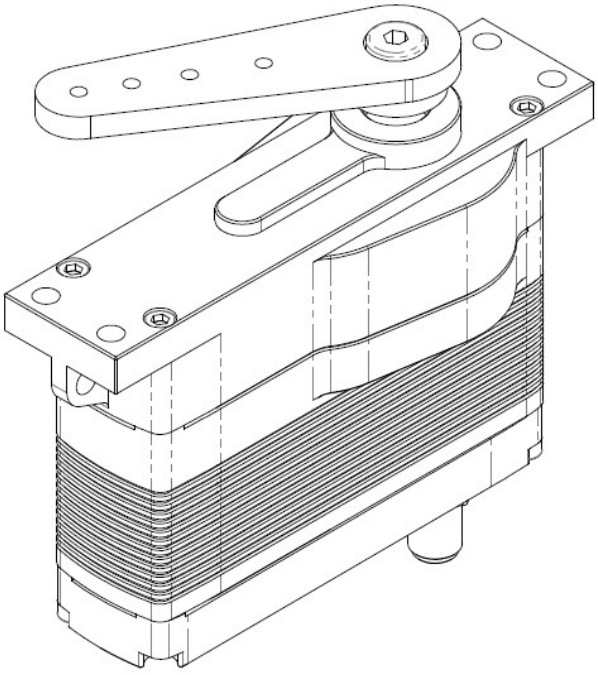
DA 15-N-HT
Technical Specification



DA 15-N-HT-06
DA 15-N-HT-12
DA 15-N-HT-30

Content

1. General Description

The DA 15-N-HT is a full brushless actuator incorporating contactless position sensing. It is based on our DA 15-N.

Its brushless motor and contactless, wear free position sensing system makes the DA 15-N-HT 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-HT series is available with digital serial command interface (RS-485) or with a standard PWM input, including position feedback as standard feature.

The digital serial command interface (RS-485) uses a CRC secured protocol. It can return not only the shaft position in digital format, but also several diagnostic data such as the level of the supply voltage, current consumption and the temperature of the motor and electronics in digital form. These kind of diagnostic capabilities help to determine the health state of the actuators before, during and after deployment.

The DA 15-N-HT uses the same components as the DA 15-N. The main difference is that it has an additional gear stage resulting in a higher gear ratio and torque. DA 15-N actuators have been subjected to endurance tests of more than 4,000 hours under load.

Advantages of the full brushless actuator:

