SSDC-ECX-H/J

Step-Servo System
Hardware Manual

SSDC06-ECX-H/J SSDC10-ECX-H/J

SHANGHAI AMP&MOONS' AUTOMATION CO.,LTD.

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1 Introduction....3
1.1 Features....3
1.2 Safety Instructions....4
2 Getting Started....5
2.1 Installing Software....6
2.2 Connecting the Power Supply....8
2.3 Choosing a Power Supply....9
2.3.1 Voltage....9
2.3.2 Current....10
2.4 Connecting the Motor....20
2.5 Connecting the EtherCAT....21
2.6 Setting the EtherCAT Node ID....21
3 Inputs and Outputs....22
3.1 Digital Inputs....23
3.2 Digital Outputs....25
3.3 Analog Inputs （SSDC-ECX-J）....27
4 Mounting the Drive....28
5 Warning and Fault Display....28
6 Reference Materials....30
6.1 Drive Mechanical Outlines(Units: mm)....30
6.2 Technical Specifications....31
6.3 Recommended Motors....32
7 Contacting MOONS'....33

1 Introduction

Thank you for selecting the MOONS' SSDC series step-servo drive and motor. The SSDC-ECX series are high performance EtherCAT fieldbus control step-servo drive which also integrates with built-in motion controller. The SSDC-ECX drive can operate as a standard EtherCAT slave using CANopen over EtherCAT (CoE). The SSDC-ECX-H/J drive is the second generation of SSDC series, which has more higher performance and supports Vender specific profile over EtherCAT (VoE).

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

1.1 Features

- Programmable, digital step-servo drive and motor package
- Push-in spring type connector, faster and reliable connection
- CANopen over EtherCAT (CoE) with full support of CiA402. Based on the widely used 100BASE-TX cabling system and with a baud rate of 100Mbps full-duplex, EtherCAT enables high speed and highly reliable communication
- Vender specific profile over EtherCAT (VoE) is contribute to update the firmware over EtherCAT.
- Supported modes: Profile Position, Profile Velocity, Profile Torque, Cyclic Synchronous Position, Cyclic Synchronous Velocity and Homing mode as well as MOONS' own Q mode
- Current output
  SSDC06 output current：continuous 6A/phase（peak of sin）, boost 7.5A(1.5s)
  SSDC10 output current：continuous 10A/phase（peak of sin）, boost 15A(1.5s)
- Wide range input voltage:
  SSDC06：24~70VDC
  SSDC10：24~70VDC
- Encoder resolution：
  20000 counts/rev (AM17/23/24/34SS-N motor)
  4096 counts/rev (AM08/11/17/23/24/34RS motor)
- Abundant I/O interface
  SSDC06/10-ECX-H
  3 optically isolated digital inputs,5-24VDC
  1 optically isolated digital outputs,max30V/100mA

  SSDC06/10-ECX-J
  5 optically isolated digital inputs,5-24VDC
  2 optically isolated digital outputs,max30V/100mA
  1 analog inputs can be configured to 0-5V, 0-10V, ±5V or ±10V signal ranges
- Communication
  Dual-port RJ45 for EtherCAT communication
  USB port for configuration

1.2 Safety Instructions

Only qualified personnel should transport, assemble, install, operate, or maintain this equipment. Properly qualified personnel are persons who are familiar with the transport, assembly, installation, operation, and maintenance of motors, and who meet the appropriate qualifications for their jobs.

To minimize the risk of potential safety problems, all applicable local and national codes regulating the installation and operation of equipment should be followed. These codes may vary from area to area and it is the responsibility of the operating personnel to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. MOONS does not guarantee the products described in this publication are suitable for a particular application, nor do they assume any responsibility for product design, installation, or operation.

Read all available documentation before assembly and operation. Incorrect handling of the products referenced in this manual can result in injury and damage to persons and machinery.

All technical information concerning the installation requirements must be strictly adhered to.

It is vital to ensure that all system components are connected to earth ground. Electrical safety is impossible without a low-resistance earth connection.

This product contains electrostatically sensitive components that can be damaged by incorrect handling. Follow qualified anti-static procedures before touching the product.

During operation keep all covers and cabinet doors shut to avoid any hazards that could possibly cause severe damage to the product or personal health.

During operation, the product may have components that are live or have hot surfaces.

Never plug in or unplug the Integrated Motor while the system is live. The possibility of electric arcing can cause damage.

Be alert to the potential for personal injury. Follow recommended precautions and safe operating practices emphasized with alert symbols. Safety notices in this manual provide important information. Read and be familiar with these instructions before attempting installation, operation, or maintenance. The purpose of this section is to alert users to the possible safety hazards associated with this equipment and the precautions necessary to reduce the risk of personal injury and damage to equipment. Failure to observe these precautions could result in serious bodily injury, damage to the equipment, or operational difficulty.

2 Getting Started

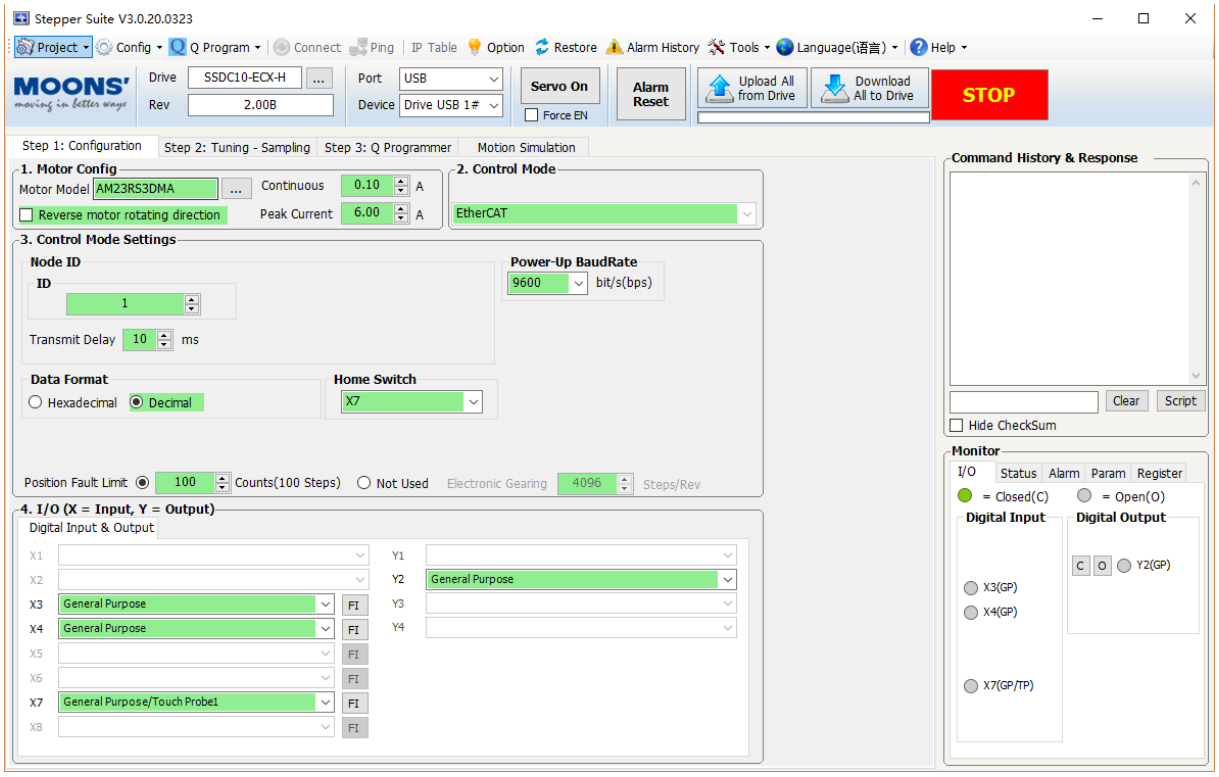
The following items are needed:

- A 24-70VDC power supply, see the section below entitled “Choose a Power Supply” for helping to choose the right one.
- A compatible SS or RS motor, please see the section below entitled “Recommended Motor”
- A small flat blade screwdriver for tightening the connectors screw
- A PC running Microsoft Windows 7/ Windows 8/ Windows 10 (32bit or 64bit) and Microsoft.net framework 4.0
- A USB Mini-B cable (Sold separately)
- Install the Stepper Suite software
- A power cable(included)
- A CAT5 cable, used to do the daisy-chain connection. It is also used to configure the drive.
- Optional extended motor cable(Sold separately)
- Optional extended encoder cable(Sold separately)

2.1 Installing Software

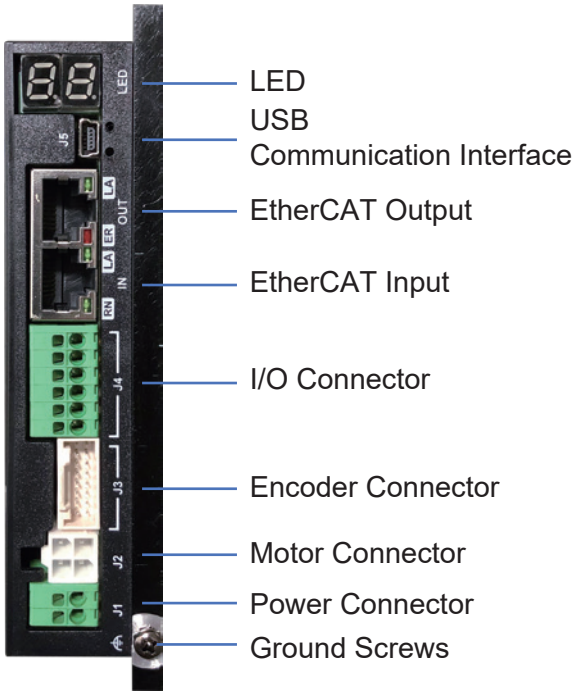
Stepper Suite is the PC based software application used to configure, and perform servo tuning, drive testing and evaluation of the step-servo products. System servo control gains, drive functionality and I/O configuration are set with ***Stepper Suite***. It also contains an oscilloscope function to help set the servo control gains.

- Download the ***Stepper Suite*** from the MOONS' website and install it.
- Launch the software by clicking Start-----Programs ----MOONS' ----Stepper Suite
- Connect the drive to PC by USB Mini-B cable. Please see the section below entitled "Choosing the Right USB Port".
- Connect the drive to the Power Supply.
- Connect the motor to the drive.
- Power up the drive.
- The software will recognize your drive, display the model and firmware version and be ready for action.

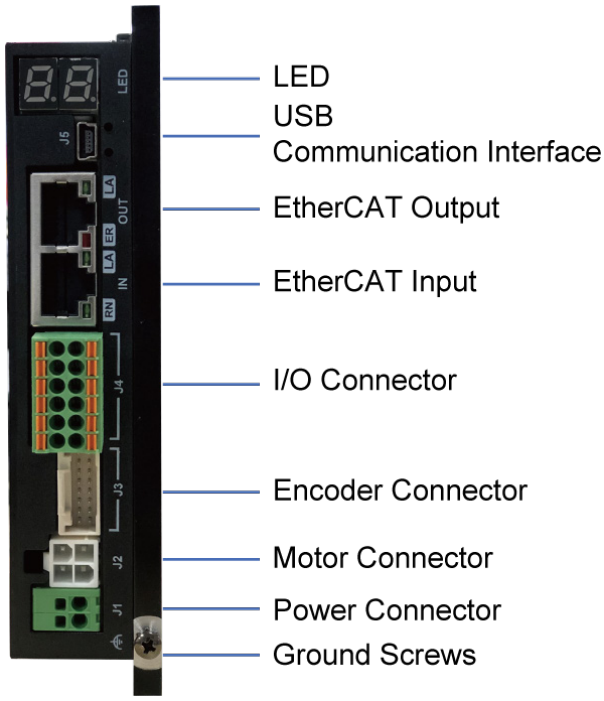


The connectors and other points of interest are illustrated below:

SSED-ECX-H



SSED-ECX-J



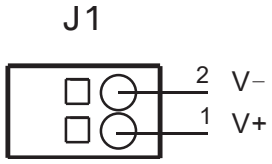
2.2 Connecting the Power Supply

The SSDC series step-servo drive and motor are shipped with a power cable, 2 meters long. Connect the red wire to the positive of the power supply. Connect the black wire to the negative of the power supply. Plug the cable into the power connector of the drive.

(NOTE: Be careful not to reverse the wires. Reversing the connection may open the internal fuse on the drive and void the warranty.)

SSDC06: 24 – 70VDC

SSDC10: 24 – 70VDC



Power Connector

Wire Range：0.2mm^2 – 1.5mm^2 (24 – 16AWG)

Recommended stripping length：10mm

Connect the chassis to the earth ground through the grounding screws.

The section entitled “Choosing a Power Supply” will help you to select a right power supply.

2.3 Choosing a Power Supply

The main considerations when choosing a power supply are the voltage and current requirements for the application.

2.3.1 Voltage

The SSDC drive is designed to give optimum performance between 24 and 48 Volts DC. Choosing the voltage depends on the performance needed and motor/drive heating that is acceptable and/or does not cause a drive over-temperature. Higher voltages will give higher speed performance but will cause the RS driver to produce higher temperatures. Using power supplies with voltage outputs that are near the drive maximum may significantly reduce the operational duty-cycle.

