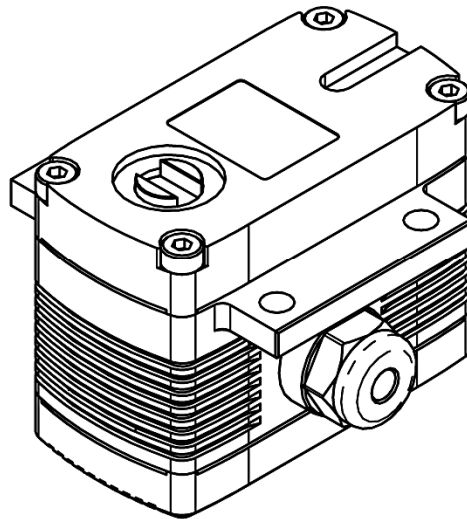


DA 20-T

Technical Specification



DA 20-T-12-BLDC
DA 20-T-30-BLDC

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1. General Description

The DA 20-T has been developed as a fly-by-wire actuator for direct installation onto the throttle valve shaft of a combustion engine. This eliminates the need for linkage rods or bowden cables, shortens the installation time and minimizes the installation space and overall weight!

Its brushless motor and contactless, wear free position detection make the DA 20-T immune to vibrations. Designed for use at high temperatures, only components with extended temperature range were put to use. The connection cable is shielded and aviation specified.

The servo is fully programmable. Our PC programming tool permits teaching of the idle and full throttle positions. These are assigned to automatically determined position feedback voltages. Teaching the idle and full throttle position makes it possible to replace a throttle valve servo or a throttle-servo unit without the need to reconfigure the engine control unit.

Advantages of the throttle valve actuator:

- Maximized service life through vibration-resistant, brushless DC motor
- Brushless technology eliminates the typical electromagnetic noise of brush-type motors
- Contactless, wear free position sensing
- Aluminum housing with minimal weight and size in functional design with integrated adapter bracket for directly flanging to the throttle valve shaft
- 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
- Good resistance to electromagnetic interference achieved with aluminum housing, low interference emission through brushless motor
- Several programming possibilities, e.g. overload protection for the internal electric motor, which enables powering down the current consumption in the blocked state.

2. Operating Data

		DA 20-T-12-BLDC...	DA 20-T-30-BLDC...
Supply Voltage (rated)		14 V DC	28 V DC
Supply Voltage Range		10 ... 16 V DC	24 ... 30 V DC
Standby Current ¹	at rated voltage	< 0.06 A	< 0.06 A
Rated Current ¹	at rated voltage	0.4 A	0.2 A
Peak Current ¹	at rated voltage	0.64 A	0.32 A
Rated Torque ¹	at rated speed	15 Ncm (21.2 ozf-in)	
Stall Torque ¹	at rated voltage	30 Ncm (42.4 ozf-in)	
No Load Speed ¹	at rated voltage	420 °/s	
Rated Speed ¹	at rated torque	270 °/s	
Default Travel Angle		±45° = 90° total travel	
Max. Travel Angle ²		±45° = 90° 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		-35°C ... +80°C (-31°F ... +176°F)	

