MOONS'

moving in better ways

RS Step-Servo

New
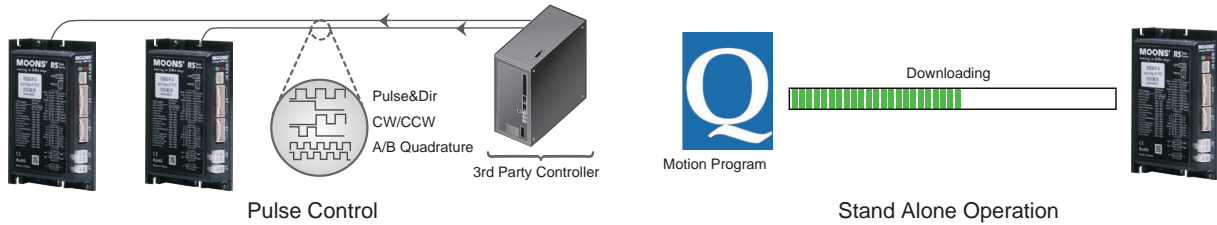
3rd Generation Step-Servo

- ■ Closed loop step system with servo control
  - ■ Intelligent built-in controller
    - ■ Efficient, smooth, accurate & fast
      - ■ Low vibration, low noise, low heat
        - ■ Enhanced motor optimized design

Closed Loop

MOONS' RS Step Series
RS06-Q-A
Input Voltage 13-70VDC
1444203B
J5 LED
J4
J3
J2
J1

MOONS' RS Step Series
RS06-P-A
Input Voltage 24-70VDC
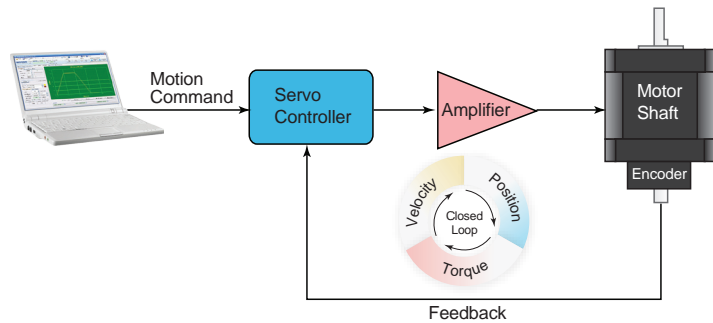154770017
J5 LED
J4
J3
J2
J1

CE RoHS Compliant

The **S**tep-**S**ervo is an innovative revolution for the world of stepper motor, it enhances the stepper motors with servo technology to create a product with exceptional feature and broad capability.

■ Multi-functional Capability

Pulse&Dir
CW/CCW
A/B Quadrature

3rd Party Controller

Pulse Control

Downloading

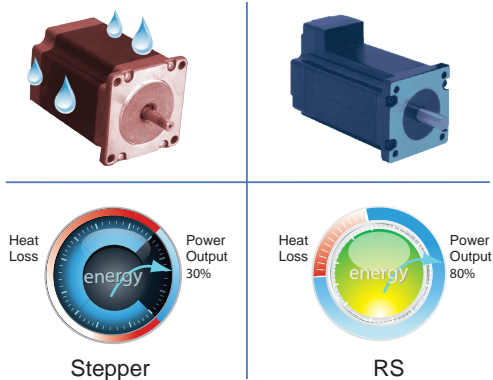Motion Program

Stand Alone Operation

■ Closed Loop

- Very tight position and velocity control for the most demanding applications.

- Robust servo loops that tolerate wide fluctuation in load inertia and frictional loading.

- Precise positioning to within ± 0.2° count using high resolution(4096 counts/rev) encoder.

Motion Command
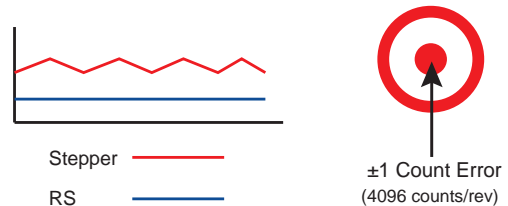
Servo Controller

Amplifier

Motor Shaft

Encoder

Velocity · Position · Closed Loop · Torque

Feedback

■ Low Heating/High Efficiency

Heat Loss   Power Output 30%
energy
Stepper

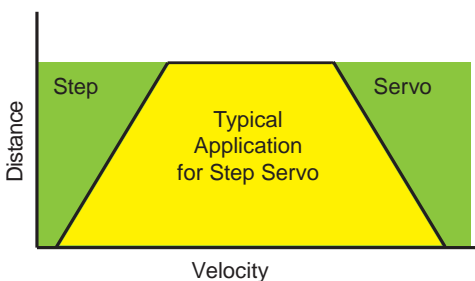Heat Loss   Power Output 80%
energy
RS

- Uses only the current required by the application, generating minimum heat output.

- When stand-still, current can reach nearly zero for extremely low heat output.

- Being able to use almost 100% of torque, allows for more efficient and compact motor usage.

■ Smooth & Accurate

- Space vector current control with 1024 line high resolution encoder, gives smooth and quiet operation, especially at low speeds.
  ------A feature never found with traditional stepping motors

- High stiffness due to the nature of the stepping motor combined with the highly responsive servo control
 ------Accurate position control both while running and static positioning

Stepper ——————
RS ——————

±1 Count Error
(4096 counts/rev)

■ Fast Response

Distance

Step   Servo
Typical Application for Step Servo

Velocity

- When performing fast point-to-point moves, the high torque output and advanced servo control provides a very responsive system far exceeding what can be done with a conventional stepper system.

High Torque

- Because the *Step-Servo* operates in full servo mode, all the available torque of the motor can be used.
- The motor can provide as much as 50% more torque in many applications. High torque capability often eliminates the need for gear reduction.
- Boost torque capability can provide as much as 50% more torque for short, quick moves.

150% Boost

70% Stepper

100% Continuous

Rated Torque

RS
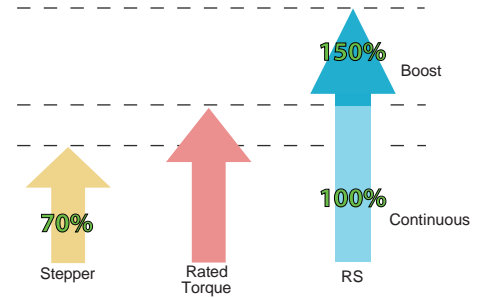
Motion Monitoring

- For difficult control situations where performing a precise move is necessary, the *Step-Servo* Quick Tuner provide an easy to use interface for performing and monitoring the motion profile.
- Many common parameters such as Actual Speed or Position Error can be monitored to evaluate system performance.
- The monitoring is interactive with the servo tuning capability so that optimum performance can be achieved.

