

**V-TORK®**



## VSM Series Electric Actuator



Incorporates advanced technology  
Safety and reliability as core design principles  
Supports a variety of redundant control methods  
Supports an array of communication protocols including  
PROFIBUS, FF (Foundation Fieldbus), and MODBUS

## Product Introduction

### Product Overview

As a new-generation core fluid control device, it follows a safety-first, reliability-based design core. Its performance meets industrial needs: supporting Class C frequent modulation (throttle valves, etc.) and Class A/B intermittent control (gate valves, etc.), with Class 1 positioning accuracy and wear-free torque detection for long-term stability.

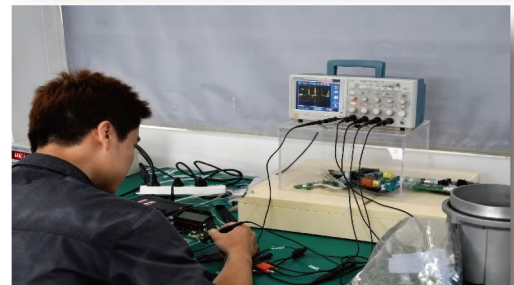
Integrating cutting-edge actuator tech, it innovatively uses dual structures (integrated for compact spaces, split for long-distance/special layouts) for complex domestic industrial scenarios.

Widely used in domestic key industries (power plants, petrochemicals, etc.), offering efficient, safe fluid control solutions.

### Product Features



|                                  |  |
|----------------------------------|--|
| <b>Circuit module</b>            | Uses large-scale digital integrated chips, powerful and high-precision.  |
| <b>Communication protocols</b>   | Supports PROFIBUS, FF, MODBUS, HART and other fieldbus protocols, plus multiple redundant control methods.                   |
| <b>Torque monitoring</b>         | Continuously measures output torque via current, voltage, flux detection, with mathematical models and advanced algorithms.  |
| <b>Displacement sensor</b>       | Uses absolute encoder (no battery memory required), basic valve positioning error meets Class 1 precision.                   |
| <b>On-site operation</b>         | Function setting, parameter configuration, commissioning and electric operation via handheld remote or knob.                 |
| <b>Wiring ports</b>              | Plug-in or sunflower-disc wiring for easy and quick maintenance.   |
| <b>Display screen</b>            | Full English & character display, menu-driven, easy to operate.  |
| <b>Protection class</b>          | Enclosure IP68, explosion-proof class dIICT4.  |
| <b>Electrical sealing</b>        | Wiring part adopts double-sealing structure to block moisture ingress.   |
| <b>Valve position indication</b> | LED indicates fully open/closed valve positions, visible from a distance.  |
| <b>Handwheel</b>                 | Newly designed manual mechanism with double seals, solves common lubricating oil leakage at handwheel in electric actuators. |



## Product Features

1. Standard enclosure protection class: IP68.
2. Wiring section adopts double-sealing structure to effectively block moisture ingress.
3. Terminal cover port is rotatable every 90°, allowing the electric actuator's installation direction to be unrestricted by cable orientation, and ensuring the cable inlet always faces downward to prevent rain and snow ingress.
4. Terminal cover connects to the cabinet via captive bolts, with a nylon lanyard between cover and cabinet for easy on-site wiring operation.
5. Newly designed manual operation mechanism with double seals, solving the common lubricating oil leakage issue at the handwheel of electric actuators.
6. Adopts advanced magnetoelectric absolute encoder: the output shaft drives the encoder to rotate, and the generated coding signal is sent to the main control chip to calculate the current valve position. The absolute encoder is unaffected by power failure or interference, ensuring accurate valve position at all times.
7. Graphic dot-matrix LCD screen: displays actuator torque, valve position, limit settings and other operating status/alarms in Chinese, numbers, graphics, etc., supporting multiple languages including Chinese and English.
8. Remote/local mode selection knob; local valve open/close knobs.
9. LED indicators show fully open/closed valve positions, visible from a distance.
10. Backup battery enables valve position display when main power is off.
11. Adopts more stable, higher-grade three-phase three-control circuit design, while being backward compatible with three-phase two-control circuits.
12. Torque detection: Continuously measures output torque by detecting current, voltage, flux, establishing a mathematical model and using advanced algorithms. Torque protection value adjustment can be easily done via the programmer. Compared with mechanical torque or other detection methods, it eliminates mechanical wear for long-term reliability.
13. Non-intrusive setting:
  - a) Local/remote selection knob and local operation knob use magnets to control Hall sensors inside the electrical enclosure, eliminating traditional through-shafts.
  - b) No need to open the actuator enclosure when setting, checking or querying via a wireless programmer.
  - c) Enclosure remains closed, preventing dust, harmful gases and moisture in the environment from eroding the actuator; easy commissioning in rain or flammable gas environments; convenient query of various actuator statuses.
14. Protection functions:
  - a) Torque protection
  - b) Valve position limit protection
  - c) Automatic phase sequence adjustment
  - d) Instant reverse protection
  - e) Power phase loss protection
  - f) Optional follow-up action for valve jamming
  - g) Overheating protection
  - h) Electrical protection
15. Configurable alarms:
  - a) Fully open/closed valve position feedback
  - b) Over-torque alarm
  - c) ESD trigger alarm
  - d) Motor temperature alarm
  - e) Power phase loss alarm
  - f) Remote signal loss alarm
  - g) Operation knob status
  - h) PST success signal
16. Other functions:
  - a) Intermittent timed operation (multi-speed control)
  - b) Fieldbus control: ST-Ring (proprietary protocol), Profibus, Modbus, Foundation Fieldbus, Hart
  - c) Electronic latching function
  - d) Advanced real-time clock
  - e) Intelligent diagnostic function



