DA 36 Low Profile
Technical Specification

DA 36-LP-30-4224

Content

Revision: D

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

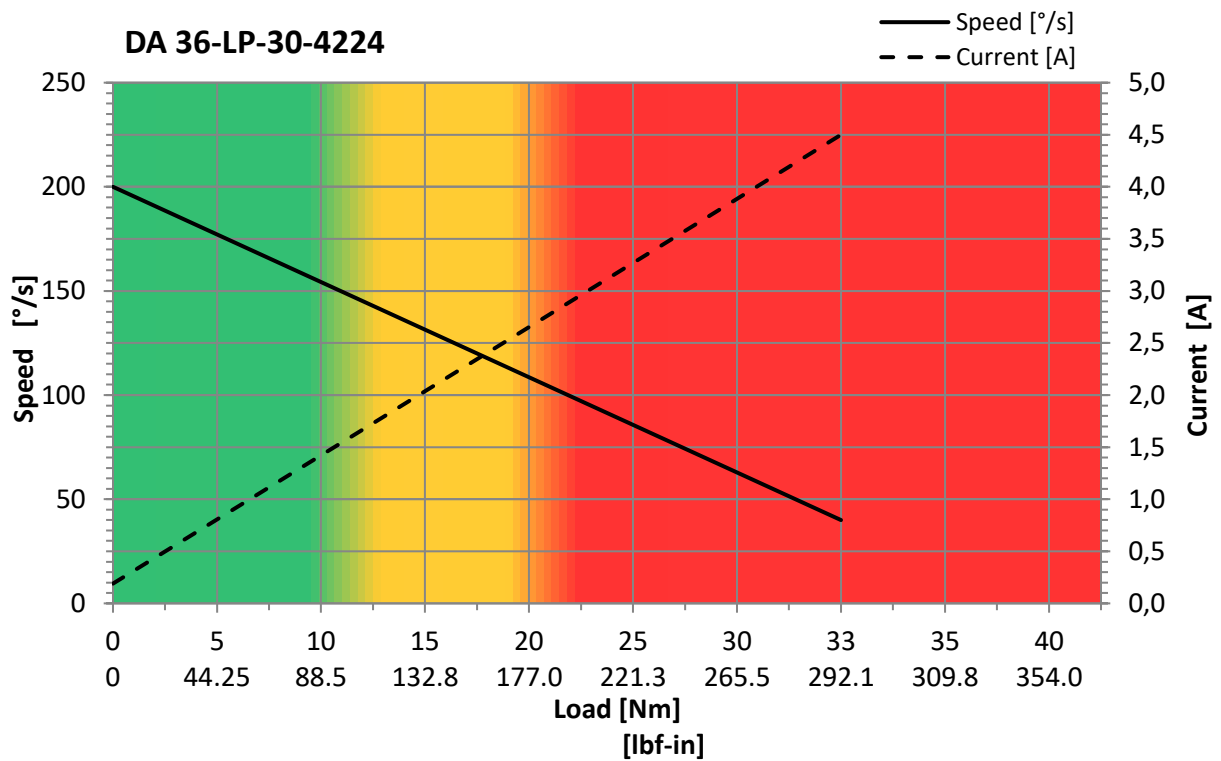|		DA 36-LP-30-4224…
Supply Voltage (rated)		28 V DC
Supply Voltage Range		22 … 32 V DC
Standby Current [1]	at rated voltage	< 0.04 A
Rated Current [1]	at rated voltage	1.6 A
Peak Current [1]	at rated voltage	4.5 A
Rated Torque [1]	at rated speed	11.0 Nm (97.4 lbf-in)
Peak Torque [1]	at rated voltage	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

DA 36-LP-30-4224

Speed [°/s] ——
Current [A] - - -

Operation Mode:

🟩 Continuous	🟨 Short Time <10s , 60s cool down	🟥 Overload <1s , 60s cool down

Revision: D

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	≤ 1.0 µs	

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 ±1.5% bits/s		
Protocol (Documentation available)	6 Byte (incl. 2 byte CRC)		

Revision: D

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).

-45° / 5V

0° / 2,5V

+45° / 0V

PWM-OPTO/TTL
PWM-RS 422/TTL
Single Ended
Default Setting

-45° / 15V (A) / 5V (B)

0° / 10V (A,B)

+45° / 5V (A) / 15V (B)

PWM-OPTO/TTL
PWM-RS 422/TTL
Differential A-B
Default Setting

Position Feedback (Pos FB)

