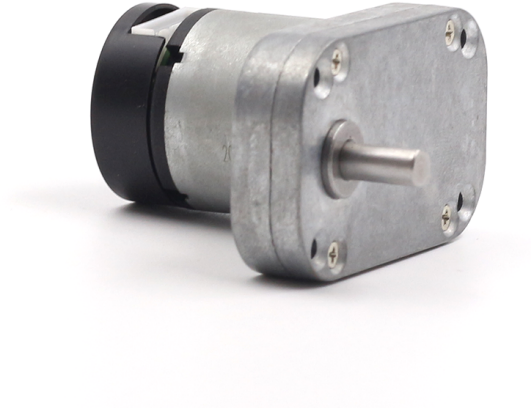


TSL-GM3865-520-EN

38 x 65 mm Brushed DC Motor With Spur Gearbox And Encoder



Product Model	TSL-GM3865-520-EN
Product Type	38 x 65 mm brushed DC motor with spur gearbox and Hall encoder
Operating Voltage	DC 6 V / DC 12 V
Gear Ratio Options	29.029:1, 42:1, 67:1, 125:1, 225:1, 450:1
Gearbox Outline	64.4 x 38 mm front plate
Output Shaft	Ø6 mm D-shaft; 12 mm projection
Connector	XH2.54-6PIN
Encoder Type	AB dual-phase incremental magnetic Hall encoder
Encoder Supply Voltage	DC 3.3 V / DC 5.0 V
Basic Pulse Count	13 PPR x gear reduction ratio

Compact Gearmotor

Integrated spur gearbox, DC motor, and Hall encoder for closed-loop motion-control applications.

Multiple Reduction Ratios

Available from 29.029:1 to 450:1 for a wide range of speed and torque requirements.

Customizable Solution

Shaft, wiring, voltage, gear ratio, rear cover, and performance can be customized.

Performance Parameters

Gear ratio: 29.029:1

Parameter	DC 12 V	DC 6 V
Rated Voltage	DC 12 V	DC 6 V
No-load Current	≤ 0.15 A	≤ 0.8 A
Rated Current	≤ 0.65 A	≤ 0.5 A
No-load Speed After Reduction	340 $\pm 10\%$ rpm	170 $\pm 10\%$ rpm
Rated Speed After Reduction	265 $\pm 10\%$ rpm	135 $\pm 10\%$ rpm
Maximum Output Power of Motor	5.5 W	1.65 W
Rated Torque	1.2 kgf-cm	0.75 kgf-cm
Stall Torque	≥ 5.5 kgf-cm	≥ 3.0 kgf-cm
Stall Current	≤ 3.2 A	≤ 1.8 A

Note: Performance parameters are for reference only and can be customized according to customer requirements.

Performance Parameters - DC 12 V

TSL-GM3865-520-EN | maximum output: 5.2 W

Ratio	No Load		Rated Load				Stall	
	Current	Speed	Voltage	Torque	Speed	Current	Torque	Current
	mA	RPM	V	kg·cm	RPM	A	kg·cm	A
42:1	≤180	240	12	1.8	185	≤0.6	≥8.0	≤3.5
67:1	≤180	148	12	2.9	112	≤0.6	≥12.0	≤3.5
125:1	≤180	74	12	5.5	56	≤0.6	≥20.0	≤3.5
225:1	≤180	44	12	10.0	33	≤0.6	Max. 25.0	≤3.5
450:1	≤180	22	12	20.0	16	≤0.6	Max. 25.0	≤3.5

Note: Performance parameters are for reference only and can be customized according to customer requirements.

For 225:1 and 450:1 versions, continuous load or stall torque must not exceed 25.0 kg·cm.

