JENNY SCIENCE

moving precisely, within tight space

Data Sheet
ROTAX® Rxvp 28-6T0.04

Edition 20. Dezember 2024

Ultra-compact rotary axis
ROTAX® Rxvp = vacuum pressure

Highlights

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

360° endless rotation repeatability ±0.006° / ±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.

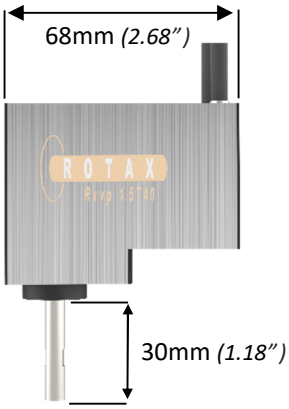
Alois Jenny
Jenny Science AG

Content

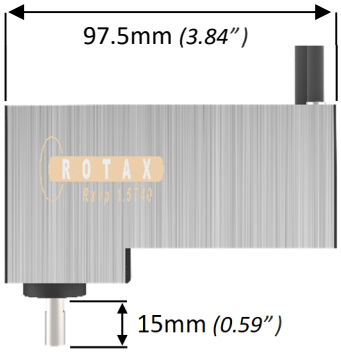
1 Type Overview ROTAX® Rxvp

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

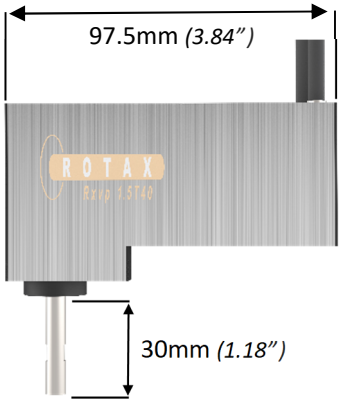
ROTAX® Rxvp 28-6T0.04
with 30mm *(1.18")* shaft