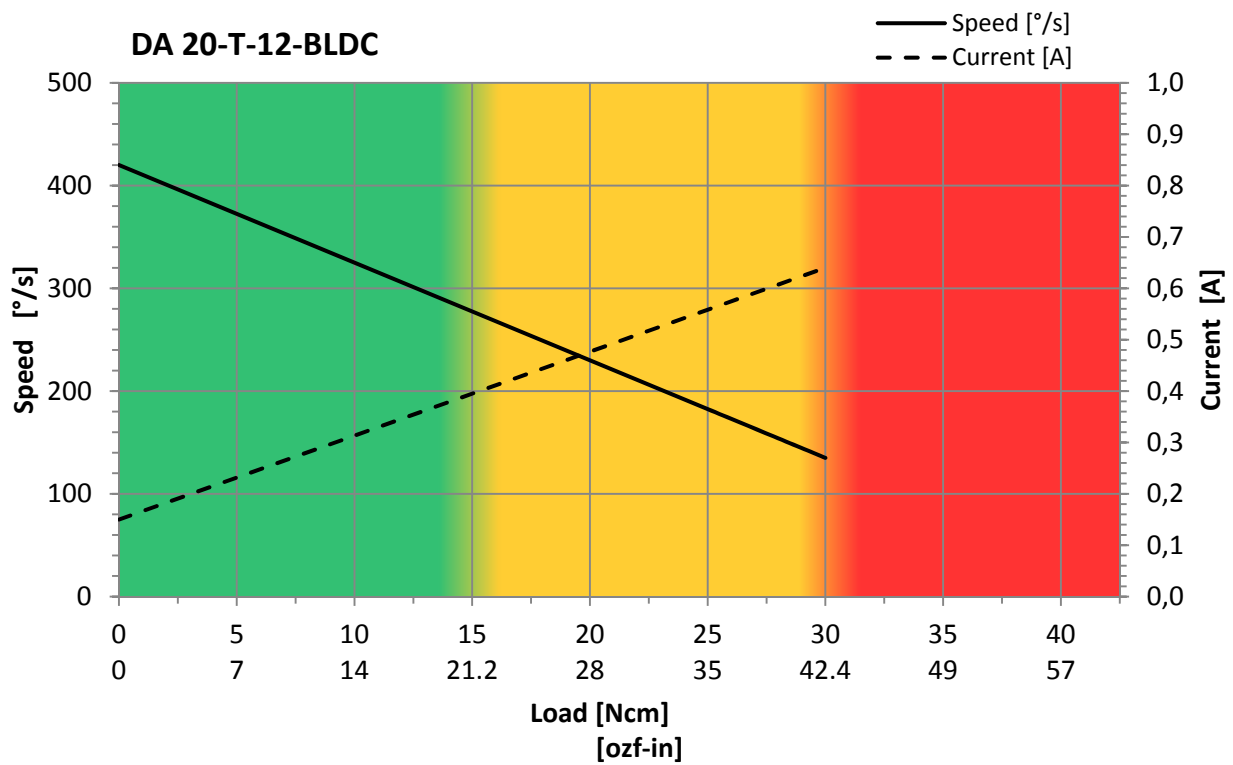
1) Tolerance ±10%

2) Programming Tool # 985.7 required

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

3. Performance

3.1. Performance 12V-Version



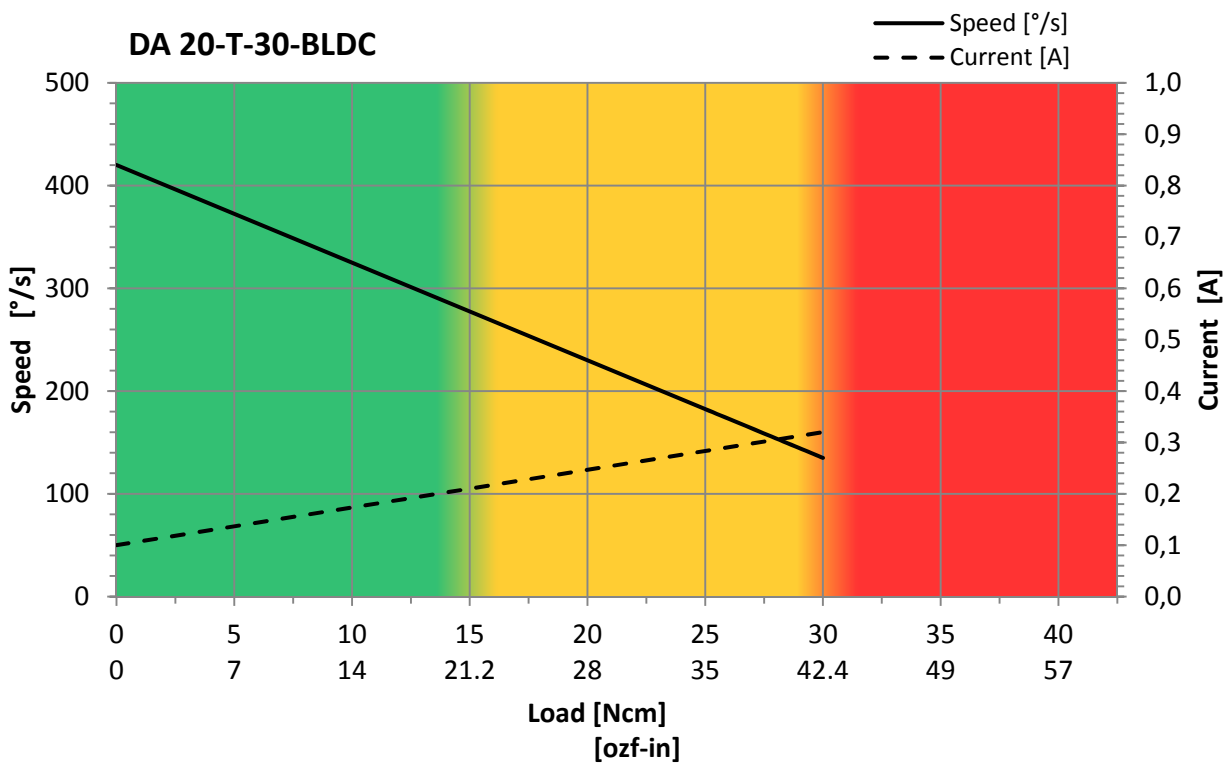
Operation Mode:

