambient temperature -22°F to 122°F [-30°C to 50°C] -40°F to 176°F [-40°C to 80°C] Storage temperature UL Type 4X/NEMA 4X/IP66 & IP67 Housing type Housing material Polypropelene cULus according to UL 60730-1A/-2-14, CAN/ Agency listings† CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC. Quality standard ISO 9001

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

*Cannot be used with the CCV-EXT-KIT

	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B231-B232	11⁄4"	32	3.72" [94.6]	2.04" [51.9]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B250	2"	50	4.21" [107.0]	2.27" [57.7]
B251-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve



Valve Nominal Size		Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]



ARX24-MFT-T N4 NEMA 4X Actuators, Multi-Function Technology

Wiring Diagrams

🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2\ Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC. /3\

Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.

- Control signal may be pulsed from either the Hot (source) ∕6∖ or the Common (sink) 24 VAC line.
- Contact closures A & B also can be triacs.
- /8\ A& B should both be closed for triac source and open for triac sink.
 - For triac sink the common connection from the actuator

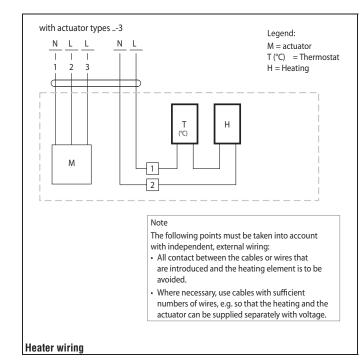
must be connected to the hot connection.

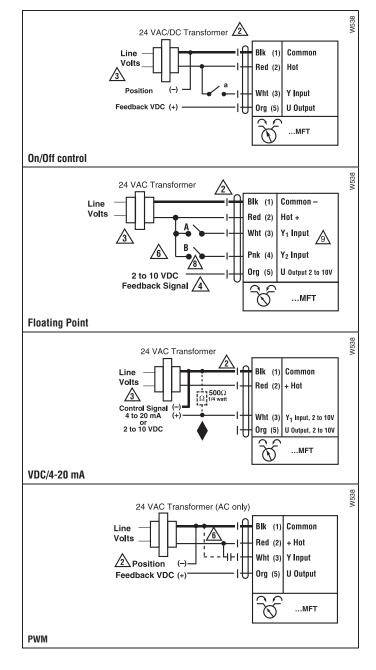
APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

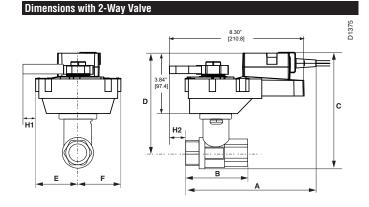
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Models

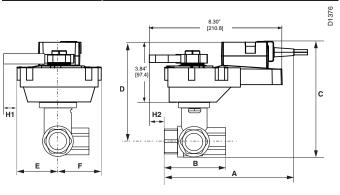
ARQX24-1 Flexible Version

Technical Data	on/off	
	24 VAC ± 20% 50/60 Hz	
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%	
De la constitución de la constit		
Power consumption running		
holding		
Transformer sizing	26 VA (Class 2 power source)	
Electrical connection	1⁄2" conduit connector,	
	18 GA plenum rated cable	
	3 ft [1m], 10 ft [3m], 16 ft [5m]	
Overload protection	electronic throughout 0 to 95° rotation	
Input impedance	100 Ω	
Angle of rotation	max 95°, adjustable with mechanical stop	
Direction of rotation	reversible with γ/\sim switch	
Position indication	reflective visual indicator (snap-on)	
Manual override	external push button	
Running time	constant of independent load	
-	10 or 15 seconds	
Humidity	5 to 95% RH non-condensing	
	(EN 60730-1)	
Ambient temperature	-22°F to 122°F [-30°C to 50°C]	
Storage temperature	-40°F to 176°F [-40°C to 80°C]	
Housing	NEMA 2/IP54	
Housing material	UL94-5VA	
Agency listings†	cULus according to UL 60730-1A/-2-14,	
rigency neurger	CAN/CSA E60730-1:02, CE according to	
	2004/108/EC and 2006/95/EC for line voltage	
	and/or –S versions	
Noise level	<52 dB(A)	
Quality standard	ISO 9001	
	faction 1 Control Pollution Degree 3	

Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

	Valve Nor	ninal Size	Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B248-B280	2"	50	4.21" [107]	2.27" [57.7]

Dimensions with 3-Way Valve



Valve Nominal Size			Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C	
B330-B332	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]	
B338-B340	1½"	40	4.39" [111.6]	2.51" [63.7]	2.90" [61.1]	
B348-B352	2"	50	4.95" [124.5]	2.73" [69.5]	2.74" [69.7]	



ARQX24-1 Quick Running Actuators, On/Off

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required. /1\

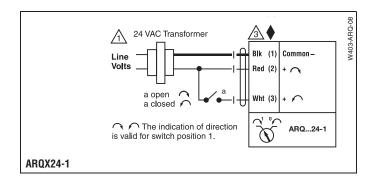
Actuators may also be powered by 24 VDC. /3\

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

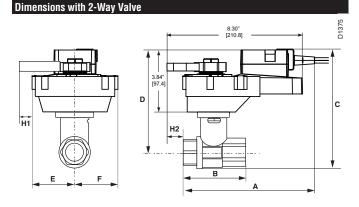
Æ During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



ARQX24-MFT Quick Running Actuators, Multi-Function Technology







Models

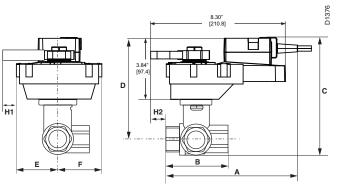
ARQX24-MFT Flexible Version

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	15 W
holding	1.5 W
Transformer sizing	26 VA (Class 2 power source)
Electrical connection	1/2" conduit connector,
	18 GA plenum rated cable
	3 ft [1m], 10 ft [3m], 16 ft [5m]
Overload protection	electronic throughout 0 to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA (default)
	variable (VDC, on/off)
Feedback output U	2 to 10 VDC, 0.5mA max
	VDC variable
Input impedance	100 kΩ (0.1 mA), 500 Ω, 1500 Ω
	(on/off)
Angle of rotation	max 95°, adjustable with mechanical stop
	electronically variable
Direction of rotation	reversible with $\gamma/\!$
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time	constant of independent load
	10 or 15 seconds
Humidity	5 to 95% RH non-condensing
	(EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EC and 2006/95/EC for line voltage
	and/or –S versions
Noise level	<52 dB(A)
Quality standard	ISO 9001

Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

DN (mm)		
	A	В
32	3.72" [94.6]	2.04" [51.9]
40	3.88" [98.5]	2.04" [51.9]
50	4.21" [107]	2.27" [57.7]
	40	40 3.88" [98.5]

Dimensions with 3-Way Valve



Valve Nominal Size		Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C
B330-B332	1¼"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B340	1½"	40	4.39" [111.6]	2.51" [63.7]	2.90" [61.1]
B348-B352	2"	50	4.95" [124.5]	2.73" [69.5]	2.74" [69.7]



Wiring Diagrams

/2`

/3`

/5`

X INSTALLATION NOTES

ig< Provide overload protection and disconnect as required.

CAUTION Equipment damage! Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC.

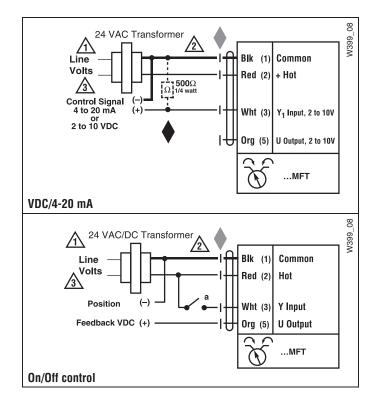
Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

APPLICATION NOTES

The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



GRB24-3, GRX24-3 Actuators, On/Off, Floating Point

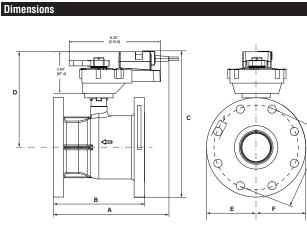


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Models

GRB24-3-5-14 GRX24-3-5-14

Technical Data		
Control		on/off, floating point
Power supply		24 VAC ± 20% 50/60 Hz
Power consumption	running	4 W
	holding	2 W
Transformer sizing		6 VA (Class 2 power source)
Electrical connection		3 ft,18 GA plenum rated cable
		½" conduit connector
	GRX	3 ft. [1m], 10 ft. [3m], 16 ft. [5m]
Overload protection		electronic throughout 0° to 95° rotation
Input impedance		600 Ω
Angle of rotation		max. 95°, adjustable with mechanical stop
Direction of rotation		reversible with 🗥 switch
Position indication		visual indicator
Running time		150 seconds, constant independent of load
Manual override		external push button
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Housing		NEMA 2/IP54, Enclosure Type 2
Agency listings †		cULus according to UL 60730-1A/-2-14,
		CAN/CSA E60730-1:02, CE according to
		2004/108/EEC and 2006/95/EC.
Noise level		<45 dB(A)
Quality standard		ISO 9001

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

	Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
				Α	В	C
	B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]
	B6500	5" [125]	F05	10.00" [254]	10.30" [261.6]	10.50" [266.4]
_	B6600	6" [150]	FUD	11.00" [279.4]	12.50" [317.5]	11.70" [296.9]



GRB24-3, GRX24-3 Actuators, On/Off, Floating Point

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required.

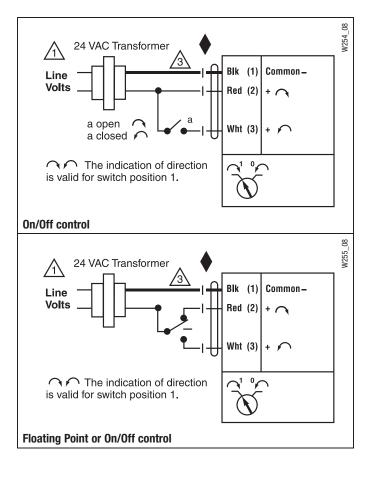
Actuators may also be powered by 24 VDC. /3\

APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

<u>[</u>] During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

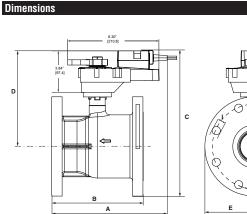


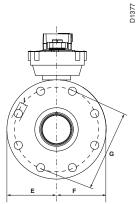






D





Models

GRB120-3 GRX120-3

Technical Data	
Power Supply	100 to 240 VAC, 50/60 Hz (nominal)
	85 to 265 VAC, 50/60 Hz (tolerance)
Power consumption running	4 W
holding	2 W
Transformer sizing	7 VA (Class 2 power source)
Electrical connection	18 GA appliance rated cable
	1/2" conduit connector
	3 ft. [1m], 10 ft. [3m], 16 ft. [5m]
Overload protection	electronic throughout 0° to 95° rotation
Control	on/off, floating point
Input impedance	600 Ω
Angle of rotation	max. 95°, adjustable with mechanical stop
Direction of rotation	reversible with 🔨 🔿 switch
Position indication	external push button
Running time	150 seconds, constant independent of load
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Housing	NEMA 2/IP54, Enclosure Type 2
Housing material	UL94-5VA
Agency listings †	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EEC and 2006/95/EC.
Noise level	<45 dB(A)
Quality standard	ISO 9001
	ion 1.AA (1.AA.B for -S version). Control Pollution Degree 3.

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]
B6500	5" [125]	F05	10.00" [254]	10.30" [261.6]	10.50" [266.4]
B6600	6" [150]	FUD	11.00" [279.4]	12.50" [317.5]	11.70" [296.9]



GRB120-3, GRX120-3

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required.

Actuators may be connected in parallel.

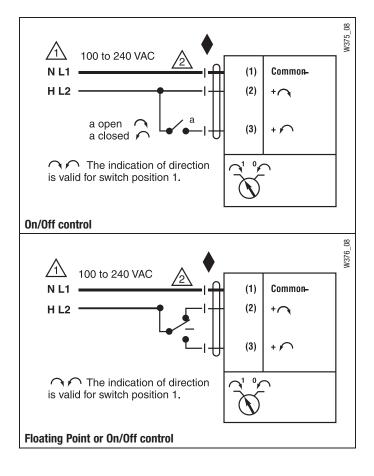
/2] Power consumption and input impedance must be observed.

APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



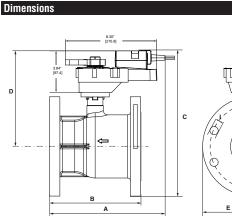
GRX24-MFT Actuators, Multi-Function Technology

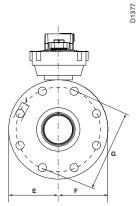






D





CE	LISTED 94 D5 TEMP.IND. & CULUS REG. EQUIP.	
		_

Models

GRX24-MFT-5-14

Technical Data		
Control	2 to 10 VDC, 4 to 40 mA (default)	
	variable (VDC, PWM, floating point, on/off)	
Power supply	24 VAC ± 20% 50/60 Hz	
	24 VDC ± 10%	
Power consumption running	4.5 W	
holding	1.5 W	
Transformer sizing	7 VA (Class 2 power source)	
Electrical connection	3 ft,18 GA plenum rated cable	
	1/2" conduit connector	
	3 ft. [1m], 10 ft. [3m], 16 ft. [5m]	
Overload protection	electronic throughout 0° to 95° rotation	
Feedback output	2 to 10 VDC, 0.5 mA max, VDC variable	
Input impedance	100 kΩ (0.1 mA, 500 Ω)	
	1500 Ω (PWM, floating point , on/off)	
Angle of rotation	max. 95°, adjustable with mechanical stop	
	electronically variable	
Direction of rotation	reversible with γ/\sim switch	
Position indication	visual indicator	
Running time	150 seconds (default)	
	variable (75 to 300 seconds)	
Manual override	external push button	
Ambient temperature	-22°F to 122°F [-30°C to 50°C]	
Housing	NEMA 2/IP54, Enclosure Type 2	
Housing material	UL94-5V (flammability rating)	
Agency listings †	cULus according to UL 60730-1A/-2-14,	
	CAN/CSA E60730-1:02, CE according to	
	2004/108/EEC and 2006/95/EC.	
Noise level	<45 dB(A)	
Quality standard	ISO 9001	

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]
B6500	5" [125]	F05	10.00" [254]	10.30" [261.6]	10.50" [266.4]
B6600	6" [150]	FUD	11.00" [279.4]	12.50" [317.5]	11.70" [296.9]



GRX24-MFT Actuators, Multi-Function Technology

Wiring Diagrams

X INSTALLATION NOTES

Provide overload protection and disconnect as required.

CAUTION Equipment Damage!

Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

3 Actuators may also be powered by 24 VDC.

Position feedback cannot be used with Triac sink controller.

- $\stackrel{4}{\longrightarrow}$ The actuator internal common reference is not compatible.
- Control signal may be pulsed from either the Hot (source)

or the Common (sink) 24 VAC line.

8 Contact closures A & B also can be triacs.

 $\underline{8}$ A & B should both be closed for triac source and open for triac sink.

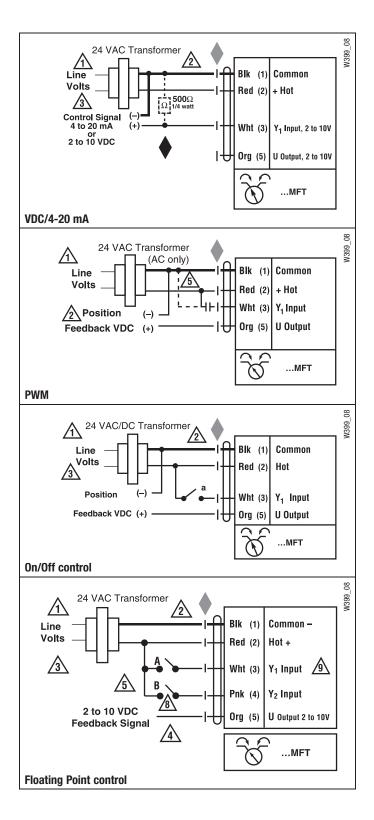
- 9. For triac sink the common connection from the actuator must be connected to the hot connection of the controller.
 - APPLICATION NOTES

Meets UL requirements without the need of an electrical ground connection.