## Product Features

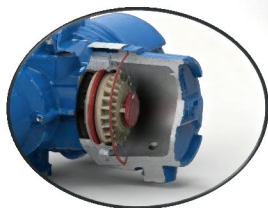
Simple and reliable structure, optimized drive train parameter design, high transmission efficiency ratio, and the worm adopts angular contact bearings, which enhances the axial load-carrying capacity.



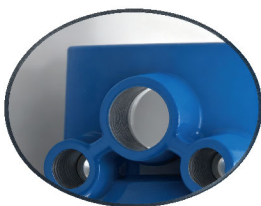
The motor mounting structure adopts a brand-new design, featuring easy disassembly and high reliability.



The cable entry part adopts a double-sealed structure, which effectively blocks the ingress of moisture.



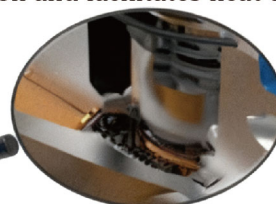
The cable entry port can be customized.



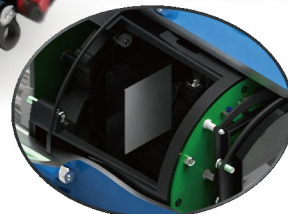
Output flanges conforming to ISO 5210 and other international standards; special flanges can be customized.



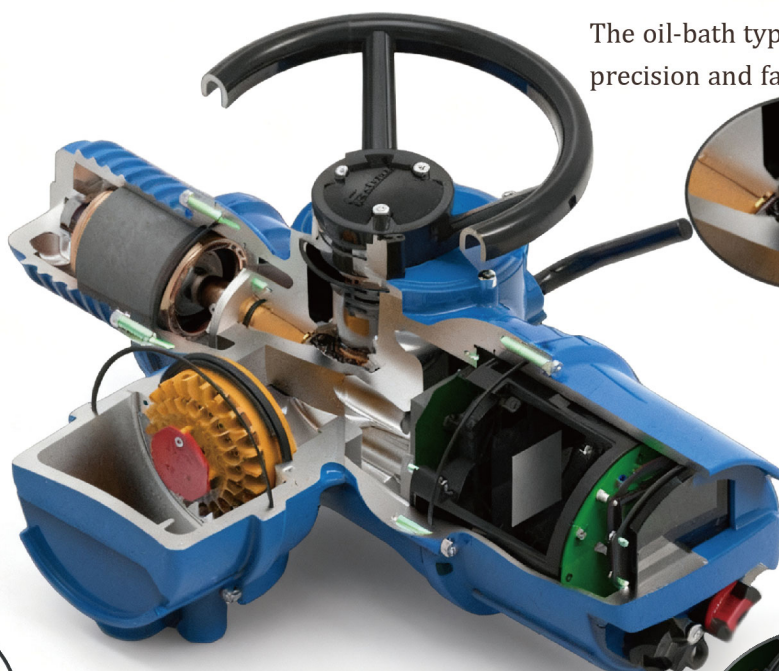
The oil-bath type worm gear improves precision and facilitates heat dissipation.



The electrical part adopts a suspended anti-vibration structure.

