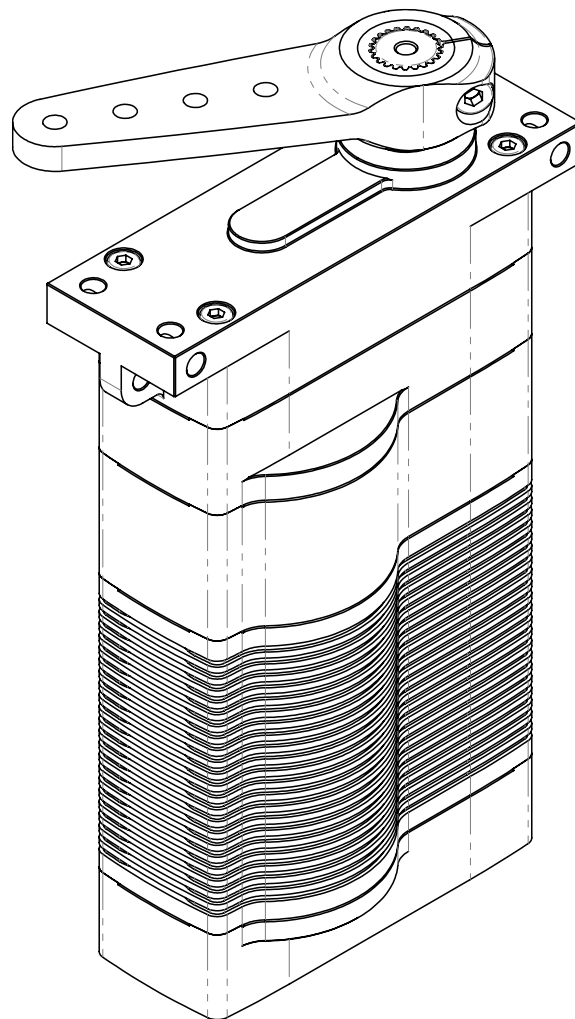


DA 30-HT

Technical Specification





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1. General Description

To guarantee maximum safety and reliability, our DA 30-HT features a brushless motor and a contactless, wear free position sensor. This means maximum service life with the greatest-possible power delivery and its design prevents electromagnetic emissions (EMI) caused by brush sparking. The housing made of saltwater-resistant aluminum is HART-coat treated, meets the IP 67 standard for water and dust sealing. Brackets integrated into the housing for horizontal and vertical assembly.

The DA 30-HT series can be equipped with a single ended PWM input or differential RS-422 PWM interface. To use all possible capabilities of the DA 30-HT three different RS-485 interfaces are available. The DA 30-HT with digital serial command interface (RS-485) receives its commands via a CRC secured protocol. It can return not only the shaft position, but also several diagnostic data such as the level of the supply voltage, current consumption and the temperatures of the motor and electronics. The diagnostic capabilities help to determine the health state of the actuators before, during and after deployment.

The DA 30 comes in different Hardware Options:

Option 1:

PWM with Optocoupler (.1)

Customers can choose using either single-ended PWM or galvanic isolated PWM via an optocoupler by changing the electrical wiring (chapter 8.1).

Option 2:

PWM with RS 422 (.2)

Customer can choose differential PWM (RS-422) with either single-ended or differential position feedback by changing the electrical wiring (chapter 8.2).

Option 3:

RS-485 (2-wire) (.3)

RS-485 compatible, asynchronous serial command interface

Option 4:

RS-485 Redundant (.4)

RS-485 Redundant communication interface and redundant power supply

Option 5:

RS-485 (4-wire) (.5)

RS-485 Separated receiver and transmitter lines for interface 1 and 2

For RS-485 versions only:

Customized commands can be implemented on request.



2. Operating Data

		DA 30-HT.30
Supply Voltage (rated)		28 V DC
Supply Voltage Range		24 ... 32 V DC
Standby Current ¹	at rated voltage	< 0.05 A
Rated Current ¹	at rated voltage	2.0 A
Peak Current ¹	at rated voltage	3.6 A
Rated Torque ¹	at rated speed	18.0 Nm [159 lbf-in]
Peak Torque ¹	at rated voltage	32.0 Nm [283 lbf-in]
No Load Speed ¹	at rated voltage	165 °/s
Rated Speed ¹	at rated torque	100 °/s
Default Travel Angle for PWM		±45° = 90° total travel
Max. Travel Angle for PWM ²		±90° = 180° total travel
Max. Travel Angle for RS 485		±170° = 340° total travel
Backlash (mechanical)		≤ 0.5°
Position Error under Temperature ³		≤ ±1°
Operating Temperature Range ⁴		-30°C ... +70°C [-22°F ... +158°F]
Storage Temperature Range		-55°C ... +85°C [-67°F ... +185°F]

