



42 mm sq.

0.9° - 1.8° /step RoHS

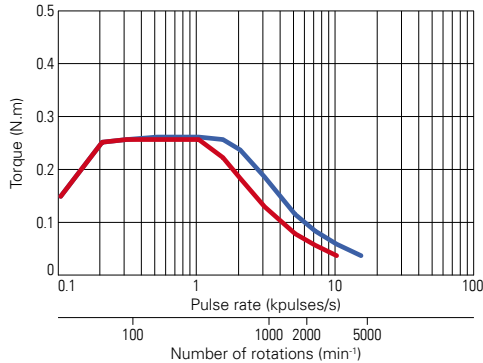
Unipolar and Bipolar winding
Lead wire and Connector type

Based motor	Holding torque at 2-phase energization	Step angle °	Winding type	Rated current A/phase	Wiring resistance Ω /phase	Winding inductance mH/phase	Rotor Inertia [x 10 ⁻⁴ kg.m ²]	Weight kg	Optional motor cable
	[N.m min.]								
2P4233B10	0.23	0.9	Bipolar	1	3.3	8.0	0.044	0.24	-
2H4233B05	0.26	1.8	Bipolar	0.48	14	27	0.036	0.23	4835728-1
2H4238B17	0.39	1.8	Bipolar	1.7	1.3	3.4	0.056	0.29	4835728-1
2H4241B05	0.42	1.8	Bipolar	0.5	18	42	0.062	0.31	4835728-1
2H4241U12	0.32	1.8	Unipolar	1.2	3	3.9	0.062	0.31	4835710-1
2H4248U12	0.37	1.8	Unipolar	1.2	3.3	3.4	0.074	0.37	4835710-1

Dynamic performances

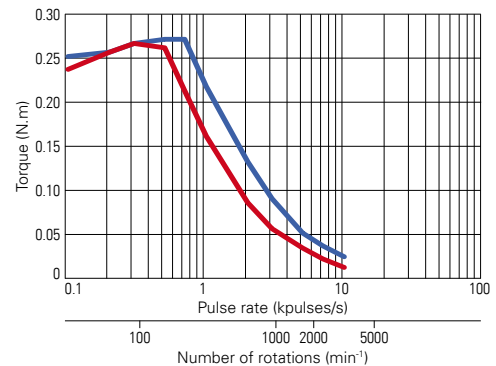
2P4233B10

Driver: Internal circuit
Power supply: — 36V — 24V
Current: 1A/phase bipolar
Excitation mode: Full-step
Load inertia JL = 0.94x10⁻⁴kg.m² (rubber coupling)



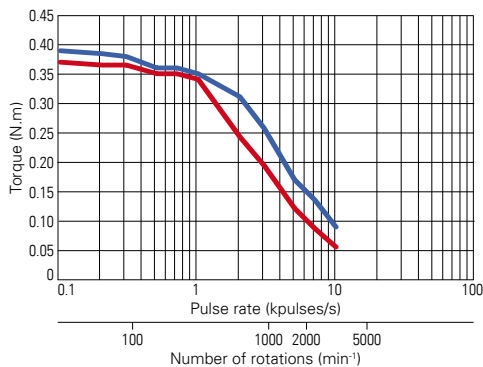
2H4233B05

Driver: Internal circuit
Power supply: — 36V — 24V
Current: 0.48A/phase bipolar
Excitation mode: Full-step
Load inertia JL = 0.94x10⁻⁴kg.m² (rubber coupling)



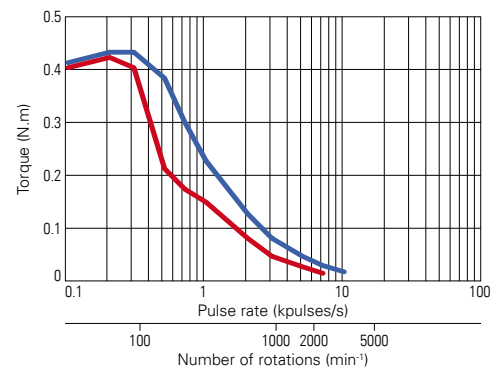
2H4238B17

Driver: BS1D200P10
Power supply: — 36VDC — 24VDC
Current: 1.7A/phase bipolar
Excitation mode: Full-step
Load inertia JL = 0.94x10⁻⁴kg.m² (rubber coupling)



