

FA-2000

Spring Return Valve Actuator

Introduction

The FA-2000 series electric actuators are available for 3-point control or with electronic positioner for 0...10 V or 0...20 mA control. It provides a fully variable valve aperture, a power failure spring return safety mechanism and an electrically operated manual override.

Three models of the FA-2000 are available.

The FA-22 ("failsafe" position down = stem fully extended) and FA-25 ("failsafe" position up = stem fully retracted): this model pair has a 25 mm stroke and a minimum of 2400 N thrust.

The FA-23 ("failsafe" position down) and FA-26 ("failsafe" position up): this model pair has a 42 mm stroke of and a minimum thrust of 2200 N.

The FA-24 ("failsafe" position down) and FA-27 ("failsafe" position up): this model pair has a stroke of 13 mm and 2000 N minimum thrust.

The actuator can be combined with VG8000, VBB, and VBD series flanged valves in accordance with the maximum close-off pressure ratings specified.

The FA-2000, when delivered as a single unit, is pre-set to facilitate installation with minimum adjustment; it is also available with a variety of options such as auxiliary switches and feedback potentiometers.



FA-23 (left), FA-26 (right) and FA-25 mounted on VG8000 flanged valve

Features and Benefits

☐ Power failure safety mechanism (spring return).	Fast valve close off or opening after power failure.
☐ Visible calibration ring on stem coupling.	Provides easy close-off force setting.
☐ Models for 3-point and proportional 0...10 V or 0...20 mA control.	Allows optimum choice of electrical signal.
☐ Positioner with adjustable: starting point, span and direct / reverse action.	Provides flexibility in application. Allows easy sequencing from only one controller output.
☐ Active 0...10 V feedback on proportional models.	Provides active signal for independent position monitoring and command function.
☐ Electrically operated manual override.	Provides manual positioning of the valve.
☐ Quick-fit coupling clamp.	Provides easy mounting of the actuator on flanged valves with slotted stem.
☐ Optional auxiliary switches and feedback potentiometers available.	Provides potential free contacts for independent monitoring of the actuators position.

Ordering data for FA-22 and FA-25

25 mm stroke, 2400 N thrust, spring return actuator:

FA-2			-751	
				Voltage supply type
				1 230V, 50 Hz
				6 24 V, 50 Hz
				Factory fitted accessories
				00 None
				01 (2) Auxiliary switches
				02 2 kΩ feedback pot.
				03 (2) Auxiliary switches and 2 kΩ feedback pot.
				04 135 Ω feedback pot.
				40 Built-in electronic positioner 0...10 V / 0 (4) ...20 mA *
				41 Built-in electronic positioner 0...10 V / 0...20 mA and (2) Auxiliary switches
				Spring return function
				2 “Failsafe” position: stem fully extended
				5 “Failsafe” position: stem fully retracted

* Not for 230 V model; A requirement for a 4...20 mA factory setting must be stated when the order is made (special order). Otherwise the positioner mA settings are adjustable in situ.

Ordering procedure

The actuator can be ordered as a separate unit or a factory fitted valve-actuator combination. Should the latter be required, please just add "+M" to the end of the actuator ordering code.

For example:

Item 1 **VG82G1S1N** (valve body)
Item 2 **FA-2241-7512** (actuator)

Alternatively, to order a factory fitted combination.

Item 1 **VG82G1S1N** (valve body)
Item 2 **FA-2241-7512+M** (actuator)

Actuator - Valve combinations

The FA-22 and FA-25 electric spring return actuator models are to be used with the VBB, VBD and VG8000 valve series.

The ordering data for valve bodies is as follows:

● VG8000 series (PN 16 flanged valves)

VG82□□S1N	2-way PDTC	DN 50...80
VG88□□S1N	3-way mixing	DN 50...80
VG89□□S1N	3-way diverting	DN 50...80

● VBD series (PN 25 flanged valves)

VBD-□□□2-520□	2-way PDTC	DN 50...65
VBD-□□□8-520□	3-way mixing	DN 50...65

● VBB series (PN 16 and 25 pressure balanced flanged valves)

VBB-□□12-520□	2-way PDTC (NO)	DN 50...65
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Please refer to the product bulletins "VG8000 Series Flanged Valves", "VBD Series Flanged Valves" and "VBB Series Flanged Valves" for complete ordering information.

FA-22 and FA-25 accessory kits for in-situ installation

Order No.	Description	Comments
EQ-1008-7101	(2) Limit switches	-
EQ-1009-7101	Remote position indicator assembly. fitted with (1) 2 kΩ potentiometer	Not available for 0...10V models
EQ-1029-7101	Remote position indicator assembly fitted with (1) 135 Ω potentiometer	Not available for 0...10V models
EQ-1010-7101	* (1) 2 kΩ potentiometer	Not available for 0...10V models
EQ-1030-7101	* (1) 135 Ω potentiometer	Not available for 0...10V models
EQ-1007-7101	Replacement PCB	-

* For models with remote position indicator assembly fitted as standard.

A combination of:

EQ-1008-7101 and EQ-1009-7101

or

EQ-1008-7101 and EQ-1029-7101

is also available.

