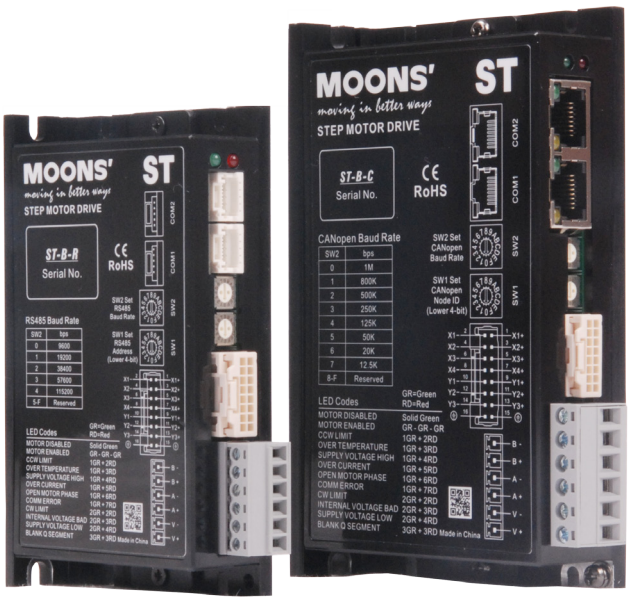
STB

Stepper Motor Drive
Hardware Manual

MSSTB05-R MSSTB10-R
MSSTB05-C MSSTB10-C



SHANGHAI AMP & MOONS' AUTOMATION CO.,LTD.

Rev. 1.0
09/06/2015

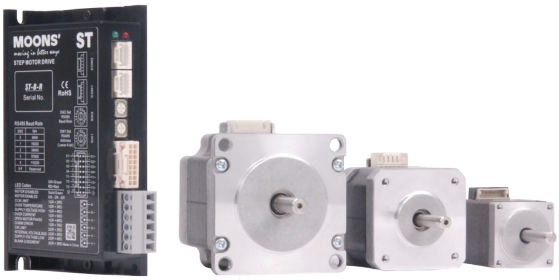
Contents

This User Manual is only applicable to the following models.

Model	Communication	
	RS-485	CANopen
MSSTB05-R	✓	
MSSTB10-R	✓	
MSSTB05-C		✓
MSSTB10-C		✓

1 Introduction

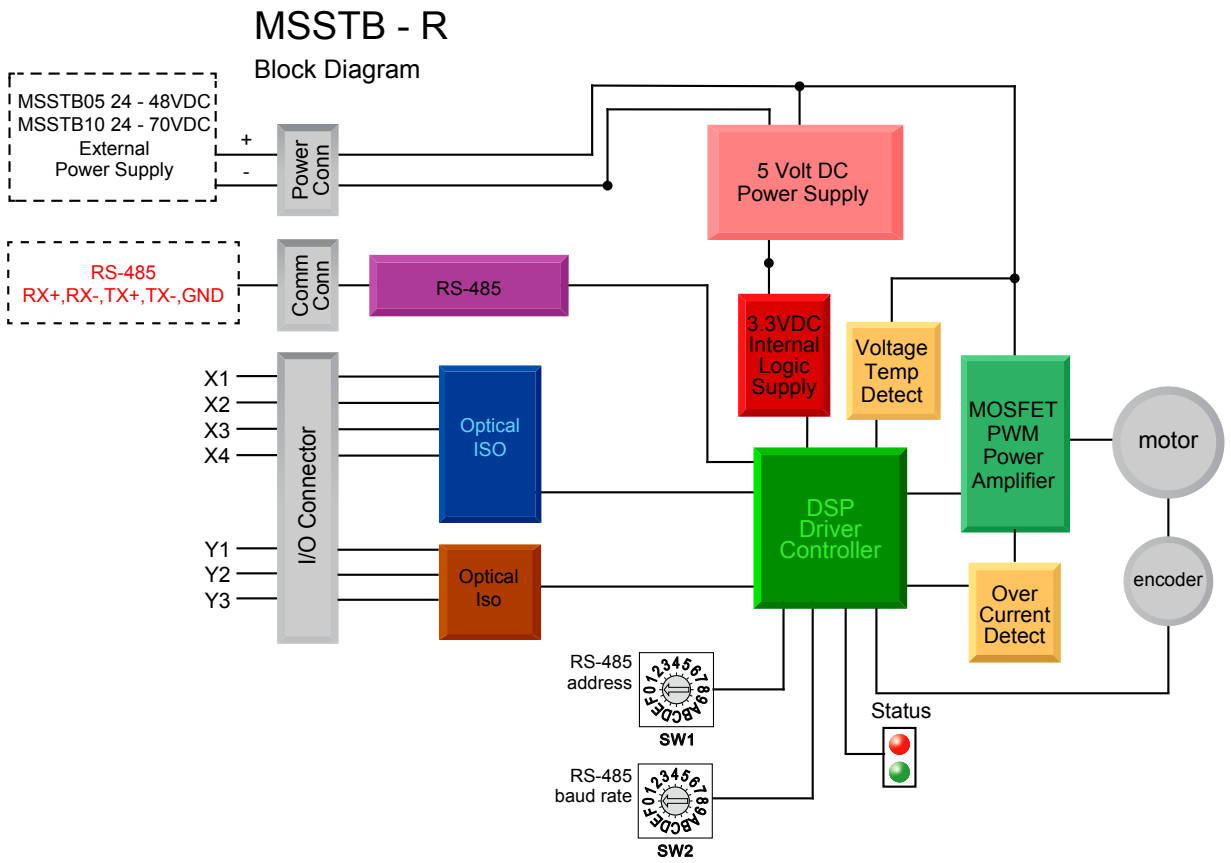
Thank you for selecting the MOONS' STB series stepper drive. The STB series are high performance fieldbus control stepper drive which also integrates with built-in motion controller. The drives can be controlled by SCL, Modbus/RTU or CANopen in real time. Motion profiles can also be programmed and stored in drives (Q Program) and then be triggered by SCL, Modbus/RTU or CANopen commands. The drives support RS-485/422 or CANopen communication.

