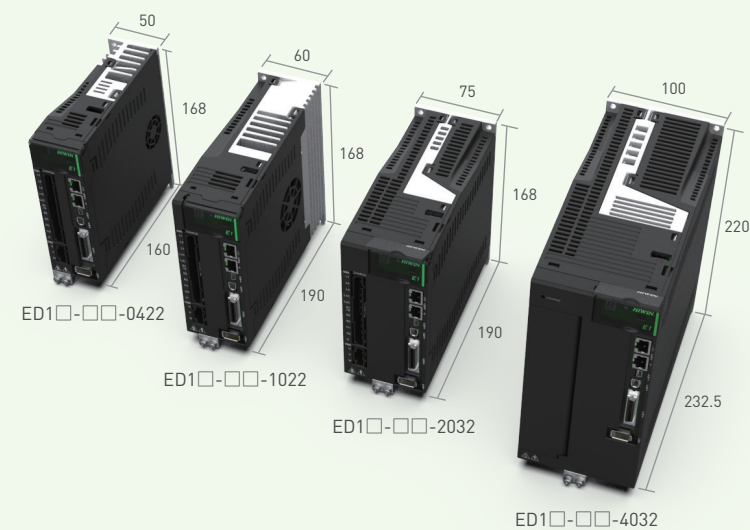


## Features

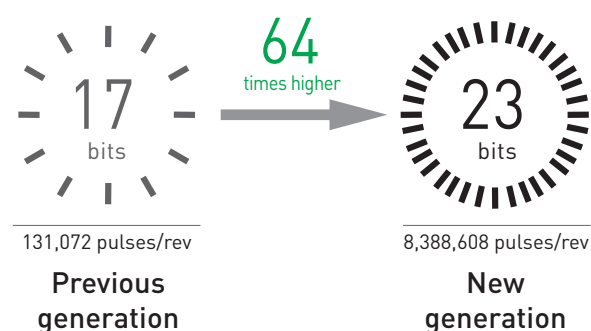
- 3.2 kHz speed response
- Tuneless function
- Advanced auto tuning
- Ripple compensation
- Unique gantry control function
- Network with industrial communication devices
- Supports various motor types
- Built-in STO function
- Supports various types of encoders, such as Digital, Analog, Tamagawa, EnDat and Biss-C

### Applications

Industries related to Display, Semiconductor, Automation, Laser cutting, PCB etc.



### 1 Higher Accuracy



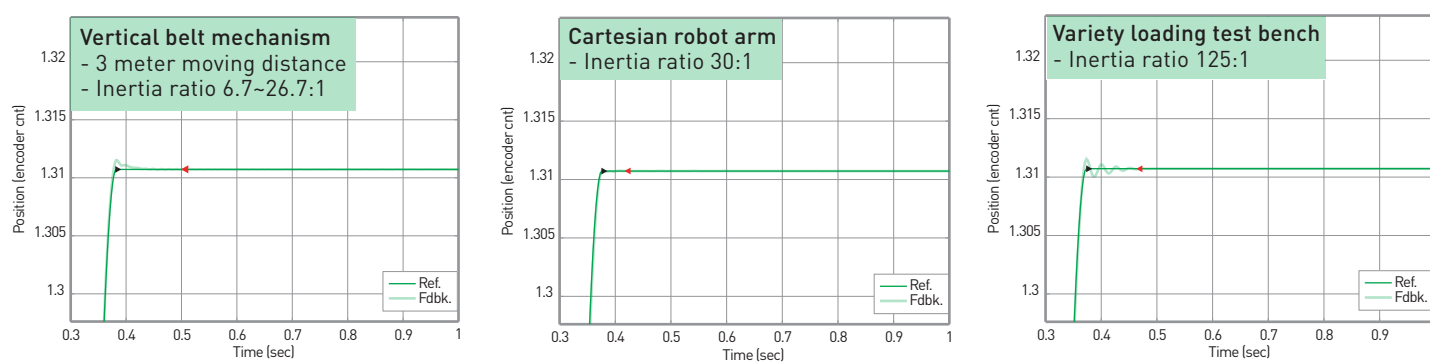
### 2 3.2kHz Speed Response

Higher speed response, faster settling and higher productivity.



