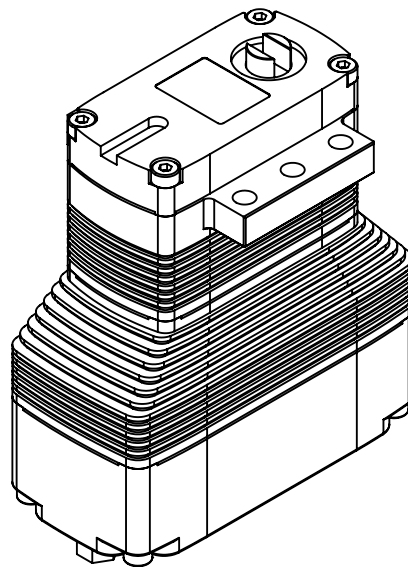


DA 20-TS

Technical Specification



DA 20.TS.30.BLDC

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1. General Description

The DA 20-TS 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-TS 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 DA 20 TS features a digital serial command interface (RS-485), which 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 level of the supply voltage, current consumption and the temperature of the electronics in digital form (optionally also the humidity within actuator case). These kind of diagnostic capabilities help to determine the health state of the actuators before, during and after deployment.

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

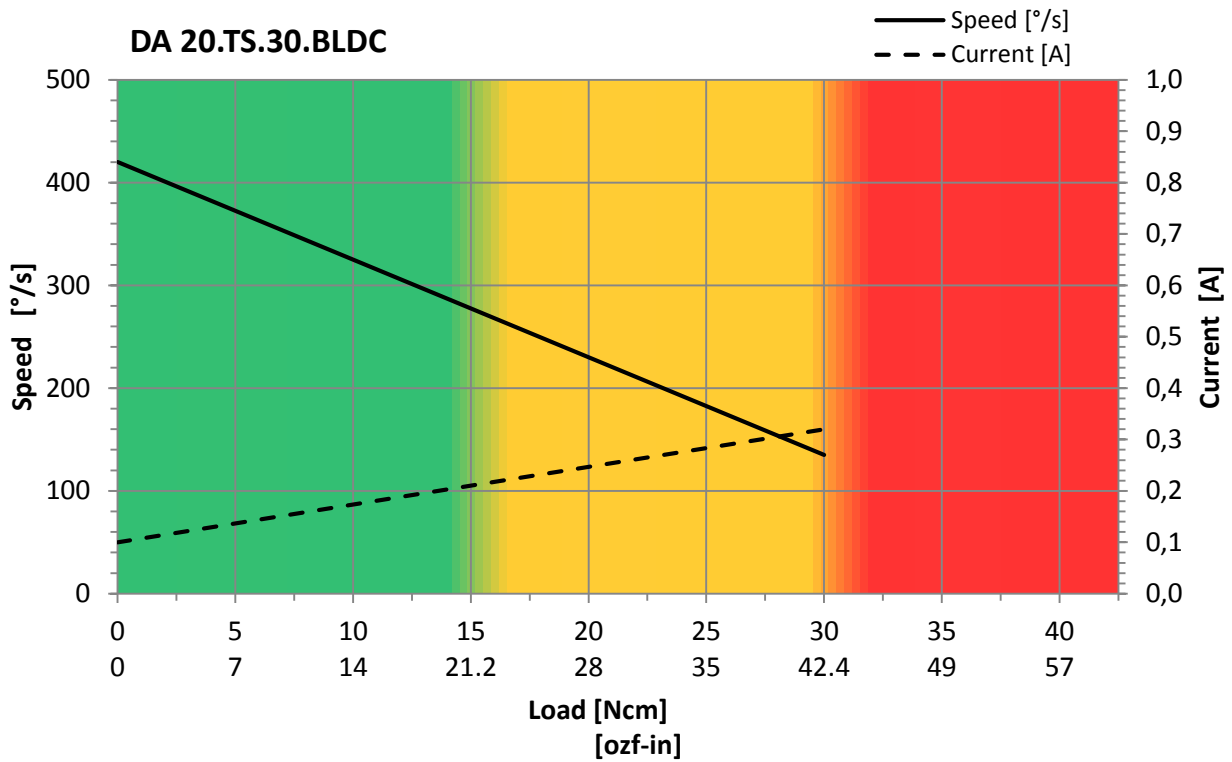
		DA 20.TS.30.BLDC...
Supply Voltage (rated)		28 V DC
Supply Voltage Range		24 ... 30 V DC
Standby Current ¹	at rated voltage	< 0.06 A
Rated Current ¹	at rated voltage	0.2 A
Peak Current ¹	at rated voltage	0.32 A
Rated Torque ¹	at rated speed	15 Ncm (21.2 ozf-in)
Peak Torque ¹	at rated voltage	30 Ncm (42.4 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		±55° = 110° total travel
Backlash (mechanical)		≤ 0.8°
Position Error under Temperature ²		≤ ±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) -20°C ... +50°C , Δt = 70°C (-4°F ... +122°F , Δt = 126°F)

