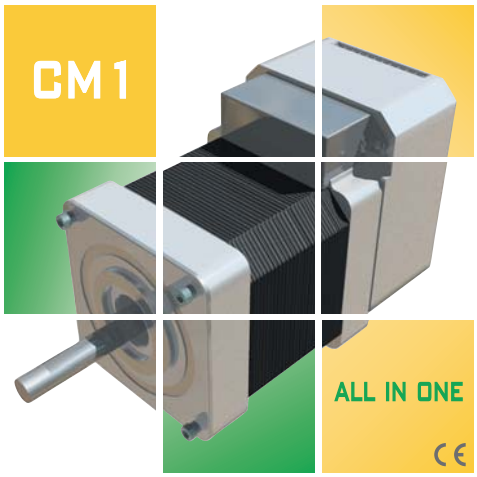
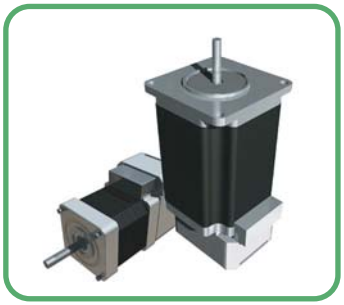


ENGLISH EDITION

COOL MUSCLE

Integrated Vector Drive Servo System

The Cool Muscle is a closed loop vector drive servo system.
An intelligent driver with a 32-bit RISC CPU, a magnetic encoder, and power management are built onto the motor. The Cool Muscle excels in performance, size, and cost, offering new ways to design and develop with motion control.



ALL IN ONE SOLUTION

***Integrated Driver**
***Controller**
***Encoder**

The Cool Muscle is an all in one solution for your motion control.

Integrated Controller

Based around a 32-bit RISC CPU, the integrated controller offers a wide range of hardware and software features. Motion programs can be stored with the motor, eliminating the need for driver and controller boxes. Networked motors can also communicate with each other.

Integrated Driver

A 24VDC sinusoidal driver with regenerative braking implements The Cool Muscle's Vector Driven motions at speeds up to 3000RPM. The closed loop architecture allows the driver to work extremely effectively, resulting in a cool long life servo system.

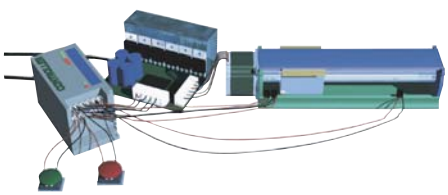
High Resolution Magnetic Encoder

Minimizing position error and reducing motion ripple can only be achieved with an advanced encoder. The Cool Muscle standard magnetic encoder feeds back position changes as small as 0.0072° or 0.43 arch minutes.

PURSUIT OF SIMPLIFICATION

Conventional System

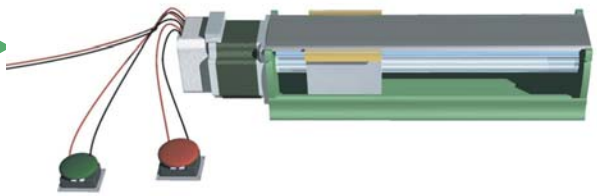
A typical conventional slider system requires a driver, controller, origin sensor, limit sensor and so on, to make the whole system bulky and complecated.



Very hard to differentiate your product

Cool Muscle System

The Cool Muscle eliminates the need for an external driver box, controller and sensors to make your system compact and simple.



Leave your competition behind with Cool Muscle

Cool Muscle Types

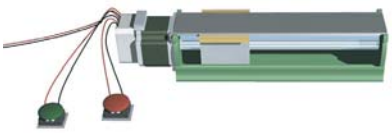
Cool Muscle supports three different interfaces; the C-type for Computor, the P-type for Pulse, the V-type for Analog. Choose a type that will best fit your needs.

C type

The C-type is the most versatile and feature packed solution among the three types.
It can be preprogrammed and controlled directly by PC or PLC, and networked for multi-axis applications. Also digital signals can activate stored motion programs, creating compact and powerful machine with simple controls.

Solution 1 Pre-program

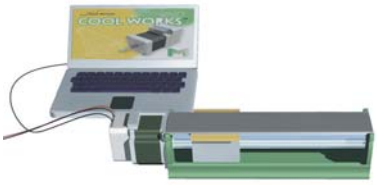
If your application only requires repetitive motion, you can preprogram the motor, eliminating the need for a controller. Preloaded programs can be executed by a switch, PC or PLC.



A slyder system with a pre-programed C type Cool Muscle

Solution 2 Direct Command

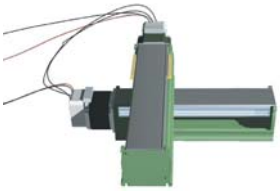
If your application requires complicated motion or arbitrary motion, you can send command directly to the Cool Muscle via PC or embedded computers.



A slyder system with Cool Muscle controlled by direct command via PC

Solution 3 Network

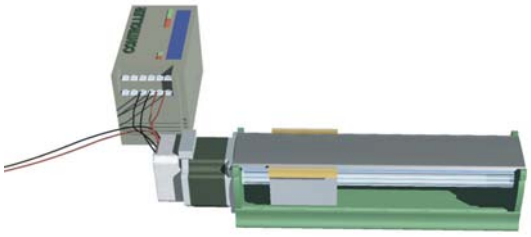
The C type Cool Muscles can be daisy chained, providing you with a simple and low cost network solution. There are different ways to network the C type Cool Muscles to suit your needs.



X-Y system with the C type Cool Muscles in a daisy chain network

P type

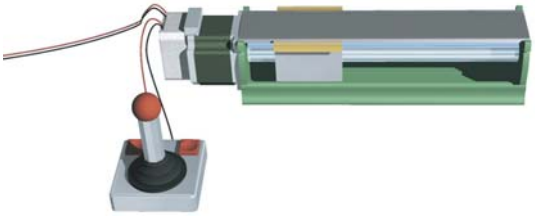
Replacing your current pulse driven system with the P type Cool Muscle will save space and remove problems associated with an open loop stepper. The P type Cool Muscle supports both CW/CCW and Pulse/Direction.



A typical slider system with the P type Cool Muscle

V type

The V type Cool Muscle can vary speeds or positions in proportion to voltage input level. Set the max speeds or travel distance with ease by parameters. The V type Cool Muscle is an ideal solution for constant feed systems, and valves.



Slider system with the V type Cool Muscle controlled by a joy stick

Which Type Do I Need?

If you

- want to perfom complicated motion with a digital signal
- have a system that does repetitive motion
- want to run a multi-axis machine

CHOOSE ➤➤➤ C type

If you

- want to continue with a pulse driver system
- want to improve machine performance
- want to remove problems associated with an open loop stepper
- want to save space and reduce cost

CHOOSE ➤➤➤ P type

If you

- want to contorol speed or positions with an analog input
- want to save space and reduce cost
- want a simple solution

CHOOSE ➤➤➤ V type

COOL MUSCLE

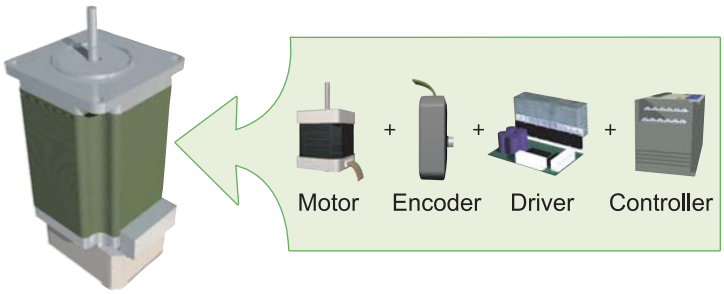
Cool Muscle Features

The Cool Muscle is packed with features that help you reduce the size and cost of your machines while also shortening development time.