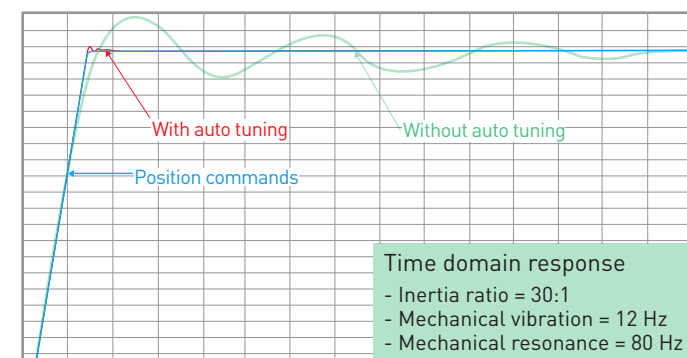
### 3 Tuneless Function

Maintains good performance and stable movement of the motor with inertia ratio up to 250:1. Auto gain tuning to be adapted to load changes.



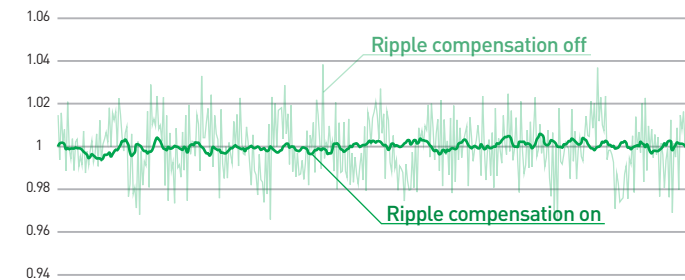
### 4 Advanced Auto Tuning

This function supports automatic loop gains tuning and filters adjustment to suppress mechanical vibration and resonance, which optimizes machine performance.



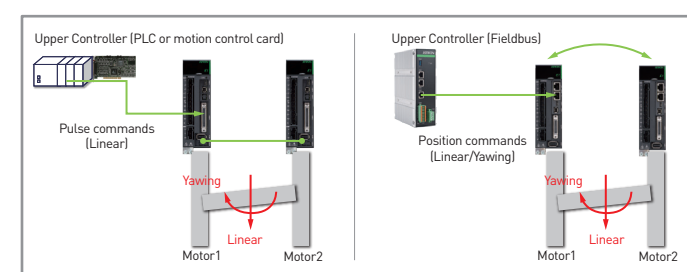
### 5 Ripple Compensation

Effectively suppresses the speed ripple caused by motor cogging. This function is especially useful for mechanism in which high control gains are not allowed.



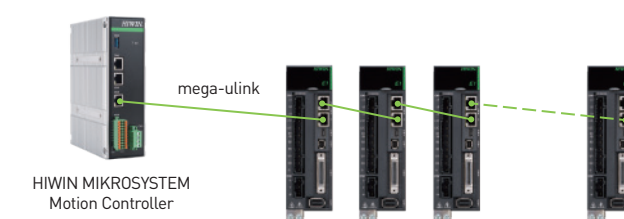
### 6 Unique Gantry Control Function

With the connection of two E1 drives, the linear and yawing movement of a gantry can be easily optimized.



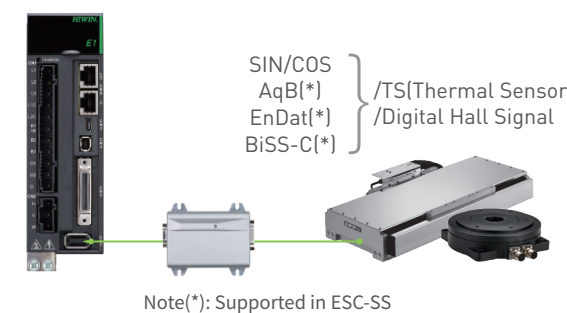
### 7 Network with Industrial Communication

Supports EtherCAT®, MECHATROLINK-III and PROFINET. E1 can also be consolidated with HIWIN controllers through HIWIN mega-ulink protocol.



