Ezi-STEP®

Micro Stepping System

CC-Link IE TSN 4X

- CC-Link IE TSN-compatible Microstepper System
- CiA402 Drive Profile
- Software Damping (Resonance & Vibration Suppression)
- Compact Multi-Axis Drive (Max. 4-Axis)
- Space Saving, Reduced Wiring



FASTECH

Fast Accurate Smooth Motion

Ezi-STEP®

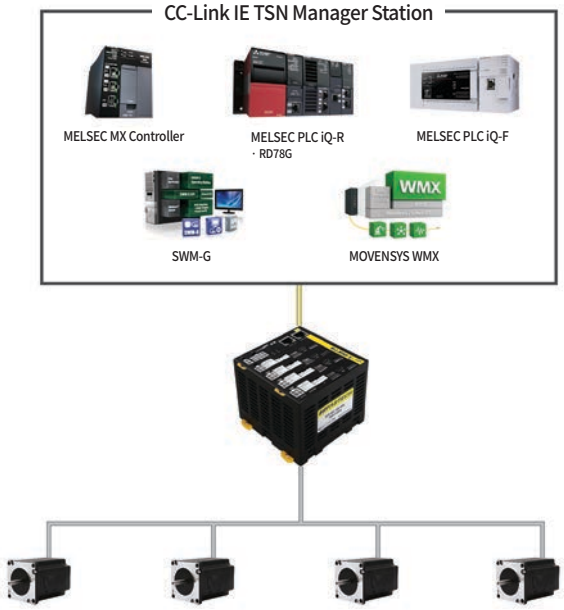
Micro Stepping System

CC-LinkIE TSN 4X



CC-Link IE TSN-compatible Motion Control

Ezi-STEP CC-Link IE TSN 4X is stepper motor control system that supports CC-Link IE TSN, an industrial network based on high-speed Ethernet (1 Gbps, full-duplex communication). Ezi-STEP CC-Link IE TSN 4X employs CiA402 drive profile and supports Cyclic Synchronous Position Mode (CSP Mode), Profile Position Mode (PP Mode) and Homing Mode (HM Mode).

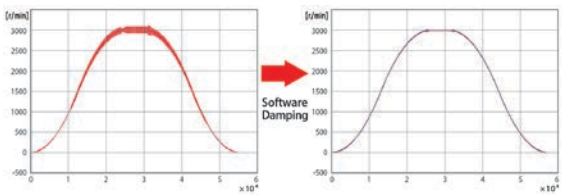


Microstep and Filtering

Ezi-STEP adopts a microstepping drive method, allowing the basic step angle of 1.8° to be subdivided up to 1/250 (0.0072°) for high-precision control. Unlike conventional drives, it performs PWM control every 50 µs, enabling enhanced current control for even more precise motion.
In addition, Ezi-STEP incorporates filtering control technology, ensuring smooth operation even at very low speeds.

Software Damping

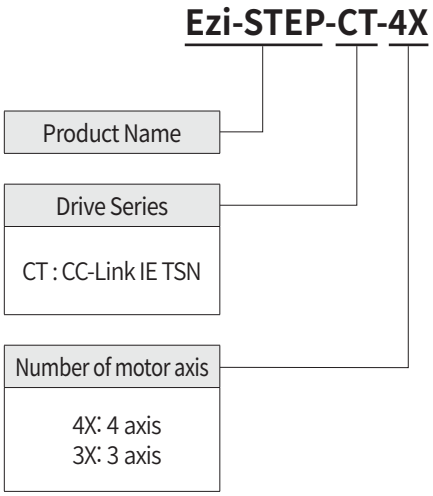
Motor vibration is created by magnetic flux variations of the motor, lower current from the drive due to back-emf from the motor at high speeds and lowering of phase voltages from the drive. Ezi-STEP drive detects these problems and the MCU adjusts the phase of the current according to the pole position of the motor, drastically suppressing vibration. This allows the smooth operation of the motor at high speeds.



Software Damping OFF **Software Damping ON**

※ This is real measured speed that using 100,000 P/R encoder

Ezi-STEP CC-Link IE TSN 4X Part Numbering



※ Ezi-STEP CC-Link IE TSN 4X can connect up to 4 motors to one rive. Standard motors, motors with brake, and motors with gearbox can be connected, and diferent types of motors can be connected to each axis.

Standard Motor

Motor Model Number
BM-20M
BM-20L
BM-28S
BM-28M
BM-28L
BM-42S
BM-42M
BM-42L
BM-42XL
BM-56S
BM-56M
BM-56L
BM-60S
BM-60M
BM-60L

