

Data Sheet
ROTAX® Rxvp 28-6T0.04

Edition 24. May 2024

Ultra-compact rotary axis
ROTAX® Rxvp = vacuum pressure



Highlights

Resolution 64'000Inc per revolution, encoder directly on hollow shaft

360° endless rotation repeatability
 $\pm 0.006^\circ$ / ± 20 arcsec

Running accuracy <10um

Direct mounting to ELAX® Ex Linear Motor Slide

Vacuum/Compressed air tube up to 6bar

Double bearing allows for axial force up to 180N (40lbf)

One-cable connection to XENAX®

Torque limitation and torque monitoring with XENAX® servo controller

General

This ultra-compact rotary axis with vacuum gripper picks parts within a typical weight range of 1mg up to 500g (*1.1lbs*). With the standard internal screw thread of M5, a lot of different commercially available vacuum grippers are applicable. This unit is the perfect fit for the ELAX® electric slide or for LINAX® linear motor axis.

The high precision rotary drive runs endless 360° with a resolution of 64'000 Inc/rev. They can be assembled in a grid of 30mm (*1.18"*) next to each other. Opposing each other, the minimal distance of the ROTAX® shafts is also 30mm (*1.18"*). This saves space and applications can be built more compact.

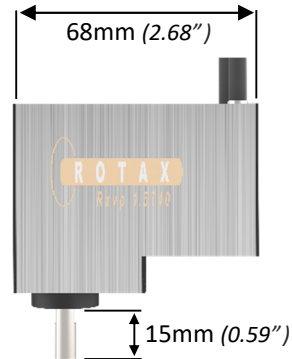
Alois Jenny
Jenny Science AG

Content

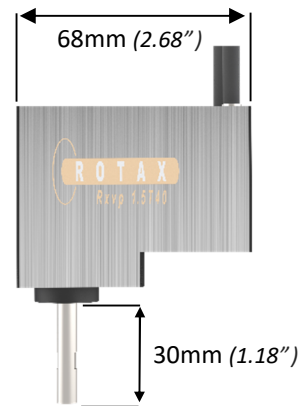
1 Type Overview ROTAX® Rxvp	4
2 Dimension ROTAX® Rxvp 28-6T0.04	5
2.1 Installation for ELAX® without weight Comp. 68mm	5
2.2 Installation for ELAX® with weight Comp. 97.5mm	6
3 Modular System	7
3.1 Mounting to ELAX® Ex front flange	7
3.2 Mounting to ELAX® Y-Z composition	7
3.3 Mounting to ELAX® with GEKO	8
3.4 Mounting to LINAX® Lxu ground plate	8
4 Smart, practical details	9
4.1 Vacuum-/compressed air feed-through Ø 3mm	9
4.2 Encoder directly on the hollow shaft	9
4.3 Compact design	9
4.4 One-Cable connection reduces cabling requirements	9
5 Vacuum/compressed air variants	10
5.1 With connection plug outside diameter 4mm	10
5.2 With M5 internal thread	10
5.3 With blind plug	10
6 Accessories	11
6.1 Compressed air accessories	11
6.2 General accessories	12
7 Performance data	13
7.1 Technical specification	13
7.2 Torque/Speed curve	14
8 Accuracy	15
8.1 Positioning	15
8.2 Mechanical accuracy	15
9 Maintenance, Life time	16
9.1 Lubrication	16
9.2 Life time	16
10 Safety, Environment	17
10.1 Safety with XENAX® Servo Controller	17
10.2 Environmental Conditions	17
11 Note	18

1 Type Overview ROTAX® Rxvp

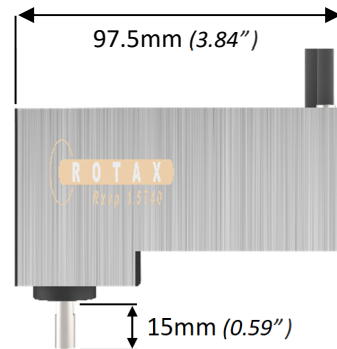
ROTAX® Rxvp 28-6T0.04
with 15mm (0.59") shaft



