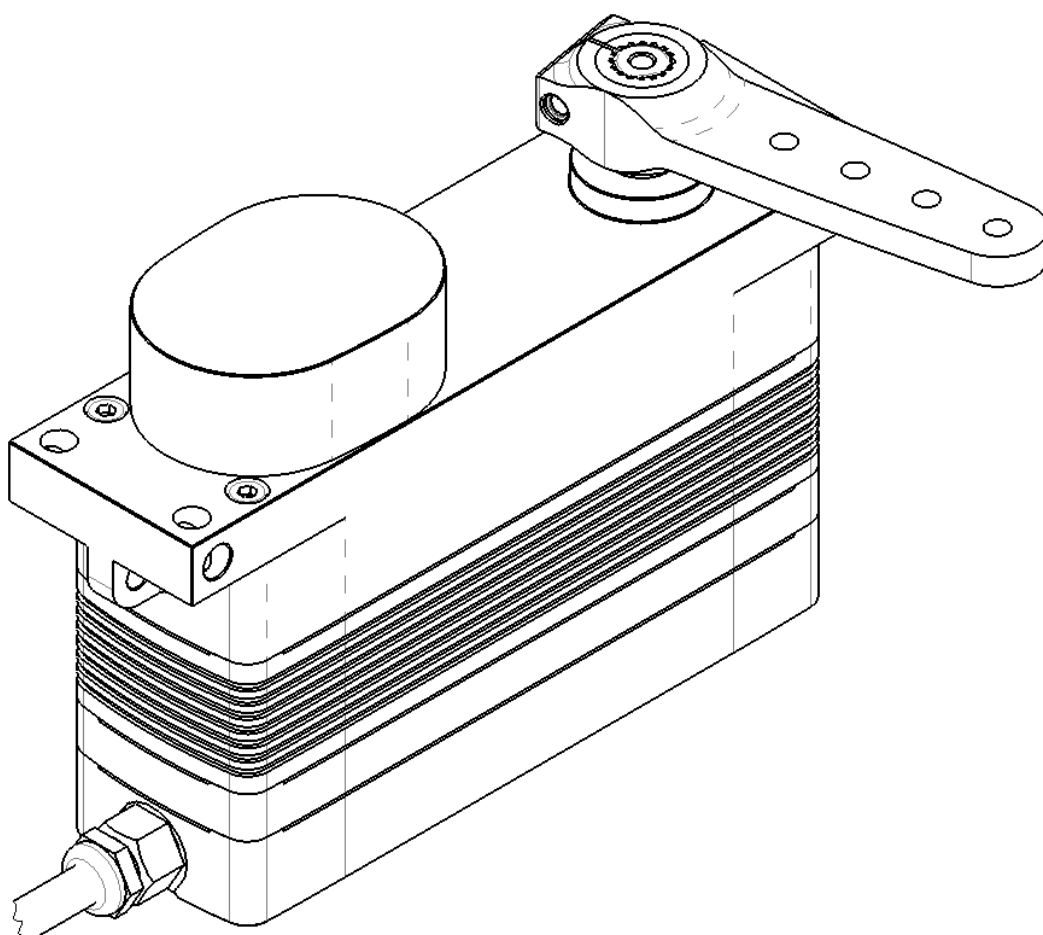


DA 36 Low Profile Technical Specification



DA 36-LP-30-4224



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1. General Description

To guarantee maximum safety and reliability, our DA 36 Low Profile (LP) 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 and provides an integrated MIL specified Glenair Superfly connector. Alternatively the servo can be equipped with a cable gland and integrated cable. Brackets integrated in the housing for horizontal and vertical assembly. 8-fold, ball-bearing supported, steel gear train, drive shaft with DIN spline or square shaped.

The DA 36-LP series can be equipped with a standard PWM input (Pulse Width Modulation) that has two different interfaces: a differential, galvanic isolated interface (Opto-Coupler) and a single-ended interface with CMOS levels that is also used to program the servo parameters. It includes analog position feedback to detect the drive shaft position. A differential RS-422 PWM interface can be chosen instead of the opto-coupled interface.

The DA 36-LP 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 level of the supply voltage, current consumption and the temperature of the motor and electronics in digital form (optionally also the humidity within the actuator case). These kind of diagnostic capabilities help to determine the health state of the actuators before, during and after deployment.

Interface Options:

PWM-OPTO

PWM-Level Compatible, OPTO-coupler PWM Interface

PWM-TTL

PWM-Level Compatible, TTL PWM Interface

RS 422/TTL

RS 422-Level Compatible, Differential PWM Interface

RS 485 (2-wire)

RS-485 Compatible, Asynchronous Serial Command Interface

RS 485 Redundant

RS 485 Redundant Communication Interface and Redundant Power Supply

RS 485 (4-wire)

RS 485 Separated Receiver and Transmitter Lines for Interface A and B

For RS 485-Versions Only:

Customized commands can be implemented on request. Humidity sensor available.

2. Operating Data

		DA 36-LP-30-4224...
Supply Voltage (rated)		28 V DC
Supply Voltage Range		22 ... 32 V DC
Standby Current ¹	at rated voltage	< 0.04 A
Rated Current ¹	at rated voltage	1.6 A
Peak Current ¹	at rated voltage	4.5 A
Rated Torque ¹	at rated speed	11.0 Nm (97.4 lbf-in)
Peak Torque ¹	at rated voltage	33.0 Nm (292.1 lbf-in)
No Load Speed ¹	at rated voltage	200 °/s
Rated Speed ¹	at rated torque	140 °/s
Default Travel Angle		±45° = 90° total travel
Max. Travel Angle ²		±85° = 170° total travel
Backlash (mechanical)		≤ 0.5°
Position Error under Temperature ³		≤ ±1.0°
Operating Temperature Range ⁴		-30°C ... +70°C (-22°F ... +158°F)
Storage Temperature Range		-55°C ... +85°C (-67°F ... +185°F)

