



QUARTER-TURN ELECTRIC
ACTUATOR

SM - IM SERIES



4MATIC focuses on R&D, manufacturing and sales of electric actuator for control valves. With an annual production capacity of 9,000 units, 4MATIC has established strategic partnerships with many fortune 500 companies to provide the best flow control solutions. Sales network has been expanded to all continents. We follow the belief of "Continuous Improvement and Pursuit of Excellence", implement lean production and 6 Sigma management mode, hence creating 4MATIC's core competitiveness.

Electric actuators can widely apply to water treatment, HVAC, chemical, petroleum, metallurgy, electric power, medicine, ship building projects. Our electric actuators products are also approved for a number of international certifications, These include UL, SIL3, CE, CSA, explosion-proof (ATEX, IECEx), IP68, RoHS, REACH and others. Most of them are awarded by TUV, NEPSI, DNV, SGS, BSI and other internationally renowned institutions.

4MATIC has obtained ISO9001 quality management system. 4MATIC will always adhere to the business philosophy of "serving customers, respecting employees, and be first to serve on site". While working towards the material and psychological benefits of our workers, pay tributes towards the progression of society and humanity.

CHARACTERISTICS



QUARTER-TURN

CONTROL MODE

PATENT MECHANIC DESIGN

-----PAVING THE WAY FOR FUTURE TREND

IM series of electric actuators are equipped with manual / electric automatic switching function. No clutch design thus enables the hand wheel to be rotated while the machine is running; this is to ensure the safety of the operator. Such design will be the mainstream trend in the future.

USER INTERACTION INTERFACE

Intelligent type is equipped with brand new UI control interface, with the specialized remote control, achieves a variety of functions of the actuator configuration operation. Supports multi-language, satisfies all kinds of demands from the customer. It can also be customized based on special requirements.



NON-INVASIVE CONTROL

Non-through-the-shaft magnetic switch design, it is controlled by the Hall switch inside the actuator. Equipped with local control / remote control / disable knob, and on / off / stop button (knob), accommodating with the indicator light and LCD screen to achieve non-invasive field control operations.

INFRARED REMOTE CONTROL

The intelligent type actuator is able to provide different remote control sets based on different application requirements. Such as portable infrared remote control in general places, and explosion-proof remote control for hazardous locations.

PLANETARY GEARS

Using high strength alloy steel for the planetary gear set, more compact and efficient, achieving greater output for the same volume. At the same time, having differential input for motor drive and hand wheel operation, we are therefore able to operate electrically and manually at the same time.

PROFESSIONAL GEAR DESIGN

The adoption of the planetary gear design achieved a combination of manual and electric control without the need of the clutch which ensures the operator's safety. Above all, the unique solar planetary gear design has gotten the national patent.

INTERCHANGEABLE SPLINE SLEEVE

Depending on the spindle of the valve, the output sleeve of the actuator is designed in spline form. The inner holes can be replaced into square holes and keyways and other different sizes. Fast debugging and replacing makes the operation more flexible.

INTERCHANGEABLE CONNECTING FLANGE

The base connecting holes are in accordance with ISO 5211 standard, also with various connecting flange sizes. It can be replaced and rotated for the same type of actuators in order to achieve with different hole positions and angles of the valve flange connection purposes.

360 ° POSITION INDICATOR

Adopts high strength, anti-sunlight and RoHS-compliant plastic 3D window indicator. Users are able to observe the stroke position of the actuator within the 360° visual angle as there's no dead angles.

ENERGY EFFICIENCY

Single-phase and DC power supply is optional, ultra-low energy consumption, suitable for solar and wind powered applications.

SPROCKET OPERATION

Based on the features of operating manually and electrically without clutch mechanism, sprocket operation is more convenient to operate the valve at higher positions.



RELIABLE & STABLE



SAFER MORE

OVERLOAD PROTECTION

The power will automatically shut off when the valve jam occurs. Thus preventing further damage to the valve and actuator.

OPERATIONAL DIAGNOSIS

Intelligent actuators are equipped with multiple sensing devices. With the functions of real-time reflections of the control signal received by the actuator, fault alarm, operating parameters, status indication and other status. Multi-diagnostic function can locate the fault, thus making it easy for the users.

PASSWORD PROTECTION

Intelligent actuators possess classifiable password protection, which can be authorized to different operators to avoid misuse which causing the actuator failure.

OPERATIONAL SAFETY

F grade insulation motor. The motor winding has a temperature control switch to sense the temperature of the motor to protect the overheating issues, thus ensures the operational safety of the motor. (H grade optional).

MOISTURE RESISTANCE

Installed with heater inside the actuator used to remove the internal condensation which cause damages to electrical parts.

PHASE SEQUENCE CONTROL

Phase detection and correction functions avoid the actuator being damaged by connecting to the wrong power supply.

VOLTAGE PROTECTION

Protection against the high and low voltage situations.

WORKING ENVIRONMENT

ANTI-CORROSION PROTECTION:

..... Epoxy resin enclosure meets NEMA 4X, customer-special painting is available.

INGRESS PROTECTION:

..... IP67 is standard, IP68 is optional.

The definition of IP68 is:
Depth of water: Maximum 15 m under water level.
Duration of continuous immersion in water: Max.(72 hours).

FIREPROOFING GRADE:

..... High temperature fireproof enclosure meets requirements in different situation. It can be customized according to special needs.

EXPLOSION-PROOF RATING:

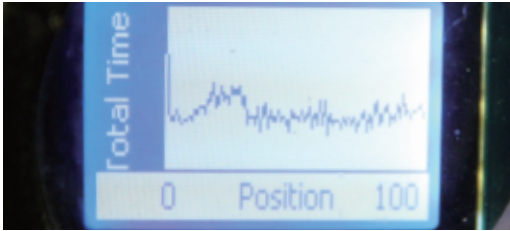
..... Ex d IIC T6 design and IECEx, ATEX certifications which satisfy the requirements in hazardous locations.

AMBIENT TEMPERATURE:

..... Temperature range is from -30 °C to 70 °C (-22 °F to +158 °F).

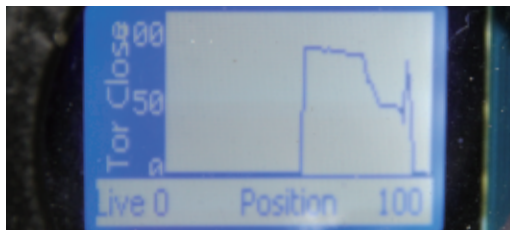
RELATIVE HUMIDITY:

..... ≤ 95 % (at 25 °C /275°F).



TIME-POSITION CURVE:

The curve shows the running trend of the actuator, and the number of times the actuator has been passed at the corresponding positions.



AVERAGE TORQUE CURVE:

It records the average output torques in the corresponding positions of both OPEN and CLOSE directions. The operating load of the actuator can be detected via the curve.