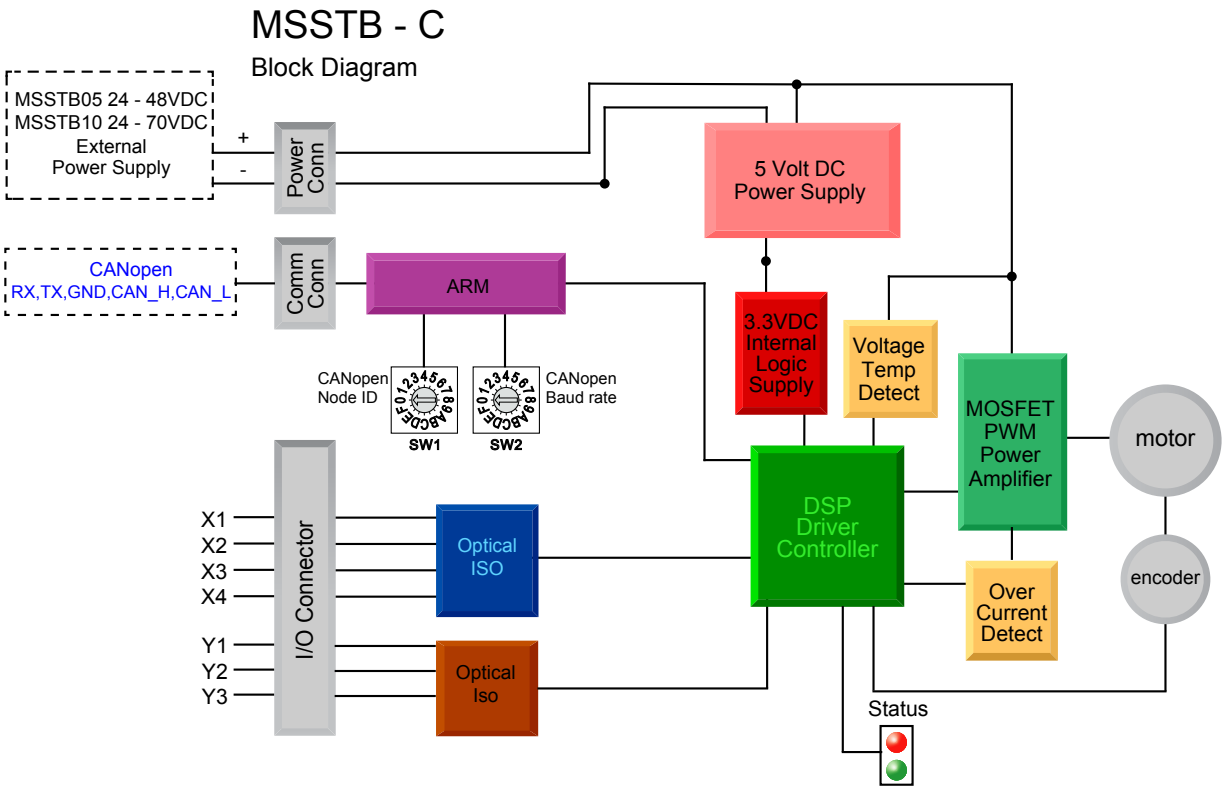


1.1 Features

- Programmable, filed bus controlled stepper motor drive in compact package
- Operating DC voltage range:
  - MSSTB05 24-48V
  - MSSTB10 24-70V
- Control Mode
  - SCL
    - * Serial Communication Command
  - Q program
    - * Stand-Alone operation mode
  - Modbus/RTU (-R model only)
  - CANopen(-C model only)
    - * Compliant with CiA301 and CiA402 standanrd
- Communication
  - -R: Dual port RS-485/422
  - -C: Dual port CANopen, RS-232 included
- MSSTB05 output current: max 5A/phase (peak-of-sine)
- MSSTB10 output current: max 10A/phase (peak-of-sine)
- I/O
  - 4 optically isolated digital inputs, 5-24VDC
  - 3 optically isolated digital outputs, max30V/100mA

1.2 Block Diagram





1.3 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 24-48VDC power supply (24-70VDC power supply for MSSTB10), see the section below entitled “Choose a Power Supply” for help in choosing the right one.
- A compatible stepper motor, please see the section below entitled “Recommended Motor”
- A small flat blade screwdriver for tightening the connectors screw(included)
- A PC running Microsoft Windows XP / Vista / Windows 7/ Windows 8(32-bit or 64-bit)operation system
- Install ***STB Configurator*** software (Available from MOONS’ website)
- -R model

  For MSSTB05-R drive, a RS-485 daisy chain communication cable is included in the package. It is used for connection with the next drive in the RS-485 network. It can also be used for connection with PC for drive configuration.

  For MSSTB10-R drive, a network cable is included in the package. It is used for connection with the next drive in the RS-485 network. It can also be used for connection with PC for drive configuration.
- -C model

  A RS-232 programming cable(included in the package)

  For MSSTB05-C drive, a CANopen daisy chain communication cable is included in the package. It is used for connection with the next drive in the CANopen network.

  For MSSTB10-C drive, a network cable is included in the package. It is used for connection with the next drive in the CANopen network.

TIP: When connecting the first drive in the RS-485 or CANopen network with PC or controller. you can cut the daisy chain cable or network cable into two: one half is used for connection with the RS-485 or CANopen port on the PC or controller, the other half can be used for connection with termination resistor, which can be put at the end of the network.

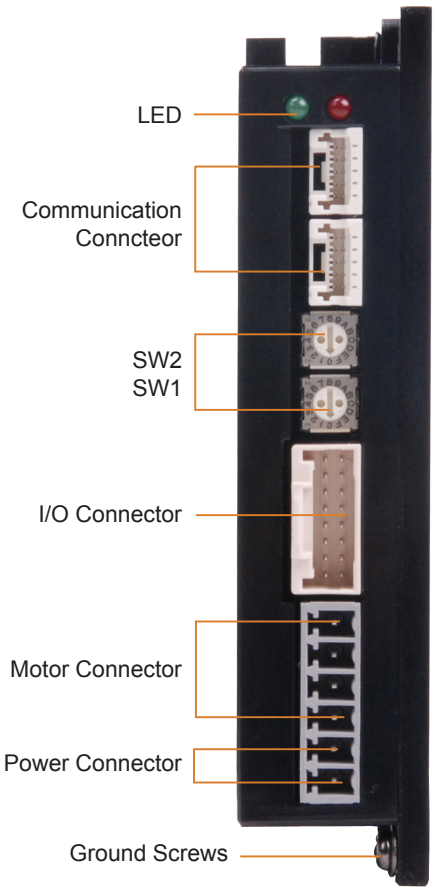
2.1 Installing Software

- Download the ***STB Configurator*** Software from the MOONS' website and install it.
- Launch the software by clicking Start-----Programs ----MOONS'
- Connect the drive to the PC using communication cable:

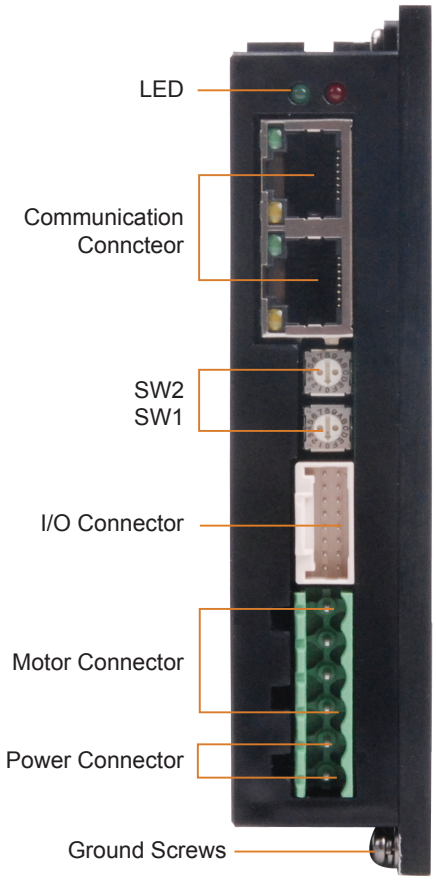
  Connect the -R model drive to the RS-485 port of the PC using the daisy chain cable or network cable included in the package

  Connect the -C model drive to the RS-232 port of the PC using the RS-232 cable included in the package

The connectors and other points of interest are illustrated below:



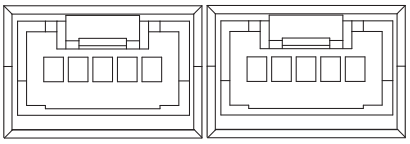
Model number
MSSTB05-R
MSSTB05-C



Model number
MSSTB10-R
MSSTB10-C

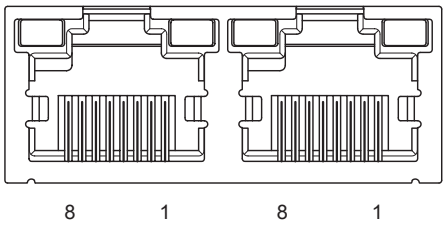
2.2 Connecting communication (-R model)

MSSTB05-R RS-485 Port



PIN	Signal
1	RX+
2	RX-
3	TX+
4	TX-
5	GND

MSSTB10-R RS-485 Port



PIN	Signal
1	RX+
2	RX-
3	TX+
4.5	NC
6	TX-
7.8	GND

Connection STB drive with PC using RS-485 communication

Before using ***STB configurator*** for –R drive configuration, please connect COM1 or COM2 on the driver to host PC by RS-485 daisy chain cable or network cable provided. Both 4 wire connection or 2 wire connection can be used.

