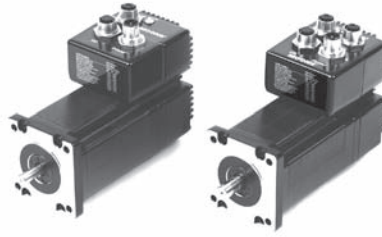


IP65 Type Integrated Stepper Motor-SWM Series



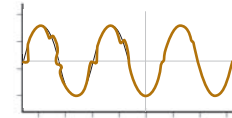
- ✓ Advanced Current Control
- ✓ Anti-Resonance
- ✓ Torque Ripple Smoothing
- ✓ Microstep Emulation
- ✓ Stall Detection and Stall Prevention

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.

■ Features

Anti-Resonance

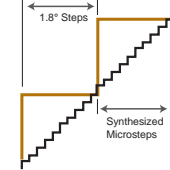
Step motor systems have a natural tendency to resonate at certain speeds. The SWM integrated motors automatically calculate the system's natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also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



Provides better motor performance and higher speeds

Microstep Emulation

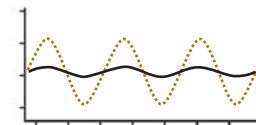
With Microstep Emulation, low resolution systems can still provide smooth motion. The drive can take low resolution step pulses and create fine resolution motion.



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

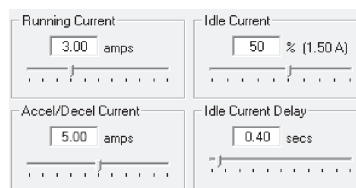
Efficient Integrated TSM
 Integrated SSM
 IP65 Integrated TXM
 Motor & Drive RS
 Motor & Drive SS
 Pulse Input STM-R
 With Controller STM
 IP65 With Controller SWM
 Pulse Input SRAC
 With Controller STAC
 Pulse Input SR
 Field Bus STF
 With Controller ST
 AC Input
 DC Input
 AC Input
 DC Input
 2-Phase
 3-Phase
 UL
 Power Supplies
 Cables
 Software
 Glossary

Step-Servo
 Integrated Stepper Motor
 2-Phase Stepper Drive
 3-Phase Stepper Drive
 Stepper Motor
 Accessories
 Appendix

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.



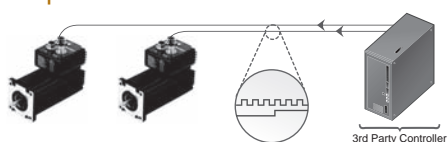
System runs cooler

Stall Detection & Stall Prevention

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

Control Options

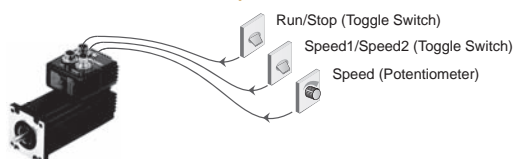
Step & Direction



S

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

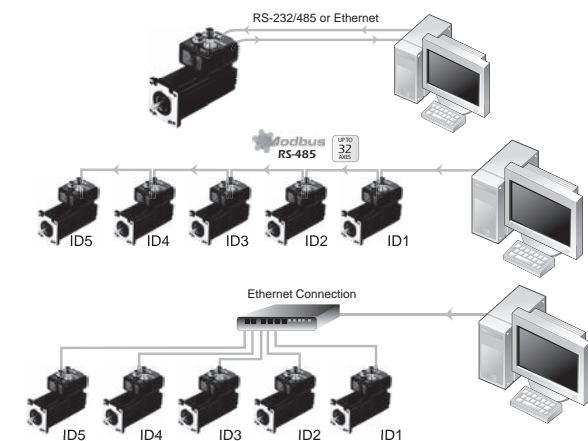
Oscillator / Run-Stop



S

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

Host Control



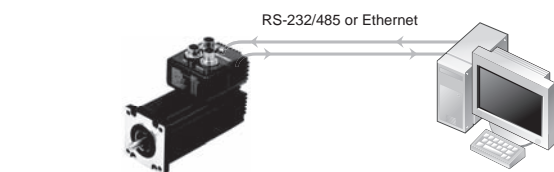
S & Q

- RS-232
 - Accepts commands from host PC or PLC
- RS-485 or Modbus/RTU network
 - 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

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

Efficient Integrated TSM	Motor & Drive RS	Motor & Drive SS	IP65 Integrated TSM	IP65 Motor & Drive STM-R	IP65 Motor & Drive STM	IP65 Motor & Drive SWM	AC Input SRAC	2-Phase Stepper Drive STAC	DC Input SR	DC Input STF	DC Input ST	3-Phase Stepper Drive AC Input	DC Input ID1-ID5	2-Phase Stepper Drive ID1-ID5	3-Phase Stepper Drive ID1-ID5	UL	Power Supplies	Cables	Software	Glossary
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SWM24 - IP65 controller type integrated stepper 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)



