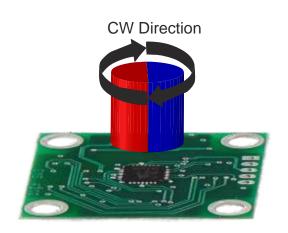


# WSB28 - Magnetic encoder module

# Passion for Excellence

# Based on Dipole Magnet and Hall Sensors



WSB28 magnetic rotary encoder module has a precision sensor having an integrated Hall element for scanning a permanent Dipole magnet. The Sensor itself generates a constant amplitude Sine and Cosine voltages that is used for angle calculations. These Sine and Cosine signals are further interpolated to get the Incremental or Absolute signals with resolutions up to 14 bits per rotation.

WSB28 module is a 28mm PCB assembly which has a wide operating voltage range suitable for many applications

#### **Salient Features:**

- 28mm Square PCB assembly module
- Wide operating voltage range 5V DC and 6.5V to 30V DC
- Variety of outputs supported like Analog Sin-Cos output, Incremental RS422, Absolute SSI and BiSS-C protocol
- Supports up to 14 bits (16384 positions) per rotation Absolute and Incremental output
- Accuracy +/- 0.5 deg
- 3600 CPR also available to give angular resolutions easier for mathematical calculations
- Suitable for applications like motor control, Medical instrumentation, paper and textile industry, Industrial automation and many more





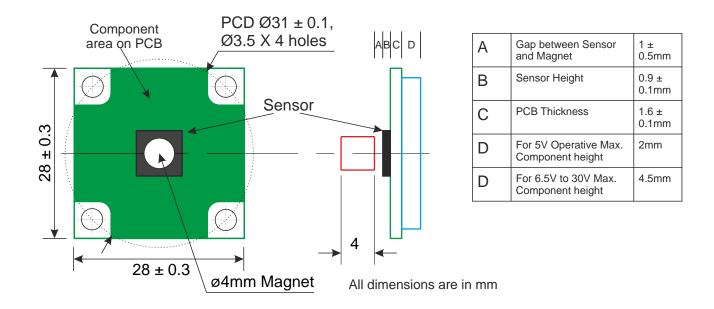
#### **Available models:**

- **WSB28AS / AC -** Analog single ended (AS) / complementary (AC) Sine Cosine output with a single sine-cosine cycle per rotation
- **WSB28IC** Incremental open collector A, B, and Z output with up to 16384 counts per rotation (CPR)
- **WSB28IR** Incremental RS422 A, B and Z output with up to 16384 counts per rotation (CPR)
- **WSB28SB / SG** Absolute output on Synchronous Serial interface (SSI) with Binary (SB) / Grey (SG) coded data up to 13 Bits per rotation
- **WSB28BC** Absolute output on BiSS-C data up to 14 Bits per rotation
- **WSB28UX -** UVW single ended output with up to 16 pole pairs per rotation along with the Incremental RS422 signals up to 4096 counts per rotation
- **WSB28ZS/ZG/ZB** Analog Sine Cosine + Absolute SSI + Incremental up to 14 Bits per rotation



