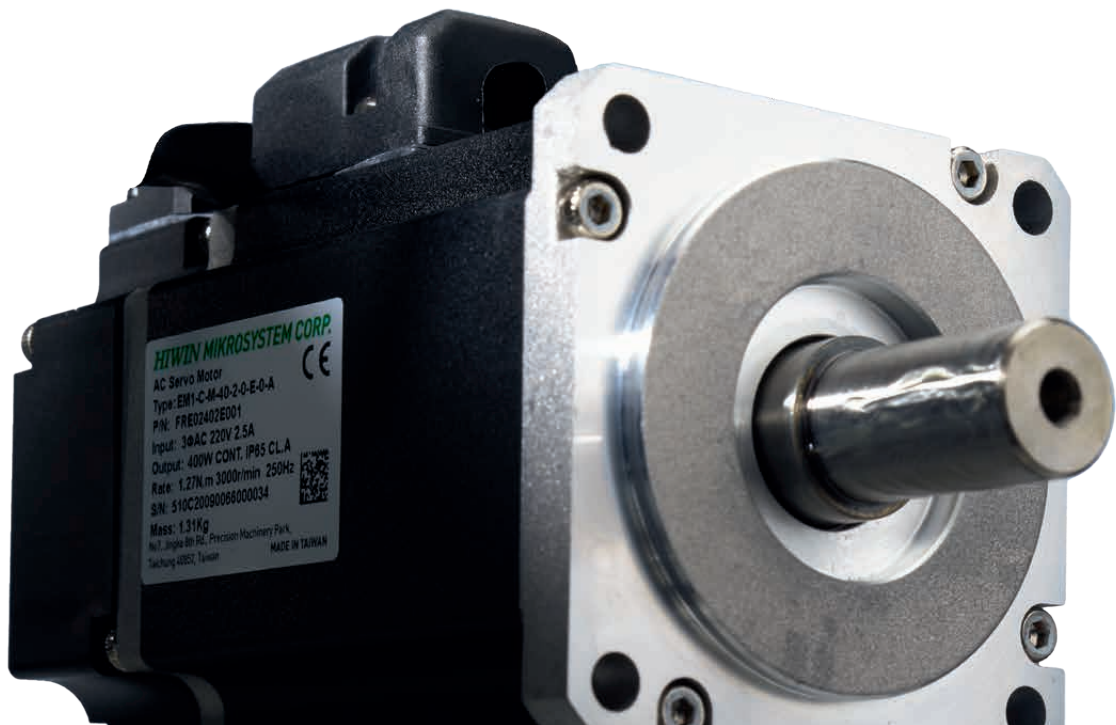




Servo Motors

Motors & Accessories

Servo Motors

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



Assembly instructions and catalogue for download

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

Contents

1	Product overview	7
2	General information	8
2.1	General information about HIWIN servo motors EM1	8
2.2	General properties of HIWIN servo motors EM1	8
3	AC servo motors EM1	10
3.1	Characteristics EM1	10
3.2	Order code EM1	11
3.3	Technical data EM1	12
3.4	Options EM1	18
3.5	Accessories EM1	18

1. Product overview



AC servo motors

Page 10

- 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

Page 18

- Connectors
- Cables

Servo Motors

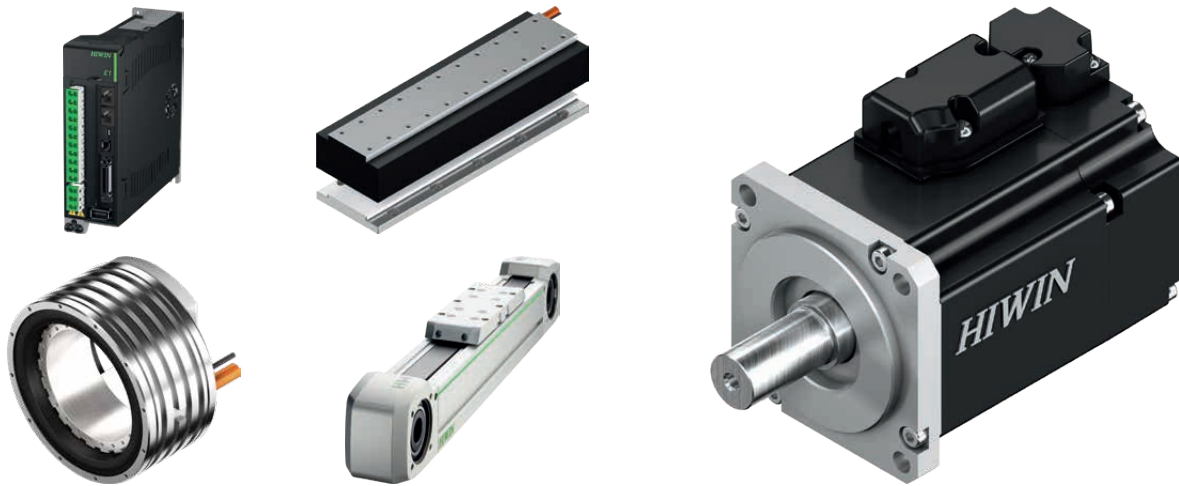
General information

2. General information

2.1 General information about HIWIN servo motors EM1

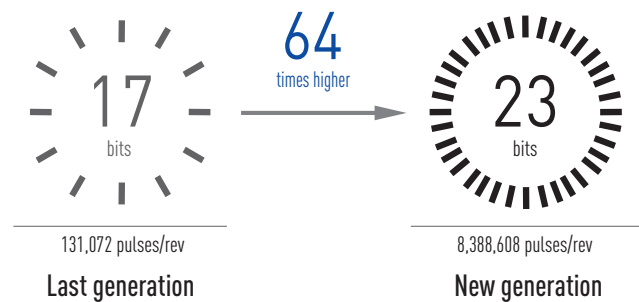
For efficient and economical use with HIWIN belt and spindle axes, for example.

