Ever Stepper Drives

The Titanio family of drives from Ever Motion Solutions (formerly Ever Elettronica) are high performance vector stepper drives that provide industry-leading quality and control. The drives are available with high speed pulse input or EtherCAT control modes and available in Open Loop (no encoder feedback) and Closed Loop (motor-mounted encoder provides position feedback to the drive). Like most Closed Loop stepper drives, Ever's Titanio drives can alert the upper control system if a motor stalls (Stall Detection). However, the Ever Titanio drives also have Stall Detection capability in Open Loop control mode: the drive uses the motor's back EMF to monitor motor movement. This means the Titanio drives can detect and report Stall Detection without encoder feedback.

The Titanio drive technology is based on ELSE – Error Less Servo Efficient – technology pioneered by Ever. ELSE provides precise sinusoidal stepper motor current control. ELSE is built on the f4d2 (Fast Forward Feed Full Digital Drive) technology. The proprietary and patented f4d2 algorithms reduce the parasitic phase current harmonics that cause unnecessary motor heating and noisy/ inefficient motor operation.

Features

- ELSE® (**E**rror**L**ess **S**ervo **E**fficient) step loss detection without encoder
- Quiet and smooth operation
- 36 month warranty
- Closed Loop and Open Loop models
- Protection against short circuit and open circuit
- Alarms for over/under voltage, temperature, short circuit
- Basic setup configured by DIP switches or free Ever Studio software

The breakthrough of ELSE technology and the f4d2 algorithms result in greatly improved phase current control and near "stepless" operation of stepper motors. The benefits of better and smoother current control include:

- drastic reduction of motor noise
- extremely smooth movement of the motor, regardless of microstep resolution
- significant damping of motor vibrations and resonances
- increased positioning accuracy
- better and more constant torque output at every rotational speed
- less heating and higher efficiency of the motor and drive system
- all drives with ELSE technology also have BEMF stall detection, with or without encoder feedback

For more information on f4d2: https://www.everelettronica.com/en/technologies/f4d2-fast-forward-feed-full-digital-drive

For more information on ELSE: https://www.everelettronica.com/en/technologies/-else-technology-for-different-type-of-motors

For more information on Closed Loop stepper technology: https://www.everelettronica.com/en/technologies/closed-loop-of-torque-speed-and-position-systems

The Titanio drives are available in models with complete drive setup using DIP switches only and models that can be fine-tuned and set up with free Ever Studio software.

Ever Stepper Drive Specifications

Ever High Speed Pulse Input Steppers – Drive Feature Comparison			
Drive Model	**LW4D3070N2I1-00**	**LW3D3070N0A1-00**	**LW3A9030N2A1-00**
Price	$105.00	$205.00	$290.00
Drawing	PDF	PDF	PDF
Drive Type	2-phase digital stepper drive for hybrid stepper motors		
Supply Voltage	24–75 VDC	24–80 VDC	100–240 VAC
Pulse Input Type	Differential, Single-ended		
Step Input Modes	Differential, Single-ended, AB Quadrature	Differential, Single-ended	
Digital Input Voltage	5–24 VDC	2–24 VDC	5–24 VDC
PPR Range	200–25600 (DIP switch) 200–65536 (software)	200–51200 (DIP switch)	200–2000 (DIP switch) 200–65536 (software)
Motor Output Current Range	0.0–7.1 A/ph rms 0.0–10.0 A/ph peak	1.7– 7.1 A/ph rms 2.4–10.0 A/ph peak	0.0–3.0 A/ph rms 0–4.2 A/ph peak
Digital Output	2 optocoupled, 5–24 VDC, 100mA max NPN or PNP for Alarm and In Position	1 optocoupled, 24VDC, 400mA max, , NPN or PNP for Alarm	1 optocoupled, 24VDC, 400mA max PNP or NPN for Alarm
Open or Close Loop	Open or Closed	Open	Open
Safe Torque Off	No	No	No
Self-test Capable	Software-based (internal indexing)	Pulse Input Test (LEDs signal if the incoming pulse rate is 0Hz, <1kHz, or ≥1kHz))	Software-based (internal indexing)
Special Features	Advanced software setup	–	Basic software setup

Note: Many drives require a connector kit and/or cable kit. Please see the table on the next page.

Ever EtherCAT Steppers – Drive Feature Comparison					
Drive Model	**SW3D2042H241-01**	**SW3A9030H241-21**	**SW4D2042H241-00**	**SW4A3070H241-00**	**SW5A5080H221-30**
Price	$189.00	$430.00	$245.00	$315.00	$515.00
Drawing	PDF	PDF	PDF	PDF	PDF
Drive Type	2-phase digital stepper drive for hybrid stepper motors				
Supply Voltage	12–48 VDC	100–240 VAC, single phase	12–48 VDC	18–56 VAC 24–48 VDC	85–120 VAC single phase
Pulse Input Type	N/A (EtherCAT connection)				
Step Input Modes	N/A (EtherCAT connection)				
Digital Input Voltage	5–24 VDC NPN, PNP, or Line Driver 5MHz		2–24 VDC NPN, PNP, or Line Driver 2MHz		
PPR Range	200–65536 (set via EtherCAT)				
Motor Output Current Range	0–4.2 A/ph rms 0–6.0 A/ph peak	0–3.0 A/ph rms 0–4.2 A/ph peak	0–4.2 A/ph rms 0–6.0 A/ph peak	0.0–7.0 A/ph rms 0.0–10.0 A/ph peak	0–8.0 A/ph rms 0–11.3 A/ph peak
Digital Output	2 optocoupled outputs, PNP, 24VDC, 100mA, Fmax 1kHz	2 optocoupled outputs, PNP, 24VDC, 100mA	2 optocoupled outputs, PNP, 24VDC, 100mA	2 optocoupled outputs, PNP, 24VDC, 100mA	2 optocoupled outputs 24VDC, 100mA, Fmax 500kHz 1 optocoupled output 24VDC, 1.3A, Fmax 1kHz
Open or Close Loop	Open	Open	Open or Closed	Open or Closed	Open or Closed
Safe Torque Off	No	Yes	No	No	Yes
Self-test Capable	Software-based (internal indexing)				
Special Features	Advanced software setup via Ever Studio				

Note: Many drives require a connector kit and/or cable kit. Please see the table on the next page.

Ever Stepper Drive Cable and Connection Requirements

Each Ever stepper drive requires connection of incoming power supply, outgoing motor power, I/O wiring (if used), and encoder feedback (if using Closed Loop).

LW3x drives from Ever Motion Solutions come with all relevant connectors. The other drives require purchase of either a connector kit or individual cables. See the table below for the applicable connectors/cables for each drive.

Some connector kits contain loose crimp pins and connectors. For those kits, Ever also provides pre-made cables for power, motor and feedback. These are a convenient alternative to crimping pins and assembling connectors.