Ordering data FA-23 and FA-26

42 mm stroke, 2200 N thrust, spring return actuator:

FA-2	□	□	-741	□	Voltage supply type	
					1	230VAC, 50 Hz
					6	24 VAC, 50 Hz
					Factory fitted accessories	
					00	None
					01	(2) Auxiliary switches
					02	2 kΩ feedback pot.
					03	(2) Auxiliary switches and 2 kΩ feedback pot.
					04	135 Ω feedback pot.
					40	Built-in electronic positioner 0...10 V / 0 (4) ...20 mA *
					41	Built-in electronic positioner 0...10 V / 0...20 mA and (2) Auxiliary switches
					Spring return function	
					3	"Failsafe" position: stem fully extended
					6	"Failsafe" position: stem fully retracted

* Not for 230 V model; A requirement for a 4...20 mA factory setting must be stated when the order is made (special order). Otherwise the positioner mA settings are adjustable in situ.

Ordering procedure

The actuator can be ordered as a separate unit or a factory fitted valve-actuator combination. Should the latter be required, please just add "+M" to the end of the actuator ordering code.

For example:

Item 1 **VG82J1S1N** (valve body)
Item 2 **FA-2341-7412** (actuator)

Alternatively, to order a factory fitted combination.

Item 1 **VG82J1S1N** (valve body)
Item 2 **FA-2341-7412+M** (actuator)

Actuator - Valve combinations

The FA-23 and FA-26 electric spring return actuator models are to be used with the VBB, VBD and VG8000 valve series.

The ordering data for valve bodies is as follows:

● VG8000 series (PN 16 flanged valves)

VG82 □ □ **S1N** **2-way PDTC** **DN 100...150**

VG88 □ □ **S1N** **3-way mixing** **DN 100...150**

VG89 □ □ **S1N** **3-way diverting** **DN 100...150**

● VBD series (PN 25 flanged valves)

VBD-□ □ □ **4-520** □ **2-way PDTC (NO)** **DN 80...150**

VBD-□ □ □ **8-520** □ **3-way mixing** **DN 80...150**

● VBB series (PN 16 and 25 pressure balanced flanged valves)

VBB-4 □ □ **12-520** □ **2-way PDTC (NO)** **DN 80...150**

Please refer to the product bulletins "VG8000 Series Flanged Valves", "VBD Series Flanged Valves" and "VBB Series Flanged Valves" for complete ordering information.

FA-23 and FA-26 accessory kits for in-situ installation

Order No.	Description	Comments
EQ-1008-7101	(2) Limit switches	-
EQ-1016-7101	Remote position indicator assembly, fitted with (1) 2 kΩ potentiometer	Not available for 0...10V models
EQ-1017-7101	Remote position indicator assembly fitted with (1) 135 Ω potentiometer	Not available for 0...10V models
EQ-1018-7101	* (1) 2 kΩ potentiometer	Not available for 0...10V models
EQ-1019-7101	* (1) 135 Ω potentiometer	Not available for 0...10V models
EQ-1007-7101	Replacement PCB	-

* For models with remote position indicator assembly fitted as standard.

A combination of:

EQ-1008-7101 and EQ-1016-7101

or

EQ-1008-7101 and EQ-1017-7101

is also available.

Ordering data FA-24 and FA-27

13 mm stroke, 2000 N thrust, spring return actuator:

FA-2	□	□	-7	11	□	Voltage supply type
						1 230V, 50 Hz
						6 24 V, 50 Hz
						Factory fitted accessories
						00 None
						01 (2) Auxiliary switches
						02 2 kΩ feedback pot.
						03 (2) Auxiliary switches and 2 kΩ feedback pot.
						04 135 Ω feedback pot.
						40 Built-in electronic positioner 0...10 V / 0 (4) ...20 mA *
						41 Built-in electronic positioner 0...10 V / 0...20 mA and (2) Auxiliary switches
						Spring return function
						4 "Failsafe" position: stem fully extended – DN 25...40
						7 "Failsafe" position: stem fully retracted – DN 25...40

* Not for 230 V model; A requirement for a 4...20 mA factory setting must be stated when the order is made (special order). Otherwise the positioner mA settings are adjustable in situ.

Ordering procedure

The actuator can be ordered as a separate unit or a factory fitted valve-actuator combination. Should the latter be required, please just add "+M" to the end of the actuator ordering code.

For example:

Item 1 **VG82E2S1N** (valve body)
Item 2 **FA-2441-7116** (actuator)

Alternatively, to order a factory fitted combination.

Item 1 **VG82E2S1N** (valve body)
Item 2 **FA-2441-7116+M** (actuator)

Actuator - Valve combinations

The FA-24 and FA-27 electric spring return actuator models are to be used with the VBD and VG8000N valve series.

● VG8000N series (PN 16 flanged valves)

VG8□□□S1N 2-way PDTC DN 25...40
VG8□□□S1N 3-way mixing DN 25...40
VG8□□□S1N 3-way diverting DN 25...40

● VBD series (PN 25 flanged valves)

VBD-□□□4-520□ 2-way PDTC DN 25...40
VBD-□□□8-520□ 3-way mixing DN 25...40

Please refer to the product bulletins "VG8000 Series Flanged Valves" and "VBD Series Flanged Valves".

FA-24 and FA-27 accessory kits for in-situ installation

Order No.	Description	Comments
EQ-1008-7101	(2) Limit switches	-
EQ-1009-7101	Remote position indicator assembly. fitted with (1) 2 kΩ potentiometer	Not available for 0...10V models
EQ-1029-7101	Remote position indicator assembly fitted with (1) 135 Ω potentiometer	Not available for 0...10V models
EQ-1010-7101	* (1) 2 kΩ potentiometer	Not available for 0...10V models
EQ-1030-7101	* (1) 135 Ω potentiometer	Not available for 0...10V models
EQ-1007-7101	Replacement PCB	-

* For models with remote position indicator assembly fitted as standard.

