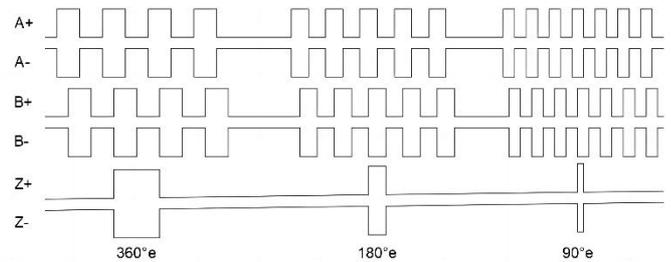




ER28C-P Encoder

For 28/35/42mm Stepping, BLDC & DC Motor



Introduction

ER28C-P series are reflective optical encoders. These encoders are designed with two or three channels output, and also with resolution from 500 pulse per revolution (PPR) to 20000 PPR. Because of the bear-less and split-type design, ER28C-P has very smaller size: 28mm (Cylinder). The low profile design can save assembly space and system weight, and the bear-less structure can reduce some potential failure risks, such as motion wear and grease volatilization. ER28C-P series encoders can be widely used onto stepping motor ,DC motor and BLDC motor with 28mm frange size.

Features

- Bear-less, split-type
- Compact size: 28mm(Cylinder)
- A/B/Z differential or single-ended output
- TVS/ESD and reverse connection protection
- Incremental resolution from 500 to 20000 PPR



Applications

- Robot
- Linear Module
- XYZ Table Sys.
- Feedback Measure Sys.
- Automation & 3C Device

Selection Guide

ER28C-P	Resolution ⁽¹⁾ ⁽²⁾	Channel	Output	Shaft Size ⁽³⁾	Connection ⁽⁴⁾	Voltage ⁽⁵⁾	Z pulse width
	500: 500PPR	2: A/B	D: Differential	3: 3mm	4: 9Pin	T: TTL 5V	0: 1/4T cover w/o hole
	512: 512PPR	3: A/B/Z	S: Single-ended	4: 4mm		H: HTL 8~30V	1: 1/2T cover w/o hole
	1K0: 1000PPR			6: 6mm			2: 1T cover w/o hole
	10B: 1024PPR			8: 8mm			3: 1/4T cover with hole
	2K0: 2000PPR						4: 1/2T cover with hole
	11B: 2048PPR						5: 1T cover with hole
	2K5: 2500PPR						
	4K0: 4000PPR						
	12B: 4096PPR						
	5K0: 5000PPR						
	8K0: 8000PPR						
	13B: 8192PPR						
	10K: 10000PPR						
	16K: 16000PPR						
	14B: 16384PPR						
	20K: 20000PPR						

Notes:

1. If other resolutions requirement, please consult CDD for detail.
2. Max rotation speed is different for different PPR, details seen in “velocity characteristics” table.
3. The standard shaft size is 3mm or 4mm, for other size requirement, please consult local sales.
4. For other connector requirement, please consult for customer design.
5. For HTL output, please consult CDD for detail.

Electrical characteristics

Items	Min.	Typ.	Max.	Unit	Statement
Supply Voltage	4.5	5.0	5.5	V dc	Ripple < 100mVpp
Supply Current		30	90	mA	No Load
High-level Output	2.4			V dc	$V_{CC} = 5V, I_{OH} = 4mA$
Low-level Output			0.4	V dc	$V_{CC} = 5V, I_{OL} = -4mA$
Output Current			± 20	mA	$V_{CC} = 5V$
Output Rise Time		25	100	ns	$V_{CC} = 5V, C_L \leq 100pF$
Output Fall Time		25	100	ns	$V_{CC} = 5V, C_L \leq 100pF$
A/B Duty Cycle	40	50	60	%	
A/B Phase Difference	75	90	105	°e	

Mechanical characteristics

Items	Value	Unit	Statement
Shaft Radial Load	50	N	
Shaft Axial Load	30	N	
Shaft Radial Play	0.03	mm	
Shaft Axial Play	± 0.2	mm	
Inertia	0.034	Kg*mm ²	
Weight	10	g	