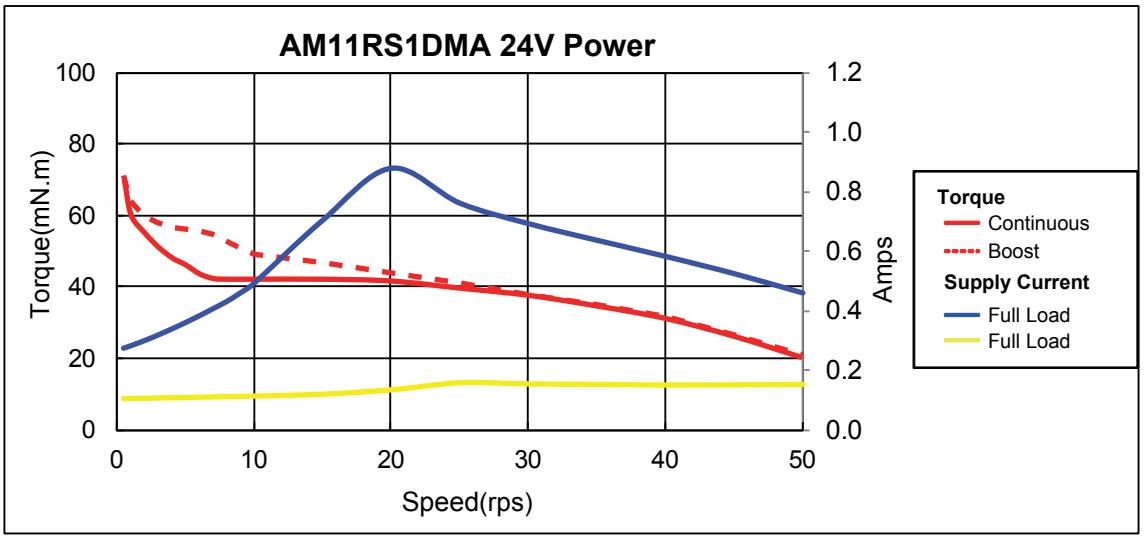
SSDC06/10

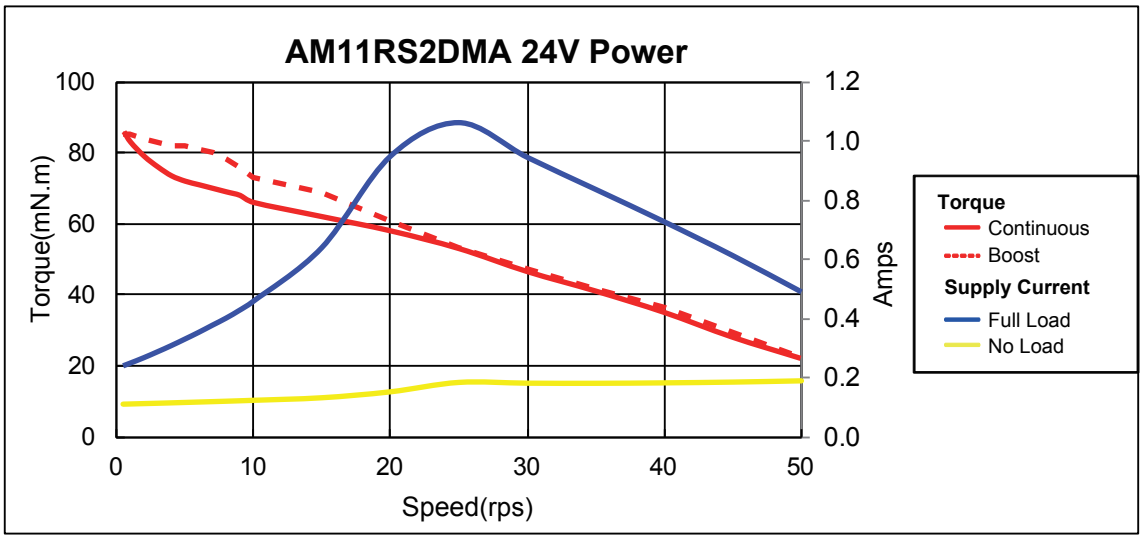
For the SSDC06/10 drive, the extended range of operation can be as low as 18 VDC minimum to as high as 75 VDC maximum. When operating below 18 VDC, the power supply input may require larger capacitance to prevent under-voltage and internal-supply alarms. Current spikes may make supply readings erratic. The supply input cannot go below 18 VDC for reliable operation. This will not fault the drive. Absolute maximum power supply input is 75 VDC at which point an over-voltage alarm and fault will occur. When using a power supply that is regulated and is near the drive maximum voltage of 75 VDC, a voltage clamp may be required to prevent over-voltage when regeneration occurs. When using an unregulated power supply, make sure the no-load voltage of the supply does not exceed the drive’s maximum input voltage of 75 VDC.

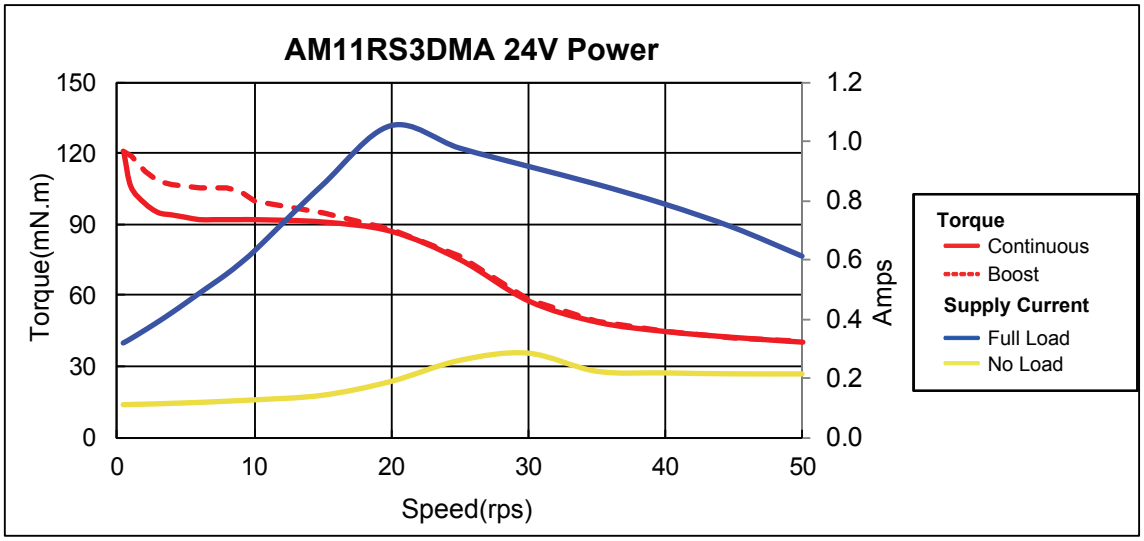
2.3.2 Current

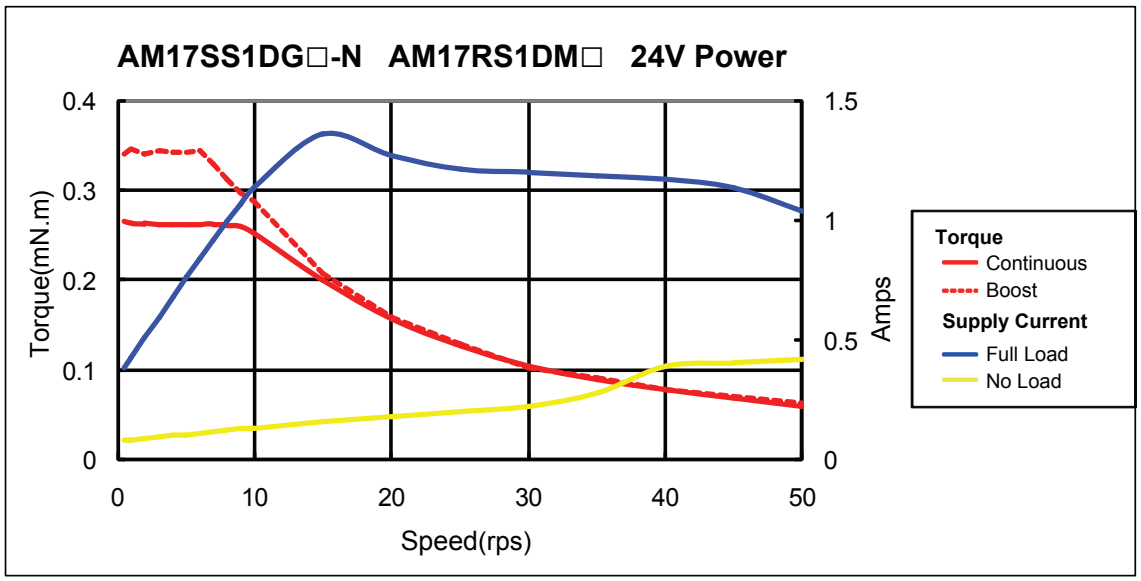
The maximum supply currents required by the SSDC series step servo drive and motor are shown below in chats at different power supply voltage input. The SSDC drive power supply current is lower than the winding currents because it uses switching amplifiers to convert a high voltage and low current into low voltage and high current. The more power supply voltage exceeds the motor voltage, the less current will be required from the power supply.

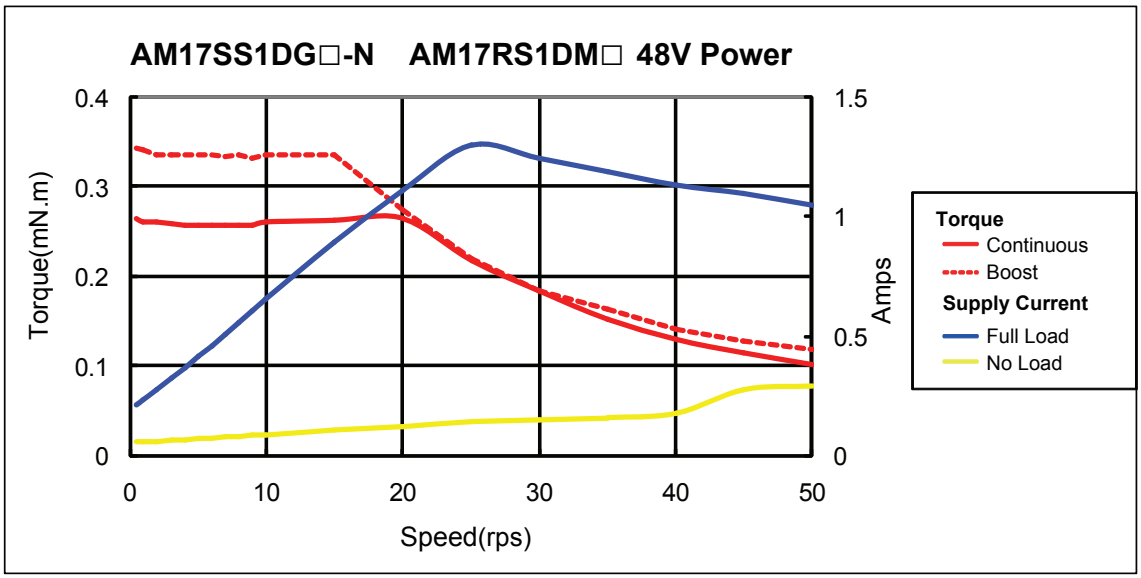
It is important to note that the current draw is significantly different at higher speeds depending on the torque load to the motor. Estimating how much current is necessary may require a good analysis of the load to the motor.

