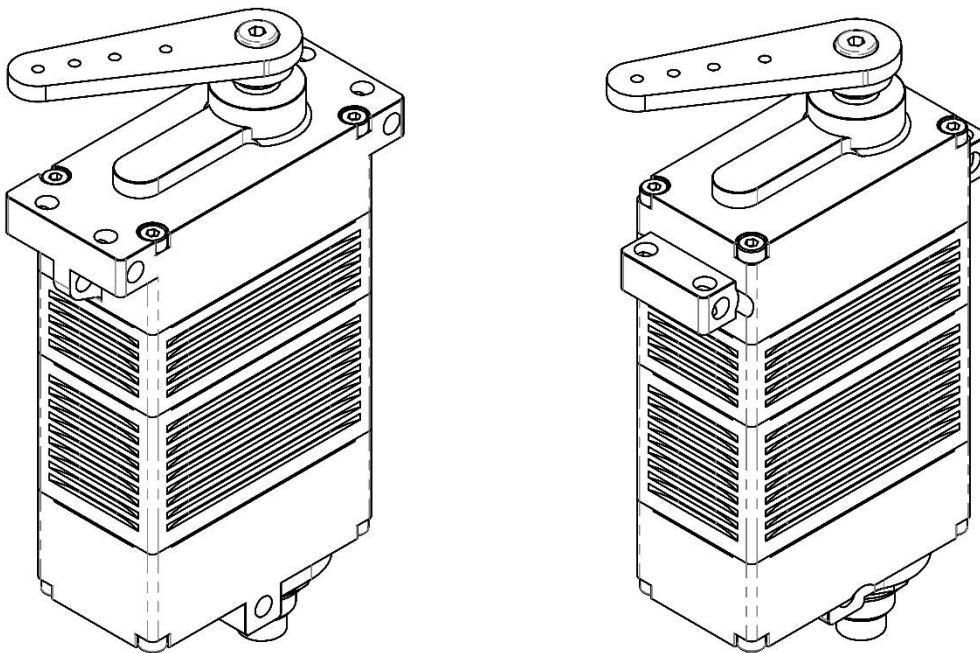


DA 22 - BLDC

Technical Specification



DA 22-12-3612
DA 22-30-3624



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1. General Description

The DA 22 BLDC is the next generation of our proven DA 22 actuator range, featuring a brushless BLDC motor and contactless position sensing. To guarantee maximum safety and reliability, its brushless motor and contactless, wear free position sensing system makes the DA 22 BLDC immune to wear, vibrations and shock loads. It has especially been designed for the usage in harsh environments and for safety critical applications that require an actuator with high endurance. The conductive aluminum case and the shielded connection cable are reducing the susceptibility to any kind of EMI/RFI noise to the absolute minimum.

The CNC machined sealed cases, made of saltwater resistant aluminum, comply with the IP 67 standard for water/dust resistance. All types of our DA 22 BLDC actuators use all steel gear trains with ISS gear protection system as an option and are fully programmable (motor overload protection, Fail Safe Position in case of PWM command signal lost, etc.). The DA 22 BLDC features an industrial circular connector with M9 thread. Optionally available with a MIL specified connector or an integrated shielded cable with cable gland. The cases offer integrated lug mounts for both horizontal and vertical installation.

The DA 22 BLDC with digital serial command interface (RS-485) receives its commands via a CRC secured protocol. It can return not only the shaft position in digital format, but also several diagnostic data such as the supply voltage reading, current consumption and the internal temperature in digital form (optionally also the humidity within actuator case). These kinds of diagnostic capabilities help to determine the health state of the actuator before, during and after deployment.

Interface Options:

PWM (TTL/CMOS level compatible)

RS 485 (2-wire, asynchronous Serial Command Interface)

2. Operating Data

		DA 22-12-3612...	DA 22-30-3624...
Supply Voltage (rated)		12 V DC	28 V
Supply Voltage Range		10 ... 16 V DC	20 ... 32 V DC
Standby Current ¹	at rated voltage	< 0.1 A	< 0.1 A
Rated Current ¹	at rated voltage	0.9 A	0.5 A
Peak Current ¹	at rated voltage	1.8 A	1.1 A
Rated Torque ¹	at rated speed	1.3 Nm (184 ozf-in)	1.5 Nm (212 ozf-in)
Peak Torque ¹	at rated voltage	3 Nm (424 ozf-in)	3.5 Nm (495 ozf-in)
No Load Speed ¹	at rated voltage	280 °/s	320 °/s
Rated Speed ¹	at rated torque	180 °/s	210 °/s
Default Travel Angle PWM		±45° = 90° total travel	
Max. Travel Angle PWM ²		±90° = 180° total travel	
Default Travel Angle RS 485		±45° = 90° (0xDD command)	
Extended Travel Angle ² RS 485		±170° = 340° (0x76 command)	
Backlash (mechanical)		≤ 0.9°	
Position Error under Temperature ³		≤ ±1.0°	
Operating Temperature Range ⁴		-30°C ... +70°C (-22°F ... +158°F)	
Storage Temperature Range		-35°C ... +80°C (-31°F ... +176°F)	