■ Continuous

■ Short Time
< 10s , 60s cool down

■ Overload
< 1s , 60s cool down

3.2. Performance 28V-Version



Operation Mode:

■ Continuous

■ Short Time
< 10s , 60s cool down

■ Overload
< 1s , 60s cool down

4. Command Signal

4.1. PWM Command Signal

Valid for all Versions with PWM Command Signal

PWM	DA 20-T-__-BLDC...
Signal Voltage	TTL-Level HIGH: min. 3.5V , max. 5.5V TTL-Level LOW: min. 0.0V , max. 1.5V
Frame Rate	2.6 ... 2000 ms
Valid Pulse Lengths	0.9 ... 2.1 ms
Pulse Lengths for Position Left / Center / Right	1.0 / 1.5 / 2.0 ms
Resolution	$\leq 1.0 \mu\text{s}$

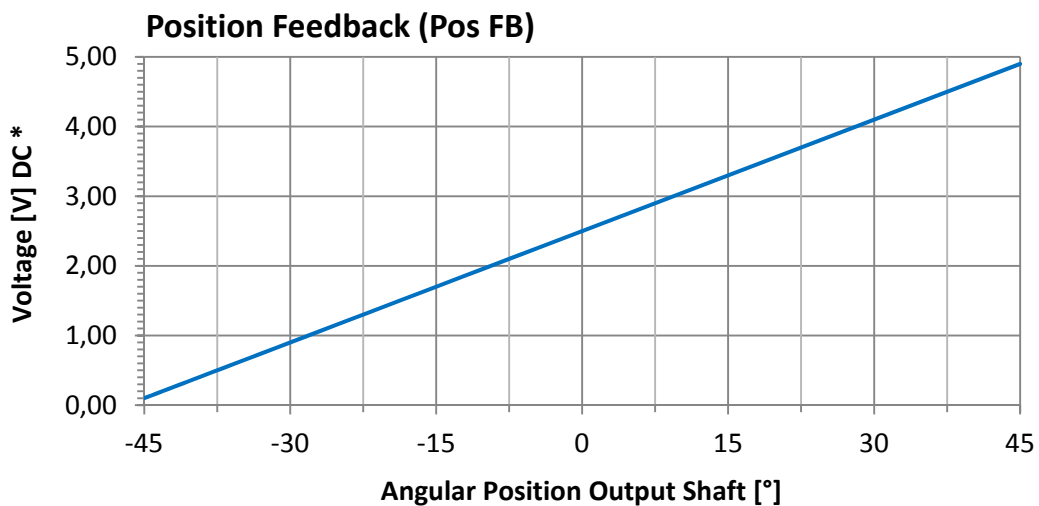
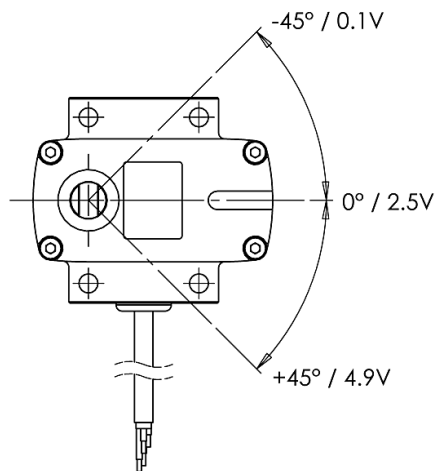
4.2. KeeLoq Protocol Command Signal

Valid for all Versions with KeeLoq Protocol Command Signal

The DA 20-T is available with an one-wire serial communication interface replacing the standard PWM command interface. This serial interface is using an encoding mechanism which is similar to the one being used by the KeeLoq® encryption system. The interface allows sending set-points and receiving actual position information in digital format. Additionally there are commands available to seek the mechanical end-stops of the butterfly valve. Documentation available on request.

