

BLA21-12R3-C01 Technical Specification

Update Number
241031-01

BLA21-12R3-C01
Technical Specification



Model	Features
BLA21-12R3-C01	▪ Compact, Lightweight, High-Torque brushless servo motor. ▪ RS485 communication and daisy chain compatible. ▪ PWM input signal compatible.

- Caution
- This product **SHOULD NOT** be used for the devices that is directly related to human life.
 - Keep the servo away from an object which produces a strong magnetic field.
There is a possibility of malfunction if the servo is affected by a strong magnetic field.
 - Specifications and appearance of hardware/software and accessories are subject to change without notice for improvement.

BLA21-12R3-C01 Technical Specification

Update Number
241031-01

Basic specifications

	Item		Specification		Remark	
1	Rated Voltage		11.1 ~ 14.8V		DC power supply.	
2	Operating Voltage		9.0 ~ 14.8V		DC power supply.	
3	Standby Current		≤ 50mA		at 12.0V	
4	Starting Current *1	Design value	≤ 10A		at 12.0V	
			4.95A		100% of torque control. See No.26.	
5	Consumption Current *1,*2		80	mA	at 12.0V , No-Load	
6	Max. Torque *1,*2		50.0	kgf·cm	at 12.0V	
			4.90	N·m		
			694	ozf·in		
			49.0	kgf·cm	at 11.1V	
			54.0		at 14.8V	
7	Rated Torque *1,*2		10.0	kgf·cm	at 12.0V	
			0.98	N·m		
			139	ozf·in		
			9.8	kgf·cm	at 11.1V	
			10.8		at 14.8V	
8	Rotation Time *1		0.17	s/60°	at 12.0V	This unit is commonly used as the speed unit for RC servos.
			0.19		at 11.1V	
			0.14		at 14.8V	
9	No Load Speed *1,*2 (Angle control mode)		353	°/s	at 12.0V	
			58.8	rpm		
10	No Load Speed *1,*2 (Speed control mode)		58.8	rpm	at 12.0V	
11	Rotation Angle *1	Range	Mechanical	-180.0 ~ +179.9 °	Absolute	
			Software	-3,270.0 ~ +3,270.0°	Pseudo absolute *Incremental above mechanical range.	
		Accuracy	3.0		Standard value	at 12.0V, No-Load, Position:±60°
			0.2		Measured value	
12	Direction *1	PWM RS485	CW :Rotation Angle > 0 CCW :Rotation Angle < 0			

*1 At 23±5°C (Initial Performance Data)

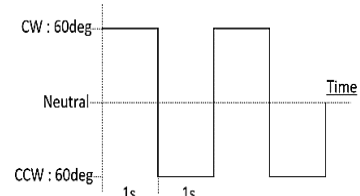
*2 Each value is typical.

BLA21-12R3-C01 Technical Specification

Basic specifications

	Item		Specification	Remark
13	BackLash *1		$\leq 0.5^{\circ}$	
14	Temperature Range	Operating	0~+40°C (32~104°F)	
		Storage	-20~+60°C (-4~140°F)	