- Sizes 50 W, 100 W, 200 W, 400 W, 750 W and 1,000 W
- EtherCAT CoE and EtherCAT mega-ulink
- UL-certified



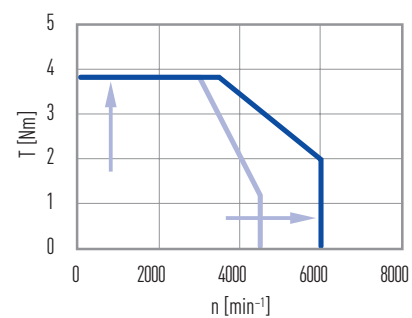
2.2 General properties of HIWIN servo motors EM1

- Improved processing accuracy



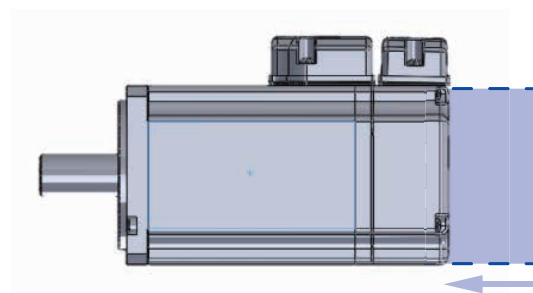
- High speed

Max. speed 6,000 rms, max. torque improves by 310-350 %



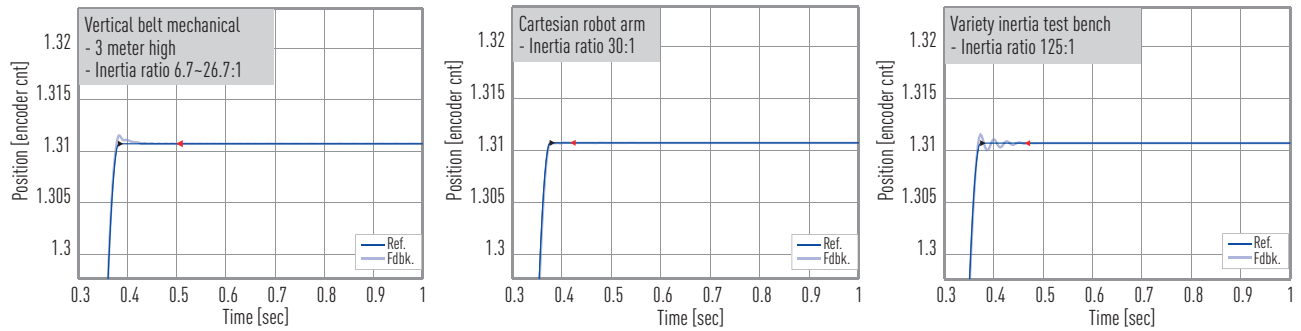
- Compact size

Shorten 10 % in length



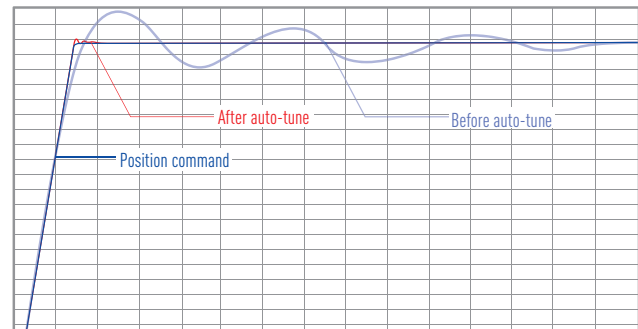
○ Tuneless function

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.

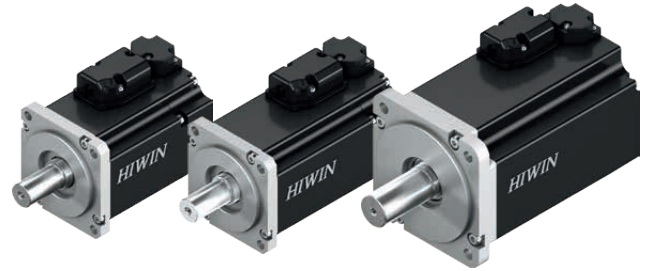


Servo Motors

AC servo motors EM1

3. 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.



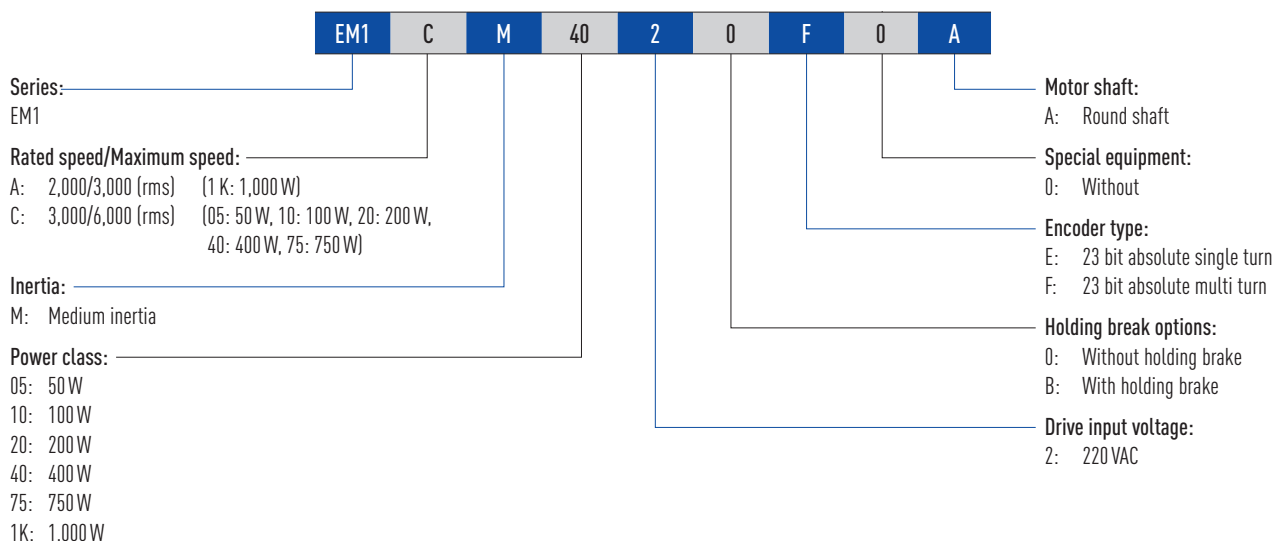
3.1 Characteristics EM1

Table 3.1 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 F					
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)					

