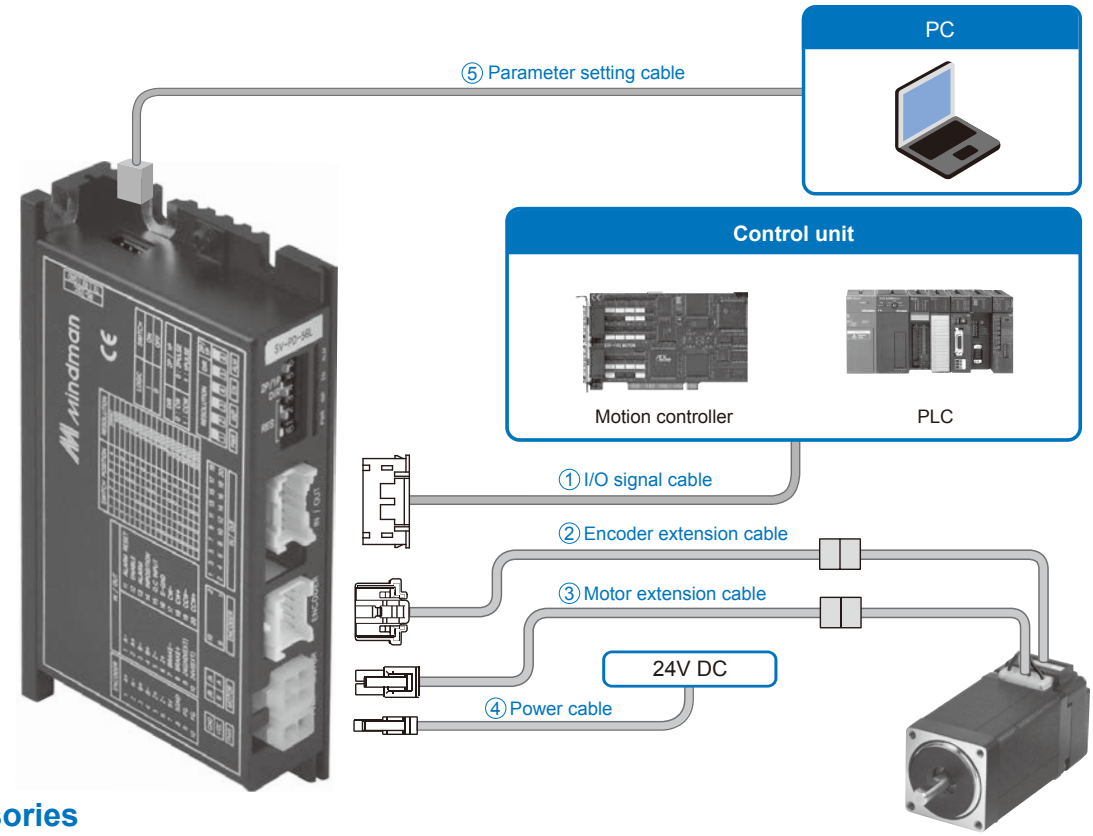
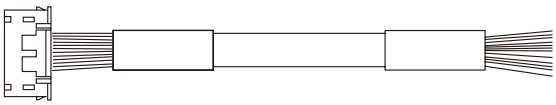
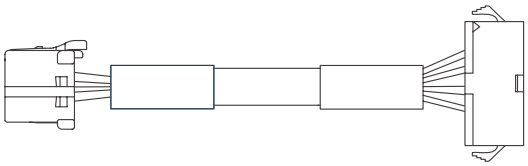
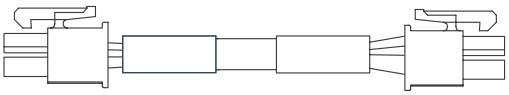
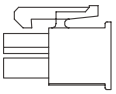
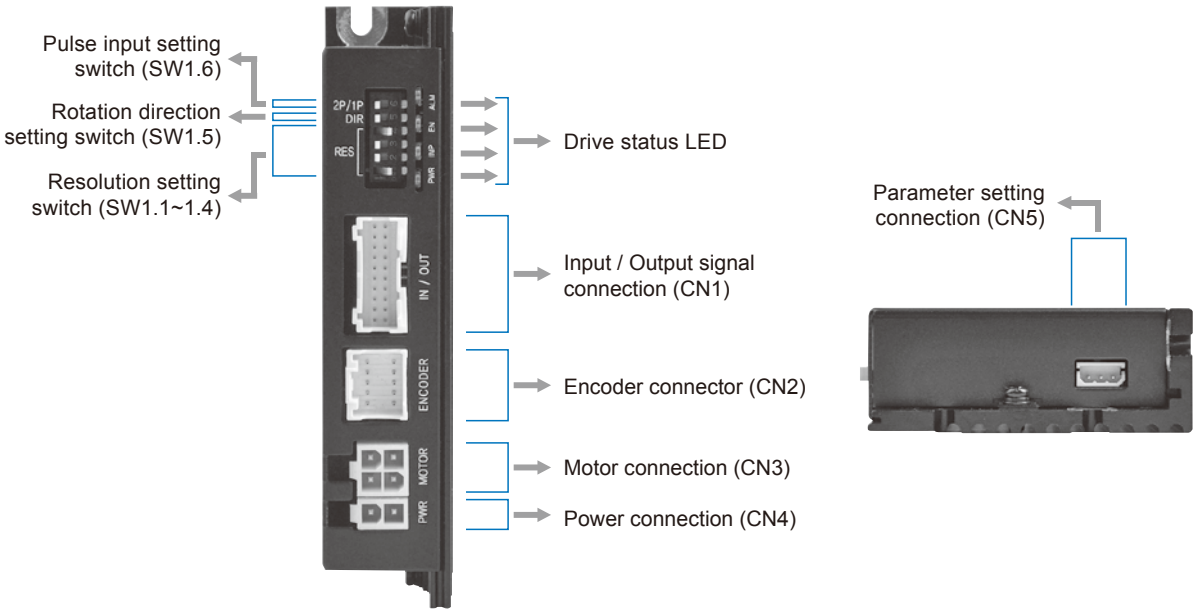


