VSI®

VS-EM MULTI-TURN ELECTRIC ACTUATOR

About VSI

Valve Solutions, Inc. (VSI) originated in Alpharetta, GA, USA, in 1995. Our primary focus is crafting actuation control products for both Commercial and Industrial sectors. Collaborating closely with valve companies, we deliver automated valve packages to some of the globe's leading controls enterprises.

Our range of electric actuators undergoes comprehensive development, manufacturing, and testing within our own facilities. These products find extensive application across diverse industries including Oil & Gas, HVAC, Marine, Mining, Pulp & Paper, Food & Beverage, Power, Water & Wastewater, Pharmaceutical, and Chemical sectors worldwide.

VSI Actuators holds numerous invention patents, along with new utility patents and software copyrights. Our commitment revolves around "Quality-driven, Technical innovation, Reliable service," ensuring the provision of optimal actuator solutions to the market.

CONTENTS

Multi Turn Electric Actuator

> **Available torque range : 60Nm to 3000Nm**

> **Available Speed range : 18 rpm to 144 rpm**

> **Design with basic, intelligent, fieldbus and separated Local control unit options**

> **IP67 enclosure protection as standard, IP68, Ex-proof enclosure available upon request**

> **Suitable for a wide range of applications, including Ball valves, butterfly valves, plug valves, gate valves, globe valves, check valves, regulating valves and penstock**

VS-EM Multi-Turn Electric Actuator, Standard Model

Patent No: 20203008118.5

VS-EM Multi-Turn Electric Actuator, Intelligent Model

Patent No: 202030073234.5

Advance Technology

> Reliable Operation
> Heavy duty motor
> Accurate torque measurement
> Continuous position tracking
> Real Time valve and actuator performance data
> Auto self test and diagnostic
> Easy maintenance
> Hardwired controls and fieldbus communication options

Non-intrusive settings

> Command / Mode selector switch for remote or local control
> Infrared remote controller

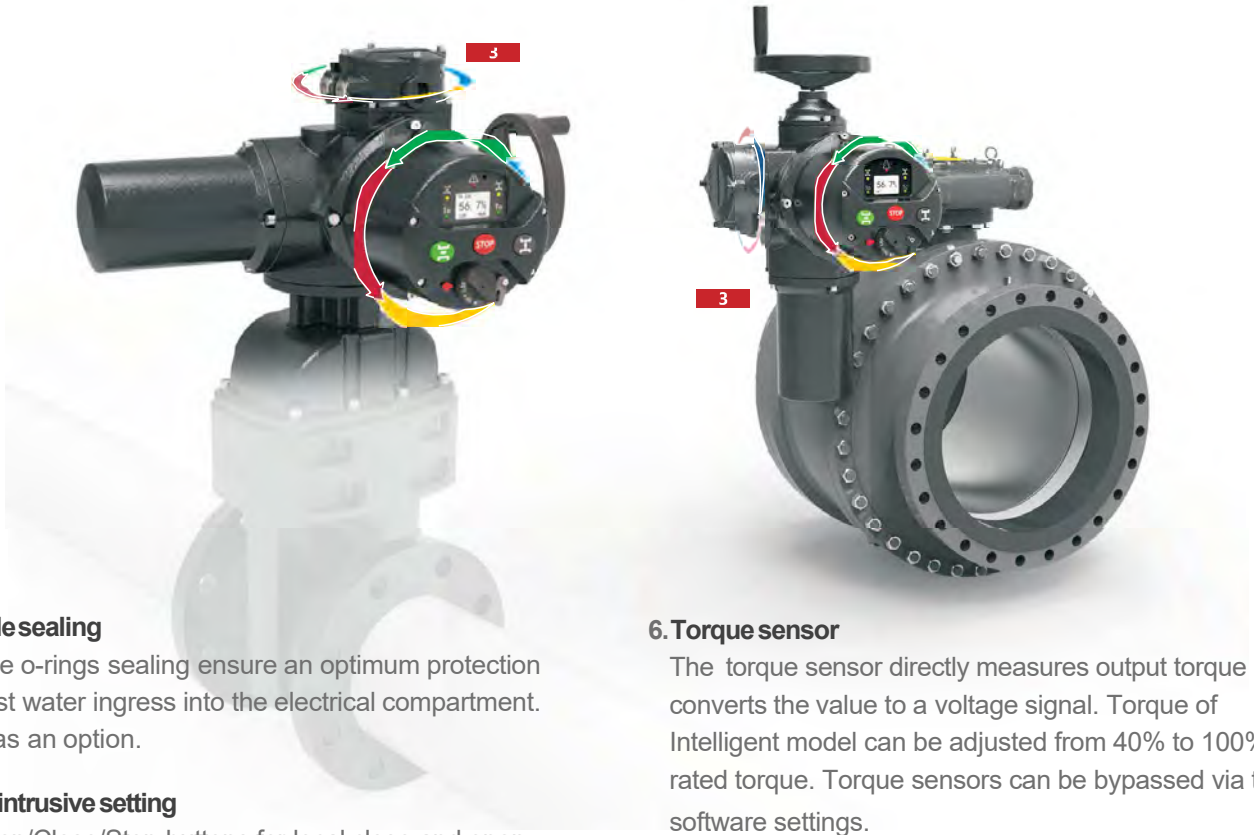
Valve and Actuator Protection

> Phase monitoring
> Direction change protection
> Motor thermal protection
> Torque protection
> Emergency shutdown protection
> Failure monitor feedback
> Passwords protection
> Actuator Failure alarms

Intuitive and user friendly controls

> High resolution LCD display (Smart type only)
> Local / remote controls
> User friendly menu

VS-EM Series Features



1.Double sealing

Double o-rings sealing ensure an optimum protection against water ingress into the electrical compartment. IP68 as an option.