Simple and compact

An intelligent driver with a 32 bit RISC CPU, Magnetic encoder, and power management are all built in right on the motor.

No more driver/boxes. Reduce wiring. Smaller machines. Shortend development time.



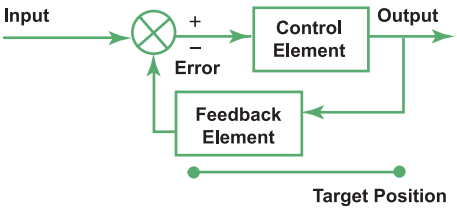
Full Closed Loop System

The Cool Muscle is a full closed loop system, with the high resolution magnetic encoder and the intelligent driver board mounted on the back. Cool Muscle constantly monitors its position, eliminating any miss-steps.

Higher repeatability, stability, and accuracy.

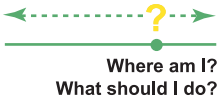
Closed Loop System

By recieving position input from the sensor the Cool Muscle know its position and can correct itself.



Open Loop System

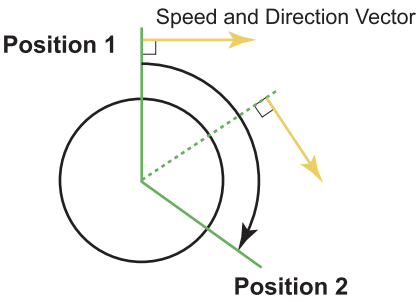
An open loop system does not know its position, often resulting in problems such as miss-steps and targets.



Smooth and Accurate Movements

The Cool Muscle's high resolution encoder gives you an exceptionally fine placement of 50,000 units per rotaion. The Cool Muscle constantly monitors its position, eliminating any miss- steps.

Performance levels similar to AC servo at a fraction of the price.



Vector Drive Control

Vector Drive is a control technique used in servo systems. Vector Drive Control is a completely different technique from micro-stepping. Unlike micro-stepping Vector Drive Control is not subject to resonance problems and produces smooth movements.

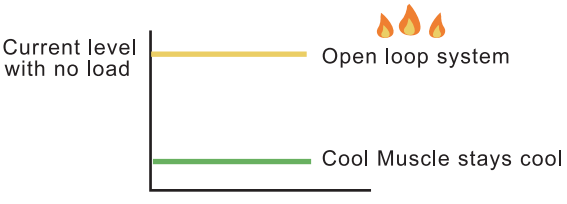
Cool Operation

The Cool Muscle's power management monitors and provides the optimum current based on load, keeping the motor cool. In addition, using a stepping motor, the Cool Muscle generates high torque at low speed.

Longer motor life. Increased power efficiency. Great for enclosed space. Reduced need for gear boxes.

The Cool Muscle applies optium current to produce motion whereas an open loop stepper always used the maximum current.

The Cool Muscle has high torque even at low speed.



Features

Various Interfaces

The Cool Muscle can be controlled by various methods, including Computer, Pulse, Analog and PLC. Choose the type that best suits your needs.

Minimum modification required to your system.

A wide range of solutions for your system.

	Control	*Variations*
C type	PC Embedded Computer PLC Switch	Pre Programmed
P type	Pulses	CW/CCW Pulse/Direction
V type	Variable Voltage	Position Speed

Programmable

Program the Cool Muscle to create the motion you need.
Define motion profiles and create programs using easy-to-understand the Cool Muscle Language(CML). Motion programs you create can be downloaded to the Cool Muscle. The program can be executed via PC, embedded computer or simply using I/Os.

Great solution for repetitive motion.
Simple and compact machines.

CML

The Cool Muscle Language is a set of ASCⅡ commands that lets you easilly create motion programs. Programs you create can be downloaded to the Cool Muscle via free software from MuscleCorporation, Cool WorksLite or any standard terminal program.

```
P1=1000
P2=2000
P3=5000
S1=100
S2=300
A1=50
T1=100
```

Define motion profiles such as speed, acceleration, position and timer.

```
B1
A1,S1,P1
A1,S2,P2
T1
B2
S1,P3
```

Difine motion programs using the motion profiles defined above.

User Difinable Parameters

Defined the character of your Cool Muscle to suit your needs. Cool Muscle gives you over 50 parameters. Prameters can easily be set by using the Cool Works software.

Flexibly change your motor characteristic.

K46=1	Origin search set to Automatic Origin Search using bumper
K48=100	Mechanical and Electrical origin offet distance set to 100 pulses
K58=2000	Software limit + side set to 2000 pulses
K28=7000	Set Origin Serch to Input 4
K34=21	Set Alarm to Output 2, Inposition to Output1
K60=50	Set the torque to 50% in Push mode
⋮	

Useful Parameter Example

Origin Search

Origin search parameter lets you select a origin search method. Eliminate the need for origin sensors using our unique origin search technique. Origin can be determined using a hardware-stop/bumper instead of using a origin sensor. The Cool Muscle hits a bumper at very low speed and keeps pushing until it reaches a specified current level, at which the motor determines that it has reached origin. This method eliminates the need for origin sensor and wiring.

Software Limit

You can set software limits using the Cool Muscle parameters. Set limits on both CW/CCW sides to eliminate limit sensors.

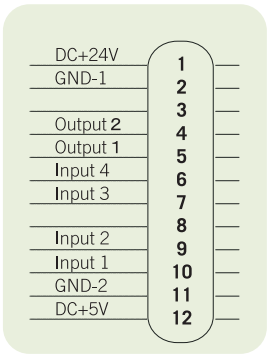
These two software features just saved you the cost of three sensors and the time to install wiring and calibrate them.

COOL MUSCLE

Programmed I/Os

Configure and assign multiple functions to I/Os on the Cool Muscle. The Cool Muscle has 4 inputs and 2 outputs that can be digital or anolog I/O, serial or pulse counters(input only). The Cool Muscle lets you assign a function to each point of a signal.

Custom I/O.
Flexible application of powerfully built in features.



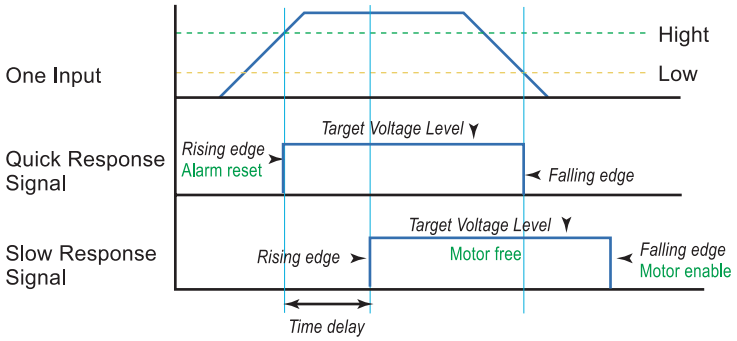
Input Function Example
Origin sensor
Manual feed
Manual jog
Execute Bank1
Origin search
Motor free
Enable motor
Excute next step
Excute previous step

Output Function Example
Alarm
In-position
Analog output for monitoring

Virtual Input Signal

Make the most of the I/O ports by taking advatages of the Cool Muscle's unique virtual signal technique. The Cool Muscle creates two signals based on an original input signal by setting a time delay between the two signals, allowing you to assign multiple functions onto the same input.