Accessories

Purpose		Item		Max. length (m)	Note	Exterior
I/O signal cable		Housing	PADP-20V-1-S	3	Isolation cable	
		Terminal	SPH-002T-P0.5L			
Encoder extension cable	Drive side	Housing	51353-1000	5	Isolation + Flexible cable	
		Terminal	56134-9000			
	Encoder side	Housing	SMP-09V-NC			
		Terminal	SHF-001T-0.8BS			
Motor extension cable	Drive side	Housing	5557-04R	5	Flexible cable	
		Terminal	5556T			
	Motor side	Housing	5557-04R			
		Terminal	5556T			
Power connection		Housing	5557-02R	–	Housing and terminal only	
		Terminal	5556T			
Parameter setting cable		Housing	5264-03	–	Housing and terminal only	
		Terminal	5263			



1. Drive status LED

Indication	Color	Function	ON/OFF condition
PWR	Green	Power input indication	LED is turned ON when power is applied.
INP	Yellow	Complete positioning motion	Light on then position deviation located within preset value* from target position, after position command pulse input is completed.
EN	Orange	Motor enable status	Enable: Lights on, Disable: Lights off
ALM	Red	Alarm indication	Flash when protection function is activated (Identifiable which protection mode is activated by counting the blinking times)

* Default = 0, can be selected by parameter setting GUI.

Protection functions and LED flash times

Times	Protection	Conditions
1	Over current error	The current through power devices in drive exceeds 4.8A
2	Over speed error	Motor speed exceed 3000rpm
3	Position tracking error	Position error value is higher than 90° in motor run state
4	Over load error	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over temperature error	Inside temperature of drive exceeds 65°C
6	Over regeneratived voltage error	Back EMF more than 48V
7	Motor connect error	The power is ON without connectin of the motor cable to drive
8	Encoder connect error	Cable connection error in encoder connector of drive
10	In-position error	After operation is finished, position error more than 1 pulse is continued for more than 3 seconds.
12	ROM error	Error occurs in parameter storage device (ROM)
15	Position overflow error	Position error value is higher than 90° in motor stop state

Alarm LED flash (ex: Position tracking error)

2. Resolution setting switch (SW1.1~SW1.4)

The number of pulse per revolution.

Position (SW1)				Pulse / revolution
1	2	3	4	
ON	ON	ON	ON	500
ON	ON	ON	OFF	1000
ON	ON	OFF	ON	1600
ON	ON	OFF	OFF	2000
ON	OFF	ON	ON	3200
ON	OFF	ON	OFF	3600
ON	OFF	OFF	ON	4000
ON	OFF	OFF	OFF	5000
OFF	ON	ON	ON	6400
OFF	ON	ON	OFF	8000
OFF	ON	OFF	ON	10000
OFF	ON	OFF	OFF	20000
OFF	OFF	ON	ON	25000
OFF	OFF	ON	OFF	36000
OFF	OFF	OFF	ON	40000
OFF	OFF	OFF	OFF	50000

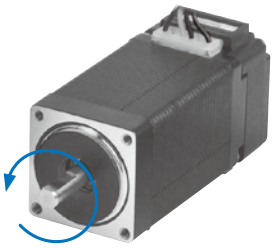
* Default = 4000

3. Rotational direction setting switch (SW1.5)

Indication	Switch name	Functions
DIR	Switching rotational direction	Based on CW (DIR signal) input to driver. ON: CCW (-DIRECTION), OFF: CW (+DIRECTION) * Default: CW mode

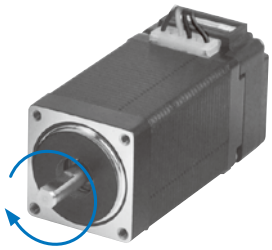
Switch: ON

CCW Dir



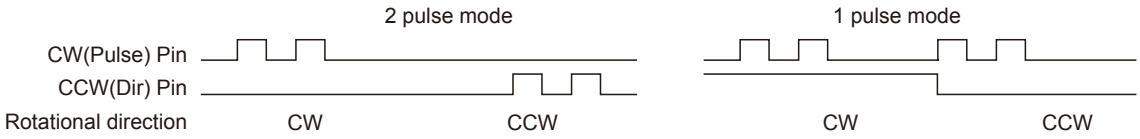
Switch: OFF

CW Dir



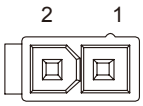
4. Pulse input setting switch (SW1.6)

Indication	Switch name	Funtions
2P / 1P	Selecting pulse input mode	Selectable 1 pulse input mode or 2 pulse input mode as pulse input signal. ON: 1 pulse mode, OFF: 2 pulse mode * Default: 2 pulse mode



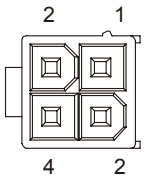
5. Power connector (CN4)

NO.	Function	I / O
1	24VDC	Input
2	GND	Input



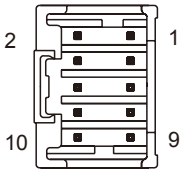
6. Motor connector (CN3)

NO.	Function	I / O
1	A Phase	Output
2	B Phase	Output
3	/A Phase	Output
4	/B Phase	Output



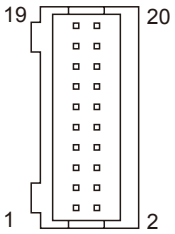
7. Encoder connector (CN2)