Values are valid at 20°C

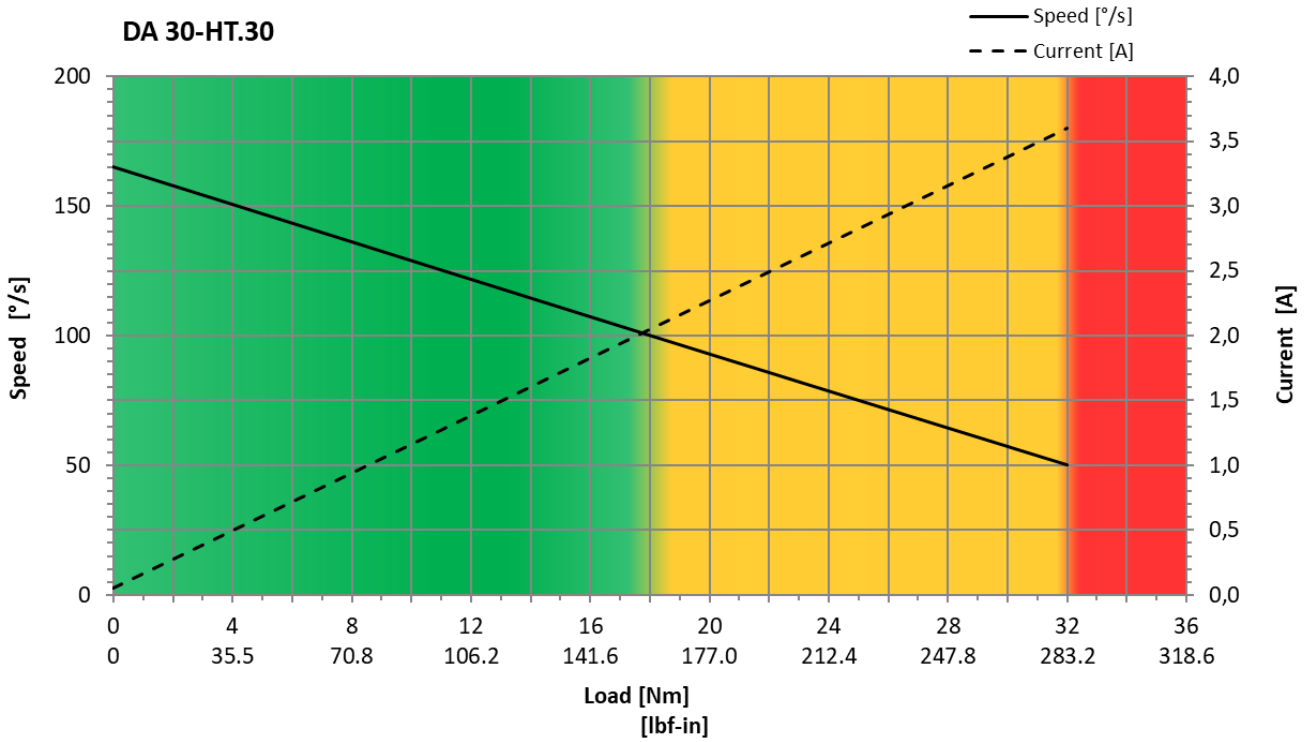
¹ Tolerance ±10%

² Programming Tool # 985.3 required

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. Performance



Operation Mode:

■ Continuous

■ Short Time
<10 s, 60 s cool down

■ Overload
<1 s, 60 s cool down

4. Command Signal

4.1. PWM Command Interface

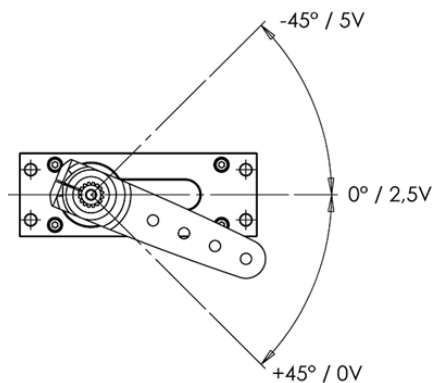
Valid for all versions with PWM command signal

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	10 ... 2000 ms
Valid Pulse Lengths	0.9 ... 2.1 ms
Pulse Lengths for Position Left / Center / Right	2.0 / 1.5 / 1.0 ms
Resolution	$\leq 1.0 \mu\text{s}$

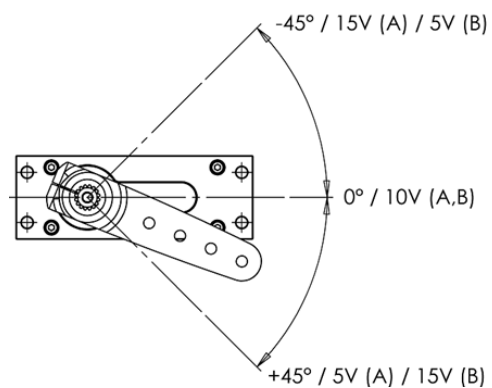
*Only applicable if EEPROM Parameters are set to "Reverse" =0 and "Expansion" =100%⁵

4.2. Position Feedback Signal (PWM Versions)

The analog Position Feedback signal (Pos FB) is an analog output signal with a voltage value which is directly related to the output shaft's angular position. Reference is Supply and Signal Ground (GND). Analog Position Feedback is only available for PWM servos, all other interfaces have digital feedback.

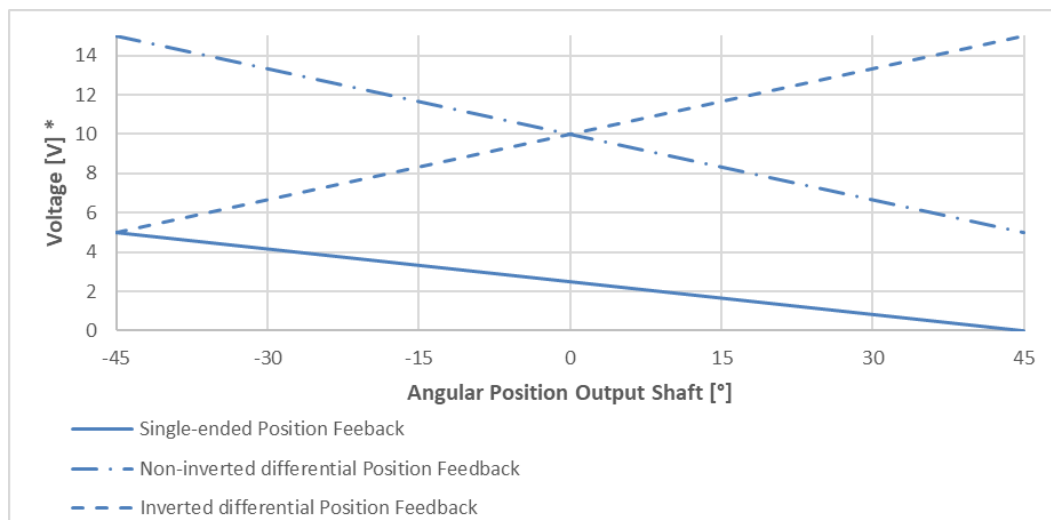


Single-ended analog Position Feedback



Differential analog Position Feedback

*Only applicable if EEPROM Parameters are set to "Reverse" =0 and "Expansion" =100%⁵