RS-485 four-wire connection:

Drive	Connection
RX+	Connect to host's TX+
RX-	Connect to host's TX-
TX+	Connect to host's RX+
TX-	Connect to host's RX-
GND	Connect to host's GND

RS-485 two-wire connection:

Drive	Connection
RX+	Connect to host's +
RX-	Connect to host's -
TX+	Connect to host's +
TX-	Connect to host's -
GND	Connect to host's GND

NOTE: The RS-485 port on the drive is isolated from internal circuitry of the drive. So the GND of each drive's RS-485 port must be connected together. The first drive's GND of the RS-485 port must be connected to the GND of RS-485 port on the host PC or controller.

RS-485 network connection

Multiple –R model drive network can be built via dual RS-485 communication port by daisy chain cable or network cable provided.

RS-485 Four-wire Configuration

RS-485 four-wire system utilize separate transmit and receive wires. One pair of wires connect the host's transmit signals(TX+/TX-) to each drive's RX+/RX- receive terminals. The other pair connects the drive's TX+/TX- terminals to the host's receive signals. A logical ground terminal is provided on each drive and can be used to keep all the drives at the same ground potential. The first drive's logical GND of the RS-485 bus must connect to host's ground.

Four-wire Connection

Connect the drive's RX+ to the TX+ terminal of the host controller,and connect the drive's RX- to the TX- terminal of the host controller . Connect the drive's TX+ to the RX+ terminal of the host controller,and connect the drive's TX- to the RX- terminal of the host controller .

Connect the drive's GND and the host's GND to a same ground.

NOTE: The RS-485 port on the drive is isolated from internal circuitry of the drive. So the GND of each drive's RS-485 port must be connected together. The first drive's GND of the RS-485 port must be connected to the GND of RS-485 port on the host PC or controller.

RS-485 Tow-wire Configuration

In a two-wire system ,the data transmitting and receiving use a same cable. the host must stop its transmitting before receiving data. That means the host must stop transmit data before drive begins to answer a query which just come from the host, otherwise the host cannot receive any data witch sent from a drive. There is a transmit delay parameter that can be adjusted to compensate for a host that is slow to disable its transmitter. This adjustment can be set over the network using the TD command,it also can be set by using the ***STB Configurator*** software. Users can set a shorter transmit delay in a four-wire system.

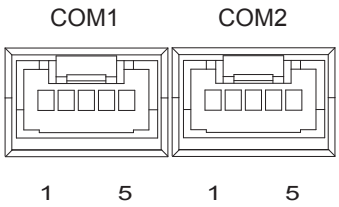
Two-wire connection

The RX+ and TX+ of the drive connect to the host's + in parallel. The RX- and TX- of the drive connect to the host's - in parallel. Connect the drive's GND and the host's GND to a same ground.

NOTE: The RS-485 port on the drive is isolated from internal circuitry of the drive. So the GND of each drive's RS-485 port must be connected together. The first drive's GND of the RS-485 port must be connected to the GND of RS-485 port on the host PC or controller.

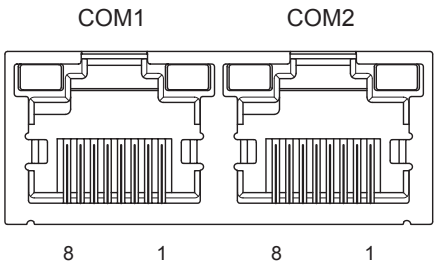
2.3 Connecting communication (-C model)

MSSTB05-C COM Port



PIN	COM1 Signal	COM2 Signal
1	RS-232_TX	NC
2	RS-232_RX	NC
3	CAN_H	CAN_H
4	CAN_L	CAN_L
5	GND	GND

MSSTB10-C COM Port



PIN	COM1 Signal	COM2 Signal
1	CAN_H	CAN_H
2	CAN_L	CAN_L
3,7,8	GND	GND
4	RS-232_TX	NC
5	RS-232_RX	NC
6	NC	NC

PC connection with RS-232 cable

Before using ***STB configurator*** for –C drive configuration, please connect COM1 on the driver to host PC by RS-232 programming cable.

CANopen network connection

Multiple –C model drive network can be built via dual CANopen communication port by daisy chain cable or network cable provided.

NOTE: The CANopen port on the drive is isolated from internal circuitry of the drive. So the GND of each drive's CANopen port must be connected together. The first drive's GND of the CANopen port must be connected to the GND of CANopen port on the controller.

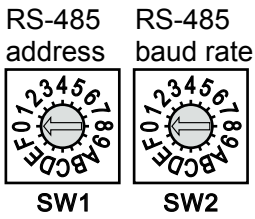
2.4 Setting bus address and baud rate

MSSTB drives have two rotary switches to set the bus address and baud rate.

2.4.1 RS-485 address and baud rate settings(-R model)

Set drive's RS-485 address by rotary switch SW1

Set drive's RS-485 baud rate by rotary switch SW2



SW1 is used to set drive's RS-485 address, and the range is 0~F (0~15 in decimal). If you want to set the drive's RS-485 address range to 10~1F (16~31 in decimal), you need to configure it in ***STB Configurator*** software.

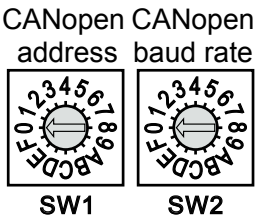
Upper/Lower addr	SW1 position	SCL addr	Upper/Lower addr	SW1 position	SCL addr
Lower(Axis 0~15)	0	0	Upper(Axis 16~31)	0	@
	1	1		1	!
	2	2		2	"
	3	3		3	#
	4	4		4	$
	5	5		5	%
	6	6		6	&
	7	7		7	'
	8	8		8	(
	9	9		9	)
	A	:		A	*
	B	;		B	+
	C	<		C	,
	D	=		D	-
	E	>		E	.
	F	?		F	/

SW2 position	Baud Rate (bps)
0	9600
1	19200
2	38400
3	57600
4	115200
5-F	Reserved

2.4.2 CANopen address and baud rate settings(-C model)

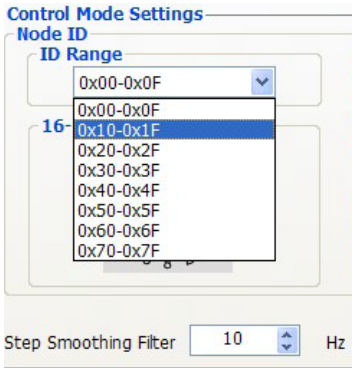
Set drive's CANopen address by rotary switch SW1

Set drive's CANopen baud rate by rotary switch SW2



Each node on a CANopen network must have a unique Node ID. Valid ranges for the Node ID are 0x01 through 0x7F (1~127). Node ID 0x00 is reserved in accordance with CiA301. The Node ID is selected using rotary switches and software; one sixteen position switch set the lower four bits (0~F) of node ID, while upper three bits of node ID are configured by ***STB Configurator*** software. Each time when Node ID is changed, a power cycle is required before the new Node ID is valid.