NO.	Function	I / O
1	A+	Input
2	A-	Input
3	B+	Input
4	B-	Input
5	Z+	Input
6	Z-	Input
7	5VDC	Output
8	GND	Output
9	F. GND	–
10	F. GND	–



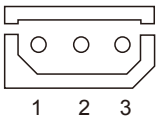
8. I/O signal connector (CN1)

NO.	Function	I / O
1	A-	Output
2	A+	Output
3	B-	Output
4	B+	Output
5	Z-	Output
6	Z+	Output
7	BRAKE-	Output
8	BRAKE+	Output
9	EXT_GND	Input
10	EXT_24VDC	Input
11	Alarm Reset	Input
12	Enable	Input
13	Alarm	Output
14	In-Position	Output
15	O.C Input	Input
16	S-GND	Output
17	CW-(Pulse-)	Input
18	CW+(Pulse+)	Input
19	CCW-(Dir-)	Input
20	CCW+(Dir+)	Input



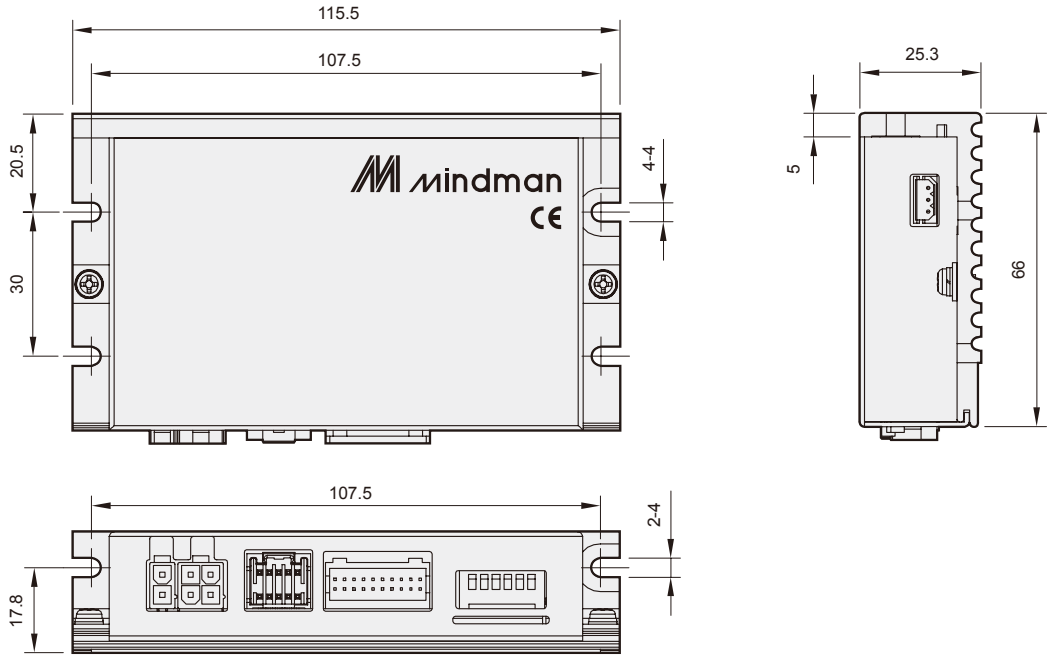
9. Parameter setting connector (CN5)

NO.	Function	I / O
1	TX	Output
2	RX	Input
3	GND	-

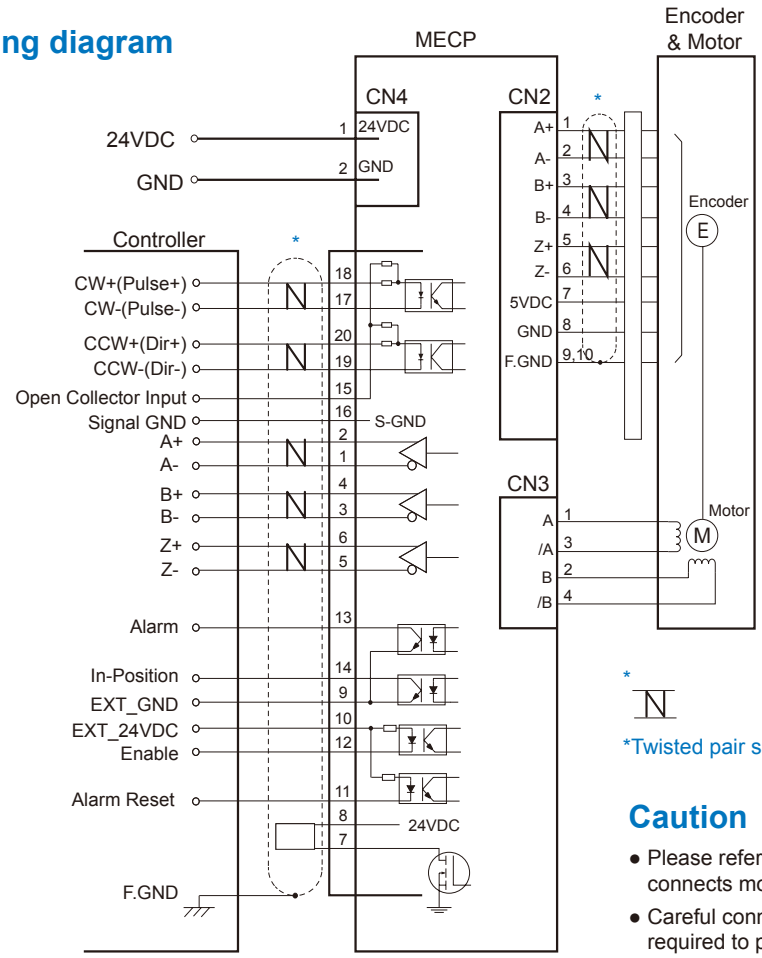


MECP Motor drive – Dimension & External wiring diagram

ELECTRIC PRODUCT DRIVER – PULSE



External wiring diagram



Caution

- Please refer to the manual when connects motor exttension cable.
- Careful connection will be required to protect any damages.