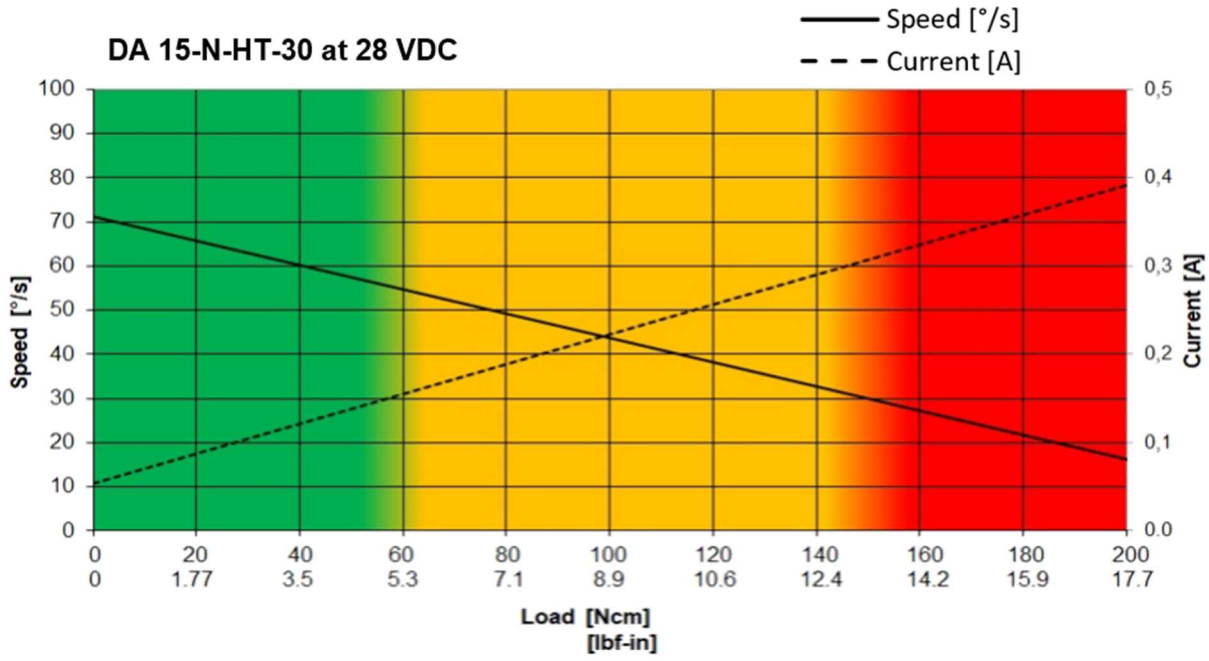
1. Maximized service life through vibration-resistant, brushless DC motor
2. Brushless motor technology eliminates the typical electromagnetic noise of brush-type motors and provides ultra-long endurance
3. Contactless, wear free position sensing system
4. Aluminum housing with minimal weight and size 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-HT-06	DA 15-N-HT-12	DA 15-N-HT-30
Supply Voltage (rated)		6 VDC	12 VDC	28 VDC
Supply Voltage Range		5 … 9 VDC	10 … 16 VDC	24 … 32 VDC
Standby Current [1]	at rated voltage	0.05 A	0.05 A	0.02 A
Rated Current [1]	at rated voltage	0.45 A	0.3 A	0.15 A
Peak Current [1]	at rated voltage	0.85 A	0.6A	0.3 A
Rated Torque [1]	at rated speed	60 Ncm (85 ozf-in)		
Peak Torque [1]	at rated voltage	150 Ncm (212.4 ozf-in)		
No Load Speed [1]	at rated voltage	60°/s	60°/s	70 °/s
Rated Speed [1]	at rated torque	45°/s	45°/s	55 °/s
Default Travel Angle		±45° = 90° total travel		
Max. Travel Angle for PWM [2]		±90° = 180° total travel		
Max. Travel Angle for RS485		±170° = 340° total travel		
Backlash (mechanical)		≤ 0.9°		
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)

