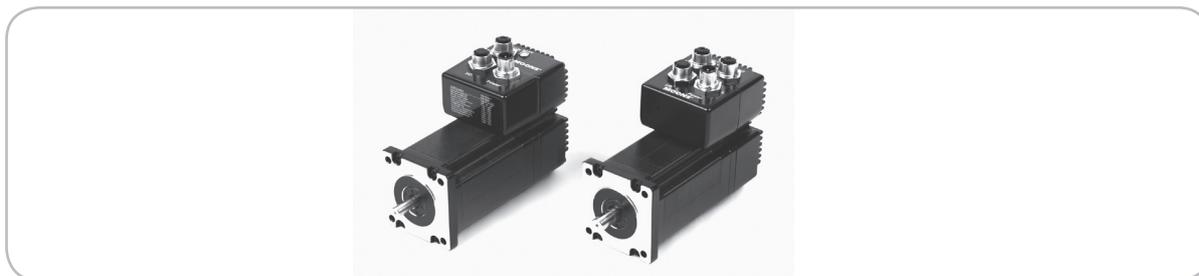


## IP65 Type Integrated Stepper Motor-SWM Series



**Drive** + **Motor** + **Controller**

The SWM is an integrated Drive+Motor+Controller with IP65 of ingress protection against dust and water, fusing step motor and drive technologies into a single device, offering savings on space, wiring and cost over conventional motor and drive solutions.

- ✓ Advanced Current Control
- ✓ Anti-Resonance
- ✓ Torque Ripple Smoothing
- ✓ Microstep Emulation
- ✓ Stall Detection and Stall Prevention

### ■ Features

#### Anti-Resonance

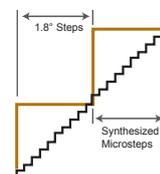
Step motor systems have a natural tendency to resonate at certain speeds. The SWM integrated motors automatically calculate the system's natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also improves settling times.



**Provides better motor performance and higher speeds**

#### Microstep Emulation

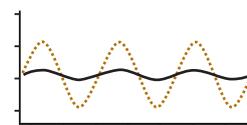
With Microstep Emulation, low resolution systems can still provide smooth motion. The drive can take low resolution step pulses and create fine resolution motion.



**Delivers smoother motion in any application**

#### Torque Ripple Smoothing

All step motors have an inherent low speed torque ripple that can affect the motion profile of the motor. By analyzing this torque ripple the system can apply a negative harmonic to counter this effect. This gives the motor much smoother motion at low speed.



**Produces smoother motion at lower speeds**

#### Command Signal Smoothing

Command Signal smoothing can soften the effect of immediate changes in velocity and direction, making the motion of the motor less jerky. An added advantage is that it can reduce the wear on mechanical components.



**Improves smoother system performance**

Step-Servo

Integrated TSM

Integrated SSM

IP65 Integrated TXM

Motor & Drive SS

IP65 Integrated STM-R

With Controller STM

IP65 With Controller SWM

Pulse Input SRAC

AC Input With Controller STAC

DC Input Pulse Input SR

DC Input With Controller ST

3-Phase Stepper Drive AC Input

DC Input

2-Phase Stepper Motor

3-Phase

Power Supplies

Accessories Cables

Software

Appendix Glossary

### Dynamic Current Control

Allows for three current settings to help the motor run cooler and reduce power consumption.

- Running Current - the current the drive will deliver for continuous motion.
- Accel Current - the current the drive will deliver when accelerating or decelerating.
- Idle Current - reduces current draw when motor is stationary.

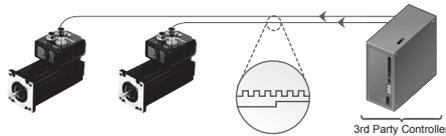
**System runs cooler**

### Stall Detection & Stall Prevention

The optional encoder detects the rotor's position to provide Stall Detection and Stall Prevention functions.