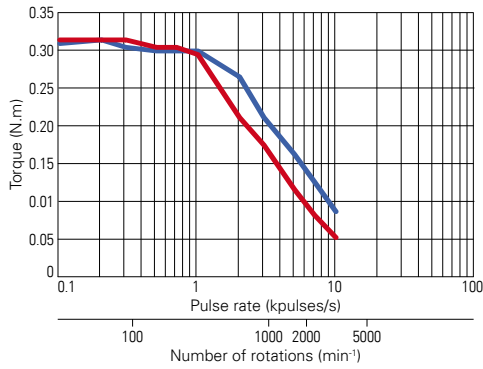
2H4241B05

Driver: Internal circuit
Power supply: — 36V — 24V
Current: 0.5A/phase bipolar
Excitation mode: Full-step
Load inertia JL = 0.94x10⁻⁴kg.m² (rubber coupling)



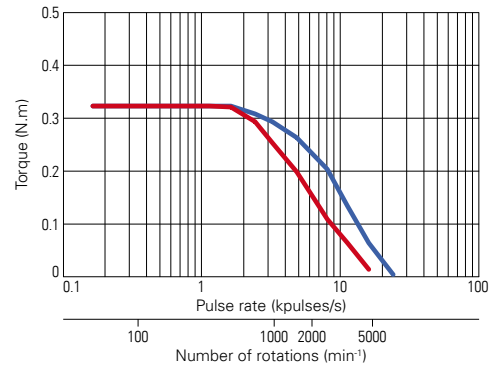
2H4241U12

Driver: US1D200P10
 Power supply: — 36V — 24V
 Current: 1.2A/phase unipolar
 Excitation mode: Full-step
 Load inertia JL = 0.94x10⁻⁴kg.m² (rubber coupling)



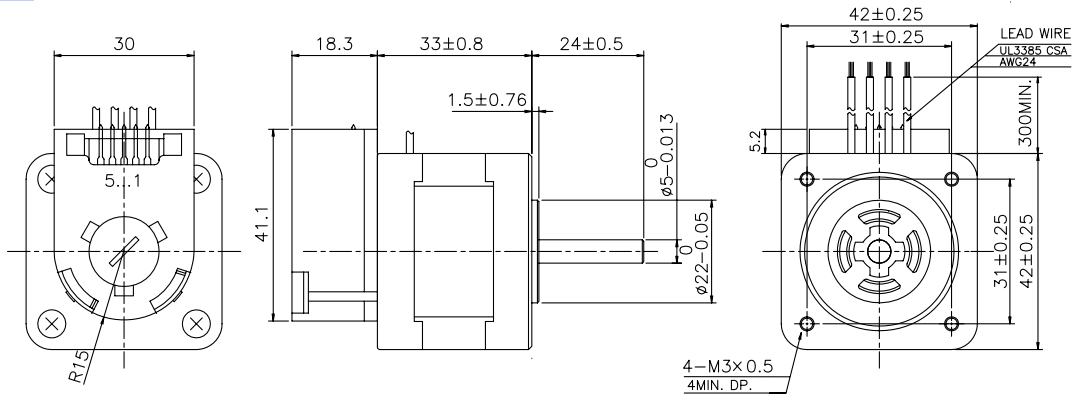
2H4248U12

Driver: US1D200P10
 Power supply: — 36V — 24V
 Current: 1.2A/phase unipolar
 Excitation mode: Full-step
 Load inertia JL = 0.94x10⁻⁴kg.m² (rubber coupling)