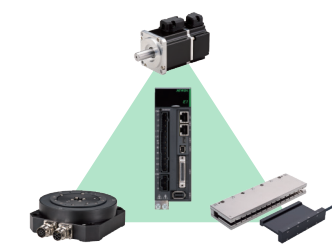
### 8 Compatible Encoder Types

Built-in interface to receive digital encoder signals. Tamagawa serial encoder interface is also supported. With an ESC(Excellent Smart Cube), E1 can support other types of encoders, such as analog [SIN/COS], EnDat® and BiSS®-C.



### 9 Supports Various Motor Types

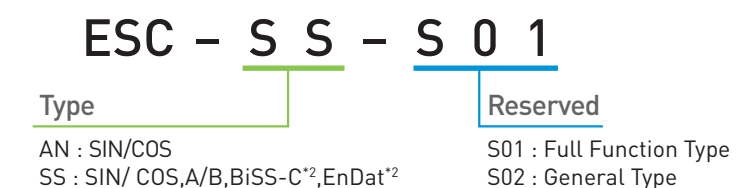
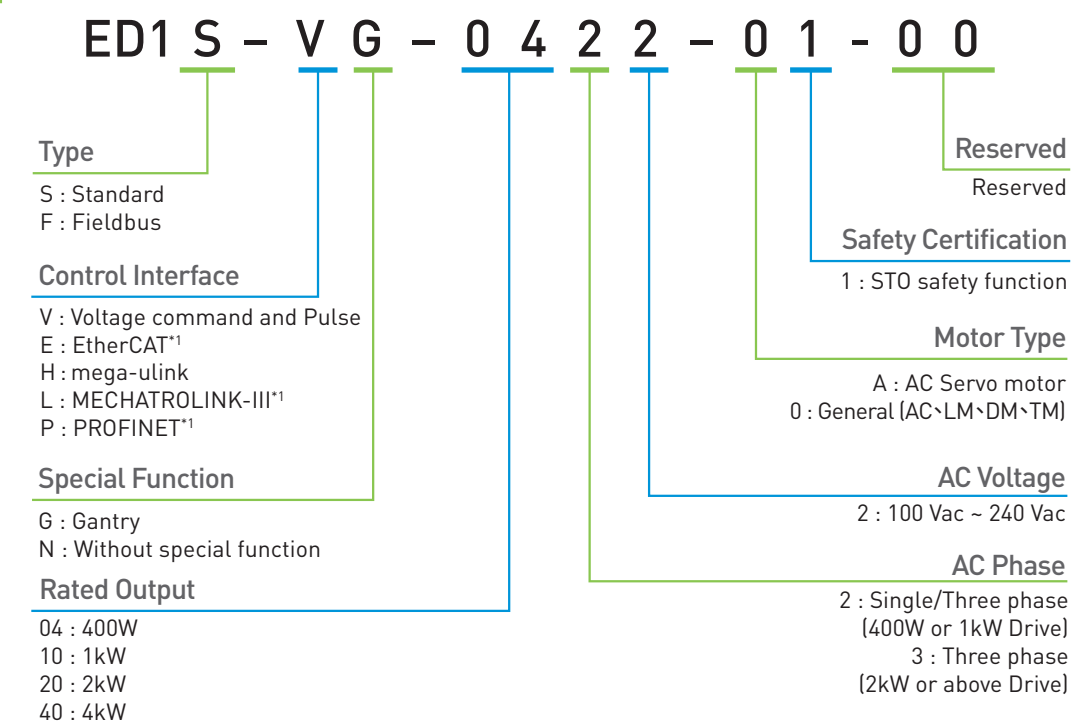
E1 is designed for general purpose, allowing AC servo motors, linear motors and direct drive motors to be supported with the same type of drive.