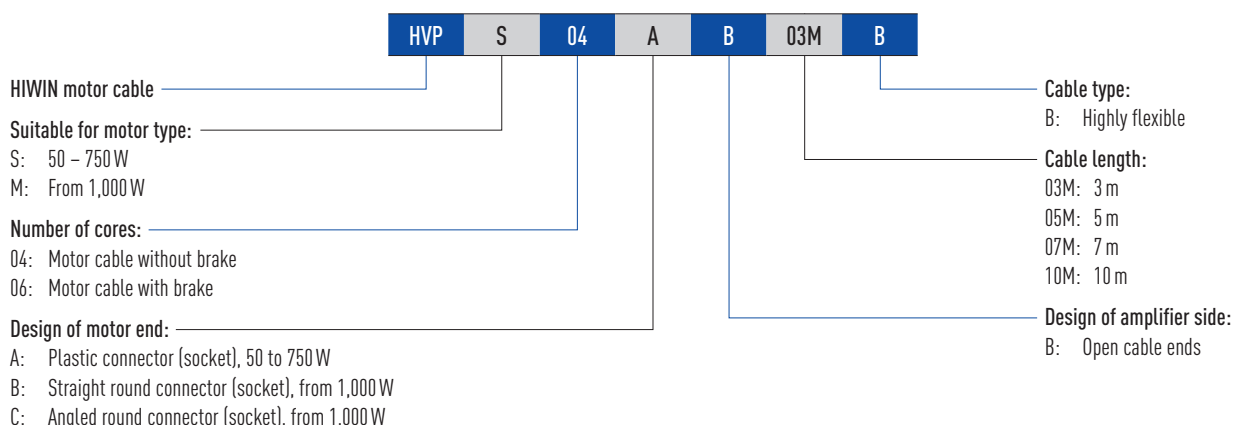
Table 3.2 Ambient conditions AC servo motors EM1						
Size	50 W	100 W	200 W	400 W	750 W	1,000 W
Ambient temperature	0 °C to 50 °C					
Storage temperature	-15 °C to 70 °C					
Air humidity	Up to 80 % relative air humidity					
Max. Max. installation height	1,000 m above sea level					

3.2 Order code EM1

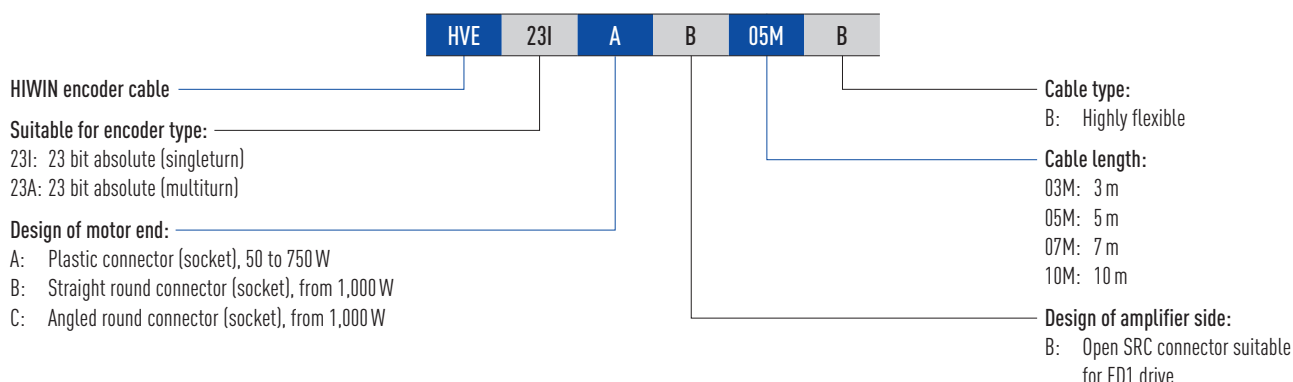
Motor



Motor cable



Encoder cable



Servo Motors

AC servo motors EM1

3.3 Technical data EM1

3.3.1 AC servo motor EM1 – 50 W

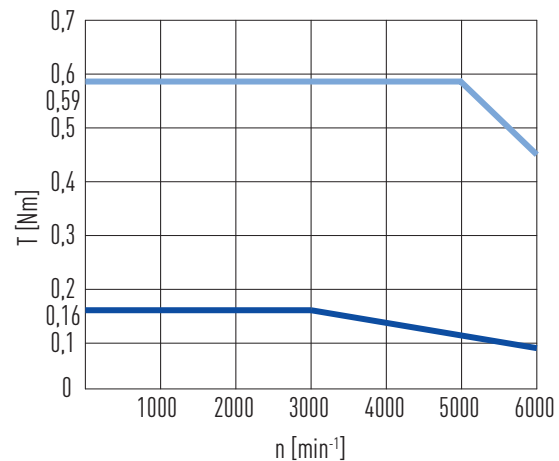
Table 3.3 Technical data EM1 – 50 W			
Motor data	Symbol	Unit	EM1-05
Drive input voltage	V	VAC	220
Rated power	W	W	50
Rated torque	T _C	Nm	0.16
Rated current	I _C	A _{eff}	0.64
Peak max. torque	T _P	Nm	0.59
Peak max. current	I _P	A _{eff}	2.8
Rated speed	n _N	rms	3,000
Peak max. speed	n _{max}	rms	6,000
Torque constant	K _t	Nm/A _{eff}	0.25
Back EMF constant	K _e	V _{eff} /(1,000 rms)	18.526
Resistance ¹⁾	R	Ω	25.24
Inductance ¹⁾	L	mH	13.09
Inertia of rotating parts (with brake)	J	kgm ² (×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 MΩ, 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 ±10 %
Braking time	t ₀	ms	40
Release time	t _R	ms	20

¹⁾ Line to line

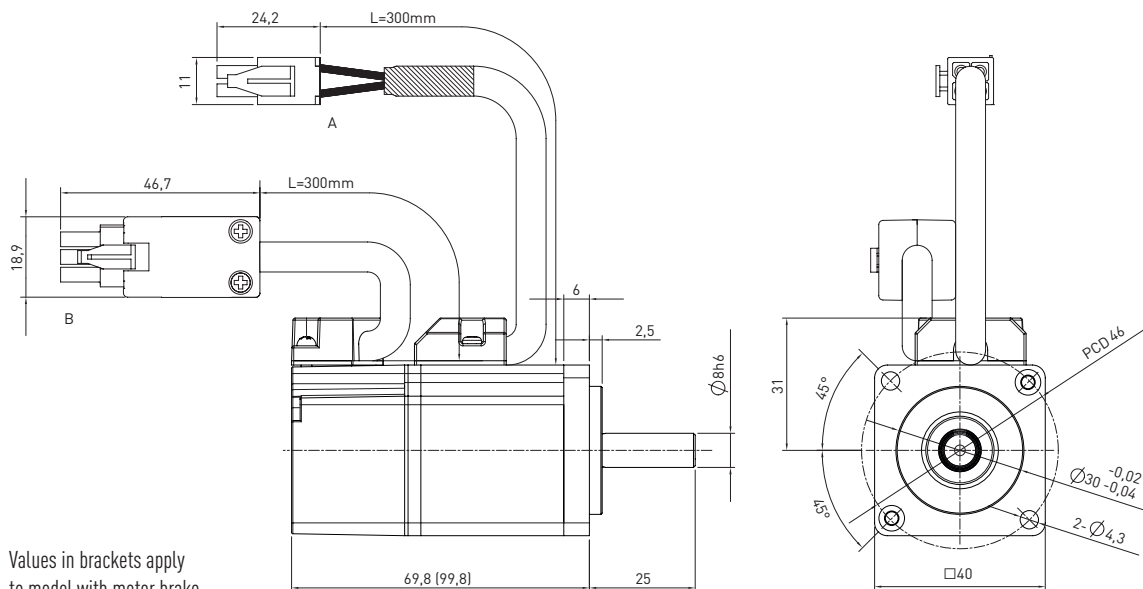
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 50 W