OPERATION TREND CURVE:

The curve shows the cumulative number of positions corresponding to the control signal received by the actuator so far. It enables the clients to understand the overall controlling trend of the actuator.

INSTALLATION & MAINTENANCE

IM 10 and above models are equipped with lifting ring for easy handling and on-site installation construction.

The mounting flange is in accordance with ISO 5211 international standard, and the replaceable spline sleeve makes the installation more flexible.

The wiring cavity with double sealing structure can be selected, while the actuator is well sealed and protected when installed and debugged on site.

α shrapnel terminal block, doesn't need to install a special wiring copper ring and can be directly connected. On-site installation is more convenient.

Seal off lubrication design, without regular grease supplement, life-long maintenance-free.



BASIC (B)



SFM1/A



SFM1/A/B-H



SM2-9



SM10-12



SM13-15

General Parameters	Torque Range		▪ 35 - 20000 N.m
	Switch Time		▪ 11 - 155 s
	Ambient Temperature		▪ -25 °C ... 70 °C ○ Optional: -40 °C ... 60 °C
	Anti-vibration Level		▪ JB/T8219
	Noise Level		▪ Less than 75 dB within 1 m
	Electrical Interface		▪ TwoPG13.5 (<100N.m) TwoPG16 (≥100N.m)(customized)
	Ingress Protection		▪ IP67, Optional:IP68 <small>The definition of IP68 is:Depth of water: Maximum 15 m under water level.Duration of continuous immersion in water: Max.(72 hours).</small>
	Connection Size		▪ ISO5211
Mechanical Parameters	Motor Specifications		▪ Class F, with thermal protector up to +135 °C (+275 °F) ○ Optional: Class H
	Working System		▪ On-off Type: S2 ~ 15 min, no more than 600 times per hour start
	Applicable Voltage		▪ 3 phase: AC (±10 %); Hz (±5 %) 50 Hz (220, 240, 380, 400, 460, 500, 525, 550 Volts) 60 Hz (208, 220, 230, 240, 380, 440, 460, 480, Volts) ▪ DC: 24 V (±10 %) ※ SFM series is for 1 phase only (For special inquire, please contact 4MATIC)
	Bus		▪ N/A
	On/off Type Signal	Input	▪ Built-in contacts for 5A @ 250Vac (depending on the control box)
		Signal Feedback	▪ Opening stroke limit, closing stroke limit ▪ Opening over torque, closing over torque ○ Optional: Semi-modulating type - position feedback potentiometer ○ Optional: 4 ~ 20 mA to send
		Malfunction Feedback	▪ Integrated fault alarm: Motor overheating, over torque and such contacts ○ Optional: Undercurrent protection contact
	Modulating Type Signal	Input	▪ N/A
		Output	▪ N/A
		Signal Reverse	▪ N/A
		Loss Signal Mode Setting	▪ N/A
		Dead Zone	▪ N/A
		Time Lag	▪ N/A
Control mode	Indication		▪ 3D opening indicator
	Operation Settings		▪ N/A
	Local Control		▪ N/A
Others	Intelligently Analyze Data Records		▪ N/A
	Other Function		▪ Moisture-resistant heaters(anti-moisture device) ▪ Torque protection ▪ Motor overheat protection

※For explosion protection options, please refer to the P10 explosion-proof rating and parameter list.

※Working system of SM8A/SM12 is S2-8min, AC220V.

INTEGRAL (M)



SFMB-1/2/3



SFM1/A



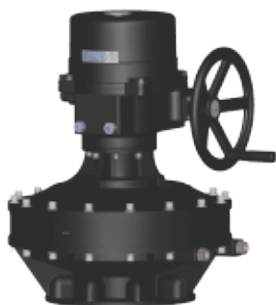
SFM1/A/B-H



SM2-9



SM10-12



SM13-15

General Parameters	Torque Range		▪ 10 - 20000 N.m
	Switch Time		▪ 11 - 155 s
	Ambient Temperature		▪ -25 °C ... +70 °C
	Anti-vibration Level		▪ JB/T8219
	Noise Level		▪ Less than 75 dB within 1 m
	Electrical Interface		▪ Two PG13.5(<100N.m) Two PG16(≥100N.m) (customized)
	Ingress Protection		▪ IP67, Optional:IP68 <small>The definition of IP68 is:Depth of water: Maximum 15 m under water level.Duration of continuous immersion in water: Max.(72 hours).</small>
	Connection Size		▪ ISO5211
Mechanical Parameters	Motor Specifications		▪ Class F, with thermal protector up to +135 °C (+275 °F) Optional: Class H
	Working System		▪ On/off type: S2 ~ 15 min no more than 600 times per hour start ▪ Modulating type: S4~50% up to 600 triggers per hour Optional: 1200 times per hour
	Applicable Voltage		▪ 1 phase: Voltage (±10 %); Hz (±5 %) 50 Hz (24, 220, 230, 240 Volts) 60 Hz (24, 110, 120, 220, 230, 240 Volts) ▪ 3 phase: Voltage (±10 %); Hz (±5 %) 50 Hz (220, 240, 380, 400, 460, 500, 525, 550 Volts) 60 Hz (208, 220, 230, 240, 380, 440, 460, 480, Volts) ▪ DC: 24 V (±10 %) ※ SFM series is for 1 phase only (For special inquire, please contact 4MATIC)
	Bus		▪ N/A
	On/off Type Signal	Input	▪ AC/DC 24 input control or AC 110/220 V input control
		Signal Feedback	▪ Close the valve contact ▪ Open the valve contact (contact capacity: 5 A @ 250 Vac) Optional: Opening torque signal contact Closing torque signal contact Local/remote contacts Integrated fault contact 4 ~ 20 mA to send ※ SFM series has no torque options
		Malfunction Feedback	▪ Integrated fault alarm: Power off, motor over heat-ing, lack of phase, over torque, signal off ※ SFM series has no torque options
	Modulating Type Signal	Input	▪ Input signal: 4 - 20 mA; 0 - 10 V; 2 - 10 V ▪ Input impedance: 250 Ω (4 - 20 mA)
		Output	▪ Output signal: 4 - 20 mA;0 - 10 V; 2 - 10 V ▪ Output impedance: ≤ 750 Ω (4 - 20 mA) (Repeatability and linearity within ± 1 % of full valve stroke)
		Signal Reverse	▪ Support
		Loss Signal Mode Setting	▪ Support
		Dead Zone	▪ ≤ 2.5 %
		Time Lag	▪ N/A
Control mode	Indication		▪ 3D opening indicator
	Operation Settings		▪ N/A
	Local Control		▪ N/A
Others	Intelligently Analyze Data Records		▪ N/A
	Other Function		▪ Phase correction(3-phase power supply only) ▪ Torque protection ▪ Motor overheat protection ▪ Moisture-resistant heaters (anti-moisture device)

※For explosion protection options, please refer to the P10 explosion-proof rating and parameter list.

※Working system of SM 8A/SM12 is S2-8min, AC220V.

