

**Features:**

91, 92, 93  
series



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 ½" – 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

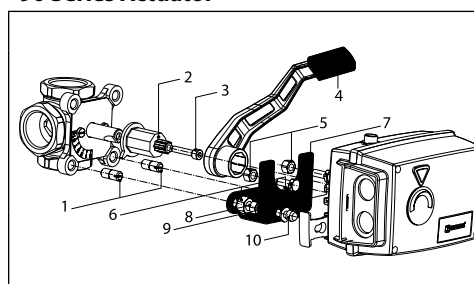
**Ordering information:**

**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)
<b>065F8952</b>	91EM	Floating 3 point, with Aux. Switch	12 sec.
<b>065F8953</b>	92EM		50 sec.
<b>065F8959</b>	92-2EM		100 sec.
<b>065F8954</b>	93EM		4 min.
<b>065F8955</b>	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 #
	<b>25413000</b>	Metal drive sleeve	2
	<b>193B1615</b>	Mounting kit for 90 series	1-10
	<b>193B1616</b>	Series 90 actuators to ESBE VRG valves	(Not shown)



Applications:

3-way mixing valve application	
	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.
4-way mixing valve application	
	The Series 90 motor actuator provides higher torque capabilities allowing use on larger sized valves requiring up to 135 in. lbs. of torque.

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 <sup>0</sup>
<b>193B1500</b>	VRG 131	½", FNPT	2.9
<b>193B1501</b>	VRG 131	¾", FNPT	4.7
<b>193B1502</b>	VRG 131	¾", FNPT	7.3
<b>193B1503</b>	VRG 131	1", FNPT	7.3
<b>193B1504</b>	VRG 131	1", FNPT	11.7
<b>193B1505</b>	VRG 131	1-¼", FNPT	18.7
<b>193B1506</b>	VRG 131	1-½", FNPT	29.3
<b>193B1507</b>	VRG 131	2", FNPT	46.8
<b>065B8960</b>	3 F 65-50	2-½" Flanged	75
<b>065B8961</b>	3 F 65	2-½" Flanged	105
<b>065B8962</b>	3 F 80	3" Flanged	175
<b>065B8963</b>	3 F 100	4" Flanged	265
<b>065B8964</b>	3 F 125	5" Flanged	325
<b>065B8965</b>	3 F 150	6" Flanged	465

<sup>0</sup>Cv value in GPM at pressure drop of 1 psi

Contact Danfoss for information on MG or G styles of valves

**4-way Valves**

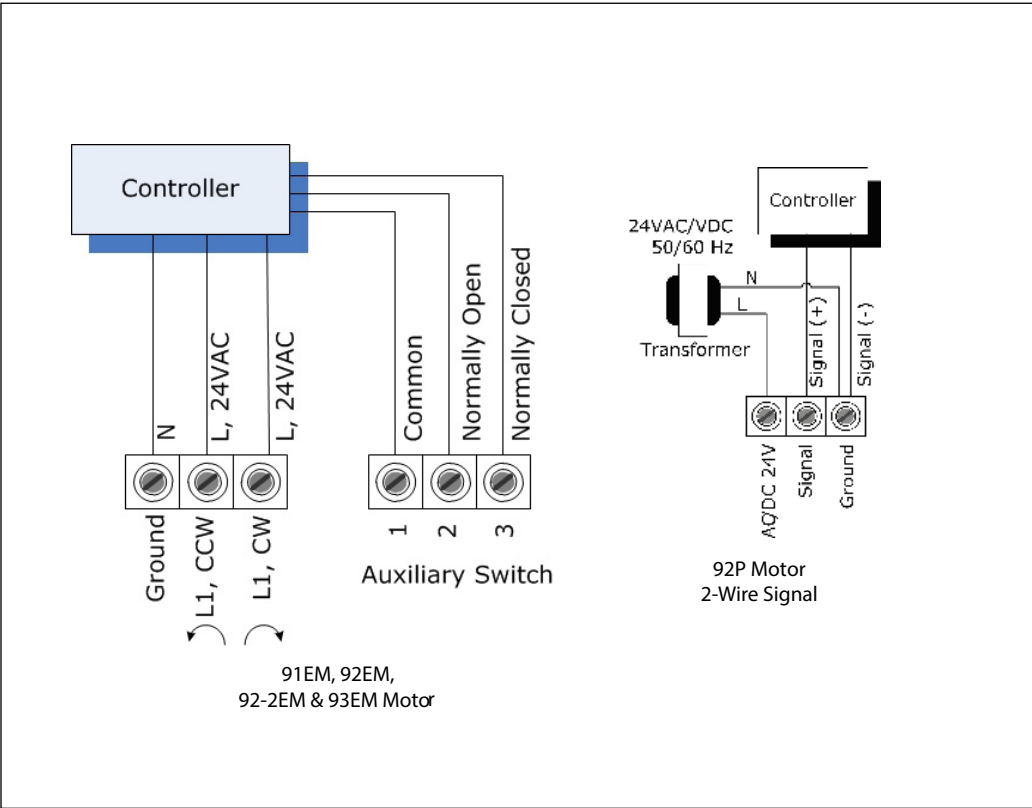
Code No.	Reference	Connection	Cv <sup>0</sup>
<b>193B1531</b>	VRG 141	¾", FNPT	4.7
<b>193B1532</b>	VRG 141	¾", FNPT	7.3
<b>193B1533</b>	VRG 141	1", FNPT	11.7
<b>193B1534</b>	VRG 141	1-¼", FNPT	18.7
<b>193B1535</b>	VRG 141	1-½", FNPT	29.3
<b>193B1536</b>	VRG 141	2", FNPT	46.8
<b>193B1537</b>	VRG 141	¾", Solder	2.9
<b>193B1538</b>	VRG 141	1", Solder	7.3
<b>193B1539</b>	VRG 141	1-¼", Solder	13.9
<b>065B6150</b>	4 F 50	2" Flanged	75
<b>065B6165</b>	4 F 65	2-½" Flanged	105
<b>065B6180</b>	4 F 80	3" Flanged	175
<b>065B6200</b>	4 F 100	4" Flanged	265
<b>065B6225</b>	4 F 125	5" Flanged	325
<b>065B6250</b>	4 F 150	6" Flanged	465