3. Performance

3.1. Performance 28V-Version



Operation Mode:

■ Continuous

■ Short Time
< 10s, 60s cool down

■ Overload
< 1s, 60s cool down

4. Command Signal

4.1. RS 485 Command Signal

RS 485, RS 485 Redundant, RS 485 4-wire	
Baud-Rate	115200 bits/s \pm 1.5%
Protocol	(Documentation available) 6 Byte (incl. 2 byte CRC)

4.2. RS 485 Protocol Specifications

RS 485, RS 485 Redundant, RS 485 4-wire	
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 Protective Features

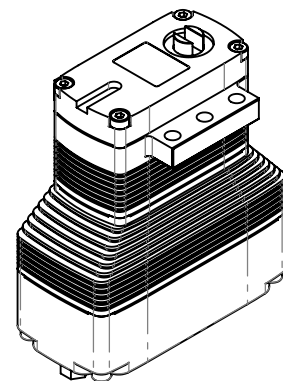
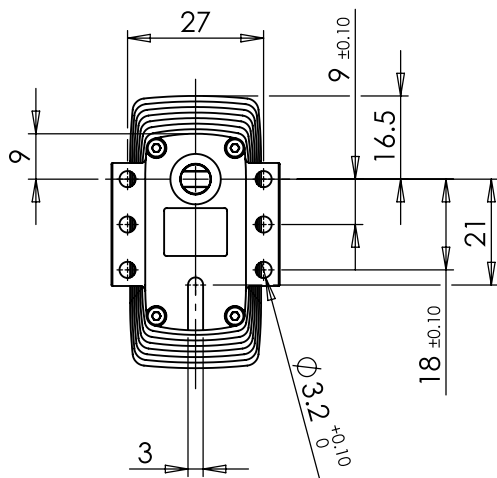
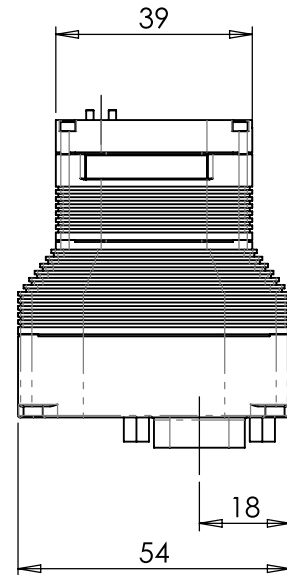
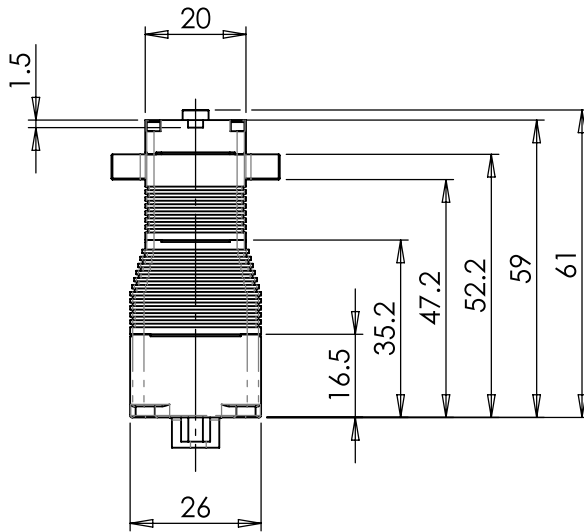
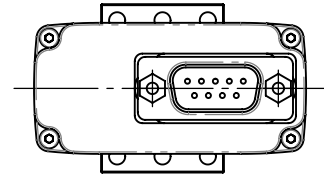
Case Material	Saltwater resistant Aluminum Alloy
Splash Water Resistance	IP 67, waterproof to 1m depth
Case Surface Treatment	HART®-Coat
Salt Water Resistance	> 100 hrs. Salt Water Spray
EMI / RFI Shielding	Case Shielding
Motor Type	Brushless DC Motor
Gear Set Material	Hardened Steel
Position Sensor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