The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



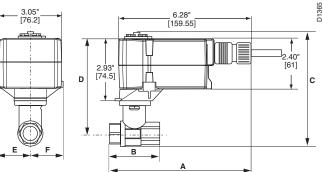
TFRB(X) Actuators, On/Off







Dimensions with 3-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B207(B)-B211(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212(B)-B215(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217(B)-B221(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B217(B)-B221(B)	3/4	20	2.73 [69.3]	1.87 [47.4]

Models TFRB(X)24

TFRB(X)24 TFRB(X)120 TFRB(X)24-S TFRB(X)120-S w/built-in Aux. Switch

Technical Data			
Control	on/off		
Power supply			
TFRB(X)24(-S)	24VAC ± 20%, 50/60Hz		
	24VDC ± 10%		
TFRB(X)120(-S)	(nominal) 100 to 240 VAC, 50/60 Hz		
	(tolerance) 85 to 265 VAC, 50/60 Hz		
Power consumption running	2.5 W		
holding	1.3 W		
Transformer sizing			
TFRB(X)24(-S)	5 VA (class 2 power source)		
TFRB(X)120(-S)	5 VA (class 2 power source)		
Electrical connection	1/2" conduit connector		
(-S models have 2 cables)	18 GA appliance cable		
TFRB(X)24	3 ft [1m]		
TFRB(X)120	10 ft [3m]		
	16 ft [5m]		
Overload protection	electronic throughout 0° to 95° rotation		
Angle of rotation	95°		
Direction of rotation	reversible with protected γ / \sim mounting		
Position indication	visual indicator, 0° to 95°		
Running time motor	<75 seconds (0 to 18 in-lb)		
spring	<75 sec @ -22°F to 122°F [-20°C to 50°C]		
Humidity	5 to 95% RH non-condensing		
Ambient temperature	-22°F to 122°F [-30°C to 50°C]		
Storage temperature	-40°F to 176°F [-40°C to 80°C]		
Housing	NEMA type 2/IP42		
Housing material	UL94 - 5VA		
Agency listings†	cULus according to UL 60730-1A/-2-14, CAN/		
	CSA E60730-1:02, CE according to 2004/108/		
	EC and 2006/95/EC for line voltage and/or –S		
	versions		
	<40 db (A)		
spring return			
Quality standard	ISO 9001		
TFRB(X)S			
Auxiliary switch	1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed		
+ Dated impulse valtage 000V//4V/	adjustable 0° to 95°		

† Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3, Type of action 1.AA (1.AA.B for -S models)

3.05 [™] →	6.28" <u></u> [159.55] ►	D1366
		c

	Valve Nominal Size		Dimen	[mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]

TFRB(X) Actuators, On/Off



Wiring Diagrams

🔀 INSTALLATION NOTES

CAUTION Equipment damage! /2\

/3\

Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

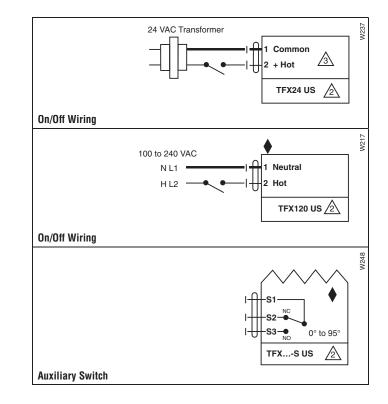
Actuators may also be powered by 24 VDC.

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

 \wedge During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a gualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

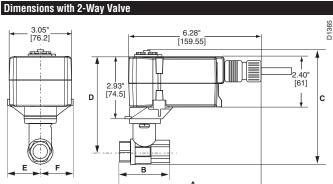


TFRB(X)24-3 Actuators, Floating Point









Valve Nominal Size		Dimensions (Inches [mm])
Inches	DN [mm]	А	В
1⁄2"	15	2.41" [61.1]	1.39" [35.2]
1⁄2"	15	2.38" [60.4]	1.78" [45.2]
3⁄4"	20	2.73" [69.3]	1.87" [47.4]
	Inches 1⁄2" 1⁄2"	Inches DN [mm] ½" 15 ½" 15	Inches DN [mm] A ½" 15 2.41" [61.1] ½" 15 2.38" [60.4]

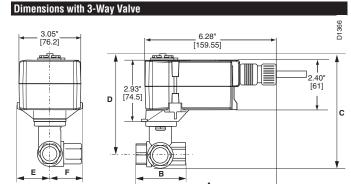
Models

TFRB(X)24-3 TFRB(X)24-3-S

S w/built-in Aux. Switch

Technical Data	
Control	floating point
Power supply	24VAC ± 20%, 50/60Hz
Power consumption running	2.5 W
holding	1.0 W
Transformer sizing	4 VA (class 2 power source)
Electrical connection	½" conduit connector
(-S models have 2 cables)	18 GA plenum rated cable
TFRB(X)24-3	3 ft [1m]
	10 ft [3m]
	16 ft [5m]
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	1000 Ω (0.6w) control inputs
Angle of rotation	95°
Direction of rotation spring	reversible with CW/CCW mounting
motor	reversible with built-in n/n switch
Position indication	visual indicator, 0° to 95°
	95 sec constant, independent of load
spring	<25 sec @ -4°F to 122°F [-20°C to 50°C]
	<60 sec @ -22°F [-30°C]
Humidity	5 to 95% RH non-condensing
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA type 2/IP42
Housing material	UL94 - 5VA
Agency listings†	cULus according to UL 60730-1A/-2-14, CAN/
	CSA E60730-1:02, CE according to 2004/108/
	EC and 2006/95/EC for line voltage and/or –S versions
	<35 db (A)
spring return	62 dB (A)
Quality standard	ISO 9001
TFRB(X)24-3-S US	
Auxiliary switch	1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed,
	adjustable 0° to 95°
Deteril	u 100V medal). Control nellution degree 0

† Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3, Type of action 1.AA (1.AA.B for -S models)



	Valve Nominal Size		Dimen	Dimensions (Inches		
Valve Body	Inches	DN [mm]	Α	В	C	
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]	
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]	
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]	

TFRB(X)24-3 Actuators, Floating Point



Wiring Diagrams

X INSTALLATION NOTES

CAUTION Equipment damage! /2\ Actuators may be connected in parallel. Power consumption and input impedance must be observed. The common connection from the actuator must be ∕3∖

connected to the Hot connection of the controller.

The actuator Hot must be connected to the control board common. /4\

For end position indication, interlock control, fan startup, etc., TF24-3-S US incorporates one built-in auxiliary switch: 1 x SPDT, 3A <u>/</u>5` (0.5A) @250 VAC, UL listed, adjustable 0° to 95°.

Actuators with plenum rated cable do not have numbers on wires; use

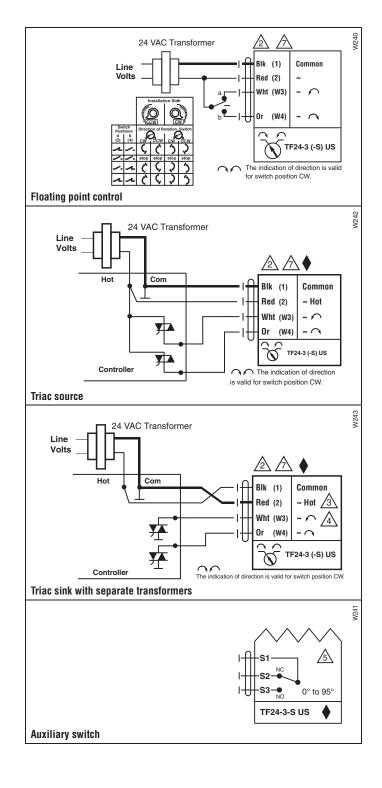
color coded instead. Actuators with appliance rated cable use numbers.

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

/!\ During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

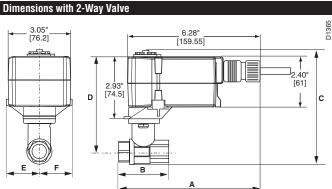


TFRB(X)24-SR Actuators, Proportional









	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B207(B)-B211(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212(B)-B215(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217(B)-B221(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]

Models

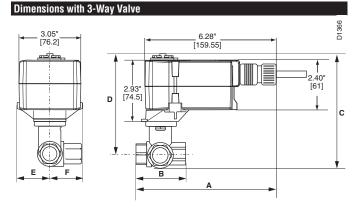
TFRB(X)24-SR TFRB(X)24-SR-S w/built-in Aux. Switch

Technical Data	proportional
Power supply	24 VAC ± 20%, 50/60 Hz
i owei supply	24 VDC ± 10%
Power consumption running	
holding	-
Transformer sizing	4 VA (class 2 power source)
Electrical connection	1/2" conduit connector
(-S models have 2 cables)	18 GA plenum rated cable
TFRB(X)24-SR	3 ft [1m]
	10 ft [3m]
	16 ft [5m]
Electrical protection	actuators are double insulated
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA
Input impedance	100k Ω (0.1mA), 500 Ω
Angle of rotation	95°
Direction of rotation spring	reversible with CW/CCW mounting
motor	
Position indication	visual indicator, 0° to 95°
Running time motor	95 sec constant, independent of load
spring	<25 sec @-4°F to 122°F [-20°C to 50°C]
	<60 sec @-22°F [-30°C]
Humidity	5 to 95% RH non-condensing
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA type 2/IP42
Housing material	UL94 - 5VA
Agency listings†	cULus according to UL 60730-1A/-2-14, CAN/
	CSA E60730-1:02, CE according to 2004/108/
	EC and 2006/95/EC for line voltage and/or –S
	versions
	<35 db (A)
spring return	
Quality standard	ISO 9001

1 x SPDT, 3A (0.5A) @ 250 VAC, UL Listed,

adjustable 0° to 95°

†Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3,



	Valve Nominal Size		Dimen	[mm])	
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B321(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]

Type of action 1.AA (1.AA.B for -S models)

Auxiliary switch

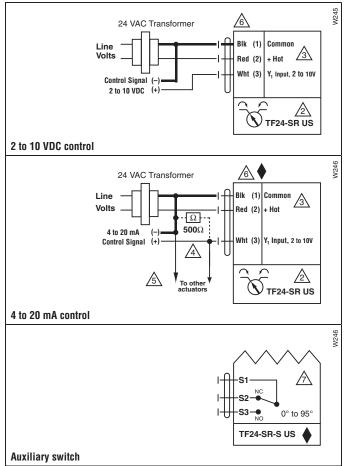
TFRB(X)24-SR Actuators, Proportional



Wiring Diagrams 🔀 INSTALLATION NOTES **CAUTION** Equipment damage! /2\ Actuators may be connected in parallel. Power consumption and input impedance must be observed. Up to 4 actuators may be connected in parallel. With 4 actuators wired to one 500 Ω resistor, a +2% shift of control signal may be required. /4\ Power consumption must be observed. Actuators may also be powered by 24 VDC. /3\ Only connect common to neg. (---) leg of control circuits. /5\ Actuators with plenum rated cable do not have numbers on wires; ∕6∖ use color codes instead. For end position indication, interlock control, fan startup, etc., TF24-SR-S US incorporates one built-in auxiliary switch: 1 x SPDT, 3A (0.5A) @250 VAC, UL listed, adjustable 0° to 95°. **APPLICATION NOTES** Meets cULus or UL and CSA requirements without the need of an electrical ground connection. WARNING Live Electrical Components! During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components

perform these tasks. Failure to follow all electrical safety precautions when exposed to live

electrical components could result in death or serious injury.

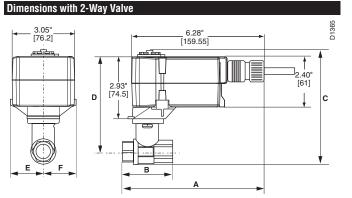


TFRX24-MFT Actuators, Multi-Function Technology







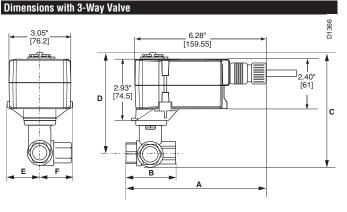


	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	А	В
B207-B211	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212-B215	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217-B221	3⁄4"	20	2.73" [69.3]	1.87" [47.4]

Models TFRX24-MFT

Technical Data	
Control	MFT
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	2.5 W
holding	1.0 W
Transformer sizing	4 VA (class 2 power source)
Electrical connection	1/2" conduit connector
	3 ft [1m], 18 GA plenum rated cable
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y*	2 to 10 VDC, 4 to 20 mA (default)
	variable (VDC, PWM, floating point, on/off)
Feedback output U*	2 to 10 VDC, 0.5 mA max
Input impedance	100 kΩ for 2 to 10 VDC (0.1 mA)
	500 Ω for 4 to 20 mA
	1500 Ω for PWM, floating point and
	on/off control
Mechanical angle of rotation*	95°
Angle of rotation adaptation*	Off (Default)
Direction of rotation spring	reversible with CW/CCW mounting
motor	reversible with built-in α/\sim switch
Position indication	visual indicator, 0° to 95°
Override control*	Min. (Min Position) = 0%
	- ZS (Mid. Position) = 50%
	- Max. (Max. Position) = 100%
Running time motor*	95 seconds constant independent of load
spring	<25 seconds @-4°F to 122°F [-20°C to 50°C]
	<60 seconds @-22°F [-30°C]
Humidity	5 to 95% RH, non-condensing
Ambient temperature	-22 to 122° F (-30 to 50° C)
Storage temperature	-40 to 176° F (-40 to 80° C)
Housing	NEMA 2/IP42
Housing material	UL 94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14, CAN/
	CSA E60730-1:02, CE according to 2004/108/
	EC and 2006/95/EC for line voltage and/or –S
	versions
. , –	<35 dB (A)
spring return	
Quality standard	ISO 9001
* Variable when configured with MF	

† Rated impulse voltage 0.8 kV, Control pollution degree 3, Type of action 1.AA.