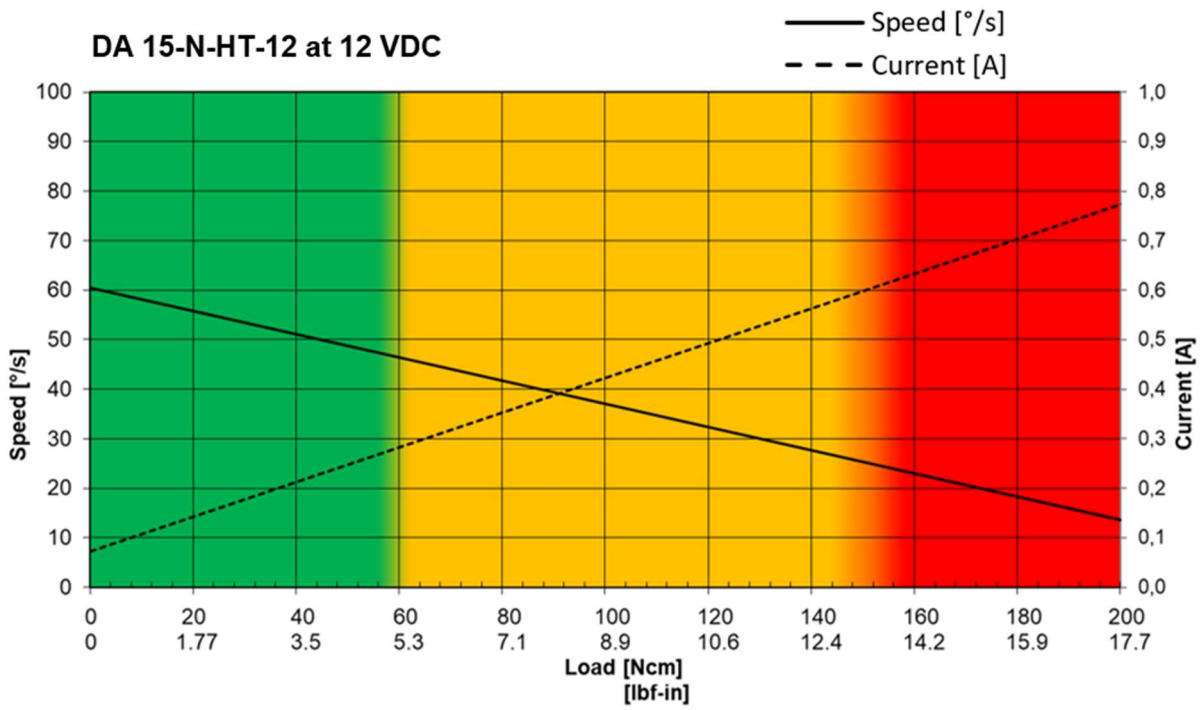
3. Performance



Continuous

Short Time
< 10s, 60s cool down

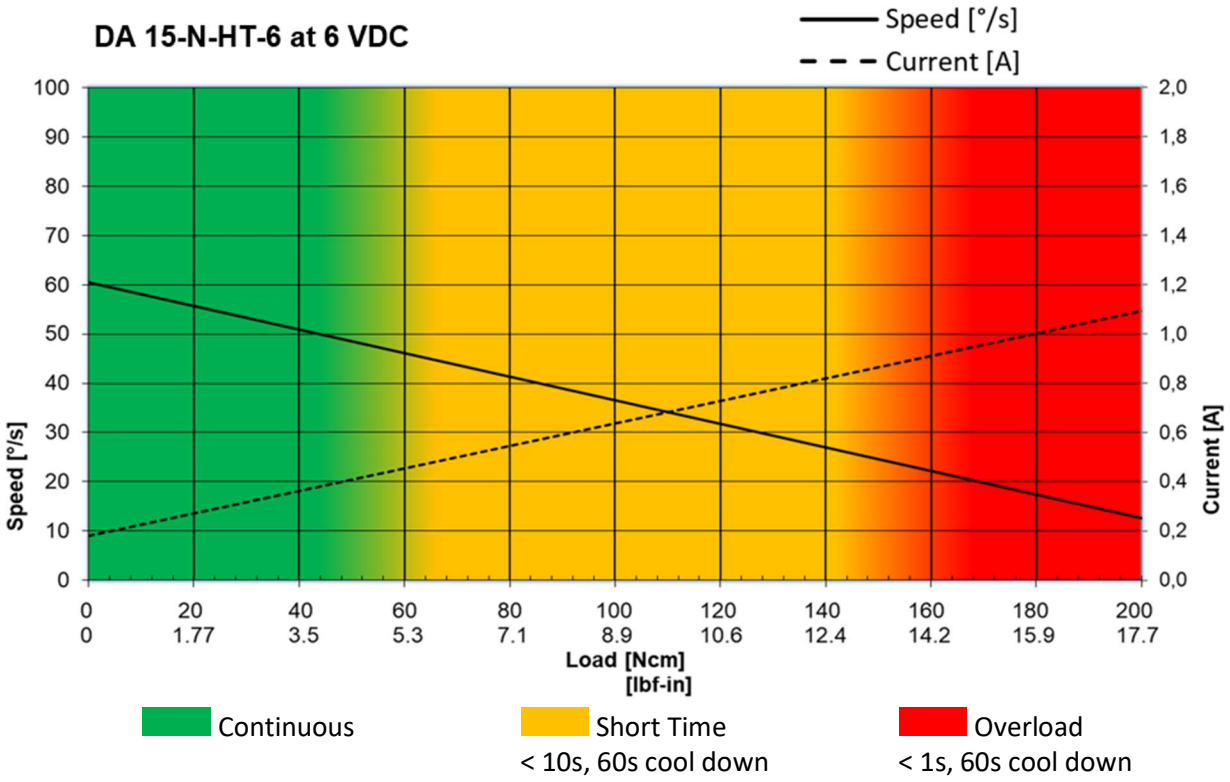
Overload
< 1s, 60s cool down



Continuous

Short Time
< 10s, 60s cool down

Overload
< 1s, 60s cool down



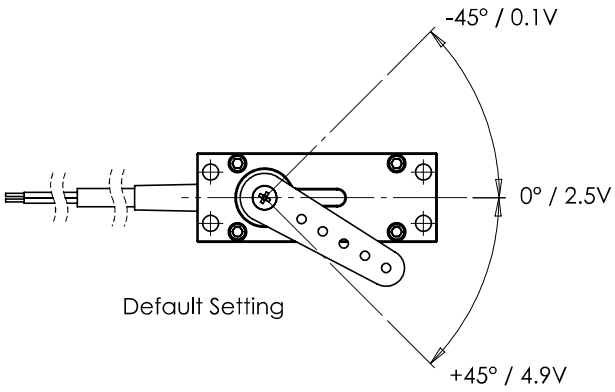
4. Command Interface

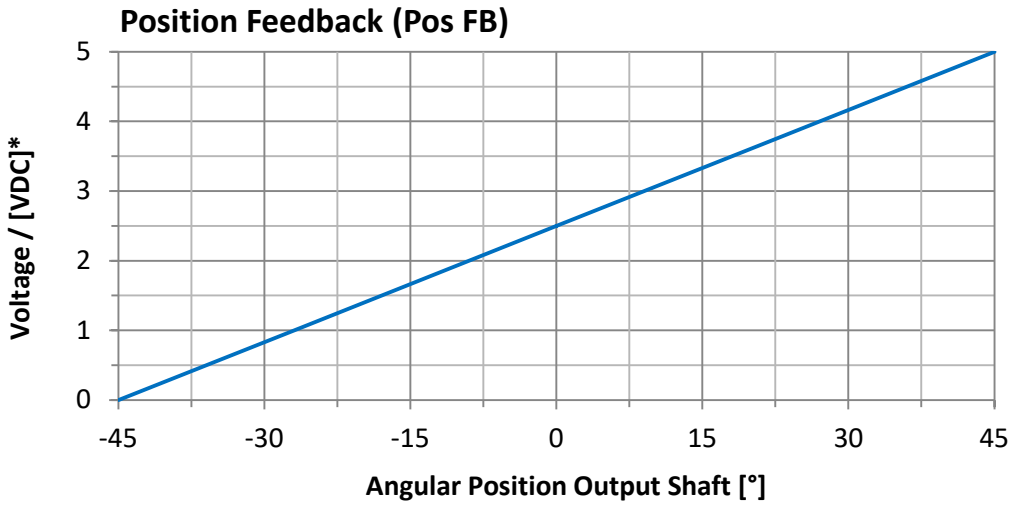
4.1. PWM Command Interface

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

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. Environmental Compliance

Designed and tested to MIL-STD-810G:

High Temperature	Up to 71 °C
Low Temperature [4]	Down to -55 °C
Altitude	Up to 40000 feet
Humidity	95 % RH
Vibration	different frequencies (total RMS 4.91)
Mechanical Shock	15 G´s

4) With Low Temperature Modification

7. Dimensions

Case Dimensions	41,6 mm x 62 mm x 22 mm ±0.2 mm (1.64 in x 2.44 in x 0.87 in ±0.008 in)
Weight	66 g (2.33 oz) ±10%