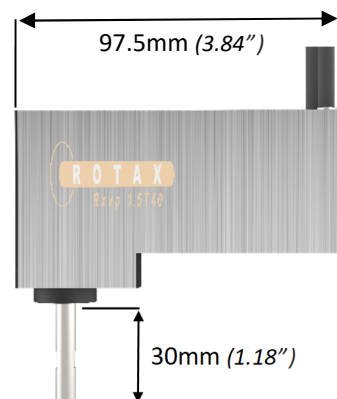
ROTAX® Rxvp 28-6T0.04
with 30mm (1.18") shaft



ROTAX® Rxvp 28-6T0.04
for ELAX® with weight Comp.
and 15mm (0.59") shaft

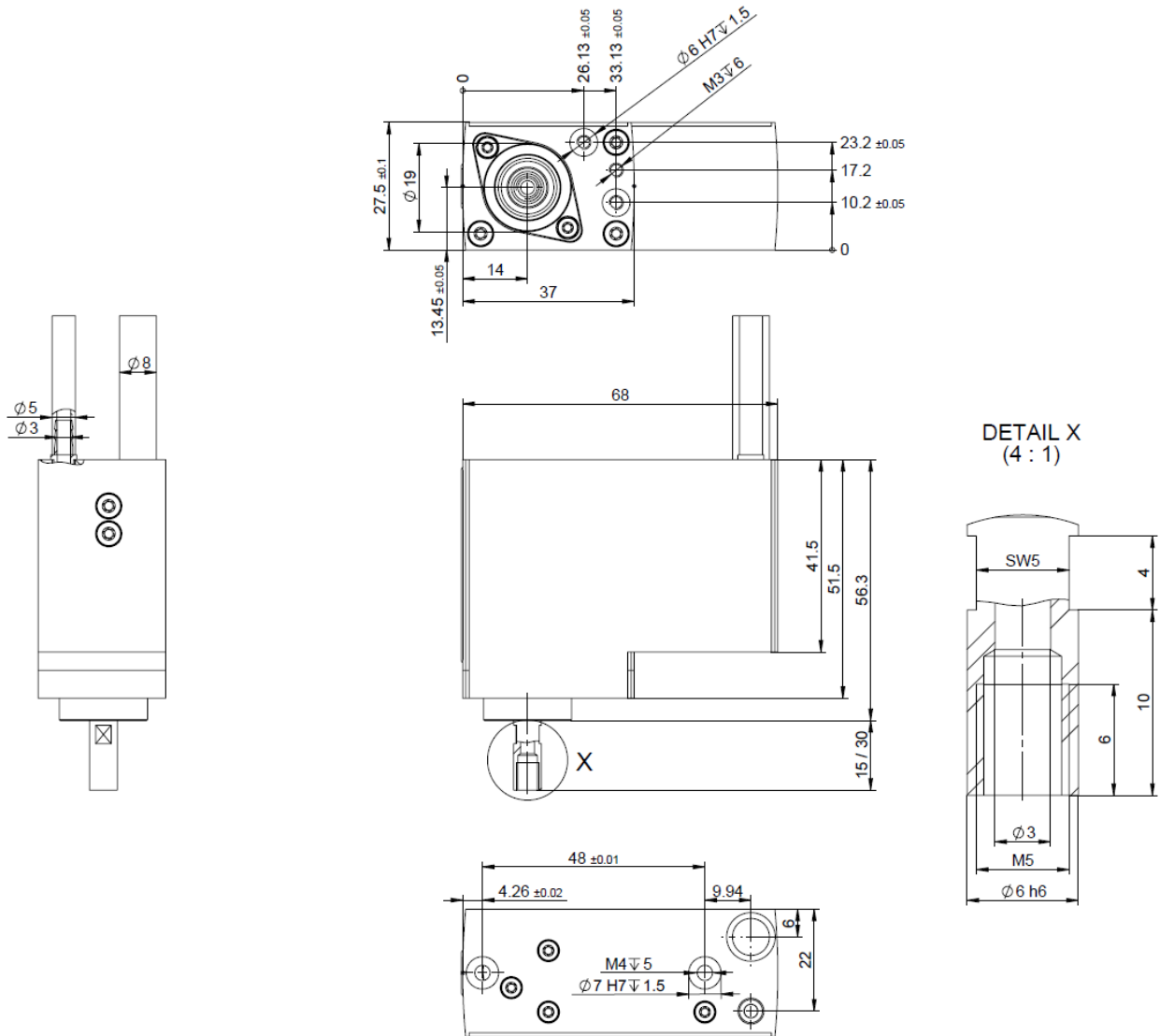


ROTAX® Rxvp 28-6T0.04
for ELAX® with weight Comp.
and 30mm (1.18") shaft

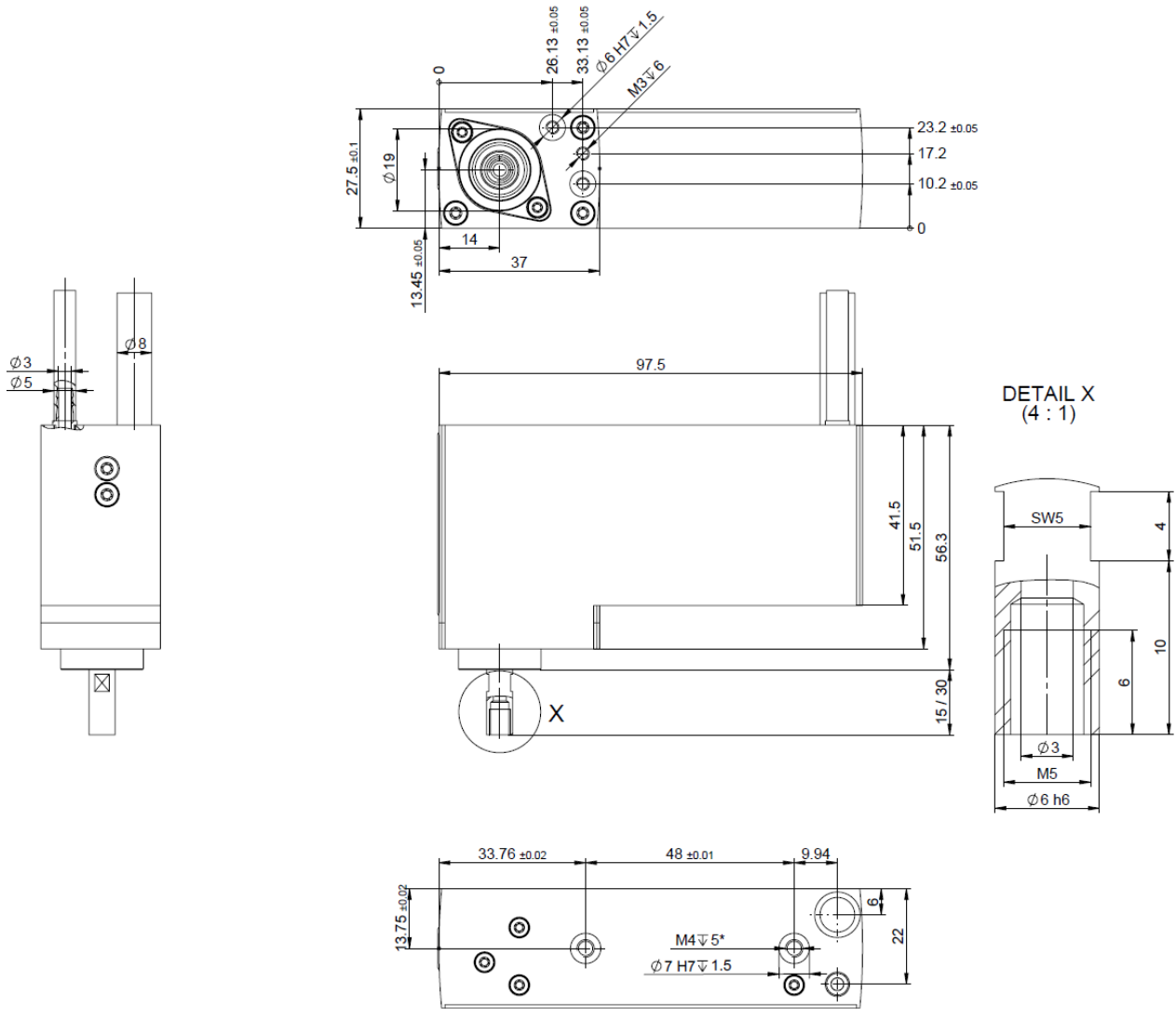


2 Dimension ROTAX® Rxvp 28-6T0.04

2.1 Installation for ELAX® without weight Comp. 68mm



2.2 Installation for ELAX® with weight Comp. 97.5mm



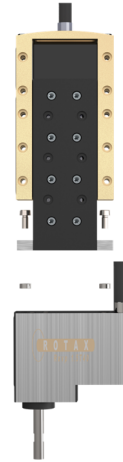
3 Modular System

3.1 Mounting to ELAX® Ex front flange

Mounting to ELAX® Ex front flange

Example:

- 1 x ELAX® Ex50F20
- 1 x ROTAX® Rxvp 28-6T0.04
- 2 x Dowel bushings $\varnothing 7\text{mm}$
- 2 x Torx, M4 x 8



3.2 Mounting to ELAX® Y-Z composition

Mounting to ELAX® Y-Z composition