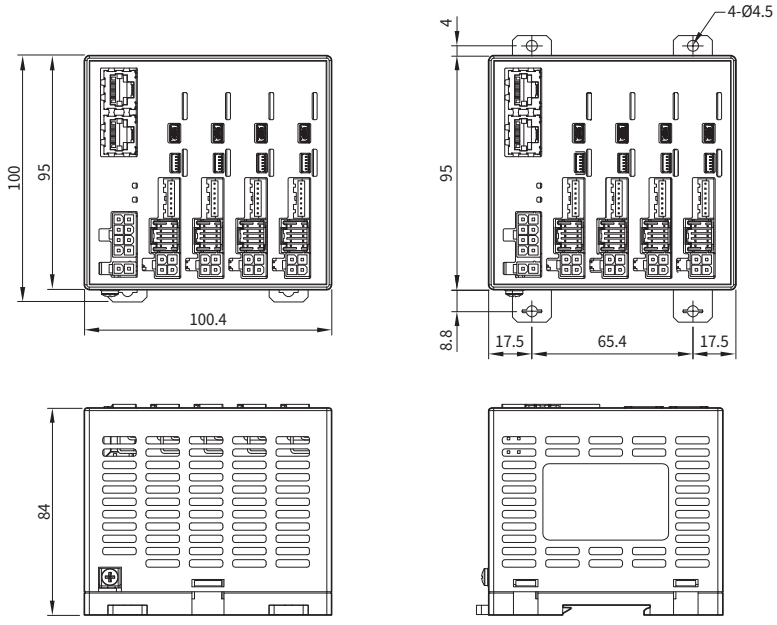
Combination with Brake

Motor Model Number
BM-42S-BK
BM-42M-BK
BM-42L-BK
BM-42XL-BK
BM-56S-BK
BM-56M-BK
BM-56L-BK
BM-60S-BK
BM-60M-BK
BM-60L-BK

Specifications of Drive

Motor Model		BM-20 series	BM-28 series	BM-42 series	BM-56 series	BM-60 series
Drive Model		EzT2-CT-4X, 3X series				
Input Voltage		24 V DC ± 10 %				
Control Method		Closed loop control with 32 bit MCU				
Current Consumption		Max. 500 mA/axis (Except motor current)				
Operating Condition	Ambient Temperature	· In Use: 0 ~ 50 °C · In Storage: -20 ~ 70 °C				
	Humidity	· In Use: 35 ~ 85 % RH (Non-Condensing) · In Storage: 10 ~ 90 % RH (Non-Condensing)				
	Vib. Resist.	0.5 g				
Function	Rotation Speed	0 ~ 3,000 r/min				
	Resolution	Configurable Resolution [P/R] 500 1,000 1,600 2,000 3,200 3,600 4,000 5,000 6,400 8,000 10,000 20,000 25,000 36,000 40,000 50,000 (Selectable by parameter)				
	Error Type	Over Current Error, Over Speed Error, Over Temperature Error, Over Regenerative Voltage Error, Motor Connection Error, Main Power Voltage Error, ROM Error				
	LED Display	Power status, Alarm status, Run status, Step On status				
CC-Link IE TSN	Communication Protocol	CC-Link IE TSN Class B				
	Operation Mode	CiA402 Drive Profile: Cyclic Synchronous Position Mode(CSP), Profile Position Mode(PP), Homing Mode(HM)				
	Synchronization	Minimum Cycle Time: 250 µs / Synchronous Comm. (CSP, PP, HM) / Asynchronous Comm. (PP, HM)				
I/O Signal	Input Signals	3 dedicated inputs (LIMIT+, LIMIT-, ORIGIN) for each axis				
	Output Signals	1 brake signal output for each axis				

Dimensions of Drive [mm]



※ Can be installed on DIN Rail. (35 mm)
※ Outer dimension of Ezi-STEP CC-Link IE TSN 3X drive is the same as Ezi-STEP CC-Link IE TSN 4X drive.

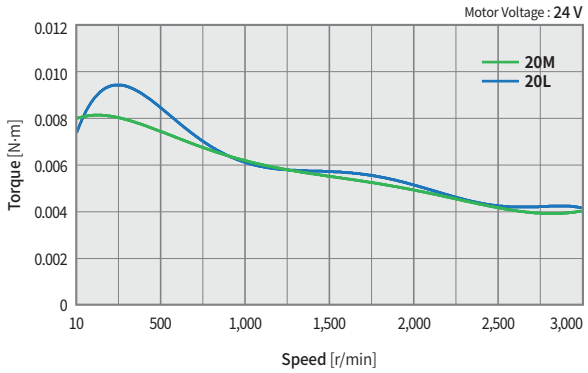
Specifications of Motor

MODEL				BM-20 series		BM-28 series			BM-42 series			
			UNIT	20M	20L	28S	28M	28L	42S	42M	42L	42XL
Drive method			-	Bipolar								
Number of phase			-	2 Phase								
Current per Phase			A/Phase	0.5	0.5	0.95	0.95	0.95	1.2	1.2	1.2	1.2
Maximum Holding Torque			N·m	0.016	0.025	0.069	0.098	0.118	0.32	0.44	0.5	0.65
Rotor Inertia			g·cm²	2.5	3.3	9.0	13	18	35	54	77	114
Motor Weight			kg	0.053	0.078	0.115	0.174	0.202	0.238	0.303	0.374	0.508
Length (L)			mm	28	38	32	45	50	34	40	48	60
Permissible Radial Load	Distance From End of Shaft	3 mm	N	18	18	30	30	30	22	22	22	22
		8 mm		30	30	38	38	38	26	26	26	26
		13 mm		-	-	53	53	53	33	33	33	33
		18 mm		-	-	-	-	-	46	46	46	46
Permissible Axial Load			N	Must be less than the motor weight								
Insulation Resistance			MΩ	Min. 100 (When measured with a 500 V DC insulation resistance meter)								
Insulation Class			-	Class B (130 °C)								
Operating Temperature			°C	0 ~ 55								