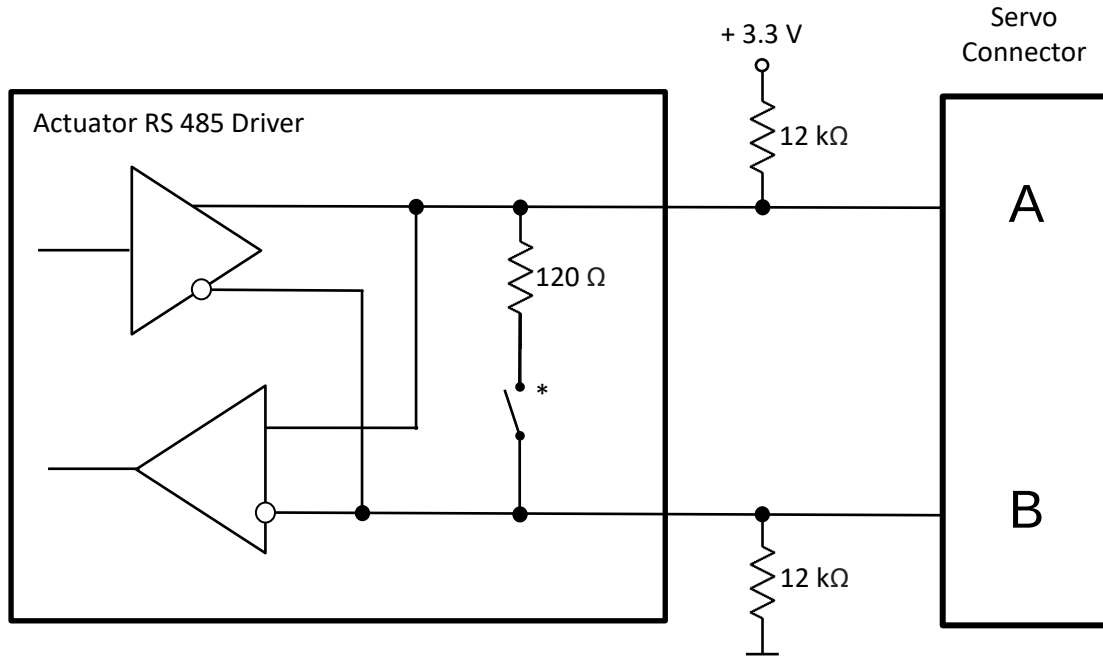
1) Tolerance ±10%

2) Requires Programming Tool # 985.3 (PWM)

3) -20°C ... +50°C, Δt = 70°C (-4°F ... +122°F, Δt = 126°F)