Performance Parameters - DC 6 V

TSL-GM3865-520-EN | maximum output: 1.5 W

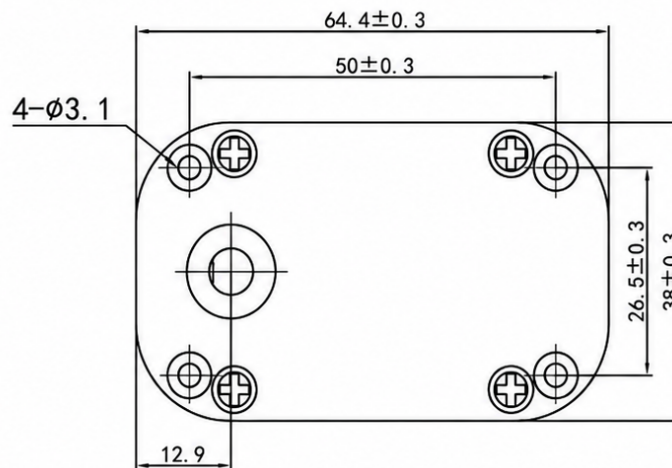
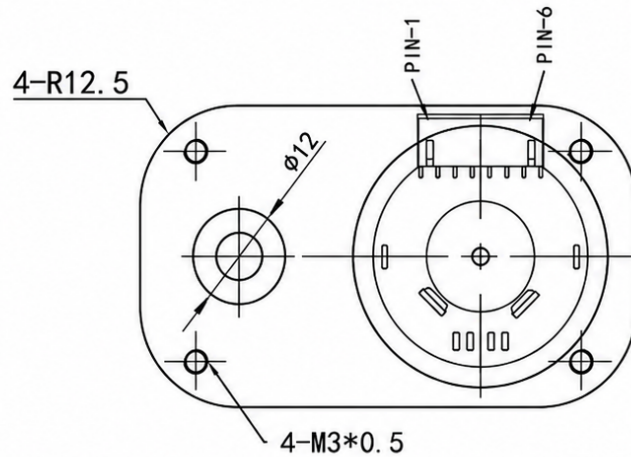
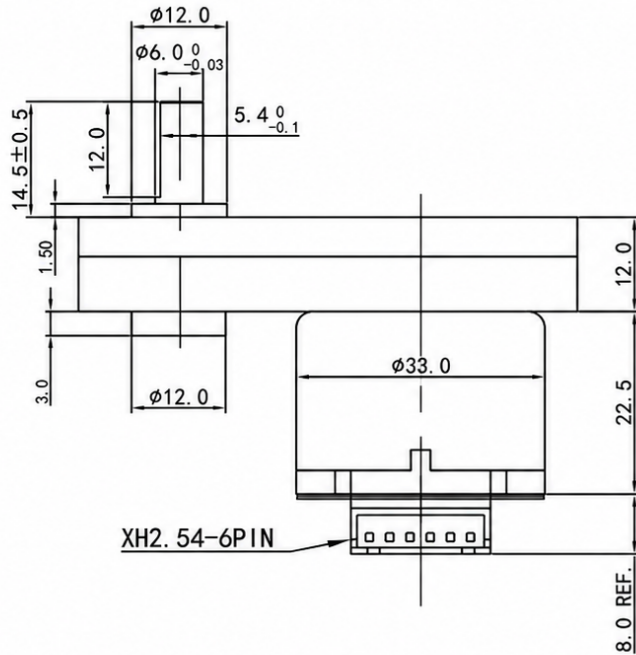
Ratio	No Load		Rated Load				Stall	
	Current	Speed	Voltage	Torque	Speed	Current	Torque	Current
	mA	RPM	V	kg·cm	RPM	A	kg·cm	A
42:1	≤100	115	6	1.0	90	≤0.4	≥4.0	≤1.8
67:1	≤100	72	6	1.5	55	≤0.4	≥6.0	≤1.8
125:1	≤100	36	6	3.0	27	≤0.4	≥10.0	≤1.8
225:1	≤100	21	6	5.0	16	≤0.4	≥20.0	≤1.8
450:1	≤100	10	6	10.0	8	≤0.4	≥25.0	≤1.8

Note: Performance parameters are for reference only and can be customized according to customer requirements.

Avoid prolonged operation near stall. Select the gear ratio according to the required continuous torque and speed.

Mechanical Dimensions

Encoder version without rear cover



PIN1- M1	MOTOR POWER IN + (Red wire)
PIN2- GND	HALL SENSOR GND. (Black wire)
PIN3- B	C2 HALL SENSOR B Vout (Yellow wire)
PIN4- A	C1 HALL SENSOR A Vout (Green wire)
PIN5- VCC	HALL SENSOR VCC. (Blue wire)
PIN6- M2	MOTOR POWER IN + (White wire)