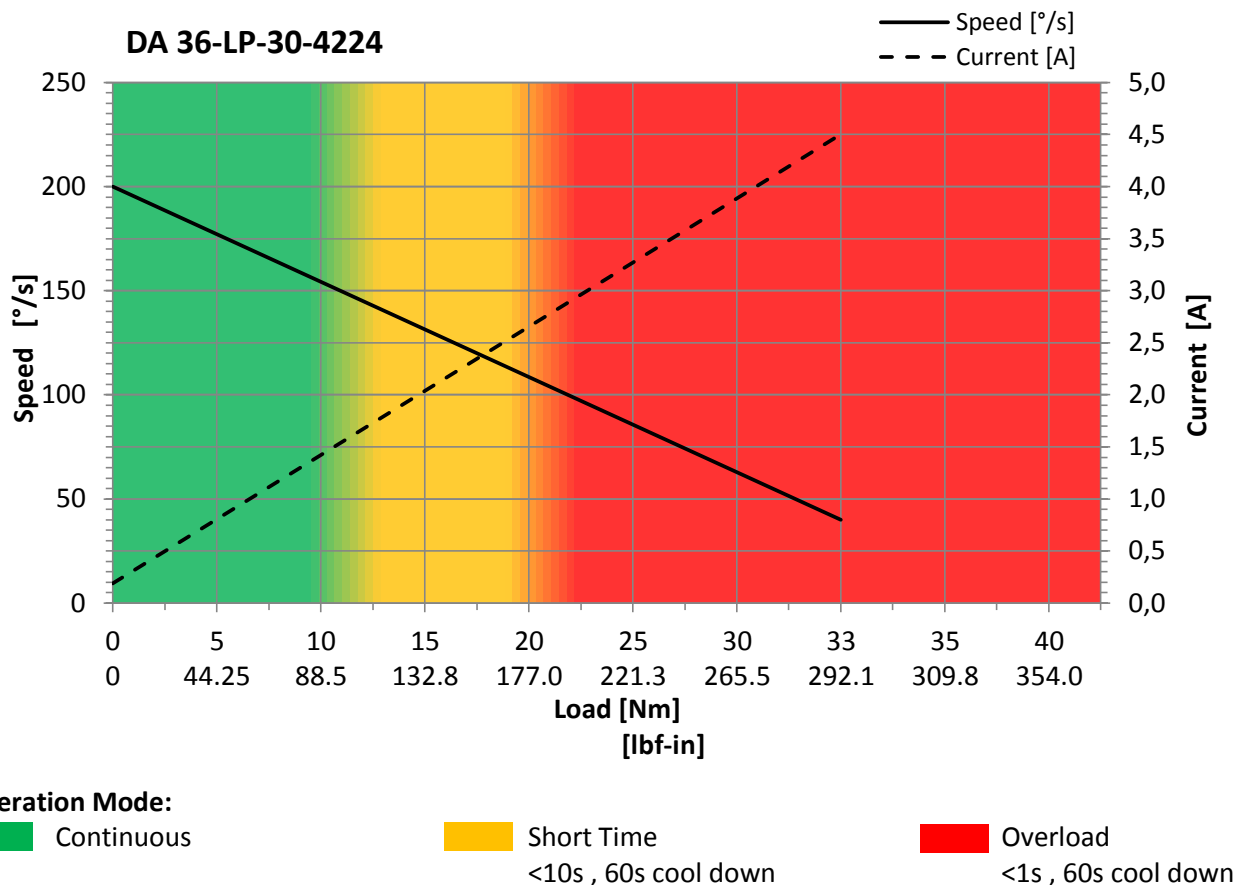
1) Tolerance ±10%

2) Programming Tool # 985.4 for PWM-Versions 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



4. Command Signal

4.1. PWM Command Interface

PWM-OPTO/TTL , PWM-RS 422/TTL	DA 36-LP-30-4224.1...	DA 36-LP-30-4224.2...
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. RS 485 Command Signal

RS 485 (2 and 4 wire), RS 485 Redundant	DA 36-LP-30-4224.3...	DA 36-LP-30-4224.4...	DA 36-LP-30-4224.5...
Baud-Rate	115200 $\pm$ 1.5% bits/s		
Protocol (Documentation available)	6 Byte (incl. 2 byte CRC)		

4.3. RS 485 Protocol Specifications

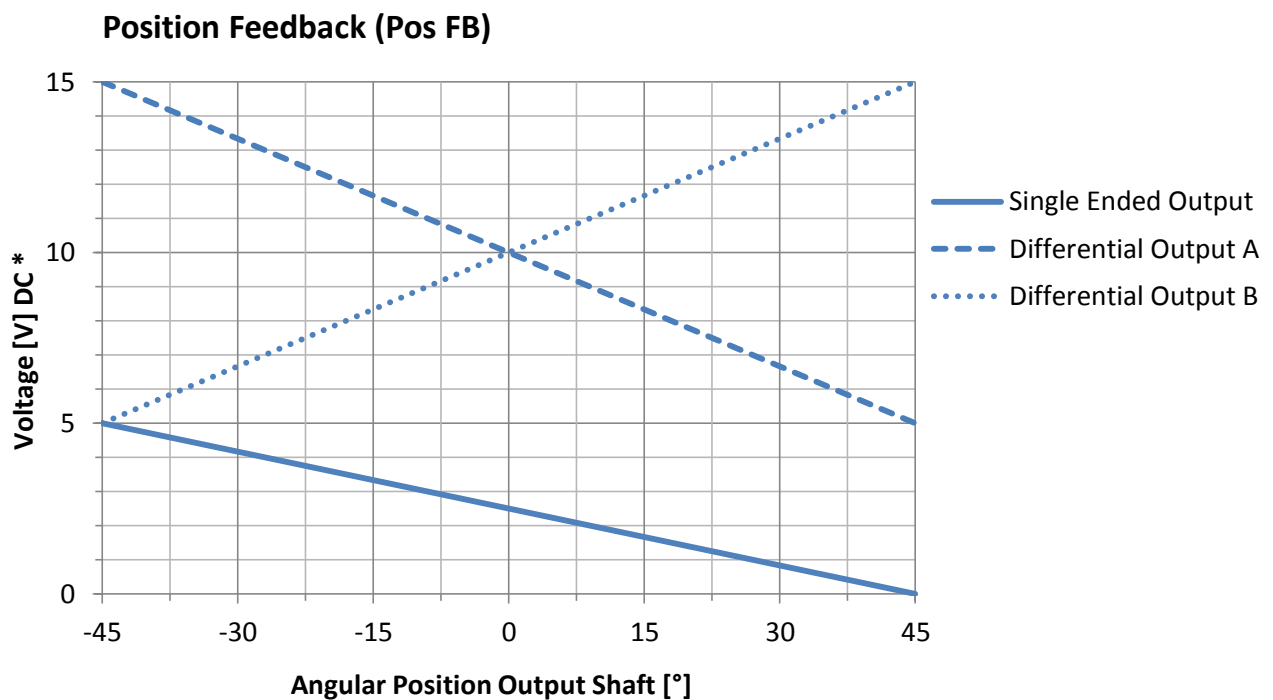
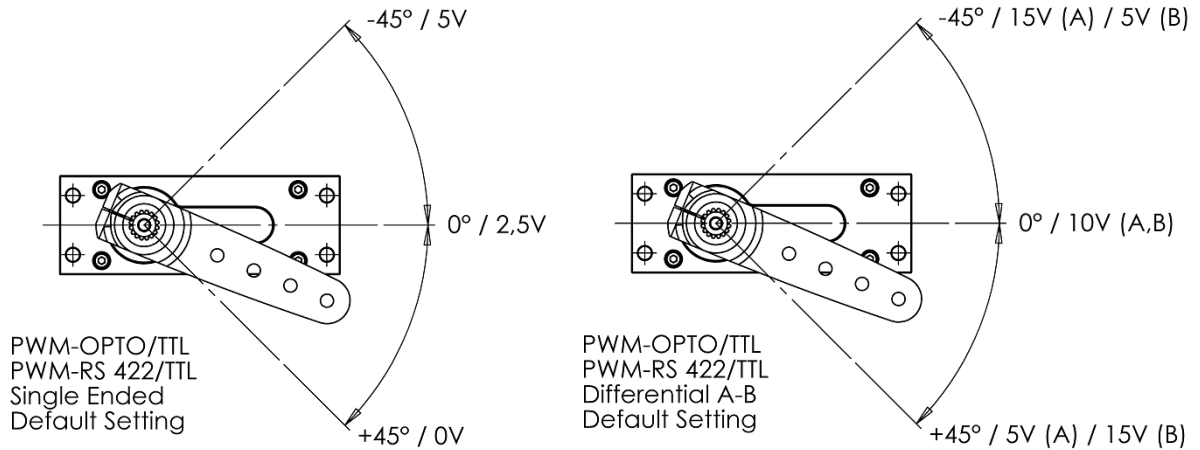
RS 485 (2 and 4 wire), RS 485 Redundant	DA 36-LP-30- 4224.3...	DA 36-LP-30- 4224.4...	DA 36-LP-30- 4224.5...
Number of Data Bits	8		
Number of Stop Bits	1 or 2		
Parity	None		

