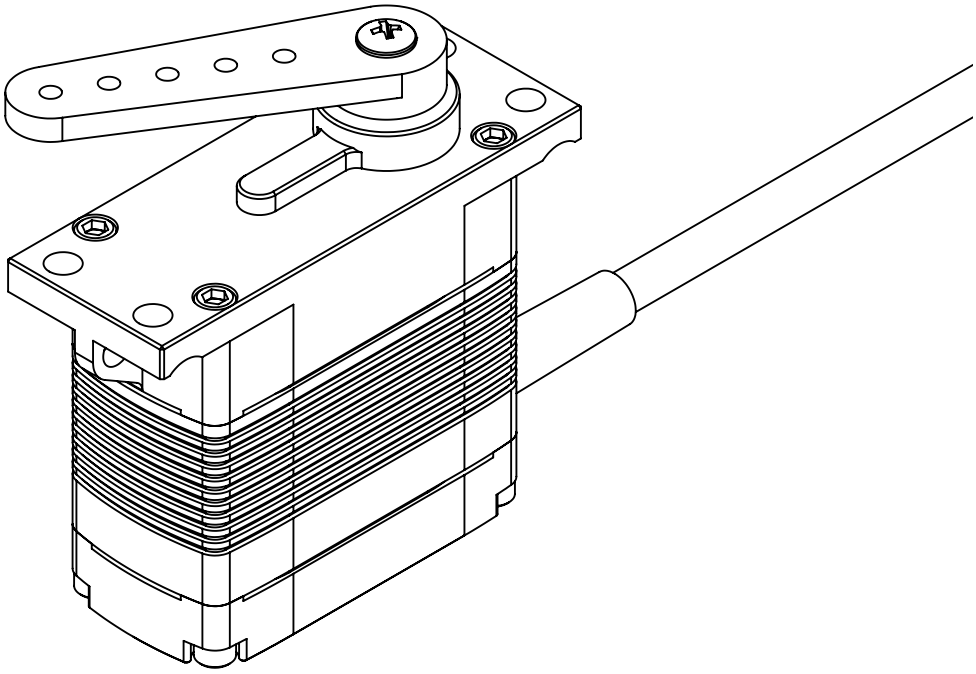
DA 15-N
Technical Specification



DA 15-N-06-BLDC
DA 15-N-12-BLDC
DA 15-N-30-BLDC
DA 15-N-06-BLDC-32
DA 15-N-12-BLDC-32
DA 15-N-30-BLDC-32

 www.volz-servos.com

Content

1. General Description

The DA 15-N is our smallest and lightest full brushless actuator incorporating contactless position sensing.

Its brushless motor and contactless, wear free position sensing system makes the DA 15-N 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 to EMI/RFI noise to the absolute minimum.

The servo is fully programmable.

The DA 15-N series can be equipped with a standard PWM input, a single ended serial interface as well as a RS 485 interface. Position feedback is a standard feature.

In addition the DA 15-N is also available with a CAN interface, whereas it supports our own 11-bit CAN protocol as well as UAVCAN.

The DA 15-N 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 current consumption and the temperature of the electronics in digital form. These kind of diagnostic capabilities help to determine the health state of the actuators before, during and after deployment.

DA 15-N actuators have been subjected to endurance tests of more than 4,000 hours under load.

Advantages of the full brushless actuator:

1. Maximized service life through vibration-resistant, brushless DC motor
2. Brushless motor technology eliminates the typical electromagnetic noise of brush-type motors and provides ultra-long endurance
3. Contactless, wear free position sensing system
4. Aluminum housing with minimal weight and size in functional design
5. The saltwater-resistant, HART-coat treated aluminum housing withstands at least 100 hours of saltwater spray without damage and meets the IP-67 standard for water and dust protection
6. Excellent immunity to any kind of electromagnetic noise achieved with aluminum housing, low electromagnetic emissions through brushless motor
7. Several programming possibilities, e.g. overload protection of the internal electric brushless motor, which allows to reduce the motor current if the motor is being overloaded

2. Operating Data

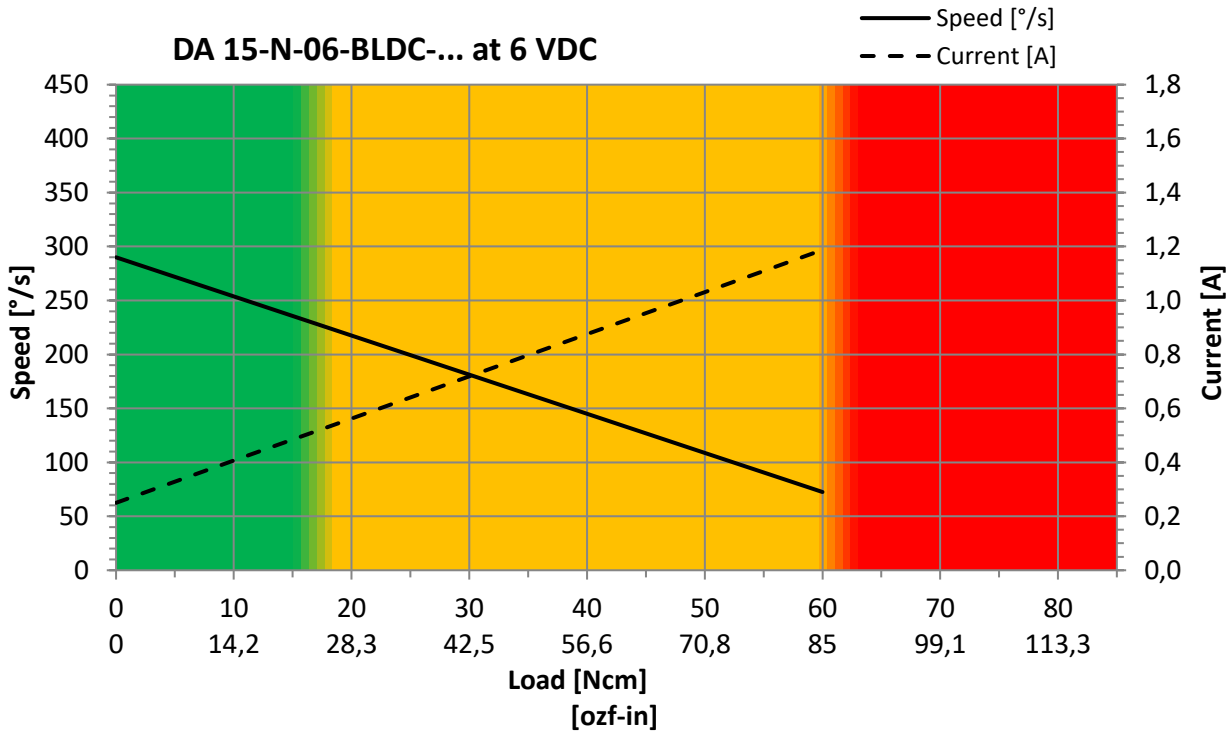
	DA 15-N-06-BLDC-...	DA 15-N-12-BLDC-...	DA 15-N-12-BLDC-...	DA 15-N-30-BLDC-...
Supply Voltage (rated)	6 VDC	12 VDC	14 VDC	28 VDC
Supply Voltage Range	5 ... 9 VDC	10 ... 16 VDC	10 ... 16 VDC	20 ... 30 VDC
Standby Current [1] at rated voltage	0.05 A	0.05 A	0.05 A	0.05 A
Rated Current [1] at rated voltage	0.5 A	0.35 A	0.35 A	0.2 A
Peak Current [1] at rated voltage	1.5 A	0.85 A	0.95 A	0.45 A
Rated Torque [1] at rated speed	16 Ncm (22.7 ozf-in)	25 Ncm (35.4 ozf-in)	25 Ncm (35.4 ozf-in)	25 Ncm (35.4 ozf-in)
Peak Torque [1] at rated voltage	60 Ncm (85 ozf-in)	60 Ncm (85 ozf-in)	60 Ncm (85 ozf-in)	60 Ncm (85 ozf-in)
No Load Speed [1] at rated voltage	290 °/s	330 °/s	390 °/s	360 °/s
Rated Speed [1] at rated torque	235 °/s	240 °/s	290 °/s	260 °/s
Default Travel Angle	±45° = 90° total travel			
Max. Travel Angle [2]	±90° = 180° total travel			
Backlash (mechanical)	≤ 0.5°			
Position Error under Temperature [3]	≤ ±1.0°			
Operating Temperature Range	-30°C ... +70°C (-22°F ... +158°F)			
Storage Temperature Range	-40°C ... +80°C (-31°F ... +176°F)			