Dimensions EM1 – 50 W:



3.3.2 AC servo motor EM1 – 100 W

Table 3.4 Technical data EM1 – 100 W

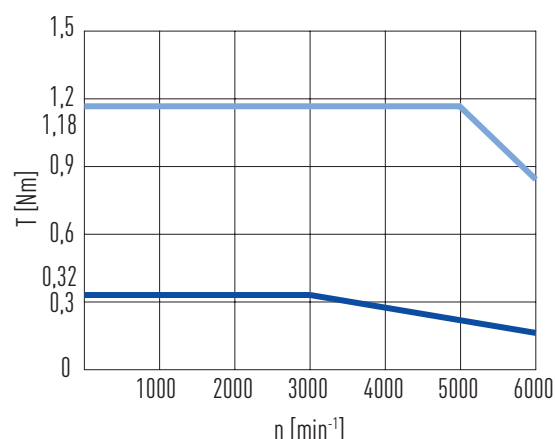
Motor data	Symbol	Unit	EM1-10
Drive input voltage	V	VAC	220
Rated power	W	W	100
Rated torque	T _C	Nm	0.32
Rated current	I _C	A _{eff}	0.78
Peak max. torque	T _P	Nm	1.18
Peak max. current	I _P	A _{eff}	3.45
Rated speed	n _N	rms	3,000
Peak max. speed	n _{max}	rms	6,000
Torque constant	K _t	Nm/A _{eff}	0.41
Back EMF constant	K _e	V _{eff} /(1,000 rms)	28.364
Resistance ¹⁾	R	Ω	22.72
Inductance ¹⁾	L	mH	13.86
Inertia of rotating parts (with brake)	J	kgm ² (×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 MΩ, 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 ±10 %
Braking time	t ₀	ms	40
Release time	t _R	ms	20

¹⁾ Line to line

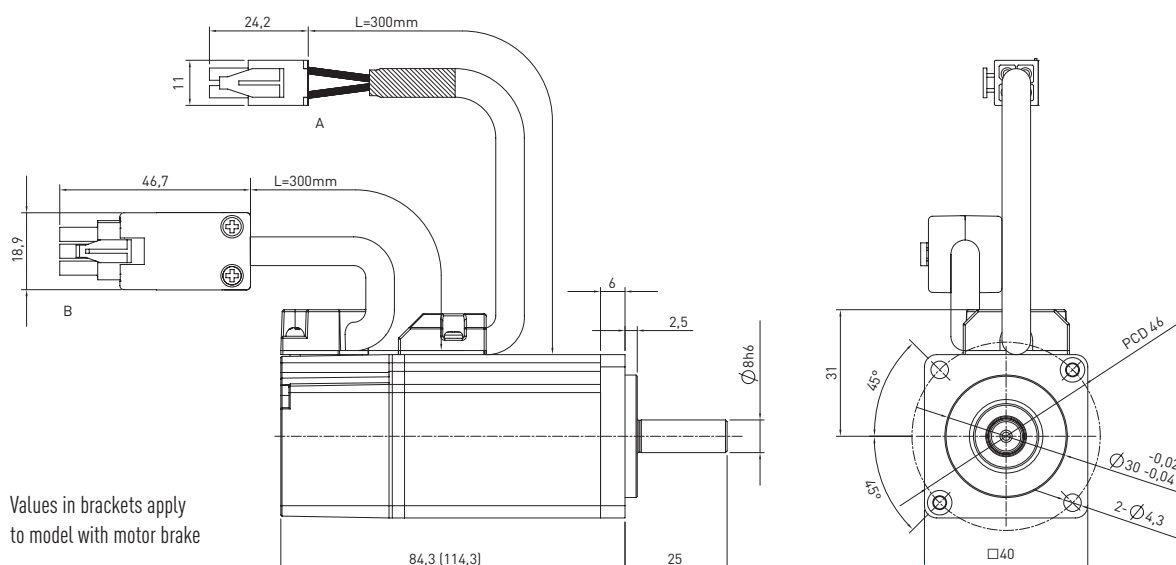
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 100 W:



Dimensions EM1 – 100 W:



Values in brackets apply to model with motor brake

Servo Motors

AC servo motors EM1

3.3.3 AC servo motor EM1 – 200 W

Table 3.5 Technical data EM1 – 200 W

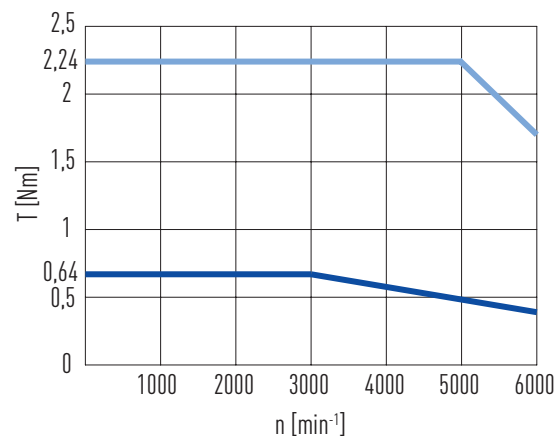
Motor data	Symbol	Unit	EM1-20
Drive input voltage	V	VAC	220
Rated power	W	W	200
Rated torque	T _C	Nm	0.64
Rated current	I _C	A _{eff}	1.6
Peak max. torque	T _P	Nm	2.24
Peak max. current	I _P	A _{eff}	6.4
Rated speed	n _N	rms	3,000
Peak max. speed	n _{max}	rms	6,000
Torque constant	K _t	Nm/A _{eff}	0.4
Back EMF constant	K _e	V _{eff} /(1,000 rms)	27.23
Resistance ¹⁾	R	Ω	5.53
Inductance ¹⁾	L	mH	8.76
Inertia of rotating parts (with brake)	J	kgm ² (×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 MΩ, 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 ±10 %
Braking time	t ₀	ms	30
Release time	t _R	ms	20