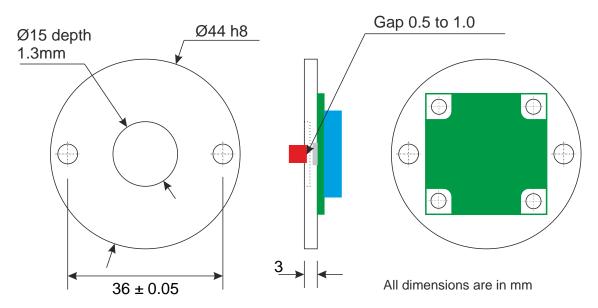
### **Installation drawings:**

### Only PCB



**Note:** Magnet center axis and PCB center should be with in ± 0.2mm to get the specified accuracy results

### Board with Flange mounting (optional)



**Note:** Magnet center axis and PCB center should be with in ± 0.2mm to get the specified accuracy results



# **WSB28 Specifications:**

	WSB28AS / AC	WSB28SB / SG	WSB28BC
Power Supply (V <sub>dd</sub> )	Option 1: +5V DC (±5%) or Option 2: 6.5V DC to 30V DC		
Current consumption	50mA maximum 90mA maximum		
Output	AS - 2Vpp each signal		
	AC - 0.5Vpp each signal	RS422	
Maximum RPM	120000 RPM	2500 to 120000 RPM	
Operating Temperature	-40°C to +125°C		
Storage Temperature	-40°C to +125°C		
Accuracy	±0.5°		
Clock Frequency	Not Applicable	4MHz maximum	10MHz maximum
Output data format	Not Applicable	SB - Binary data	BiSS-C
	Not Applicable	SG - Grey coded data	BISS-C
SSI Data time out	Not Applicable	16µS	12.5µS to 40µS
Output driving current	20mA maximum		

	WSB28IC	WSB28IR	WSB28UX
Power Supply (V <sub>dd</sub> )	Option 1: +5V DC (±5%) or Option 2: 6.5V DC to 30V DC		
Current consumption	90mA maximum		
Output	A, B, Z Signals open collector	RS422 for 5VDC HDL for 6.5V to 30V operating	U, V, W single ended + Incremental RS422
Maximum RPM	20000 to 120000 RPM		
Operating Temperature	-40°C to +125°C		
Storage Temperature	-40°C to +125°C		
Accuracy	±0.5°		
Output driving current	20mA maximum		

Note: For specifications of ZS, ZG, ZB models refer below table

Model	Sine cosine	Incremental	Absolute
WSB28ZS	WSB28AC	WSB28IR	WSB28SB
WSB28ZG	WSB28AC	WSB28IR	WSB28SG
WSB28ZB	WSB28AC	WSB28IR	WSB28BC

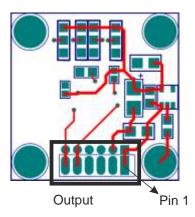
### **Pin Connection details:**

(Model and Pin number "1" marked on the PCB)

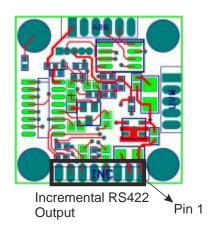
Pin	WSB28AS	WSB28AC	WSB28IR	WSB28IC	WSB28SB/SG/BC	WSB28UX
1	Vdd	Vdd	Vdd	Vdd	Vdd	Vdd
2	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
3	SIN+	SIN+	A +	А	Data +	U
4	COSINE +	COSINE +	A -	В	Data -	V
5		SIN -	B+	Z	Clock +	W
6		COSINE -	В-		Clock -	
7			Z +			
8			Z -			



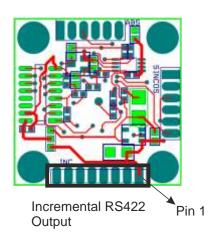
### **◯** WSB28AS/AC



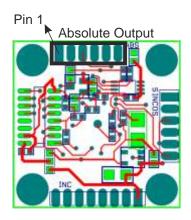
### **WSB28IR/UX (up to 12bits)**



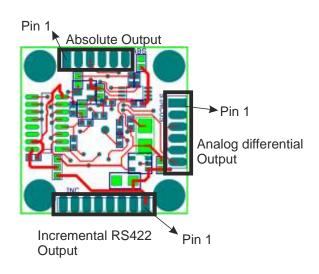
# **WSB28IR** (for 13 and 14 bits)



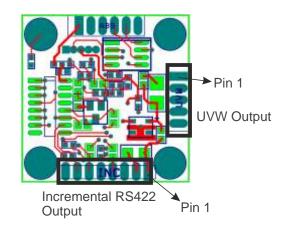
### ▼ WSB28SB/SG/BC



### WSB28ZB/ZG/ZC



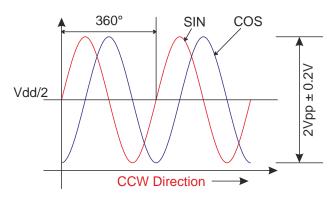
### **WSB28UX**





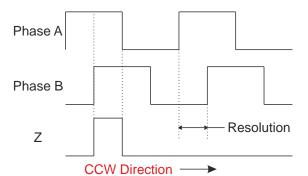
### **Output waveforms:**

### **WSB28AS**





(Differential signals in case of IR are not shown)