## Control Options

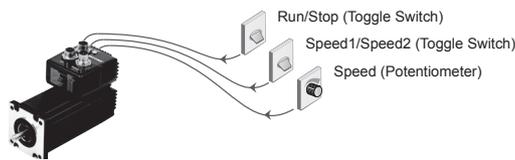
### Step & Direction



**S**

- Step & Direction
- CW & CCW pulse
- A/B quadrature (master encoder)

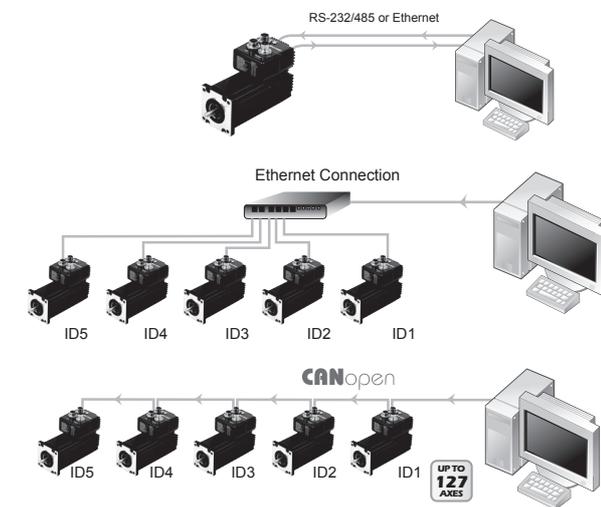
### Oscillator / Run-Stop



**S**

- Software Configuration
- Two Speeds
- Vary speed with analog input
- Joystick compatible

### Host Control



**S & Q**

- RS-232
- Accepts commands from host PC or PLC
- RS-485
- Accepts commands from host PC or PLC
  - Multi-axis capable, up to 32 axes

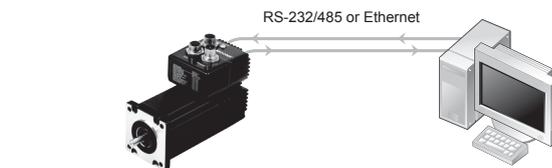
**Q & IP**

- Accepts commands from host PC or PLC
- 1000's of axes with Ethernet and Ethernet/IP

**C**

- CANopen Model
- Connect to CANopen network
  - DS301 and DSP402 protocols

### Stand Alone Programmable



**Q & IP**

- Comprehensive text based language
- Download, store & execute programs
- High level features: multi-tasking, conditional programming and math functions
- Host interface while executing stored programs

## SWM24 - IP65 controller type integrated step motor

### ■ Specifications

Power Amplifier	
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 20 KHz
Output Torque	SWM24□-3□□: Up to 2.4N•m
Power Supply	External 12 - 70 volt power supply required
Protection	Over-voltage, under-voltage, over-temp, internal motor shorts (phase-to-phase, phase-to-ground)



CE RoHS

Controller	
Microstep Resolution	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
Encoder Feedback	Optional 4000 counts/rev encoder feedback
Speed Range	Speeds up to 3000 rpm
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Modes of Operation	SWM24S: Step & direction, CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands(SCL) SWM24Q: All SWM24S modes of operation plus stored Q program execution SWM24C: CANopen slave node plus stored Q Program execution SWM24IP: All SWM24Q modes of operation plus EtherNet/IP industrial network communications
Digital Input SF and QF models	Adjustable bandwidth digital noise rejection filter on all I/O points configured as inputs <b>IN1+/-</b> : optically isolated, 5-24 volts, minimum pulse width 250 ns., maximum pulse frequency 2 MHz Function: Step, CW step, A quadrature (encoder following), CW jog, start/stop (oscillator mode), Enable or general purpose input <b>IN2+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 250 ns, Maximum pulse frequency = 2 MHz Function: Direction, CCW step, B quadrature (encoder following), CCW jog, direction (oscillator mode), alarm/fault reset or general purpose input <b>IN3+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 100 µs, Maximum pulse frequency = 10 KHz Function: CW limit, Enable, speed 1/speed 2 (oscillator mode) or general purpose input <b>IN4+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 100 µs, Maximum pulse frequency = 10 KHz Function: CCW limit, alarm/fault reset or general purpose input
Digital Input S/Q Ethernet models	Adjustable bandwidth digital noise rejection filter on all inputs <b>STEP+/-</b> : optically isolated, 5-24 volts, minimum pulse width 250 ns., maximum pulse frequency 2 MHz Function: Step, CW step, A quadrature (encoder following), CW limit, CW jog, start/stop (oscillator mode), or general purpose input <b>DIR+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 250 ns, Maximum pulse frequency = 2 MHz Function: Direction, CCW step, B quadrature (encoder following), CCW limit, CCW jog, direction (oscillator mode), or general purpose input <b>EN+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 100 µs, Maximum pulse frequency = 10 KHz Function: Enable, alarm/fault reset, speed 1/speed 2 (oscillator mode), or general purpose input
Digital Input C models	Adjustable bandwidth digital noise rejection filter on all inputs <b>IN1+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 250 ns, Maximum pulse frequency = 2 MHz Function: CW limit, CW jog, or general purpose input <b>IN2+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 250 ns, Maximum pulse frequency = 2 MHz Function: CCW limit, CCW jog, or general purpose input <b>IN3+/-</b> : Optically isolated, 5-24 volt. Minimum pulse width = 100 µs, Maximum pulse frequency = 10 KHz Function: general purpose input
Digital Output	<b>OUT+/-</b> : Optically isolated, 30V/100 mA max. Functions: Fault, brake, motion, tach, and general purpose programmable
Analog Input	AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits. (Not present on SWM24C).
Communication	S/Q Model: RS-232, RS-485 or Ethernet C Model: CANopen&RS-232 IP Model: Ethernet

