

BLA21-12U-A01 Technical Specification

This product is a compact servo motor featuring high torque, IP67-rated, and a long-life.



Model	Features
BLA21-12U-A01	Supports DroneCAN v1

■Caution

- This product **SHOULD NOT** be used for the devices that is directly related to human life.
- The application of this product as a weapon of mass destruction is banned, and for military use, it is confined to defense purposes in regions with no security risks.
- 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.
- When disposing of this product, please comply with the relevant laws and regulations of each country and dispose of it as industrial waste.
- Do not insert or remove connectors while the power is on. Always turn off the power before connecting or disconnecting any connector.
- If you use this product in a vibrating environment, please check the connectors regularly to ensure they have not become loose.

Basic specifications

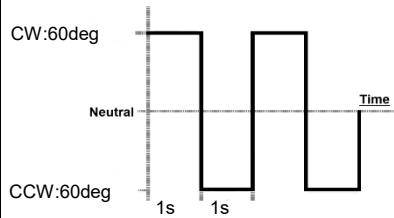
Item		Specification				Remarks		
Rated Voltage	typical	12.0			V	DC power supply.		
	range	11.1	~	14.8	V	DC power supply.		
Operating Voltage		9.0	~	16.8	V	DC power supply.		
Standby Current		≤ 55			mA	at 12.0V		
Starting Current ^{*1}	Design value	≤ 10			A	at 12.0V		
		7			A	100% of torque control. See each signal specification.		
Consumption Current ^{*1,*2}		120			mA	at 12.0V , No-load		
Max Torque ^{*1,*2}		4.90			N·m	at 12.0V	Applying this torque value for more than 1 second may cause damage.	
		50.0			kgf·cm			
		693.9			ozf·in			
		4.71			N·m	at 11.1V		
		5.10				at 14.8V		
Rated Torque ^{*1,*2}		1.47			N·m	at 12.0V	Please use at or below this torque.	
		15.0			kgf·cm			
		208.2			ozf·in			
		1.36			N·m	at 11.1V		
		1.47				at 14.8V		
Rotation Time ^{*1}		0.09			s/60°	at 12.0V	This unit is commonly used as the speed unit for RC servos.	
		0.10				at 11.1V		
		0.07				at 14.8V		
Speed with no load ^{*1,*2} (Angle control mode)		667			°/s	at 12.0V		
		111			min ⁻¹			
Speed with no load ^{*1,*2} (Speed control mode)		111			min ⁻¹	at 12.0V		
Rotation Angle ^{*1}	Range	Mechanical	179.9 ~ -180.0			°	Absolute	
		Software	-	36,000,000 ~			°	Pseudo absolute *Incremental above mechanical range.
	Accuracy	±3.0			°	Standard value	at 12.0V, No- Load, Position:±60°	
		±1.5				Measured value		
Direction ^{*1}		CW : Rotation Angle > 0 (+) CCW : Rotation Angle < 0 (-)				Based on the top surface of the servo (the side with the nameplate).		
BackLash ^{*1}		≤ 0.50			°			
Temperature Range	Operating	-40	~	70	°C	-40 °F ~ 158 °F		
	Storage	-40	~	80	°C	-40 °F ~ 176 °F		
Over heat protection		80			°C	The default temperature to activate the self-protection function “Torque OFF” in order to prevent overheat. The temperature can be set from 20° C to 80°C on the Signal line ^{※3} and on the program tool additionally provided by Futaba.		
		176			°F			

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

^{*2} Each value is typical.

^{*3} The signal used for configuration varies depending on the model.