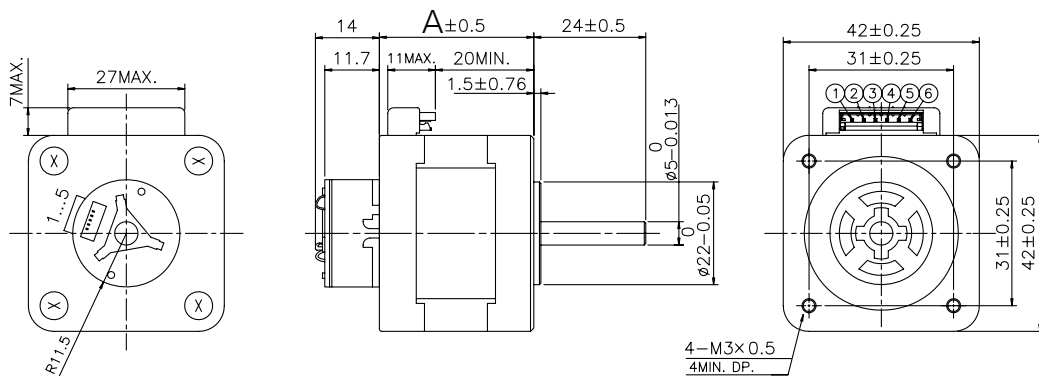


Dimensions [Unit: mm]

2P4233B10Sx40
 2P4233B10Mx1x



2H42xxxxR220



Motor Length	A [mm]
2H4233	33
2H4238	39
2H4248	48

35mm sq.

42mm sq.

56mm sq.

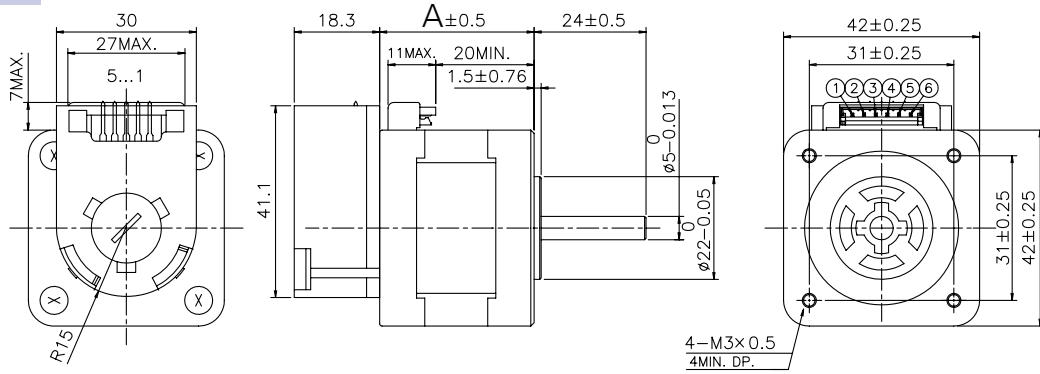
60mm sq.

86mm sq.

Encoder Specifications

Customization Service

2H42xxxxSx40
2H42xxxxMx1x

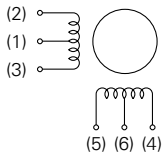


Motor Length	A [mm]
2H4233	33
2H4238	39
2H4241	41
2H4248	48

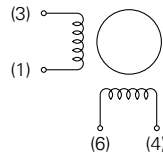
Internal wiring

() connector pin number

Unipolar winding



Bipolar winding



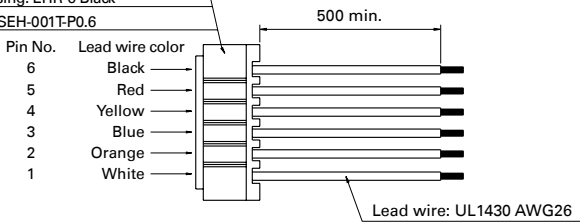
General Specification ▶ p. 24

Rotation Direction ▶ p. 25

Motor cables

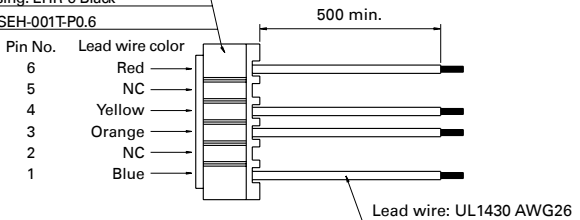
Unipolar winding, Cable P/N: 4835710-1

Manufacturer: J.S.T. Mfg. Co., Ltd.
 Housing: EHR-6 Black
 Pin: SEH-001T-P0.6



Bipolar winding, Cable P/N: 4835728-1

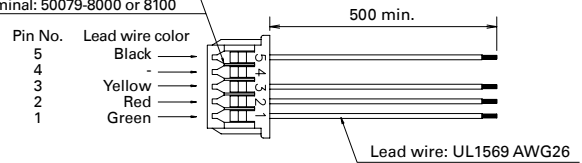
Manufacturer: J.S.T. Mfg. Co., Ltd.
 Housing: EHR-6 Black
 Pin: SEH-001T-P0.6