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

4.4. Position Feedback Signal (PWM Versions)

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 / Signal Ground (GND).



* Tolerance $\pm 5\%$

Content is subject to change without notice

Revision: A

4.5. Position Feedback Value (RS 485 Versions)

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.

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
Salt Water Resistance	Standard, Case Material
EMI / RFI Shielding	Case Shielding
Motor Type	Brushless DC Motor
Gear Set Material	Hardened Steel
Position Sensor	Contactless
Position Feedback	Standard
RS 485 Communication Interface	Optional
Humidity Sensor	Optional
Temperature Sensor ⁵	Standard , Motor and PCB

5) RS 485-Versions only

6. Dimensions

	DA 36-LP-30-4224...
Case Dimensions	136 mm x 88 mm x 36 mm ± 0.2 mm (5.35 in x 3.46 in x 1.41 in ± 0.008 in)
Weight	840g (29.63oz) $\pm 10\%$

WARNING

DO NOT COMMAND THE SERVO IN THE EXCLUSION ZONE!

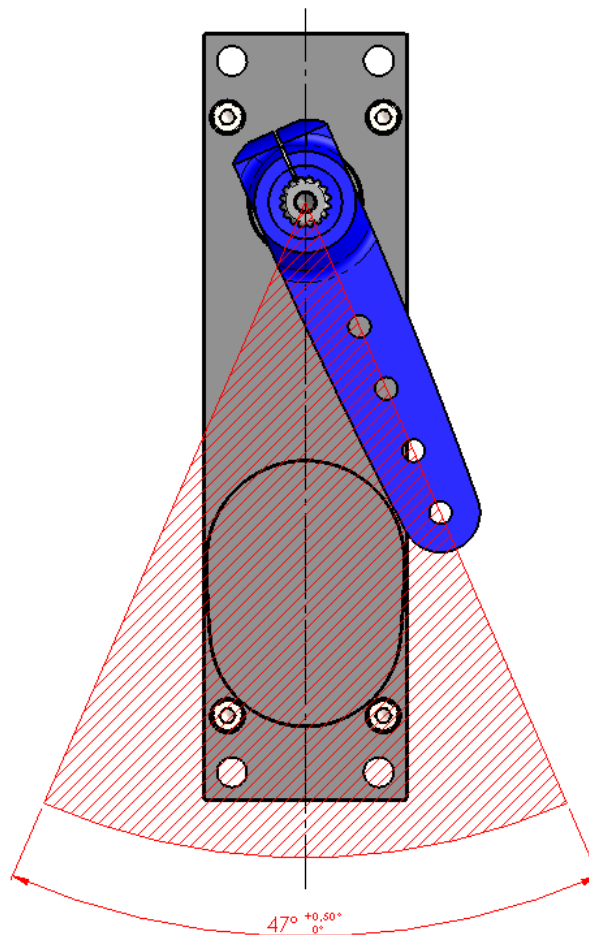
Exclusion zone is shown as red highlighted hachure in image below.

Driving the servo arm in the exclusion zone will cause damage and / or destruction of servo arm, servo assembly and / or gear train!

Initial Operation Procedure:

Dismount the servo arm, power up the servo and command the output shaft in neutral position. Then mount the servo arm on output shaft and verify that the required travel angle range can be achieved without binding.

