



Features:



The ESBE 24 volt electronic series of motors are direct mounted actuators that rotate ESBE 3 & 4-way rotary valves for hydronic heating and cooling systems. The Series 90 actuator provides additional torque compared to the Series 60 and ARA series of actuators, and can be installed on all ESBE 3 & 4 way rotary valves, in sizes from 1/2" – 6" valves. The Series 90 motors also have linkage kits available capable of adapting to Viessmann, Honeywell, Centra DR/ZR, Landis & Staefa and TA VTR styles of valves.

Features:

- ESBE control motor series are of a compact design
- Direct mount actuators
- Easy manual override of motor actuator
- Adjustable rotation between 30° and 180° with internal cams
- Floating 3-point and proportional signal operation
- Several motors with an auxiliary contact switch activated through an adjustable cam

Ordering information:

90 Series Actuator: All ESBE rotary mixing valves (91EM, valves up to 2" only for diverting application)

Code No.	Series	Signal	Run Time (90°@60Hz)
065F8952	91EM	Floating 3 point, with Aux. Switch	12 sec.
065F8953	92EM		50 sec.
065F8959	92-2EM		100 sec.
065F8954	93EM		4 min.
065F8955	92P	Proportional	60, 90 or 120 sec.

*If the series 90 actuator will be mounted to a VRG series of valve body an adapter mounting kit is required (Code No. 193B1616)

Replacement Parts:

90 Series Actuator

Code No.	Description	Item #
25413000	Metal drive sleeve	2
193B1615	Mounting kit for 90 series	1-10
193B1616	Series 90 actuators to ESBE VRG valves	(Not shown)

Applications:

3-way mixing valve application	
	<p>When coupled with a controller the assembly of the 90 Series motor actuator and ESBE rotary valve provide regulation of the fluid through the system.</p>
4-way mixing valve application	
	<p>The Series 90 motor actuator provides higher torque capabilities allowing use on larger sized valves requiring up to 135 in. lbs. of torque.</p>

Accessories:

Linkage Kit	Non ESBE Valves
065F8957	Viessmann Valve
065F8958	Centra #900 Valve
065F8990	Landis & Staefa Valve
065F8991	Oventrop Valve
065F8992	TA VTR Valve



3 & 4-way Mixing Valves:

3-way Valves

Code No.	Reference	Connection	Cv ^o
193B1500	VRG 131	½", FNPT	2.9
193B1501	VRG 131	¾", FNPT	4.7
193B1502	VRG 131	¾", FNPT	7.3
193B1503	VRG 131	1", FNPT	7.3
193B1504	VRG 131	1", FNPT	11.7
193B1505	VRG 131	1-¼", FNPT	18.7
193B1506	VRG 131	1-½", FNPT	29.3
193B1507	VRG 131	2", FNPT	46.8
065B8960	3 F 65-50	2-½" Flanged	75
065B8961	3 F 65	2-½" Flanged	105
065B8962	3 F 80	3" Flanged	175
065B8963	3 F 100	4" Flanged	265
065B8964	3 F 125	5" Flanged	325
065B8965	3 F 150	6" Flanged	465

4-way Valves

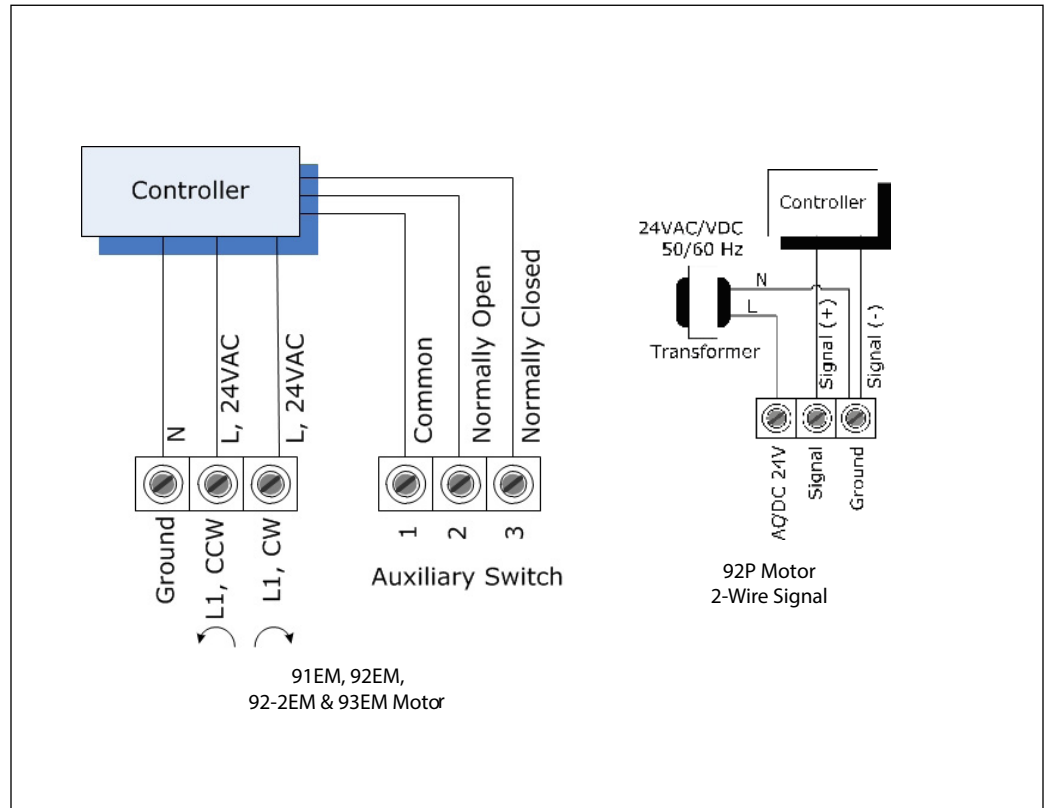
Code No.	Reference	Connection	Cv ^o
193B1531	VRG 141	¾", FNPT	4.7
193B1532	VRG 141	¾", FNPT	7.3
193B1533	VRG 141	1", FNPT	11.7
193B1534	VRG 141	1-¼", FNPT	18.7
193B1535	VRG 141	1-½", FNPT	29.3
193B1536	VRG 141	2", FNPT	46.8
193B1537	VRG 141	¾", Solder	2.9
193B1538	VRG 141	1", Solder	7.3
193B1539	VRG 141	1-¼", Solder	13.9
065B6150	4 F 50	2" Flanged	75
065B6165	4 F 65	2-½" Flanged	105
065B6180	4 F 80	3" Flanged	175
065B6200	4 F 100	4" Flanged	265
065B6225	4 F 125	5" Flanged	325
065B6250	4 F 150	6" Flanged	465