*Tolerance of $\pm 5\%$ applies to max voltage of 5 V DC

⁵ Parameters can be changed using the programming tool mentioned in Chapter 9

4.3. RS 485 Command Signal

	DA 30.30.3	DA 30.30.4	DA 30.30.5
Baud-Rate	115200 ±1.5% bits/s		
Protocol (Documentation available)	6 Byte (incl. 2 byte CRC)		
Number of Data Bits	8		
Number of Stop Bits	1		
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

RS-485 position feedback

Integrated in the RS-485 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 RS-485 documentation.

Detailed information is provided in the RS-485 ICD.

5. Materials and Protective Features

Case Material	Saltwater resistant aluminium alloy
Splash Water Resistance	IP 67, waterproof up to 1m depth for 30 minutes
Case Surface Treatment	HART®-Coat
Salt Water Resistance	> 100 h. Salt Water Spray
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 Hall sensor
Position Feedback	Standard
RS-485 Communication Interface	Optional
Temperature Sensor ⁶	Motor and PCBA

6. Environmental Specifications

Operating Temperature	-55°C [-67°F] ⁷	MIL 810G Method 502.5
	+70°C [158°F]	MIL 810G Method 501.5
Altitude	40.000 ft [12.192 m]	MIL 810G Method 500.5
Humidity	95% at 30°C -60°C for 240 h	MIL 810G Method 507.5
Vibration	Vibration Profile: Cat. 13, Figure 514.6D-2	MIL 810G Method 514.6
Mechanical Shock	Procedure 1 – Functional shock 15 g, 11 ms, half sine	MIL 810G Method 516.6
Salt Spray	Salt mist, cyclic, 24 h	DIN EN 60068-2-52 /
		MIL 810G Method 509.5
Dust and Water	IP 67 - Dust tight and Immersion, up to 1 m depth for 30 minutes	DIN EN 60529

Test reports on request

⁶ RS-485-Versions only

⁷ Low Temperature Modification on request.