Example:

- 1 x ELAX® Ex50F20
- 1 x ELAX® Ex150F20
- 1 x ROTAX® Rxvp 28-6T0.04
- 2 x Dowel bushings $\varnothing 7\text{mm}$
- 2 x Torx, M4 x 8
- 1 x Hose- and Cable Feedthrough sidewise for ELAX® Z and ELAX® Y upright
- incl. 4 x Torx M3 x 5
- 2 x Torx M4 x 18
- 4 x Dowel bushings $\varnothing 7\text{mm}$
- 2 x Centering pins $\varnothing 4 \times 6\text{mm}$



3.3 Mounting to ELAX® with GEKO

For the mounting to an ELAX® with weight compensation, the wider version 97.5mm (3.84") of the ROTAX® can be used.
See type overview in chapter 1.



3.4 Mounting to LINAX® Lxu ground plate

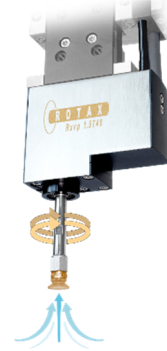
Mounting to an LINAX® Lxu ground plate
Example:
1 x LINAX® Lxu160F60
1 x ROTAX® Rxvp 28-6T0.04
1 x Angle bracket for LINAX® Lxu
incl. 4x torx M4 x 8
2 x Dowel bushings \varnothing 7mm
2 x Centering pins \varnothing 4 x 6mm



4 Smart, practical details

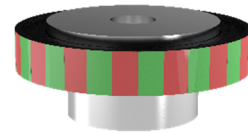
4.1 Vacuum-/compressed air feed-through \varnothing 3mm

The flow rate is designed for vacuum or compressed air up to 6bar. This allows vacuum grippers, precise "semiconductor nozzles" or parallel grippers with spring return to be operated.



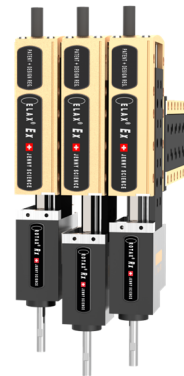
4.2 Encoder directly on the hollow shaft

For the rotation angle measuring, the encoder is mounted directly on the shaft. With a resolution of 64,000 inc. per revolution, a repetitive accuracy of ± 20 asec can be achieved. The shaft rotates with a concentricity of $<10\mu\text{m}$ ($<0.4\text{mil}$). A zero-point sensor within 360° is already integrated.