4) Low Temperature Modification (-70°C /-94°F) on request

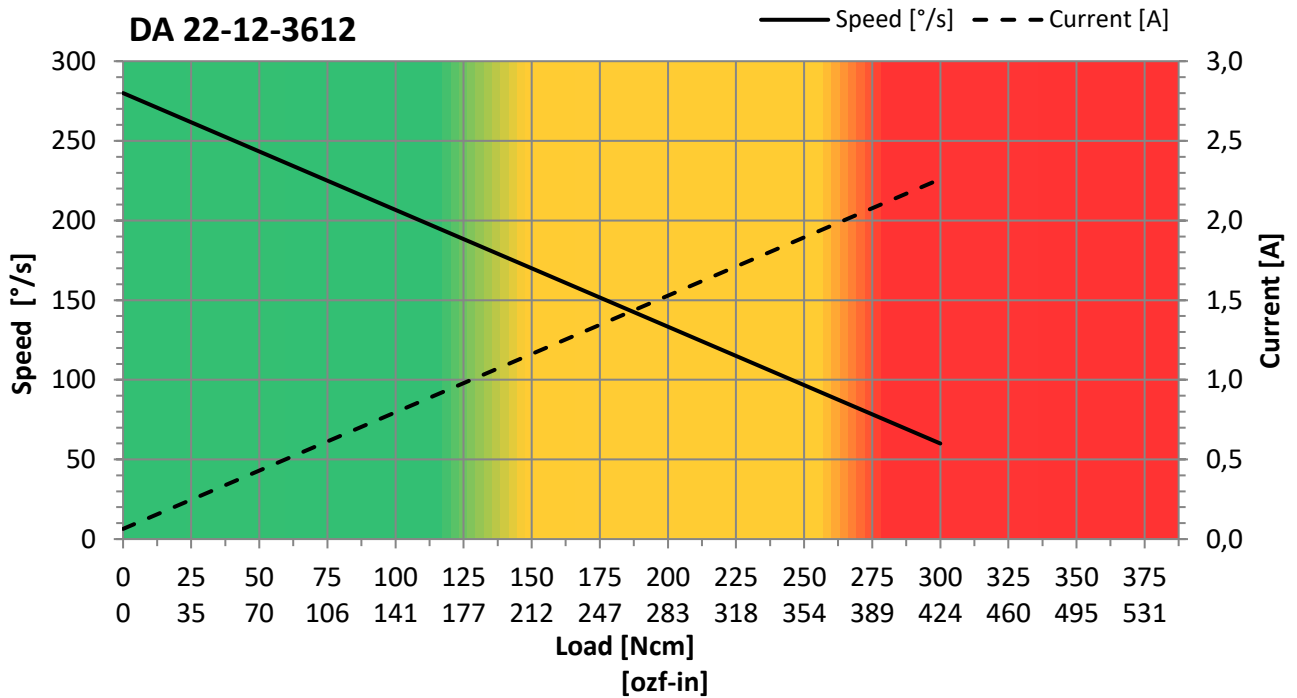
3. RS 485 Termination Network



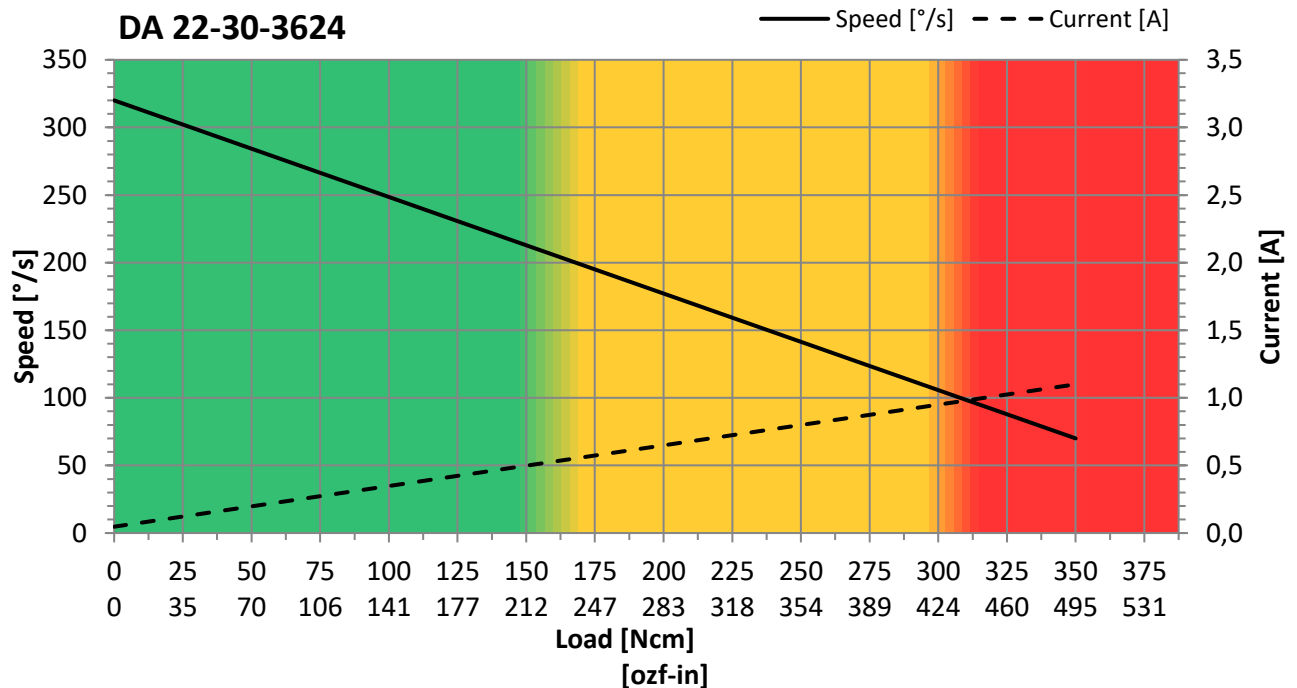
* Switchable 120 Ohm Termination Resistor. Can be configured via the RS 485 Interface.

4. Performance

4.1. Performance 12V-Version



4.2. Performance 28V-Version



5. Command Signal

5.1. PWM Command Signal

Valid for all Versions with PWM Command Signal

PWM	DA 22-__-__-__-__-__-__-X-__
Signal Voltage	TTL-Level HIGH: min. 2.5V, max. 5.0V TTL-Level LOW: min.- 0.5V, max. 2.3V
Frame Rate	2.6 ... 2000 ms
Valid Pulse Lengths	0.85 ... 2.15 ms
Pulse Lengths for Position Left / Center / Right	1.0 / 1.5 / 2.0 ms
Resolution	≤ 0.5 μs

5.2. RS 485 Command Signal

Valid for all Versions with RS 485 Command Signal

RS 485	DA 22-_-_-_-_-R-_-
Baud-Rate	115200 $\pm$ 1.5% bits/s
Protocol (Documentation available)	6 byte (incl. 2 byte CRC)

5.3. RS 485 Protocol Specifications

RS 485	DA 22-_-_-_-_-R-_-
Number of Data Bits	8
Number of Stop Bits	1 or 2
Parity	None

Command / Response Frame

Byte #	Description
1	Command / Response-Code
2	Actuator ID
3	Argument 1
4	Argument 2
5	CRC High Byte
6	CRC Low Byte

5.4. RS 485 Position Feedback

Integrated in the RS485 protocol a Position Feedback Value is available, representing the output shaft's angular position. Value readout by sending a request command. Detailed information is provided in the RS485 documentation.