Please refer to the CANopen manual for more information.



CANopen Baud Rate

There are 8 types of baud rate supported by CANopen communication on MSSTB drive. It is set via SW2 switch on the drive

SW2 position	Baud Rate (bps)
0	1M
1	800K
2	500K
3	250K
4	125K
5	50K
6	20K
7	12.5K
8-F	Reserved

2.5 Connecting the Power Supply

Connect power supply “+” terminal to the drive terminal labeled “V+”.

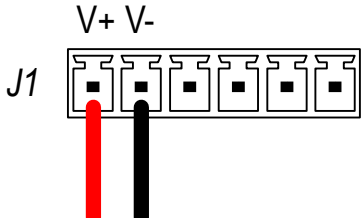
Connect power supply “-” terminal to the drive terminal labeled “V-”.

MSSTB05 accepts DC voltage range from 24 – 48VDC

MSSTB10 accepts DC voltage range from 24 – 70VDC

Warning: DO NOT reverse the wires

NOTE: DO NOT apply power until all connections to the drive have been made



Power Connector

Ensure a proper earth ground connection by using the screw on the left side of the chassis.

Please read “choosing a power supply” for more details.

2.6 Choosing A Power Supply

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

2.6.1 Voltage

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

The MSSTB drive extended range of operation can be as low as 18VDC minimum to as high as 75VDC maximum. (18-53VDC for MSSTB05 Drives) When operation below 18VDC, the MSSTB series will work unstable. The supply input cannot go blow 18VDC for reliable operation, otherwise under voltage alarm will be triggered. MSSTB drive will stop working when this alarm is triggered.

MSSTB05

If a regulated power supply is used,and that is near the driver maximum voltage of 53VDC ,a voltage clamp may be required to prevent the voltage over 53VDC which will occurs a over-voltage fault. When using an unregulated power supply, make sure the no-load voltage of the supply does not exceed the maximum input voltage 53VDC.

MSSTB10

If a regulated power supply is used,and that is near the driver maximum voltage of 75VDC ,a voltage clamp may be required to prevent the voltage over 75VDC which will occurs a over-voltage fault. When using an unregulated power supply, make sure the no-load voltage of the supply does not exceed the maximum input voltage 75VDC.

2.6.2 Current

When MSSTB drives work with different motors, the recommended power supply output current capacity under different supply voltage is shown in below table. The MSSTB drive power supply current is lower than the 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.

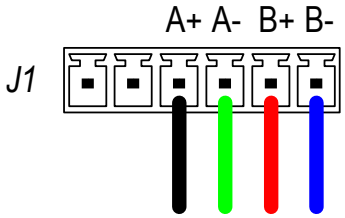
It is important to note that the current draw is significantly different at higher speeds depending on the torque load to the motor. Estimating how much current is necessary may require a good analysis of the load to the motor.

Drive	Motor	Voltage	Current
MSSTB05	AM11	24V	above 1A
	AM14	24V	above 1A
	AM17	24V	above 1.5A
		48V	above 1.5A
	AM23	24V	above 3A
		48V	above 4A
	AM24	24V	above 4.5A
		48V	above 4.5A

Drive	Motor	Voltage	Current
MSSTB10	AM23	24V	above 3A
		48V	above 4A
		70V	above 4A
	AM24	24V	above 4.5A
		48V	above 4.5A
		70V	above 4.5A
	AM34	24V	above 6A
		48V	above 6A
		70V	above 6A

2.7 Connecting the motor

For MOONS' stepper motor, please connect black, green, red, blue wires to drive's A+, A-, B+ and B- correspondingly.



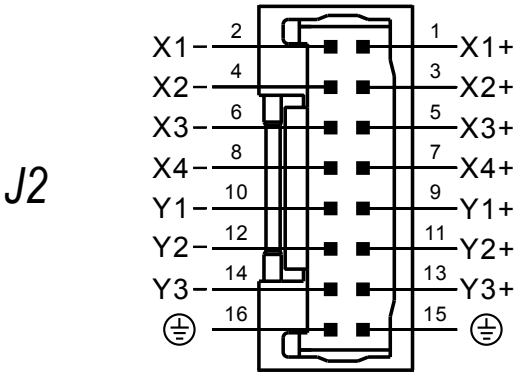
Motor Connector

If using a non-MOONS' motor, please refer to your motor specs for wiring information.

3 Inputs and Outputs

MSSTB05/10-R/C inputs and outputs include:

- 4 optically isolated digital inputs, 5-24VDC for high level voltage
- 3 optically isolated digital outputs, maximum voltage 30V, maximum sinking or sourcing current 100mA



I/O Connector Diagram

3.1 Digital Inputs

3.1.1 X1,X2,X3,X4 digital input signal

X1, X2: optically isolated, differential, 5-24VDC, minimum pulse width 250ns, maximum pulse frequency 2MHz

X3, X4: optically isolated, differential, 5-24VDC, minimum pulse width 50μs, maximum pulse frequency 10KHz

X1 can be used as CW limit input or general purpose input.

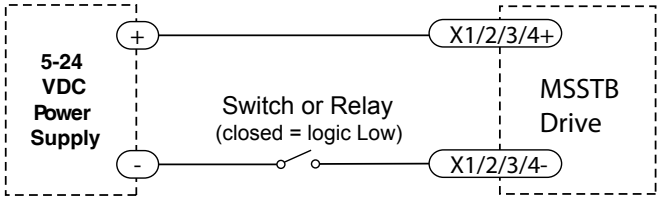
X2 can be used as CCW limit input or general purpose input.

X3 can be used as motor enable input or general purpose input.

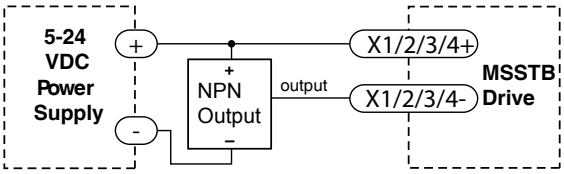
X4 can be used as alarm reset input or general purpose input.

Please use STB Configurator software for X1,X2,X3 and X4 function configuration.

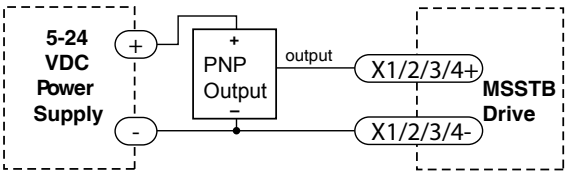
Following graphs shows some common connection methods for the inputs:



Connecting the inputs to a Switch or Relay



Connecting the inputs to a NPN type output



Connecting the inputs to a PNP type output

3.2 Digital Outputs

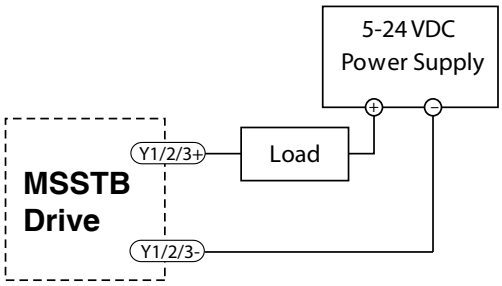
3.2.1 Y1, Y2, Y3 Digital Outputs

- Y1 can be used as alarm output or general purpose output.
- Y2 can be used as brake output or general purpose output.
- Y3 cab be used as motion output , tach output, timing signal output(50pulse/rev) or general purpose output.