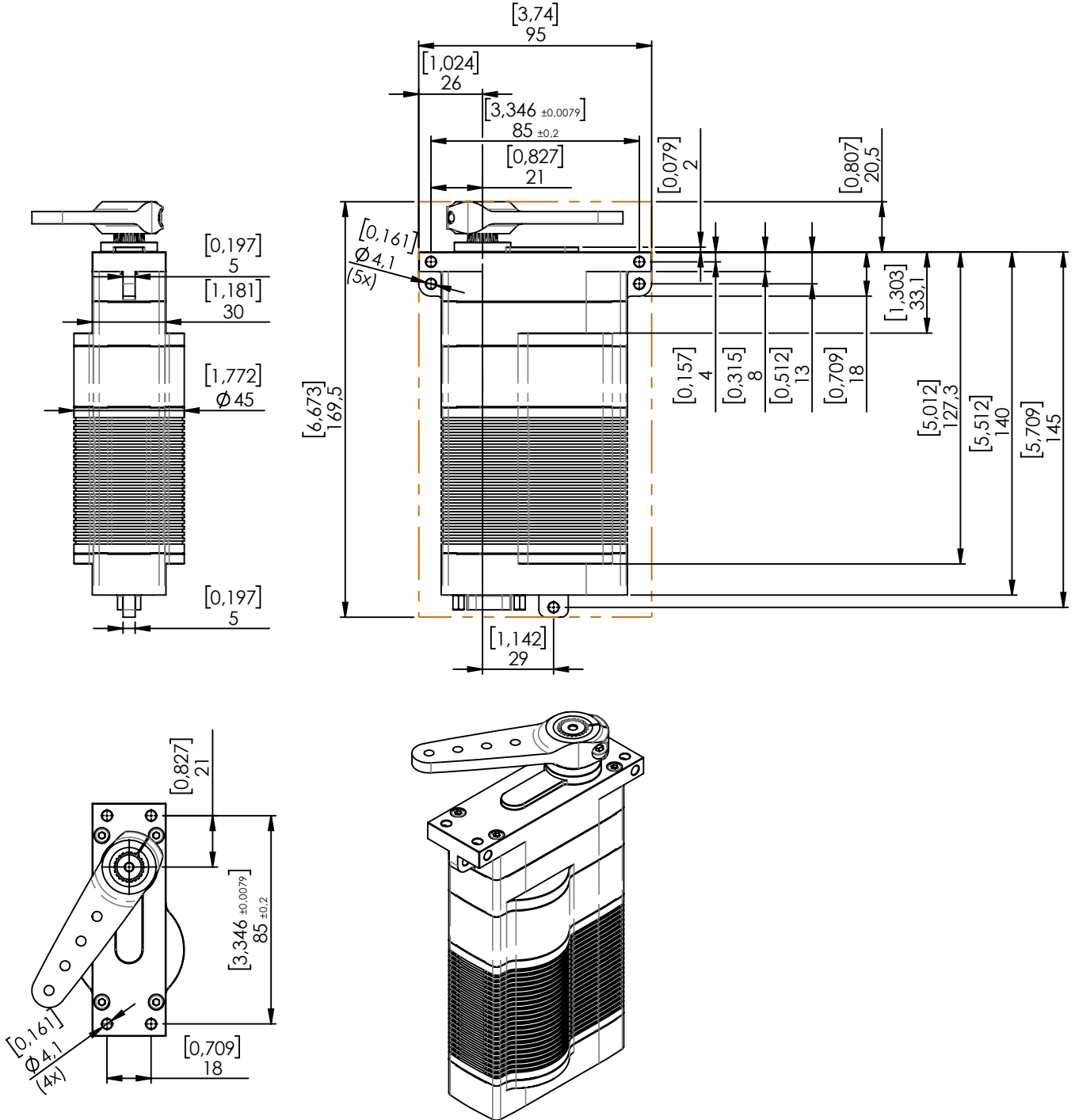


7. Dimensions

Envelope dimensions for servo with D-Sub connector (.S9)	169,5 mm x 95 mm x 45.0 mm [6,673 in x 3,74 in x 1.772 in]
Weight with D-Sub connectors (.S9)	1100 g [38.8 oz] ±10%
Envelope dimensions for servo MIL Grade D38999 connectors (.MIL13)	203,29 x 95 mm x 45.0 mm [8,004 in x 3,74 in x 1.772 in]
Weight with MIL Grade D38999 connectors (.MIL13)	1150 g [40,6 oz] ±10%

7.1. Installation Dimensions .S9.U

D-Sub connector (.S9), bottom sided (.U) with spline or square shaft (.SQ)



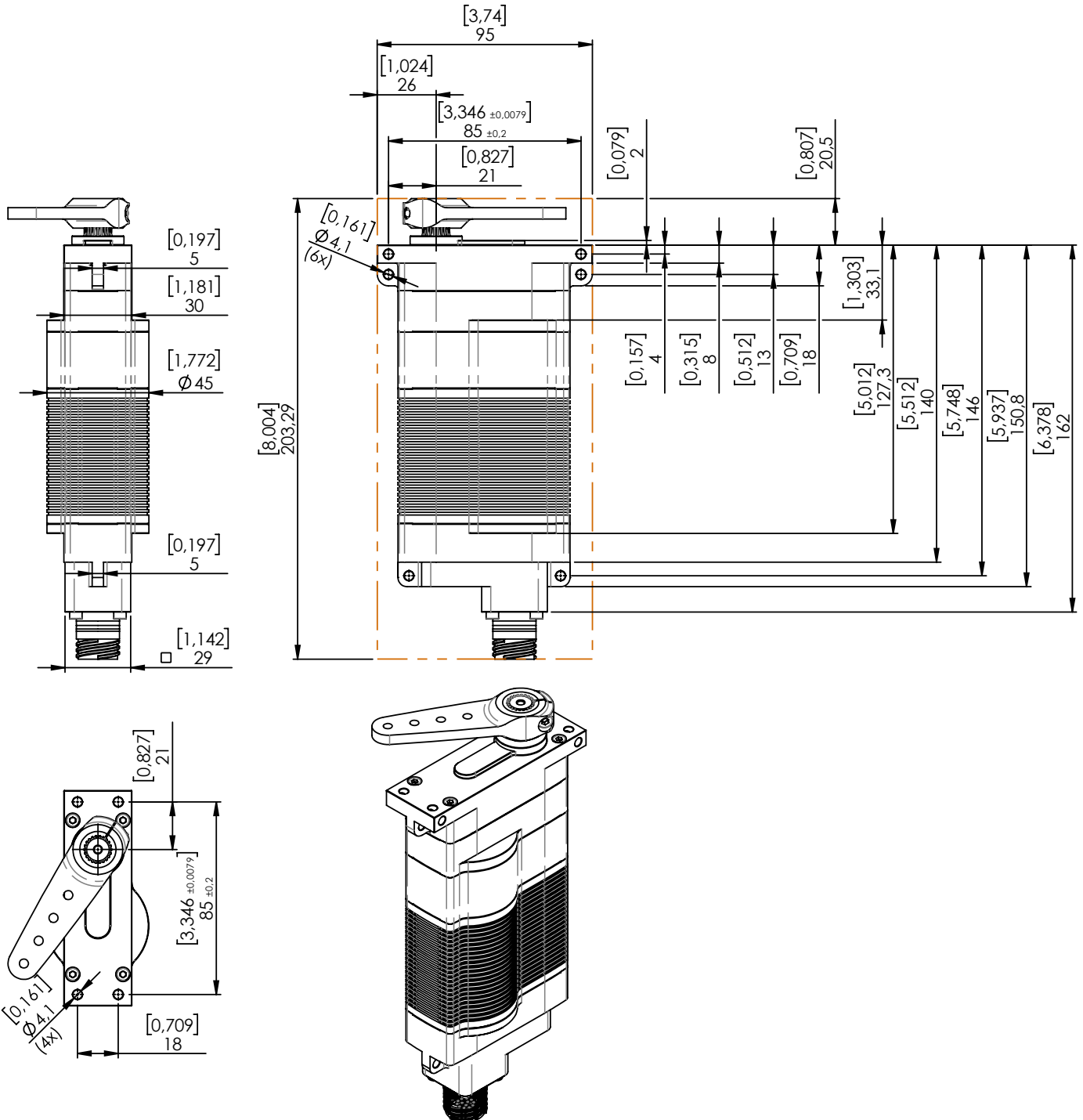
Not to scale

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

Dimensions: [in], mm

7.2. Installation Dimensions .MIL13.U

MIL graded D38999 connector (.MIL13), bottom sided (.U) with spline or square shaft (.SQ)