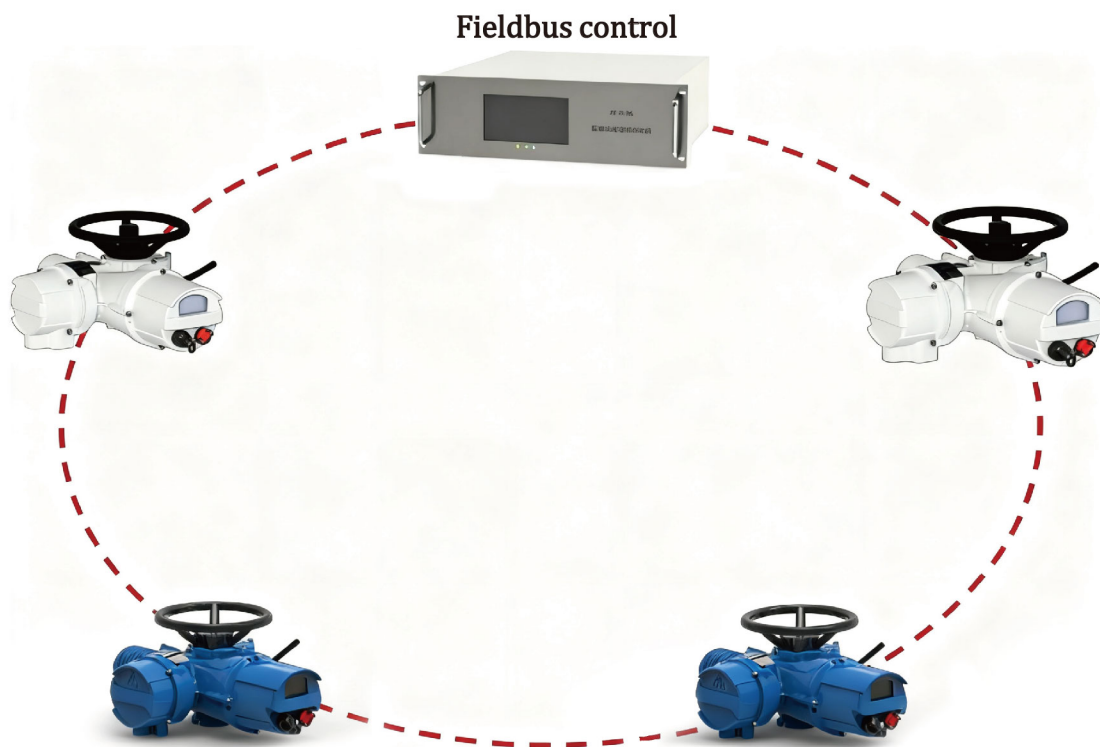


Knob anti-collision design.





## Product Features



In addition to supporting conventional control methods, the VSM series actuators of V-TORK also support seamless connection with a variety of fieldbus control systems that comply with international standards, such as PROFIBUS, FF (Foundation Fieldbus), MODBUS, HART, etc. They support device descriptions of EDDL and FDT/DTM, and support multiple bus redundancy methods.

V-TORK's advanced ST-RING controller supports forming a ring network with up to 250 actuators, and can independently implement remote control and diagnosis of actuators without the need for DCS/PLC.

- Two-wire fieldbus system
- Intelligent terminal
- Supports multiple actuator devices
- Maximum supported devices: 250 units per host
- Maximum loop distance: 20Km (without repeater)
- Compatible with SMART PLUS detector
- Response delay: 50ms

## Overview of VSM series selection contents

### Split-type electric actuator (optional)

- Designed for harsh working conditions
- Separates the electrical part from the mechanical part to protect electrical components from harsh conditions such as high temperature and vibration
- Split-type arrangement
- Modular design with highly universal components
- Does not affect original functions and applications
- Maximum distance for split layout can reach
- 200m, IP68 waterproof standard
- IEC ATEX DIICT4 explosion-proof standard
- Please state in the purchase remarks: Split-type electric actuator is required

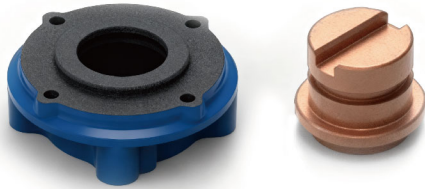


### SMART PLUS detector (optional)

- Infrared addressing for quick binding to actuators
  - Bluetooth effective distance: 30m
  - Ergonomic design
  - 3-inch LCD display, what you see is what you get, displaying the actuator screen content in real time
  - Wireless charging
  - Supports HART protocol
  - Intrinsically safe type
  - Offline parameter setting
  - No need to set one by one for each unit
  - Suitable for setting in small spaces, high altitudes, and underground
  - Can download actuator historical data (Data log) for analysis and comparison on the PLUS setter or computer
- \* VSM SMART PLUS detector is an additional purchase; the actuator comes with an ordinary wireless setter

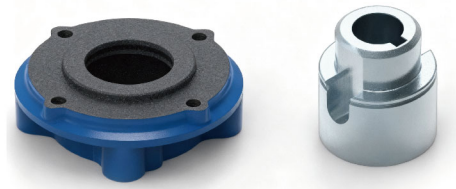
## Overview of VSM Series Selection

### Drive Forms



Thrust Type (Type A Bushing)

Mainly used in applications with large axial forces; different drive sleeves are selected based on the valve stem shaft diameter.



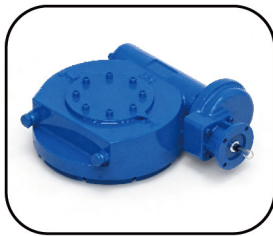
Non-thrust Type (Type B Bushing)

Mainly used in occasions without axial force, and different drive bushings are selected according to the stem shaft diameter and mode.

### Internet of Things (IoT) Module (Optional)

- V-TORK SMART-IIoT Industrial IoT Module (Optional)
- An essential product for actuator products to enter the Industry 4.0 era
- Data monitoring in the wireless era
- Wireless 4G\5G ① connection adaptation
- Factory safety application