Environmental characteristics

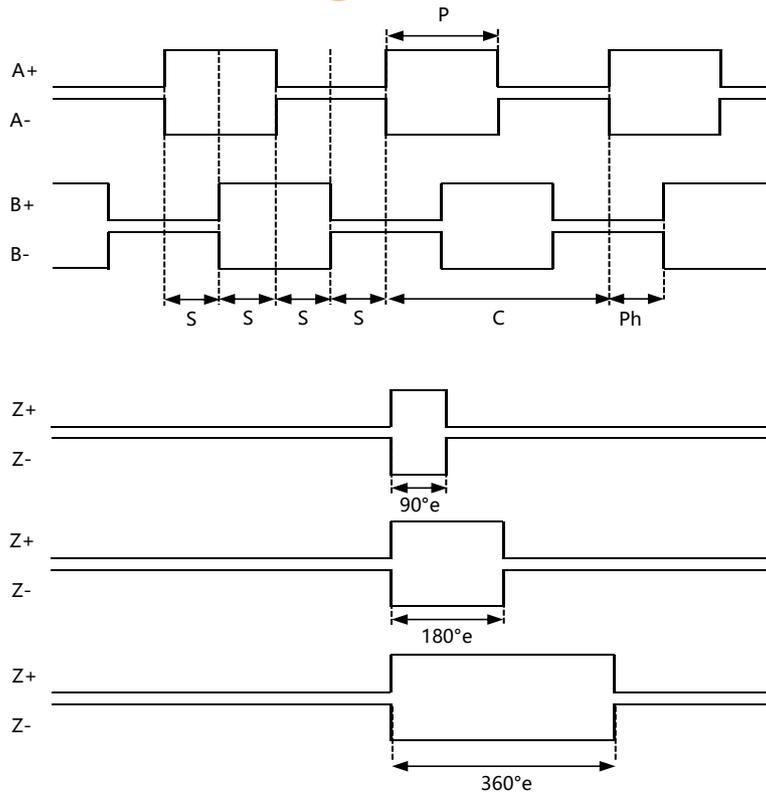
Items	Value	Unit	Statement
Operating Temperature	-40 ~ +85	°C	
Storage Temperature	-40 ~ +95	°C	
Humidity	20 ~ 90	%	non-condensing
Vibration	10	G	10~55Hz 0.75mm、55~2KHz 2h on each XYZ
Shock	50	G	3 pulses, 11ms, 3 on each XYZ
Protection Class	40	IP	
RoHS	Yes	---	

Velocity characteristics (The different resolution Vs. the maximum rotation speed)

Resolution(PPR)	500	512	1000	1024	2000	
Max Speed(RPM)	13000					
Resolution(PPR)	2048	2500	4000	4096	5000	
Max Speed(RPM)	13000					
Resolution(PPR)	8000	8192	10000	16000	16384	20000
Max Speed(RPM)	13000			8000		

Signal Output

CCW seen from encoder rear end



Parameters	Symbol	Min.	Tpy.	Max.	Unit
Pulse Period	C	325	360	395	°e
Pulse Width	P	160	180	200	°e
A/B State Width	S	75	90	105	°e
Quadrature Angle	Ph	75	90	105	°e

Notes:

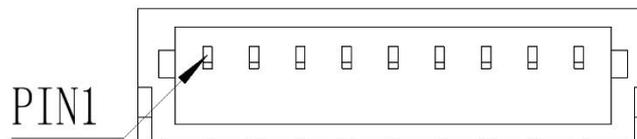
1. The above parameters are measured in 5V power supply, 25 °C environment and manufacturer test platform.
2. There may be some deviations in above specifications for certain types of encoders.