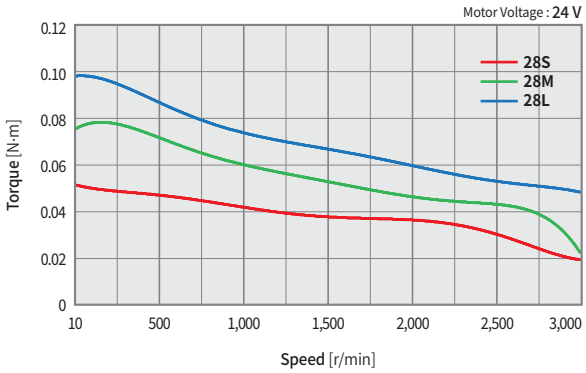
MODEL				BM-56 series			BM-60 series		
			UNIT	56S	56M	56L	60S	60M	60L
Drive method			-	Bipolar					
Number of phase			-	2 Phase					
Current per Phase			A/Phase	3.0	3.0	3.0	4.0	4.0	4.0
Maximum Holding Torque			N·m	0.64	1.0	1.5	0.88	1.28	2.4
Rotor Inertia			g·cm²	180	280	520	240	490	690
Motor Weight			kg	0.548	0.726	1.159	0.616	0.793	1.349
Length (L)			mm	46	55	80	47	56	85
Permissible Radial Load	Distance From End of Shaft	3 mm	N	52	52	52	70	70	70
		8 mm		65	65	65	87	87	87
		13 mm		85	85	85	114	114	114
		18 mm		123	123	123	165	165	165
Permissible Axial Load			N	Must be less than the motor weight					
Insulation Resistance			MΩ	Min. 100 (When measured with a 500 V DC insulation resistance meter)					
Insulation Class			-	Class B (130 °C)					
Operating Temperature			°C	0 ~ 55					

Torque Characteristics of Motor

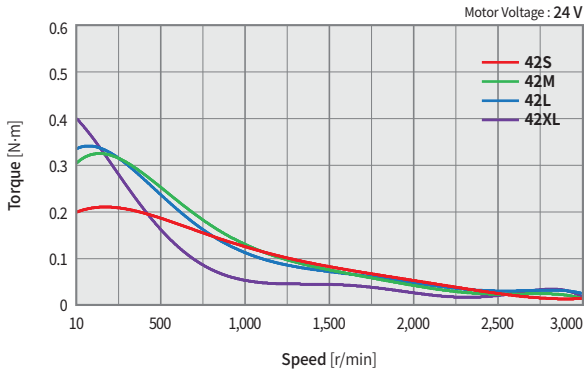
Ezi-STEP-CT-4X-20 series



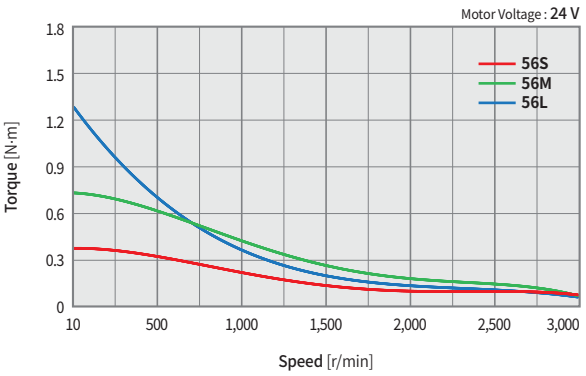
Ezi-STEP-CT-4X-28 series



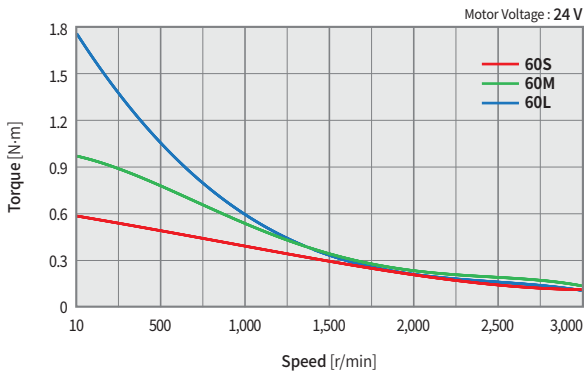
Ezi-STEP-CT-4X-42 series



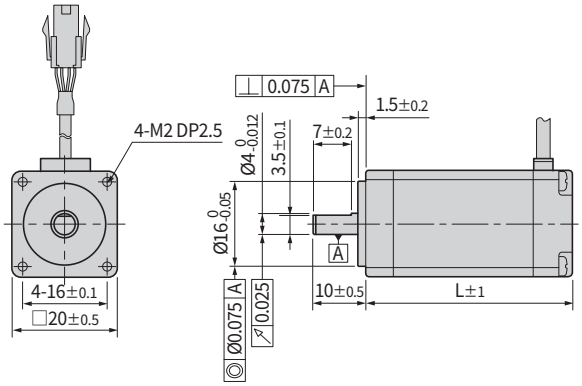
Ezi-STEP-CT-4X-56 series



Ezi-STEP-CT-4X-60 series

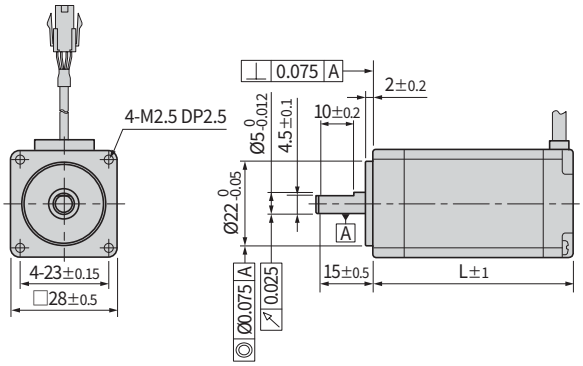


Dimensions of Motor [mm]