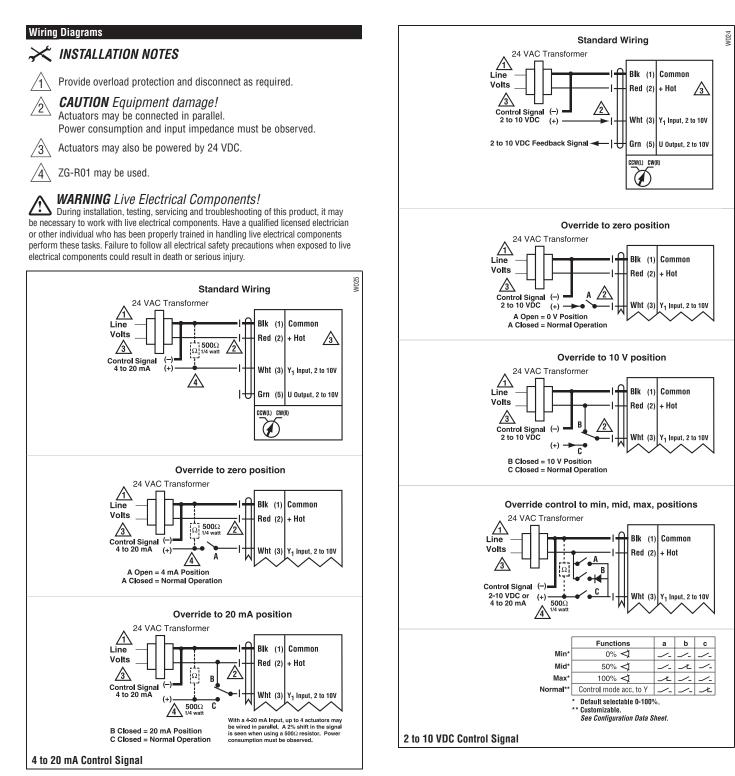


Valve Body Inches DN [mm] A B B307-B311 ½" 15 2.41" [61.1] 1.39" [35.2] 1.4	Valve	sions (Inches [mm])
B307-B311 ½" 15 2.41" [61.1] 1.39" [35.2] 1.3	Valve Body Inch	В	C
	B307-B311 1/2	1.39" [35.2] 1.20"	[30.6]
B312-B315 1/2" 15 2.38" [60.4] 1.78" [45.2] 1.1	B312-B315 1/2	1.78" [45.2] 1.29"	[32.8]
B317-B321 ³ / ₄ " 20 2.73" [69.3] 1.87" [47.4] 1.4	B317-B321 34	1.87" [47.4] 1.47"	[37.3]

800-543-9038 USA



TFRX24-MFT Actuators, Multi-Function Technology



LF Actuators, On/Off



Dimensions (Inches [mm])

A

2.41" [61.1]

2.38" [60.4]

2.73" [69.3]

3.09" [78.4]

3.72" [94.6]

В

1.39" [35.2]

1.78" [45.2]

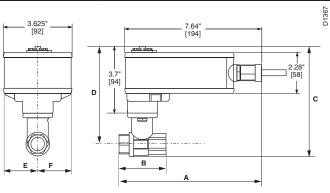
1.87" [47.4]

1.87" [47.4]

1.87" [47.4]



Dimensions with 2-Way Valve



DN [mm]

15

15

20

25

32

Valve Nominal Size

Inches

1/2"

1⁄2"

3⁄4"

1"

11⁄4"

Models	

LF24 US	
LF24-S US	w/built-in Aux. Switch
LF120 US	
LF120-S US	w/built-in Aux. Switch

Technical Data			
Control		on/off, floating point	
Power supply			
LF24(-S) US		24 VAC ± 20% 50/60 Hz	
		24 VDC ± 10%	
LF120(-S) US		120 VAC ± 10% 50/60 Hz	
Power consumption			
LF24(-S) US r	unning	5 W	
h	olding	2.5 W	
LF120(-S) US r	unning	5.5 W	
h	olding	3.5 W	
Transformer sizing			
LF24(-S) US		7 VA, class 2 power source	
LF120(-S) US		7.5 VA, class 2 power source	
Electrical connection		½" conduit connector	
(-S models have 2 cables	;)	3 ft [1m], 18 GA appliance cable	
Electrical protection		120V actuators double insulated	
Overload protection		electronic throughout rotation	
Angle of rotation		95°	
Spring return direction		reversible with CW/CCW mounting	
Position indication		visual indicator 0° to 90°	
Running time	motor	<40 to 75 seconds (on/off)	
	spring	<25 sec. @-4°F to 122°F [-20°C to 50°C]	
		<60 sec. @-22°F [-30°C]	
Ambient temperature		-22° F to 122° F [-30° C to 50° C]	
Housing		NEMA 2	
Agency listings†		cULus according to UL 873 and CAN/CSA	
		C22.2 No. 24-93	
()		<30 db(A)	
spring	return	62 dB(A)	
Quality standard		ISO 9001	
LF\$ U\$			
Auxiliary switch		1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed,	
		adjustable 0° to 95° (double insulated)	

 Rated impulse voltage 800V (4kV for 120V model), Control pollution degree 3, Type of action 1.AA (1.AA.B for -S models)

Dimensions with 3-Way Valve

Valve Body

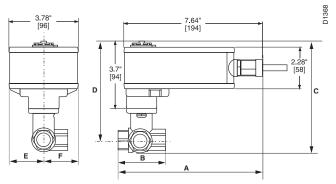
B207(B)-B211(B)

B212(B)-B215(B)

B217(B)-B220(B)

B222-B225

B229-B230



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B320(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]

LF Actuators, On/Off



Wiring Diagrams

🕻 INSTALLATION NOTES

Provide overload protection and disconnect as required. /1\

CAUTION Equipment damage! /2\ Actuators may be connected in parallel. Power consumption must be observed.

Actuator may also be powered by 24 VDC. /3

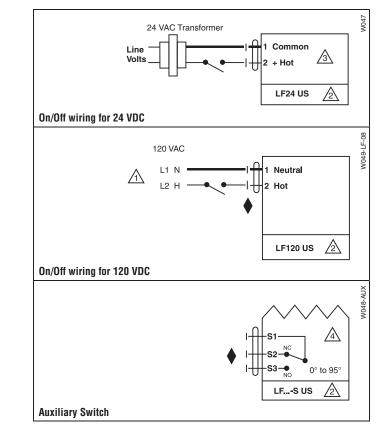
For end position indication, interlock control, fan startup, etc., LF24-S US and LF120-S US incorporates a built-in auxiliary switch: /4\ 1 x SPDT, 6A (1.5A) @ 250 VAC, UL listed, adjustable 0° to 95°.

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

MARINING LIVE Electrical components. During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LF24-3 Actuators, Floating Point





Models

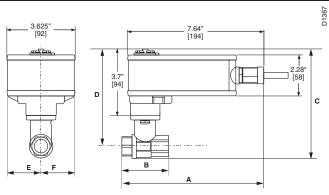
LF24-3 US LF24-3-S US

w/built-in Aux. Switch

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz
		24 VDC ± 10%
Power consumption	running	2.5 W
	holding	1W
Transformer sizing		5 VA (class 2 power source)
Electrical connection		½" conduit connector
(-S models have 2 ca	bles)	3 ft [1m], 18 GA appliance cable
Overload protection		electronic throughout 0° to 95° rotation
Input impedance		1000 Ω (0.6w) control inputs
Angle of rotation		95°
Direction of rotation	spring	reversible with CW/CCW mounting
	motor	reversible with built-in $\alpha/\!\!\!/$ switch
Position indication		visual indicator 0° to 90°
Running time	motor	150 seconds constant independent of load
	spring	<25 seconds @ -4°F to 122°F [-20°C to 50°C]
		<60 seconds @ -22°F [-30°C]
Humidity		5 to 95% RH non-condensing
Ambient temperature		-22° F to 122° F [-30° C to 50° C]
Storage temperature		-40° F to 176° F [-40° C to 80° C]
Housing		NEMA type 2/IP54
Housing material		zinc coated metal
Agency listings		cULus according to UL 873 and CAN/CSA
		C22.2 No. 24-93
Noise level (max)	running	<30 db(A)
sp	ring return	62 dB(A)
Servicing		maintenance free
Quality standard		ISO 9001
LF24-3-S US		
Auxiliary switch		1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed,
-		

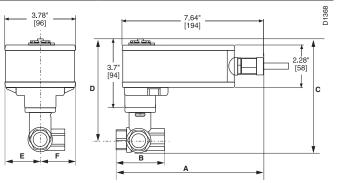
Auxiliary switch	1 x SPDT, 6A (1.5A)	@ 250 VAC, UL Lis
	adjustable 0° to 95°	(double insulated)

Dimensions with 2-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В
B207(B)-B211(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212(B)-B215(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217(B)-B220(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	1¼"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve



	Valve Nor	ninal Size	Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B320(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]

LF24-3 Actuators, Floating Point



Wiring Diagrams

X INSTALLATION NOTES

Actuators may be connected in parallel. Power consumption must be observed.

3 Actuators may also be powered by 24 VDC.

The common connection from the actuator must be connected to the Hot connection of the controller.

 $\sqrt{5}$ The actuator Hot must be connected to the control board common.

For end position indication, interlock control, fan startup, etc., LF24-3-S US incorporates one built-in auxiliary switch: 1 x SPDT, 6A (1.5A) @ 250 VAC, UL listed, adjustable 0° to 95°.

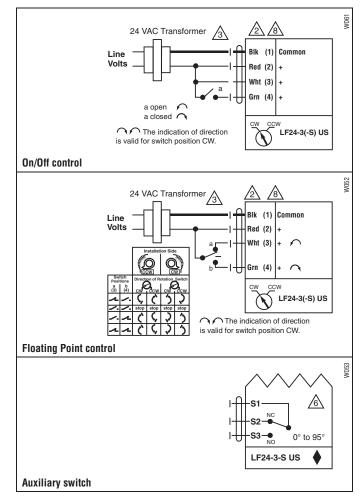
Actuators with plenum rated cable do not have numbers on wires; use color coded instead. Actuators with appliance rated cable use numbers.

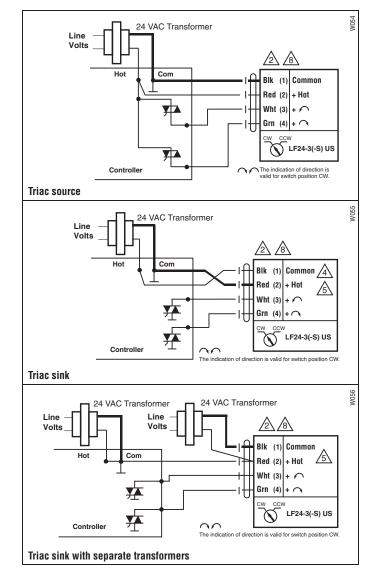
APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





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LF24-SR Actuators, Proportional





Models

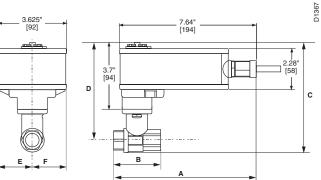
LF24-SR US LF24-SR-S US

w/built-in Aux. Switch

Technical Data	
Control	proportional
Control signal	2 to 10 VDC
, and the second s	4 to 20 mA (with 500 Ω resistor)
Power consumption running	2.5 W
holding	1 W
Transformer sizing	5 VA, class 2 power
Electrical connection	1/2" conduit connector
(-S models have 2 cables)	3 ft [1m], 18 GA appliance cable
Overload protection	electronic throughout 0° to 95° rotation
Feedback output	2 to 10 VDC
Input impedance	100 kΩ
Angle of rotation	95°
Direction of rotation spring	reversible with CW/CCW mounting
motor	reversible with built-in α/\sim switch
Position indication	visual indicator
Running time motor	150 sec. independent of load (proportional)
spring	<25 seconds @ -4°F to 122°F [-20°C to 50°C]
	<60 seconds @ -22°F [-30°C]
Ambient temperature	-22° F to 122° F [-30° C to 50° C]
Housing	NEMA 2
Agency listings	cULus according to UL 873 and CAN/CSA
	C22.2 No. 24-93
Noise level (max) running	<30 db(A)
spring return	62 dB(A)
Quality standard	ISO 9001
LF24-SR-S US	
Auxiliary switch	1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed,
	adjustable 0° to 95° (double insulated)

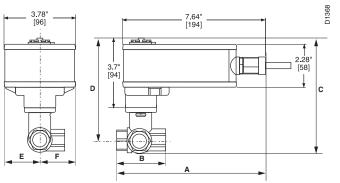
3.625" [92]

Dimensions with 2-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В
B207(B)-B211(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]
B212(B)-B215(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]
B217(B)-B220(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]
B222-B225	1"	25	3.09" [78.4]	1.87" [47.4]
B229-B230	1¼"	32	3.72" [94.6]	1.87" [47.4]

Dimensions with 3-Way Valve



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	А	В	C
B307(B)-B311(B)	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312(B)-B315(B)	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]
B317(B)-B320(B)	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]





Wiring Diagrams 🔀 INSTALLATION NOTES **CAUTION** Equipment damage! /2\ Actuators may be connected in parallel. Up to 4 actuators may be connected in parallel. With 4 actuators wired to one 500 Ω resistor, a +2% shift of control signal may be required. Power consumption must be observed. Actuators may also be powered by 24 VDC. /3\

Actuators with plenum rated cable do not have numbers on wires; use color codes instead.

Only connect common to neg. (-) leg of control circuits. /5\

For end position indication, interlock control, fan startup, etc., LF24-SR-S US incorporates one built-in auxiliary switch: 1 x SPDT, 6A (1.5A) @ 250 VAC, UL listed, adjustable 0° to 95°.



/6\

The LF24-SR-S US wire 5 is white.

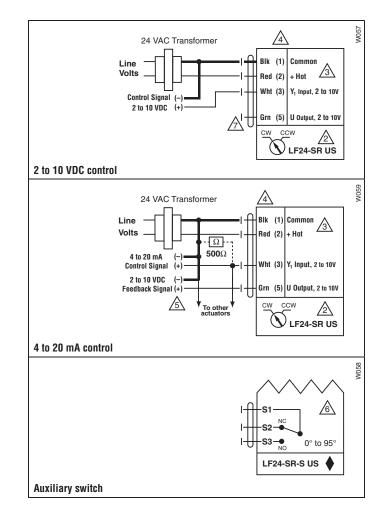
APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel. Meets cULus or UL and CSA requirements without the

need of an electrical ground connection.

WARNING Live Electrical Components!

MAKINING LIVE Electrical components. During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



LF24-MFT Actuators, Multi-Function Technology





Dimensions with 2-Way Valve

Models LF24-MFT US

LF24-MFT-S US w/bi

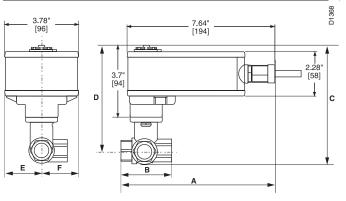
w/built-in Aux. Switch

Technical Data		
Control		MFT
Control signal		2 to 10 VDC
Power consumption	running	2.5 W
	holding	1 W
Transformer sizing		5 VA (class 2 power source)
Electrical connection		1/2" conduit connector
(-S models have 2 cab	les)	3 ft [1m], 18 GA appliance cable
Overload protection		electronic throughout 0° to 95° rotation
Feedback output		2 to 10 VDC, 0.5 mA max
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA)
		500 Ω for 4 to 20mA
		750 Ω for PWM
		500 Ω for on/off and floating point
Angle of rotation		95°
Direction of rotation	spring	reversible with CW/CCW mounting
	motor	reversible with built-in $\alpha/\!\sim$ switch
Position indication		visual indicator
Running time	motor	150 seconds independent of load
		(proportional, default)
	spring	<25 seconds @-4°F to 122°F [-20°C to 50°C]
		<60 seconds @-22°F [-30°C]
Ambient temperature		-22° F to 122° F [-30° C to 50° C]
Housing		NEMA 2
Agency listings		cULus according to UL 873 and CAN/CSA
		C22.2 No. 24-93
Noise level (max)	running	<30 db(A)
spri	ng return	62 dB(A)
Quality standard		ISO 9001
LF24-MFT-S US		
Auxiliary switch		1 x SPDT 6A (1 5A) @ 250 VAC 111 Listed

Auxiliary switch	1 x SPDT, 6A (1.5A) @ 250 VAC, UL Listed,
	adjustable 0° to 95° (double insulated)

Valve Nominal Size		Dimensions (Inches [mm])
Inches DN [mm]		А	В
1⁄2"	15	2.41" [61.1]	1.39" [35.2]
1⁄2"	15	2.38" [60.4]	1.78" [45.2]
3⁄4"	20	2.73" [69.3]	1.87" [47.4]
1"	25	3.09" [78.4]	1.87" [47.4]
11⁄4"	32	3.72" [94.6]	1.87" [47.4]
	Inches ½" ½" ½" ¾" 1"	Inches DN [mm] ½" 15 ½" 15 ¾" 20 1" 25	Inches DN [mm] A ½" 15 2.41" [61.1] ½" 15 2.38" [60.4] ¾" 20 2.73" [69.3] 1" 25 3.09" [78.4]

Dimensions with 3-Way Valve



	Valve Nor	ninal Size	Dimen	Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C	
B307-B311	1⁄2"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]	
B312-B315	1⁄2"	15	2.38" [60.4]	1.78" [45.2]	1.29" [32.8]	
B317-B320	3⁄4"	20	2.73" [69.3]	1.87" [47.4]	1.47" [37.3]	
B322-B325	1"	25	3.09" [78.4]	1.87" [47.4]	1.59" [40.3]	



LF24-MFT Actuators, Multi-Function Technology

Wiring Diagrams

X INSTALLATION NOTES

CAUTION Equipment damage!

Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC.

IN4004 or IN4007 diode (IN4007 supplied, Belimo part number 40155).

Triac A and B can also be contact closures.

6 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

Position feedback cannot be used with Triac sink controller.