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

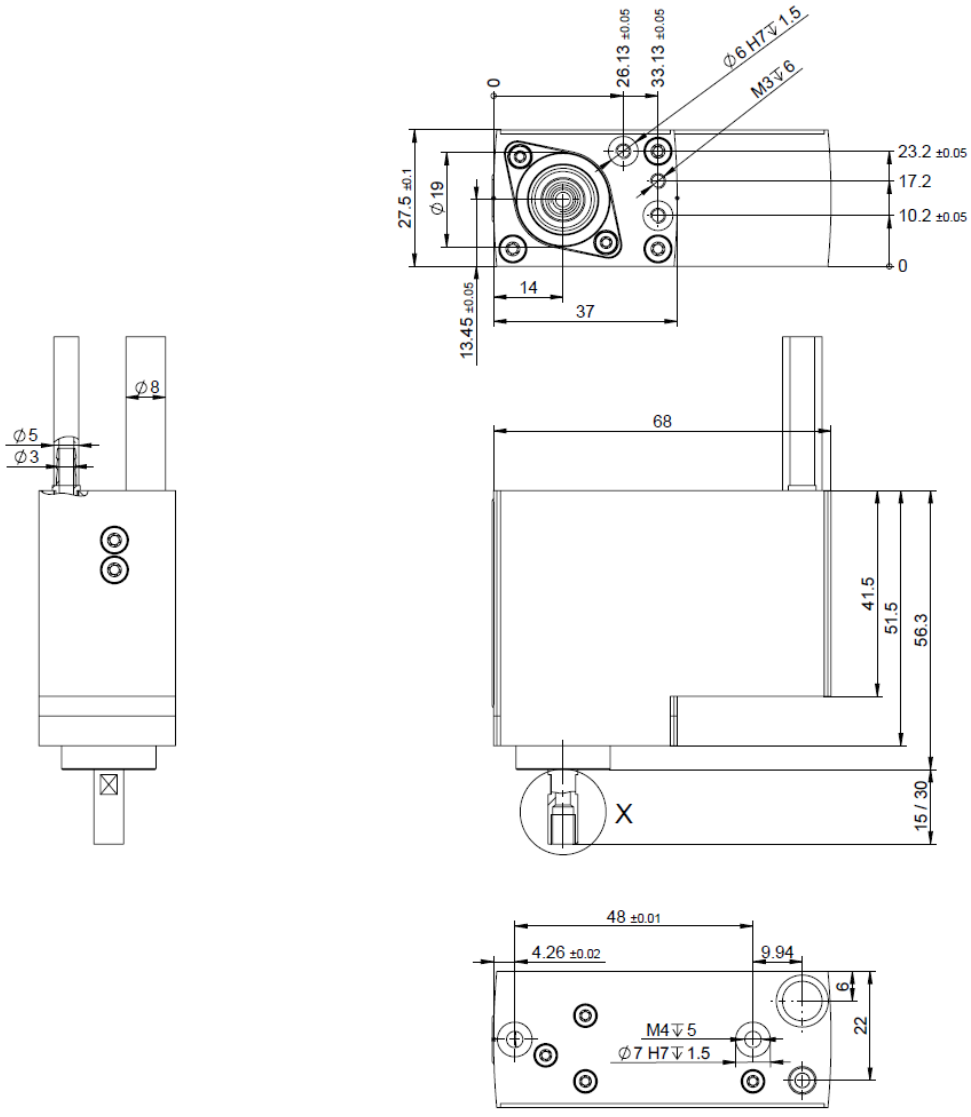


ROTAX® Rxvp 28-6T0.04
for ELAX® with weight Comp.
and 30mm *(1.18")* shaft

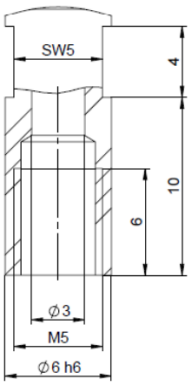


2 Dimension ROTAX® Rxvp 28-6T0.04

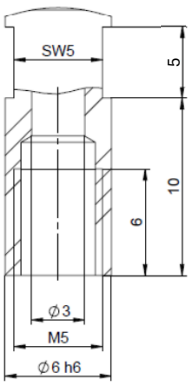
2.1 Installation for ELAX® without weight Comp. 68mm