Physical	
Ambient Temperature	0 - 40°C (32 - 104°F) when mounted to a suitable heat sink
Humidity	90% non-condensing
Mass	SWM24□-3□□: 1800 g
Rotor Inertia	SWM24□-3□□: 900 g•cm <sup>2</sup>

Step-Servo

Integrated TSM

Integrated SSM

IP65 Integrated TXM

Motor & Drive SS

Integrated Stepper Motor STM-R

With Controller STM

IP65 With Controller SWM

Pulse Input SRAC

AC Input With Controller STAC

Pulse Input SR

DC Input With Controller ST

AC Input

DC Input

2-Phase

3-Phase Stepper Drive

2-Phase Stepper Motor

3-Phase

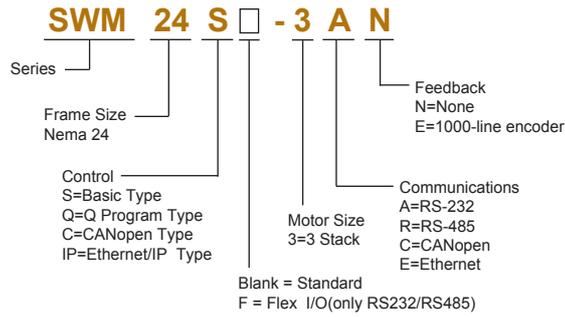
Power Supplies

Cables

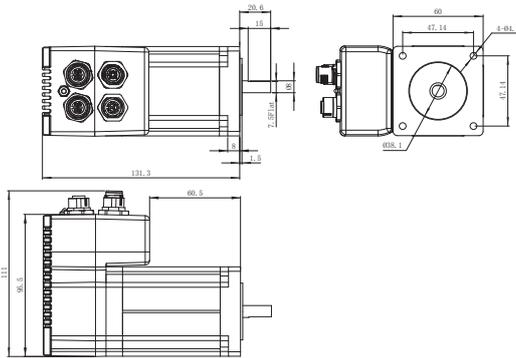
Software

Glossary

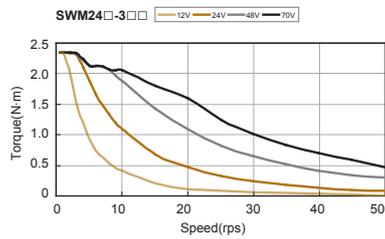
## ■ Numbering System



## ■ Dimensions (Unit:mm)



## ■ Torque Curves



## ■ Ordering Information

Model	Torque	Control	Encoder	RS-232	RS-485	CANopen	Ethernet	Daisy Chain	
SWM24SF-3AN	2.4N·m	S		✓					
SWM24SF-3AE			✓	✓					
SWM24SF-3RN					✓				✓
SWM24SF-3RE			✓	✓					✓
SWM24S-3EN			✓					✓	
SWM24S-3EE			✓					✓	
SWM24QF-3AN		Q		✓					
SWM24QF-3AE			✓	✓					
SWM24QF-3RN					✓				✓
SWM24QF-3RE			✓	✓					✓
SWM24Q-3EN			✓					✓	
SWM24Q-3EE			✓					✓	
SWM24C-3CN		C					✓		✓
SWM24C-3CE			✓				✓		✓
SWM24IP-3EN		IP						✓	
SWM24IP-3EE			✓					✓	