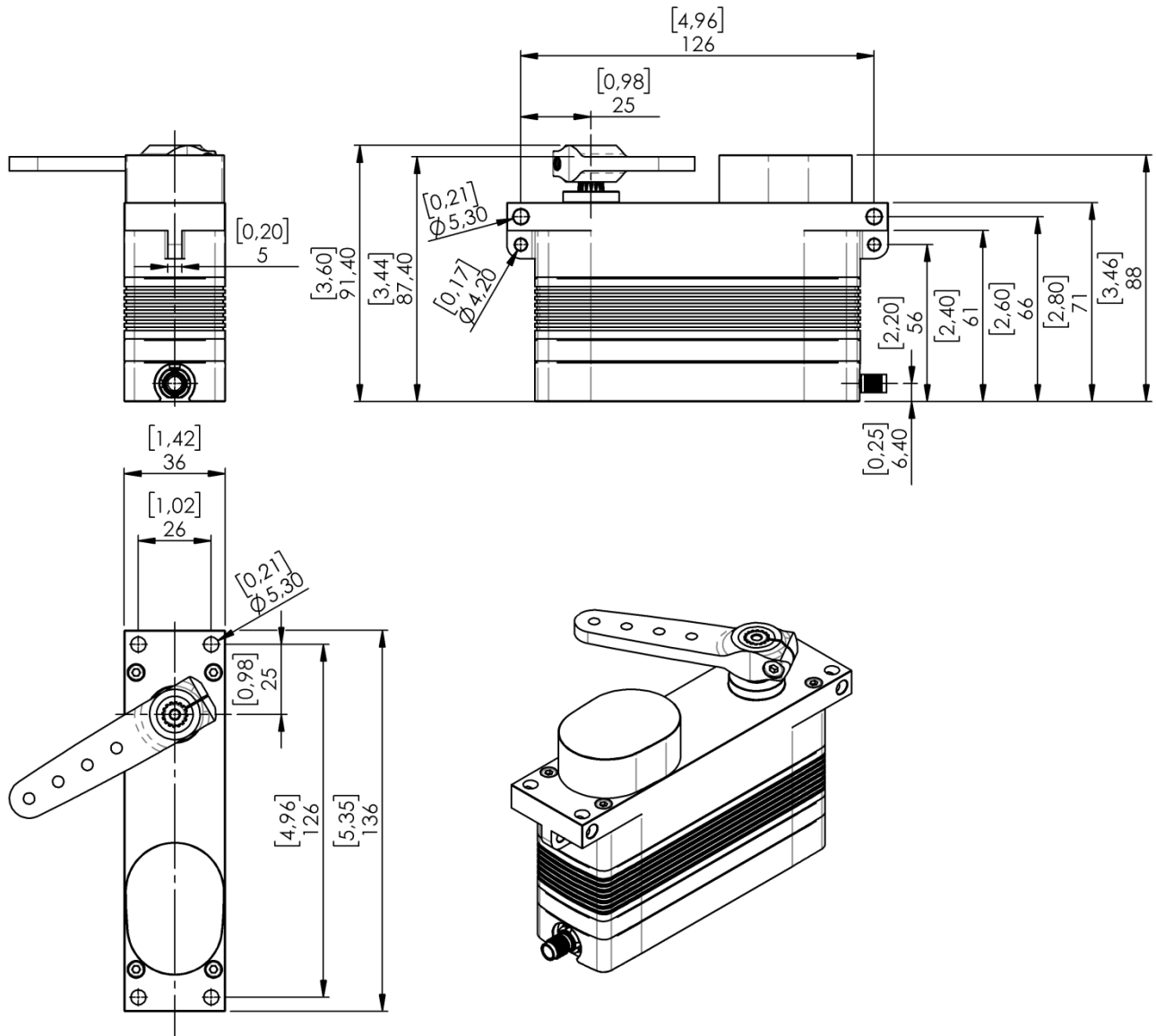
Check the servo settings and commands very carefully to prevent damages or failure!



