



Transmisiones Ltda.

Un Mundo en Automatización y Potencia

Transmisiones Ltda. Carrera 68 B # 21 A -
24, bodega UE 28- 1 Parque Industrial
Montevideo PBX: (57+1) 4126898
Bogotá - Colombia
info@transmisiones.de
www.transmisiones.de

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2009321ROE-E



ROE

Delta Rotary Optical Encoders



www.delta.com.tw/industrialautomation

Rotary Optical Encoder

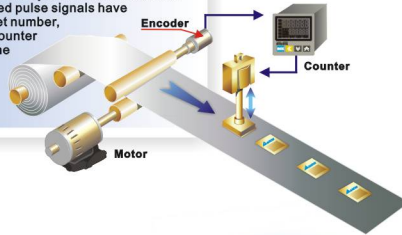
ROE

Various Applications



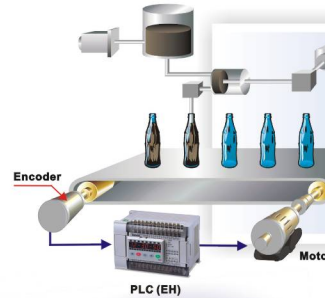
Label Printing Machine

When the motor starts to run, the motor rotation number will be converted to encoder pulse signals and counted by the electronic counter. Once the counted pulse signals have reached a preset number, the electronic counter will command the machine and activate the printing operation.



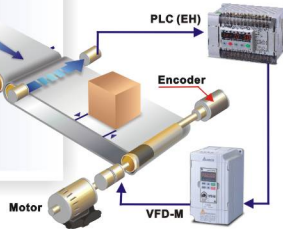
Auto Bottling Machine

The operation of filling bottles can be controlled by the encoder, programmable logic controller, and motor. The position of the bottles can be confirmed by the detected encoder feedback pulse signals.



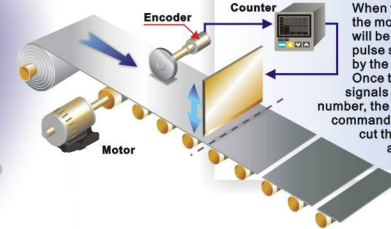
Detecting Machine

Use a sensor to generate pulse signals that is processed by the Rotary Optical Encoder for counting. When the counted pulse signals have reached a preset number, the object will be detected and its size will be verified if correct or not.



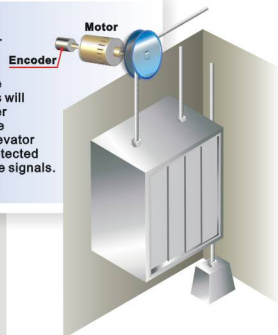
Fixed Length Cutting Machine

When the motor starts to run, the motor rotation number will be converted to encoder pulse signals and counted by the electronic counter. Once the counted pulse signals have reached a preset number, the electronic counter will command the cutting machine to cut the material in the same and fixed length.



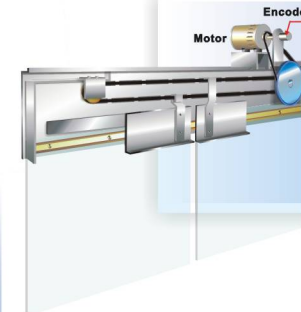
Elevator

Rotary Optical Encoder is connected to the motor directly. When the elevator moves, the motor rotation numbers will be converted to encoder pulse signals. Then, the moving speed of the elevator can be known by the detected encoder feedback pulse signals.



Elevator Door

Rotary Optical Encoder is connected to the motor directly. When the motor starts to run, the motor rotation number will be converted to encoder pulse signals. The Rotary Optical Encoder is used to detect and confirm the position and speed of the elevator door.



Rotary Optical Encoder is a sensor, which converts rotary motion or position to electronic pulse numbers for phase change, speed and position detection. It is also used to detect the speed, position, angle, distance and counts information relating to mechanical machine.

Major applications include main hoist of crane (crane control), elevator, industry sewing machine, textile machine, storage equipment, medical treatment related machine, and servo motor. Therefore, Rotary Optical Encoder is a very important device in industrial automation field.

Rotary Optical Encoder

ROE

Ordering Information

Model Name Explanation

ES5-05CN8942F is an incremental encoder, shaft type is solid shaft, outer diameter is 50mm, resolution can reach 500PPR, output form is open collector, signal output is A, B & Z (ungated), shaft/bore diameter is 8mm, input voltage is 7~24VDC and operation environment is IP40.

It means ES5-05CN8942F this product has protection against solid foreign objects of 1.0 mm in diameter and greater but does not have waterproof protection. Also, it is suitable for the use within -10°C ~ 70°C operating temperature. Besides, the cable length of ES5-05CN8942F is 2000mm and mechanism code is F (F: Flange).