INTEGRATION (Y)



SFM1/A/B-H



SM2-9

※Working system of SM8A/
SM12 is S2-8min, AC220V.

General Parameters	Torque Range		▪ 35 - 20000 N.m
	Switch Time		▪ 11 - 155 s
	Ambient Temperature		▪ -25 °C ... +70 °C
	Anti-vibration Level		▪ JB/T8219
	Noise Level		▪ Less than 75 dB within 1 m
	Electrical Interface		▪ Two PG13.5 (<100N.m) Two PG16 (≥100N.m) (customized)
	Ingress Protection		▪ IP65
	Connection Size		▪ ISO5211
Mechanical Parameters	Motor Specifications		▪ Class F, with thermal protector up to +135 °C (+275 °F) Optional: Class H
	Working System		▪ On/off type: S2 ~ 15 min no more than 600 times per hour start ▪ Modulating type: S4~50% up to 600 triggers per hour Optional: 1200 times per hour
	Applicable Voltage		▪ 1 phase: Voltage (±10 %); Hz (±5 %) 50 Hz (24, 220, 230, 240 Volts) 60 Hz (24, 110, 120, 220, 230, 240 Volts) ▪ 3 phase: Voltage (±10 %); Hz (±5 %) 50 Hz (220, 240, 380, 400, 460, 500, 525, 550 Volts) 60 Hz (208, 220, 230, 240, 380, 440, 460, 480, Volts) ▪ DC: 24 V (±10 %) ※ SFM series is for 1 phase only (For special inquire, please contact 4MATIC)
	Bus		▪ N/A
	On/off Type Signal	Input	▪ AC/DC 24 input control or AC 110/220 V input control
		Signal Feedback	▪ Close the valve contact ▪ Open the valve contact (contact capacity: 5 A @ 250 Vac) Optional: Opening torque signal contact Closing torque signal contact Local/remote contacts Integrated fault contact 4 ~ 20 mA to send ※ SFM series has no torque options
		Malfunction Feedback	▪ Integrated fault alarm: Power off, motor overheating, lack of phase, over torque, signal off ※ SFM series has no torque options
	Modulating Type Signal	Input	▪ Input signal: 4 - 20 mA; 0 - 10 V; 2 - 10 V ▪ Input impedance: 250 Ω (4 - 20 mA)
		Output	▪ Output signal: 4 - 20 mA; 0 - 10 V; 2 - 10 V ▪ Output impedance: ≤ 750 Ω (4 - 20 mA) (Repeatability and linearity within ± 2.5 % of full valve stroke)
		Signal Reverse	▪ Support
		Loss Signal Mode Setting	▪ Support
		Dead Zone Time Lag	▪ ≤ 2.5 % ▪ N/A
Control mode	Indication		▪ 3D opening indicator ▪ On/off/remote control/fault indicator (Button type) ▪ Open/close/power indicator (Knob)
	Operation Settings		▪ N/A
	Local Control		▪ Non-intrusive local control knob: Open/close/stop ▪ Non-intrusive local control knob: Local/remote/prohibit
Others	Intelligently Analyze Data Records		▪ N/A
	Other Function		▪ Phase correction(4-phase power supply only) ▪ Torque protection ▪ Motor overheat protection ▪ Moisture-resistant heaters (anti-moisture device)

INTELLIGENT (I)



IM2-12

General Parameters	Torque Range		▪ 100 - 20000 N.m
	Switch Time		▪ 19 - 155 s
	Ambient Temperature		▪ -25 °C ... +70 °C
	Anti-vibration Level		▪ JB/T8219
	Noise Level		▪ Less than 75 dB within 1 m
	Electrical Interface		▪ Two PG16. (customized)
	Ingress Protection		▪ IP67, Optional:IP68 <small>The definition of IP68 is:Depth of water: Maximum 15 m under water level.Duration of continuous immersion in water: Max.(72 hours).</small>
	Connection Size		▪ ISO5211
Mechanical Parameters	Motor Specifications		▪ Class F, with thermal protector up to +135 °C (+275 °F) Optional: Class H
	Working System		▪ On/off type: S2 ~ 15 min no more than 600 times per hour start ▪ Modulating type: S4~50% up to 600triggers per hour Optional: 1200 times per hour
	Applicable Voltage		▪ 1 phase: Voltage (±10%); Hz (±5%) 50 Hz (24, 220, 230, 240 Volts) 60 Hz (24, 110, 120, 220, 230, 240 Volts) ▪ 3 phase: Voltage (±10 %); Hz (±5 %) 50 Hz (220, 240, 380, 400, 460, 500, 525,550 Volts) 60 Hz (208, 220, 230, 240, 380, 440, 460, 480, Volts) ▪ DC: 24 V (±10 %) (For special inquire, please contact 4MATIC)
	Bus		▪ Modbus
	On/off Type Signal	Input	▪ AC/DC 24 auxiliary power input control ▪ Optoelectronic isolation
		Signal Feedback	▪ Close the valve contact ▪ Open the valve contact (contact capacity:3A @ 250 Vac) Standard: Opening torque signal contact Closing torque signal contact Local/Remote contacts Optional:Integrated fault contact 4 ~ 20 mA to send
		Malfunction Feedback	▪ Integrated fault alarm:Power off, motor overheating, lack of phase, over torque, signal off, ESD beyond protection, terminal output ※ SFM series has no torque options
	Modulating Type Signal	Input	▪ Input signal: 4 - 20 mA; 0 - 10 V; 2 - 10 V ▪ Input impedance: 150 Ω (4 - 20 mA)
		Output	▪ Output signal: 4 - 20 mA;0 - 10 V; 2 - 10 V ▪ Output impedance: ≤ 750 Ω (4 - 20 mA) (Repeatability and linearity within ± 1.5 % of full valve stroke)
		Signal Reverse	▪ Support
		Loss Signal Mode Setting	▪ Support
		Dead Zone	▪ 0.5 ~ 9.9 % adjustable rate within full stroke
		Time Lag	▪ N/A
Control mode	Indication		▪ LCD screen opening indicator ▪ On/off/remote control/fault indicator (Digital display of the opening percentage)
	Operation Settings		▪ Settings done opening the cover
	Local Control		▪ Non-intrusive local control knob: Open/close/stop ▪ Non-intrusive local control knob: Local/remote/prohibit
Others	Intelligently Analyze Data Records		▪ N/A
	Other Function		▪ Phase correction (3-phase power supply only) ▪ Alarm signal (local and remote included) ▪ Torque protection ▪ Motor overheat protection ▪ Moisture-resistant heaters(anti-moisture device) ▪ Infrared remote control Optional: Explosion-proof infrared remote control

※For explosion protection options, please refer to the P10 explosion-proof rating and parameter list. ※Working system of IM8A/IM12 is I2-8min, AC220V.

