

# M3 AC Servo System





# M3 Series High Performance Servo System

**Supply Voltage:** 220VAC

**Power Rating:** 100W~2kW

**Servo Drive**

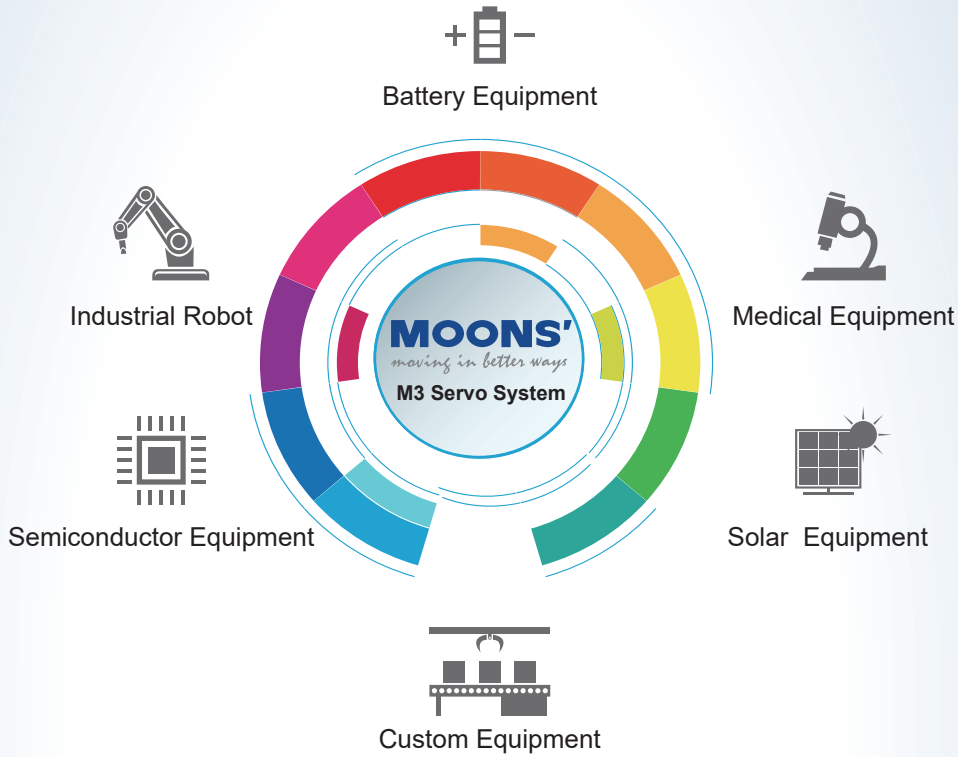
Rated Current: 1.8A, 3.0A, 4.5A, 6.0A, 10A, 13A

**Servo Motor**

Frame Size: 40mm, 60mm, 80mm, 130mm

## Application

M3 Servo System is widely used in industrial robots, semiconductor equipment, medical equipment, custom equipment, solar processing equipment, battery processing equipment, etc.



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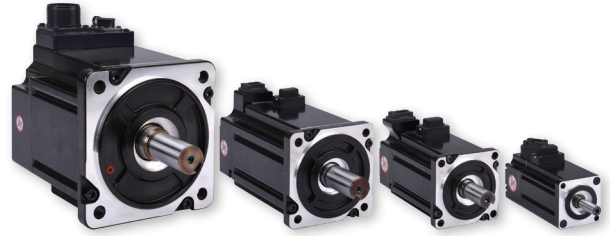
## Standard



## What's NEW

### ● Various Product Lineup

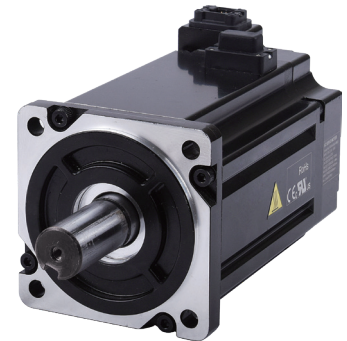
- Frame Sizes: 40/60/80/130mm
- Low / Medium / High Inertia Servo Motor
- Power Rating: 100W to 2kW



### ● High-precision Encoder

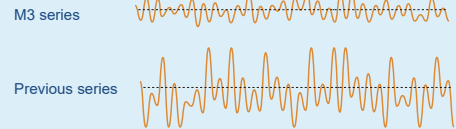
Enhanced high resolution encoder enables smooth speed control and high precise position control of the servo system. Serial communication encoder is used for high EMI immunity and wiring simplicity.

- 20-bit Incremental / Absolute Optical Encoder
  - ◆ High resolution, up to 1,048,576 divisions pre revolution
  - ◆ Optional battery backup for 16-bit multi-turn
- 17-bit Battery-less Absolute Multi-turn Encoder
  - ◆ High resolution, up to 131,072 divisions pre revolution
  - ◆ Battery-less for 16-bit multi-turn
- 17-bit Incremental Magnetic Encoder
  - ◆ High resolution, up to 131,072 divisions pre revolution
  - ◆ Robust design for harsh environment application



### ● Low Cogging Torque

- New servo motor design reduces motor cogging torque by 20%, it significantly reduces the motor speed and torque fluctuation.
- With up to 20-bit high-precision encoders, the equipment runs smoothly at constant speed and low speed.



### ● Two Optional I/O Connectors



#### 50Pin high density type

- ◆ Varieties of input and output signal options
- ◆ The connector is fastened to the drive with screw



#### 26Pin push-in spring type

- ◆ Fast and reliable connection
- ◆ With self-locking function

Features

Drive Numbering Information

Drive Overview

Motor Numbering Information

Servo Drive and Motor Matching List

Drive Specification

Motor Specification

Accessories



## Easy Set-up

For M3 Servo system, our commitment is to improve your work efficiency on every step of the way, from system installation, tuning and maintenance.

Unpacking



Wiring



Tuning

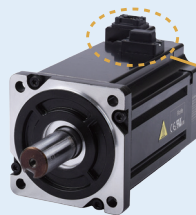


Commissioning

### Easy wiring



- Spring type I/O and power connector



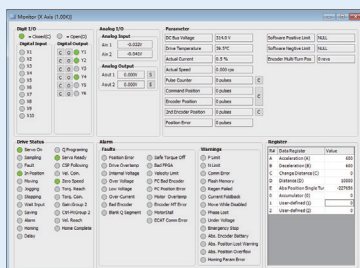
- Plug-in type IP65 protection level connector

### Easy tuning

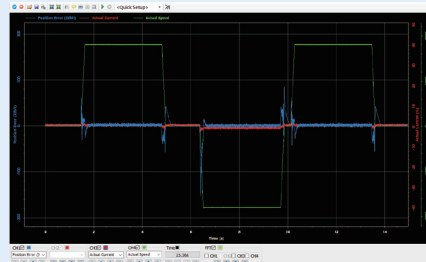
- High speed USB communication between tuning software and drive
- The drive automatically recognizes motors with smart encoder
- Both auto-tuning and tuning-less adjustment function are available
- Stable and smooth operation without complicated gain setting

### Friendly software

- Operating Status Monitor



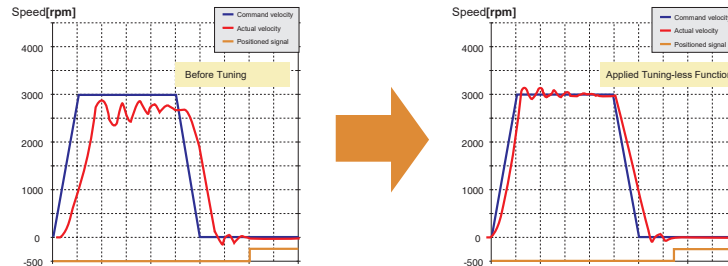
- Real-time Oscilloscope Interface



## Easy Tuning

### Tuning-less Function

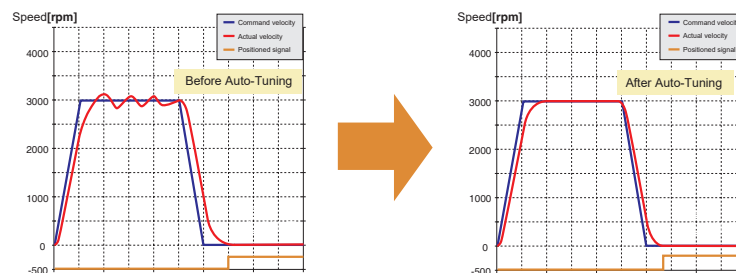
- ◆ No tuning is required for load up 30 times of the load inertia ratio.
- ◆ No limitation towards any load type and drive control mode.
- ◆ High robustness for maximum control of servo system stability.



### Auto-tuning

The real-time auto-tuning algorithm can automatically identify the load inertia (ratio), gain and vibration suppression parameters in real time.

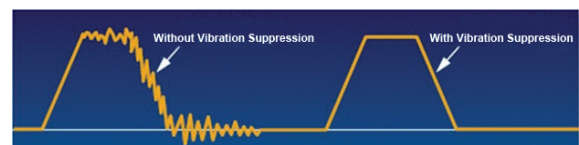
The auto-tuning function can greatly shorten your system tuning time, improve system responsiveness and equipment production efficiency.



### Notch Filters

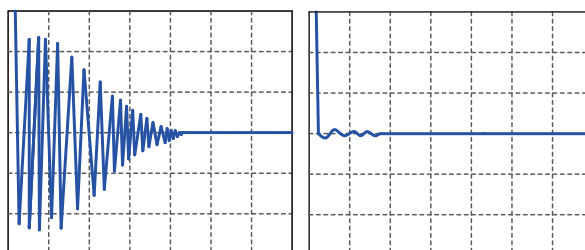
There are 4 notch filters available for suppress mechanical vibration.

- ◆ 2 sets of automatically set notch filters can search and set resonance frequency automatically.
- ◆ 2 sets of manual notch filters for more adjust options.



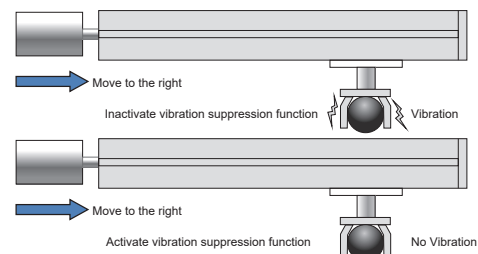
### Mechanical End Vibration Suppression

Vibration at the end of the machine will lead to longer system setting time, resulting in the decrease of product precision or production efficiency. With mechanical end vibration suppression control, M3 servo can suppress vibrations at the end of the machine, shortening tuning time, increasing the system precision and productivity.



Without Anti Vibration

With Anti Vibration

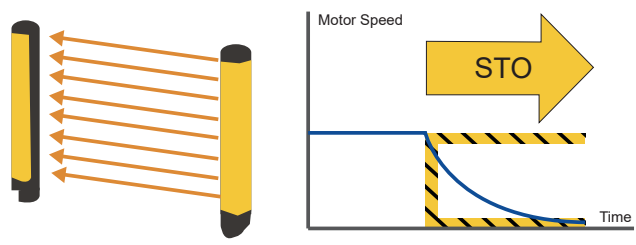


# Reliable Operation

## ● STO

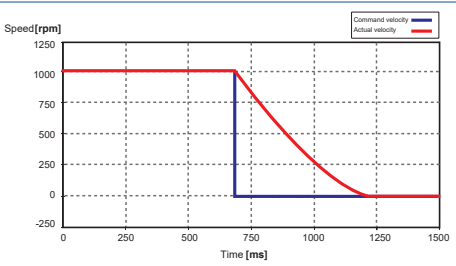
Safe Torque Off (STO) is a hardware level safety protection function. When the STO function is activated, the ability to drive motor current is cut-off. In case of an emergency, this operator can protect human and equipment safety while the drive is continuously powered.

M3 series drive meets UL61800-5-2(SIL2), IEC61508, ISO138491(PL d).

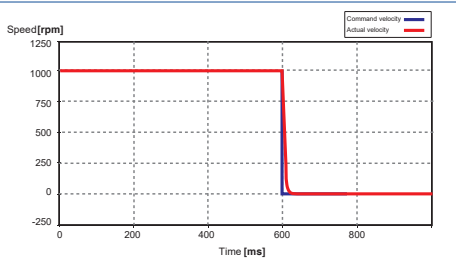


## ● Dynamic Brake

Dynamic brake is a mechanism that stops the motor with the fastest speed by shorting the motor three-phase in case of an emergency, the intention is to protect the safety of equipment and surrounding. Dynamic brake is driven by motor's back EMF current, no external power source is needed to engage or disengage the brake function.



**Without Dynamic brake**  
The drive will disable, decelerate and free stop uncontrollable while a fault occurs. The deceleration time and distance are determined by the system inertia and friction.



**Dynamic brake is in effect**  
The velocity command is set to 0 as soon as the drive is disabled. The actual velocity ramps down immediately as the braking applies.

## ● Built-in Regenerative Absorbing Resistor

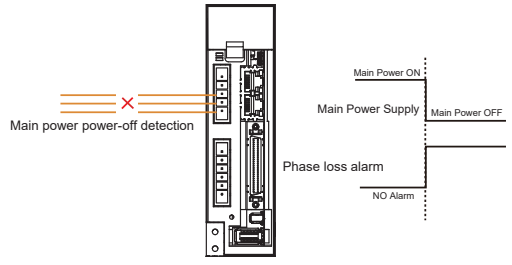
All M3 drives have built-in regenerative absorbing resistor, it can consume the regenerative energy generated when the motor and load decelerate rapidly, make sure the servo system can stop quickly and operate reliably.

No additional absorbing resistor is required for most applications.



## ● Main Power Power-off & Phase Loss Detection

The power source is monitored during the operation process, it detects whether the main power power-off or phase loss, and provides faster protection measures for the servo system that fail caused by sudden power failure.



## Brand New Motor Features

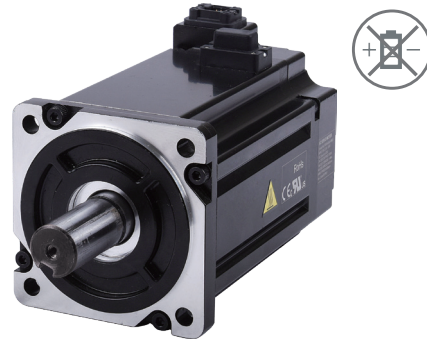
### ● Smaller Size, More Efficient

The new magnetic circuit design improves the efficiency of the servo motor, reduces heat generation, and makes the motor shorter.



### ● Battery-less Absolute Encoder

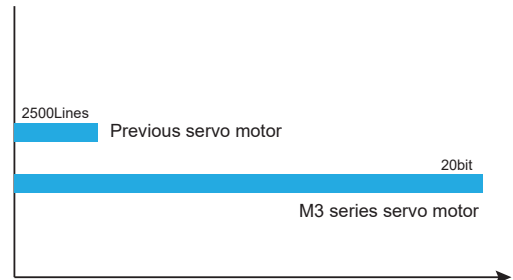
The 17-bit absolute multi-turn encoder records encoder position even when the drive power is off. It will dramatically reduce your system complexity and design cost.



### ● High Positioning Accuracy

Combining high resolution encoder and low cogging motor, M3 provides ultimate smooth and accurate motion experience.

- ◆ 20-bit optical encoder, the number of feedback pulses per revolution is up to 1,048,576.
- ◆ Absolute encoder with battery, even if the drive is powered off, it can record current position of the motor.
- ◆ There is also a battery-less absolute encoder option, the actual position of the motor will not be lost when the drive is powered off.