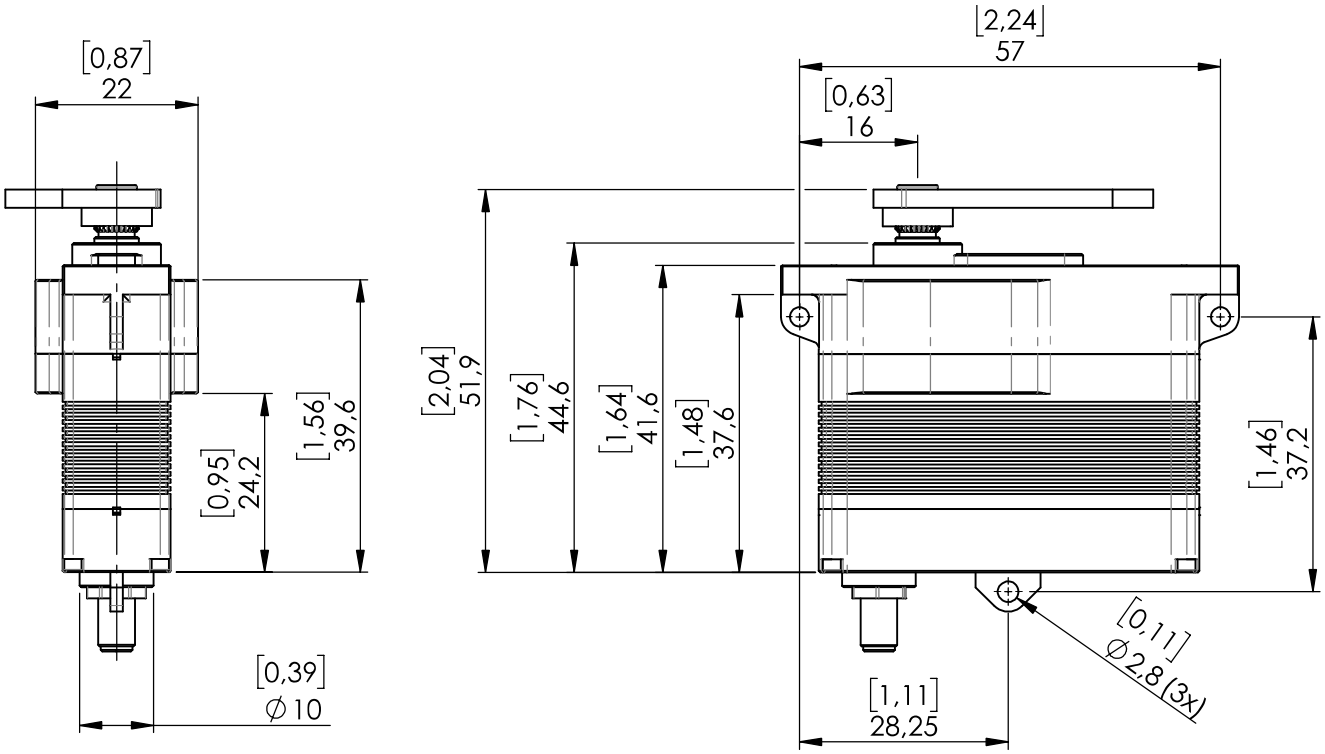
Standard Tolerances	Unless otherwise specified according to DIN ISO 2768 - m