¹⁾ Line to line

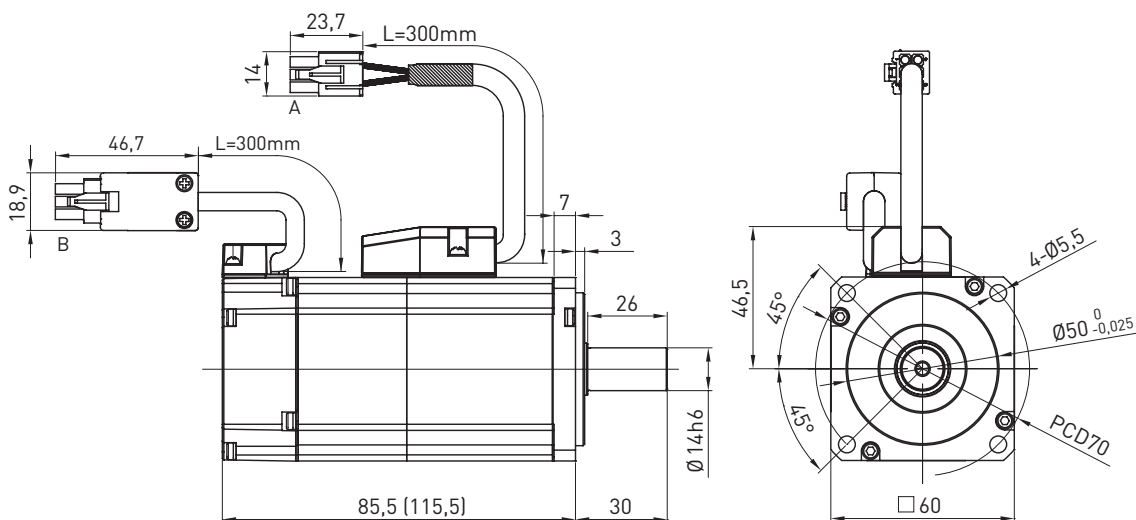
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 200 W:



Dimensions EM1 – 200 W:



Values in brackets apply to model with motor brake

3.3.4 AC servo motor EM1 – 400 W

Table 3.6 Technical data EM1 – 400 W

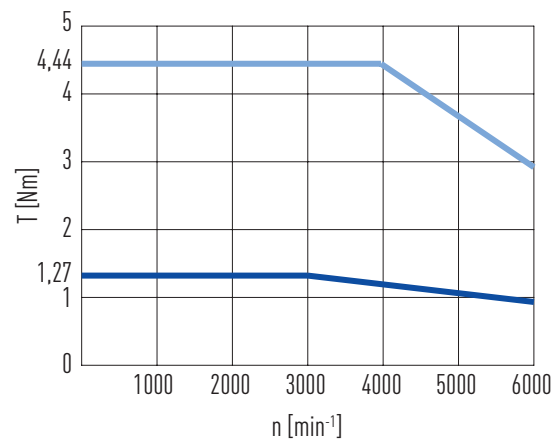
Motor data	Symbol	Unit	EM1-40
Drive input voltage	V	VAC	220
Rated power	W	W	400
Rated torque	T _C	Nm	1.27
Rated current	I _C	A _{eff}	2.5
Peak max. torque	T _P	Nm	4.44
Peak max. current	I _P	A _{eff}	10
Rated speed	n _N	rms	3,000
Peak max. speed	n _{max}	rms	6,000
Torque constant	K _t	Nm/A _{eff}	0.508
Back EMF constant	K _e	V _{eff} /(1,000 rms)	33.87
Resistance ¹⁾	R	Ω	3.59
Inductance ¹⁾	L	mH	7.22
Inertia of rotating parts (with brake)	J	kgm ² (×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 MΩ, 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 ±10 %
Braking time	t ₀	ms	30
Release time	t _R	ms	20

¹⁾ Line to line

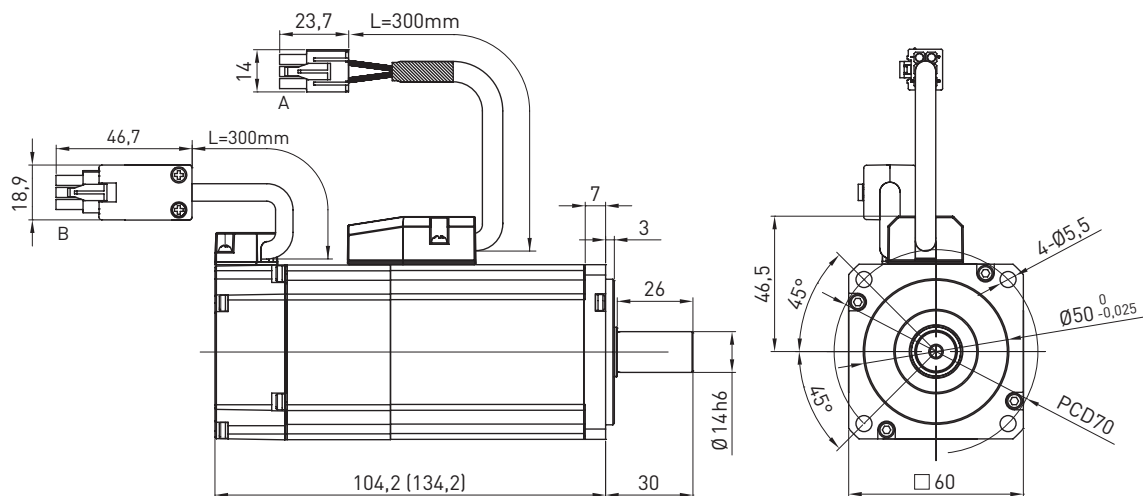
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 400 W:



Dimensions EM1 400 – W:



Values in brackets apply to model with motor brake

Servo Motors

AC servo motors EM1

3.3.5 AC servo motor EM1 – 750 W

Table 3.7 Technical data EM1 – 750 W

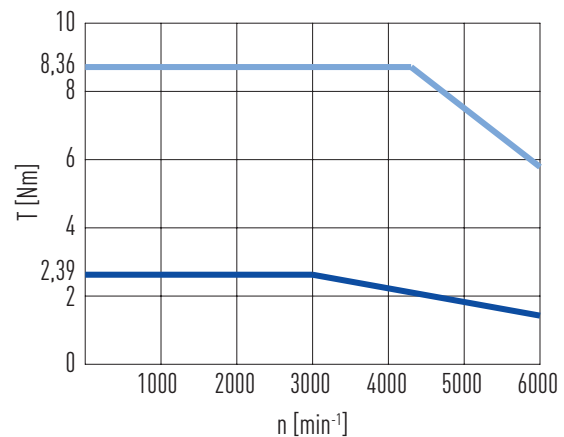
Motor data	Symbol	Unit	EM1-75
Drive input voltage	V	VAC	220
Rated power	W	W	750
Rated torque	T _C	Nm	2.39
Rated current	I _C	A _{eff}	4.65
Peak max. torque	T _P	Nm	8.36
Peak max. current	I _P	A _{eff}	18.6
Rated speed	n _N	rms	3,000
Peak max. speed	n _{max}	rms	6,000
Torque constant	K _t	Nm/A _{eff}	0.514
Back EMF constant	K _e	V _{eff} /(1,000 rms)	33.48
Resistance ¹⁾	R	Ω	1.08
Inductance ¹⁾	L	mH	4.6
Inertia of rotating parts (with brake)	J	kgm ² (×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 MΩ, 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 ±10 %
Braking time	t ₀	ms	45
Release time	t _R	ms	10