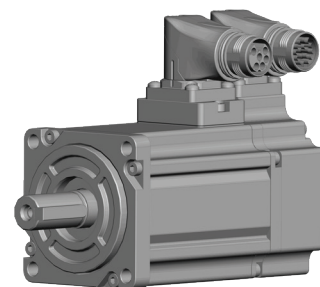
### ● Push-in Type Connector

- ◆ Both power and encoder cable are equipped with plug-in connectors
- ◆ Convenient for installation and easy for system wiring
- ◆ IP65 protection level (with oil seal)



### ● Sealed Metal Connector (Under Developing)

- ◆ Better EMC protection performance
- ◆ Applicable motor frame size: 40/60/80/130mm
- ◆ There are two options of straight head and 90 ° elbow





## ● Low, Medium, High Inertia Servo Motor

A suitable motor rotational inertia will be benefit to optimize your mechanical system performance.

Low inertia motor	Medium inertia motor	High inertia motor
Suitable for most of applications ◆ Low inertia load ◆ High acceleration and deceleration ◆ Quick and frequent starting and stopping	Suitable for applications with low mechanical stiffness ◆ Belt and synchronous belt load ◆ Large inertia load ◆ Stability improvement during high-speed operation	Suitable for large inertia load ◆ Large inertia belt load ◆ Low speed and high torque ◆ Turntable with a large moment of inertia

## ● IP65 Protection Level

The M3 series servo motors are designed to protect against water and dust (Except transfixion part of shaft).

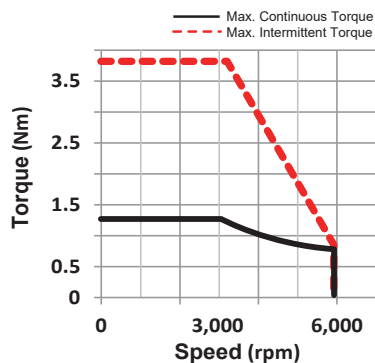
If the transfixion part of shaft needs to meet the IP65 protection level, please install the oil seal or select the servo motor model with oil seal.



Note: The installation of oil seal will bring extra torque loss. With oil seal, please consider 90% of the rated torque as current torque.

## ● High Speed Motor with 300% of Rated Torque

- ◆ The maximum speed of M3 series servo motor is 6000rpm.
- ◆ 300% peak torque is conducive to providing higher acceleration and deceleration, leading to better manufacture efficiency and capacity.



## Various of Control Mode

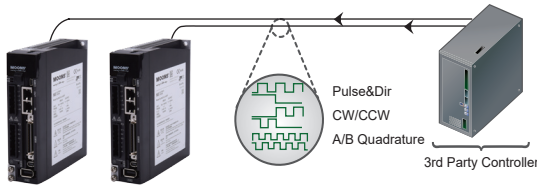
### Digital Pulse Position Modes

Support STEP/DIR, CW/CCW pulse and A/B quadrature pulse.

**Low-speed Open Collector Pulse Input:** 200KHz, 24VDC

**Low-speed Differential Input:** 500KHz, 5VDC

**High-speed Differential Input:** 4MHz, 5VDC

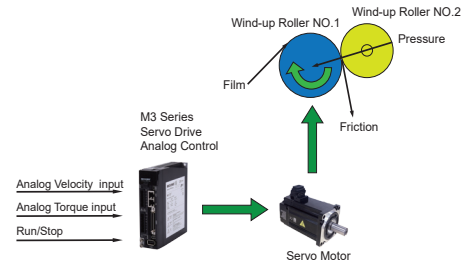


### Analog Input / Output Control Modes

Certain models have two analog inputs and two analog outputs.

-10V ~ +10V analog inputs can be used for analog velocity and analog torque control.

-10V ~ +10V analog outputs can be used to monitor the speed and torque of motor.



### Built-in Software PLC — Q Program

Q Programmer is MOONS' own single-axis motion control software based on SCL commands. It can be used to create sophisticated and functional programs that can be saved to a drive's nonvolatile memory, and then run stand-alone, or without a permanent connection to the host. Q drives offer a high level of flexibility and functionality to the machine designer and system integrator.

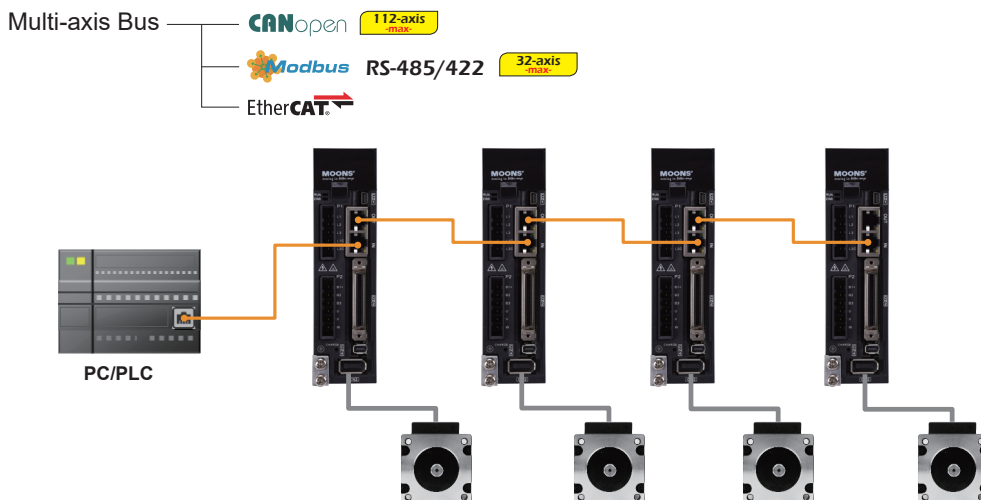
Features:

- Motion control commands (relative position, absolute position, homing mode, etc.)
- Multi-tasking
- Conditional Processing (external I/O, internal command)
- Math Calculation (+, -, \*, /, &, or)
- Data register manipulation
- Logic motion commands (loop, call functions)

Line	Label	Cmd	Param1	Param2	Comment
1		MT	1		Turn ON Multi-Tasking
2		DL	3		Turn OFF limits
3		PF	2000		Set Position Fault limit
4		CC	2		Set continuous current to 50%
5		CP	2		Also set peak current to same
6		DI	4000		Make distance positive for CW
7		JM	1		Set Jog mode to positioning
8		J5	1		Set Jog speed to 1 rev/sec
9		JA	10		Set Jog accel to 10 rev/sec/sec
10		CJ			Start Jogging
11	Label2	TR	x	100	Test Reg "x" against 100
12		QJ	G	#Label1	Jump if greater than
13		TR	x	-100	Test Reg "x" against -100
14		QJ	G	#Label2	Jump if greater than
15	Label1	SM	M		Stop move with max accel (AM)
16		WM			Wait for stop to complete
17		EP	0		Set encoder position to zero
18		VE	1		Set Velocity to 1 rev/sec
19		DI	-8000		Set home offset distance (CCW)
20		FL			Do a Relative move
21		WM			Wait for move to complete
22		SP	0		Set absolute position to zero
23		AX			Clear any faults just in case
24		WT	0.1		Wait 0.1 seconds
25		ME			Enable servo drive
26		CC	2.5		Set current to normal
27		CP	5		Set peak current to normal
28		MT	0		Disable Multi-Tasking
29		QX	3		Jump to Program 2

### Field Bus Control

M3 Servo system support various of industrial field bus options such as CANopen, EtherCAT and Modbus/RTU.



# Various of Field Bus

## EtherCAT

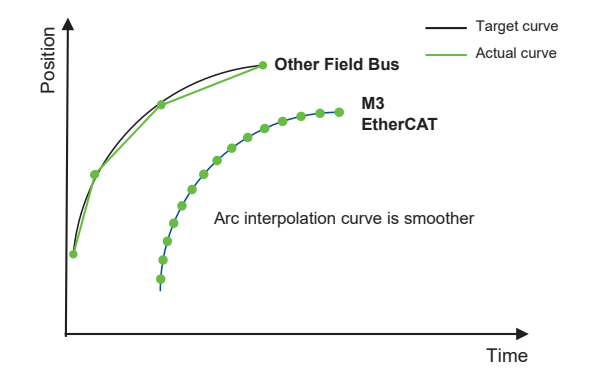
### High Speed, High Efficient

Full duplex, communication baud rate 100Mbps  
 Support CoE(CiA 402 protocol), VoE(Vendor over EtherCAT)  
 Support PP, PV, TQ, CSP, CSV, CST, HM mode  
 Full closed-loop mode  
 Combine with MOONS' EtherCAT stepper series product, we can meet all your motion demands.



### High Performance

The synchronous cycle of M3 series EtherCAT products is up to 0.5ms, which technically makes the position command subdivision smaller, and the equipment movement smoother.



## CANopen



Standard CAN bus interface is available in M3 series servo drives, which makes it easy to get integrated to the industrial field bus.

Features	Specification
Physical Layer Standard	CiA 303-1 Cabling and connector pin assignment
Communication Protocol	CiA 301 Application Layer and Communication Profile CiA 402 Device Profile Drives and Motion Control
Bus Connector	RJ45
Communication Rate	12.5Kbps, 20Kbps, 50Kbps, 125Kbps, 250Kbps, 500Kbps, 800Kbps, 1Mbps
Message Type	SDO, PDO, SYNC, EMCY, NMT, Heartbeat
Control Mode	Profile Position, Profile Velocity, Profile Torque, Homing Mode, Q Program
PDO Data	4 RxPDOs, 4 TxPDOs
Support Axis	Up to 112 axis

## Modbus



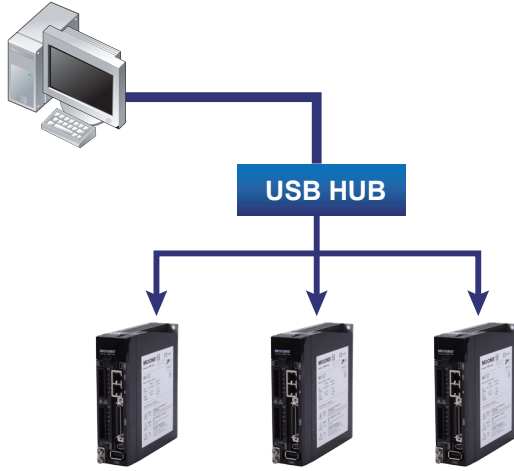
M3 series servo drive supports Modbus/RTU communication protocol based on RS-485. Through Modbus protocol, it provides an easy motion control platform for modifying drive parameters, and monitor the status of the servo drive.

Features	Specification
Physical Layer Standard	RS-485
Communication Protocol	Modbus/RTU
Bus Connector	RJ45(RS-485)
Communication Rate	9600bps, 19200bps, 38400bps, 57600bps, 115200bps
Control Mode	Position Mode, Velocity Mode, Torque Mode, Homing Mode
Support Axis	Up to 32 axis

## Friendly Software

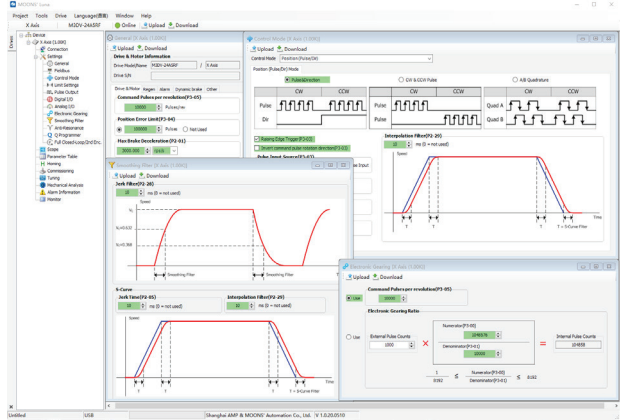
### USB Multi-axis Tuning

Based on USB communication, it can realize multi-axis tuning, simple and convenient.



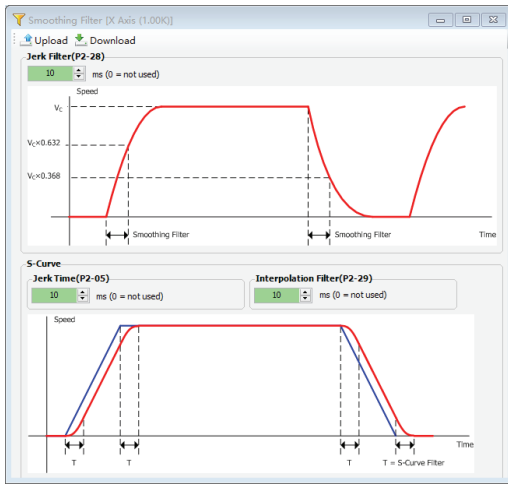
### Tree Structure

Newly designed tree-structure software, multi-window display, clear function classification.



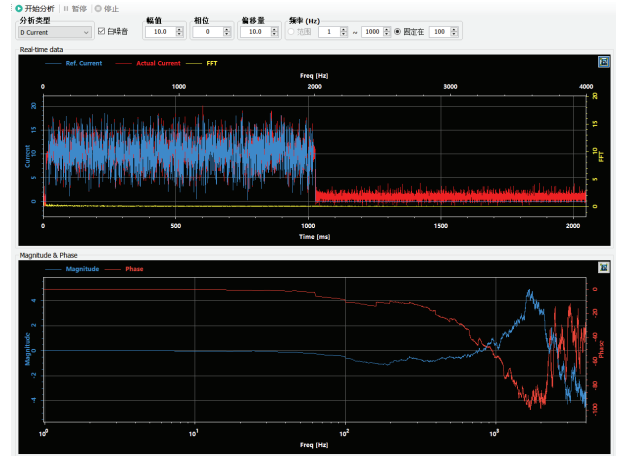
### Graphical Setting Interface

The setting interface adopts a simple and clear graphical interface, which can intuitively set the required functions.



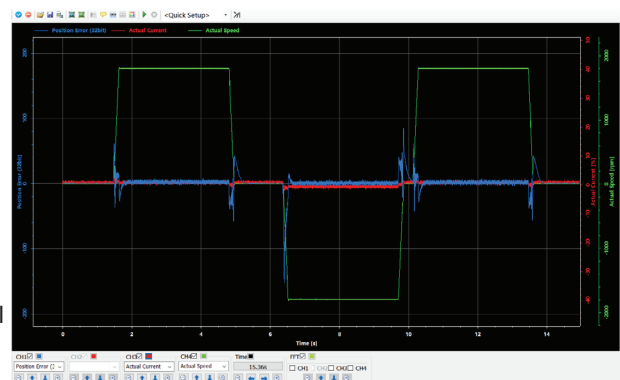
### Mechanical Analysis

Quickly diagnose the frequency characteristics of mechanical equipment and draw a Bode diagram. It can be used to detect the resonance point and frequency response characteristics of the machine, and quickly set the notch filter.



### Powerful Oscilloscope Function

- Real-time data curve display
- Up to 4 channels with 16bit data per channel and 8kHz sampling rate
- Up to 2 channels with 32bit data per channel and 8kHz sampling rate
- In the selected cursor area, display the maximum value, minimum value, root mean square, etc.
- Customizing trigger conditions
- Monitoring the operation status of the drive and the digital inputs and outputs



Features

Drive Numbering Information

Drive Overview

Motor Numbering Information

Servo Drive and Motor Matching List

Drive Specification

Motor Specification

Accessories



# General Specifications

## Safety Certification

M3 series products are designed to meet the following standards.