E S 5 - 0 5 C N 8 9 4 2 F ← Example

1 2 3 - 4 5 6 7 8 9 10 11 ← Code Order

1. Product Type

E: Incremental Encoder
 A: Absolute Encoder
 C: CNC Incremental Encoder
 M: Incremental Encoder with commutation UVW (for Servo Motor)

2. Shaft Type

S: Solid Shaft
 H: Hollow Shaft
 T: Through Hole Shaft

3. Outer Diameter / Frame Size

3: 36.6mm 4: 38.7mm
 5: 50mm A: 100mm
 7: 68mm

4. Resolution

ES/EH/ET (PPR):
 01: 100; 02: 200; 0B: 256; 03: 300;
 0C: 360; 04: 400; 05: 500; 06: 600;
 10: 1000; 11: 1024; 12: 1200; 20: 2000;
 25: 2500; 36: 3600; 50: 5000

AS/AH (BIT):
 05: 06; 07; 08; 09; 10; 11; 12

MH/MT (PPR):
 25: 2500

CS(PPR):
 11: 1024

5. Output Form

V: Voltage Output C: Open Collector
 L: Line Driver P: Push Pull

6. Signal Output

ES/EH/ET:
 A: A (without Z signal output)
 B: A & B (without Z signal output)
 G: A, B & Z (Gated with A&B)
 N: A, B & Z (Ungated)
 U: A, B & Z (Ungated, active low)
 V: A, B & Z (Gated with A&B, active low)

AS/AH:
 B: Binary code G: Gray code

MH/MT:
 F: 14 cores, A, B & Z and U, V, W output simultaneously
 N: 8 cores, A, B & Z and U, V, W do not output simultaneously

7. Shaft/Bore Diameter

4: 4mm 5: 5mm 6: 6mm
 8: 8mm M: 30mm Q: 1/4 inch
 T: 9mm with Taper 1:10 R: 15mm

8. Input Voltage

5: 5VDC; 8: 5~12VDC; 9: 7~24VDC

9. Operating Environment

1: IP40 & 60°C; 4: IP40 & 70°C; 6: IP65 & 70°C;
 C: IP30 & 85°C; H: IP55 & 70 °C

10. Cable Length

1: 1000 mm; 2: 2000 mm; 3: 3000 mm;
 5: 500 mm; 7: 170 mm; A: 300 mm;
 M: Military Connector

11. Suffix Code

0: UVW 10 poles; 4: UVW 4 poles; 6: UVW 6 poles;
 8: UVW 8 poles; F: Flange

IP (Ingress Protection) is a coding system which is used to indicate the environmental protection of enclosures around the electrical equipment. The environmental protection includes the degree of protection from ingress of solid foreign objects, ingress of water and mechanical impacts. IP code normally has two numbers.

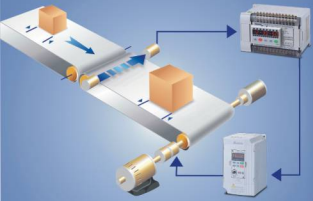
The first number indicates the degree of protection against solid foreign objects and the degree that persons are protected against hazardous parts or harmful deposit.

The second number indicates the degree of protection against water. The number is higher, the protection is better.

For example, IP Rating IP 65, 6 describes the level of protection from totally protected against dust and 5 describes the level of protection against low pressure jetting water from all directions.



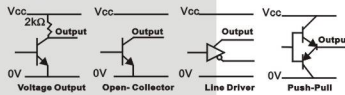
Specifications



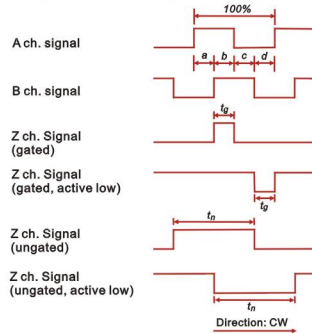
ES/EH/ET Series

Wire Color	Brown	Blue	Black	Black/Red	White	White/Red	Orange	Orange/Red
Function	Vcc	0V	A	\bar{A}	B	\bar{B}	Z	\bar{Z}
Voltage Output	○	○	○	○	○	○	○	○
Open Collector	○	○	○	○	○	○	○	○
Line Driver	○	○	○	○	○	○	○	○
Push Pull	○	○	○	○	○	○	○	○

Output Circuit



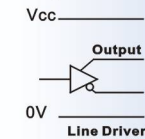
Output Waveform (View from shaft end)



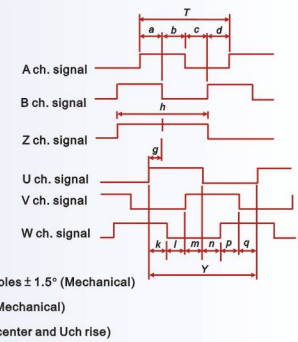
MH4/MT4 Series

Wire Color	Function	Wire Color	Function
Black	A	Yellow	U
Black/Red	\bar{A}	Yellow/Red	\bar{U}
White	B	Green	V
White/Red	\bar{B}	Green/Red	\bar{V}
Orange	Z	Pink	W
Orange/Red	\bar{Z}	Pink/Red	\bar{W}
Brown	DC+5V	Blue	0V