Easy Tuning

1:10   1:5   1:1

Load Inertia
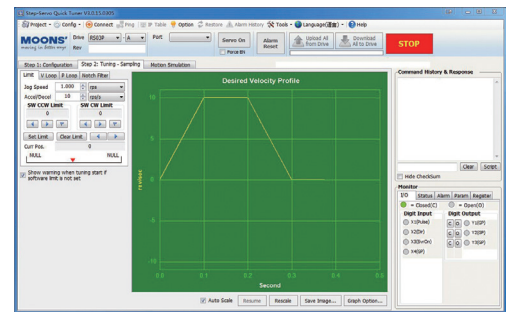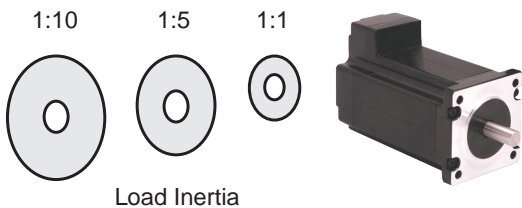
- Pre-defined tuning parameters for maximum control performance and stability.
- Easy selection list provides the level of control desired.
- In most cases NO extra manual tuning is required.

Key Features

- Up to 4 digital inputs, 3 digital outputs for P/S/Q type
- AOUT+/- BOUT+/- ZOUT+/- differential encoder signal outputs for P type
- Automatic load inertia detection
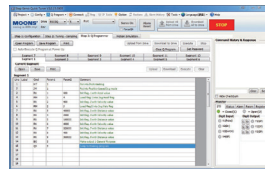- Multiple homing methods for S/Q type
- Software limit for S/Q type

Software

Step-Servo Quick Tuner
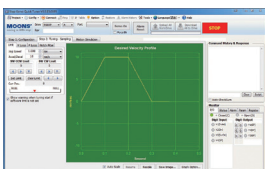
- Friendly interface
- Easy setup within just three steps
- Drive setup and configuration
- Servo tuning and sampling
- Motion testing and monitoring
- Write and save SCL command scripts
- Integrated online help

Built-in Q Programming

- Single-axis motion control
- Stored program execution
- Multi-tasking
- Conditional processing
- Math functions
- Data registers
- Motion profile simulation
- Online help integrated

FREE DOWNLOAD
Our software and user manual can be downloaded from our website:
www.moonsindustries.com

All software applications run on Windows 7, Windows 8, 32-bit or 64-bit, Windows XP.

■ System Configuration
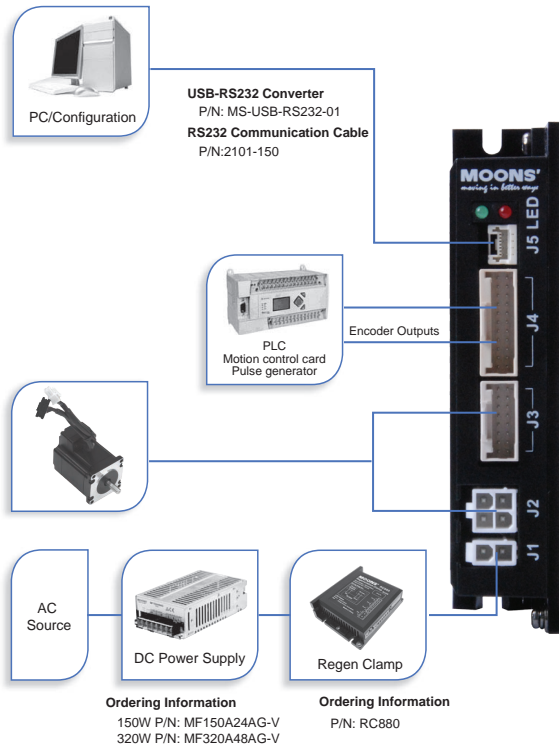
◇ -P Software Setting Pulse Input Type
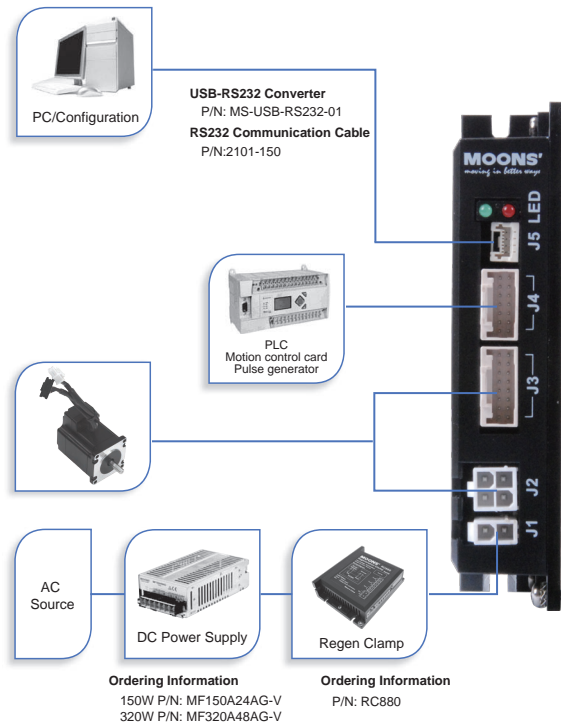Controlled via pulse generator.
Main Features

- Accepts three types of pulse signal input as Pulse&Direction, CW/CCW and A/B Quadrature
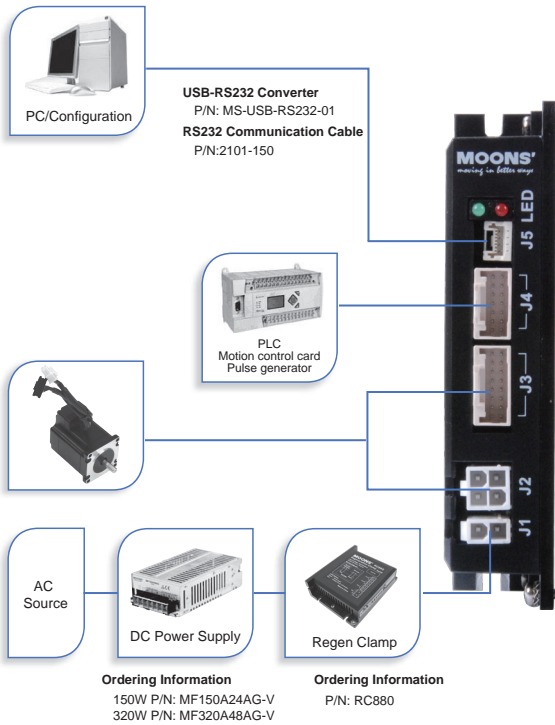- Encoder Outputs

USB-RS232 Converter
P/N: MS-USB-RS232-01
RS232 Communication Cable
P/N:2101-150

PC/Configuration

PLC
Motion control card
Pulse generator

Encoder Outputs

AC Source   DC Power Supply   Regen Clamp

Ordering Information
150W P/N: MF150A24AG-V
320W P/N: MF320A48AG-V

Ordering Information
P/N: RC880

◇ -S Basic Type with Serial Communication
Controlled via pulse signals, or MOONS' SCL streaming series commands.