4.3. Position Feedback Signal

The 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 Ground (GND). Independent from the programmed max. travel angle the signal is automatically set to range from 0.1...4.9V between the end positions. End positions can be teach-in.



* Tolerance $\pm 5\%$

5. Materials and Protective Features

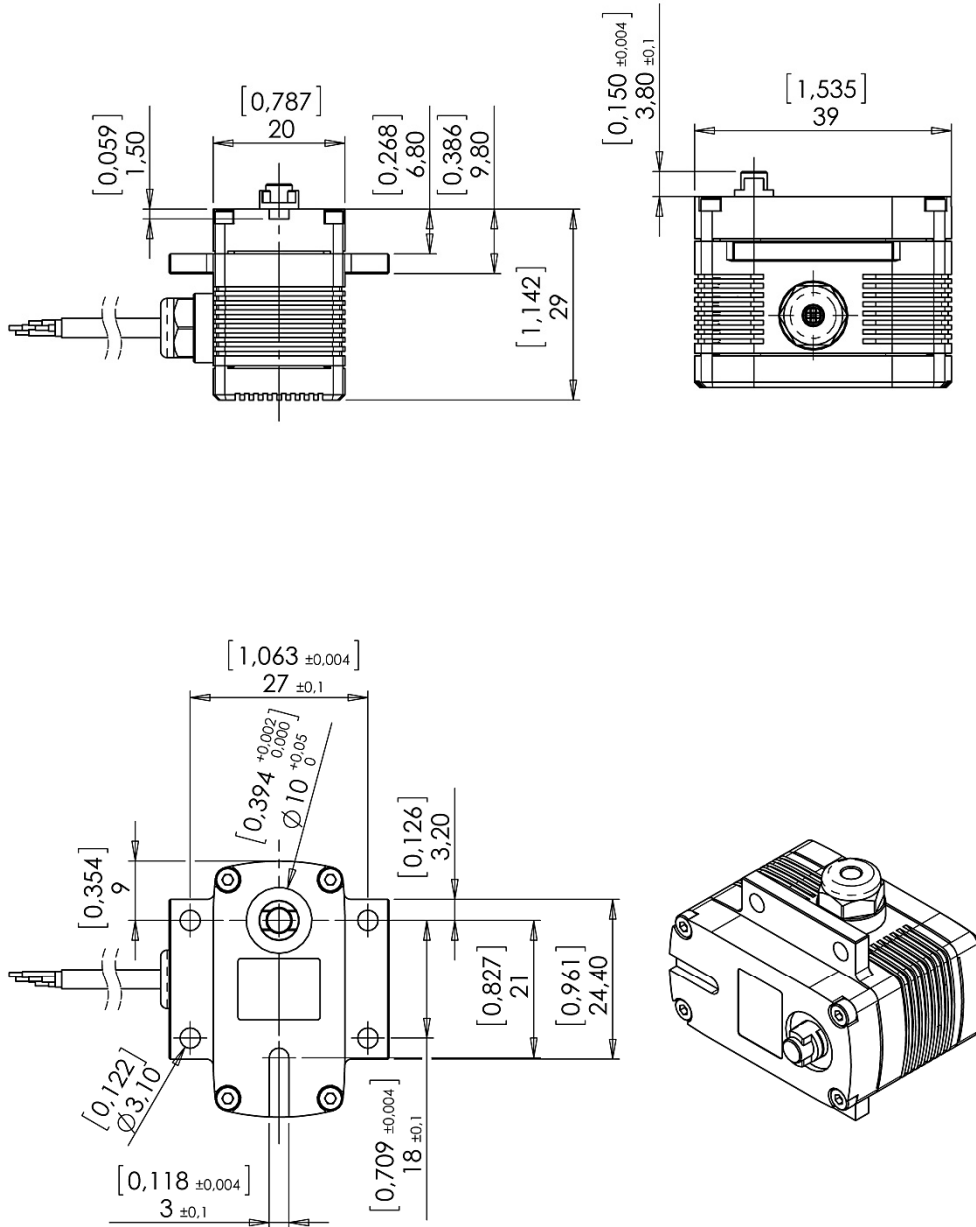
Case Material	Saltwater resistant Aluminum Alloy
Splash Water Resistance	IP 67 , waterproof to 1m depth
Case Surface Treatment	HART®-Coat
Salt Water Resistance	> 100 hrs. Salt Water Spray
EMI / RFI Shielding	Case Shielding
Motor Type	Brushless DC Motor
Gear Set Material	Hardened Steel
Position Sensor	Contactless
Position Feedback	Standard
Shielded Connecting Cable	Standard