Eliminates the need for external I/O board.

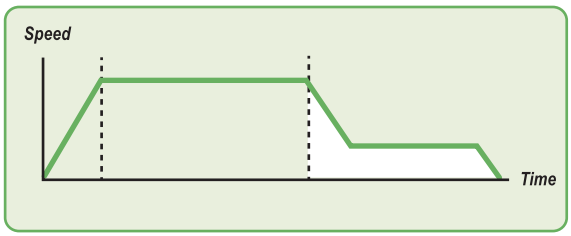


Quick and Slow response signals example

You can assign Alarm Reset, Motor Free and Enable Motor to the rising edge of Quick response, target voltage level and failling edge of Slow response signals respectively. Input functions are set by parameters.

Push Mode (C-type only)

Push mode mimics a typical pneumatic cylinder motion. It keeps pushing for a given time and at a set current level when a motor encounters a resistance such as bumper and stopper.

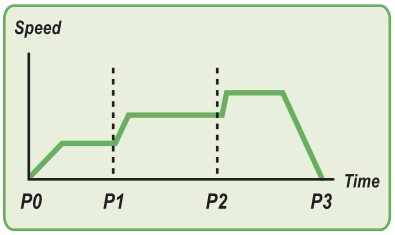


Quick and Slow response signals example

Push mode is standard allowing for electric simulation of common pneumatic operations.

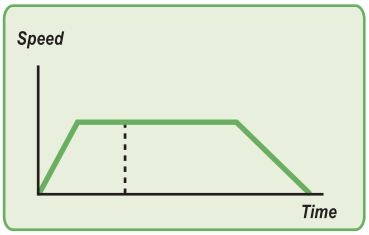
Advanced Motion

Speed or acceleration can be changed while the motor is in operation. Cool Muscle supports advanced motions such as continuous PTP and PTP motion with different accelerations/decelerations and more.



Continuous PTP

There is no steps in motion between origin and P3. Speed and Acceleration are changed at each point.



PTP with different deceleration

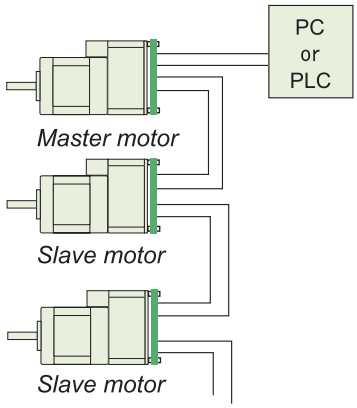
Acceleration and deceleration can be set separately.

Network

The Cool Muscle provides you with different networking solutions that best suits your needs. Connect multiple the Cool Muscles in a daisy chain style network. The daisy chained the Cool Muscles can tell other motors to activate program as well as receive commands from a computer or an embedded controller.

Simple network solution that lowers your cost.

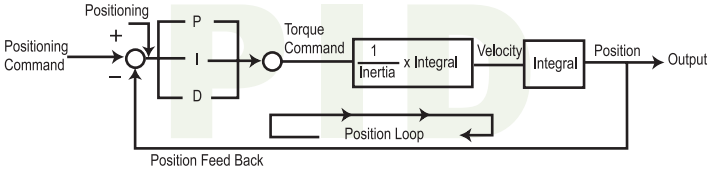
Daisy Chain Network



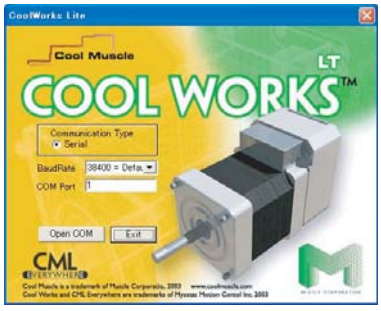
Gain Tuning

The Cool Muscle can be tuning very easily by three user's parameters only.

Save your time and cost for Mechanical development by the simplification of the tuning.



Cool Works

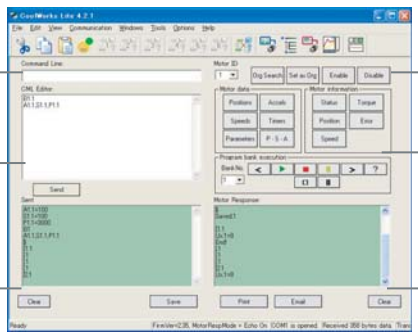


The Cool Works is a free software.
An easy-to-use interface makes it easy to work with the Cool Muscle.
You can simply use this for setting parameters, program mode, jog mode, confirmation of status and more.

It's available to download the free software from the Muscle's HP.

http://www.musclecorp.com

Functional Description



Command Line
Enter commands in a single line to send.

CML Editor
Edit and send data like parameters and commands.

Sent Date
Display the data sent to the motor.

Motor Data / Information
Conformation of the speed data and parameters.

Motor Execution
Pause, stop, display bank in motor and more functions.

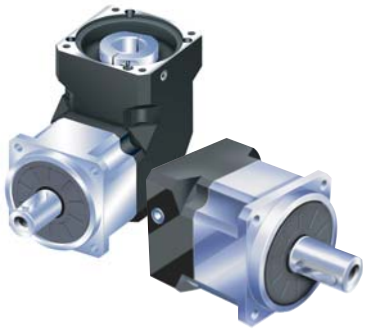
Motor Response
Display the data received from the motor.

Accessories for the Cool Muscle

Intelligent AC Servo

It is possible to conbine an ideal servo system with lots of the Cool muscle Actuators.
Ideal design solutions for amazing prices!
The Cool Muscle Actuator eliminates the external conrollers, drivers, and origin and limit sensors, providing a compact and low cost solution.

Please ask for detailed information.



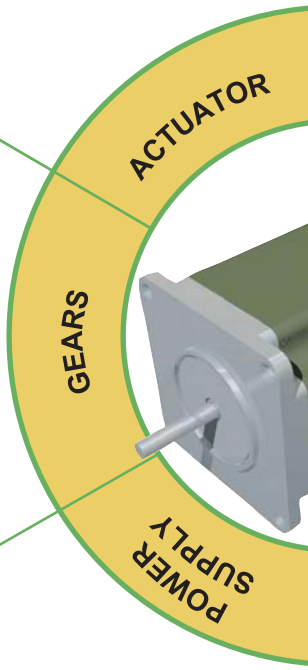
Gear Heads

A wide range of high quality gearheads are available to suit your application needs. Combine a low backlash, zero maintenance, high durability gear heads with the Cool Muscle to maximize perfomance.

Ratio
1:3, 1:4, 1:5, 1:6, 1:7, 1:8, 1:9, 1:10,
1:15, 1:20, 1:25, 1:30, 1:35, 1:40, 1:45,
1:50, 1:60, 1:70, 1:80, 1:90, 1:100

Backlash
Precision :1:3～10/≦3
1:15～100/≦5
Standard :1:3～10/≦5
1:15～100/≦7

Please ask for detailed information.



Power Supply

Designed specifically for the Cool Muscle, our power supply is built to withstand the current draw spikes that the hard stops or starts often require.

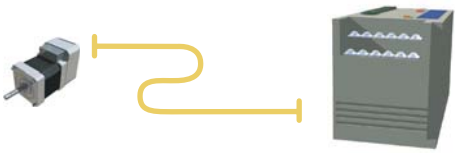
Spec

150W/6A （CMPS-XMUS-150）
240W/10A（CMPS-XMUS-240）

Accessories

Motor Cable (CM1C1-400S)

A standard motor cable(40cm) comes with every Cool Muscle motor. Longer motor cables are available as an option.