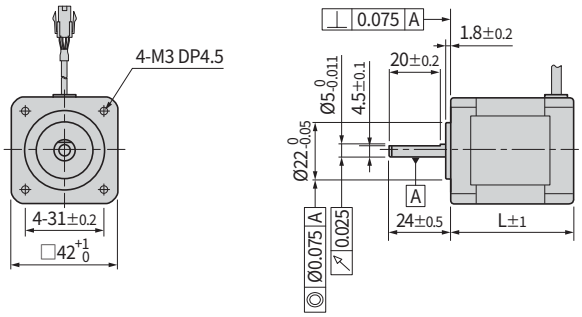
20 mm

Model name	Length (L)
BM-20M	28
BM-20L	38



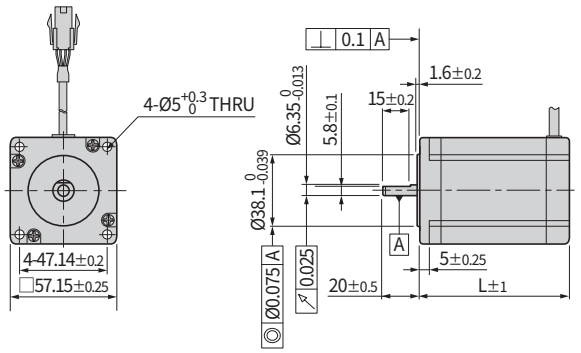
28 mm

Model name	Length (L)
BM-28S	32
BM-28M	45
BM-28L	50



42 mm

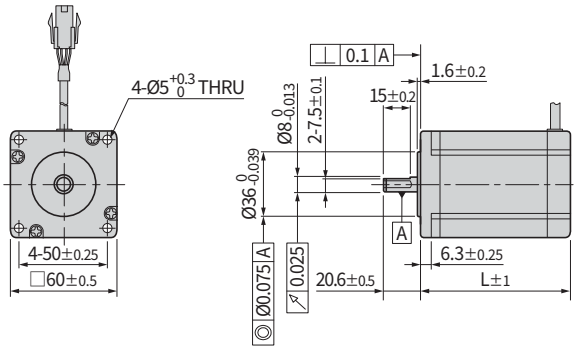
Model name	Length (L)
BM-42S	34
BM-42M	40
BM-42L	48
BM-42XL	60



56 mm

Model name	Length (L)
BM-56S	46
BM-56M	55
BM-56L	80

Dimensions of Motor [mm]



60 *mm*

Model name	Length (L)
BM-60S	47
BM-60M	56
BM-60L	85

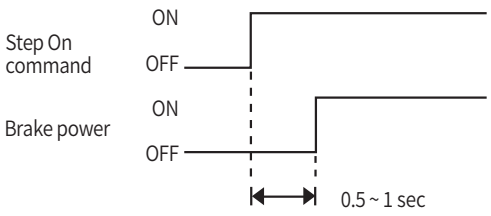
Specifications of Motor with Brake

Motor Model Number	Electromagnetic Brake					Motor Weight [kg]	Permissible Radial Load [N]				Permissible Axial Load [N]
	Type	Voltage Input [V]	Rated Current [A]	Power Consumption [W]	Static Friction Torque [N·m]		Distance from End of Shaft [mm]				
							3	8	13	18	
BM-42S-BK	Non-excitation run Type	24 V DC ± 10 %	0.2	5	0.2	0.500	22	26	33	46	Must be less than the motor weight
BM-42M-BK						0.560					
BM-42L-BK						0.630					
BM-42XL-BK						0.770					
BM-56S-BK			0.27	6.6	0.7	0.970	52	65	85	123	
BM-56M-BK						1.150					
BM-56L-BK						1.580					
BM-60S-BK						1.060	70	87	114	165	
BM-60M-BK						1.230					
BM-60L-BK						1.790					

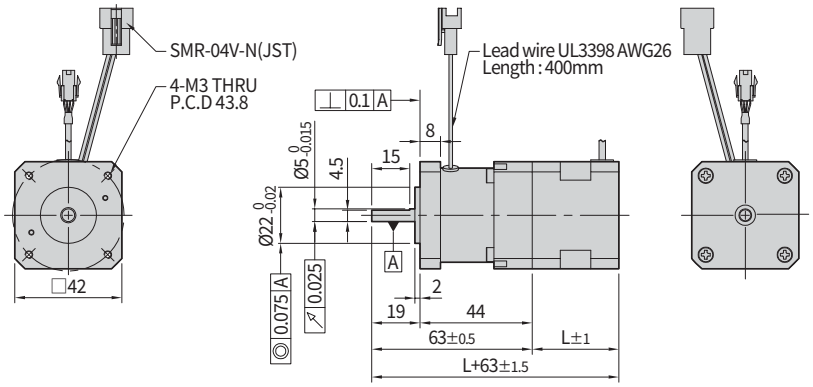
* Electronic Brake cannot be used for braking. Position hold purpose only when power OFF.
* The motor weight refers to the total weight of the motor, including the integrated electromagnetic brake.
* Motor Model Number is combined model name of Motor and Barke.
* Motor specification and torque characteristic are same as Standard Motor.

* Brake Operation Timing Chart

Ezi-STEP CC-Link IE TSN 4X controls Brake by Drive automatically. Please refer to Timing Chart on the right when Brake is controlled by the upper controller other than using Ezi-STEP CC-Link IE TSN 4X Brake control. Otherwise, Drive might malfunction and loads might fall down. Also, please do not operate Brake during motor operation to prevent damage.