		Drive	Motor
Europe	EMC	EN 61800-3	EN 55011
			EN 55014-1
			EN 55014-2
			EN 6100-3-2
	LVD	EN 61800-5-1	EN 6100-3-3
			EN 60034-1
Function Safety (STO)	UL61800-5-2(SIL2)	IEC61508	
		ISO13849-1(PL d)	
		EN 60034-5	
UL Standard		UL 61800-5-1	UL 1004-1 UL 1004-6
CSA Standard		C22.2 No.274-13	CSA C22.2 No.100



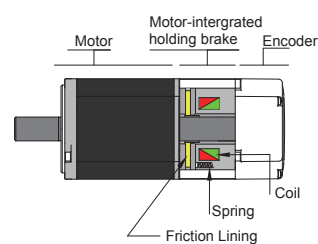
## Motor General Specifications

Insulation class	Class B (130°C )	Ambient temperature	Working temperature: 0°C ~ 40°C Storage temperature: -20°C ~ 60°C
Protection level	IP65( Except transfixion part of shaft )	Humidity	Storage and usage: 20 ~ 85%RH ( no condensation )
Installation conditions	indoor installation, avoiding direct sunlight, corrosive and flammable gas	Altitude	Lower than 1000m
Vibration	Under 49m/s <sup>2</sup> , 10 ~ 60Hz(Do not use continuously at resonance frequency )		

## Brake Specifications

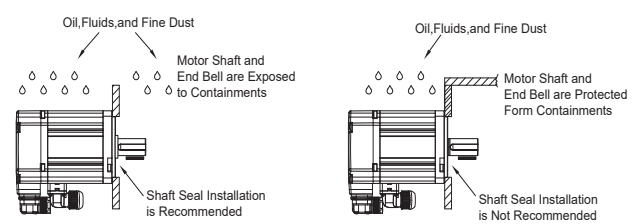
Motor brake is used to prevent motor from rotating by power off the servo system. The most common way of use is in vertical application, when the motor is disabled or powered off, in order to prevent the displacement of the mechanical mechanism driven by the motor due to gravity and other reasons, the servo motor with brake needs to be used. When the brake is powered on, the armature is adsorbed, the brake pad is released, and the motor can operate normally. When the brake is powered off, the armature is released, the brake pad is locked, and the motor can't rotate normally.

Frame	40mm	60mm	80mm	130mm
Static Friction Torque (Nm)	0.32	1.5	3.2	18.5
Rated Voltage (VDC)	24			
Power Waste (W @ 20°C)	6.3	7.2	9.6	24.3
Current (A)	0.26	0.3	0.4	1.05
Braking Time	< 70ms (Standard air gap,at 20°C)			
Release Time	<25ms			
Release Voltage	18.5VDC max.(at 20°C)			



## Shaft Seal

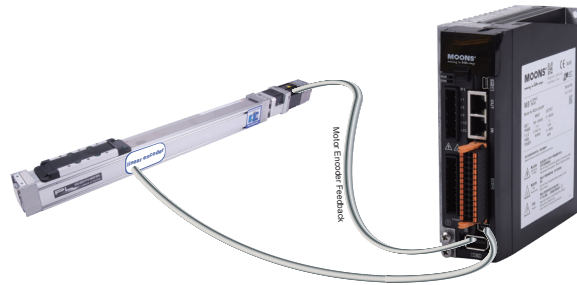
Industrial oil seals can block contaminants (oils, impurities) to extend the life of the motor. The oil seal will produce a certain resistance to the motor shaft, about 10% torque will be lost.



## Featured Function Application

### ● Full Closed-loop Control

A linear encoder mounted on the device (load) and a high resolution encoder mounted on the motor, the system positioning accuracy of the device can be improved by the full closed-loop control based on dual position feedback. It can also improve servo responsiveness and reliability, and suppress mechanical vibration.



### ● More Functions

Position / Velocity / Torque Control
Support position control, velocity control and torque control. <ul style="list-style-type: none"> <li>Position control supports pulse, internal position or communication command for positioning.</li> <li>Velocity control supports analog, internal multi-segments velocity or communication commands.</li> <li>Torque control supports analog, internal torque or communication commands.</li> </ul>
Control Mode Switching
Position control, speed control, and torque control can be switched using an external digital input. The P and R types of drive can switch between 2 control modes.
Gain Switching Function
The gain during operation and stop can be automatically switched under certain conditions. Or freely switch between the two sets of gains via digital input.
Internal Multi-segment Velocity Function
Velocity control is possible with digital inputs. 8 segments of velocity can be saved in the drive, and the corresponding internal velocity control commands can be selected via digital inputs.
Pulse Input Inhibit Function
When the pulse inhibit input signal is valid, the drive ignores the external pulse command and the motor decelerates to stop.
Internal Software Position Limit
In absolute value systems, the software position limit can be set to protect the device without the external limit sensor.

Configurable Input and Output
<ul style="list-style-type: none"> <li>The input functions can be assigned to any of the digital input by parameters.</li> <li>The output functions can be assigned to any of the digital output by parameters.</li> </ul>
Encoder Feedback Output
<ul style="list-style-type: none"> <li>The motor encoder feedback and the second encoder feedback are output in A/B/Z pulse mode, and the pulse division output is supported.</li> <li>Support for pulse command By-pass output.</li> </ul>
Analog Input
Support 2 analog voltage inputs for analog velocity control and torque control.
Analog Monitor output
2 analog output, real-time voltage output the command or actual speed, command or actual torque, or the actual position error of the motor.
Zero Speed Clamp Function
In the velocity control mode, when the zero speed clamp signal is valid, when the actual speed is less than the zero speed threshold value, the servo motor enters the zero position lock state. At this time, the internal position loop of the drive is activated, and even if the external force rotates the motor, it also returns to the clamping position.
Stop Mode Setting
When the drive servo off or fault, the stop type(free run, reduce speed, dynamic brake ) and the status after stopping can be selected.
Moving Command Smoothing Filter
The command smoothing function filters the position command and the speed command, which makes the servo motor run smoother even if the command is abrupt.

## ● Numbering System for M3 Servo Drive

# M3DV - 2 3A0 P F - \*\*\*

- ① M3 Series
- ② Supply Voltage \*1
- ④ Function Type
- ⑤ Model Type
- ⑥ Customization

\*1 Line to Line Voltage  
 \*2 Available for both single phase or three phase power connection.  
 \*3 Available for single-phase while the motor power is under 1.8kW.

### ③ Current

	Rated Current A(rms)	Peak Current A(rms)	Power
*2 1A8	1.8	5.4	100/200W
*2 3A0	3	12	400W
*2 4A5	4.5	15	750W
*2 6A0	6	21	1.0kW
*3 10A	10	30	1.5kW
*3 13A	13	45	2.0kW

## ● Function Type

### Servo Drive

## -P

Pulse Control Type

- ◆ Pulse Control
- ◆ Position, Velocity, Torque Control
- ◆ Encoder feedback output
- ◆ STO(SIL2)\*1
- ◆ Dynamic Brake\*1
- ◆ USB(Configuration)

## -R

RS-485 Type

- ◆ RS-485 Bus, Support Modbus/RTU
- ◆ Pulse Control
- ◆ Analog Control
- ◆ 2 Analog Inputs
- ◆ 2 Analog Outputs
- ◆ Position, Velocity, Torque Control
- ◆ Encoder feedback output
- ◆ Built-in Q program control function
- ◆ Full Closed Loop Control
- ◆ STO(SIL2)\*1
- ◆ Dynamic Brake\*1
- ◆ USB(Configuration)

## -EC

EtherCAT Type

- ◆ EtherCAT
- ◆ 2 Analog Inputs\*2
- ◆ 1 Analog Output\*2
- ◆ Position, Velocity, Torque Control
- ◆ Encoder feedback output\*2
- ◆ Built-in Q program control function
- ◆ Full Closed Loop Control\*2
- ◆ STO(SIL2)\*1
- ◆ Dynamic Brake\*1
- ◆ USB(Configuration)




## -C

CANopen Type

- ◆ CEA 301 & CEA 402 protocols
- ◆ 2 Analog Inputs\*2
- ◆ 1 Analog Output\*2
- ◆ Position, Velocity, Torque Control
- ◆ Encoder feedback output\*2
- ◆ Built-in Q program control function
- ◆ Full Closed Loop Control\*2
- ◆ STO(SIL2)\*1
- ◆ Dynamic Brake\*1
- ◆ USB(Configuration)

\*1\*2 Certain models don't support this function. Please refer to the drive list on page 16&17 for details.

● Servo Drive Table

Function Type		-P—Pulse Control Type				-R—RS-485 Type			
									
Model Type		F	R	X	N	F	R	X	N
Control Mode	Position Mode	●	●	●	●	●	●	●	●
	Velocity Mode	●	●	●	●	●	●	●	●
	Torque Mode	●	●	●	●	●	●	●	●
	Q Program					●	●	●	●
	Full Closed-loop Control					●	●	●	●
Interface	Pulse Inputs	●	●	●	●	●	●	●	●
	2 Analog Inputs					●	●	●	●
	2 Analog Outputs					●	●	●	●
	10 Inputs / 6 Outputs (Digital)	●	●			●	●		
	8 Inputs / 4 Outputs (Digital)								
	4 Inputs / 4 Outputs (Digital)			●	●			●	●
	Encoder Feedback Output	●	●	●	●	●	●	●	●
	Second Encoder Input					●	●	●	●
Comm Port	USB(Configuration)	●	●	●	●	●	●	●	●
	RS-485					●	●	●	●
	CANopen								
	EtherCAT								
Safety Function	Dynamic Brake	●		●		●		●	
	STO	●		●		●		●	

Features

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Servo Drive and  
Motor Matching List

Drive Specification

Motor Specification

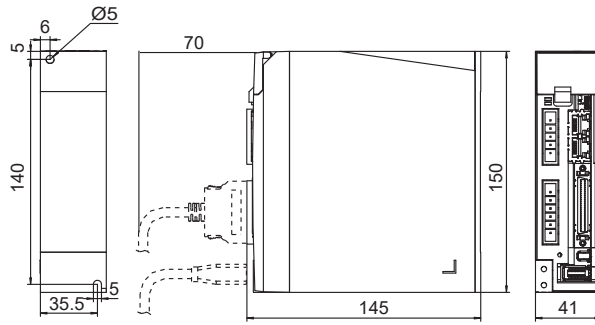
Accessories



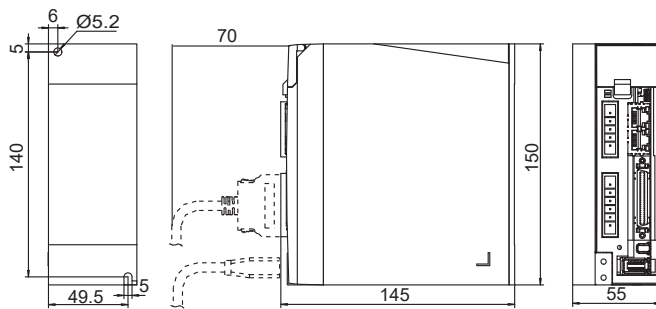
		-EC—EtherCAT Type				-C—CANopen Type			
									
Model Type		F	R	X	N	F	R	X	N
Control Mode	Position Mode	●	●	●	●	●	●	●	●
	Velocity Mode	●	●	●	●	●	●	●	●
	Torque Mode	●	●	●	●	●	●	●	●
	Q Program	●	●	●	●	●	●	●	●
	Full Closed-loop Control	●		●		●		●	
Interface	Pulse Inputs								
	2 Analog Inputs	●		●		●		●	
	1 Analog Output	●		●		●		●	
	10 Inputs / 6 Outputs (Digital)								
	8 Inputs / 4 Outputs (Digital)	●	●	●	●	●	●	●	●
	4 Inputs / 4 Outputs (Digital)								
	Encoder Feedback Output	●				●			
	Second Encoder Input	●		●		●		●	
Comm Port	USB(Configuration)	●	●	●	●	●	●	●	●
	RS-485								
	CANopen					●	●	●	●
	EtherCAT	●	●	●	●				
Safety Function	Dynamic Brake	●		●		●		●	
	STO	●		●		●		●	

● Drive Mechanical Dimensions(Unit: mm)

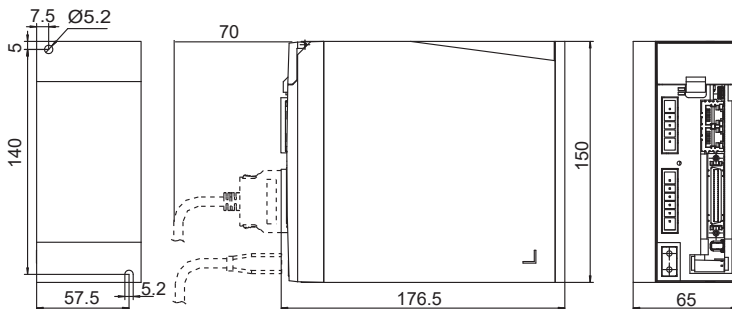
□ M3DV-21A8 ■◆ (100/200W Type)



□ M3DV-23A0 ■◆ (400W Type)



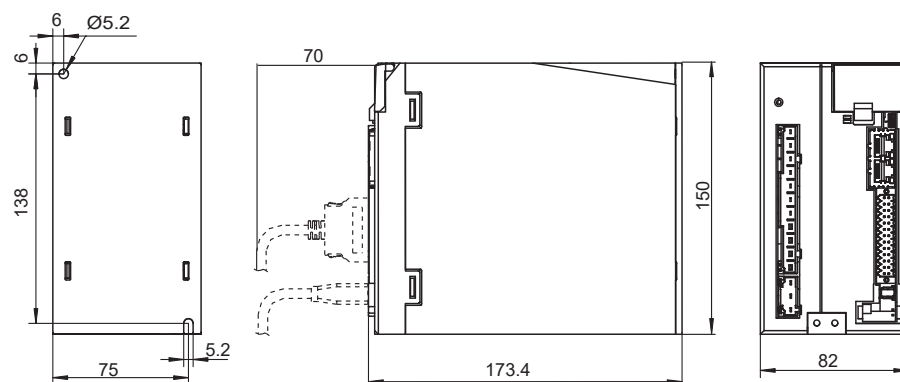
□ M3DV-24A5 ■◆ (750W Type)



□ M3DV-26A0 ■◆ (1.0 kW Type)

M3DV-210A ■◆ (1.5 kW Type)

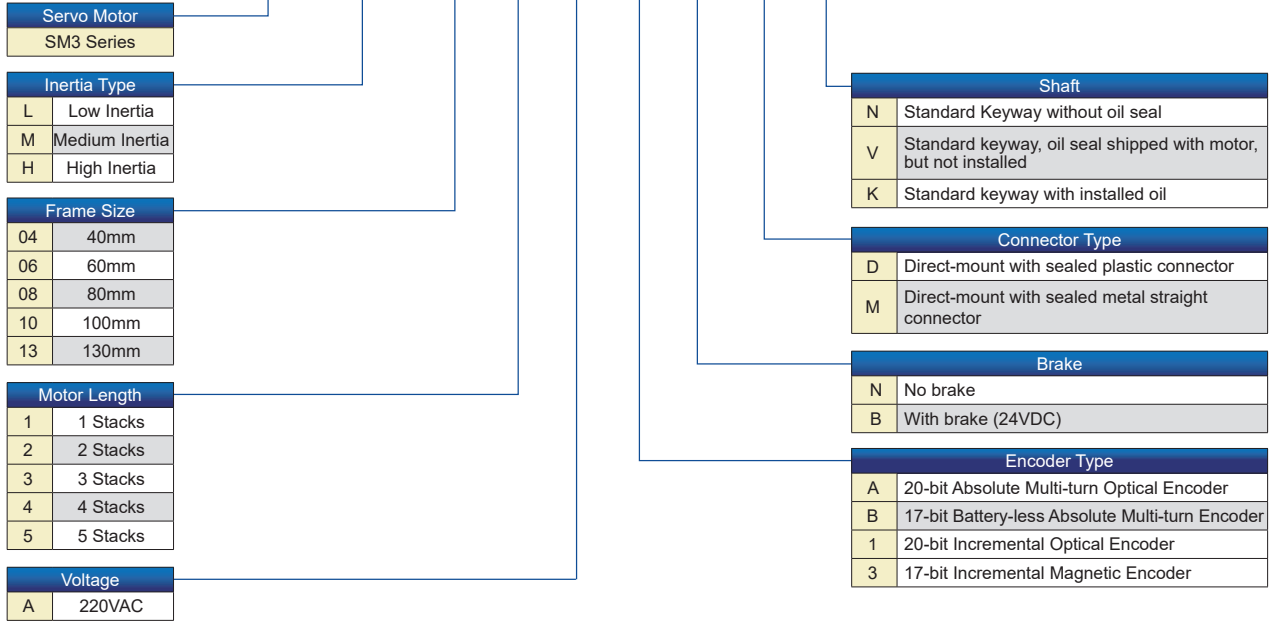
M3DV-213A ■◆ (2.0 kW Type)