SUPER INTELLIGENT (S)



SM2-9

General Parameters	Torque Range		▪ 100 - 20000 N.m
	Switch Time		▪ 19 - 155 s
	Ambient Temperature		▪ -25 °C ... +70 °C
	Anti-vibration Level		▪ JB/T8219
	Noise Level		▪ Less than 75 dB within 1 m
	Electrical interface		▪ Two NPT 3/4, Two NPT1 1/2 (customized)
	Ingress Protection		▪ IP67 Optional:IP68 <small>The definition of IP68 is:Depth of water: Maximum 15 m under water level.Duration of continuous immersion in water: Max.(72 hours).</small>
	Connection size		▪ ISO5211
Mechanical Parameters	Motor Specifications		▪ Class F, with thermal protector up to +135 °C (+275 °F) Optional: Class H
	Working System		▪ On/off type: S2 ~ 15 min no more than 600 times per hour start Modulating type: S4~50% up to 600 triggers per hour Optional: 1200 and 1800 times per hour
	Applicable Voltage		▪ 1 phase: Voltage (±10 %); Hz (±5 %) 50 Hz (24, 220, 230, 240 Volts) 60 Hz (24, 110, 120, 220, 230, 240 Volts) ▪ 3 phase: Voltage (±10 %); Hz (±5 %) 50 Hz (220, 380, 400, 460 Volts) 60 Hz (220, 380, 440,460, 480 Volts) ▪ DC: 24 V (±10 %) (For special inquire, please contact 4MATIC)
	Bus		▪ Modbus
	On/off Type Signal	Input	▪ 20 ~ 60 V AC/DC Optional: 60 - 120 V AC ▪ Optoelectronic isolation
		Signal Feedback	▪ Relay X 5 (4 can be set to "constant open" or "constant closed" contacts. 1 integrated fault contact) a. On/off in place b. On/off over torque c. Local/remote d. Center position e. Multiple malfunctions to choose Optional: 4 ~ 20 mA to send
		Malfunction Feedback	▪ Phase correction ▪ Torque switch ▪ Heat protection ▪ Jammed valve protection ▪ Broken signal protection ▪ Instantaneous ▪ Other alarms reverse protection
	Modulating Type Signal	Input	▪ Input signal: 4 ~ 20 mA (the input signal can be arbitrarily correspond-ing to the valve position) ▪ Accuracy: (1.5 %) ▪ Input impedance: 75 Ω (4 ~ 20 mA)
		Output	▪ Output signal: 4 - 20 mA ▪ Output impedance: ≤ 750 Ω (4 - 20 mA) (Repeatability and linearity within ± 1 % of full valve stroke)
		Signal Reverse	▪ Support
		Loss SignalSetting	▪ Support
		Dead Zone Time Lag	▪ 0 - 25.5 % adjustable rate within full stroke ▪ 0 - 25.5 s (Adjustable)
Control mode	Indication		▪ LCD screen opening indicator ▪ On/off/remote control/fault indicator (Digital display of the opening percentage and torque percentage)
	Operation Settings		▪ Settings done without opening cover(menu settings by the remote control) ▪ Configuration settings(such as valve position, the maximum opening, the maximum torque, etc.)
	Local Control		▪ Non-intrusive local control knob:Open/close/stop ▪ Non-intrusive local control knob: Local/remote/prohibit
Others	Intelligently Analyze Data Records		▪ Use infrared remote control to conduct fault diagnosis analysis on the display
	Other Function		▪ Phase correction(3-phase power supply only;Electron torque must be greater than 60% to be settable) ▪ Alarm signal (local and Telecontrol) ▪ Torque setting and protection ▪ Motor overheat protection ▪ Moisture-resistant heaters (anti-moisture device) ▪ Operation start up recording ▪ Operational trend records ▪ ESD can be set to fully opened, fully closed, and remain still ▪ Torque bypass ▪ Event log ▪ Operation time ▪ Average torque ▪ Valve torque curve Optional: Two-way remote control Optional: Explosion-proof infrared remote control

EXPLOSION PROOF



ESC(G)1/A/B



ESB(C)2-9



ESCJ2-9

	Basic (B) Integral (M)	Intelligent (I) Super Intelligent (S)
NEPSI certified	<ul style="list-style-type: none"> NEPSI : GB 3836.1, GB3836.2, GB 12476.1 Ex d IIB/II C T4 — T6 Gb DIP A21 TA, T4 (GB 3836.1, GB 3836.2) Ex tb IIIC T85 °C to T135 °C (GB 12476.1) 	<ul style="list-style-type: none"> NEPSI : GB 3836.1, GB3836.2, GB 12476.1 Ex d IIB/II C T4 — T6 Gb DIP A21 TA, T4 (GB 3836.1, GB3836.2) Ex tb IIIC T85 °C to T135 °C (GB 12476.1)
ATEX certified	<ul style="list-style-type: none"> ATEX (94/9/EC) II 2 GD c. EN 60079-0, EN 60079-1, EN 60079-31 Ex d IIB T4 — T6 Gb T4 Ex tb IIIC T85 °C/T100 °C/T135 °C Db T4, IP66 Temperature range:-20 °Cto+65 °C Optional: -40 °C to +60 °C Optional: IP67/IP68 (EN60529) Ex d IIC T4 — T6 Gb Ex tb IIIC T85 °C/T100 °C/T135 °C Db T4, IP66 Temperature range:-20 °Cto+65 °C Optional: -40 °C to +60 °C Optional: IP67/IP68 (EN60529) 	<ul style="list-style-type: none"> ATEX (94/9/EC) II 2 GD c. EN 60079-0, EN 60079-1, EN 60079-31 Ex d IIC T4 — T6 Gb Ex tb IIIC T85 °C/T100 °C/T135 °C Db T4, IP66 Temperature range:-20 °Cto+65 °C Optional: -40 °C to +60 °C Optional: IP67/IP68 (EN 60529)
IECEX certified	<ul style="list-style-type: none"> IECEX. IEC 60079-0 & IEC 600679-1 Ex d IIC T4 — T6 Gb Ex tb IIIC T85 °C — T135 °C Db IP66 Temperature range:-20 °Cto+65 °C Optional: -40 °C to +65 °C Optional: IP67/IP68 (IEC60529) 	<ul style="list-style-type: none"> IECEX. IEC 60079-0 & IEC 600679-1 Ex d IIB T4 — T6 Gb Ex tb IIIC T85 °C — T135 °C Db IP66 Temperature range:-20 °Cto+65 °C Optional: -40 °C to +65 °C Optional: IP67/IP68 (IEC 60529) Ex d IIC T4 — T6 Gb Ex tb IIIC T85 °C — T135 °C Db IP66 Temperature range:-20 °Cto+65 °C Optional: -40 °C to +65 °C Optional: IP67/IP68 (IEC 60529)
CSA certified	<ul style="list-style-type: none"> CSA Explosionproof to CSA 60079-0-11, CSA 600679-1-11, CSA 60079-31-12, UL 60079-0-11, UL 600679-1-11 , IAS 60079-31-13 Ex d IIB T4 — T6 Gb Ex tb IIIC T4 — T6 Db IP66 Temperature range:-25 °Cto+65 °C Optional: IP67/IP68 (EN 60529) Ex d IIC T4 — T6 Gb Ex tb IIIC T4 — T6 Db IP66 Temperature range:-25 °C to +65 °C Optional: IP67/IP68 (EN 60529) 	<ul style="list-style-type: none"> CSA Explosionproof to CSA 60079-0-11, CSA 600679-1-11, CSA 60079-31-12, UL 60079-0-11, UL 600679-1-11 , IAS 60079-31-13 Ex d IIC T4 — T6 Gb Ex tb IIIC T4 — T6 Db IP66 Temperature range:-25 °Cto+65 °C Optional: IP67/IP68 (EN 60529)

※Please refer to P5-P9 for the technical parameters of the above models.