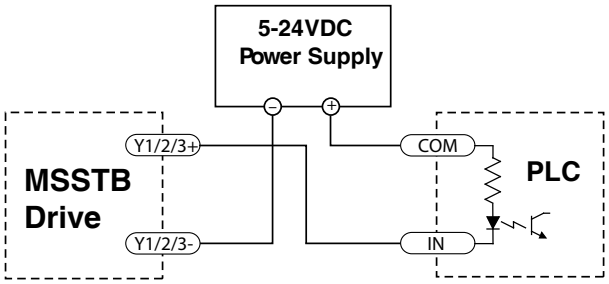
Please use STB Configurator software for Y1,Y2 and Y3 function configuration.

Following graphs shows some common connection methods for the outputs:

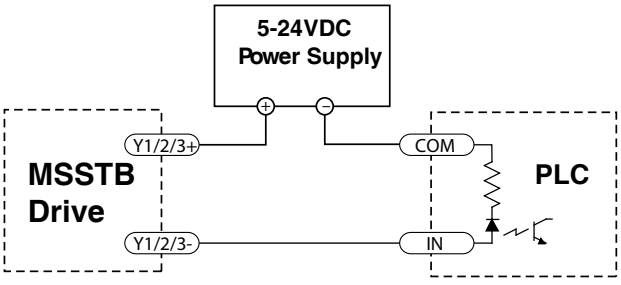
NOTE: Do not connect the outputs to more than 30VDC power supply. And the current of each output terminal must not exceed 100mA.



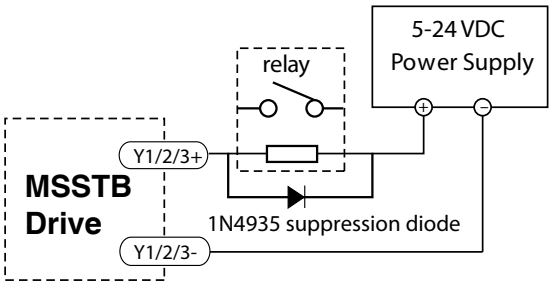
Connecting a sinking output



Connecting a sinking output with PLC's input



Connecting a sourcing output with PLC's input



Driving a relay

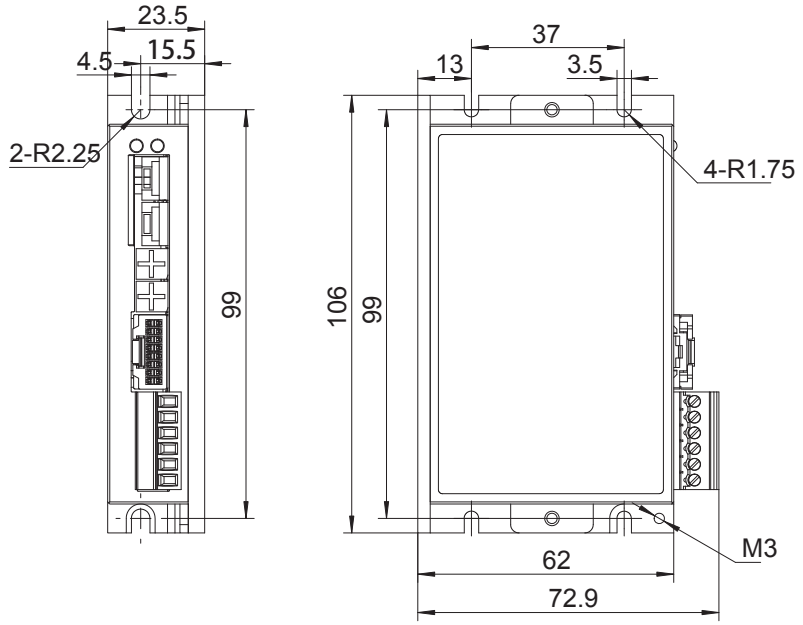
4 Mounting the Drive

Use the M3 or M4 screw to mount the MSSTB series drive .The drive should be securely fastened to a smooth ,flat metal surface the 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.

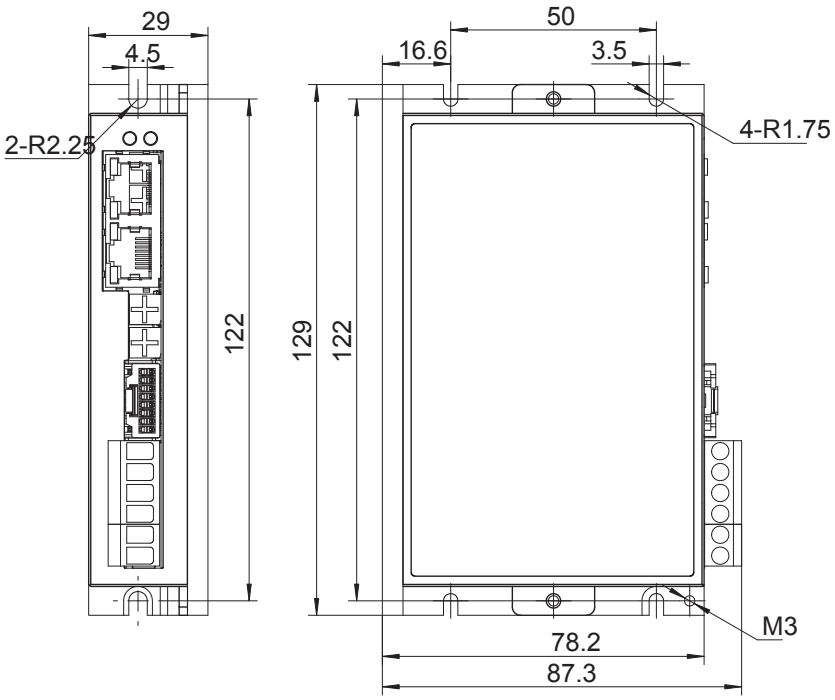
- Never use the drive in a place where there is no air flow or the surrounding air is more than 40℃.
- Never put the drive where it can get wet or where metal or other electrically conductive particle particles can get on the circuity.
- Always provide air flow around the drive. When mounting multiple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

5 Reference Materials

5.1 Drive Mechanical Outlines



Model
MSSTB05-R
MSSTB05-C



Model
MSSTB10-R
MSSTB10-C

5.2 Technical Specifications

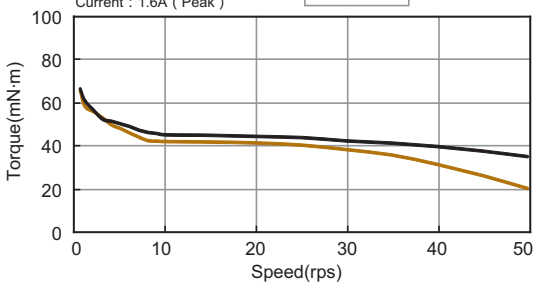
Power Amplifier	
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 20 KHz
Output Current	MSSTB05: 0.1-5.0A/phase (peak-of-sine) in 0.01 amp increments
	MSSTB10: 0.1-10.0A/phase (peak-of-sine) in 0.01 amp increments
voltage range	MSSTB05: 24 - 48VDC
	MSSTB10: 24 - 70VDC
Input Voltage Range	MSSTB05: 18 - 53VDC
	MSSTB10: 18 - 75VDC
Protection	Over-voltage, under-voltage, over-temp, Over-current
Idle Current Reduction	Reduction range of 0 - 90% of running current after a delay selectable in milliseconds
Controller	
Anti-Resonance	Raises the system-damping ratio to eliminate midrange instability and allow stable operation throughout the speed range of the motor
Torque Ripple Smoothing	Allows for fine adjustment of phase current waveform harmonic content to reduce low-speed torque ripple in the range of 0.25 to 1.5 rps
Auto Test & Auto Setup	Auto test and setup at power on (ie. motor resistance, and capacitance) to optimize your system performance.
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Operation Mode	R Version: SCL, Q, Modbus
	C Version: CANopen (CiA301 and CiA402 standard). Q program can also be triggered via CANopen Command
Digital Input	4 digital inputs: X1, X2: Optically isolated, differential, 5-24VDC, minimum pulse width = 250ns, maximum pulse frequency = 2MHz X3, X4: Optically isolated, differential, 5-24VDC, minimum pulse width = 50μs, maximum pulse frequency = 10KHz
Digital Output	3 digital Outputs Y1, Y2, Y3: Optically isolated, 30V/100mA max
Communication Port	R model: dual port RS-485(MSSTB05: crimp style connector / MSSTB10: RJ45 connector)
	C model: dual port CANopen (MSSTB05: crimp style connector / MSSTB10: RJ45 connector) RS-232 included
Physical	
Ambient Temperature	0 - 40°C when mounted to a suitable heat sink
Humidity	90% non-condensing