Ever Steppers – Cable and Connection Requirements

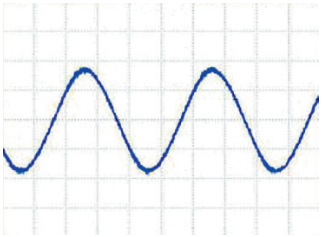
Drive	*Connector Kit*	*Cable Kit (Power, Motor, Feedback)*	*Power Cables*	*Motor Cables*	*Feedback Cables*	*I/O Connections*	*Optional Programming Cable*
LW4D3070N2I1-00	LW4D3KIT-C0[1]	LW4D3KIT-050[2]	CBL/0340-050 CBL/0190-100	CBL/0191-050 CBL/0191-100	CBL/0341-050 CBL/0192-100	Included in LW4D3KIT-C0[1] or LW4D3KIT-050[2]	EVER-PGM-1
LW3D3070N0A1-00	Connectors included w/drive[3]	n/a	Connectors included w/drive[3] Replacement connector: LW3D-CON-A	Connectors included w/drive[3] Replacement connector: LW3D-CON-A	n/a	Connectors included w/drive[3] Replacement connector: LW3D-CON-B	n/a
LW3A9030N2A1-00	Connectors included w/drive[4]	n/a	Connectors included w/drive[4] Replacement connector: LW3A-CON-A	Connectors included w/drive[4] Replacement connector: LW3A-CON-A	n/a	Connectors included w/drive[4] Replacement connector: LW3A-CON-B	EVER-PGM-2
SW4D2042H241-00	SW4D2KIT-C1[5]	n/a	CBL/0340-050 CBL/0190-100	CBL/0191-050 CBL/0191-100	CBL/0341-050 CBL/0192-100	Connectors included in SW4D2KIT-C1[5]	EVER-PGM-1
SW3D2042H241-01	SW3D2KIT-C1[5]	n/a	CBL/0340-050 CBL/0190-100	CBL/0191-050 CBL/0191-100	n/a	Connectors included in SW3D2KIT-C1[5]	EVER-PGM-1
SW3A9030H241-21	SW3A93KIT-C1[4]	n/a	Connectors included in SW3A93KIT-C1[4]	Connectors included in SW3A93KIT-C1[4]	n/a	Connectors included in SW3A93KIT-C1[4]	EVER-PGM-2
SW4A3070H241-00	SW4A3KIT-C1[5]	n/a	CBL/0340-050 CBL/0190-100	CBL/0191-050 CBL/0191-100	CBL/0341-050 CBL/0192-100	Connectors included in SW4A3KIT-C1[5]	EVER-PGM-1
SW5A5080H221-30	SW5A5KIT-C1[4]	n/a	Connectors included in SW5A5KIT-C1[4]	Connectors included in SW5A5KIT-C1[4]	Connectors included in SW5A5KIT-C1[4]	Connectors included in SW5A5KIT-C1[4]	EVER-PGM-2

1 - Includes crimp pin/connectors (power, motor, feedback) and screw terminal I/O connector.
2 - Kit with 0.5m cables (power, motor, feedback) and screw terminal I/O connector. Purchase cable kit or connector kit, not both.
3 - Screw terminal connectors.
4 - Screw terminal connectors and cage clamp connectors.
5 - Includes crimp pin/connectors (power, motor, feedback) and cage clamp I/O connector.

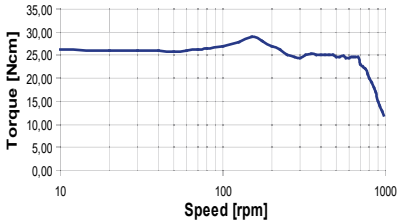
Ever Stepper Drive Feature Overview

Vector Control

The sinusoidal phase current with "ELSE" technology keeps the motor torque constant allowing smooth and noiseless movements.



Current

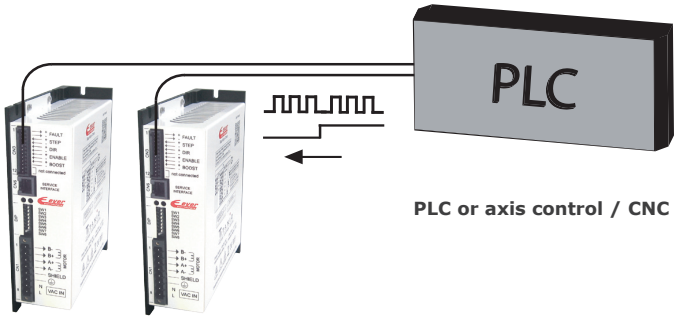


Torque

Easy Drive Configuration

Pulse and Direction Drives

- Set motor current value using dip-switches. Option to set motor current with Ever Studio software (LW3A and LW4D)
- Select step angle using roto-switches. Option to set motor current with Ever Studio software. Step angles have been emulated through software to maintain compatibility with traditional drives. Current regulation is always sinusoidal.
- Enable motor stall detection with DIP switches (LW3D, LW3A) or software (LW4D).
  By reading the motor BEMF, LWx drivers detect step loss without encoder input. Drive displays alarm status with Fault digital OUT and an LED sequence.
- DIP switches to select Step/Direction or CW/CCW control mode.
- ENABLE input can be set for active high or active low.
- 30% or 70% automatic current reduction (when motor is not moving).
- Enable "Clock Test" function during drive installation to show the presence of the high speed pulse signals via status LED flashes (LW3D).

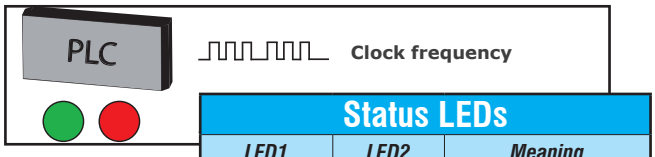


PLC or axis control / CNC

EtherCAT Drives

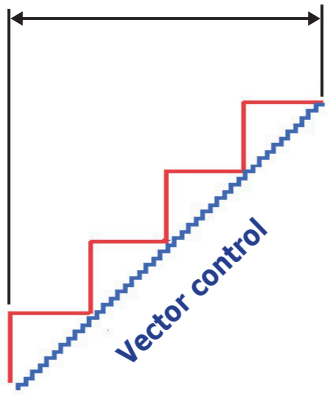
- Download Ever Studio to configure and commission (test run/jog/index) the drive and motor without needing the EtherCAT master connected.
- Download each drive's ESI file from the drive's Item Page. The .xml configuration file will import into the EtherCAT Master to control the drive on the EtherCAT network.

Master Slaves



Status LEDs		
LED1	*LED2*	*Meaning*
Green	Red	No incoming pulses
Green flash	Yellow	Incoming pulses < 1kHz
Green flash	Red	Incoming pulses > 1kHz

Even at 1/4 stepping, Ever's vector current control results in smooth motor operation and low motor temperatures



EtherCAT Stepping Drives

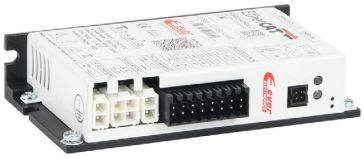
SW3D2042H241-01 and SW3A9030H241-21 EtherCAT Stepper Drives

The SW3 EtherCAT drives from Ever Motion Solutions (formerly Ever Elettronica) are high-performance vector stepper drives from Ever's Titanio family. The SW3s are two-phase stepper drives that operate in Open Loop mode (no motor encoder required). The SW3D drive accepts an incoming voltage of 12-48VDC, and can power hybrid bipolar stepper motors with up to 6.0A peak output current. The SW3A drive accepts an incoming voltage of 100-240VAC (single phase), and can power hybrid bipolar stepper motors with up to 4.2A peak output current.