2.Non - intrusive setting

> Open/Close/Stop buttons for local close and open operation .

> LOC/OFF/REM selector switch for selection of local or remote command operation .

> Infrared remote controller for settings and operating of the actuator

3.Rotatable electrical compartment and LCD display.

> The rotatable electrical compartment and LCD display offer flexibility for various actuator mounting positions.

> The direction of the rotatable cable entries can be adjusted to accommodate different wiring positions.

> The high-resolution display features a wide viewing angle, ensuring readability from a distance.

4.Heavy duty motor

Squirrel cage motor with built-in 135°C thermostat protection, featuring a low inertia design and Class F insulation.

5.Position Monitoring

The absolute position encoder provides accurate actuator positioning for display on the LCD, ensuring no loss of position due to power interruptions or interference.

6.Torque sensor

The torque sensor directly measures output torque and converts the value to a voltage signal. Torque of Intelligent model can be adjusted from 40% to 100% of rated torque. Torque sensors can be bypassed via the software settings.

7.Drive train

The drive train features a fundamental design that emphasizes simplicity, reliability, and robustness. Its components are oil- lubricated and require no maintenance.

8.Explosion proof enclosure (option)

> In accordance with ExdIICT4

> Atmospheric pressure range from 86Kpa to 106Kpa

> Ambient temperature from -30 °C to 60°C

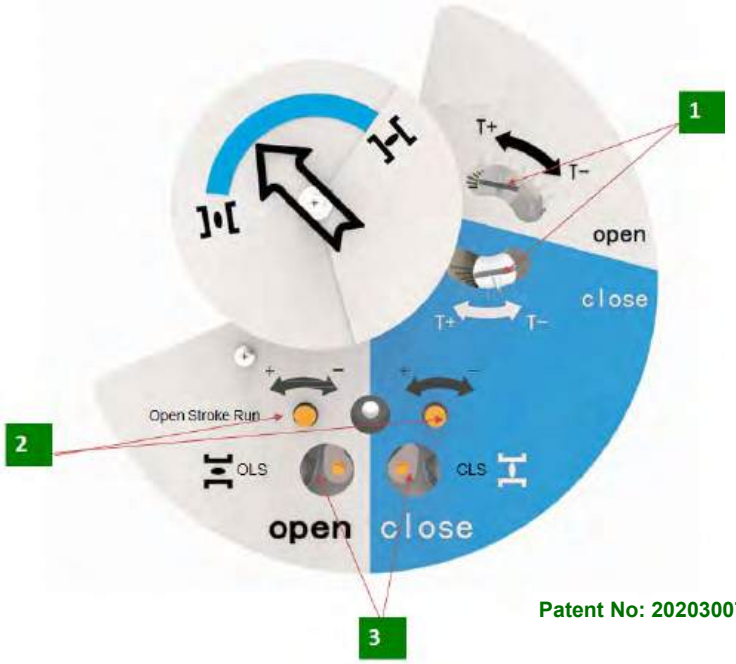
> ExdIIBT6, ExdIICT6 as an option

9.Handwheel and Declutch button

Press the RED declutch button to engage the handwheel for manual operation

Patent No: 20201060145.3
202020282671.2

Mechanical Adjustments (Basic model without Local control unit)



1 Torque Adjustment

2 Open / Close Limits Adjustment

3 Open / Close Limits micro switches

Patent No: 202030073234.5

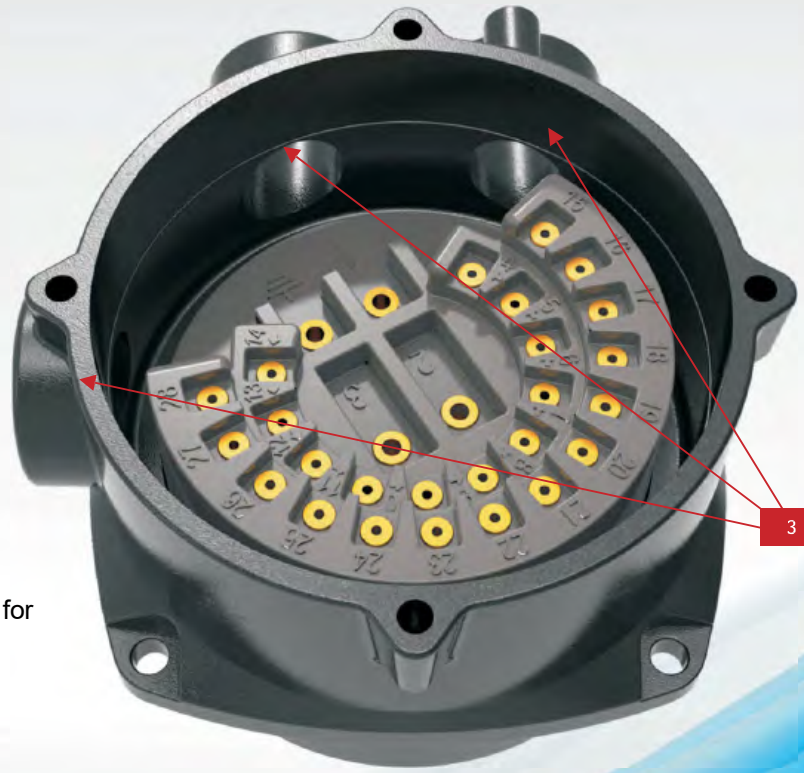
User Friendly & intuitive controls (Intelligent Model)