Main Features

- Pulse control
- Host real time control using SCL via RS-232

USB-RS232 Converter
P/N: MS-USB-RS232-01
RS232 Communication Cable
P/N:2101-150

PC/Configuration

PLC
Motion control card
Pulse generator

AC Source   DC Power Supply   Regen Clamp

Ordering Information
150W P/N: MF150A24AG-V
320W P/N: MF320A48AG-V

Ordering Information
P/N: RC880

◇ -Q Built-in Programmable Motion Controller

Run stand-alone with sophisticated and functional programs. Commands for controlling motion, inputs & outputs, drive configuration and status, as well as math operations, register manipulation, and multi-tasking.

Main Features

- Stand-alone operation plus Serial host control
- Math operations
- Register manipulation
- Multi-tasking
- With all features in S type

USB-RS232 Converter
P/N: MS-USB-RS232-01
RS232 Communication Cable
P/N:2101-150

PC/Configuration

PLC
Motion control card
Pulse generator

AC Source

DC Power Supply

Regen Clamp

Ordering Information
150W P/N: MF150A24AG-V
320W P/N: MF320A48AG-V

Ordering Information
P/N: RC880

■ Drive Specifications

Power Amplifier	
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 20 KHz
Output Current	RS03: Continuous Current 3A max, Boost Current 4.0A max (1.5s), current limitation auto set-up by attached motor
	RS06: Continuous Current 6A max, Boost Current 7.5A max (1.5s), current limitation auto set-up by attached motor
	RS10: Continuous Current 10A max, Boost Current 12A max (1.5s), current limitation auto set-up by attached motor
Power Supply	External nominal 24 - 70 volt DC power supply required, Absolute maximum input voltage range 18 - 75 VDC
Protection	Over-voltage, under-voltage, over-temp, motor/winding shorts (phase-to-phase, phase-to-ground)
Controller	
Electronic Gearing	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
Filters	Digital input noise filter, Smoothing filter, PID filter, Notch filter
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Modes of Operation	P type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature) S type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature); Torque Mode, Velocity Mode, SCL Mode Q type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature); Torque Mode, Velocity Mode, SCL Mode, Q Programming
Digital Inputs	P/S/Q type: X1/STEP, X2/DIR, Optically isolated, differential, 5-24VDC; Minimum pulse width = 250 ns, Maximum pulse frequency = 2 MHz; X3,X4:optically isolated, single-ended, sinking or souring, 5-24VDC, minimum pulse width 50μs, maximum pulse frequency 10KHz;
Digital Outputs	P/S/Q type: Y1/Alarm, Y2/In Position, Y3/Brake; Optically isolated, 30V/100 mA max
Encoder Outputs	P type: Differential encoder outputs (AOUT+/- BOUT+/- ZOUT+/-), 26C31 line driver, 20 mA sink or source max
Communication	RS-232
Physical	
Ambient Temperature	0 to 40°C (32 to 104°F) when mounted to a suitable heatsink
Ambient Humdity	90% Max., non-condensing
Mass	Approx 0.2 Kg

■ Dimensions
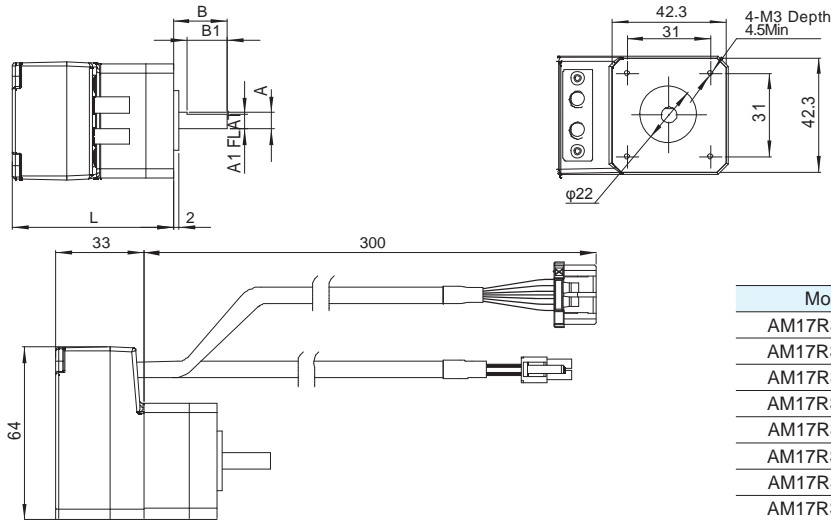
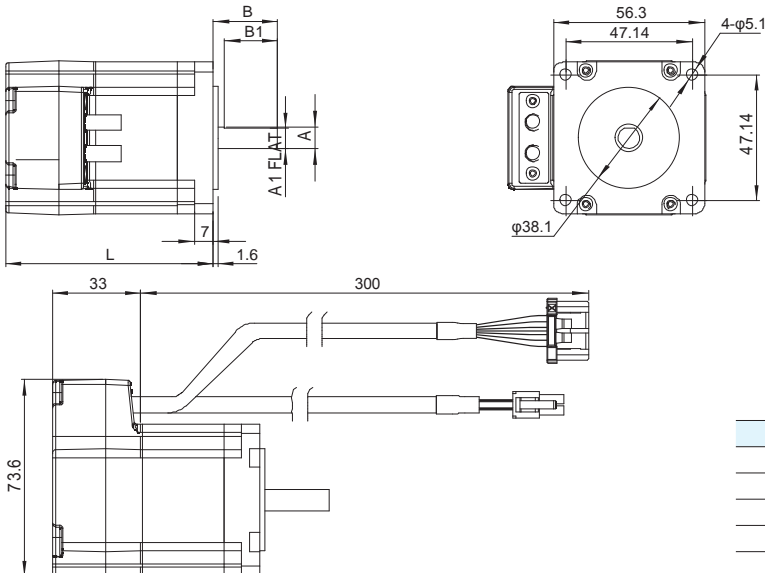👆 Visit www.moonsindustries.com to get the 3D drawings.