Voltage [V] DC *

Angular Position Output Shaft [°]
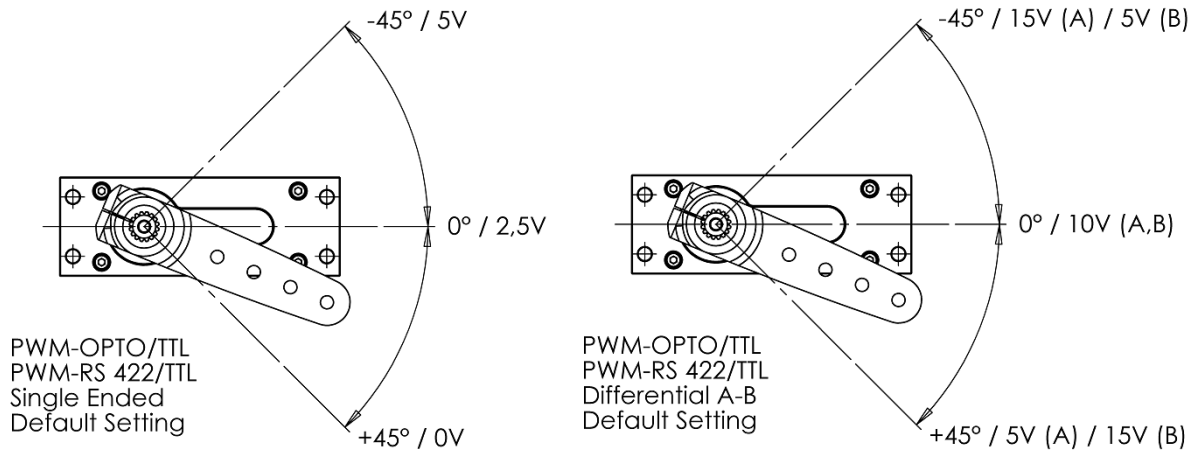
—— Single Ended Output
- - - Differential Output A
······ Differential Output B
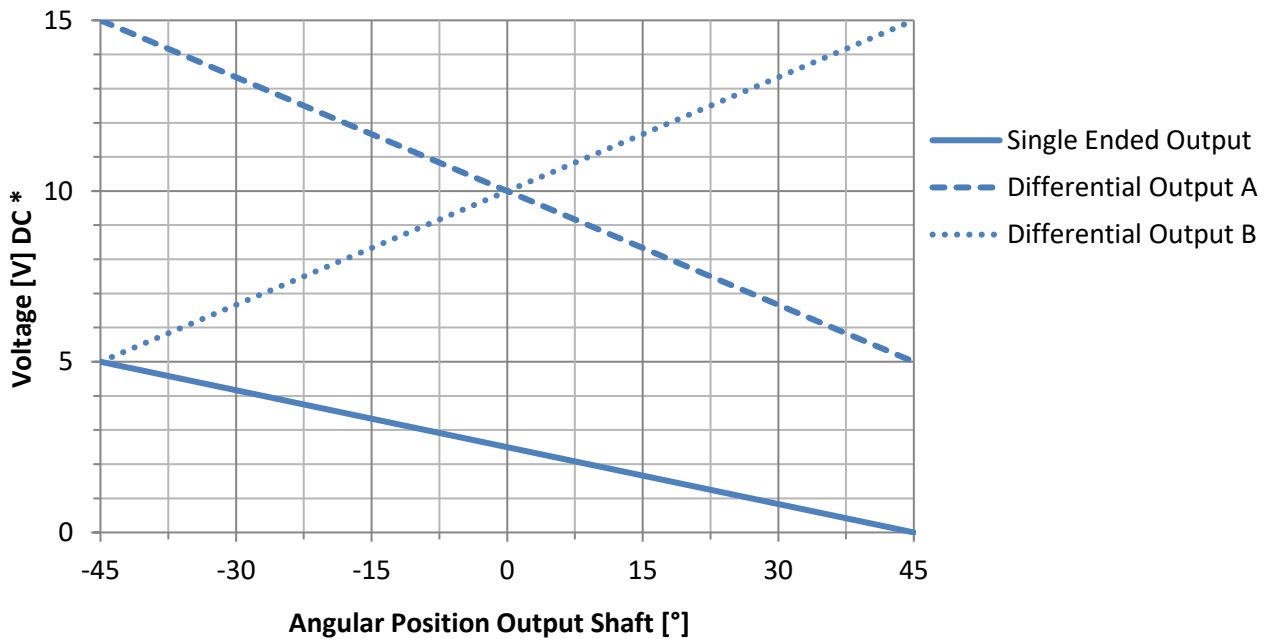
* Tolerance ±5%

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.