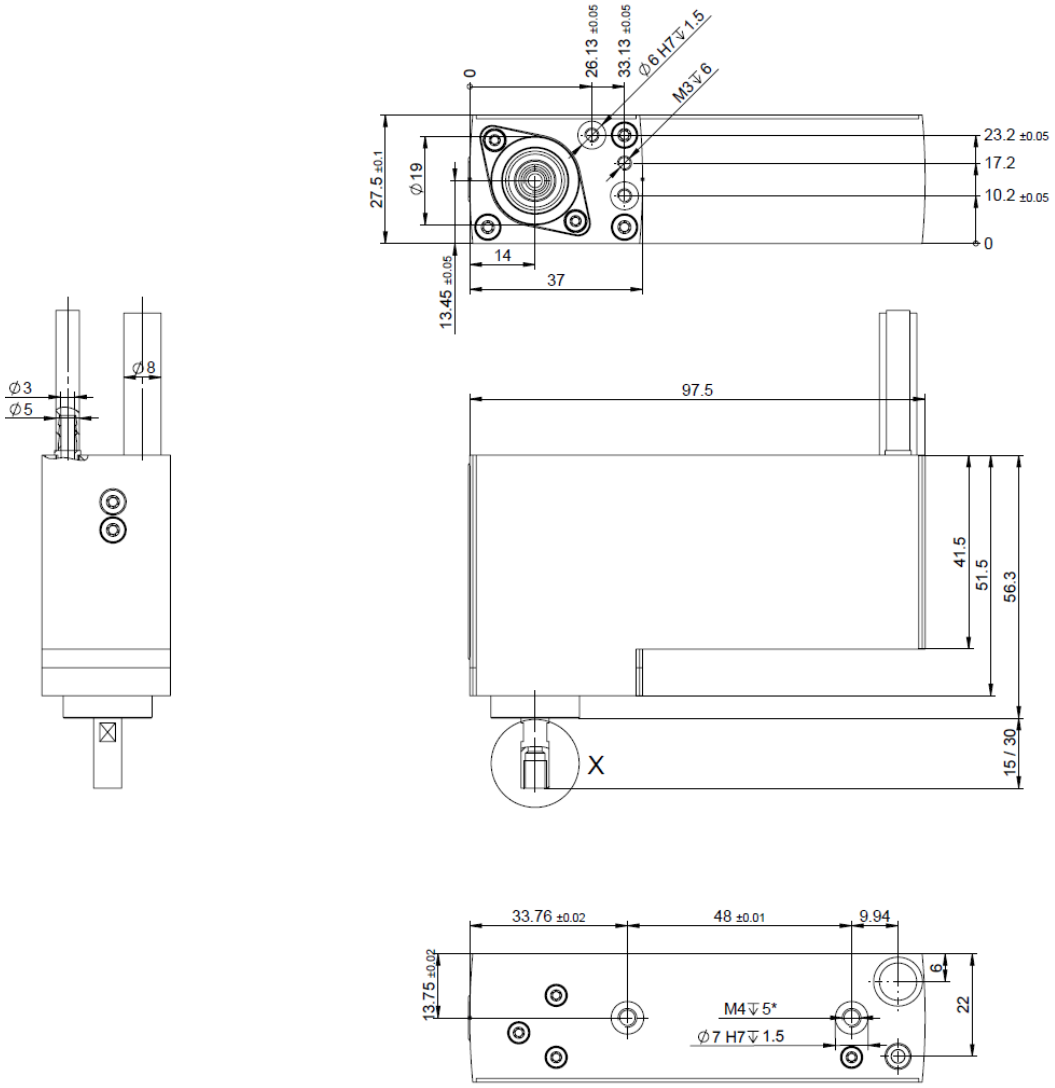
DETAIL X
15mm shaft
(4 : 1)



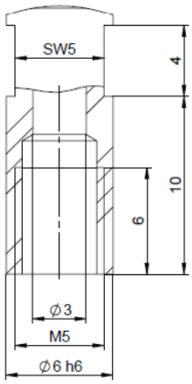
DETAIL X
30mm shaft
(4 : 1)



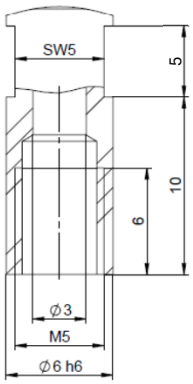
2.2 Installation for ELAX® with weight Comp. 97.5mm



DETAIL X
15mm shaft
(4 : 1)



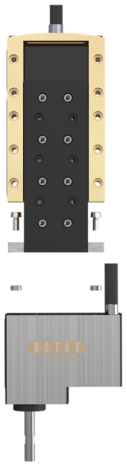
DETAIL X
30mm shaft
(4 : 1)



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 Ø7mm
2 x Torx, M4 x 8



3.2 Mounting to ELAX® Y-Z composition

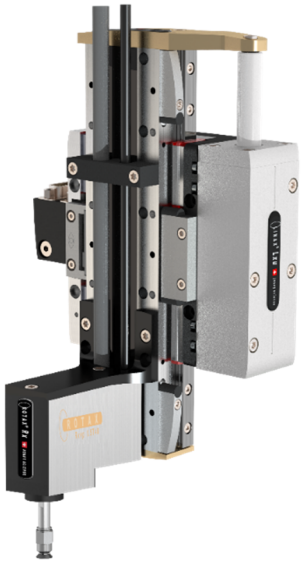
Mounting to ELAX® Y-Z composition
Example:
1 x ELAX® Ex50F20
1 x ELAX® Ex150F20
1 x ROTAX® Rxvp 28-6T0.04
2 x Dowel bushings Ø7mm
2 x Torx, M4 x 8
1 x Hose- and Cable Feedthrough sidewise for ELAX® Z and ELAX® Y upright
incl. 4 x Torx M3 x 5
2 x Torx M4 x 18
4 x Dowel bushings Ø7mm
2 x Centering pins Ø4 x 6mm