Output Circuit



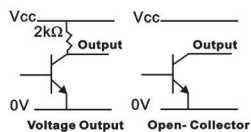
Output Waveform (CCW rotation, view from shaft end)



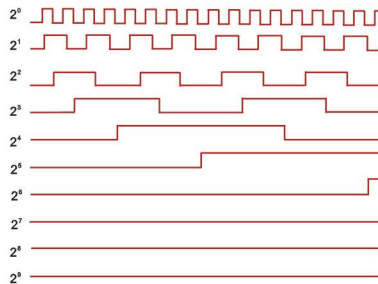
AS/AH Series

Wire Color	Function	Wire Color	Function
Red	Vcc	Blue	2 ¹
Black	0V	Purple	2 ¹
Brown	2 ²	Gray	2 ¹
Orange	2 ²	White	2 ²
Yellow	2 ²	Pink	2 ¹
Green	2 ¹	Light Blue	2 ¹

Output Circuit



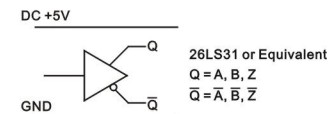
Output Waveform (View from shaft end)



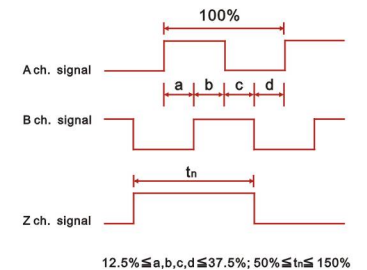
CS Series

Function	PIN	Function	PIN
Vcc	H	0V	K
A	A	\bar{A}	N
B	C	\bar{B}	R
Z	B	\bar{Z}	P
Shielding	T		

Output Circuit



Output Waveform (CW rotation, view from shaft end)





Incremental Encoder

ROE

Solid Shaft Outer Diameter 36.6mm

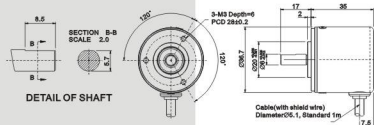
ES3



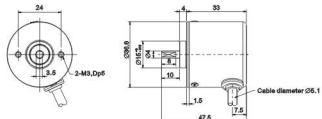
	ES3 Series			
	Model Name	ES3...5XX	ES3...8XX	ES3...9XX
Electrical Specifications	Rated Voltage	5±5%V	5-5%~12+5%V	7-5%~24+5%V
	Output Type	Open Collector	Voltage Output	Push Pull Line Driver
	Sink Current	20 mA	--	20 mA 20mA 26C31or equivalent
	Source Current	--	--	20 mA
	Max. Load Power Voltage	DC30V	--	
	Output Signal	A,B,Z		A,Ā,B,Ḃ,Z,Z̄
	Output Voltage	VH >(V _{in} -2V)	VL ≥(V _{cc} -2V)	
			≤500mV	
	Encoder Resolution: 100 to 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 5.1mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length: 500 / 1000 / 2000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 1μs Typ. ; Fall Time 1μs Typ.			
Mechanical Specifications	Max. Speed of Main Shaft: 6000rpm Starting Torque: 2.0 N·mm Typ. / 5.0 N·mm Typ. (IP65) Moment of Inertia: 0.3 kg · mm ² Typ. Outer Diameter: 36.6mm Height: 33mm (S4) / 35mm (S6) / 50.2mm (IP65) Weight: <70g / <120g (IP65) Shaft Diameter: 4mm / 6mm Max. Shaft Load: Thrust: 15 N / Radial: 30N (10 mm from mounting surface) Wire Color: Vcc: Brown, 0V: Blue, A: Black, Ā: Black / Red, B: White, Ḃ: White / Red, Z: Orange, Z̄: Orange / Red			
Environmental Specifications	Operating Temperature: -10°C~70°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~85°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40 / IP65			

Dimensions

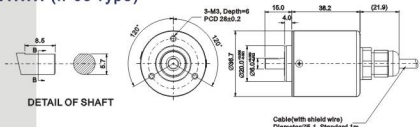
Shaft Diameter 6mm



Shaft Diameter 4mm



Shaft Diameter 6mm (IP65 Type)