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/SF: Step & direction, CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands(SCL) SWM24Q/QF: All SWM24S/SF modes of operation with stored Q program execution SWM24IP: EtherNet/IP industrial network communication plus Q Program execution
Digital Input SF and QF models	Adjustable bandwidth digital noise rejection filter on all I/O points configured as inputs IN1+/- : 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 IN2+/- : 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 IN3+/- : Optically isolated, 5-24 volt. Minimum pulse width = 50 μs, Maximum pulse frequency = 10 KHz Function: CW limit, Enable, speed 1/speed 2 (oscillator mode) or general purpose input IN4+/- : Optically isolated, 5-24 volt. Minimum pulse width = 50 μs, Maximum pulse frequency = 10 KHz Function: CCW limit, alarm/fault reset or general purpose input
Digital Output SF/QF models	OUT1+/- : Optically isolated, 30V/100 mA max. Functions: Fault, brake, motion, tach, and general purpose programmable OUT2+/- : Optically isolated, 30V/100 mA max. Functions: Fault, brake, motion, tach, and general purpose programmable OUT3+/- : Optically isolated, 30V/100 mA max. Functions: Fault, brake, motion, tach, and general purpose programmable OUT4+/- : Optically isolated, 30V/100 mA max. Functions: Fault, brake, motion, tach, and general purpose programmable
Digital Input S/Q Ethernet models	Adjustable bandwidth digital noise rejection filter on all inputs STEP+/- : 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 DIR+/- : 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 EN+/- : Optically isolated, 5-24 volt. Minimum pulse width = 50 μs, Maximum pulse frequency = 10 KHz Function: Enable, alarm/fault reset, speed 1/speed 2 (oscillator mode), or general purpose input
Digital Input S/Q Ethernet models	OUT+/- : 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
Communication	SF/QF Type: RS-232, RS-485 or Modbus/RTU S/Q Type: Ethernet TCP or UDP IP Type: EtherNet/IP

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 ²

■ Connection interface

Power Port			RS-232 Communication Port		
	Pin.	Description		Pin.	Description
	1	Power Supply+		1	Data Receive RX
	2	Power Supply-		2	+5V 50mA
	3	Power Supply+		3	Data Transmit TX
	4	Power Supply-		4	GND
RS-485 or Modbus Communication Port			Ethernet Communication Port		
	Pin.	Description		Pin.	Description
	1	Data Receive RX+		1	Data Transmit TX+
	2	Data Receive RX-		2	Data Receive RX+
	3	Data Transmit TX+		3	Data Transmit TX-
	4	Data Transmit TX-		4	Data Receive RX-
5	GND				

I/O Port				
SF&QF Type		S/Q Ethernet Type		
Pin.	Description	Pin.	Description	
1	I/O1+	1	STEP+	
3	I/O1-	3	STEP -	
5	I/O2+	5	DIR+	
8	I/O2-	8	DIR-	
6	I/O3+	6	EN+	
4	I/O3-	4	EN-	
11	I/O4+	11	OUT +	
12	I/O4-	12	OUT-	
9	+5V 50mA	9	+5V 50mA	
2	N/C	2	N/C	
10	AIN	10	AIN	
7	GND	7	GND	

Efficient
Integrated
TSM

Integrated
SSM

Step-Servo
IP65
Integrated
TXM

Motor & Drive
RS

Motor & Drive
SS

Pulse Input
STM-R

With Controller
STM

IP65
With Controller
SWM

Pulse Input
SRAC

AC Input
With Controller
STAC

Pulse Input
SR

Field Bus
STF

DC Input
With Controller
ST

AC Input
3-Phase Stepper Drive

DC Input
3-Phase Stepper Drive

2-Phase
Stepper Motor

3-Phase
Stepper Motor

UL

Power Supplies

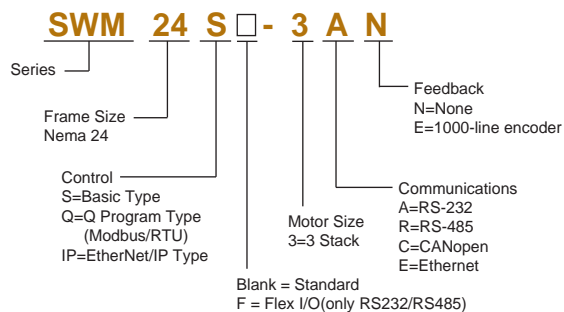
Cables

Software

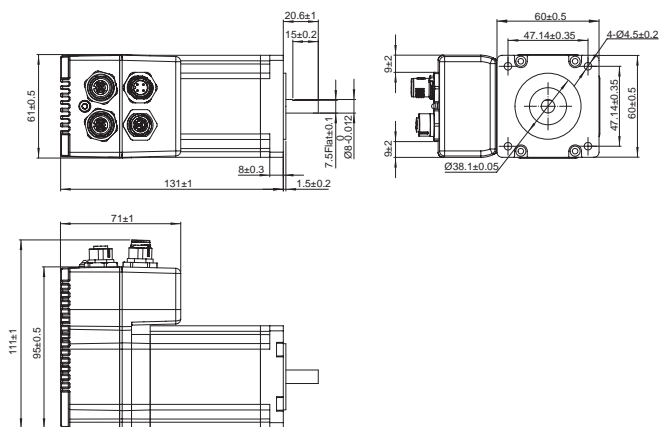
Glossary

Appendix

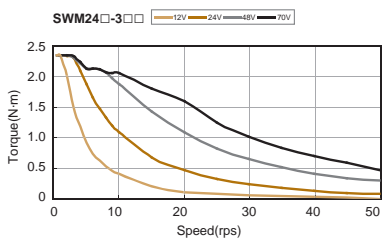
■ Numbering System



■ Dimensions(Unit:mm)



■ Torque Curves



■ Ordering Information

Model	Torque	Control	Encoder	RS-232	RS-485	Modbus/RTU	Ethernet	EtherNet/IP	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		✓						✓		
SWM24IP-3EN			IP					✓	✓	
SWM24IP-3EE		✓						✓	✓	