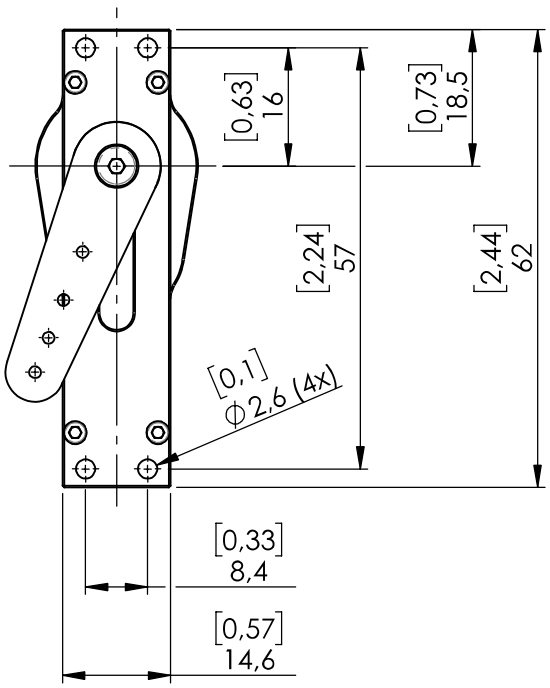
Not to scale

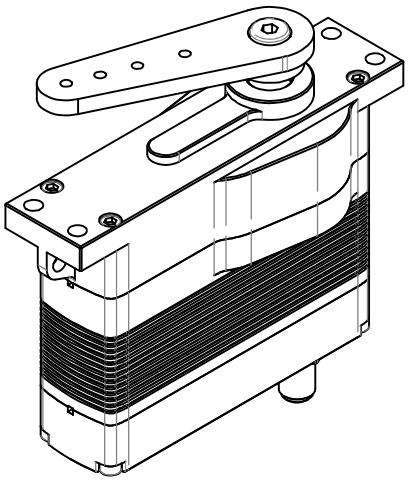
Dimensions [in] , mm

7.1. Installation Dimensions

DA 15-N-HT; valid for both M5 and Shielded Cable







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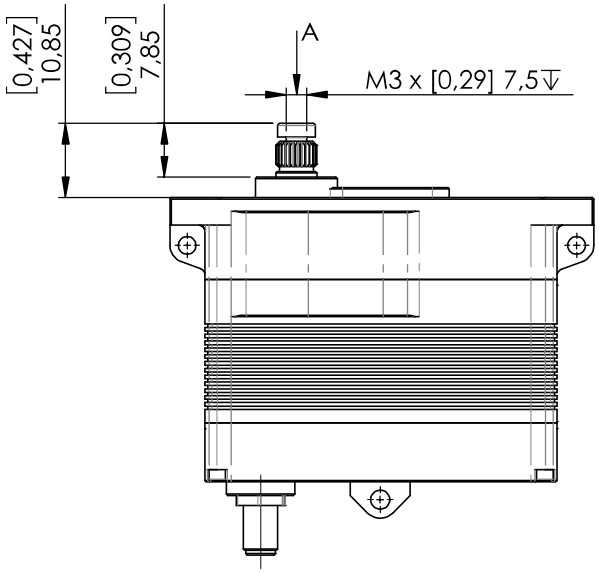
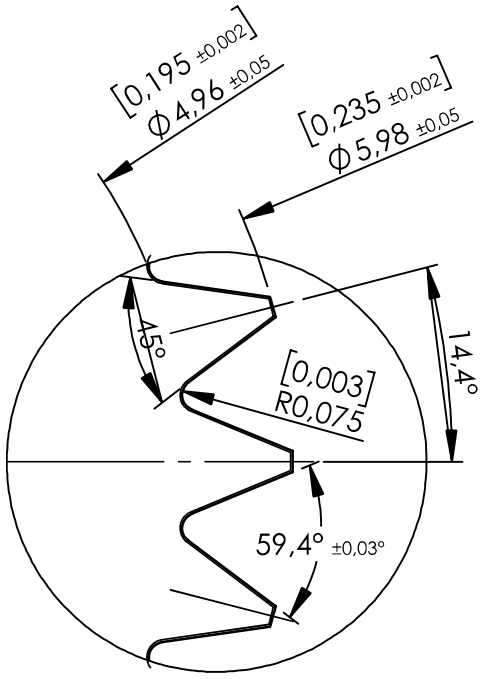
Dimensions [in] , mm

7.2. Output Shaft Spline

Valid for all Versions





View "A"

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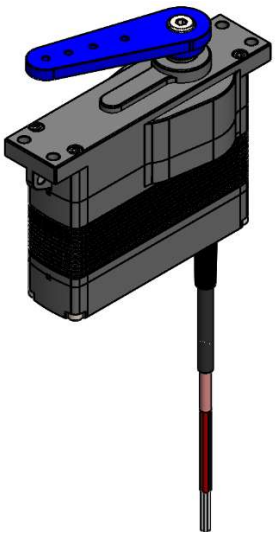
Dimensions [in] , mm

8. Electrical Connection Options

8.1. PWM Interface

Available for 6V, 12V, and 28V Versions.