Solid Shaft Outer Diameter 50mm

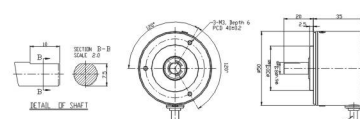
ES5



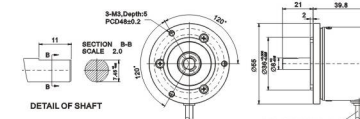
	ES5 series			
	Model Name	ES5...5XX	ES5...8XX	ES5...9XX
Electrical Specifications	Rated Voltage	5±5%V	5-5%~12+5%V	7-5%~24+5%V
	Output Type	Open Collector	Voltage Output	Push Pull Line Driver
	Sink Current	20 mA	--	20 mA 20mA 26C31or equivalent
	Source Current	--	--	20 mA
	Max. Load Power Voltage	DC30V	--	
	Output Signal	A,B,Z		A,Ā,B,Ḃ,Z,Z̄
	Output Voltage	VH >(V _{in} -2V)	VL ≥(V _{cc} -2V)	
			≤500mV	
	Encoder Resolution: 100 to 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 5.1mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length: 500/1000/2000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 1μs Typ. ; Fall Time 1μs Typ.			
Mechanical Specifications	Max. Speed of Main Shaft: 6000rpm Starting Torque: 4.0 N·mm Typ. / 6.0 N·mm Typ. (IP65) Moment of Inertia: 0.8 kg · mm ² Typ. Outer Diameter: 50mm Height: 35mm / 57mm (IP65) Weight: <130g / <145g (IP65) (All provided without Flange) Shaft Diameter: 5mm / 6mm / 8mm Max. Shaft Load: Thrust: 30N / Radial: 50N (10 mm from mounting surface) Wire Color: Vcc: Brown, 0V: Blue, A: Black, Ā: Black / Red, B: White, Ḃ: White / Red, Z: Orange, Z̄: Orange / Red			
Environmental Specifications	Operating Temperature: -10°C~70°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~85°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40 / IP65			

Dimensions

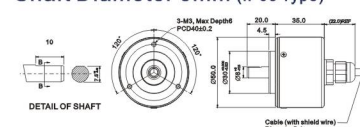
Shaft Diameter 6mm / 8mm



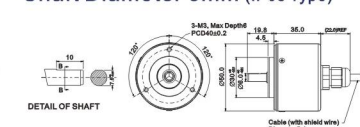
Shaft Diameter 8mm (Flange Type)

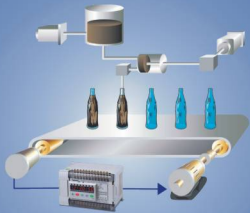


Shaft Diameter 8mm (IP65 Type)



Shaft Diameter 6mm (IP65 Type)





Incremental Encoder

ROE

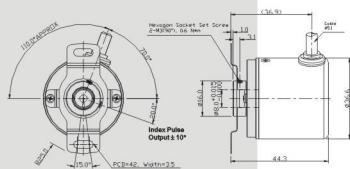
Hollow Shaft Outer Diameter 36.6mm

EH3

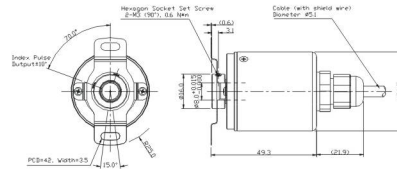


	EH3 Series			
	Model Name	EH3...5XX	EH3...8XX	EH3...9XX
Electrical Specifications	Rated Voltage	5±5%V	5-5%~12+5%V	7-5%~24+5%V
	Output Type	Open Collector	Voltage Output	Push Pull Line Driver
	Sink Current	20 mA	--	20 mA
	Source Current	--	--	20 mA
	Max. Load Power Voltage	DC30V	26C31 or equivalent	
	Output Signal	A, B, Z		A, \bar{A} , B, \bar{B} , Z, \bar{Z}
	Output Voltage	VH >(V _{in} -2V)	VL ≥(V _{cc} -2V)	
			≤500mV	
	Encoder Resolution: 100 to 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 5.1mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length : 500/1000/2000±20mm Cross Sectional Area : 0.18mm ² Signal Characteristic: Rise Time 1 μs Typ.; Fall Time 1 μs Typ.			
Mechanical Specifications	Max. Speed of Main Shaft: 6000rpm Starting Torque: 4.0 N·mm Typ. / 6.0 N·mm Typ. (IP65) Moment of Inertia: 1.5 kg · mm ² Typ. Outer Diameter: 36.6mm Height: 44.3mm / 70.2mm (IP65) Weight: <85g / <130g (IP65) Bore Diameter: 8mm Max. Shaft Load: Thrust: 15N / Radial: 30N (10 mm from shaft end) Wire Color: Vcc: Brown, 0V: Blue, A: Black, \bar{A} : Black / Red, B: White, \bar{B} : White / Red, Z: Orange, \bar{Z} : Orange / Red			
Environmental Specifications	Operating Temperature: -10°C~70°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~85°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40 / IP65			

Dimensions Bore Diameter 8mm



Bore Diameter 8mm (IP65 Type)