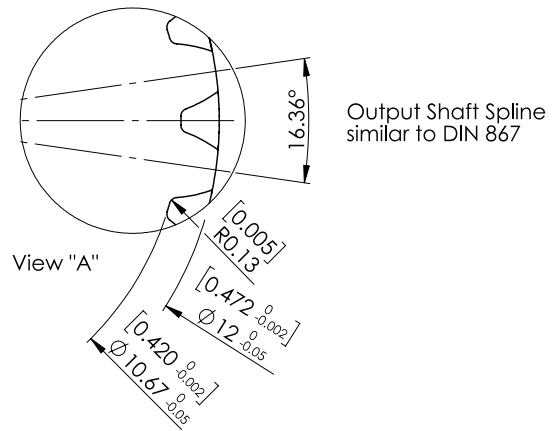
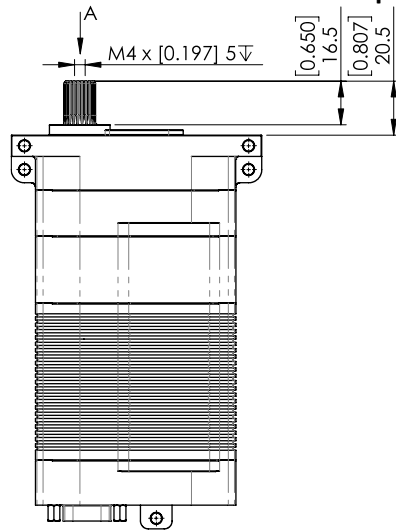
Not to scale

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

Dimensions: [in], mm

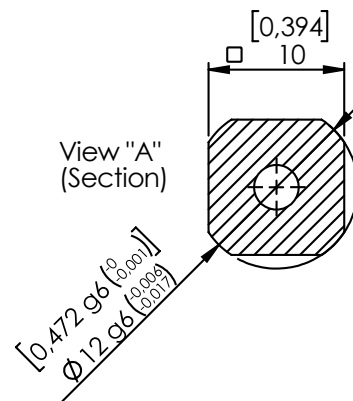
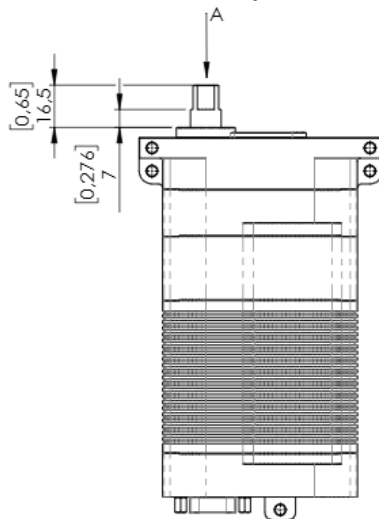
7.3. Output Shaft Spline

Valid for all Versions with standard spline shaft



7.1. Output square shaft (.SQ)

Valid for all Versions with square shaft (.SQ)



Not to scale

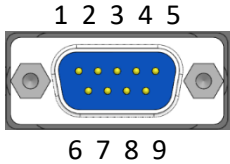
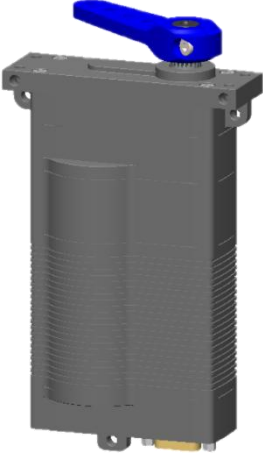
Tolerances: Unless otherwise specified according to DIN ISO 2768- m

Dimensions: [in], mm

8. Electrical Connection Options

8.1. PWM with Optocoupler (.1)

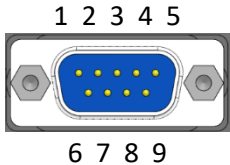

PWM with Optocoupler (.1) with single ended PWM interface and D-Sub connector (.S9)

	Manufacturer		ITT Cannon
	Type		DEMM-9PE
	Mating		D-SUB DE-9f
	1	NC	Do not connect
	2	NC	Do not connect
	3	Diff FB A	Non-inverted differential Position Feedback
	4	PWM	Single-ended PWM Input
	5	Case	Case (Not connected to GND)
	6	+V DC	Supply Voltage
	7	GND	Supply and Signal Ground
	8	Pos FB	Position Feedback
	9	Diff FB B	Inverted differential Position Feedback

NOTE:

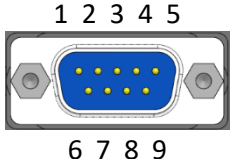

Access to the actuator parameters using Programming Tool # 985.4 is only possible via the single ended PWM interface (Pin 4).

PWM with Optocoupler (.1) with galvanic isolated PWM interface and D-Sub connector (.S9)

	Manufacturer		ITT Cannon
	Type		DEMM-9PE
	Mating		D-SUB DE-9f
	1	PWM (AO)	Non-differential PWM Input, Anode
	2	PWM (CO)	Non-differential PWM Input, Cathode
	3	Diff FB A	Non-inverted differential Position Feedback
	4	to Pin 7	Connect to Pin 7 (Supply Ground)
	5	Case	Case (Not connected to GND)
	6	+V DC	Supply Voltage
	7	GND	Supply and Signal Ground
	8	Pos FB	Position Feedback
	9	Diff FB B	Inverted differential Position Feedback

8.2. PWM with RS 422 (.2)

PWM with RS 422 (.2) with integrated D-Sub connector (.S9)