1 LCD Display

2 Non-intrusive Open / Stop / Open push buttons

3 Mode Selector Switch

Patent No: 202030008118.5



3 X Cable entries to cater for different cable directions

Type Y mounting base

Removable mounting base

- Type Y(Claw) as standard based on JB2920 standard
- Type Z(bore and keyway) or type T(Thrust) based on ISO5210 standard

Thrust bearings

- Removable type T mounting base suitable for thrust bearings, please refer to the technical data for more information

Coupling for type Z

Coupling for type T

VS-EM Remote Local Control Unit

The Remote Local Control Unit can be useful when the electric actuator is mounted in a tight confined, high vibration or excessive high or low temperature area. The maximum distance between the actuator and the separated Local Control Unit can be up to 20 meters

TORQUE SPECIFICATIONS

- Due to effects of inertia and drive wearing of coupling , speed is not recommended for direct mounted gate valve application.
- Rated torque is maximum torque setting in both directions. Stall torque is typically 1.4 to 2 times of maximum torque, depending on speed and voltage . If running on 60 Hz frequency, the speed will increase by 1.2 times
- If actuator requires to operate at maximum torque for more than 20% of the valve travel, please contact us

• 3ph,400VAC On-Off type and modulating up to 600 starts/hour(1200 starts for modulating as option)

Model	18	24	36	48	72	96	144
VS-EM10/380V	100	100	90	80	70	50	40
VS-EM15/380V	150	150	130	120	100	75	60
VS-EM20/380V	200	200	190	180	170	150	100
VS-EM30/380V	300	300	280	250	200	170	120
VS-EM40/380V	400	400	350	300	250	230	150
VS-EM50/380V	500	500	450	400	350	300	200
VS-EM60/380V	600	600	550	500	450	400	260
VS-EM80/380V	800	800	750	650	600	480	350
VS-EM90/380V	900	900	800	730	630	550	420
VS-EM100/380V	1000	1000	850	700	x	x	x
VS-EM150/380V	1500	1500	1300	1000	x	x	x
VS-EM200/380V	2000	2000	1700	1400	x	x	x
VS-EM300/380V	3000	3000	2000	1800	1000	750	500

• 1ph 220VAC On-Off type

Model	18	24	36	48	72	96	144
VS-EM10/220V	88	88	60	45	30	22	15
VS-EM40/220V	190	190	125	95	65	48	32
VS-EM60/220V	440	440	300	220	150	110	75

• 1ph,220VAC Modulating type

Model	18	24	36	48	72	96	144
VS-EM10/220V	70	70	48	35	24	18	12
VS-EM40/220V	150	150	100	75	50	40	25
VS-EM60/220V	350	350	235	175	118	90	60

Technical Specifications

INTELLIGENT MODEL (With Local Control Unit)

Standard Configurations	Torque		· 60-3000Nm(Without worm gearbox)
	Output Speed		· 18-144(rpm)
	Ambient Temperature		· -30℃~70℃ (-40℃-70℃ as option)
	Vibration Resistance		· Comply with JB/T8219
	Noise Level		· Less than 70dB witin 1 meter
	Cable Entry		· Two NPT3/4,one NPT 3/4 (Please contact us for other sizes)
	Enclosure Protection		· IP67as standard, IP68 as option
	Mounting Base		· Standard JB2920(clutch); ISO5210
Technical Specifications	Motor Rating		· Class F, with 150°C thermal protection
	Duty Rating		· ON-OFF: S2-15min, less than 600 starts/hour
	Voltage		· Three phase: AC400V（±10%）; 50HZ（±5%）three phase three wires
			· AC220V, AC415V and other voltages as option
	Fieldbus controls		· Optional : Modbus, Profibus HART
	ON-OFF	Control Signals	· ON-OFF signal (dry contact, 24V, 220V,programmable between Inching and Holding)
		Feedback Signals	· 6 x relay contacts(5 x state relay+1 x fault relay)
			· 1 x analogue feedback: 4~20mA, output impedance: ≤750Ω(4~20mA as standard; 0~10V, 2~10V as option)
	Modulating	Control Signals	· Analogue signal: 4~20mA, input impedance: 65Ω；(0~10V, 2~10V as option)
		Feedback Signals	· 6 x relay contacts (5 x state relay+1 x fault relay)
			· 1 x analogue feedback:4~20mA, output impedance: ≤750Ω(4~20mA standard; 0~10V, 2~10V as option)
		Deadband	· 0.3~9.9% adjusted within full stroke
		Polarity	· Yes
		Loss of Signals action	· Yes
Operation Mode	Position indication		· LCD display
			· Open/Close/Remote/Failure lamp (Displayed in percentage for position and torque)
	Software Menu		· Remote control or Selector switch
			· Programmable Configuration (position, status feedback, Max.torque)
	Local Control		· Command selector switch (OPEN/CLOSE/STOP)
			· Mode selector switch(LOC/REM/OFF)
	Data Logging and Diagnostics		· Infrared remote control suit menu to access the faults diagnosis
Others	Functions		· Automatic phase correcton(3PH only) · Alarms(Local and remote) · Infrared remote control
			· Torque protection · Motor thermal protection · Bypass torque switch
			· Space heater · ESD set(Open,Close,Keep) · Average torque
			· Average torque