Revision: D

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) ±10%

Revision: D

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!
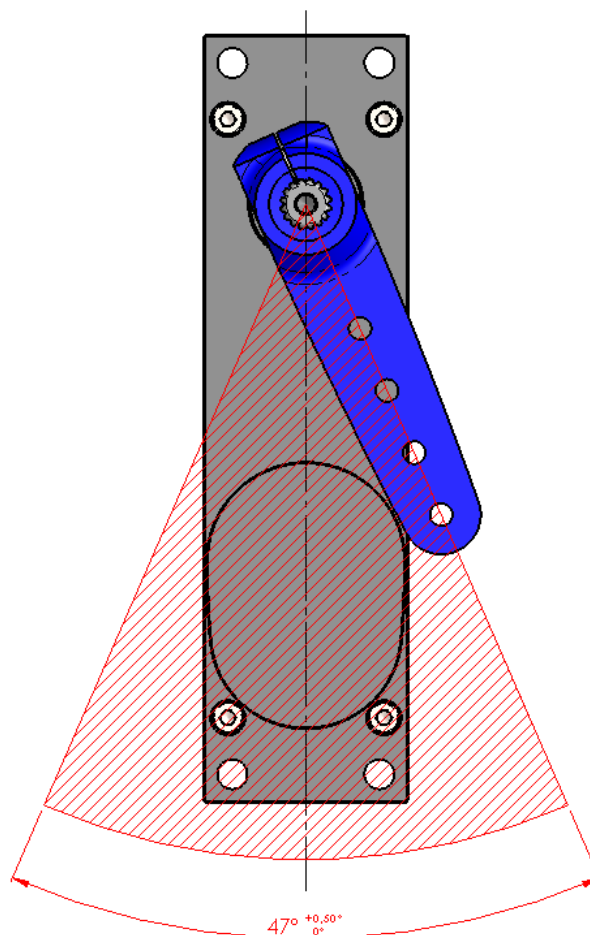
DA 36 Low Profile Servo
47° Exclusion Zone

© Volz Servos GmbH & Co. KG   www.volz-servos.com

6.1. Installation Dimensions

MIL-Specified Electrical Connector
DA 36-LP-30-4224._._.SF
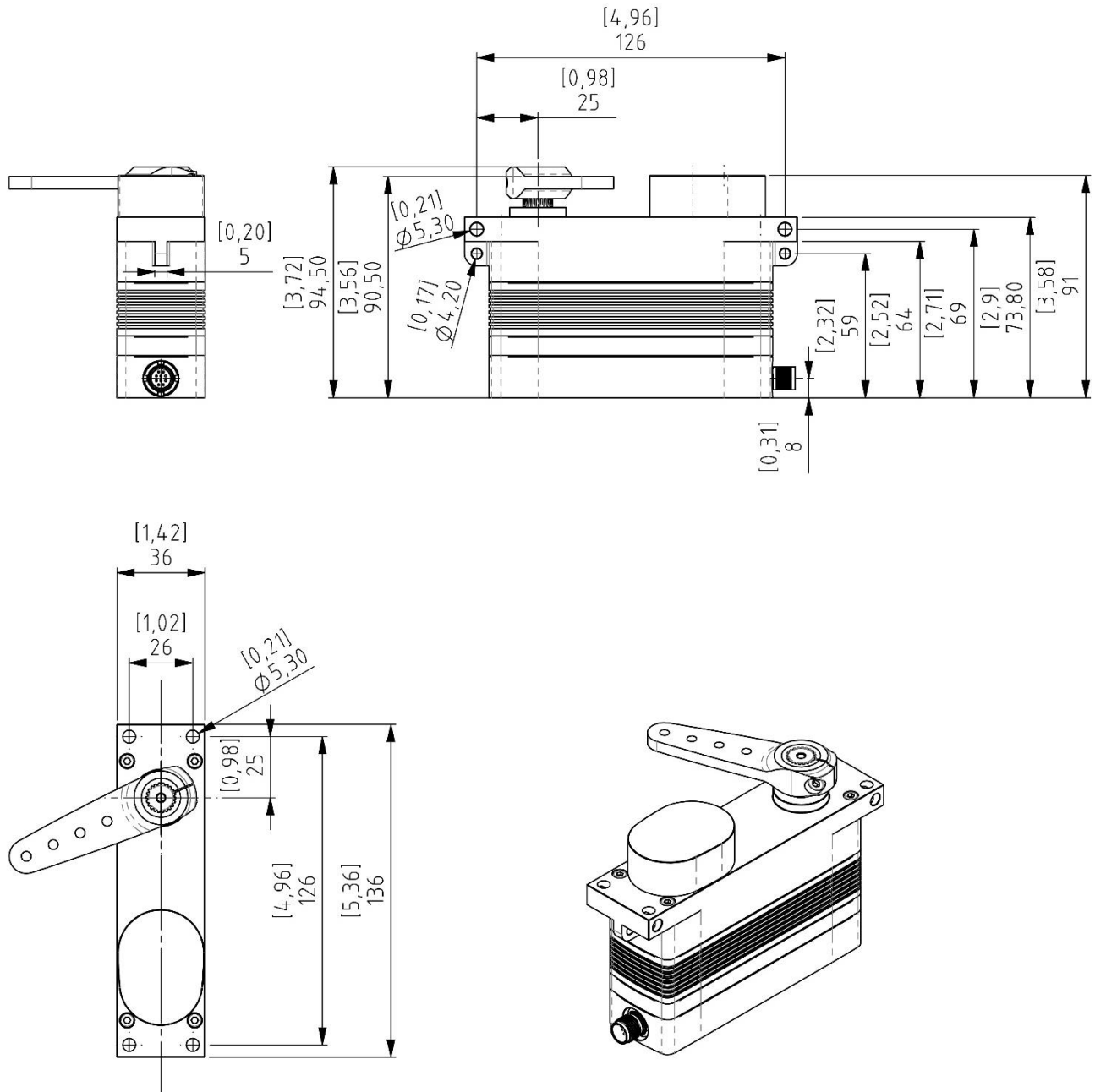
Not to scale   Dimensions [in] , mm