Encoder cables

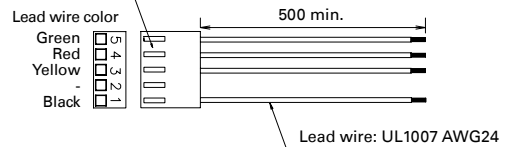
R220 Encoder, Cable P/N: CRP12500

Manufacturer: MOLEX
 Housing: 51021-0500
 Terminal: 50079-8000 or 8100



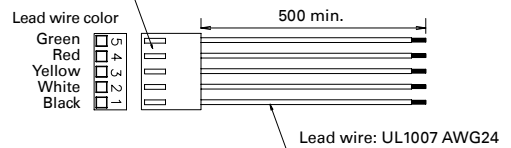
S2xx, M2xx Encoder, Cable P/N: CS2500

Manufacturer: MOLEX
 Housing: 22-01-2055
 (locking ramp cut)



S3xx, M3xx Encoder, Cable P/N: CS3500

Manufacturer: MOLEX
 Housing: 22-01-2055
 (locking ramp cut)





R type Encoder

RoHS

- Two channel quadrature outputs
- Resolution 200 counts per revolution
- TTL compatible
- Single 5VDC supply
- HEDR serie encoders from Broadcom Limited

Encoder features

Parameter	R220
Supply voltage [VDC]	5 ± 0.5
Max. Supply current [mA]	33
Output voltage [VDC]	VOH = 2.4 min, VOL = 0.4 max
Output channels	2 (A, B)
Maximum frequency [kHz]	16

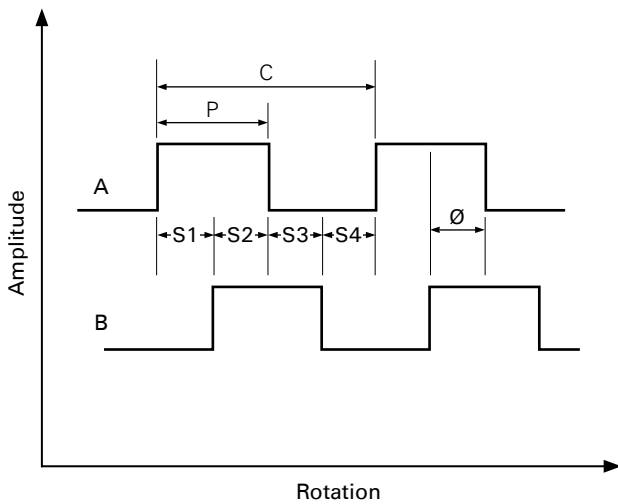
Encoder pin-outs

Pins	R220	R220
	35, 42mm sq.	56, 86mm sq.
Pin 1	Channel B	GND
Pin 2	5 VDC	NC
Pin 3	Channel A	Channel A
Pin 4	NC	5 VDC
Pin 5	GND	Channel B

Encoder P/N

R220: 2 channels, 200CPR

Output waveforms

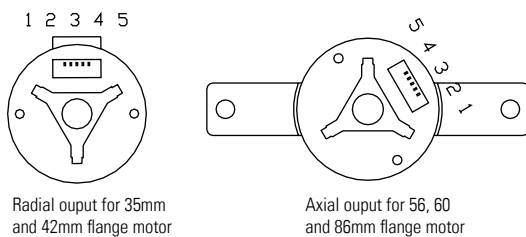


Encoding characteristics

Parameter	Symbol	R220	
		Typ.*	Max.
Pulse width error [°e]	ΔP	7	75
Logic width error [°e]	ΔS	15	60
Phase error [°e]	$\Delta \emptyset$	15	60
Position error [arcmin.]	$\Delta \emptyset$	50	120
Cycle error [°e]	ΔC	10	45