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 Ø7mm
2 x Centering pins Ø4 x 6mm



4 Smart, practical details

4.1 Vacuum-/compressed air feed-through Ø 3mm

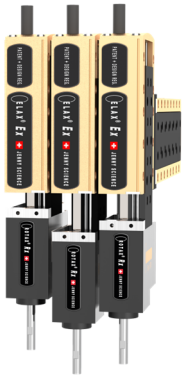
The flow rate is designed for vacuum or compressed air up to 6bar. This allows vacuum grippers, precise "semiconductor nozzles" or parallel grippers with spring return to be operated.

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 ± 20asec can be achieved. The shaft rotates with a concentricity of <10µm *(<0.4mil)*. 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 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

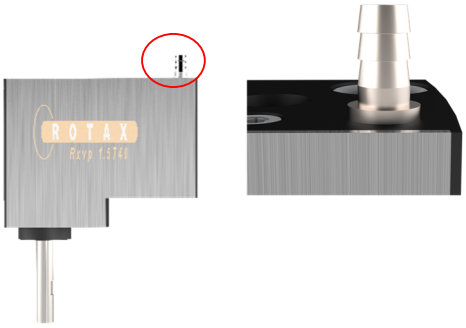
The one-cable connection from Jenny Science simplifies the whole machine cabling complexity. In addition, the cable chains are more compact and lighter, need less room and achieve higher dynamics.

5 Vacuum/compressed air variants

5.1 With connection plug outside diameter 4mm

The ROTAX® Rxvp is supplied with a Ø4mm *(0.16")* connection plug as standard. Recommended hose inner diameter 3mm *(0.12")*.

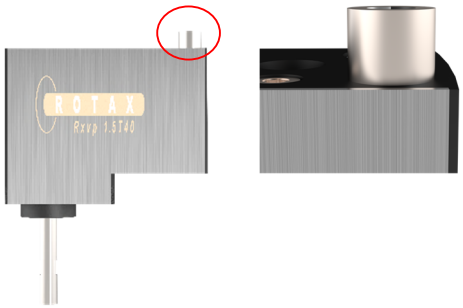
Suitable for mounting on the flange side of ELAX® Rx linear motor slides.



5.2 With M5 internal thread

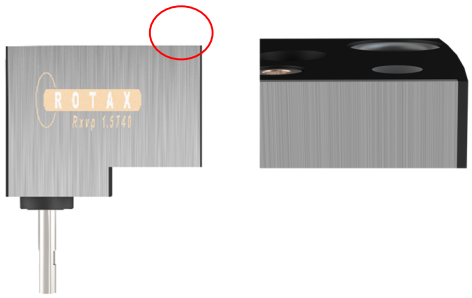
Plug nipple with M5 female thread for connection coupling such as Festo QSM-M5-4I.

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

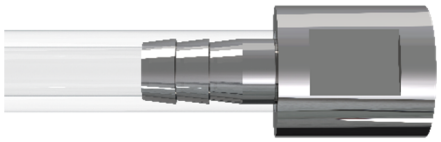
Hose PUR
Outside diameter 5mm *(0.20")*
Inside diameter 3mm *(0.12")*

Fits to plug nipples Ø4mm *(0.16")*

Hose Coupling

Plug nipple Ø4mm *(0.16")* with a M5 female thread

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



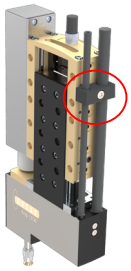
Festo QSM-M5-4l
M5 outside thread
Hose diameter 4mm *(0.16")*

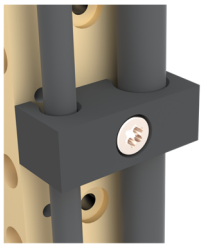
Festo QSM-M5-6l
M5 outside thread
Hose diameter 6mm *(0.24")*