◇ Motor (Unit:mm)

AM11RS
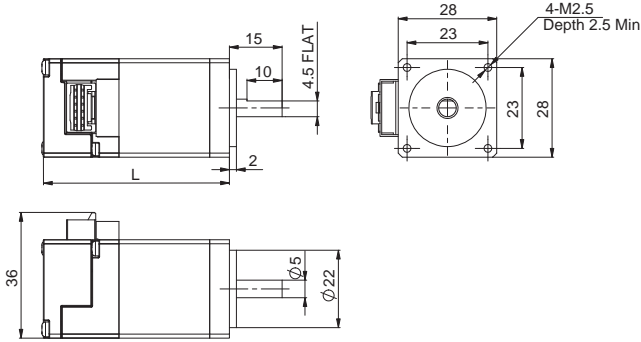
Model	L
AM11RS1DMA	43.8
AM11RS2DMA	52.9
AM11RS3DMA	64.1

AM17RS

Model	A	A1	B	B1	L
AM17RS1DMA	φ6	5.5	20	15	59.5
AM17RS1DMB	φ5	4.5	24	15	59.5
AM17RS2DMA	φ6	5.5	20	15	65
AM17RS2DMB	φ5	4.5	24	15	65
AM17RS3DMA	φ6	5.5	20	15	73.5
AM17RS3DMB	φ5	4.5	24	15	73.5
AM17RS4DMA	φ6	5.5	20	15	89
AM17RS4DMB	φ5	4.5	24	15	89

AM23RS

Model	A	A1	B	B1	L
AM23RS2DMA	φ8	7.5	24	20	77.5
AM23RS2DMB	φ6.35	5.85	20	15	77.5
AM23RS3DMA	φ8	7.5	24	20	99.5
AM23RS3DMB	φ6.35	5.85	20	15	99.5
AM23RS4DMA	φ8	7.5	24	20	102.5

AM24RS
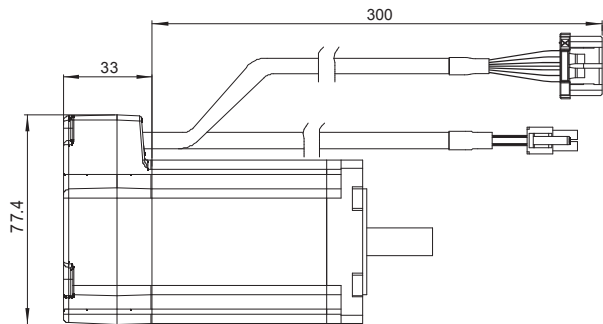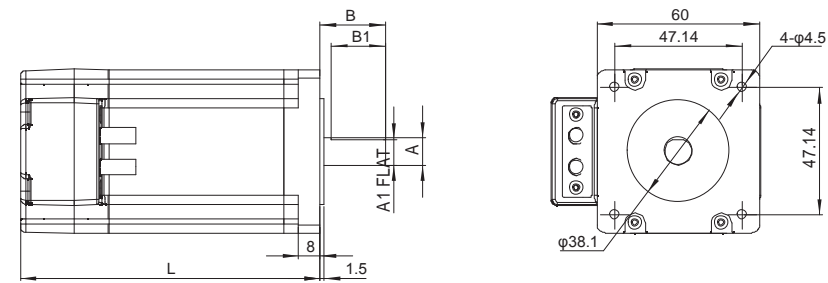
Model	A	A1	B	B1	L
AM24RS3DMA	φ10	9.5	24	20	110
AM24RS3DMB	φ8	7.5	20.6	15	110

AM34RS
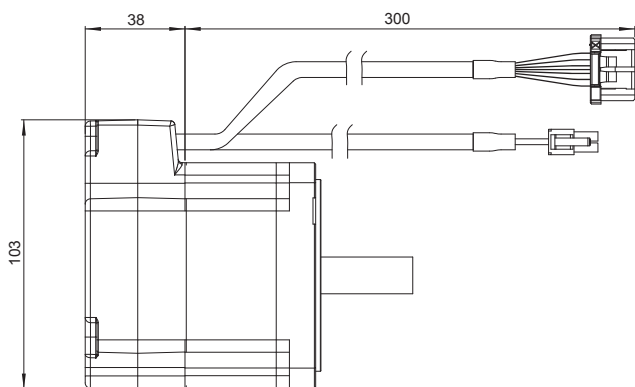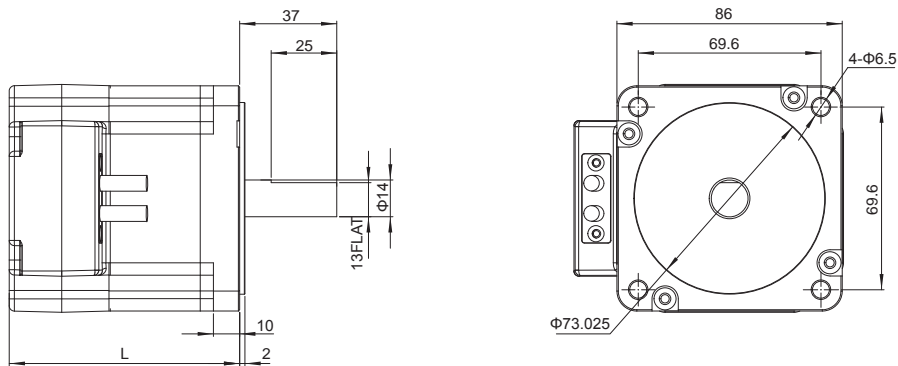
Model	L
AM34RS1DMA	88
AM34RS3DMA	117.5
AM34RS5DMA	147

◇ Drive (Unit:mm)