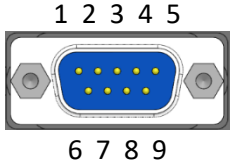
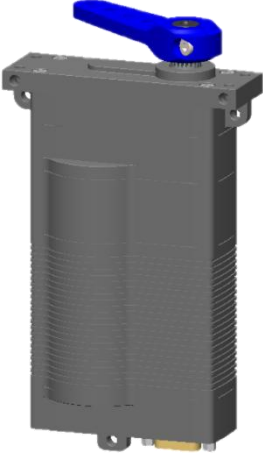
	Manufacturer		ITT Cannon
	Type		DEMM-9PE
	Mating		D-SUB DE-9f
	1	PWM A	Non-Inverted differential PWM Input
	2	PWM B	Inverted differential PWM Input
	3	Diff FB A	Non-inverted differential Position Feedback
	4	PWM	Single-ended PWM Input
	5	Case	Case (Not connected to GND)
	6	+V DC	Supply Voltage
	7	GND	Supply and Signal Ground
	8	Pos FB	Position Feedback
	9	Diff FB B	Inverted differential Position Feedback

NOTE:

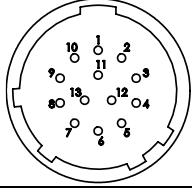

Access to the actuator parameters using Programming Tool # 985.4 is only possible via the single ended PWM interface (Pin 4).

8.3. RS-485 two-wire interface (.3)

RS-485 two-wire interface (.3) with integrated D-Sub connector (.S9)

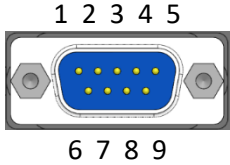
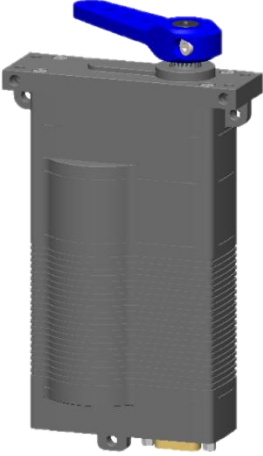
	Manufacturer		ITT Cannon
	Type		DEMM-9PE
	Mating		D-SUB DE-9f
	1	RS-485 A	Non-Inverted Input/Output (Rx/Tx)
	2	RS-485 B	Inverted Input/Output (Rx/Tx)
	3	NC	Do not connect
	4	+V DC (2)	Supply Voltage (Secondary)
	5	Case	Case (Not connected to GND)
	6	+V DC (1)	Supply Voltage (Primary)
	7	GND (1)	Supply and Signal Ground (Primary)
	8	GND (2)	Supply and Signal Ground (Secondary)
	9	NC	Do not connect

RS-485 two-wire interface (.3) with MIL specified connector (.MIL13)

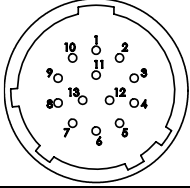

	Manufacturer		Amphenol
	Type		D38999-20WB35PN
	Mating		e.g. D38999-26WB35SN
	1	NC	Not connected
	2	+V DC (1)	Supply Voltage (Primary)
	3	NC	Not connected
	4	RS-485 A	Non-Inverted Input/Output (Rx/Tx)
	5	RS-485 B	Inverted Input/Output (Rx/Tx)
	6	Case	Case (Not connected to GND)
	7	NC	Do not connect
	8	NC	Do not connect
	9	NC	Not connected
	10	+V DC (2)	Supply Voltage (Secondary)
	11	NC	Not connected
	12	GND (1)	Supply and Signal Ground (Primary)
	13	GND (2)	Supply and Signal Ground (Secondary)

8.4. RS-485 redundant interface (.4)

RS-485 redundant interface (.4) with integrated D-Sub connector (.S9)

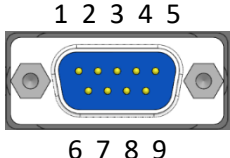

	Manufacturer		ITT Cannon
	Type		DEMM-9PE
	Mating		D-SUB DE-9f
	1	RS-485 A (1)	Non-Inverted Input/Output (Rx/Tx), Interface 1
	2	RS-485 B (1)	Inverted Input/Output (Rx/Tx), Interface 1
	3	RS-485 A (2)	Non-Inverted Input/Output (Rx/Tx), Interface 2
	4	+V DC (2)	Supply Voltage (Secondary)
	5	Case	Case (Not connected to GND)
	6	+V DC (1)	Supply Voltage (Primary)
	7	GND (1)	Supply and Signal Ground (Primary)
	8	GND (2)	Supply and Signal Ground (Secondary)
	9	RS-485 B (2)	Inverted Input/Output (Rx/Tx), Interface 2

RS-485 redundant interface (.4) with MIL specified connector (.MIL13)

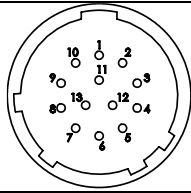

	Manufacturer		Amphenol
	Type		D38999-20WB35PN
	Mating		e.g. D38999-26WB35SN
	1	NC	Not connected
	2	+V DC (1)	Supply Voltage (Primary)
	3	NC	Not connected
	4	RS-485 A (1)	Non-Inverted Input/Output (Rx/Tx), Interface 1
	5	RS-485 B (1)	Inverted Input/Output (Rx/Tx), Interface 1
	6	Case	Case (Not connected to GND)
	7	RS-485 A (2)	Non-Inverted Input/Output (Rx/Tx), Interface 2
	8	RS-485 B (2)	Inverted Input/Output (Rx/Tx), Interface 2
	9	NC	Not connected
	10	+V DC (2)	Supply Voltage (Secondary)
	11	NC	Not connected
	12	GND (1)	Supply and Signal Ground (Primary)
	13	GND (2)	Supply and Signal Ground (Secondary)

8.5. RS-485 four-wire interface (.5)

RS-485 four-wire interface (.5) with integrated D-Sub connector (.S9)