### 10 Built-in STO Function

When STO is engaged on E1 drives, the motor will come to a dead stop, protecting equipment and personnel.

## Model Explanation



Note:  
\*1 EtherCAT® is a registered trademark of Beckhoff Automation Co., Ltd.  
MECHATROLINK is a registered trademark of MECHATROLINK Members Association.  
PROFINET® is a registered trademark of PROFIBUS & PROFINET International (PI).  
\*2 EnDat® is a registered trademark of HEIDENHAIN GmbH.  
BiSS® is a registered trademark of IC-Haus GmbH.

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E1

E1 Series Servo Drive



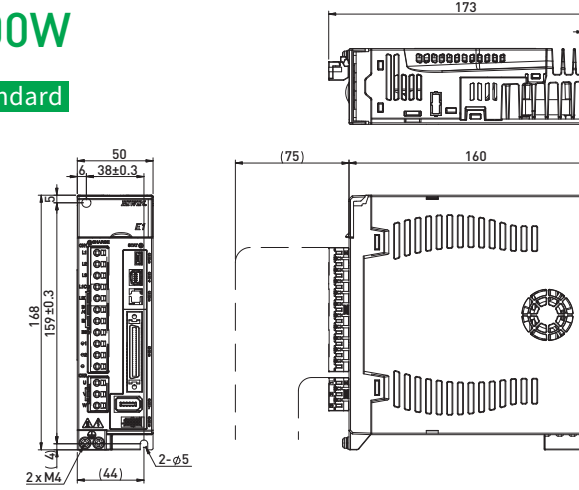
## Drive Specification (Please refer to "E1 Series Servo Drive User Manual")

Rated Output		400W	1kW	2kW	4kW	
Input Power	Single Phase Main Power	Rated Voltage (Line to Line)	AC 100 ~ 120 Vrms, 50~60 Hz		-	
		Rated Current (Arms)	2.9	6.5	-	
	Three Phase Main Power	Rated Voltage (Line to Line)	AC 200 ~ 240 Vrms, 50~60 Hz			
		Rated Current (Arms)	1.46	3.3	11.3	17.0
Control Power		1 Ø/AC 100 ~ 120 Vrms, 50~60 Hz				
		1 Ø/AC 200 ~ 240 Vrms, 50~60 Hz				
Output Power	Phase Voltage	3 Ø/AC 240 Vrms max.				
	Max Rated Power (W)	400	1k	2k	4k	
	Peak Current (Arms)	10	23.3	42	75	
	Rated Current (Arms)	2.5	5.6	12	25	
Cooling Method		Fan cooling				
Control Method		IGBT PWM space vector control				
PWM Modulation Frequency		16 kHz			8 kHz	
Applicable Motor		AC/DM/LM				
STAT LED Indicator		Blinking red: Error/Blinking green: Ready				
CHARGE LED Indicator		Red: The main power is supplied./No light: The main power is not supplied.				
Dynamic Brake		Built-in dynamic brake circuit/Delay time of relay: 20 ms				
Built-in Resistor for Dynamic Brake		-	10 Ohm / 10 W	27 Ohm / 40 W		
Analog Output		Channel: 2/Resolution: 12 bit/Output voltage range: ±10 V/Accuracy: ±2%/Maximum output current: ± 10 mA				
Position Mode	Command Source	Pulse command from controller				
	Signal Type	Pulse / Direction, CW / CCW, AqB				
	Isolated Circuit	High-speed optical coupler				
	Input Signal	Differential input or single-ended input				
Maximum Input Bandwidth	Differential: 5 Mpps / Single-ended: 200 kpps					
Electronic Gear	Gear ratio: Pulses / Counts Pulses: 1~1,073,741,824 Counts: 1~1,073,741,824					
Velocity Mode	Command Source	DC voltage command from controller				
	Impedance	14 kOhm				
	Signal Format	±10 Vdc				
	Maximum Input Bandwidth	100 Hz				
Specification	16 bit A/D input (V-REF+/-)					
Torque Mode	Command Source	DC voltage command from controller				
	Impedance	14 kOhm				
	Signal Format	±10 Vdc				
	Maximum Input Bandwidth	100 Hz				
Specification	16 bit A/D input (T-REF+/-)					

