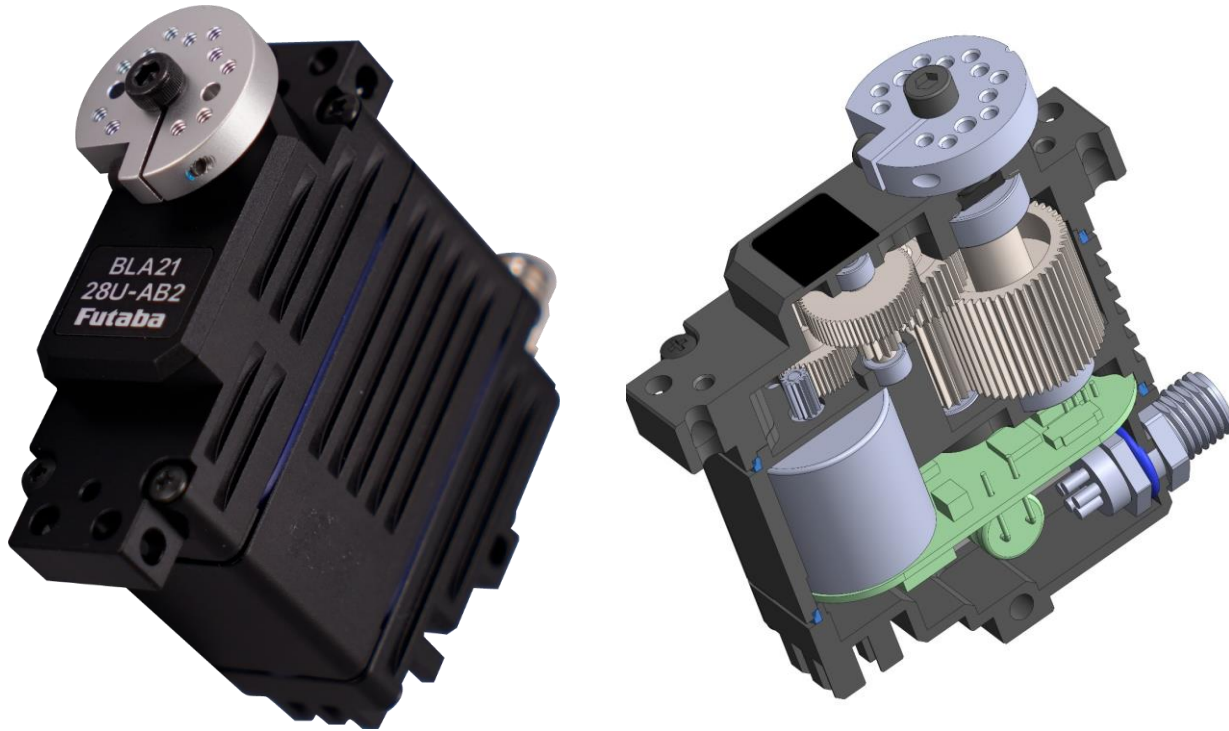


BLA21-28U-A02 / AB2 Technical Specification

BLA21-28U-A02 / AB2 Technical Specification

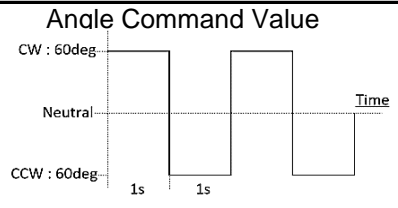


- BLA21-28U-A02 : Supports UAVCAN v0 signals.
Case shielded line and Battery line(-) are separated.
No PWM
- BLA21-28U-AB2 : Supports UAVCAN v0 and PWM signals.
Case shielded line and Battery line(-) are common.
No Case shield

BLA21-28U-A02 / AB2 Technical Specification**Basic specifications (BLA21-28U-A02 and AB2)**

