

HIWIN®

Motion Control & Systems



Drives & Servo Motors

Motors, Drives & Accessories

Drives & Servo Motors

As well as linear and torque motors, the HIWIN product range includes suitable drives and rotary servo motors for the dynamic, high-precision positioning of belt and spindle axles. Drives and servo motors are available in different versions for different applications.



Assembly instructions and catalogue for download

Here you can download the corresponding assembly instruction and the current catalogue as PDF files.

Drives & Servo Motors

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1. Product overview



Drive ED1

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- Sizes 400 W, 1,000 W, 5,000 W and 7,500 W
- EtherCAT CoE and EtherCAT mega-ulink
- UL-certified

Accessories for drive ED1

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- Cables
- Brake resistor
- Mains filter
- Excellent Smart Cube (ESC)



AC servo motors

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- Sizes 50 W, 100 W, 200 W, 400 W, 750 W and 1,000 W
- Highly dynamic
- High-torque
- Compact design
- UL-certified

Accessories for AC servo motors

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- Connectors
- Cables

Drives & Servo Motors

General information

2. General information

2.1 General information about HIWIN drive ED1

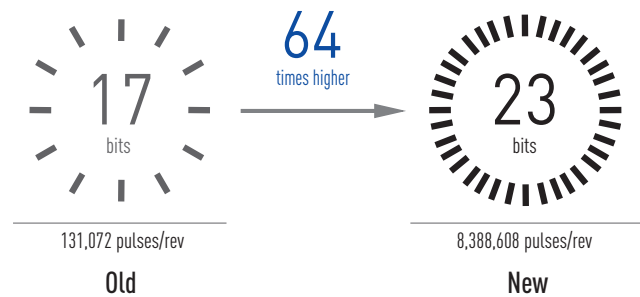
The HIWIN ED1 drives are specially matched to the HIWIN EM1 servomotors and HIWIN linear and torque motors. Different versions and power classes are available depending on the application.

- Power range from 400 W to 7,500 W
- EtherCAT CoE, pulse/direction, $\pm 10V$
- Multienncoder interface
- Safety function STO
- For AC servo, linear and torque motors



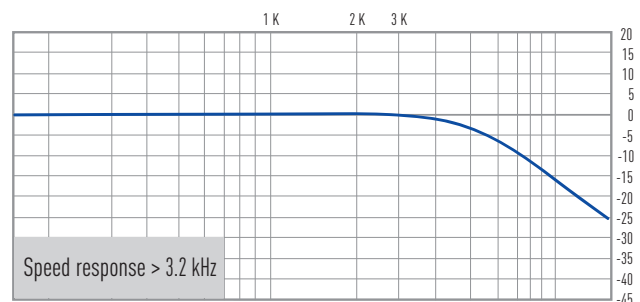
2.2 General properties of HIWIN drives ED1

- Improved processing accuracy



- 3.2 kHz speed response

Higher speed response, faster settling and higher throughput.



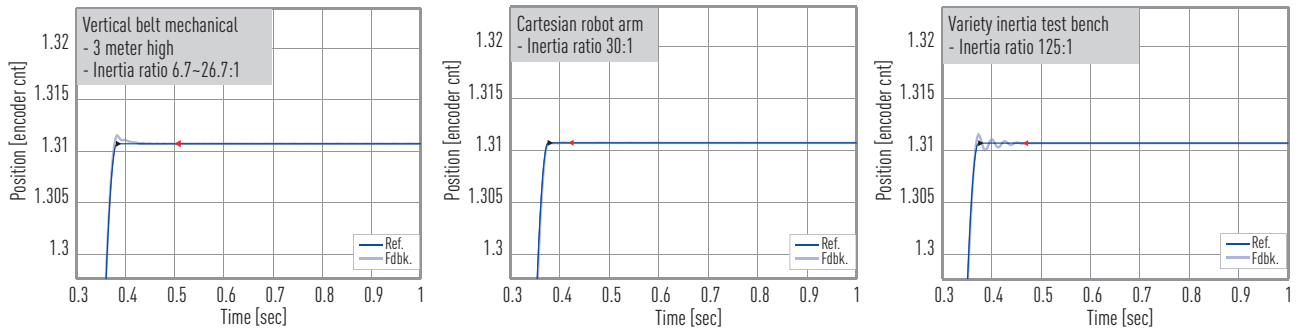
- Support variety motors

One drive type for linear motor, AC servo motor and direct-drive motor.



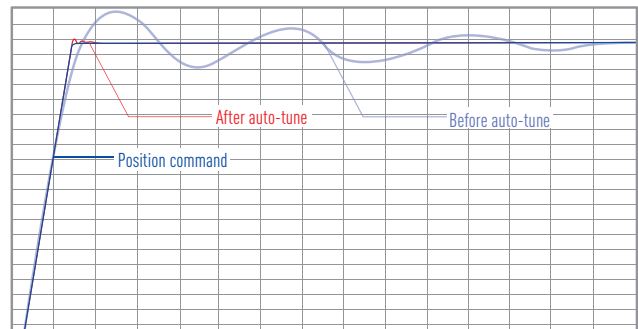
○ **Tuneless function**

Brings good performance and stable movement with inertia ratio up to 250:1. Adaptive gain tuning in accordance with load changes.



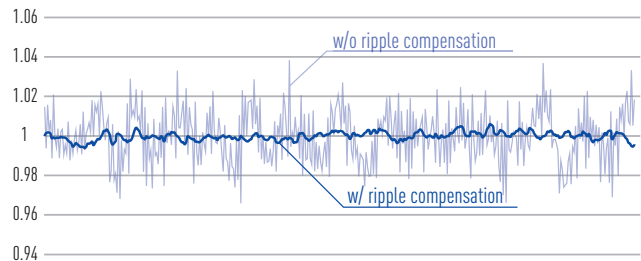
○ **Advanced auto-tune function**

Automatic gains tuning, filters adjustment, model following control activation, vibration and resonance suppression to optimize machine performance.



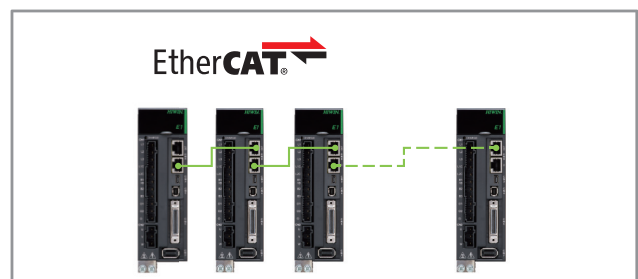
○ **Ripple compensation**

Delivers more smooth movement by reducing velocity ripple caused by motor cocking. Servo loop gains are not necessary to change.



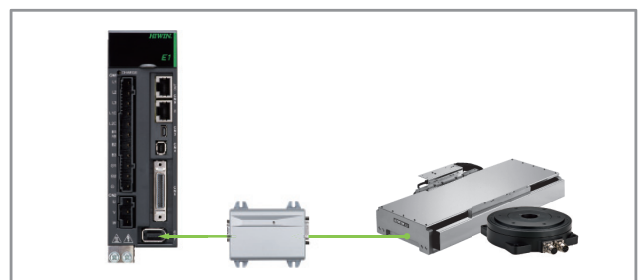
○ **Network connectivity**

Supports EtherCAT interfaces and HIWIN mega-ulink communication.



○ **Feedback interface**

Built-in digital AqB and serial encoder interface for Tamagawa encoder. With the Excellent Smart Cube (ESC) resp. the encoder box E1 drive is able to support analog SIN/COS, EnDat and BiSS-C encoder.

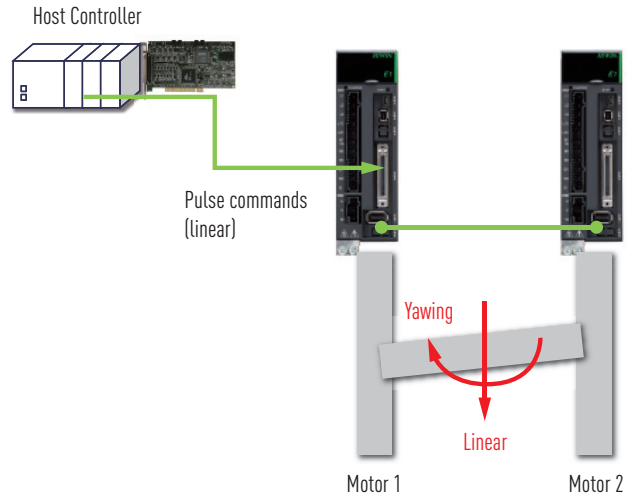


Drives & Servo Motors

General information

- **Gantry application**

Combines two ED1 drives to realize gantry algorithm which contains linear and yawing control.



- **Built-in safe torque off (STO)**

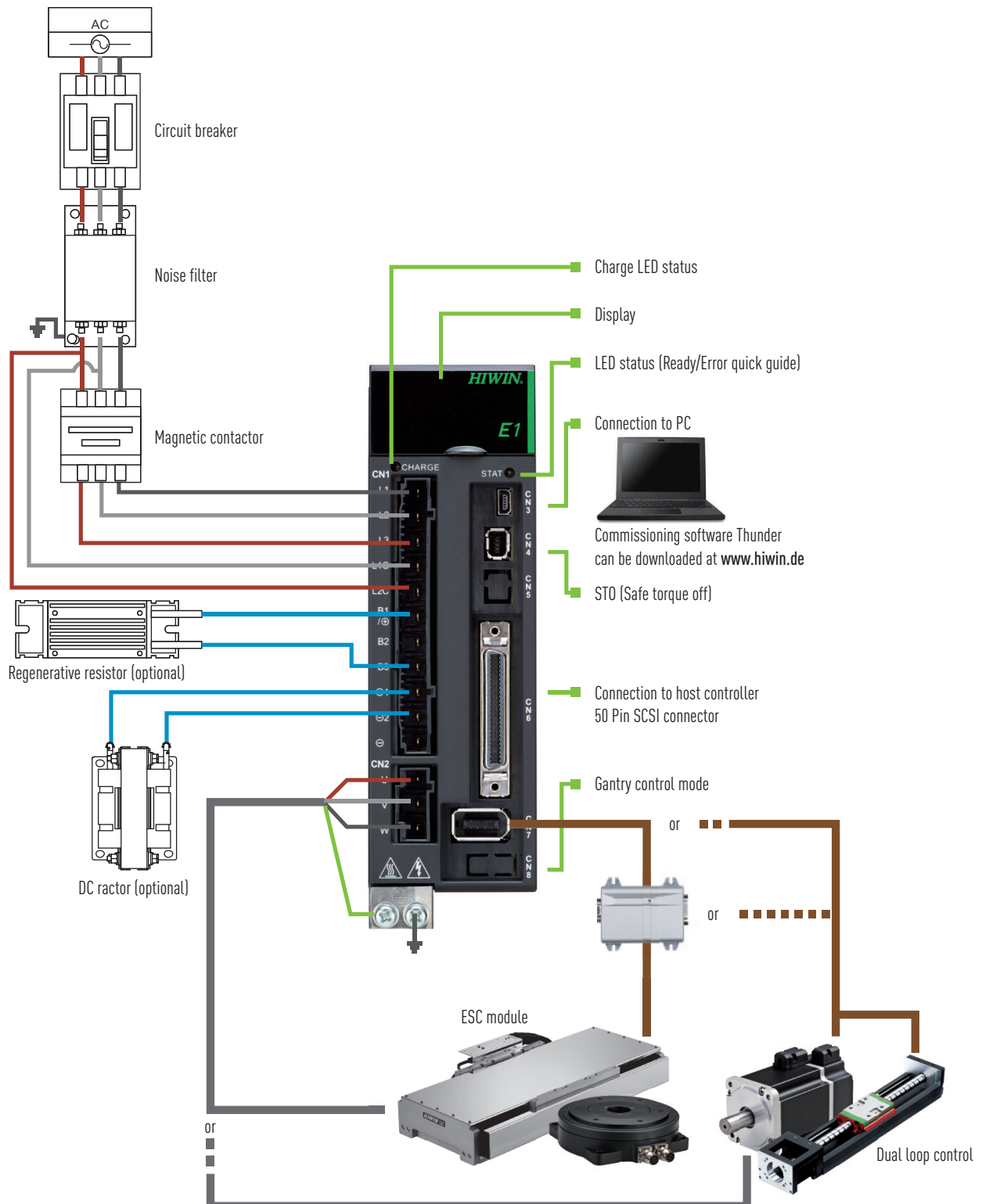
Motor power is cut-off when STO is activated.

3. ED1 drive

The ED1 vector-controlled, fully digital drive with STO safety function are specially adapted to the HIWIN EM1 servomotors and the HIWIN linear and torque motors. Particularly for multi-axis systems, the ED1 series offers a gantry mode function to position parallel axes dynamically, with high precision and synchronously.