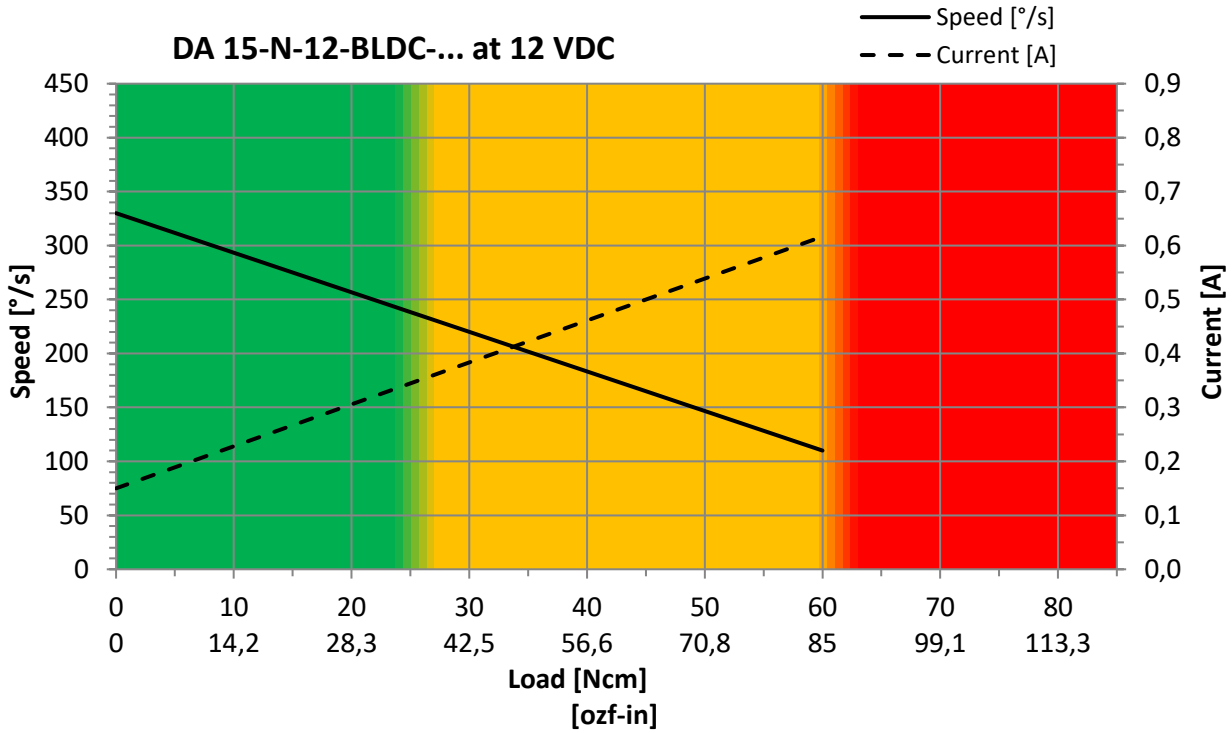
1) Tolerance ±10%
2) Programming Tool # 985.3 required
3) -20°C ... +50°C , Δt = 70°C (-4°F ... +122°F , Δt = 126°F)

	DA 15-N-06-BLDC-32-...	DA 15-N-12-BLDC-32-...	DA 15-N-12-BLDC-32-...	DA 15-N-30-BLDC-32-
Supply Voltage (rated)	6 VDC	12 VDC	14 VDC	28 VDC
Supply Voltage Range	5 ... 9 VDC	10 ... 16 VDC	10 ... 16 VDC	20 ... 30 VDC
Standby Current [5] at rated voltage	0.05 A	0.05 A	0.05 A	0.05 A
Rated Current [5] at rated voltage	0.5 A	0.35 A	0.35 A	0.2 A
Peak Current [5] at rated voltage	1.5 A	0.85 A	0.95 A	0.45 A
Rated Torque [5] at rated speed	11 Ncm (15.6 ozf-in)	18 Ncm (25.5 ozf-in)	18 Ncm (25.5 ozf-in)	18 Ncm (25.5 ozf-in)
Peak Torque [5] at rated voltage	40 Ncm (56.6 ozf-in)	40 Ncm (56.6 ozf-in)	40 Ncm (56.6 ozf-in)	40 Ncm (56.6 ozf-in)
No Load Speed [5] at rated voltage	540 °/s	620 °/s	730 °/s	670 °/s
Rated Speed [5] at rated torque	410 °/s	415 °/s	505 °/s	450°/s
Default Travel Angle	±45° = 90° total travel			
Max. Travel Angle [6]	±90° = 180° total travel			
Backlash (mechanical)	≤ 0.5°			
Position Error under Temperature [7]	≤ ±1.0°			
Operating Temperature Range [8]	-30°C ... +70°C (-22°F ... +158°F)			
Storage Temperature Range	-40°C ... +80°C (-31°F ... +176°F)			

4) Tolerance ±10%
5) Programming Tool # 985.3 required
6) -20°C ... +50°C , Δt = 70°C (-4°F ... +122°F , Δt = 126°F)
7) Low Temperature Modification on request