	Item		Specification				Remark
1	Rated Voltage		24.0 ~ 28.0V				DC power supply.
2	Operating Voltage		20.0 ~ 32.0V				DC power supply.
3	Standby Current		≤ 42mA				at 28.0V
4	Starting Current *	Design value	≤ 5A				The maximum peak current may reach 5A for a short moment before the over current protection is activated.
		Over current protection	BLA21-28U-A02: 3.2A (TBC) BLA21-28U-AB2: 2.4A (TBC)				For the self-protection purpose the peak current can be limited in the range from 1.6A to 3.2A / 2.4A on the CANBUS line and on the program tool additionally provided by Futaba. 3.2A / 2.4A is the default setting and corresponds to the maximum torque at 28.0V (see No.6).
5	Consumption Current *		LL	Me	UL	unit	at 28.0V , No-Load LL : Low Limit Me : Medium Value UL : Upper Limit
			30	80	145	mA	
6	Max. Torque *		34.0	46.0	58.0	kgf·cm	at 28.0V
			3.33	4.51	5.69	N·m	
			472	639	805	ozf·in	
			44.0				kgf·cm
7	Rated Torque *		15.0			kgf·cm	at 28.0V
			1.47			N·m	
			208			ozf·in	
			13.9			kgf·cm	at 24.0V
8	No Load Speed * (Angle control mode)		LL	Me	UL	unit	at 28.0V
			0.04	0.07	0.10	s/60°	
			600	857	1500	°/s	
			100	143	250	rpm	
	0.08				s/60°	at 24.0V	
	No Load Speed * (Speed control mode)		LL	Me	UL	unit	at 28.0V
			100	143	250	rpm	
9	Travel Angle * (Angle control) + : CW - : CCW	Range	+179.9° ~ -180.0° (Absolute)				See also No.25 and No.27 for other operating modes in addition to the absolute angle control.
		Accuracy	±3.0° (Standard)				at 28.0V, No-Load, positioned at ±60°
			±1.5° (Measured)				
10	BackLash *		≤ 0.5°				—
11	Temperature Range	Operating	-40~+70°C (-40~158°F)				The operating noise level may increase at a low temperature range.
		Storage	-40~+80°C (-40~176°F)				—
		Over heat protection	+80°C (176°F)				The default temperature to activate the self-protection function “Torque OFF” in order to prevent overheat. The temperature can be set from 20°C ton 80°C on the CANBUS line and on the program tool additionally provided by Futaba.

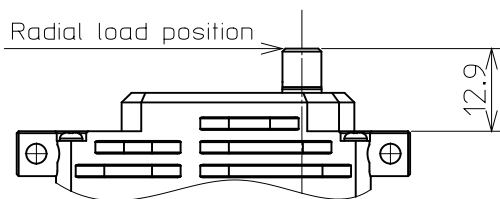
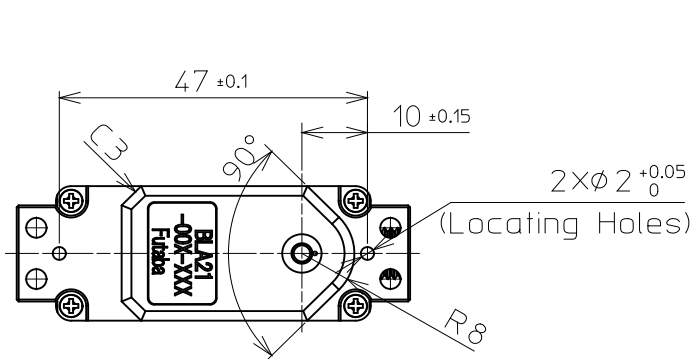
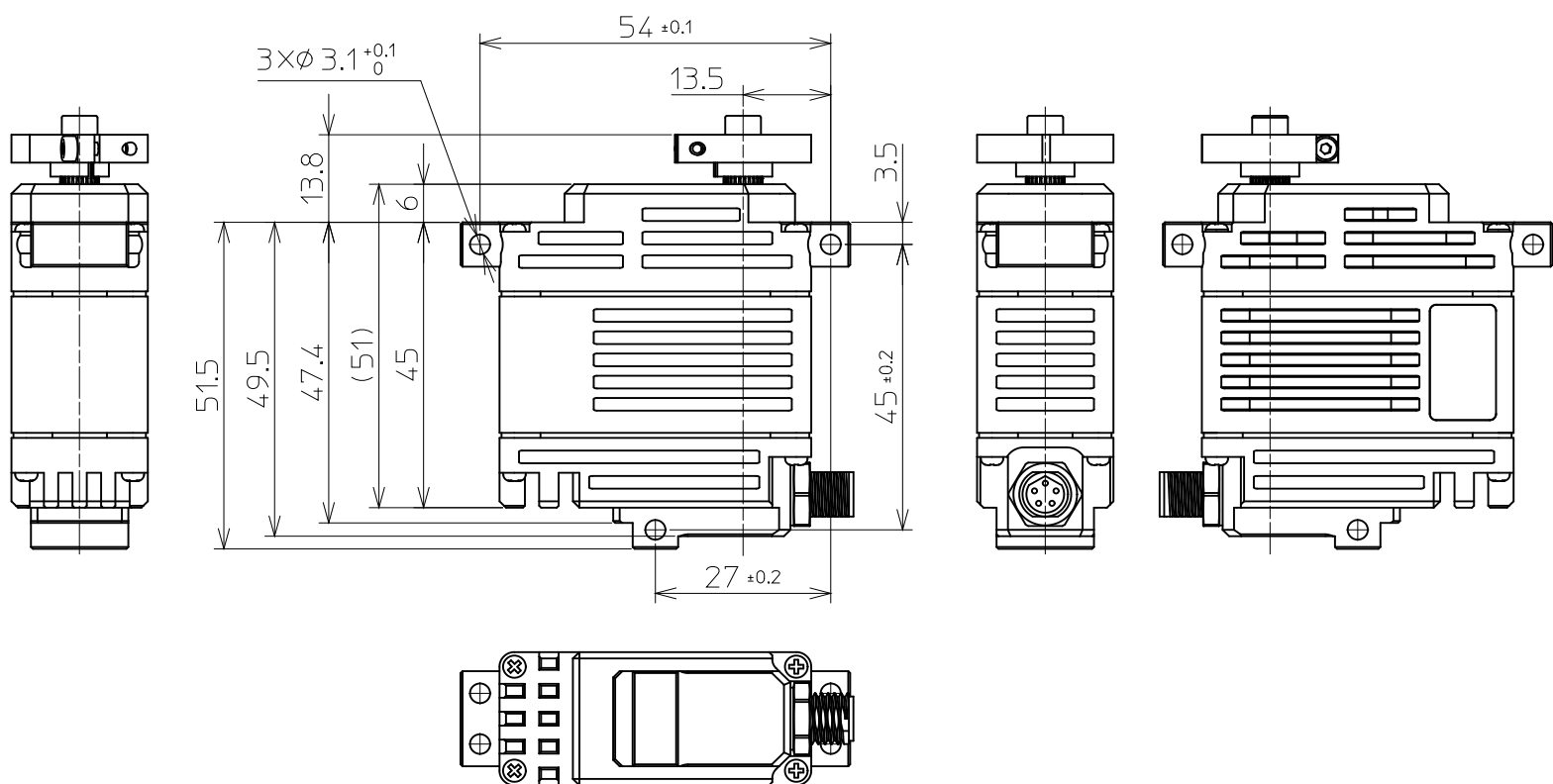
BLA21-28U-A02 / AB2 Technical Specification**Mechanical specifications (BLA21-28U-A02 and AB2)**