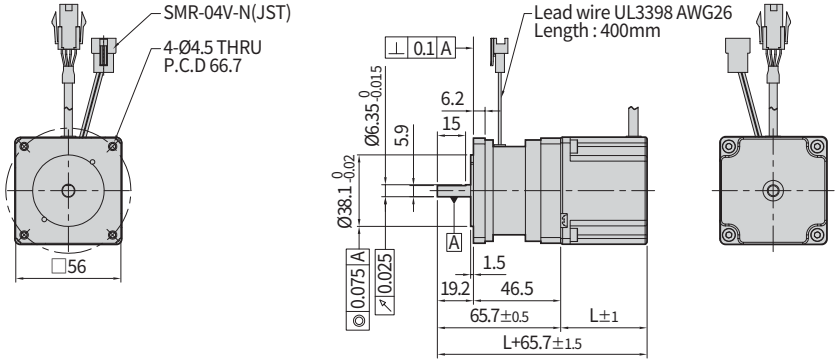


Dimensions of Motor with Brake [mm]



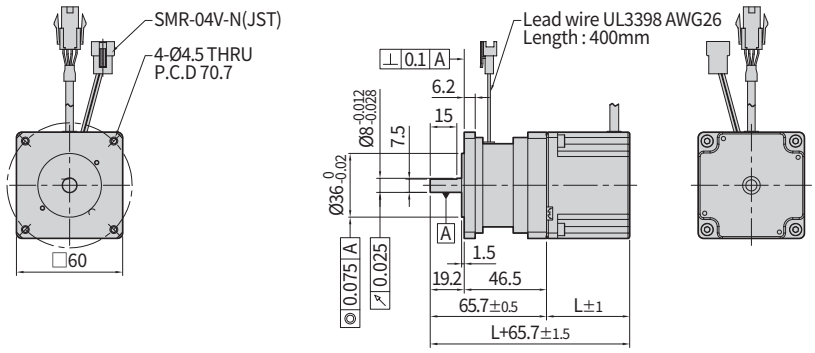
42 mm

Model name	Length (L)
BM-42S	34
BM-42M	40
BM-42L	48
BM-42XL	60



56 mm

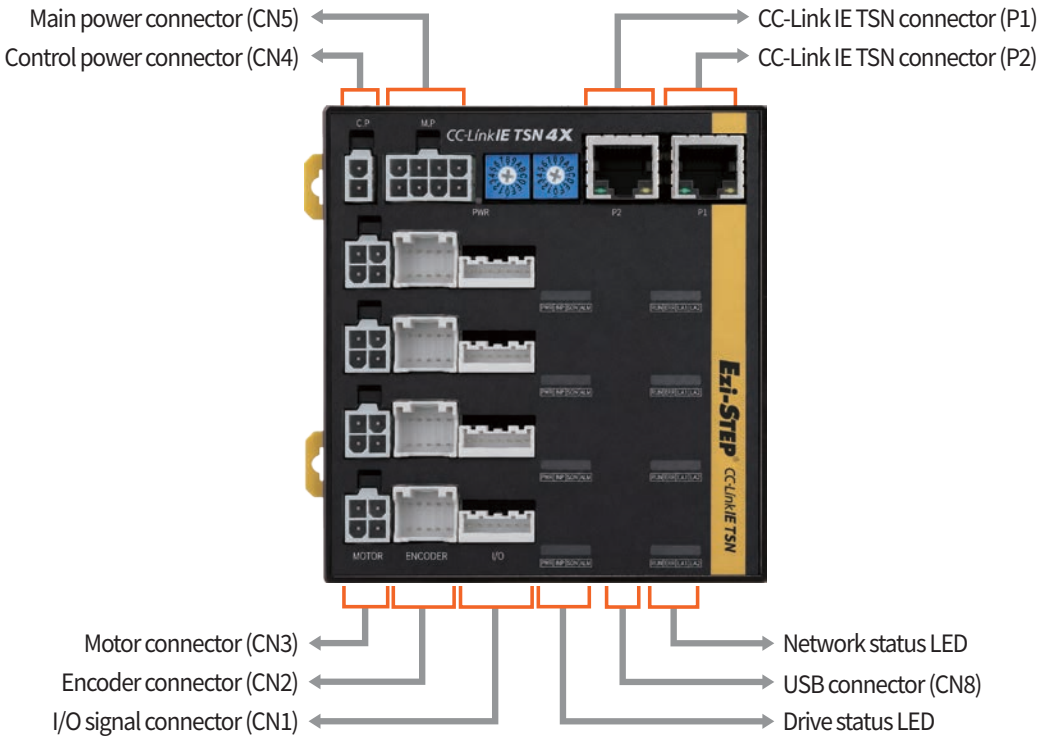
Model name	Length (L)
BM-56S	46
BM-56M	55
BM-56L	80

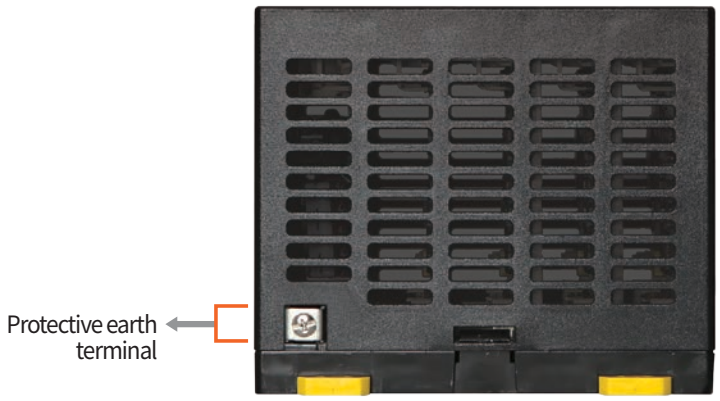


60 mm

Model name	Length (L)
BM-60S	47
BM-60M	56
BM-60L	85

Names and Functions of Each Part





※ Basic configuration of 3X drive is the same as 4X and only difference is number of axis.

1. Network Status LED

LED indicates communication status of CC-Link IE TSN.