*Typical values specified at supply voltage = 5.0 V and 25°C

Electrical interface



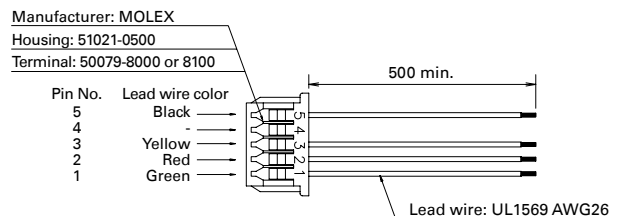
Pull-up resistors on output pins have already been integrated. Each of the three encoder outputs can drive a single TTL load in this configuration.

Suitable connectors

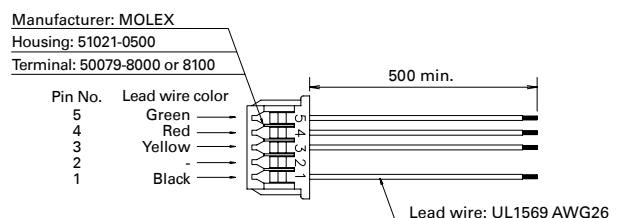
Manufacturer	Part number	
	Housing	Contact
Molex	51021-0500	50079-8000

Encoder cables

R220 Encoder, 35 & 42mm flange Motor, Cable P/N: CRP12500



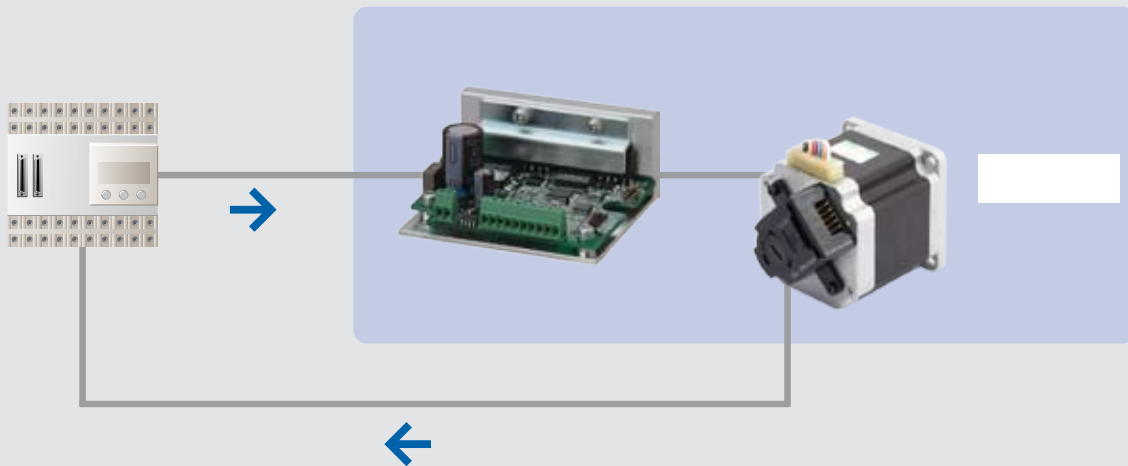
R220 Encoder, 56, 60 & 86mm flange Motor, Cable P/N: CRS22500



STEPPING MOTOR WITH ENCODER

When open-loop control is not enough

Stepping systems provide precise positioning with easy control. By adding an encoder to a stepping motor, the controller can monitor the actual position directly, closing the feedback loop and improving the safety and reliability.



Stepping Motor with Encoder: Features

Safety: Position verification

Adding an encoder is an ideal and easy solution for safety-sensitive applications, requiring position verification and position maintenance, such as medical instrumentation.

Close-loop control with stepper benefit

High-end close loop control can be achieved while keeping the advantages of stepping motors: stable stop without hunting, higher torque than DC servo motor at low speed over the same size, eliminating the need of gearboxes.