¹⁾ Line to line

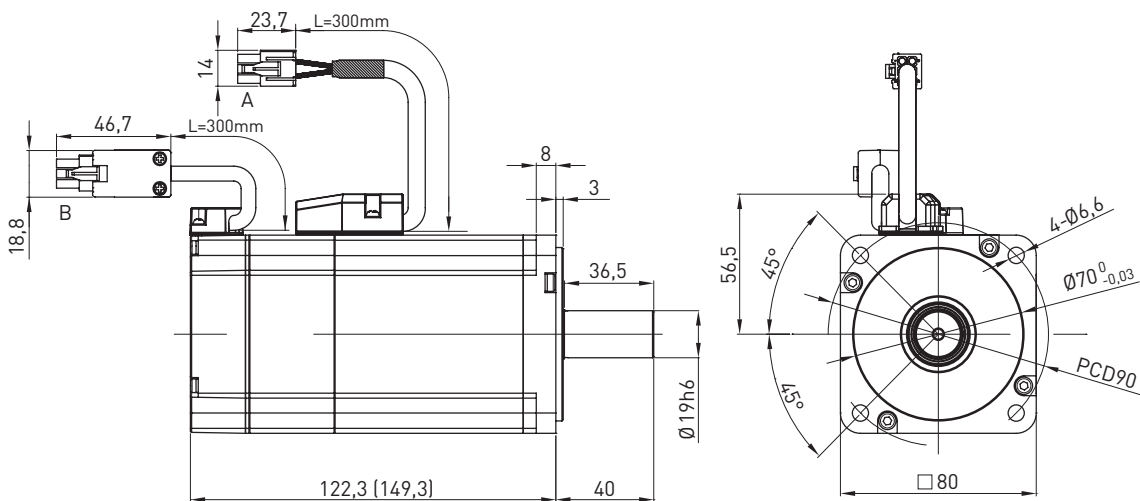
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 750 W:



Dimensions EM1 – 750 W:



Values in brackets apply to model with motor brake

3.3.6 AC servo motor EM1 – 1,000 W

Table 3.8 Technical data EM1 – 1,000 W

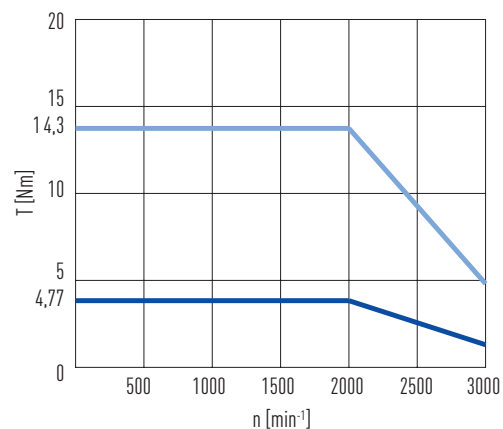
Motor data	Symbol	Unit	EM1-1K
Drive input voltage	V	VAC	220
Rated power	W	W	1,000
Rated torque	T _C	Nm	4.77
Rated current	I _C	A _{eff}	5.1
Peak max. torque	T _P	Nm	14.3
Peak max. current	I _P	A _{eff}	15.3
Rated speed	n _N	rms	2,000
Peak max. speed	n _{max}	rms	3,000
Torque constant	K _t	Nm/A _{eff}	0.935
Back EMF constant	K _e	V _{eff} /(1,000 rms)	54.15
Resistance ¹⁾	R	Ω	0.81
Inductance ¹⁾	L	mH	8
Inertia of rotating parts (with brake)	J	kgm ² (×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 MΩ, 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 ±10 %
Braking time	t ₀	ms	80
Release time	t _R	ms	30

¹⁾ Line to line

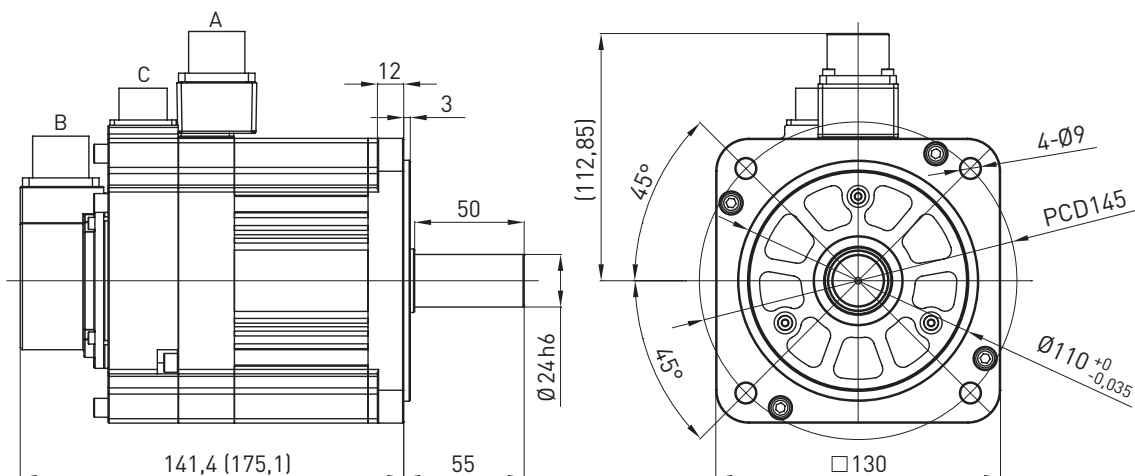
²⁾ The motor brakes are holding brakes only, not operating brakes



Torque-speed curve EM1 – 1,000 W:



Dimensions EM1 – 1,000 W:



Values in brackets apply to model with motor brake

Servo Motors

AC servo motors EM1

3.4 Options EM1

3.4.1 Motor brake

Table 3.9 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

3.5 Accessories EM1

3.5.1 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. 3.1 (motor and encoder connectors).