	Item	Specification	Remark
12	Outer Dimension	48.0x 21.0 x 51.0mm (1.89 x 0.83 x 2.01 in)	See below Outer Dimension
13	Weight	127g	with Horn and screws without cables
14	International Protection Code	IP67	Waterproof and dustproof
15	Case Material	Aluminum	Surface : Anodized Salt Water Resistance, EMI Case Shielding
16	Gear Set Material	Steel	Surface : Hardening treatment
17	Gear bearing	8 ball bearing	—
18	Output Shaft	Serration S6L	Size: ϕ 6mm, 25 teeth, Long type
19	Radial load	100N (for reference use only)	Load position : See below Outer Dimension
20	Position Sensor	Magnetic Encoder	—
21	Motor Type	Brushless DC Motor	
22	MTTF *	Operating time > 1,000h (TBC) (Inquire for the test report)	<u>Operating Condition</u> <ul style="list-style-type: none"> • at 28.0V • $\pm 60^\circ$, 0.5Hz sweep <u>Test Condition</u> <ul style="list-style-type: none"> • Load : Rated Torque (Powder Brake) 
		Operating time \geq 1,000h (TBC) (Inquire for the test report)	<u>Operating Condition</u> <ul style="list-style-type: none"> • at 28.0V • $\pm 60^\circ$, 0.5Hz sweep • No-Load <u>Test Condition (sine wave)</u> <ul style="list-style-type: none"> • Frequency : 10 to 500Hz • sweep 1oct/min • amplitude limit 2mm • Acceleration : 300m/s^2 • Vibration axis : X,Y,Z
		Equivalent to MIL-STD-810H Method 514.8 (Annex E , Minimum Integrity) 1h per axis (Applicable model is BLA21-28U-AB2)	<u>Operating Condition</u> <ul style="list-style-type: none"> • at 28.0V • $\pm 60^\circ$, 0.5Hz sweep • No-Load <u>Test Condition (Random wave)</u> <ul style="list-style-type: none"> • Refer to MIL-STD-810H Method 514.8 • Company internal test
23	Vibration Resistance *		

Outer Dimension (BLA21-28U-A02 and AB2)

Technical drawing of the BLA21-00X-XXX Fueler, showing dimensions in millimeters:

- Overall width: 60
- Overall height: 21
- Main body width: 54 ± 0.1
- Main body height: 15
- Fueler head diameter: 13.5
- Fueler head height: 10.5
- Base width: 48
- Base height: 8 ± 0.1
- Mounting holes: 4 $\times \varnothing 3.1^{+0.1}_0$
- Label: BLA21-00X-XXX Fueler
- Orientation: CW (Clockwise) and CCW (Counter-clockwise) rotation indicated.