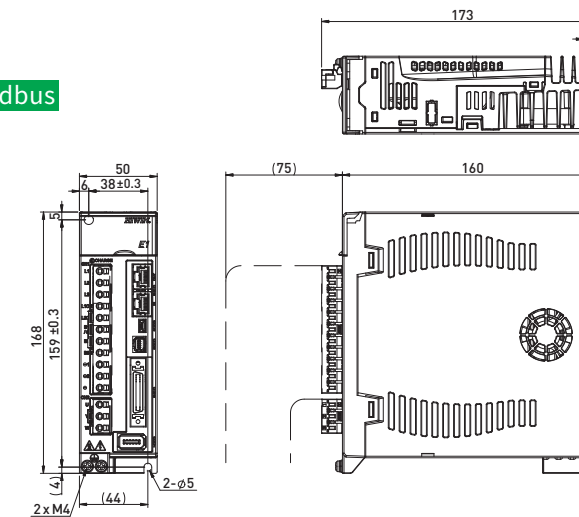
Rated Output		400W	1kW	2kW	4kW
Encoder	Control Mode	Position mode Velocity mode Torque mode Full-closed loop mode (Dual loop mode)			
	Power Supply	+5.1 Vdc±5%, 700 mA			
		Signal Format	Resolution: 23 bit (Single-turn/multi-turn absolute encoder) Bandwidth: 5 MHz		
	Signal Format	Serial Signal	AqB and Z-phase signals (Digital differential TTL signal) The maximum input bandwidth of each phase is 5 MHz		
Incremental Signal		Encoder power malfunction detection/Short circuit protection/Undervoltage protection /Overvoltage protection			
Safety Functions		Encoder power malfunction detection/Short circuit protection/Undervoltage protection /Overvoltage protection			
Position Counting Range		-2,147,483,648~2,147,483,647 (32 bit)			
Maximum Differential Input Bandwidth		Internal quadruple frequency 20 M counts/s			
Linear Motor/Direct Drive Motor		Depending on encoder type, Excellent Smart Cube (ESC) may be required.			
Encoder Feedback	Emulated Encoder Output (Fieldbus servo drive does not support)	Z Phase	1. Serial encoder and incremental encoder (AqB · sin/cos) are supported. 2. The width of output signal can be adjusted by parameter. 3. Digital differential signal output 4. Z-phase open collector output is supported. 5. Two output methods can be selected. (a.) Only outputs one Z-phase signal for total travel distance. (b.) Outputs one Z-phase signal per one revolution.		
		A/B Phase	1. Serial encoder and digital encoder (AqB) are supported. 2. Differential signal output. The maximum output bandwidth is 18 Mcount/s. 3. The scaling of output can be adjusted. For instance, ten encoder counts = one emulated encoder count.		
Computer Communication	Standard USB2.0 (Mini USB type)	Connect the servo drive with your computer to set parameters, monitor physical quantities and operate manually via Thunder.			
General-purpose I/O	Input	The functions of general-purpose inputs (Optical couplers) can be defined by the user. E1 series servo drive provides ten general-purpose inputs (I1 to I10). Fieldbus servo drive only provides eight general-purpose inputs (I1 to I8) 24 V/5 mA (Each input pin)			
	Output	The functions of general-purpose outputs (Optical couplers) can be defined by users. E1 series servo drive provides five general-purpose outputs (O1 to O5) 24 V/0.1 A (Each output pin)			
	Position Trigger (PT)	Outputs are differential signals. The timing for the outputs and condition to trigger should be set with parameters.			
Regenerative Energy Protection	Regenerative Resistor	400 W : Without built-in regenerative resistor Connect to external regenerative resistor if needed. 1 kW/2 kW/4 kW : With built-in regenerative resistor. Connect to external regenerative resistor to increase regenerative capacity.			
	Built-in Regenerative Resistor	-	40 Ohm / 40 W	12 Ohm / 60 W	13 Ohm / 120 W
	Protection of Regenerative Resistor Enabled	+HV > 370 Vdc			
	Protection of Regenerative Resistor Disabled	+HV < 360 Vdc			
Overvoltage Protection		390 Vdc			
Optional Function		Gantry synchronization control function			
Environment	Operating Temperature	0~45°C			
	Storage Temperature	-20°C~65°C			
	Humidity	Operating and storage temperature: 20 to 85% RH (Non-condensing)			
	Altitude	Altitude 1,000 M or lower above sea level			
	Vibrating	Less than 0.5 G, Frequency 10 to 500 Hz, (No continuous use under resonance frequency)			
	IP Rating	IP20			