Reliability: Stall Detection

Device reliability is improved with possible detection and reporting of stalls.

Accurate Homing

Encoder with index pulse option can be used to achieve precise homing.

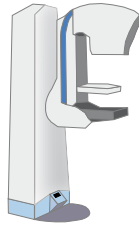


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Application Examples



Blood Analyser



Mammograph









3D Printing








Industrial machine

Stepping Motors: Lineup RoHS

Basic step angle	Motor size		Holding torque [Nm min.] Model number	Page
1.8°	35 mm sq.		0.195 to 0.23 2H35□	p. 8
0.9°	42 mm sq.		0.23 2P42□	p. 10
1.8°	42 mm sq.		0.26 to 0.42 2H42□	p. 10
1.8°	56 mm sq.		0.83 to 2 2H56□	p. 13
1.8°	60 mm sq.		0.88 to 2.7 2H60□	p. 16
1.8°	86 mm sq.		3.3 to 9 2H86□	p. 18

Encoder Selection Guide RoHS

4 types of encoder can be selected. They are two and three channels optical incremental encoders and emphasize high reliability and high resolution.

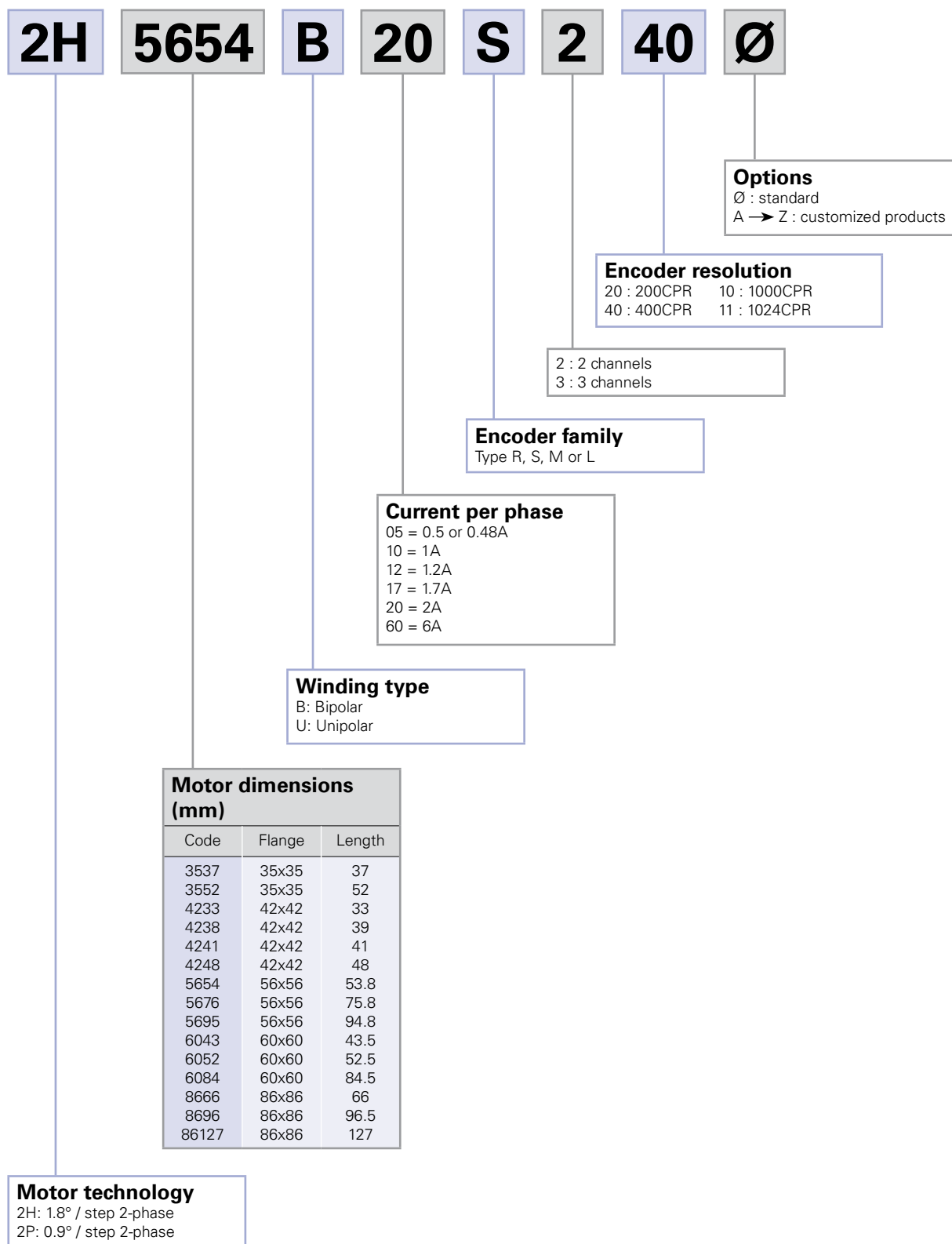
Encoder type		Counts Per Revolution [CPR]				Pulse index option	Single ended	Differential line driver	Key points
		200	400	1000	1024				
R _{type}		■					■		Compact size Simple interface Cost effective
S _{type}			■			■	■		Medium resolution Pulse index option Simple interface
M _{type}				■	■	■	■		High resolution Pulse index option Simple interface
L _{type}			■					■	Noise immunity Transmitting encoder signal over a long distance