* When connects I/O cable between controller and drive, please turn off the power of both controller and drive, in order to protect the drive from any damage.

Specifications

Model		MECP-20	MECP-28	MECP-35	MECP-42	MECP-56
Motor size		☐20L	☐28L	☐35L	☐42L	☐56L
Input voltage		24VDC ± 10%				
Current consumption		Max 500mA (Except motor current)				
Operating condition	Temperature	In use: 0~50°C, In storage: -20~70°C				
	Humidity	In use: 35~85%RH (No condensing), In storage: 10%~90%RH (No condensing)				
	Vib. resist	0.5G				
Functions	Rotation speed	0~1600rpm	0~3000rpm			
	Resolution [P/R] *1	500, 1000, 1600, 2000, 3200, 3600, 4000, 5000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000 (Selectable by DIP switch) * Default: 4000				
	Protection function	Over current error, over speed error, position tracking erroe, over load error, over temperature error, over regenerated voltage error, motor connect error, encoder connect error, in position error, ROM error, position overflow error				
	LED display	Power status, In-position status, Enable status, Alarm stauts				
	RUN current	50%~150%(Selectable by parameter) RUN current is current value which flows onto the motor during operation (rotation) of the motor and it is set based on rated on rated current of the motor * Default: 100%				
	Max frequency	500KHz (Duty 50%)				
I/O signal	Input signal	Position command pulse, Enable, Alarm reset (Photocoupler input)				
	Output signal	In-position, Alarm (Photocoupler output), Brake				

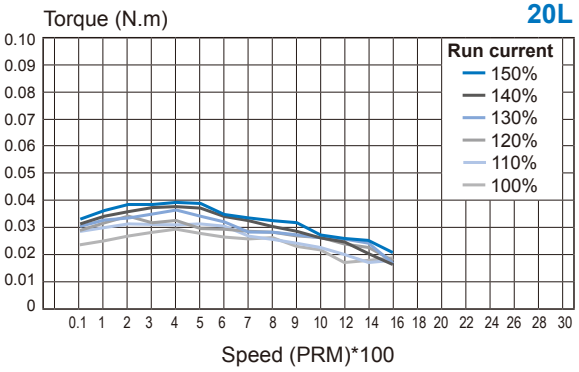
*1. When selected resolution is more than encoder resolution, motor shall be operated by microstep between pulses.

Motor specifications

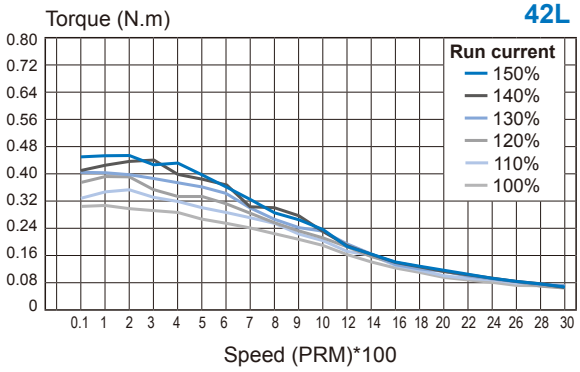
Motor size	☐20L	☐28L	☐35L	☐42L	☐56L
Current per phace (A)	0.6	0.67	1	1.68	2.8
Holding torque (N.m)	0.037	0.118	0.137	0.431	1.72
Rotor inertia (g.cm^2)	3.3	18	14	68	480
Weight (g)	80	200	180	380	1000