PIN-OUT

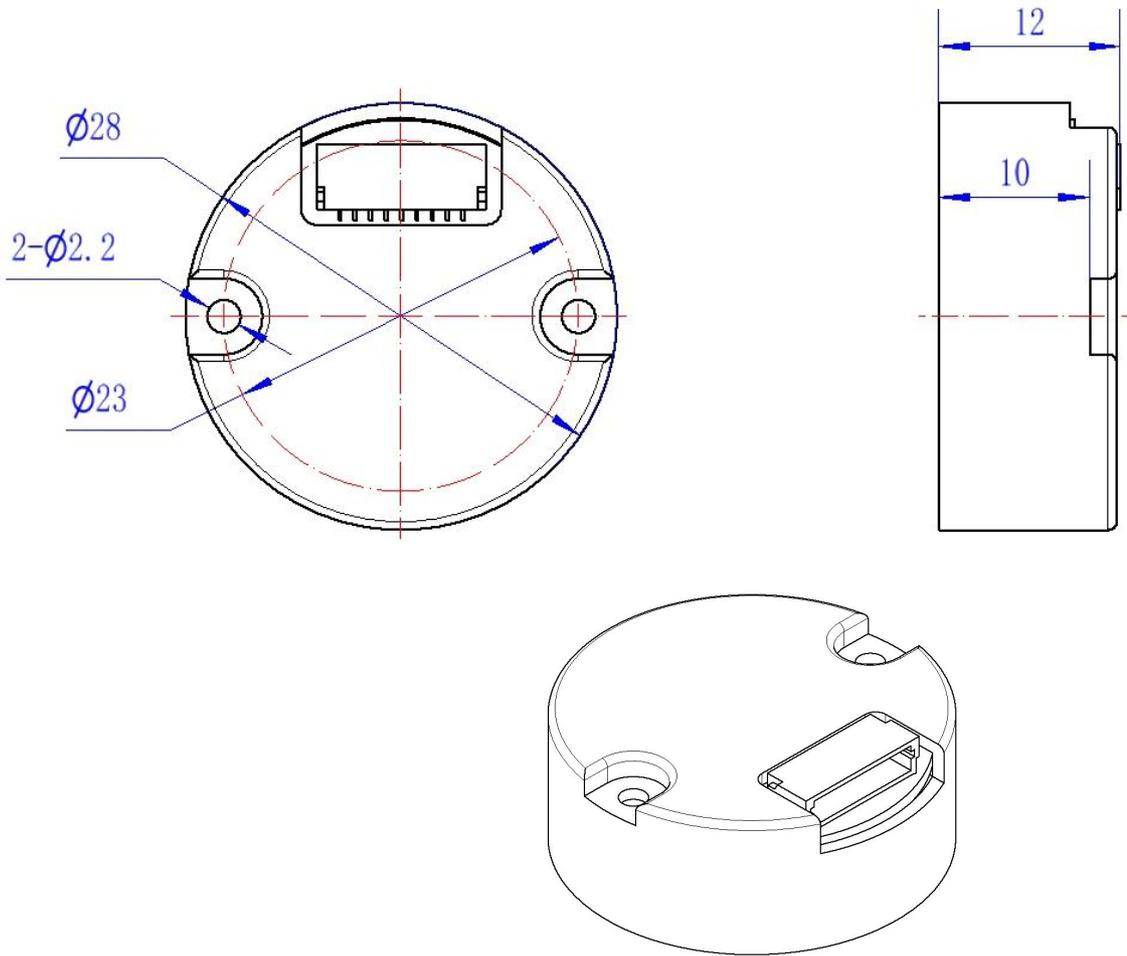
Output Definition of 9-Pin connector (JST Header Model: SM09B-SRSS-TB)

Pin No.	1	2	3	4	5	6	7	8	9
Definition	+5V	GND	A+	A-	Z+	Z-	/	B+	B-

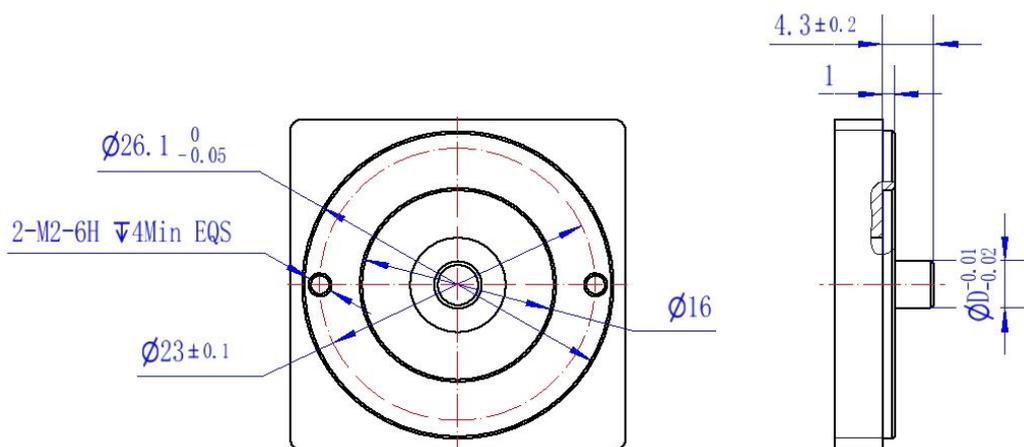
Note: Housing Model: SHR-09V-S-B; Contact Model: SSH-003T-P0.2-H; Applicable Wire: AWG #28~32