6. Materials and Protective Features

Case Material	Saltwater resistant Aluminum Alloy
Splash Water Resistance	IP 67, waterproof to 1m depth
Salt Water Resistance	HART® coating
EMI / RFI Shielding	Case Shielding
Motor Type	Brushless BLDC
Gear Set Material	Hardened Steel
Position Sensor	Contactless Magnet Encoder
ISS Gear Protection System	Optional
Position Feedback	Standard
Extended Travel Angle	Standard (configurable)
RS 485 Communication Interface	Optional
Shielded Connecting Cable	Standard
MIL specified electrical Connector	Optional

7. Dimensions

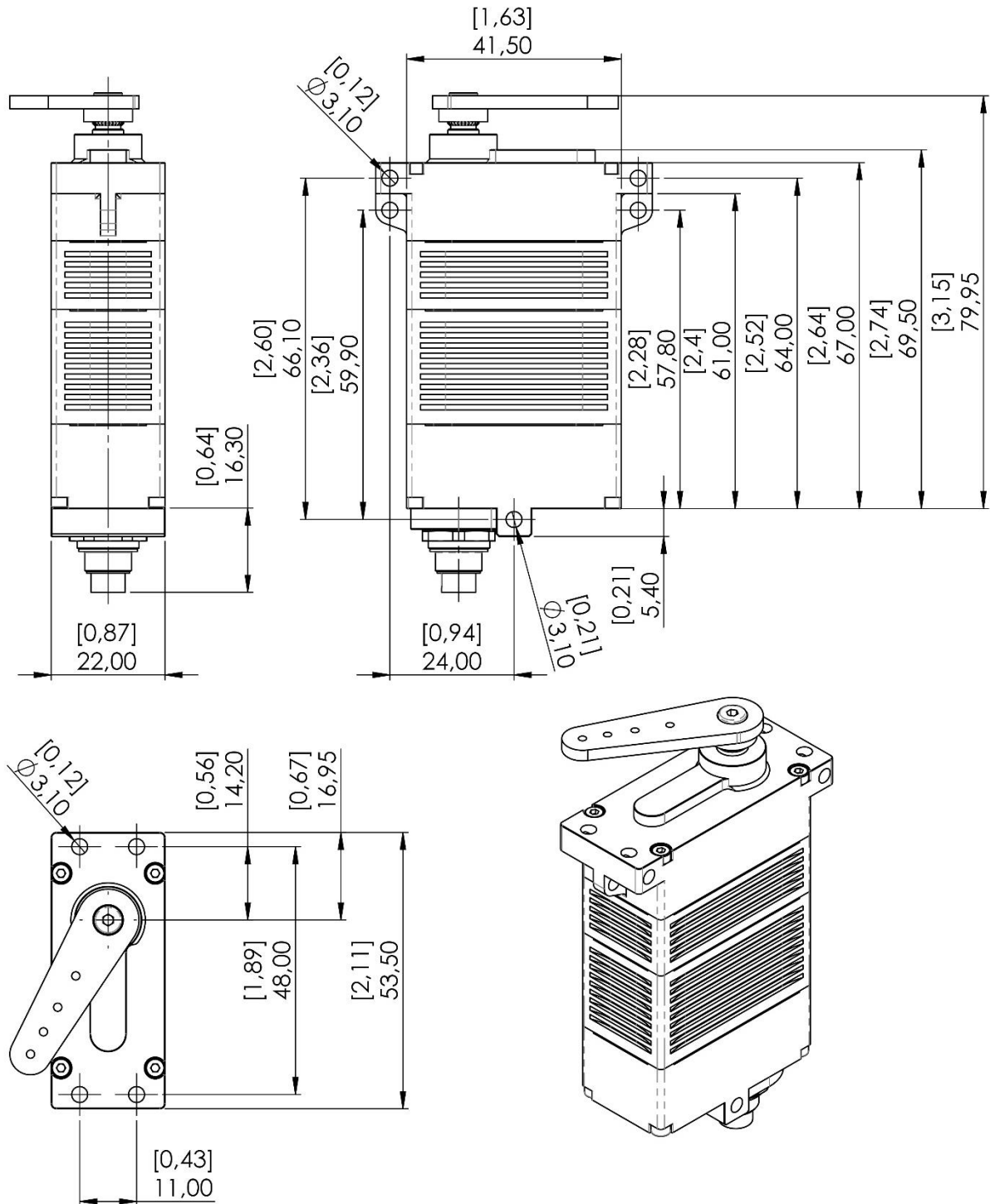
DA 22-__-36_... Case Design "A"	
Overall Dimensions	67.0 mm x 41.5 mm x 22.0 mm (2.64 in x 2.11 in x 0.87 in)

DA 22-__-36_... Case Design "B"	
Overall Dimensions	65.3 mm x 41.5 mm x 22.0 mm (2.57 in x 1.63 in x 0.87 in)

Weight	141 g $\pm 10\%$
Standard Tolerances	Unless otherwise specified according to DIN ISO 2768 - m

7.1. Installation Dimensions

Case Design "A"
DA 22-__-36__-A...