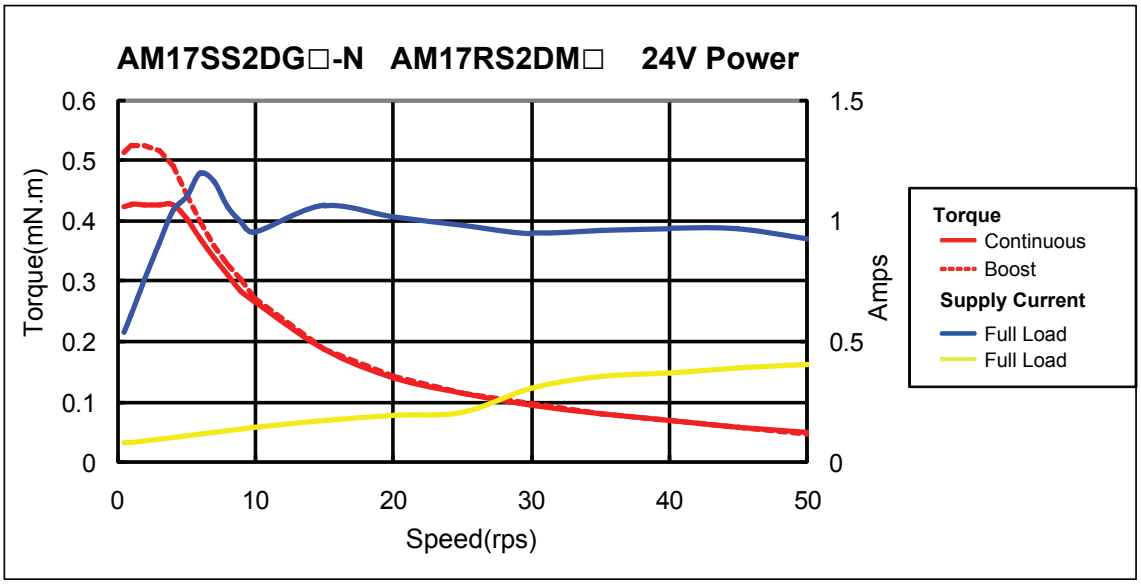


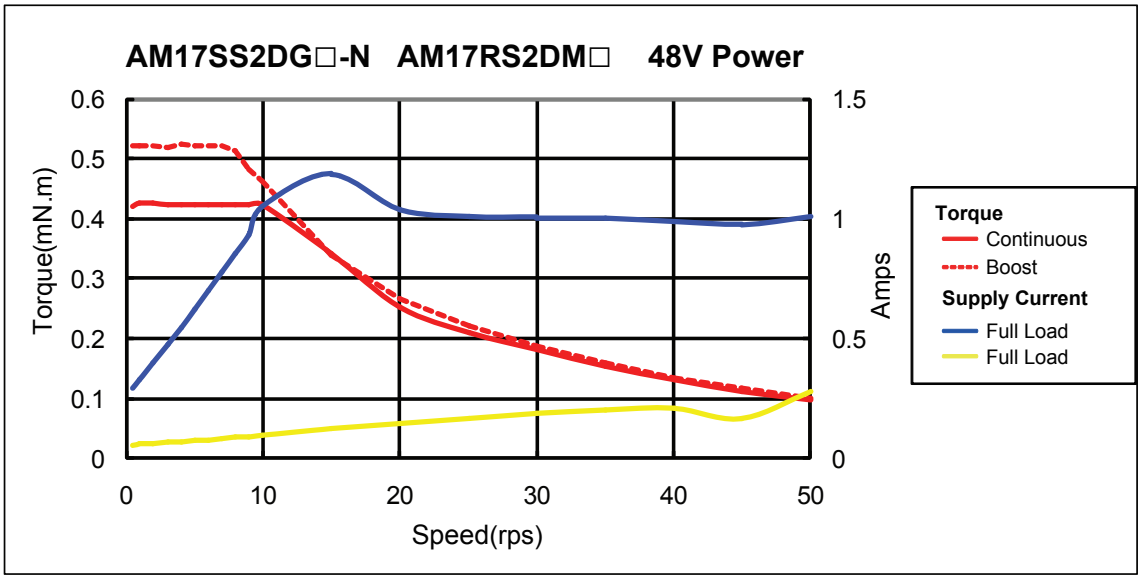


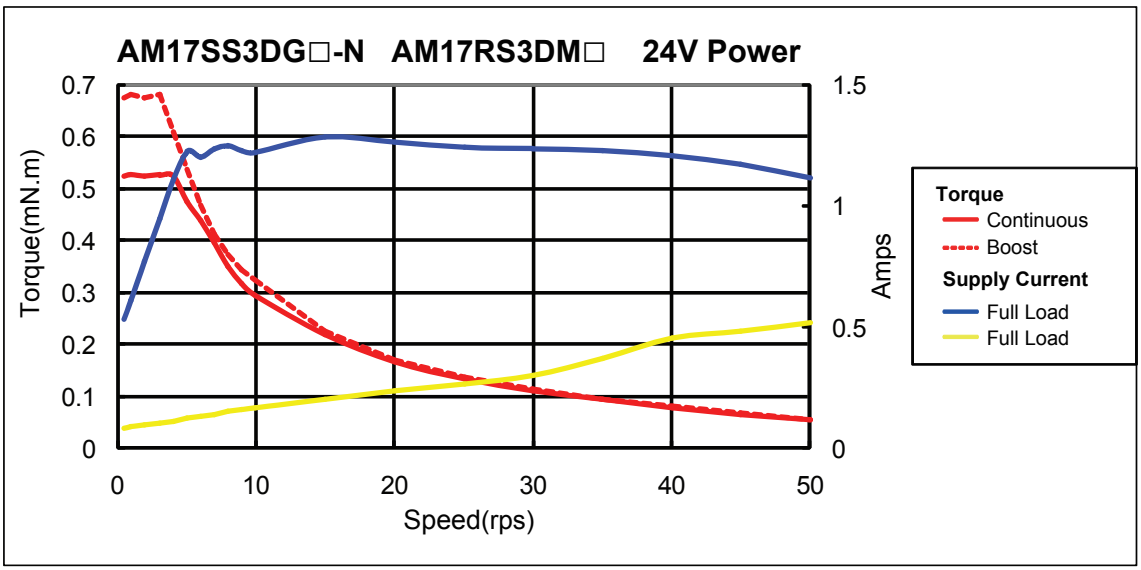

AM11RS3DMA 24V Power
Torque(mN.m)
150
120
90
60
30
0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
No Load

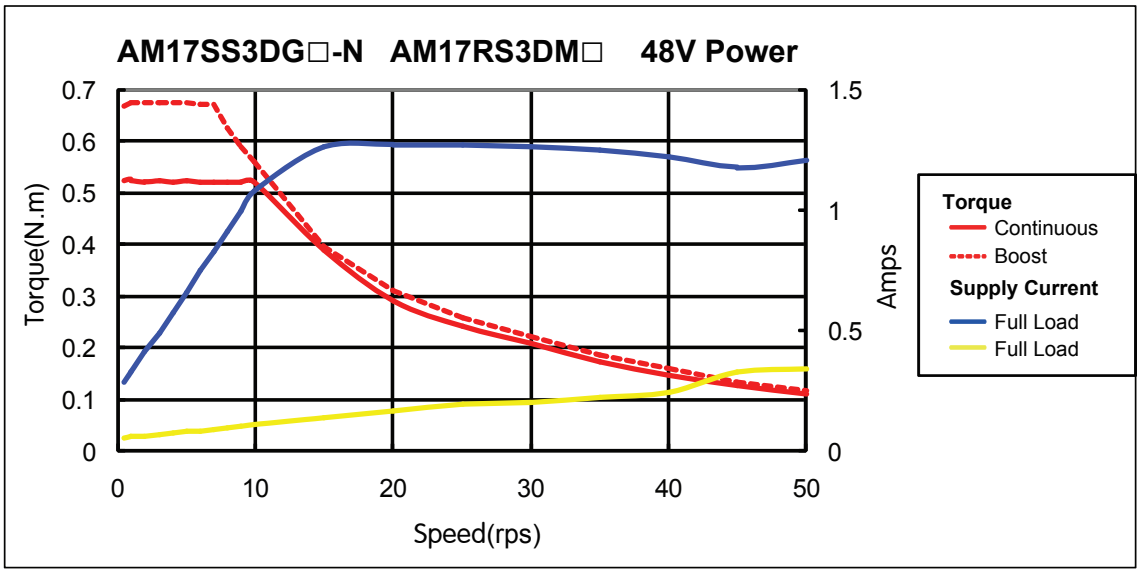

AM17SS1DG□-N AM17RS1DM□ 24V Power
Torque(mN.m)
0.4
0.3
0.2
0.1
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
No Load

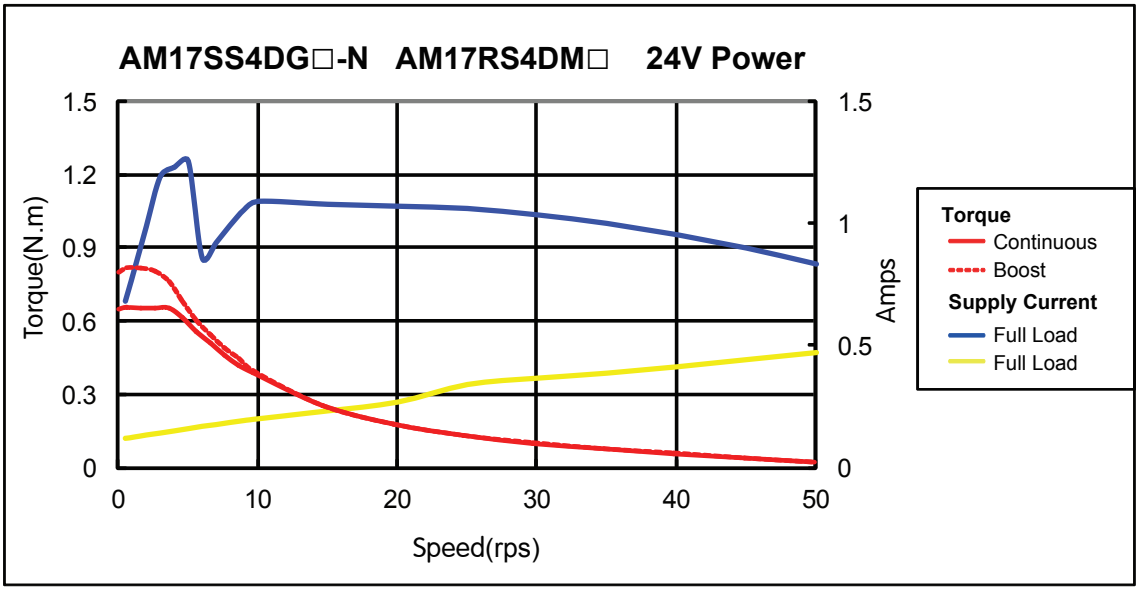

AM17SS1DG□-N AM17RS1DM□ 48V Power
Torque(mN.m)
0.4
0.3
0.2
0.1
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
No Load

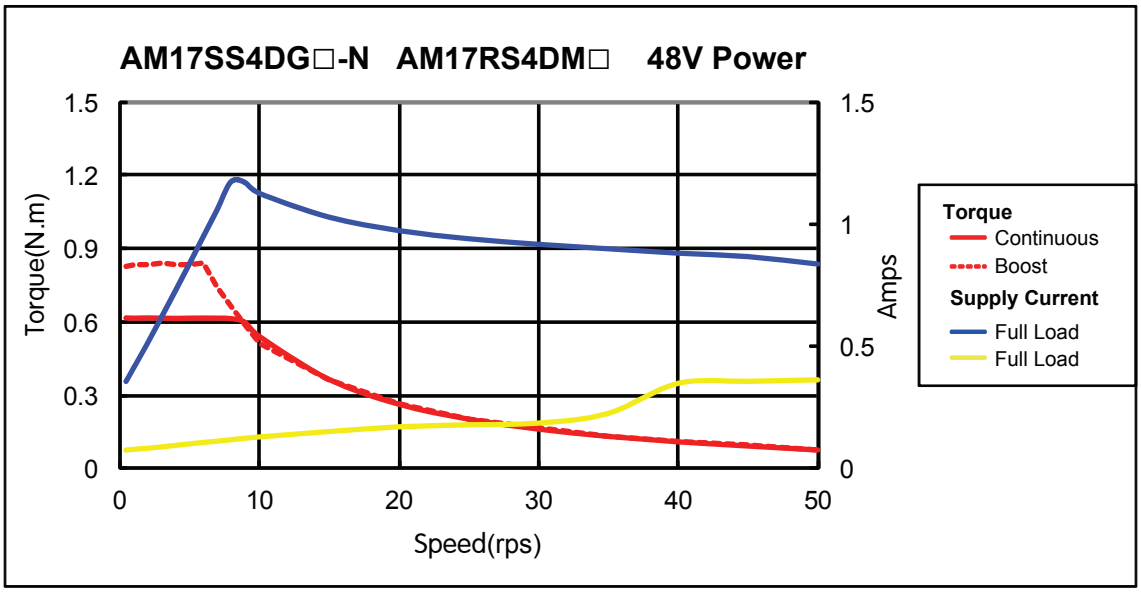

AM17SS2DG□-N AM17RS2DM□ 24V Power
Torque(mN.m)
0.6
0.5
0.4
0.3
0.2
0.1
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

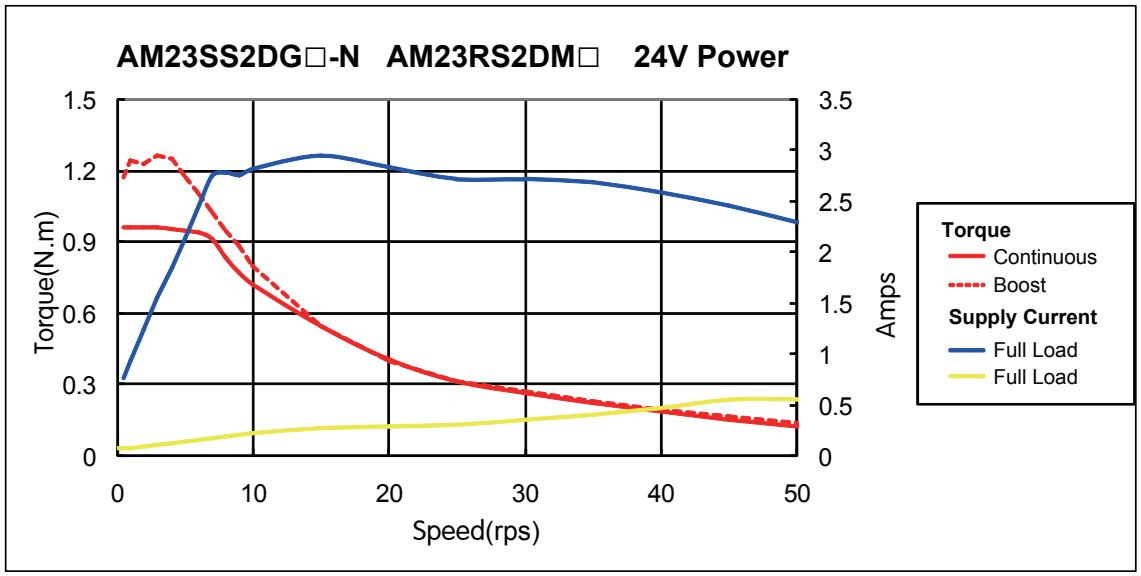

AM17SS2DG□-N AM17RS2DM□ 48V Power
Torque(mN.m)
0.6
0.5
0.4
0.3
0.2
0.1
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