Indicator	Color	Status	Description
RUN	Green	OFF	Power off
		Single Flash	Not connected to master
		Double Flash	Pre-operational state
		Blinking	Safe-operational state
		Interval Off	Operational state

Indicator	Color	Status	Description
ERR	Red	OFF	No error or power off
		Blinking	Drive error
		Single Flash	CC-Link IE TSN communication error
		Double Flash	IP address conflict error

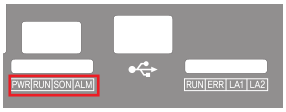
Indicator	Color	Status	Description
LINK1/ LINK2	Green	OFF	Link inactive
		ON	Link active



2. Drive Status LED

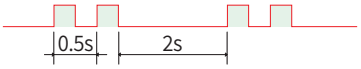
LED informs operation Status of the drive.

Indicator	Color	Function	Description
PWR	Green	Power Input Indicator	Lights up when power is supplied.
RUN	Yellow	Motor Running Indicator	Lights up while the motor is running.
SON	Orange	STEP ON / OFF Indicator	Lights up when Step is On; turns off when Step is Off.
ALM	Red	Alarm Indicator	Blinks repeatedly when an error occurs.



List of error types by the the number of LED blinking

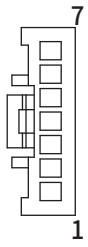
No.	Error Type	Causes
1	Over Current Error	The current through power devices in drive exceeds 4.8 A
2	Over Speed Error	The motor speed exceeds 3,000 r/min
5	Over Temperature Error	Internal temperature of the drive exceeds 85 °C
6	Over Regenerative Voltage Error	Back-EMF is higher than 48 V
7	Motor Connect Error	There is a problem with the connection between the drive and the motor
9	Main Power Voltage Error	Main supply voltage is approximately below 18 V
12	ROM Error	Error occurs in parameter storage device (ROM)



Alarm LED flash (e.g., Over Speed error)

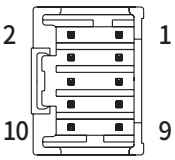
3. I/O Signal Connector (CN1)

No.	Function	I/O
1	EXT_24 V DC	Input
2	EXT_GND	Input
3	LIMIT+	Input
4	LIMIT-	Input
5	ORIGIN	Input
6	BRAKE+	Output
7	BRAKE-	Output



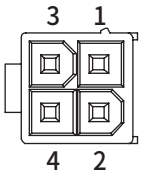
4. Encoder Connector (CN2)

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



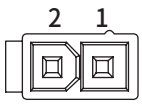
5. Motor Connector (CN3)

No.	Function	I/O
1	A Phase	Output
2	B Phase	Output
3	$\overline{A}$ Phase	Output
4	$\overline{B}$ Phase	Output



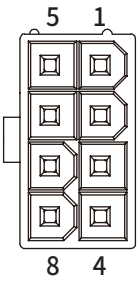
6. Control Power Connector (CN4)

No.	Function	I/O
1	24 V DC	Input
2	GND	Input



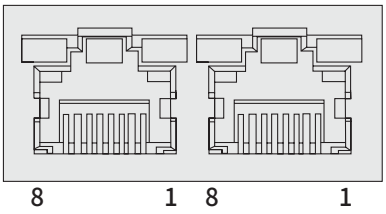
7. Main Power Connector (CN5)

No.	Function	I/O
1	24 V DC	Input
2	24 V DC	Input
3	24 V DC	Input
4	F.GND	----
5	GND	Input
6	GND	Input
7	GND	Input
8	F.GND	----