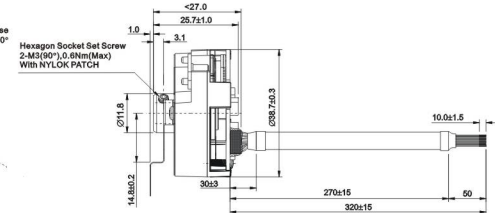
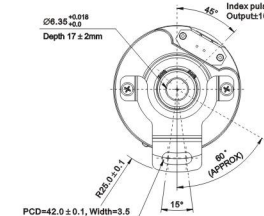
Hollow Shaft Outer Diameter 38.7mm

EH4



	EH4 Series			
	Model Name	EH4...5XX	EH4...8XX	EH4...9XX
Electrical Specifications	Rated Voltage	5±5%V	5-5%~12+5%V	7-5%~24+5%V
	Output Type	Open Collector	Voltage Output	Push Pull Line Driver
	Sink Current	20 mA	--	20 mA
	Source Current	--	--	20 mA
	Max. Load Power Voltage	DC30V	26C31 or equivalent	
	Output Signal	A, B, Z		A, \bar{A} , B, \bar{B} , Z, \bar{Z}
	Output Voltage	VH >(V _{in} -2V)	VL ≥(V _{cc} -2V)	
			≤500mV	
	Encoder Resolution: 100 to 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 5.8mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length : 320±15mm Cross Sectional Area : 0.18mm ² Signal Characteristic: Rise Time 1 μs Typ.; Fall Time 1 μs Typ.			
Mechanical Specifications	Max. Speed of Main Shaft: 6000rpm Starting Torque: 4.0 N·mm Typ. / 6.0 N·mm Typ. Moment of Inertia: 1.2 kg · mm ² Typ. Outer Diameter: 38.7mm Height: 26.7mm Weight: <85g Bore Diameter: 6.35mm Max. Shaft Load: Thrust: 30N / Radial: 50N (10 mm from shaft end) Wire Color: Vcc: Brown, 0V: Blue, A: Black, \bar{A} : Black / Red, B: White, \bar{B} : White / Red, Z: Orange, \bar{Z} : Orange / Red			
Environmental Specifications	Operating Temperature: -10°C~85°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~100°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP30			

Dimensions Bore Diameter 6.35mm



Incremental Encoder

Hollow Shaft Outer Diameter 50mm

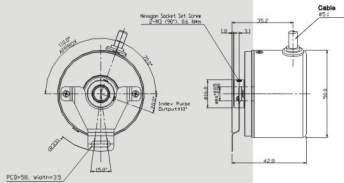
EH5



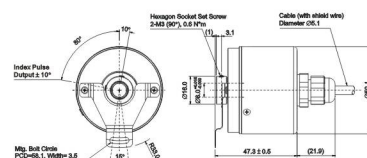
Series	EH5 Series		
Model Name	EH5...5XX	EH5...8XX	EH5...9XX
Rated Voltage	5±5%V	5-5%~12+5%V	7-5%~24+5%V
Output Type	Open Collector	Voltage Output	Push Pull Line Driver
Sink Current	20 mA	--	20 mA
Source Current	--	--	20 mA
Max. Load Power Voltage	DC30V	--	
Output Signal	A, B, Z		A, \bar{A} , B, \bar{B} , Z, \bar{Z}
Output Voltage	VH >(V _s -2V)	VL ≥(V _{cc} -2V)	
		≤500mV	
Electrical Specifications Encoder Resolution: 100 to 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 5.1mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length: 500/1000/2000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 1 μs Typ. ; Fall Time 1 μs Typ.			
Mechanical Specifications Max. Speed of Main Shaft: 6000rpm Starting Torque: 4.0 N·mm Typ. / 6.0 N·mm Typ. (IP65) Moment of Inertia: 0.8 kg · mm ² Typ. Outer Diameter: 50mm Height: 42.8mm / 69.2mm (IP65) Weight: <135g / <150g (IP65) Bore Diameter: 8mm Max. Shaft Load: Thrust: 30N / Radial: 50N (10 mm from shaft end) Wire Color: Vcc: Brown, 0V: Blue, A: Black, \bar{A} : Black / Red, B: White, \bar{B} : White / Red, Z: Orange, \bar{Z} : Orange / Red			
Environmental Specifications Operating Temperature: -10°C~70°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~85°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40 / IP65			

Dimensions

Bore Diameter 8mm



Bore Diameter 8mm (IP65 Type)