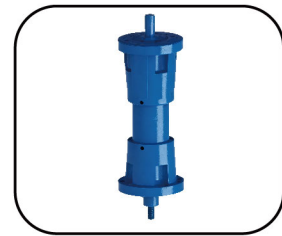
### Gearbox Adaptation



Worm gear  
Rotary stroke gearbox



Bevel/Spur Gear  
Multi-turn Gearbox



Linear Stroke  
Linear Thrust Unit

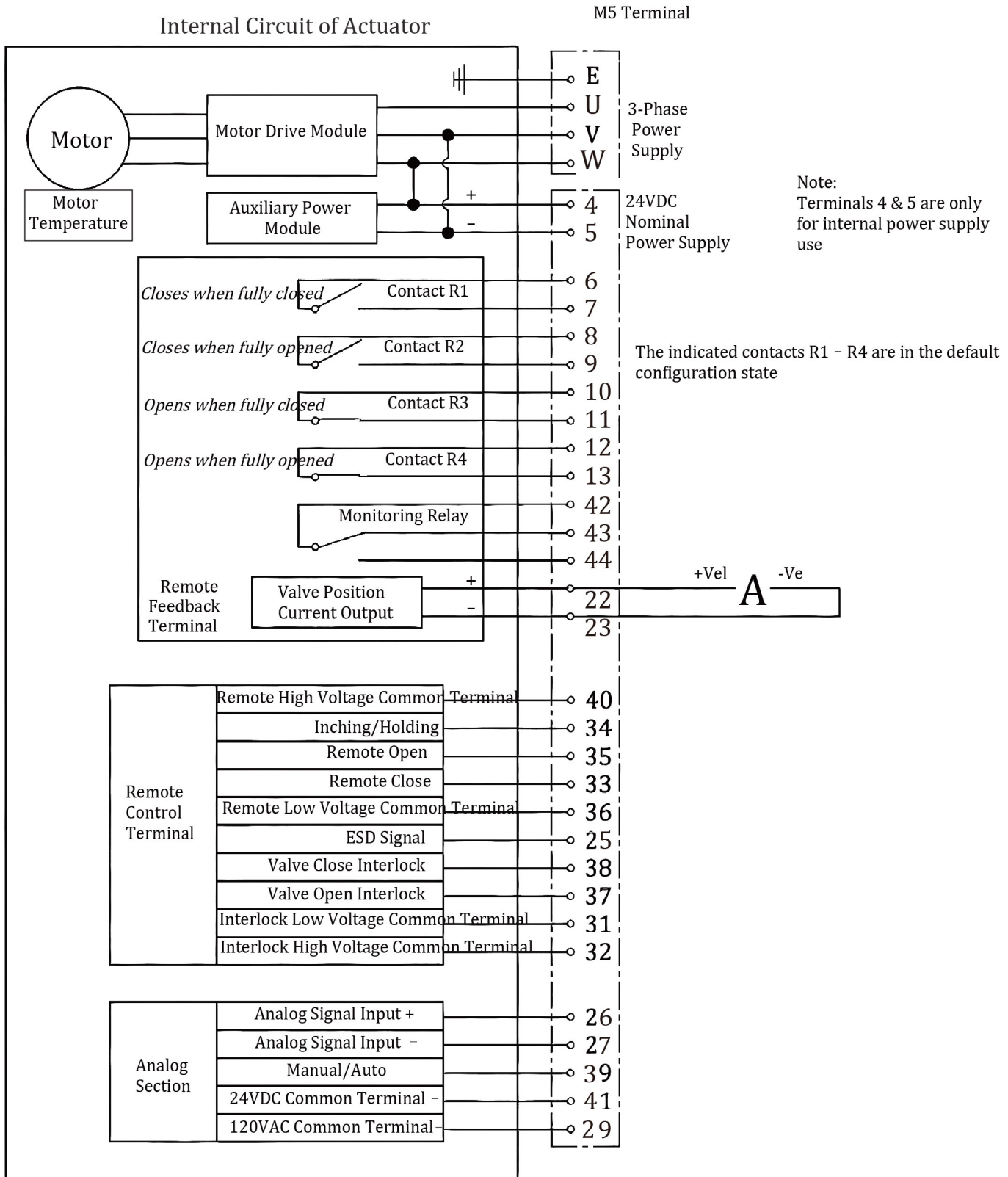
Multiple paint specifications and colors are available





# VSM Series Wiring Diagram

## VSM Wiring Diagram



The circuit shown is in a power-off state and the actuator is in the middle position of the stroke.