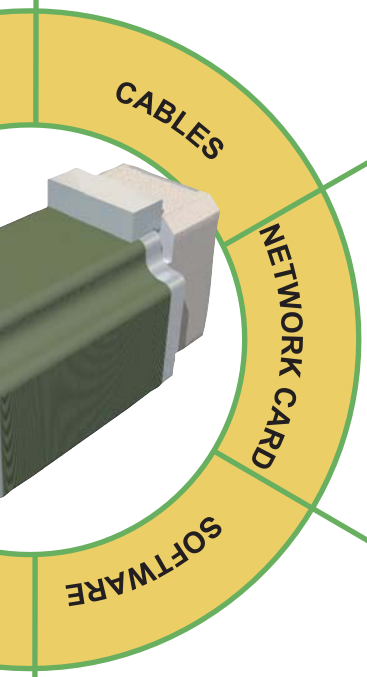


RS232C Cable (CM1C2-2000)

RS232C Cable is required to connect the Cool Muscle to a serial port. It is for all types of the Cool Muscle motors.

Straight Cable (CM1DC1-SSC-1800)

Straight Cable(D Sub - 9 pin) is required for daisy chain network using
the Interface card.



Network Card

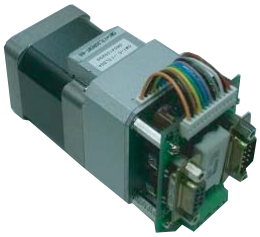
Daisy chain the Cool Muscle using the Network cards. Equipped with a voltage clipper, this Network board protects the motor from regenerated voltage.

※Need to separately Straight Cable for Network.

Master Card

Slave Card

Master Card set (CM1DC1-MBS)
Slave Card set (CM1DC1-SBS)
Network Board Case (CM1DC1-CASE)



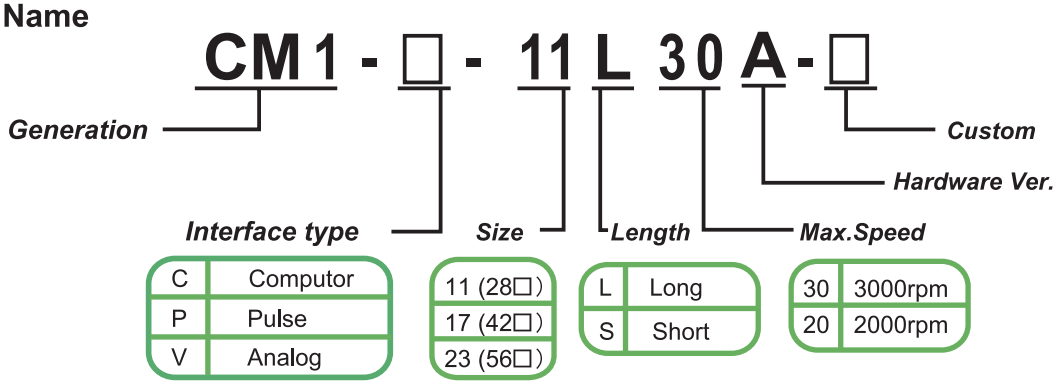
COOL WORKS

Cool Works is a free software that gives you basic tools for setting parameters and creating motion profiles. An easy-to-use interface makes it easy towork with the Cool Muscle.

Safty Standard

The Cool Muscle is the products that meet the safty standard. (CE/RoHS)

Product Name

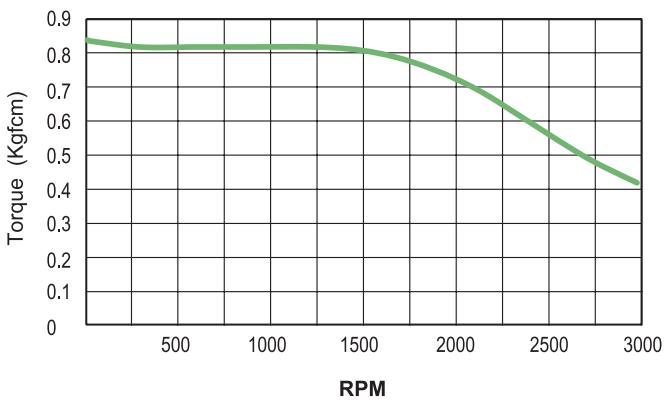


CM1-□-11L/S

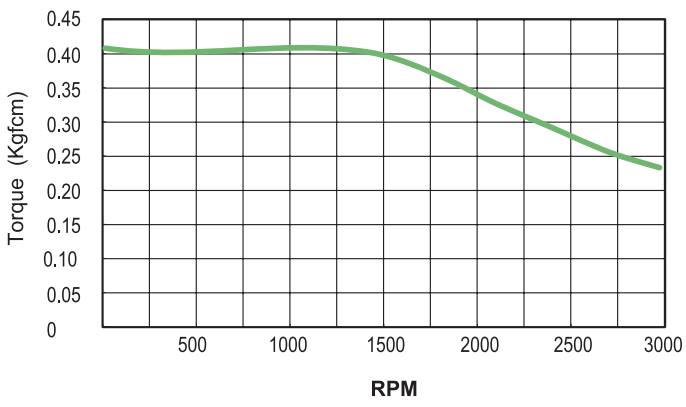
	CM1- □ -11L30	CM1- □ -11S30
Motor Output Power	18W	9W
Max. Speed	3000rpm	3000rpm
Rated Continuous Torque Kgfcm (Nm)	0.56 (0.055)	0.28 (0.027)
Peak Torque Kgfcm (Nm)	0.8 (0.078)	0.4 (0.039)
Load Inertia g · cm²	180	80
Motor Inertia g · cm²	18	8
	Depending on the load inertia, servo gain needs to be adjusted within the above range : adjustable by parameters	
Encoder	Incremental Magnetic Encoder (50000 pulses / Rotstion)	
Control Method	Closed Loop Vector Control	
Input Supply Voltage	DC24V ± 10%	
Input Supply Current Rated (Continuous Torque / Rated Peak Torque)	1.2A/1.5A	0.8A/1.0A
Resolution (Pulse / Rotation)	From 200 to 50000 Set by parameter	
Environmental Conditions Operating / Storage Temperature	0℃ ~ +40℃ / -20℃ ~ +60℃ (No Condensation condition)	
Operating Humidity	Less Than 90% RH	
Impact / Vibration	Less than 10G / Less than 1G	
Weight	Approx. 300 g	Approx.240 g