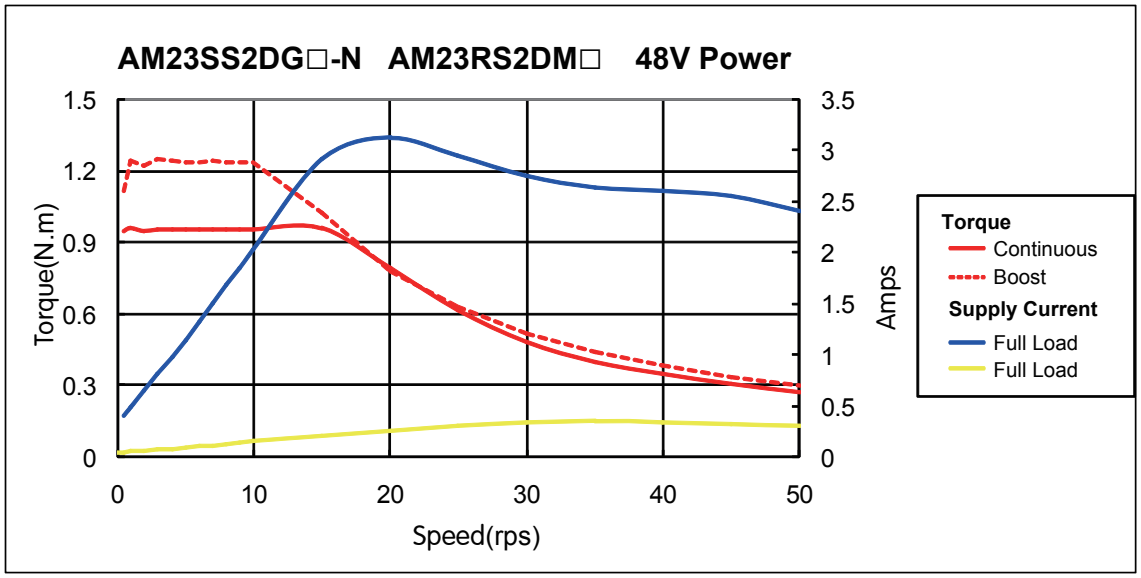

AM17SS3DG□-N AM17RS3DM□ 24V Power
Torque(mN.m)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

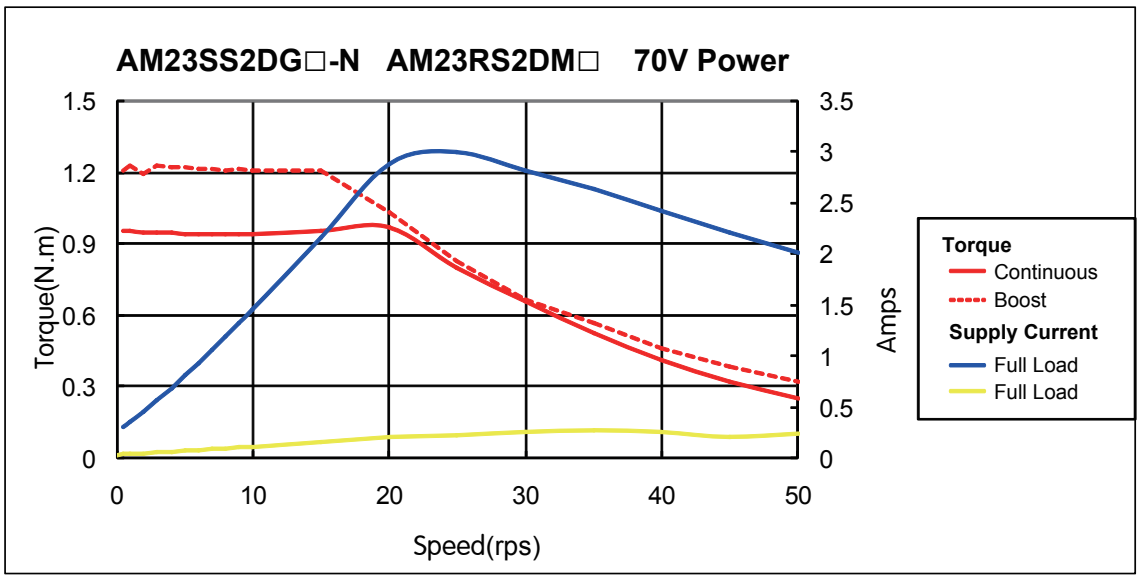

AM17SS3DG□-N AM17RS3DM□ 48V Power
Torque(N.m)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

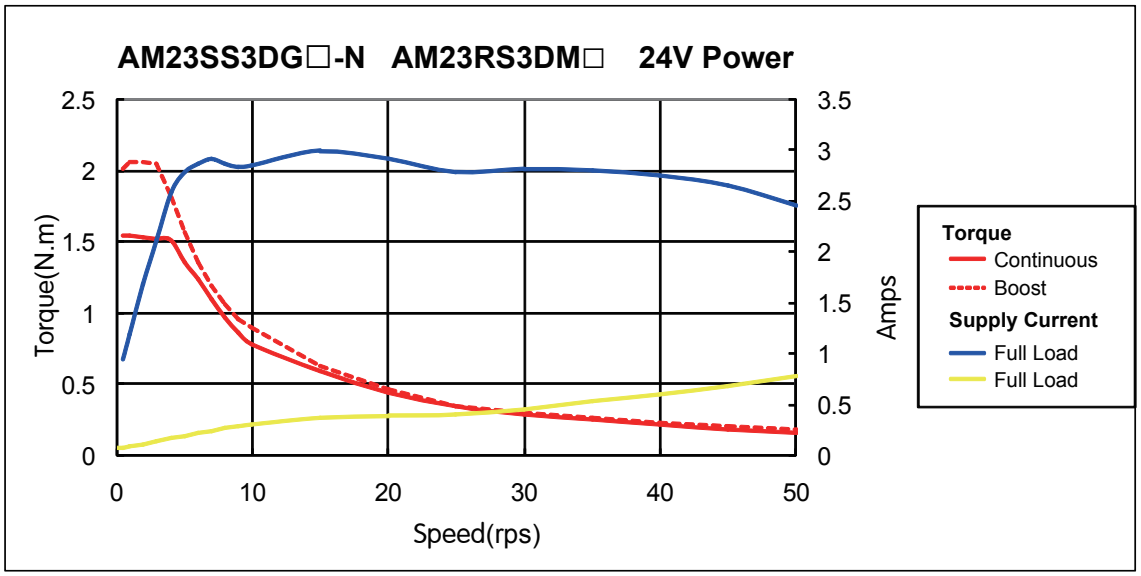

AM17SS4DG□-N AM17RS4DM□ 24V Power
Torque(N.m)
1.5
1.2
0.9
0.6
0.3
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

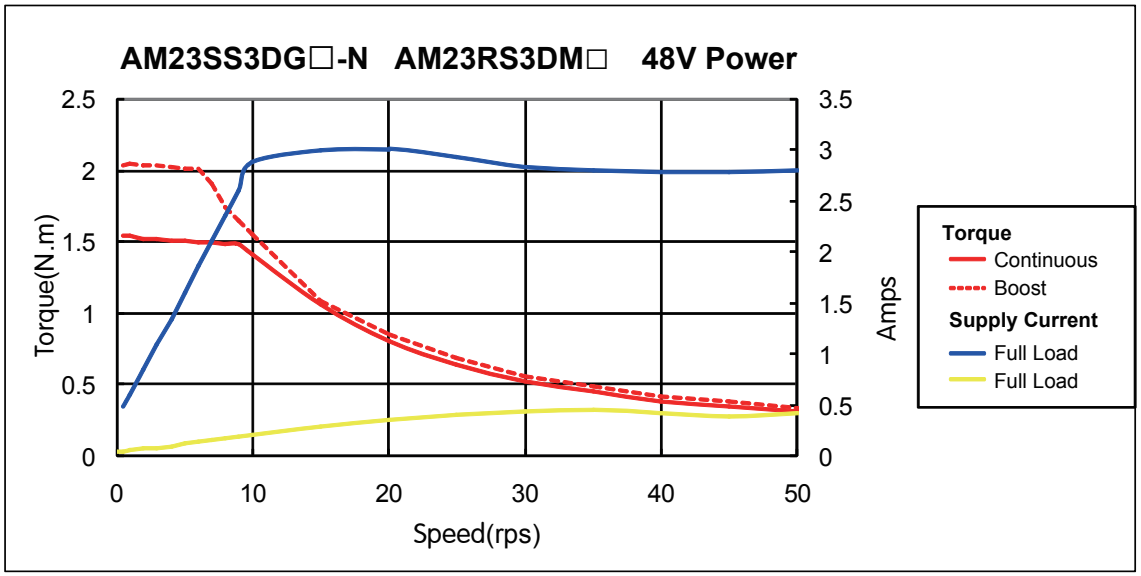

AM17SS4DG□-N AM17RS4DM□ 48V Power
Torque(N.m)
1.5
1.2
0.9
0.6
0.3
0
1.5
1
0.5
0
Amps
0
10
20
30
40
50
Speed(rps)
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

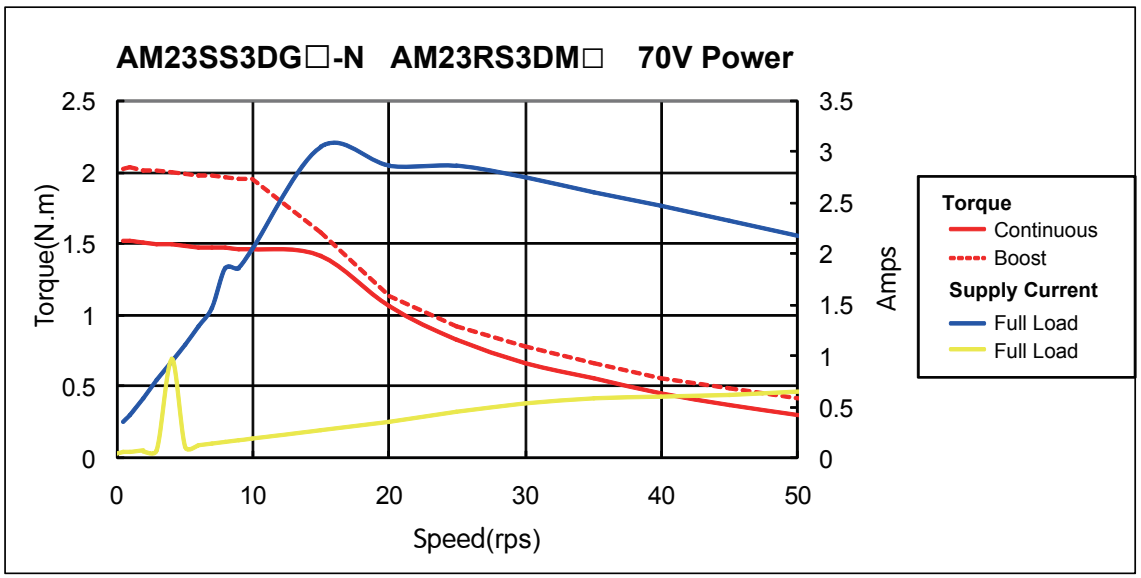

AM23SS2DG□-N AM23RS2DM□ 24V Power
Torque(N.m)
Amps
Speed(rps)
0
0.3
0.6
0.9
1.2
1.5
0.5
1
1.5
2
2.5
3
3.5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

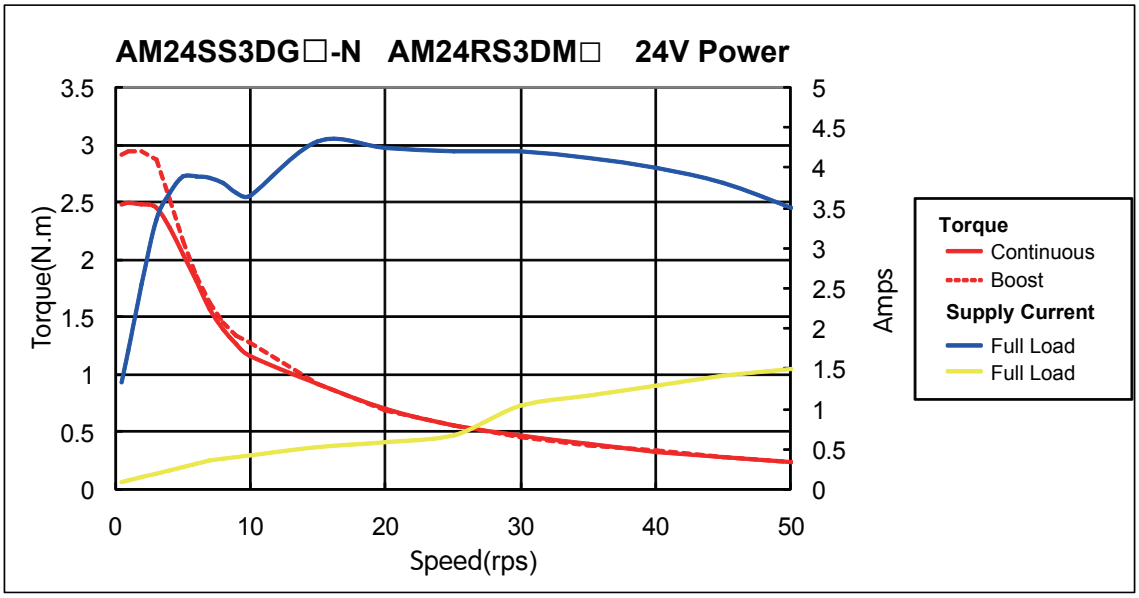

AM23SS2DG□-N AM23RS2DM□ 48V Power
Torque(N.m)
Amps
Speed(rps)
0
0.3
0.6
0.9
1.2
1.5
0.5
1
1.5
2
2.5
3
3.5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