■: Function Type ◆: Model Type

## Numbering System for M3 Servo Motor

**SM3 L - 13 1 A A N D V**



## Servo Motor Table

Rated Power	Low Inertia		Medium Inertia		High Inertia (Low Rated Speed)	
	Frame Size	Rated Speed (Max.Speed)	Frame Size	Rated Speed (Max.Speed)	Frame Size	Rated Speed (Max.Speed)
W	mm	rpm	mm	rpm	mm	rpm
100	40	3000 (6000)		3000 (6000)		1500 (3000)
200	60					
400	60		60			
750	80		80			
850					130	
1000	80		130	2000 (3000)		
1300			130			
1500			130			
1800			130			
2000			130			

## Servo Motor and Drive Table

Inertia Type	Frame Size (mm)	Rated Power (watts)	Rated Torque (Nm)	Peak Torque (Nm)	Rated Speed (rpm)	Max. Speed (rpm)	Rated Current A(rms)	Peak Current A(rms)	Matching Servo Motor	
									20-bit Incremental Optical Encoder	20-bit Absolute Multi-turn Optical Encoder
Low Inertia	40	100	0.32	1.28	3000	6000	1.2	5.9	SM3L-042A1 □ DV	SM3L-042AA □ DV
	60	200	0.64	1.9			1.5	5.4	SM3L-061A1 □ DV	SM3L-061AA □ DV
		400	1.27	3.8			2.8	10	SM3L-062A1 □ DV	SM3L-062AA □ DV
	80	750	2.4	6.7			4.5	14	SM3L-083A1 □ DV	SM3L-083AA □ DV
		1000	3.2	9.6			5.6	19	SM3L-084A1 □ DV	SM3L-084AA □ DV
	Medium Inertia	60	400	1.27			3.8	2000	3000	2.8
80		750	2.4	6.7	4.5	14	SM3M-083A1 □ DV			SM3M-083AA □ DV
130		1000	4.77	14.3	5.6	16.9	—			SM3M-132AA □ MV
		1500	7.16	21.5	8.5	25.2	—			SM3M-133AA □ MV
		2000	9.55	28.6	11	32.7	—			SM3M-134AA □ MV
High Inertia		130	850	5.39	16.2	1500	3000			6
	1300		8.34	25	9.6			29.6	—	SM3H-133AA □ MV
	1800		11.5	34.5	13			45	—	SM3H-134AA □ MV

□ : Brake Options. Please refer to the numbering system of servo motor on page 19.

◆ : Model Type. Please refer to the numbering system of servo drive on page 15.

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		Matching Servo Drive				
	17-bit Incremental Magnetic Encoder	17-bit Absolute Encoder (Battery-less)	-P Pulse Type	-R RS-485 Type	-EC EtherCAT Type	-C CANopen Type
	SM3L-042A3 □ DV	SM3L-042AB □ DV	M3DV-21A8P ◆	M3DV-21A8R ◆	M3DV-21A8EC ◆	M3DV-21A8C ◆
	SM3L-061A3 □ DV	SM3L-061AB □ DV				
	SM3L-062A3 □ DV	SM3L-062AB □ DV	M3DV-23A0P ◆	M3DV-23A0R ◆	M3DV-23A0EC ◆	M3DV-23A0C ◆
	SM3L-083A3 □ DV	SM3L-083AB □ DV	M3DV-24A5P ◆	M3DV-24A5R ◆	M3DV-24A5EC ◆	M3DV-24A5C ◆
	SM3L-084A3 □ DV	SM3L-084A3 □ DV	M3DV-26A0RF		M3DV-26A0ECX	M3DV-26A0CX
	SM3M-062A3 □ DV	SM3M-062AB □ DV	M3DV-23A0P ◆	M3DV-23A0R ◆	M3DV-23A0EC ◆	M3DV-23A0C ◆
	SM3M-083A3 □ DV	SM3M-083AB □ DV	M3DV-24A5P ◆	M3DV-24A5R ◆	M3DV-24A5EC ◆	M3DV-24A5C ◆
	SM3M-132A3 □ MV	—	M3DV-26A0RF		M3DV-26A0ECX	M3DV-26A0CX
	SM3M-133A3 □ MV	—	M3DV-210ARF		M3DV-210AECX	M3DV-210ACX
	SM3M-134A3 □ MV	—	M3DV-213ARF		M3DV-213AECX	M3DV-213ACX
	SM3H-132A3 □ MV	—	M3DV-26A0RF		M3DV-26A0ECX	M3DV-26A0CX
	SM3H-133A3 □ MV	—	M3DV-210ARF		M3DV-210AECX	M3DV-210ACX
	SM3H-134A3 □ MV	—	M3DV-213ARF		M3DV-213AECX	M3DV-213ACX

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Drive Specification -P--Pulse Control Type -R--RS-485 Type

Input Power	M3DV-21A8 ■◆ M3DV-23A0 ■◆	Main Circuit	Single / Three-phase, 200 ~ 240V ± 10%, 50/60Hz
	M3DV-24A5 ■◆ M3DV-26A0 ■◆	Control Circuit	Single-phase, 200 ~ 240V ± 10%, 50/60Hz
	M3DV-210A ■◆	Main Circuit	Three-phase, 200 ~ 240V ± 10%, 50/60Hz
	M3DV-213A ■◆	Control Circuit	Single-phase, 200 ~ 240V ± 10%, 50/60Hz
Withstand Voltage			Primary to earth: withstand 1500 VAC, 1 min, (Leakage current: 20 mA) [220V Input]
Environment	Temperature		◆ Ambient temperature: 0°C ~ 50°C (If the ambient temperature of servo drive is higher than 45°C, please install the drive in a well-ventilated location) ◆ Storage temperature: -20°C ~ 65°C
	Humidity		Both operating and storage : 10 ~ 85%RH or less
	Altitude		Lower than 1000m
	Vibration		9.8m/s <sup>2</sup> or less, 10 ~ 60Hz (Do not use continuously at resonance frequency)
Motor Encoder Feedback			◆ 20-bit Incremental/Absolute optical encoder ◆ 17-bit Incremental magnetic encoder ◆ 17-bit Battery-less absolute encoder
Second Encoder Feedback			A/B/Z phase signal differential input
I/O	Digital Signal	Input	◆ -F/R type: 10 Configurable optically isolate digital general inputs, 24VDC, 20mA ◆ -X/N type: 4 Configurable optically isolate digital general inputs, 24VDC, 20mA
		Output	◆ -F/R type: 6 Configurable optically isolate digital general outputs, Max.30VDC, 30mA ◆ -X/N type: 4 Configurable optically isolate digital general outputs, Max.30VDC, 30mA
	Analog Signal*1	Input	2 Analog inputs, -10V ~ +10V, 12bit
		Output	2 Analog outputs, -10V ~ +10V, Max.10mA
	Pulse Signal*2	Input	2 Pulse Inputs (Photo-coupler input, Line receiver input) ◆ Photo-coupler input: 5 ~ 24V, minimum pulse width 1μs, max. pulse frequency 500KHz ◆ Line receiver input: 5V differential signal, minimum pulse width 0.125μs, max. pulse frequency 4MHz
		Output	4 Outputs (Line driver: 3 outputs, open collector: 1 output) ◆ Line driver output: Encoder A±, B±, Z± feedback output ◆ Open collector output: Encoder Z phase
Comm Port	USB		Connection with PC for configuration
	RS-485		Modbus/RTU
Front Panel			4 keys (MODE, UP, DOWN, SET) 5 - digital LED Display
Regeneration Resistor			Built-in regenerative resistor (external resistor is also available)
Control Mode*3			1. Pulse Position Mode 2. Analog Velocity Mode 3. Analog Torque Mode 4. Internal Position Mode 5. Internal Velocity Mode 6. Command Torque Mode 7. Full Closed Loop Control Mode 8. Q Program
Control Input Signal			Servo Enable, Alarm Reset, CW/CCW Limit, Control Mode Select, Gain Select, Clear Position Error, Emergency Stop, Zero Speed Clamp, Torque and Velocity Direction Switch, Torque and Velocity Start, Start Homing, Homing Switch, Torque Limit, Speed Limit, Pulse Inhibit, Multi-velocity Switch, Start Q Program, General Purpose Input
Control Output Signal			Warning Output, Fault Output, Servo Ready, Velocity Reached, Torque Reached, Position Reached, Servo-on Status, Brake Release, Dynamic Position Error Following, Positioning Complete, Zero Speed Detected, Velocity Coincidence, Torque Coincidence, Velocity limit, Torque limit, Homing Finished, Soft Limit CW/CCW, General Purpose Output
Protection			Over Load, Over Heating, Over Current, Over Voltage, Low Voltage, Bad Encoder Feedback, Over Speed, Position Error, STO, CW/CCW Limit, Full Closed-loop Hybrid Deviation Fault, Main Power Phase Loss
Dynamic Brake*4			-F/X Built in
STO*4			-F/X Built in
Weight			M3DV-21A8 ■◆ : 0.8kg                      M3DV-26A0 ■◆ : 1.9kg M3DV-23A0 ■◆ : 1.1kg                      M3DV-210A ■◆ : 1.9kg M3DV-24A5 ■◆ : 1.6kg                      M3DV-213A ■◆ : 1.9kg

**Note:** \*1、\*2、\*3、\*4 Certain models don't support this function, please refer to page 16&17.

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Drive Specification -EC--EtherCAT Type -C--CANopen Type

Input Power	M3DV-21A8 ■◆ M3DV-23A0 ■◆ M3DV-24A5 ■◆ M3DV-26A0 ■◆	Main Circuit	Single / Three-phase, 200 ~ 240V ± 10%, 50/60Hz
		Control Circuit	Single-phase, 200 ~ 240V ± 10%, 50/60Hz
	M3DV-210A ■◆ M3DV-213A ■◆	Main Circuit	Three-phase, 200 ~ 240V ± 10%, 50/60Hz
		Control Circuit	Single-phase, 200 ~ 240V ± 10%, 50/60Hz
Withstand Voltage		Primary to earth: withstand 1500 VAC, 1 min, (Leakage current: 20 mA) [220V Input]	
Environment	Temperature		◆ Ambient temperature: 0°C ~ 50°C (If the ambient temperature of servo drive is higher than 45°C, please install the drive in a well-ventilated location) ◆ Storage temperature: -20°C ~ 65°C
	Humidity		Both operating and storage : 10 ~ 85%RH or less
	Altitude		Lower than 1000m
	Vibration		9.8m/s <sup>2</sup> or less, 10 ~ 60Hz (Do not use continuously at resonance frequency)
Motor Encoder Feedback		◆ 20-bit Incremental/Absolute optical encoder ◆ 17-bit Incremental magnetic encoder ◆ 17-bit Battery-less absolute encoder	
Second Encoder Feedback		A/B/Z phase signal differential input	
I/O	Digital Signal	Input	◆ 8 Configurable optically isolate digital general inputs, 24VDC, 20mA
		Output	◆ 4 Configurable optically isolate digital general outputs, Max.30VDC, 30mA
	Analog Signal* <sup>1</sup>	Input	2 Analog inputs, -10V ~ +10V, 12bit
		Output	1 Analog output, -10V ~ +10V, Max.10mA
	Pulse Signal	Output	-F type: 4 Outputs (Line driver: 3 outputs, open collector: 1 output) ◆ Line driver output: Encoder A±, B±, Z± feedback output ◆ Open collector output: Encoder Z phase
Comm Port	USB		Connection with PC for configuration
	EtherCAT		EtherCAT
	CANopen		CANopen
Front Panel		4 keys (MODE, UP, DOWN, SET) 5 - digital LED Display	
Regeneration Resistor		Built-in regenerative resistor (external resistor is also enabled)	
Control Mode* <sup>2</sup>		-EC Function Type: 1.PP 2.PV 3.TQ 4.CSP 5.CSV 6.CST 7.HM 8.Full closed-loop 9.Q programming -C Function Type: 1.PP 2.PV 3.TQ 4.HM 5.Full closed-loop 6.Q programming	
Control Input Signal		Alarm Reset, CW/CCW Limit, Virtual CW/CCW Limit, Gain Select, Emergency Stop, Zero Speed Clamp, Homing Switch, Torque Limit, Speed Limit, General Purpose Input	
Control Output Signal		Warning Output, Fault Output, Servo Ready, Velocity Reached, Torque Reached, Position Reached, Servo-on Status, Brake Release, Dynamic Position Error Following, Positioning Complete, Zero Speed Detected, Velocity Coincidence, Torque Coincidence, Velocity limit, Torque limit, Homing Finished, Soft Limit CW/CCW, General Purpose Output	
Protection		Over Load, Over Heating, Over Current, Over Voltage, Low Voltage, Bad Encoder Feedback, Over Speed, Position Error, STO, CW/CCW Limit, Full Closed-loop Hybrid Deviation Fault, Main Power Phase Loss	
Dynamic Brake* <sup>3</sup>		-F/X Built in	
STO* <sup>4</sup>		-F/X Built in	
Weight		M3DV-21A8 ■◆ : 0.8kg M3DV-23A0 ■◆ : 1.1kg M3DV-24A5 ■◆ : 1.6kg	M3DV-26A0 ■◆ : 1.9kg M3DV-210A ■◆ : 1.9kg M3DV-213A ■◆ : 1.9kg

Note: \*1、\*2、\*3、\*4 Certain models don't support this function, please refer to page 16&17.