3. Performance



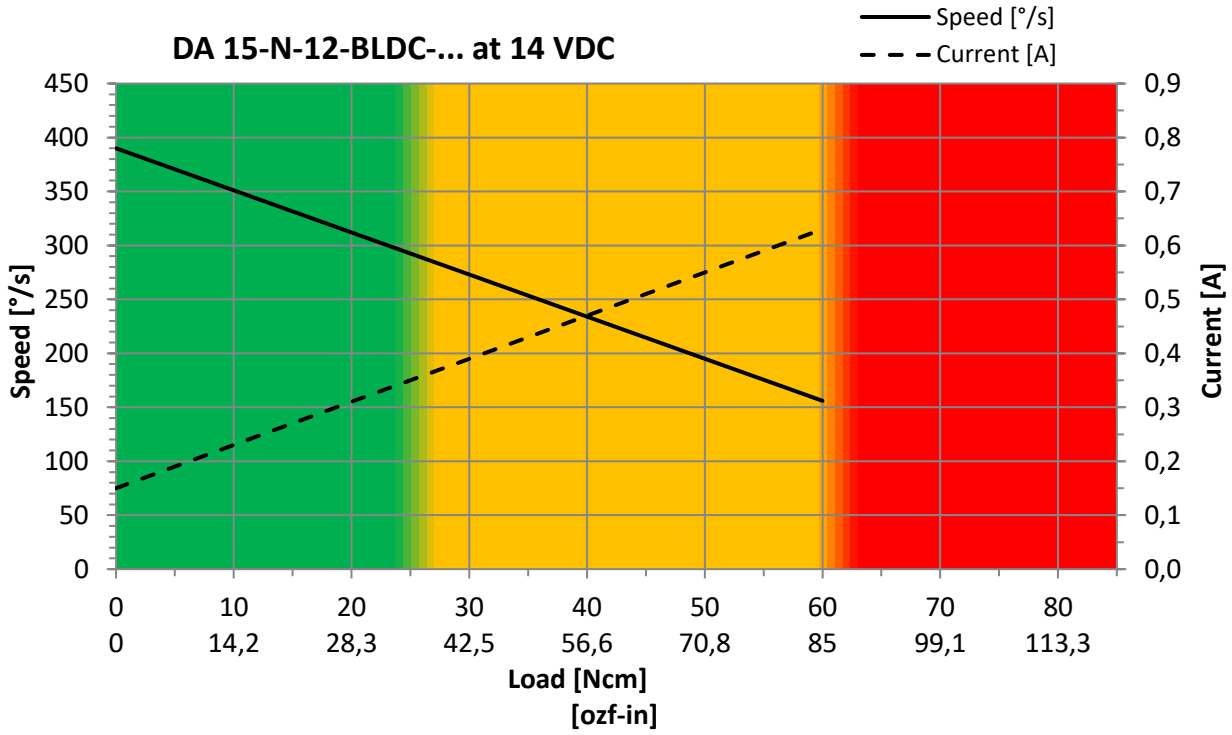


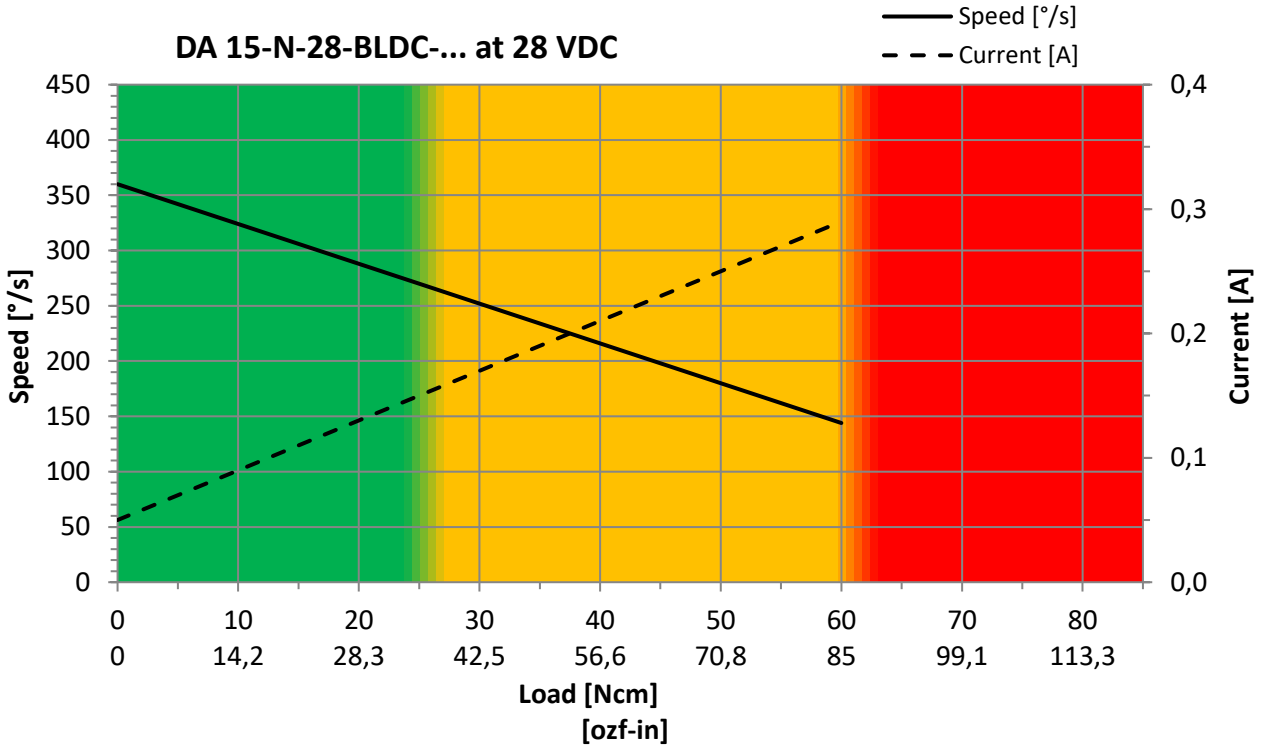
Operation Mode:

Continuous

Short Time
< 10s , 60s cool down

Overload
< 1s , 60s cool down



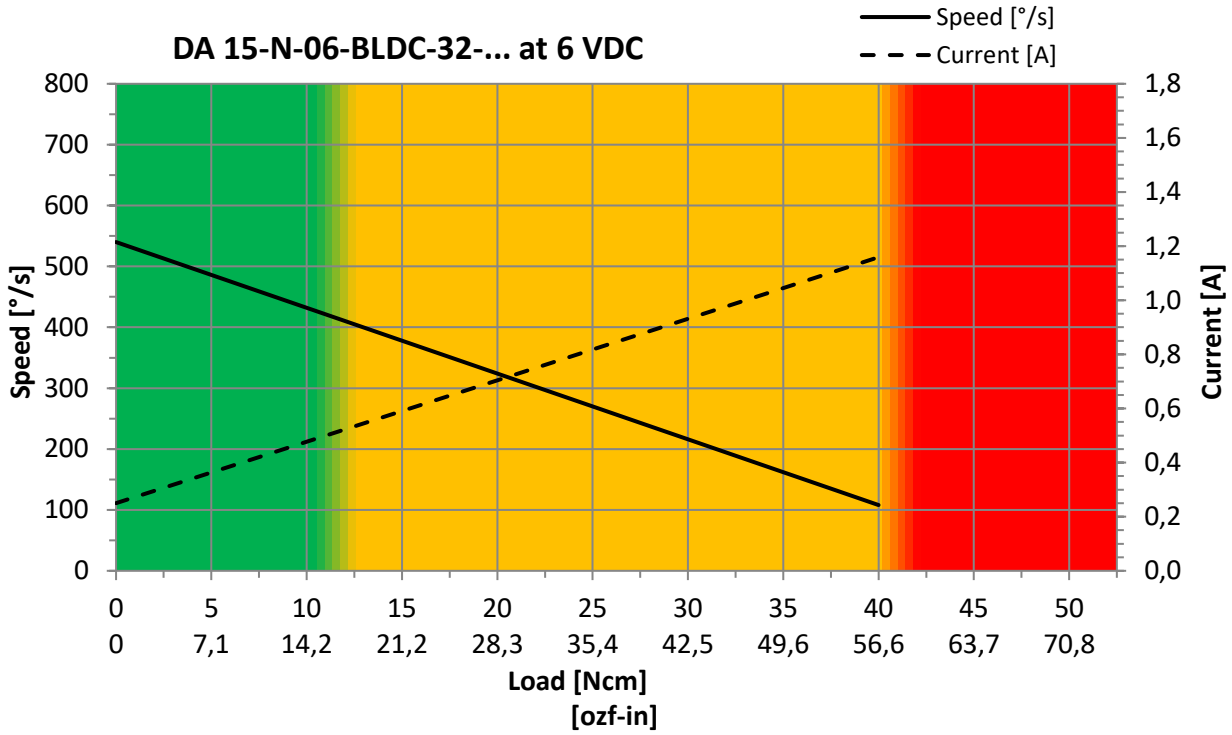


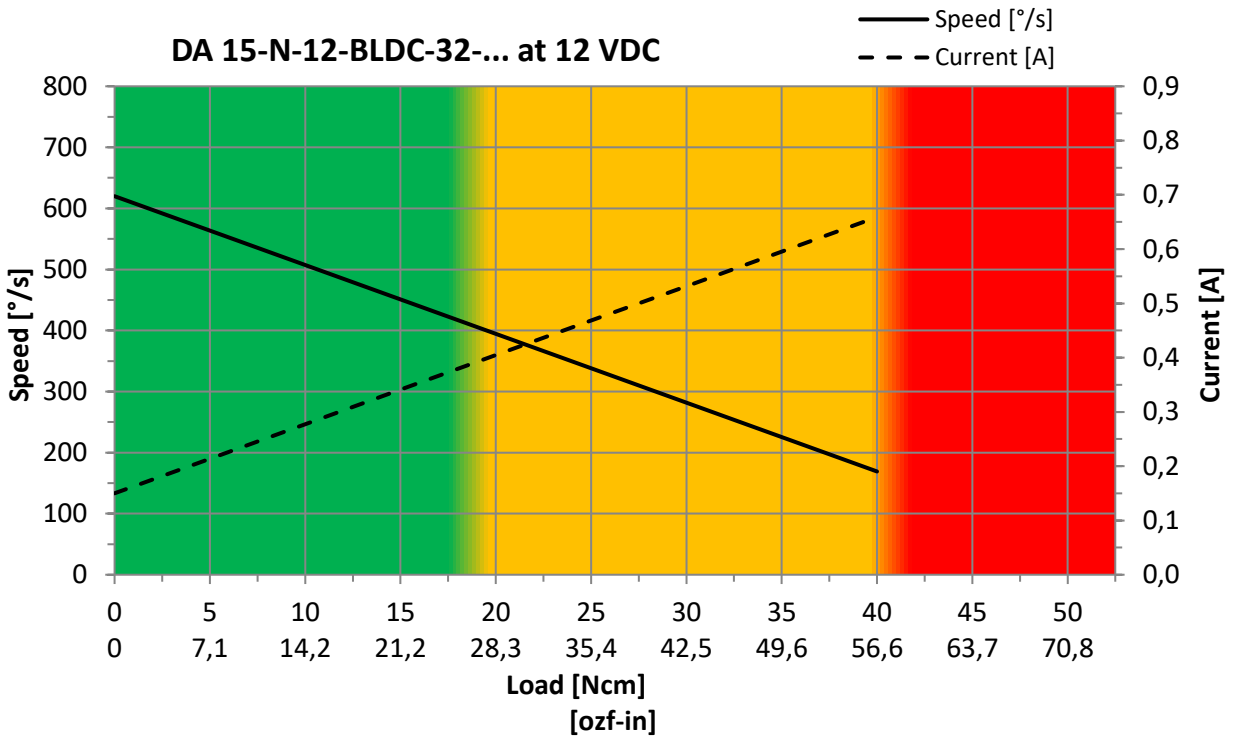
Operation Mode:

Continuous

Short Time
< 10s , 60s cool down

Overload
< 1s , 60s cool down



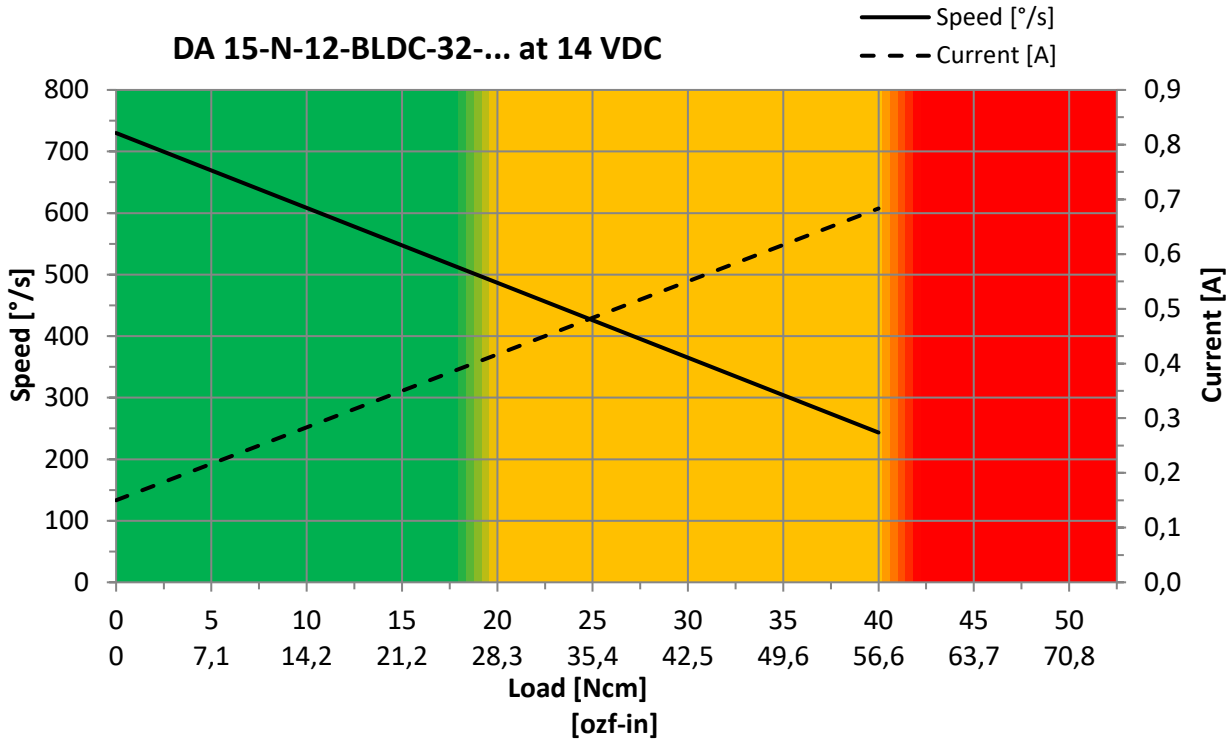


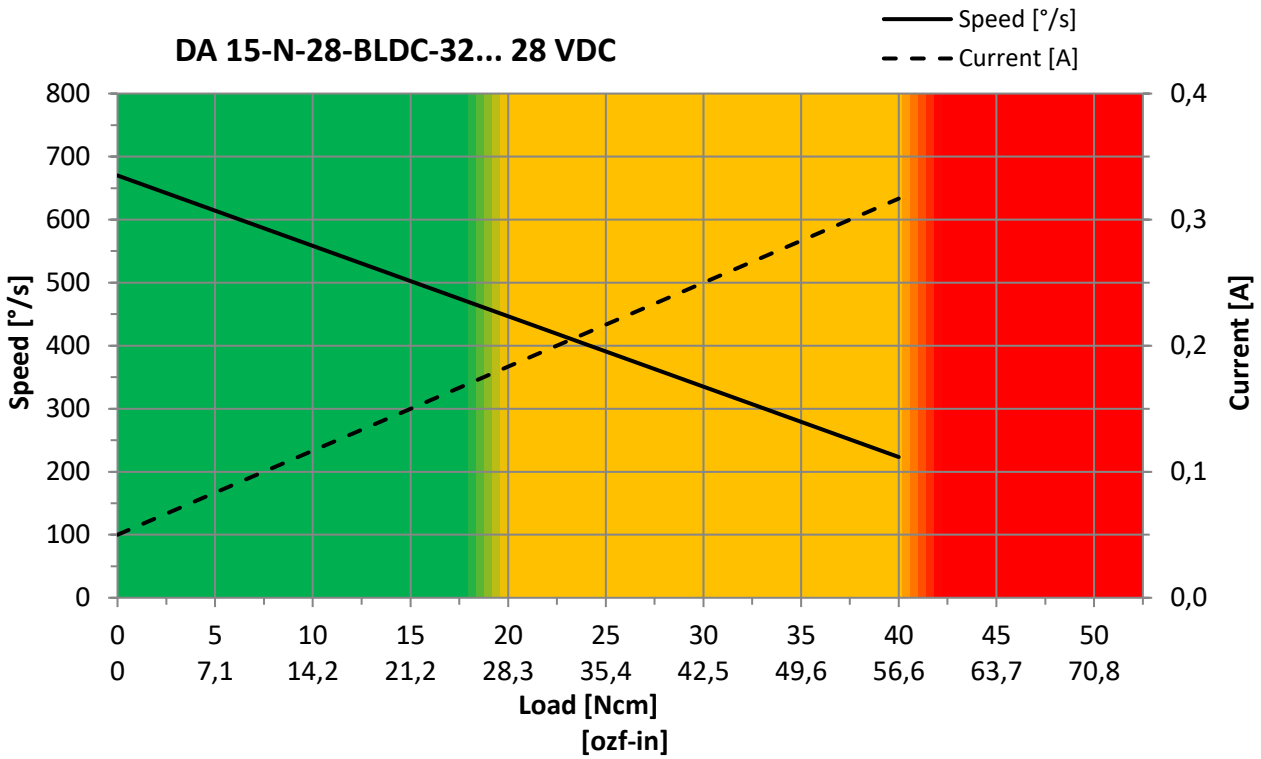
Operation Mode:

Continuous

Short Time
< 10s , 60s cool down

Overload
< 1s , 60s cool down





Operation Mode:

Continuous

Short Time
< 10s , 60s cool down

Overload
< 1s , 60s cool down

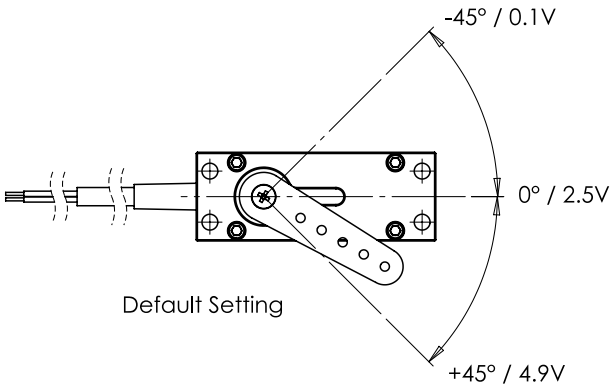
4. Command Interface

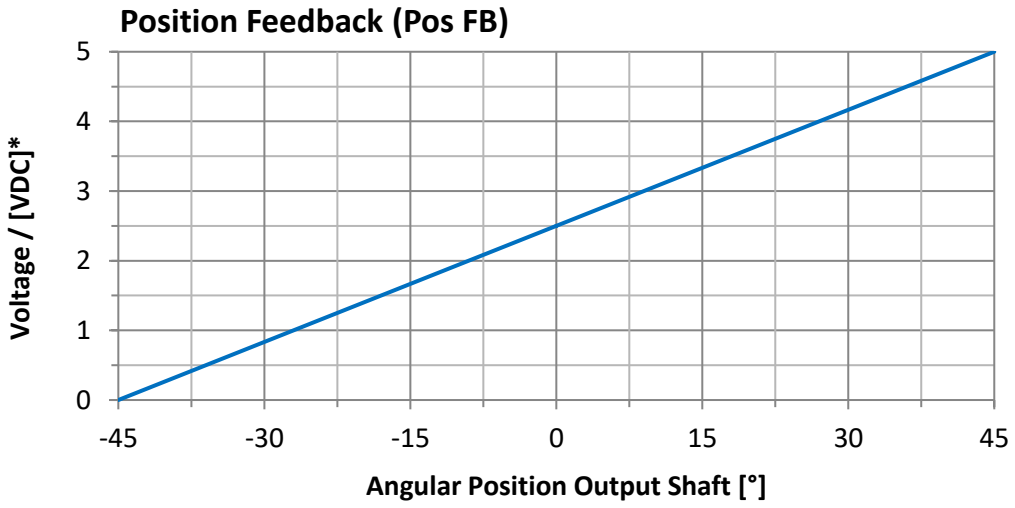
4.1. PWM Command Interface

PWM Signal Voltage	TTL-Level HIGH: min. 3.5 V, max. 5.5 V TTL-Level LOW: min. 0.0 V, max. 1.5 V
Frame Rate	2.6 … 2000 ms
Valid Pulse Lengths	0.9 … 2.1 ms
Pulse Length for Position Left / Center / Right	1.0 / 1.5 / 2.0 ms
Resolution	≤ 1 µs

4.2. Position Feedback Signal

The Position Feedback signal (Pos FB) is an analog output signal providing a voltage value, which is directly related to the output shaft's angular position. Reference is Supply Ground / Signal Ground (GND).





* Tolerance ±5%

4.3. Serial / RS 485 Command Interface

Baud-Rate		115200 ±1.5% bits/s
Protocol	(Documentation available)	6 Byte (incl. 2 byte CRC)

4.4. RS 485 Protocol Specifications

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

4.5. CAN Specifications

Baud-Rate	(different rates on request)	500,000 ±1.5% bits/s
Protocol	(Documentation available)	Volz 11-Bit CAN Actuator Protocol, UAVCAN V0

CAN identifier structure:

CAN ID bits	10	9	8	7	6	5	4	3	2	1	0
Value	CAN Base ID						R	Actuator ID			

5. Materials and Features

Case Material	Saltwater Resistant Aluminum Alloy
Case Surface Treatment	HART® - Coat
Splash Water Resistance	IP 67, waterproof to 1m depth
Salt Water Resistance	Case Material / HART® - Coat treatment
EMI / RFI Shielding	Case Shielding
Motor Type	Brushless DC Motor
Gear Set Material	Hardened Steel
Position Sensor	Contactless
Position Feedback	Standard
Shielded Connecting Cable	Standard

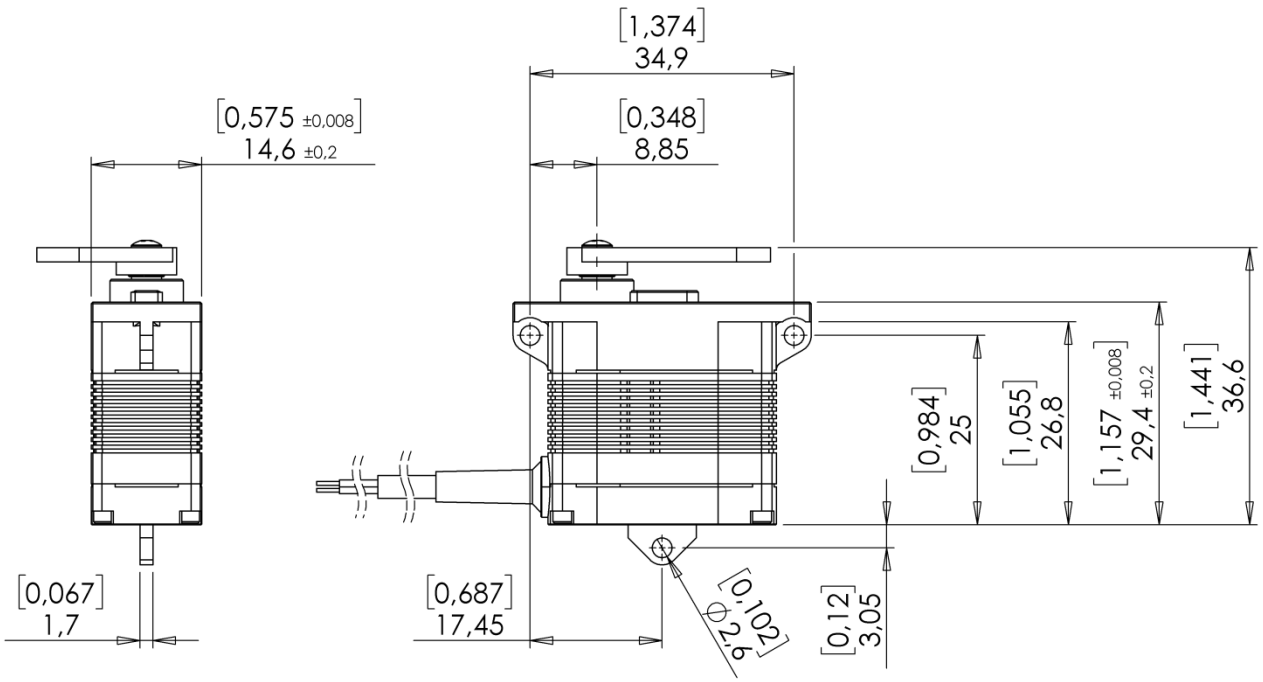
6. Dimensions

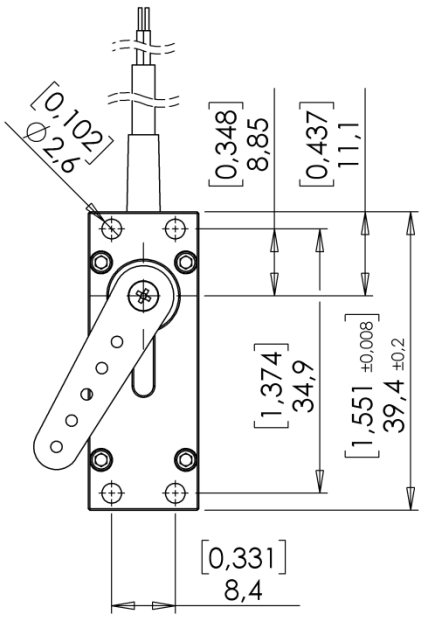
Case Dimensions	29.4 mm x 39.4 mm x 14.6 mm ±0.2 mm (1.157 in x 1.551 in x 0.575 in ±0.008 in)
Weight	30g (1.06oz) ±10%