5.3 Recommended Motor

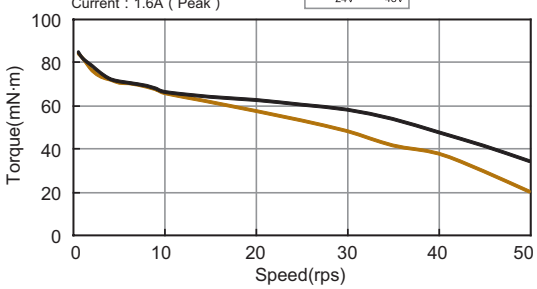
Model	Shaft	Leads	Length"L"	Holding Torque	Current	Resistance	Rotor Inertia	Motor Mass	Dielectric Strength
			mm	N·m	A/Phase	Ω/Phase	g·cm^2	Kg	
AM11HS1008-07	Single Shaft	4	31.0	0.05	1.6	2.5	9.0	0.1	500V AC 1 minute
AM11HS3007-02	Single Shaft		40.0	0.08	1.6	1.7	12.0	0.15	
AM11HS5008-01	Single Shaft		51.0	0.12	1.6	3.5	18.0	0.2	
AM14HYB401-03	Single Shaft		40.0	0.2	1.0	4.3	20.0	0.21	
AM17HD4452-02N	Single Shaft		34.3	0.25	1.8	1.5	38.0	0.23	
AM17HD4452-01N	Double Shaft								
AM17HD4452-E1000D	W/Encoder								
AM17HD2438-02N	Single Shaft		39.8	0.4	1.8	1.9	57.0	0.28	
AM17HD2438-01N	Double Shaft								
AM17HD2438-E1000D	W/Encoder								
AM17HD6426-06N	Single Shaft		48.3	0.5	1.8	2.3	82.0	0.36	
AM17HD6426-05N	Double Shaft								
AM17HD6426-E1000D	W/Encoder								
AM17HDB410-01N	Single Shaft		62.8	0.8	1.6	2.6	123	0.6	
AM23HS0421-01	Single Shaft		41.0	0.6	4.5	0.48	135.0	0.42	
AM23HS0421-02	Double Shaft								
AM23HS0421-E1000D	W/Encoder								
AM23HS2450-01	Single Shaft		54.0	1.2	4.5	0.63	260.0	0.6	
AM23HS2450-02	Double Shaft								
AM23HS2450-E1000D	W/Encoder								
AM23HS3455-01	Single Shaft		76.0	1.8	4.5	0.75	460.0	1.0	
AM23HS3455-02	Double Shaft								
AM23HS3455-E1000D	W/Encoder								
AM23HS5412-01	Single Shaft		111.0	3.2	4.5	1.2	750.0	1.5	
AM24HS2402-08N	Single Shaft		54.0	1.2	4.5	0.43	450.0	0.83	
AM24HS5401-10N	Single Shaft		85.0	2.5	4.5	0.65	900.0	1.4	
AM24HS5401-24N	Double Shaft								
AM24HS5401-E1000D	W/Encoder								
AM34HD0404-08	Single Shaft		66.5	3.0	7.0	0.24	1100.0	1.6	
AM34HD0404-09	Double Shaft								
AM34HD0404-E1000D	W/Encoder								
AM34HD1404-06	Single Shaft		96.0	5.0	7.0	0.33	1850.0	2.7	
AM34HD1404-07	Double Shaft								
AM34HD1404-E1000D	W/Encoder								
AM34HD2403-07	Single Shaft		125.5	7.1	7.0	0.49	2750.0	3.8	
AM34HD2403-08	Double Shaft								
AM34HD2403-E1000D	W/Encoder								

5.4 Torque Curves

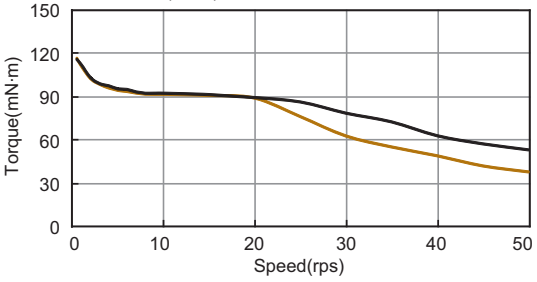
AM11HS1008
Microstep : 20000 steps/rev
Current : 1.6A (Peak)



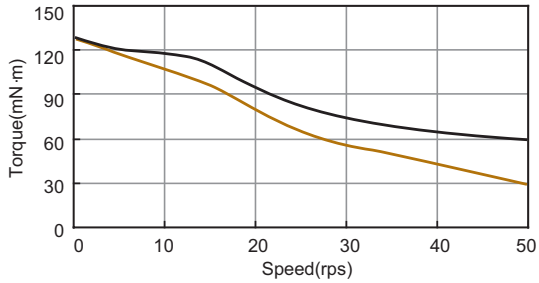
AM11HS3007
Microstep : 20000 steps/rev
Current : 1.6A (Peak)



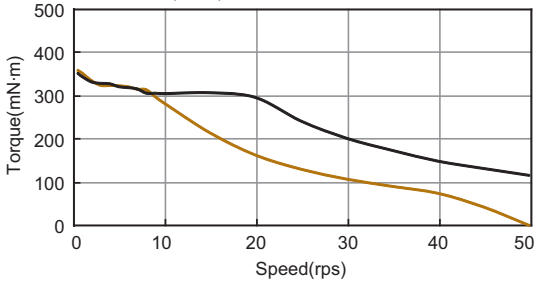
AM11HS5008
Microstep : 20000 steps/rev
Current : 1.6A (Peak)



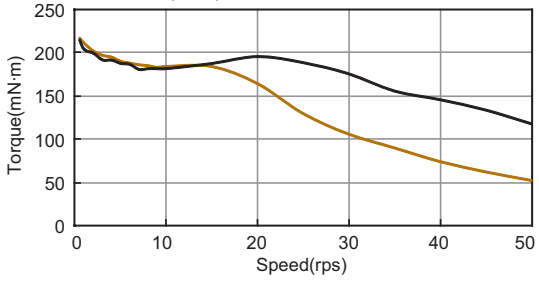
AM14HYB401
Microstep : 20000 steps/rev
Current : 1.0A (Peak)