Revision: D

© Volz Servos GmbH & Co. KG   www.volz-servos.com

6.2. Installation Dimensions

Cable Gland with Shielded Cable
DA 36-LP-30-4224._._.SC2000
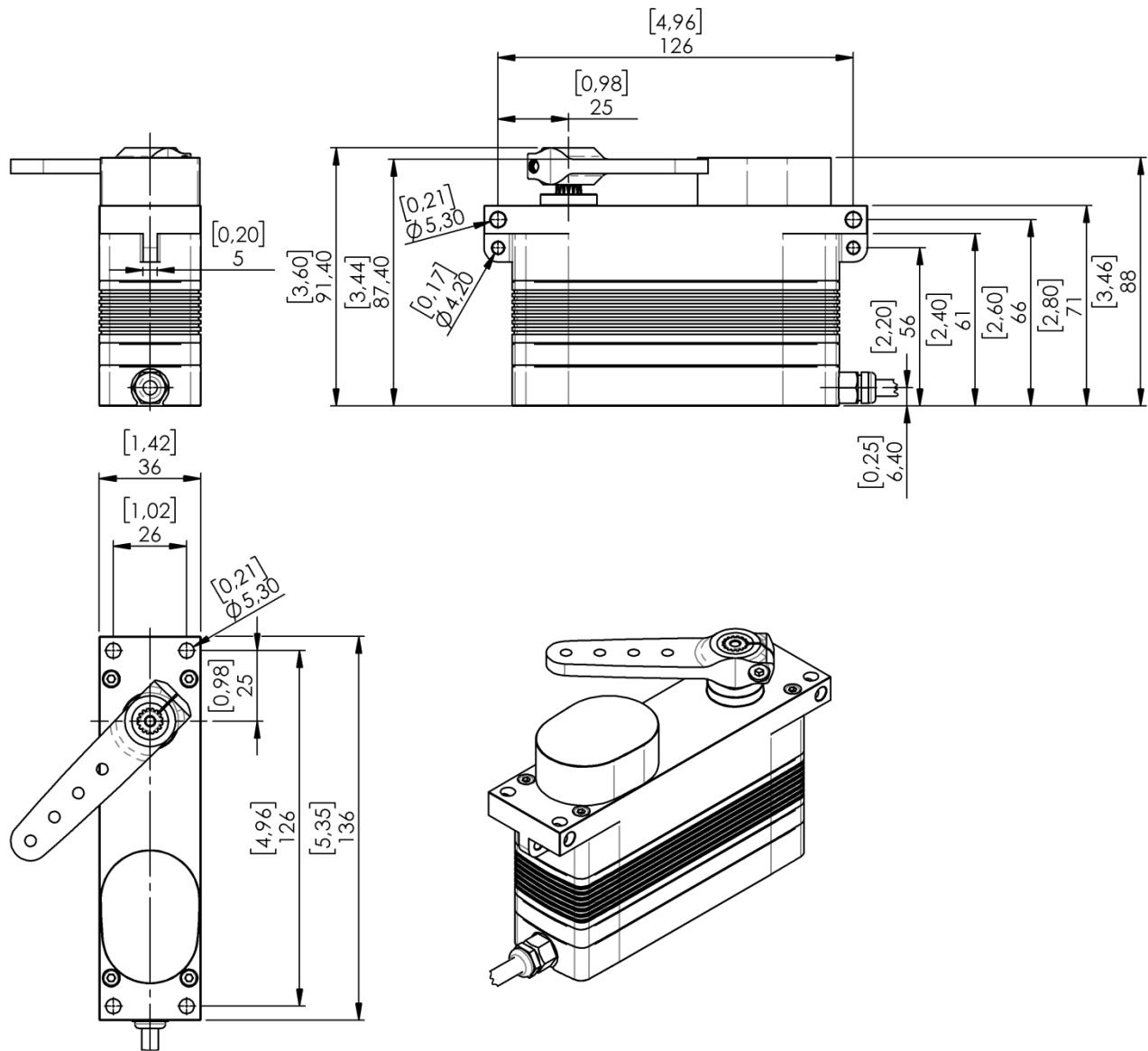
Not to scale   Dimensions [in] , mm