4.3 Compact design

These compact electric servo axes are only 28mm (1.10") wide. In combination with the ELAX® Linear motor slides, Pick & Place arrangements in a grid of only 30mm (1.18") are possible. This saves space and the systems can be built more compactly, especially in comparison with the oversized robot installations.



4.4 One-Cable connection reduces cabling requirements

The one-cable connection from Jenny Science simplifies the whole machine cabling complexity. In addition, the cable chains are more compact and lighter, need less room and achieve higher dynamics.

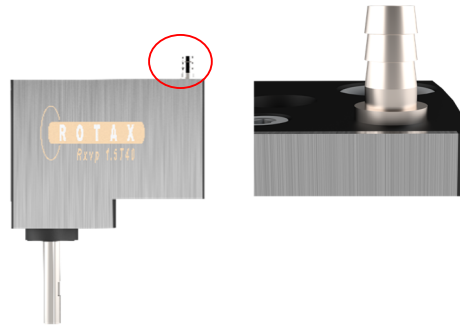


5 Vacuum/compressed air variants

5.1 With connection plug outside diameter 4mm

The ROTAX® Rxvp is supplied with a $\varnothing 4\text{mm}$ (0.16") connection plug as standard. Recommended hose inner diameter 3mm (0.12").

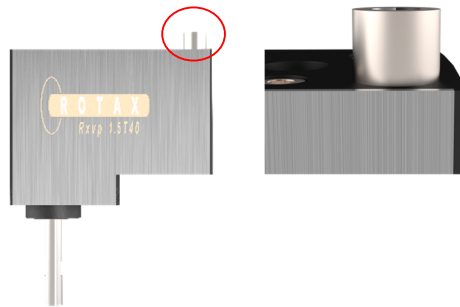
Suitable for mounting on the flange side of ELAX® Rx linear motor slides.



5.2 With M5 internal thread

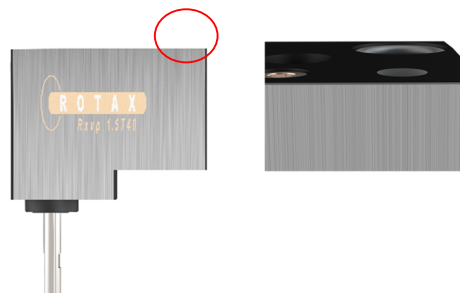
Plug nipple with M5 female thread for connection coupling such as Festo QSM-M5-4I.

Not suitable for flange-side attachment to ELAX® Ex linear motor slides.



5.3 With blind plug

Blind plug, without vacuum/compressed air connection.



6 Accessories

6.1 Compressed air accessories

Hose PUR

Outside diameter 5mm (0.20")
Inside diameter 3mm (0.12")

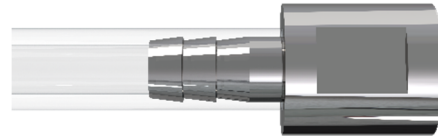
Fits to plug nipples \varnothing 4mm (0.16")



Hose Coupling

Plug nipple \varnothing 4mm (0.16") with a M5 female thread

Fits to hose PUR inside diameter 3mm (0.12")



Festo QSM-M5-4I
M5 outside thread
Hose diameter 4mm (0.16")

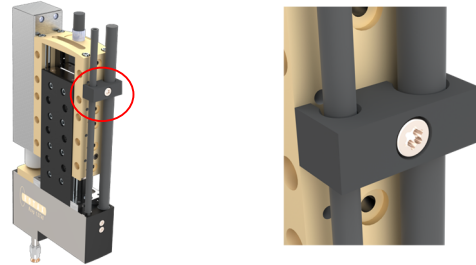
Festo QSM-M5-6I
M5 outside thread
Hose diameter 6mm (0.24")