A combination of:

EQ-1008-7101 and EQ-1009-7101

or

EQ-1008-7101 and EQ-1029-7101

is also available.

Operation

3-point models

Connections	Actuator stem
1-2	extends
1-3	retracts

Proportional models

Action plug	Input control signal	Actuator stem
Direct action	increases decreases	retracts extends
Reverse action	increases decreases	extends retracts

Power failure:

FA-22:	Stem extends
FA-25:	Stem retracts
FA-23:	Stem extends
FA-26:	Stem retracts
FA-24:	Stem extends
FA-27:	Stem retracts



WARNING

"Failsafe"

In a power failure situation the actuator stem extends / retracts

Safety function

When the safety function is activated, spring force opens or closes the valve depending on the actuator "failsafe" mode. Further information can be found in the service and data information provided as actuator by-pack:

SDI No. 111 6064 010 for FA-22 and FA-25

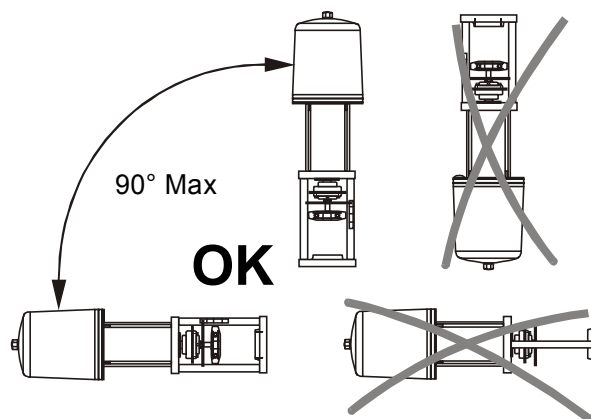
SDI No. 111 6189 010 for FA-23 and FA-26

SDI No. 111 6095 010 for FA-24 and FA-27

Mounting instructions

When mounting the actuator on a valve, please follow the instructions below:

- It is recommended that the valves be mounted within 90° of the upright position, in an easily accessible location. When mounting in an *inclined to horizontal* position, the yoke should be fitted such that the stanchions are aligned vertically one above the other.



- The actuator must be protected against dripping water, which could enter the housing and damage the mechanism or motor.
- Do not cover with insulating material.
- Sufficient clearance must be allowed for actuator removal (refer to the dimension drawings).
- The valve must be installed so that the plug seats against the flow as indicated by the arrow(s) on the valve.

Close-off pressures

Maximum Close-off pressures (kPa) for FA-2000 actuator / valve combinations

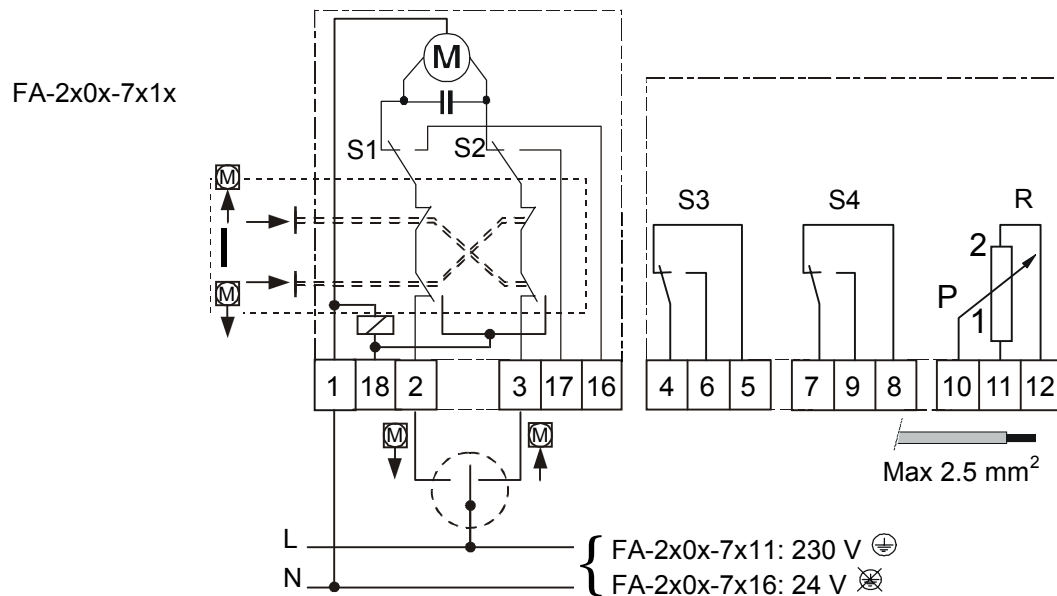
Valve series	FA-22 and FA-25		FA-23 and FA-26			FA-24 and FA-27		
	Body Size (DN)		Body Size (DN)		Close-off pressures	Body Size (DN)		Close-off pressures
	Two-way	Mixing	Two-way	Mixing		Two-way	Mixing	
VG8000, PN 16	50				190	25		1600
	65				110	40		1600
	80				50	-		
VBD, PN 25	-		80		220	25		2500
	50		100		110	40		1400
	65		125		50		25	2500
	-		150		20		40	1050
VBB, PN 16	-		80	-	1600	-		
	50		100	-				
	65		125	-				
	-		150	-				
VBB, PN 25	-		80	-	2000	-		
	50		100	-				
	65		125	-				
	-		150	-				