6. Dimensions

Case Dimensions	29.0 mm x 39.0 mm x 20.0 mm ± 0.2 mm (1.142 in x 1.535 in x 0.787 in ± 0.008 in)
Weight	58g (2.05oz) $\pm 10\%$

6.1. Installation Dimensions with Plastic Adapter

Valid for all Versions
 DA 20-T-__-BLDC.1000._



Not to scale

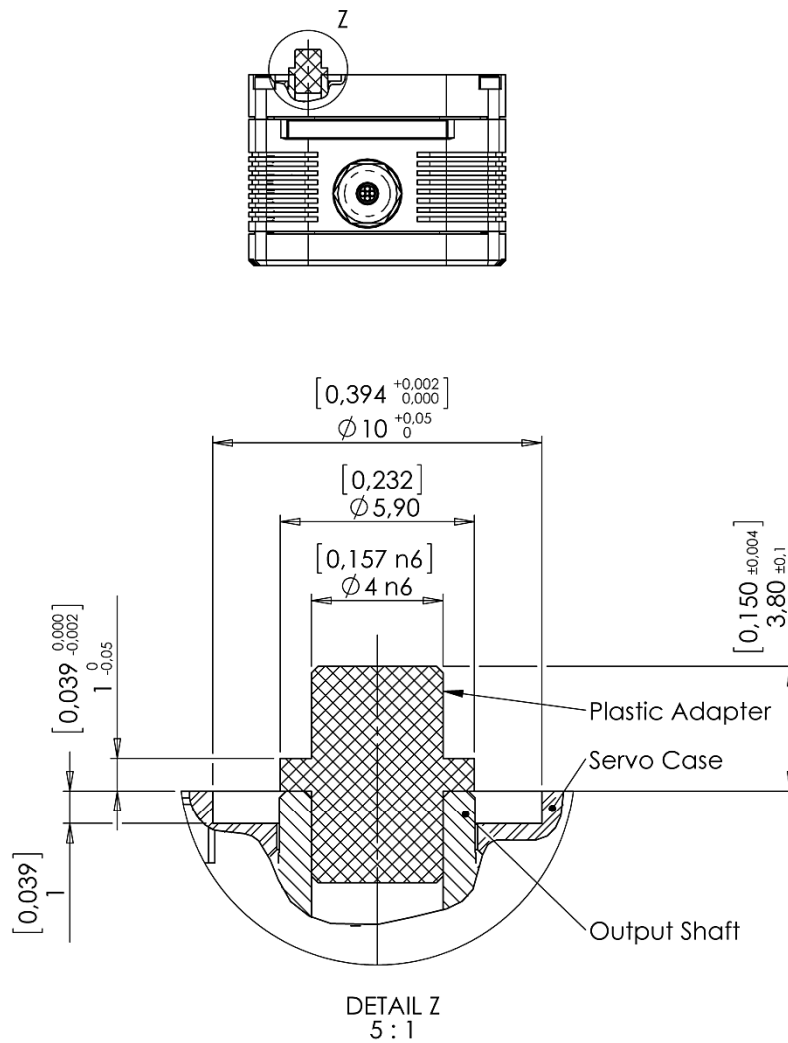
Dimensions [in] , mm

Content is subject to change without notice

Revision: B

6.2. Output Shaft Mechanical Interface with Plastic Adapter

Valid for all Versions
 DA 20-T-__-BLDC.1000._



Not to scale

Dimensions [in] , mm

Content is subject to change without notice

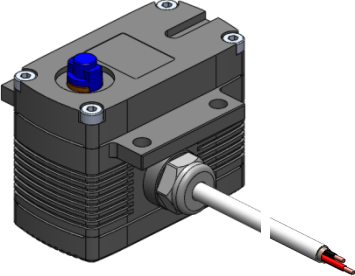
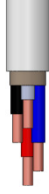
Revision: B