Shielded Cable
Length 250mm (9,81in), open leads

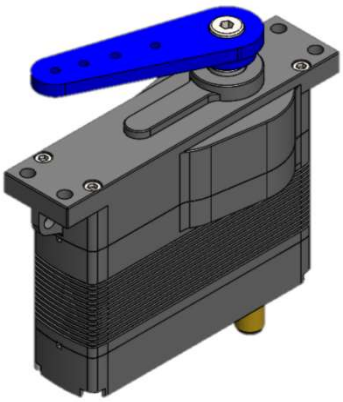


Shielded Cable	
Manufacturer	Flexible shielded cable
Type	LifYDY-UL
Wire gauge	4x AWG 28 (4x 0.08 mm²)

mating face

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]



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

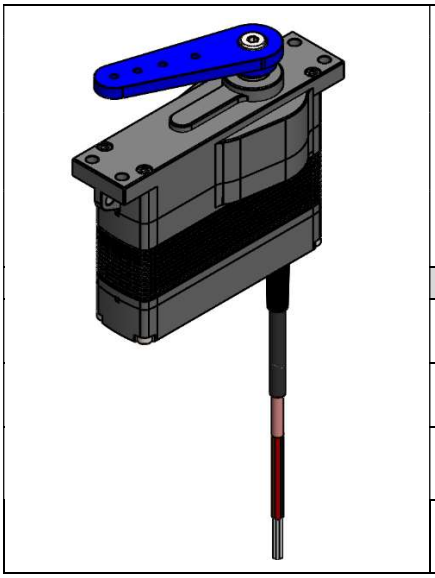
Pin Assignment			
1	Brown	**+VDC**	Supply Voltage
2	White	**GND**	Supply Ground, Signal Ground
3	Blue	**SIG**	PWM Command Signal

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

8.2. RS 485 Interface

Available only for 6V and 12V Versions.

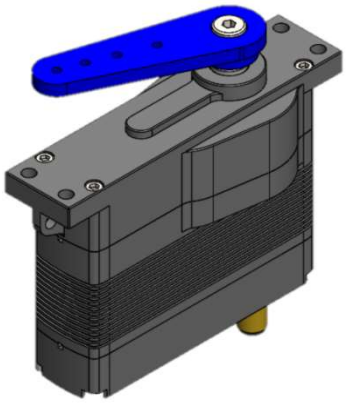
Shielded Cable
Length 250mm (9,81in), open leads



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

mating face			
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 [5]



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

mating face			
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

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

9. Accessories

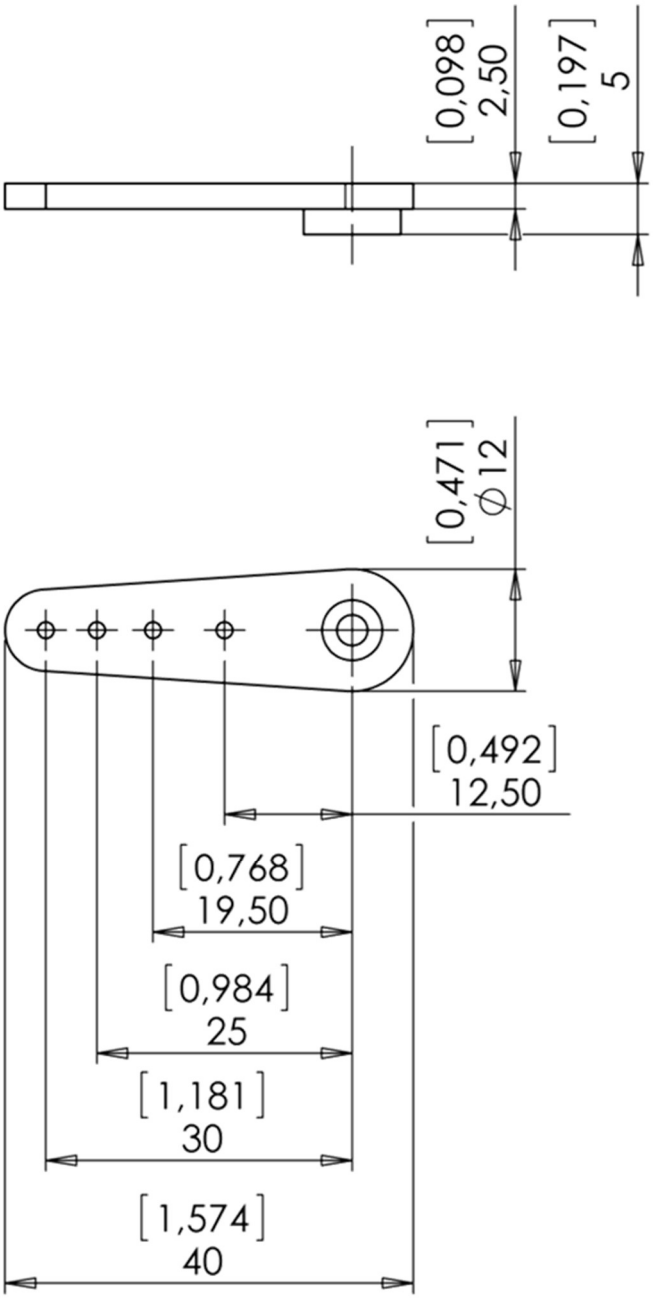
Item	Item-No.
Servo Arm, Single Sided	1641.21
Programming Tool (PWM)	985.3
Programming Tool (RS485)	985.5