### 400W

Standard

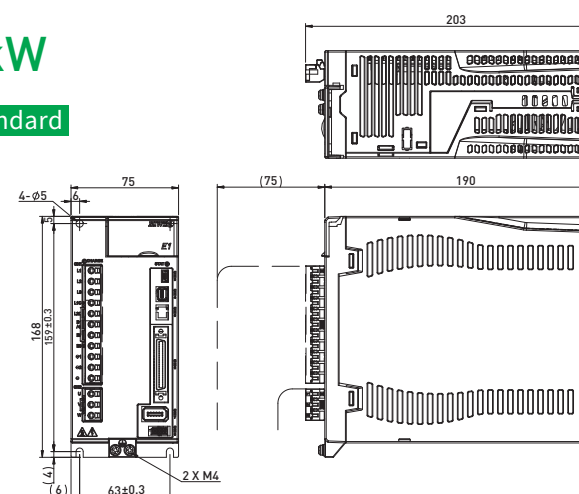


Fieldbus

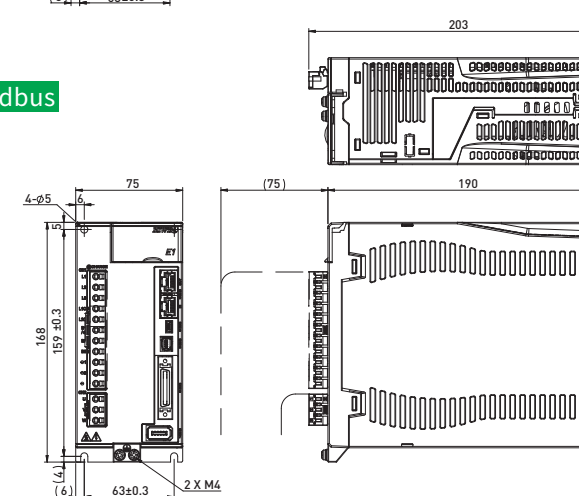


### 2kW

Standard

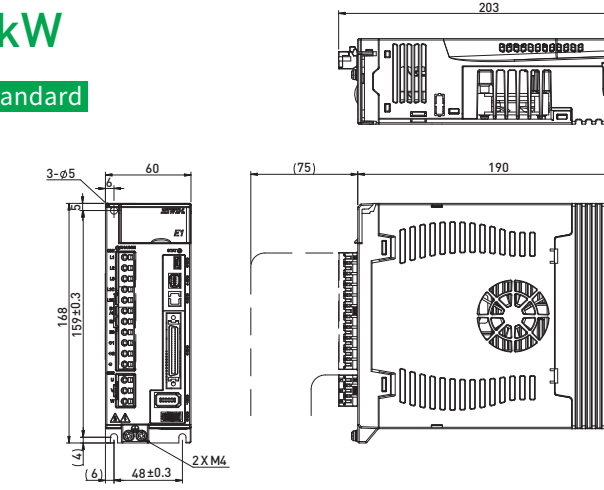


Fieldbus

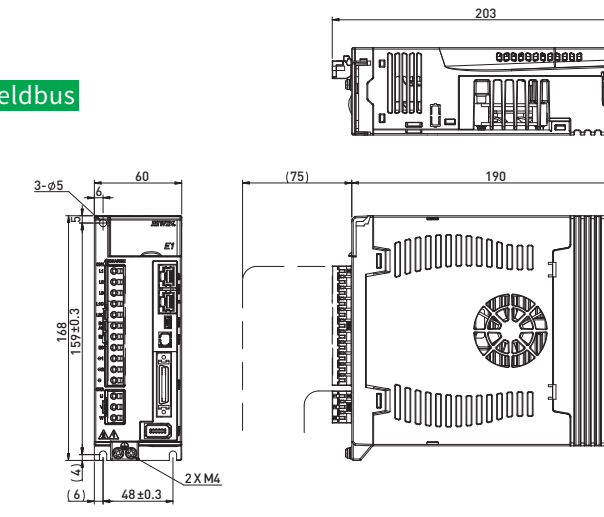


### 1kW

Standard

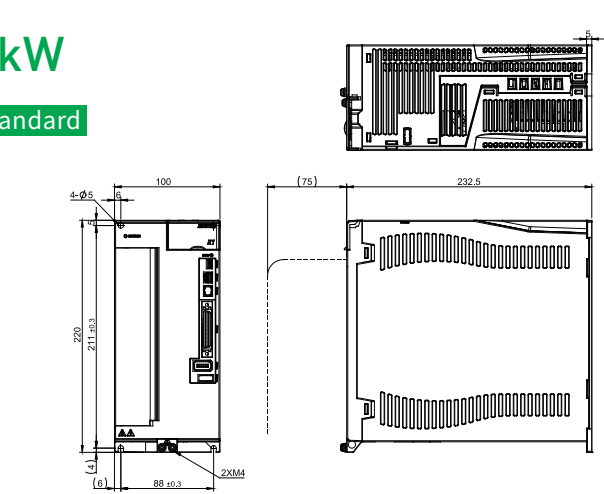


Fieldbus

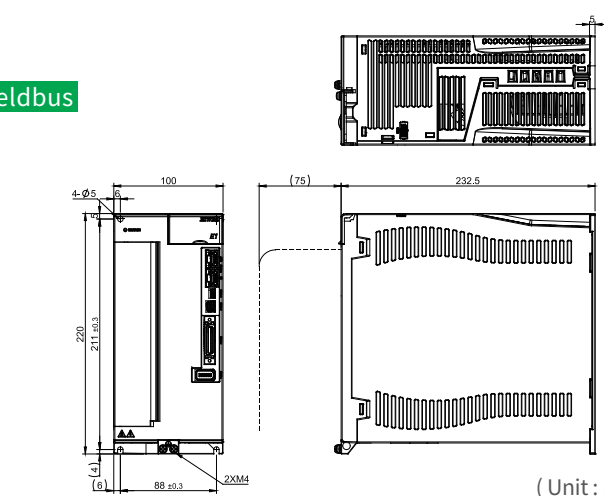


### 4kW

Standard

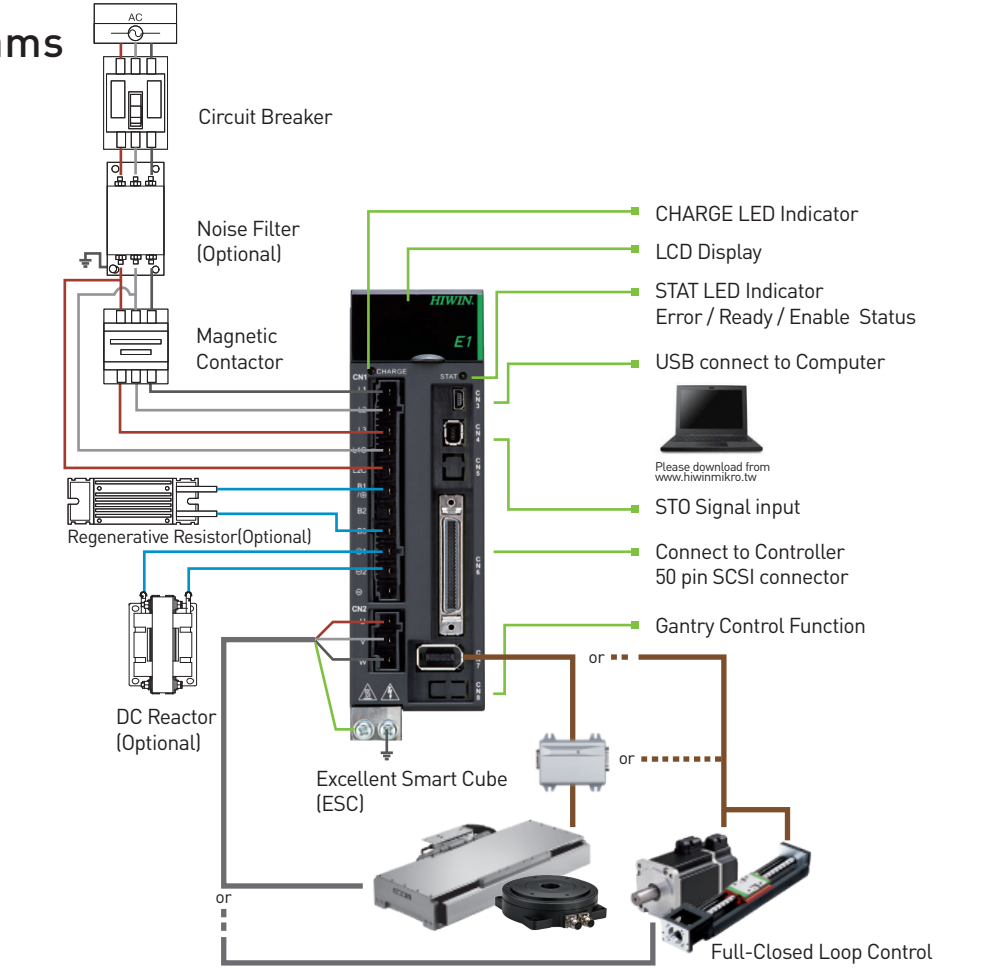