Revision: D

6.3. Output Shaft Spline

Valid for all Interface Versions
DA 36-LP-30-4224._._
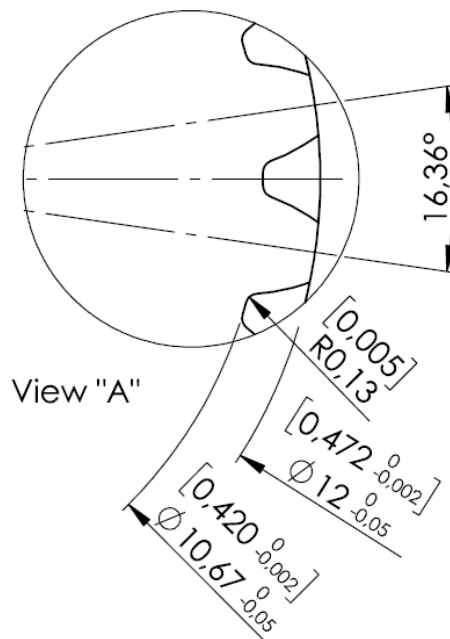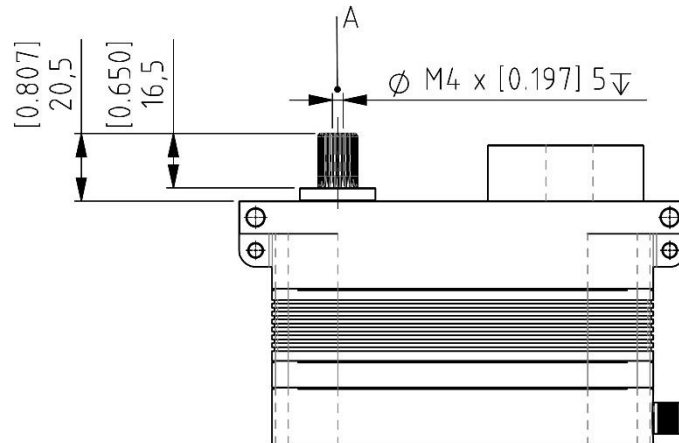
Output Shaft Spline
similar to DIN 867

View "A"

Not to scale

Dimensions [in] , mm

Revision: D

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

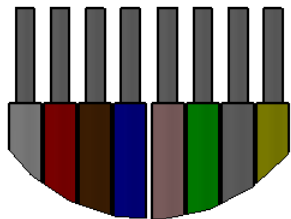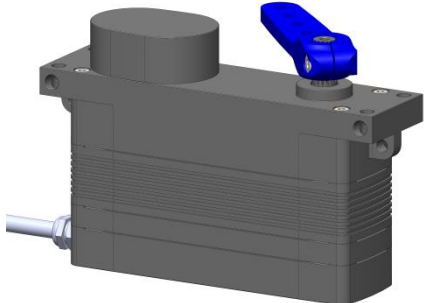| PWM-OPTO Pin Assignment		
1	PWM (AO)	Command Signal, Anode Optocoupler
2	PWM (CO)	Command Signal, Cathode Optocoupler
3	Diff FB A	Differential Position Feedback Signal, Output A
4	to Pin 7	Connect to Pin 7 (Supply Ground)
5	Case GND	Case Ground
6	+V DC	Supply Voltage
7	GND	Supply Ground, Signal Ground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

NOTE:
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**

Cable Gland with Shielded Cable	
Cable Manufacturer	Lapp Kabel
Type	UNITRONIC LIYCY <TP> 4x2x0,14

WTE RED BRN BLU PINK GRN GRY YEL

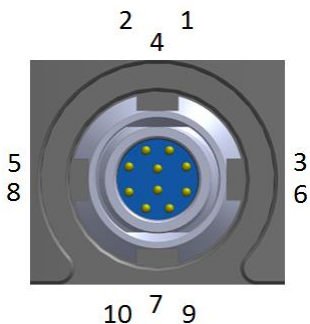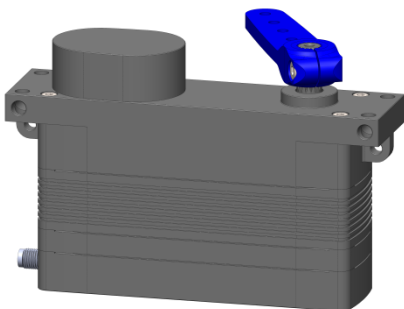| PWM-OPTO Pin Assignment		
WTE	PWM (AO)	Command Signal, Anode Optocoupler
BRN	PWM (CO)	Command Signal, Cathode Optocoupler
YEL	Diff FB A	Differential Position Feedback Signal, Output A
PINK	to Pin 7	Connect to Pin 7 (Supply Ground)
SHIELD	Case GND	Case Ground
RED	+V DC	Supply Voltage
BLU	GND	Supply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