This also applies to HIWIN belt and spindle axes. Ready-made motor and encoder cables are available for easy installation and commissioning, as is the freely available HIWIN commissioning software "Thunder".

3.1 Interfaces ED1



Drives & Servo Motors

ED1 drive

3.2 Order code ED1



Serie:
ED1

Type:
S: Standard
F: Fieldbus

Control interface:
V: Voltage command+Pulse (Type S: Standard)
E: EtherCAT CoE (Type F: Fieldbus)
H: EtherCAT mega-ulink (Type F: Fieldbus)

Special function:
N: without gantry
G: with gantry

Power class:
04: 400 W
10: 1,000 W
50: 5,000 W
75: 7,500 W

Safety functions:
1: STO (Safe torque off)

Motor type:
A: AC servo motor
0: AC servo, linear and torque motor

AC voltage:
2: 220 VAC (for 400 W and 1,000 W)
3: 400 VAC (for 5,000 W and 7,500 W)

AC phase:
2: Single/Three phase (for 400 W and 1,000 W)
3: Three phase (for 5,000 W and 7,500 W)

3.3 Technical data ED1

HIWIN ED1 drive	Rated output	400 W	1,000 W	5,000 W	7,500 W
Input power	Rated voltage (line to line)	200 ~ 240 VAC, 50 ~ 60 Hz			380 ~ 480 VAC, 50 ~ 60 Hz
	Number of phases	1 or 3			3
	Current	1.5 A _{eff}	5 A _{eff}	12.6 A _{eff}	17.6 A _{eff}
	Control power	1 Ø, 200 ~ 240 VAC, 50 ~ 60 Hz			DC 24 V ±15 %, 2 A
Output power	Phase voltage	3 Ø, 240 VAC			3 Ø, AC 480 VAC
	Rated power	400 W	1,000 W	5,000 W	7,500 W
	Peak current	10 A _{eff}	23.3 A _{eff}	42 A _{eff}	85 A _{eff}
	Rated current	2.5 A _{eff}	5.6 A _{eff}	16 A _{eff}	27.4 A _{eff}
Cooling method	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	Red: error / green: servo ready			
	Built-in regenerative resistor	–	40 Ω / 40 W	27 Ω / 180 W	–
	Dynamic brake	Built-in dynamic brake / delay time of relay: 20 ms			
	Internal dynamic brake resistor	–	10 Ω	–	–
Analog output	Channel: 2 / resolution: 12 bit / output voltage range: ±10 V / accuracy: ±2 % / max. output current: ±10 mA				
Control function					
Control mode	– Position mode – Velocity mode – Torque mode – Dual loop mode				
Position mode	Signal type	Pulse/direction, CW/CCW, A/B phase			
	Max. 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			

HIWIN ED1 drive	Rated output	400 W	1,000 W	5,000 W	7,500 W	
Control function						
Velocity mode (analog input)	Impedance	14 kΩ				
	Signal format	±10 VDC				
	Max. input bandwidth	100 Hz				
	Specification	16 bit				
Torque mode (analog input)	Impedance	14 kΩ				
	Signal format	±10 VDC				
	Max. input bandwidth	100 Hz				
	Specification	16 bit				
Encoder feedback	Power supply	5.1 VDC ±5 %, 700 mA				
	Signal format	Serial signal – resolution: 23 bit (singleturn / multiturn absolute encoder). Bandwidth: 5 MHz Incremental signal – AqB and Z phase signals (digital differentail TTL signal). The maximum input bandwidth of each phase is 5 MHz.				
	Safety function	Encoder power malfunction detection / short circuit protection / undervoltage protection/ overvoltage protection				
	Position counting range	-2,147,483,648 ~ 2,147,483,647 (32 bit)				
	Linear motor / torque motor	Excellent smart cube (ESC) must be connected, depending on encoder type.				
Encoder output						
Emulated encoder Output	Z phase	1. Serial and digital (AqB) encoders are supported. 2. The width of output signal can be adjusted by parameter. 3. Differential signal output 4. Z phase open collector output is supported. 5. Two output methods can be selected. – Only outputs one Z phase signal for the total travel distance. – Outputs one Z phase signal per one revolution.				
	A/B phase	1. Serial and digital (AqB) encoders are supported. 2. Differentail signal output. The maximum output bandwidth is 18 M count/s. 3. The scaling of output can be adjusted. For instance, ten encoder counts = one emulated encoder count.				
	Computer communication Standard USB 2.0 (Mini USB)	Connnet the drive with your computer to set parameters, monitor physical quantities and execute trial operations via Thunder.				
General purpose I/O	Input	The functions of general-purpose inputs (I1 – I10, photocoupler) can be defined by user. 24 V/5 mA (Each input pin)				
	Output	The functions of general-purpose outputs (O1 – O5, photocoupler) can be defined by user. 24 V/0.1 A (Each output pin)				
	Position trigger (PT)	The functions of general-purpose outputs (O1 – O5, photocoupler) can be defined by user. 24 V/0.1 A (Each output pin)				
Regenerative energy protection	Regenerative resistor	– Without built-in regenerative resistor – if needed, consider external regenerative resistor	– With built-in regenerative resistor – If necessary, external regenerative resistor can be extended	– With built-in regenerative resistor – If necessary, external regenerative resistor can be extended	– Without built-in regenerative resistor – if needed, consider external regenerative resistor	
	AC 200 – 240 VAC	Protection of regenerative resistor enable	+HV > 370 VDC	+HV > 370 VDC	–	–
	AC 200 – 240 VAC	Protection of regenerative resistor disable	+HV < 360 VDC	+HV < 360 VDC	–	–
	AC 380 VAC	Protection of regenerative resistor enable	–	–	+HV > 620 VDC	+HV > 620 VDC
	AC 380 VAC	Protection of regenerative resistor disable	–	–	+HV < 600 VDC	+HV < 600 VDC

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ED1 drive

HIWIN ED1 drive	Rated output	400 W	1,000 W	5,000 W	7,500 W	
Encoder output						
Regenerative energy protection	AC 480 VAC	Protection of regenerative resistor enable	-	-	+HV > 770 VDC	+HV > 770 VDC
	AC 480 VAC	Protection of regenerative resistor disable	-	-	+HV < 755 VDC	+HV < 755 VDC
	Overvoltage Protection		390 VDC	390 VDC	800 VDC	800 VDC
Environment	Insulation voltage		1,500 VAC (1 min)			
	Operating temperature		0 °C - 45 °C		0 °C - 40 °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 5.88 m/s ² 10 to 600 Hz (no continuous operation at resonant frequency)			
	IP rating		IP20			

3.4 Options ED1

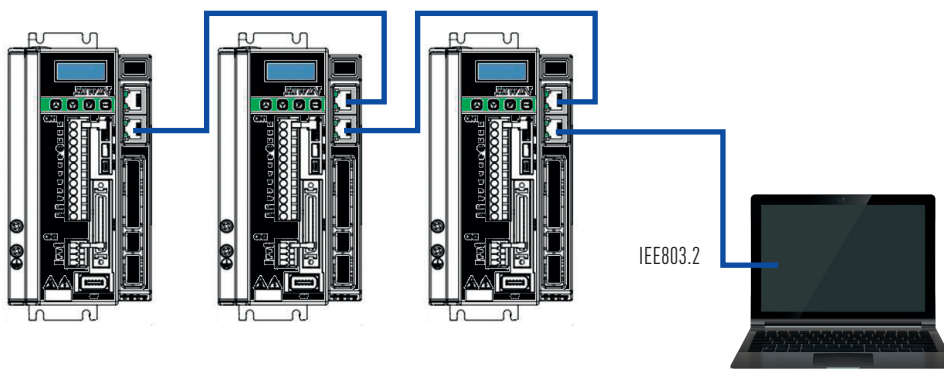
○ EtherCAT interface

The ED1 drive supports the Ethernet-based EtherCAT field bus system. EtherCAT is an open technology which is regulated in international standards IEC 61158, IEC 61784 and ISO 15745-4. EtherCAT is a very fast industrial Ethernet system, also suited to use in time-critical motion control applications. The ED1 supports the CoE (CANoverEtherCAT) protocol and can therefore be integrated in any EtherCAT master controller which supports this protocol. Furthermore, the ED1 works according to the standardised drive profile CiA 402 and can therefore be easily integrated into the TwinCAT control software of Beckhoff as an NC axis.



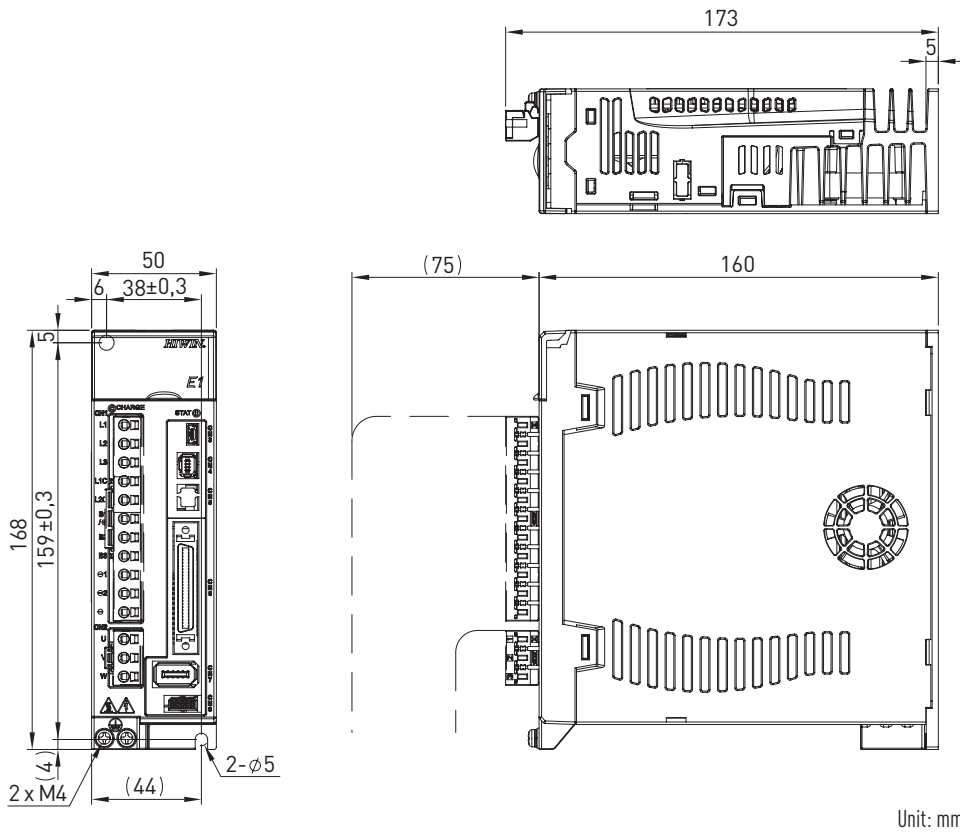
○ mega-ulink interface

The ED1 drive supports the proprietary protocol mega-ulink, which is based on EtherCAT. The EtherCAT mega-ulink interface can be used for communication and control between the industrial PC and drive. Communication takes place via the standard Ethernet interface on the PC and the EtherCAT mega-ulink interface on the drive. A dll library (MPI.dll) handles communication and control between PC and drive controller. A detailed description of this library and how to use it is available at www.hiwin.de.