6. Dimensions

Case Dimensions	59 mm x 54 mm x 26 mm ± 0.2 mm (2.323 in x 2.126 in x 1.024 in ± 0.008 in)
Weight	105 g (3.7 oz) $\pm 10\%$

6.1. Installation Dimensions

Valid for all Versions
 DA 20.TS.30.BLDC._



Not to scale

Dimensions mm

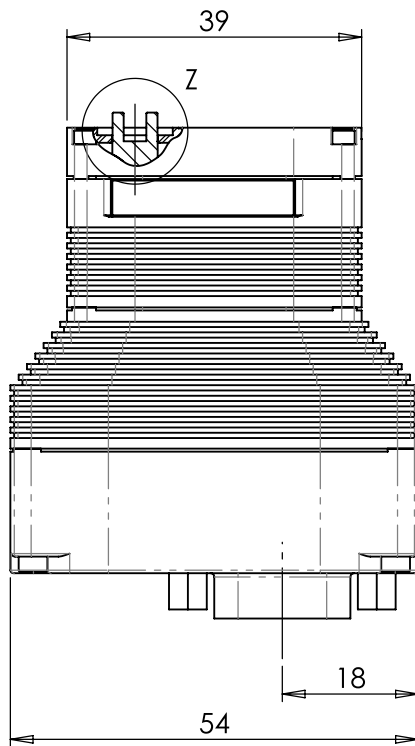
Tolerances (if not otherwise specified) ± 0.2 mm

[Content is subject to change without notice](#)