Technical Specifications

STANDARD MODEL (Without Local Control Unit)

Standard Configurations	Torque		· 60-3000Nm(Without worm gearbox)
	Output Speed		· 18-144(rpm)
	Ambient Temperature		· -30℃~70℃ (-40℃-70℃ as option)
	Vibration Resistance		· Comply with JB/T8219
	Noise Level		· Less than 70dB witin 1 meter
	Cable Entry		· Two NPT3/4,one NPT 3/4 (Please contact us for other sizes)
	Enclosure Protection		· IP67as standard, IP68 as option
	Mounting Base		· Standard JB2920(clutch); ISO5210
Technical Specifications	Motor Rating		· Class F, with 150°C thermal protection
	Duty Rating		· ON-OFF: S2-15min, less than 600 starts/hour
	Voltage		· Three phase: AC400V（±10%）; 50HZ（±5%）three phase three wires
			· AC220V, AC415V and other voltages as option
	Fieldbus controls		· Optional : Modbus, Profibus HART
	ON-OFF	Control Signals	· ON-OFF, buil-in contacts with 5A@250VAC ratings
		Feedback Signals	· Fully open/ close (Dry Contacts)
			· Separate open / close torque switches (dry contacts)
			· Potentiometer (Optional)
Operation Mode	Position indication		· Mechanical Arrow display
Others	Functions		· Motor thermal protection
			· Torque protection
			· Space heater

Communication Interfaces

Industrial network systems require seamless control, feedback, and asset management data between actuators and the control room. This setup allows process operators to access real-time operational data for managing local equipment effectively. Additionally, asset management data helps the maintenance team create an effective maintenance plan.

Serial Communication

- When VSI developed the control module, our engineers took into account the ongoing evolution of the industrial network bus system. With the support of a professional system support team, VSI offers compatible and advanced actuators for fieldbus controls.
- The VS-EM series fieldbus controls are designed to be upgradeable, allowing for the inclusion of additional functions.
- These fieldbus controls can be used wither independently or alongside hardwired controls, depending on specific applications or site requirements.

Profibus®

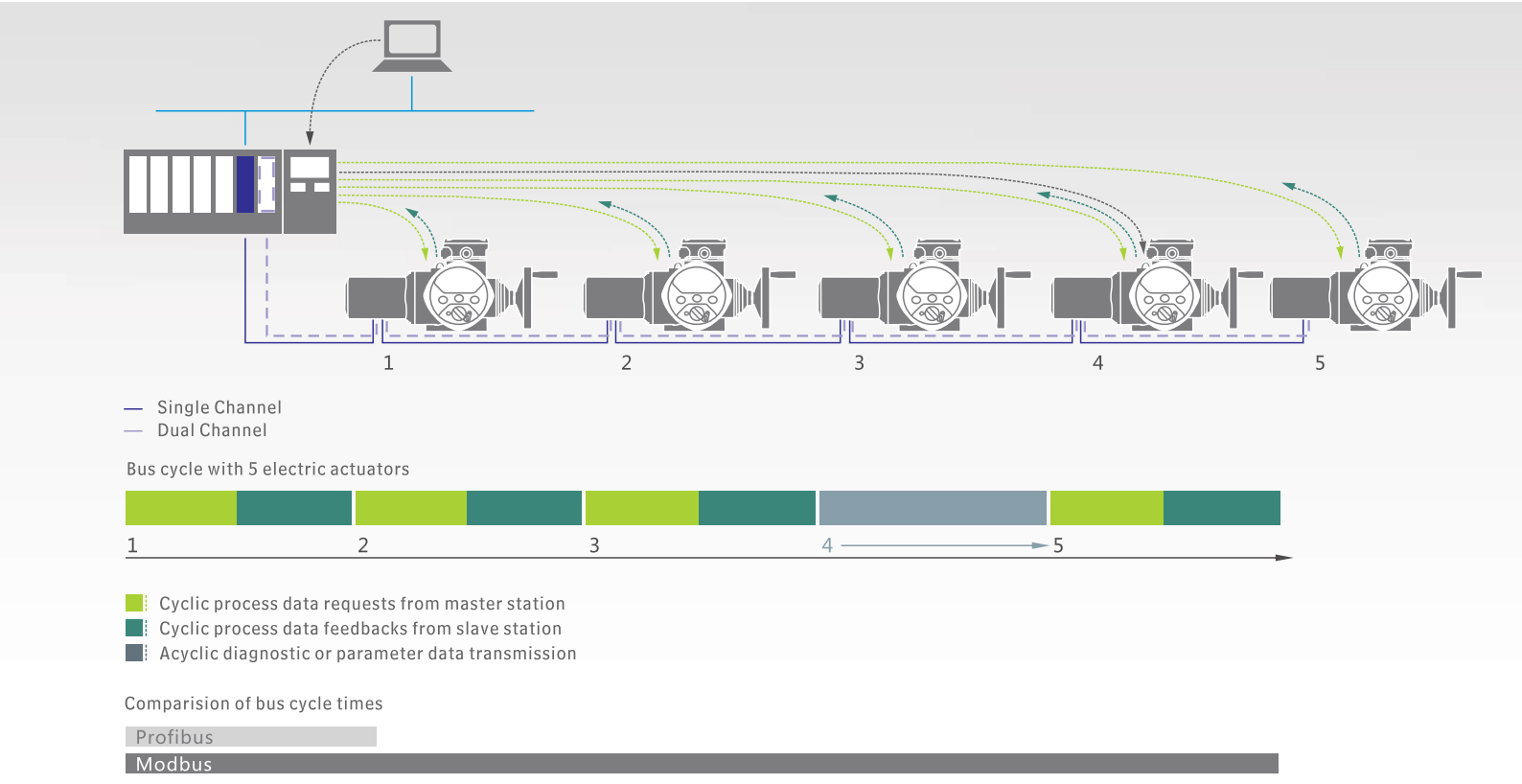
- The Profibus DP interface module enables the integration of actuators into a Profibus network. It ensures full compatibility with EN50170 standards, allowing for comprehensive actuator control and feedback of data to the host system.