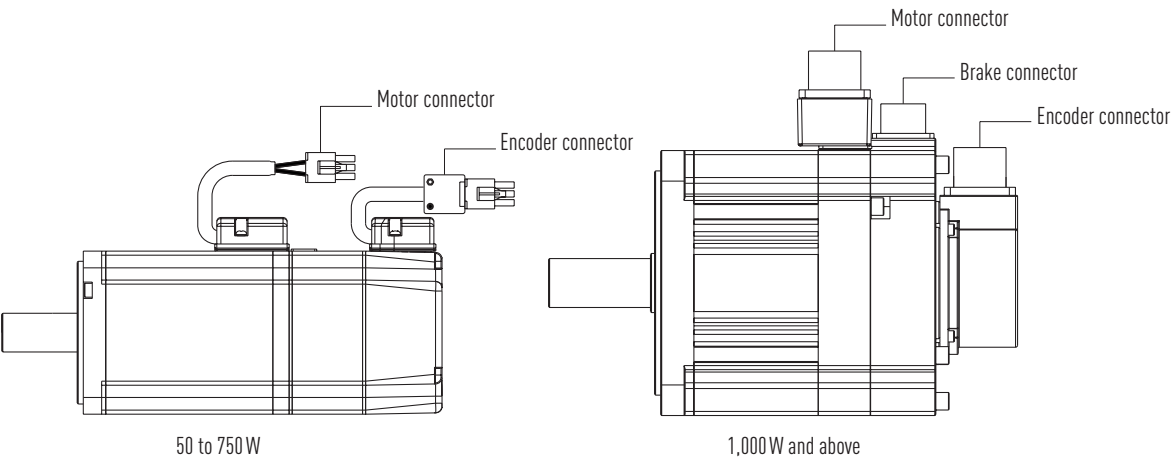


Fig. 3.1 Overview of motor and encoder connectors

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

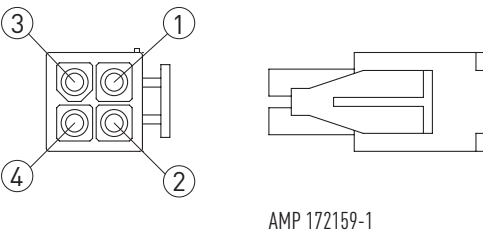


Fig. 3.2 Connector assignment without brake, motor connector for 50 W – 750 W motors

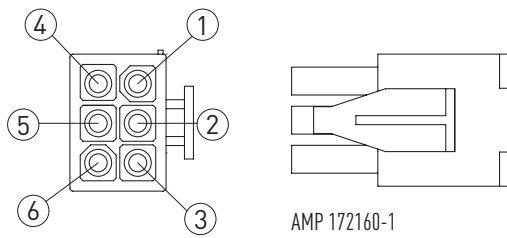


Fig. 3.3 Connector assignment with brake, motor connector for 50 W – 750 W motors

Table 3.10 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. 3.5).

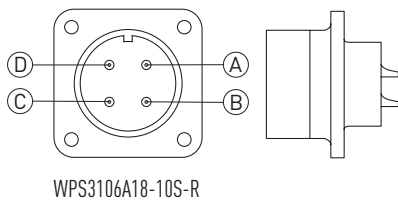


Fig. 3.4 Assignment of motor connector, 1,000 W and above

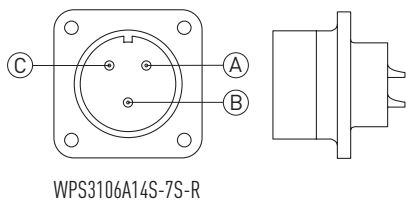


Fig. 3.5 Connector assignment for brake, 1,000 W and above

Table 3.11 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

Servo Motors

AC servo motors EM1

Encoder connector, 50 W – 750 W

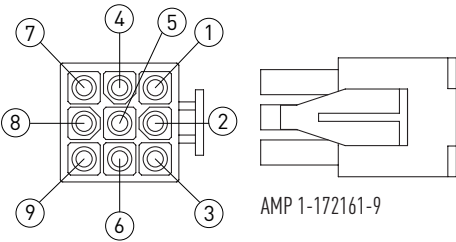


Fig. 3.6 Encoder connector, 50 W – 750 W

Table 3.12 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 $\pm$ 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

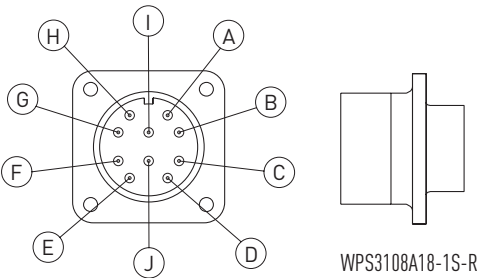


Fig. 3.7 Encoder connector, 1,000 W and above

Table 3.13 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 $\pm$ 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

3.5.2 Motor and encoder cables

Motor cables

Table 3.14 Motor cables for 50 W – 750 W motors without brake

Article number	Order code	Length	
8-10-1800	HVPS04AB03MB	3 m	
8-10-1801	HVPS04AB05MB	5 m	
8-10-1802	HVPS04AB07MB	7 m	
8-10-1803	HVPS04AB10MB	10 m	

Table 3.15 Motor cables for 50 W – 750 W motors with brake

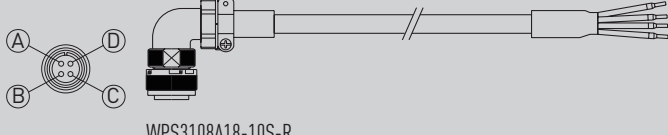
Article number	Order code	Length	
8-10-1804	HVPS06AB03MB	3 m	
8-10-1805	HVPS06AB05MB	5 m	
8-10-1806	HVPS06AB07MB	7 m	
8-10-1807	HVPS06AB10MB	10 m	

Table 3.16 Motor cables for 1,000 W motors and above without brake

Article number	Order code	Length	
80032333	HVPM04CB03MB	3 m	
80032352	HVPM04CB05MB	5 m	
80032354	HVPM04CB07MB	7 m	
80032355	HVPM04CB10MB	10 m	

Motor cables with straight connector on request

Table 3.17 Motor cables for 1,000 W motors and above with brake

Article number	Order code	Length	
80032356	HVPM06CB03MB	3 m	
80032357	HVPM06CB05MB	5 m	
80032358	HVPM06CB07MB	7 m	
80032359	HVPM06CB10MB	10 m	

Motor cables with straight connector on request

Servo Motors

AC servo motors EM1

Encoder cables

Table 3.18 Encoder cables 23 bit absolute (singleturn) for 50 W – 750 W motors, ED1 drive