**System Configuration** High Density I/O Connector Model Type: F, R 200/400/750W Type

Features

Drive Numbering Information

Drive Overview

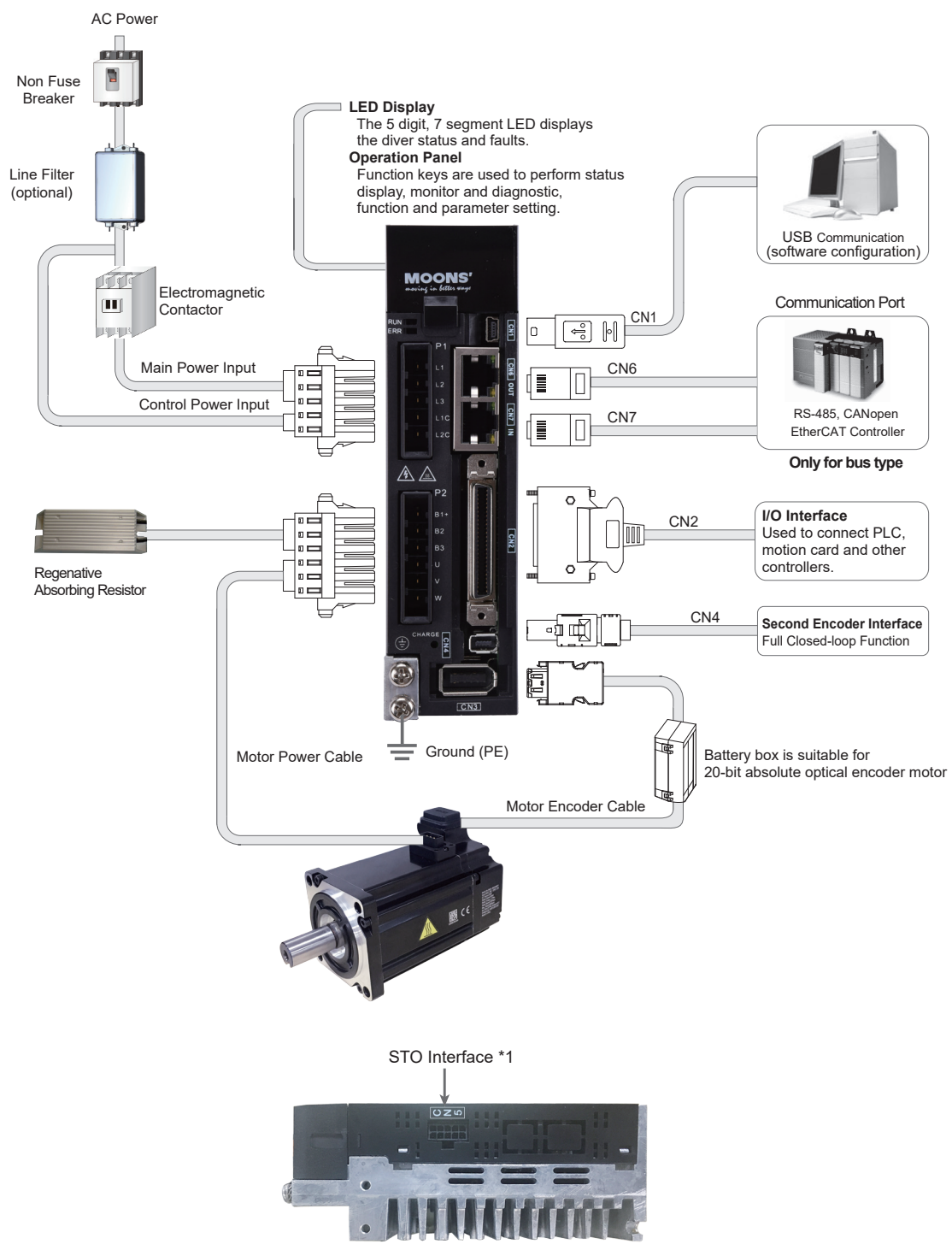
Motor Numbering Information

Servo Drive and Motor Matching List

Drive Specification

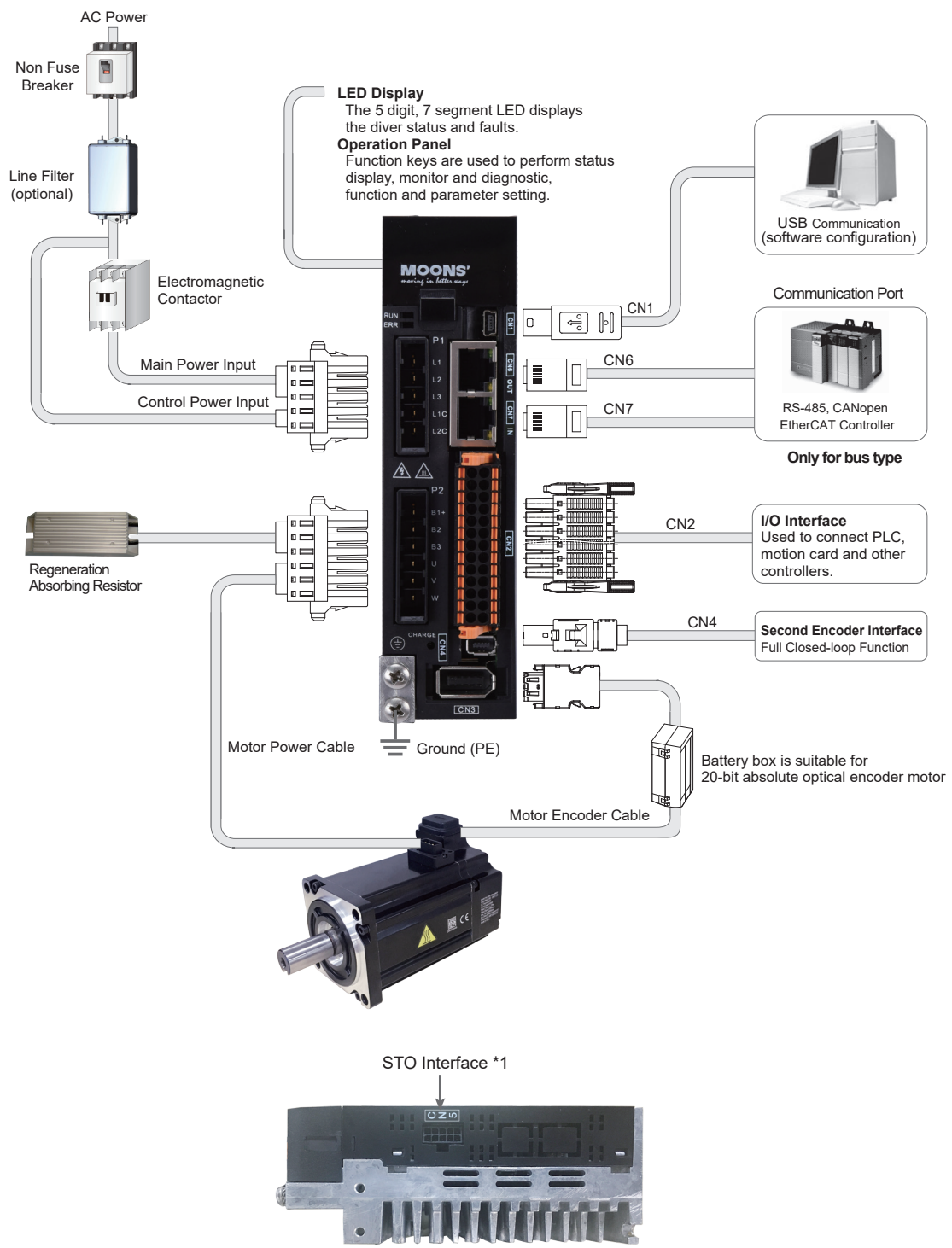
Motor Specification

Accessories



Note: \*1 Certain models don't support this function, please refer to page 16&17.

**System Configuration** Push-in Spring I/O Connector Mode Type: X, N 200/400/750W Type



Note: \*1 Certain models don't support this function, please refer to page 16&17.

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**System Configuration** High Density I/O Connector Mode Type: F 1.0/1.5/2.0kW Type

Features

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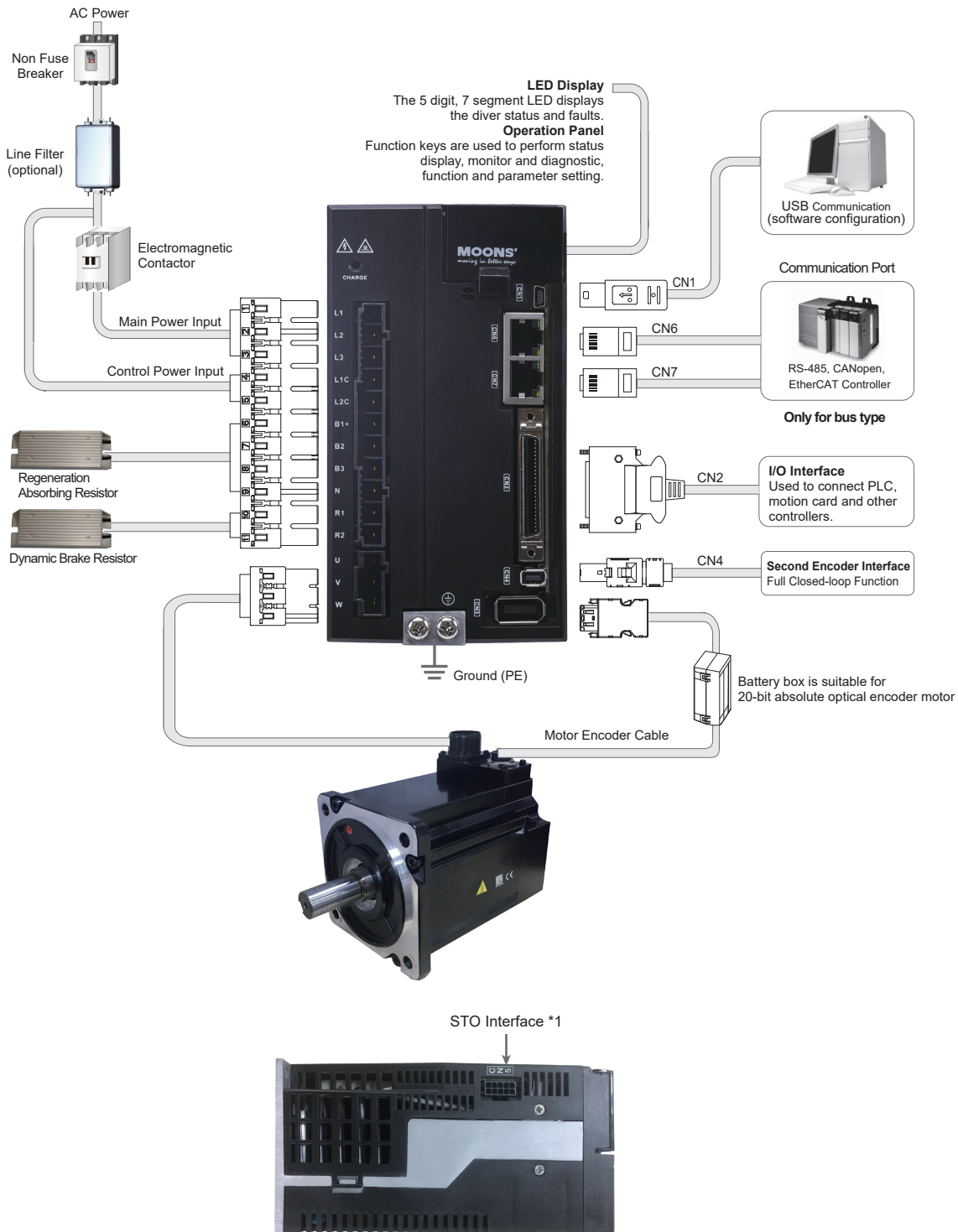
Motor Numbering Information

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Drive Specification

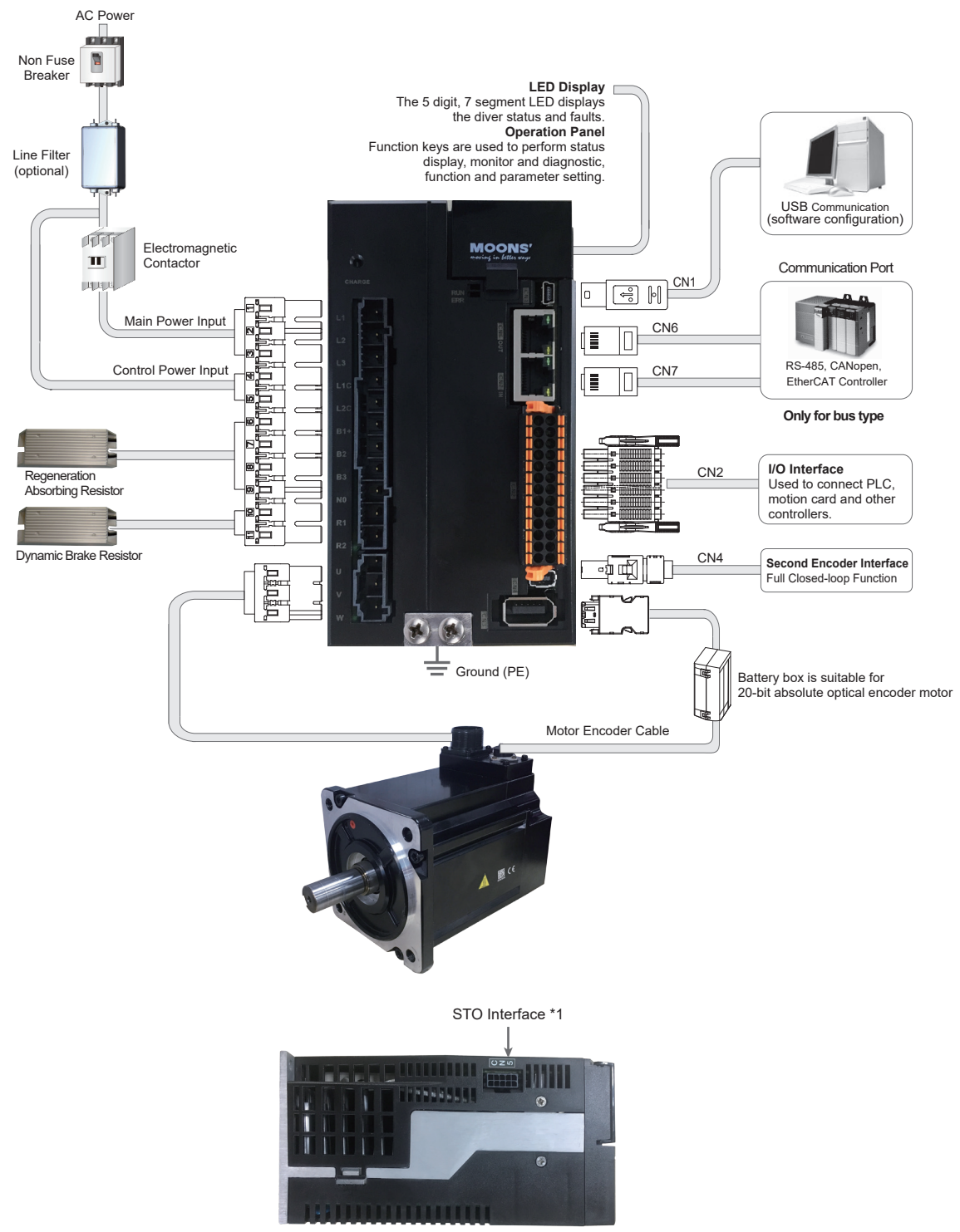
Motor Specification

Accessories



Note: \*1 Certain models don't support this function, please refer to page 16&17.

**System Configuration** Push-in Spring I/O Connector Mode Type: X 1.0/1.5/2.0kW Type



Note: \*1 Certain models don't support this function, please refer to page 16&17.