Through Hole Shaft Outer Diameter 100mm

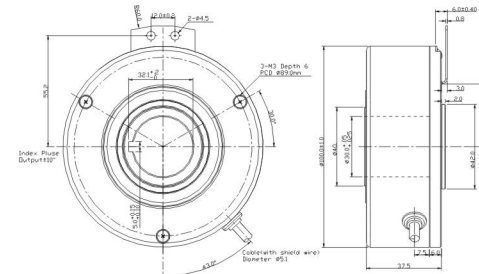
ETA

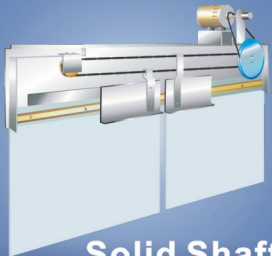


Series	ETA Series		
Model Name	ETA...5XX	ETA...8XX	ETA...9XX
Rated Voltage	5±5%V	5-5%~12+5%V	7-5%~24+5%V
Output Type	Open Collector	Voltage Output	Push Pull Line Driver
Sink Current	20 mA	--	20 mA
Source Current	--	--	20 mA
Max. Load Power Voltage	DC30V	--	
Output Signal	A, B, Z		A, \bar{A} , B, \bar{B} , Z, \bar{Z}
Output Voltage	VH >(V _s -2V)	VL ≥(V _{cc} -2V)	
		≤500mV	
Electrical Specifications Encoder Resolution: 1024 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 5.1mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length: 500/1000/2000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 1 μs Typ. ; Fall Time 1 μs Typ.			
Mechanical Specifications Max. Speed of Main Shaft: 3000rpm Starting Torque: 60 N·mm Typ. Moment of Inertia: 1.6 kg · mm ² Typ. Outer Diameter: 100mm Height: 37.5mm Weight: <1000g Bore Diameter: 30mm Max. Shaft Load: Thrust: 30N / Radial: 50N (10 mm from mounting surface) Wire Color: Vcc: Brown, 0V: Blue, A: Black, \bar{A} : Black / Red, B: White, \bar{B} : White / Red, Z: Orange, \bar{Z} : Orange / Red			
Environmental Specifications Operating Temperature: -10°C~70°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~85°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40			

Dimensions

Bore Diameter 30mm



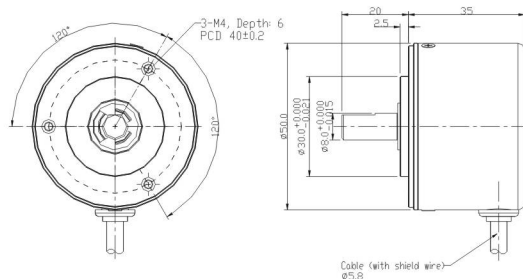
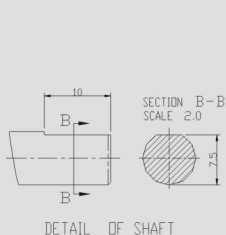


Solid Shaft Outer Diameter 50mm

AS5



Dimensions Shaft Diameter 8mm



	AS5 Series	
	AS5...5XX	AS5...8XX
Electrical Specifications		
Model Name	AS5...5XX	AS5...8XX
Rated Voltage	5±5%V	5-5%~12+5%V
Output Type	Open Collector	Voltage Output
Sink Current	20 mA	--
Source Current	--	--
Max. Load Power Voltage	DC15V	--
Output Signal	Gray Code	
Output Voltage	VH >(V _{cc} -2V)	VL ≥(V _{cc} -2V)
		≤500mV
	Encoder Resolution: 5bit to 10bit Current Consumption: 200mA Max. Max. Response Frequency: 20kHz Max. Cable Diameter: 5.8mm Cable Length: 1000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 1µs Typ. ; Fall Time 1µs Typ.	
Mechanical Specifications		
	Max. Speed of Main Shaft: 3000rpm Starting Torque: 4.0 N·mm Typ. Moment of Inertia: 0.8 kg · mm ² Typ. Outer Diameter: 50mm Height: 35mm Weight: <130g Shaft Diameter: 8mm Max. Shaft Load: Thrust: 30N / Radial: 50N (10 mm from mounting surface) Wire Color: Vcc: Red, 0V: Black, 2: Brown, 2: Orange, 2: Yellow, 2: Green, 2: Blue, 2: Purple, 2: Gray, 2: White, 2: Pink, 2: Light Blue	
Environmental Specifications		
	Operating Temperature: -10°C~60°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~75°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40	