The stepper drive utilizes Ever's ELSE (Error Less Servo Efficient) technology that supplies the motor with sinusoidal current, resulting in reduced harmonic currents, lower motor temperature, and smoother/quieter motor operation. The drives have built-in protections that include overcurrent, under/over voltage, overheating, and motor output short circuit protection.

Ever's configuration software, Ever Studio, can be used to configure the drives for phase currents, step angles (microsteps), tuning parameters, etc. The software can also assist in commissioning the drives by commanding jogging and internal indexing without the EtherCAT master connected. There is also a software-based oscilloscope to assist in troubleshooting. Ever Studio is available as a free download from AutomationDirect (SW3D requires USB-serial programming cable EVER-PGM-1; SW3A requires USB-serial programming cable EVER-PGM-2).

Please download the drive's ESI file from the drive Item Page at AutomationDirect.com.



SW3D2042H241-01

SW3A9030H241-21

CAUTION: USE ONLY HIGH VOLTAGE STEPPER MOTORS, LIKE STP-MTRAC-XXXXX AND STP-MTRACH-XXXXX, WITH A HIGH-VOLTAGE STEPPER DRIVE. THE AC INPUT RESULTS IN HIGH VOLTAGE BEING APPLIED TO THE MOTOR. STANDARD LOW-VOLTAGE STEPPER MOTORS (STP-MTR-XXXXX) CAN BE DAMAGED.

SW3x Drive Specifications

Drive Model	SW3D2042H241-01	SW3A9030H241-21
Power Supply Voltage	12–48 VDC	100–240 VAC, single phase
Logic Power Supply Voltage	(optional) 12–48 VDC	n/a
Digital Input Voltage	5–24 VDC	5–24 VDC
Output current	0–4.2 A/ph rms 0–6.0 A/ph peak	0–3.0 A/ph rms 0–4.2 A/ph peak
Control mode	Fieldbus EtherCAT mode (slave)	
Power stage	H bridge bipolar chopper at 40 kHz	
Digital Inputs	4 optocoupled 5 -24 VDC NPN, PNP, or Line Driver 5kHz	
Digital Outputs	2 optocoupled outputs, PNP, 24VDC, 100mA, Fmax 1kHz	
Open or Closed Loop	Open Loop	
Step Resolution	Stepless control technology (65536 positions per turn)	
PPR Range	200–65536 (configurable via EtherCAT or software)	
Safety Protections	Over/Under voltage, Over Current, Over Heating, Short Circuit Phase/Phase and Phase/Ground	
Status Monitoring	Two multicolor LEDs (Run/Err)	
Operating Temperature	5 to 40 °C [41 to 104 °F]	
Storage Temperature	-25 to +55 °C [-13 to 131 °F]	
Operating Humidity	5–85 % non-condensing	
Safe Torque Off	No	Yes
Protection class	IP20	
Mounting	Wall mount	
Dimensions H x L x W	104.8 x 62.5 x 23.5 mm	180.7 x 130 x 50 mm
Weight	0.18 kg (0.4 lbs)	0.98 kg (2.15 lbs)
Agency Approvals	CE	

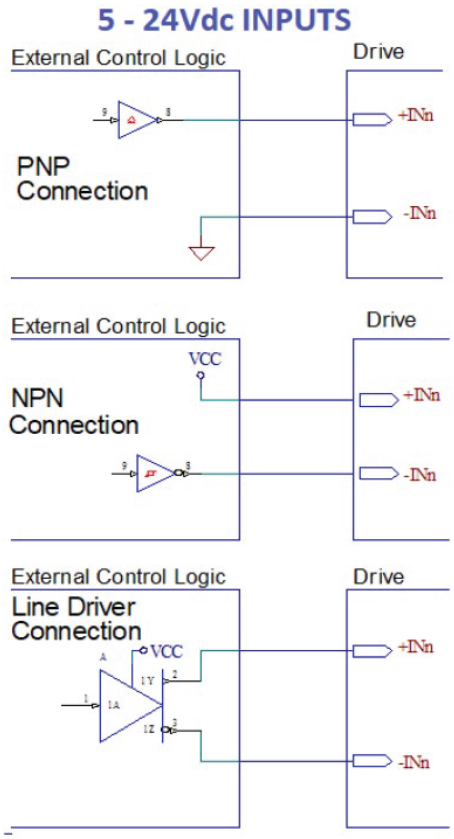
EtherCAT® Specification

Communication Standard	CoE (IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile)
Physical Layer	100BASE-TX (IEEE802.3)
Connector	RJ45 x 2
Communication Distance	Distance between nodes 100m or less
DC (Distributed Clock)	Synchronization by DC mode, minimum DC cycle: 125µs
LED Display	L/A0 & L/A1 (Link Activity) LED for EtherCAT In & Out status
CiA 402 Drive Profile	Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Cyclic Synchronous Position Mode, Cyclic Synchronous Velocity Mode, Cyclic Synchronous Torque Mode, Homing Mode, Velocity Mode, Interpolated Position Mode

SW3x Digital Input/Output Wiring

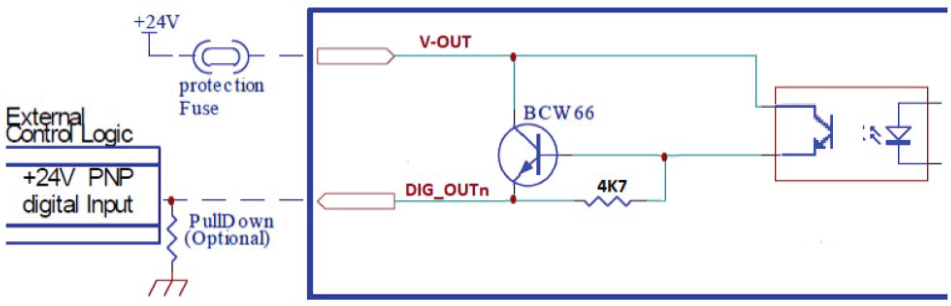
Digital Input Wiring

Differential PNP, NPN, and Line Driver type.