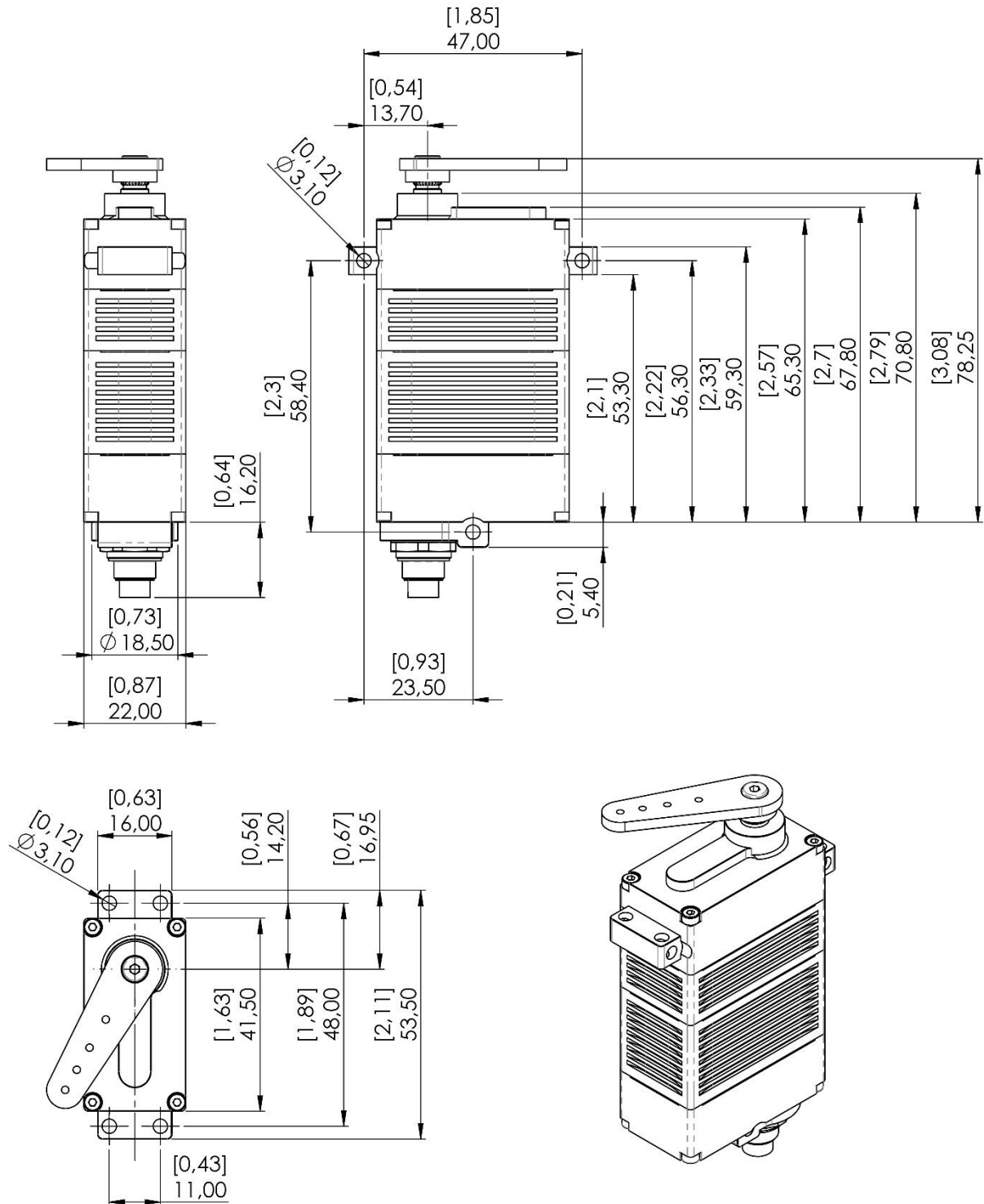
Content is subject to change without notice

Revision: A

7.2. Installation Dimensions

Case Design "B" (identical to brushed DA 22-__-41-__)

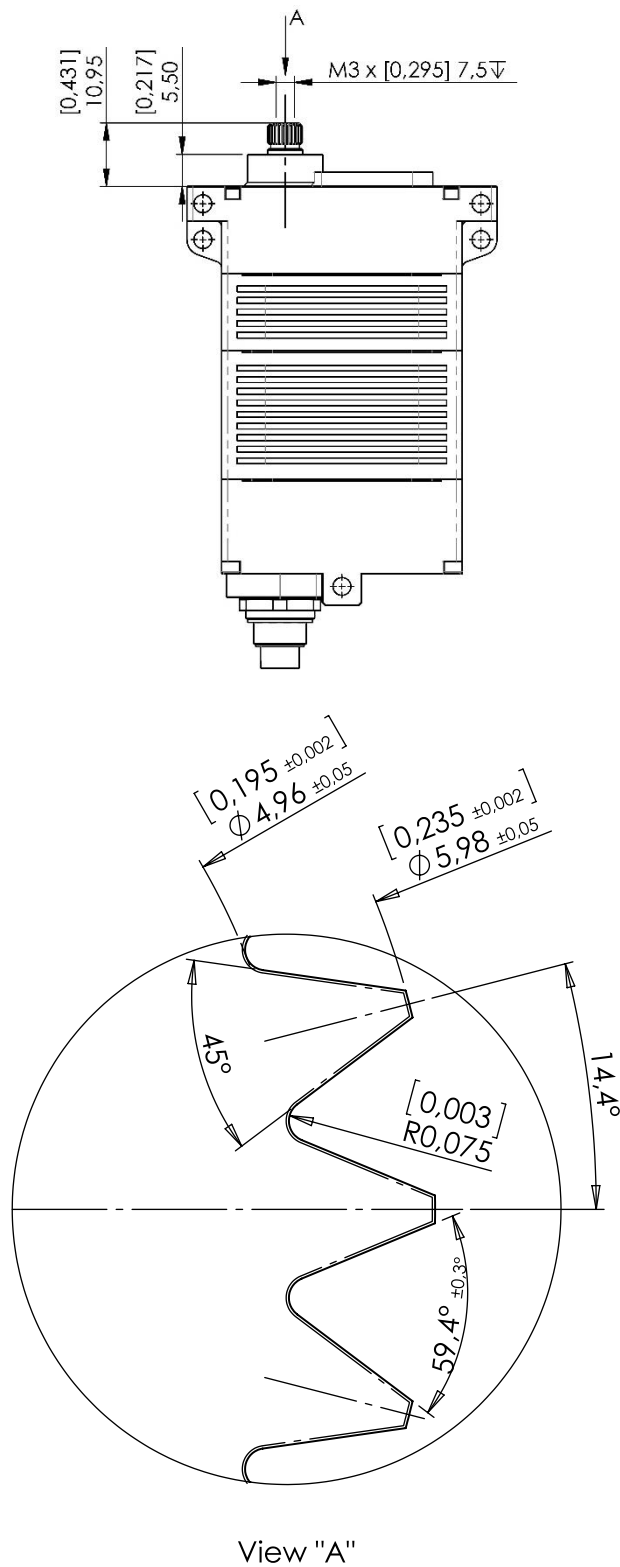
DA 22-__-36-__-B...