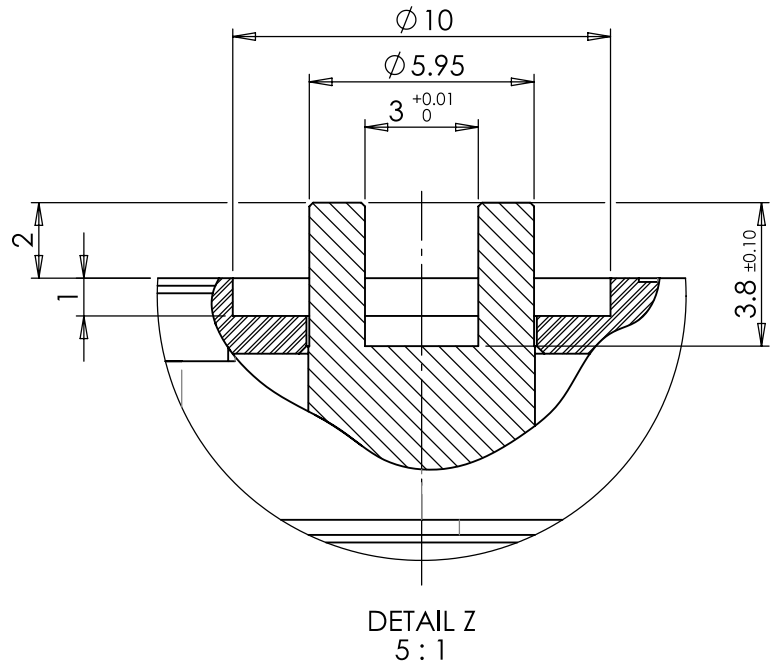
Revision: A

6.2. Output Shaft Mechanical Interface

Valid for all Versions
 DA 20.TS.30.BLDC._



Output Shaft
 Abtriebswelle



Not to scale

Dimensions mm

Tolerances (if not otherwise specified) ± 0.2 mm

[Content is subject to change without notice](#)

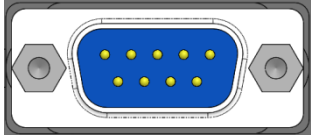
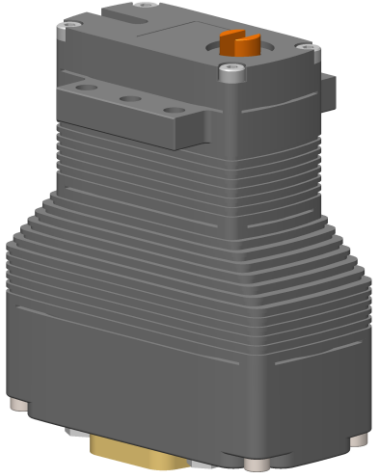
Revision: A

7. Electrical Connection Options

RS 485 Interface (2-wire)

Integrated Connector

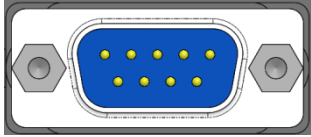
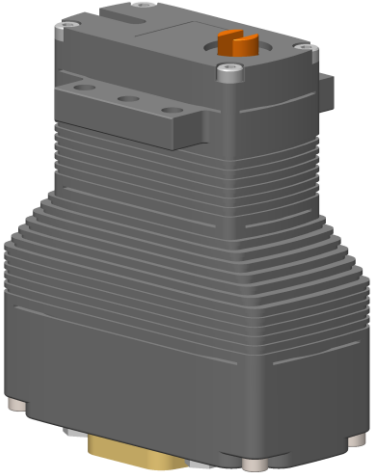
Item # DA 20.TS...3

		Standard Connector		
				Manufacturer
Type	DEMM-9PE			
Mating	D-SUB DE-9f			
		RS 485 (2-wire) Pin Assignment		
		1	RS 485 A	Non-Inverted Input/Output
		2	RS 485 B	Inverted Input/Output
		3	-	Do not connect
		4	+V DC (2)	Supply Voltage, Secondary
		5	Case GND	Case Ground
		6	+V DC (1)	Supply Voltage, Primary
		7	GND (1)	Supply Ground, Signal Ground, Primary
		8	GND (2)	Supply Ground, Signal Ground, Secondary
		9	-	Do not connect

RS 485 Redundant Interface

Integrated Connector

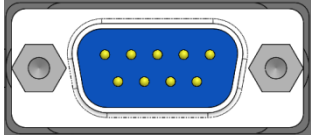
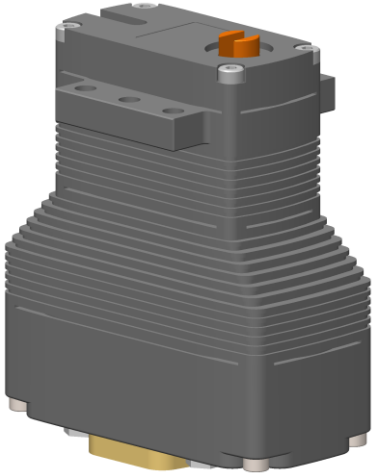
Item # DA 20.TS...4