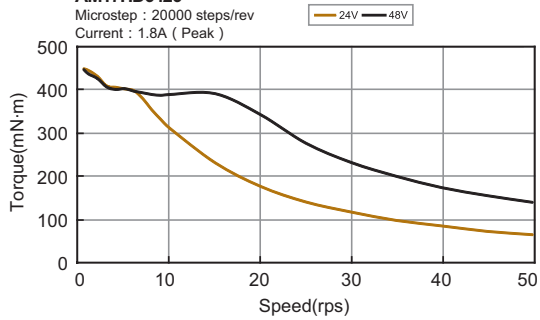
AM17HD2436
Microstep : 20000 steps/rev
Current : 1.8A (Peak)



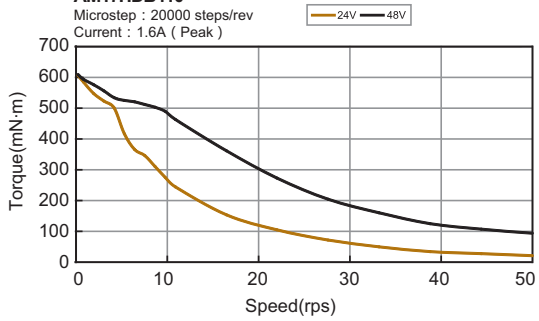
AM17HD4452
Microstep : 20000 steps/rev
Current : 1.8A (Peak)



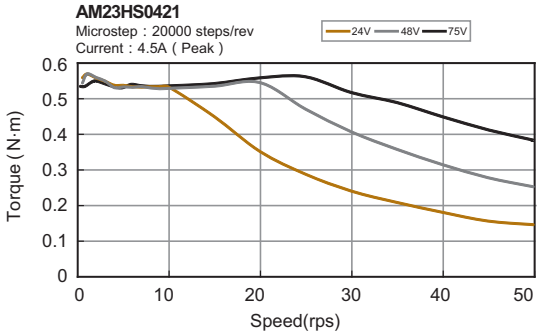
AM17HD6426
Microstep : 20000 steps/rev
Current : 1.8A (Peak)



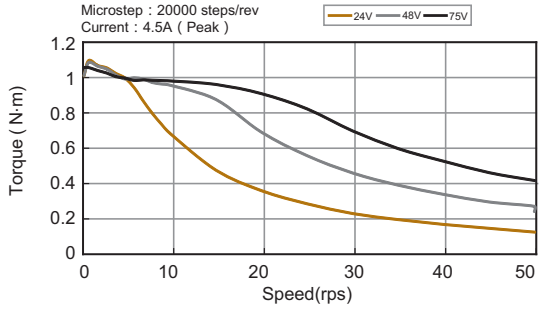
AM17HDB410
Microstep : 20000 steps/rev
Current : 1.6A (Peak)



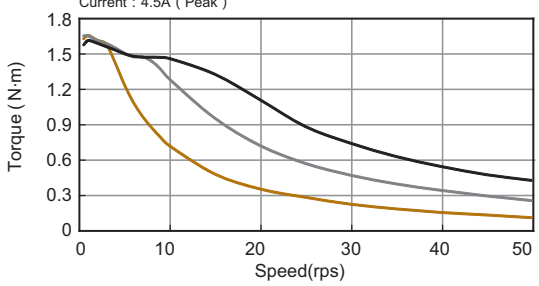
AM23HS0421
Microstep : 20000 steps/rev
Current : 4.5A (Peak)



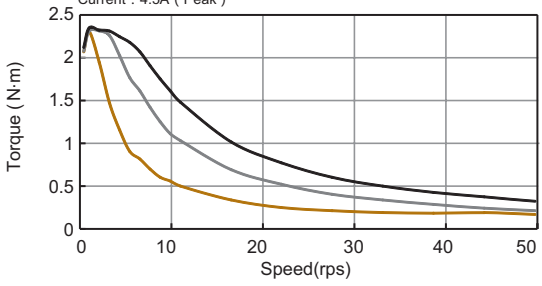
AM23HS2450
Microstep : 20000 steps/rev
Current : 4.5A (Peak)



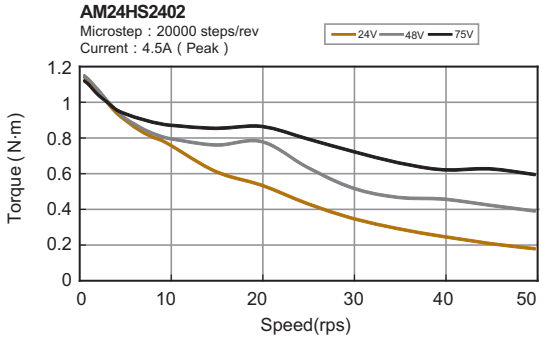
AM23HS3455
Microstep : 20000 steps/rev
Current : 4.5A (Peak)



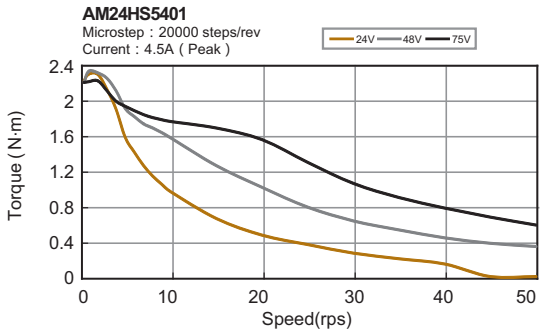
AM23HS5412
Microstep : 20000 steps/rev
Current : 4.5A (Peak)



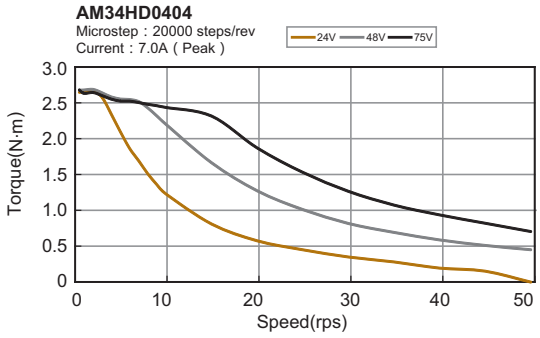
AM24HS2402
Microstep : 20000 steps/rev
Current : 4.5A (Peak)



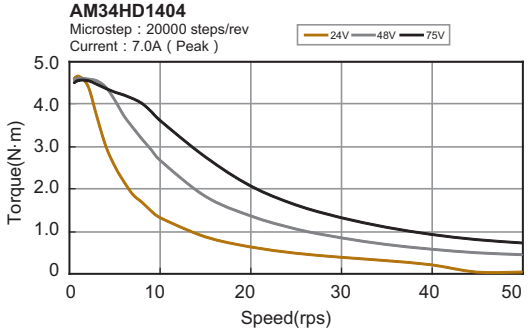
AM24HS5401
Microstep : 20000 steps/rev
Current : 4.5A (Peak)



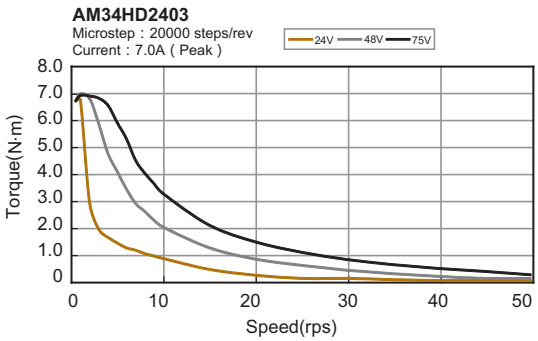
AM34HD0404
Microstep : 20000 steps/rev
Current : 7.0A (Peak)



AM34HD1404
Microstep : 20000 steps/rev
Current : 7.0A (Peak)