Digital Output Wiring

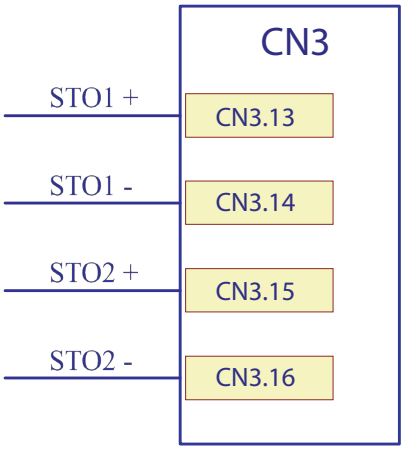
$Vout_{MAX}$ = 24VDC
$Iout_{MAX}$ = 100mA
F_{MAX} = 1kHz



SW3A Safe Torque Off (STO) Wiring

Safe Torque Off inputs (STO)

2 terminals, 24V compatible (optoisolated)



STO1	STO2	Drive Status	Motor Status
+24Vdc	+24Vdc	Enable	SW controlled
+24Vdc	Not connected	Disable	Stop for inertia
Not connected	+24Vdc	Disable	Stop for inertia
Not connected	Not connected	Disable	Stop for inertia

The drive has a safety feature that is designed to provide the Safe Torque Off (STO) function. Two inputs signlas are provided which, when not connected, prevent the upper and lower devices in the PWM outputs from being operated by the digital control core. This provides a positive OFF capability that cannot be overridden by the control firmware, or associated hardware components.
When both STO signals are activated (current is flowing in the input diodes of the optocouplers), the control core will be able to control the on/off state of the PWM outputs.

SW3A9030H241-21 Bipolar Drive Wiring

The SW3A AC drive allows high voltage AC stepper motors to be run in either Series or Parallel wiring. Only use step motors rated for a high DC bus voltage. Standard lower DC voltage step motors will be damaged when driven by this drive.

If the motor's rated parallel-wired current is not higher than the drive's rated current, wire the motor for parallel operation: a parallel wired motor has higher torque and speed than the same motor wired in series.

Example 1:

STP-MTRAC-23078 can be used with the SW3A drive wired in series or parallel (both values are within the drive's 3.0 A rms output range):

	Series	Parallel
STP-MTRAC-23078	0.71A	1.41A

Wire this motor in parallel to get more available torque and a higher max speed.

Example 2:

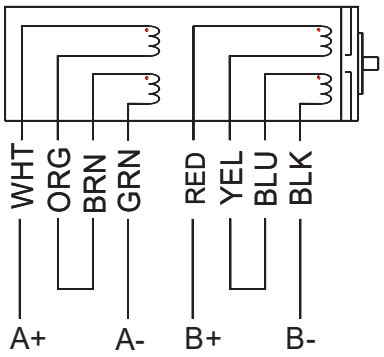
STP-MTRAC-34075 should only be used with the SW3A wired in series (the parallel-wired current exceeds the drive's 3.0 A rms max output).

	Series	Parallel
STP-MTRAC-34075	2.15A	4.3A

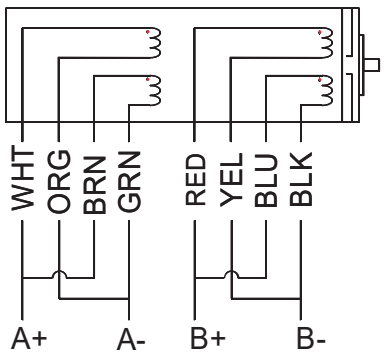
Note: Motors with rated phase currents greater than the drive maximum 3.0 A rms can be used. The resulting torque will be proportionally lower than the motor rated torque: The STP-MTRAC-42151 is rated for 6A (series wiring). Used with an SW3A drive (3.0 A rms), the motor will generate roughly 1/2 of the motor's rated torque.

STP-MTRAC-42xxx
STP-MTRACH-42xxx
STP-MTRAC-230xx(x)
STP-MTRAC-34156(x)

Bi-polar series

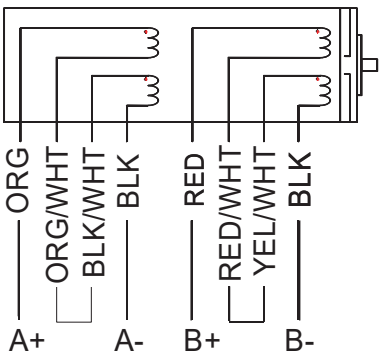


Bi-polar parallel

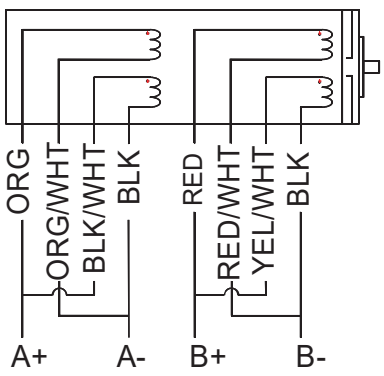


STP-MTRAC-34075(x)
STP-MTRAC-34115(x)

Bi-polar series



Bi-polar parallel



EtherCAT Stepping Drives

SW4D2042H241-00 and SW4A3070H241-00 EtherCAT Stepper Drives

The SW4 EtherCAT drives from Ever Motion Solutions (formerly Ever Elettronica) are high-performance vector stepper drives from Ever's Titanio family. The SW4s are two-phase stepper drives that can operate in either Open Loop mode (no motor encoder required) or Closed Loop mode (motor-mounted encoder provides position feedback to the drive). The SW4D drive accepts an incoming voltage of 12-48VDC, and can power hybrid bipolar stepper motors with up to 6.0A peak output current. The SW4A drive accepts an incoming voltage of 18-56VAC (can also be powered by 24-48VDC), and can supply hybrid bipolar stepper motors with up to 10.0A peak output current.

The stepper drive utilizes Ever's ELSE (Error Less Servo Efficient) technology that supplies the motor with sinusoidal current, resulting in reduced harmonic currents, lower motor temperature, and smoother/quieter motor operation. The drives have built-in protections that include overcurrent, under/over voltage, overheating, and motor output short circuit protection.

Ever's configuration software, Ever Studio, can be used to configure the drives for phase currents, step angles (microsteps), tuning parameters, etc. The software can also assist in commissioning the drives by commanding jogging and internal indexing without the EtherCAT master connected. There is also a software-based oscilloscope to assist in troubleshooting. Ever Studio is available as a free download from AutomationDirect (SW4D and SW4A require USB-serial programming cable EVER-PGM-1).

Please download the drive's ESI file from the drive Item Page at AutomationDirect.com.