Fieldbus



(Unit: mm)

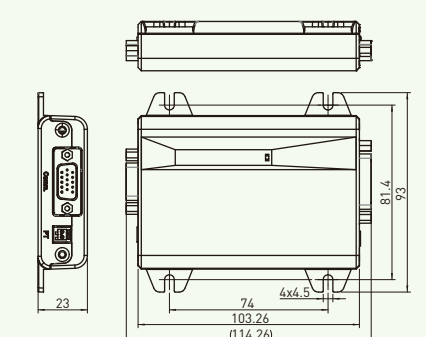
## Wiring Diagrams



## ESC Hardware



Excellent Smart Cube(ESC)



Item	Description				
Maximum Output Voltage	+5.0 V ± 5%				
Maximum Output Current	650 mA				
Supported Signal Type	Digital Hall Sensor	Incremental Sign		Absolute Type	
	Hall U/ V/ W	SIN / COS / Reference	A/ B/ Index	BiSS-C	Tamagawa
Maximum Signal Bandwidth	2 kHz	1 MHz (multiplier factor : 40% times)	4 MHz	5 MHz	4 MHz
	Maximum Data Length	-	-	32 bits	64 bits
Input Signal Format	5V CMOS / TTL	Differential signal (RS422)		Differential signal (RS485)	
Motor Thermal Protection (TTS)	PTC (Positive Temperature Coefficient) Thermistor				
Operating Temperature	0°C to + 45°C				
Storage Temperature	-20°C to + 65°C				
IP Level	IP20				