Fits to plug nipple \varnothing 4mm (0.16") with M5 female thread

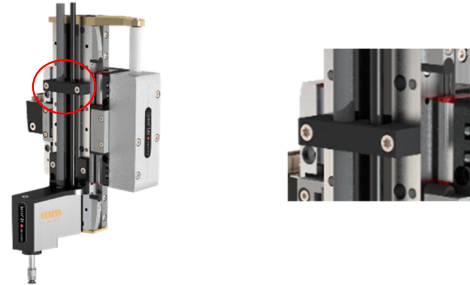


6.2 General accessories

Hose- and cable feedthrough on ELAX® Ex sidewise



Hose- and cable feedthrough on LINAX® Lxu



Hose- and cable feedthrough ROTAX® on ELAX® Z and ELAX® Y upright



Forked ends for vacuum shaft ROTAX® Rxvp



7 Performance data

7.1 Technical specification

Supply voltage

24V DC

Nominal speed ⁽¹⁾	n_N	rpm		1'000
Stall torque	M_0	mNm	(lbf·in)	40 (0.009)
Nominal torque ⁽¹⁾	M_N	mNm	(lbf·in)	40 (0.009)
Peak torque ⁽²⁾	M_P	mNm	(lbf·in)	110 (0.025)
Nominal current ⁽¹⁾	I_N	A		0.920
Peak current ⁽²⁾	I_P	A		2.530

Mechanical Data

Max. axial load		N	(lbf)	180 (40.5)
Max. moment load		Nm	(lbf·in)	1.4 (12.4)
Rotor moment of inertia	J_{Rot}	g·cm ²	(lbf·in ²)	550 (0.188)
Total weight with shaft 30mm (1.18")	m	g	(lbs)	180 (0.04)
Total weight with shaft 15mm (0.59")	m	g	(lbs)	175 (0.39)
Total weight for ELAX [®] with weight comp. & shaft 30mm (1.18")	m	g	(lbs)	200 (0.44)
Total weight for ELAX [®] with weight comp. & shaft 15mm (0.59")	m	g	(lbs)	195 (0.43)

(1) continuous operation with 25°C(77°F) ambient temperatur and convection cooling (ambient air)

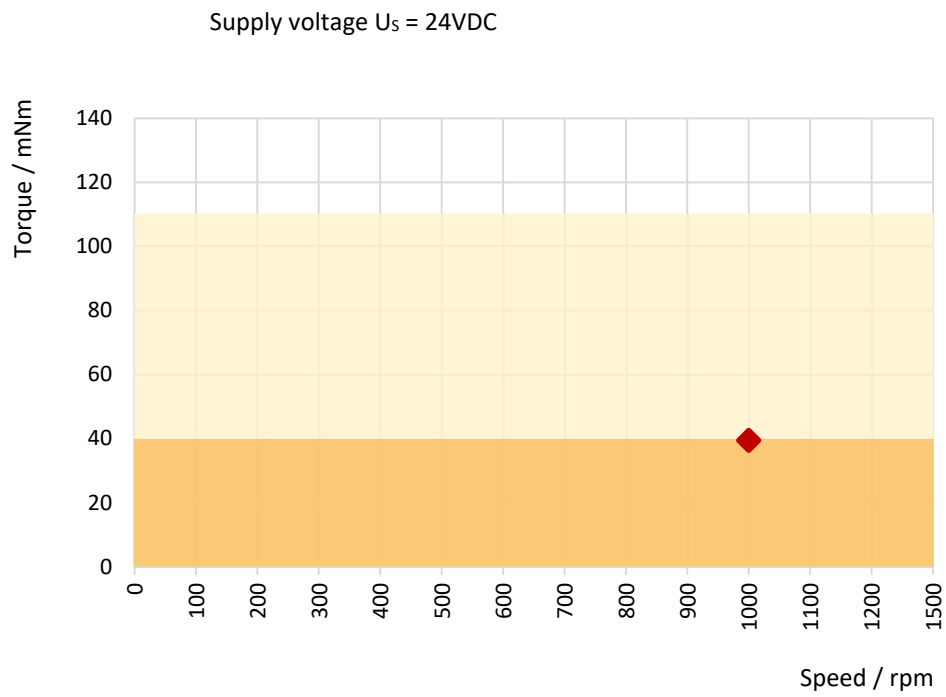
(2) peak operation (duty 10%)