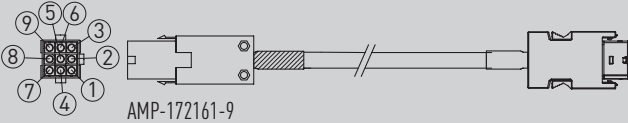
Article number	Order code	Length	 AMP-172161-9
8-10-1816	HVE23IAB03MB	3 m	
8-10-1817	HVE23IAB05MB	5 m	
8-10-1818	HVE23IAB07MB	7 m	
8-10-1819	HVE23IAB10MB	10 m	

Table 3.19 Encoder cables 23 bit absolute (multiturn) for 50 W – 750 W motors, ED1 drive

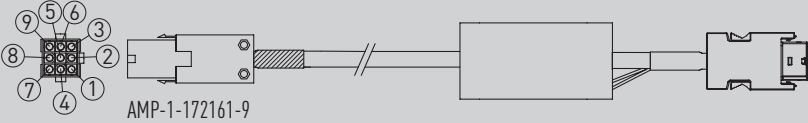
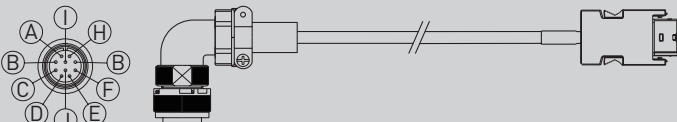
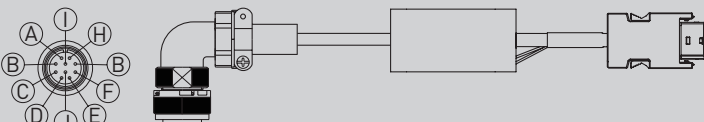
Article number	Order code	Length	 AMP-1-172161-9
8-10-1824	HVE23AAB03MB	3 m	
8-10-1825	HVE23AAB05MB	5 m	
8-10-1826	HVE23AAB07MB	7 m	
8-10-1827	HVE23AAB10MB	10 m	

Table 3.20 Encoder cables 23 bit absolute (singleturn) for 1,000 W motors and above, ED1 drive

Article number	Order code	Length	 WPS3108A18-1S-R
80032398	HVE23ICB03MB	3 m	
80032411	HVE23ICB05MB	5 m	
80032412	HVE23ICB07MB	7 m	
80032414	HVE23ICB10MB	10 m	

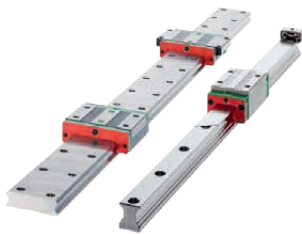
Encoder cables with straight connector on request

Table 3.21 Encoder cables 23 bit absolute (multiturn) for 1,000 W motors and above, ED1 drive

Article number	Order code	Length	 WPS3108A18-1S-R
80032415	HVE23ACB03MB	3 m	
80032416	HVE23ACB05MB	5 m	
80032417	HVE23ACB07MB	7 m	
80032418	HVE23ACB10MB	10 m	

Encoder cables with straight connector on request

We live motion.



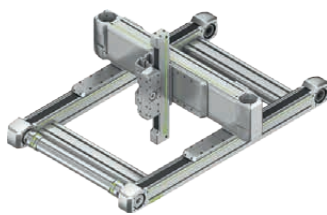
Linear Guideways



Ballscrews



Linear Axes



Linear Axis Systems



Torque Motors



Robots



Linear Motors



Rotary Tables



Drives & Servo Motors

Germany

HIWIN GmbH
Brücklesbünd 1
D-77654 Offenburg
Phone +49 (0) 7 81 9 32 78 - 0
Fax +49 (0) 7 81 9 32 78 - 90
info@hiwin.de
www.hiwin.de

Taiwan

Headquarters
HIWIN Technologies Corp.
No. 7, Jingke Road
Taichung Precision Machinery Park
Taichung 40852, Taiwan
Phone +886-4-2359-4510
Fax +886-4-2359-4420
business@hiwin.tw
www.hiwin.tw

Taiwan

Headquarters
HIWIN Mikrosystem Corp.
No. 6, Jingke Central Road
Taichung Precision Machinery Park
Taichung 40852, Taiwan
Phone +886-4-2355-0110
Fax +886-4-2355-0123
business@hiwinmikro.tw
www.hiwinmikro.tw

France

HIWIN GmbH
4, Impasse Joffre
F-67202 Wolfisheim
Phone +33 (0) 3 88 28 84 80
contact@hiwin.fr
www.hiwin.fr

Italy

HIWIN Srl
Via Pitagora 4
I-20861 Brugherio (MB)
Phone +39 039 287 61 68
Fax +39 039 287 43 73
info@hiwin.it
www.hiwin.it

Poland

HIWIN GmbH
ul. Puławska 405a
PL-02-801 Warszawa
Phone +48 22 544 07 07
Fax +48 22 544 07 08
info@hiwin.pl
www.hiwin.pl

Switzerland

HIWIN Schweiz GmbH
Eichwiesstrasse 20
CH-8645 Jona
Phone +41 (0) 55 225 00 25
Fax +41 (0) 55 225 00 20
info@hiwin.ch
www.hiwin.ch

Slovakia

HIWIN s.r.o., o.z.z.o.
Mládežnícka 2101
SK-01701 Považská Bystrica
Phone +421 424 43 47 77
Fax +421 424 26 23 06
info@hiwin.sk
www.hiwin.sk

Czech Republic

HIWIN s.r.o.
Medkova 888/11
CZ-62700 Brno
Phone +42 05 48 528 238
Fax +42 05 48 220 223
info@hiwin.cz
www.hiwin.cz

Netherlands

HIWIN GmbH
info@hiwin.nl
www.hiwin.nl

Austria

HIWIN GmbH
info@hiwin.at
www.hiwin.at

Romania

HIWIN GmbH
info@hiwin.ro
www.hiwin.ro

Slovenia

HIWIN GmbH
info@hiwin.si
www.hiwin.si

Hungary

HIWIN GmbH
info@hiwin.hu
www.hiwin.hu

Denmark

HIWIN GmbH
info@hiwin.dk
www.hiwin.dk

China

HIWIN Corp.
www.hiwin.cn

Japan

HIWIN Corp.
info@hiwin.co.jp
www.hiwin.co.jp

USA

HIWIN Corp.
info@hiwin.com
www.hiwin.com

Korea

HIWIN Corp.
www.hiwin.kr

Singapore

HIWIN Corp.
www.hiwin.sg