Torque Curve

CM1-□-11L30



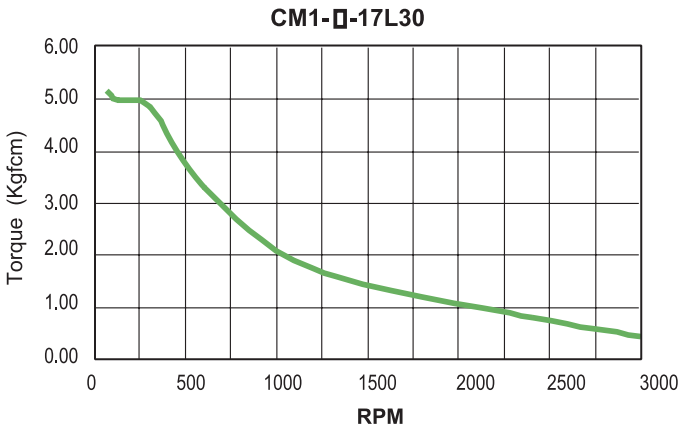
CM1-□-11S30

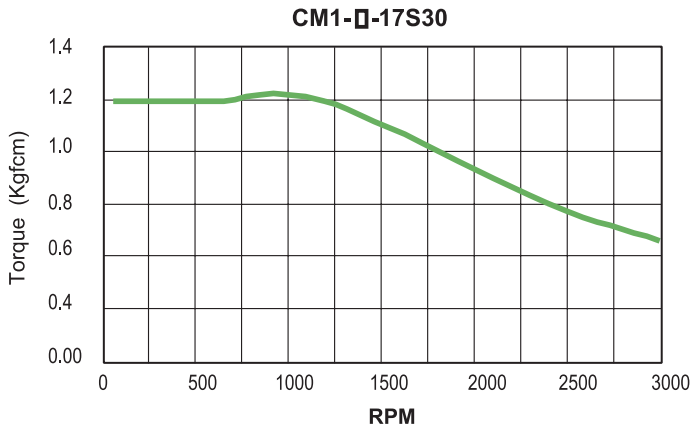


CM1-□-17L/S

	CM1- □ -17L30	CM1- □ -17S30
Motor Output Power	18W	18W
Max. Speed	3000rpm	3000rpm
Rated Continuous Torque Kgfcm (Nm)	3.7 (0.38)	0.84 (0.082)
Peak Torque Kgfcm (Nm)	5.3 (0.54)	1.2 (0.117)
Load Inertia g · cm²	760	380
Motor Inertia g · cm²	76	38
	Depending on the load inertia, servo gain needs to be adjusted within the above range : adjustable by parameters	
Encoder	Incremental Magnetic Encoder (50000 pulses / Rotstion)	
Control Method	Closed Loop Vector Control	
Input Supply Voltage	DC24V ±10%	
Input Supply Current Rated (Continuous Torque / Rated Peak Torque)	1.5A/1.8A	0.8A/1.0A
Resolution (Pulse / Rotation)	From 200 to 50000 Set by parameter	
Environmental Conditions Operating / Storage Temperature	0℃ ~ +40℃ / -20℃ ~ +60℃ (No Condensation condition)	
Operating Humidity	Less Than 90% RH	
Impact / Vibration	Less than 10G / Less than 1G	
Weight	Approx. 470 g	Approx. 330 g

Torque Curve



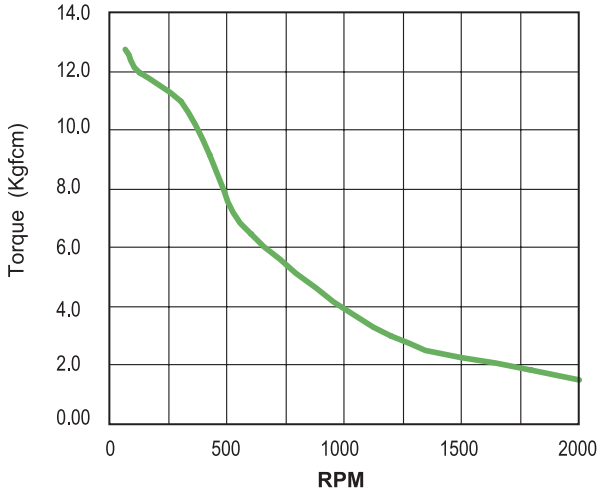


CM1-□-23L/S

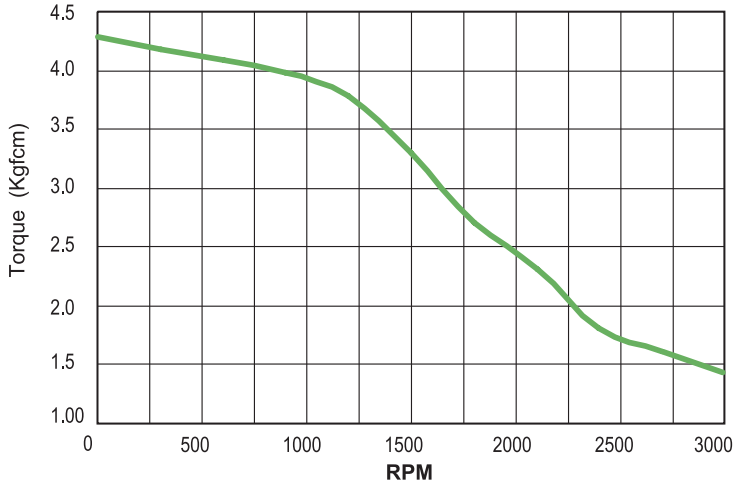
	CM1- □ -23L20	CM1- □ -23S30
Motor Output Power	30W	45W
Max. Speed	2000rpm	3000rpm
Rated Continuous Torque Kgfcm (Nm)	8.9 (0.87)	3.0 (0.294)
Peak Torque Kgfcm (Nm)	12.7 (1.24)	4.3 (0.42)
Load Inertia g · cm²	4600	1400
Motor Inertia g · cm²	460	140
	Depending on the load inertia, servo gain needs to be adjusted within the above range : adjustable by parameters	
Encoder	Incremental Magnetic Encoder (50000 pulses / Rotstion)	
Control Method	Closed Loop Vector Control	
Input Supply Voltage	DC24V ±10%	
Input Supply Current Rated (Continuous Torque / Rated Peak Torque	2.6A/3.4A	3.9A/5.1A
Resolution (Pulse / Rotation)	From 200 to 50000 Set by parameter	
Environmental Conditions Operating / Storage Temperature	0℃ ~ +40℃ / -20℃ ~ +60℃ (No Condensation condition)	
Operating Humidity	Less Than 90% RH	
Impact / Vibration	Less than 10G / Less than 1G	
Weight	Approx. 1100 g	Approx. 580 g