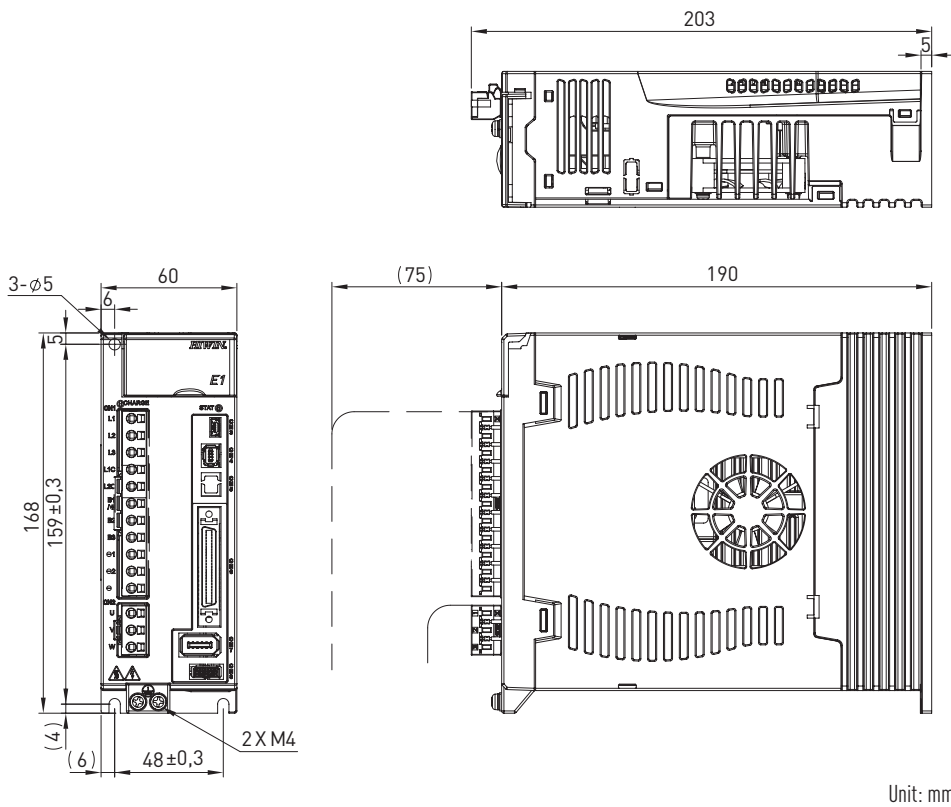


3.5 Dimensions ED1 (standard version)

○ ED1S – 400 W



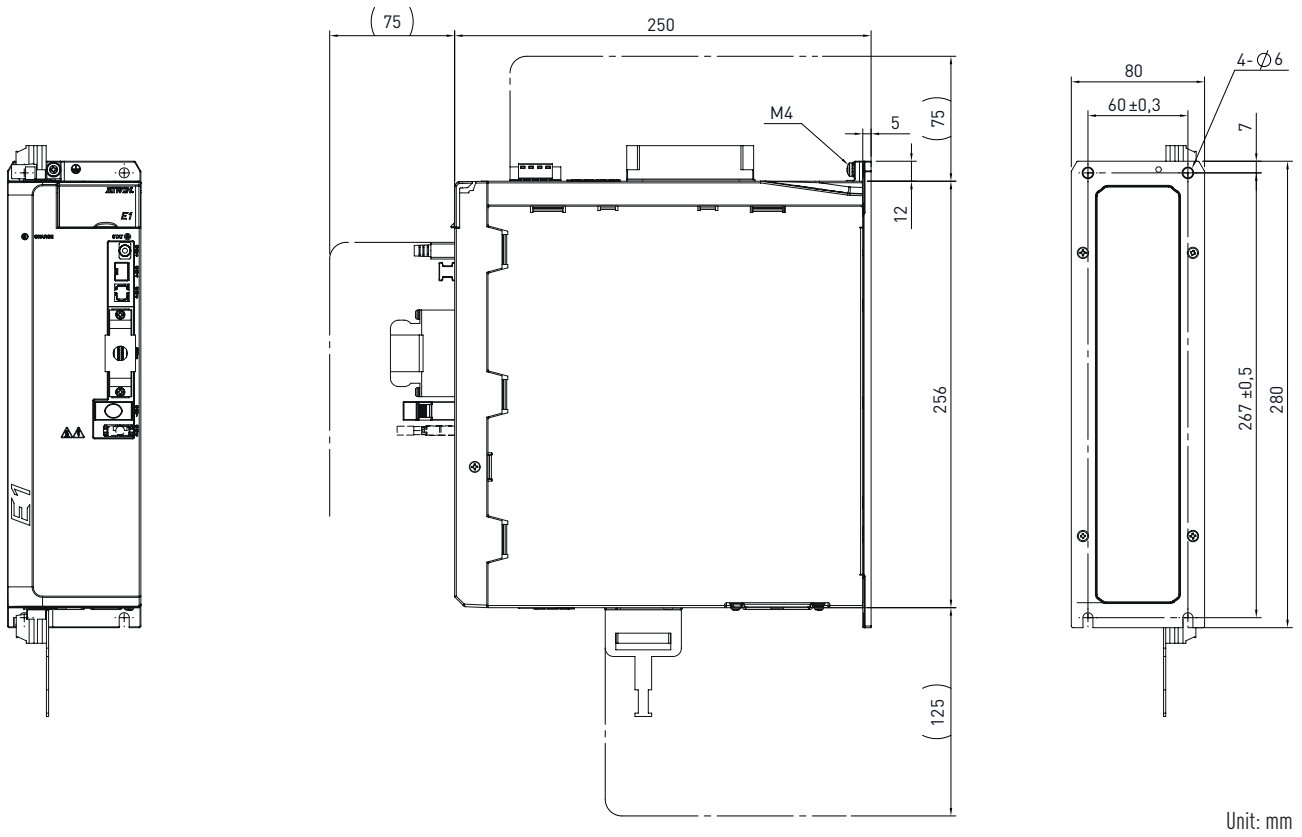
○ ED1S – 1,000 W



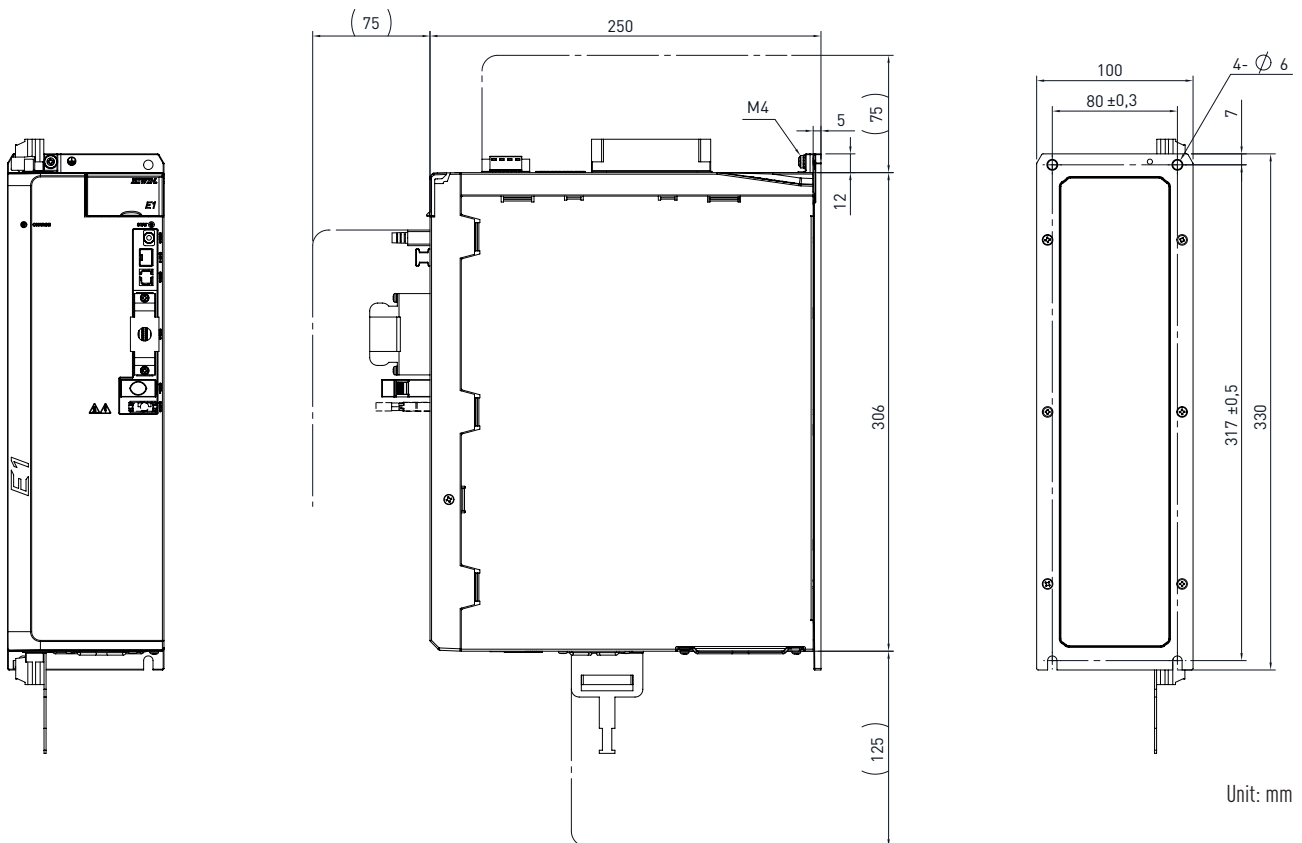
Drives & Servo Motors

ED1 drive

ED1S - 5,000 W

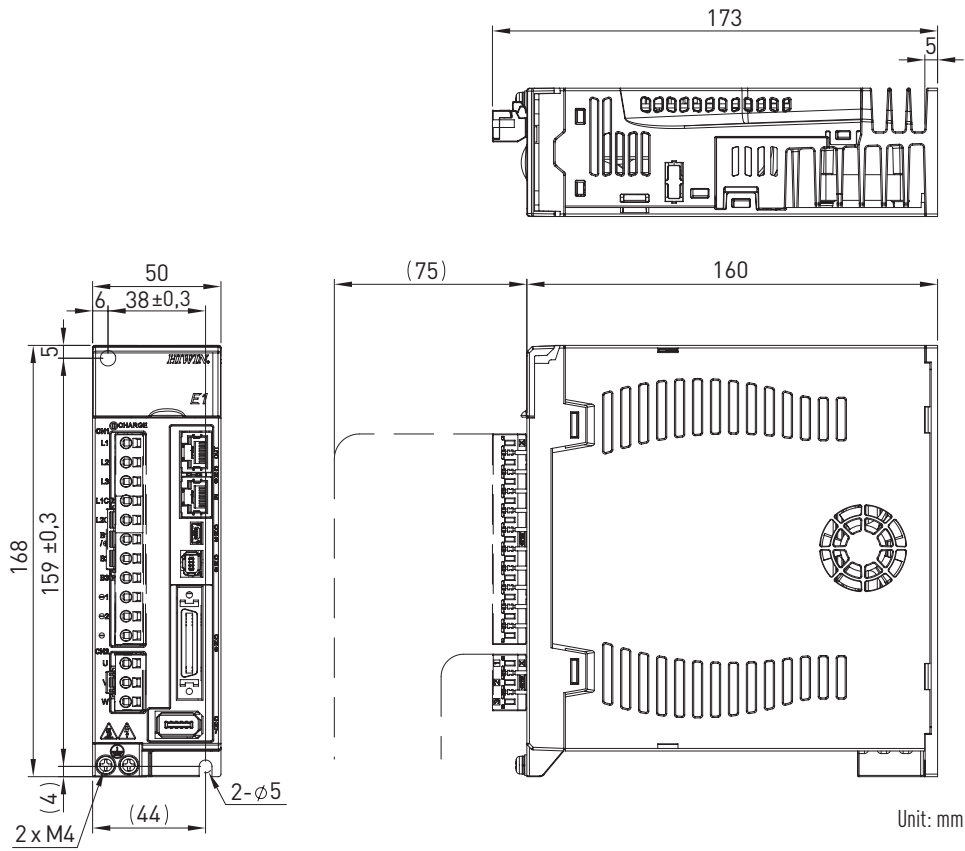


ED1S - 7,500 W

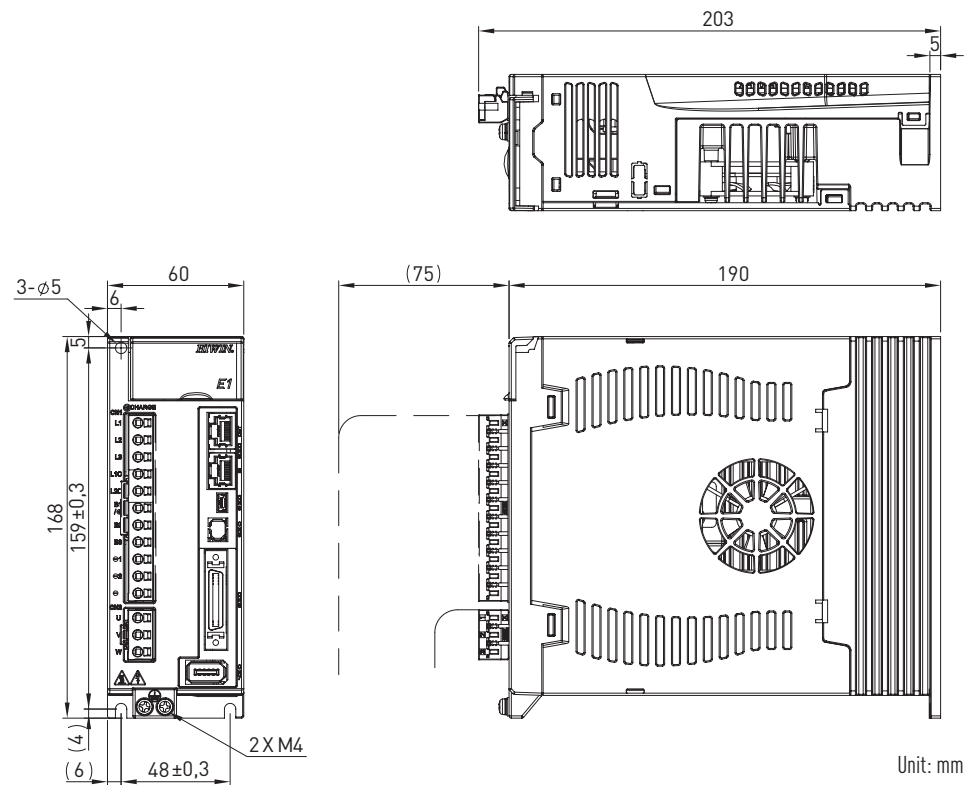


3.6 Dimensions ED1 (fieldbus)

○ ED1F - 400 W



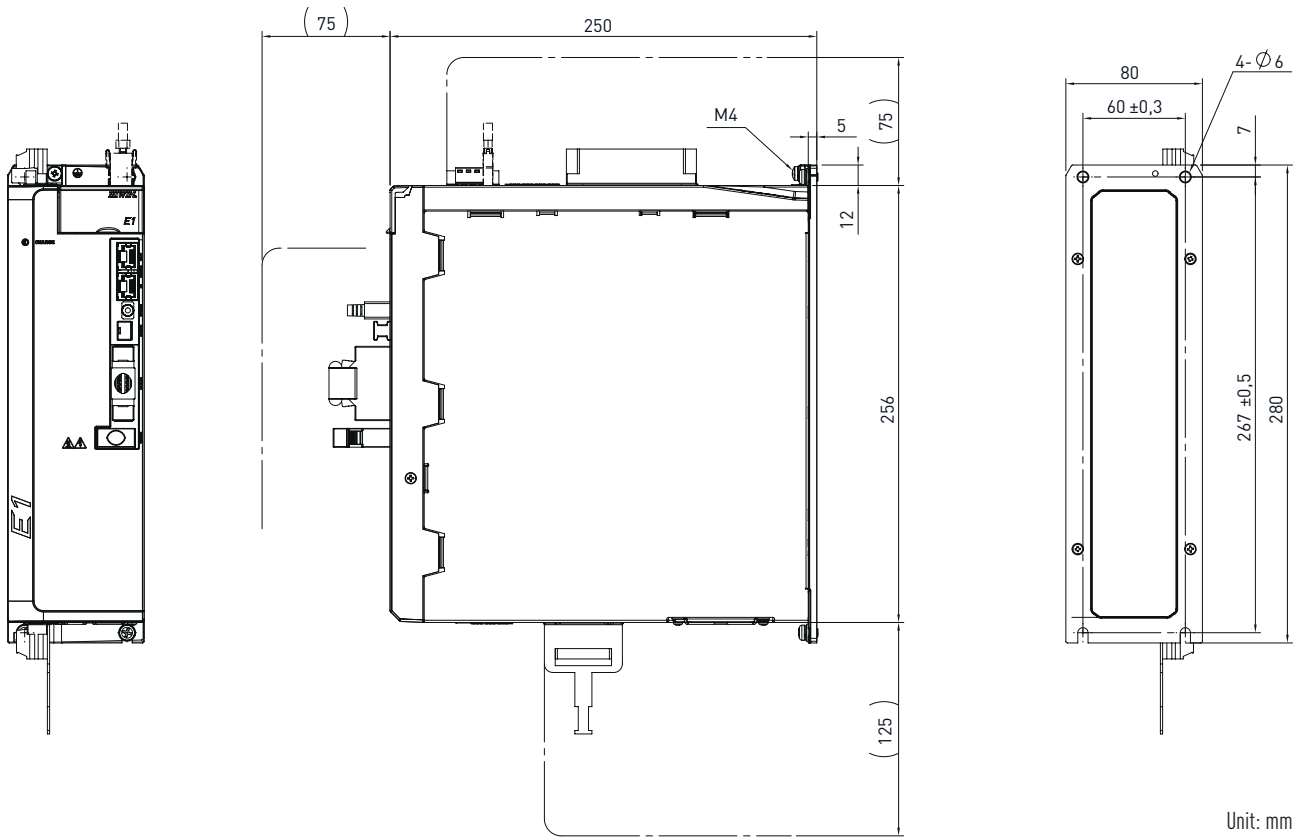
○ ED1F - 1,000 W



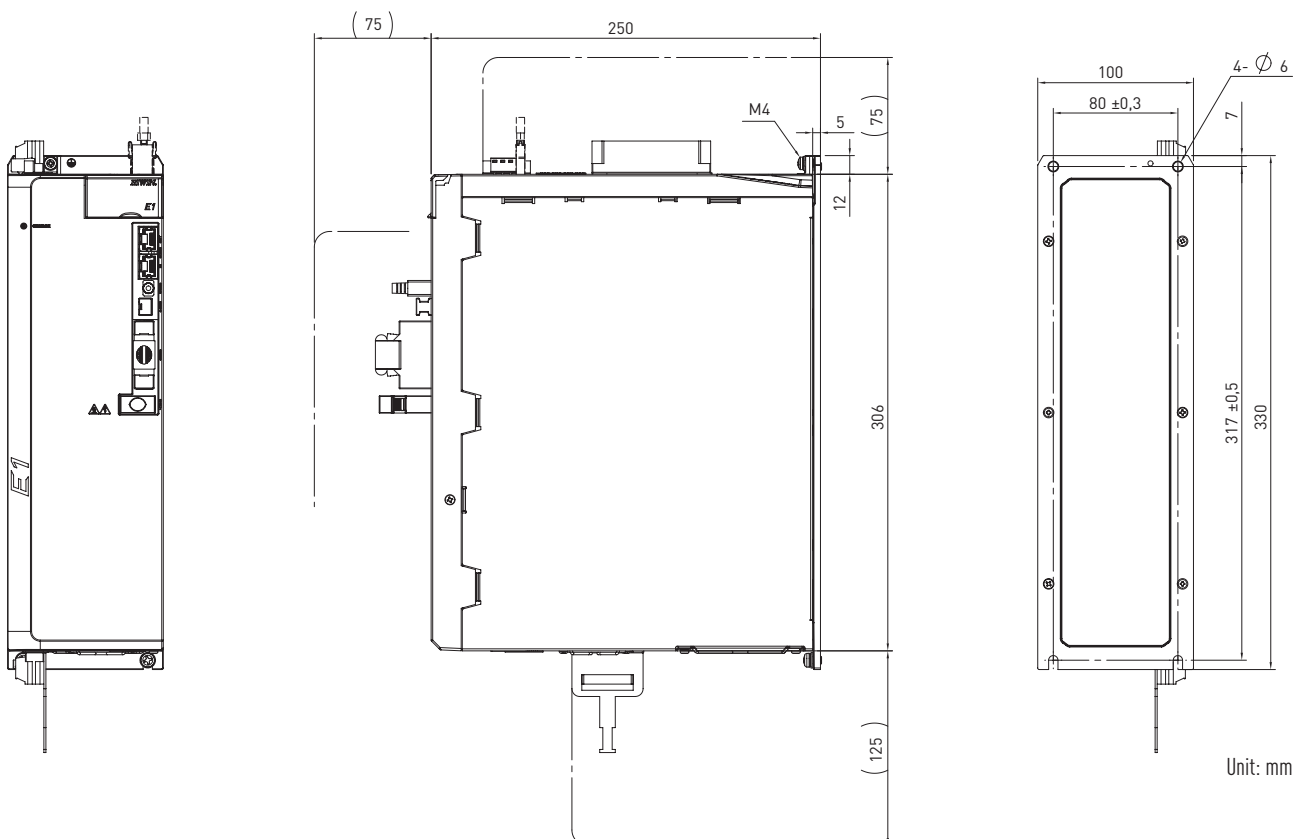
Drives & Servo Motors

ED1 drive

ED1F - 5,000 W

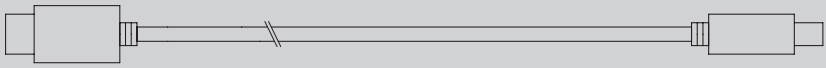
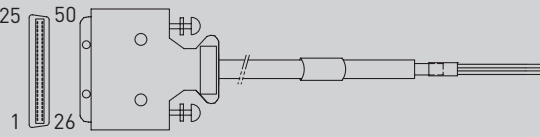
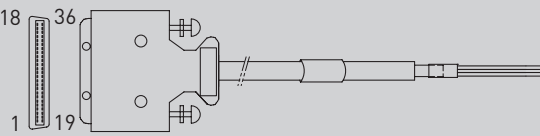


ED1F - 7,500 W

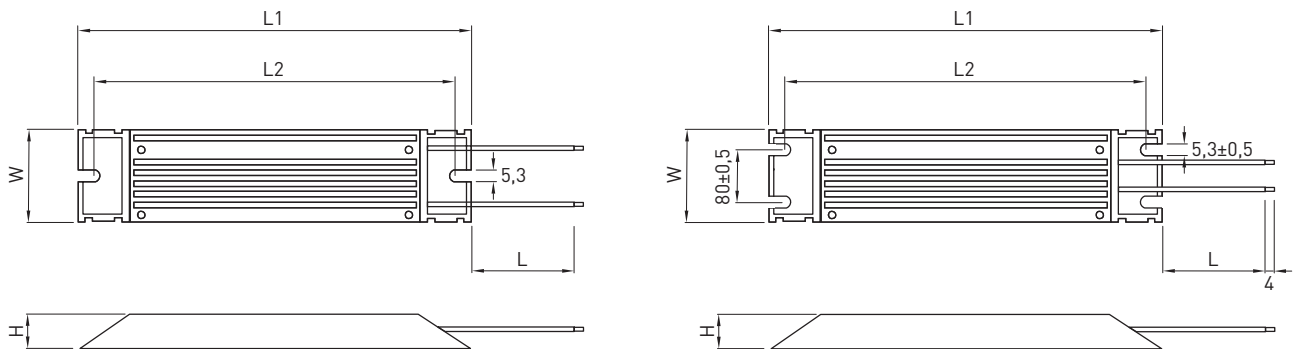


3.7 Accessories ED1

3.7.1 Cables