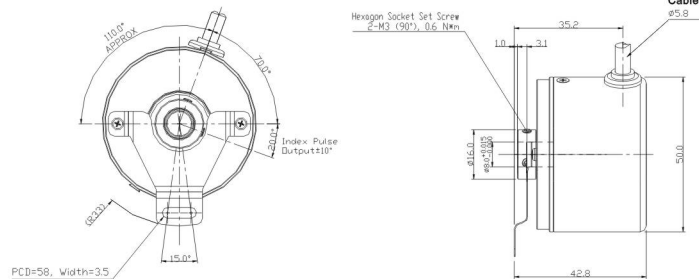
ROE

Hollow Shaft Outer Diameter 50mm

AH5



Dimensions Bore Diameter 8mm



	AH5 Series	
	AH5...5XX	AH5...8XX
Electrical Specifications		
Model Name	AH5...5XX	AH5...8XX
Rated Voltage	5±5%V	5-5%~12+5%V
Output Type	Open Collector	Voltage Output
Sink Current	20 mA	--
Source Current	--	--
Max. Load Power Voltage	DC15V	--
Output Signal	Gray Code	
Output Voltage	VH >(V _{cc} -2V)	VL ≥(V _{cc} -2V)
		≤500mV
	Encoder Resolution: 5bit to 10bit Current Consumption: 200mA Max. Max. Response Frequency: 20kHz Max. Cable Diameter: 5.8mm Cable Length: 1000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 1µs Typ. ; Fall Time 1µs Typ.	
Mechanical Specifications		
	Max. Speed of Main Shaft: 3000rpm Starting Torque: 4.0 N·mm Typ. Moment of Inertia: 0.8 kg · mm ² Typ. Outer Diameter: 50mm Height: 35mm Weight: <135g Bore Diameter: 8mm Max. Shaft Load: Thrust: 30N / Radial: 50N (10 mm from mounting surface) Wire Color: Vcc: Red, 0V: Black, 2: Brown, 2: Orange, 2: Yellow, 2: Green, 2: Blue, 2: Purple, 2: Gray, 2: White, 2: Pink, 2: Light Blue	
Environmental Specifications		
	Operating Temperature: -10°C~60°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~75°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40	

Commutation Encoder (For Servo Motor)

Hollow Shaft Outer Diameter 40.9mm

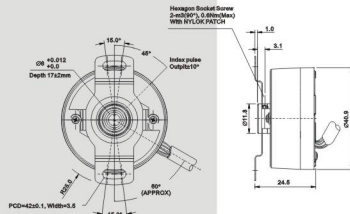
MH4



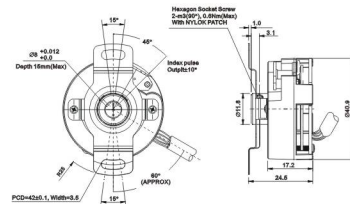
	Series	
	MH4 Series	
Model Name	MH4...5xx	MH4...8xx
Rated Voltage	5±5%V	5-5~12+5%V
Output Type	Line Driver	
Sink Current	20mA	
Source Current	26C31 or equivalent	
Output Signal	A, \bar{A} , B, \bar{B} , Z, \bar{Z} (U, \bar{U} , V, \bar{V} , W, \bar{W})	
Output Voltage	VH	\geq (Vcc-2V)
	VL	\leq 500mV
Electrical Specifications	Encoder Resolution: 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 6.8mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length: 1000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 100ns Max.; Fall Time 100ns Max.	
Mechanical Specifications	Max. Speed of Main Shaft: 6000rpm Starting Torque: 4.0 N-mm Typ. Moment of Inertia: 1.2 kg · mm ² Typ. Outer Diameter: 40.9mm Height: 26.7mm Weight: <85g Bore Diameter: 6mm / 8mm Max. Shaft Load: Thrust: 15N / Radial: 30N (10 mm from mounting surface) Wire Color: DC +5V: Brown, 0V: Blue, A: Black, \bar{A} : Black / Red, B: White, \bar{B} : White / Red, Z: Orange, \bar{Z} : Orange / Red, U: Yellow, \bar{U} : Yellow / Red, V: Green, \bar{V} : Green / Red, W: Pink, \bar{W} : Pink / Red	
Environmental Specifications	Operating Temperature: -10°C~85°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~100°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP30	