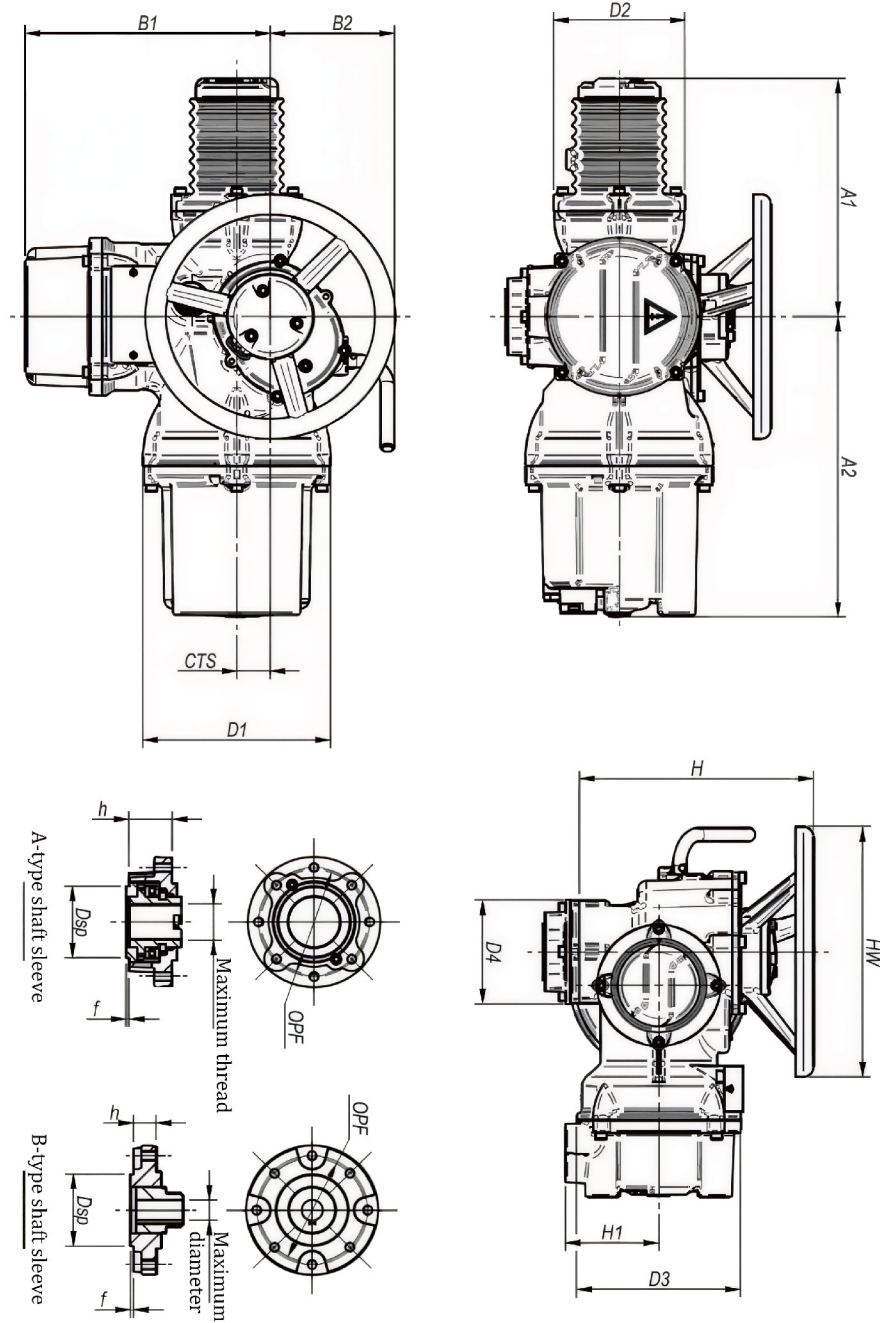
# VSM Series Model Specifications and Main Performance Parameters