RS03/06/10-P
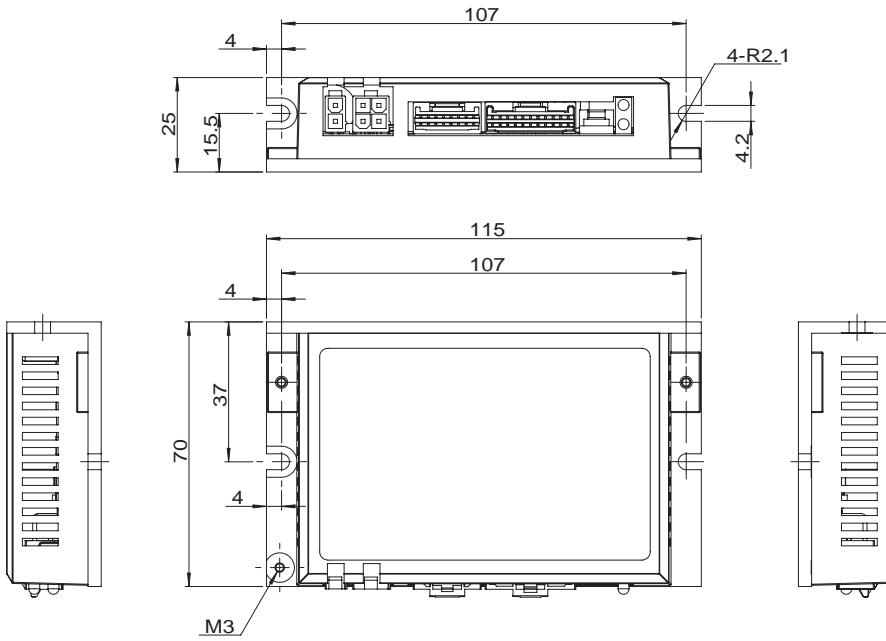
Part Number		
RS03-P-A	RS06-P-A	RS10-P-A

RS03/06/10-S/Q
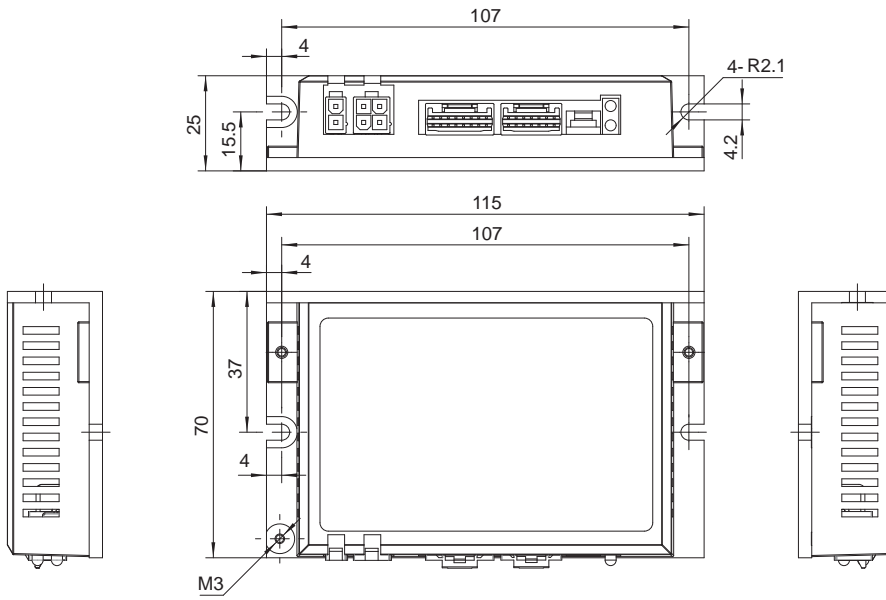
Part Number					
RS03-S-A	RS06-S-A	RS10-S-A	RS03-Q-A	RS06-Q-A	RS10-Q-A

■ Motor Specifications

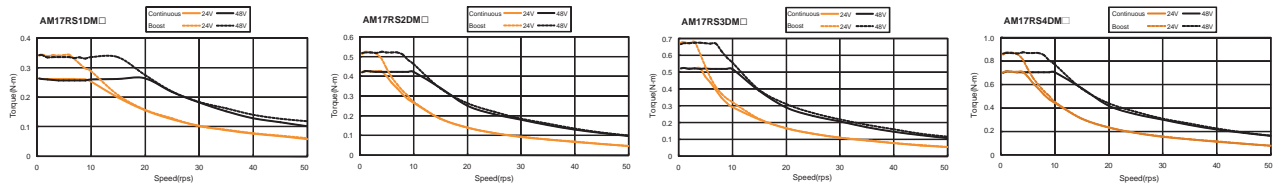| Motor P/N	Drive P/N	Torque	Rotor Inertia	Encoder Resolution	Maximum Speed	Mass	Frame Size	Permissible Overhung Load（N）					Permissible Thrust Load
								Distance(L) from Shaft End(mm)					
		N•m	g•cm²	counts/rev	RPM	g	mm	0	5	10	15	20	
AM11RS1DMA		0.065	9			118	28	20	25	34	52	-	
AM11RS2DMA		0.08	12			168							
AM11RS3DMA		0.125	18			218							
AM17RS1DM□	RS03-■-A	0.25	38			390	42	35	44	58	85	-	
AM17RS2DM□		0.4	57			440							
AM17RS3DM□		0.5	82			520							
AM17RS4DM□		0.7	123	4096	3000	760							Less than the motor mass
AM23RS2DM□		0.95	260			850	56	63	75	95	130	190	
AM23RS3DM□	RS06-■-A	1.5	460			1250							
AM23RS4DMA		2.4	365			1090							
AM24RS3DM□		2.5	900			1650	60	90	100	130	180	270	
AM34RS1DMA		2.6	915			2000	80	260	290	340	390	480	
AM34RS3DMA	RS10-■-A	5.2	1480			3100							
AM34RS5DMA		7.2	2200			4200							
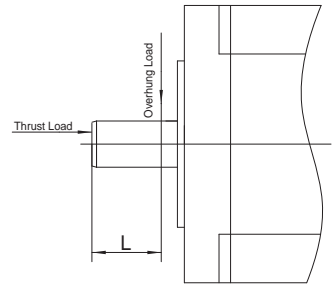
□：A or B, refer to motor part numbering system; ■：P, S or Q refer to driver part numbering system;

■ Torque Curves

AM11RS Series
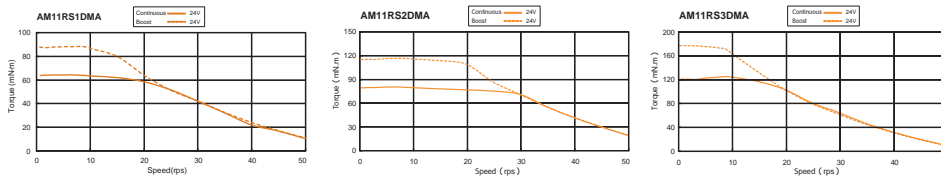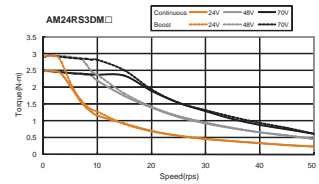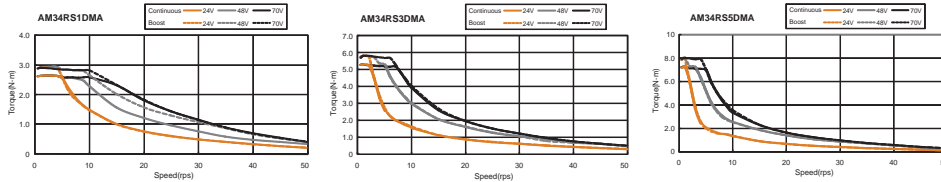