Fits to plug nipple Ø4mm *(0.16")* with M5 female thread

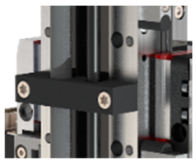
6.2 General accessories

Hose- and cable feedthrough on ELAX® Ex sidewise

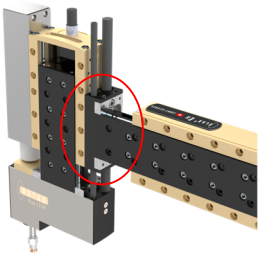


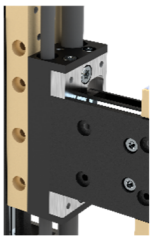


Hose- and cable feedthrough on LINAX® Lxu



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

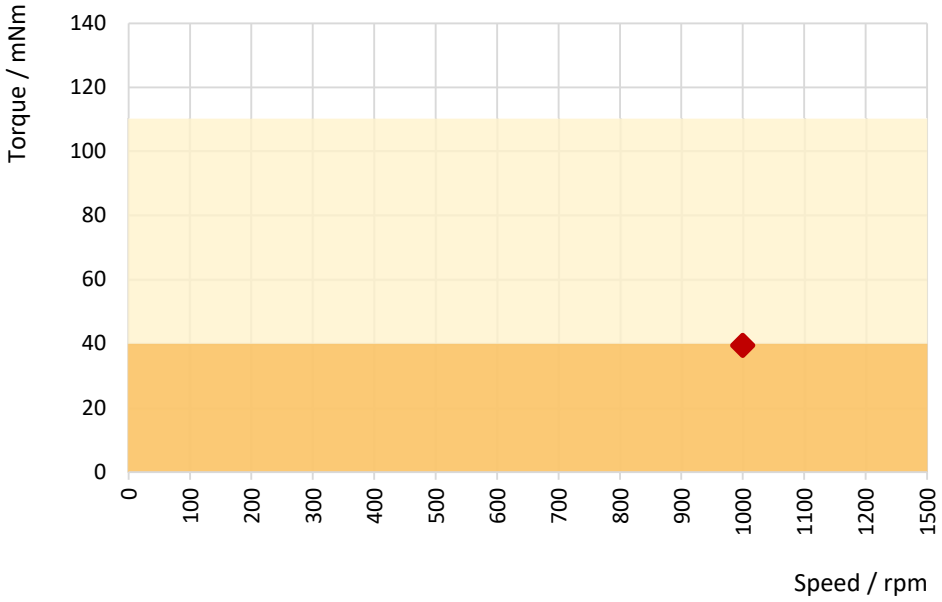
Supply voltage				**24V DC**
Nominal speed (1)	n_N	rpm		1'000
Stall torque	M_0	mNm	*(lbf·in)*	40 *(0.009)*
Nominal torque (1)	M_N	mNm	*(lbf·in)*	40 *(0.009)*
Peak torqaue (2)	M_P	mNm	*(lbf·in)*	110 *(0.025)*
Nominal current (1)	I_N	A		0.920
Peak current (2)	I_P	A		2.530
Mechanical Data				
Max. axial load		N	*(lbf)*	180 *(40.5)*
Max. moment load		Nm	*(lbf·in)*	1.4 *(12.4)*
Rotor moment of inertia	J_{Rot}	g·cm²	*(lbf·in²)*	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 | Continous operation | Peak operation

Supply voltage U_S = 24VDC



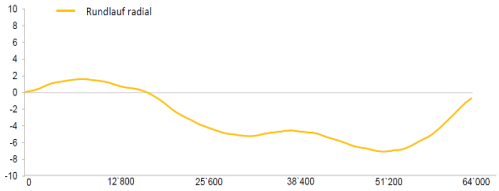
8 Accuracy

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

Runout [µm]



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

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

9 Maintencance, 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

Life time calculation

SWISS MADE

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]

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

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

Jenny Science AG
Sandblatte 11
CH-6026 Rain, Schweiz

Tel +41 (0) 41 255 25 25

www.jennyscience.ch
info@jennyscience.ch