Torque characteristics

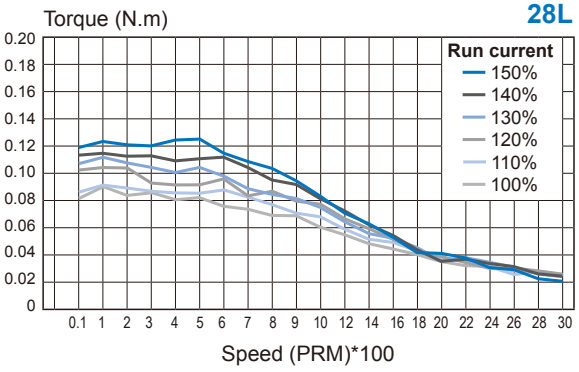
20L



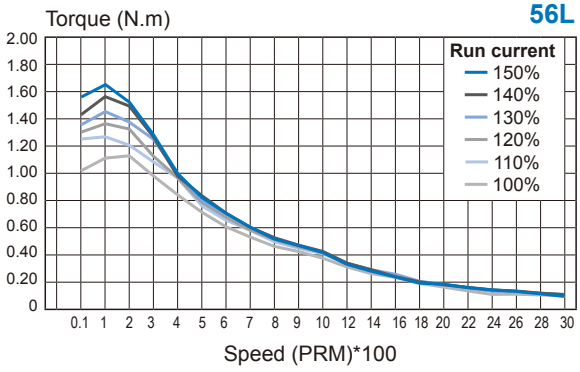
42L



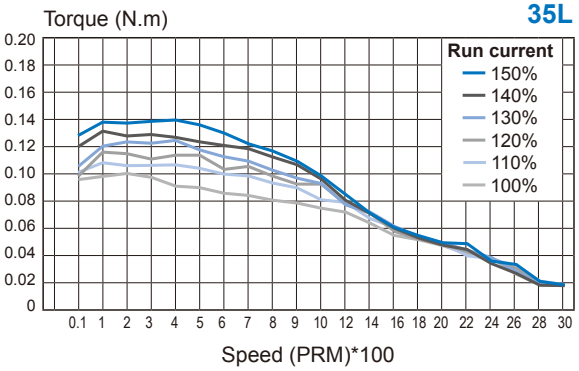
28L



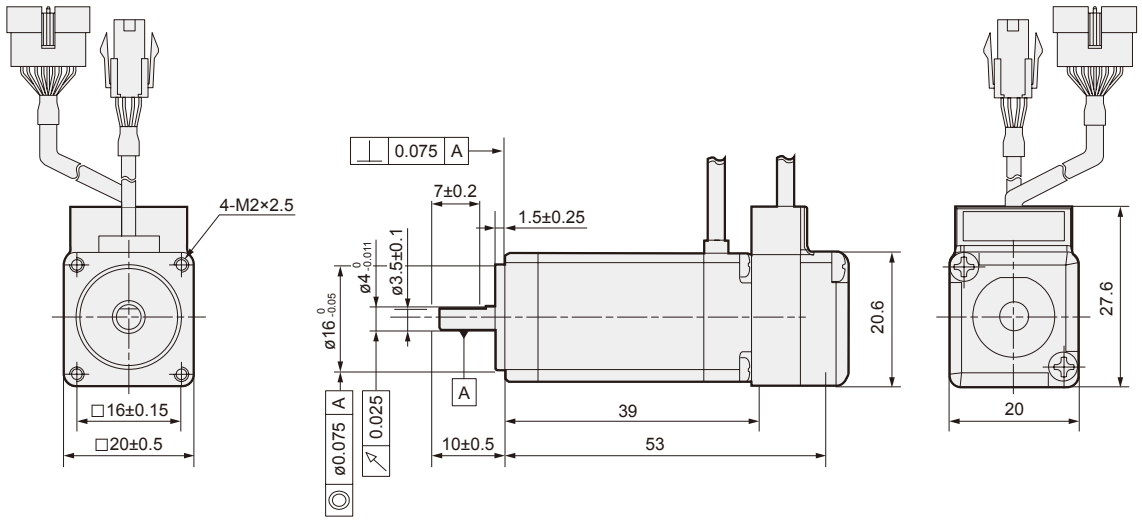
56L



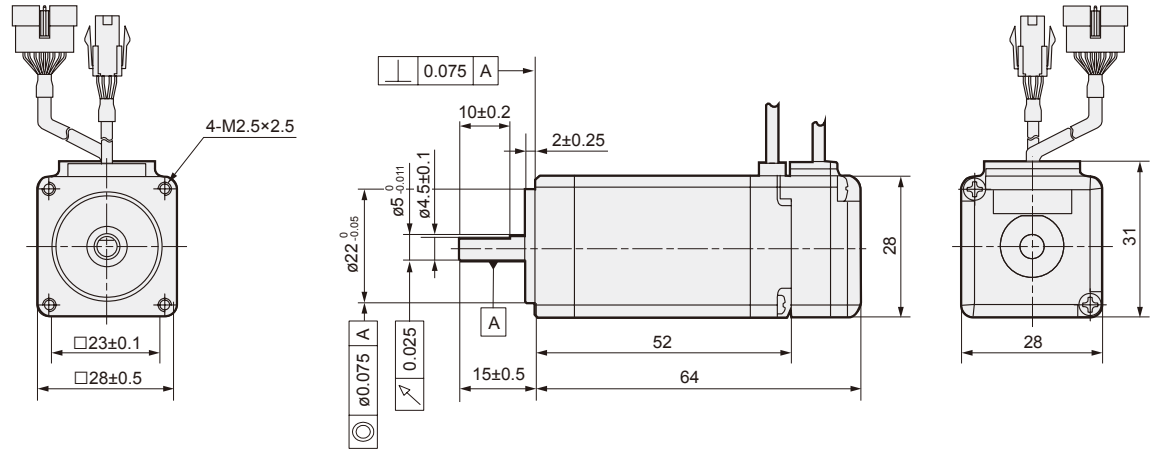
35L



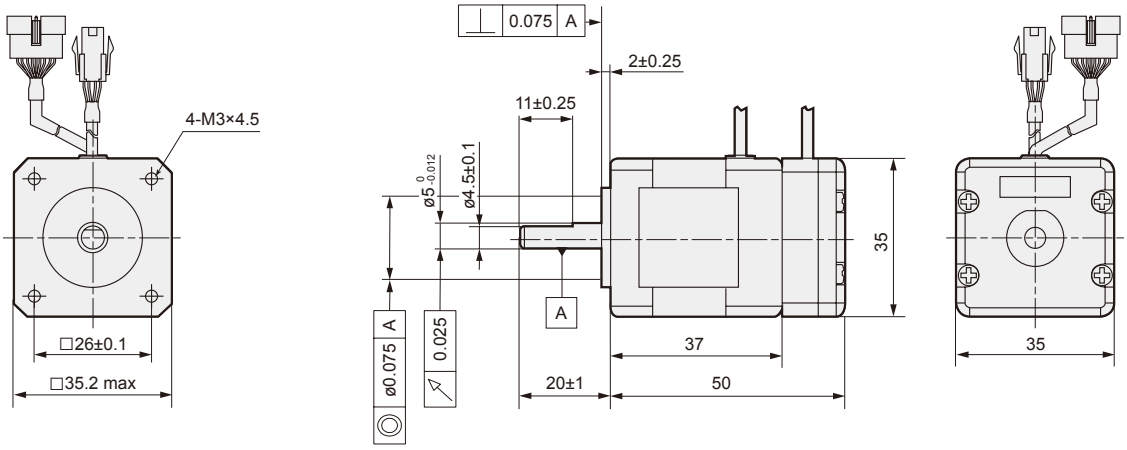
20L


4-M2×2.5
□16±0.15
□20±0.5
0.075 A
7±0.2
1.5±0.25
ø4 0 -0.011
ø3.5±0.1
ø16 0 -0.05
20.6
A
39
10±0.5
53
ø0.075 A
0.025
27.6
20