AM17RS Series

AM23RS Series
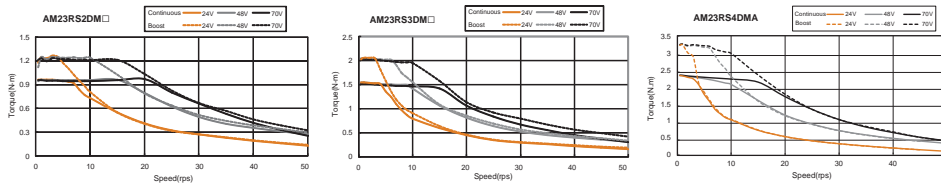
AM24RS Series

AM34RS Series

■ Numbering System

AM17 RS 1 D M A

- Frame Size
  11,17,23,24,34
- Step Servo
- Motor Size
  1 = 1Stack
  2 = 2Stack
  3 = 3Stack
  4 = 4Stack
  5 = 5Stack
- D=DC Input
- Encoder
  M=1024-Line
- Mechanical Option
  A=Output shaft size
  11:Φ5
  17:Φ6
  23:Φ8
  24:Φ10
  34:Φ14
  B=Output shaft size
  17:Φ5
  23:Φ6.35
  24:Φ8

RS 03 - P - A

- Step Servo
- Output Current
  03 - 3A
  06 - 6A
  10 - 10A
- Control Option
  P = Pulse Input Type
  S = Basic Type
  Q = Q Type
- A = RS-232
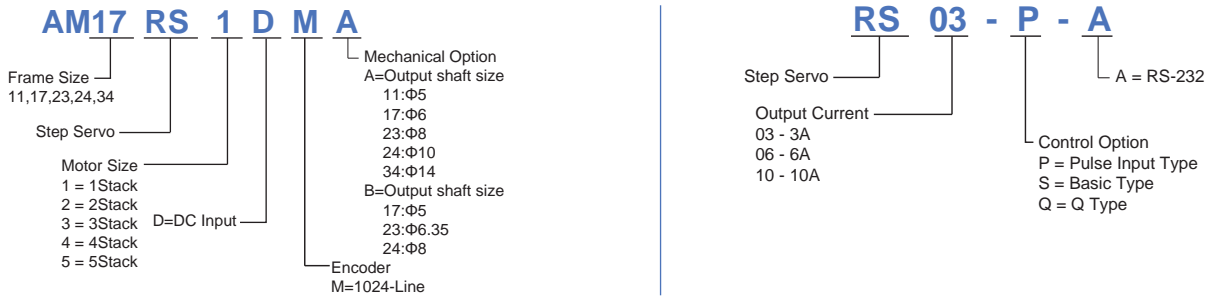
■ Ordering Information

Control	Drive Type	Motor Type	Torque
P Type Pulse Input Type RS-232 Software 4 Digital Inputs 3 Digital Outputs Encoder Outputs	RS03-P-A	AM11RS1DMA	0.065N·m
		AM11RS2DMA	0.08N·m
		AM11RS3DMA	0.125N·m
		AM17RS1DM □	0.25N·m
		AM17RS2DM □	0.4N·m
		AM17RS3DM □	0.5N·m
		AM17RS4DM □	0.7N·m
	RS06-P-A	AM23RS2DM □	0.95N·m
		AM23RS3DM □	1.5N·m
		AM23RS4DMA	2.4N·m
		AM24RS3DM □	2.5N·m
	RS10-P-A	AM34RS1DMA	2.6N·m
		AM34RS3DMA	5.2N·m
		AM34RS5DMA	7.2N·m

Control	Drive Type	Motor Type	Torque
S Type Basic Type RS-232 Communication 4 Digital Inputs 3 Digital Outputs	RS03-S-A	AM11RS1DMA	0.065N·m
		AM11RS2DMA	0.08N·m
		AM11RS3DMA	0.125N·m
		AM17RS1DM □	0.25N·m
		AM17RS2DM □	0.4N·m
		AM17RS3DM □	0.5N·m
		AM17RS4DM □	0.7N·m
	RS06-S-A	AM23RS2DM □	0.95N·m
		AM23RS3DM □	1.5N·m
		AM23RS4DMA	2.4N·m
		AM24RS3DM □	2.5N·m
	RS10-S-A	AM34RS1DMA	2.6N·m
		AM34RS3DMA	5.2N·m
		AM34RS5DMA	7.2N·m

Control	Drive Type	Motor Type	Torque
Q Type Programm Type RS-232 Communication 4 Digital Inputs 3 Digital Outputs	RS03-Q-A	AM11RS1DMA	0.065N·m
		AM11RS2DMA	0.08N·m
		AM11RS3DMA	0.125N·m
		AM17RS1DM □	0.25N·m
		AM17RS2DM □	0.4N·m
		AM17RS3DM □	0.5N·m
		AM17RS4DM □	0.7N·m
	RS06-Q-A	AM23RS2DM □	0.95N·m
		AM23RS3DM □	1.5N·m
		AM23RS4DMA	2.4N·m
		AM24RS3DM □	2.5N·m
	RS10-Q-A	AM34RS1DMA	2.6N·m
		AM34RS3DMA	5.2N·m
		AM34RS5DMA	7.2N·m

□: Enter A(Enhanced Shaft) or B(Standard) in the box(□) within the model name

■ Standard Accessories (Within the package)

P/N	Catagory	Technical Specification
1103-200	Cable	Power Supply Cable
2101-150	Cable	RS-232 Communication Cable

■ Optional Accessories (Sold separately)

P/N	Catagory	Technical Specification
MF150A24AG-V	Switching Power Supply	150W, 24V
MF320A48AG-V	Switching Power Supply	320W, 48V
RC880	Regenaration Clamp	80VDC Max. 50W
MS-USB-RS-232-01	USB Converter	USB-RS-232
1108-□□□	Cable	RS-S/Q Standard I/O Cable, Shield
1115-□□□	Cable	RS-P Standard I/O Cable, Shield
2103-□□□	Cable	Motor Extension Cable for AM17/23/24/34RS motor
2109-□□□	Cable	Motor Extension Cable for AM11RS motor
2116-□□□	Cable	Encoder Extension Cable for AM17/23/24/34RS motor
2118-□□□	Cable	Encoder Extension Cable for AM11RS motor