SW4D2042H241-00

SW4A3070H241-00

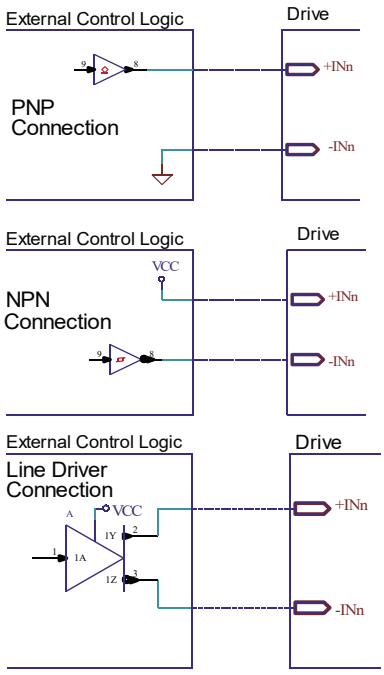
SW4x Drive Specifications		
Drive Model	***SW4D2042H241-00***	***SW4A3070H241-00***
Power Supply Voltage	12–48 VDC	18–56 VAC (Accepts 24-48 VDC)
Logic Power Supply Voltage	12–48 VDC	24–80 VDC
Digital Input Voltage	2–24 VDC	
Output current	0–4.2 A/ph rms 0–6.0 A/ph peak	0.0–7.0 A/ph rms 0.0–10.0 A/ph peak
Control mode	Fieldbus EtherCAT (slave)	
Power stage	H bridge bipolar chopper at 40 kHz	
Feedback Interface	Configurable via EtherCAT or Software	
Digital Inputs	4 optocoupled 2–24 VDC NPN, PNP, or Line Driver 2MHz	
Digital Outputs	2 optocoupled outputs, PNP, 24VDC, 100mA	
Open or Closed Loop	Can be used in Open or Closed	
Step Resolution	Stepless control technology (65536 positions per turn)	
PPR Range	200–65536 (configurable via EtherCAT or software)	
Safety Protections	Over/Under voltage, Over Current, Over Heating, Short Circuit Phase/Phase and Phase/Ground	
Status Monitoring	Two multicolor LEDs (Run/Err)	
Operating Temperature	0 to 40 °C [32 to 104 °F]	
Storage Temperature	-25 to +55 °C [-13 to 131 °F]	
Operating Humidity	5–85 % non-condensing	
Safe Torque Off	No	
Protection class	IP20	
Mounting	Wall mount	
Dimensions H x L x W	121 x 74 x 26 mm	148.8 x 82 x 30 mm
Weight	0.27 kg (0.60 lbs)	0.39 kg (0.85 lbs)
Agency Approvals	CE	

EtherCAT® Specification	
Communication Standard	CoE (IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile)
Physical Layer	100BASE-TX (IEEE802.3)
Connector	RJ45 x 2
Communication Distance	Distance between nodes 100m or less
DC (Distributed Clock)	Synchronization by DC mode, minimum DC cycle: 125µs
LED Display	L/A0 & L/A1 (Link Activity) LED for EtherCAT In & Out status
CiA 402 Drive Profile	Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Cyclic Synchronous Position Mode, Cyclic Synchronous Velocity Mode, Cyclic Synchronous Torque Mode, Homing Mode, Velocity Mode, Interpolated Position Mode

SW4D2042H241-00 Digital Input/Output Wiring

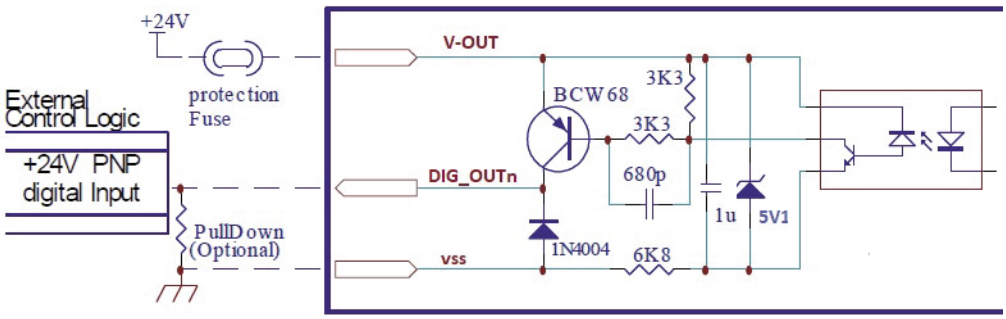
Digital Input Wiring

Differential PNP, NPN, and Line Driver type.



Digital Output Wiring

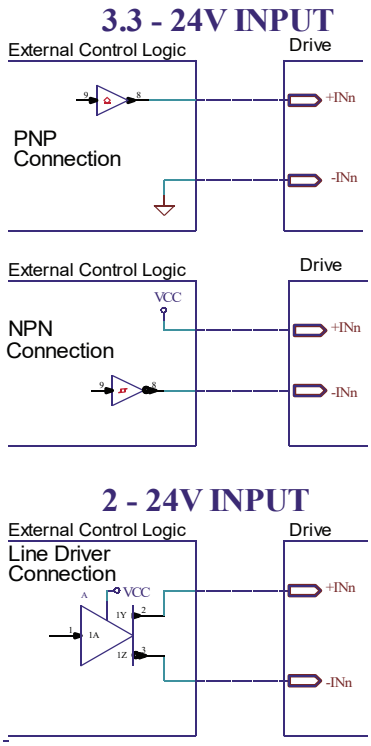
$Vout_{MAX}$ = 24VDC
$Iout_{MAX}$ = 100mA
F_{MAX} = 1kHz



SW4A3070H241-00 Digital Input/Output Wiring

Digital Input Wiring

Differential PNP, NPN, and Line Driver type.

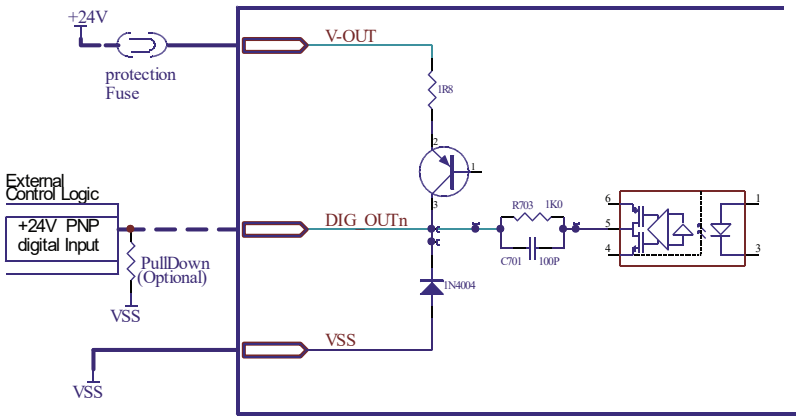


Digital Output Wiring

$Vout_{MAX}$ = 24VDC

$Iout_{MAX}$ = 100mA

F_{MAX} = 500kHz



EtherCAT Stepping Drives

SW5A5080H221-30 EtherCAT Stepper Drive

The SW5 EtherCAT drive from Ever Motion Solutions (formerly Ever Elettronica) is a high-performance vector stepper drive from Ever's Titanio family. The SW5A is a two-phase stepper drive that operates in either Open Loop mode (no motor encoder required) or Closed Loop mode (motor-mounted encoder provides position feedback to the drive). The drive accepts an incoming voltage of 85-120VAC, and can power hybrid bipolar stepper motors with up to 11.3A peak output current.

The stepper drive utilizes Ever's ELSE (Error Less Servo Efficient) technology that supplies the motor with sinusoidal current, resulting in reduced harmonic currents, lower motor temperature, and smoother/quieter motor operation. The drive has built-in protections that include overcurrent, under/over voltage, overheating, and motor output short circuit protection.

Seperate STO inputs are available to inhibit power when a safety circuit is energized. This allows power to be safely removed from the motor without having to drop power to the drive.

Ever's configuration software, Ever Studio, can be used to configure the drive for phase currents, step angles (microsteps), tuning parameters, etc. The software can also assist in commissioning the drive by commanding jogging and internal indexing without the EtherCAT master connected. There is also a software-based oscilloscope to assist in troubleshooting. Ever Studio is available as a free download from AutomationDirect (SW5A requires USB-serial programming cable EVER-PGM-2).

