iEM Series Integrated Stepper Motor

iEM series is integrated stepper motor which implements advanced control algorithm of leadshine based on its tens of years' experience in stepper and servo controls. At very compact size can save mounting space, eliminate motor wiring time, reduce interference, and cut/reduce cable and labor costs.

The iEM series are reliable, affordable and performs excellent in many industrial applications such as CNC, 3D printer, stage equipment, medical, electronics, packaging...

Feature

- No tuning for easy setup
- Soft-start with no "jump" when powered on
- Low noise and vibration, smooth motion
- Step&Direction and CW&CCW control
- 3 digital inputs, 1 optically isolated digital output
- RS232 communication for Leadshine software connection
- Over voltage, over current protections

Model Designation

iEM - 17 03 - □

① ② ③ ④

① Series Name
iEM : Integrated open loop stepper motor

② Frame Size
17: NEMA17
23: NEMA23
24: NEMA24

③ Holding Torque
03: 0.3N.m
06: 0.6N.m
08: 0.8N.m
13: 1.3N.m
23: 2.3N.m
21: 2.1N.m
31: 3.1N.m
30: 3.0N.m
35: 3.5N.m

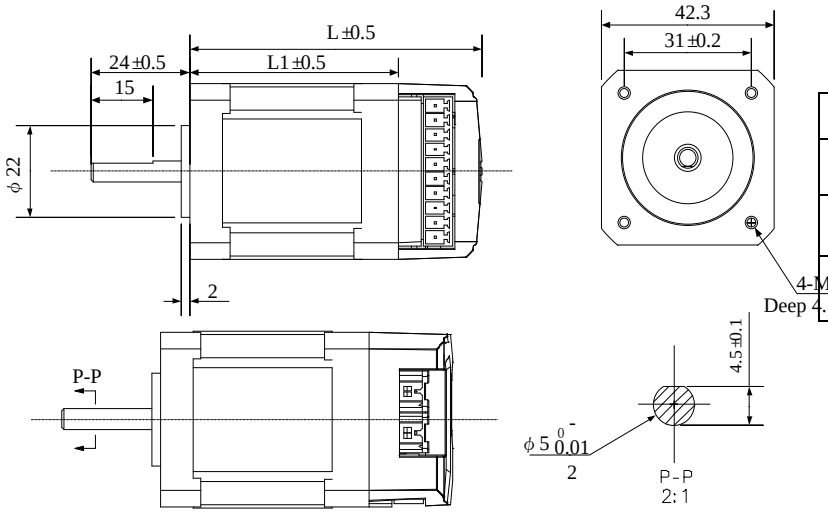
④ Remark
Blank: Normal type
L: Special type

Technical Specification

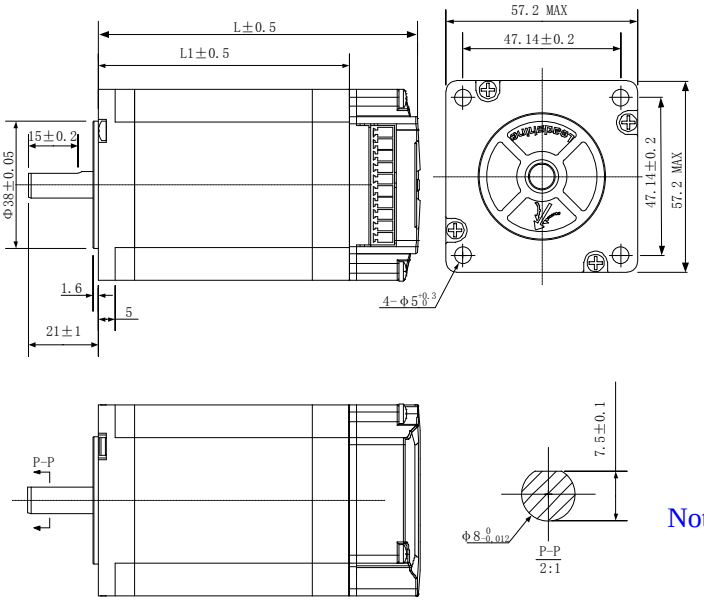
Model	Frame Size	Length (mm)	Holding Torque (N.m)	Weight (Kg)	Command Source		Electrical Parameters		Control Signal				
					PUL& DIR	CW&CCW	Power Voltage (VDC)	Peak Current (A)	Logical Current	Logical Voltage	Max Input Frequency	MIN PUL Width	MIN DIR Setup
iEM-1703	NEMA17	64	0.3	0.5	√	x	20-36	0.3 - 3.0	7-16mA	5V	200KHz	2.5μs	5.0μs
iEM-1706		72	0.4	0.9	√	x	20-36	0.3 - 3.0					
iEM-1708		85	0.8	1.1	√	x	20-36	0.3 - 3.0					
iEM-2313	NEMA23	75	1.3	1.0	√	√	20-50	0.5 - 4.5					
iEM-2323		96	1.9	1.3	√	√	20-50	0.5 - 7.0					
iEM-2321-L		89	2.1	1.4	√	√	20-50	0.5 - 7.0					
iEM-2331-L		109	3.1	1.6	√	√	20-50	0.5 - 7.0					
iEM-2430	NEMA24	109	3.0	1.6	√	√	20-50	0.5 - 7.0					
iEM-2435		122	3.5	1.9	√	√	20-50	0.5 - 7.0					