◇ Switching Power Supplies (Unit:mm)

MOONS' recommend to use following switching power supplies

**P/N:MF150A24AG-V** 150W,24VDC   **P/N:MF320A48AG-V** 320W,48VDC
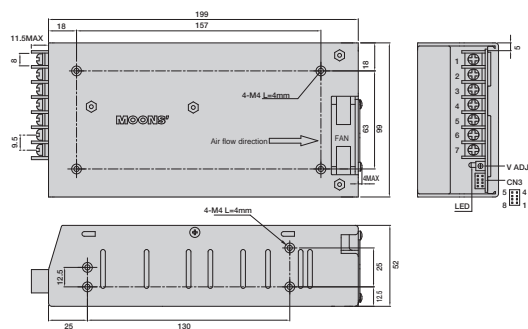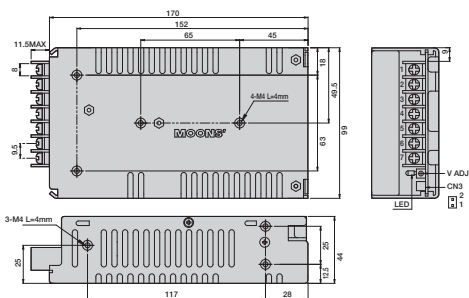
◇ Regeneration Clamp (Unit:mm)

P/N: RC880

When using regulated power supply you may encounter a problem with regeneration. The kinetic energy caused by regeneration is transferred back to the power supply. This can trip the overvoltage protection of a switching power supply, causing it to shut down.

MOONS' offer the RC880 "regeneration clamp" to solve this problem. If in doubt, use an RC880 for your first installation. If the "regen" LED on the RC880 never flashes, you don't need the clamp.
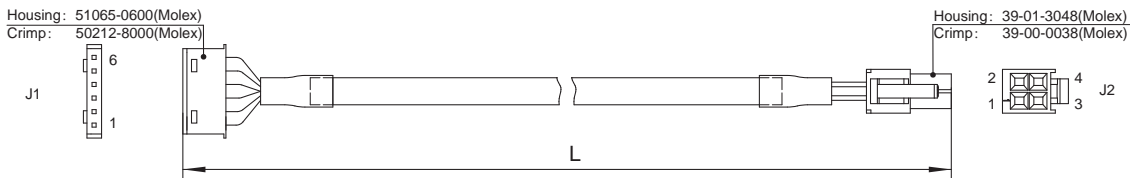

Unit:mm
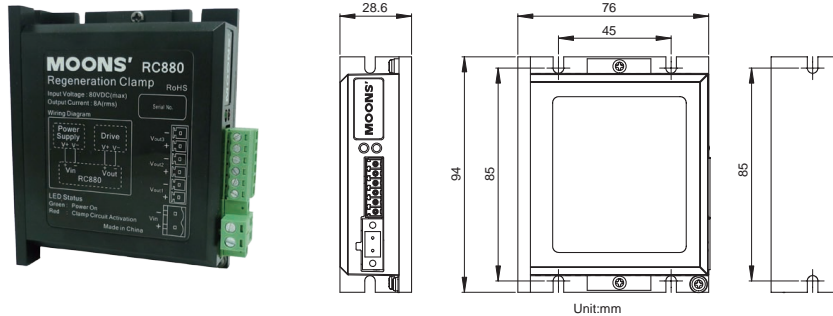
◇ USB Converter

Model: MS-USB-RS-232-01

Description: USB-RS-232 converter

◇ Motor Extension Cable for AM11RS motor

P/N	Length (L)
2109-100	1M
2109-300	3M
2109-500	5M
2109-1000	10M

Wiring Diagram		
PIN（J1）	Colour(Signal)	PIN（J2）
1	Blue（B-）	1
3	Red（B+）	2
4	Green（A-）	3
6	Black（A+）	4

◇ Motor Extension Cable for AM17/23/24/34RS motor

Housing：39-01-3049(Molex)
Crimp：39-00-0040(Molex)

Housing：39-01-3048(Molex)
Crimp：39-00-0038(Molex)
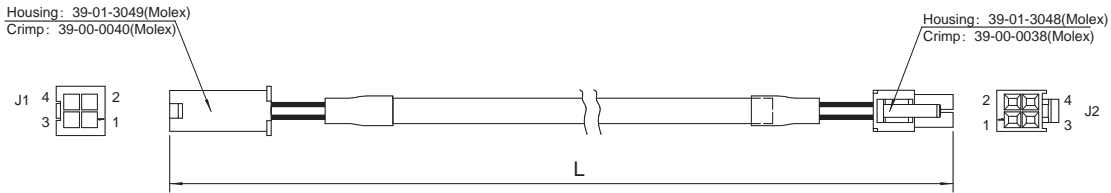
P/N	Length (L)
2103-100	1M
2103-300	3M
2103-500	5M
2103-1000	10M

Wiring Diagram		
PIN（J1）	Colour(Signal)	PIN（J2）
1	Blue（B-）	1
2	Red（B+）	2
3	Green（A-）	3
4	Black（A+）	4

◇ Encoder Extension Cable for AM11RS motor

Housing：501646-1200(Molex)
Crimp：501648-1000(Molex)

Housing：501646-1600(Molex)
Crimp：501648-1000(Molex)
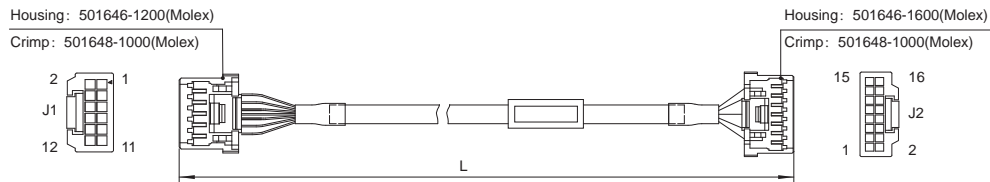
P/N	Length (L)
2118-100	1M
2118-300	3M
2118-500	5M
2118-1000	10M