Article number	Designation	Connector	Figure	Length
8-10-0864	USB parameterisation cable	CN3		2 m
8-10-1619	50-pin I/O cable for ED1S (standard)	CN6		3 m
8-10-1608	36-pin I/O cable for ED1F (fieldbus)	CN6		3 m

3.7.2 Brake resistor



Article number	Designation	Resistance [Ω]	Nominal power [W]	L [mm]	L1±2 [mm]	L2±2 [mm]	W [mm]	H [mm]
050100700001	Brake resistor	68	100	500	165	150	40±0,5	20±0,5
050100700004	Brake resistor	190	1,000	200±20	400	385	100±1	50±1

Unit: mm

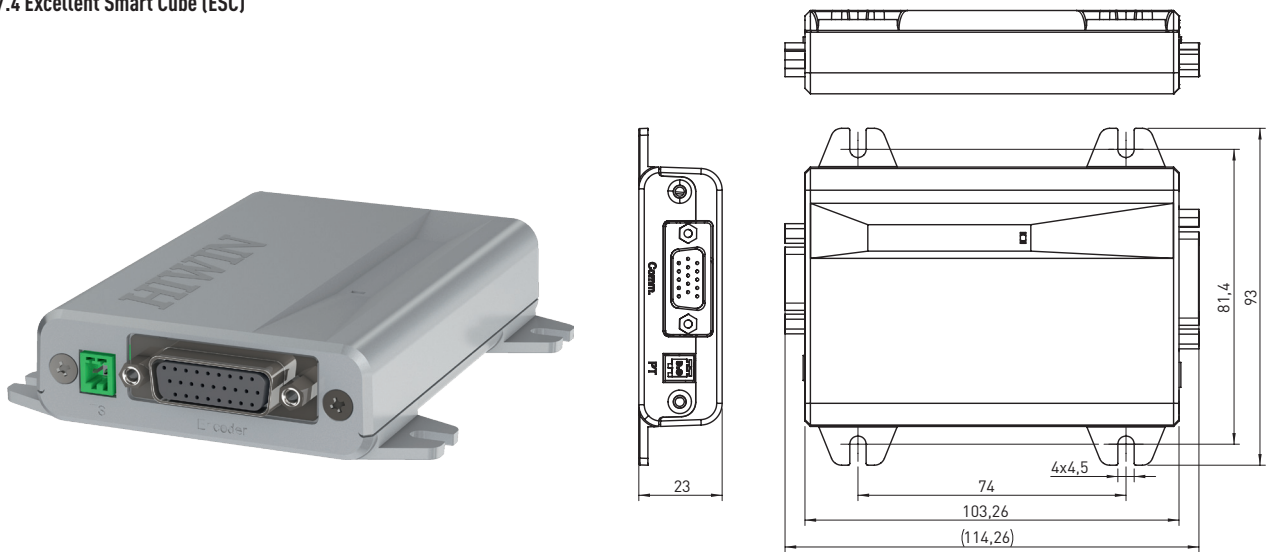
3.7.3 Mains filter

Article number	Designation	Type	Nominal current [A]	Leakage current [mA]
8-09-0670	ED1 mains filter, 1-phase, 400 to 1,000 W	FN2090-10-06	10	0.67
80029045	ED1 mains filter, 3-phase, 5,000 W	FN3270HQ1-20-44	20	0.40
80029046	ED1 mains filter, 3-phase, 7,500 W	FN3270HQ1-35-33	35	0.40