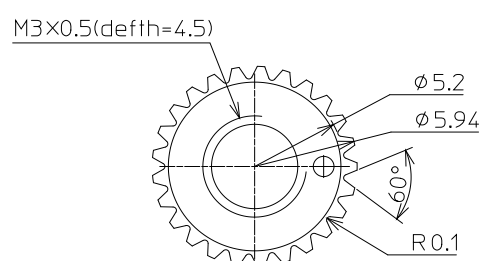


Technical drawing of a circular mechanical part, likely a flange or end plate, showing dimensions and features:

- Overall Diameter:** $\phi 21$
- Inner Circle Diameter:** P.C.D 12.45
- Outer Circle Diameter:** P.C.D 15
- Locating Holes:** 2 $\times \phi 2^{+0.05}_0$
- Threaded Holes:** 11 $\times M2$
- Angular Spacing:** 15°
- Radial Spacing:** 22.5°
- Overall Angular Spacing:** 45°

Servo Horn

Figure 1 is a schematic diagram of the serrated structure. It shows a cross-section of a material with a wavy, serrated surface. A dimension line indicates a length of 5.2, labeled '(Serration length)'.

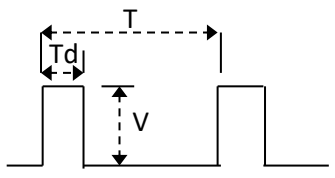


Tooth : 25

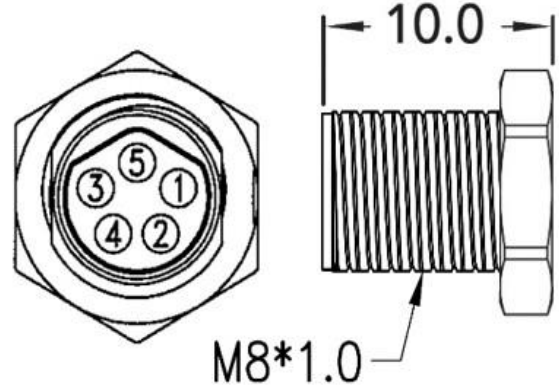
BLA21-28U-A02 / AB2 Technical Specification**Specifications for CAN BUS signals (BLA21-28U-A02 and AB2)**

Item		Specification	Remark
24	Communication Interface	CAN BUS	Protocol
			UAVCAN V0
			Baud Rate
			1Mbps
			Sample Point
25	Operating mode (CANBUS) + : CW - : CCW (Turn direction reversible)	Angle control (Absolute)	87.5%
			Node ID
			1 ~ 127
			(Please ask us for more information)
25	Operating mode (CANBUS) + : CW - : CCW (Turn direction reversible)	Angle control (Absolute)	TravelAngle: +179.9° ~ -180.0°
		Angle control (multi-turn)	TravelAngle: +36,000,000.0° ~ -36,000,000.0°
		Speed control	Max Speed: +300rpm ~ -300rpm
		Torque control	Max Torque: +100% ~ -100%

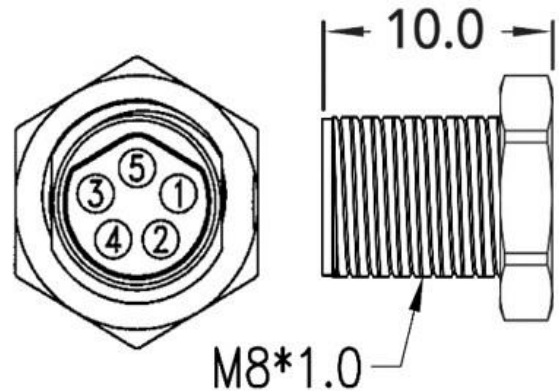
Specifications for PWM signals (Only BLA21-28U-AB2)