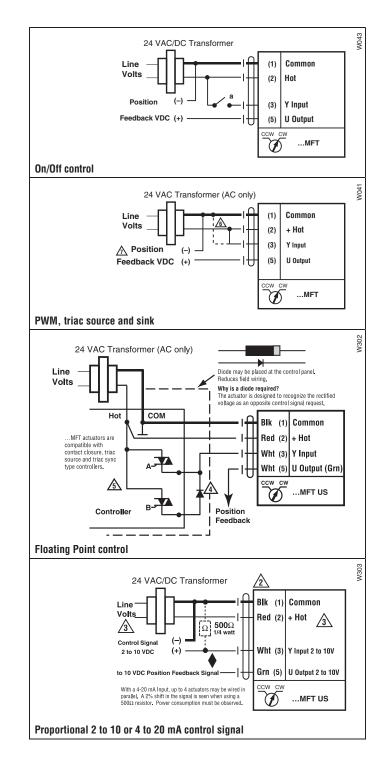
 $\angle 7$ The actuators internal common reference is not compatible.

APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



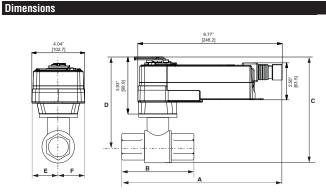
AFRB24(-S), AFRX24(-S) Actuators, On/Off



D1369



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Models AFRB24

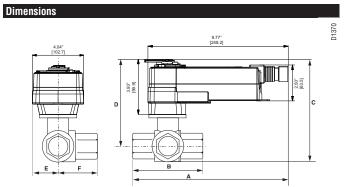
AFRB24-S AFRX24 AFRX24-S

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz
		24 VDC +20% / -10%
Power consumption	running	5 W
	holding	
Transformer sizing		7.5 VA (class 2 power source)
Electrical connection		
AFRB24		3 ft., 18 GA appliance cable, 1/2" conduit
		connector
		-S models: two 3 ft., 18 gauge appliance
		cables with 1/2" conduit connectors
AFRX24		3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA
		appliance or plenum cables, with or without
		1/2" conduit connector
		-S models: two 3 ft. [1m], 10 ft. [3m] or
		16 ft. [5m] appliance cables, with or without
		1/2" conduit connectors
Overload protection		electronic throughout 0 to 95° rotation
Control		on/off
Direction of rotation	spring	reversible with CW/CCW mounting
Angle of rotation		95°
Running time	motor	< 75 seconds
	spring	20 seconds @ -4°F to 122°F [-20°C to 50°C];
		< 60 seconds @ -22°F [-30°C]
Position indication		visual indicator, 0° to 95°
		(0° is full spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2, IP54, Enclosure Type2
Agency listings †		cULus according. to UL60730-1A/-2-14,
		CAN/CSA E60730-1:02, CE according. to
		2004/108/EC & 2006/95/EC
Noise level		<50dB(A) motor @ 75 seconds
		<u><62dB(A) spring return</u>
Quality standard		ISO 9001
+ Bated Impulse Voltage 800V	Tuno of oot	ion 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFRB24-S, AFRX24-S Auxiliary switches

2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90°

	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	А	В
B212-B216	1⁄2"	15	2.38" [60.4]	1.72" [43.7]
B217-B221	3⁄4"	20	2.73" [69.3]	1.81" [45.9]
B222-B225	1"	25	3.09" [78.4]	1.81" [45.9]
B229-B230	1¼"	32	3.72" [94.6]	1.81" [45.9]
B231-B232	11⁄4"	32	3.72" [94.6]	1.98" [50.4]
B238-B240	11⁄2"	40	3.88" [98.5]	1.98" [50.4]
B248-B250	2"	50	4.21" [107.0]	2.21" [56.2]
B251-B254	2"	50	4.93" [125.2]	2.68" [68.0]
B261-B265	21⁄2"	65	5.55" [140.9]	2.68" [68.0]
B277-B280	3"	80	5.82" [147.9]	2.68" [68.0]



	Valve Nominal Size		Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C	
B312-B316	1⁄2"	15	2.38" [60.4]	1.72" [43.7]	1.26" [32.1]	
B317-B321	3⁄4"	20	2.73" [69.3]	1.81" [45.9]	1.45" [36.8]	
B322-B325	1"	25	3.09" [78.4]	1.81" [45.9]	1.56" [39.8]	
B329-B331	11⁄4"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]	
B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]	
B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]	

P10419 - 09/13 - Subject to change. © Belimo Aircontrols (USA), Inc.



AFRB24(-S), AFRX24(-S) Actuators, On/Off

Wiring Diagrams

🕻 INSTALLATION NOTES

Provide overload protection and disconnect as required.

CAUTION Equipment Damage! /2`

Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

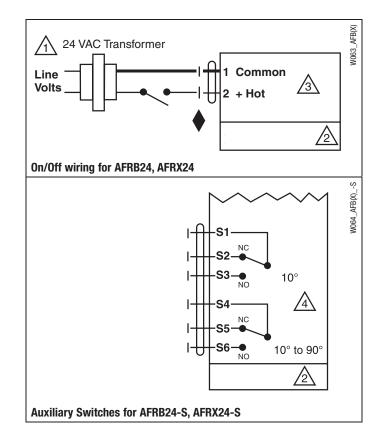
- /3 Actuators may also be powered by 24 VDC.
- For end position indication, interlock control, fan startup, etc., ∕4∖ AFRB24-S and AFRX24-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





2.50"

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Dimensions



AFRBUP-S AFRXUP AFRXUP-S

Technical Data		
Power supply	24 to 240 VAC -20% / +10%, 50/60 Hz	
	24 to 125 VDC <u>+</u> 10%	
Power consumption running		
holding		
Transformer sizing	7 VA @ 24 VAC (class 2 power source)	
hanolorinor olzing	8.5 VA @ 120 VAC	
	18 VA @ 240 VAC	
Electrical connection		
AFRBUP	3 ft., 18 GA appliance cable, 1/2" conduit connector	
	-S models: two 3 ft., 18 gauge appliance	
	cables with 1/2" conduit connectors	
AFRXUP	3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA	
	appliance or plenum cables, with or without	
	1/2" conduit connector	
	-S models: two 3 ft. [1m], 10 ft. [3m] or	
	16 ft. [5m] appliance cables, with or without	
	1/2" conduit connectors	
Overload protection	electronic throughout 0 to 95° rotation	
Control	on/off	
Direction of rotation spring	reversible with CW/CCW mounting	
Angle of rotation	95° (adjustable with mechanical end stop, 35°	
	to 95°)	
Running time motor	< 75 seconds	
spring	L 17	
	< 60 seconds @ -22°F [-30°C]	
Position indication	visual indicator, 0° to 95°	
	(0° is full spring return position)	
Manual override	5 mm hex crank (3/16" Allen), supplied	
Ambient temperature	-22°F to 122°F [-30°C to 50°C]	
Storage temperature	-40°F to 176°F [-40°C to 80°C]	
Housing	NEMA 2/IP54, Enclosure Type2	
Agency listings †	cULus according. to UL60730-1A/-2-14,	
	CAN/CSA E60730-1:02, CE according. to	
N. 1 1	2004/108/EC & 2006/95/EC	
Noise level	<50dB(A) motor @ 75 seconds	
	<62dB(A) spring return	
Quality standard	ISO 9001	
+ Rated Impulse Voltage 800V, Type of act	ion 1.AA (1.AA.B for -S version), Control Pollution Degree 3.	

AFRBUP-S, AFRXUP-S

Auxiliary switches

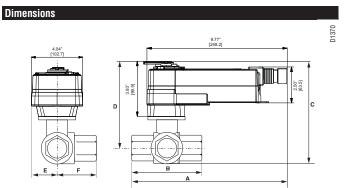
2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90°

	Valve Nominal Size		Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В		
B212-B216	1⁄2"	15	2.38" [60.4]	1.72" [43.7]		
B217-B221	3⁄4"	20	2.73" [69.3]	1.81" [45.9]		
B222-B225	1"	25	3.09" [78.4]	1.81" [45.9]		
B229-B230	1¼"	32	3.72" [94.6]	1.81" [45.9]		
B231-B232	1¼"	32	3.72" [94.6]	1.98" [50.4]		
B238-B240	1½"	40	3.88" [98.5]	1.98" [50.4]		
B248-B250	2"	50	4.21" [107.0]	2.21" [56.2]		
B251-B254	2"	50	4.93" [125.2]	2.68" [68.0]		
B261-B265	21⁄2"	65	5.55" [140.9]	2.68" [68.0]		
B277-B280	3"	80	5.82" [147.9]	2.68" [68.0]		

3.93" 19 PB

п

9.77" [248.2]



Valve Nominal Size		Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C
B312-B316	1⁄2"	15	2.38" [60.4]	1.72" [43.7]	1.26" [32.1]
B317-B321	3⁄4"	20	2.73" [69.3]	1.81" [45.9]	1.45" [36.8]
B322-B325	1"	25	3.09" [78.4]	1.81" [45.9]	1.56" [39.8]
B329-B331	11⁄4"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]
B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]

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AFRBUP(-S), AFRXUP(-S) Actuators, On/Off



Wiring Diagrams

X INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 CAUTION Equipment Damage!

Actuators may be connected in parallel.

Power consumption and input impedance must be observed.

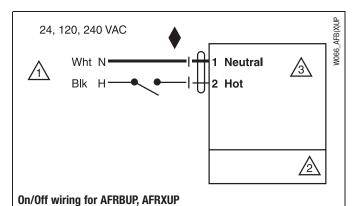
- 3 No ground connection is required.
- For end position indication, interlock control, fan startup, etc., AFRBUP-S and AFRXUP-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



_AFB(X)UP-S 24, 120, 240 VAC Wht N Neutral 1 W067 /1\ /3\ Blk н 2 Hot Г **S1** NC S3 • NO 10° /4\ NC **S**5 • NO 10° to 90° S6 /2

Auxiliary Switches for AFRBUP-S, AFRXUP-S

AFRB24-SR, AFRX24-SR

Proportional, Spring Return, 24 V, for 2 to 10 VDC or 4 to 20 mA Control Signal



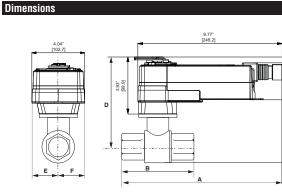
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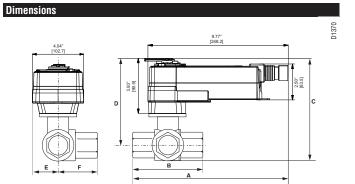
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Power supply		24 VAC ±20%, 50/60 Hz	
ronor ouppij		24 VDC +20% / -10%	
Power consumption	running		
	holding	3 W	
Transformer sizing		8.5 VA (class 2 power source)	
Electrical connection			
AFRB		3 ft, 18 GA appliance cable, 1/2" conduit	
		connector	
		-S models: two 3 ft, 18 gauge appliance cables	
		with 1/2" conduit connectors	
AFX		3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA	
		appliance or plenum cables, with or without 1/2'	
		conduit connector	
		-S models: Two 3 ft [1m], 10 ft [3m] or	
		16 ft [5m] appliance cables, with or without 1/2"	
Overland protection		conduit connectors	
Overload protection		electronic throughout 0 to 95° rotation	
Operating range Y		2 to 10 VDC, 4 to 20mA	
Input impedance		100 k Ω for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA	
Foodbook output II		2 to 10 VDC (max. 0.5 mA)	
1 0		reversible with CW/CCW mounting	
		reversible with built-in switch	
Mechanical angle of rota		95° (adjustable with mechanical end stop, 35° to	
weenanical angle of roa		95°)	
Running time	spring	< 20 seconds @ -4°F to 122°F [-20°C to 50°C];	
i annig anno	opinig	< 60 seconds @ -22°F [-30°C]	
	motor		
Position indication		visual indicator, 0° to 95°	
		(0° is full spring return position)	
Manual override		5 mm hex crank (3/16" Allen), supplied	
Humidity		max. 95% RH non-condensing	
Ambient temperature		-22°F to 122°F [-30°C to 50°C]	
Storage temperature		-40°F to 176°F [-40°C to 80°C]	
Housing		Nema 2, IP54, Enclosure Type2	
Housing material		zinc coated metal and plastic casing	
Agency listings+		cULus acc. to UL60730-1A/-2-14, CAN/CSA	
		E60730-1:02, CE acc. to 2004/108/EC &	
		2006/95/EC	
Noise level		≤40dB(A) motor @ 95 seconds	
		≤62dB(A) spring return	
Servicing		maintenance free	
Quality standard		ISO 9001	
Weight		4.6 lbs (2.1 kg); 4.9 lbs (2.25 kg) with switches 1.AA (1.AA.B for -S version), Control Pollution Degree 3.	



	Valve Nominal Size		al Size Dimensions (Inches [mm	
Valve Body	Inches	DN [mm]	Α	В
B212-B216	1⁄2"	15	2.38" [60.4]	1.72" [43.7]
B217-B221	3⁄4"	20	2.73" [69.3]	1.81" [45.9]
B222-B225	1"	25	3.09" [78.4]	1.81" [45.9]
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B238-B240	1½"	40	3.88" [98.5]	1.98" [50.4]
B248-B250	2"	50	4.21" [107.0]	2.21" [56.2]
B251-B254	2"	50	4.93" [125.2]	2.68" [68.0]
B261-B265	21⁄2"	65	5.55" [140.9]	2.68" [68.0]
B277-B280	3"	80	5.82" [147.9]	2.68" [68.0]



Valve Nominal Size			Dime	nsions (Inches [[mm])
Valve Body	Inches	DN [mm]	А	В	C
B312-B316	1⁄2"	15	2.38" [60.4]	1.72" [43.7]	1.26" [32.1]
B317-B321	3⁄4"	20	2.73" [69.3]	1.81" [45.9]	1.45" [36.8]
B322-B325	1"	25	3.09" [78.4]	1.81" [45.9]	1.56" [39.8]
B329-B331	11⁄4"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]
B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]

BELIMO

Accessories	
AV 8-25	Shaft extension
IND-AFB	Damper position indicator
KH-AFB	Crank arm
K7-2	Universal clamp for up to 1.05" dia jackshafts
TF-CC US	Conduit fitting
Tool-06	8mm and 10 mm wrench
ZG-100	Universal mounting bracket
ZG-101	Universal mounting bracket
ZG-118	Mounting bracket for Barber Colman® MA 3./4, Honeywell® Mod III or IV or Johnson® Series 100 replacement or new crank arm type installations
ZG-AFB	Crank arm adaptor kit
ZG-AFB118	Crank arm adaptor kit
ZS-100	Weather shield (metal)
ZS-150	Weather shield (polycarbonate)
ZS-260	Explosion-proof housing
ZS-300	NEMA 4X housing
NOTE: When using AFR	R24-SR_AERB24-SR-S_AERX24-SR and AERX24-SR-S actuators only use

NOTE: When using AFRB24-SR, AFRB24-SR-S, AFRX24-SR and AFRX24-SR-S actuators, only use accessories listed on this page.

For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500 Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators shall be cULus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

2

🔀 INSTALLATION NOTES

Provide overload protection and disconnect as required.

CAUTION Equipment Damage!

Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Up to 4 actuators may be connected in parallel if not mechanically mounted to the same shaft. With 4 actuators wired to one 500 Ω resistor.

Power consumption must be observed.

Actuator may also be powered by 24 VDC.

For end position indication, interlock control, fan startup, etc., AFB24-SR-S and AFX24-SR-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

 $\sqrt{5}$ Only connect common to neg. (–) leg of control circuits

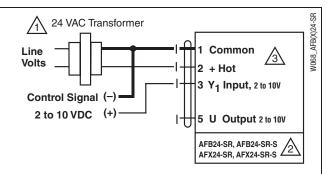
7 APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.

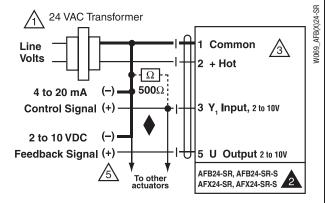
ATTENTION: AFRB24-SR(-S) and AFRX24-SR(-S) <u>cannot</u> be tandem mounted on the same damper or valve shaft. Only On/Off and MFT AF models can be used for tandem mount applications.

WARNING Live Electrical Components!