DA 36 Low Profile Servo
47° Exclusion Zone

6.1. Installation Dimensions

MIL-Specified Electrical Connector
DA 36-LP-30-4224._._.SF



Not to scale

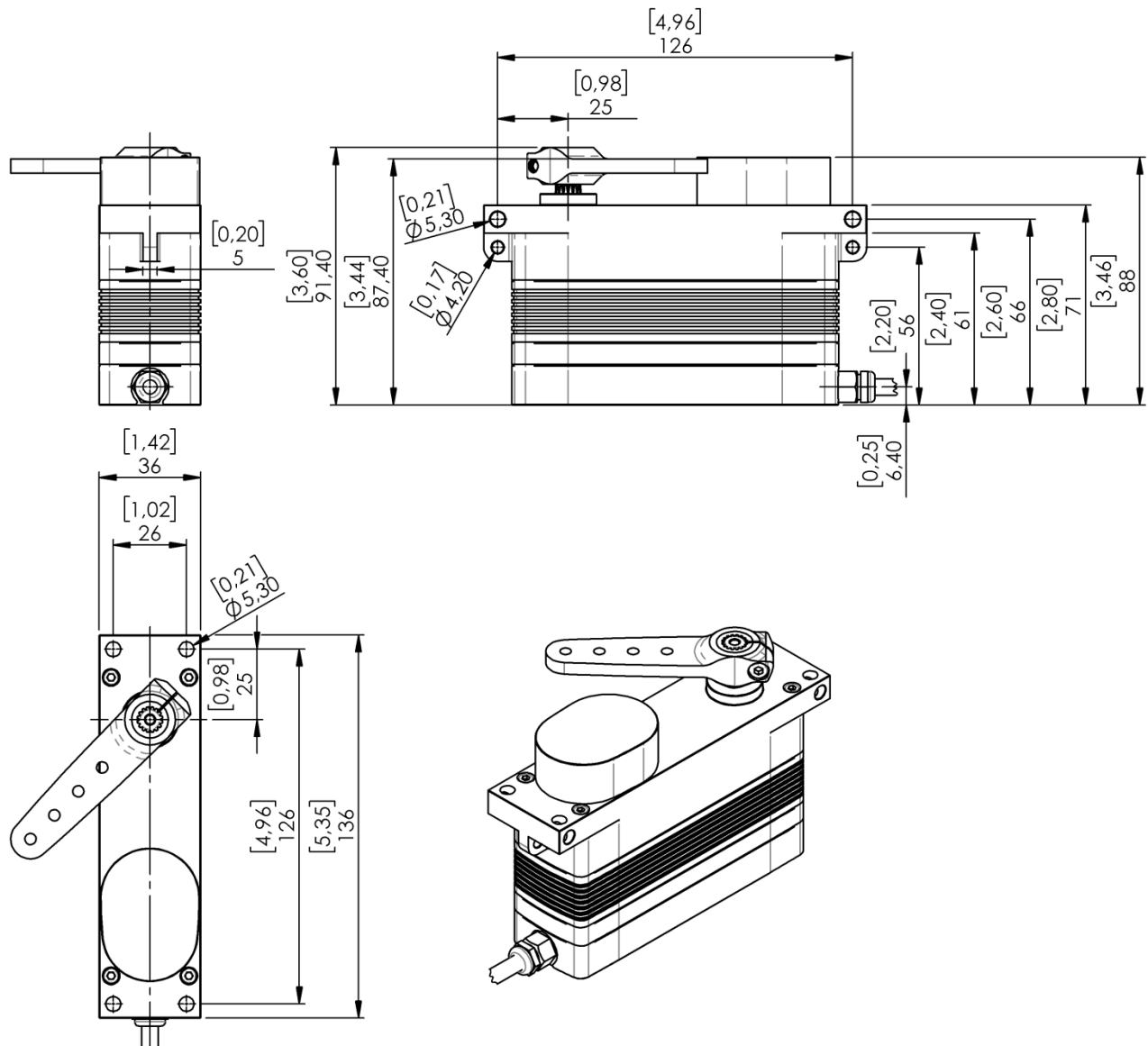
Dimensions [in] , mm

Content is subject to change without notice

Revision: A

6.2. Installation Dimensions

Cable Gland with Shielded Cable
DA 36-LP-30-4224._._.SC2000



Not to scale

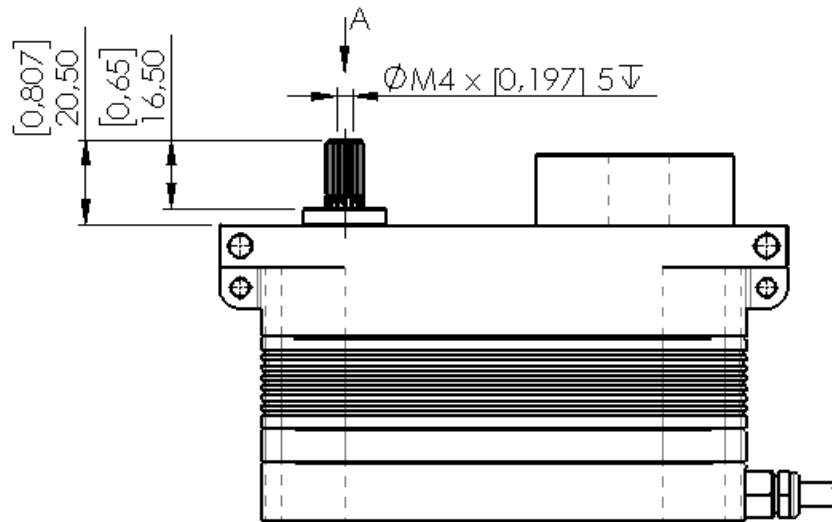
Dimensions [in] , mm

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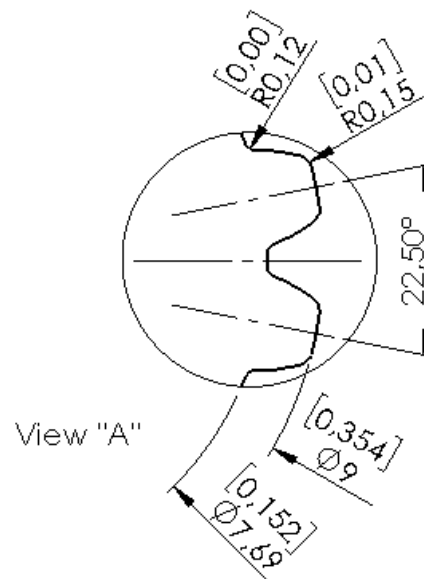
Revision: A

6.3. Output Shaft Spline

Valid for all Interface Versions
DA 36-LP-30-4224. _._



Output Shaft Spline:
similar to DIN 867



Not to scale

Dimensions [in] , mm

Content is subject to change without notice

Revision: A

7. Electrical Connection Options

PWM-OPTO Interface

Integrated Connector

Item # DA 36.LP.30.4224.1._SF

Standard Connector	
Manufacturer	Glenair Inc.
Type	Superfly # 881-004RA-H10W-M100J7
Mating	881-001PB-H10W-M200J5-24 881-006PB-H10W-M200J5-36

PWM-OPTO Pin Assignment		
1	PWM (AO)	Command Signal, Anode Optocoupler
2	PWM (CO)	Command Signal, Cathode Optocoupler
3	Diff FB A	Differential Position Feedback Signal, Output A
4	to Pin 7	Connect to Pin 7 (Supply Ground)
5	Case GND	Case Ground
6	+V DC	Supply Voltage
7	GND	Supply Ground, Signal Ground
8	Pos FB	Single Ended Position Feedback Signal
9	Diff FB B	Differential Position Feedback Signal, Output B
10	NC	Do not connect

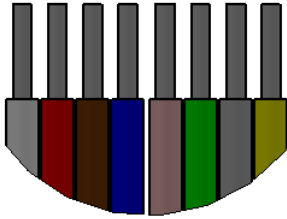
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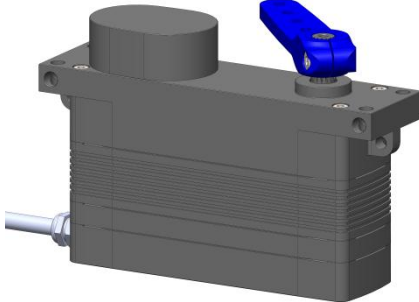
Access to the actuator parameters is possible via the TTL-PWM-Interface only.
Programming Tool # 985.4 required.

PWM-OPTO Interface

Shielded Connecting Cable

Item # DA 36.LP.30.4224.1._.SC2000

 WTE RED BRN BLU PINK GRN GRY YEL	Cable Gland with Shielded Cable		
	Cable Manufacturer		Lapp Kabel
	Type		UNITRONIC LIYCY <TP> 4x2x0,14

	PWM-OPTO Pin Assignment		
	WTE	PWM (AO)	Command Signal, Anode Optocoupler
	BRN	PWM (CO)	Command Signal, Cathode Optocoupler
	YEL	Diff FB A	Differential Position Feedback Signal, Output A
	PINK	to Pin 7	Connect to Pin 7 (Supply Ground)
	SHIELD	Case GND	Case Ground
	RED	+V DC	Supply Voltage
	BLU	GND	Supply Ground, Signal Ground
	GRY	Pos FB	Single Ended Position Feedback Signal
	GRN	Diff FB B	Differential Position Feedback Signal, Output B

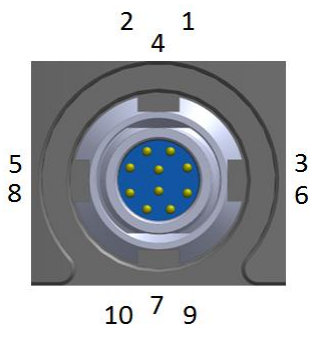
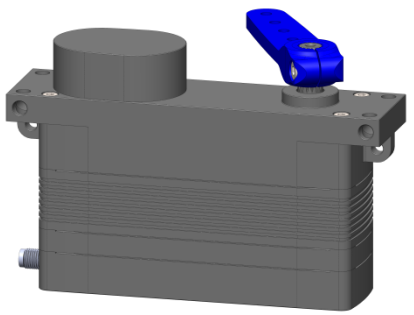
NOTE:

Access to the actuator parameters is possible via the TTL-PWM-Interface only.
Programming Tool # 985.4 required.