Torque Curve

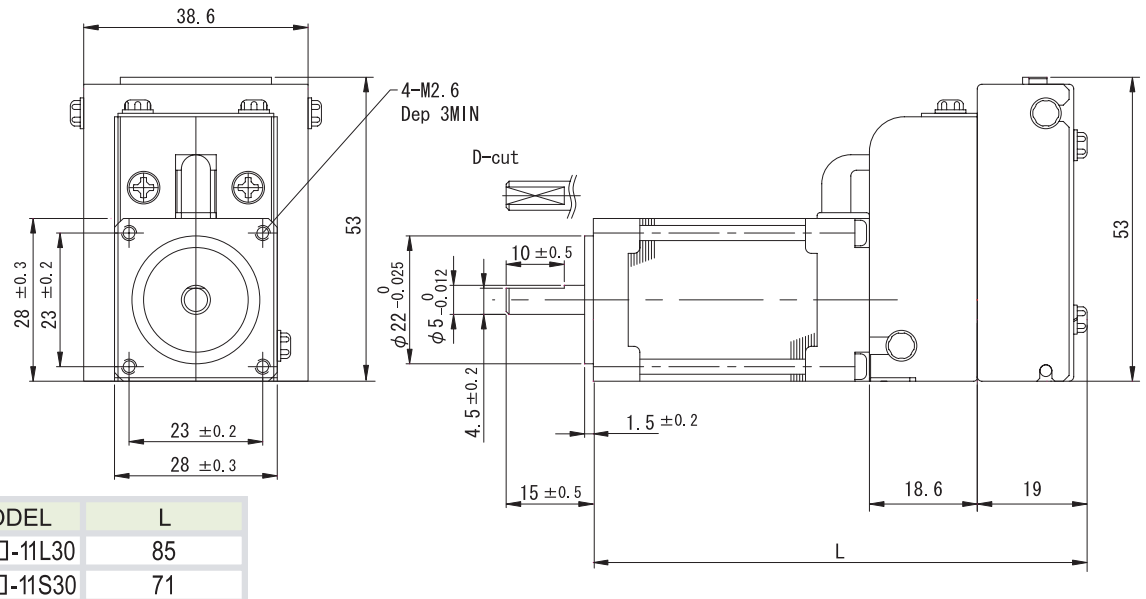
CM1-□-23L20



CM1-□-23S30

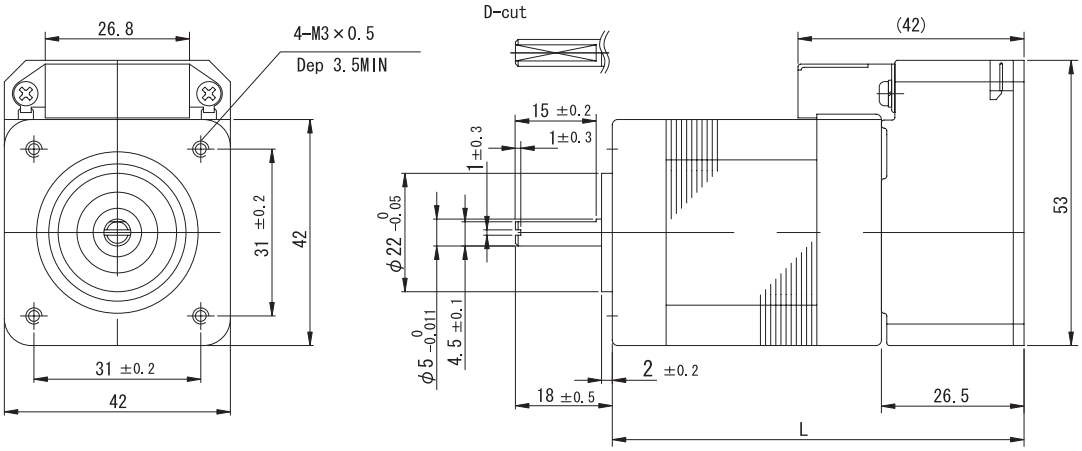


CM1-□-11L/S Dimension (UNIT : mm)



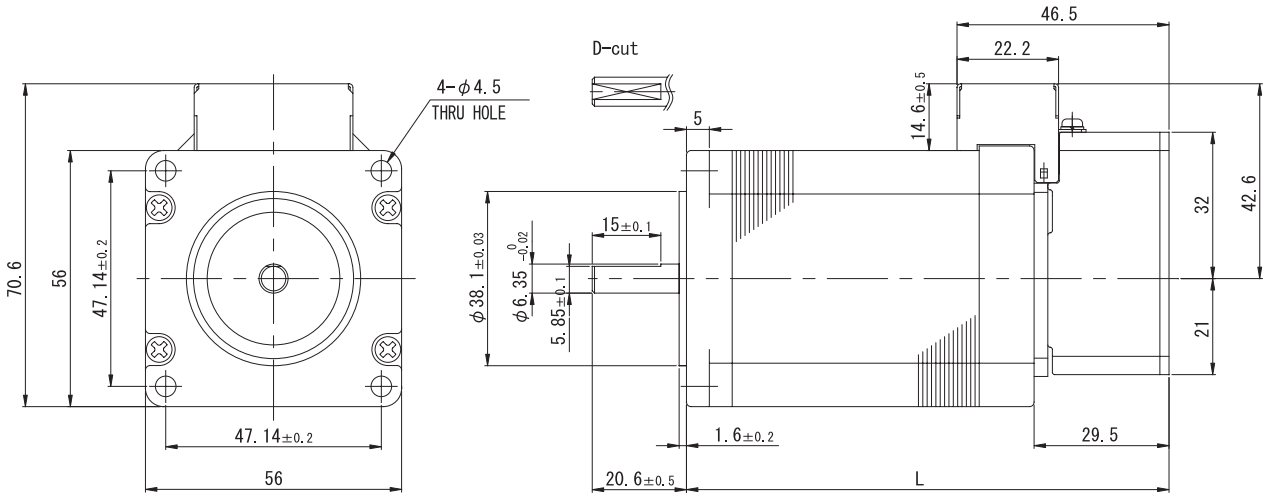
MODEL	L
CM-□-11L30	85
CM-□-11S30	71

CM1-□-17L/S Dimension (UNIT : mm)



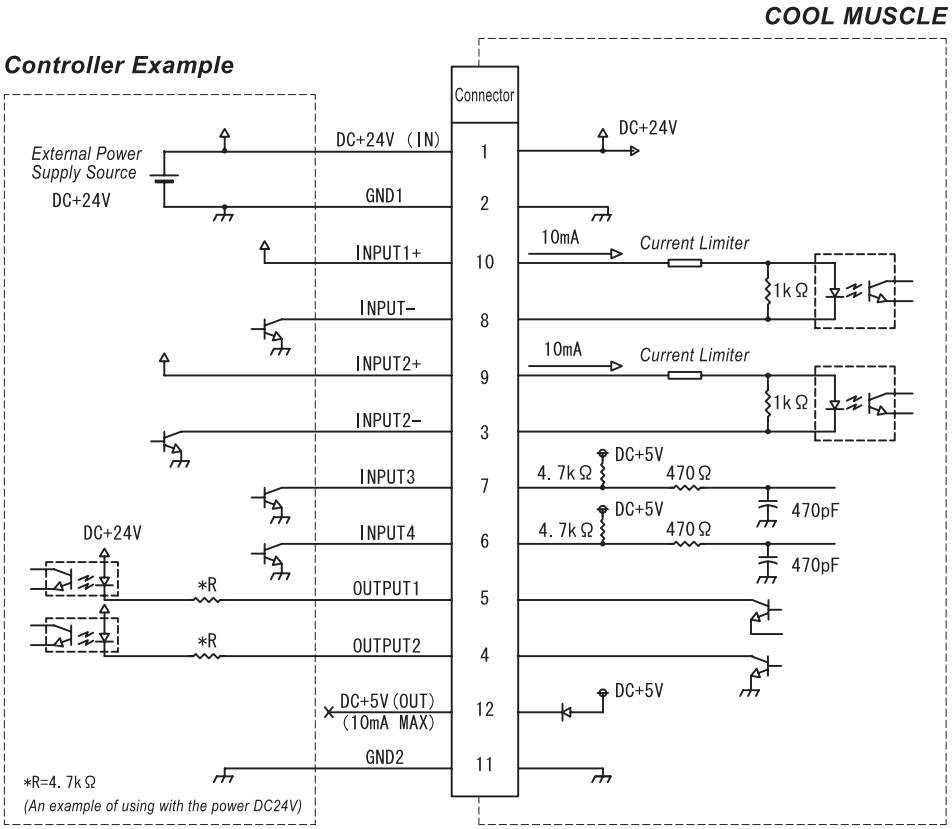
MODEL	L
CM-□-17L30	76.5
CM-□-17S30	60.5

CM1-□-23□L/S Dimention (UNIT : mm)