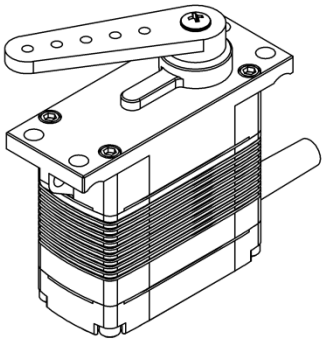
Standard Tolerances	Unless otherwise specified according to DIN ISO 2768 - m

6.1. Installation Dimensions

DA 15-N-…-BLDC-…-250





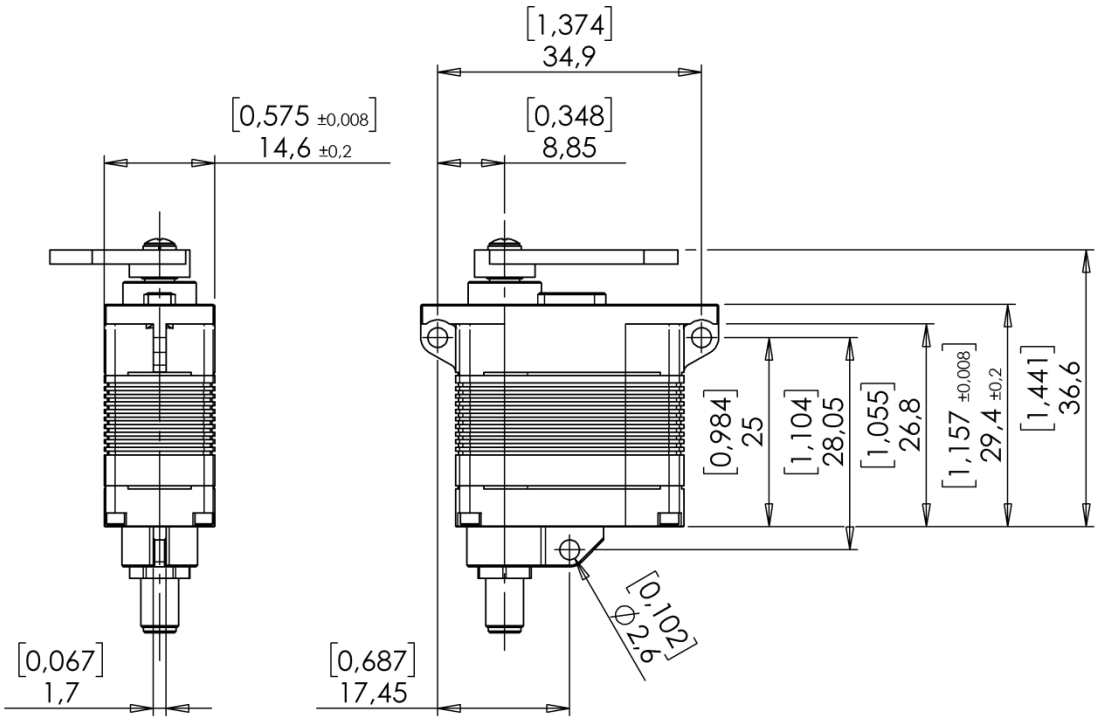


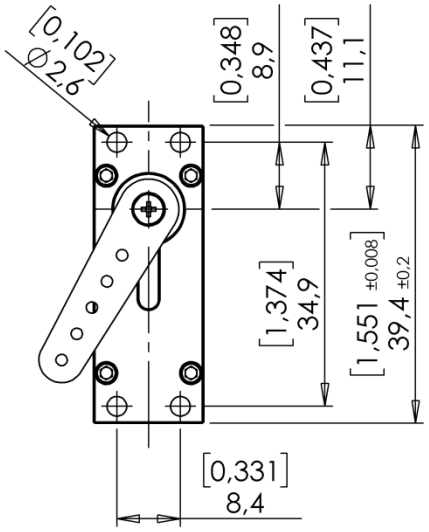
Not to scale

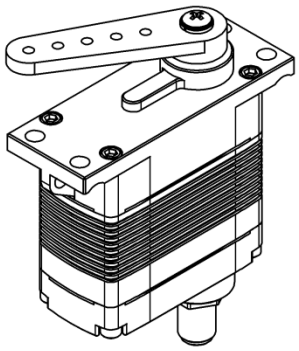
Dimensions [in] , mm

6.2. Installation Dimensions

DA 15-N-…-BLDC-…-C







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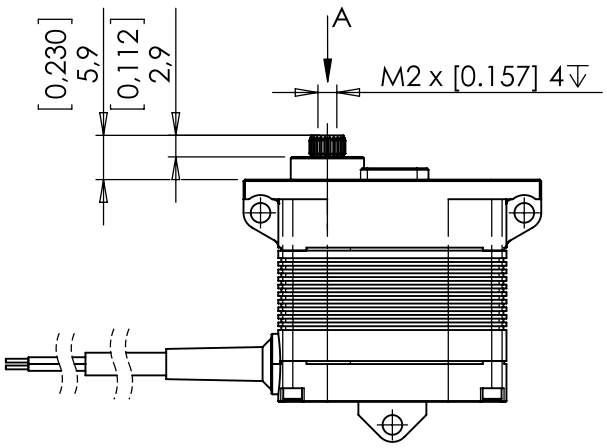
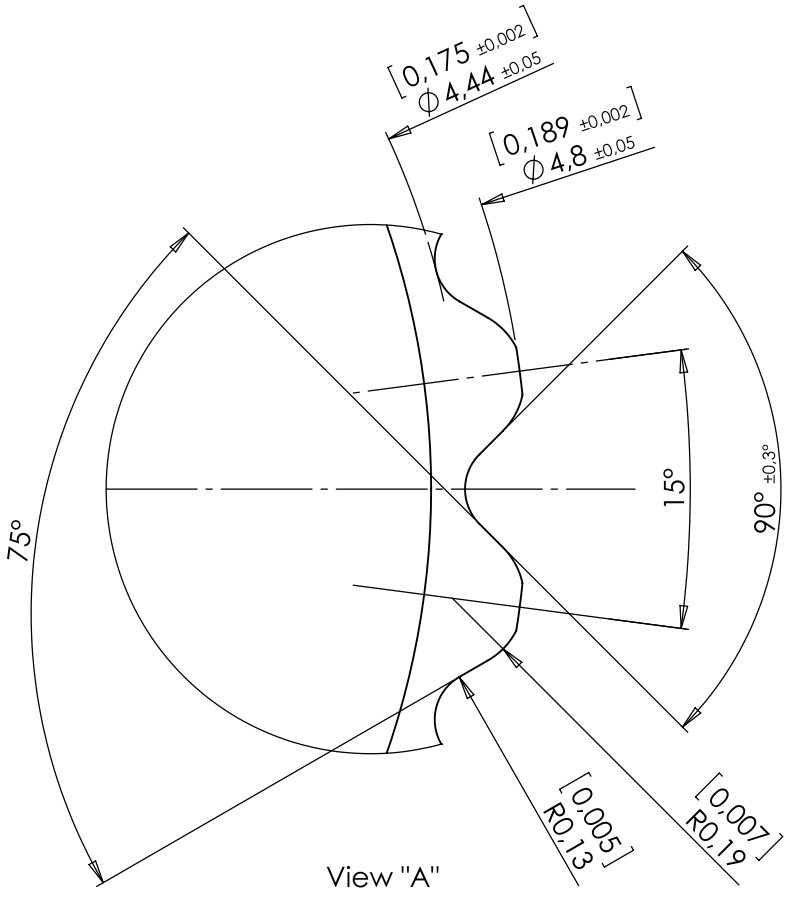
Dimensions [in] , mm