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# Motor Specification

Low Inertia  
Frame Size: 40mm

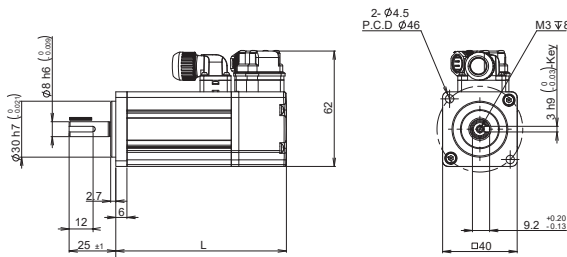
## Specification

Type*	SM3L - 042A $\diamond$ <input type="checkbox"/> DV	
Rated Output Power	watts	100
Rated Speed	rpm	3000
Max.Speed	rpm	6000
Rated Torque	Nm	0.32
Peak Torque	Nm	1.28
Rated Current	A (rms)	1.2
Peak Current	A (rms)	5.9
Voltage Constant $\pm 5\%$	V (rms) / K rpm	16.8
Torque Constant $\pm 5\%$	Nm / A (rms)	0.267
Rotor Inertia	Kg·m <sup>2</sup>	$0.038 \times 10^{-4}$
Rotor Inertia - With Brake	Kg·m <sup>2</sup>	$0.0433 \times 10^{-4}$
Shaft Load - Axial	N (max.)	50
Shaft Load - Radial (End of Shaft)	N (max.)	60
Weight	kg	0.55
Weight - With Brake	kg	0.8

- \*  $\diamond$  Encoder Options
- Brake Options

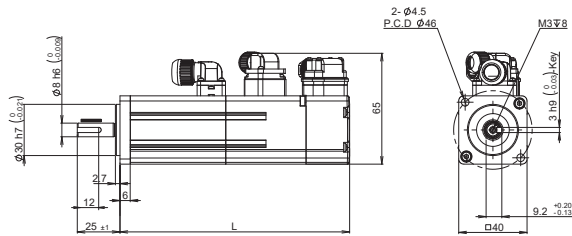
## Dimensions (Unit: mm)

### 1) Without Brake



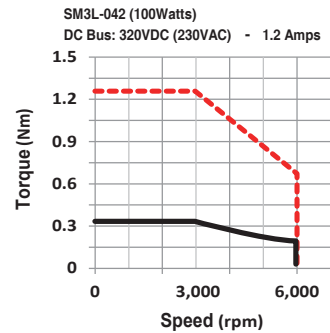
Without Brake	L
SM3L-042A $\diamond$ NDV	91.5
SM3L-042ABNDV	100

### 2) With Brake



With Brake	L
SM3L-042A $\diamond$ BDV	134.5
SM3L-042ABBDV	143

## Torque Curves



— Max. Continuous Torque  
- - - Max. Intermittent Torque



# Motor Specification Low Inertia Frame Size: 60mm

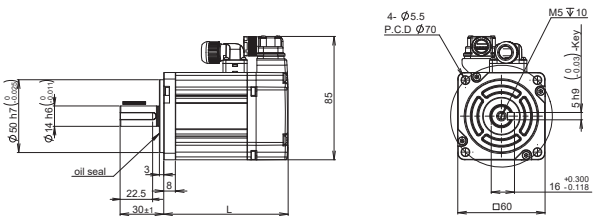
## Specification

Type*		SM3L - 061A <input type="checkbox"/> DV	SM3L - 062A <input type="checkbox"/> DV
Rated Output Power	watts	200	400
Rated Speed	rpm	3000	3000
Max. Speed	rpm	6000	6000
Rated Torque	Nm	0.64	1.27
Peak Torque	Nm	1.9	3.8
Rated Current	A (rms)	1.5	2.8
Peak Current	A (rms)	5.4	10
Voltage Constant ± 5%	V (rms) / K rpm	26.5	28.3
Torque Constant ± 5%	Nm / A (rms)	0.427	0.454
Rotor Inertia	Kg·m <sup>2</sup>	0.152 × 10 <sup>-4</sup>	0.237 × 10 <sup>-4</sup>
Rotor Inertia - With Brake	Kg·m <sup>2</sup>	0.182 × 10 <sup>-4</sup>	0.268 × 10 <sup>-4</sup>
Shaft Load - Axial	N (max.)	70	70
Shaft Load - Radial (End of Shaft)	N (max.)	200	240
Weight	kg	1.1	1.4
Weight - With Brake	kg	1.5	1.9

- \*  Encoder Options
- Brake Options

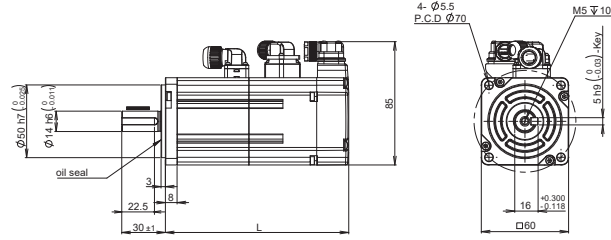
## Dimensions (Unit: mm)

### 1) Without Brake



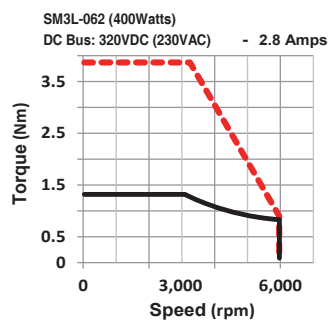
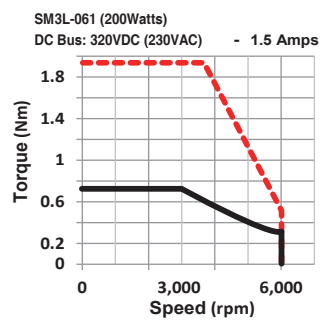
Without Brake	L
SM3L - 061A <input type="checkbox"/> NDV	85.5
SM3L - 062A <input type="checkbox"/> NDV	104

### 2) With Brake



With Brake	L
SM3L - 061A <input type="checkbox"/> BDV	126
SM3L - 062A <input type="checkbox"/> BDV	144.5

## Torque Curves



— Max. Continuous Torque  
 - - - Max. Intermittent Torque

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Low Inertia  
Frame Size: 80mm

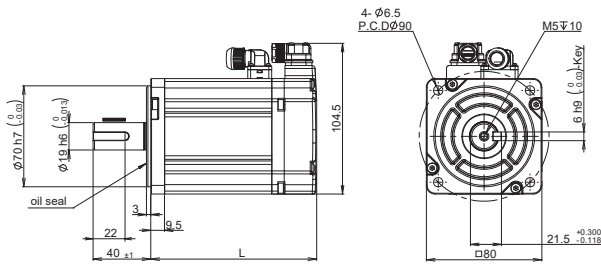
## Specification

Type*		SM3L - 083A <input type="checkbox"/> DV	SM3L - 084A <input type="checkbox"/> DV
Rated Output Power	watts	750	1000
Rated Speed	rpm	3000	3000
Max.Speed	rpm	6000	6000
Rated Torque	Nm	2.4	3.2
Peak Torque	Nm	6.7	9.6
Rated Current	A (rms)	4.5	5.6
Peak Current	A (rms)	14	19
Voltage Constant ± 5%	V (rms) / K rpm	33.9	36.65
Torque Constant ± 5%	Nm / A (rms)	0.533	0.63
Rotor Inertia	Kg·m <sup>2</sup>	0.829 × 10 <sup>-4</sup>	1.01 × 10 <sup>-4</sup>
Rotor Inertia - With Brake	Kg·m <sup>2</sup>	0.961 × 10 <sup>-4</sup>	1.12 × 10 <sup>-4</sup>
Shaft Load - Axial	N (max.)	90	90
Shaft Load - Radial (End of Shaft)	N (max.)	270	270
Weight	kg	2.6	2.8
Weight - With Brake	kg	3.4	3.6

- \*  Encoder Options
- Brake Options

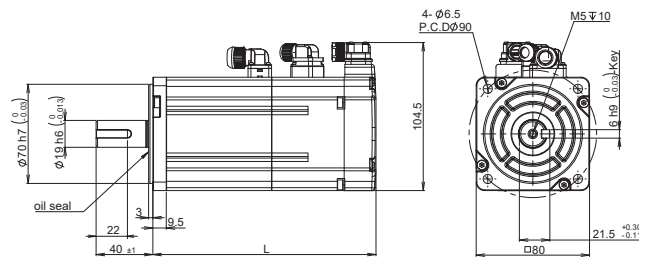
## Dimensions (Unit: mm)

### 1) Without Brake



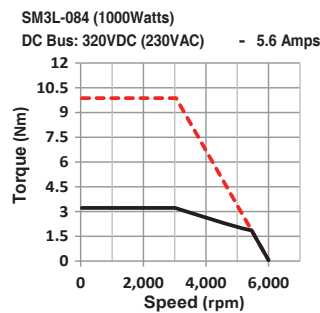
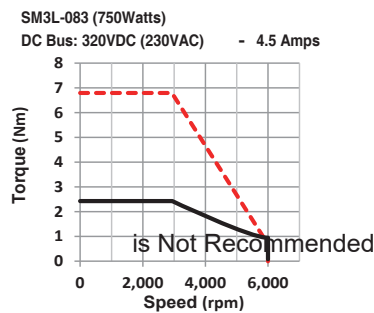
Without Brake	L
SM3L-083A <input type="checkbox"/> NDV	115
SM3L-084A <input type="checkbox"/> NDV	129

### 2) With Brake



With Brake	L
SM3L-083A <input type="checkbox"/> BDV	157.5
SM3L-084A <input type="checkbox"/> BDV	171.5

## Torque Curves



— Max. Continuous Torque  
- - - Max. Intermittent Torque

# Motor Specification Medium Inertia Frame Size: 60mm

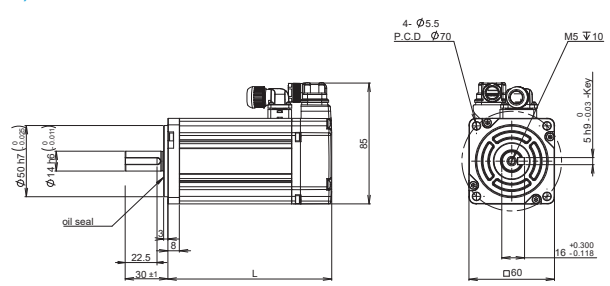
## Specification

Type*		SM3M - 062A ◇ NDV	SM3M - 062A ◇ BDV
Rated Output Power	watts	400	400
Rated Speed	rpm	3000	3000
Max.Speed	rpm	6000	6000
Rated Torque	Nm	1.27	1.27
Peak Torque	Nm	3.8	3.8
Rated Current	A (rms)	2.8	2.8
Peak Current	A (rms)	10	10
Voltage Constant ± 5%	V (rms) / K rpm	28.9	28.9
Torque Constant ± 5%	Nm / A (rms)	0.454	0.454
Rotor Inertia	Kg·m <sup>2</sup>	0.639 × 10 <sup>-4</sup>	0.67 × 10 <sup>-4</sup>
Shaft Load - Axial	N (max.)	70	70
Shaft Load - Radial (End of Shaft)	N (max.)	240	240
Weight	kg	1.6	2.1

\* ◇ Encoder Options

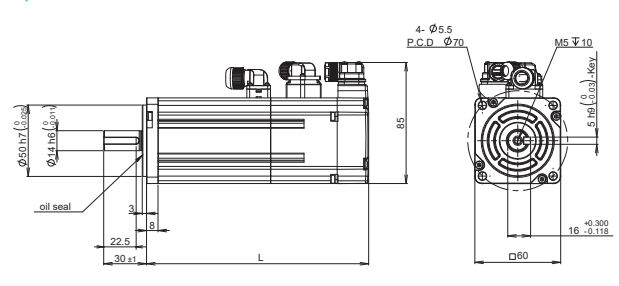
## Dimensions (Unit: mm)

### 1) Without Brake



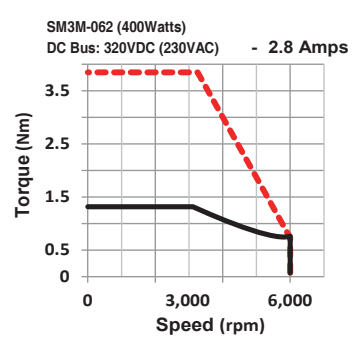
Without Brake	L
SM3M-062A ◇ NDV	115

### 2) With Brake



With Brake	L
SM3M-062A ◇ BDV	155.5

## Torque Curves



— Max. Continuous Torque  
 - - - Max. Intermittent Torque

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Medium Inertia  
Frame Size: 80mm

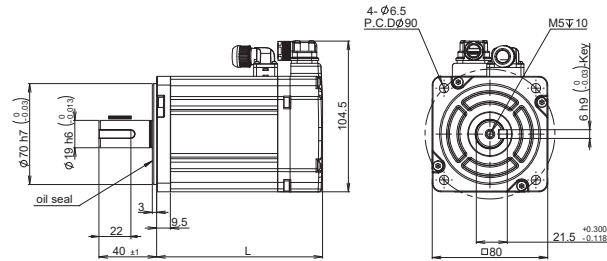
## Specification

Type*		SM3M - 083A ◇ NDV	SM3M - 083A ◇ BDV
Rated Output Power	watts	750	750
Rated Speed	rpm	3000	3000
Max.Speed	rpm	6000	6000
Rated Torque	Nm	2.4	2.4
Peak Torque	Nm	6.7	6.7
Rated Current	A (rms)	4.5	4.5
Peak Current	A (rms)	14	14
Voltage Constant ± 5%	V (rms) / K rpm	33.9	33.9
Torque Constant ± 5%	Nm / A (rms)	0.533	0.533
Rotor Inertia	Kg·m <sup>2</sup>	$1.32 \times 10^{-4}$	$1.45 \times 10^{-4}$
Shaft Load - Axial	N (max.)	90	90
Shaft Load - Radial (End of Shaft)	N (max.)	270	270
Weight	kg	2.8	3.6

### \* ◇ Encoder Options

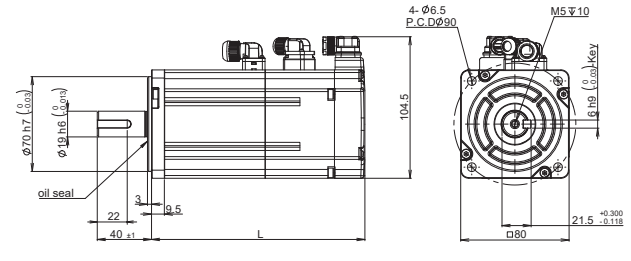
## Dimensions (Unit: mm)

### 1) Without Brake



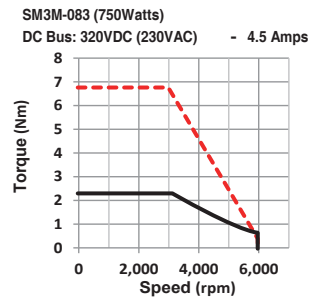
Without Brake	L
SM3M-083A ◇ NDV	125.5

### 2) With Brake



With Brake	L
SM3M-083A ◇ BDV	168.5

## Torque Curves



— Max. Continuous Torque  
- - - Max. Intermittent Torque

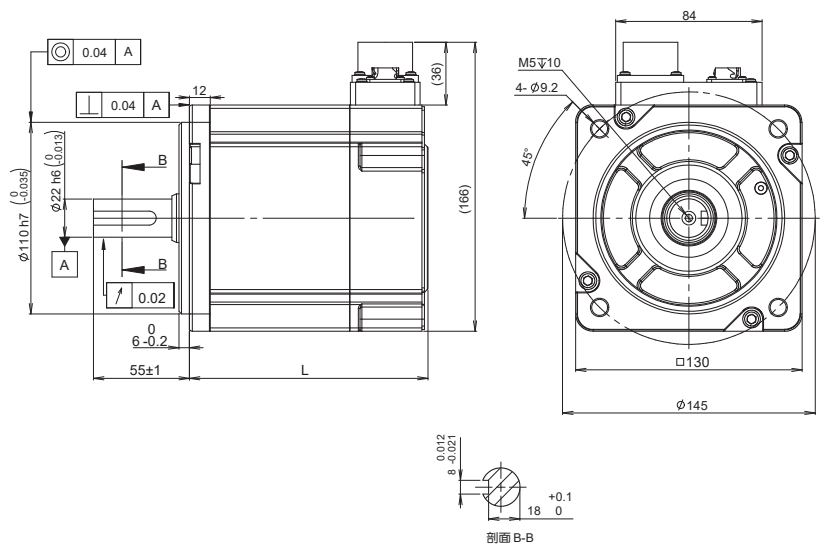
# Motor Specification Medium Inertia Frame Size: 130mm

## Specification

Type*		SM3M - 132A $\diamond$ <input type="checkbox"/> MV	SM3M - 133A $\diamond$ <input type="checkbox"/> MV	SM3M - 134A $\diamond$ <input type="checkbox"/> MV
Rated Output Power	watts	1000	1500	2000
Rated Speed	rpm	2000	2000	2000
Max.Speed	rpm	3000	3000	3000
Rated Torque	Nm	4.77	7.16	9.55
Peak Torque	Nm	14.3	21.5	28.6
Rated Current	A (rms)	5.6	8.5	11
Peak Current	A (rms)	16.9	25.2	32.7
Voltage Constant $\pm 5\%$	V (rms) / K rpm	54	54.2	55.5
Torque Constant $\pm 5\%$	Nm / A (rms)	0.891	0.894	0.916
Rotor Inertia	Kg·m <sup>2</sup>	$13.9 \times 10^{-4}$	$19.4 \times 10^{-4}$	$23.3 \times 10^{-4}$
Rotor Inertia - With Brake	Kg·m <sup>2</sup>	$16.1 \times 10^{-4}$	$21.6 \times 10^{-4}$	$25.5 \times 10^{-4}$
Shaft Load - Axial	N (max.)	245	245	245
Shaft Load - Radial (End of Shaft)	N (max.)	680	680	680
Weight	kg	6.9	8	9.6
Weight - With Brake	kg	9.2	10.3	11.9