Modbus®

- VSI Modbus modules are designed for single or dual communication highways, facilitating Fieldbus communication for all actuator control functions and feedback data through an RS485 data highway. The communication protocol employed is Modbus RTU. System addresses and data baud rates are programmed vis infrared communication or Bluetooth.

Profinet and Modbus TCP

- Profinet has increasingly become a leading solution in industrial automation. VSI equips its VS-EM series actuators with modules for both Modbus TCP and Profinet. For more details, please contact VSI.



ELECTRIC ACTUATOR - With Thrust Unit / Gearbox

Thrust range with thrust unit : 5KN - 217KN

- Thrust unit Specification

No.	Max.Thrust(N)	Standard stroke(mm)	Customized stroke(mm)
1	6500	16-40	possible to customize the stroke
2	10000	16-40	
3	16000	16-40	
4	25000	60-100	
5	35000	60-100	
6	45000	130-150	
7	65000	130-150	

Torque range with bevel gearbox : 200Nm - 50,000Nm
Suitable for Gate Valves , Globe vlaves

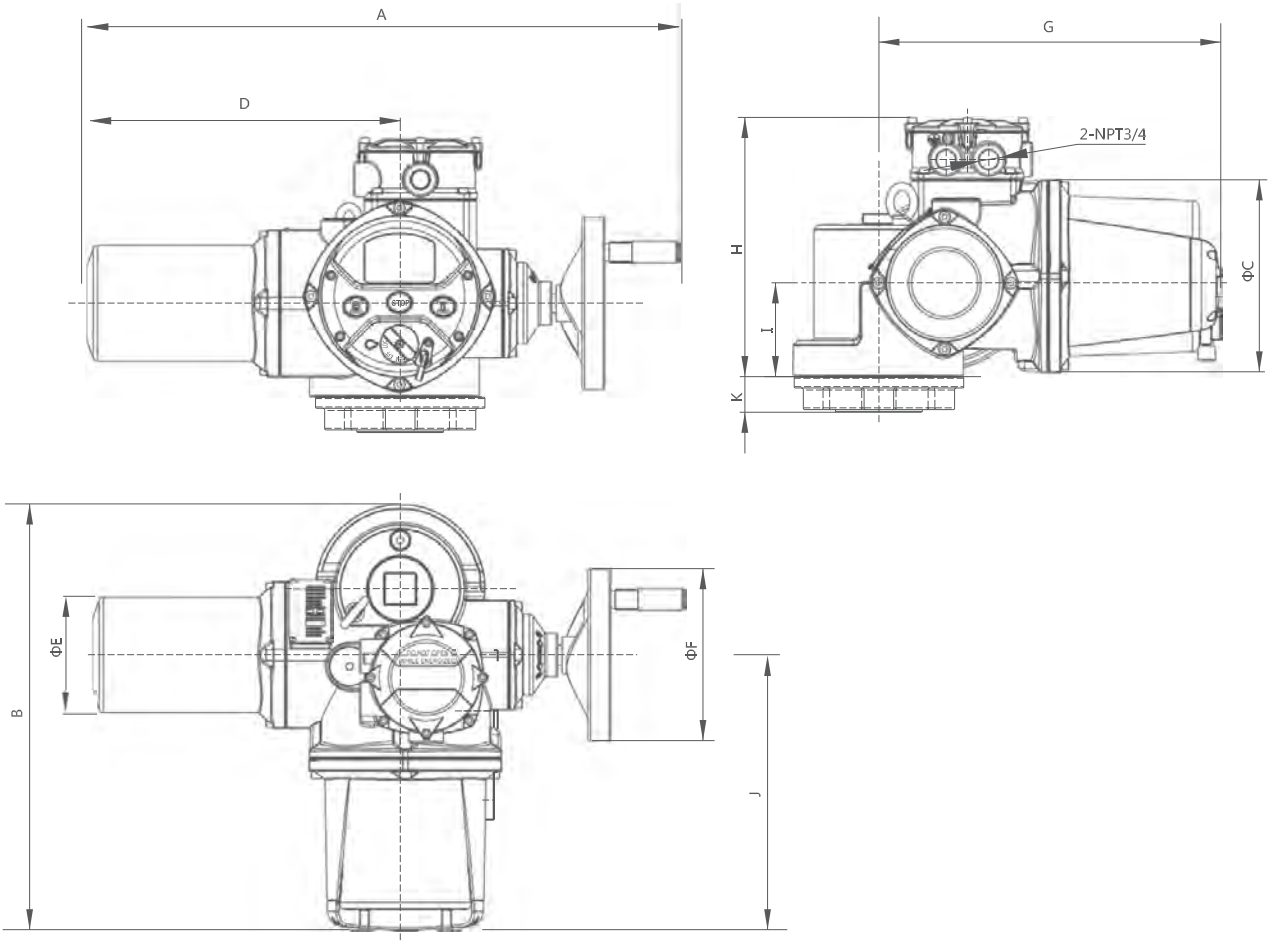
Torque range with worm gearbox : 100Nm - 60,000Nm
suitable for Butterfly valves, ball valves, plug valves