All accessories to be purchased separately

Not to scale

Dimensions [in] , mm

9.1. Servo Arm, Single Sided 1641.21



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Dimensions [in] , mm

10. Item Number System

1	Type of Actuator		
	DA 15-N-HT	15mm Class High Torque Actuator with brushless motor	
2	Internal Servo Saver (ISS)		
	Empty field	Without Internal Servo Saver	
3	Supply Voltage		
	06	6V Supply Voltage	
	12	12V Supply Voltage	
	30	30V Supply Voltage	
4	Gear Set		
	Empty field	Standard Gear Train	
5	Interface		
	0	PWM Interface	
	3	RS 485 two-wire (Digital Interface)	Only with 6V and 12V
	6	UAVCAN v0 & 11-bit Protocol (Digital Interface)	Only with 12V and 30V
	8	Volz CAN 11-bit Protocol (Digital Interface)	Only with 12V and 30V
6	Routing Option (only redundant Servos)		
	Empty field	N/A	
7	Case		
	Empty field	Standard Case	
8	Analog Feedback		
	Empty field	Without Analog Feedback	
	P	Analog Position Feedback	Only for PWM Interface
9	Extended Travel Angle		
	Empty field	Standard Travel Angle	
10	Electrical Connection		
	SC250	Shielded Cable; Open Leads, length 250mm	
	SC1000	Shielded Cable; Open Leads, length 1000mm	
	SC1500	Shielded Cable; Open Leads, length 1500mm	
	M5	Integrated 5mm Round Connector, 4pin	N/A for PWM Interface
11	Orientation Electrical Connection		
	U	Bottom Sided	
12	Output Shaft		
	Empty field	Standard Spline	
13	High Impedance Option (Only for Digital Interfaces)		
	Empty field	With Bus Termination Resistor	N/A for CAN Interface
	HI	Without Bus Termination Resistor	N/A for PWM Interface

14	Temperature Range		
	Empty field	Standard Range (-30°C … 70°C)	
	LT	Low Temperature Modification	

15	Baud Rate		
	Empty field	N/A	Only for PWM Interface
	115	Baud Rate of 115.200 bits/s (Standard)	Only RS 485 Interface
	038	Baud Rate of 38.400 bits/s	Only RS 485 Interface
	057	Baud Rate of 57.600 bits/s	Only RS 485 Interface
	500	Baud Rate of 500.000 bits/s	Only CAN Interface
	1M	Baud Rate of 1.000.000 bits/s	Only CAN Interface

Example Part Numbers:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DA 15-N-HT		.12		.0			.P		.SC1000	.U				

DA 15-N 12V, PWM Interface with Analog Position Feedback and a Bottom Sided Shielded Cable

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DA 15-N-HT		.12		.3					.M5	.U		.HI	.LT	.115

DA 15-N-HT with 12V, RS 485 Interface, M5 Connector without Bus Termination Resistor, Low Temperature Modification and Standard Baud Rate

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