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ED1 drive

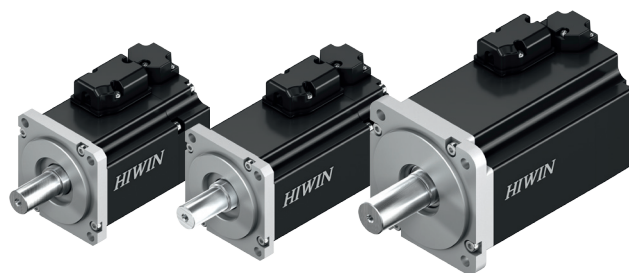
3.7.4 Excellent Smart Cube (ESC)



Power supply voltage	+5 VDC ±5 %					
Max. input current	1000 mA					
Max. output current	650 mA					
	Digital halls	Incremental		Absolute		
Encoder type	Hall U / V / W	SIN / COS / reference	A / B / index	BiSS-C	EnDat	Tamagawa
Signal frequency	2 kHz	1 MHz	4 MHz	5 MHz	4 MHz	5 MHz
Signal resolution	–	The multiplier factor is 4096	–	32 bits (ST+MT)		
Input signal format	5 VDC CMOS / TTL	Differential (RS422)		Differential (RS485)		
Motor thermal protection	PTC					
Operating temperature	0°C to + 45°C					
Storage temperature	-20°C to + 65°C					
IP level	IP20					

4. AC servo motors EM1

HIWIN EM1 highly dynamic AC synchronous servo motors deliver high torques across the entire speed range. Because they have minimal mass inertia moment, they are also suitable for demanding dynamic drive tasks such as high-frequency reversing. The special stator/rotor structure of the EM1 series achieves very low torque ripple and high power density in a compact form.



4.1 Characteristics EM1

Table 4.1 General characteristics AC servo motors EM1

Size	50 W	100 W	200 W	400 W	750 W	1,000 W
Motor type	Permanently excited synchronous servo motor					
Magnets	Neodymium iron boron magnets					
Housing	Aluminium					
Colour	Black					
Motor protection class	IP65					
Connector protection class	IP20					IP65
Motor shaft protection class	IP40 (optional IP65)					
Insulation class	Class A					
Shaft end	Without feather key groove, with centric threaded hole					
Peak torque	3 × nominal torque					
Service life	> 20,000 h (at nominal load)					
Motor connection	Cable (300 mm) with ready-assembled connector					Connector
Encoder connection	Cable (300 mm) with ready-assembled connector					Connector
Cooling	Convective					
Thermal monitoring	Not available					
Encoder	23-bit absolute (single or multi turn)					

Table 4.2 Ambient conditions AC servo motors EM1

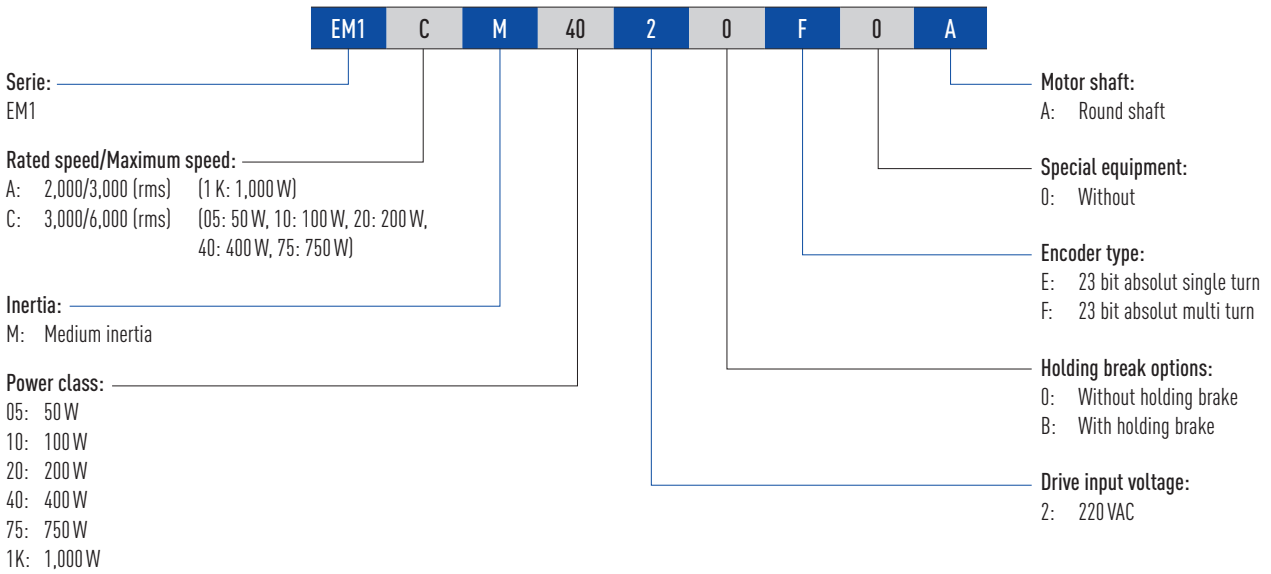
Size	50 W	100 W	200 W	400 W	750 W	1,000 W
Ambient temperature	0 °C to 50 °C					
Storage temperature	-15 °C to 70 °C					
Air humidity	Up to 80 % relative air humidity					
Max. Max. installation height	1,000 m above sea level					

Drives & Servo Motors

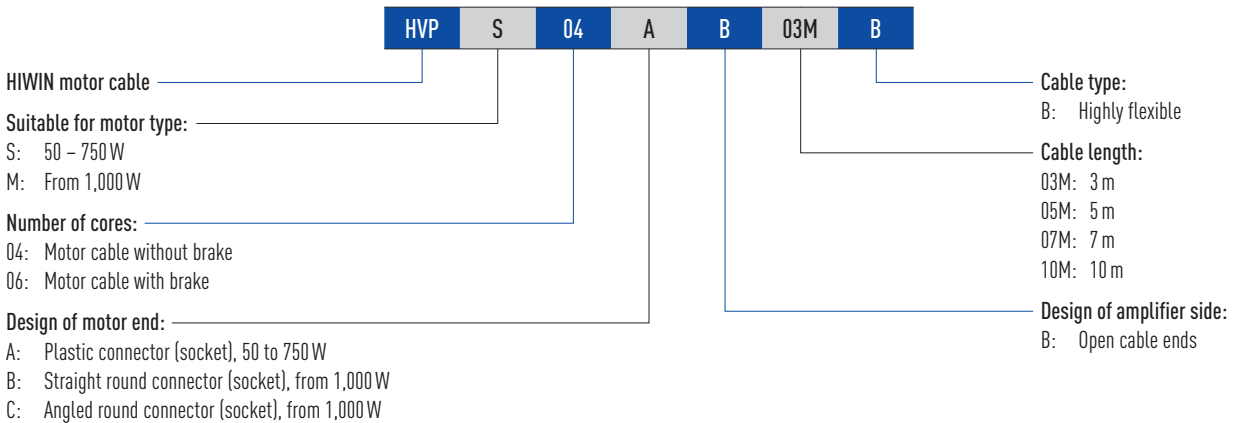
AC servo motors EM1

4.2 Order code EM1

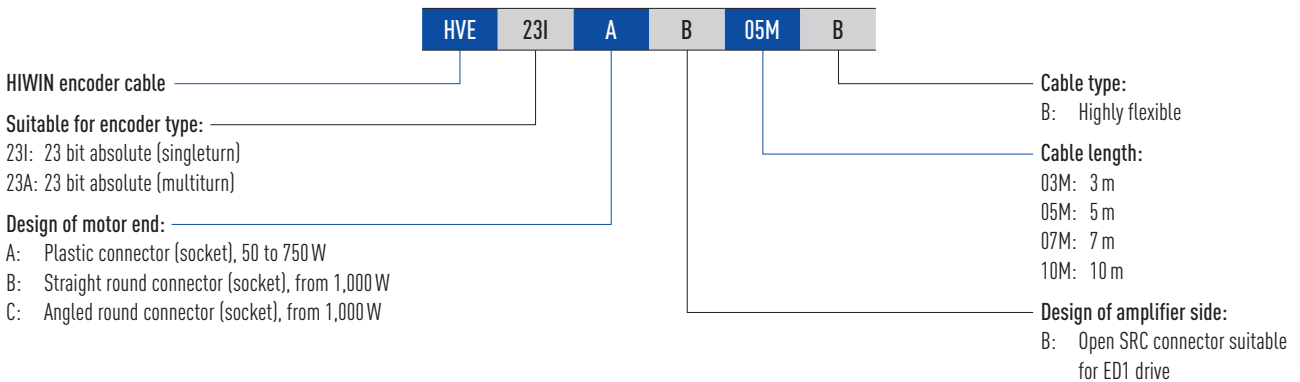
Motor



Motor cable



Encoder cable



4.3 Technical data EM1

4.3.1 AC servo motor EM1 – 50 W

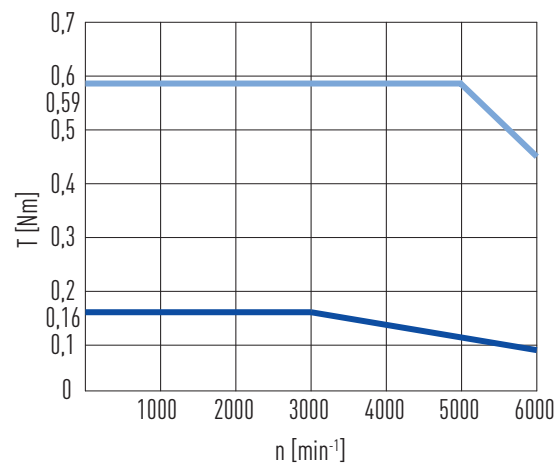
Table 4.3 Technical data EM1 – 50 W			
Motor data	Symbol	Unit	EM1-05
Drive input voltage	V	VAC	220
Rated power	W	W	50
Rated torque	T_C	Nm	0.16
Rated current	I_C	A_{eff}	0.64
Peak max. torque	T_P	Nm	0.59
Peak max. current	I_P	A_{eff}	2.8
Rated speed	n_N	rms	3,000
Peak max. speed	n_{max}	rms	6,000
Torque constant	K_t	Nm/ A_{eff}	0.25
Back EMF constant	K_e	$V_{eff}/(1,000 \text{ rms})$	18.526
Resistance ¹⁾	R	Ω	25.24
Inductance ¹⁾	L	mH	13.09
Inertia of rotating parts (with brake)	J	$kgm^2 (\times 10^{-4})$	0.0368 (0.0401)
Mass (with brake)	M	kg	0.36 (0.56)
Motor insulation level	Class F (under certification)		
Motor protection level	Total enclosed, self-cooled, IP65 (except for shaft and connector)		
Insulation resistance	10 M Ω , DC 500 V		
Insulation voltage resistance	AC 1500 V, 60 seconds		
Brake specifications ²⁾			
Static friction torque	T_b	Nm	0.32
Enabled current	A_b	A	0.25
Brake input voltage	V	VDC	24 \pm 10 %
Braking time	t_0	ms	40
Release time	t_R	ms	20

¹⁾ Line to line

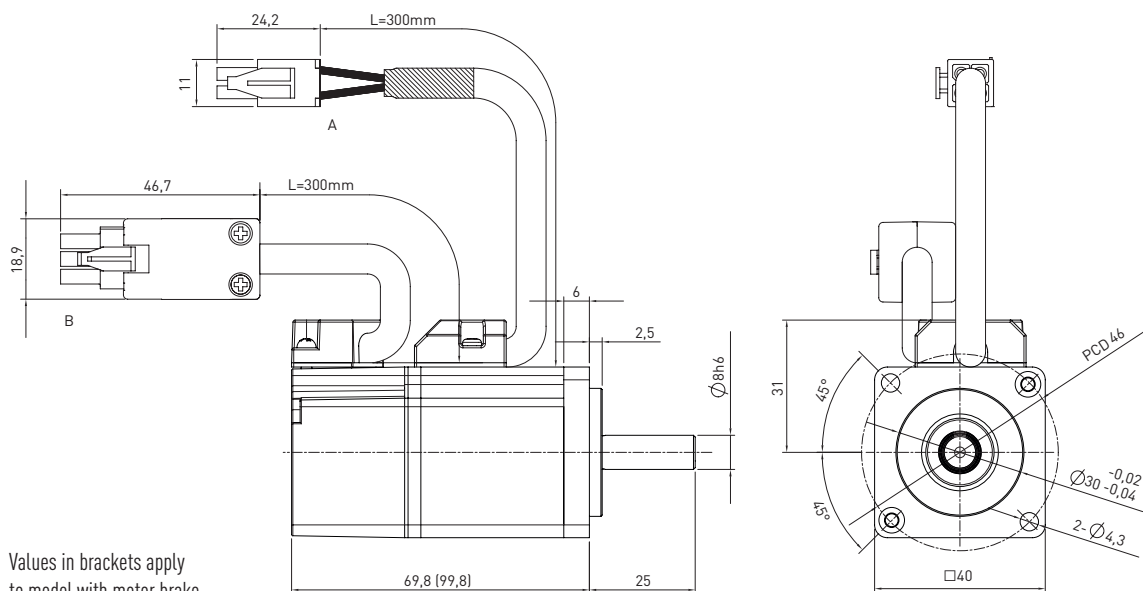
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 50 W