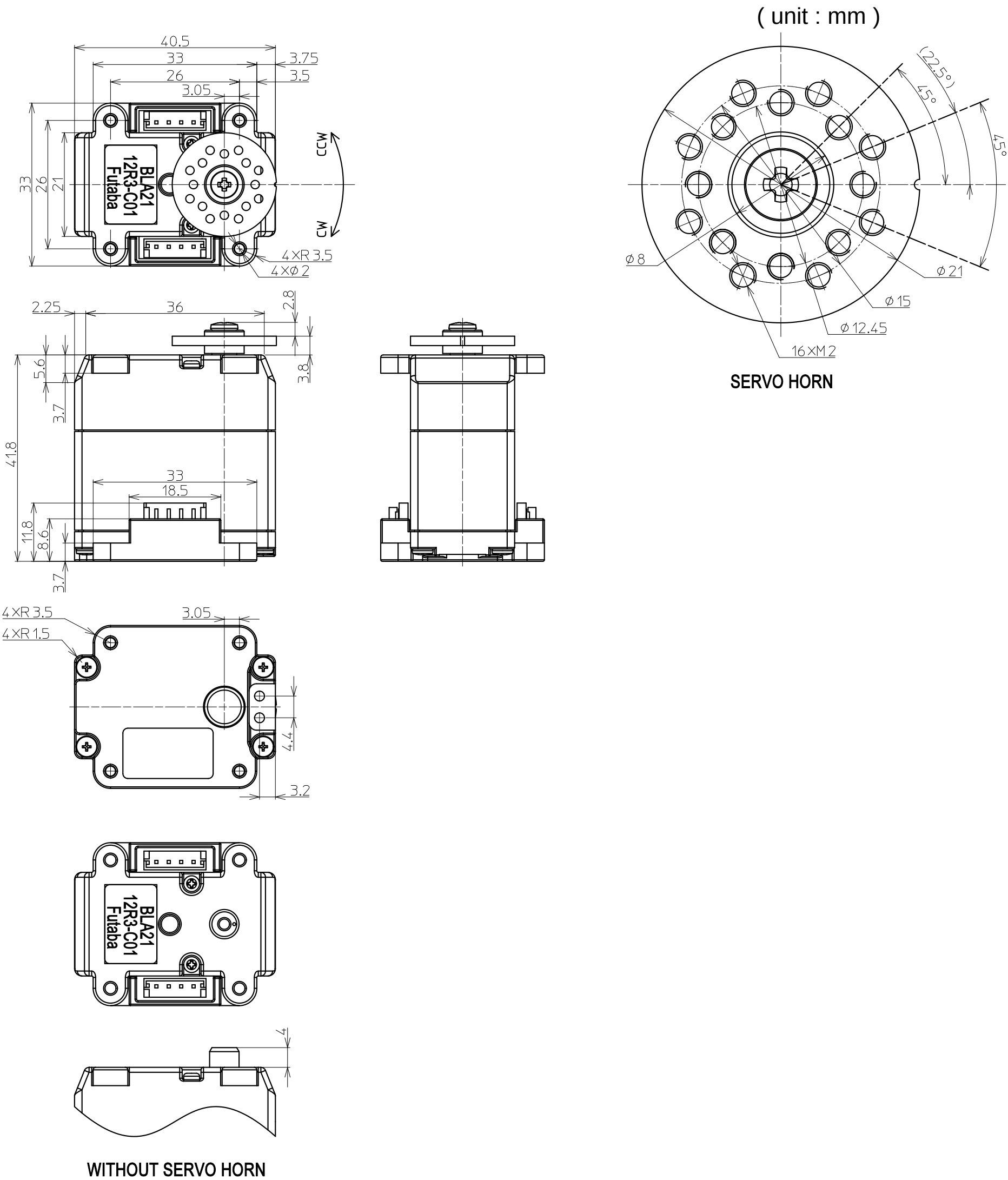
Mechanical specifications

	Item		Specification	Remark
15	Outer Dimension		40.5 x 33.0 x 41.8mm (1.59 x 1.30 x 1.65 inch)	See below Outer Dimension
16	Weight		67.0g (2.36oz)	with Horn and screws without cables
17	IP Code		–	Not waterproof or dustproof
18	Case Material		Upper,Middle,Bottom : Resin Heatsink : Aluminum	Surface : Anodizing (Heatsink)
19	Gear Set Material		Steel	Surface : Hardening treatment
20	Gear bearing		2 ball bearing	Assembled to the final gear
21	Output Shaft		Serration S6	Size: $\phi 6$ mm, 25 teeth
22	Position Sensor		Magnetic Encoder	
23	Motor Type		Brushless DC Motor	
24	MTTF *1		Operating time = 41h (73,800 cycle) (Inquire for the test report)	<u>Operating Condition</u> • at 12.0V • $\pm 60^{\circ}$, 0.5Hz sweep <u>Test Condition</u> • Load : Rated Torque (Powder Brake) <u>Angle Command Value</u> 
25	Vibration Resistance *1		Operating time ≥ 300 h (Inquire for the test report)	<u>Operating Condition</u> • at 12.0V • $\pm 60^{\circ}$, 0.5Hz sweep • No-Load <u>Test Condition (sine wave)</u> • Frequency : 10 to 500Hz (sweep 1oct/min, amplitude limit 2mm) • Acceleration : 300m/s² • Vibration axis : X,Y,Z

*1 At 23 $\pm$ 5°C (Initial Performance Data)