MODULATING VS ON-OFF TYPE

REGULAR SERIES	ON/OFF TYPE	MODULATING TYPE	Explosion-proof Series	ON/OFF TYPE	MODULATING TYPE
Basic (B)	√	—	Basic (B)	√	—
Integral (M)	√	√	Integral (M)	√	√
Integration (Y)	√	√	Intelligent (I)	√	√
Intelligent (I)	√	√	Super Intelligent (S)	√	√
Super Intelligent (S)	√	√			

GENERAL SEPCIFICATION

TECHNICAL PARAMETER CHART

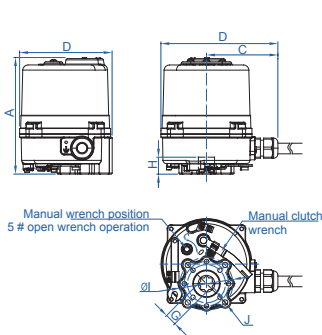
Model	Power (W)	Max Output Torque(N.m)		Max Output Torque(lbf.in)		Running time (Sec)				ISO 5211	Remarks
		AC 110 V AC 220 V AC/DC 24 V	AC 220 V AC 380 V 3 phase	AC 110 V AC 220 V AC/DC 24 V	AC 220 V AC 380 V 3 phase	50 Hz		AC/DC 24 V	Fail-safe		
						AC 110 V AC 220 V	AC 380 V 3 phase				
SFMB-1	5	10	-	89	-	13	-	13	-	F03/F04/ F05	Manual wrench
SFMB-2	8	20	-	177	-	12	-	12	-		
SFMB-3	10	30	-	266	-	11	-	11	-		
SFM1-(H)	10	35	-	310	-	11	-	8		F03/F05/ F07	Manual wrench options: Handwheel Handwheel
SFMA-(H)		50	-	443	-	15	-	10			
SFMB-H		80	-	708	-	22	-	15			
SM 2	40	100		885		19		14		F05/F07/ F10/F12	Handwheel operation, planetary gear mechanism
SM 3		200		1770		39		28			
SM 3A		300		2655		39		28			
SM 4	90	400		3540		29		21		F10/F12/ F14	
SM 5		600		5310		39		28			
SM 6		800		7080		47		34			
SM 7	120	1000		8850		47		34		F12/F14/ F16	
SM 7A		1300		11505		47		34			
SM 8		1700		15045		34		25			
SM 8A	200	2000		17700		34		25	-	F14/F16	
SM 9		2300		20355		47		34	-		
SM 10		3500		30975		76		55	-		
SM 11	400	5000		44250		105		76	-	F25	
SM 12		8000		70800		143		103	-		
SM 13		-	13000	-	115050	-	109	-	-		
SM 14	400	-	16000	-	141600	-	129	-	-	F25/F30	
SM 15		-	20000	-	177000	-	155	-	-		

Note: Standard configuration.

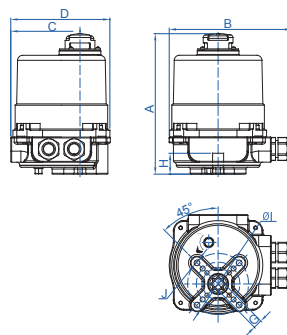
1. Rated torque is 75 % of the max torque.
2. Motor insulation is class F, class H is optional.
3. The running time of 60 Hz is 5/6 of that of 50 Hz. The max output torque is the same as above.
4. Above mentioned 3 phase output power doesn't apply to SFM1-(H),SFMA-(H).

DIMENSION

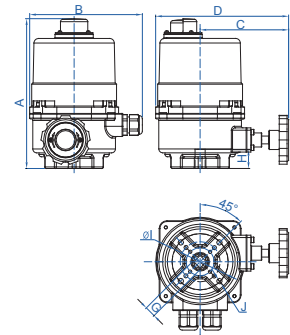
BASIC TYPE & INTEGRAL TYPE



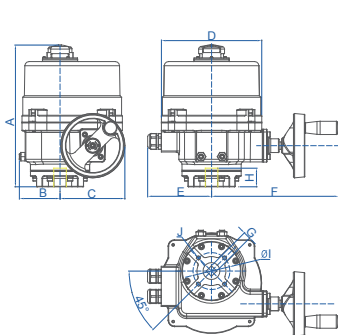
SFMB 1/2/3



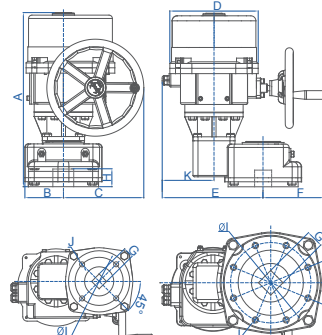
SFM 1/A/B



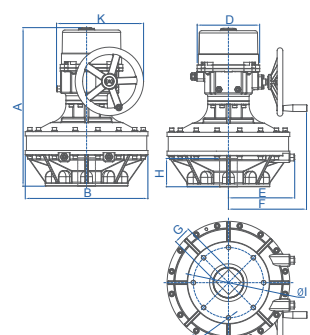
SFM 1/A/B-H



SM 2~9



SM 10~12



SM 13~15

Model	A	B	C	D	E	F	G	H	ΦI	J	Weight (kg)
SFMB-1	110	111	71	87	-	-	11x11	16	36	4-M5	1
SFMB-2									42	4-M5	
SFMB-3									50	4-M6	
SFM1	165	150	82	118	-	-	11x11	20	36	4-M5	3
SFMA											
SFM1-H	192	150	135	170	-	-	11x11	20	50	4-M6	3.6
SFMA-H											
SFMB-H											
	212		135	170	-	-	17x17		70	4-M8	3.8
SM2	268	77	123	216	121	240	14x14	35	70	4-M8	11
SM3							17x17				
SM4							22x22		102	4-M10	
SM5	327	103	187	266	150	297	22x22	55	102	4-M10	22
SM6							27x27		125	4-M12	
SM7							27x27		125	4-M12	
SM8	380	127	242	293	161	333	27x27	65	125	4-M12	36
SM9							36x36		140	4-M16	
									165	4-M20	
SM10	532	118	242	293	308	186	40x40	85	140	4-M16	76
SM11							46x46		165	4-M20	
SM12							55x55		254	8-M16	
SM13	545	160	242	293	343	160	55x55	130	254	8-M16	107
SM14							55x55		254	8-M16	
SM15							75x75		298	8-M20	

Note: 1. Dimension unit is mm.