6.3. Output Shaft Spline

Valid for all Versions





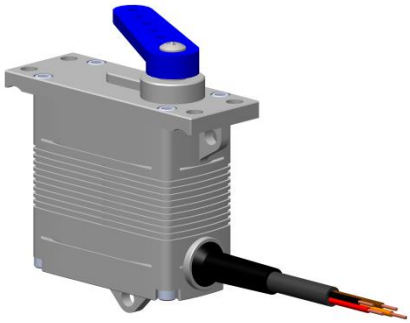
Not to scale

Dimensions [in] , mm

7. Electrical Connection Options

7.1. PWM Interface

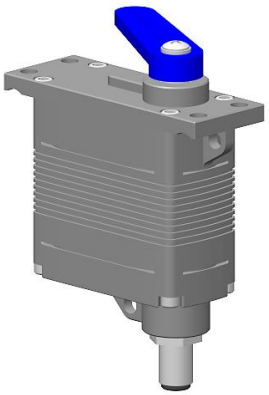
Shielded Cable **Item # DA 15.N._.BLDC._.250**
Length 250mm (9.84in), open leads



Shielded Cable	
Description	Flexible shielded cable
Type	LifYDY-UL
Wire Gauge	4x AWG 28 (4x 0.08 mm²)

Pin Assignment			
1	Red	**+VDC**	Supply Voltage
2	Black	**GND**	Supply Ground, Signal Ground
3	Orange	**SIG**	PWM Command Signal
4	Brown	**Pos FB**	Position Feedback

Industrial Standard M5 electrical Connector [5] **Item # DA 15.N._.BLDC._.C



4 3

1 2
mating face

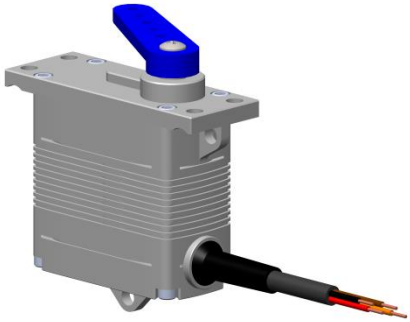
Shielded Cable	
Manufacturer	Franz Binder GmbH & Co.
Type	Series 707, No. 09 3111 86 04
Mating	No. 79 3108 35 04 No. 79 3110 52 04

Pin Assignment			
1	Brown	**+VDC**	Supply Voltage
2	White	**GND**	Supply Ground, Signal Ground
3	Blue	**SIG**	PWM Command Signal
4	Black	**Pos FB**	Position Feedback

5) 200cm (78in) connecting cable with mating straight connector and open leads included

7.2. RS 485 Interface

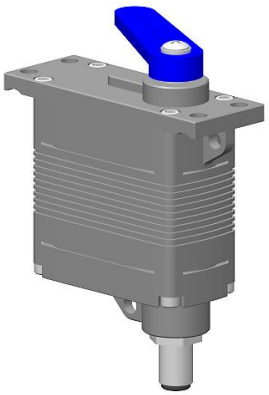
Shielded Cable **Item # DA 15.N._.BLDC._.R.250**
Length 250mm (9.84in), open leads



Shielded Cable	
Description	Flexible shielded cable
Type	LifYDY-UL
Wire Gauge	4x AWG 28 (4x 0.08 mm²)

Pin Assignment			
1	Red	**+VDC**	Supply Voltage
2	Black	**GND**	Supply Ground, Signal Ground
3	Orange	**RS 485 A**	Non-Inverted Input / Output line
4	Brown	**RS 485 B**	Inverted Input / Output line

Industrial Standard M5 electrical Connector [6] **Item # DA 15.N._.BLDC._.R.C



4 3

1 2
mating face

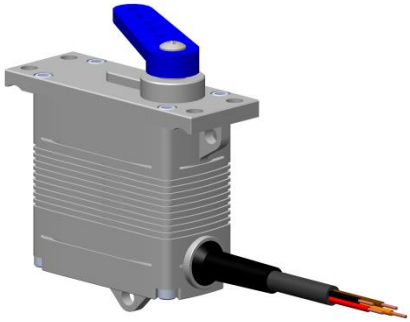
Shielded Cable	
Manufacturer	Franz Binder GmbH & Co.
Type	Series 707, No. 09 3111 86 04
Mating	No. 79 3108 35 04 No. 79 3110 52 04

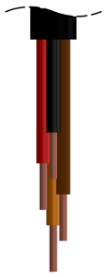
Pin Assignment			
1	Brown	**+VDC**	Supply Voltage
2	White	**GND**	Supply Ground, Signal Ground
3	Blue	**RS 485 A**	Non-Inverted Input / Output line
4	Black	**RS 485 B**	Inverted Input / Output line

6) 200cm (78in) connecting cable with mating straight connector and open leads included

7.3. Single Ended Serial Interface

Shielded Cable **Item # DA 15.N._.BLDC._.SE.250**
Length 250mm (9.84in), open leads

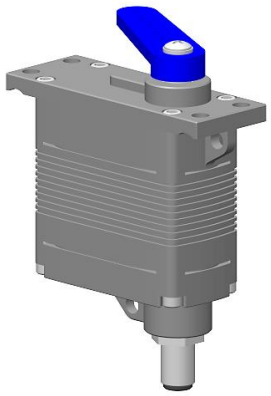




Shielded Cable	
Description	Flexible shielded cable
Type	LifYDY-UL
Wire Gauge	4x AWG 28 (4x 0.08 mm²)

Pin Assignment			
1	Red	**+VDC**	Supply Voltage
2	Black	**GND**	Supply Ground, Signal Ground
3	Orange	**Serial**	Bidirectional serial data line
4	Brown	**DU**	Don't Use

Industrial Standard M5 electrical Connector [7] **Item # DA 15.N._.BLDC._.SE.C**



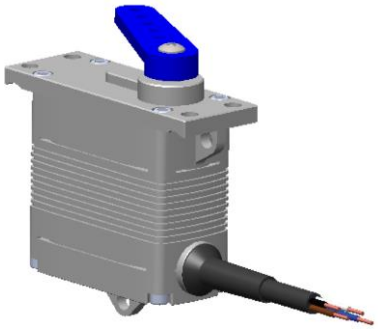
Shielded Cable	
Manufacturer	Franz Binder GmbH & Co.
Type	Series 707, No. 09 3111 86 04
Mating	No. 79 3108 35 04 No. 79 3110 52 04

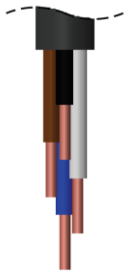
Pin Assignment			
1	Brown	**+VDC**	Supply Voltage
2	White	**GND**	Supply Ground, Signal Ground
3	Blue	**Serial**	Bidirectional serial data line
4	Black	**DU**	Don't Use

7) 200cm (78in) connecting cable with mating straight connector and open leads included

7.4. CAN Interface

Shielded Cable **Item # DA 15.N._.BLDC._.CAN.250**
Length 250mm (9.84in), open leads

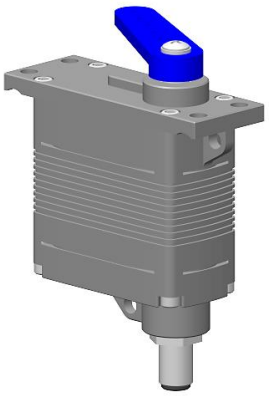




Shielded Cable	
Description	Sensocord®
Type	M/D-UL
Wire Gauge	4x AWG 28 (4x 0.08 mm²)

Pin Assignment			
1	Brown	**+VDC**	Supply Voltage
2	Black	**GND**	Supply Ground, Signal Ground
3	Blue	**CAN H**	CAN High
4	White	**CAN L**	CAN Low

Industrial Standard M5 electrical Connector [8] **Item # DA 15.N._.BLDC._CAN.C**



4 3

1 2
mating face

Shielded Cable	
Manufacturer	Franz Binder GmbH & Co.
Type	Series 707, No. 09 3111 86 04
Mating	No. 79 3108 35 04 No. 79 3110 52 04

Pin Assignment			
1	Brown	**+VDC**	Supply Voltage
2	Black	**GND**	Supply Ground, Signal Ground
3	Blue	**CAN H**	CAN High
4	White	**CAN L**	CAN Low

8) 200cm (78in) connecting cable with mating straight connector and open leads included