Revision: D

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

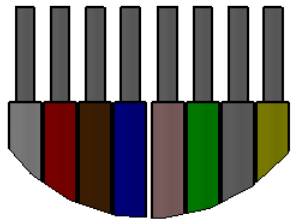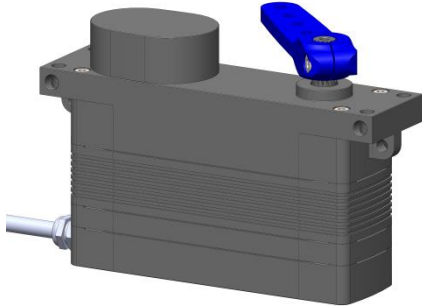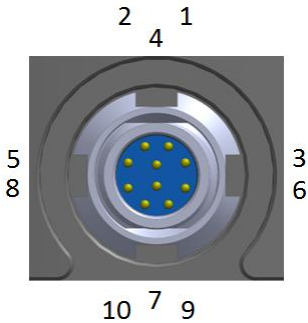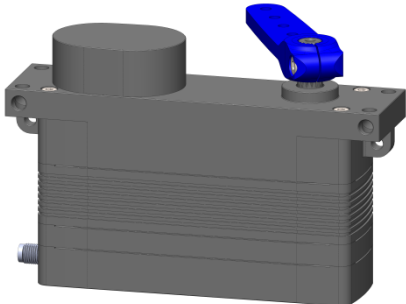| PWM-TTL Pin Assignment		
1	NC	Do not connect
2	NC	Do not connect
3	Diff FB A	Differential Position Feedback Signal, Output A
4	PWM	Command Signal
5	Case GND	Case Ground
6	+V DC	Supply Voltage
7	GND	Supply Ground, Signal Ground
8	Pos FB	Single Ended Position Feedback Signal
9	Diff FB B	Differential 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**

Cable Gland with Shielded Cable	
WTE RED BRN BLU PINK GRN GRY YEL	
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.

Content is subject to change without notice

Revision: D

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

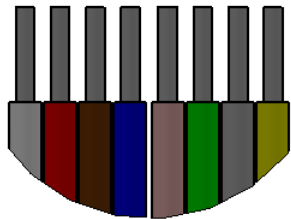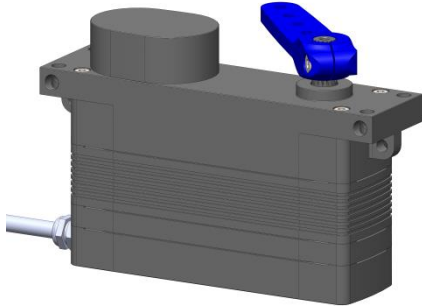| PWM-RS 422/TTL Pin Assignment		
1	RS 422 / PWM	Non-Inverted RS 422-Input
2	RS 422 / PWM	Inverted RS 422-Input
3	Diff FB A	Differential Position Feedback Signal, Output A
4	TTL / PWM	Command and Parameter Input
5	Case GND	Case Ground
6	+V DC	Supply Voltage
7	GND	Supply Ground, Signal Ground
8	Pos FB	Single Ended Position Feedback Signal
9	Diff FB B	Differential Position Feedback Signal, Output B
10	NC	Do not connect

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

Revision: D

PWM-RS 422/TTL Interface

Shielded Connecting Cable   **Item # DA 36.LP.30.4224.2._.SC2000**

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

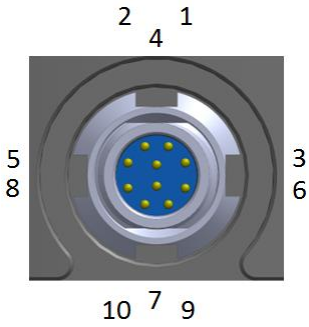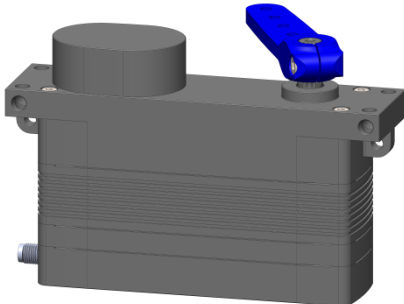|	PWM-RS 422/TTL Pin Assignment	
WTE	RS 422 / PWM	Non-Inverted RS 422-Input
BRN	RS 422 / PWM	Inverted RS 422-Input
YEL	Diff FB A	Differential Position Feedback Signal, Output A
PINK	TTL / PWM	Command and Parameter Input
SHIELD	Case GND	Case Ground
RED	+V DC	Supply Voltage
BLU	GND	Supply Ground, Signal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