Item		Specification	Remark
26	Communication Interface		Signal Voltage: V
			HIGH : min. 2.0V max. 5.0V
			LOW : min. 0.0V max. 0.45V
			Frame Rate: T
27	Operating Mode (PWM) + : CW - : CCW (Turn direction reversible)	Angle control (Absolute)	14.25ms
			CW / Center / CCW: Td
			Default 2120 / 1520 / 920μs
27	Operating Mode (PWM) + : CW - : CCW (Turn direction reversible)	Angle control (Absolute)	Default: +60.0° (2120μs), Neutral 0° (1520μs), -60.0° (920μs) Max.: +180.0° Neutral 0°, -180.0°
		Angle control (Extended)	Default: +360.0° (2120μs), Neutral 0° (1520μs), -360.0° (920μs) Max.: +360.0° Neutral 0°, -360.0°
		Speed control	Max Speed: +600rpm (2120μs), 0rpm (1520μs), -600rpm (920μs)
		Torque control	-

BLA21-28U-A02 / AB2 Technical Specification**Connector specifications (Only BLA21-28U-A02)**

	Item		Specification			Remark	
28	Cable		Shielded Cable (Detachable)			Cable Length : 15.75 inch (400mm)	
29	Connector	Manufacture	ODS Electronics Co., Ltd.				
		Type	MMEPM05MCC-SHS7001				
		Mating	MAEAF05FCC-SRC7000 etc.				
30	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		

Connector specifications (Only BLA21-28U-AB2)

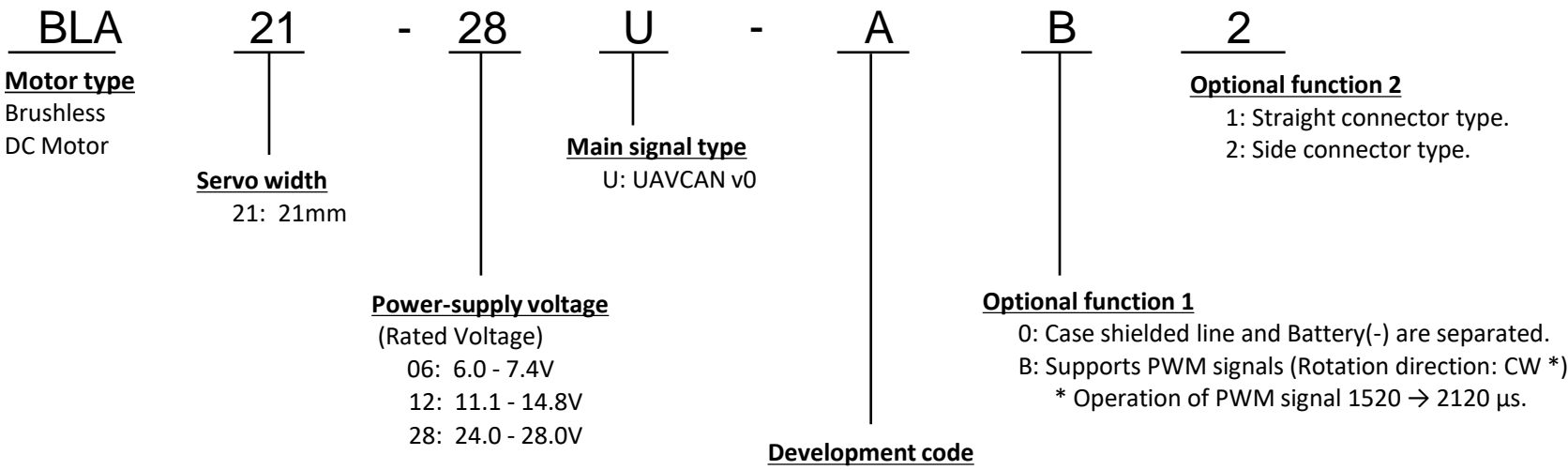
	Item		Specification			Remark
31	Cable		Shielded Cable (Detachable)			Cable Length : 15.75 inch (400mm)
32	Connector	Manufacture	ODS Electronics Co., Ltd.			
		Type	MMEPM05MCC-SHS7001			
		Mating	MAEAF05FCC-SRC7000 etc.			
33	Pin Assignment		Pin No.	Assignment	Cable Color	
			①	Battery (+)	Brown	
			②	PWM	White	
			③	CAN-H	Blue	
			④	CAN-L	Black	
			⑤	Battery (-) and Case Shield Line	Drain	

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

All Specifications are subject to change without prior notice.

BLA21-28U-A02 / AB2 Technical Specification

Model name system



- **Caution**
- This product SHOULD NOT been 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.