**Technical Specifications:**

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



Electrical Wiring:



Installation:

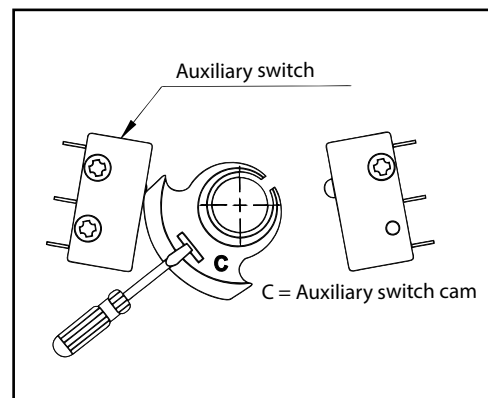
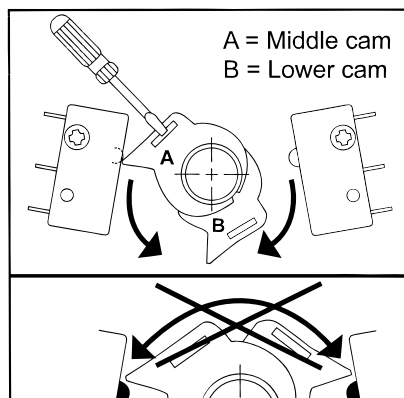
The actuator should be mounted with the valve stem in either a horizontal position or pointing upwards. The actuator should not be installed in a downward orientation.

		<ul style="list-style-type: none"><li>1) Threaded stud</li><li>2) Drive sleeve</li><li>3) Locking screw</li><li>4) Handle</li><li>5, 6, 8, 9) Mounting hardware</li><li>7) Mounting base</li></ul>
<p>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</p>		
<p>Incorrect handle orientation</p>	<p>Correct handle orientation</p>	

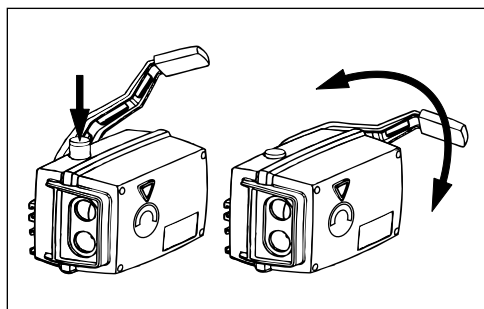
**Adjustment of Rotation  
and Auxiliary Switch Cam:**

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.

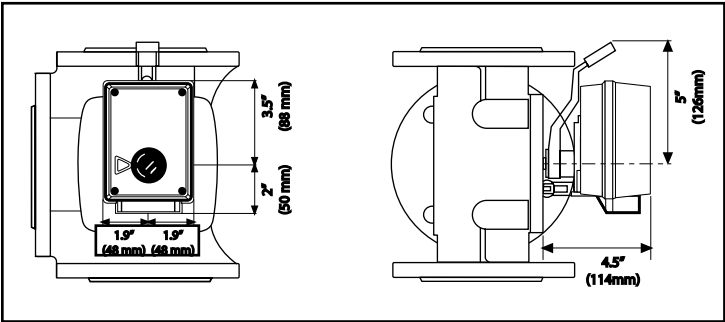


Proportional  
Actuator Settings:

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.

Danfoss can accept no responsibility for possible errors in printed materials and reserves the right to alter its products without notice. All trademarks in this material are property of the respective companies. Danfoss and Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.



**Danfoss**  
Baltimore, Toronto, ON  
Toll Free: 866-375-4822  
Fax: 416-352-5981  
[www.heating.danfoss.us](http://www.heating.danfoss.us)