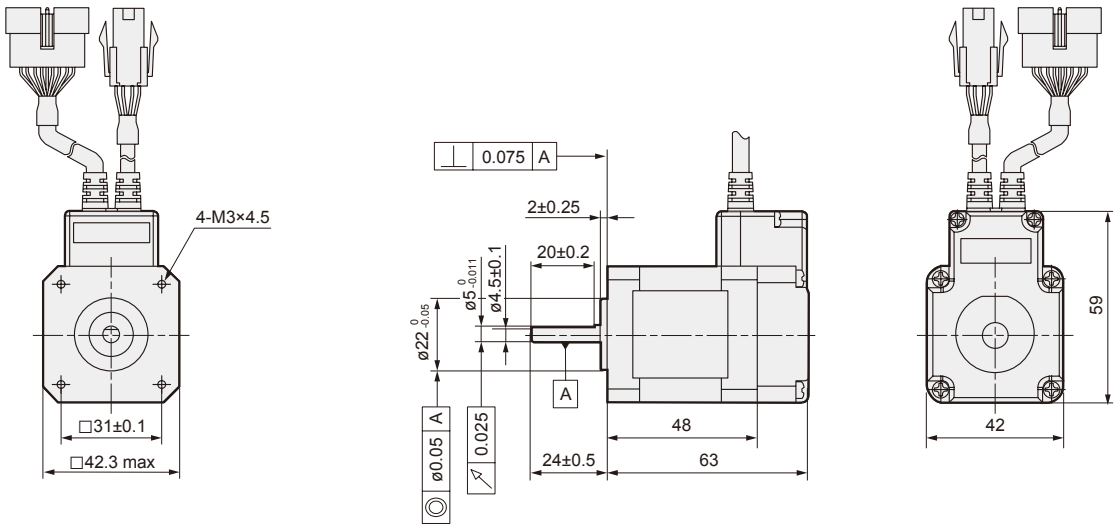
28L


4-M2.5×2.5
□23±0.1
□28±0.5
0.075 A
10±0.2
2±0.25
ø5 0 -0.011
ø4.5±0.1
ø22 0 -0.05
28
A
52
15±0.5
64
ø0.075 A
0.025
31
28

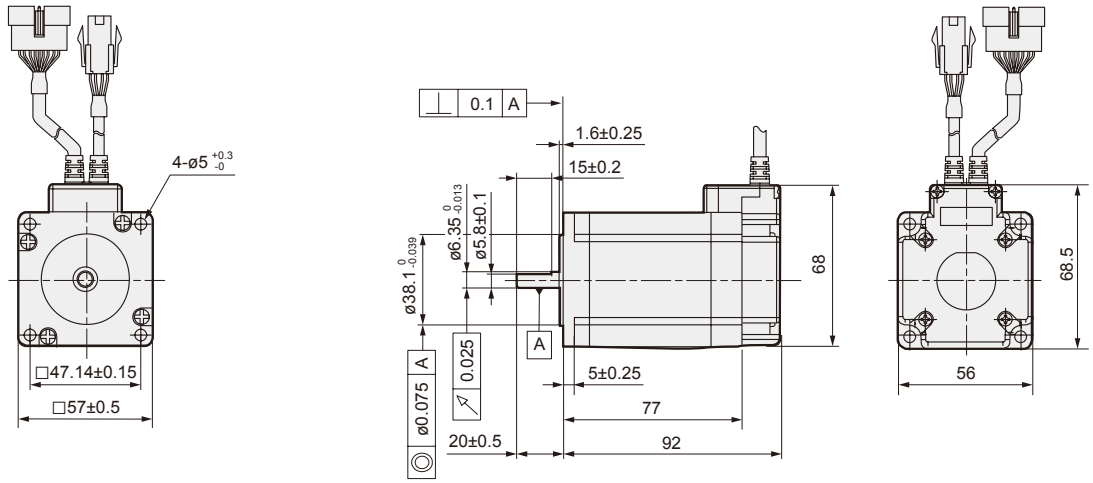
35L


4-M3×4.5
□26±0.1
□35.2 max
0.075 A
2±0.25
11±0.25
ø5 0 -0.012
ø4.5±0.1
35
A
37
20±1
50
ø0.075 A
0.025
35

42L

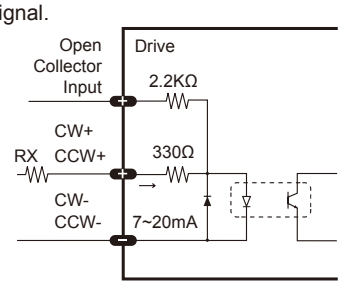

4-M3×4.5
□31±0.1
□42.3 max
0.075 A
2±0.25
20±0.2
ø5 0 -0.011
ø4.5±0.1
ø22 0 -0.05
A
ø0.05 A
0.025
48
24±0.5
63
59
42

56L


4-ø5 +0.3 -0
□47.14±0.15
□57±0.5
0.1 A
1.6±0.25
15±0.2
ø6.35 0 -0.013
ø5.8±0.1
ø38.1 0 -0.039
A
ø0.075 A
0.025
5±0.25
77
20±0.5
92
68
68.5
56

Input signal

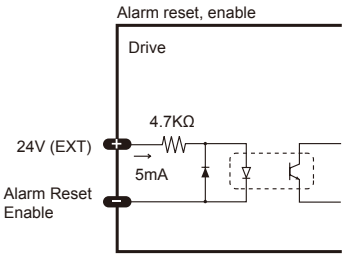
Input signals of the drive are all photocoupler protected.
The signal shows the status of internal photocouplers [ON: conduction], [OFF: non-conduction], not displaying the voltage levels of the signal.