Dimensions

Bore Diameter 6mm



Bore Diameter 8mm



Through Hole Shaft Outer Diameter 40.9mm

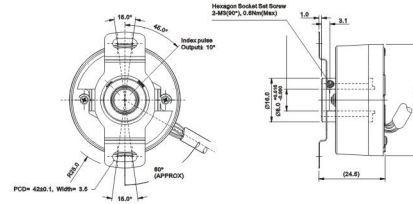
MT4



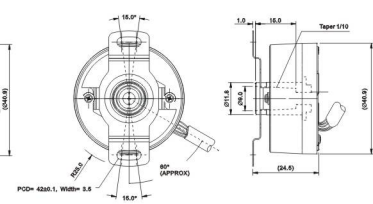
	Series	
	MT4 Series	
Model Name	MT4...5xx	MT4...8xx
Rated Voltage	5±5%V	5-5~12+5%V
Output Type	Line Driver	
Sink Current	20mA	
Source Current	26C31 or equivalent	
Output Signal	A, \bar{A} , B, \bar{B} , Z, \bar{Z} (U, \bar{U} , V, \bar{V} , W, \bar{W})	
Output Voltage	VH	\geq (Vcc-2V)
	VL	\leq 500mV
Electrical Specifications	Encoder Resolution: 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 6.8mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length: 1000±20mm Cross Sectional Area: 0.18mm ² Signal Characteristic: Rise Time 100ns Max.; Fall Time 100ns Max.	
Mechanical Specifications	Max. Speed of Main Shaft: 6000rpm Starting Torque: 4.0 N-mm Typ. Moment of Inertia: 1.2 kg · mm ² Typ. Outer Diameter: 40.9mm Height: 26.7mm Weight: <85g Bore Diameter: 8mm / 9mm (Taper 1/10) Max. Shaft Load: Thrust: 15N / Radial: 30N (10 mm from mounting surface) Wire Color: DC +5V: Brown, 0V: Blue, A: Black, \bar{A} : Black / Red, B: White, \bar{B} : White / Red, Z: Orange, \bar{Z} : Orange / Red, U: Yellow, \bar{U} : Yellow / Red, V: Green, \bar{V} : Green / Red, W: Pink, \bar{W} : Pink / Red	
Environmental Specifications	Operating Temperature: -10°C~85°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~100°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP30	

Dimensions

Bore Diameter 8mm



Bore Diameter 9mm(Taper)





Commutation Encoder (For Servo Motor)

Incremental Encoder (For Spindle Applications)



Through Hole Shaft Outer Diameter 43.7mm

Solid Shaft Frame Size 68mm

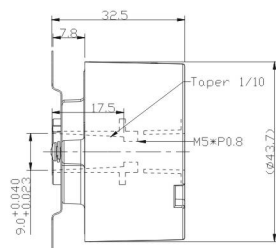
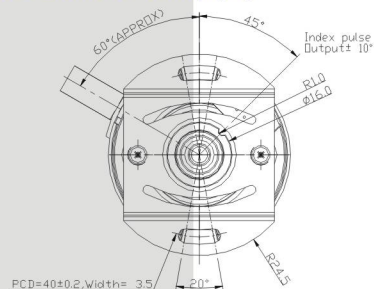
MT4



Series	MT4 Series
Rated Voltage	5V±5%
Resolution	2500 PPR
Output Form	Line Driver
Consumption Current	100 mA Max.
Sink Current	20mA
Output Signal	A, \bar{A} , B, \bar{B} , Z, \bar{Z} (U, \bar{U} , V, \bar{V} , W, \bar{W})
Output Voltage	VH \geq (Vin-2V) VL \leq 500mV
Electric Spec.	Encoder Resolution: 2500 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Cable Diameter: 6.8mm Output Phase Difference: Output phase difference 90° + zero point signal Cable Length: 1000±20mm Signal Characteristic: Rise Time 100ns Max. ; Fall Time 100ns Max.
Mechanical Specifications	Max. Speed of Main Shaft: 6000rpm Starting Torque: < 5.0 N-mm Typ. Moment of Inertia: < 1.2kg · mm ² Typ. Outer Diameter: 43.7mm Height: 32.5mm Weight: < 85g Bore Diameter: 8/9 mm Max. Shaft Load: Thrust: 15N / Radial: 30N (10 mm from mounting surface)
Environmental Specifications	Operating Temperature: -20°C~85°C, 95%RH without condensation Storage Temperature: -25°C~100°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: IP40

Dimensions

Bore Diameter 9mm(Taper)



CS



Series	CS Series	
Model Name	CS7...5xx	CS7...9xx
Rated Voltage	5±5%V	5-5%~12+5%V
Output Type	Line Driver	
Sink Current	20mA	
Source Current	20mA	
Output Signal	A, \bar{A} , B, \bar{B} , Z, \bar{Z}	
Output Voltage	VH \geq (Vcc-2V) VL \leq 500mV	
Electrical Specifications	Encoder Resolution: 1024 (PPR) Current Consumption: 100mA Max. Max. Response Frequency: 300kHz Max. Output Phase Difference: Output phase difference 90° + zero point signal Signal Characteristic: Rise Time 500ns Typ. ; Fall Time 500ns Typ.	
Mechanical Specifications	Max. Speed of Main Shaft: 8000rpm Starting Torque: 23 N-mm Typ. Moment of Inertia: 4.1kg · mm ² Typ. Frame size: 68mm Height: 102.8mm Weight: < 420g Shaft Diameter: 15mm Max. Shaft Load: Thrust: 50N / Radial: 85N (10 mm from mounting surface) Pin Definition: Vcc: H, OV: K, A: A, \bar{A} : N, B: C, \bar{B} : R, Z: B, \bar{Z} : P, Shielding: T	
Environmental Specifications	Operating Temperature: -10°C~70°C, 95%RH (Non-condensing, Non-freezing) Storage Temperature: -25°C~85°C (Non-condensing, Non-freezing) Shock: 100G's at 6ms Vibration: 10 to 200Hz at 5G's Protection Degree: Ip55	

Dimensions

Shaft Diameter 15mm