2. Above "G" dimension is what we recommended. However, it can be customized according to customers' requirements.

3. Above "ΦI" and "J" dimensions are in accordance with ISO 5211 flange specifications. Which means that there's only one specification can be chosen, please specify when ordering.

BASIC TYPE

More functions as options:

○ Quick open ○ Slow open
(The running time can be customized. Quick and slow open functions are added.)

More accessories as options:

○ Flange ○ Spline sleeve
○ Independent wiring box ○ Sprocket

INTEGRAL TYPE

More functions as options:

○ Quick Open ○ Slow Open
(The running time can be customized. Quick and slow open functions are added.)
○ Battery mackup ○ Capacitor return ○ Spring return (Fail-safe)

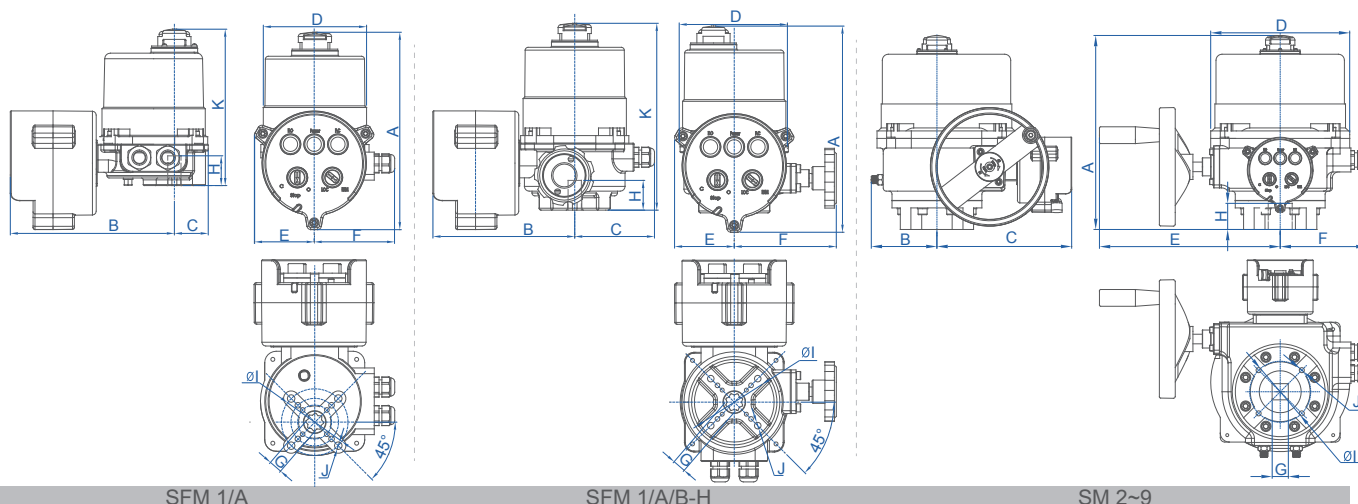
More accessories as options:

○ Flange ○ Spline sleeve
○ Independent wiring box ○ Sprocket

DIMENSION



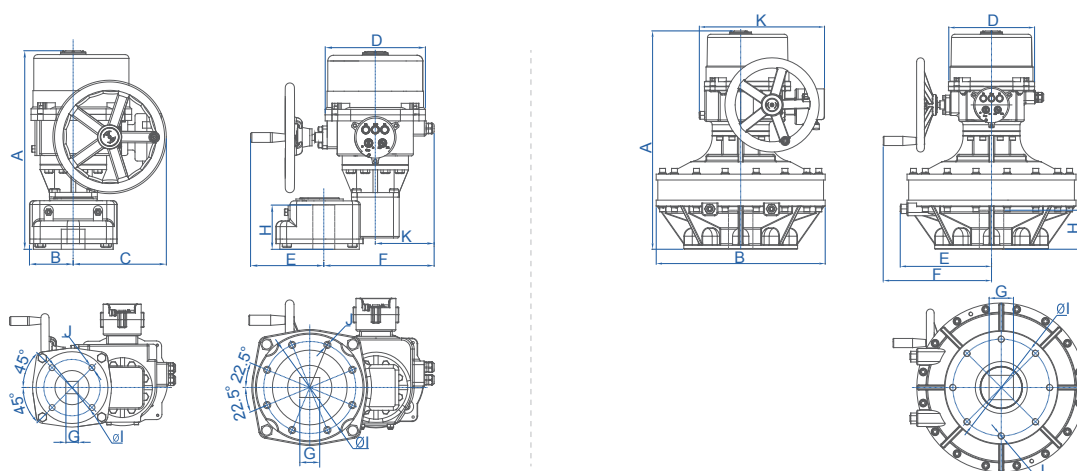
INTEGRATION TYPE



SFM 1/A

SFM 1/A/B-H

SM 2~9



SM 10~12

SM 13~15

Model		A	B	C	D	E	F	G	H	ΦI	J	K	Weight (kg)
SFM1	On-off	207	173	36	114	63	85	11 X 11 14 X 14	20	36 50 70	4- M5 4- M6 4- M8	164	4.1
SFMA	Modulating	227											4.3
SM1 -H	On-off	217	149	84	114	63	108	11 X 11 14 X 14 17 X 17	20	36 50 70	4- M5 4- M6 4- M8	197	4.7
SFMA -H	Modulating	237											4.9
SM 2		268	77	208	190	240	121	14 X 14 17 X 17	35	70	4- M8	-	12.2
SM 3		327	110	225	266	301	145	22 X 22	55	102	4- M10	-	23.2
SM 4								22 X 22		102	4- M10		
SM 5								27 X 27		125	4- M12		
SM 6								27 X 27		125	4- M12		
SM 7		380	127	248	265	333	161	27 X 27	65	125	4- M12	-	37.2
SM 8								27 X 27		140	4- M16		
SM 9								36 X 36		140	4- M16		
SM 10		532	118	242	265	194	292	40 X 40	85	140 165	4- M16 4- M20	156	77.2
SM 11		545	160	242	265	168	343	46 X 46		165	4- M20		
SM 12								55 X 55	130	254	8- M16	156	108.2
SM 13		672	520	-	265	281	331	55 X 55 75 X 75	120	254 298	8- M16 8- M20	385	219.2
SM 14													
SM 15													

Note: 1. Dimension unit is mm.

2. Above "G" dimension is what we recommended. However, it can be customized according to customers' requirements.

3. Above " ΦI " and "J" dimensions are in accordance with ISO 5211 flange specifications. Which means that there's only one specification can be chosen, please specify when ordering.