Dimension

(Unit: mm [1inch=25.4mm])



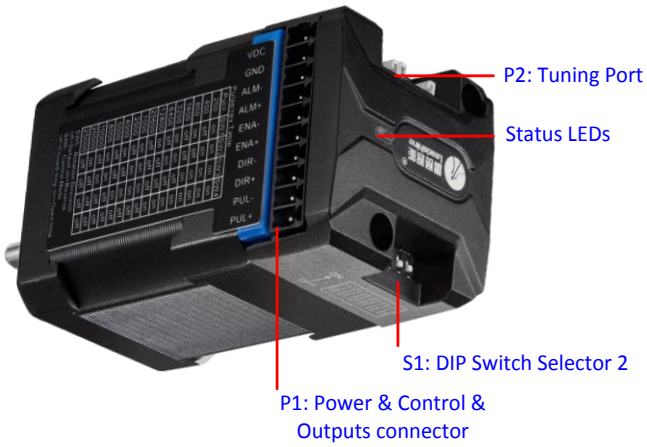
Models	L1 length	L length
iEM-1703	43	64
iEM-1706	51	72
iEM-1708	64	85



Models	L1 length	L length
iEM-2313	54	75
iEM-2323	75	96
iEM-2321-L	68	89
iEM-2331-L	88	109
iEM-2430①	88	109
iEM-2435②	101	122

Note: ① Frame size is 60mm, center diameter is 36mm.
② Frame size is 60mm, center diameter is 36mm, shaft diameter is 10mm

Connector and Pin Assignment



➢ **Pin Assignments of P1**

PIN	I/O	Details
VCC	**I**	Power supply positive connection. iEM-17xx:20-36VDC iEM-23xx and iEM-24xx: 20-50 VDC
GND	**I**	Power supply ground connection.
ALM-	**O**	Alarm: An OC output signal. It takes a sinking or sourcing at 5-24V@30mA
ALM+	**O**	
ENA-	**I**	Enable Signals: Optional, not connected by default.
ENA+	**I**	**(1)** Effective high level is 4.5-5V; Effective low level is 0-0.5V connection

		(2) ENA signal requires advance DIR signal minimum 200ms in single pulse mode
DIR-	**I**	Pulse and Direction Connection: **(1)** Optically isolated, high level 4.5-5V, low voltage 0-0.5V. **(2)** Max 200 KHz input frequency. **(3)** The width of PUL signal is at least 2.5μs, duty cycle is recommended 50%. **(4)** Single pulse (step & direction), iEM-23xx and iEM-24xx support double pulse (CW&CCW), while iEM-17xx do not support. **(5)** DIR signal requires advance PUL signal minimum 5 μs.
DIR+	**I**	
PUL-	**I**	
PUL+	**I**	

Notes:

(1) Shielding control signal wires is suggested;

(2) To avoid/reduce interference, do not tie control signal cables and power wires together.

- **Tuning Port P2**

The P2 connector in Figure 2 is a RS232 communication port for Leadshine software connection. It is just used to modify parameter, not for equipment control because neither precision nor stability is sufficient. If you need a Modbus-RS485 control, use a Leadshine iEM-RS series integrated stepper motor.The interface definition is as follows:

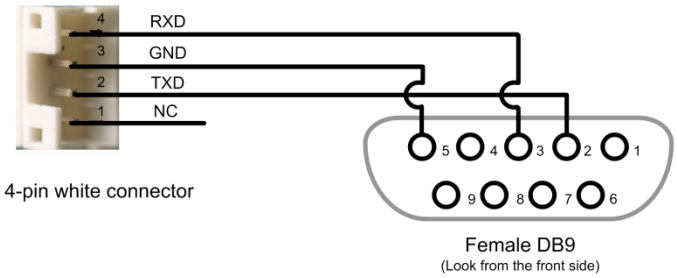
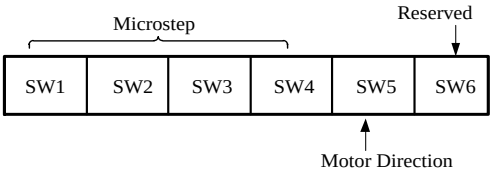