Function	Pin number	Function	Pin number
Open Collector	15	CCW+	20
CW+	18	CCW-	19
CW-	17		

CW, CCW input

This signal can be used to receive a positioning pulse command from a user host motion controller. The user can select 1 pulse input mode or 2 pulse input mode.
The input schematic of CW, CCW is designed for 5V TTL level. When using 5V level as an input signal, the resistor Rx is not used and connect to the driver directly. When the level of input signal is more than 5V, Rx resistor is required. If the resistor is absent, the drive will be damaged. If the input signal level is 12V, Rx value is 680ohm and 24V, please use open collector input.



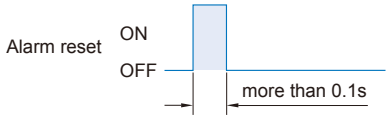
Function	Pin number
24V (EXT)	10
Alarm Reset	11
Enable	12

Enable input

This input can be used only to adjust the position by manually moving the motor shaft from the load side. By setting the signal [ON], the driver cuts off the power supply to the motor. Then, one can manually adjust output position. When setting the signal bakc to [OFF], the driver resumes the power to the motor and recovers the holding torque. When driving a motor, one needs to set the signal [OFF].

Alarm reset input

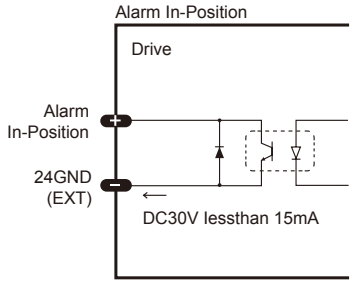
When a protection mode has been activated, a signal to this alarm reset input cancels the alarm output.



* By setting the alarm reset input signal [ON], cancel the alarm output. Before cancel the alarm output, have to remove the source of alarm.

Output signal

Out signals from the driver are photocoupler protected: Alarm, in-position. The signal indicates the status of internal photocouplers [ON: conduction], [OFF: non-conduction], not displaying the voltage levels of the signal.



Function	Pin number
Alarm	13
In-Position	14
24GND (EXT)	9

Alarm output

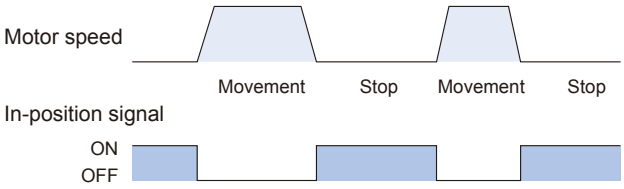
The alarm output indicates [ON] when the driver is in abnormal operation. If a protection mode has been activated, it goes [OFF]. A host controller needs to detect this signal and stop sending a motor driving command. When the driver detects an abnormal operation such as overload or over current of the motor, it sets the alarm output to [OFF], flashes the alarm LED, disconnect the power to a motor and stops the motor simultaneously.

Caution

Only at the alarm output port, the photocoupler isolation is in reverse. When the driver is in normal operation the alarm output is [ON].

In-position output

In-position signal is [ON] when positioning is completed. This signal is [ON] when the motor position error is within the value set by the switch SW4.



MECP Parameter setting GUI (User interface)

ELECTRIC PRODUCT DRIVER – PULSE

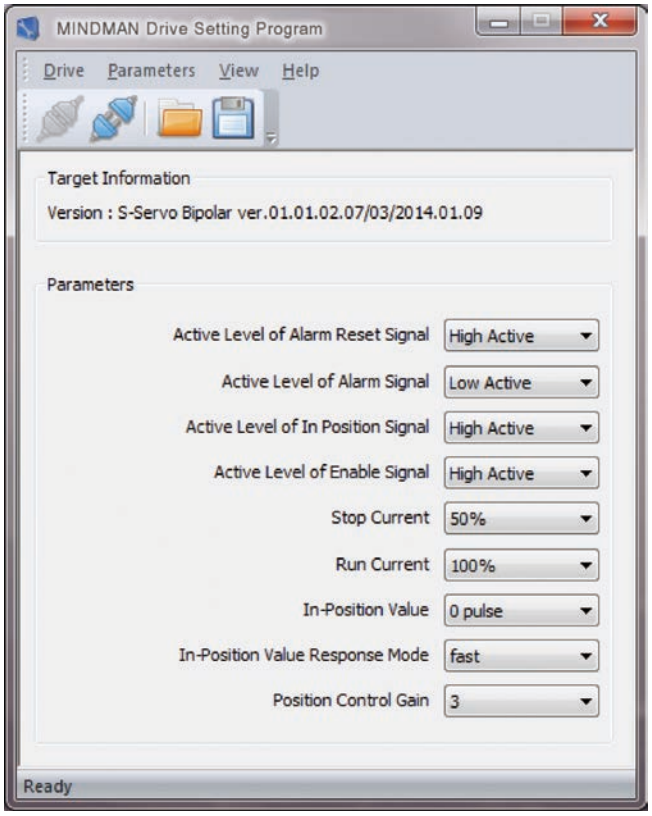
MECP drive utilizes various parameters for operation.

Some parameters need to be adjusted once users feel inconvenience to use or in order to maximize efficiency.

MECP provides parameter modification program for convenience of product usage for users.

The screen shot as below is computer program (GUI) which used for operation process. Users can change and set the parameters of drive for enable level, alarm reset level, in-position level, alarm output level. Users can use MECP according to its own system.

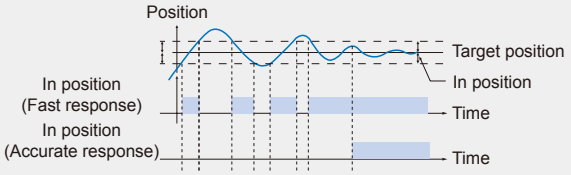
Please connect parameter setting GUI when MECP is disable state. For safety reason, MECP cannot be connected to setting GUI when it is enable state.