Wiring Diagram					
PIN（J1）	Colour(Signal)	PIN（J2）	PIN（J1）	Colour(Signal)	PIN（J2）
10	Blue（A+）	1		Brown（U+）	
9	Blue/Black（A-）	2		Brown/Black（U-）	
8	Green（B+）	3		Gray（V+）	
7	Green/Black（B-）	4		Gray/Black（V-）	
6	Yellow（Z+）	5	1	White（W+）	15
5	Yellow/Black（Z-）	6	2	White/Black（W-）	16
3	Red（+5V）	7	12	Shield	10
4	Black（GND）	8			

◇ Encoder Extension Cable for AM17/23/24/34RS motor

Housing：1-1903130-6(TYCO)
Crimp：1903120-1(TYCO)

Housing：501646-1600(Molex)
Crimp：501648-1000(Molex)
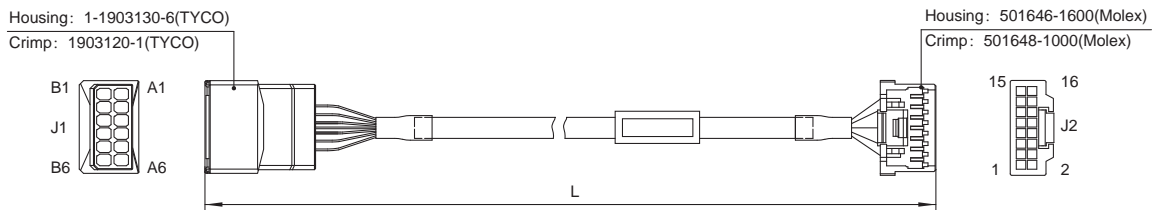
P/N	Length (L)
2116-100	1M
2116-300	3M
2116-500	5M
2116-1000	10M

Wiring Diagram					
PIN（J1）	Colour(Signal)	PIN（J2）	PIN（J1）	Colour(Signal)	PIN（J2）
A6	Blue（A+）	1		Brown（U+）	
B6	Blue/Black（A-）	2		Brown/Black（U-）	
A5	Green（B+）	3		Gray（V+）	
B5	Green/Black（B-）	4		Gray/Black（V-）	
A4	Yellow（Z+）	5	A2	White（W+）	15
B4	Yellow/Black（Z-）	6	B2	White/Black（W-）	16
A3	Red（+5V）	7	A1	Shield	10
B3	Black（GND）	8			

◇ Standard I/O Cable (For RS03/06/10-S/Q)
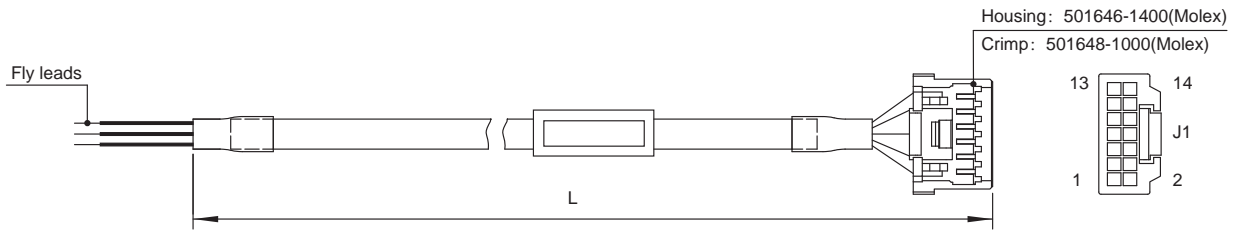
Fly leads

Housing：501646-1400(Molex)
Crimp：501648-1000(Molex)

L

13   14
J1
1   2

P/N	Length (L)	Wiring Diagram			
		PIN（J1）	Colour(Signal)	PIN（J1）	Colour(Signal)
1108-030	30CM	1	Blue（STEP+）	8	Black（XCOM）
1108-100	1M	2	Blue/Black（STEP-）	9	Brown（Y1+）
1108-200	2M	3	Green（DIR+）	10	Brown/Black（Y1-）
		4	Green/Black（DIR-）	11	Gray（Y2+）
		5	Yellow（X3/EN）	12	Gray/Black（Y2-）
		6	Yellow/Black（X4/AR）	13	White（Y3+）
		7	Shield	14	White/Black（Y3-）

◇ Standard I/O Cable (For RS03/06/10-P)
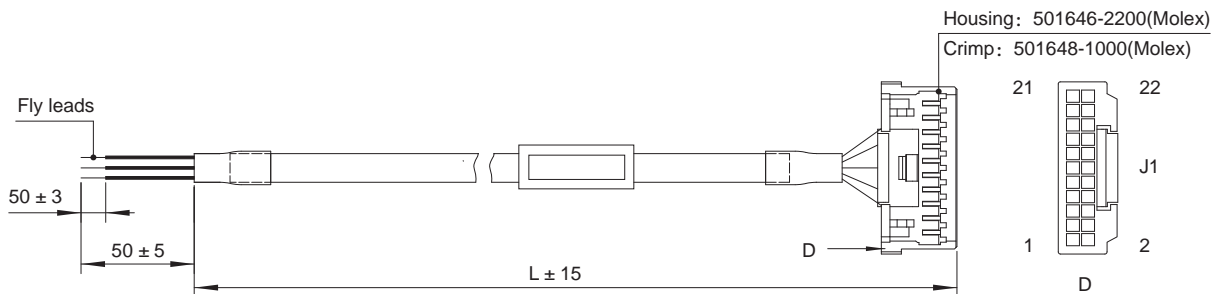
Fly leads

Housing：501646-2200(Molex)
Crimp：501648-1000(Molex)

21   22
J1
1   2

50 ± 3

50 ± 5

L ± 15   D

D

P/N	Length (L)	Wiring Diagram			
		PIN（J1）	Colour(Signal)	PIN（J1）	Colour(Signal)
1115-030	30CM	1	Blue/White（STEP+）	12	Gray/Black（Y2-）
1115-100	1M	2	Blue/Black（STEP-）	13	Purple/White（Y3+）
1115-200	2M	3	Green/White（DIR+）	14	Purple/Black（Y3-）
		4	Green/Black（DIR-）	15	NC
		5	Purple（X3）	16	Black（GND）
		6	Blue（X4）	17	Red/White（AOUT+）
		7	Shield	18	Red/Black（AOUT-）
		8	Brown（XCOM）	19	Orange/White（BOUT+）
		9	Brown/White（Y1+）	20	Orange/Black（BOUT-）
		10	Brown/Black（Y1-）	21	Yellow/White（ZOUT+）
		11	Gray/White（Y2+）	22	Yellow/Black（ZOUT-）

• All the specifications, technical parameters of the products provided in this catalog are for reference only, subject to change without notice. For the latest details, please contact our sales department.