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Revision: A

7.3. Output Shaft



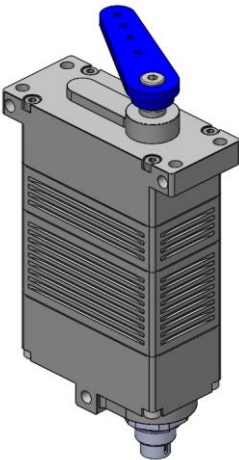
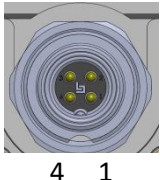
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Revision: A

8. Electrical Connection Options

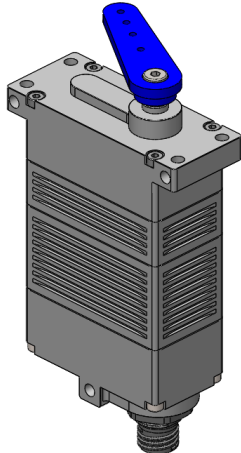
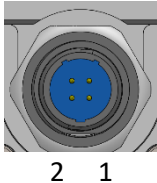
Integrated M9 Electrical Connector

Item # DA 22._._.36_._._._._.M9

	M9 Electrical Connector		
		Manufacturer	Franz Binder GmbH & Co.
		Type	Series 712 / 702, No. 09-0411-90-04
		Mating	No. 79-1410-12-04, 79-1410-72-04
	PWM Pin Assignment		
	1	+V DC	Supply Voltage
	2	GND	Supply Ground
	3	SIG	Command Signal
	4	Pos FB	Position Feedback Signal
	-	NC	Not connected (Standard Connecting Cable)
	RS 485 Pin Assignment		
	1	+V DC	Supply Voltage
	2	GND	Supply Ground
	3	RS 485 Ch A	RS 485 Interface Channel A
	4	RS 485 Ch B	RS 485 Interface Channel B
	-	NC	Not connected (Standard Connecting Cable)

Integrated MIL-specified Electrical Connector

Item # DA 22.__.36_._._._.MM

	MIL-specified Electrical Connector		
		Manufacturer	Glenair Inc.
		Type	No. 801-011-07MT6-4PA
		Mating	No. 801-007-..., 801-008-...
	PWM Pin Assignment		
	1	+V DC	Supply Voltage
	2	Pos FB	Position Feedback Signal
	3	SIG	PWM Command Signal
	4	GND	Supply Ground
	RS 485 Pin Assignment		
	1	+V DC	Supply Voltage
	2	RS 485 Ch B	RS 485 Interface Channel B
	3	RS 485 Ch A	RS 485 Interface Channel A
	4	GND	Supply Ground

Integrated Cable Gland with 250 mm Cable *

Item # DA 22._.36_._.._.CG250

Cable Gland			
	Manufacturer	LiYCY	
	Type	4x0.25mm ²	
	Length	250 mm*	
PWM Pin Assignment			
1	Green	+V DC	Supply Voltage
2	Brown	GND	Supply Ground
3	White	SIG	Command Signal
4	Yellow	Pos FB	Position Feedback Signal
RS 485 Pin Assignment			
1	Green	+V DC	Supply Voltage
2	Brown	GND	Supply Ground
3	White	RS 485 Ch A	RS 485 Interface Channel A
4	Yellow	RS 485 Ch B	RS 485 Interface Channel B