PWM-TTL Interface

Integrated Connector

Item # DA 36.LP.30.4224.1._.SF

	Standard Connector	
	Manufacturer	Glenair Inc.
	Type	Superfly # 881-004RA-H10W-M100J7
	Mating	881-001PB-H10W-M200J5-24 881-006PB-H10W-M200J5-36
	PWM-TTL Pin Assignment	
	1	NC Do not connect
	2	NC Do not connect
	3	Diff FB A Differential Position Feedback Signal, Output A
	4	PWM Command Signal
	5	Case GND Case Ground
	6	+V DC Supply Voltage
	7	GND Supply Ground, Signal Ground
	8	Pos FB Single Ended Position Feedback Signal
	9	Diff FB B Differential Position Feedback Signal, Output B
	10	NC Do not connect

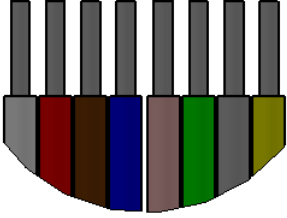
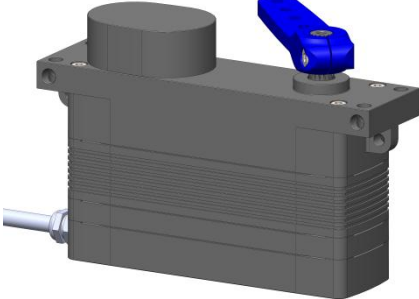
NOTE:

Access to the actuator parameters is possible via the TTL-PWM-Interface only.
Programming Tool # 985.4 required.

PWM-TTL Interface

Shielded Connecting Cable

Item # DA 36.LP.30.4224.1_.SC2000

 WTE RED BRN BLU PINK GRN GRY YEL	Cable Gland with Shielded Cable		
	Cable Manufacturer		Lapp Kabel
	Type		UNITRONIC LIYCY <TP> 4x2x0,14
	PWM-TTL Pin Assignment		
	WTE	NC	Do not connect
	BRN	NC	Do not connect
	YEL	Diff FB A	Differential Position Feedback Signal, Output A
	PINK	PWM	Command Signal
	SHIELD	Case GND	Case Ground
	RED	+V DC	Supply Voltage
	BLU	GND	Supply Ground, Signal Ground
	GRY	Pos FB	Single Ended Position Feedback Signal
	GRN	Diff FB B	Differential Position Feedback Signal, Output B

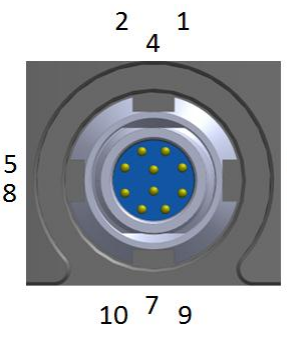
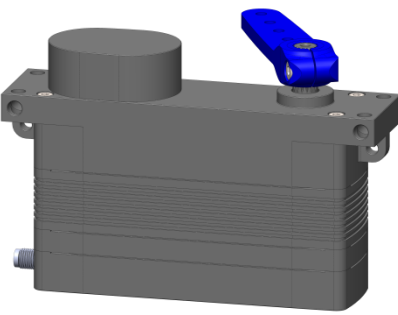
NOTE:

Access to the actuator parameters is possible via the TTL-PWM-Interface only.
Programming Tool # 985.4 required.

PWM-RS 422/TTL Interface

Integrated Connector

Item # DA 36.LP.30.4224.2._.SF

	Standard Connector	
	Manufacturer	Glenair Inc.
	Type	Superfly # 881-004RA-H10W-M100J7
	Mating	881-001PB-H10W-M200J5-24 881-006PB-H10W-M200J5-36
	PWM-RS 422/TTL Pin Assignment	
	1	RS 422 / PWM Non-Inverted RS 422-Input
	2	RS 422 / PWM Inverted RS 422-Input
	3	Diff FB A Differential Position Feedback Signal, Output A
	4	TTL / PWM Command and Parameter Input
	5	Case GND Case Ground
	6	+V DC Supply Voltage
	7	GND Supply Ground, Signal Ground
	8	Pos FB Single Ended Position Feedback Signal
	9	Diff FB B Differential Position Feedback Signal, Output B
	10	NC Do not connect

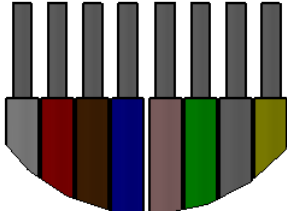
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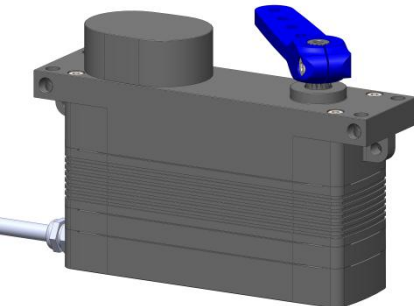
Access to the actuator parameters is possible via the TTL-PWM-Interface only.
Programming Tool # 985.4 required.