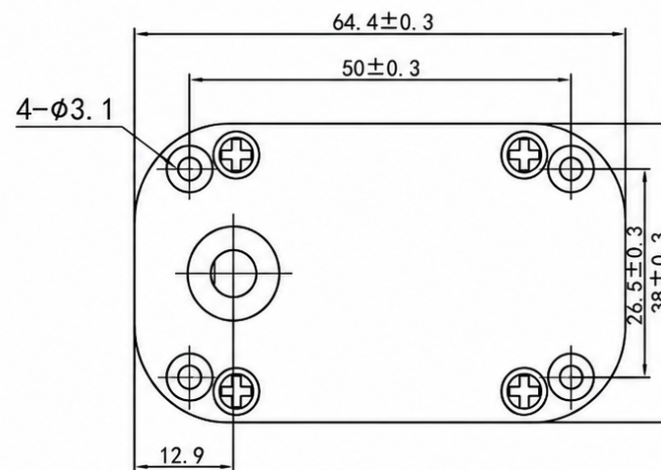
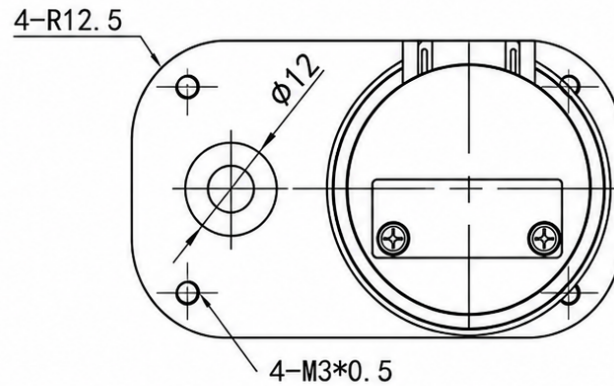
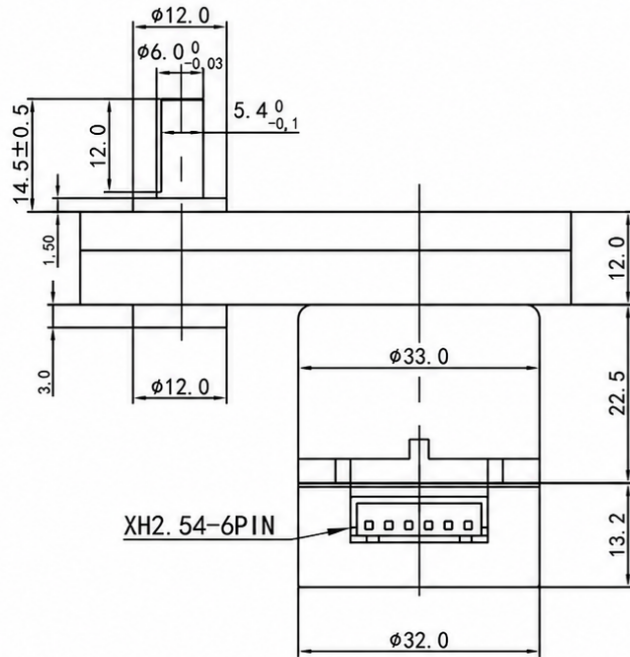
Feature	Value
Gearbox outline	64.4 x 38 mm
Gearbox thickness	12.0 mm
Motor diameter	Ø33.0 mm
Motor body length	22.5 mm
Encoder extension	8.0 mm REF.
Output shaft	Ø6.0 mm D-shaft
Shaft projection	12.0 mm
Mounting holes	4 x Ø3.1 mm
Connector	XH2.54-6PIN

All dimensions are in millimetres.

Refer to the drawing for tolerances and datum details.

Mechanical Dimensions

Encoder version with rear cover



PIN1- M1	MOTOR POWER IN + (Red wire)
PIN2- GND	HALL SENSOR GND. (Black wire)
PIN3- B	C2 HALL SENSOR B Vout (Yellow wire)
PIN4- A	C1 HALL SENSOR A Vout (Green wire)
PIN5- VCC	HALL SENSOR VCC. (Blue wire)
PIN6- M2	MOTOR POWER IN + (White wire)

Feature	Value
Gearbox outline	64.4 x 38 mm
Gearbox thickness	12.0 mm
Motor diameter	Ø33.0 mm
Motor body length	22.5 mm
Rear cover extension	13.2 mm
Rear cover diameter	Ø32.0 mm
Output shaft	Ø6.0 mm D-shaft
Mounting holes	4 x Ø3.1 mm
Connector	XH2.54-6PIN