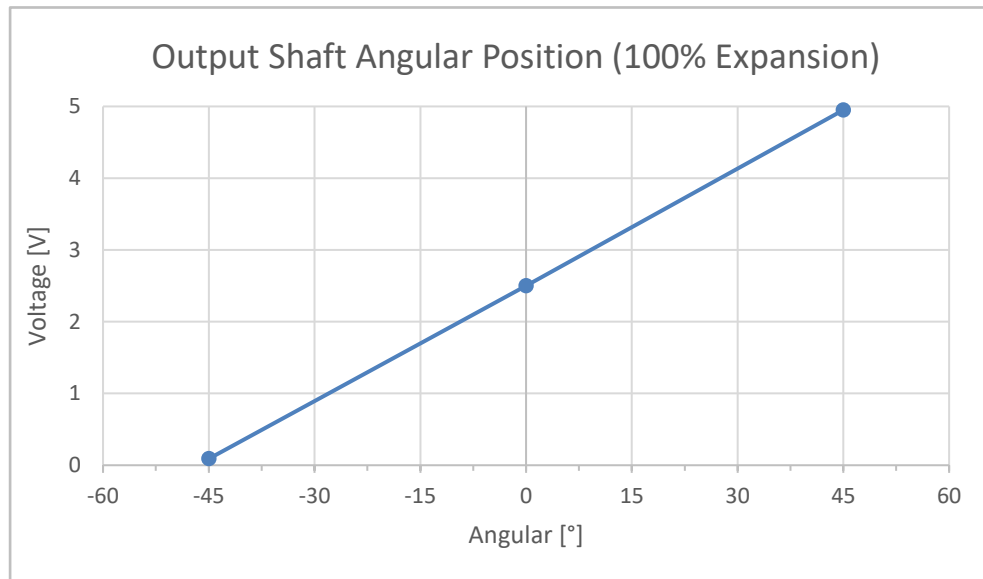
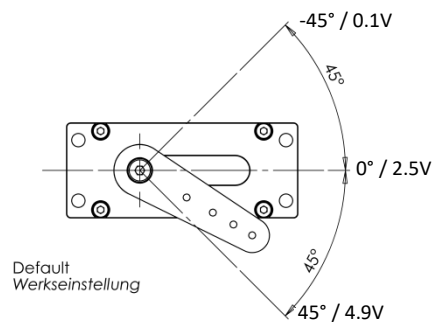
*other cable length on request

9. Position Feedback Signal

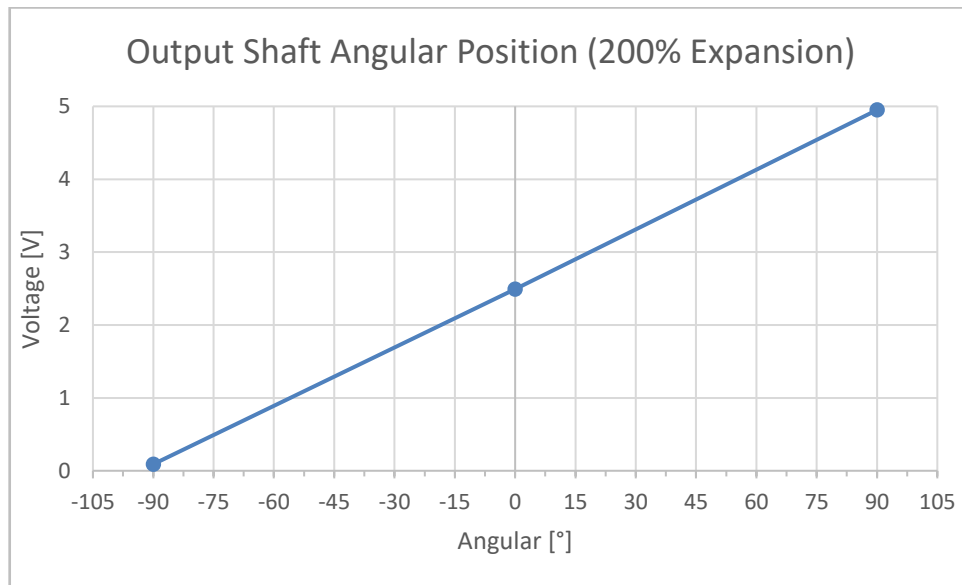
PWM Command Signal

The Position Feedback signal (Pos FB) is an analogue output signal with a voltage value which is directly related to the output shaft's position. Reference is Supply Ground (GND).

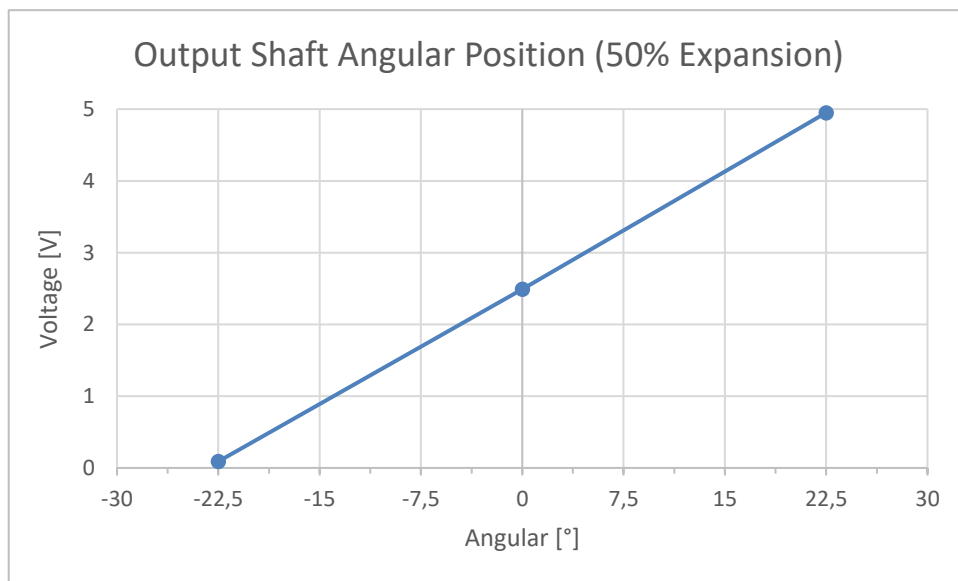
Independent from the programmed max. travel angle the signal is automatically set to range from 0...5V between the end positions.