Please download the drive's ESI file from the drive Item Page at AutomationDirect.com.

SW5A5080H221-30

CAUTION: USE ONLY HIGH VOLTAGE STEPPER MOTORS, LIKE STP-MTRAC-XXXXX AND STP-MTRACH-XXXXX, WITH A HIGH-VOLTAGE STEPPER DRIVE. THE AC INPUT RESULTS IN HIGH VOLTAGE BEING APPLIED TO THE MOTOR. STANDARD LOW-VOLTAGE STEPPER MOTORS (STP-MTR-XXXXX) CAN BE DAMAGED.

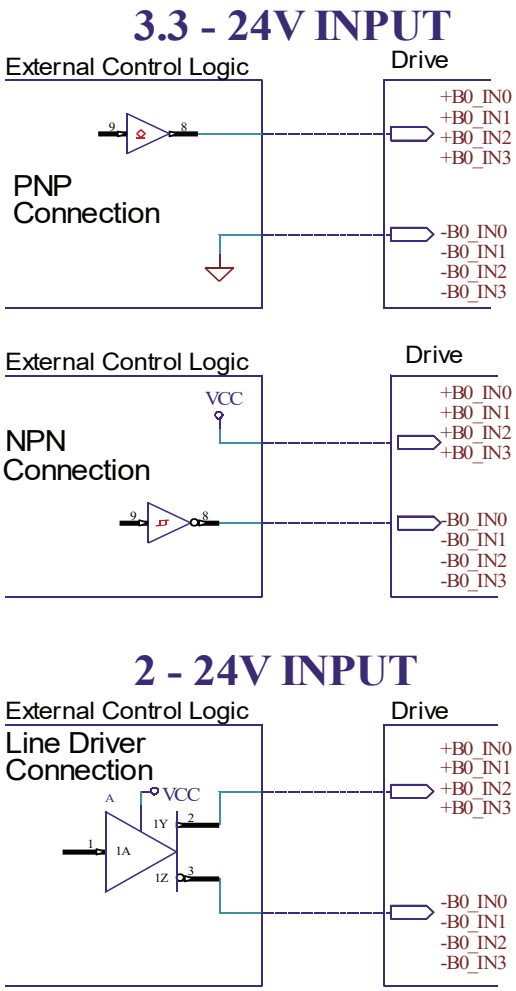
SW5A Drive Specifications	
Drive Model	***SW5A5080H221-30***
Power Supply Voltage	85–120 VAC single phase
Logic Power Supply Voltage	24VDC
Digital Input Voltage	2–24 VDC
Output current	0–8.0 A/ph rms 0–11.3 A/ph peak
Control mode	Fieldbus EtherCAT
Power stage	H bridge bipolar chopper at 40 kHz
Feedback Interface	EtherCAT CoE
Digital Inputs	4 optocoupled 2–24 VDC NPN, PNP, or Line Driver 2MHz
Digital Outputs	2 optocoupled outputs 24VDC, 100mA, Fmax 500kHz 1 optocoupled output 24VDC, 1.3A, Fmax 1kHz
Open or Closed Loop	Can be used in Open or Closed
Step Resolution	Stepless control technology (65536 position per turn)
PPR Range	200–65536 (Configurable via EtherCAT or software)
Safety Protections	Over/Under voltage, Over Current, Over Heating, Short Circuit Phase/Phase and Phase/Ground
Status Monitoring	Two multicolor LEDs (Run/Err)
Operating Temperature	5 to 40 °C [41 to 104 °F]
Storage Temperature	-25 to +55 °C [-13 to 131 °F]
Operating Humidity	5–85 % non-condensing
Safe Torque Off	Yes
Protection class	IP20
Mounting	Wall mount
Dimensions H x L x W	196.6 x 136.6 x 47 mm
Weight	1.0 kg (2.20 lbs)
Agency Approvals	CE, $_{c}$UR$_{us}$

EtherCAT® Specification	
Communication Standard	CoE (IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile)
Physical Layer	100BASE-TX (IEEE802.3)
Connector	RJ45 x 2
Communication Distance	Distance between nodes 100m or less
DC (Distributed Clock)	Synchronization by DC mode, minimum DC cycle: 125µs
LED Display	L/A0 & L/A1 (Link Activity) LED for EtherCAT In & Out status
CiA 402 Drive Profile	Profile Position Mode, Profile Velocity Mode, Profile Torque Mode, Cyclic Synchronous Position Mode, Cyclic Synchronous Velocity Mode, Cyclic Synchronous Torque Mode, Homing Mode, Velocity Mode, Interpolated Position Mode

SW5A5080H221-30 Digital Input Wiring

Digital Input Wiring

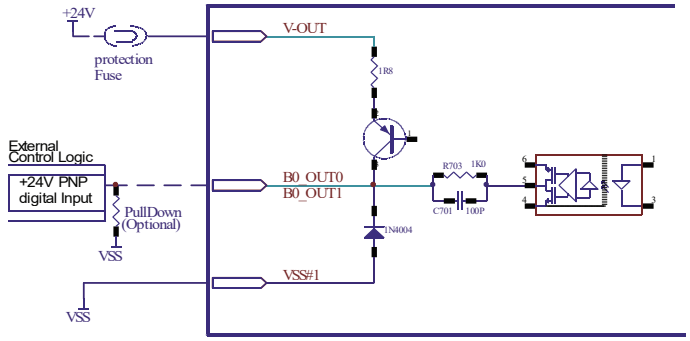
Differential PNP, NPN, and Line Driver type.



SW5A5080H221-30 Digital Output Wiring

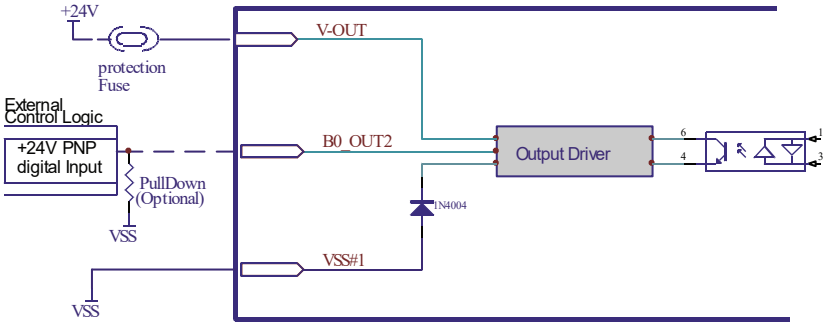
Digital Output Wiring (B0_OUT0 and B0_OUT1)