Connector Pin Assignment

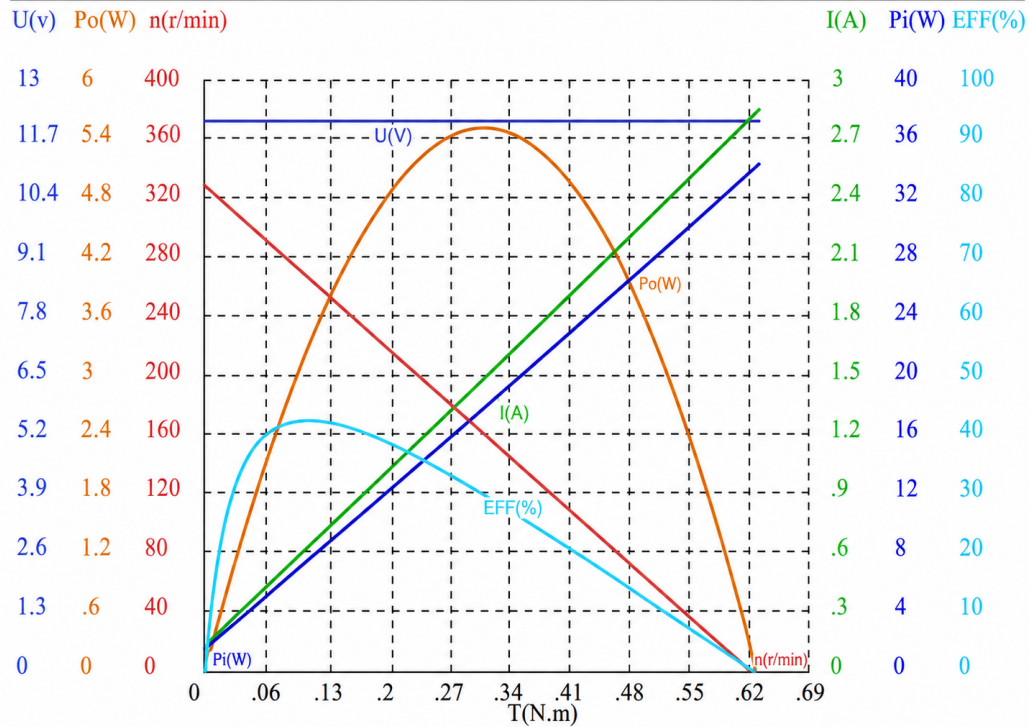
Pin	Signal	Function	Wire Color
1	M1	Motor power terminal M1	Red
2	GND	Hall sensor ground	Black
3	B / C2	Hall phase B output	Yellow
4	A / C1	Hall phase A output	Green
5	VCC	Hall sensor supply	Blue
6	M2	Motor power terminal M2	White