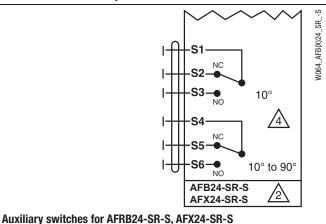
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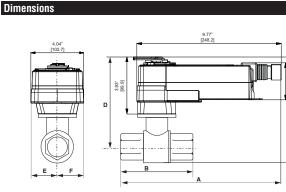
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Models AFRX24-MFT AFRX24-MFT-S

Technical Data		
Control		MFT
Control signal		2 to 10 VDC, 4 to 20 mA (default)
		variable (VDC, PWM, floating point, on/off)
Power supply		24 VAC, +/- 20%, 50/60 Hz
		24 VDC, +20% / -10%
Power consumption [†]	running	7.5 W
	holding	3 W
Transformer sizing†		10 VA (Class 2 power source)
Electrical connection		3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA
		appliance or plenum cables, with or without
		1/2" conduit connector
		-S models: two 3 ft. [1m], 10 ft. [3m] or 16
		ft. [5m] appliance cables with or without 1/2"
		conduit connectors
Overload protection		electronic throughout 0 to 90° rotation
Feedback output*		2 to 10 VDC, 0.5 mA max (variable)
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA)
		500 Ω for 4 to 20 mA
		1500 Ω for on/off and floating point
Angle of rotation		95°
Direction of rotation*	spring	reversible with CW/CCW mounting
	motor	reversible with built-in γ / \sim switch
Position indication		visual indicator 0° to 95°(0° is spring return
		position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Running time	motor*	150 seconds (default),
		variable (70 to 220 seconds)
	spring	
Ambient temperature		-22° F to 122° F [-30° C to 50° C]
Housing		NEMA 2, IP54, Enclosure Type 2
Agency listings		cULus according. To UL60730-1A/-2-14,
		CAN/CSA E60730- 1:02, CE according. To
		2004/108/EC & 2006/95/EC
Noise level		<40dB(A) motor @ 150 seconds, run time
		dependent
		<u><</u> 62dB(A) spring return
Quality standard		ISO 9001
+ Programmed for 70 sec	motor run	time. At 150 sec motor run time, transformer sizing

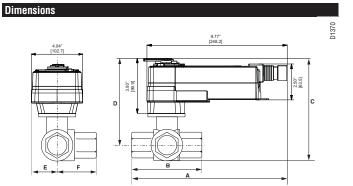
† Programmed for 70 sec motor runtime. At 150 sec motor run time, transformer sizing is 8.5 VA and power consumption is 6 W running/3 W holding. * Variable when configured with MFT options

‡ Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFRX24-MFT-S

Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL approved
	one set at +10° to 90°

Valve BodyInchesDN [mm]ABB212-B216½"152.38" [60.4]1.72" [43.7]B217-B221¾"202.73" [69.3]1.81" [45.9]B222-B2251"253.09" [78.4]1.81" [45.9]B229-B2301¼"323.72" [94.6]1.81" [45.9]B231-B2321¼"323.72" [94.6]1.98" [50.4]B238-B2401½"403.88" [98.5]1.98" [50.4]B248-B2502"504.21" [107.0]2.21" [56.2]B251-B2542"504.93" [125.2]2.68" [68.0]B261-B2652½"655.55" [140.9]2.68" [68.0]B277-B2803"805.82" [147.9]2.68" [68.0]		Valve Nominal Size		ominal Size Dimensions (Inches [m	
B217-B221 34" 20 2.73" [69.3] 1.81" [45.9] B222-B225 1" 25 3.09" [78.4] 1.81" [45.9] B229-B230 1¼" 32 3.72" [94.6] 1.81" [45.9] B231-B232 1¼" 32 3.72" [94.6] 1.81" [45.9] B238-B240 1½" 40 3.88" [98.5] 1.98" [50.4] B248-B250 2" 50 4.21" [107.0] 2.21" [56.2] B251-B254 2" 50 4.93" [125.2] 2.68" [68.0] B261-B265 2½" 65 5.55" [140.9] 2.68" [68.0]	Valve Body	Inches	DN [mm]	Α	В
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	B251-B254	2"	50	4.93" [125.2]	2.68" [68.0]
B277-B280 3" 80 5.82" [147.9] 2.68" [68.0]	B261-B265	21⁄2"	65	5.55" [140.9]	2.68" [68.0]
	B277-B280	3"	80	5.82" [147.9]	2.68" [68.0]



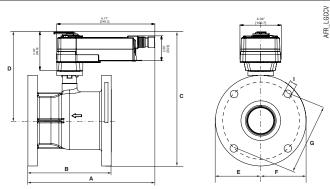
Valve Nominal Size		Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	Α	В	C
B312-B316	1⁄2"	15	2.38" [60.4]	1.72" [43.7]	1.26" [32.1]
B317-B321	3⁄4"	20	2.73" [69.3]	1.81" [45.9]	1.45" [36.8]
B322-B325	1"	25	3.09" [78.4]	1.81" [45.9]	1.56" [39.8]
B329-B331	11⁄4"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]
B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]

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AFRX Actuators, Multi-Function Technology

Dimensions



Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6250	21⁄2" [65]		7.50" [190.5]	5.50" [139.7]	8.10" [205.4]
B6300	3" [80]	F05	8.00" [203.2]	6.60" [167.6]	8.40" [213.1]
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]

Wiring Diagrams

🔀 INSTALLATION NOTES

Provide overload protection and disconnect as required.

Activition Equipment Damage!

Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

3 Actuators may also be powered by 24 VDC.

A Position feedback cannot be used with Triac sink controller.

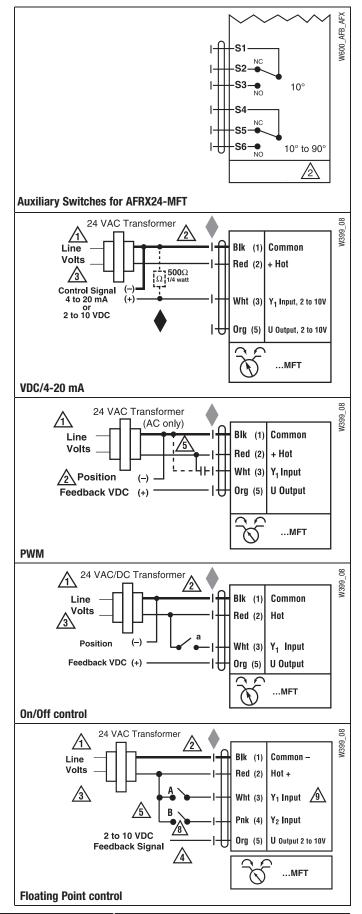
- Δ The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source)
- or the Common (sink) 24 VAC line.
- Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
 - For triac sink the common connection from the actuator must be connected to the hot connection of the controller.
 - APPLICATION NOTES

Meets UL requirements without the need of an electrical ground connection.

The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



AFRX24-MFT95 Actuator, Proportional Potentiometric Control



2.50"

c

D1369





Dimensions



Technical Data		
Control		MFT
Control signal		0 to 135 Ω Honeywell Electronic Series 90,
		0 to 135 Ω input
Power supply		24 VAC, +/- 20%, 50/60 Hz
		24 VDC, +20% / -10%
Power consumption†	running	7.5 W
	holding	3 W
Transformer sizing†		10 VA (Class 2 power source)
Electrical connection		3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA
		plenum cables, with or without 1/2" conduit
		connector
Overload protection		electronic throughout 0 to 90° rotation
Feedback output*		2 to 10 VDC, 0.5 mA max (variable)
Angle of rotation		95°
Direction of rotation*	spring	reversible with CW/CCW mounting
	motor	reversible with built-in α/\sim switch
Position indication		visual indicator 0° to 95°(0° is spring return
		position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Running time	motor*	150 seconds (default),
		variable (70 to 220 seconds)
	spring	<20 sec @ -4°F to 122°F [-20°C to 50°C]
Ambient temperature		-22° F to 122° F [-30° C to 50° C]
Housing		NEMA 2, IP54, Enclosure Type 2
Agency listings		cULus according. To UL60730-1A/-2-14,
		CAN/CSA E60730- 1:02, CE according. To
		2004/108/EC & 2006/95/EC
Noise level		<40dB(A) motor @ 150 seconds, run time
		dependent
		<u><</u> 62dB(A) spring return
Quality standard		ISO 9001
+ Programmed for 70 cor	motor run	time At 150 cas motor run time transformer sizing

† Programmed for 70 sec motor runtime. At 150 sec motor run time, transformer sizing

is 8.5 VA and power consumption is 6 W running/3 W holding. * Variable when configured with MFT options

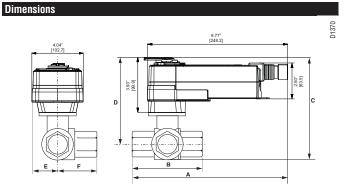
‡ Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

	Valve Nominal Size		Dimensions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В
B212-B215	1⁄2"	15	2.38" [60.4]	1.72" [43.7]
B217-B221	3⁄4"	20	2.73" [69.3]	1.81" [45.9]
B222-B225	1"	25	3.09" [78.4]	1.81" [45.9]
B229-B230	1¼"	32	3.72" [94.6]	1.81" [45.9]
B231-B232	11⁄4"	32	3.72" [94.6]	1.98" [50.4]
B238-B240	1½"	40	3.88" [98.5]	1.98" [50.4]
B248-B250	2"	50	4.21" [107.0]	2.21" [56.2]
B251-B254	2"	50	4.93" [125.2]	2.68" [68.0]
B261-B265	21⁄2"	65	5.55" [140.9]	2.68" [68.0]
B277-B280	3"	80	5.82" [147.9]	2.68" [68.0]

.93"

п

9.77" [248.2]



	Valve Nominal Size		Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	Α	В	C
B312-B315	1⁄2"	15	2.38" [60.4]	1.72" [43.7]	1.26" [32.1]
B317-B321	3⁄4"	20	2.73" [69.3]	1.81" [45.9]	1.45" [36.8]
B322-B325	1"	25	3.09" [78.4]	1.81" [45.9]	1.56" [39.8]
B329-B331	11⁄4"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]
B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]



AFRX24-MFT95 Actuator, Proportional Potentiometric Control

D1378

Dimensions

Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6250	2½" [65]		7.50" [190.5]	5.50" [139.7]	8.10" [205.4]
B6300	3" [80]	F05	8.00" [203.2]	6.60" [167.6]	8.40" [213.1]
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]

Wiring Diagrams

🔀 INSTALLATION NOTES

Provide overload protection and disconnect as required.

 \sim Actuators and controller must have separate transformers.

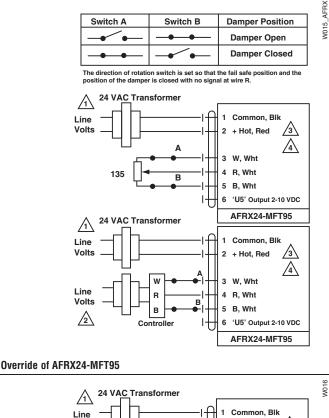
Consult controller instruction data for more detailed installation information.

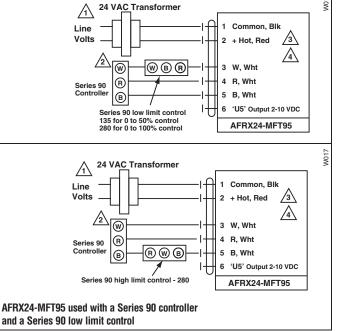
4 To reverse control rotation, use the reversing switch.

Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell resistor kits may also be used.

WARNING Live Electrical Components!

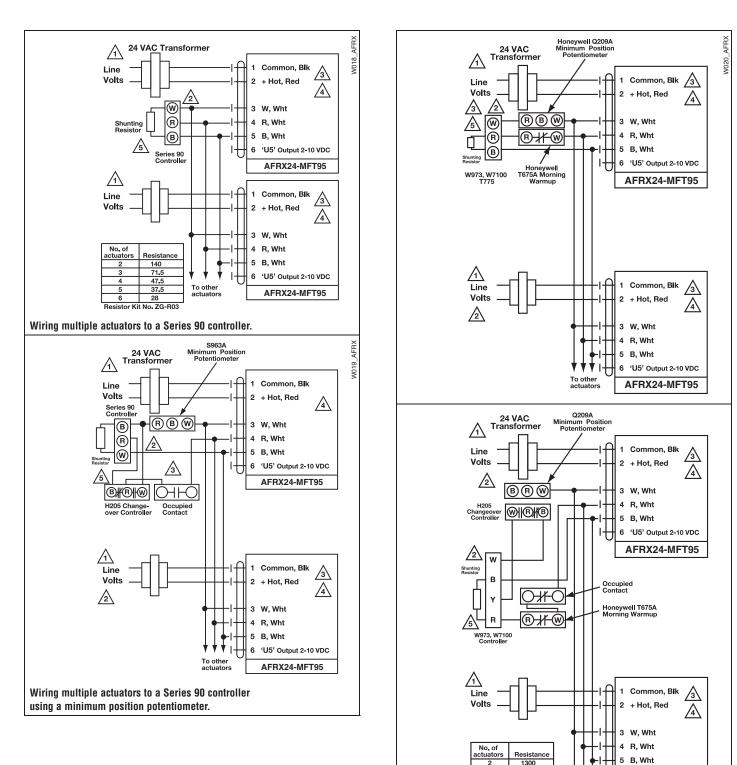
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





AFRX24-MFT95 Actuator, Proportional Potentiometric Control





Typical wiring diagrams for multiple actuators used with the W973, W7100 and T775 controllers.

Resistor Kit No. ZG-R06

768

To other actuators

4

6 'U5' Output 2-10 VDC

AFRX24-MFT95

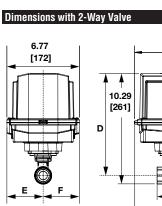


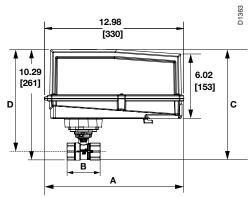
AFRB24 N4, AFRB24 N4H, AFRB24-S N4, AFRB24-S N4H, AFRX24 N4, AFRX24 N4H, AFRX24-S N4, AFRX24-S N4H

NEMA 4, On/Off, Spring Return, 24 V



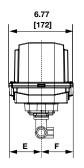


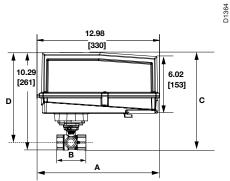




	Valve Nominal Size		minal Size Dimensions (Inches [mm]	
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	1.84" [47.4]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve





	Valve Nominal Size		Dime	nsions (Inches [[mm])
Valve Body	Inches	DN [mm]	Α	В	С
B329-B332	1¼"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]

Models

AFRB24 N4	Basic Version
AFRB24 N4H	Basic Version w/built in heater
AFRB24-S N4	Basic Version w/built-in aux. switch
AFRB24-S N4H	Basic Version w/built-in aux. switch & heater
AFRX24 N4	Flexible Version
AFRX24-S N4	Flexible Version w/built-in aux. switch
AFRX24 N4H	Flexible Version w/built in heater
AFRX24-S N4H	Flexible Version aux. switch & heater

Technical Data

Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC +20% / -10%
Power consumption running	5 W / heater 25 W
holding	
Transformer sizing	7.5 VA (class 2 power source) / heater 25 VA
Electrical connection	3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance
AFR N4	cable, with or without 1/2" conduit connector
	-S models: Two 3 ft [1m], 10 ft [3m] or
	16 ft [5m] appliance cables with or without 1/2" conduit
	connectors
heater (N4H)	terminal block, 26-16 GA
Overload protection	electronic throughout 0 to 95° rotation
Control	on/off
Torque	180 in-lb [20 Nm] minimum
Direction of rotation spring	reversible with CW/CCW mounting in housing
Mechanical angle of rotation	95° (adjustable with mechanical end stop, 35° to 95°)
~	< 75 seconds
	20 seconds @ -4°F to 122°F [-20°C to 50°C];
opg	< 60 seconds @ -22°F [-30°C]
spring (with heater)	20 seconds @ -4°F to 122°F [-20°C to 50°C], <60
	seconds @ -49°F [-45°C]
Position indication	visual indicator, 0° to 95°
- <u></u>	(0° is full spring return position)
Manual override	5 mm hex crank (3/16" Allen), supplied
Humidity	max. 95% RH non-condensing
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
with heater	-49°F to 122°F [-45°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	UL Type 4, NEMA 4, IP66 polycarbonate
Housing material Agency listings †	cULus acc. to UL60730-1A/-2-14.
Agency insurigs	CAN/CSA E60730-1:02, CE acc. to
	2004/108/EC & 2006/95/EC
Noise level	<50dB(A) motor @ 75 seconds
	≤62dB(Å) spring return
Servicing	maintenance free
Quality standard	ISO 9001
Weight	9.7 lbs (4.4 kg); 10 lbs (4.5 kg) with switches;
	10.5 lbs (4.8 kg) with heater
	1.AA (1.AA.B for -S version), Control Pollution Degree 4.
AFRB24-S N4, AFRB24-S N4H, A	
Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL approved
	one set at +10°, one adjustable 10° to 90°

AFRB24 N4, AFRB24 N4H, AFRB24-S N4, AFRB24-S N4H, AFRX24 N4, AFRX24 N4H, AFRX24-S N4, AFRX24-S N4H



NEMA 4, On/Off, Spring Return, 24 V

Accessories					
Tool-06	8mm and 10 mm wrench				
43442-00001	Gland (needed for additional wires)				
11097-00001	Gasket for Gland (needed for additional wires)				
NOTE: When using AFRB24 N4, AFRB24 N4H, AFRB24-S N4, AFRB24-S N4H, AFRX24 N4,					
AFRX24 N4H, AFRX24-S N4, AFRX24-S N4H actuators, only use accessories listed on this page.					
For actuator wiring infor	For actuator wiring information and diagrams, refer to Belimo Wiring Guide.				