- Worm gearbox specification

No.	Worm gearbox output torque (Nm)	Item	Actuator input torque (Nm)	Speeds (r/min)	Ratio	Working time (s)
1	3500	VS-EM30-24-B1EO-aB+2J-D	250	24	50:1	31
2	4500	VS-EM30-24-B1EO-aB+3-D	300	24	50:1	31
3	7500	VS-EM50-24-B1EO-aB+3J-D	500	24	53:1	33
4	12000	VS-EM80-24-B1EO-aB+4-D	800	24	55:1	35
5	16500	VS-EM90-24-B1EO-aB+4J-D	900	24	57:1	36
6	22000	VS-EM100-24-B1EO-aB+5-D	1000	24	62:1	39
7	28000	VS-EM150-24-B1EO-aB+5-D	1500	24	67:1	42
8	38000	VS-EM200-24-B1EO-aB+6-D	2000	24	65:1	41
9	48000	VS-EM200-24-B1EO-aB+6J-D	2000	24	75:1	47
10	63000	VS-EM300-24-B1EO-aB+7-D	3000	24	82:1	52
11	80000	VS-EM300-24-B1EO-aB+7X-D	3000	24	70:1	44

Please contact the company if you need more details of specification.

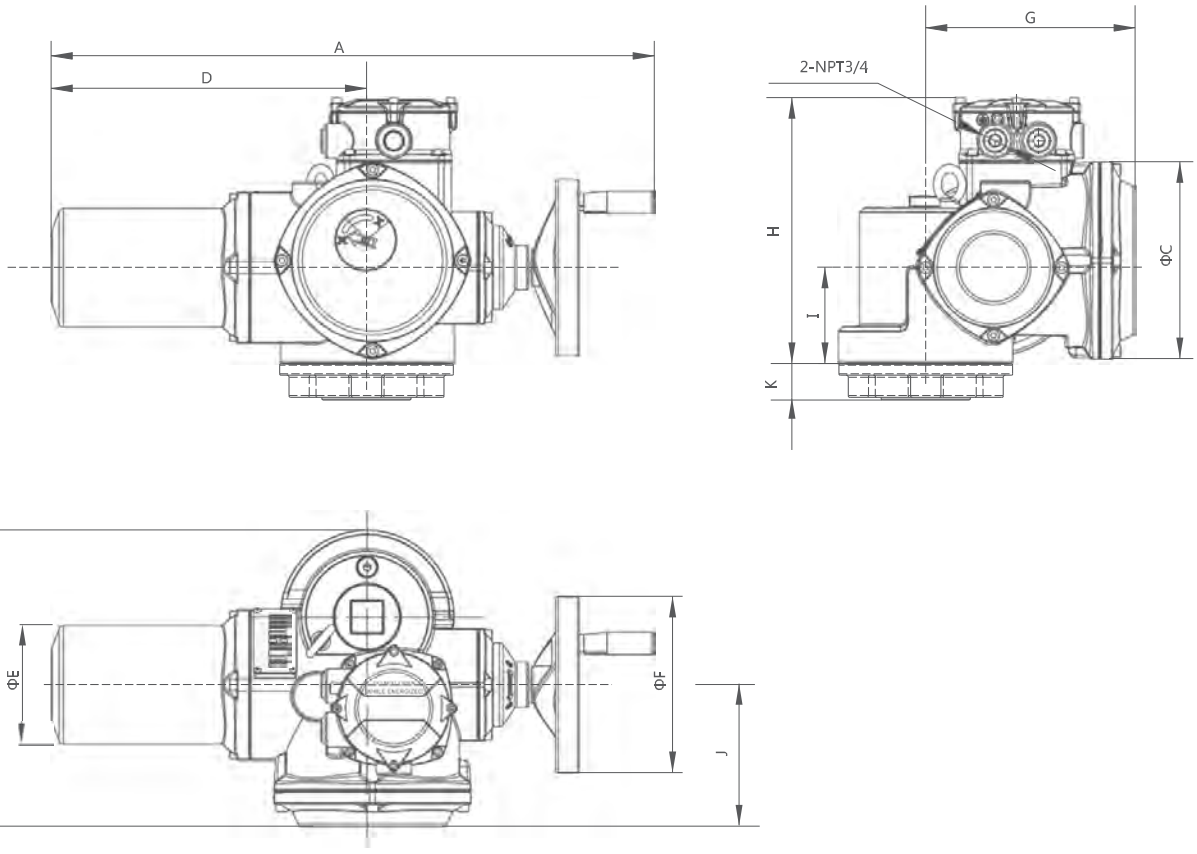
DIMENSIONS (INTELLIGENT MODEL)