Mechanical Drawings (Unit: mm)



Assembly Size (Unit: mm)



Assembly Instruction

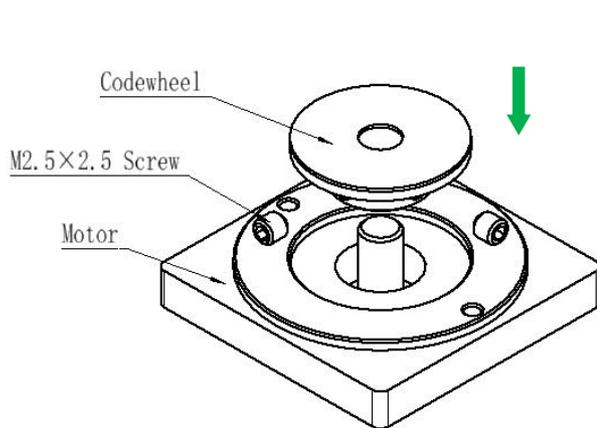
- The installation and debugging of the encoder must be performed by trained and qualified operator
- The execution process must be carried out in accordance with the process conditions
- No hot plug and no high voltage on all I/O
- Avoid corrosive medium
- Do not use organic solvents such as thinner or gasoline to clean the encoder
- Wear finger covers and anti-static rings during encoder installation

STEP 1: Install Codewheel

1. Put Space(0.65mm) onto Base along the gap
2. Install codewheel onto motor shaft
3. Push codewheel close to Spacer and tighten 2 screws
4. Remove Spacer

Note:

- Ensure screw fastening torque 3~3.5kgf.cm

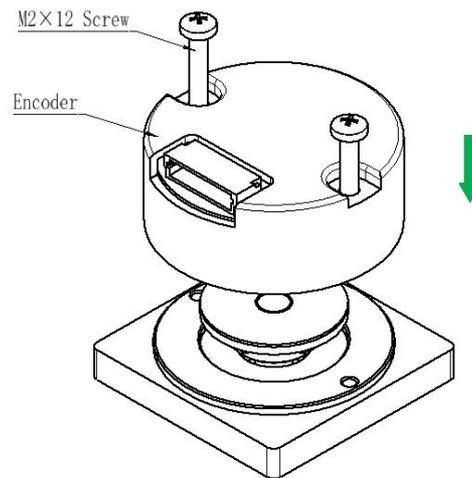


STEP 2: Install Encoder

1. Put Encoder onto Base
2. Align the two holes on encoder shell and tighten 2 screws

Note:

- Ensure screw fastening torque 3kgf.cm



Notes:

1. Centering tool type: Ctool-EM28-x("x" means shaft diameter size, such as 3~8)
2. Spacer type: Spacer-ER28
3. The above tools need to order by customer

Ordering Information

- The following model are part of recommended encoders, user can define required model according to [Selection Guide](#).

Order number	Model name	Description
3013132324	ER28C-P500-3D34T0	500PPR, ABZ, differential, shaft 3mm, 9-pin connector
⋮	⋮	⋮
3013132474	ER28C-P20K-3D34T0	20000PPR, ABZ, differential, shaft 3mm, 9-pin connector

Notes:

- Any other requirement, please contact CDD for detail.

CDD-华传智感

As a leading and professional encoder manufacturer, CDD offers a wide range of encoder product solution on AC motor, brushless motor, stepper motor, Hollow Cup motor, DD motor, linear module system, joint module system, also automation equipment and process feedback system.

Optical, magnet and inductive technology are used in our encoder product design, so CDD can provide different encoder solution, such as optical encoder, magnet encoder, inductive encoder, and even hybrid encoder where two technology are combined.

CDD team has extensive application experience and deep application scenario understanding in many industries field, and the team also has deep technical skills in encoder, motor and drive products. So we are able to provide accurate products and solution services to meet and even lead the market demand.

Future Sensor

CDD (SHANGHAI) TECHNOLOGY CO.,LTD.

Add: Room 501,Building 12,No.58,Wenxiang East Road,
Songjiang District,Shanghai,China.

Tel: (+86) 021-61279830

Fax: (+86) 021-61279830

E-mail: sales@cddtech.cn

Web: www.cddtech.cn



Data subject to change. @Copyright 2024 CDD (SHANGHAI) TECHNOLOGY CO.,LTD.

All rights reserved.