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

🗡 INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- S CAUTION Equipment Damage!

Actuators may be connected in parallel. Power consumption and input impedance must be observed.

Actuators may also be powered by 24 VDC.

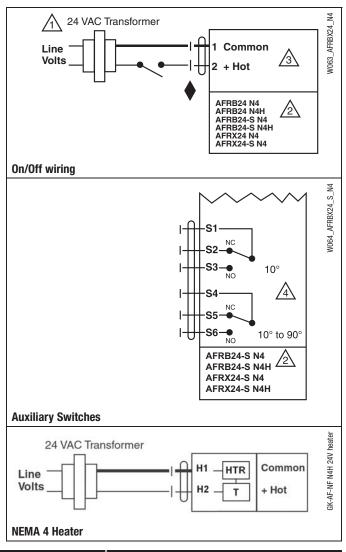
For end position indication, interlock control, fan startup, etc., AFRB24-S N4, AFRB24-S N4, AFRB24-S N4, AFRX24-S N4, AFRX24-S N4H incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

7 APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

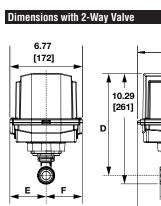


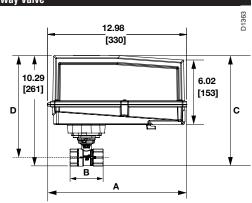


AFRBUP N4, AFRBUP-S N4, AFRBUP N4H, AFRBUP-S N4H, AFRXUP N4, AFRXUP-S N4, AFRXUP N4H, AFRXUP-S N4H

NEMA 4, On/Off, Spring Return, 24 to 240 VAC

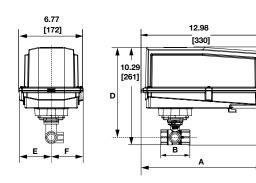






	Valve Nominal Size		Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	1.84" [47.4]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]
DZ11-DZ0U	1 3	00	J.UZ [147.9]	2.15 [09.5]

Dimensions with 3-Way Valve-



	Valve Nominal Size		ze Dimensions (Inches [mm])		
Valve Body	Inches	DN [mm]	А	В	C
B329-B331	1¼"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]

AFRBUP N4	Basic Version
AFRBUP-S N4	Basic Version w/built-in aux. switch
AFRBUP N4H	Basic Version w/built in heater
AFRBUP-S N4H	Basic Version w/built-in aux. switch & heater
AFRXUP N4	Flexible Version
AFRXUP-S N4	Flexible Version w/built-in aux. switch
AFRXUP N4H	Flexible Version w/built in heater
AFRXUP-S N4H	Flexible Version w/built-in aux. switch & heater

Technical Data

Power supply	24240 VAC -20% / +10%, 50/60 Hz 24125 VDC ±10%
Power consumption runni	
holdi	.9
Transformer sizing	7 VA @ 24 VAC (class 2 power source)
5	8.5 VA @ 120 VAC / heater 25 VA @120 VAC
	18 VA @ 240 VAC
Electrical connection	
AFRBUP N4	3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance
AFRXUP N4	cable, with or without 1/2" conduit connector
	-S models: Two 3 ft [1m], 10 ft [3m] or
	16 ft [5m] appliance cables with or without 1/2" conduit connectors
heater (N4	
Overload protection	electronic throughout 0 to 95° rotation
Control	on/off
Torque	180 in-lb [20 Nm] minimum
Direction of rotation spri	ng reversible with CW/CCW mounting inside housing
Mechanical angle of rotation	95° (adjustable with mechanical end stop,
-	35° to 95°)
Running time mot	or < 75 sec
sprin	ng 20 sec @ -4°F to 122°F [-20°C to 50°C];
	< 60 sec @ -22°F [-30°C]
spring (with heat	
	< 60 sec @ -49°F [-45°C]
Position indication	visual indicator, 0° to 95°
Manual override	(0° is full spring return position) 5 mm hex crank (¾6" Allen), supplied
Humidity	max. 95% RH non-condensing
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
with hea	
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	UL Type 4, NEMA 4, IP66
Housing material	polycarbonate
Agency listings †	cULus acc. to UL60730-1A/-2-14,
Agency listings	CAN/CSA E60730-1:02, CE acc. to
	2004/108/EC & 2006/95/EC
Noise level	<50dB(A) motor @ 75 seconds
	≤62dB(A) spring return
Servicing	maintenance free
Quality standard	ISO 9001
Weight	9.7 lbs (4.4 kg), 10 lbs (4.5 kg) with switches
	10.5 lbs (4.8 kg) with heater

AFRBUP-S N4, AFRBUP-S N4H, AFRXUP-S N4, AFRXUP-S N4H

Auxiliary switches

2 x SPDT 3A (0.5A) @ 250 VAC, UL Approved one set at $+10^{\circ}$, one adjustable 10° to 90°

800-543-9038 USA

D1364

6.02 [153]

С

AFRBUP N4, AFRBUP-S N4, AFRBUP N4H, AFRBUP-S N4H, AFRXUP N4, AFRXUP-S N4, AFRXUP N4H, AFRXUP-S N4H

NEMA 4, On/Off, Spring Return, 24 to 240 VAC

Accessories		
Tool-06	8mm and 10 mm wrench	
43442-00001	Gland (needed for additional wires)	
11097-00001	Gasket for Gland (needed for additional wires)	
NOTE: When using AFRBUP N4, AFRBUP-S N4, AFRBUP N4H, AFRBUP-S N4H, AFRXUP N4,		
AFRXUP-S N4, AFRXUP N4H, AFRXUP-S N4H actuators, only use accessories listed on this page.		
For actuator wiring information and diagrams, refer to Belimo Wiring Guide.		

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

🔀 INSTALLATION NOTES

Provide overload protection and disconnect as required.

CAUTION Equipment Damage!

Actuators may be connected in parallel. Power consumption and input impedance must be observed.

 $\sqrt{3}$ Actuators may also be powered by 24 VDC.

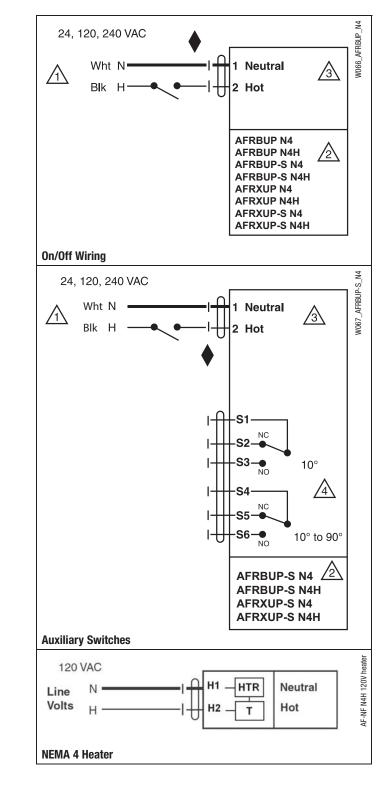
For end position indication, interlock control, fan startup, etc., AFRB24-S
 N4, AFRB24-S N4H, AFRX24-S N4, AFRX24-S N4H incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





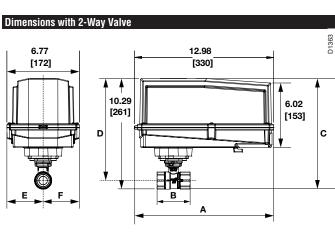


AFRB24-MFT N4, AFRB24-MFT-S N4, AFRB24-MFT N4H, AFRB24-MFT-S N4H AFRX24-MFT N4, AFRX24-MFT-S N4, AFRX24-MFT N4H, AFRX24-MFT-S N4H

NEMA 4, Proportional, Spring Return, Direct Coupled, 24V, Multi-Function Technology®

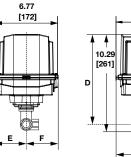
Models	
AFRB24-MFT N4	Basic Version
AFRB24-MFT-S N4	Basic Version w/built-in aux. switch
AFRB24-MFT N4H	Basic Version w/built in heater
AFRB24-MFT-S N4H	Basic Version w/built-in aux. switch & heater
AFRX24-MFT N4	Flexible Version
AFRX24-MFT-S N4	Flexible Version w/built-in aux. switch
AFRX24-MFT N4H	Flexible Version w/built in heater
AFRX24-MFT-S N4H	Flexible Version w/built in aux. switch & heater
Technical Date	

Technical Data		
Power supply		24 VAC, +/- 20%, 50/60 Hz
Tower Suppry		24 VDC, +20% / -10%
Power	runnina	7.5 W / heater 25 W
	holdina	
Transformer sizing		10 VA (Class 2 power source) / heater 25 VA
Electrical connection		3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance cables, with
AFRB N4		1/2" conduit connector
AFRX N4		-S models: two 3 ft [1m], 10 ft [3m] or
/		16 ft [5m] appliance cables with 1/2" conduit connectors
heate	r (N4H)	terminal block, 26-16 GA
Overload protection		electronic throughout 0 to 95° rotation
Operating range Y*		2 to 10 VDC, 4 to 20 mA (default)
		variable (VDC, PWM, floating point, on/off)
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA)
		500 Ω for 4 to 20 mA
		1500 Ω for PWM, floating point and on/off control
Feedback output U*		2 to 10 VDC, 0.5 mA max
Torque		minimum 180 in-Ib (20 Nm)
Direction of	spring	reversible with cw/ccw mounting inside housing
rotation*	motor	reversible with built-in switch
Mechanical		95° (adjustable with mechanical end stop, 35° to 95°)
angle of rotation*		
Running time	motor*	150 seconds (default), variable (70 to 220 seconds)
	spring	<20 sec @ -4°F to 122°F [-20°C to 50°C];
		<60 sec @ -22°F [-30°C]
spring (with heater)		<20 sec @ -4°F to 122°F [-20°C to 50°C];
Angle of Rotation		<60 sec @ -49°F [-45°C]
adaptation		off (default)
Override control*		min position = 0%
		mid. position = 50%
		max. position = 100%
Position indication		visual indicator, 0° to 95°
		(0° is spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Humidity		max. 95% RH non-condensing
Ambient temperature		-22°F to 122°F (-30°C to 50°C)
with	heater	-49°F to 122°F (-45°C to 50°C)
Storage temperature		-40°F to 176°F (-40°C to 80°C)
Housing		UL Type 4, NEMA 4, IP66
Housing material		polycarbonate
Noise level		≤40dB(A) motor @ 150 seconds, run time dependent
		≤62dB(A) spring return
Agency listings †		cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-
		1:02, CE acc. to 2004/108/EC & 2006/95/EC
Quality standard		ISO 9001
Servicing		maintenance free
Weight		9.7 lbs. (4.4 kg), 10 lbs. (4.5 kg) with switches
-		10.5 lbs (4.8 kg) with heater



	Valve Nominal Size		Dimensions (Inches [mm])	
Valve Body	Inches	DN [mm]	Α	В
B231-B232	1¼"	32	3.72" [94.6]	1.84" [47.4]
B238-B240	1½"	40	3.88" [98.5]	2.04" [51.9]
B248-B254	2"	50	4.93" [125.2]	2.73" [69.5]
B261-B265	21⁄2"	65	5.55" [140.9]	2.73" [69.5]
B277-B280	3"	80	5.82" [147.9]	2.73" [69.5]

Dimensions with 3-Way Valve



12.98 [330] 6.02 [153] с в

D1364

Valve Nominal Size			Dime	nsions (Inches [mm])
Valve Body	Inches	DN [mm]	Α	В	C
B329-B331	11⁄4"	32	3.96" [100.6]	2.27" [57.7]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.51" [63.7]	2.40" [61.1]
B347-B352	2"	50	4.90" [124.5]	2.73" [69.5]	2.74" [69.7]

* Variable when configured with MFT options

AFRB24-MFT-S N4, AFRB24-MFT-S N4H, AFRX24-MFT-S N4, AFRX24-MFT-S N4H

Auxiliary switches

2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90°

AFRB24-MFT N4, AFRB24-MFT-S N4, AFRB24-MFT N4H, AFRB24-MFT-S N4H AFRX24-MFT N4, AFRX24-MFT-S N4, AFRX24-MFT N4H, AFRX24-MFT-S N4H



NEMA 4, Proportional, Spring Return, Direct Coupled, 24V, Multi-Function Technology®

Accessories			
Tool-06	8mm and 10 mm wrench		
43442-00001	Gland (needed for additional wires)		
11097-00001	Gasket for Gland (needed for additional wires)		
NOTE: When using AFRB24-MFT N4, AFRB24-MFT-S N4, AFRB24-MFT N4H, AFRB24-MFT-S N4H			
AFRX24-MFT N4, AFRX2	4-MFT-S N4, AFRX24-MFT N4H, AFRX24-MFT-S N4H actuators, only use		
11097-00001 NOTE: When using AFR	Gasket for Gland (needed for additional wires) 324-MFT N4, AFRB24-MFT-S N4, AFRB24-MFT N4H, AFRB24-MFT-S N4H		

accessories listed on this page. For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500 Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators shall be cllus Approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

🔀 INSTALLATION NOTES

Provide overload protection and disconnect as required.

CAUTION Equipment Damage!

Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

- Actuators may also be powered by 24 VDC.
- Position feedback cannot be used with Triac sink controller.
- 4 The actuator internal common reference is not compatible.
- Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- Contact closures A & B also can be triacs.
- $3 \rightarrow$ A & B should both be closed for triac source and open for triac sink.
- For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

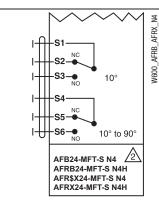
APPLICATION NOTES

Meets UL requirements without the need of an electrical ground connection.

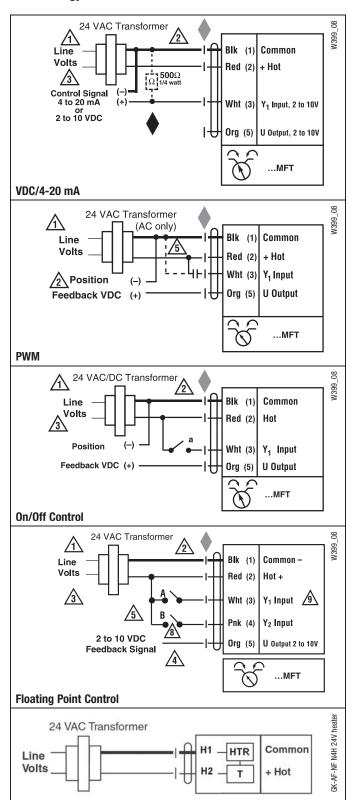
The ZG-R01 500 Ω resistor may be used.

WARNING Live Electrical Components!