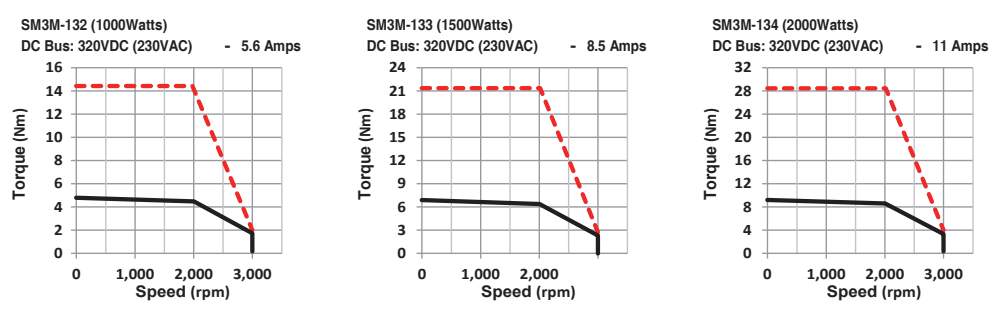
- \*  $\diamond$  Encoder Options
- Brake Options

## Dimensions (Unit: mm)



	Mode	L
Without Brake	SM3M-132A $\diamond$ NMV	137
	SM3M-133A $\diamond$ NMV	151
	SM3M-134A $\diamond$ NMV	168
With Brake	SM3M-132A $\diamond$ BMV	170
	SM3M-133A $\diamond$ BMV	184
	SM3M-134A $\diamond$ BMV	201

## Torque Curves



— Max. Continuous Torque  
 - - - Max. Intermittent Torque

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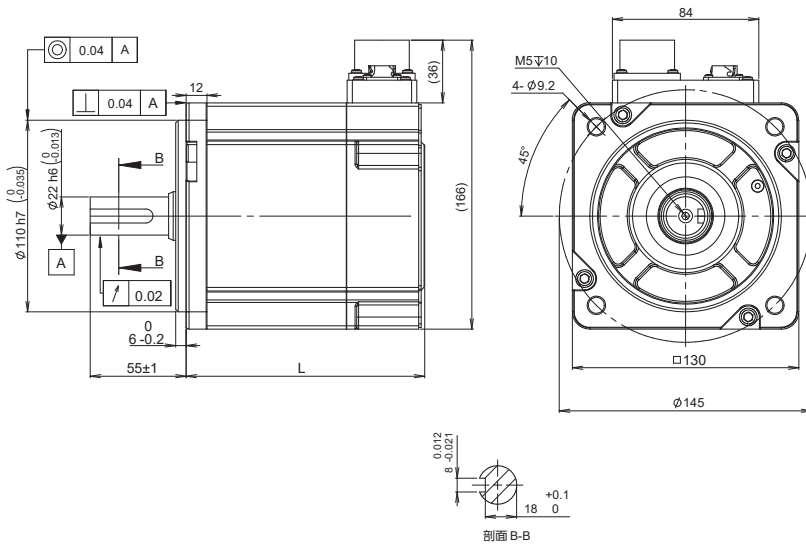
High Inertia (Low Speed, High Torque)  
Frame Size: 130mm

## Specification

Type*		SM3H - 132A ◇ □ MV	SM3H - 133A ◇ □ MV	SM3H - 134A ◇ □ MV
Rated Output Power	watts	850	1300	1800
Rated Speed	rpm	1500	1500	1500
Max.Speed	rpm	3000	3000	3000
Rated Torque	Nm	5.39	8.34	11.5
Peak Torque	Nm	16.2	25	34.5
Rated Current	A (rms)	6	9.6	13
Peak Current	A (rms)	19.4	29.6	45
Voltage Constant ± 5%	V (rms) / K rpm	54	54.2	50.5
Torque Constant ± 5%	Nm / A (rms)	0.891	0.894	0.84
Rotor Inertia	Kg·m <sup>2</sup>	13.9 × 10 <sup>-4</sup>	19.4 × 10 <sup>-4</sup>	23.3 × 10 <sup>-4</sup>
Rotor Inertia - With Brake	Kg·m <sup>2</sup>	16.1 × 10 <sup>-4</sup>	21.6 × 10 <sup>-4</sup>	25.5 × 10 <sup>-4</sup>
Shaft Load - Axial	N (max.)	196	245	245
Shaft Load - Radial (End of Shaft)	N (max.)	490	680	680
Weight	kg	6.9	8	9.6
Weight - With Brake	kg	9.2	10.3	11.9

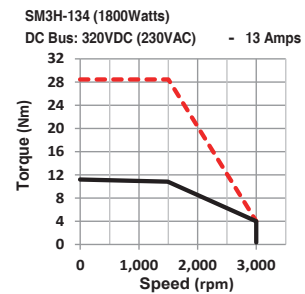
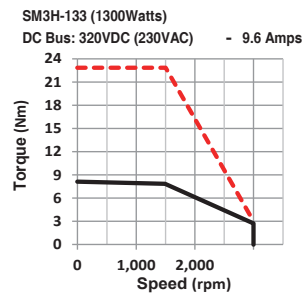
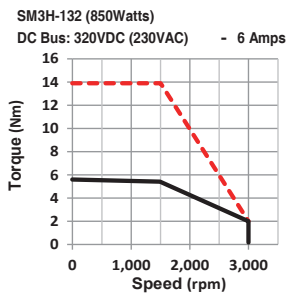
- \* ◇ Encoder Options
- Brake Options

## Dimensions (Unit: mm)



Type		L
Without Brake	SM3H-132A ◇ NMV	137
	SM3H-133A ◇ NMV	151
	SM3H-134A ◇ NMV	168
With Brake	SM3H-132A ◇ BMV	170
	SM3H-133A ◇ BMV	184
	SM3H-134A ◇ BMV	201

## Torque Curves



— Max. Continuous Torque  
- - - Max. Intermittent Torque



**Accessories** Encoder Cables For 40mm、60mm、80mm Frame Size Motor

Model*	Length	Description	For Servo Motor*	Outline	
2640-0100	1m	Encoder Cables Incremental Encoder Standard	SM3L-042A1 □ DV		
2640-0200	2m		SM3L-061A1 □ DV		
2640-0300	3m		SM3L-062A1 □ DV		
2640-0400	4m		SM3L-083A1 □ DV		
2640-0500	5m		SM3L-084A1 □ DV		
2640-0800	8m		SM3M-062A1 □ DV		
2640-1000	10m		SM3M-083A1 □ DV		
2640-1500	15m		SM3M-083A1 □ DV		
2640-2000	20m	SM3M-083A1 □ DV			
2640-0100-C10	1m	Encoder Cables Incremental Encoder Flexible	SM3L-042A3 □ DV		
2640-0200-C10	2m		SM3L-061A3 □ DV		
2640-0300-C10	3m		SM3L-062A3 □ DV		
2640-0400-C10	4m		SM3L-083A3 □ DV		
2640-0500-C10	5m		SM3L-083A3 □ DV		
2640-0800-C10	8m		SM3L-084A3 □ DV		
2640-1000-C10	10m		SM3M-062A3 □ DV		
2640-1500-C10	15m		SM3M-062A3 □ DV		
2640-2000-C10	20m	SM3M-083A3 □ DV			
2639-0100	1m	Encoder Cables With Battery Absolute Encoder Standard	SM3L-042AA □ DV		
2639-0200	2m		SM3L-061AA □ DV		
2639-0300	3m		SM3L-062AA □ DV		
2639-0400	4m		SM3L-083AA □ DV		
2639-0500	5m		SM3L-083AA □ DV		
2639-0800	8m		SM3L-084AA □ DV		
2639-1000	10m		SM3M-062AA □ DV		
2639-1500	15m	SM3M-062AA □ DV			
2639-2000	20m	SM3M-083AA □ DV			
2639-0100-C10	1m	Encoder Cables With Battery Absolute Encoder Flexible	SM3L-042AA □ DV		
2639-0200-C10	2m		SM3L-061AA □ DV		
2639-0300-C10	3m		SM3L-062AA □ DV		
2639-0400-C10	4m		SM3L-083AA □ DV		
2639-0500-C10	5m		SM3L-083AA □ DV		
2639-0800-C10	8m		SM3L-084AA □ DV		
2639-1000-C10	10m		SM3M-062AA □ DV		
2639-1500-C10	15m	SM3M-062AA □ DV			
2639-2000-C10	20m	SM3M-083AA □ DV			
2641-0100	1m	Encoder Cables Battery - less Absolute Encoder Standard	SM3L-042AB □ DV		
2641-0200	2m		SM3L-061AB □ DV		
2641-0300	3m		SM3L-062AB □ DV		
2641-0400	4m		SM3L-083AB □ DV		
2641-0500	5m		SM3L-083AB □ DV		
2641-0800	8m		SM3L-084AB □ DV		
2641-1000	10m		SM3M-062AB □ DV		
2641-1500	15m	SM3M-062AB □ DV			
2641-2000	20m	SM3M-083AB □ DV			
2641-0100-C10	1m	Encoder Cables Battery - less Absolute Encoder Flexible	SM3L-042AB □ DV		
2641-0200-C10	2m		SM3L-061AB □ DV		
2641-0300-C10	3m		SM3L-062AB □ DV		
2641-0400-C10	4m		SM3L-083AB □ DV		
2641-0500-C10	5m		SM3L-083AB □ DV		
2641-0800-C10	8m		SM3L-084AB □ DV		
2641-1000-C10	10m		SM3M-062AB □ DV		
2641-1500-C10	15m	SM3M-062AB □ DV			
2641-2000-C10	20m	SM3M-083AB □ DV			

\* □ Brake Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

**Accessories**

**Motor Cables、 Brake Cables**  
For 40mm、 60mm、 80mm Frame Size Motor

Model*	Length	Description	For Servo Motor*	Outline
1645-0100	1m	Motor Cables Standard	SM3L-042A ◇ □ DV SM3L-061A ◇ □ DV SM3L-062A ◇ □ DV SM3L-083A ◇ □ DV SM3L-084A ◇ □ DV SM3M-062A ◇ □ DV SM3M-083A ◇ □ DV	
1645-0200	2m			
1645-0300	3m			
1645-0400	4m			
1645-0500	5m			
1645-0800	8m			
1645-1000	10m			
1645-1500	15m			
1645-2000	20m			
1645-0100-C10	1m			
1645-0200-C10	2m			
1645-0300-C10	3m			
1645-0400-C10	4m			
1645-0500-C10	5m			
1645-0800-C10	8m			
1645-1000-C10	10m			
1645-1500-C10	15m			
1645-2000-C10	20m			
1646-0100	1m	Brake Cables Standard	SM3L-042A ◇ BDV SM3L-061A ◇ BDV SM3L-062A ◇ BDV SM3L-083A ◇ BDV SM3L-084A ◇ BDV SM3M-062A ◇ BDV SM3M-083A ◇ BDV	
1646-0200	2m			
1646-0300	3m			
1646-0400	4m			
1646-0500	5m			
1646-0800	8m			
1646-1000	10m			
1646-1500	15m			
1646-2000	20m			
1646-0100-C10	1m			
1646-0200-C10	2m			
1646-0300-C10	3m			
1646-0400-C10	4m			
1646-0500-C10	5m			
1646-0800-C10	8m			
1646-1000-C10	10m			
1646-1500-C10	15m			
1646-2000-C10	20m			

\* ◇ Encoder Options

□ Brake Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

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**Accessories** Encoder Cables (Straight Plug) For 130mm Frame Size Motor

Model*	Length	Description	For Servo Motor*	Outline
2643-0100	1m	Encoder Cables Incremental Encoder Standard	SM3M-132A3 <input type="checkbox"/> MV	
2643-0300	3m		SM3M-133A3 <input type="checkbox"/> MV	
2643-0500	5m		SM3M-134A3 <input type="checkbox"/> MV	
2643-1000	10m		SM3H-132A3 <input type="checkbox"/> MV	
2643-1500	15m		SM3H-133A3 <input type="checkbox"/> MV	
2643-2000	20m		SM3H-134A3 <input type="checkbox"/> MV	
2643-0100-C10	1m	Encoder Cables Incremental Encoder Flexible	SM3M-132AA <input type="checkbox"/> MV	
2643-0300-C10	3m		SM3M-133AA <input type="checkbox"/> MV	
2643-0500-C10	5m		SM3M-134AA <input type="checkbox"/> MV	
2643-1000-C10	10m		SM3H-132AA <input type="checkbox"/> MV	
2643-1500-C10	15m		SM3H-133AA <input type="checkbox"/> MV	
2643-2000-C10	20m		SM3H-134AA <input type="checkbox"/> MV	
2642-0100	1m	Encoder Cables With Battery Absolute Encoder Standard	SM3M-132AA <input type="checkbox"/> MV	
2642-0300	3m		SM3M-133AA <input type="checkbox"/> MV	
2642-0500	5m		SM3M-134AA <input type="checkbox"/> MV	
2642-1000	10m		SM3H-132AA <input type="checkbox"/> MV	
2642-1500	15m		SM3H-133AA <input type="checkbox"/> MV	
2642-2000	20m		SM3H-134AA <input type="checkbox"/> MV	
2642-0100-C10	1m	Encoder Cables With Battery Absolute Encoder Flexible	SM3M-132AA <input type="checkbox"/> MV	
2642-0300-C10	3m		SM3M-133AA <input type="checkbox"/> MV	
2642-0500-C10	5m		SM3M-134AA <input type="checkbox"/> MV	
2642-1000-C10	10m		SM3H-132AA <input type="checkbox"/> MV	
2642-1500-C10	15m		SM3H-133AA <input type="checkbox"/> MV	
2642-2000-C10	20m		SM3H-134AA <input type="checkbox"/> MV	

\*  Brake Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

**Accessories** Encoder Cables (Angled Plug)  
For 130mm Frame Size Motor

Model*	Length	Description	For Servo Motor*	Outline
2645-0100	1m	Encoder Cables Incremental Encoder Standard	SM3M-132A3 <input type="checkbox"/> MV	
2645-0300	3m		SM3M-133A3 <input type="checkbox"/> MV	
2645-0500	5m		SM3M-134A3 <input type="checkbox"/> MV	
2645-1000	10m		SM3H-132A3 <input type="checkbox"/> MV	
2645-1500	15m		SM3H-133A3 <input type="checkbox"/> MV	
2645-2000	20m		SM3H-134A3 <input type="checkbox"/> MV	
2645-0100-C10	1m	Encoder Cables Incremental Encoder Flexible	SM3M-132AA <input type="checkbox"/> MV	
2645-0300-C10	3m		SM3M-133AA <input type="checkbox"/> MV	
2645-0500-C10	5m		SM3M-134AA <input type="checkbox"/> MV	
2645-1000-C10	10m		SM3H-132AA <input type="checkbox"/> MV	
2645-1500-C10	15m		SM3H-133AA <input type="checkbox"/> MV	
2645-2000-C10	20m		SM3H-134AA <input type="checkbox"/> MV	
2644-0100	1m	Encoder Cables With Battery Absolute Encoder Standard	SM3M-132AA <input type="checkbox"/> MV	
2644-0300	3m		SM3M-133AA <input type="checkbox"/> MV	
2644-0500	5m		SM3M-134AA <input type="checkbox"/> MV	
2644-1000	10m		SM3H-132AA <input type="checkbox"/> MV	
2644-1500	15m		SM3H-133AA <input type="checkbox"/> MV	
2644-2000	20m		SM3H-134AA <input type="checkbox"/> MV	
2644-0100-C10	1m	Encoder Cables With Battery Absolute Encoder Flexible	SM3M-132AA <input type="checkbox"/> MV	
2644-0300-C10	3m		SM3M-133AA <input type="checkbox"/> MV	
2644-0500-C10	5m		SM3M-134AA <input type="checkbox"/> MV	
2644-1000-C10	10m		SM3H-132AA <input type="checkbox"/> MV	
2644-1500-C10	15m		SM3H-133AA <input type="checkbox"/> MV	
2644-2000-C10	20m		SM3H-134AA <input type="checkbox"/> MV	