	Manufacturer		ITT Cannon
	Type		DEMM-9PE
	Mating		D-SUB DE-9f
	1	RS-485 A (1)	Non-inverted Input (Rx), Interface 1
	2	RS-485 B (1)	Inverted Input (Rx), Interface 1
	3	RS-485 A (2)	Non-inverted Output (Tx), Interface 2
	4	+V DC (2)	Supply Voltage (Secondary)
	5	Case	Case (Not connected to GND)
	6	+V DC (1)	Supply Voltage (Primary)
	7	GND (1)	Supply and Signal Ground (Primary)
	8	GND (2)	Supply and Signal Ground (Secondary)
	9	RS-485 B (2)	Inverted Output (Tx), Interface 2

RS-485 four-wire interface (.5) with MIL specified connector (.MIL13)

	Manufacturer		Amphenol
	Type		D38999-20WB35PN
	Mating		e.g. D38999-26WB35SN
	1	NC	Not connected
	2	+V DC (1)	Supply Voltage (Primary)
	3	NC	Not connected
	4	RS-485 A (1)	Non-inverted Input (Rx), Interface 1
	5	RS-485 B (1)	Inverted Input (Rx), Interface 1
	6	Case	Case (Not connected to GND)
	7	RS-485 A (2)	Non-inverted Output (Tx), Interface 2
	8	RS-485 B (2)	Inverted Output (Tx), Interface 2
	9	NC	Not connected
	10	+V DC (2)	Supply Voltage (Secondary)
	11	NC	Not connected
	12	GND (1)	Supply and Signal Ground (Primary)
	13	GND (2)	Supply and Signal Ground (Secondary)

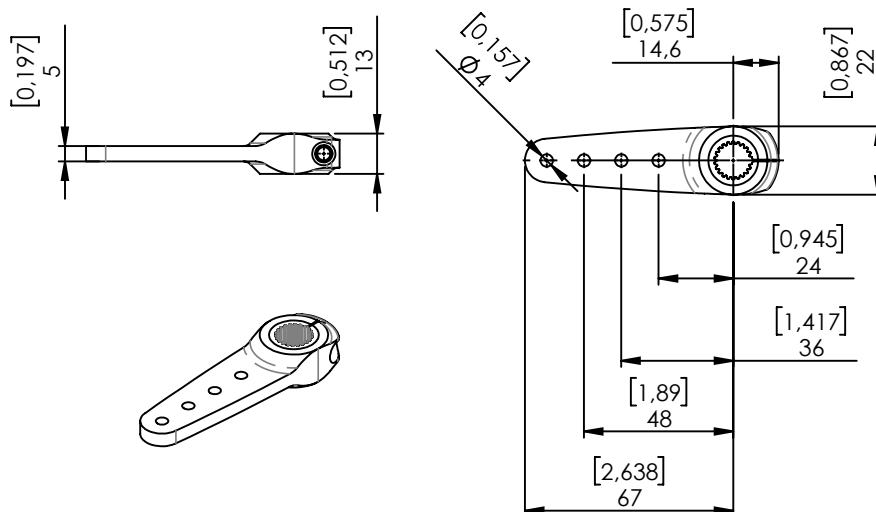
9. Accessories

Item	Item-No.
Aluminium servo arm, single sided	1951.21
Aluminium servo arm, single sided, square shaft	1951.27
Aluminium servo arm, double sided	1951.20
Aluminium servo disc	1951.23
Programming Tool PWM	985.4
Programming Tool RS-485	985.5
Programming Tool RS-485 four-wire	985.6