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Auxiliary Switches



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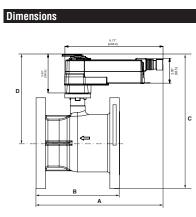
NEMA 4 Heater

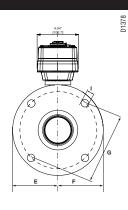


AFRB24-5-14, AFRB24-S-5-14 Actuators, On/Off









Models

AFRB24-5-14 AFRB24-S-5-14

Technical Data Power supply		24 VAC ± 20% 50/60 Hz
rowel supply		24 VDC +20% / -10%
Power consumption	running	
rower consumption	holding	-
Transformer sizing	noiuniy	7.5 VA (class 2 power source)
Electrical connection		7.5 VA (class 2 power source)
AFRB24		0 ft 10 CA appliance eable 1/0" conduit
AFKB24		3 ft., 18 GA appliance cable, 1/2" conduit connector
		- S models: two 3 ft., 18 gauge appliance
		cables with 1/2" conduit connectors
AFRX24		3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA
		appliance or plenum cables, with or without
		1/2" conduit connector
		-S models: two 3 ft. [1m], 10 ft. [3m] or
		16 ft. [5m] appliance cables, with or without
		1/2" conduit connectors
Overload protection		electronic throughout 0 to 95° rotation
Control		on/off
Direction of rotation	spring	reversible with CW/CCW mounting
Angle of rotation		95°
Running time	motor	< 75 seconds
	spring	
		< 60 seconds @ -22°F [-30°C]
Position indication		visual indicator, 0° to 95°
		(0° is full spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2, IP54, Enclosure Type2
Agency listings †		cULus according. to UL60730-1A/-2-14,
		CAN/CSA E60730-1:02, CE according. to
		2004/108/EC & 2006/95/EC
Noise level		<50dB(A) motor @ 75 seconds
		<u>≤</u> 62dB(A) spring return
Quality standard		ISO 9001

Top Flange Nominal Valve Flange Face-to-Face Pipe Height Body Diameter Length Size Design A B C 8.10" [205.4] B6250 21⁄2" [65] 7.50" [190.5] 5.50" [139.7] B6300 3" [80] F05 8.00" [203.2] 6.60" [167.6] 8.40" [213.1] 9.00" [228.6] 8.30" [210.8] B6400 4" [100] 9.30" [235.9]

P10419 - 09/13 - Subject to change. © Belimo Aircontrols (USA), Inc.

AFRB24-S, AFRX24-S	
	2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90°

800-543-9038 L	JSA
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Wiring Diagrams

🔀 INSTALLATION NOTES

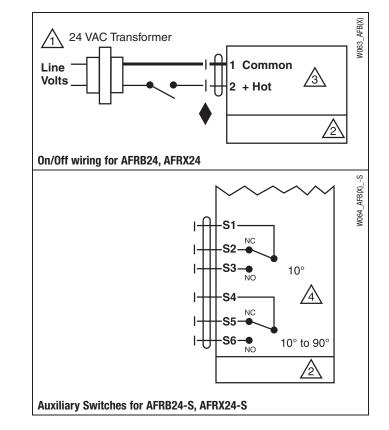
- Provide overload protection and disconnect as required.
- Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3
 - Actuators may also be powered by 24 VDC.
- For end position indication, interlock control, fan startup, etc., AFRB24-S and AFRX24-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

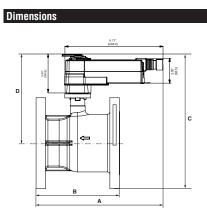


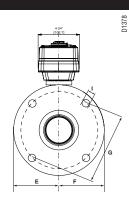


AFRBUP-5-14, AFRBUP-S-5-14 Actuators, On/Off









Models

AFRBUP-5-14 AFRBUP-S-5-14

Power supply		24 to 240 VAC -20% / +10%, 50/60 Hz
Tower suppry		24 to 125 VDC ±10%
Power consumption	running	
	holding	3.5 W
Transformer sizing	norang	7 VA @ 24 VAC (class 2 power source)
numbronniti tizing		8.5 VA @ 120 VAC
		18 VA @ 240 VAC
Electrical connection		
AFRBUP		3 ft., 18 GA appliance cable, 1/2" conduit
		connector
		-S models: two 3 ft., 18 gauge appliance
		cables with 1/2" conduit connectors
AFRXUP		3 ft. [1m], 10 ft. [3m] or 16 ft. [5m] 18 GA
		appliance or plenum cables, with or without
		1/2" conduit connector
		-S models: two 3 ft. [1m], 10 ft. [3m] or
		16 ft. [5m] appliance cables, with or without
Overland protection		1/2" conduit connectors electronic throughout 0 to 95° rotation
Overload protection Control		on/off
Direction of rotation	opring	
Angle of rotation	spring	reversible with CW/CCW mounting 95° (adjustable with mechanical end stop, 35°
Angle of folation		to 95°)
Running time	motor	< 75 seconds
	spring	20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C]
Position indication		visual indicator, 0° to 95°
		(0° is full spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2/IP54, Enclosure Type2
Agency listings †		cULus according. to UL60730-1A/-2-14,
		CAN/CSA E60730-1:02, CE according. to
		2004/108/EC & 2006/95/EC
Noise level		<50dB(A) motor @ 75 seconds
		<u>≤</u> 62dB(A) spring return
Quality standard		ISO 9001
† Rated Impulse Voltage 800V	, Type of act	ion 1.AA (1.AA.B for -S version), Control Pollution Degree 3.
AFRBUP-S, AFRXUP-S		

AFKBUP-5, AFKXUP-5	
Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL approved
	one set at +10°, one adjustable 10° to 90°

Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6250	21⁄2" [65]		7.50" [190.5]	5.50" [139.7]	8.10" [205.4]
B6300	3" [80]	F05	8.00" [203.2]	6.60" [167.6]	8.40" [213.1]
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]



Wiring Diagrams

🔀 INSTALLATION NOTES

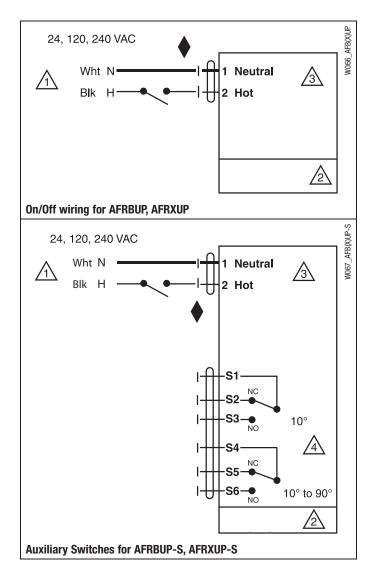
- Provide overload protection and disconnect as required.
- Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- $\sqrt{3}$ No ground connection is required.
- AFOR end position indication, interlock control, fan startup, etc., AFRBUP-S and AFRXUP-S incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





GKRB24-3-5-14 Actuators, On/Off, Floating Point, Fail-Safe



WARRANTY

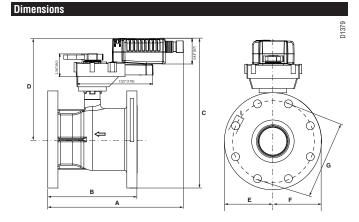


Models

GKRB24-3-5-14

	on/off, floating point
	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
0	
holding	
	18 VA (Class 2 power source)
	3 ft,18 GA plenum rated cable
	1/2" conduit connector
	electronic throughout 0° to 95° rotation
	100 kΩ (0.1mA), 500 Ω, 1500 Ω (floating
	point, on/off)
	max. 95°, adjustable with mechanical stop
	reversible with γ/\sim switch
	visual indicator
running	150 seconds
fail-safe	35 seconds
	external push button
	-22°F to 122°F [-30°C to 50°C]
	NEMA 2/IP54, Enclosure Type 2
	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EEC and 2006/95/EC
	<45 dB(A)
	ISO 9001
	0

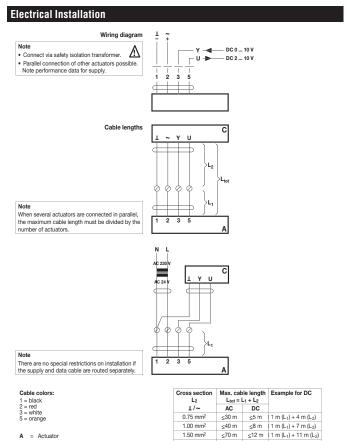
† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.



Valve Body	Nominal Pipe Size	Top Flange Design	Flange Diameter	Face-to-Face Length	Height
			Α	В	C
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]
B6500	5" [125]	EOE	10.00" [254]	10.30" [261.6]	10.50" [266.4]
B6600	6" [150]	F05	11.00" [279.4]	12.50" [317.5]	11.70" [296.9]

GKRB24-3-5-14 Actuators, On/Off, Floating Point, Fail-Safe





- = Control unit = Belimo connecting cable, 1 m (4 x 0.75 mm²) Ē.
- L = Customer cable
- Ltot = Maximum cable length
- ≤100 m 2 50 mm² ≤20 m 1 m (L₁) + 19 m (L₂)
- A C L1

Actuator Control unit Belimo connecting cable, 1 m (4 x 0.75 mm²)

Wiring Diagrams

INSTALLATION NOTES

- Provide overload protection and disconnect as required.
- **CAUTION** Equipment Damage! /2`

Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed

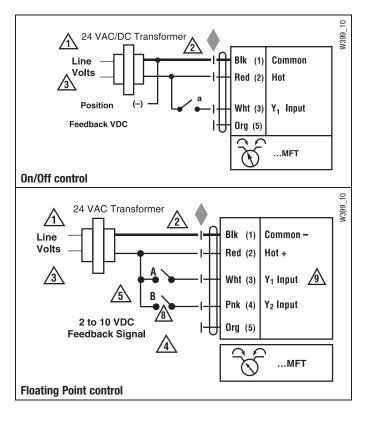
- /3\ Actuators may also be powered by 24 VDC.
- Position feedback cannot be used with Triac sink controller. ∕4∖
- The actuator internal common reference is not compatible.
- Control signal may be pulsed from either the Hot (source) ∕5∖ or the Common (sink) 24 VAC line.
- Contact closures A & B also can be triacs.
- /8\ A & B should both be closed for triac source and open for triac sink.
- For triac sink the common connection from the actuator ∕9∖
 - must be connected to the hot connection of the controller.

APPLICATION NOTES

Meets UL requirements without the need of an electrical ground connection.

WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



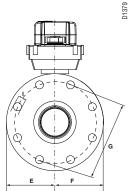


GKRX24-MFT-5-14 Actuators, Multi-Function Technology, Fail-Safe





Dimensions



Valve Body	Nominal Pipe Size	pe Flange Diameter		Face-to-Face Length	Height
			Α	В	C
B6400	4" [100]		9.00" [228.6]	8.30" [210.8]	9.30" [235.9]
B6500	5" [125]	F05	10.00" [254]	10.30" [261.6]	10.50" [266.4]
B6600	6" [150]	FUD	11.00" [279.4]	12.50" [317.5]	11.70" [296.9]

Models

GKRX24-MFT-5-14

Technical Data	
Control	2 to 10 VDC, 4 to 40 mA (default)
	variable (VDC, PWM, floating point, on/off)
Power supply	24 VAC ± 20% 50/60 Hz
	24 VDC ± 10%
Power consumption running	12 W
holding	3 W
Transformer sizing	21 VA (Class 2 power source)
Electrical connection	3 ft,18 GA plenum rated cable
	1/2" conduit connector
	10 ft. [3m], 16 ft. [5m]
Overload protection	electronic throughout 0° to 95° rotation
Feedback output	2 to 10 VDC, 0.5 mA max, VDC variable
Input impedance	100 kΩ (0.1 mA, 500 Ω)
	1500 Ω (PWM, floating point , on/off)
Angle of rotation	max. 95°, adjustable with mechanical stop
	electronically variable
Direction of rotation	reversible with γ / \sim switch
Position indication	visual indicator
Running time	150 seconds (default)
	variable (90 to 150 seconds)
fail-safe	35 seconds
Manual override	external push button
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Housing	NEMA 2/IP54, Enclosure Type 2
Housing material	UL94-5V (flammability rating)
Agency listings †	cULus according to UL 60730-1A/-2-14,
	CAN/CSA E60730-1:02, CE according to
	2004/108/EEC and 2006/95/EC.
Noise level	<45 dB(A)
Quality standard	ISO 9001

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

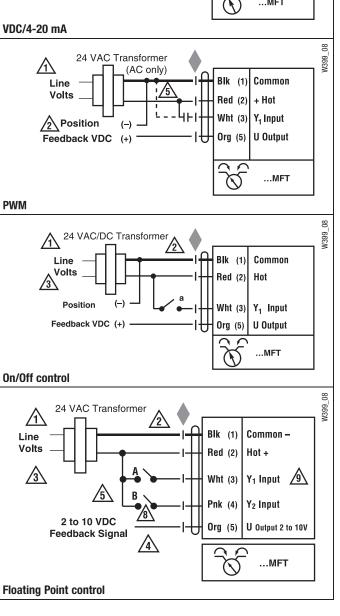


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W399

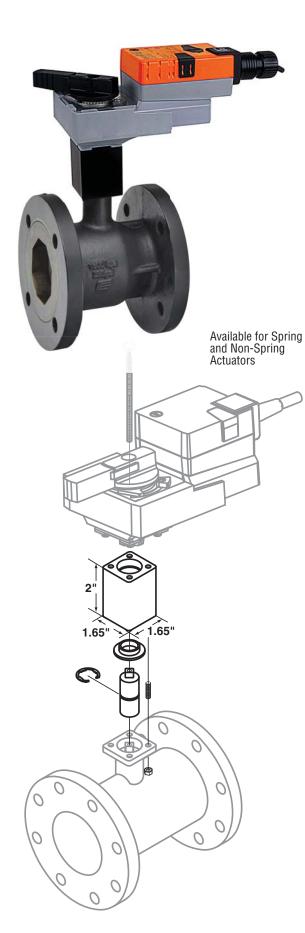
Wiring Diagrams 24 VAC Transformer **INSTALLATION NOTES** /1` <u>/2\</u> Line Blk (1)Common Provide overload protection and disconnect as required. Volts Red (2) + Hot **500**Ω $\sqrt{3}$ Ω **CAUTION** Equipment Damage! /2 Control Signal Actuators may be connected in parallel if not mechanically mounted 4 to 20 mA (+) Wht (3) Y₁ Input, 2 to 10V to the same shaft. Power consumption and input impedance must be or 2 to 10 VDC observed 14 Org (5) U Output, 2 to 10V Actuators may also be powered by 24 VDC. ∕3∖ Position feedback cannot be used with Triac sink controller. MFT ⁄4∖ The actuator internal common reference is not compatible. Control signal may be pulsed from either the Hot (source) VDC/4-20 mA ∕5∖ or the Common (sink) 24 VAC line. Contact closures A & B also can be triacs. 24 VAC Transformer /8\ ∕∩ A & B should both be closed for triac source and open for triac sink. (AC only) n Blk (1) For triac sink the common connection from the actuator Line ∕9∖ must be connected to the hot connection of the controller. Volts Red (2) Wht (3) L APPLICATION NOTES Position /2` (-) Feedback VDC (+) Org (5) t Meets UL requirements without the need of an electrical ground connection. The ZG-R01 500 Ω resistor may be used. **PWM** WARNING Live Electrical Components! During installation, testing, servicing and troubleshooting of this product, it 24 VAC/DC Transformer may be necessary to work with live electrical components. Have a qualified Λ

may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.





Accessories CCV-EXT-KIT, CCV and PICCV Valve Neck Extension Kit



Application

The CCV-EXT-KIT can be used with most CCV's* and PICCV in order to achieve a large clearance over the pipe. The Extension Kit will provide an additional 2" of space between the top of the valve and the base of the actuator. bracket is made from aluminum and is not intended as a thermal block.

- Extension kit will be automatically assembled with any Flanged CCV assembly.