	Standard Connector		
	Manufacturer	ITT Cannon	
	Type	DEMM-9PE	
	Mating	D-SUB DE-9f	
	RS 485 Redundant Pin Assignment		
	1	RS 485 A (1)	Interface 1, Non-Inverted Input/Output
	2	RS 485 B (1)	Interface 1, Inverted Input/Output
	3	RS 485 A (2)	Interface 2, Non-Inverted Input/Output
	4	+V DC (2)	Supply Voltage, Secondary
	5	Case GND	Case Ground
	6	+V DC (1)	Supply Voltage, Primary
	7	GND (1)	Supply Ground, Signal Ground, Primary
	8	GND (2)	Supply Ground, Signal Ground, Secondary
	9	RS 485 B (2)	Interface 2, Inverted Input/Output

RS 485 Interface (4-wire)

Integrated Connector

Item # DA 20.TS...5

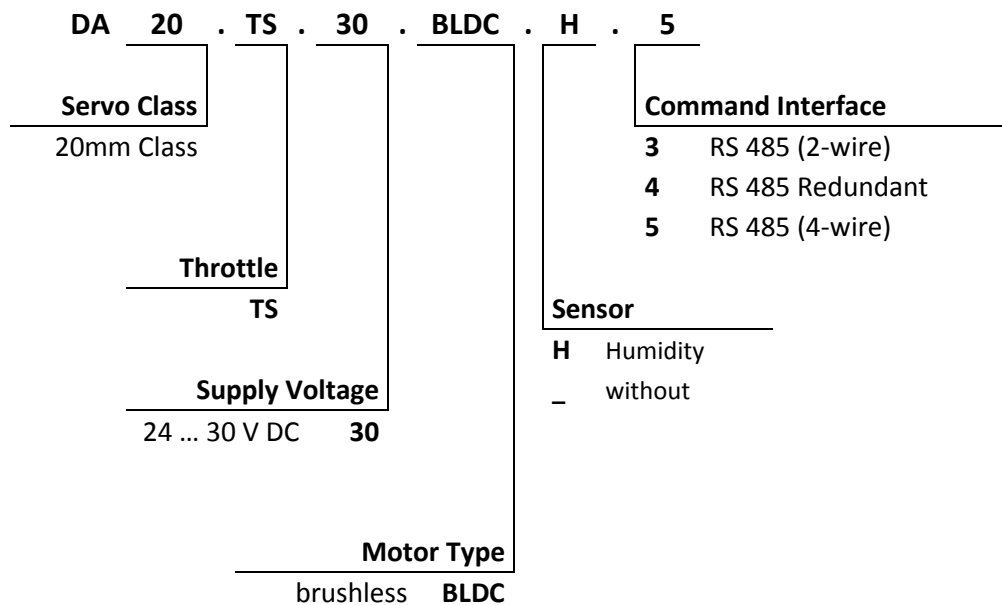
	Standard Connector		
	Manufacturer	ITT Cannon	
	Type	DEMM-9PE	
	Mating	D-SUB DE-9f	
	RS 485 (4-wire) Pin Assignment		
	1	RS 485 A (Rx)	Receiver, Non-Inverted, Input
	2	RS 485 B (Rx)	Receiver, Inverted, Input
	3	RS 485 A (Tx)	Transmitter, Non-Inverted, Output
	4	+V DC (2)	Supply Voltage, Secondary
	5	Case GND	Case Ground
	6	+V DC (1)	Supply Voltage, Primary
	7	GND (1)	Supply Ground, Signal Ground, Primary
	8	GND (2)	Supply Ground, Signal Ground, Secondary
	9	RS 485 B (Tx)	Transmitter, Inverted, Output

8. Accessories

Item	Item-No.
Programming Tool DA 20-TS	985.5

All accessories to be purchased separately.

9. Item Number System



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