## VSM Series Multi-turn Electric Actuators

| Model | Output Speed | Output Torque | Motor Power | AC380V 50Hz        |                           | AC400V 50Hz        |                           | AC440V 50Hz        |                           | Reference Weight |
|-------|--------------|---------------|-------------|--------------------|---------------------------|--------------------|---------------------------|--------------------|---------------------------|------------------|
|       | RPM          | N.m           | KW          | Rated Current<br>A | Locked-Rotor Current<br>A | Rated Current<br>A | Locked-Rotor Current<br>A | Rated Current<br>A | Locked-Rotor Current<br>A | Kg               |
| VSM1  | 18           | 80            | 0.55        | 1.3                | 3.1                       | 1.0                | 2.8                       | 0.9                | 2.3                       | 37               |
|       | 24           | 80            | 0.55        | 1.3                | 3.1                       | 1.2                | 3.4                       | 1.1                | 3.1                       |                  |
|       | 36           | 70            | 0.55        | 1.7                | 4.1                       | 1.5                | 4.4                       | 1.4                | 4.0                       |                  |
|       | 48           | 60            | 0.55        | 1.7                | 4.1                       | 1.4                | 3.6                       | 1.3                | 3.8                       |                  |
|       | 72           | 50            | 0.55        | 1.8                | 4.5                       | 1.4                | 3.5                       | 1.6                | 4.3                       |                  |
|       | 96           | 40            | 0.55        | 1.8                | 4.4                       | 1.6                | 4.4                       | 1.6                | 4.3                       |                  |
|       | 18           | 110           | 0.65        | 1.9                | 4.6                       | 1.3                | 3.6                       | 1.4                | 3.8                       |                  |
|       | 24           | 110           | 0.65        | 1.9                | 4.6                       | 1.6                | 4.5                       | 1.5                | 3.8                       |                  |
|       | 36           | 80            | 0.65        | 2.0                | 4.9                       | 1.5                | 4.8                       | 1.4                | 4.0                       |                  |
|       | 48           | 70            | 0.65        | 2.0                | 5.0                       | 1.8                | 4.8                       | 1.3                | 3.8                       |                  |
|       | 72           | 60            | 0.65        | 2.0                | 4.9                       | 2.1                | 6.9                       | 1.9                | 5.2                       |                  |
|       | 96           | 50            | 0.65        | 2.2                | 5.4                       | 2.3                | 6.9                       | 1.9                | 5.2                       |                  |
| VSM2  | 18           | 200           | 1.50        | 4.8                | 12                        | 2.1                | 7.4                       | 2.4                | 7.8                       | 62               |
|       | 24           | 200           | 1.50        | 4.8                | 12                        | 2.1                | 7.5                       | 2.0                | 5.9                       |                  |
|       | 36           | 200           | 1.50        | 4.6                | 11.5                      | 2.8                | 9.9                       | 2.6                | 8.4                       |                  |
|       | 48           | 200           | 1.50        | 5.0                | 12.3                      | 3.4                | 11.0                      | 3.1                | 11.3                      |                  |
|       | 72           | 180           | 1.50        | 5.1                | 12.3                      | 4.2                | 15.0                      | 3.6                | 11.1                      |                  |
|       | 96           | 150           | 2.20        | 6.3                | 15.6                      | 4.4                | 12.8                      | 4.0                | 11.1                      |                  |
|       | 144          | 105           | 2.20        | 6.1                | 15.3                      | 4.7                | 16.7                      | 4.2                | 10.9                      |                  |
|       | 18           | 400           | 3.00        | 5.9                | 14.6                      | 4.0                | 14.9                      | 3.7                | 15.0                      |                  |
|       | 24           | 400           | 3.00        | 5.9                | 14.6                      | 4.4                | 14.8                      | 3.5                | 10.2                      |                  |
|       | 36           | 300           | 3.00        | 6.0                | 14.9                      | 4.3                | 15.3                      | 3.5                | 11.0                      |                  |
|       | 48           | 250           | 3.00        | 5.6                | 13.8                      | 4.0                | 12.9                      | 3.8                | 11.1                      |                  |
|       | 72           | 250           | 3.00        | 6.0                | 15.0                      | 5.7                | 21.2                      | 5.0                | 17.0                      |                  |
|       | 96           | 230           | 2.20        | 6.3                | 15.6                      | 6.6                | 21.5                      | 5.9                | 24.0                      |                  |
|       | 144          | 150           | 2.20        | 6.1                | 15.3                      | 6.2                | 21.2                      | 6.1                | 21.5                      |                  |
| VSM3  | 18           | 600           | 3.00        | 5.2                | 25.8                      | 4.8                | 20.2                      | 4.3                | 17.7                      | 75               |
|       | 24           | 600           | 3.00        | 6.0                | 25.8                      | 5.8                | 20.1                      | 4.9                | 17.2                      |                  |
|       | 36           | 540           | 3.00        | 7.3                | 25.9                      | 6.8                | 25.7                      | 6.2                | 21.3                      |                  |
|       | 48           | 470           | 3.00        | 9.4                | 32.5                      | 8.4                | 35.4                      | 7.3                | 32.0                      |                  |
|       | 72           | 470           | 2.20        | 12.3               | 45.4                      | 11.6               | 48.2                      | 11.5               | 31.4                      |                  |
|       | 96           | 360           | 2.20        | 12.0               | 45.5                      | 12.0               | 35.6                      | 10.9               | 33.0                      |                  |
|       | 144          | 250           | 2.20        | 13.3               | 36.7                      | 11.5               | 36.0                      | 11.1               | 31.7                      |                  |
| VSM4  | 18           | 1000          | 2.70        | 9.6                | 34.7                      | 8.8                | 37.1                      | 10.1               | 43.5                      | 175              |
|       | 24           | 1000          | 2.70        | 11.8               | 42.6                      | 10.5               | 43.7                      | 10.1               | 43.5                      |                  |
|       | 36           | 850           | 2.70        | 11.9               | 48.8                      | 11.5               | 33.8                      | 9.4                | 36.7                      |                  |
|       | 48           | 680           | 3.50        | 14.1               | 44.1                      | 12.3               | 46.4                      | 15.2               | 70.6                      |                  |
|       | 72           | 680           | 4.30        | 16.2               | 56.5                      | 16.6               | 46.7                      | 15.4               | 71.1                      |                  |
|       | 96           | 550           | 4.30        | 17.0               | 56.6                      | 15.6               | 55.2                      | 16.5               | 65.7                      |                  |
|       | 144          | 410           | 5.40        | 17.9               | 57.0                      | 16.3               | 58.5                      | 16.5               | 65.7                      |                  |
|       | 18           | 1500          | 3.50        | 17.0               | 72.9                      | 12.8               | 42.0                      | 9.9                | 46.2                      |                  |
|       | 24           | 1500          | 3.50        | 16.5               | 57.3                      | 17.2               | 43.9                      | 14.3               | 48.0                      |                  |
|       | 36           | 1300          | 5.40        | 22.3               | 59.7                      | 22.1               | 61.1                      | 14.3               | 65.5                      |                  |
|       | 48           | 1000          | 5.40        | 19.7               | 55.6                      | 18.3               | 61.4                      | 22.6               | 75.4                      |                  |
|       | 72           | 1000          | 6.50        | 24                 | 84.5                      | 22.6               | 88.6                      | 22.6               | 75.4                      |                  |
|       | 96           | 750           | 6.50        | 23.0               | 71.0                      | 22.6               | 68.9                      | 18.1               | 100.0                     |                  |
|       | 144          | 650           | 6.50        | 25.5               | 107.1                     | 25.0               | 89.4                      | 21.9               | 100.0                     |                  |
|       | 18           | 2000          | 5.40        | 17.0               | 72.9                      | 18.1               | 77.4                      | 17.5               | 82.9                      |                  |
|       | 24           | 2000          | 5.40        | 22.3               | 74.4                      | 20.3               | 77.4                      | 17.5               | 60.4                      |                  |
|       | 36           | 1700          | 5.40        | 24.0               | 80.7                      | 22.3               | 78.3                      | 23.8               | 59.8                      |                  |
|       | 48           | 1360          | 7.00        | 24.3               | 94.6                      | 25.1               | 96.5                      | 22.3               | 70.4                      |                  |
|       | 72           | 1360          | 7.60        | 36.2               | 90.8                      | 29.5               | 96.4                      | 27.8               | 106.9                     |                  |
|       | 96           | 1000          | 7.60        | 30.9               | 91.0                      | 27.9               | 98.2                      | 27.8               | 106.9                     |                  |
|       | 144          | 870           | 7.60        | 37.3               | 107.1                     | 32.6               | 114.0                     | 28.1               | 127.8                     |                  |
|       | 24           | 3000          | 7.00        | 33                 | 97.4                      | 30.8               | 94.5                      | 29.1               | 87.6                      |                  |