MODEL	L
CM-□-23L20	105.5
CM-□-23S30	71.5

Wireing Diagram



※*Number of 1～12 is PIN No.*

Pin Layout

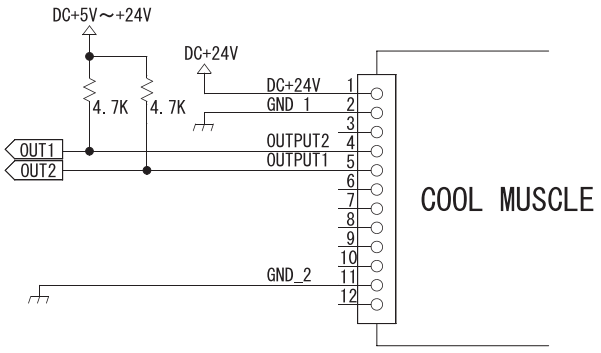
PIN	Color	Type	Function	P-type		V-type	C-type
				CW/CCW	Step/Dir		
1	Orange	+24V DC IN	Motor Power				
2	Black	GROUND 1	GND				
3	Brown	INPUT 2-	Return For Pin 9	CCW -	Direction -		
4	Yellow	OUTPUT 2	Digital Output, Serial TX, Analog Output				Serial
5	Green	OUTPUT 1	Digital Output, Serial TX				Serial
6	Blue	INPUT 4	Digital Input, Analog Input			V +	
7	Violet	INPUT 3	Digital Input				
8	Black	INPUT 1-	Return For Pin10	CW -	Step -		
9	Gray	INPUT 2+	Digital Input, Serial RX, Pulse Counter	CCW +	Direction +		Serial
10	White	INPUT 1+	Digital Input, Serial RX, Pulse Counter	CW +	Step +		Serial
11	Black	GROUND 2	GND			V -	
12	Red	+5V DC OUT	5V Power Out (Max.10mA)				

Input Signal

Input Signal	Voltage Specification : INPUT1+~INPUT1- / High Level>3V INPUT2+~INPUT2- / Low Level<0.8V INPUT3 / High Level>4.2V INPUT4 / Low Level<0.8V

Computer Type	
Digital Input (RS232C)	INPUT1/2 shall be used for the serial communucation Max.baud rate for communication : Max.57.6kbps
Pulse Type	
Pulse Signal (INPUT1/2)	CW/CCW Pulse, Step/Direction Pulse Max.Frequency : 500 Kpps / Min. Pulse Range : 0.8 μsec
Analog Type	
Analog Input (INPUT4) *OP Amp usage is recommended	Speed Control : Speed in CW direction increases by applying from DC+2.6V to DC+ 4.8V Speed in CCW direction increases by applying from DC+2.4V to DC +0.2V Max. speed is settable by the parameter
	Position Control : Position control by input voltage from 0V to DC+4.8V. Max. position range is settable by the parameter

Out Signal

Output Signal	High Level Output Voltage DC+5V~24V (Recommended : 5V) / Low Level DC+0.8V
Condition for Output Signal Measurement	

Input / Output Function

The Cool Muscle has 4 Inputs and 2 Outputs that can assign a function to each point of a signal.

Input functions for the Target Voltage Level

Functions	Description
General Use	Typically used for the I command (* C-type only)
Origin Sensor	The signal from the origin sensor
Manual Feed CW / CCW	Motor runs in a CW / CCW direction for the duration of the signal
Limit sensor CW/CCW	Limit sensor for CW / CCW direction（This can work as an origin sensor）
Emergency Stop	Emergency Stop
Full Stop	Stop the Bank Program

Input functions at the Rising / Falling Edge

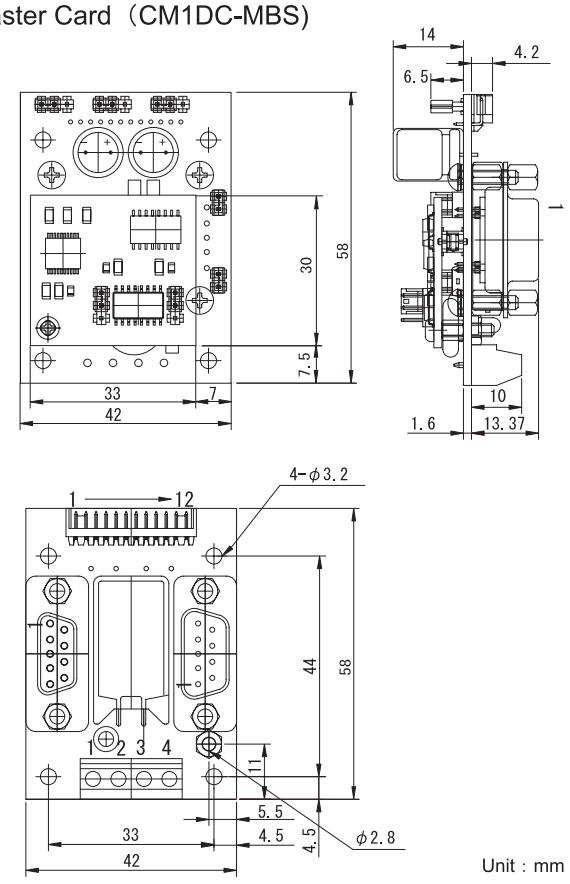
Functions	Description
Reset Alarm / Pause	Reset the alarm and pause a motor
Motor Free	Make a motor go into a motor free
Enable Motor	Enable a motor from a motor free
Position Reset	Make the current position "0"
Execute Next Line	Execute the next line in a Bank (*C-type only)
Execute Previous Line	Execute the Previous line in a Bank (*C-type only)
Execute Bank Program	Execute a 1/2/3 Bank (*C-type only)
Back to Origin	Go back to the origin
Manual Jog CW/CCW	Motor runs in a CW/CCW derection

Output functions

Functions	Description
Command	The necessary Output Signal in Daisy Chain
In-Position Signal	In-Position signal when the motor reaches the target posion
Alarm	Alarm signal
General Use	Typically used for the I command (* C-type only)
In-Position Siganal in Merge Mode	Output a signal at the passsing points in Merge Mode
Position Mark	Output a signal at certain intervals
Motor Free	Output a signal during motor free
Push Mode	Output a signal during the push mode
Analog Out	Output analog waves for monitoring