Dimensions EM1 – 50 W:



Values in brackets apply to model with motor brake

Drives & Servo Motors

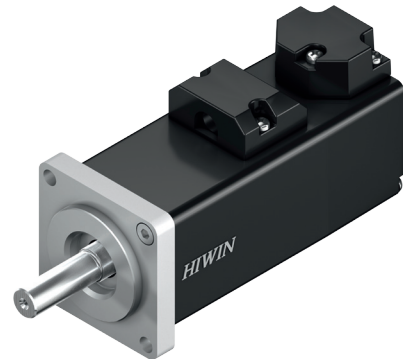
AC servo motors EM1

4.3.2 AC servo motor EM1 – 100 W

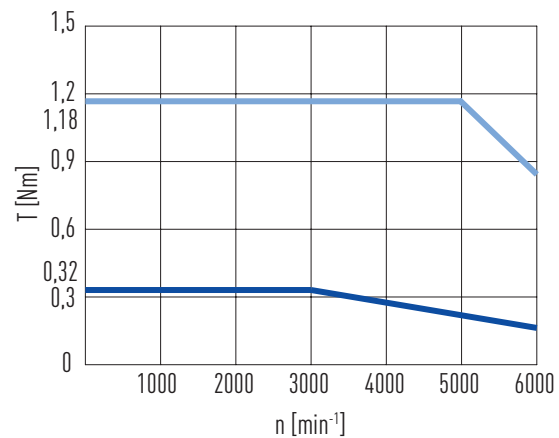
Table 4.4 Technical data EM1 – 100 W			
Motor data	Symbol	Unit	EM1-10
Drive input voltage	V	VAC	220
Rated power	W	W	100
Rated torque	T_C	Nm	0.32
Rated current	I_C	A_{eff}	0.78
Peak max. torque	T_P	Nm	1.18
Peak max. current	I_P	A_{eff}	3.45
Rated speed	n_N	rms	3,000
Peak max. speed	n_{max}	rms	6,000
Torque constant	K_t	Nm/ A_{eff}	0.41
Back EMF constant	K_e	$V_{eff}/(1,000 \text{ rms})$	28.364
Resistance ¹⁾	R	Ω	22.72
Inductance ¹⁾	L	mH	13.86
Inertia of rotating parts (with brake)	J	$kgm^2 (\times 10^{-4})$	0.0620 (0.0653)
Mass (with brake)	M	kg	0.47 (0.67)
Motor insulation level	Class F (under certification)		
Motor protection level	Total enclosed, self-cooled, IP65 (except for shaft and connector)		
Insulation resistance	10 M Ω , DC 500 V		
Insulation voltage resistance	AC 1500 V, 60 seconds		
Brake specifications ²⁾			
Static friction torque	T_b	Nm	0.32
Enabled current	A_b	A	0.25
Brake input voltage	V	VDC	24 \pm 10 %
Braking time	t_0	ms	40
Release time	t_R	ms	20

¹⁾ Line to line

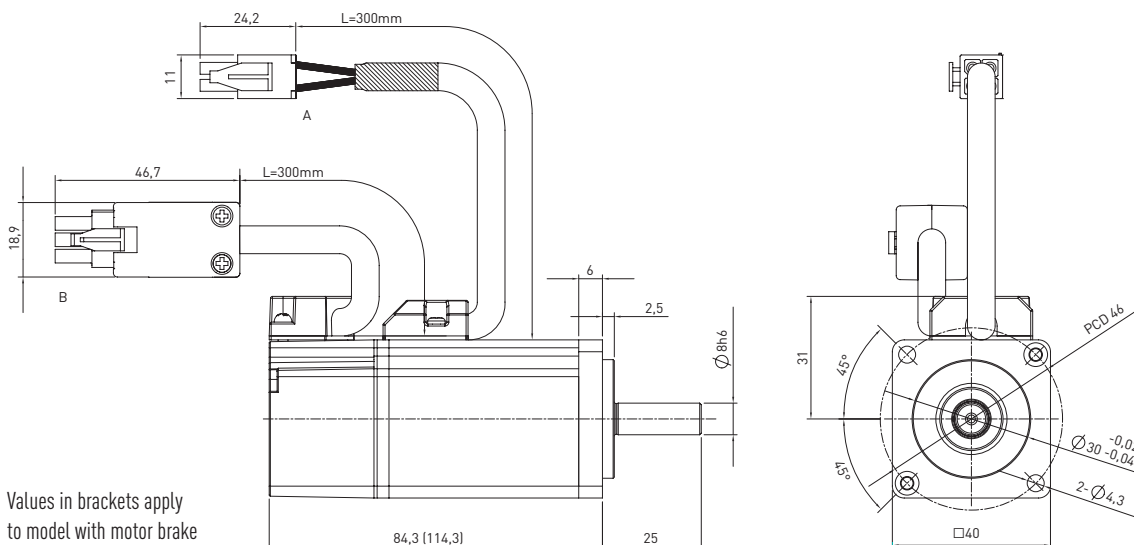
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 100 W:



Dimensions EM1 – 100 W:



Values in brackets apply to model with motor brake

4.3.3 AC servo motor EM1 – 200 W

Table 4.5 Technical data EM1 – 200 W

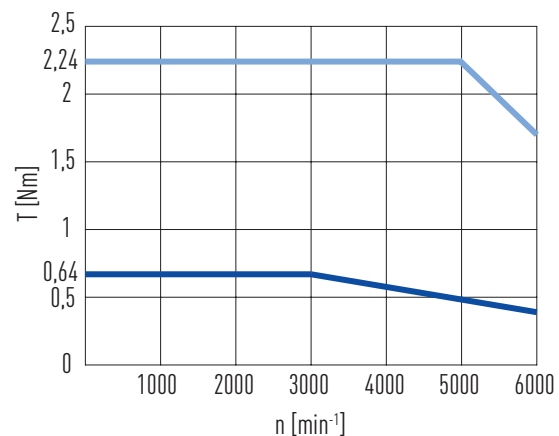
Motor data	Symbol	Unit	EM1-20
Drive input voltage	V	VAC	220
Rated power	W	W	200
Rated torque	T_C	Nm	0.64
Rated current	I_C	A_{eff}	1.6
Peak max. torque	T_P	Nm	2.24
Peak max. current	I_P	A_{eff}	6.4
Rated speed	n_N	rms	3,000
Peak max. speed	n_{max}	rms	6,000
Torque constant	K_t	Nm/ A_{eff}	0.4
Back EMF constant	K_e	$V_{eff}/(1,000 \text{ rms})$	27.23
Resistance ¹⁾	R	Ω	5.53
Inductance ¹⁾	L	mH	8.76
Inertia of rotating parts (with brake)	J	$kgm^2 (\times 10^{-4})$	0.263 (0.326)
Mass (with brake)	M	kg	0.851 (1.085)
Motor insulation level	Class F (under certification)		
Motor protection level	Total enclosed, self-cooled, IP65 (except for shaft and connector)		
Insulation resistance	10 M Ω , DC 500 V		
Insulation voltage resistance	AC 1500 V, 60 seconds		
Brake specifications²⁾			
Static friction torque	T_b	Nm	1.3
Enabled current	A_b	A	0.32
Brake input voltage	V	VDC	24 \pm 10 %
Braking time	t_0	ms	30
Release time	t_R	ms	20

¹⁾ Line to line

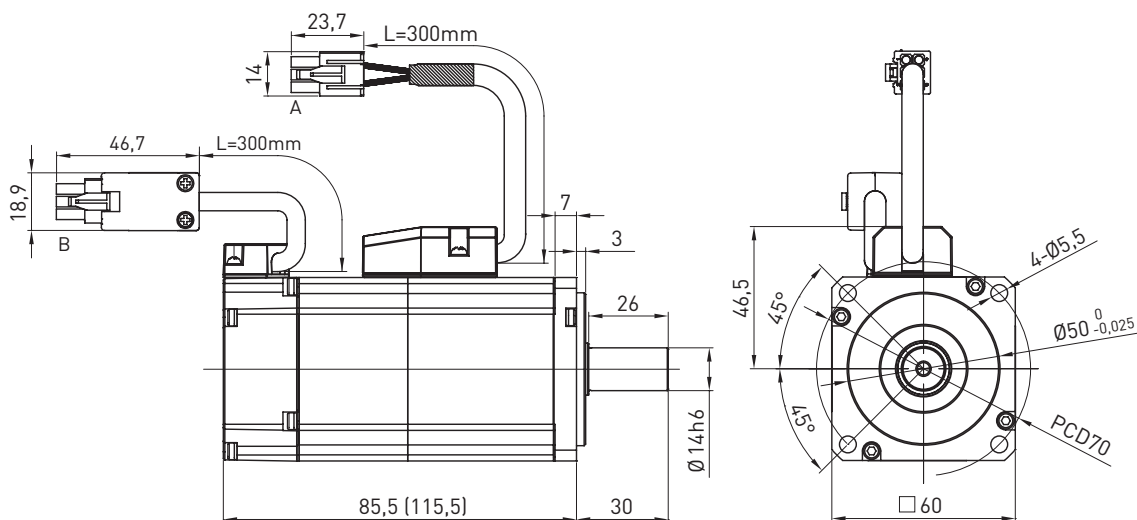
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 200 W:



Dimensions EM1 – 200 W:



Values in brackets apply to model with motor brake

Drives & Servo Motors

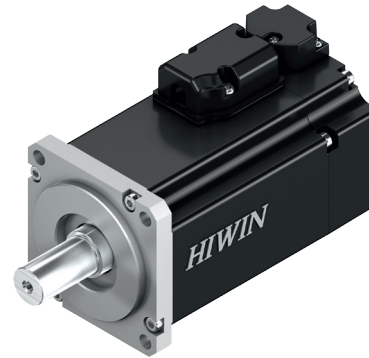
AC servo motors EM1

4.3.4 AC servo motor EM1 – 400 W

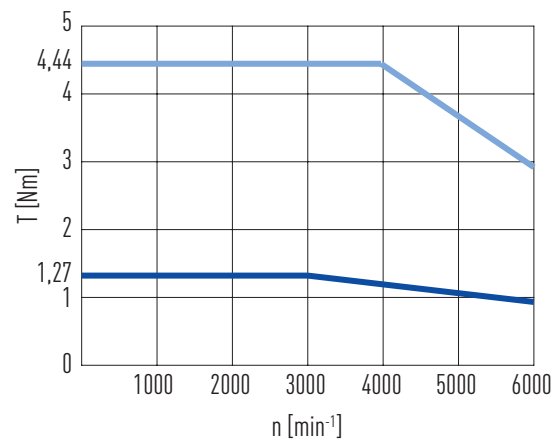
Table 4.6 Technical data EM1 – 400 W			
Motor data	Symbol	Unit	EM1-40
Drive input voltage	V	VAC	220
Rated power	W	W	400
Rated torque	T_C	Nm	1.27
Rated current	I_C	A_{eff}	2.5
Peak max. torque	T_P	Nm	4.44
Peak max. current	I_P	A_{eff}	10
Rated speed	n_N	rms	3,000
Peak max. speed	n_{max}	rms	6,000
Torque constant	K_t	Nm/ A_{eff}	0.508
Back EMF constant	K_e	$V_{eff}/(1,000 \text{ rms})$	33.87
Resistance ¹⁾	R	Ω	3.59
Inductance ¹⁾	L	mH	7.22
Inertia of rotating parts (with brake)	J	$kgm^2 (\times 10^{-4})$	0.48 (0.49)
Mass (with brake)	M	kg	1.25 (1.8)
Motor insulation level	Class F (under certification)		
Motor protection level	Total enclosed, self-cooled, IP65 (except for shaft and connector)		
Insulation resistance	10 M Ω , DC 500 V		
Insulation voltage resistance	AC 1500 V, 60 seconds		
Brake specifications ²⁾			
Static friction torque	T_b	Nm	1.3
Enabled current	A_b	A	0.32
Brake input voltage	V	VDC	24 \pm 10 %
Braking time	t_0	ms	30
Release time	t_R	ms	20