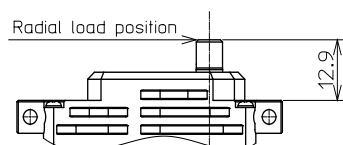
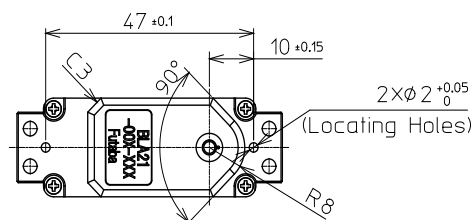
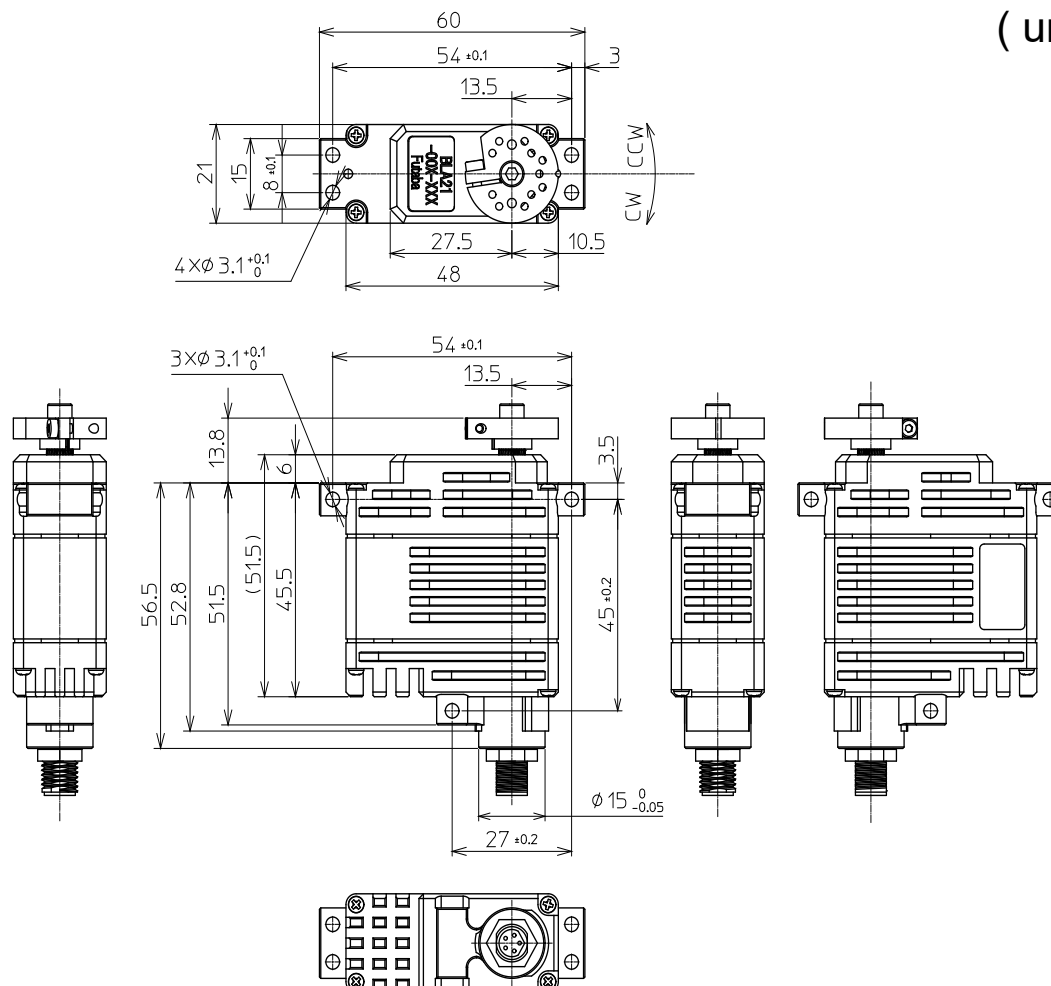
Mechanical specifications

Item	Specification						Remarks
Outer Dimension	48.0	×	21.0	×	51.5	mm	See below Outer Dimension
	1.89	×	0.83	×	2.03	inch	
Weight	130					g	with Horn and screws
	4.59					oz	without cables
IP Code	IP67					Waterproof and Dustproof	
Case Material	Upper		Aluminium			Surface: Anodizing	
	Middle		Aluminium			Surface: Anodizing	
	Bottom		Aluminium			Surface: Anodizing	
Gear Set Material	Steel					Surface: Hardening treatment	
Gear bearing	8				ball bearing	Assembled to the final gear	
Output Shaft	Serration S6L					Size: φ6mm, 25 teeth	
Radial load	100				N	Load position : Refer to Outer Dimension	
Position Sensor	Magnetic Encoder						
Motor Type	Brushless DC Motor						
MTTF *1	Operating time (Inquire for the test report)		3,620		h	Operating Condition ▪ at 12.0V ▪ ±60°, 0.5Hz sweep Test Condition ▪ Load : Rated Torque (Powder Brake)	
			6,516,000		cycle	<u>Angle Command Value</u> 	
Vibration Resistance *1	Operating time (Inquire for the test report)		1,000		h	Operating Condition ▪ at 12.0V ▪ ±60°, 0.5Hz sweep ▪ No-Load	
						<u>Test Condition(sine wave)</u> ▪Frequency: 10 to 500Hz (sweep 1oct/min, amplitude limit 2mm) ▪Acceleration : 300m/s ² ▪Vibration axis : X,Y,Z	

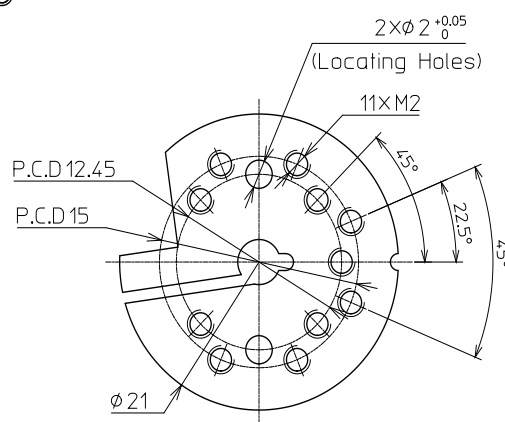
^{*1} At $23\pm 5^\circ\text{C}$ (Initial Performance Data) Each values are measured values and are not guaranteed values.