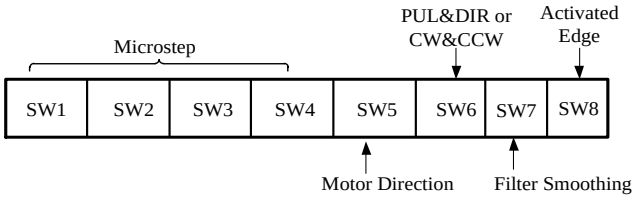
Figure5: RS232 Tuning Port

- **DIP Switch Configurations**

The iEM series has a row of DIP switches, of which the iEM17xx and iEM-23xx DIP switches are a bit different, as follows,



iEM-17xx



iEM-23xx and iEM-24xx

- For iEM-17xx Series

Microstep resolution is set by SW1, 2, 3, 4 of the DIP switches as shown in the following table:

Steps/Revolution	SW1	SW2	SW3	SW4
200 (Default)	on	on	on	on
400	off	on	on	on
800	on	off	on	on

1600	off	off	on	on
3200	on	on	off	on
6400	off	on	off	on
12800	on	off	off	on
25600	off	off	off	on
1000	on	on	on	off
2000	off	on	on	off
4000	on	off	on	off
5000	off	off	on	off
8000	on	on	off	off
10000	off	on	off	off
20000	on	off	off	off
25000	off	off	off	off

- For iEM-23xx and iEM-24xx Series

Steps/Revolution	SW1	SW2	SW3	SW4
400 (Default)	on	on	on	on
800	off	on	on	on
1600	on	off	on	on
3200	off	off	on	on
6400	on	on	off	on
12800	off	on	off	on
25600	on	off	off	on
51200	off	off	off	on
1000	on	on	on	off
2000	off	on	on	off
4000	on	off	on	off
5000	off	off	on	off
8000	on	on	off	off
10000	off	on	off	off
20000	on	off	off	off
40000	off	off	off	off

➢ **Other DIP Switch Settings**

- For iEM-17xx Series (SW5-SW6)

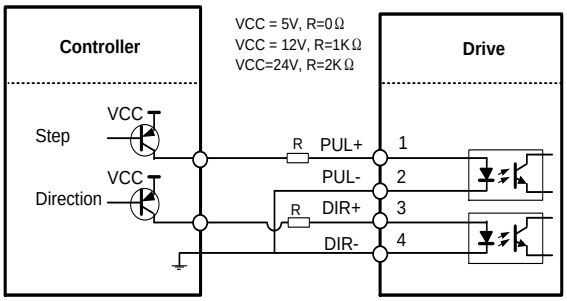
	Function	On	Off
SW5	Default Direction	CW (clockwise)	CCW (counterclockwise)
SW6	Reserved	-	-

- For iEM-23xx and iEM-24xx Series (SW5-SW8)

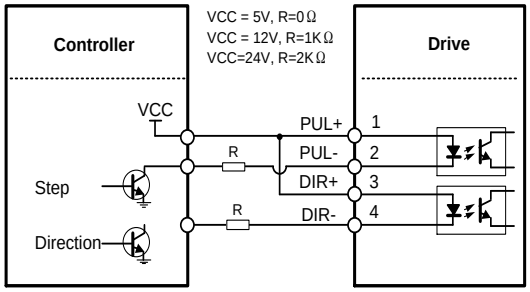
	Function	On	Off
SW5	Default Direction	CW (clockwise)	CCW (counterclockwise)
SW6	Pulse Mode	CW&CCW	PUL&DIR
SW7	Smoothing Time	Enable	Disable
SW8	Activated Edge	Rising edge	Falling edge

Wiring

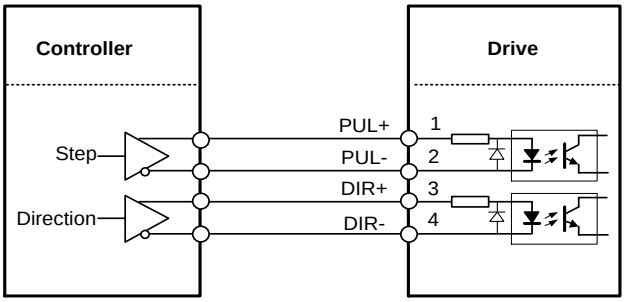
The iEM series motor can accept differential and single-ended control signal inputs (open-collector and PNP output). It has 3 optically isolated control inputs, PUL, DIR, and ENA. Refer to the following two figures for connections of PNP and NPN signals.



Connections to PNP signals
(common-cathode)



Connections to NPN Signals
(common-anode)



Connections to Differential signals