Wiring instructions

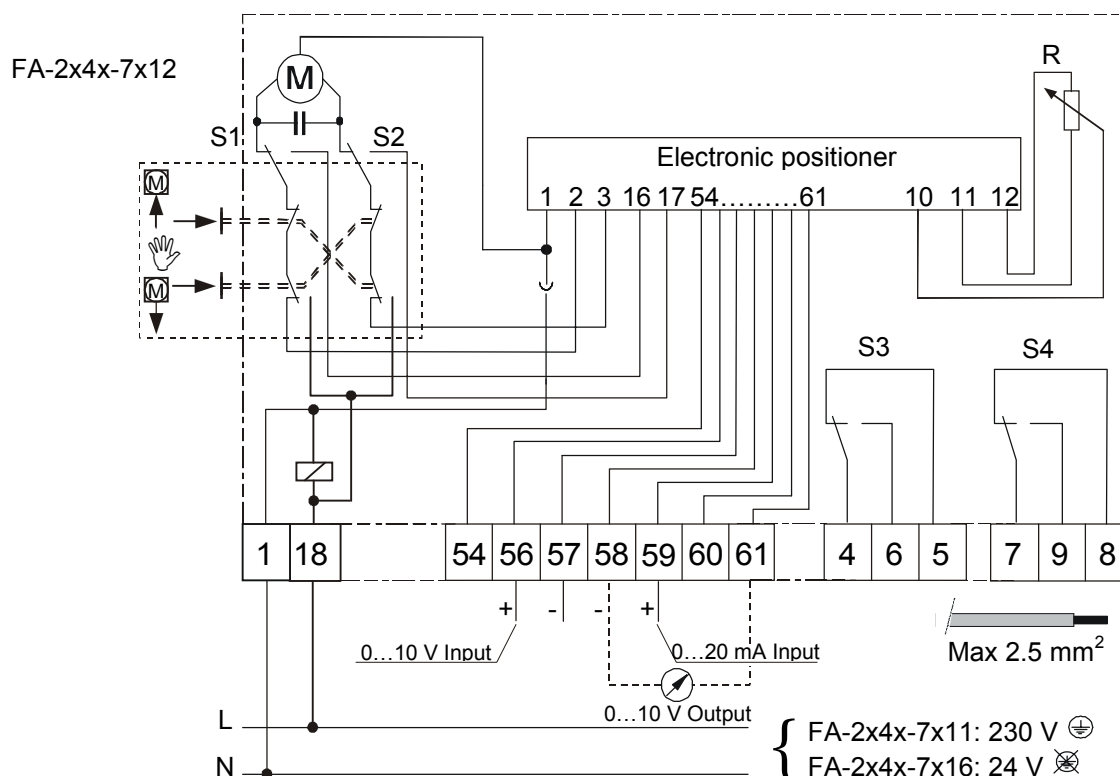
- All wiring must be in accordance with local regulations and national electrical codes and should be carried out by authorised personnel only.
- Make sure that the line power supply is in accordance with the power supply specified on the device.

Wiring diagrams

3-point models



Proportional models



Adjustments

WARNING

Shock Hazard

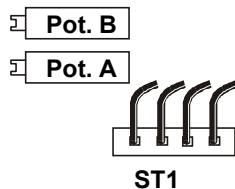
Great care must be taken when the cover is removed (by authorised personnel only) for adjustment or inspection.

In all other cases when the cover is removed the power must be switched off.

Do not touch or attempt to connect or disconnect wires when the electrical power is on.

Actuators with 0...10 V or 0...20 mA positioner (example below with 0...10 V)

Situated on electronics pcb



Selecting positioner action:

The action can be selected by disconnecting the action plug "ST1", turning it 180 degrees and reconnecting it, as in the following illustration:

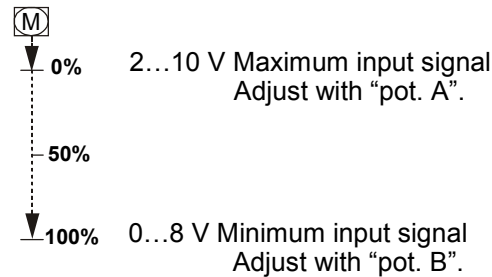


Slope adjustment:

• Direct Action:

At the **maximum** input signal, adjust the 0% position with "potentiometer A".

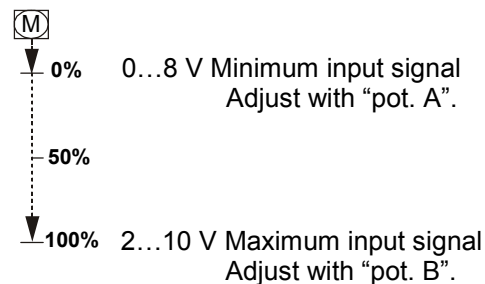
At the **minimum** input signal, adjust the 100% position with "potentiometer B".



• Reverse Action

At the **minimum** input signal, adjust the 0% position with "potentiometer A".

At the **maximum** input signal, adjust the 100% position with "potentiometer B".



Note:

The maximum input signal must always exceed the minimum input signal by at least 2 Volts.

Applications

Parallel operation of 3-point actuators.