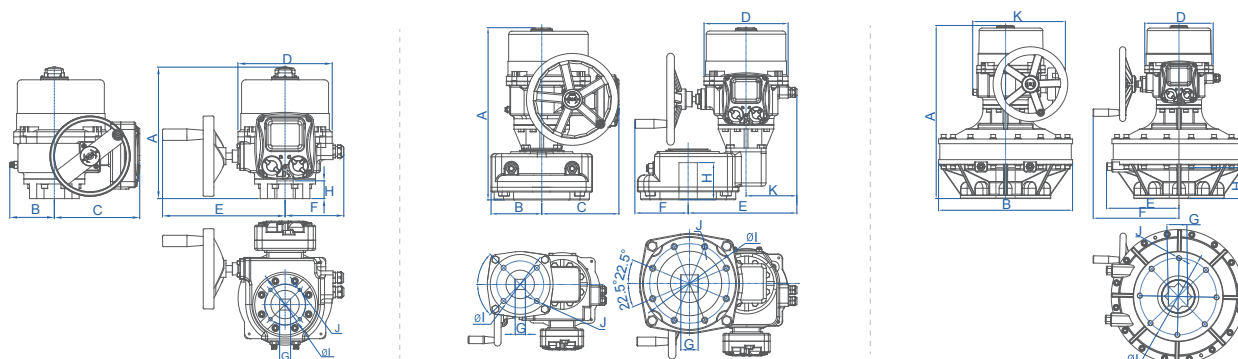
INTEGRATION TYPE

More functions as options:	<input type="radio"/> Quick Open <input type="radio"/> Slow Open <small>(The running time can be customized. Quick and slow open functions are added.)</small>
More accessories as options:	<input type="radio"/> Flange <input type="radio"/> Spline sleeve <input type="radio"/> Independent wiring box <input type="radio"/> Sprocket

DIMENSION

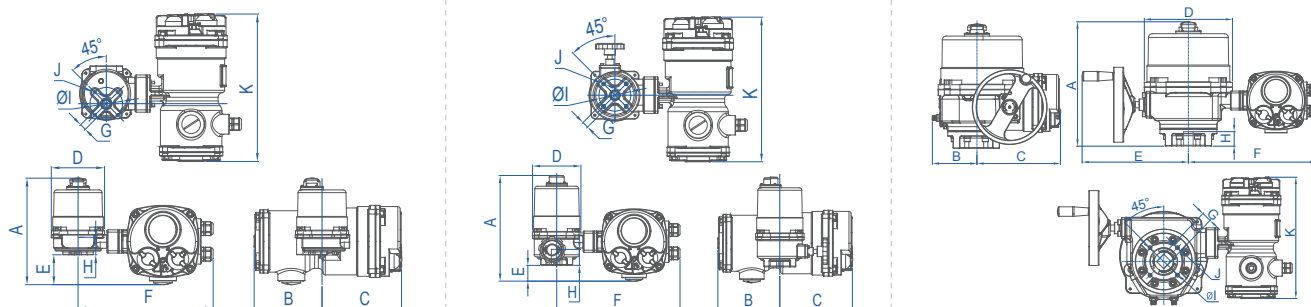


INTELLIGENT TYPE



IM 2~9				IM 10~12				IM 13~15						
Model	A	B	C	D	E	F	G	H	ΦI	J	K	Weight (kg)		
IM 2	268	79	198	190	240	121	14 X 14	35	70	4- M8	-	13		
IM 3							17 X 17							
IM 4							22 X 22						102	4- M10
IM 5							22 X 22							4- M10
IM 6	327	110	210	232	301	145	27 X 27	55	125	4- M12	-	24		
IM 7							27 X 27		125	4- M12				
IM 8							27 X 27		125	4- M12				
IM 9	380	127	234	265	333	161	36 X 36	65	140	4- M16	-	38		
IM 10							40 X 40		165	4- M20				
IM 11							46 X 46		165	4- M20				
IM 12	545	160	244	265	168	343	55 X 55	130	254	8- M16	156	109		
IM 13							254		8- M16					
IM 14							254		8- M16					
IM 15	672	520	-	265	281	331	75 X 75	120	298	8- M20	385	220		

SUPER INTELLIGENT TYPE



SFM1/A

SFM1/A/B-H

SM 2~9

Model	A	B	C	D	E	F	G	H	ΦI	J	K	Weight (kg)
SFM1/A	185	147	172	115	38	298	11 X 11	30	36	4-M5	319	8
SFM1/A/B-H	212				65		14 X 14		50	4-M6		
SM 2	268	79	198	190	240	121	14 X 14	35	70	4-M8	319	13
SM 3							17 X 17					
SM 4							22 X 22			4-M10		
SM 5							22 X 22			4-M10		
SM 6	327	110	210	232	301	338	27 X 27	55	125	4-M12	319	24
SM 7							27 X 27		125	4-M12		
SM 8							27 X 27		125	4-M12		
SM 9	380	127	234	265	333	361	36 X 36	65	140	4-M16	319	38
SM 10	532	118	227	265	180	510	40 X 40	85	140	4-M16	361	78
SM 11							46 X 46		165	4-M20		
SM 12	545	160	244	265	168	545	55 X 55	130	254	8-M16	361	109
SM 13	672	520	-	265	281	363	55 X 55	120	254	8-M16	333	220
SM 14							75 X 75		298	8-M20		
SM 15												

SM 10~12

SM 13~15

INTELLIGENT TYPE/ SUPER INTELLIGENT TYPE

More functions as options:

- Quick Open
 - Slow Open
- (The running time can be customized. Quick and slow open functions are added.)

More accessories as options:

- Flange
- Spline sleeve
- Independent wiring box
- Sprocket
- Remote control

Note: 1. Dimension unit is mm.

2. Above "G" dimension is what we recommended. However, it can be customized according to customers' requirements.

3. Above "ΦI" and "J" dimensions are in accordance with ISO 5211 flange specifications. Which means that there's only one specification can be chosen, please specify when ordering.

FAILSAFE



For the demand of the actuator to be returned to the default location when the power is off, we provide 3 solutions in battery return, capacitor return and spring return.

BATTERY BACKUP

With high-performance lithium battery as a backup power supply, when the system power is normal, the battery is charged and in standby mode. The battery is powered by the actuator and is executed to the preset position.

CAPACITOR RETURN

With super capacitor set as a backup power supply. When the system power is normal, the capacitor set is charged and in standby mode. When the system power is loss, the capacitor set supplies power to the actuator and performs to the preset position. Capacitors don't require special maintenance, no memory effect, charging time is short and up to 500,000 times for charge and discharge with the lifespan up to ten years.

SPRING RETURN

The special scroll wrap spring set is used as the energy storage unit. The spring stores energy when the system power is normal. When the system loss the power supply, the spring drives the valve and other devices to fully closed or fully open position. Pure mechanical mechanism unit with strong environmental adaptability, safe and reliable.