¹⁾ Line to line

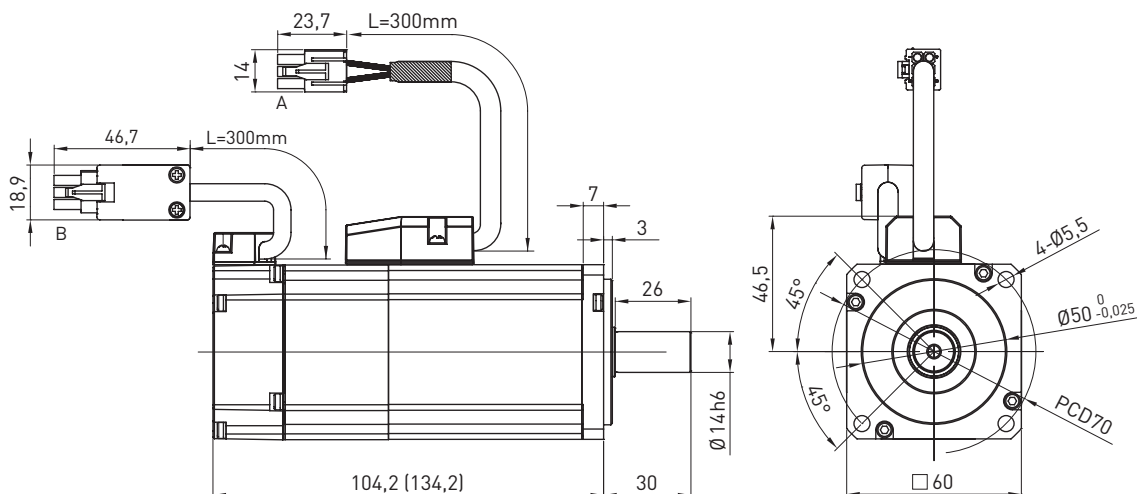
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 400 W:



Dimensions EM1 400 – W:



Values in brackets apply to model with motor brake

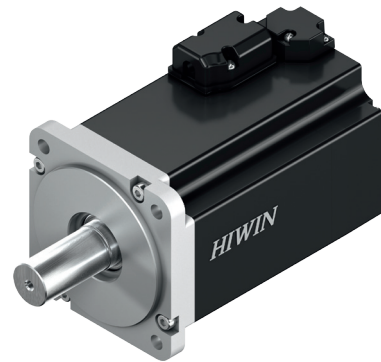
4.3.5 AC servo motor EM1 – 750 W

Table 4.7 Technical data EM1 – 750 W

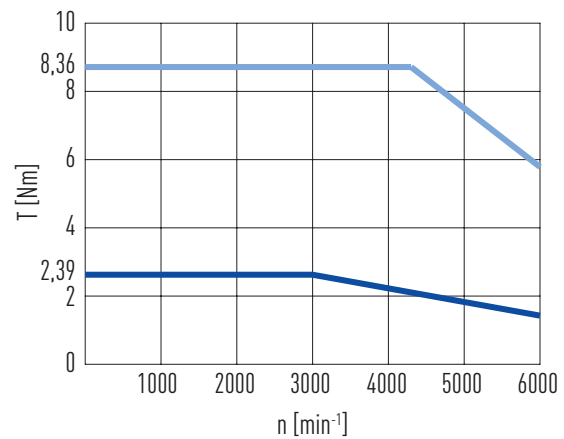
Motor data	Symbol	Unit	EM1-75
Drive input voltage	V	VAC	220
Rated power	W	W	750
Rated torque	T_C	Nm	2.39
Rated current	I_C	A_{eff}	4.65
Peak max. torque	T_P	Nm	8.36
Peak max. current	I_P	A_{eff}	18.6
Rated speed	n_N	rms	3,000
Peak max. speed	n_{max}	rms	6,000
Torque constant	K_t	Nm/ A_{eff}	0.514
Back EMF constant	K_e	$V_{eff}/(1,000 \text{ rms})$	33.48
Resistance ¹⁾	R	Ω	1.08
Inductance ¹⁾	L	mH	4.6
Inertia of rotating parts (with brake)	J	$kgm^2 (\times 10^{-4})$	1.44 (1.47)
Mass (with brake)	M	kg	2.7 (3.36)
Motor insulation level	Class F (under certification)		
Motor protection level	Total enclosed, self-cooled, IP65 (except for shaft and connector)		
Insulation resistance	10 M Ω , DC 500 V		
Insulation voltage resistance	AC 1500 V, 60 seconds		
Brake specifications ²⁾			
Static friction torque	T_b	Nm	2.4
Enabled current	A_b	A	0.358
Brake input voltage	V	VDC	24 \pm 10 %
Braking time	t_0	ms	45
Release time	t_R	ms	10

¹⁾ Line to line

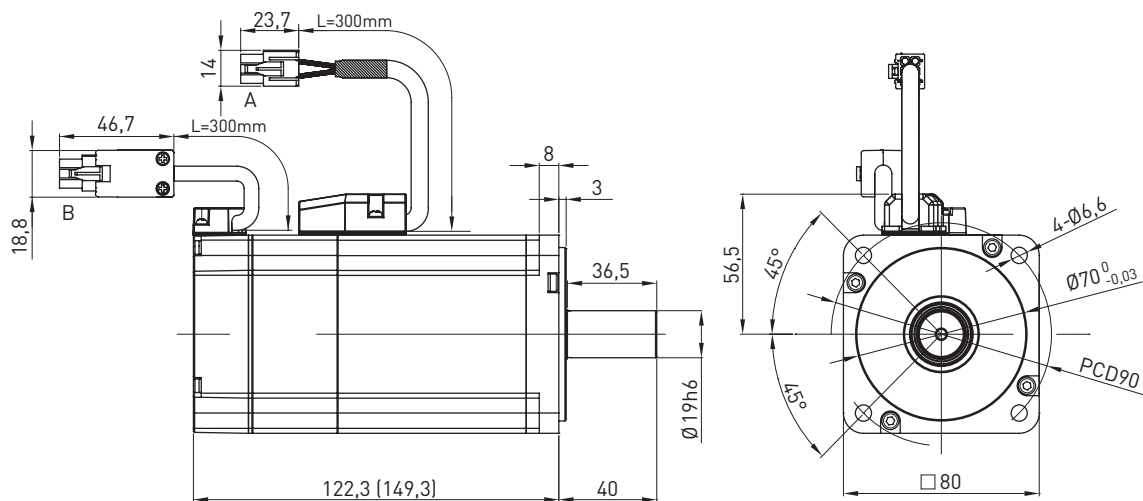
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 750 W:



Dimensions EM1 – 750 W:



Values in brackets apply to model with motor brake

Drives & Servo Motors

AC servo motors EM1

4.3.6 AC servo motor EM1 – 1,000 W

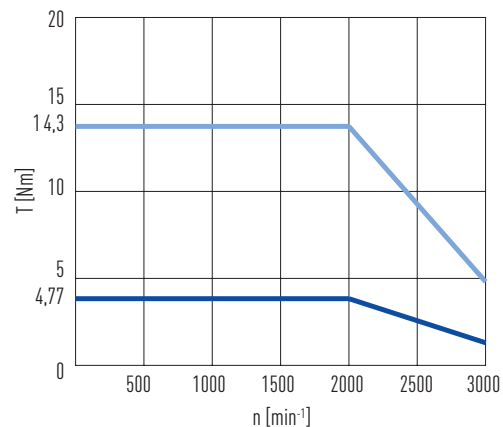
Table 4.8 Technical data EM1 – 1,000 W			
Motor data	Symbol	Unit	EM1-1K
Drive input voltage	V	VAC	220
Rated power	W	W	1,000
Rated torque	T_C	Nm	4.77
Rated current	I_C	A_{eff}	5.1
Peak max. torque	T_P	Nm	14.3
Peak max. current	I_P	A_{eff}	15.3
Rated speed	n_N	rms	2,000
Peak max. speed	n_{max}	rms	3,000
Torque constant	K_t	Nm/ A_{eff}	0.935
Back EMF constant	K_e	$V_{eff}/(1,000 \text{ rms})$	54.15
Resistance ¹⁾	R	Ω	0.81
Inductance ¹⁾	L	mH	8
Inertia of rotating parts (with brake)	J	$kgm^2 (\times 10^{-4})$	7.2 (8.0)
Mass (with brake)	M	kg	5.4 (6.2)
Motor insulation level	Class F (under certification)		
Motor protection level	Total enclosed, self-cooled, IP65 (except for shaft and connector)		
Insulation resistance	10 M Ω , DC 500 V		
Insulation voltage resistance	AC 1500 V, 60 seconds		
Brake specifications ²⁾			
Static friction torque	T_b	Nm	10
Enabled current	A_b	A	0.56
Brake input voltage	V	VDC	24 \pm 10 %
Braking time	t_0	ms	80
Release time	t_R	ms	30

¹⁾ Line to line

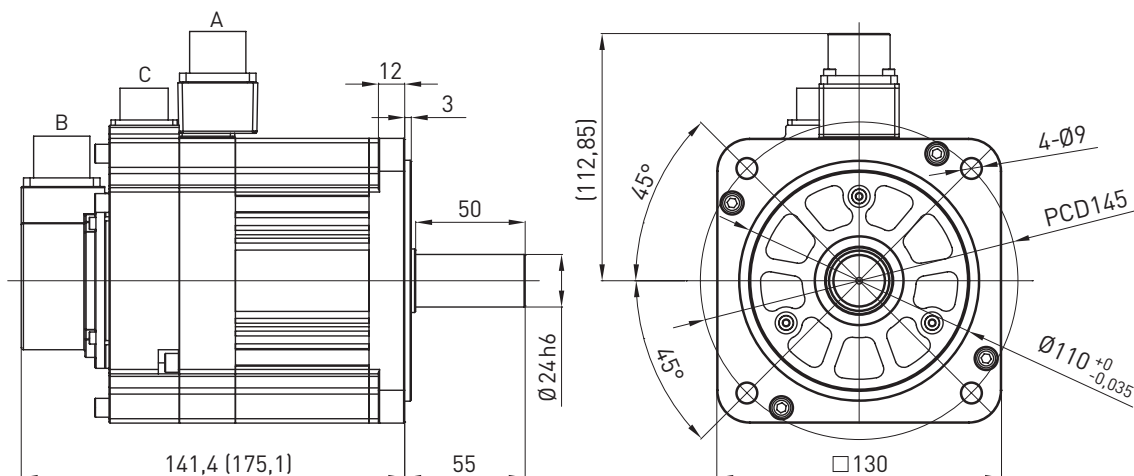
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 1,000 W:



Dimensions EM1 – 1,000 W:



Values in brackets apply to model with motor brake

4.4 Options EM1

4.4.1 Motor brake

Table 4.9 Motor brake specifications for HIWIN servo motors

Motor type	Unit	50 W	100 W	200 W	400 W	750 W	1,000 W
Braking torque (static)	Nm	0.32	0.32	1.3	1.3	2.4	10.0
Maximum speed n_{max}	rpm	6,000	6,000	6,000	6,000	6,000	3,000
Power supply	VDC	24 ± 10 %	24 ± 10 %	24 ± 10 %	24 ± 10 %	24 ± 10 %	24 ± 10 %
Power consumption	A	0.25	0.25	0.32	0.32	0.358	0.56
Response time open	ms	40.0	40.0	30.0	30.0	45.0	80.0
Response time close	ms	20.0	20.0	20.0	20.0	10.0	30.0

Please note: The motor brakes are holding brakes only, not operating brakes

4.5 Accessories EM1

4.5.1 Motor and encoder connectors

In HIWIN servo motors rated between 50 W and 750 W, the motor and encoder cables are routed directly out of the motor. For ease of installation the motor and encoder connectors are fitted on the end of the 300 mm cable and ready to connect. As of 1,000 W motors the motor and encoder connectors are fitted on the motor housing, see Fig. 4.1 (motor and encoder connectors).

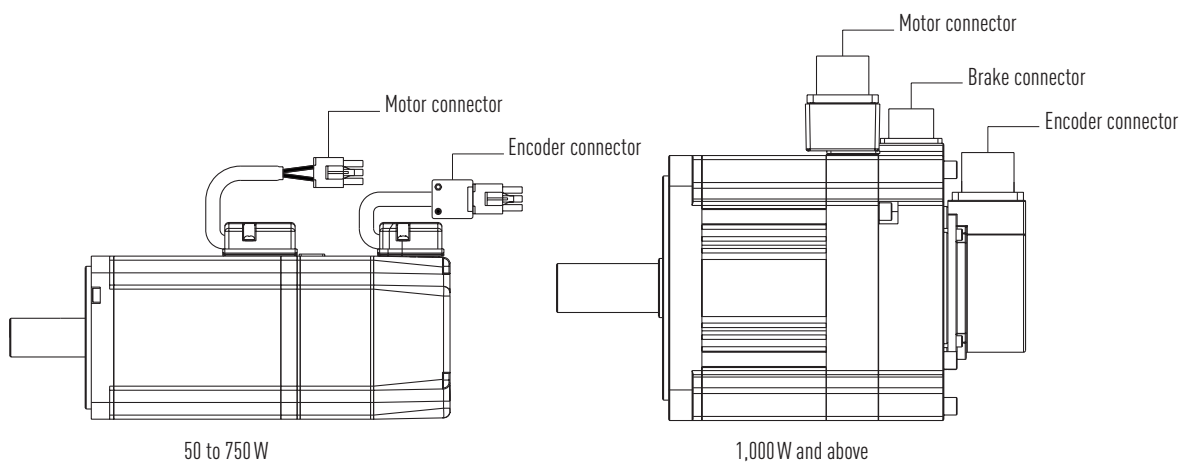


Fig. 4.1 Overview of motor and encoder connectors

Different connectors are used for HIWIN servo motors depending on the size and model. The assignment of individual connectors is described in the tables below.