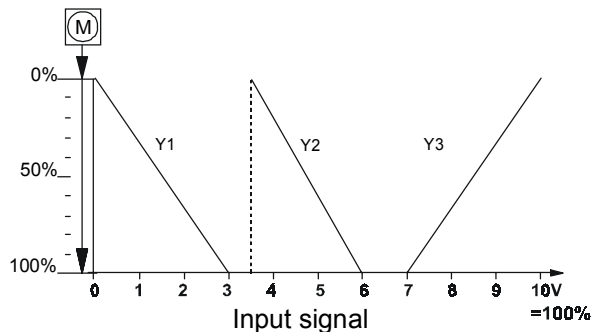


CAUTION

Parallel connection is only possible using isolation relays. If the parallel running motors do not have separately switched power supplies one or more motors will start to cycle at the end of travel.

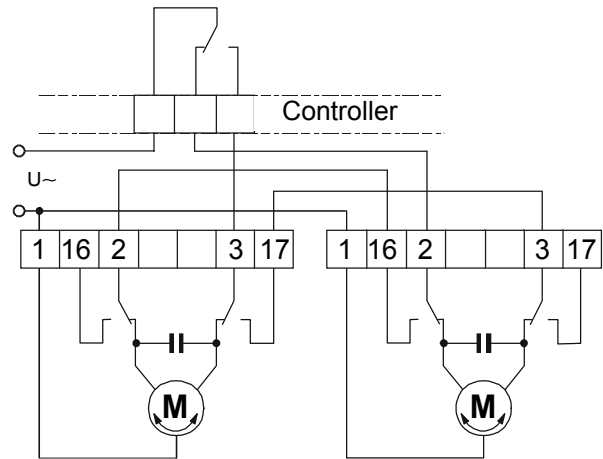
The controller output 0...10 V can operate several actuators with electronic positioner for 0...10 V or 0...20 mA control. The electrical wiring for parallel and sequenced operation is identical. The sequencing and action of the actuator can be adjusted individually on each positioner. Each positioner has its own adjustment for starting point between 0...8 V and end point between 2...10 V. Using the minimum adjustable span of 20 % therefore enables a maximum of 5 sequenced devices. Further sequencing can be accomplished by using additional controller outputs. Each positioner can be set for direct or reverse action.

Adjustments for Y1, Y2 and Y3 (example):



Reversible actuator without positioner, for floating controller.

Sequencing two actuators without positioner using limit switches.

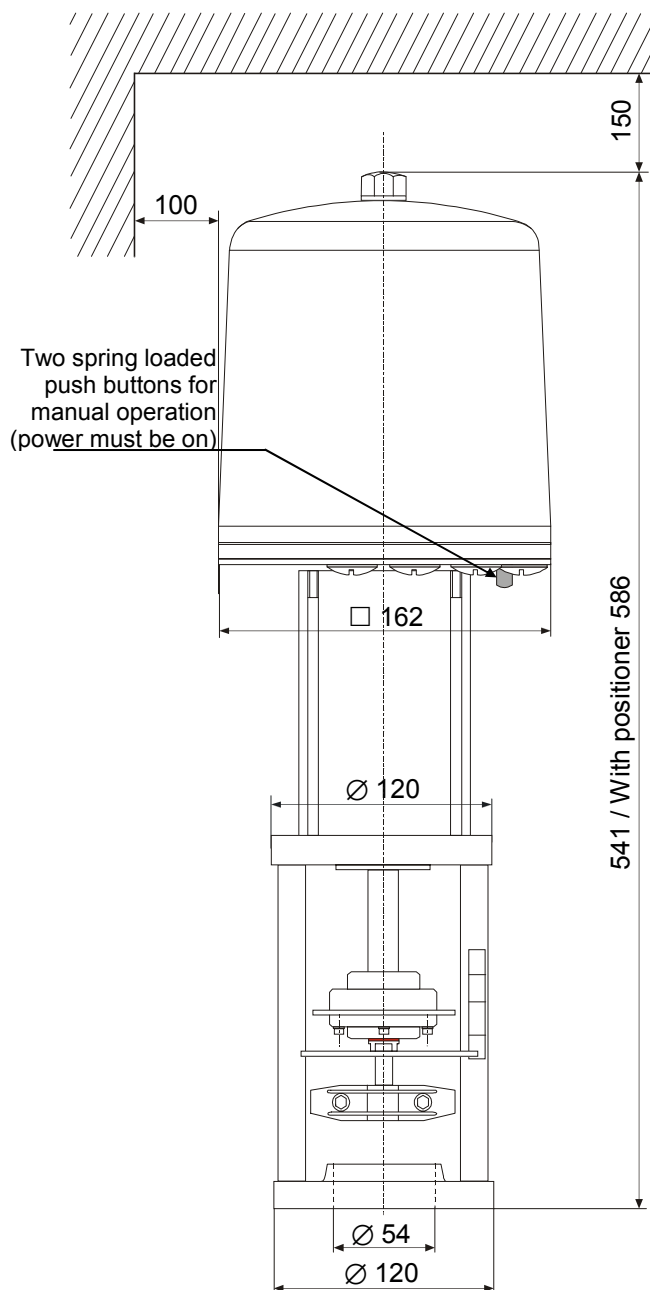


Parallel operation of actuators without positioner with synchronous motor, condenser and limit switches:

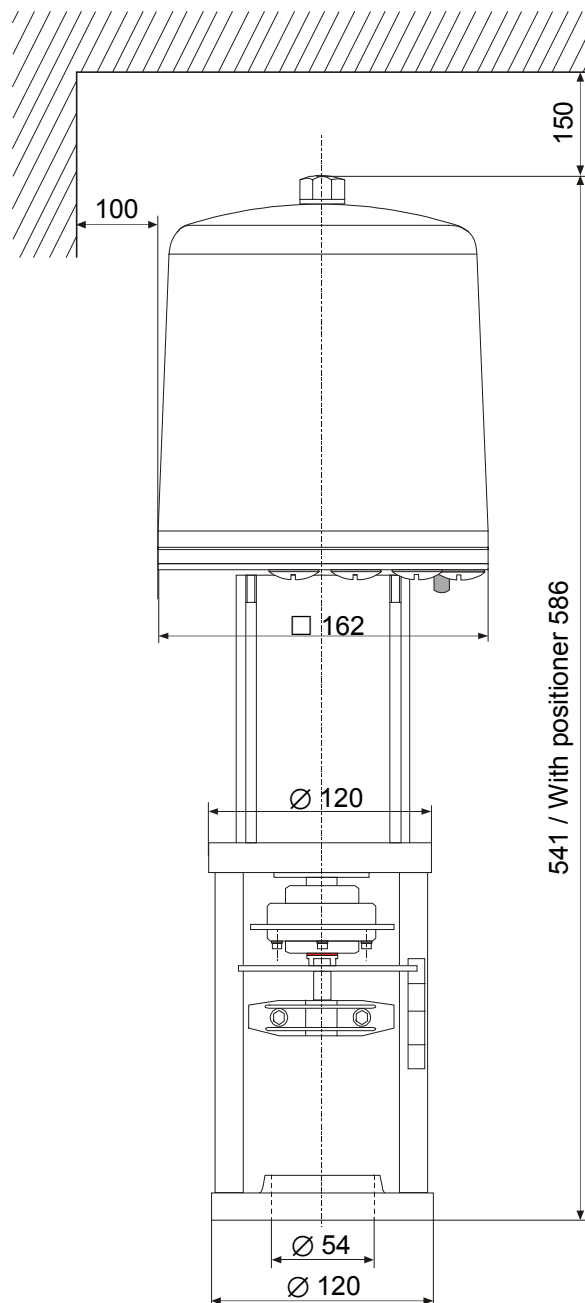
Although synchronous motors have the same running speed, deviation in travel between motors can accumulate because of varying load during start-stop operation. This deviation depends on the number of on/off cycles and is about 0.5 % per 100 cycles. Periodically switching the actuators to end of travel (e.g. normal position) will improve the synchronous running of the motors.

Dimensions (in mm)