$Vout_{MAX}$ = 24VDC
$Iout_{MAX}$ = 100mA
F_{MAX} = 500kHz



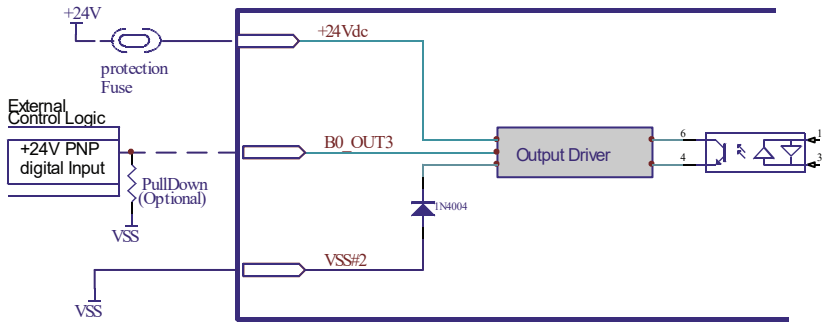
Digital Output Wiring (B0_OUT2

$Vout_{MAX}$ = 24VDC
$Iout_{MAX}$ = 1.3 A
F_{MAX} = 1kHz



Digital Output Wiring (B0_OUT3

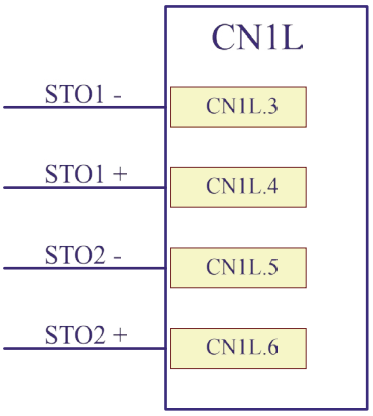
$Vout_{MAX}$ = 24VDC
$Iout_{MAX}$ = 500mA
F_{MAX} = 1kHz



SW5A5080H221-30 Safe Torque Off (STO) Wiring

Safe Torque Off inputs (STO)

2 terminals, 24V compatible (optocoupled)



STO1	STO2	Drive Status	Motor Status
+24Vdc	+24Vdc	Enable	SW controlled
+24Vdc	Not connected	Disable	Stop for inertia
Not connected	+24Vdc	Disable	Stop for inertia
Not connected	Not connected	Disable	Stop for inertia

The drive has a safety feature that is designed to provide the Safe Torque Off (STO) function as defined in IEC 61800-5-2. Two input signlas are provided which, when not connected, prevent the upper and lower devices in the PWM outputs from being operated by the digital control core. This provides a positive OFF capability that cannot be overridden by the control firmware, or associated hardware components. When both STO signals are activated (current is flowing in the input diodes of the optocouplers), the control core will be able to control the on/off state of the PWM outputs.

SW5A5080H221-30 Bipolar Drive Wiring

The SW5A AC drive allows high voltage AC stepper motors to be run in either Series or Parallel wiring. Only use step motors rated for a high DC bus voltage. Standard lower DC voltage step motors will be damaged when driven by this drive.

If the motor's rated parallel-wired current is not higher than the drive's rated current, wire the motor for parallel operation: a parallel wired motor has higher torque and speed than the same motor wired in series.

Example 1:

STP-MTRAC-34115 can be used with the SW5A drive wired in series or parallel (both values are within the drive's 8.0 A rms output range):

	Series	Parallel
STP-MTRAC-34115	2.05A	4.1A

Wire this motor in parallel to get more available torque and a higher max speed.

Example 2:

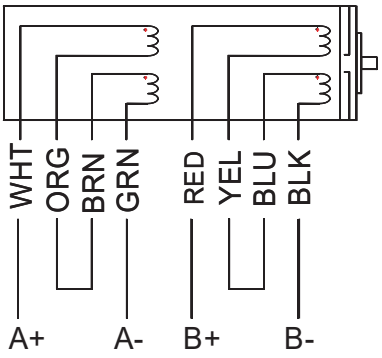
STP-MTRACH-42100 should only be used with the SW5A wired in series (the parallel-wired current exceeds the drive's 8.0 A rms max output).

	Series	Parallel
STP-MTRACH-42100	6A	12A

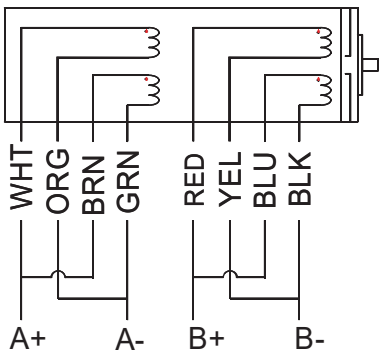
Note: Motors with rated phase currents greater than the drive maximum 8.0 A rms can be used. The resulting torque will be proportionally lower than the motor rated torque: a motor with rated current of 12A used with the SW5A drive (8.0 A rms) will generate roughly 2/3 of the motor's rated torque.

STP-MTRAC-42xxx
STP-MTRACH-42xxx
STP-MTRAC-230xx(x)
STP-MTRAC-34156(x)

Bi-polar series

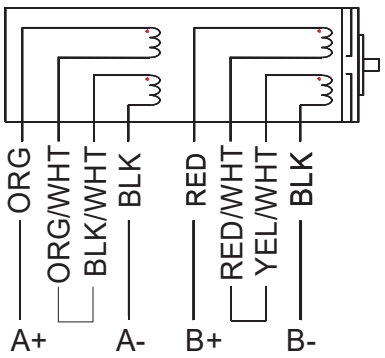


Bi-polar parallel

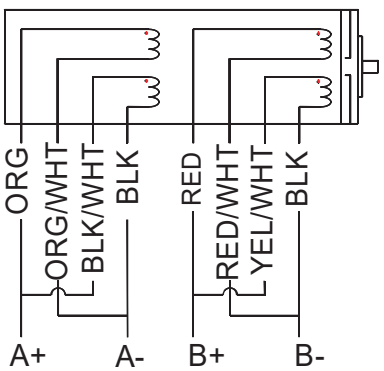


STP-MTRAC-34075(x)
STP-MTRAC-34115(x)

Bi-polar series



Bi-polar parallel



Ever Stepper Drive Accessories

Ever Stepper Drive Accessories				
Part Number	*Price*	*Description*	*Drawing Links*	*Use With*
EVER-PGM-1	$89.00	Ever Motion Solutions programming cable, USB A connector to 4-pin connector, 6ft cable length. For use with Ever Motion Solutions LW4D3070N2I1-00, SW3D2042H241-01, SW4D2042H241-00 and SW4A3070H241-00 microstepping drives.	n/a	LW4D3070N2I1-00 SW3D2042H241-01 SW4D2042H241-00 SW4A3070H241-00
EVER-PGM-2	$89.00	Ever Motion Solutions programming cable, USB A connector to RJ11, 6ft cable length. For use with Ever Motion Solutions LW3A9030N2A1-00, SW3A9030H241-21 and SW5A5080H221-30 microstepping drives.	n/a	LW3A9030N2A1-00 SW3A9030H241-21 SW5A5080H221-30
LW4D3KIT-C0	$8.00	Ever Motion Solutions connector kit, for use with Ever Motion Solutions LW4D3070N2I1-00 microstepping drive, includes (1) drive power connector, (1) motor power connector, (1) encoder connector and (1) control signal connector.	n/a	LW4D3070N2I1-00
LW4D3KIT-050	$60.00	Ever Motion Solutions cable kit, for use with Ever Motion Solutions LW4D3070N2I1-00 microstepping drive, includes (1) 1.6ft/0.5m power cable, (1) 1.6ft/0.5m motor extension cable, (1) 1.6ft/0.5m encoder cable and (1) control signal connector. Cable part numbers included are: • CBL/0340-050 • CBL/0191-050 • CBL/0341-050	n/a	LW4D3070N2I1-00
LW3D-CON-A	$11.00	Ever Motion Solutions drive/motor power connector, replacement. For use with Ever Motion Solutions LW3D3070N0A1-00 microstepping drive.	PDF	LW3D3070N0A1-00
LW3D-CON-B	$20.00	Ever Motion Solutions control signal connector, replacement. For use with Ever Motion Solutions LW3D3070N0A1-00 microstepping drive.	PDF	LW3D3070N0A1-00
LW3A-CON-A	$14.50	Ever Motion Solutions drive/motor power connector, replacement. For use with Ever Motion Solutions LW3A9030N2A1-00 microstepping drive.	PDF	LW3A9030N2A1-00
LW3A-CON-B	$28.50	Ever Motion Solutions control signal connector, replacement. For use with Ever Motion Solutions LW3A9030N2A1-00 microstepping drive.	PDF	LW3A9030N2A1-00