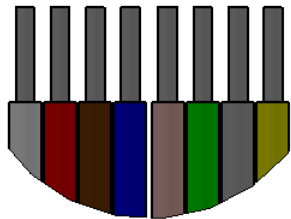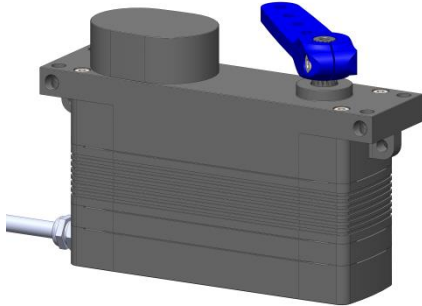Revision: D

RS 485 Interface (2-wire)

Integrated Connector   **Item # DA 36.LP.30.4224.3._.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 (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

Revision: D

RS 485 Interface (2-wire)
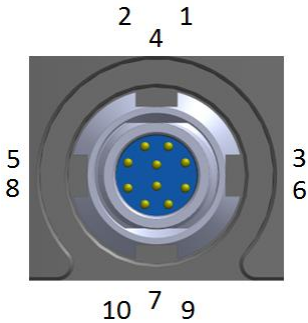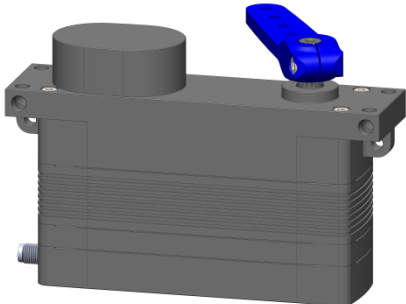
Shielded Connecting Cable   **Item # DA 36.LP.30.4224.3._.SC2000**

Cable Gland with Shielded Cable	
Cable Manufacturer	Lapp Kabel
Type	UNITRONIC LIYCY <TP> 4x2x0,14

WTE RED BRN BLU PINK GRN GRY YEL

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

Revision: D

RS 485 Redundant Interface
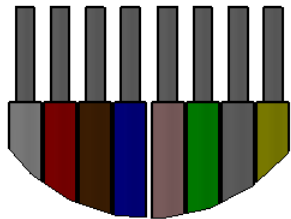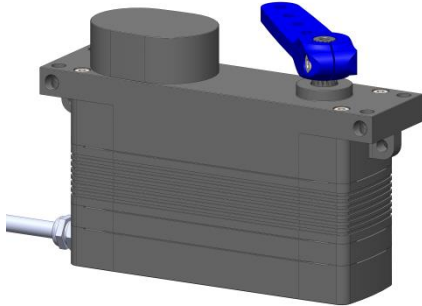
Integrated Connector   **Item # DA 36.LP.30.4224.4._.SF**

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

Revision: D

RS 485 Redundant Interface
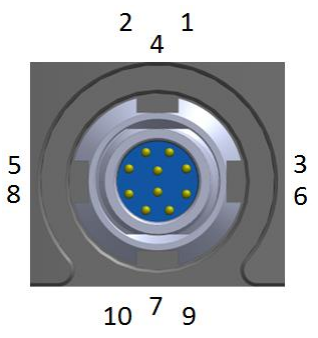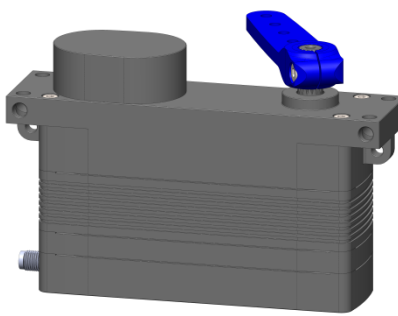
Shielded Connecting Cable   **Item # DA 36.LP.30.4224.4._.SC2000**

Cable Gland with Shielded Cable	
Cable Manufacturer	Lapp Kabel
Type	UNITRONIC LIYCY <TP> 4x2x0,14

WTE RED BRN BLU PINK GRN GRY YEL

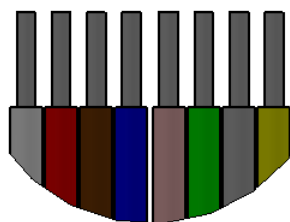| RS 485 Redundant Pin Assignment		
WTE	RS 485 A (1)	Interface 1, Non-Inverted Input/Output
BRN	RS 485 B (1)	Interface 1, Inverted Input/Output
YEL	RS 485 A (2)	Interface 2, Non-Inverted Input/Output
PINK	+V DC (2)	Supply Voltage, Secondary
SHIELD	Case GND	Case Ground
RED	+V DC (1)	Supply Voltage, Primary
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)