# VSM Series Model Specifications and Main Performance Parameters

## VSM Series Multi-turn Intelligent Electric Actuator Dimension Drawing



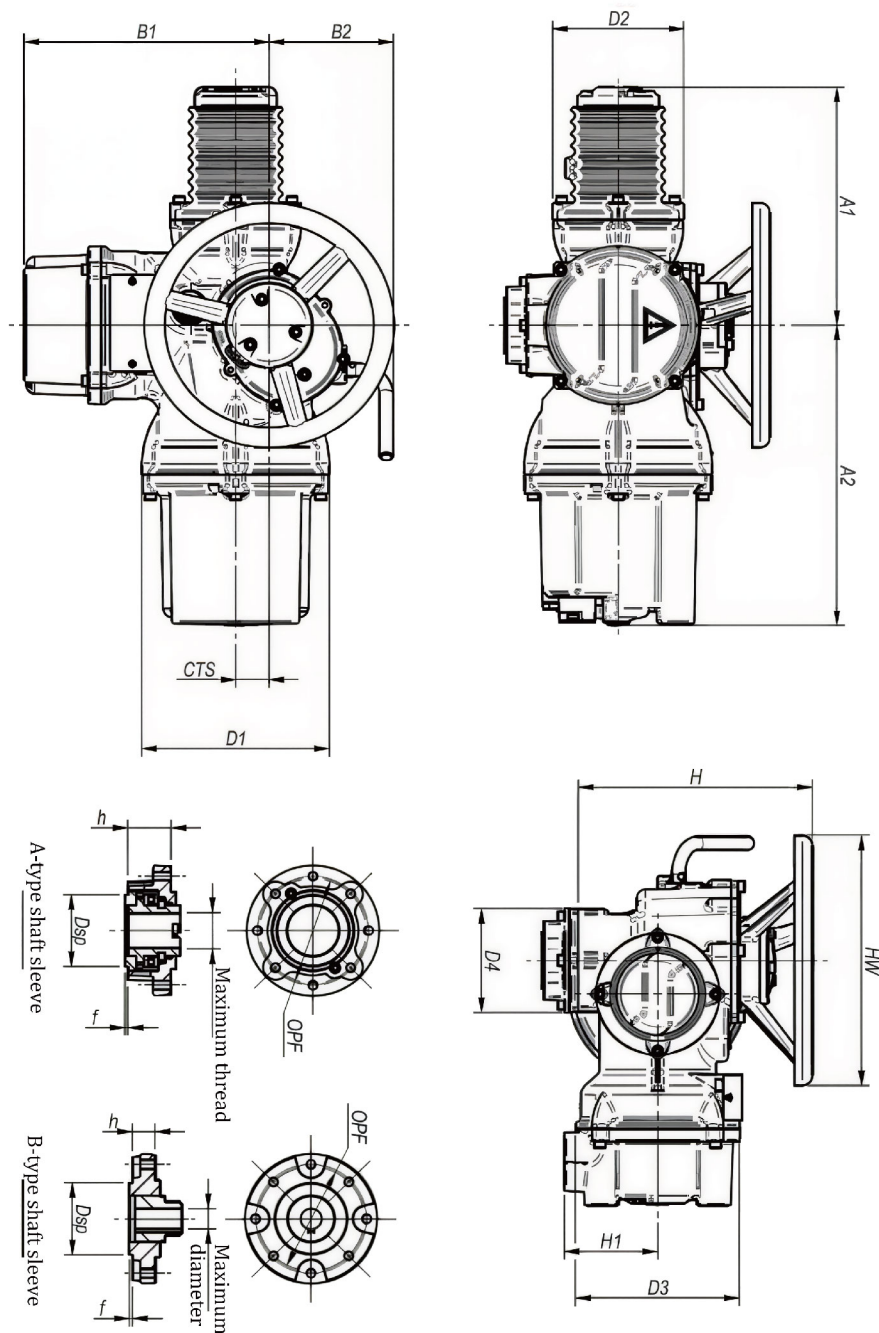
| Actuator Model                         | A1    | A2  | B1  | B2  | H   | H1<br>(Excluding<br>dust cover) | D1  | D2  | D3  | CTS | Handwheel |
|--|-------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----------|
|  |       |     |     |     |     |                                 |     |     |     |     | HW        |
| VSM1                                   | 297   | 374 | 299 | 151 | 280 | 112                             | 229 | 160 | 196 | 41  | 305       |
| VSM2                                   | 353.5 | 409 | 321 | 145 | 292 | 112                             | 229 | 191 | 196 | 60  | 450       |
| VSM3                                   | 421   | 439 | 366 | 230 | 326 | 112                             | 229 | 230 | 196 | 91  | 400       |
| VSM4 18RPM 1000N.m<br>To 144RPM 650N.m | 488   | 469 | 366 | 314 | 360 | 112                             | 229 | 269 | 196 | 91  | 400       |
| VSM4 18RPM 2000N.m<br>To 24RPM 3000N.m | 561   | 469 | 366 | 314 | 360 | 112                             | 229 | 269 | 196 | 91  | 400       |