All accessories to be purchased separately

9.1. Aluminium servo arm, single sided

1951.21



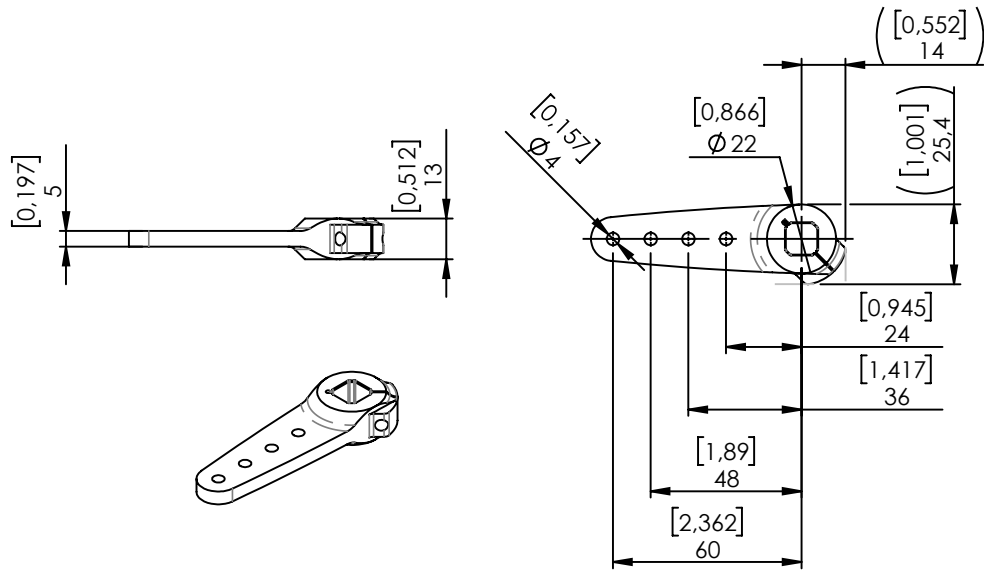
Not to scale

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

Dimensions: [in], mm

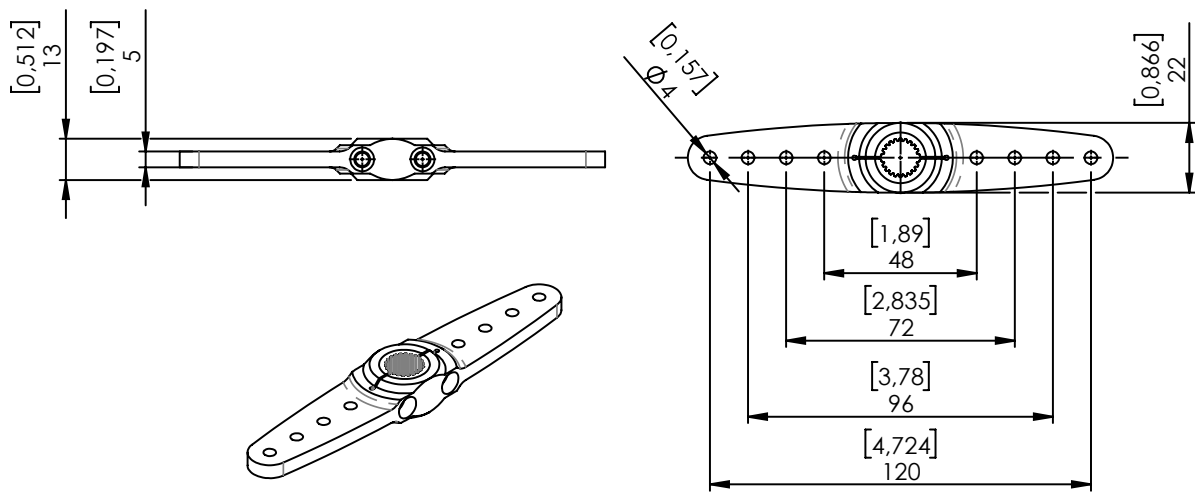
9.2. Aluminium servo arm, single sided, square shaft

1951.27



9.3. Aluminium servo arm, double sided

1951.20

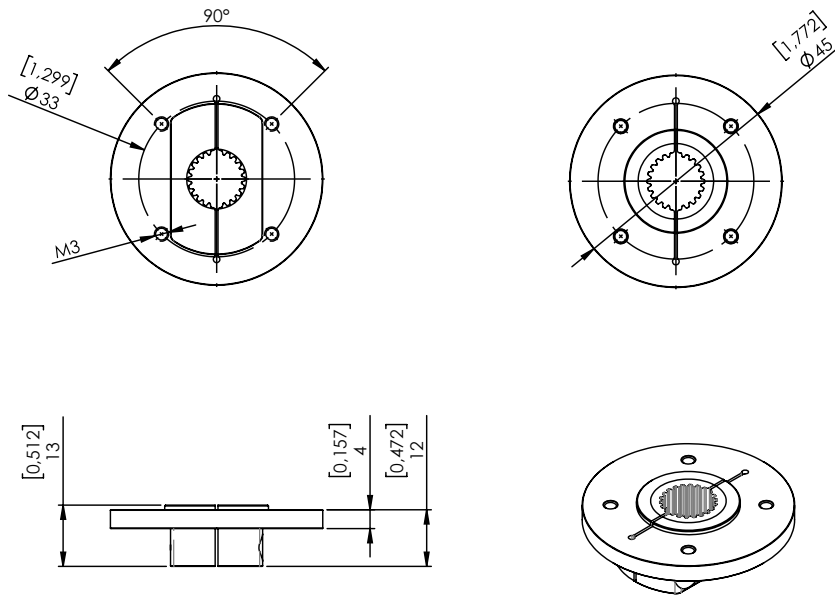


Not to scale

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

Dimensions: [in], mm

9.4. Aluminium servo disc
 1951.23



Not to scale

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

Dimensions: [in], mm

10. Item Number System

DA 30-HT		
1	Type of Actuator	
	DA 30-HT	30 mm Class Actuator High Torque
2	Internal Servo Saver (ISS)	
	Empty field	Without Internal Servo Saver
3	Supply Voltage	
	30	30 V Supply Voltage
4	Gear Set	
	Empty field	Standard Gear Train
5	Interface	
	1	PWM with Optocoupler
	2	PWM with RS 422
	3	RS 485 two-wire (Digital interface)
	4	RS 485 redundant (with digital feedback)
	5	RS 485 four wire (with digital feedback)
6	Routing Option	Only for Duplex
	Empty field	N/A
7	Case	
	Empty field	Standard Case
8	Analog Feedback	Only for PWM
	Empty field	Without Analog Feedback
	P	Analog Position Feedback
9	Extended Travel Angle	
	Empty Field	Standard Travel Angle
10	Electrical Connection	
	S9	Integrated connector D-SUB DE 9f, 9 pin
	MIL13	MIL spec D38999, 13 pin
11	Orientation Electrical Connection	
	U	Bottom sided
12	Output Shaft	
	Empty field	Standard Spline
	SQ	Square shaft
13	High Impedance Option	Only for RS 485
	Empty field	With BUS termination resistor
	H	Without BUS termination resistor
14	Temperature Range	
	Empty field	Standard Range (-30 °C 70 °C)
	LT	Low temperature modification



DA 30-HT
Technical Specification

15	Baud Rate	Only for RS 485
	Empty field	N/A
	115	Baud rate of 115.200 bits/s (Standard RS 485)
	038	Baud rate of 38.400 bits/s
	057	Baud rate of 57.600 bits/s
	250	Baud rate of 250.000 bits/s

Part Number Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DA 30-HT		.30		.1			.P		.S9					

DA 30-HT with 30 V supply voltage, PWM with Optocoupler interface, analog position feedback and integrated D-SUB connector



Volz Servos GmbH

Heinrich-Krumm-Str. 5
63065 Offenbach
Germany
Tel. +49-69-588061-0

e-Mail mail@volz-servos.com
Website www.volz-servos.com