FA-22

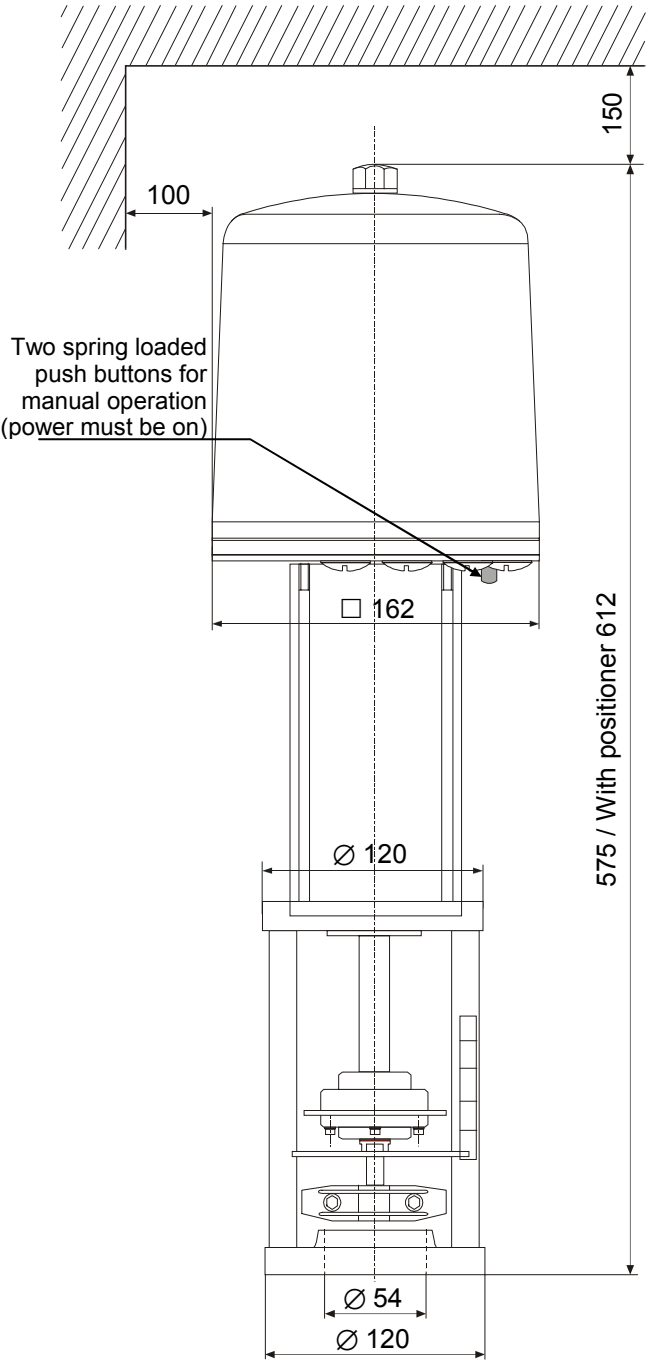


FA-25

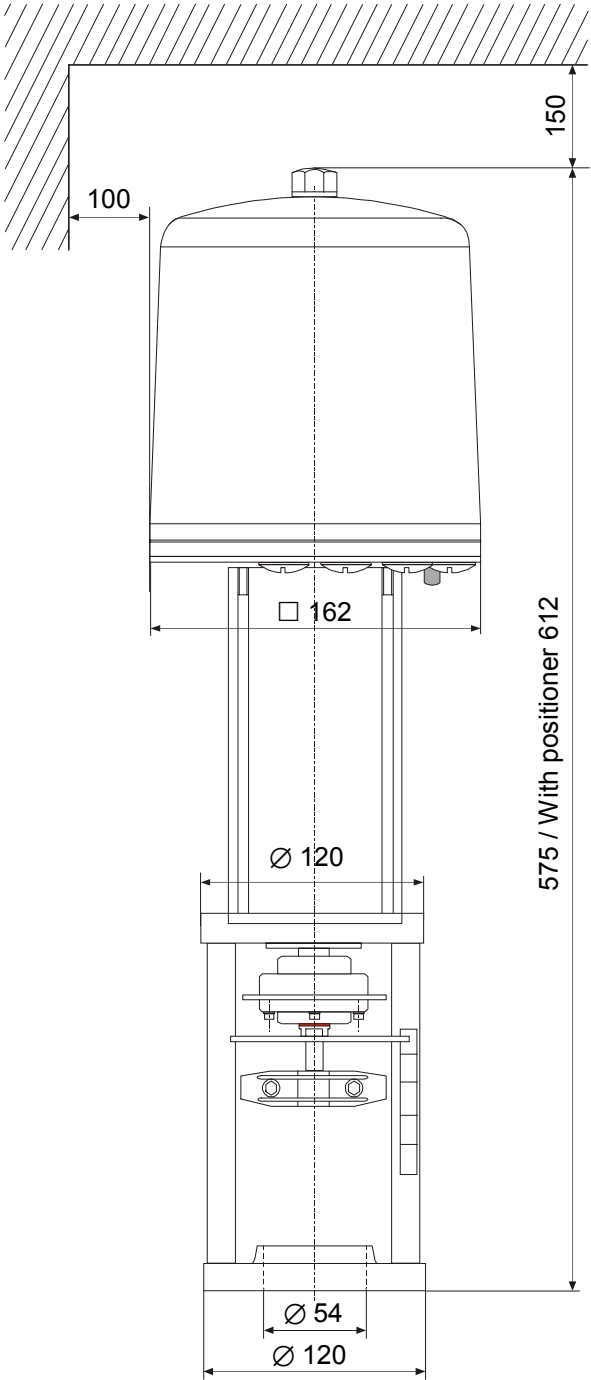


Dimensions (in mm)