Unit :mm

Item	A	B	ΦC	D	ΦE	ΦF	G	H	I	J	K		Weight (kg)
											Type Z flange	Type T flange	
VS-EM10	569	452	222	293	105	125	378	290	108	318	0	60	26
VS-EM15	569	452	222	293	105	125	378	290	108	318	0	60	26
VS-EM20	682	490	222	360	135	200	394	300	108	318	41	60	42
VS-EM30	682	490	222	360	135	200	394	300	108	318	41	60	42
VS-EM40	682	490	222	360	135	200	394	300	108	318	41	60	42
VS-EM50	732	545	222	404	155	200	420	305	114	323	41	62	56
VS-EM60	732	545	222	404	155	200	420	305	114	323	41	62	56
VS-EM80	732	545	222	404	155	200	420	305	114	323	41	62	56
VS-EM90	732	545	222	404	155	200	420	305	114	323	41	62	56
VS-EM100	855	602	222	519	226	247	445	355	165	323	0	125	165
VS-EM150	855	602	222	519	226	247	445	355	165	323	0	125	165
VS-EM200	855	602	222	519	226	247	445	355	165	323	0	125	165
VS-EM300	855	602	222	519	226	247	445	355	165	323	0	125	165

DIMENSIONS (STANDARD MODEL)

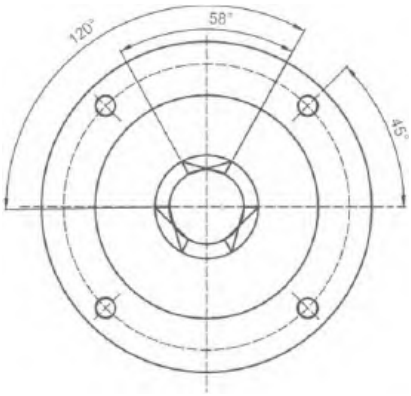


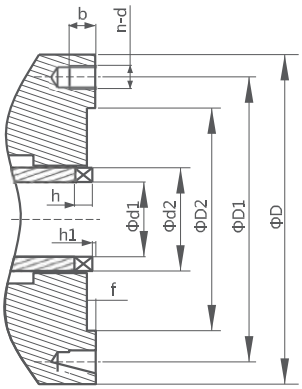
Unit : mm

Item	A	B	ΦC	D	ΦE	ΦF	G	H	I	J	K		Weight (kg)
											Type Z flange	Type T flange	
VS-EM10	569	294	222	293	105	125	219	290	108	160	0	60	20
VS-EM15	569	294	222	293	105	125	219	290	108	160	0	60	20
VS-EM20	682	332	222	360	135	200	235	300	108	160	41	60	38
VS-EM30	682	332	222	360	135	200	235	300	108	160	41	60	38
VS-EM40	682	332	222	360	135	200	235	300	108	160	41	60	38
VS-EM50	732	387	222	404	155	200	261	305	114	165	41	60	54
VS-EM60	732	387	222	404	155	200	261	305	114	165	41	60	54
VS-EM80	732	387	222	404	155	200	261	305	114	165	41	60	54
VS-EM90	732	387	222	404	155	200	261	305	114	165	41	60	54
VS-EM100	855	445	222	519	226	247	287	355	165	165	0	125	145
VS-EM150	855	445	222	519	226	247	287	355	165	165	0	125	145
VS-EM200	855	445	222	519	226	247	287	355	165	165	0	125	145
VS-EM300	855	445	222	519	226	247	287	355	165	165	0	125	145

DIMENSIONS iMOUNTING BASE

- **Type Y (Claw) ----- JB2920 standard**

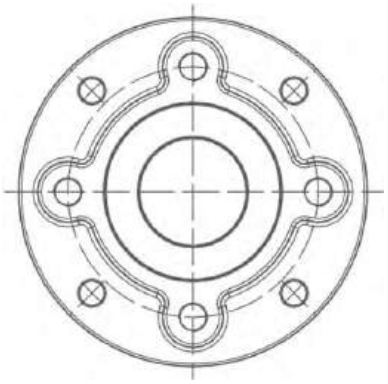


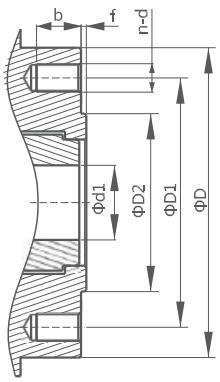


Unit : mm

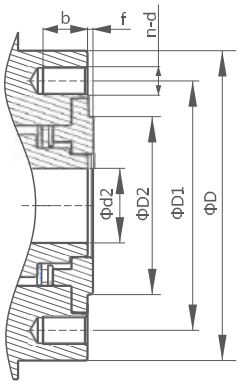
Item	Flange	ΦD	ΦD1	ΦD2	Φd1	Φd2	f	h	h1	n-d	b
VS-EM10/15	JB2	145	120	90	30	45	5	8	2	4-M10	15
VS-EM20/30/40	JB3	185	160	125	42	58	5	10	2	4-M12	15
VS-EM50/60/80	JB4	225	195	150	50	72	5	12	2	4-M16	30
VS-EM100/150/200/300	JB7	330	285	220	65	98	6	16	2	4-M24	35

- **Type Z (Bore and Keyway) ot Type T (Thrust) ----ISO5210 Standard**





Type Z (Bore and Keyway)



Type T (Thrust)