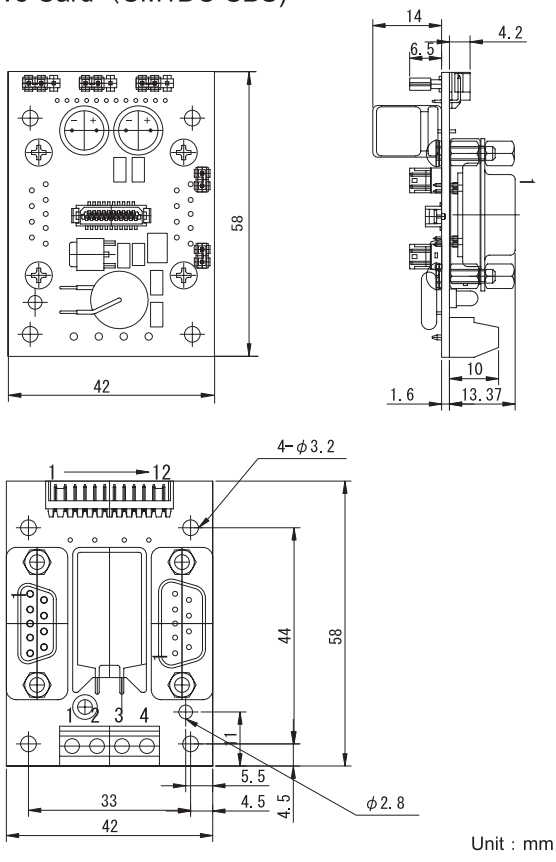
Network Card Dimensions

Master Card（CM1DC-MBS）



Unit：mm

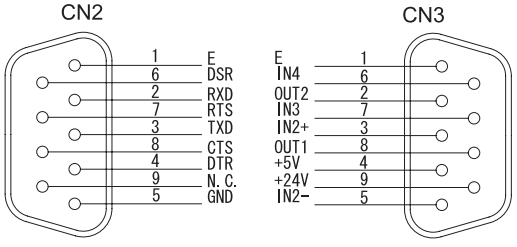
Slave Card（CM1DC-SBS）



Unit：mm

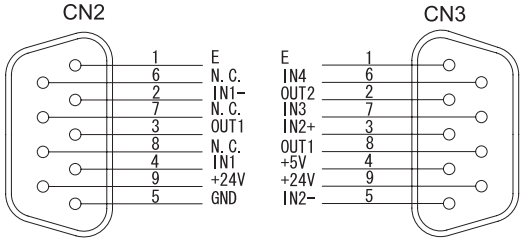
D-SUB Connector / Pin

Master Card



D-Sub 9 Socket type　　*D-Sub 9 Pin type*

Slave Card



D-Sub 9 Socket type　　*D-Sub 9 Pin type*

COOL MUSCLE

A total of 15-axis electric actuators of various types can be integrated into a network system at low cost. Over 40 models and 600 types of the Cool Muscle actuators can be combined easily with each other to form an ideal servo systems.

*Please refer to the Cool Muscle Actuator catalog.

RL SERIES — *Rodless Type*

Low cost actuator, Ball screw and LM guide system.

- Max.load(kg) : 5,10,8,16
- Stroke(mm) : 50～600　50mm each
- Positioning accuracy repeatability(mm) : ±0.02
- Max. speed(mm/sec) : 600,300

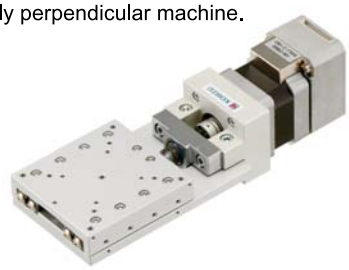
RD SERIES — *Rod Type*

Low cost actuator, Ball screw and Lubricous equipment system.

- Roted force(N) : 34,67,123
- Stroke(mm) : 50～300　50 each
- Positioning accuracy repeatability(mm) : ±0.02
- Max. speed(mm/sec) : 600

CR SERIES — *Cross Roller Stage*

The specially designed cross roller guide system.
Highly perpendicular machine.



- Load capacity(kg): 5,10,20
- Stroke(mm) : 7.5,10,12.5
- Positioning accuracy repeatability(mm) : ±0.005
- Table size(mm): 50×50, 70×70, 100×100

RC SERIES — *Clamp Rack Type*

Pressing is abailable as an aircylinder.

- Max. force(N) : 9.5,35
- Stroke(mm) : 40(Changeble a stroke)
- Max. speed(mm/sec) : 200
- Backlash(mm) : 0.1～0.2

IG SERIES — *Miniature Index Type*

Stainless steel on the output surface eliminates the need for treatment.
High torque, load capacity and positioning accuracy.

- Output radial load(N) : 200～550
- Output axial load(N) : 630～1800
- Rated torque(N・m) : 1.2～4.0
- Transmission error : 2 arc・min

ROBO SERIES — *Super MY ROBO PTRW Series*

Suitable for large variation and small lot production.
Simple programming by CAD data onto PC.

- Max.load(kg) : XY / 8(kg)　Z / 3(kg)
- Range of operation(mm) : 200,300,400
- Positioning accuracy repeatability(mm) : XY/±0.08　Z/±0.05
- Table size(mm) : 400×400,500×500,600×600

Our Sales Network

We have established our sales network : Japan, Asia, Europe, and America. We will offer flexible sales and a highly reliable system in local communities in order to meet customer needs. We are now expanding and advancing our network throughout the world.

JAPAN

DAIDO CO., LTD.
2-20-8, Nishimizue, Edogawa-Ku, Tokyo, 132-0015, Japan TEL : +81-3-3676-9111 / FAX : +81-3-3676-9111
HP : http://www.daido-net.co.jp

NUMATA CO., LTD.
4-1-20, Minamihorie, Nishi-Ku, Osaka, 550-0015, Japan TEL : +81-6-6532-2491 / FAX +81-6-6532-8899
HP : http://www.numata.co.jp

KAWAKITA DENKO CO., LTD.
1-2-3, Kikawanishi, Yodogawa-Ku, Osaka, 532-0013, Japan TEL : +81-6-6886-8822 / FAX +81-6-6886-8838
HP : http://www.kawakita-d.co.jp

ASIA

KOREA : MUSCLE COREA
Hyundai APT 3F,151-1, Shingal, Kiheung-Eup, Yongin-Si, Kyonggi-Do, Korea
TEL : +82-31-285-0778 / FAX : +82-31-285-4230 HP : http://coolmuscle.co.kr

TAIWAN : NEW MOTECH CO., LTD.
4F-2, No.58, Hsing Shan Rd., Neihu Chiu, Taipei, TAIWAN
TEL: +886-2-8792-9888 / FAX: +886-2-8792-9968 HP : http://www.hhstc.com.tw

THAI : PREMIER AUTOMATION CENTER CO., LTD
84/12 Moo 4, Sukumvit 77 Rd., Prawet, Bangkok 10250 Thailand
TEL: +66-2-321-0099 / FAX: +66-2-321-0906 HP : http://www.premier-ac.co.th

HONGKONG : INTERMECH CO., LTD
Work Shop 9A, 16/F, Block A, Kailey Industrial Centre, 12 Fung Yip Street, Chai Wan, Hong Kong
TEL: +852-2505-5818 / FAX: +852-2505-4260 HP : http://www.intermech.com.cn

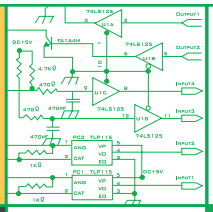
SINGAPORE : ELSHIN INTERNATIONAL PTE LTD
1 Kaki Bukit Ave. 3 #06-12, Singapore 416087
TEL: +65-6286-7707 / FAX: +65-6748-2618 HP : http://www.elshin.com

AMERICA and EUROPE

CANADA : MYOSTAT MOTION CONTROL INC.
17817 Leslie St. Unit 43, Newmarket, Ontario, L3Y 8C6 Canada
TEL: +1-905-836-4441 / FAX: +1-905-836-1214 HP : http://www.coolmuscle.com

UK & IRELAND : RELIANCE PRECISION MECHATRONICS LLP
Rowley Mills, Penistone Road, Lepton, Huddersfield, West Yorkshire, HD8 OLE UK
TEL : +44-1484-601002 / Fax +44-1484-601061 HP : http://www.rpmechatronics.co.uk

マッスル株式会社
〒532-0012　大阪市淀川区木川東2-5-35
TEL　06-6886-2885
FAX　06-6886-2889



MUSCLE CORPORATION
2-5-35, Kikawahigashi, Yodogawa-ku
Osaka 532-0012, JAPAN
Tel +81-6-6886-2885
Fax +81-6-6886-2889

E-Mail info@musclecorp.com
URL http://www.musclecorp.com