FA-23

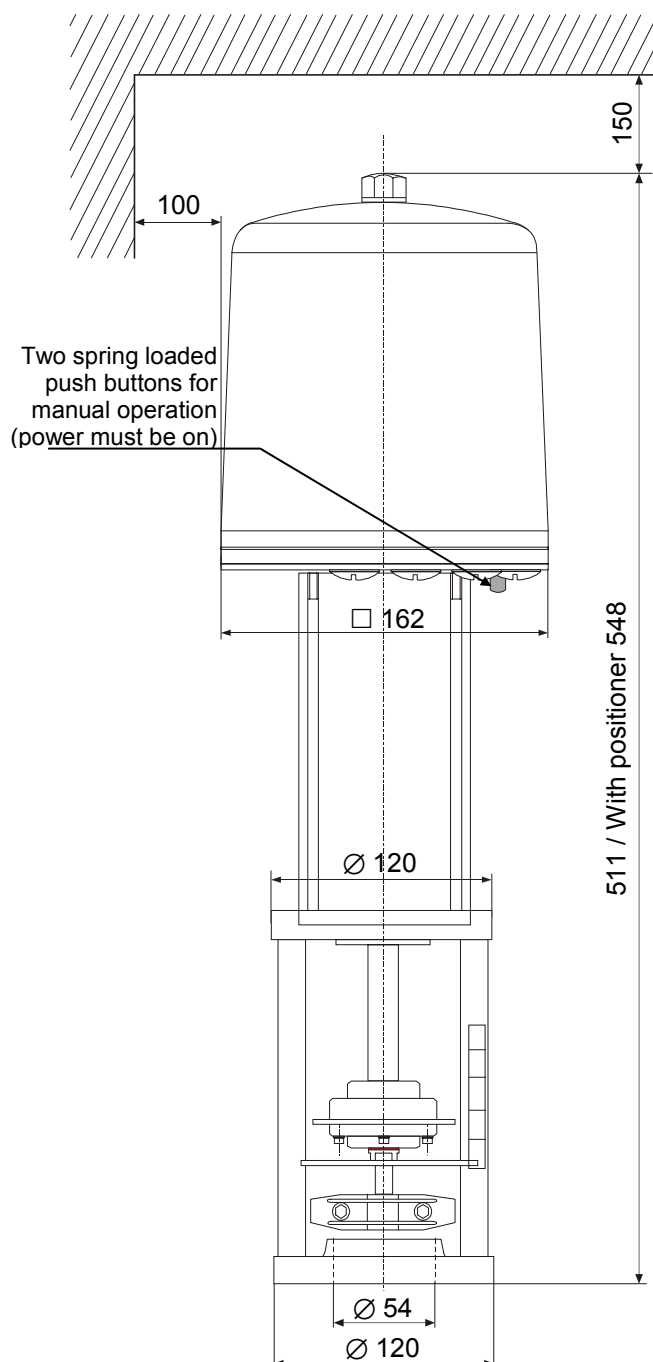


FA-26

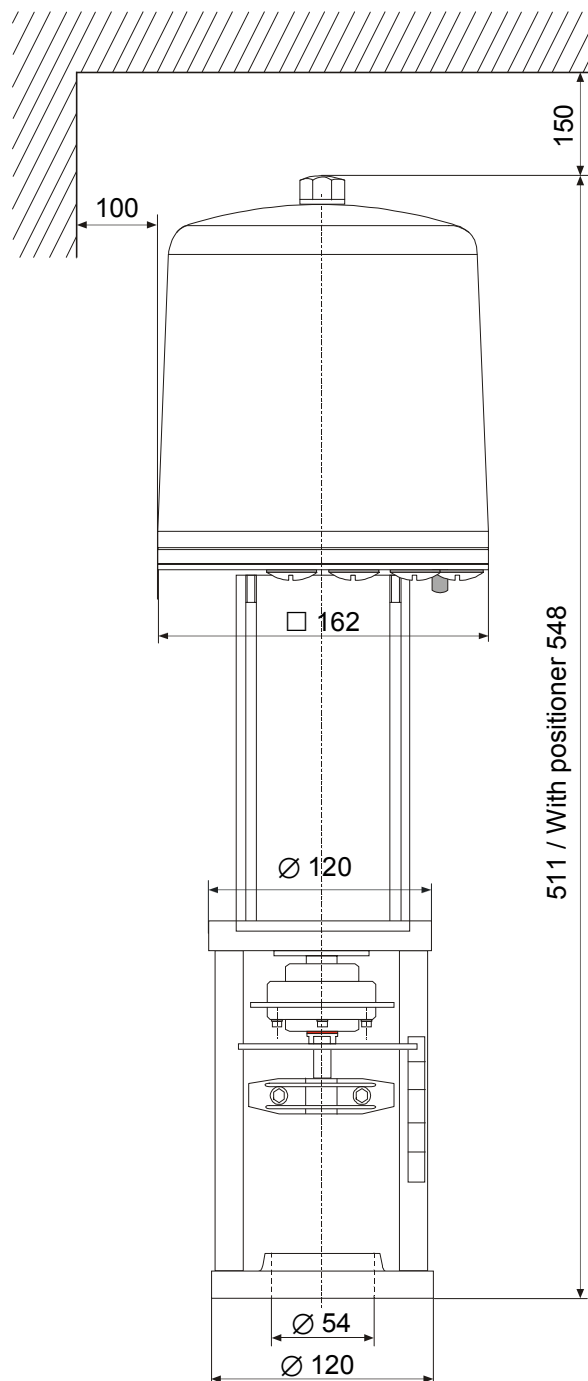


Dimensions (in mm)

FA-24



FA-27



***N*otes**

Specifications

Actuator Models:		FA-22 and FA-25		FA-23 and FA-26		FA-24 and FA-27	
Associated valve series:							
VBB		PN 16, PN25:	DN 50...65	PN 16, PN25: DN 80...150			
VBD		PN 25:	DN 50...65	PN 25: DN 80...150		PN 25:	DN25...40
VG8000		PN 16:	DN 50...80	PN 16: DN 100...150		PN 25:	DN25...40
Type of motor:				Synchronous reversible			
Action / control:		3-point - Proportional with built-in 0...10 V or 0...20 mA electronic positioner (input impedance 10 kΩ)					
Voltage supply and frequency:		230 V +10% / -15% 50 Hz 24 V +10% / -15% 50 Hz		230 V +10% / -10% 50 Hz 24 V +10% / -15% 50 Hz (60 Hz on request)		230 V +10% / -10% 50 Hz 24 V +10% / -15% 50 Hz	
Power consumption:		Motor: 24 V = 6.1 VA 230 V = 5 VA Solenoid: 15 VA / with positioner 4 VA					
Nominal Thrust:		2.4 kN ₁₀₀		2.2 kN min		2 kN min	
Nominal stroke:		25 mm		42 mm		13 mm	
Nominal running speed:		17.5 mm / min 86s at 25 mm stroke		17.5 mm / min 144s at 42 mm stroke		17.5 mm / min 45s at 13 mm stroke	
Emergency shut-off speed:		≤ 8s		≤ 20s		≤ 5s	
Close off direction:		Stem extending	Stem retracting	Stem extending	Stem retracting	Stem extending	Stem retracting
Manual operation:		2 Spring loaded buttons (power must be on)					
Motor stop:		2 limit switches - 250 VAC max. 10 A					
Enclosure protection:		IP 54					
Electrical connection:		Terminal strip via 4 PG 11 screw fittings					
Operation (as per VDE 0530):		Control function, 100% continuous rating					
Materials:		Stainless steel (material DIN W-No. 1.4305) Synthetic, ABS					
Stem:							
Cover:							
Required clearance for actuator cover removal:		100 mm / With positioner 150 mm					
Operating and storage conditions:		-20...+60 °C R.H. 10...90 %, non condensing					
Net weight:		9.4 kg		9.8 kg		9.3 kg	
Approvals:		European Directives:		EMC (89 / 336 EEC) LVD (73 / 23 / EEC)			

The performance specifications are nominal and conform to acceptable industrial standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls Incorporated are not liable for damages resulting from misapplication or misuse of its products.

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Printed in Germany