PWM-RS 422/TTL Interface

Shielded Connecting Cable

Item # DA 36.LP.30.4224.2_.SC2000

 WTE RED BRN BLU PINK GRN GRY YEL	Cable Gland with Shielded Cable		
	Cable Manufacturer		Lapp Kabel
	Type		UNITRONIC LIYCY <TP> 4x2x0,14

	PWM-RS 422/TTL Pin Assignment		
	WTE	RS 422 / PWM	Non-Inverted RS 422-Input
	BRN	RS 422 / PWM	Inverted RS 422-Input
	YEL	Diff FB A	Differential Position Feedback Signal, Output A
	PINK	TTL / PWM	Command and Parameter Input
	SHIELD	Case GND	Case Ground
	RED	+V DC	Supply Voltage
	BLU	GND	Supply Ground, Signal Ground
	GRY	Pos FB	Single Ended Position Feedback Signal
	GRN	Diff FB B	Differential Position Feedback Signal, Output B

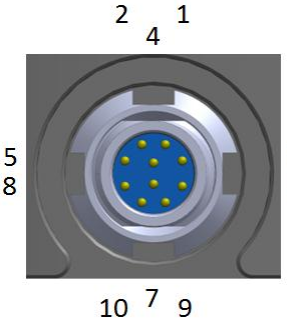
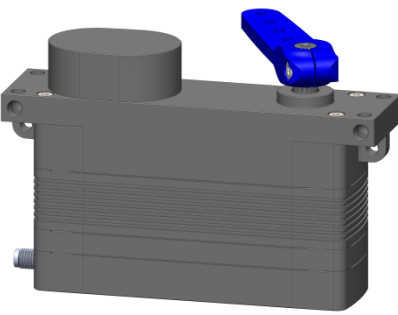
NOTE:

Access to the actuator parameters is possible via the TTL-PWM-Interface only.
Programming Tool # 985.4 required.

RS 485 Interface (2-wire)

Integrated Connector

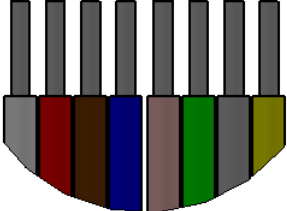
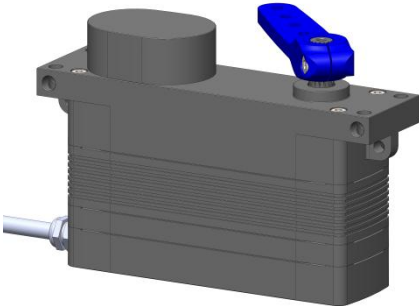
Item # DA 36.LP.30.4224.3._.SF

	Standard Connector		
	RS 485 (2-wire) Pin Assignment		
	1	RS 485 A	Non-Inverted Input/Output
	2	RS 485 B	Inverted Input/Output
	3	NC	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	NC	Do not connect
	10	NC	Do not connect

RS 485 Interface (2-wire)

Shielded Connecting Cable

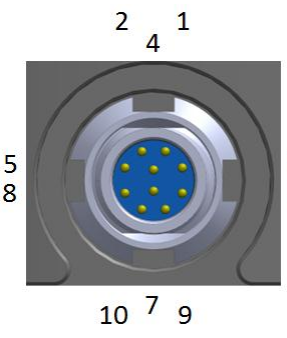
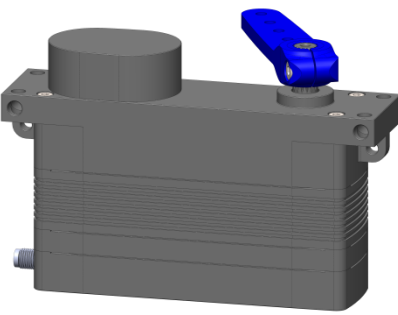
Item # DA 36.LP.30.4224.3_.SC2000

 WTE RED BRN BLU PINK GRN GRY YEL	Cable Gland with Shielded Cable		
	Cable Manufacturer		Lapp Kabel
	Type		UNITRONIC LIYCY <TP> 4x2x0,14
	RS 485 (2-wire) Pin Assignment		
	WTE	RS 485 A	Non-Inverted Input/Output
	BRN	RS 485 B	Inverted Input/Output
	YEL	NC	Do not connect
	PINK	+V DC (2)	Supply Voltage, Secondary
	SHIELD	Case GND	Case Ground
	RED	+V DC (1)	Supply Voltage, Primary
	BLU	GND (1)	Supply Ground, Signal Ground, Primary
	GRY	GND (2)	Supply Ground, Signal Ground, Secondary
	GRN	NC	Do not connect

RS 485 Redundant Interface

Integrated Connector

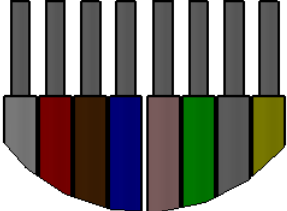
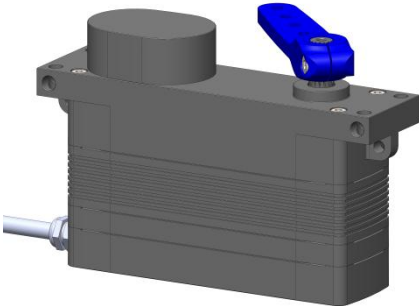
Item # DA 36.LP.30.4224.4._.SF

	Standard Connector	
	Manufacturer	Glenair Inc.
	Type	Superfly # 881-004RA-H10W-M100J7
	Mating	881-001PB-H10W-M200J5-24 881-006PB-H10W-M200J5-36
	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
	10	NC Do not connect

RS 485 Redundant Interface

Shielded Connecting Cable

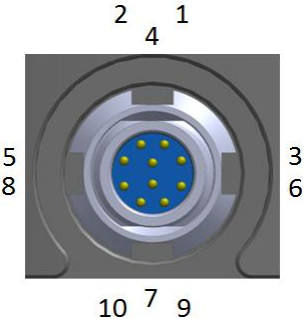
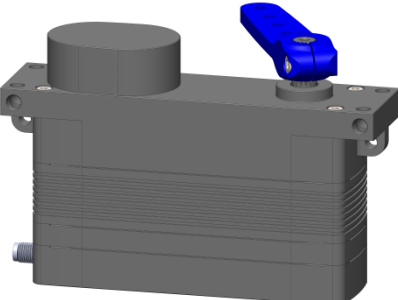
Item # DA 36.LP.30.4224.4._.SC2000