Performance Curves

Motor performance reference at DC 12 V and DC 6 V

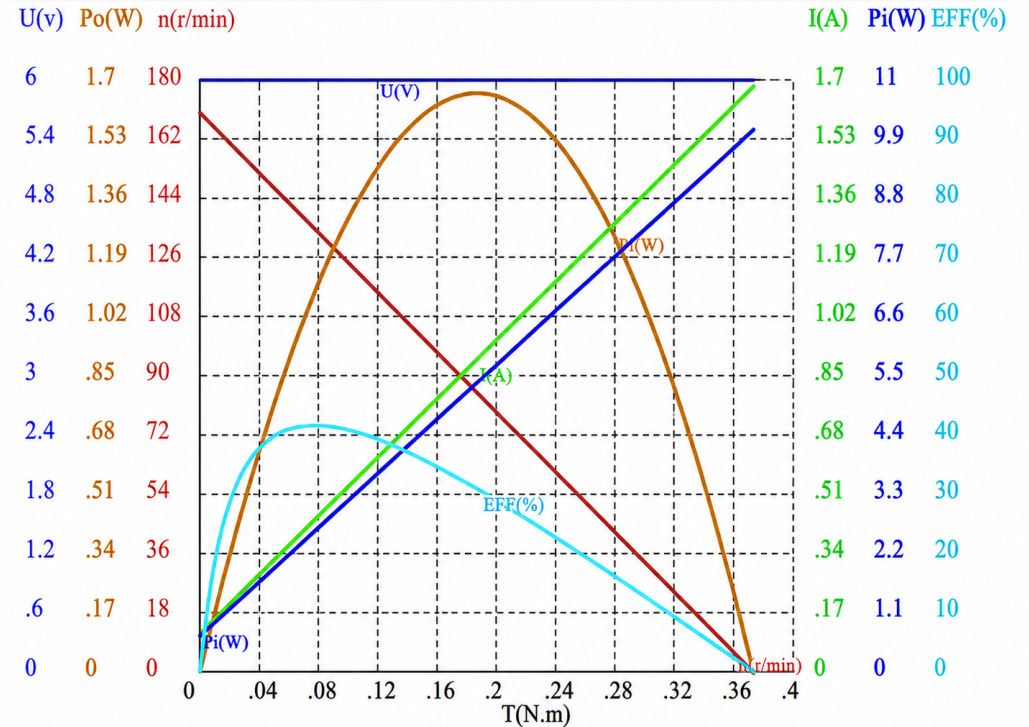
DC 12 V

12.0V Performance Curves



DC 6 V

6.0V Performance Curves

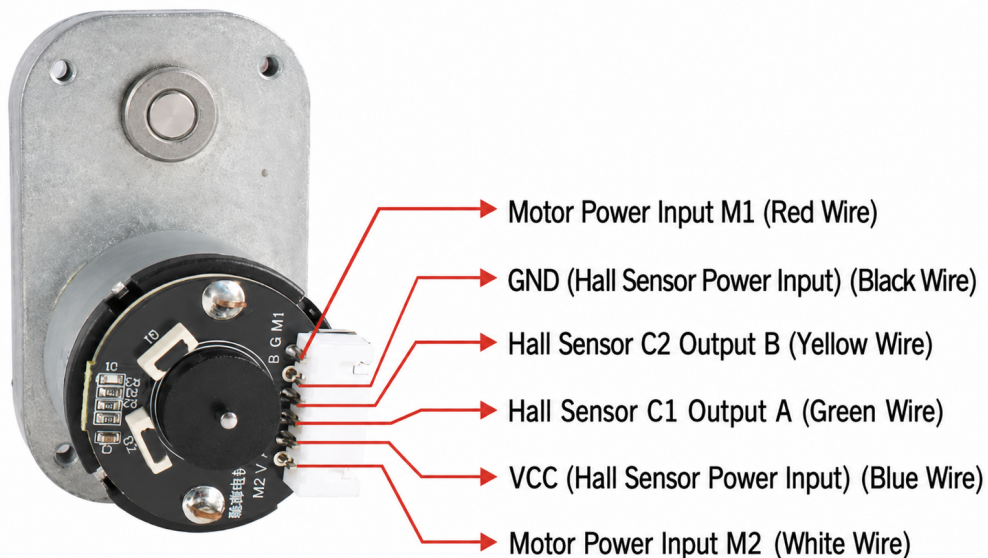


Curve	Horizontal Axis	Displayed Quantities
12 V / 6 V	Torque T (N.m)	Voltage, speed, current, input power, output power, and efficiency

Curves are typical reference data. Actual performance may vary with production tolerance, temperature, and operating conditions.

Encoder Connector and Parameters

AB dual-phase incremental magnetic Hall encoder



Pin Assignment

Pin	Signal	Function	Wire Color
1	M1	Motor power terminal M1	Red
2	GND	Hall sensor ground	Black
3	B / C2	Hall phase B output	Yellow
4	A / C1	Hall phase A output	Green
5	VCC	Hall sensor supply	Blue
6	M2	Motor power terminal M2	White