PERFORMANCE PARAMETERS

Voltage:
24 V AC / DC standard configuration
Other voltages must be matched with the power adapter.
(Transformer / switch power box).
SFM 1/A/B-(H) series 100 VA
SM 2~3 series 250 VA
SM 4~7 series 500 VA
Ambient temperature: -20 °C ~ +50 °C
Relative humidity: ≤ 95 % (25 °C)
Working environment:
Does not contain strong corrosive, flammable, explosive medium
Working time: S1 continuous working system
Control signal:
On/off type --- Switch contact signal
Modulating type --- 0 ~ 10 V / 2 ~ 10 V / 4 ~ 20 mA
Ingress protection class:
IP67 is the standard configuration, IP68 is optional
Battery parameters:
24 V DC, 1500 mAh, charging time is 5 hours
Power failure mode: Fully open, fully close, remain still

PERFORMANCE PARAMETERS

Voltage:
24 V AC / DC standard configuration
Other voltages must be matched with the power adapter.
Power 100 VA
(Transformer / switch power box).
Ambient temperature: -20 °C ~ +65 °C
Relative humidity: ≤ 95 % (25 °C)
Working environment:
Does not contain strong corrosive, flammable, explosive medium
Working time:
S1 continuous working system
Control signal:
On/off type --- Switch contact signal
Modulating type --- 0 ~ 10 V / 2 ~ 10 V / 4 ~ 20 mA
Ingress protection class:
IP67 is the standard configuration, IP68 is optional
Capacitor parameters:
24 V DC, 6F, charging time is 20 min
Power failure mode:
Fully open, fully close, remain still

PERFORMANCE PARAMETERS

Voltage:
24 V AC/DC, AC 110 V ~ 120 V
AC 220 V ~ 240 V, AC 380 V ~ AC 440 V(50Hz, 60Hz)
Ambient temperature: -25 °C ~ +70 °C
Relative humidity:
≤ 95 % (25 °C)
Working environment:
Does not contain strong corrosive, flammable, explosive medium
Working time:
S2-30 min
Control signal:
On/off type --- Switch contact signal
Modulating type --- 0 ~ 10 V / 2 ~ 10 V / 4 ~ 20 mA
Ingress protection class:
IP67 is the standard configuration, IP68 is optional
Power failure mode:
Fully open; fully close
(Standard configuration, please specify when ordering)
Loss of power operation:
1 time full stroke

QUICK OPEN & SLOW OPEN

There may be requirement to quick or slow open and close the valve based on actual situations. 4MATIC can provide the corresponding solution according to the specific needs.

MATRIX

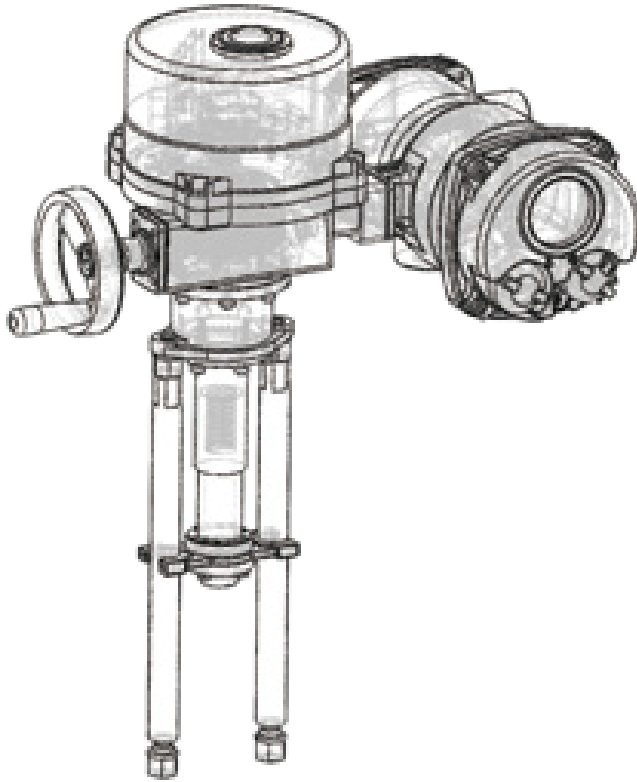
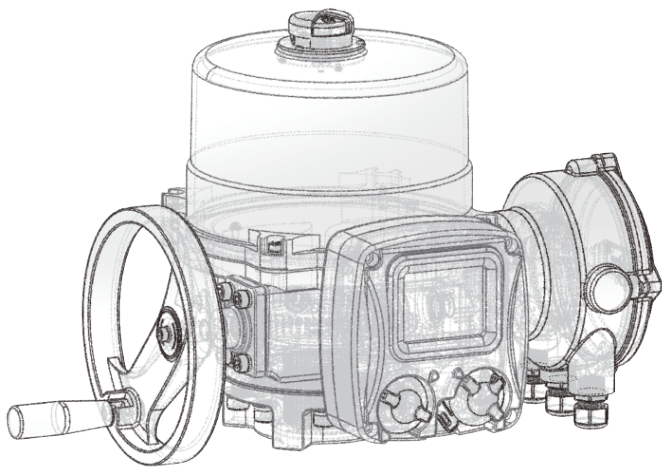
SM2 – O – dB – K5 – M

IM2 – O – dB – K5 – M

Product configuration (B: basic type; M: integral type; Y: integration type ...)
Signal code (KS: A set of fully open and fully close dry contact feedback; T3-4~20 mA input and feedback ...)
Color code (B: black; Y: yellow; G: gray; A: blue ...)
Voltage code (a: AC 24 V; I: AC 24 V/1 ph; O: 380 V/3/ph ...)
Control type (I: Modulating type; O: on/off; Mb-Modbus ...)
Torque code (Please refer to the actuator parameter chart ...)
Product series (SFM: multi-stage gear structure small size actuator ...)
(SM: Planetary gear structure with large torque actuators. Manual without clutch ...)
(IM: Planetary gear structure with large torque actuators. Manual without clutch ...)

ESB2 – 0 – dB – K5 – M

Product configuration (B: basic type; M: integral type; Y: integration type ...)
Signal code (KS: A set of fully open and fully close dry contact feedback; T3-4~20 mA input and feedback ...)
Color code (B: black; Y: yellow; G: gray; A: blue ...)
Voltage code (a: AC 24 V; I: AC 24 V/1 ph; O: 380 V/3/ph ...)
Control type (I: Modulating type; O: on/off; Mb-Modbus ...)
Torque code (Please refer to the actuator parameter chart ...)
Product series (ESB: Ex d IIB T4/T6 series explosion-proof electric actuators)
ESC: Ex d IIB T4/T6 series explosion-proof electric actuators
ESCG: Ex d IIB T4/T6 series explosion-proof electric actuators (Modulating types under 100 N.m)
ESCJ: Ex d IIB T4/T6 series intelligent type, super intelligent type explosion-proof electric actuators



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RoHS REACH