Encoder specifications ▶ p. 20 to 23
Please consult us for higher resolution encoder

How to Read Part Numbers

Note that not every combination of the following codes or characters is available. Check the part numbers available on the following or contact us.

Example: This is a standard model number for a stepping motor and encoder. The motor specifications are 2-phase stepping motor, motor size: 56mm sq., motor length: 54mm, bipolar winding, 2A/phase, S type encoder, 2 channels, 400 CPR.



Part Numbers Available

On above table are introduced available combinations between stepping motors and encoders.

■ : Valid combinations, available from stock

Motor size	Based motor	Encoder type							
		R type	S type			M type			L type
		2 channels	2 channels	3 channels	2 channels		3 channels	2 channels	
		200CPR	400CPR	400CPR	1000CPR	1024CPR	1000CPR	400CPR	
		R220	S240	S340	M210	M211	M310	L240	
35 mm sq.	2H3537B12	■	■	■	■	■	■		
	2H3552U12	■	■	■	■	■	■		
42 mm sq.	2P4233B10		■	■	■	■	■		
	2H4233B05	■	■	■	■	■	■		
	2H4238B17	■	■	■	■	■	■		
	2H4241B05		■	■	■	■	■		
	2H4241U12		■	■	■	■	■		
	2H4248U12	■	■	■	■	■	■		
56 mm sq.	2H5654U10	■	■	■	■	■		■	
	2H5654U20	■	■	■	■	■		■	
	2H5654B20		■	■	■	■		■	
	2H5676B20		■	■	■	■		■	
	2H5695B20	■	■	■	■	■		■	
60 mm sq.	2H6043B20	■	■	■	■	■		■	
	2H6052B20	■	■	■	■	■		■	
	2H6084B20	■	■	■	■	■		■	
86 mm sq.	2H8666B60	■	■	■	■	■		■	
	2H8696B60	■	■	■	■	■		■	
	2H86127B60	■	■	■	■	■		■	

Optional Cables

Motor cables

Motor size	Based motor	Cable P/N
42 mm sq.	2H4233B05	4835728-1
	2H4238B17	4835728-1
	2H4241B05	4835728-1
	2H4241U12	4835710-1
	2H4248U12	4835710-1

Encoder cables

Encoder	Motor type	Cable P/N
R220	2H35, 2H42	CRP12500
	2H56, 2H60, 2H86	CRS22500
S240 M21x	all	CS2500
S340 M310	all	CS3500

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[9GV1248P1J01](#) [9HV0412P3K001](#) [9WE1724K501](#) [9WG1212E101](#) [103H5208-5240](#) [103H7126-5840](#) [103H7822-5740](#) [109-1001F13](#) [109-1002F40](#) [109-1003M30](#) [109-313](#) [109-601](#) [109L1748H501](#) [109L5712H501](#) [109P0412D602](#) [109P0424G302](#) [109P1412M101](#)
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