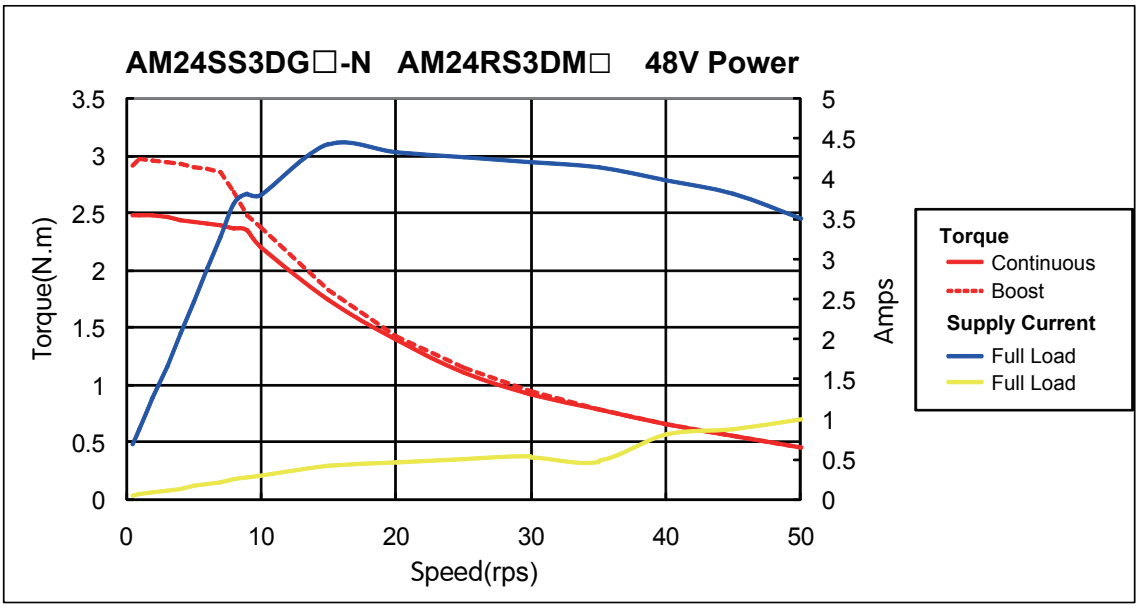

AM23SS2DG□-N AM23RS2DM□ 70V Power
Torque(N.m)
Amps
Speed(rps)
0
0.3
0.6
0.9
1.2
1.5
0.5
1
1.5
2
2.5
3
3.5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

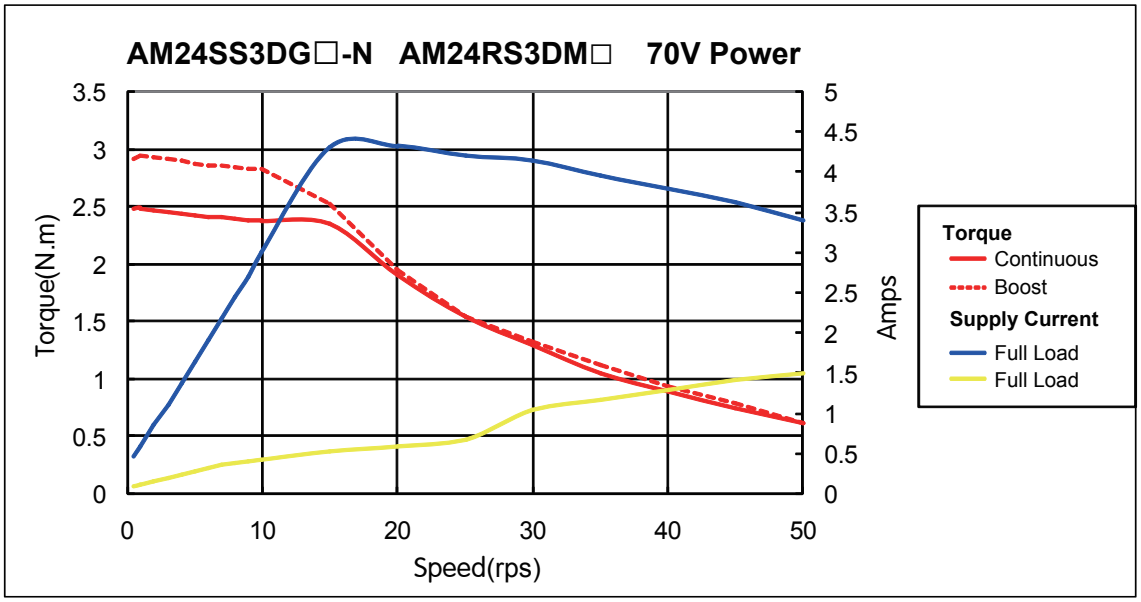

AM23SS3DG□-N AM23RS3DM□ 24V Power
Torque(N.m)
Amps
Speed(rps)
0
0.5
1
1.5
2
2.5
3
3.5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

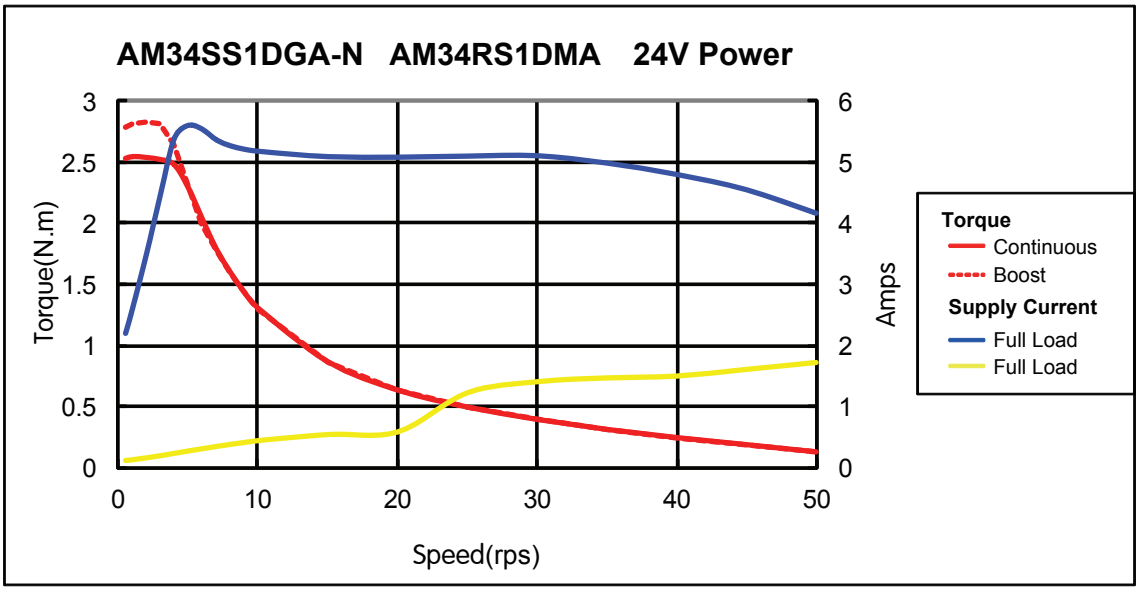

AM23SS3DG□-N AM23RS3DM□ 48V Power
Torque(N.m)
Amps
Speed(rps)
0
0.5
1
1.5
2
2.5
3
3.5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