^oCv value in GPM at pressure drop of 1 psi
Contact Danfoss for information on MG or G styles of valves

Technical Specifications:

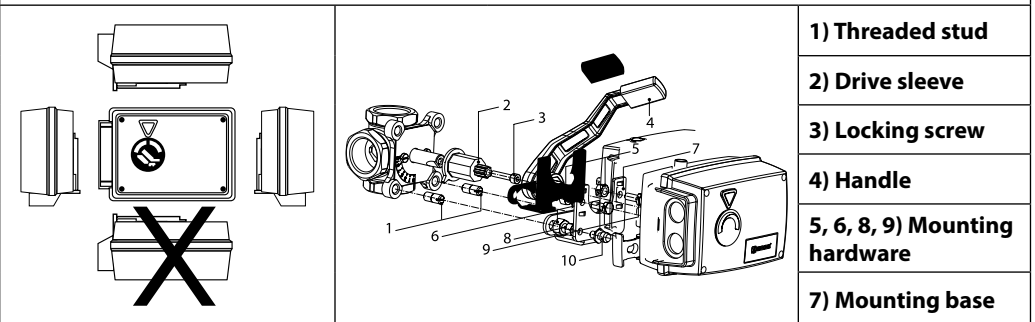
Supply Voltage	24VAC 50/60 Hz, (92P: 24VAC/DC 50/60 Hz)																	
Power Consumption	91EM / 92EM / 92-2EM / 93EM: 2VA																	
Rotation (Factory set)	90°, adjustable b/w 30° and 180° (92P only 90° rotation)																	
Torque	135 in. lb (15Nm) [91EM: 45 in. lb (5Nm)]																	
Mountable Valve Styles and Valve Sizes	ESBE rotary mixing valves MG / G / F / VRG styles Valve Sizes ½" to 6", (91EM: Up to 2")																	
Enclosure	NEMA 13, IP 54																	
Ambient Temp. Range	5 to 131°F (-15 to 55°C)																	
Weight	1.8lb (0.8kg)																	
Signal / Run Time	3-point floating: <table border="1"> <thead> <tr> <th></th> <th>50 Hz</th> <th>60 Hz</th> </tr> </thead> <tbody> <tr> <td>91EM</td> <td>15 sec.</td> <td>12 sec.</td> </tr> <tr> <td>92EM</td> <td>1 min.</td> <td>50 sec.</td> </tr> <tr> <td>92-2EM</td> <td>2 min.</td> <td>100sec.</td> </tr> <tr> <td>93EM</td> <td>5 min.</td> <td>4 min.</td> </tr> </tbody> </table>			50 Hz	60 Hz	91EM	15 sec.	12 sec.	92EM	1 min.	50 sec.	92-2EM	2 min.	100sec.	93EM	5 min.	4 min.	Proportional: (selectable) 92P- Signal: 0-10V, 2-10V, 1-5V, 0-20mA, 4-20mA Run Time: 60, 90 or 120 sec.
	50 Hz	60 Hz																
91EM	15 sec.	12 sec.																
92EM	1 min.	50 sec.																
92-2EM	2 min.	100sec.																
93EM	5 min.	4 min.																
Auxiliary Switch	All motors except 92P are with an adjustable cam position, max. 2A																	

Electrical Wiring:

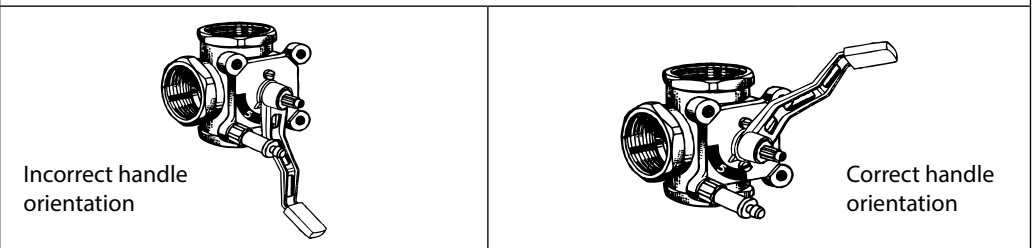


Installation:

The actuator should be mounted with the valve stem in either a horizontal position or pointing upwards. The actuator should not be installed in a downward orientation.



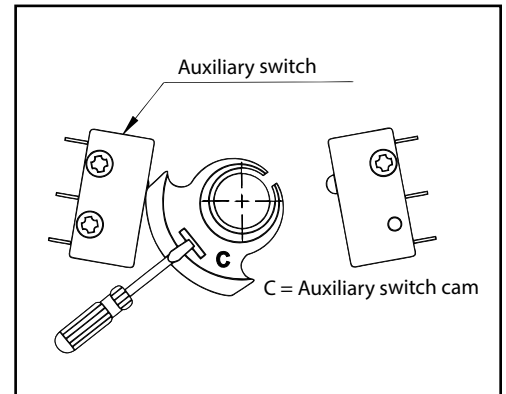
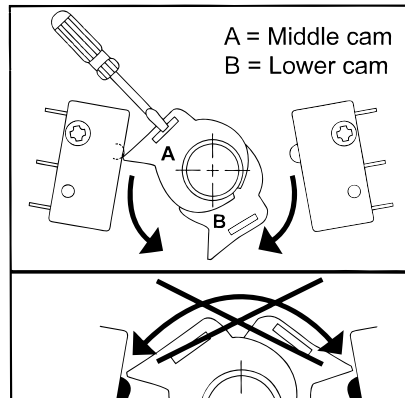
When installing the handle (4), it should be installed opposite to the indicator on the drive sleeve and the end of the handle should be facing away from the valve. Failure to properly install the handle will result in damage to the 90 series motor actuator due to the interference of the mounting stud (1) with the rotation of the handle



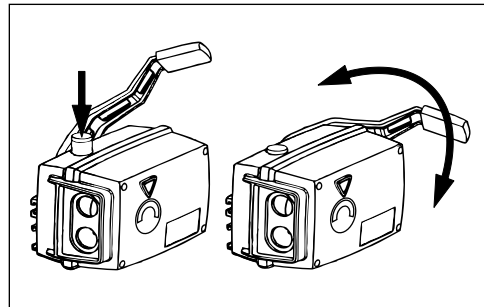
Adjustment of Rotation and Auxiliary Switch Cam:

Within the 90 Series motors, the factory set 90° of rotation can be adjustable between 30° and 180°. The adjustment of the angle of rotation and the engagement of the auxiliary switch is set

via internal cams within the motor actuator for the 91EM, 92EM, 92-2EM and 93EM. Care should be taken to ensure the cams are engaging the switches properly.



Manual Operation:



When placing the actuator in manual operation power should be turned off to the actuator. In the event the actuator is powered and is left in a manual position, the result could lead to the internal damage of the actuator.

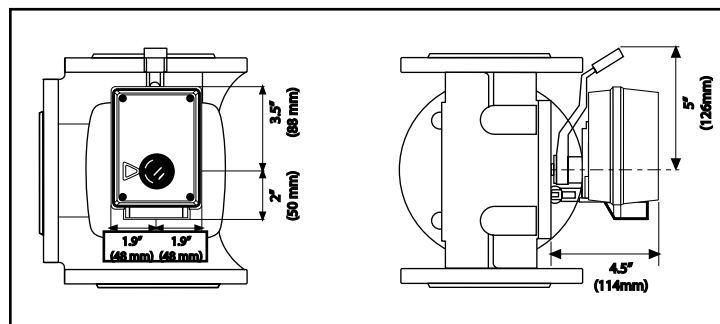
When placing the 90 Series motor in manual operation, the gray button must be pushed in. Then the handle can be rotated either clockwise or counter clockwise. To return back to automatic operation, rotate the handle until the button pops out.

**Proportional
Actuator Settings:**

**92P Actuator
Internal settable jumpers**

Actuating time			
	60s	90s	120s
60s
90s
120s	
Rotation direction			
Clock wise		Counter clock wise	
		..	
..			
Control signal			
	0-10V	2-10V	1-5V
OFS
DIV			..
CUR	..		
	0-5V	0-20mA	4-20mA
OFS	
DIV
CUR	..		

Dimensions:



Typical Specifications:

The electric actuator shall be a compact style, mountable on a rotary valve. The actuator shall be 24Vac powered with an ability for manual override via push in button. It shall have a clear

indication of the actuator's position and be available as either a floating point or proportional style of actuator.

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