7.2 Torque/Speed curve

Nominal operation

Continuous operation

Peak operation



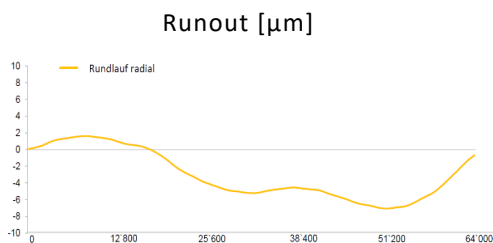
8 Accuracy

8.1 Positioning

Resolution polring	64'000 Inc. / revolution
Uni-directional repeatability	± 12 arcsec
Bi-directional repeatability	± 20 arcsec
Reference drive	A zero point sensor is integrated within 360°

8.2 Mechanical accuracy

The ROTAX® Rxvp is delivered with the following tolerances as standard.



Runout radial 15mm (0.59") shaft	10 μm (0.4mil)
Runout radial 30mm (1.18") shaft	10 μm (0.4mil)

9 Maintenance, Life time

9.1 Lubrication

The double row angular contact ball bearing of ROTAX® Rxvp is maintenance-free and cannot be relubricated.

9.2 Life time

**SWISS
MADE**
+

Life time calculation

ROTAX® Rxvp 28-6T0.04

$$L_{10h} = \frac{\left(\frac{C}{P}\right)^p * 10^6}{60 * n}$$

L_{10h} nominal life time
 C dynamic load rating
 P dynamic equivalent bearing load
 p Life time exponent: Ball bearing $p=3$
 n Speed of the bearing

Example calculation:

$C= 3050[N]$ (687lbf)
 $P= 180[N]$ (40.5lbf)
 $n= 1000[rpm]$

$$L_{10h} = \frac{\left(\frac{3050}{180}\right)^3 * 10^6}{60 * 1000} = \underline{81 * 10^3 h}$$

Actions with which life time can be extended:

- Trajectories with curve profiles instead of trapezoidal profiles (XENAX® Servo controller, default value S-curve profile = 20%).
- Dynamics not higher than needed.
- Completing non cycle time critical motions slower.
- Avoid pollution in the guides.

10 Safety, Environment

10.1 Safety with XENAX® Servo Controller

EN 61000-6-2:2005
Electromagnetic compatibility (EMC),
Immunity for industrial environments

EMC Immunity Testing, Industrial Class A

EN 61326-3-1
IFA:2012
EN 61326-1, EN 61800-3, EN 50370-1

Immunity for Functional Safety
Functional safety of power drive systems
Electrostatic discharges ESD, Electromagnetic Fields,
Fast electric transients Bursts, radio frequency common
mode

EN 61000-6-3:2001
Electromagnetic compatibility (EMC),
Emission standard for residential,
commercial and light-industrial
environments

EMC Emissions Testing, Residential Class B

EN 61326-1, EN61800-3, EN50370-1
IFA:2012

Radiated EM Field, Interference voltage
Functional safety of power drive systems

10.2 Environmental Conditions

Storage and transport

No outdoor storage. Storage rooms have to be well vented
and dry. Storage temperature -25°C up to +55°C
(-13°F up to 131°F).

Operational temperature

5°C - 50°C (41°F - 122°F) Environment, reduction in
performance at 40°C (104°F).

Operational humidity

10-90% non-condensing.

Cooling

No need of external cooling.

Protection category

IP 40

11 Note

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