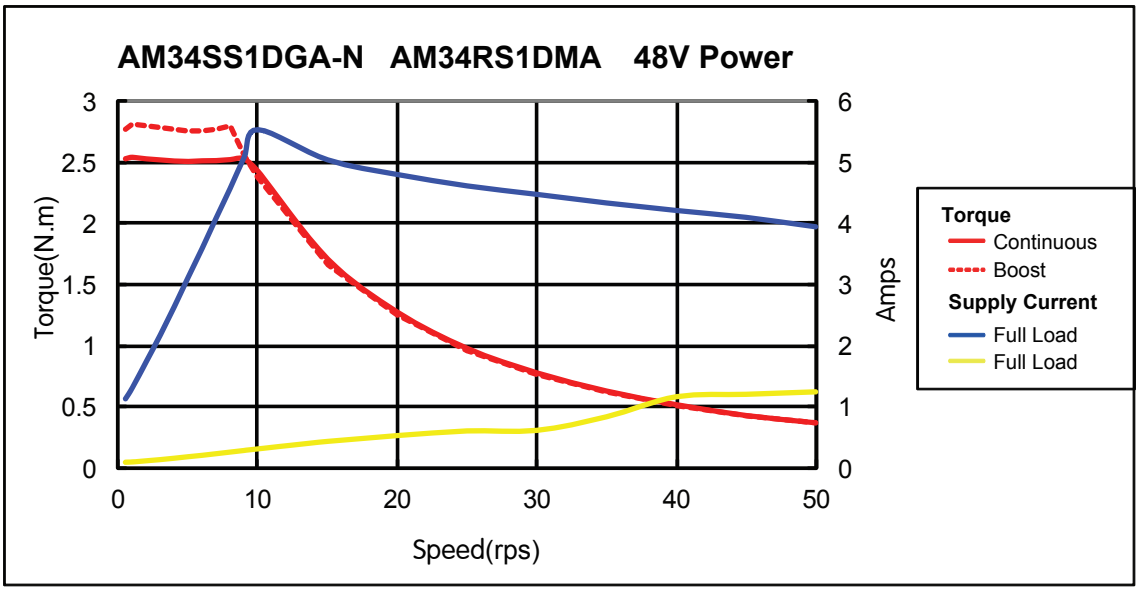

AM23SS3DG□-N AM23RS3DM□ 70V Power
Torque(N.m)
Amps
Speed(rps)
0
0.5
1
1.5
2
2.5
3
3.5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM24SS3DG□-N AM24RS3DM□ 24V Power
Torque(N.m)
Amps
Speed(rps)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM24SS3DG□-N AM24RS3DM□ 48V Power
Torque(N.m)
Amps
Speed(rps)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM24SS3DG□-N AM24RS3DM□ 70V Power
Torque(N.m)
Amps
Speed(rps)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM34SS1DGA-N AM34RS1DMA 24V Power
Torque(N.m)
Amps
Speed(rps)
0
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM34SS1DGA-N AM34RS1DMA 48V Power
Torque(N.m)
Amps
Speed(rps)
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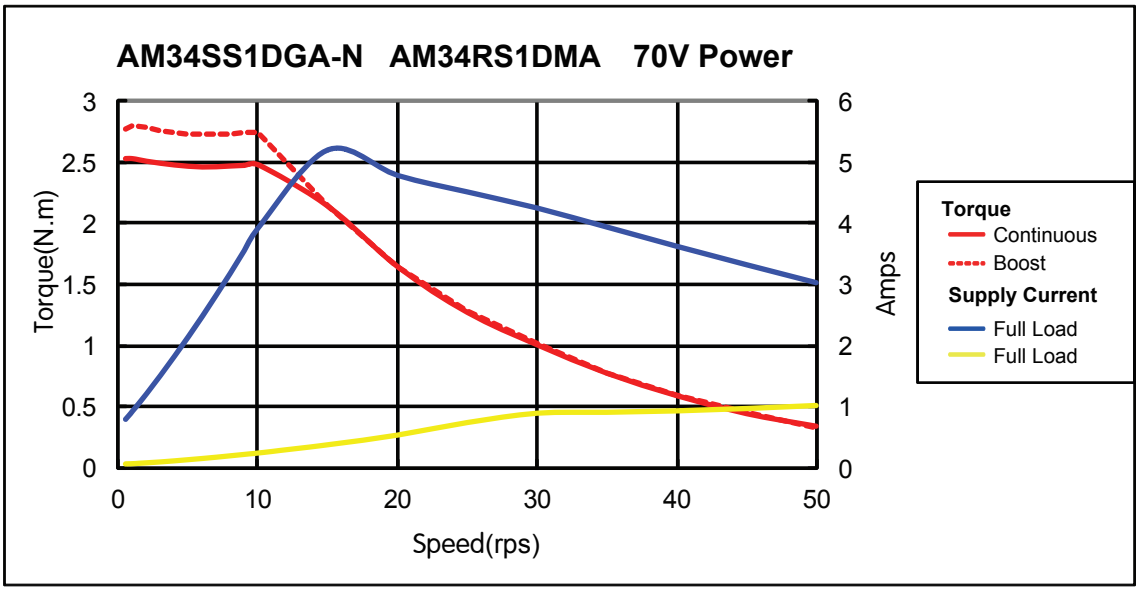
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM34SS1DGA-N AM34RS1DMA 70V Power
Torque(N.m)
Amps
Speed(rps)
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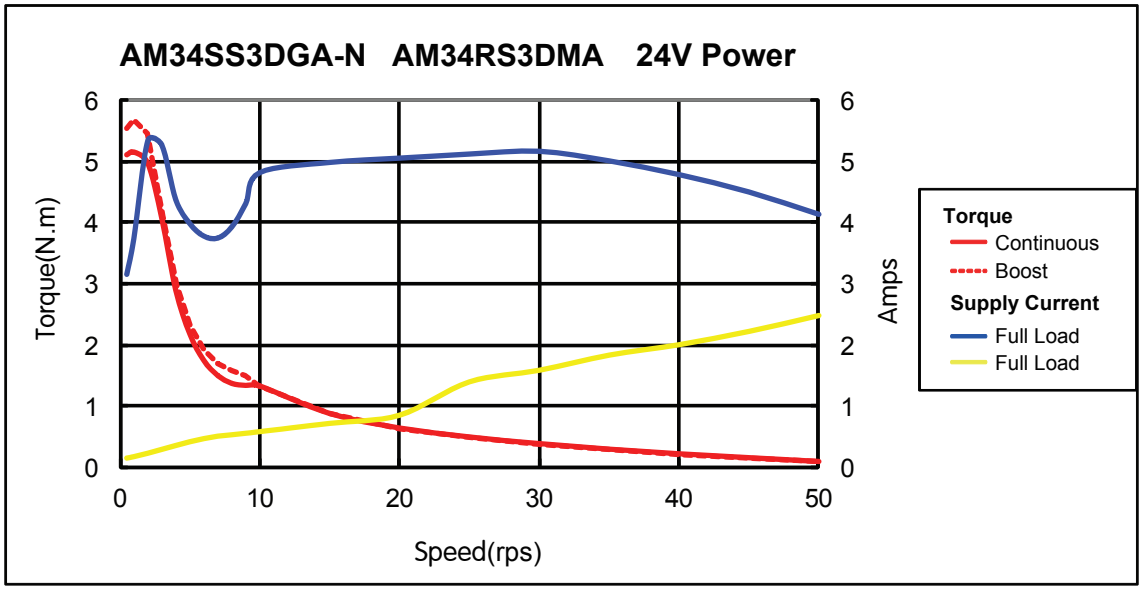
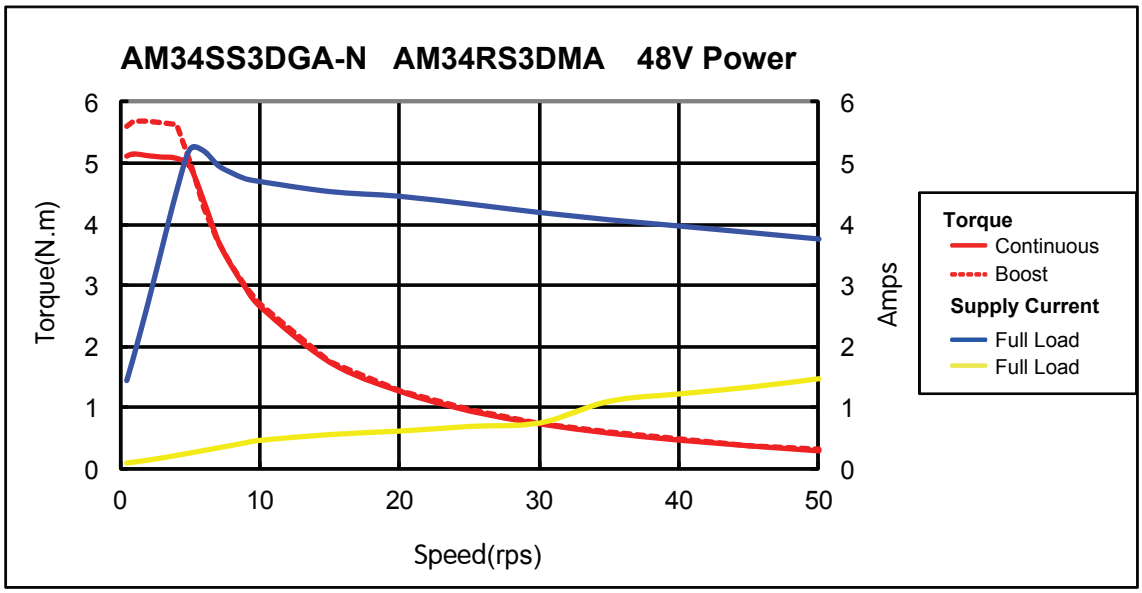
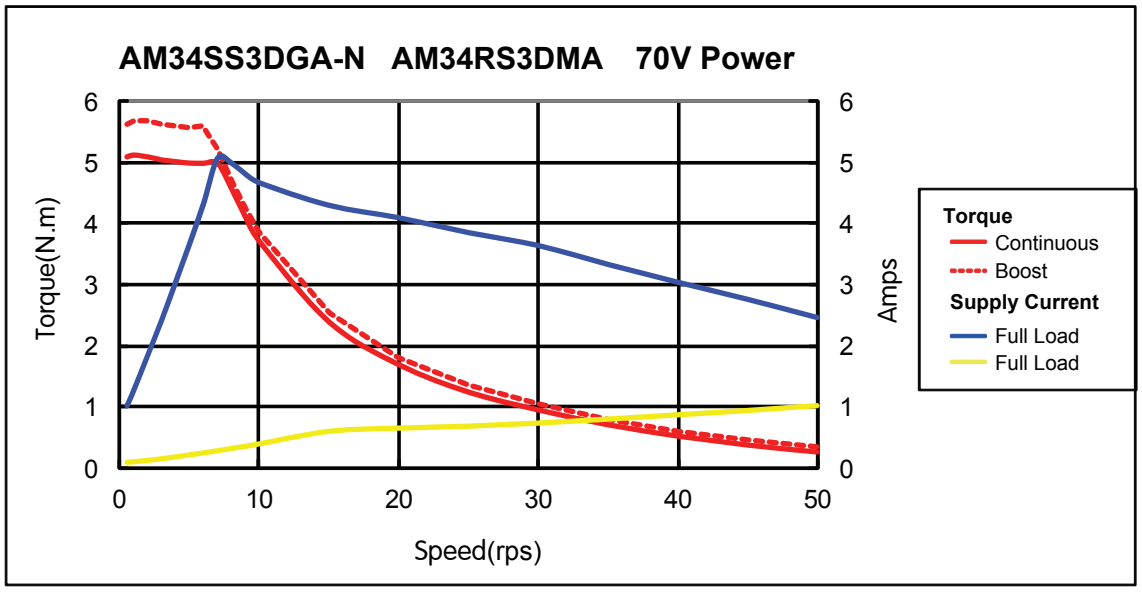
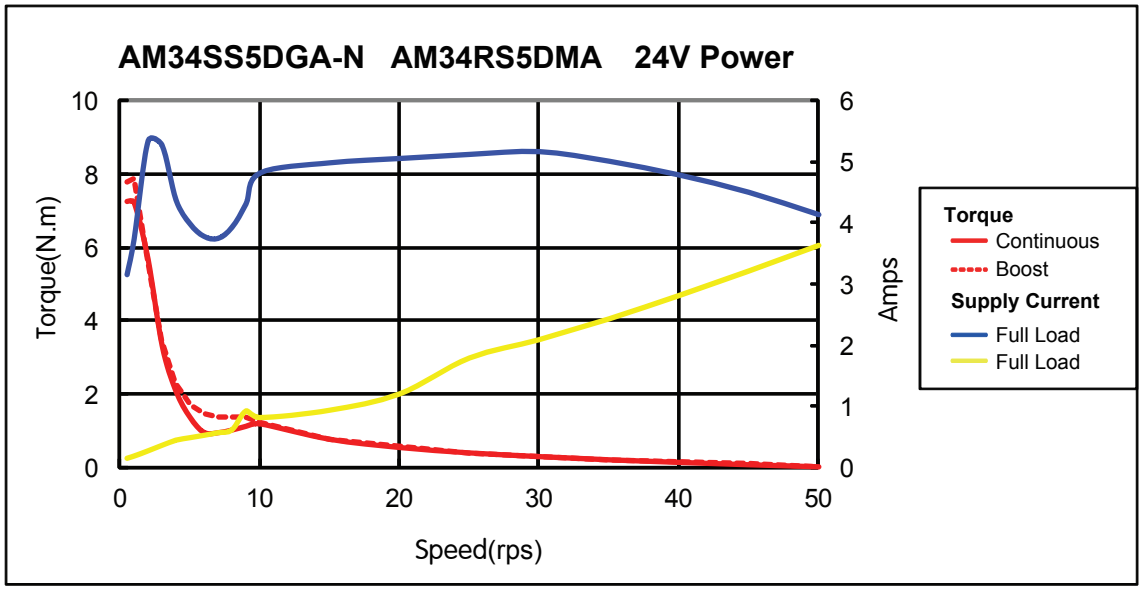
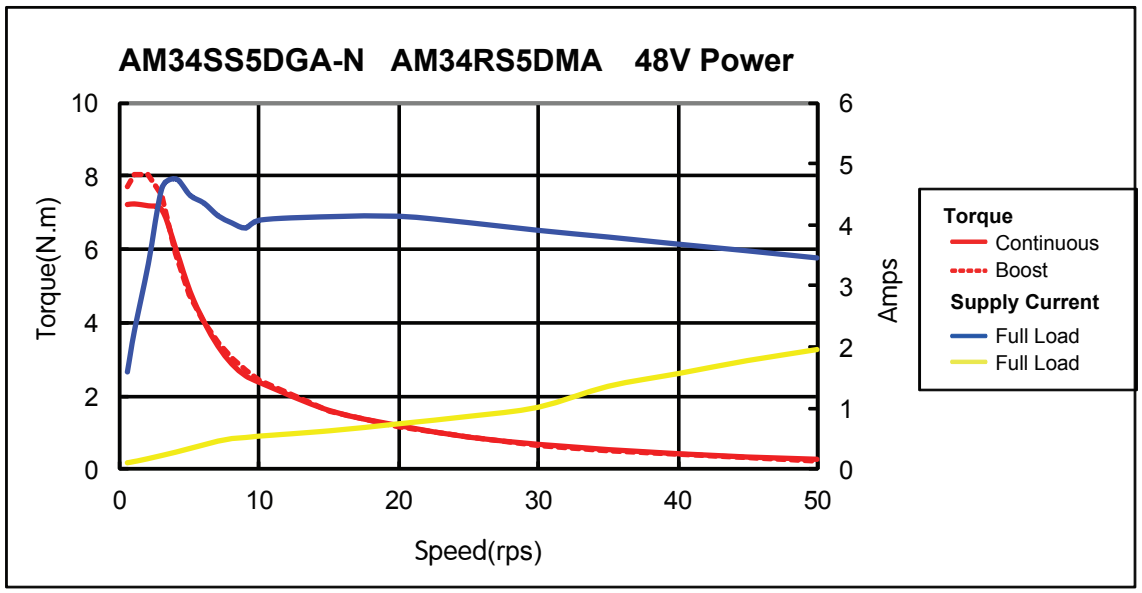
0.5
1
1.5
2
2.5
3
0
1
2
3
4
5
6
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

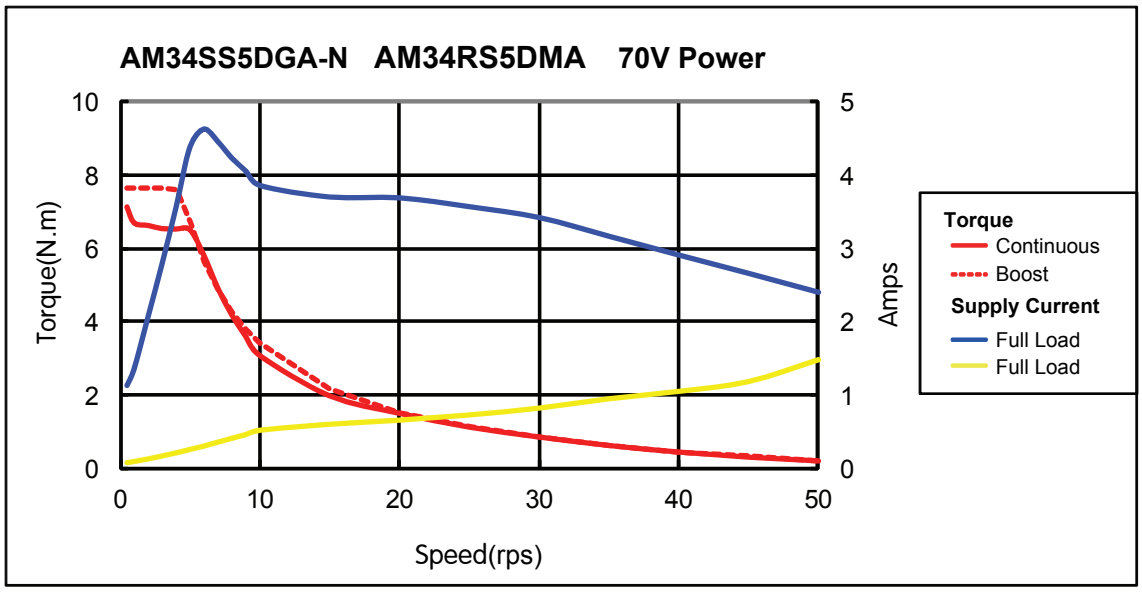

AM34SS3DGA-N AM34RS3DMA 24V Power
Torque(N.m)
Amps
Speed(rps)
0
10
20
30
40
50
0
1
2
3
4
5
6
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM34SS3DGA-N AM34RS3DMA 48V Power
Torque(N.m)
Amps
Speed(rps)
0
10
20
30
40
50
0
1
2
3
4
5
6
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM34SS3DGA-N AM34RS3DMA 70V Power
Torque(N.m)
Amps
Speed(rps)
0
10
20
30
40
50
0
1
2
3
4
5
6
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM34SS5DGA-N AM34RS5DMA 24V Power
Torque(N.m)
Amps
Speed(rps)
0
2
4
6
8
10
0
1
2
3
4
5
6
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