\*This dimension table must be used in conjunction with the content on the previous page



## VSM Series Flange Structure and Dimensions

### VSM Series Multi-turn Intelligent Electric Actuators



| Actuator Model                           | OPF      | Dsp       | Cable Entry Hole |           | Type A Bushing |   |                | Type B Bushing |   |                    |
|--|----------|-----------|------------------|-----------|----------------|---|----------------|----------------|---|--------------------|
|  |          |           | 1                | 2         | h              | f | Maximum Thread | h              | f | Maximum Valve Stem |
| VSM1                                     | F10/FA10 | 70/58.7   | M40x2            | 2xM25x1.5 | 41             | 3 | 32             | 22             | 3 | 20                 |
| VSM2                                     | F14/FA14 | 100/95.25 | M40x2            | 2xM25x1.5 | 69             | 4 | 51             | 25             | 4 | 32                 |
| VSM3                                     | F16/FA16 | 130/127   | M40x2            | 2xM25x1.5 | 98             | 5 | 73             | 45             | 5 | 60                 |
| VSM4 18RPM 1000 N.m<br>To 144RPM 650 N.m | F16/FA16 | 130/127   | M40x2            | 2xM25x1.5 | 98             | 5 | 73             | 45             | 5 | 60                 |
| VSM4 18RPM 2000 N.m<br>To 144RPM 870 N.m | F25/FA25 | 200/152.4 | M40x2            | 2xM25x1.5 | 98             | 5 | 73             | 45             | 5 | 60                 |
| VSM4 24RPM 3000 N.m                      | F30/FA30 | 230/177.8 | M40x2            | 2xM25x1.5 | 122            | 5 | 83             | 45             | 5 | 60                 |

## VSM Series Flange Structure and Dimensions

### Selection Standards and References

| <b>VSM</b>   | <b>RPM</b>  | <b>T</b>   | <b>K</b>  | <b>V</b>  | <b>IP</b>  | <b>E</b>  | <b>B</b>  |
|--|---|--|---|---|--|---|---|
| Product Model  | Work speed  | Torque   | Control method  | Voltage   | Protective performance   | Explosion proof performance   | Remarks   |
| <b>Product Model</b><br>Example:<br>VSM1<br>VSM2<br>VSM3<br>VSM4 | <b>Speed (RPM)</b><br>Example:<br>24 : 24RPM<br>36 : 36RPM<br>72 : 72RPM<br>...<br>144 : 144RPM | <b>Torque (T)</b><br>Example:<br>70 : 70 N.m<br>80 : 80 N.m<br>150 : 150 N.m<br>230 : 230 N.m<br>400 : 400 N.m<br>...<br>3000 : 3000 N.m | <b>Control method (K)</b><br>M0: Switching quantity<br>M1: 4-20 mA input/output<br>PB: PROFIBUS communication protocol<br>FF: FF Communication Protocol<br>MB: MODBUS communication protocol<br>HT: HART communication protocol | <b>Voltage (V)</b><br>H: Three phase AC 380 V( 50 / 60 hz)<br>I: Three phase AC 440 V( 50 / 60 hz)<br>J: Three phase AC 400 V(50hz) | <b>Protective performance (IP)</b><br>IP67: IP67 version<br>IP68: IP68 version | <b>Explosion proof performance (E)</b><br>EX: Explosion proof version<br>N: Regular Edition | <b>Note (B)</b><br>Note: The following are optional items. If necessary, choose one of the two.<br>LT40: -40 °C environmental model<br>LT60: -60 °C environmental model |

#### \* Naming demonstration:

VSM1-18-80-M1-I-IP67-N

(VSM1 series, 18rpm, 80 N.m, 4-20 mA input/output, three-phase AC 440 V (50/60 Hz), IP67 version, regular version)

VSM3-36-540-FF-H-IP68-N-LT60

(VSM3 series, 36rpm, 540 N.m, FF communication protocol, three-phase AC 380 V (50/60 Hz), IP68 version, regular version, -60 °C environment version)

#### ▲ Notice

The performance data of products such as pressure and rated temperature recorded on this sample are based on national standard specifications and summarized by our company based on design, calculation, internal testing, and actual use of on-site products. The products introduced on this sample are mainly provided to customers who use them under general conditions. If you need to use these products under special conditions, please contact our company in advance, or the customer can conduct research and evaluation on the performance of these products before using them. Our company is not responsible for any damage or personal injury caused by careless use. In addition, although our company has made every effort to prepare samples, we cannot be held responsible for any errors, inadequacies, or inadequacies. The content described on this sample can be corrected at any time as deemed necessary by our company: discontinuation of product production, design changes, and product introductions.