○ Motor connector for 50 W – 750 W motors

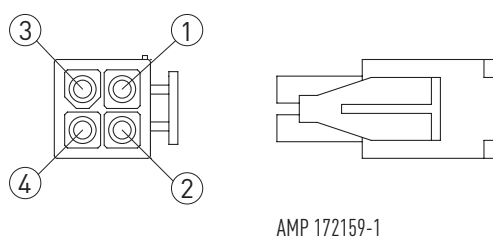
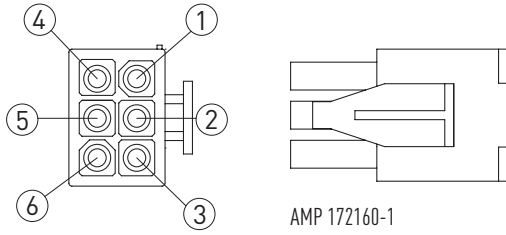


Fig. 4.2 Connector assignment without brake, motor connector for 50 W – 750 W motors

Drives & Servo Motors

AC servo motors EM1



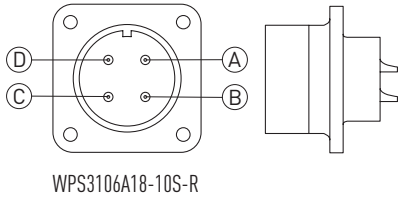
AMP 172160-1

Fig. 4.3 Connector assignment with brake, motor connector for 50 W – 750 W motors

Table 4.10 Assignment of motor connector for 50 W – 750 W motors		
Signal	AMP 172159-1 (without brake)	AMP 172160-1 (with brake)
U	3	3
V	2	2
W	1	1
GND	4	4
B+	—	5
B-	—	6

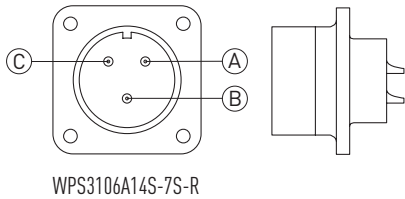
Motor connector, 1,000 W and above

Motors of 1,000 W and above with a motor brake have an additional, separate brake connector (see Fig. 4.5).



WPS3106A18-10S-R

Fig. 4.4 Assignment of motor connector, 1,000 W and above



WPS3106A14S-7S-R

Fig. 4.5 Connector assignment for brake, 1,000 W and above

Table 4.11 Assignment of motor connector, 1,000 W and above		
Signal	WPS3106A18-10S-R	WPS3106A14S-7S-R
U	A	—
V	B	—
W	C	—
GND	D	—
B+	—	A
B-	—	C

Encoder connector, 50 W – 750 W

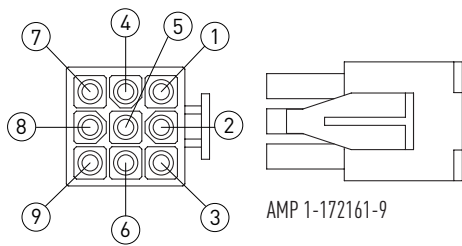


Fig. 4.6 Encoder connector, 50 W – 750 W

Table 4.12 Assignment of encoder connector, 50 W – 750 W			
Function	23 bit absolute (singleturn)	23 bit absolute (multiturn)	AMP 1-172161-9
Power supply	5 V ± 5 %		1
	0 V		2
Data	SC+	—	3
	SC-	—	4
	—	VB (battery)	5
	—	GND (battery)	6
	MA+	SD+	7
	MA-	SD-	8
Shielding	Shielding		9

Encoder connector, 1,000 W and above

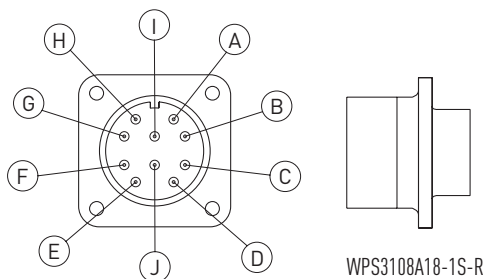


Fig. 4.7 Encoder connector, 1,000 W and above

Table 4.13 Assignment of encoder connector, 1,000 W and above			
Function	23 bit absolute (singleturn)	23 bit absolute (multiturn)	WPS3108A18-1S-R
Power supply	5 V ± 5 %		A
	0 V		B
Data	SC+	—	C
	SC-	—	D
	—	VB (battery)	E
	—	GND (battery)	F
	MA+	SD+	G
	MA-	SD-	H
Shielding	Shielding		I

Drives & Servo Motors

AC servo motors EM1

4.5.2 Motor and encoder cables

Motor cables

Table 4.14 Motor cables for 50 W – 750 W motors without brake

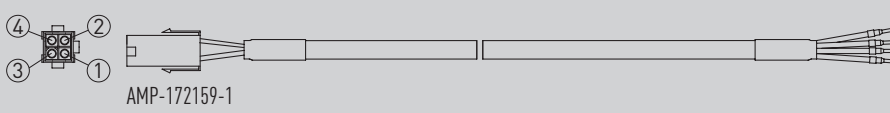
Article number	Order code	Length	
8-10-1800	HVPS04AB03MB	3 m	 <p>AMP-172159-1</p>
8-10-1801	HVPS04AB05MB	5 m	
8-10-1802	HVPS04AB07MB	7 m	
8-10-1803	HVPS04AB10MB	10 m	

Table 4.15 Motor cables for 50 W – 750 W motors with brake

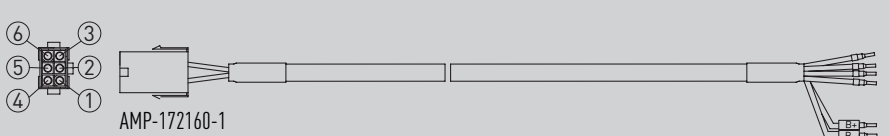
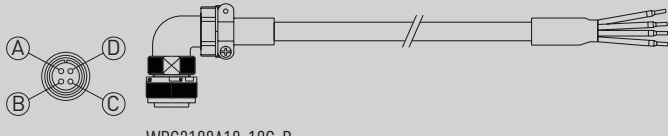
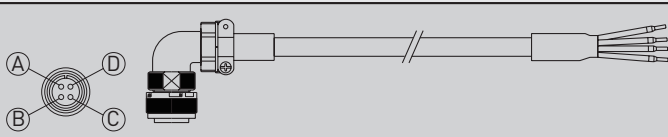
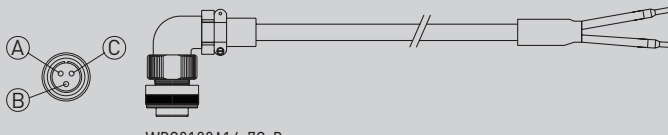
Article number	Order code	Length	
8-10-1804	HVPS06AB03MB	3 m	 <p>AMP-172160-1</p>
8-10-1805	HVPS06AB05MB	5 m	
8-10-1806	HVPS06AB07MB	7 m	
8-10-1807	HVPS06AB10MB	10 m	

Table 4.16 Motor cables for 1,000 W motors and above without brake

Article number	Order code	Length	
80032333	HVPM04CB03MB	3 m	 <p>WPS3108A18-10S-R</p>
80032352	HVPM04CB05MB	5 m	
80032354	HVPM04CB07MB	7 m	
80032355	HVPM04CB10MB	10 m	

Motor cables with straight connector on request

Table 4.17 Motor cables for 1,000 W motors and above with brake

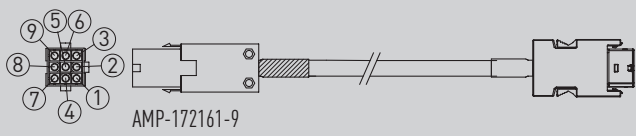
Article number	Order code	Length	
80032356	HVPM06CB03MB	3 m	 <p>WPS3108A18-10S-R</p>
80032357	HVPM06CB05MB	5 m	
80032358	HVPM06CB07MB	7 m	 <p>WPS3108A14-7S-R</p>
80032359	HVPM06CB10MB	10 m	

Motor cables with straight connector on request

Encoder cables

Table 4.18 Encoder cables 23 bit absolute (singleturn) for 50 W – 750 W motors, ED1 drive

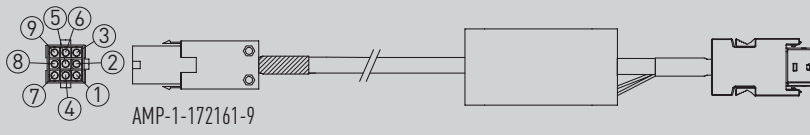
Article number	Order code	Length
8-10-1816	HVE23IAB03MB	3 m
8-10-1817	HVE23IAB05MB	5 m
8-10-1818	HVE23IAB07MB	7 m
8-10-1819	HVE23IAB10MB	10 m



AMP-172161-9

Table 4.19 Encoder cables 23 bit absolute (multiturn) for 50 W – 750 W motors, ED1 drive

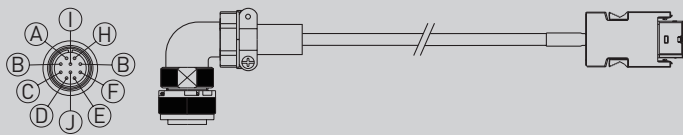
Article number	Order code	Length
8-10-1824	HVE23AAB03MB	3 m
8-10-1825	HVE23AAB05MB	5 m
8-10-1826	HVE23AAB07MB	7 m
8-10-1827	HVE23AAB10MB	10 m



AMP-1-172161-9

Table 4.20 Encoder cables 23 bit absolute (singleturn) for 1,000 W motors and above, ED1 drive

Article number	Order code	Length
80032398	HVE23ICB03MB	3 m
80032411	HVE23ICB05MB	5 m
80032412	HVE23ICB07MB	7 m
80032414	HVE23ICB10MB	10 m

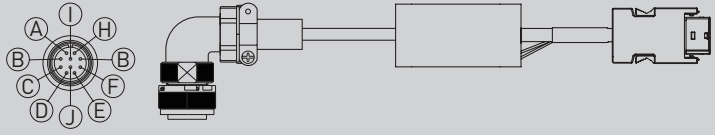


WPS3108A18-1S-R

Encoder cables with straight connector on request

Table 4.21 Encoder cables 23 bit absolute (multiturn) for 1,000 W motors and above, ED1 drive

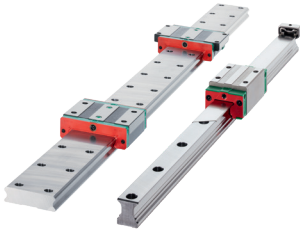
Article number	Order code	Length
80032415	HVE23ACB03MB	3 m
80032416	HVE23ACB05MB	5 m
80032417	HVE23ACB07MB	7 m
80032418	HVE23ACB10MB	10 m



WPS3108A18-1S-R

Encoder cables with straight connector on request

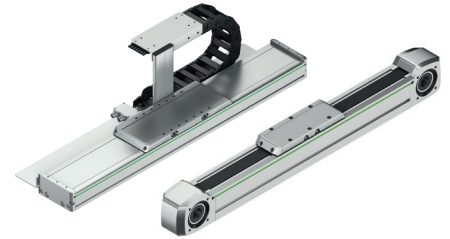
We live motion.



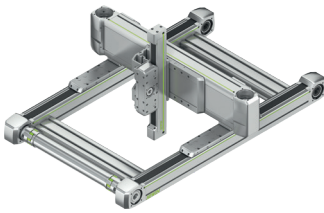
Linear Guideways



Ballscrews



Linear Axes



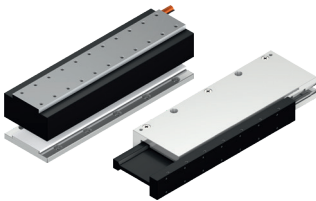
Linear Axis Systems



Torque Motors



Robots Direct Drive Rotary Table



Linear Motors



Rotary Tables



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