Outer Dimension

(unit : mm)

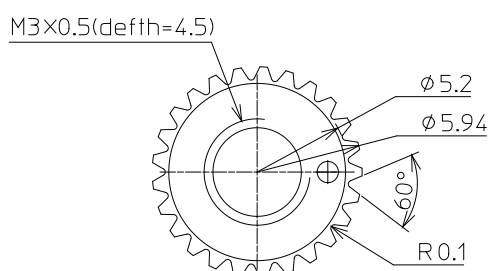
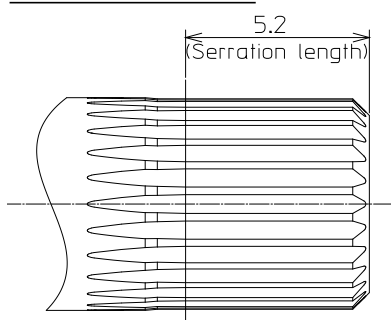


Without Servo Horn



Servo Horn

OUTPUT SHAFT



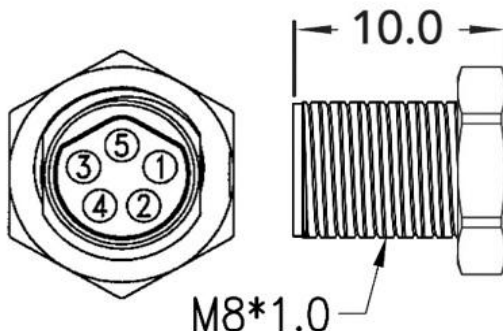
Sarretion Size

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

Specifications for CAN BUS signals

Item		Specification				Remarks	
Communication Interface		CAN BUS				Protocol :	DroneCAN v1
						Baud Rate :	1 Mbps
						Sample Point:	87.5 %
						NodeID:	1 ~ 127
Operating mode (CAN BUS)	Angle control (Absolute)	-180.0	~	+179.9	°	The position within this range is absolute and can be recognized by the servo even after power-off. The position commands within this range are uniquely identified. For accuracy, see "Speed with no load (Speed control mode)". Resolution is 0.1°.	
	Angle control	-36,000,000.0	~	+36,000,000.0	°	The servo can accept position commands over 360°, but will lose multi-turn information when switched off, recognizing only the absolute position within 360°. Resolution is 0.1°.	
	Speed control	-300	~	+300	min ⁻¹	This mode is for continuous servo rotation, with speeds ranging within 300min ⁻¹ . Speed settings can be adjusted via CANBUS and a Futaba program tool. Refer to "Speed with no load (Speed control mode)" for actual speed details.	
	Torque control	-100	~	+100	%	Maximum torque at 12.0V supply voltage is 100%. Refer to "Max Torque".	

Connector specifications

Item		Specification		Remarks	
Cable		Shielded Cable(Detachable)		400	mm
				15.75	inch
Cable bending radius		78	mm		
Connector	Manufacture	ODS Electronics Co., Ltd.			
	Type	MMEPM05MCC-SHS7001			
	Matching	BE0010 or BE0011		Futaba Support Product Code	
Pin Assignment		Pin No.	Assignment	Cable Color	
		①	Battery(+)	Brown	
		②	Battery(-)	White	
		③	CAN-H	Blue	
		④	CAN-L	Black	
		⑤	Case Shield Line	Drain	
Pin Layout					

Model name system

<u>BLA</u>	<u>21</u>	-	<u>12</u>	<u>U</u>	-	<u>A</u>	<u>0</u>	<u>1</u>
<u>Motor type</u>			<u>Power-supply voltage</u>			<u>Development code</u>	<u>Optional function 1</u>	
BLA : Brushless Motor			(Rated Voltage) 06 : 6.0~7.4V 12 : 11.1~14.8V 28 : 24.0~28.0V			0: Case shielded line and Battery(-) are separated. B: Supports PWM signals (Rotation direction: CW *) *Operation of PWM signal 1,520 → 2,120 μs.		
	<u>Servo width</u> 21 : 21mm *Gear box width			<u>Main signal type</u> U : DroneCAN v1			<u>Optional function 2</u>	
						1: Straight connector type. 2: Side connector type.		