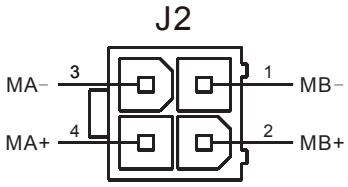

AM34SS5DGA-N AM34RS5DMA 48V Power
Torque(N.m)
Amps
Speed(rps)
0
2
4
6
8
10
0
1
2
3
4
5
6
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load


AM34SS5DGA-N AM34RS5DMA 70V Power
Torque(N.m)
Amps
Speed(rps)
0
2
4
6
8
10
0
1
2
3
4
5
0
10
20
30
40
50
Torque
Continuous
Boost
Supply Current
Full Load
Full Load

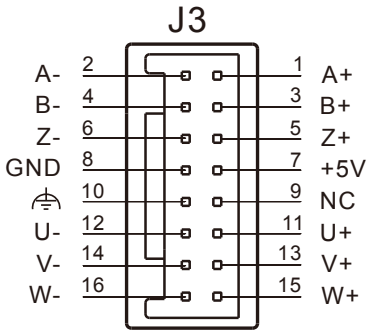
2.4 Connecting the Motor

The SS/RS motors have two different cables. One is the motor power cable, the other one is the encoder feedback cable. Plug the motor power cable into the motor connector on the drive and plug the encoder feedback cable into the encoder feedback connector on the drive.

(NOTE: Do not damage or drag the cables on the motor.)



Motor connector on the driver



Encoder connector on the driver

Please check the information of mating connectors, extended motor cable and extended encoder cable in below section ” Optional Accessories (Sold separately)”

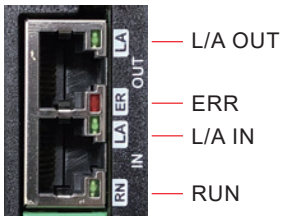
2.5 Connecting the EtherCAT

Dual RJ-45 connectors accept standard Ethernet cables and are categorized as 100BASE-TX(100 Mb/sec) ports. CAT5 or CAT5e (or higher) cables should be used. The IN port connects to a master, or to the OUT port of an upstream node. The OUT port connects to a downstream node.

If the drive is the last node on a network, only the IN port is used. No terminator is required on the OUT port.

EtherCAT Status Indicator LEDs

The LEDs are used for indicating status of the EtherCAT. There are two Link/Activity LEDs (one for each RJ-45 Ethernet connector) and two status LEDs (RUN and ERR).



LED	Color	Status	Description
Link/Activity	Green	OFF	no Ethernet connection
		ON	Ethernet is connected
		Flickering	activity on line
RUN	Green	OFF	initialization state
		Blinking	pre-operational state
		Single Flash	safe-operational state
		ON	operational state
ERR	Red	OFF	no error
		Blinking	general error
		Single Flash	sync error
		Double Flash	watch dog error

Notes:

- Flickering: Rapid flashing with a period of approximately 50ms (10Hz)
- Blinking: Flashing with equal on and off periods of 200ms (2.5Hz)
- Single Flash: Repeating on for 200ms and off for 1s
- Double Flash: Two flashes with a period of 200ms followed by off for 1s

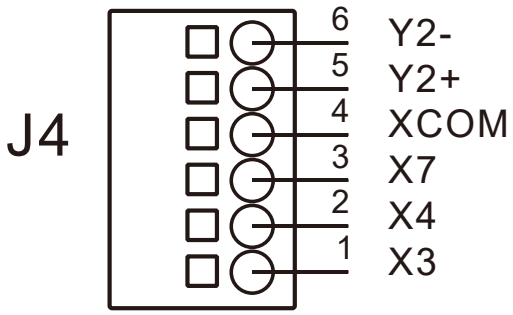
2.6 Setting the EtherCAT Node ID

When the drive’s ID is configured to be assigned by master controller in ***Stepper Suite*** software, the master controller can set the EtherCAT node Alias ID to address 0004h of SII (Slave Information Interface) EEPROM. The drive can get this ID value from SII EEPROM address 0004h after power up.

3 Inputs and Outputs

SSDC-ECX-H inputs and outputs include:

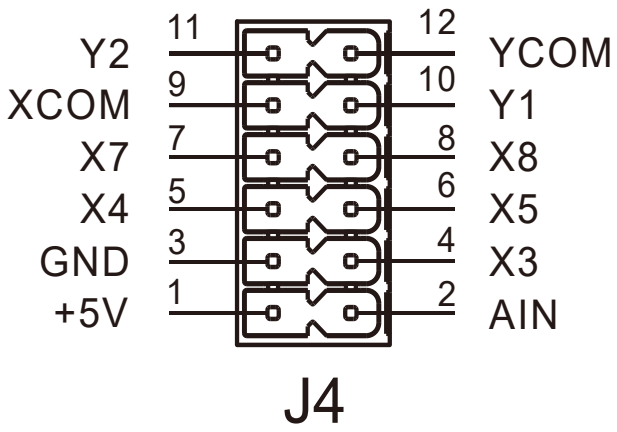
- 3 Optically isolated digital inputs, 5 - 24VDC logic
- 1 Optically isolated, Open Collector, 30V/100 mA max



I/O Connector Diagram

SSDC-ECX-J inputs and outputs include:

- 5 Optically isolated digital inputs, 5 - 24VDC logic
- 2 Optically isolated, Open Collector, 30V/100 mA max,
- 1 analog inputs can be configured to 0-5V, 0-10V, ±5V or ±10V signal ranges
- User 5V



I/O Connector Diagram

3.1 Digital Inputs

SSDC-ECX-H//J series drive has several digital optically isolated inputs, the function of every input can be configurated by ***Stepper Suite*** software.

SSDC06/10-ECX-H

Signal	Pin No.	Function
X3	1	**Available function:** CW limit sensor input Homing sensor input General purpose
X4	2	Available function: CCW limit sensor input Homing sensor input General purpose
X7	3	**Available function:** Touch probe input Homing sensor input General purpose
XCOM	4	The common voltage of X3/X4/X7

SSDC06/10-ECX-J

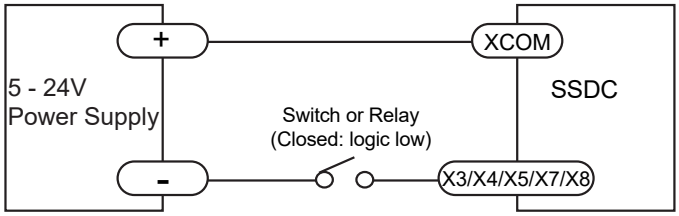
Signal	Pin No.	Function
X3	4	**Available function:** CW limit sensor input Homing sensor input General purpose
X4	5	Available function: CCW limit sensor input Homing sensor input General purpose
X5	6	General purpose
X7	7	**Available function:** Touch probe input Homing sensor input General purpose
X8	8	Available function: Emergency stop General purpose
XCOM	9	The common voltage of X3/X4/X5/X7/X8

X3、X4、X5、X7、X8: Optically isolated, 5-24VDC, Minimum pulse width = 100 μ s, Maximum pulse frequency = 5KHz.

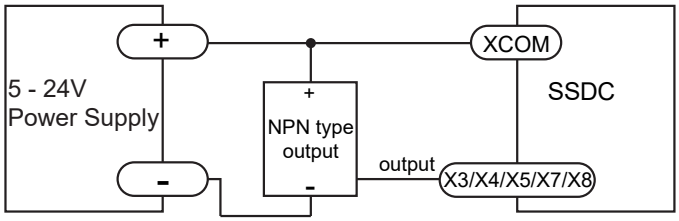
Because the input is an optically isolated circuit, a 5-24V power supply is needed. For example, you can use the power supply of the PLC when you are using a PLC control system, but if you want to connect a relay or mechanical switch to the input, you must need a power supply.

XCOM is an electronics term for a single-ended signal connection to a common voltage. If you are using a sourcing(PNP) input signals, you need to connect XCOM to the ground(power supply -), if you are using a sinking(NPN) input signals, the XCOM need to connect to the power supply +.

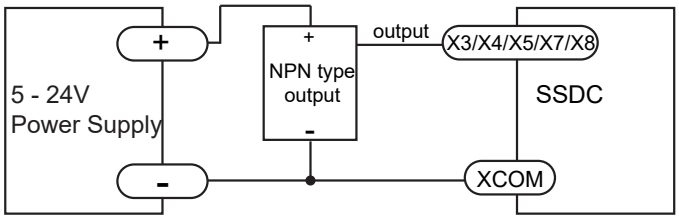
The diagrams below show how to connect the X3, X4 , X5, X7 and X8 to various commonly used devices.



Connecting a switch or relay to an input



Connecting a NPN type output to an input



Connecting a PNP type output to an input

3.2 Digital Outputs

SSDC-ECX-H//J series drive has several digital optically isolated outputs, the function of every output can be configurated by ***Stepper Suite*** software.

SSDC06/10-ECX-H

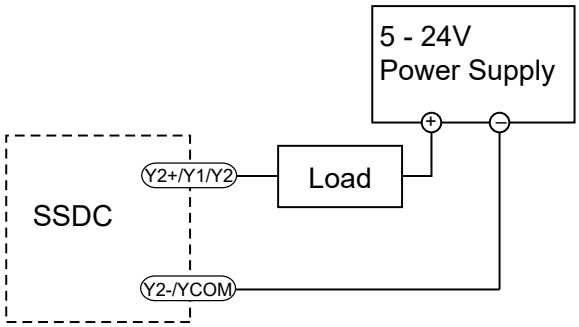
Signal	Pin No.	Function
Y2	5	**Available function:** Release brake output Static in position output Dynamic in position output General purpose output
	6	

SSDC06/10-ECX-J

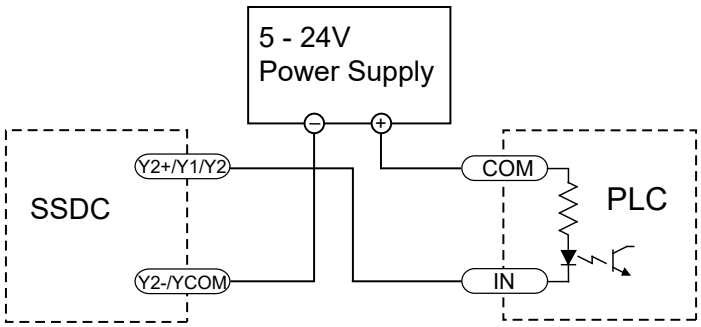
Signal	Pin No.	Function
Y1	10	**Available function:** Alarm output Static in position output Dynamic in position output
Y2	11	**Available function:** Release brake output Static in position output Dynamic in position output
YCOM	12	The common voltage of Y1/Y2

Y1、Y2: Optically isolated, 5-24VDC, Maximum pulse frequency = 10KHz.
The chats below show how to connect to the output:

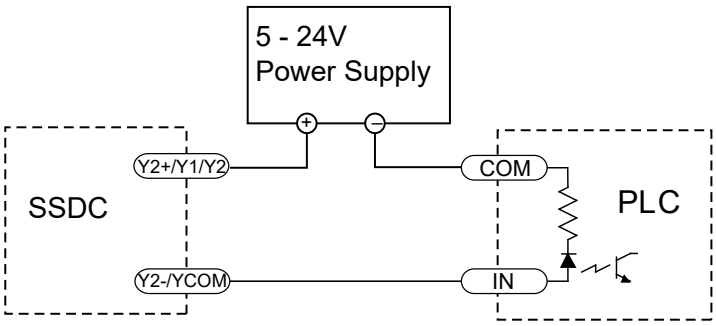
(NOTE: Do not connect the outputs to more than 30VDC power supply.
And the current of each output terminal must not exceed 100mA.)