7. Electrical Connection Options

Shielded Cable

Item # DA 20.T._.BLDC.1000._

Leads Length 1000mm (40in), open leads

		Shielded Cable	
		Manufacturer	TE Connectivity
		Type	44A1141-26-0/2/6/9-9
		Wire Gauge	4x AWG 26 (4x 0.14mm ²)
	Pin Assignment		
1	Red	+V DC	Supply Voltage
2	Black	GND	Supply Ground, Signal Ground
3	White	SIG	PWM Command Signal
4	Blue	Pos FB	Position Feedback

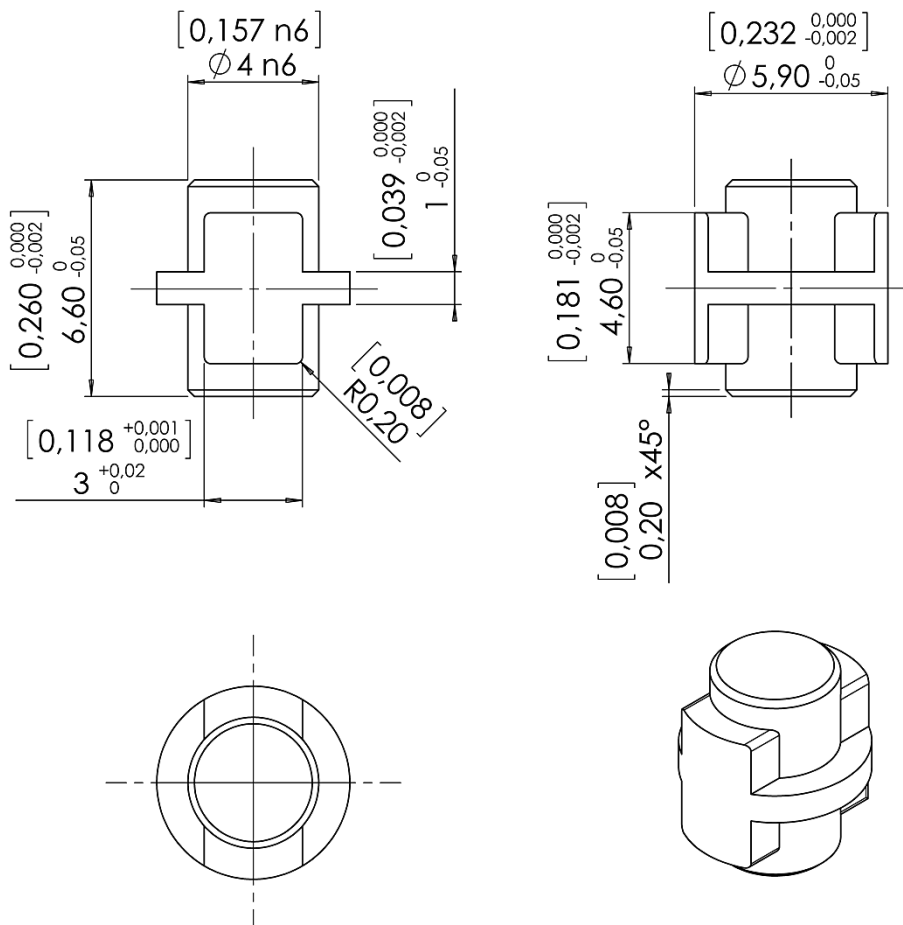
8. Accessories

Item	Item-No.
Output Shaft Plastic Adapter (1 pc.)	2020.10
Programming Tool DA 20-T	985.7

All accessories to be purchased separately.

8.1. Output Shaft Plastic Adapter

2020.10



Not to scale

Dimensions [in] , mm

Content is subject to change without notice

Revision: B

9. Item Number System

DA	20	.	T	.	12	.	BLDC	.	1000	.	K
Servo Class 20mm Class		Throttle T		Supply Voltage 10 ... 16 V DC 12 24 ... 30 V DC 30		Motor Type brushless BLDC		Command Interface K KeeLoq Protocol X PWM			Electrical Connection 1000 shielded cable, open leads, length 1000mm (40in)



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