* Tolerance $\pm 10\%$



* Tolerance $\pm 10\%$



* Tolerance $\pm 10\%$

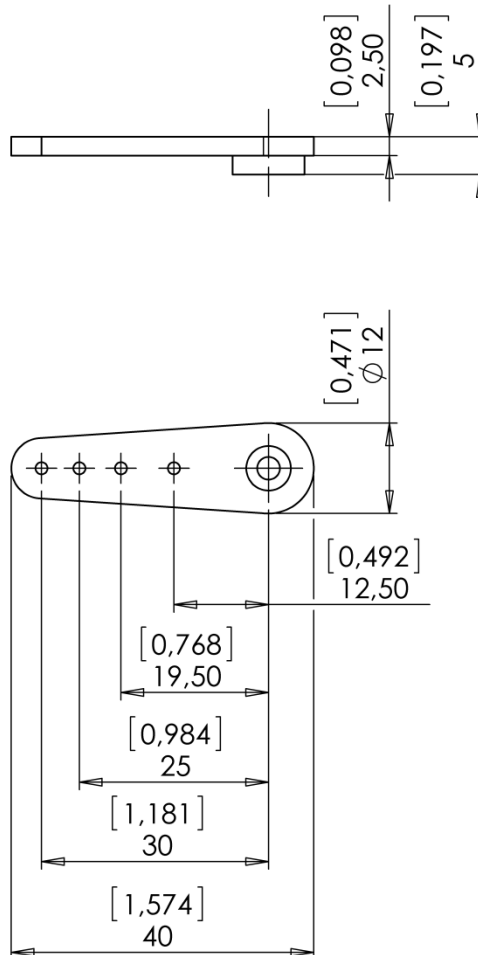
RS 485 Command Signal

Integrated in the RS 485 protocol the Position Feedback Signal can be read by sending a request command. Detailed information is provided in the RS 485 documentation.

10. Accessories

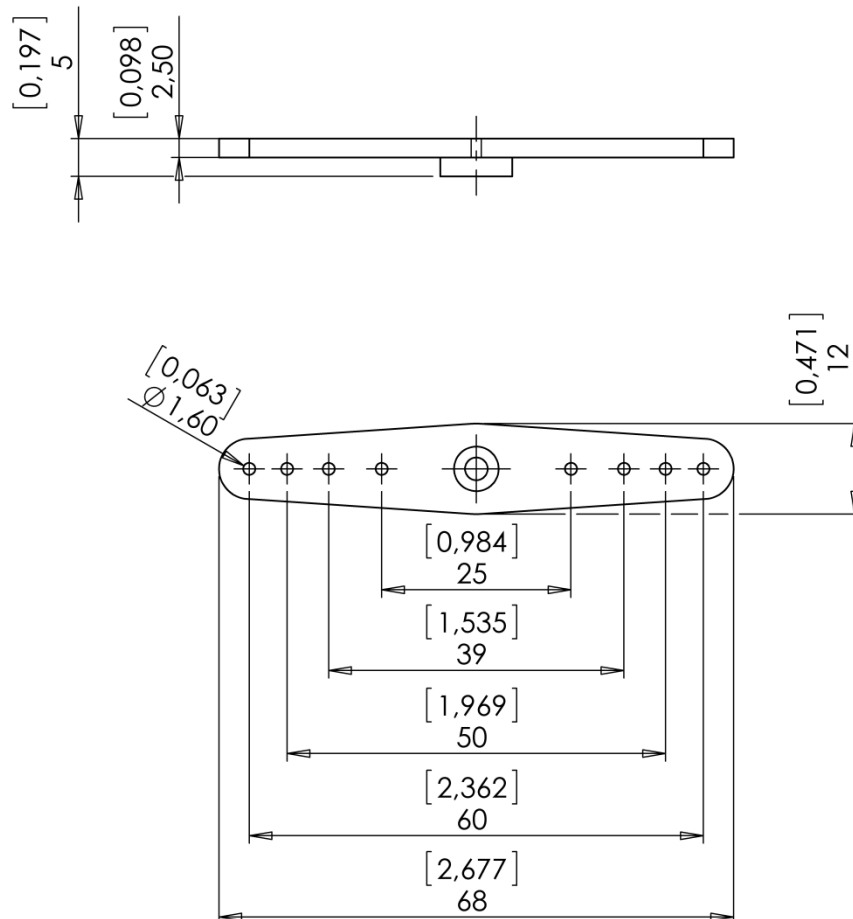
Item	Item-No.
Aluminum Servo Arm (single sided)	1641.20
Aluminum Servo Arm (double sided)	1641.21
Aluminum Mounting Frame	1521.32 incl. Hardware
Programming Tool PWM	985.3
Programming Tool RS-485	985.8

10.1. Servo Arm, Single Sided 1641.21



Not to scale

10.2. Servo Arm, Double Sided 1641.20



Not to scale

11. Item Number System

DA	22	.	30	.	36	24	.	A	.	I	.	R	.	M9
Servo Type												Electrical Connection		
22mm Class												M9		Standard BINDER Connector
												MM		MIL spec. GLENAIR Mighty Mouse
												SC250		Cable Gland, Shielded Cable 250 mm
Supply Voltage												Command Interface		
12 V DC	12											R		RS 485
30 V DC	30											X		PWM
												ISS Gear Protection System		
												I		integrated
												X		without
												Case Design		
												A		Case Design "A"
												B		Case Design "B"



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