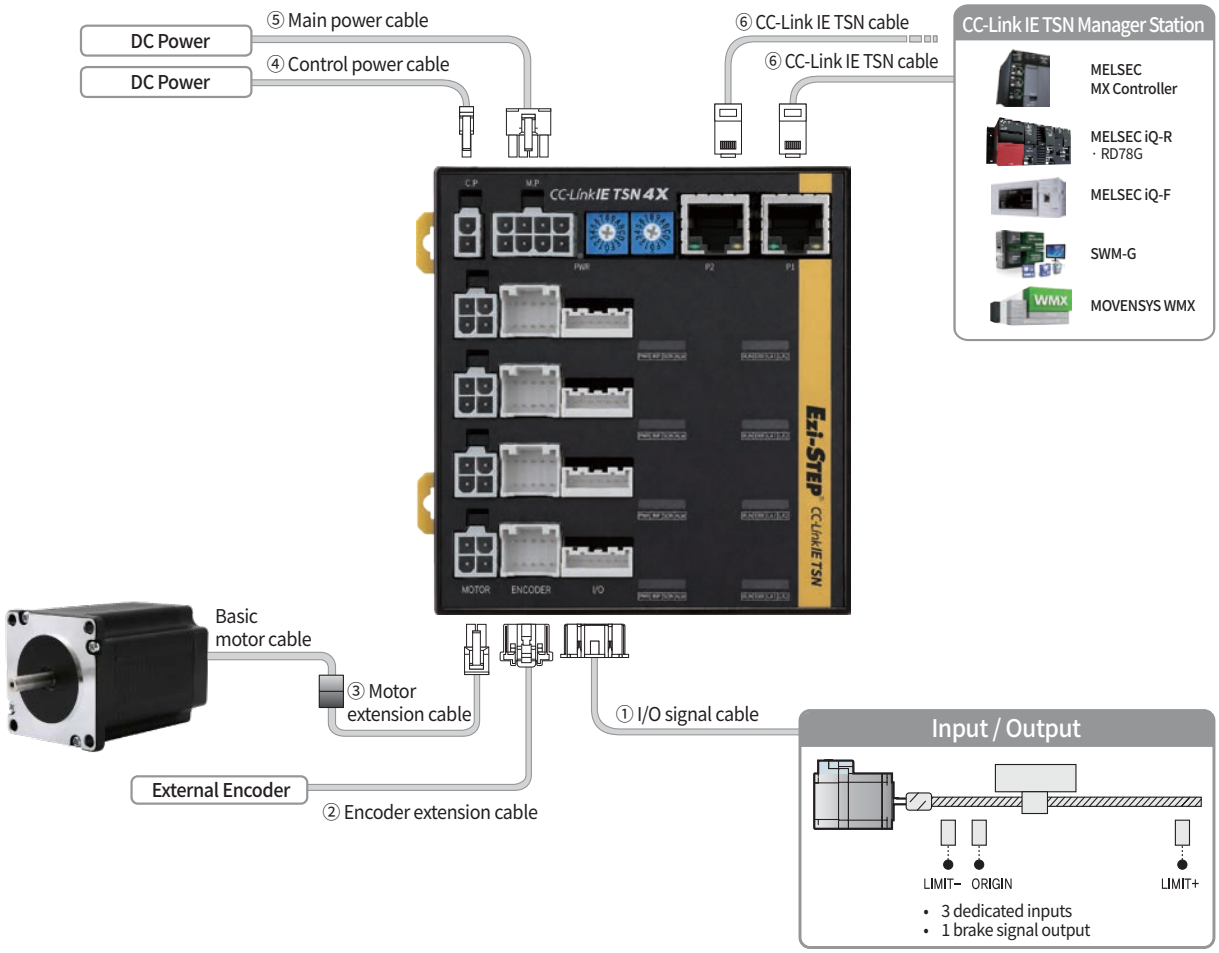


8. CC-Link IE TSN Connector (CN6, CN7)

No.	Function	No.	Function
1	TD+	6	RD-
2	TD-	7	----
3	RD+	8	----
4	----	Connector hood	F.GND
5	----		



System Configuration



Cable Type	Max. Cable Length	Remarks
① I/O Signal Cable	20 m	Options (Sold separately)
② Encoder Extension Cable	20 m	
③ Motor Extension Cable	20 m	
④ Control Power Cable	2 m	
⑤ Main Power Cable	2 m	
⑥ CC-Link IE TSN Cable	100 m	
Basic Motor Cable	0.3 m (Basic length)	Basic cables are attached to motors.

Basic configuration of 3X drive is the same as 4X and only difference is number of axis.

1. Accessories

Connectors

These are connector specifications for drive cabling.

Purpose		Item	Part Number	Manufacturer
Main Power (CN5)		Housing	5557-08R	MOLEX
		Terminal	5556T	
Control Power (CN4)		Housing	5557-02R	MOLEX
		Terminal	5556T	
Motor	Drive Side (CN3)	Housing	5557-04R	MOLEX
		Terminal	5556T	
	Motor Side	Housing	5557-04R	MOLEX
		Terminal	5556T	
Encoder	Drive Side (CN2)	Housing	51353-1000	MOLEX
		Terminal	56134-9000	
I/O Signal (CN1)		Housing	PAP-07V-S	JST
		Terminal	SPHD-001T-P0.5	

※ The connectors above are supplied with the product. If you are using other parts, please make sure they meet the specifications.

2. Options

① I/O Signal Cable

These are the cables to connect Ezi-STEP CC-Link IE TSN 4X drive and other input / output devices.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - I/O Device Connection	CCTM-S-001F	1	Fixed Cable	Max. Cable Length: 20 m
	CCTM-S-002F	2		
	CCTM-S-003F	3		
	CCTM-S-005F	5		
	CCTM-S-001M	1	Flexible Cable	
	CCTM-S-002M	2		
	CCTM-S-003M	3		
	CCTM-S-005M	5		

※ If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

② Encoder Extension Cable

These are the cables to connect Ezi-STEP CC-Link IE TSN 4X drive and the encoder.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - Basic Encoder Cable Connection	CTPR-E-001F	1	Fixed Cable	Max. Cable Length: 20 m
	CTPR-E-002F	2		
	CTPR-E-003F	3		
	CTPR-E-005F	5		
	CTPR-E-001M	1	Flexible Cable	
	CTPR-E-002M	2		
	CTPR-E-003M	3		
	CTPR-E-005M	5		

※ If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

③ Motor Extension Cable

These are the cables to connect Ezi-STEP CC-Link IE TSN 4X drive and the motor.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - Basic Motor Cable Connection	CSVO-M-001F	1	Fixed Cable	Max. Cable Length: 20 m
	CSVO-M-002F	2		
	CSVO-M-003F	3		
	CSVO-M-005F	5		
	CSVO-M-001M	1	Flexible Cable	
	CSVO-M-002M	2		
	CSVO-M-003M	3		
	CSVO-M-005M	5		

※ If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

④ Control Power Cable

These are the cables to connect Ezi-STEP CC-Link IE TSN 4X drive and the control power.

Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - Control Power Connection	CSVO-P-001F	1	Fixed Cable	Max. Cable Length: 2 m
	CSVO-P-002F	2		
	CSVO-P-001M	1	Flexible Cable	
	CSVO-P-002M	2		

⑤ Main Power Cable

These are the cables to connect Ezi-STEP CC-Link IE TSN 4X drive and the main power.