EVER-PGM-1

EVER-PGM-1 connection to drive

EVER-PGM-2

LW4D3KIT-C0

LW4D3KIT-050

LW3D-CON-A

LW3D-CON-B

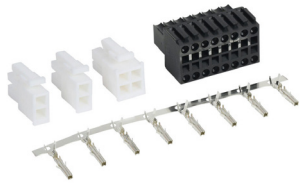
LW3A-CON-A

LW3A-CON-B

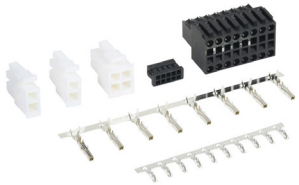
Ever Stepper Drive Accessories, *continued*

Ever Stepper Drive Accessories				
Part Number	***Price***	***Description***	***Drawing Links***	***Use With***
SW3D2KIT-C1	$7.00	Ever Motion Solutions connector kit, replacement. For use with Ever Motion Solutions SW3D2042H241-01 microstepping drive. Includes (2) drive power connectors, (1) motor power connector and (1) control signal connector.	PDF	SW3D drives
SW3A93KIT-C1	$9.00	Ever Motion Solutions connector kit, replacement. For use with Ever Motion Solutions SW3A9030H241-21 microstepping drive. Includes (1) drive power connector, (1) motor power connector and (1) control signal connector.	PDF	SW3A drives
SW4D2KIT-C1	$7.00	Ever Motion Solutions connector kit, replacement. For use with Ever Motion Solutions SW4D2042H241-00 microstepping drive. Includes (2) drive power connectors, (1) motor power connector, (1) encoder connector and (1) control signal connector.	PDF	SW4D drives
SW4A3KIT-C1	$7.00	Ever Motion Solutions connector kit, replacement. For use with Ever Motion Solutions SW4A3070H241-00 microstepping drive. Includes (2) drive power connectors, (1) motor power connector, (1) encoder connector and (1) control signal connector.	PDF	SW4A drives
SW5A5KIT-C1	$42.00	Ever Motion Solutions connector kit, replacement. For use with Ever Motion Solutions SW5A5080H221-30 microstepping drive. Includes (1) drive power connector, (1) motor power connector, (1) encoder connector and (1) control signal connector.	PDF	SW5A drives
CBL/0340-050	$22.00	Ever Motion Solutions power cable, 2-pin connector to pigtail, 1.6ft/0.5m cable length. For use with Ever Motion Solutions LW4, SW4, and SW3D series microstepping drives.	PDF	LW4, SW4, and SW3D drives
CBL/0191-050	$24.00	Ever Motion Solutions motor extension cable, 4-pin connector to pigtail, 1.6ft/0.5m cable length. For use with Ever Motion Solutions LW4, SW4, and SW3D series microstepping drives.	PDF	
CBL/0190-100	$27.00	Ever Motion Solutions power cable, 2-pin connector to pigtail, 3.2ft/1m cable length. For use with Ever Motion Solutions LW4, SW4, and SW3D series microstepping drives.	PDF	
CBL/0191-100	$32.00	Ever Motion Solutions motor extension cable, 4-pin connector to pigtail, 3.2ft/1m cable length. For use with Ever Motion Solutions LW4, SW4, and SW3D series microstepping drives.	PDF	
CBL/0341-050	$30.00	Ever Motion Solutions encoder feedback cable, 10-pin connector to pigtail, 1.6ft/0.5m cable length. For use with Ever Motion Solutions microstepping drives with encoder feedback.	PDF	Ever stepper drives with encoder feedback
CBL/0192-100	$36.00	Ever Motion Solutions encoder feedback cable, 10-pin connector to pigtail, 3.2ft/1m cable length. For use with Ever Motion Solutions microstepping drives with encoder feedback.	PDF	

SW3A93KIT-C1

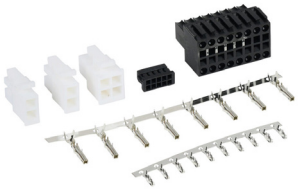


SW3D2KIT-C1

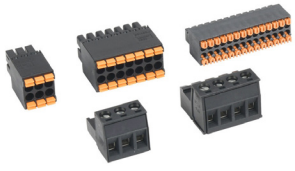


SW4A3KIT-C1

CBL/0190-100



SW4D2KIT-C1



SW5A5KIT-C1

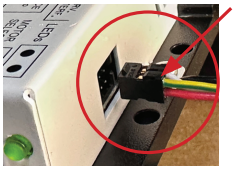
Ever Studio Drive Software

Ever Studio is a Windows PC software tool for the configuration of Ever's Titanio series stepper drives. The software allows easy modification of drive parameters. Ever Studio allows more flexibility in configuring a motor than DIP switches. For example, LW3A has 6 DIP switch options for Step Angle, but Ever Studio can set the drive for many other microstep settings. Ever Studio also allows jogging/indexing of LW4D and has a built-in oscilloscope to help with tuning and debugging the LW4D. Ever Studio has the ability to jog and index drives to assist in system setup and commissioning without requiring the upper level controller (PLC with pulse output or EtherCAT).

System requirements:

- CPU: Intel i3 or better
- Operating System: Windows 7/8/8.1/10/11
- Memory: 512MB over the Windows OS requirement
- Hard Disk: 50MB free space
- Communications Interface: PC's USB to the drive's serial service interface (using EVER-PGM-1 or EVER-PGM-2 cable)

Ever Stepper Drive Software			
Part Number	***Price***	***Description***	***Use With***
EVER-STUDIO	Free	Ever Motion Solutions Windows configuration software, free download only. For use with Ever Motion Solutions stepper drives with service interface port. Requires PC USB port.	***LW4D3070N2I1-00, LW3A9030N2A1-00, SW3D2042H241-01, SW3A9030H241-21, SW4D2042H241-00, SW4A3070H241-00, SW5A5080H221-30***



ATTENTION!!! Correct insertion direction of the CN6: TAB UP.