* Graphic user interface (GUI) program can support WindowsXP/VISTA/7/8 (32bit, 64bit).

* Graphic user interface (GUI) program can be update without prior notice for improving the performance or convenience of user.

* The content below is a description of the funtion for the parameter. Please refer to the attached sheet when set the parameters. The input and output terminal of drive are all photocoupler. The signal shows the status of internal photocouplers [ON: conduction]，[OFF: Non-conduction], not displaying the voltage levels of the signal.

Parameters	Initial value	Range	Function
Active level of alarm reset signal	High	Low, High	Set the level of input signal of alarm reset, When set it to high and input of alarm reset is [ON], the alarm output will be offed.
Active level of alarm signal	Low	Low, High	Set the level of output signal of alarm reset. When set it to low, the alarm output is [ON] when normal state, and the alarm output is [OFF] when protection function is operated.
Active level of in position signal	High	Low, High	Set the level of output signal of in position. When set it to high, in position output after completion of motor movement, output become [ON].
Active level of enable signal	High	Low, High	Set the level of input signal of enable input. When set it to high, if enable input is [ON], drive will stop to power supply to the motor.
Stop current	50%	20%~100%	Stop current means motor current which is set automatically after 0.1 seconds of motor is stopped. This parameter is used for reduce the temperature when the motor is stopped for a long time. The motor temperature can rises if set the stop current more than 60%.
Run current	100%	50%~150%	Run current is value of the current though the motor, while motor is operating (ratating), and it is set based on rated current of the motor. Run current value is related to torque while motor is operating (rotating). If run current value is high, torque value also become higher while motor is operating (rotating). Therefore, if it is determined as lack of torque while motor is operating (rotating), torque value while motor is operating (rotating) can be raised by increasing the value of run current parameter. (Warning) 1. If run current value is high, also the motor temperature can be increased, so please be aware. 2. The maximum setting value (150%) of run current is limited to the 4A. Therefore, if rated current value of motor exceeds 2.7A (56mm, 60mm), run current value cannot be increased by raise the run current value. 3. In case of MECP, run current is automatically adjusted according to the load. Therefor, please raise the run current only in case of lack of operating torque.
In position value	0 pulse	0~63 pulse	It shows output conditions of positioning complete signal, in position output signal is generated when the pulse number of positional error is lower than selected in position value set by this switch after positioning command is executed.
In position value response mode	Fast	Fast, accurate	It shows output conditions of positioning complete signal. 
Position control gain	3	0~63	When the motor is stopping, it is used to adjust the response of motor according to load mounted on the motor. This value is not the actual value that used inside of drive, it is relative value. For example, if the value is changed from 3 to 6, it dose not mean response time will be doubled. If value of this parameter is small, the motion of stopping of motor is become sensitive, and takes less time to stop. If value of this parameter is large, the motion of stopping of motor is become insensitive, and takes more time to stop. In the normal conditions, use the factory default value. Especially, if the load of inertia moment is greater than the motor so motor cannot stop normally, normal operation is possible by increasing the value of this parameter.

Caution for safety

⚠ ELECTRIC PRODUCT DRIVER

Before operation

- Thank you for your purchasing MECP.
- MECP is full digital position control step drive.
- This manual describes handing, maintenance, repair, diagnosis and troubleshooting of MECP.
- Before operating MECP, thoroughly read this manual.
- After reading the manual, keep the manual near the MECP so that any user can read the manual whenever needed.

Precautions

- General precautions
  - ① Contents of this manual are subject to change without prior notice for functional improvement, change of specifications or user's better understanding.
  - ② When the manual is damaged or lost, please contact with Mindman's agents or our company at the address on the last page of the manual.
  - ③ Our company is not responsible for a product breakdown due to user's dismantling for the product, and such a breakdown is not guaranteed by the warranty.
- Put the safety first
  - ① Before installation, operation and repairing the MECP, thoroughly read the manual and fully understand the contents. Before operating the MECP please, understand the mechanical characteristics of the MECP and related safety information and precautions.
  - ② This manual divides safety precautions into **Attention** and **Warning**.

Attention ⚠	If user does not properly handle the product, the user may seriously or slightly injured and damages may occur in the machine.
Warning ⚠	If user does not properly handle the product, a dangerous situation (such as an electric shock) may occur resulting in deaths or serous injuries.

  - ③ Although precaution is only a Attention, a serous result could be caused depending on the situation, follow safety precautions.

Check the product

⚠ Attention

- Check the product is damaged or parts are missing.
  Otherwise, the machine may get damaged or the user may get injured.

Installation

⚠ Attention

- Carefully move the MECP.
  Otherwise the product may get damaged or user's foot may get injured by dropping the product.
- Use non-flammable materials such as metal in the place where the MECP is to be installed.
  Otherwise, a fire may occur.
- When installing serveral MECP in a sealed place, install a cooling fan to keep the ambient temperature of the MECP as 50°C or lower.
  Otherwise, a fire or other kinds of accidents may occur due to overheating.

⚠ Warning

- The process of installation, connection, operation, checking and repairing should be done with qualified person.
  Otherwise, a fire or other kinds of accidents may occur.

Connect cables

⚠ Attention

- Keep the rated range of input voltage for MECP.
  Otherwise, a fire or other kinds of accidents may occur.
- Cable connection should follow the wiring diagram.
  Otherwise, a fire or other kinds of accidents may occur.

⚠ Warning

- Before connecting cables, check if input power is off.
  Otherwise, an electric shock or a fire may occur.
- The case of the MECP is insulated from the ground of the internal circuit by the condenser. Ground the MECP.
  Otherwise, an electric shock or a fire may occur.