Technical Data	
Extension Height	2"
Total Weight	0.7 lb

Material		
Extension Housing	Aluminum - Anodized	
Shaft	Stainless Steel	
Threaded Hardware	Stainless Steel	
Bearing	Oilite [®] Bearing	
Retaining Clip	Stainless Steel	

	TR	LRB (X)	ARB (X)	TF	LF	AF
Extension Bracket CCV-EXT-Kit	•	•	•	•	•	•

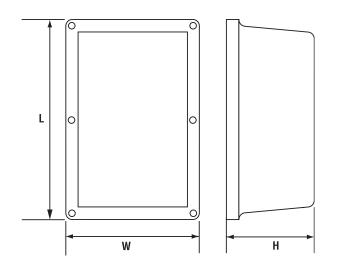
- * Cannot be used with N4 actuators.
- * Available for previous NF assemblies.
- * CCV-EXT-KIT cannot be used with any valve smaller than the B212(B) and B312(B).
- * For use with B2 and B3 series only. Cannot be used with B6 series.





Application

The ZS-CCV... weather shield provides moderate protection for valves which are mounted outdoors. This product is designed as a water tight enclosure. The housing allows easy mounting over the actuator, while allowing easy viewing of the actuator in operation. Weather shield for PICCV/CCV to provide protection for actuators in outdoor applications.



Specifications		
Cover		PETG with UV resistant smoke tint
Perimeter Gaske	t	Silicon Rubber
Rubber Gasket		Silicon Rubber
Spring Clips		Stainless Steel
Temperature limi	tations:	-22°F to 122°F (-30°C to 50°C)
Plate (ZS-CCV-1)	00)	Aluminum
Plate		Galvaneal w/black powder coat
Part Number	Actuator	
ZS - CCV - 90	LF, AF	
ZS - CCV - 100	LRB(X), ARX	
ZS - CCV - 110	AFRB(X)	
L	W	Н
16.25" [413]	8.75" [222	2] 4.5" [114]

Parts List

Cover including Rubber Perimeter Gasket, Rubber Gasket Back Plate Anti-Rotation Post with screw and lock washer

Valve Gasket

Assorted Cap plugs for unused holes

Screws AF - 2 bolts with nylon insert locking nuts LRB(X), ARX - 1 screw, 1 washer

No weather shield available at this time for the TF and TR actuators. Designed for NEMA 4 specifications.

* Cannot be used with B6 series.

Accessories Auxiliary Switches S1A, S2A



For non-spring return direct-coupled actuators

Application

The S1A and S2A auxiliary switches are used to indicate when a desired position of a valve is reached or to interface additional controls for a specific control sequence.

Operation

The S1A and S2A auxiliary switches are mounted onto the direct coupled actuator. The switches are modular units that mount directly onto LR and AR type actuators and are locked into place by guiding grooves on the sides of the actuator.

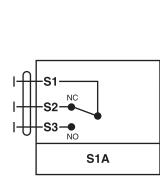
A driver disk is attached to the actuator handle and offers direct transmission of the actuator position to the micro switch cams. The switching points can be set over the full scale of 0 to 1 simply by adjusting the slotted discs.

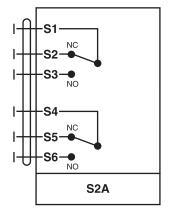
Types		
S1A	1 SPDT	3 ft, 18 GA Appliance Cable
S1A/300	1 SPDT	6 ft, 18 GA Appliance Cable
S1A/500	1 SPDT	10 ft, 18 GA Appliance Cable

S2A	2 SPDT	3 ft, 18 GA Appliance Cable
S2A/300	2 SPDT	6 ft, 18 GA Appliance Cable
S2A/500	2 SPDT	10 ft, 18 GA Appliance Cable

Technical Data	S1A	S2A		
Number of switches	1 SPDT	2 SPDT		
Weight	4.6 oz [130 g]	6.0 oz [170 g]		
Switching capacity	3A (0.5A), 250 VAC			
Switching point	adjustable over full rotation	adjustable over full rotation (0° to 95°)		
Pre-setting	with scale possible			
Humidity	5 to 95% RH non-conden	sing		
Ambient temperature	-22°F to 122°F [-30°C to	+50°C]		
Storage temperature	-40°F to 176°F [-40°C to	80°C]		
Housing	NEMA 2 / IP54			
Housing rating	UL94-5VA			
Servicing	maintenance free			
Agency listings	cULus acc. to UL60730-1			
	CE according to 73/23/EE	C		
Quality standard	ISO 9001			

Wiring Diagram







Mounting Instructions

- **1.** Press down the manual override button and rotate the actuator fully counter clockwise.
- 2. Place the switch/potentiometer adaptor onto the hex shaft of the handle which is in the center of the valve/actuator coupling.
- **3.** Slide switch onto the actuator using the actuator guiding grooves on the sides of the actuator.
- 4. Check for correct mating of the adaptor to the switch.
- 5. Adjust switch dials as necessary.

Accessories Feedback Potentiometer P...A



For the non-spring return direct-coupled actuators





Mounting Instructions

- 1. Press down the manual override button and rotate the actuator fully counter clockwise.
- 2. Place the switch/potentiometer adaptor onto the hex shaft of the handle which is in the center of the valve/actuator coupling.
- **3.** Slide switch onto the actuator using the actuator guiding grooves on the sides of the actuator.
- 4. Check for correct mating of the adaptor to the switch.
- **5.** Adjust switch dials as necessary.

Application

The P...A feedback potentiometers are used with LR and AR actuators to provide a resistive signal which varies with valve position.

The P...A units are applied with commercial proportional temperature controllers to provide feedback of the valve position, or with electric or electronic meters to provide position indication. The signal can also be used as a positioner for parallel operation of multiple actuators.

Operation

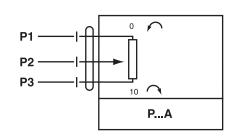
The P...A feedback potentiometers are mounted onto the direct coupled actuator. The switches are modular units that mount directly onto LR and AR type actuators and are locked into place by guiding grooves on the sides of the actuator.

A driver disk is attached to the actuator handle and offers direct transmission of the actuator position to the micro switch cams.

Types		
P140A	Feedback Potentiometer	140 Ω
P200A	Feedback Potentiometer	200 Ω
P500A	Feedback Potentiometer	500 Ω
P1000A	Feedback Potentiometer	1000 Ω
P2800A	Feedback Potentiometer	2800 Ω
P5000A	Feedback Potentiometer	5000 Ω
P10000A	Feedback Potentiometer	10000 Ω

Technical Data	РА	
Resistance values	as above	
Output	1 W	
Tolerance	± 5%	
Linearity	± 2%	
Resolution	min. 1%	
Residual resistance	max. 5% on both sides	
Electrical connection	3 ft, 18 GA appliance cable	
	1/2" conduit connector	
Humidity	5 to 95% RH non-condensing	
Ambient temperature	-22°F to 122°F [-30°C to 50°C]	
Storage temperature	-40°F to 176°F [-40°C to 80°C]	
Housing	NEMA 2 / IP54	
Housing rating	UL94-5VA	
Servicing	maintenance free	
Agency listings	cULus acc. to UL60730-1	
	CE according to 73/23/EEC	
Quality standard	ISO 9001	
Weight	4.6 oz [130 g]	

Wiring Diagram



Wiring Accessories



Protective Terminal Cover

For the non-spring return direct-coupled actuators

Application

Belimo non-spring return actuators with terminal strips are can be converted from NEMA 1/IP20 to NEMA 2/IP54 using the protective terminal cover ZS-T.

The ZS-T terminal cover accessory consists of:

- Terminal Cover
- Conduit Fitting
- Rubber Seal for Wire Diameter 4-6
- Rubber Seal for Wire Diameter 6-8

Mounting the Terminal Cover

- **1.** Attach terminal cover to actuator, if not done already.
- 2. Slide the conduit fitting and correct size rubber seal onto wire.
- **3.** Wire up actuator using the terminal strips.
- 4. Fit rubber seal into slot of terminal cover.

- 5. Shut terminal top and screw on conduit connector.





MFT Standard Configuration



	Configuration		Control		Motion			
	(Substitute 'V' for 'P' for NV[F] actuators)	Code	Input Range	Position Feedback	Running Time†	Torque %	Adaptation	
	P-10001	A01	2.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10002	A02	0.0 to 10.0 VDC	0.0 to 10.0 VDC	150	100	Manual	
	P-10003	A03	2.0 to 10.0 VDC	0.0 to 5.0 VDC	150	100	Manual	
	P-10004	A04	4.0 to 7.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10005	A05	6.0 to 9.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10006	A06	10.5 to 13.5 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10007	A07	0.0 to 5.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10009	A09	5.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
je	P-10010	A10	5.0 to 10.0 VDC	0.0 to 10.0 VDC	150	100	Manual	
Voltage	P-10013	A13	0.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
ş	P-10015	A15	2.0 to 5.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10016	A16	2.0 to 6.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10017	A17	6.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10018	A18	14.0 to 17.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10020	A20	9.0 to 12.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10028	A28	0.0 to 10.0 VDC	0.0 to 10.0 VDC	100	100	Manual	
	P-10031	A31	0.0 to 4.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10063	A63	0.5 to 4.5 VDC	0.5 to 4.5 VDC	150	100	Manual	
	P-10064	A64	5.5 to 10.0 VDC	5.5 to 10.0 VDC	150	100	Manual	
	P-20001	W01	0.59 to 2.93 sec.	2.0 to 10.0 VDC	150	100	Manual	
5	P-20002	W02	0.02 to 5.00 sec.	2.0 to 10.0 VDC	150	100	Manual	
PWM	P-20003	W03	0.10 to 25.50 sec.	2.0 to 10.0 VDC	150	100	Manual	
–	P-20004	W04	0.10 to 25.60 sec.	2.0 to 10.0 VDC	150	100	Manual	
	P-20005	W05	0.10 to 5.20 sec.	0.0 to 5.0 VDC	150	100	Manual	
+	P-30001	F01	Floating point	2.0 to 10.0 VDC	150	100	Manual	
oin	P-30002	F02	Floating point	0.0 to 10.0 VDC	150	100	Manual	
<u> </u>	P-30003	F03	Floating point	2.0 to 10.0 VDC	100	100	Manual	
atin	P-30004	F04	Floating point	0.0 to 5.0 VDC	100	100	Manual	
Floating Point	P-30005	F05	Floating point	0.0 to 10.0 VDC	100	100	Manual	
	P-30006	F06	Floating point	0.0 to 5.0 VDC	150	100	Manual	
	P-40001	J01	On/Off	2.0 to 10.0 VDC	75	100	Manual	
ŧ	P-40002	J02	On/Off	2.0 to 10.0 VDC	150	100	Manual	
0n/0ff	P-40003	J03	On/Off	2.0 to 10.0 VDC	75	100	Manual	
0	P-40004	J04	On/Off	0.0 to 5.0 VDC	100	100	Manual	
	P-40005	J05	On/Off	0.0 to 10.0 VDC	100	100	Manual	

*P-10001 is the default configuration.

Example: AF24-MFT US is the basic model. Add the P... pre-set MFT configuration number and list price to the actuator when ordering, as needed.

Note: V-codes used for NV...Series actuator. All other MFT actuators use P-codes.

Note: Most popular configurations available at no additional cost.

Note: If the configuration needed is not listed, please fill in pg. 112 or call Belimo Customer Service at 800-543-9038.

Note: For Non-Spring Return Actuators the 3-digit code can be used in place of the P... pre-set MFT configuration number.



PRODUCTS

MODEL	Base Actuator Codes	Control Input	Feedback	Running Time	Angle of Rotation/Stroke	Power Supply	VA Rating	Weight (lb)
LRX24-3	LR000	On/Off, Floating Point	—	95 (Default)	95 deg	24 VAC/DC	3	1.08
LRX24-SR	LR030	2-10 VDC (4-20mA*)	—	95 (Default)	95 deg	24 VAC/DC	3	1.08
LRX24-PC	LRXX0†	0-20 V Phasecut	2-10 VDC	95 (Default)	95 deg	24 VAC/DC	3	1.08
LRX24-MFT	LR100	2-10 VDC (Default)	2-10 VDC	150 (Default)	95 deg	24 VAC/DC	3	1.08
LRX24-MFT95	LRXX0†	0 to 135 Ohm	2-10 VDC	150 (Default)	95 deg	24 VAC/DC	3	1.08
LRX120-3	LR060	On/Off, Floating Point	_	95 (Default)	95 deg	120-240 VAC	3	1.08
LRX120-SR	LR450	2-10 VDC (4-20mA*)	—	95 (Default)	95 deg	120-240 VAC	3	1.08
ARX24-3	AR000	On/Off, Floating Point	—	95 (Default)	95 deg	24 VAC/DC	5	1.08
ARX24-SR	AR030	2-10 VDC (4-20mA*)	_	95 (Default)	95 deg	24 VAC/DC	5	1.08
ARX24-PC	ARXX0†	0-20 V Phasecut	2-10 VDC	95 (Default)	95 deg	24 VAC/DC	5	1.08
ARX24-MFT	AR100	2-10 VDC (Default)	2-10 VDC	150 (Default)	95 deg	24 VAC/DC	5	1.08
ARX24-MFT95	ARXX0†	0 to 135 Ohm	2-10 VDC	150 (Default)	95 deg	24 VAC/DC	5	1.08
ARX120-3	AR060	On/Off, Floating Point		95 (Default)	95 deg	120-240 VAC	5	1.08
ARX120-SR	AR450	2-10 VDC (4-20mA*)		95 (Default)	95 deg	120-240 VAC	5	1.08

† For correct code please call Belimo Customer service 800-543-9038

	Configuration		Control		Motion			
	(Substitute 'V' for 'P' for NV[F] actuators)	Code	Input Range	Position Feedback	Running Time†	Torque %	Adaptation	
	P-10001	A01	2.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10002	A02	0.0 to 10.0 VDC	0.0 to 10.0 VDC	150	100	Manual	
	P-10003	A03	2.0 to 10.0 VDC	0.0 to 5.0 VDC	150	100	Manual	
	P-10004	A04	4.0 to 7.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10005	A05	6.0 to 9.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10006	A06	10.5 to 13.5 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10007	A07	0.0 to 5.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10009	A09	5.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
Je	P-10010	A10	5.0 to 10.0 VDC	0.0 to 10.0 VDC	150	100	Manual	
Voltage	P-10013	A13	0.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
Š	P-10015	A15	2.0 to 5.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10016	A16	2.0 to 6.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10017	A17	6.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10018	A18	14.0 to 17.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10020	A20	9.0 to 12.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10028	A28	0.0 to 10.0 VDC	0.0 to 10.0 VDC	100	100	Manual	
	P-10031	A31	0.0 to 4.0 VDC	2.0 to 10.0 VDC	150	100	Manual	
	P-10063	A63	0.5 to 4.5 VDC	0.5 to 4.5 VDC	150	100	Manual	
_	P-10064	A64	5.5 to 10.0 VDC	5.5 to 10.0 VDC	150	100	Manual	
	P-20001	W01	0.59 to 2.93 sec.	2.0 to 10.0 VDC	150	100	Manual	
	P-20002	W02	0.02 to 5.00 sec.	2.0 to 10.0 VDC	150	100	Manual	
PWM	P-20003	W03	0.10 to 25.50 sec.	2.0 to 10.0 VDC	150	100	Manual	
-	P-20004	W04	0.10 to 25.60 sec.	2.0 to 10.0 VDC	150	100	Manual	
	P-20005	W05	0.10 to 5.20 sec.	0.0 to 5.0 VDC	150	100	Manual	
	P-30001	F01	Floating point	2.0 to 10.0 VDC	150	100	Manual	
oin	P-30002	F02	Floating point	0.0 to 10.0 VDC	150	100	Manual	
gР	P-30003	F03	Floating point	2.0 to 10.0 VDC	100	100	Manual	
tin	P-30004	F04	Floating point	0.0 to 5.0 VDC	100	100	Manual	
Floating Point	P-30005	F05	Floating point	0.0 to 10.0 VDC	100	100	Manual	
	P-30006	F06	Floating point	0.0 to 5.0 VDC	150	100	Manual	
	P-40001	J01	On/Off	None	75	100	Manual	
Ħ	P-40002	J02	On/Off	2.0 to 10.0 VDC	150	100	Manual	
0n/Off	P-40003	J03	On/Off	None	75	100	Manual	
0	P-40004	J04	On/Off	0.0 to 5.0 VDC	100	100	Manual	
	P-40005	J05	On/Off	0.0 to 10.0 VDC	100	100	Manual	

*P-10001 is the default configuration.

Custom MFT Configuration Order Form

FAX: USA Toll Free 1-800-228-8283