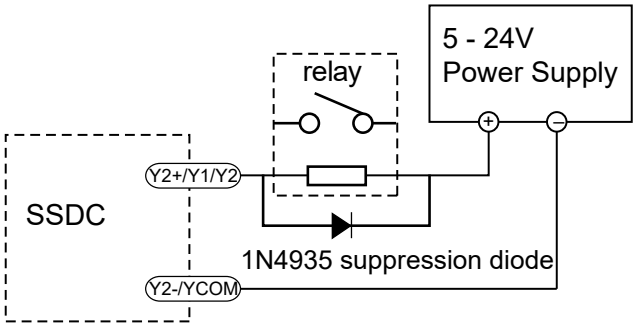
Connecting a sourcing output to load



Connecting a sinking output to PLC's input



Connecting a sourcing output to PLC's input



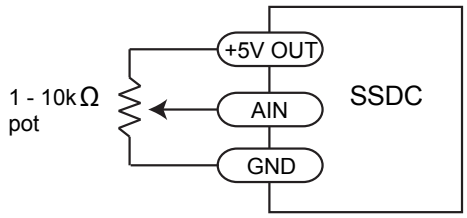
Driving a relay

3.3 Analog Inputs （SSDC-ECX-J）

SSDC-ECX-J series drive has one analog signal inputs which can accept signal range of 0-5V, 0-10V, ± 5V and ± 10V.

Use the ***Stepper Suite*** to configure the input range, offset, deadband and noisy filter frequency.

SSDC-ECX-J series provides a +5V/100mA limit power supply that can be used to power external devices such as potentiometer. It is not the most accurate supply for reference, for more precise readings use an external supply that can provide the desired accuracy.



Connecting a potentiometer to an analog input

4 Mounting the Drive

Use the M3 or M4 screw to mount the SSDC series drive .The drive should be securely fastened to a smooth, flat metal surface will help conduct heat away from the chassis. If this is not possible, forced airflow from a fan maybe required to prevent the drive from overheating.

- Never use the drive in a place where there is no air flow or the surrounding air is more than 40℃.
- Never put the drive where it can get wet or where metal or other electrically conductive particle particles can get on the circuitry.
- Always provide air flow around the drive. When mounting multiple SSDC drives near each other, maintain at least 2cm of space between drives.

5 Warning and Fault Display

The SSDC - ECX-H/J series step-servo package have two sets of 7-segment digital LED to display the EtherCAT address, alarm codes and status of the drive.

EtherCAT Address Display

The two LEDs will display the EtherCAT address (Physical address or EtherCAT ID) during the drive working in normal status.

NOTE: Physical address is assigned by master controller according to the physical topology link.
EtherCAT ID is configured by the ***Stepper Suite*** software.

① When the EtherCAT ID is set to 0, the master controller assigns each drive physical address, and the LED indicates the physical address. When the power was just turned on, the address had not been assigned, the LED displayed “0 0”. After a few seconds, the master controller assigned physical address to each drive, and the LED displayed the relevant value.

② When the EtherCAT ID is not set to 0, the master controller reads the EtheCAT ID from the drive, and then assign it again, the LED indicates this EtherCAT ID. If the master controller doesn’t assign the readed address, the LED indicates the actual assigned address.

NOTE: The LED diaplys the low two digitals address value in decimal.

Alarm Codes

When the drive has alarm, the LED flashes with the period of 0.5s to display the current alarm information .

LED1 shows the word “E” or “E.”, LED2 shows specific error or warning code. The specific alarm description is shown in the below table.

LED2	Description	LED2	Description
	Position error		Current foldback
	CCW limit		***Open winding***
	CW limit		***Bad encoder***
	CCW & CW limit		Save failed
	Drive over temperature		Communication error
	Power supply over voltage		Blank Q segment
	Power supply under voltage		NV error
	Interal voltage out of range		Move while disabled
	Over current		

NOTE: Items in bold italic represent drive faults, which automatically disable the motor.

Enabled Status and Execution Q Program Status

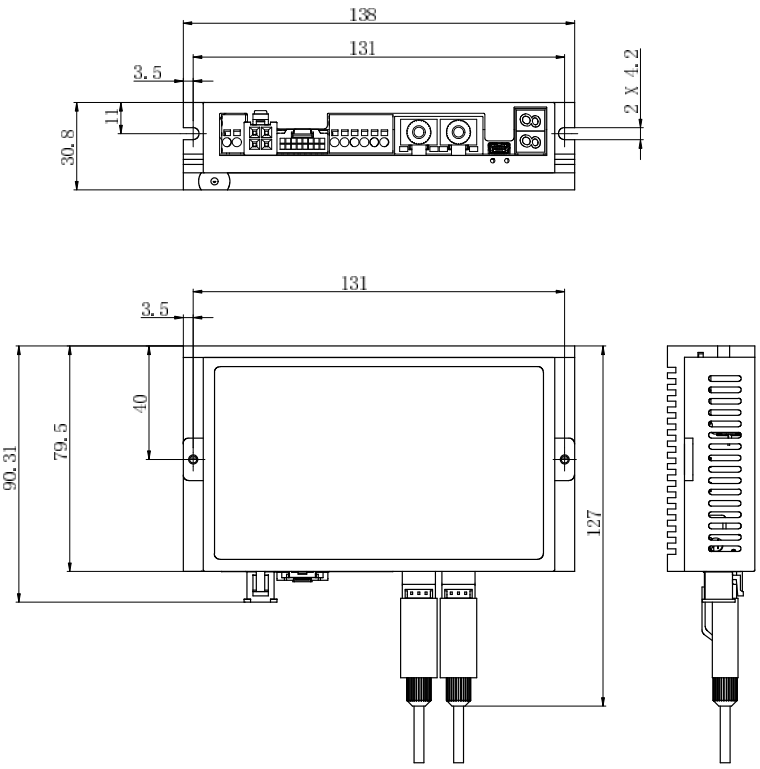
The decimal point of LED1 is used to display the execution state of the Q program, and this decimal point flashes with the period of 250ms to indicate that the Q program is being executed.

The decimal point of LED2 is used to display the drive enabling situation, this decimal point is off which indicates the drive is disable, otherwise the drive is enable.

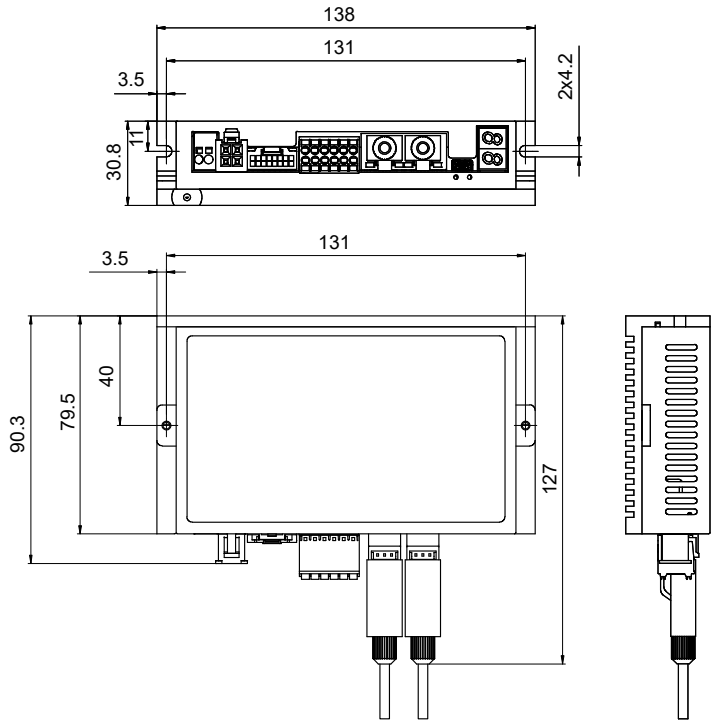
6 Reference Materials

6.1 Drive Mechanical Outlines(Units: mm)

SSDC06/10-ECX-H



SSDC06/10-ECX-J



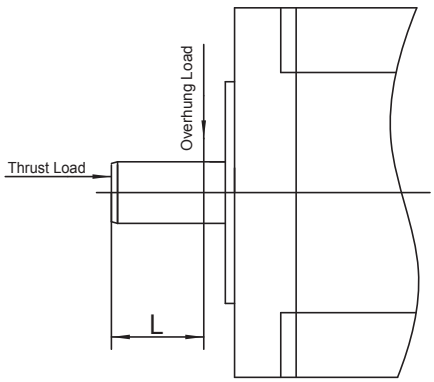
6.2 Technical Specifications

Power Amplifier		
Amplifier Type		Dual H-Bridge, 4 Quadrant
Current Control		4 state PWM at 16 KHz
Output Current		SSDC06: Continuous Current 6A max, Boost Current 7.5A max (1.5s), current limitation auto set-up by attached motor
		SSDC10: Continuous Current 10A max, Boost Current 15A max (1.5s), current limitation auto set-up by attached motor
Power Supply		SSDC06: External nominal 24 - 70 volt DC power supply required, Absolute maximum input voltage range 18 - 75 VDC
		SSDC10: External nominal 24 - 70 volt DC power supply required, Absolute maximum input voltage range 18 - 75 VDC
Protection		Over-voltage, under-voltage, over-temp, motor/winding shorts (phase-to-phase, phase-to-ground)
Controller		
Electronic Gearing & Encoder Resolution		20000 counts/rev(for AM17/23/24/34SS-N motors)
		4096 counts/rev(for AM08/11/17/23/24/34RS motors)
Speed Range		Up to 3000rpm
Filters		Digital input noise filter, Analog input noise filter, Smoothing filter, PID filter, Notch filter
Non-Volatile Storage		Configurations are saved in FLASH memory on-board the DSP
Protocol		CoE conform CiA402, VoE(Supports update the firmware over EtherCAT)
Modes of Operation		Profile Position, Profile Velocity, Profile Torque, Cyclic Synchronous Position, Cyclic Synchronous Velocity and Homing mode, Q programmer
Sync		SM Event：PP，PV，PT，Homing，Q program
		SYNC Event：CSP，CSV，Homing，Q program
Digital Inputs	SSDC06/10-ECX-H	3 digital inputs X3, X4, X7：Optically isolated, single-ended, 5-24VDC; Minimum pulse width = 100 μs,Maximum pulse frequency = 5KHz
	SSDC06/10-ECX-J	5 digital inputs X3, X4, X5, X7, X8：Optically isolated, single-ended, 5-24VDC; Minimum pulse width = 100 μs,Maximum pulse frequency = 5KHz
Digital Outputs	SSDC06/10-ECX-H	1 digital output Y2：Optically isolated, Open Collector, 30V/100 mA max, Maximum pulse frequency = 10KHz
	SSDC06/10-ECX-J	2 digital outputs Y1, Y2：Optically isolated, Open Collector, 30V/100 mA max, Maximum pulse frequency = 10KHz
Analog Inputs		1 analog input (Only for SSDC06/10-ECX-J)
		Analog resolution: 12bit
		Each input can accept a signal range of 0 to 5 VDC, ±5 VDC, 0 to 10 VDC or ±10 VDC
+5V Output		4.8~5V, 100 mA max (Only for SSDC06/10-ECX-J)
Communication		USB for configuration
		EtherCAT (Dual-port RJ45)
Physical		
Ambient Temperature		0 to 40° C (32 to 104° F) when mounted to a suitable heatsink
Ambient Humidity		90% Max., non-condensing

6.3 Recommended Motors

Model	Drive P/N	Torque	Rotor Inertia	Encoder Resolution	Maximum Speed	Mass	Frame Size	Permissible Overhung Load(N) Distance(L) from Shaft End(mm)					Permissible Thrust Load
		Nm	gcm^2	counts/rev	RPM	g	mm	0	5	10	15	20	
AM08RS1DMA	SSDC03	0.03	1.6	4096	3600	50	20	12	15	20	-	-	Less than the motor mass
AM08RS2DMA		0.042	2.9			70							
AM08RS3DMA		0.05	4.2			90							
AM11RS1DMA		0.065	9	4096		118	28	20	25	34	52	-	
AM11RS2DMA		0.08	12			168							
AM11RS3DMA		0.125	18			218							
AM17RS1DM□	SSDC03 or SSDC10	0.26	38	4096		390	42	35	44	58	85	-	
AM17RS2DM□		0.42	57			440							
AM17RS3DM□		0.52	82			520							
AM17RS4DM□		0.7	123			760							
AM17SS1DG□-N		0.26	38	20000		390							
AM17SS2DG□-N		0.42	57			440							
AM17SS3DG□-N		0.52	82			520							
AM17SS4DG□-N		0.7	123			760							
AM23RS2DM□	SSDC06 or SSDC10	0.95	260	4096		850	56	63	75	95	130	190	
AM23RS3DM□		1.5	460			1250							
AM23RS4DMA		2.4	365			1090							
AM23SS2DG□-N		0.95	260	20000		850							
AM23SS3DG□-N		1.5	460			1250							
AM23SS4DGA-N		2.4	365			1090							
AM24RS3DM□		2.5	900	4096		1650	60	90	100	130	180	270	
AM24SS3DG□-N		2.5	900	20000		1650							
AM34RS1DMA	SSDC10	2.7	915	4096		2000	86	260	290	340	390	480	
AM34RS3DMA		5.2	1480			3100							
AM34RS5DMA		7.0	2200			4200							
AM34SS1DGA-N		2.7	915	20000		2000							
AM34SS3DGA-N		5.2	1480			3100							
AM34SS5DGA-N		7.0	2200			4200							

□: A or B, refer to motor part numbering system



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