\*  Brake Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

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**Accessories** Motor Cables (Straight Plug)  
For 130mm Frame Size, 0.85/1.0kW Motor

Model*	Length	Description	For Servo Motor*	Outline
1657-0100	1m	Motor Cables Standard	SM3M-132A ◇ NMV SM3H-132A ◇ NMV	
1657-0300	3m			
1657-0500	5m			
1657-1000	10m			
1657-1500	15m			
1657-2000	20m			
1657-0100-C10	1m	Motor Cables Flexible	SM3M-132A ◇ NMV SM3H-132A ◇ NMV	
1657-0300-C10	3m			
1657-0500-C10	5m			
1657-1000-C10	10m			
1657-1500-C10	15m			
1657-2000-C10	20m			
1659-0100	1m	Motor Cables With Built-in Brake Cable Standard	SM3M-132A ◇ BMV SM3H-132A ◇ BMV	
1659-0300	3m			
1659-0500	5m			
1659-1000	10m			
1659-1500	15m			
1659-2000	20m			
1659-0100-C10	1m	Motor Cables With Built-in Brake Cable Flexible	SM3M-132A ◇ BMV SM3H-132A ◇ BMV	
1659-0300-C10	3m			
1659-0500-C10	5m			
1659-1000-C10	10m			
1659-1500-C10	15m			
1659-2000-C10	20m			

\* ◇ Encoder Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

**Accessories**

**Motor Cables (Angled Plug)**  
For 130mm Frame Size, 0.85/1.0kW Motor

Model*	Length	Description	For Servo Motor*	Outline
1658-0100	1m	Motor Cables Standard	SM3M-132A ◇ NMV SM3H-132A ◇ NMV	
1658-0300	3m			
1658-0500	5m			
1658-1000	10m			
1658-1500	15m			
1658-2000	20m			
1658-0100-C10	1m	Motor Cables Flexible	SM3M-132A ◇ NMV SM3H-132A ◇ NMV	
1658-0300-C10	3m			
1658-0500-C10	5m			
1658-1000-C10	10m			
1658-1500-C10	15m			
1658-2000-C10	20m			
1660-0100	1m	Motor Cables With Built-in Brake Cable Standard	SM3M-132A ◇ BMV SM3H-132A ◇ BMV	
1660-0300	3m			
1660-0500	5m			
1660-1000	10m			
1660-1500	15m			
1660-2000	20m			
1660-0100-C10	1m	Motor Cables With Built-in Brake Cable Flexible	SM3M-132A ◇ BMV SM3H-132A ◇ BMV	
1660-0300-C10	3m			
1660-0500-C10	5m			
1660-1000-C10	10m			
1660-1500-C10	15m			
1660-2000-C10	20m			

\* ◇ Encoder Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm



**Accessories** Motor Cables (Straight Plug)  
For 130mm Frame Size, 1.3/1.5kW Motor

Model*	Length	Description	For Servo Motor*	Outline
1655-0100	1m	Motor Cables Standard	SM3M-133A ◇ NMV SM3H-133A ◇ NMV	
1655-0300	3m			
1655-0500	5m			
1655-1000	10m			
1655-1500	15m			
1655-2000	20m			
1655-0100-C10	1m	Motor Cables Flexible	SM3M-133A ◇ NMV SM3H-133A ◇ NMV	
1655-0300-C10	3m			
1655-0500-C10	5m			
1655-1000-C10	10m			
1655-1500-C10	15m			
1655-2000-C10	20m			
1661-0100	1m	Motor Cables With Built-in Brake Cable Standard	SM3M-133A ◇ BMV SM3H-133A ◇ BMV	
1661-0300	3m			
1661-0500	5m			
1661-1000	10m			
1661-1500	15m			
1661-2000	20m			
1661-0100-C10	1m	Motor Cables With Built-in Brake Cable Flexible	SM3M-133A ◇ BMV SM3H-133A ◇ BMV	
1661-0300-C10	3m			
1661-0500-C10	5m			
1661-1000-C10	10m			
1661-1500-C10	15m			
1661-2000-C10	20m			

\* ◇ Encoder Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

**Accessories**

**Motor Cables (Angled Plug)**  
For 130mm Frame Size, 1.3/1.5kW Motor

Model*	Length	Description	For Servo Motor*	Outline
1656-0100	1m	Motor Cables Standard	SM3M-133A ◇ NMV SM3H-133A ◇ NMV	
1656-0300	3m			
1656-0500	5m			
1656-1000	10m			
1656-1500	15m			
1656-2000	20m			
1656-0100-C10	1m	Motor Cables Flexible	SM3M-133A ◇ NMV SM3H-133A ◇ NMV	
1656-0300-C10	3m			
1656-0500-C10	5m			
1656-1000-C10	10m			
1656-1500-C10	15m			
1656-2000-C10	20m			
1662-0100	1m	Motor Cables With Built-in Brake Cable Standard	SM3M-133A ◇ BMV SM3H-133A ◇ BMV	
1662-0300	3m			
1662-0500	5m			
1662-1000	10m			
1662-1500	15m			
1662-2000	20m			
1662-0100-C10	1m	Motor Cables With Built-in Brake Cable Flexible	SM3M-133A ◇ BMV SM3H-133A ◇ BMV	
1662-0300-C10	3m			
1662-0500-C10	5m			
1662-1000-C10	10m			
1662-1500-C10	15m			
1662-2000-C10	20m			

\* ◇ Encoder Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

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**Accessories** Motor Cables (Straight Plug)  
For 130mm Frame Size, 1.8/2.0kW Motor

Model*	Length	Description	For Servo Motor*	Outline
1647-0100	1m	Motor Cables Standard	SM3M-134A ◇ NMV SM3H-134A ◇ NMV	
1647-0300	3m			
1647-0500	5m			
1647-1000	10m			
1647-1500	15m			
1647-2000	20m			
1647-0100-C10	1m	Motor Cables Flexible	SM3M-134A ◇ NMV SM3H-134A ◇ NMV	
1647-0300-C10	3m			
1647-0500-C10	5m			
1647-1000-C10	10m			
1647-1500-C10	15m			
1647-2000-C10	20m			
1649-0100	1m	Motor Cables With Built-in Brake Cable Standard	SM3M-134A ◇ BMV SM3H-134A ◇ BMV	
1649-0300	3m			
1649-0500	5m			
1649-1000	10m			
1649-1500	15m			
1649-2000	20m			
1649-0100-C10	1m	Motor Cables With Built-in Brake Cable Flexible	SM3M-134A ◇ BMV SM3H-134A ◇ BMV	
1649-0300-C10	3m			
1649-0500-C10	5m			
1649-1000-C10	10m			
1649-1500-C10	15m			
1649-2000-C10	20m			

\* ◇ Encoder Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

**Accessories** Motor Cables (Angled Plug)  
For 130mm Frame Size, 1.8/2.0kW Motor

Model*	Length	Description	For Servo Motor*	Outline
1650-0100	1m	Motor Cables Standard	SM3M-134A ◇ NMV SM3H-134A ◇ NMV	
1650-0300	3m			
1650-0500	5m			
1650-1000	10m			
1650-1500	15m			
1650-2000	20m			
1650-0100-C10	1m	Motor Cables Flexible	SM3M-134A ◇ NMV SM3H-134A ◇ NMV	
1650-0300-C10	3m			
1650-0500-C10	5m			
1650-1000-C10	10m			
1650-1500-C10	15m			
1650-2000-C10	20m			
1652-0100	1m	Motor Cables With Built-in Brake Cable Standard	SM3M-134A ◇ BMV SM3H-134A ◇ BMV	
1652-0300	3m			
1652-0500	5m			
1652-1000	10m			
1652-1500	15m			
1652-2000	20m			
1652-0100-C10	1m	Motor Cables With Built-in Brake Cable Flexible	SM3M-134A ◇ BMV SM3H-134A ◇ BMV	
1652-0300-C10	3m			
1652-0500-C10	5m			
1652-1000-C10	10m			
1652-1500-C10	15m			
1652-2000-C10	20m			

\* ◇ Encoder Options

\* Flexible -C10 10 million times

Test Conditions: Bend Radius 50mm, Frequency 40 times/min, Distance 1000mm

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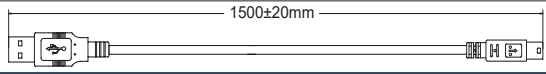
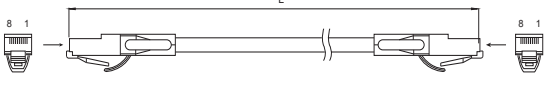
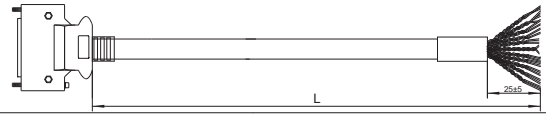

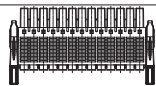
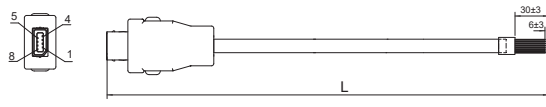
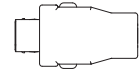
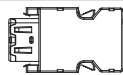
Servo Drive and Motor Matching List

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**Accessories** Servo Drive Accessories

Mini USB Cable			
Model	Length	Description	Outline
2620-150	1.5m	USB configuration cable connect with PC	
CN6/CN7 Communication Daisy Chain Cable			
Model	Length(L)	Description	Outline
2012-030	0.3m	Twisted-pair, Standard type	
2012-300	3m		
2013-030	0.3m	Twisted-pair, Shielded type	
2013-300	3m		
IO Connector, I/O Signal Cable			
Model	Length(L)	Description	Outline
1644-100	1m	CN2 50pin high density I/O cable	
1644-200	2m		
1644-300	3m		
M2-50P	-	CN2 50pin high density I/O connector	
MSOP-CN226P	-	CN2 26pin push-in spring I/O connector	
Second Encoder Connector, Full Closed-loop Accessories			
Model	Length(L)	Description	Outline
1643-300	3m	CN4 Secondary encoder feedback cable	
1643-500	5m		
1643-300-C05	3m		
1643-500-C05	5m		
MSOP-CN408P	-	CN4 Secondary encoder feedback connector	
Motor Encoder Connector (Drive Side)			
Model	Specification	Description	Outline
MSOP-CN310P	-	CN3 Motor encoder connector	
EMI Filter			
Model	Specification	Description	Outline
MSOP-EM1010	10A	EMI filter for AC power of drive side	-
Absolute Encoder System Battery Kit			
Model	Specification	Description	Outline
MSOP-BA01	-	Battery	-
MSOP-BAKIT01	-	Batteries and battery cases	-
External Regenerative Resistor			
Model	Specification	Description	Outline
REG100W120R	100W, 120 Ω	Regenerative absorbing resistor	-
REG200W120R	200W, 120 Ω		
REG300W120R	300W, 120 Ω		
Dynamic Brake Resistor (For 1.0/1.5/2.0 kW Type Drive)			
Model	Specification	Description	Outline
DBR85W3R5	85W, 3.5 Ω	External dynamic brake resistor	-
Drive Connector Kit			
Model	Specification	Description	Outline
M2 Drive Connector Kit	-	P1, P2, JST handle lever	-

**Accessories**

Servo Drive Accessories

**STO Connector Kit**

Model	Specification	Description	Outline
STO Connector Kit	-	CN5	-

**Motor Connector Kit**

Model	Description	Outline
MSOP-MTKITA	80mm and lower frame size motor (without brake connector)	-
MSOP-MTKITD	80mm and lower frame size motor (with brake connector)	-
MSOP-MTKITB	100mm and above frame size motor (straight plug type)	-
MSOP-MTKITC	100mm and above frame size motor (angle plug type)	-

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# Customer Service Center



# 400-820-9661

## ■ MOONS' Headquarter

168 Mingjia Road, Minhang District, Shanghai  
201107, P.R. China

## ■ Domestic Offices

### Shenzhen

Rm.401, Building 53, Zhongchuang Park, Jiyue City, No.13,  
Xinyi 5th Road, Taoyuan Street, Nanshan Dist, Shenzhen  
518000, P.R. China

### Beijing

Room 1206, Jing Liang Mansion, No.16 Middle Road of East,  
3rd Ring, Chaoyang District, Beijing 100022, P.R. China

### Nanjing

Room 1101-1102, Building 2, New Town Development  
Center, No.126 Tianyuan Road, Moling Street,  
Jiangning District, Nanjing 211106, P.R. China

### Qingdao

Room 1710, Zhuoyue Tower, No.16 Fengcheng Road,  
Shibei District, Qingdao 266000 P.R. China

### Wuhan

Room 3001, World Trade Tower, 686 Jiefang Avenue,  
Jiangnan District, Wuhan 430022, P.R. China

### Chengdu

Rm. 3907, Maoye Plaza, No.19, Dongyu Street,  
Jinjiang Distrit, Chengdu 610066, P.R. China

### Xi'an

Room 1006, Tower D, Wangzuo International City,  
1 Tangyan Road, Xi'an 710065, P.R. China

### Ningbo

Room 309, Tower B, Taifu Plaza, 565 Jiangjia Road,  
Jiangdong District, Ningbo, 315040, P.R. China

### Guangzhou

Room 4006, Tower B, China Shine Plaza, 9 Linhe Xi Road,  
Tianhe District, Guangzhou 510610, P.R. China

### Chongqing

Rm. 2108, South yuanzhu Buliding 20, No.18 Fuquan Rd.,  
Jiangbei District, Chongqing 400000, P.R. China

## ■ North America Company

**MOONS' INDUSTRIES (AMERICA), INC.** (Chicago)  
1113 North Prospect Avenue, Itasca, IL 60143 USA

**MOONS' INDUSTRIES (AMERICA), INC.** (Boston)  
36 Cordage Park Circle, Suite 310 Plymouth, MA 02360 USA

**APPLIED MOTION PRODUCTS, INC.**  
18645 Madrone Parkway Morgan Hill, CA 95037 USA

**LIN ENGINEERING, INC.**  
16245 Vineyard Blvd., Morgan Hill, CA 95037 USA

## ■ European Company

**MOONS' INDUSTRIES (EUROPE) S.R.L.**  
Via Torri Bianche n.1 20871 Vimercate(MB) Italy

**AMP & MOONS' AUTOMATION (GERMANY) GMBH**  
Börsenstr. 14  
60313 Frankfurt am Main Germany

## ■ South-East ASIA Company

**MOONS' INDUSTRIES (SOUTH-EAST ASIA) PTE. LTD.**  
33 Ubi Avenue 3 #08-23 Vertex Singapore 408868

## ■ Japan Company

**MOONS' INDUSTRIES JAPAN CO., LTD.**  
Room 602, 6F, Shin Yokohama Koushin Building,  
2-12-1, Shin-Yokohama, Kohoku-ku, Yokohama,  
Kanagawa, 222-0033, Japan

## ■ India Company

**MOONS' INTELLIGENT MOTION SYSTEM INDIA PVT. LTD.**  
Rm. 908, 9th Floor, Amar Business Park,  
Tal. Haveli, Baner, Pune-411045, Maharashtra, India



<https://www.moonsindustries.com/>  
E-mail: [ama-info@moons.com.cn](mailto:ama-info@moons.com.cn)

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- All the specifications, technical parameters of the products provided in this catalog are for reference only, subject to change without notice.



International Power Components srl  
via Puccini 40, 20833 Giussano (MB) Italy  
[www.ipcmotors.com](http://www.ipcmotors.com)

Tel. +39 0362 853861 r.a. +39 0362 850307  
Fax. +39 0362 853862  
e-mail: [info@ipcsrl.it](mailto:info@ipcsrl.it)

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