8. Accessories

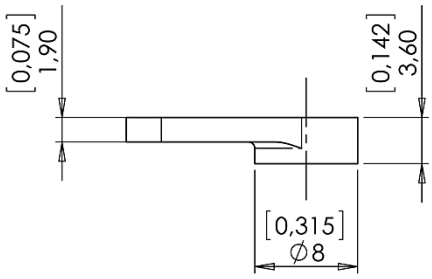
Item	Item-No.
Aluminum Servo Arm, short, single sided [9]	1521.21
Aluminum Servo Arm, long, single sided	1521.22
Aluminum Mounting Frame	1521.31 incl. screws
Programming Tool (PWM)	985.3
Programming Tool (Serial / RS 485)	985.5

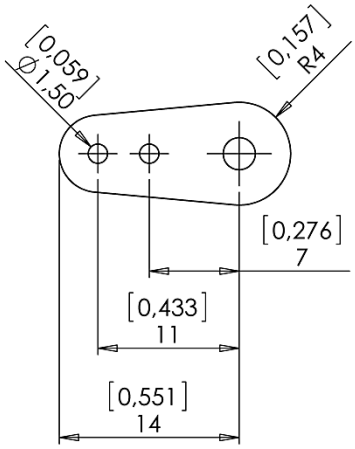
9) Single sided Servo Arm with fixation screws included

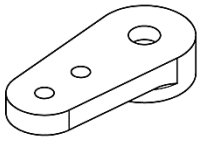
All accessories to be purchased separately

8.1. Aluminum Servo Arm, short

1521.21





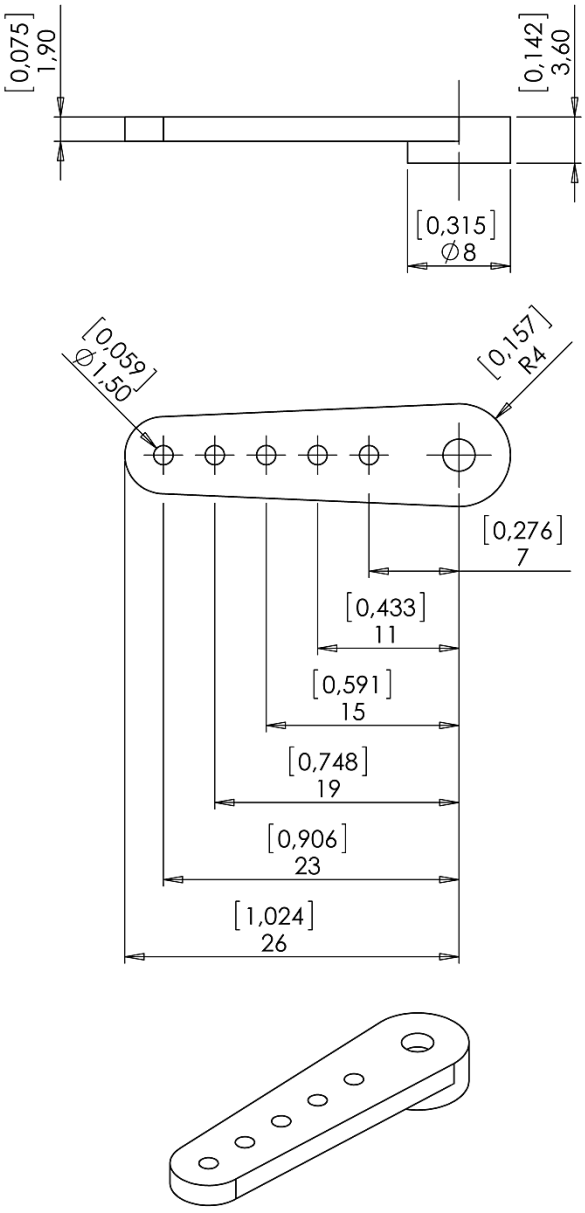


Not to scale

Dimensions [in] , mm

8.2. Aluminum Servo Arm, long

1521.22

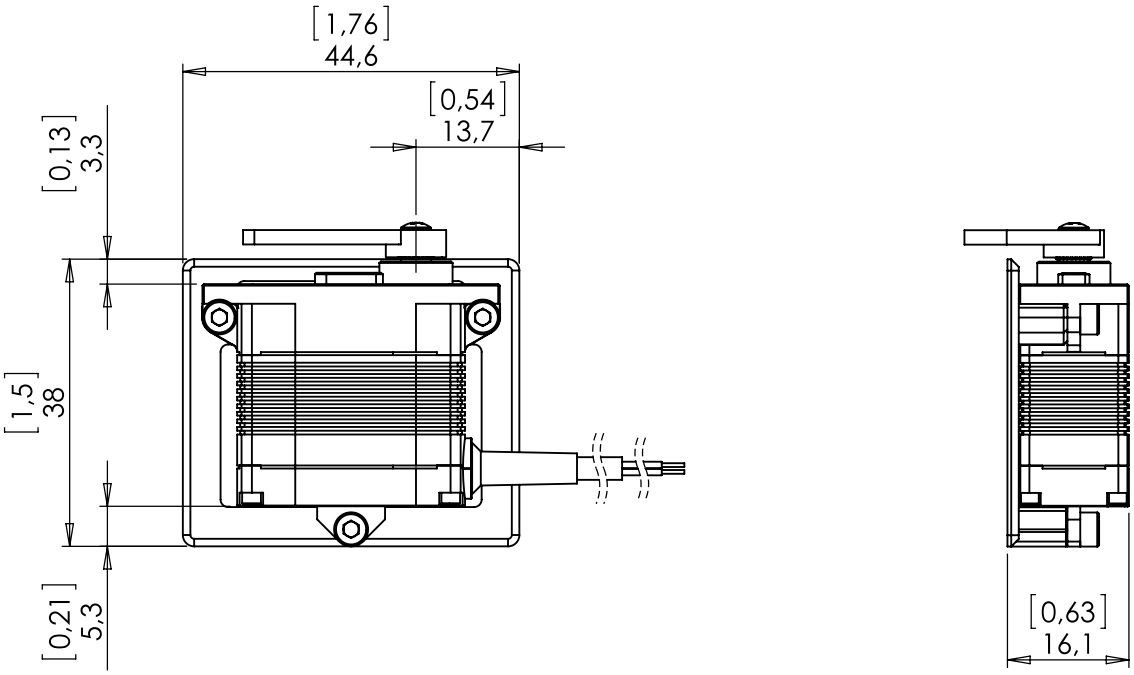


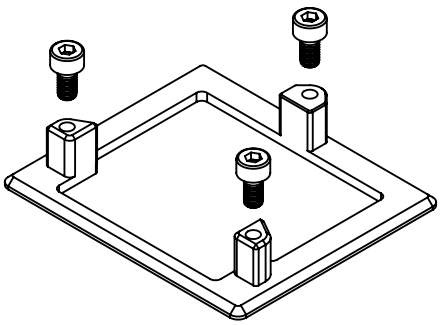
Not to scale

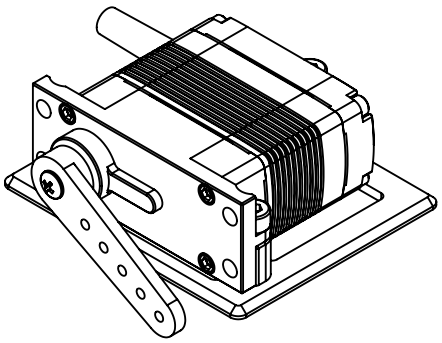
Dimensions [in] , mm

8.3. Aluminum Mounting Frame

1521.31







Mounting Frame shown with installed actuator.

Not to scale

Dimensions [in] , mm

9. Item Number System Standard Gear Set

DA 15 . N . 12 . BLDC . - . - . 250

Servo Class
15 mm Class

Supply Voltage

6 V DC	**06**
12 V DC	**12**
28 V DC	**28**

Motor Type

BLDC	Brushless Motor

Gear Set

-	Standard
32	High Speed

Interface

-	PWM Interface
R	RS 485 Interface
SE	Single Ended Serial Interface
CAN	CAN Interface

Electrical Connection

250	Shielded cable, open leads, length 250mm
C	Industrial Standard M5 Connector

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