AM34HD2403
Microstep : 20000 steps/rev
Current : 7.0A (Peak)



5.5 Numbering System

MSSTB 05 - R

- MSSTB Series
- Output Current
  05 = 5A Peak
  10 = 10A Peak
- Communication
  R = RS-485
  C = CANopen

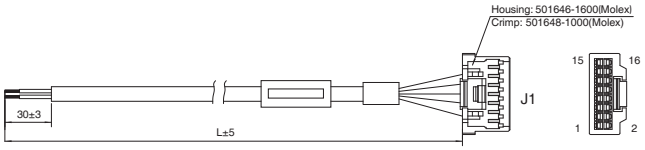
5.6 Ordering Information

Model	Current	Voltage	RS-485	Modbus/RTU	CANopen	Q Program
MSSTB05-R	0.1-5.0A	24-48VDC	√	√		√
MSSTB10-R	0.1-10.0A	24-70VDC	√	√		√
MSSTB05-C	0.1-5.0A	24-48VDC			√	√
MSSTB10-C	0.1-10.0A	24-70VDC			√	√

6 Accessories (Sold Separately)

I/O Cable

P/N	Length
1008-030	0.3m
1008-100	1m
1008-200	2m



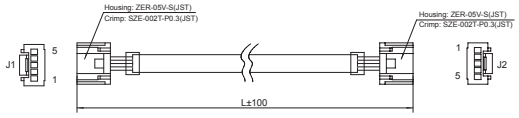
Pin No.	Assignment	Description	Color	Pin No.	Assignment	Description	Color
1	X1+	X1 Digital Input	Red	9	Y1+	Y1 Digital Output	Blue
2	X1-		Black	10	Y1-		Blue/Black
3	X2+	X2 Digital Input	Brown	11	Y2+	Y2 Digital Output	Green
4	X2-		Brown/Black	12	Y2-		Green/Black
5	X3+	X3 Digital Input	Gray	13	Y3+	Y3 Digital Output	Yellow
6	X3-		Gray/Black	14	Y3-		Yellow/Black
7	X4+	X4 Digital Input	White	15	SHIELD	Shiled	black heat-shrink tube
8	X4-		White/Black	16	SHIELD		black heat-shrink tube

RS-485 Daisy Chain Cable

(MSSTB05-R Only)

P/N	Length
2111-025 *	0.25m
2111-050	0.5m
2111-100	1m
2111-300	3m

* 2111-025 is included in the drive package.

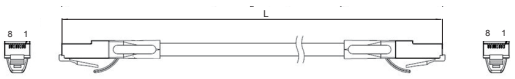


RS-485 / CANopen Daisy Chain Cable

(MSSTB10-R / MSSTB10-C Only)

Common Type	Flexible Type	Length
2012-030 *	2013-030	0.3m
2012-300	2013-300	3m

* 2012-030 is included in the drive package.

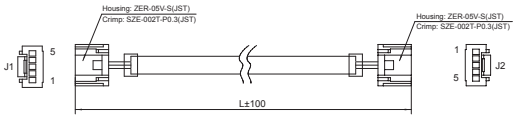


CANopen Daisy Chain Cable

(MSSTB05-C Only)

P/N	Length
2112-025 *	0.25m
2112-050	0.5m
2112-100	1m
2112-300	3m

* 2111-025 is included in the drive package.



RC-880 Regeneration Clamp

RC-880 is used to limit increase in power supply voltage when the motor is decelerating under load. This is commonly referred to as "regeneration".

RC-880 can clamp the regeneration and prevent the power supply and/or drive being damaged or destroyed. Connect the RC-880 between the power supply and the drive.

Max. Supply Voltage: 80V
Max. Output Current: 8A(rms)
Continuous Power: 50W

7 Contacting MOONS'

Service Center
+86-400-820-9661

MOONS' Headquarter

168 Mingjia Road, Minhang District, Shanghai 201107, P.R. China
Tel: +86 (0)21 52634688
Fax:+86 (0)21 52634098

MOONS' International Trading Company

4/F, Building 30, 69 Guiqing Road, Cao He Jin Hi-Tech Park, Shanghai 200233, P.R. China
Tel: +86 (0)21 64952755
Fax:+86 (0)21 64951993

Domestic Offices

Shenzhen
Room 2209, 22/F, Kerry Center, 2008 Renminnan Road, Luohu District, Shenzhen 518001, P.R. China
Tel: +86 (0)755 25472080
Fax:+86 (0)755 25472081

Beijing
Room 816, Tower B, China Electronics Plaza, 3 Danling Street, Haidian District, Beijing 100080, P.R. China
Tel: +86 (0)10 58753312
Fax:+86 (0)10 58752279

Nanjing
Room 1101-1102, Building 2, New Town Development Center, No.126 Tianyuan Road , Moling Street, Jiangning District, Nanjing 211106, P.R. China
Tel: +86 (0)25 52785841
Fax:+86 (0)25 52785485

Qingdao
Room 1012, Zhuoyue Tower, No.16 Fengcheng Road, Shibei District, Qingdao 26000, P.R. China
Tel: +86 (0)532 80969935
Fax:+86 (0)532 80919938

Wuhan
Room 3001, World Trade Tower, 686 Jiefang Avenue, Jianghan District, Wuhan 430022, P.R. China
Tel: +86 (0)27 85448742
Fax:+86 (0)27 85448355

Chengdu
Room 1917, Western Tower, 19, 4th Section of South People Road, Wuhou District, Chengdu 610041, P.R. China
Tel: +86 (0)28 85268102
Fax:+86 (0)28 85268103

Xi'an
Room 1006, Tower D, Wangzuo International City, 1 Tangyan Road, Xi'an 710065, P.R. China
Tel: +86 (0)29 81870400
Fax:+86 (0)29 81870340

Ningbo
Room 309, Tower B, Taifu Plaza, 565 Jiangjia Road, Jiangdong District, Ningbo, 315040, P.R. China
Tel: +86 (0)574 87052739
Fax:+86 (0)574 87052365

Guangzhou
Room 4006, Tower B, China Shine Plaza, 9 Linhe Xi Road, Tianhe District, Guangzhou 510610, P.R. China
Tel: +86 (0)20 38010153
Fax:+86 (0)20 38103661

North America Company

MOONS' INDUSTRIES (AMERICA), INC.
1113 North Prospect Avenue, Itasca, IL 60143 USA
Tel: +1 630 8335940
Fax: +1 630 8335946

APPLIED MOTION PRODUCTS, INC.
404 Westridge Dr. Watsonville, CA 95076, USA
Tel: +1 831 7616555
Fax:+1 831 7616544

LIN ENGINEERING, INC.
16245 Vineyard Blvd., Morgan Hill, CA 95037
Tel: +1 408 9190200
Fax:+1 408 9190201

European Company

MOONS' INDUSTRIES (EUROPE) S.R.L.
Via Torri Bianche n.1 20871 Vimercate(MB) Italy
Tel: +39 039 6260521
Fax: +39 039 9631409

South-East company

MOONS' INDUSTRIES (SOUTH-EAST ASIA) PTE. LTD.
33 Ubi Avenue 3 #08-23 Vertex Singapore 408868
Tel: +65 66341198
Fax: +65 66341138

Japan Company

MOONS' INDUSTRIES JAPAN CO., LTD.
Room 601, 6F, Shin Yokohama Koushin Building, 2-12-1, Shin-Yokohama, Kohoku-ku, Yokohama, Kanagawa, 222-0033, Janpan
Tel: +81 (0)45 4755788
Fax: +81 (0)45 4755787