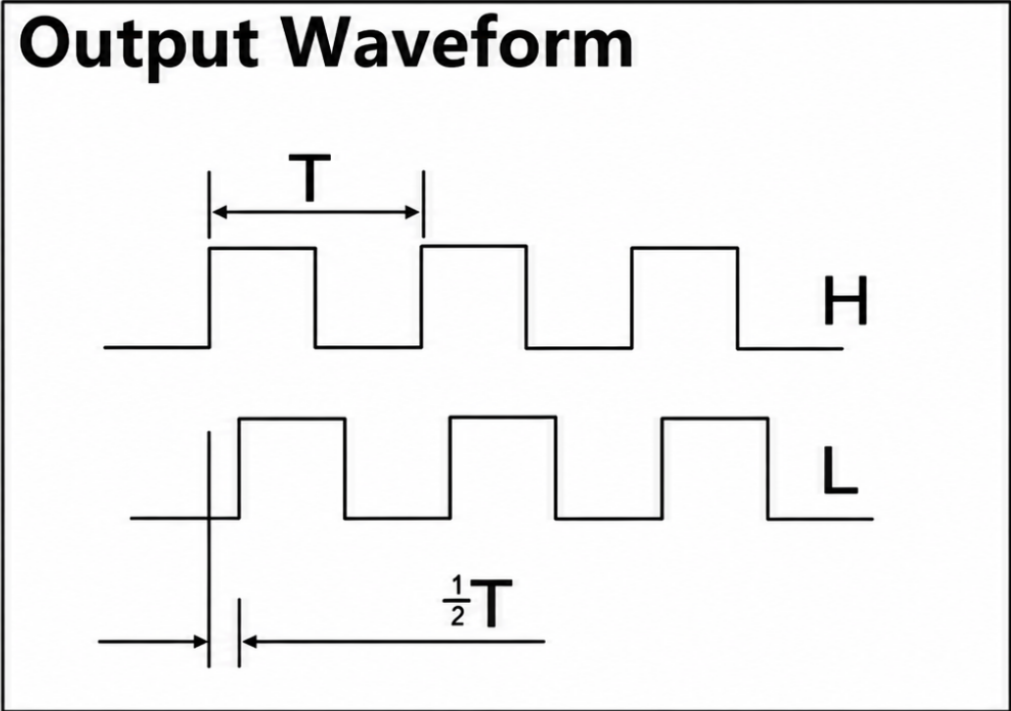
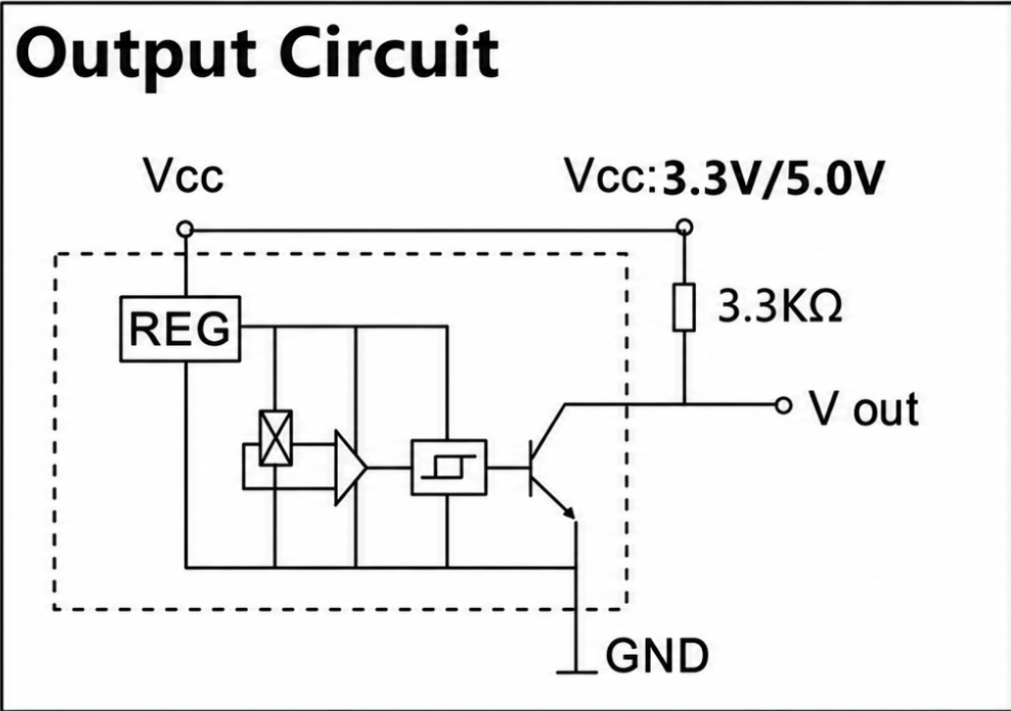
Encoder Parameters

Parameter	Specification
Type	AB dual-phase incremental magnetic Hall encoder
Line Count	Basic pulse 13 PPR x gear reduction ratio
Supply Voltage	DC 3.3 V / DC 5.0 V
Basic Function	Built-in pull-up and shaping resistors; direct connection to MCU
Interface Type	XH2.54 (with matching connecting cable)
Output Signal Type	Square wave, AB phase
Response Frequency	100 kHz
Basic Pulse Count	13 PPR
Magnetic Ring Trigger Poles	26 poles (13 pole pairs)

The connector illustration and values above are for reference. Wiring and encoder parameters can be customized.

Encoder Output Circuit and Waveform

Reference circuit for the Hall encoder output stage



Supply Voltage	Output Pull-up	Output Format
DC 3.3 V / DC 5.0 V	Built-in 3.3 kΩ pull-up reference	Two-channel square-wave AB output

Electrical integration should be verified with the target controller input level and counting method.