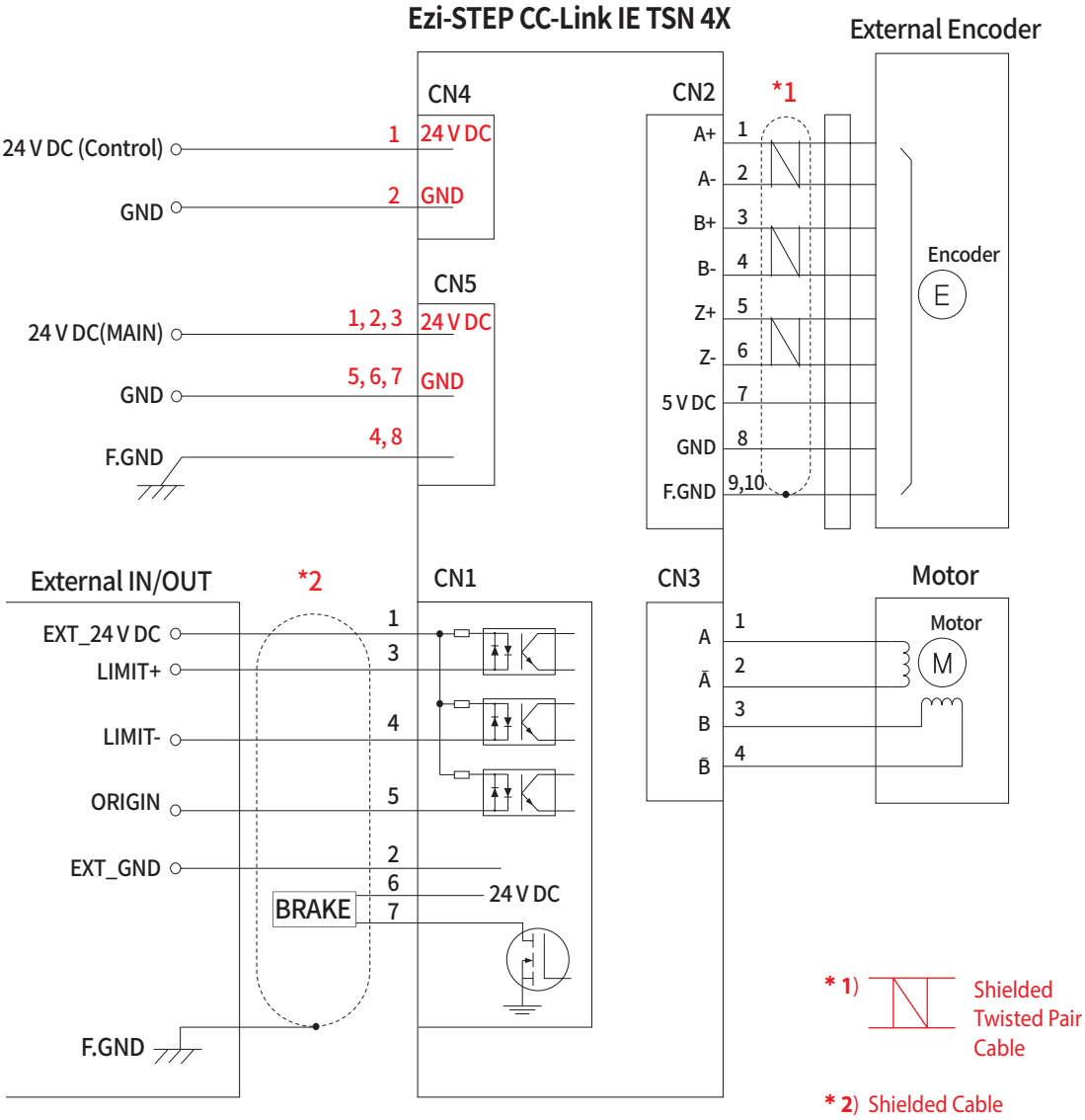
Purpose	Part Number	Length [m]	Cable Type	Remarks
Drive - Main Power Cable Connection	CCTM-P-001F	1	Fixed Cable	Max. Cable Length: 2 m
	CCTM-P-002F	2		
	CCTM-P-001M	1	Flexible Cable	
	CCTM-P-002M	2		

⑥ CC-Link IE TSN Cable

Purpose	Part Number	Length [m]	Remarks
CC-Link IE TSN Connection	CGNR-EC-001F	1	• STP(Shielded Twisted Pair) Cable • Category 5e or higher • Max. Cable Length: 100 m • Fixed Cable
	CGNR-EC-002F	2	
	CGNR-EC-003F	3	
	CGNR-EC-005F	5	

※ If you need cables with length(in units of 1 m) not listed on the table, please contact FASTECH for more information.

External Wiring Diagram



※ When connecting the I/O cable between the drive and the master controller, be sure to turn off the power to both the master controller and the drive. Failure to do so may result in electric shock or product damage.

CAUTION

To ensure the safe and proper use of the products listed in this catalog, please be sure to read the user manual thoroughly before use.

MEMO

FASTECH

Fast Accurate Smooth Motion

FASTECH Co., Ltd.

FASTECH Headquarters : (Postal Code:14502) Rm#1201 ~ 1202, 401-dong, Bucheon Techno-Park, 655 Pyeongcheon-ro, Wonmi-gu, Bucheon-si, Gyeonggi-do, Republic of Korea
TEL : +82-32-234-6317 FAX : +82-32-234-6302 E-mail : sales@fastech-motions.com

FASTECH JAPAN : (〒 450-0001 Aichi) Nagoya, Nakamura Ward, Nagono, 1-Chome 47-1 Nagoya International Center Bldg. 18th Floor
TEL : +81-70-6588-5905 E-Mail : sales_japan@fastech-motions.com

Homepage : cltsn.fastech-motions.com/en | www.fastech-motions.com

※ Please note that the color and size of the products in this catalog may differ depending on the measurement method and the specifications can be changed without prior notice for quality improvement.

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2026-10-27 Rev.2.2