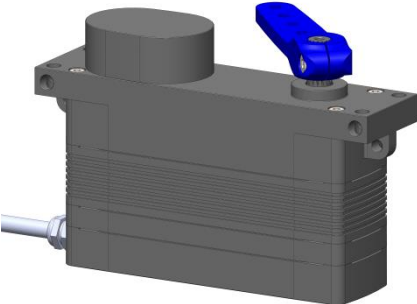**Integrated Connector**   **Item # DA 36.LP.30.4224.5._.SF**

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

	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

RS 485 Interface (4-wire)

Shielded Connecting Cable   **Item # DA 36.LP.30.4224.5._.SC2000**

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

Content is subject to change without notice

Revision: D

8. Accessories

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

© Volz Servos GmbH & Co. KG   www.volz-servos.com

8.1. Aluminum Servo Arm

Servo Arm, Single Sided with Spline
1941.21
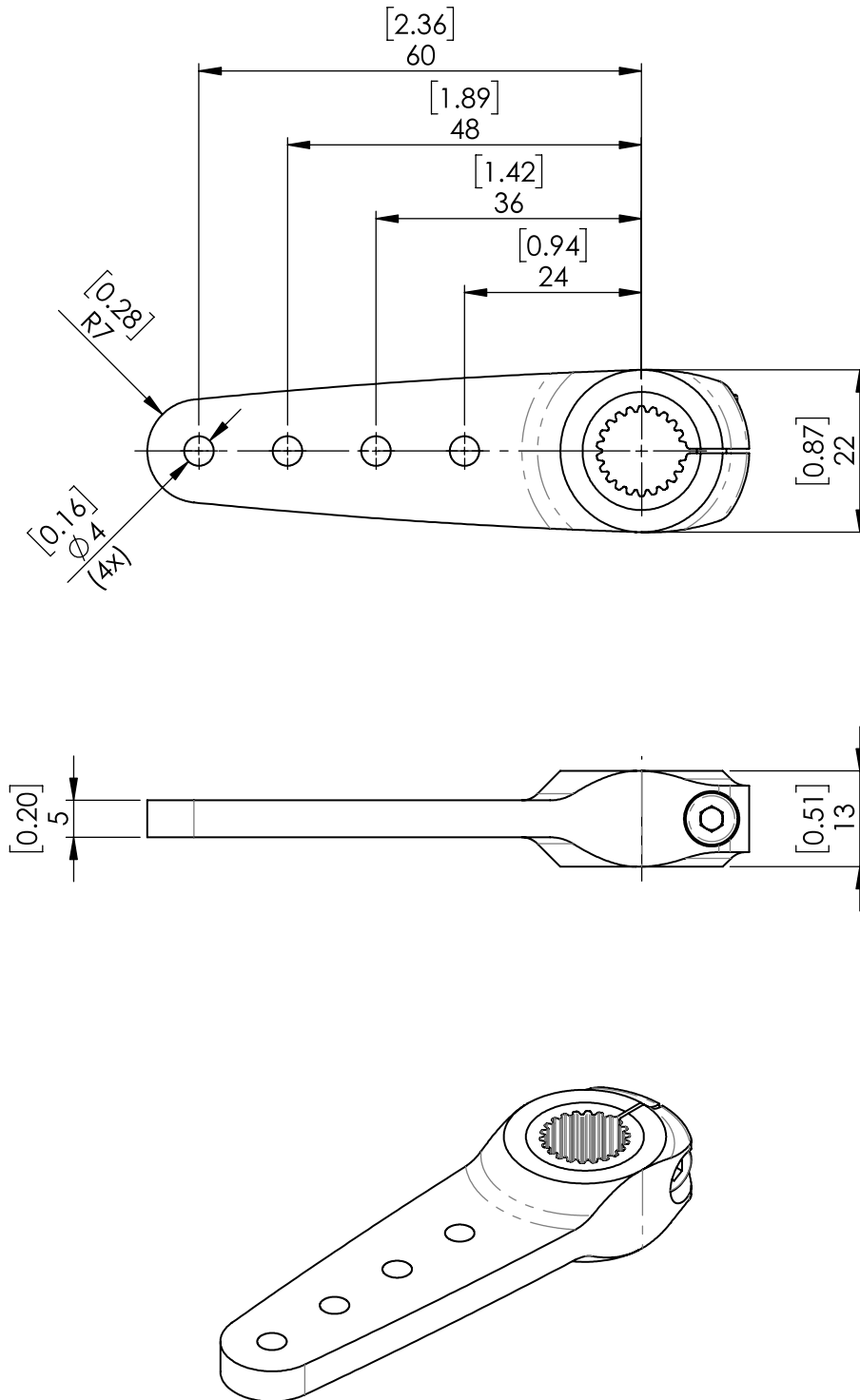
Not to scale

Dimensions [in] , mm

Revision: D

Volz Servos GmbH & Co. KG
Heinrich-Krumm-Straße 5
63065 Offenbach
Germany
Tel. +49-69-985580-0
Fax +49-69-985580-40

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

Revision: D