BLA21-12R3-C01 Technical Specification

Outer Dimension



BLA21-12R3-C01 Technical Specification

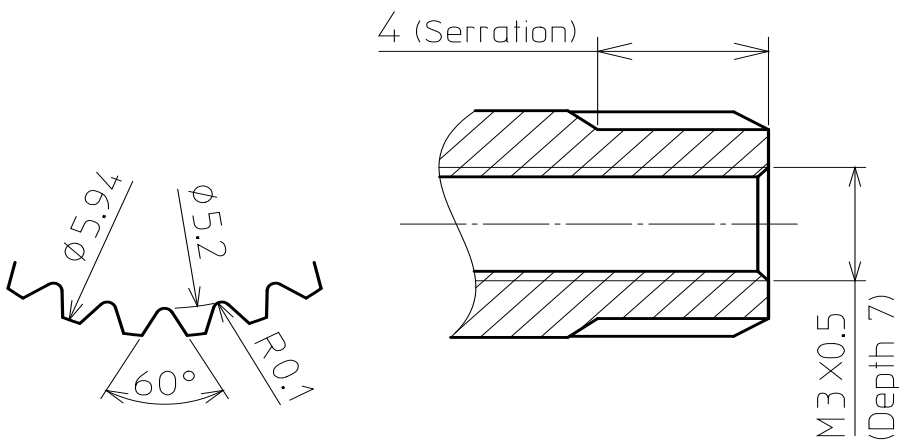
Update Number
241031-01

Outer Dimension

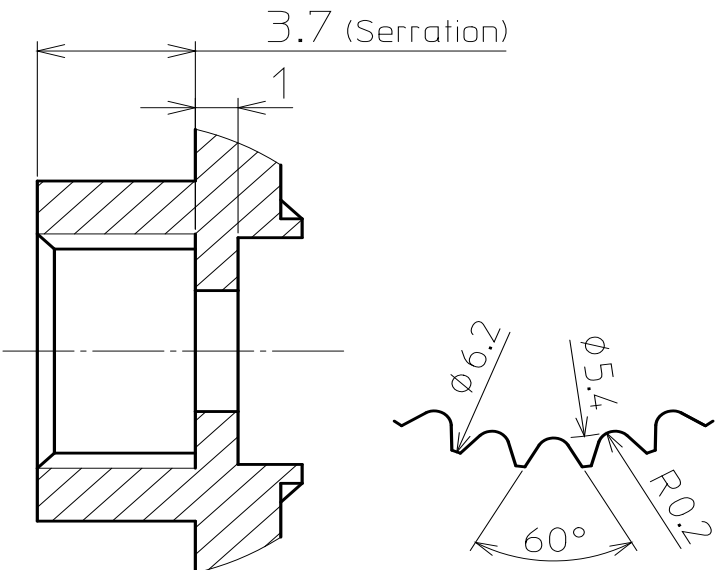
(unit : mm)

Serration Size

Standard Diameter : $\Phi 6$
Angle : 60°
Tooth : 25



Servo Output Shaft Serration



Servo Horn Serration

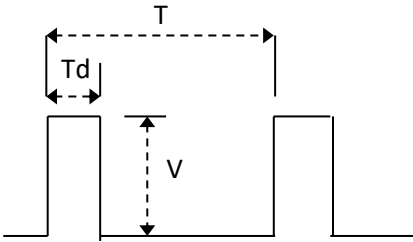
OUTPUT SHAFT

BLA21-12R3-C01 Technical Specification

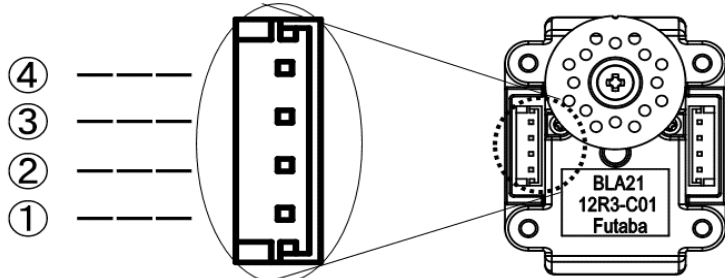
Specifications for RS485 signals

	Item		Specification		Remark	
26	Communication Interface		RS485		Protocol	Command Type
					Baud Rate	9.6k ~ 230.4 kbps
					Max. connections	6 units
					8bit, Stop bit 1, None Parity, Asynchronous	
	Operating mode (RS485)	Angle control	-32,700 ~ +32,700	0.1°	See No.11.	
		Speed control	-100 ~ +100	rpm	Commandable speed. See No.10 for actual speed.	
		Torque control	-1000 ~ +1000	0.1%	Max. torque at supply voltage of 12.0V is 100%. See No.6. The actual torque that can be output depends on the power supply, load, etc., so use the command value as a guide.	

Specifications for PWM signals

	Item		Specification		Remark	
27	Communication Interface		PWM 		Signal Voltage:V	HIGH : min. 2.0V max. 5.0V
						LOW : min. 0.0V max. 0.8V
					Frame Rate:T	14.25ms
					CW / Center / CCW:Td	2480 / 1520 / 560μs
					If the high level voltage exceeds 5V, the servo may be damaged. If you use an RC device as a signal source, please pay attention to the voltage level of the PWM signal.	
	Operating Mode (PWM)	Angle control	Rotation Angle	+144.0° (560μs) Neutral 0° (1520μs) -144.0° (2480μs)		

Connector specifications

	Item		Specification			Remark
28	Cable		Non-Shielded Cable (Detachable)			Cable Length : 150mm(5.91 inch)
29	Connector	Manufacture	J.S.T. Mfg. Co.,Ltd.			
		Type	B4B-EH			
		Matching	EHR-4 etc.			
30	Pin Assignment		Pin No.	Assignment	Cable Color	
			④	RS485 B (D-)	Gray	
			③	RS485 A (D+)	Gray	
			②	Battery(+)	Red	
			①	Battery(-)	Black	

BLA21-12R3-C01 Technical Specification

Update Number
241031-01

Model name system