 WTE RED BRN BLU PINK GRN GRY YEL	Cable Gland with Shielded Cable		
	Cable Manufacturer		Lapp Kabel
	Type		
	UNITRONIC LIYCY <TP> 4x2x0,14		
	RS 485 Redundant Pin Assignment		
	WTE	RS 485 A (1)	Interface 1, Non-Inverted Input/Output
	BRN	RS 485 B (1)	Interface 1, Inverted Input/Output
	YEL	RS 485 A (2)	Interface 2, Non-Inverted Input/Output
	PINK	+V DC (2)	Supply Voltage, Secondary
	SHIELD	Case GND	Case Ground
	RED	+V DC (1)	Supply Voltage, Primary
	BLU	GND (1)	Supply Ground, Signal Ground, Primary
	GRY	GND (2)	Supply Ground, Signal Ground, Secondary
	GRN	RS 485 B (2)	Interface 2, Inverted Input/Output

RS 485 Interface (4-wire)

Integrated Connector

Item # DA 36.LP.30.4224.5._.SF

	Standard Connector		
	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
	10	NC	Do not connect

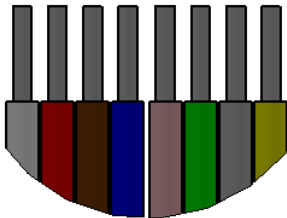
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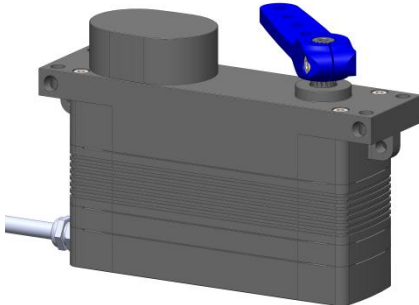
Revision: A

RS 485 Interface (4-wire)

Shielded Connecting Cable

Item # DA 36.LP.30.4224.5._.SC2000

 WTE RED BRN BLU PINK GRN GRY YEL	Cable Gland with Shielded Cable		
	Cable Manufacturer		Lapp Kabel
	Type		UNITRONIC LIYCY <TP> 4x2x0,14

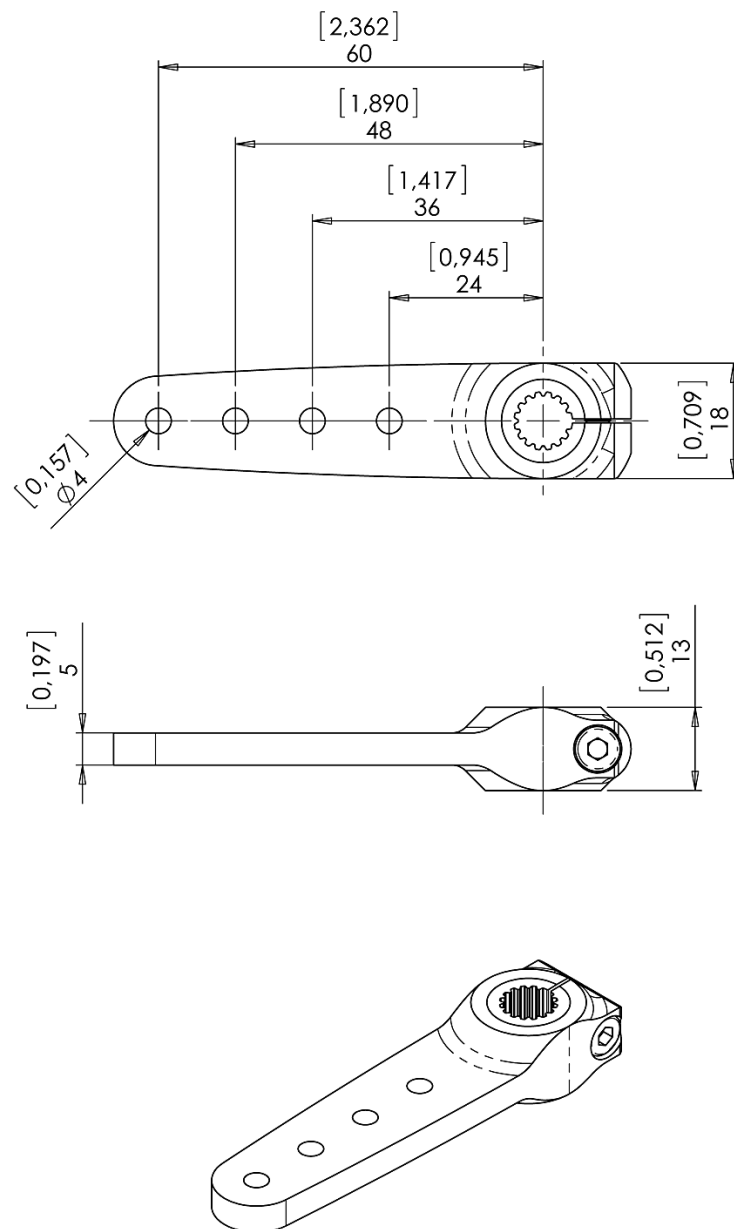
	RS 485 (4-wire) Cable Color Code		
	WTE	RS 485 A (Rx)	Receiver, Non-Inverted, Input
	BRN	RS 485 B (Rx)	Receiver, Inverted, Input
	YEL	RS 485 A (Tx)	Transmitter, Non-Inverted, Output
	PINK	+V DC (2)	Supply Voltage, Secondary
	SHIELD	Case GND	Case Ground
	RED	+V DC (1)	Supply Voltage, Primary
	BLU	GND (1)	Supply Ground, Signal Ground, Primary
	GRY	GND (2)	Supply Ground, Signal Ground, Secondary
	GRN	RS 485 B (Tx)	Transmitter, Inverted, Output

8. Accessories

Item	Item-No.
Aluminum Servo Arm	1941.21
Programming Tool PWM	985.4
Programming Tool RS-485	985.5

8.1. Aluminum Servo Arm

Servo Arm, Single Sided with Spline
1941.20



Not to scale

Dimensions [in] , mm

Content is subject to change without notice

Revision: A

9. Item Number System

DA	36	.	LP	.	30	.	42	24	.	1	.	H	.	SF
Servo Class		Servo Configuration		Supply Voltage		Servo Type		Electrical Connection		Sensor		Interface		
36mm Class		Low Profile LP		30V DC 30		4224		SF MIL spec. Glenair Superfly Connector SC2000 Cable Gland, Shielded Cable 2000mm (79in)		H Humidity X without		1 PWM-OPTO / TTL 2 PWM-RS 422 / TTL 3 RS 485 (2-wire) 4 RS 485 Redundant 5 RS 485 (4-wire)		



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