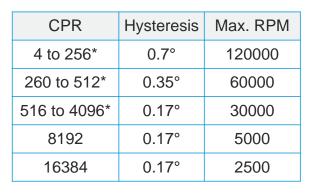
#### WSB28BC



with trailing zeros. Position data increments in CCW direction

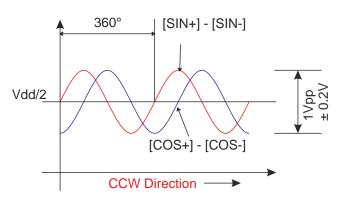
# **Output Resolutions:**

#### WSB28IC/WSB28IR



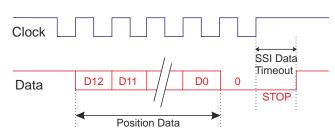
<sup>\* -</sup> In increments of 4. Eg 4, 8, 12, till 256 etc

#### WSB28AC



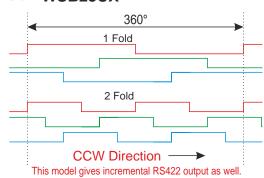
#### WSB28SB/SG

(Differential signals are not shown)



Position data is 13bit for all resolutions up to 13bits with trailing zeros. Position data increments in CCW direction

### WSB28UX



For incremental waveforms refer to IR model.

#### ▼ WSB28UX

'X'	No of Poles
'1' to '9'	1 to 9
'A' to 'G'	10 to 16

In UX model, incremental resolutions available up to 12 bits only

No of Bits	Hysteresis
8	0.7°
9	0.35°
10 to 12	0.17°
13	0.17°
14*	0.17°

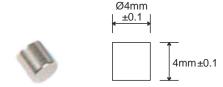
WSB28SB/SG/BC

Note: Pulse per Rotation (PPR) can be calculated as counts per rotation (CPR) ÷ 4

<sup>\* -</sup> Available only in BC



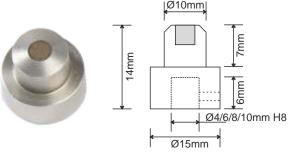




Order code - WSG04

**Note:** Magnet should be glued on a non-magnetic material

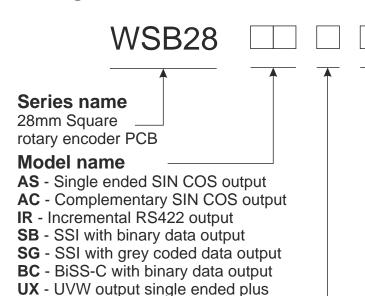
### Magnet with Holder



Order code - WSH04 / 06 / 08 / 10

Note: M3 Grub screw is provided on the holder for fixing on to Shaft

### **Ordering Information:**



Incremental RS422 output (**X** stands for number of poles) **ZS** - AC + IR + SB **ZG** - AC + IR + SG **ZB** - AC + IR + BC

**Mounting type** 

0 - only Board

1 - Board with Flange

00 - Standard
 RoHS assembly
 01 - Standard
 non-RoHS assembly

**Resolution in CPR** 

For AS and AC 00000

For **IR and IC** 

00004 to 04096, 08192, 16384

For SB and SG(no of bits)

**00512**(9), **01024**(10), **02048**(11),

**04096**(12),**08192**(13)

For **BC** (no of bits)

**00256**(8), **00512**(9), **01024**(10), **02048**(11),

**04096**(12), **08192**(13), **16384**(14)

For **UX** (use this for incremental resolution)

00004 to 04096

# **Operating Voltage**

0 - 5V DC

1 - 6.5V to 30V DC



#### Passion for Excellence

#### **Head office and Factory:**

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