Unit : mm

Item	Flange	ΦD	ΦD1	ΦD2	f	Φd1 (Max.)	Φd2 (Max.)	n-d	b
VS-EM10/15	F10	138	102	70	3	30	Tr28	4-M10	15
VS-EM20/30/40	F14	175	140	100	4	42	Tr48	4-M16	24
VS-EM50/60/80	F16	205	165	130	5	50	Tr62	4-M20	30
VS-EM100/150	F25	338	254	200	5	75	Tr80	8-M16	25
VS-EM200/300	F30	338	298	230	5	75	Tr80	8-M20	30

ACTUATION SOLUTIONS

VS-1000X Quarter-Turn Electric Actuator

Smart appearance, Light weight
Ease of installation, Economical, Robust

VS-HL Small Frame Electric Actuator
Torque from 5Nm to 25Nm
Small form factor, Weather proof

VS-QT Quarter-Turn Electric Actuator
Overtorque protection, Standard/Intelligent
Weather proof, Explosion proof available

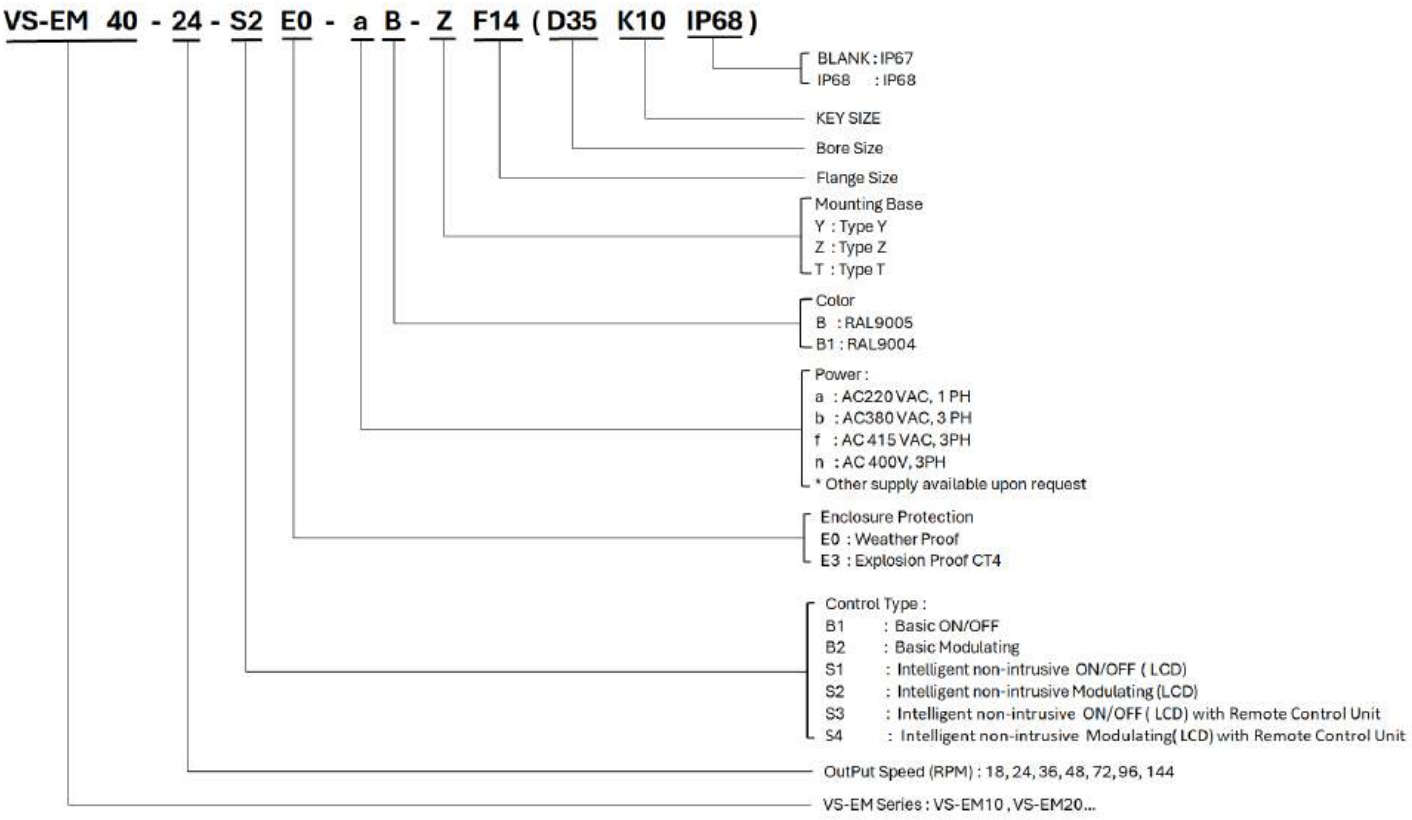
VS-HLF Damper Electric Actuator
For HVAC/ACMV application, Standard
Building control

VS-EM Multi-turn Electric Actuator
LCD Local & Remote control, Selector switch, Suitable for wide range of valve sizes. Standard & Intelligent model.

VS-EQ Series Electric Actuator
Improved and optimized design,
Ultra low noise, Double protection against
Anti-condensation, Independent control,
Standard/Remote option. IP68

Electric Actuator for Penstock, Plug Valves, Knife Gate Valves Nozzle Valves, Axial Valves. Ball Valves

Ordering Information



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