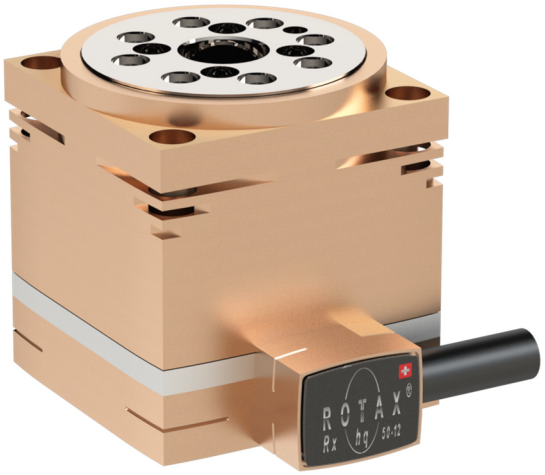
# Data Sheet
# ROTAX® Rxhq 50-12T0.3

Edition February 2024

**Compact Hollow Shaft Motor**
**ROTAX® Rxhq = high torque**




## Highlights

Compact direct drive with high torque up to 1'020mNm *(9.03 lbf·in)*

Flexible positioning with a repeatability of down to ±1 arcsec

Single-turn absolute encoder

Large hollow shaft with a diameter of 12mm *(0.47")*

No wear and tear, the direct drive ensures maximum precision over the entire service life

Variable one-cable connection to XENAX® in 90° grid orientation

Force control, force limitation and force recording with XENAX® servo controller

## General

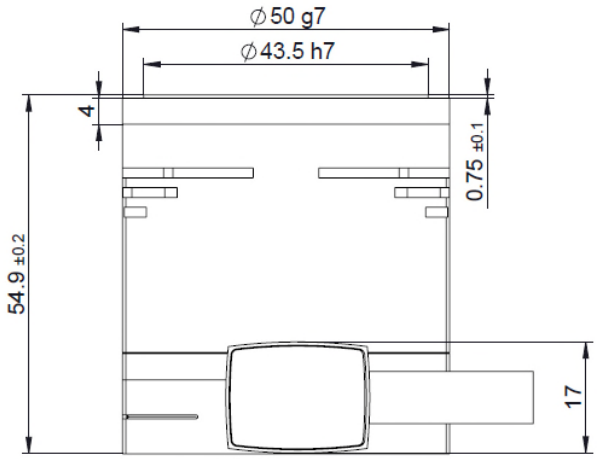
The self-developed direct drive servo motor is based on the magnetic flux technology of wind turbine generators.
This generates a high torque at low speed.
In figures this means a factor 2-3 higher torque with the same construction volume compared to a conventional direct drive of competitors.

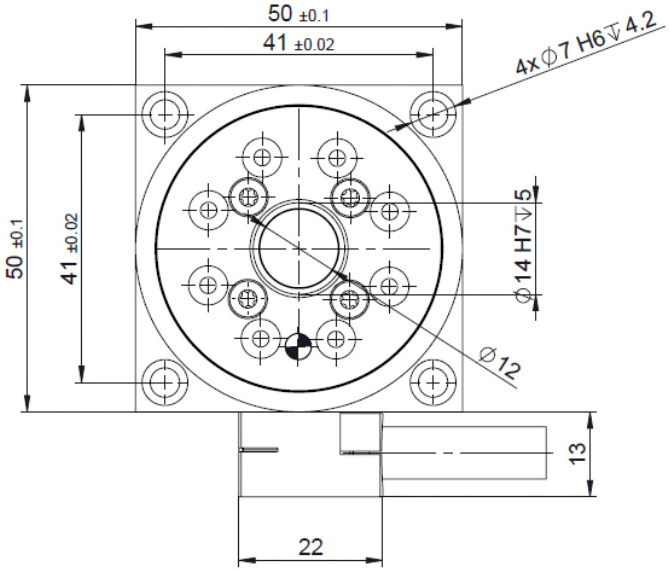
Alois Jenny
Jenny Science AG

## Inhaltsverzeichnis

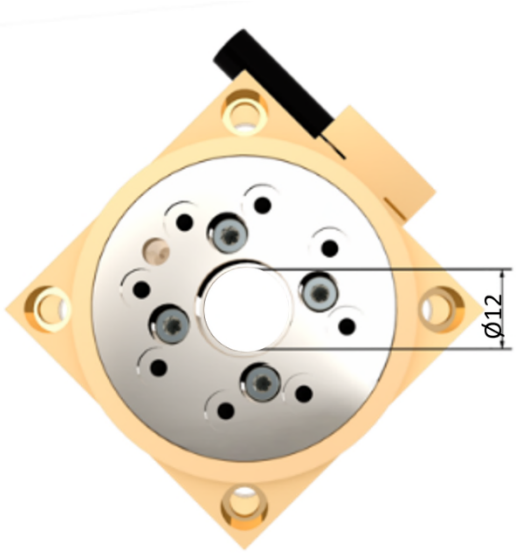
## 1 Dimension ROTAX® Rxhq 50-12

### 1.1 Installation dimension

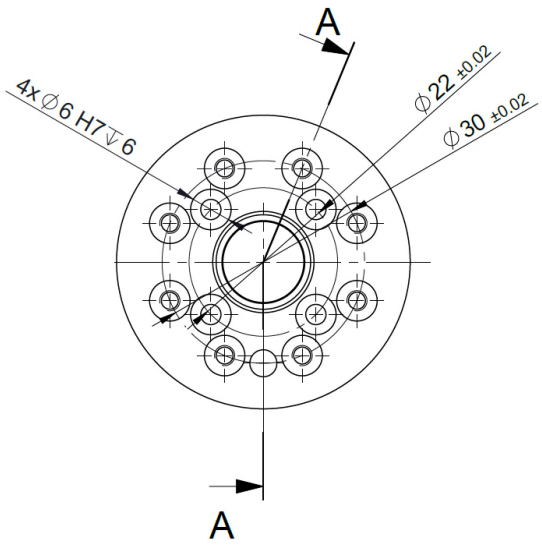


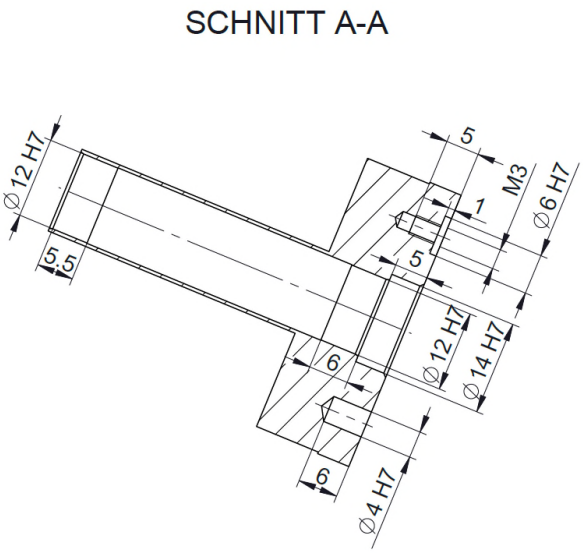



## 1.2 Hollow shaft



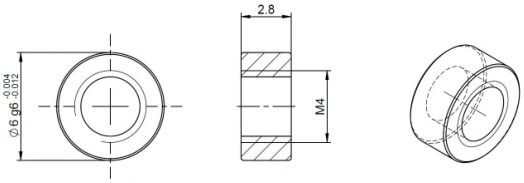

### 1.2.1 Front flange dimensions



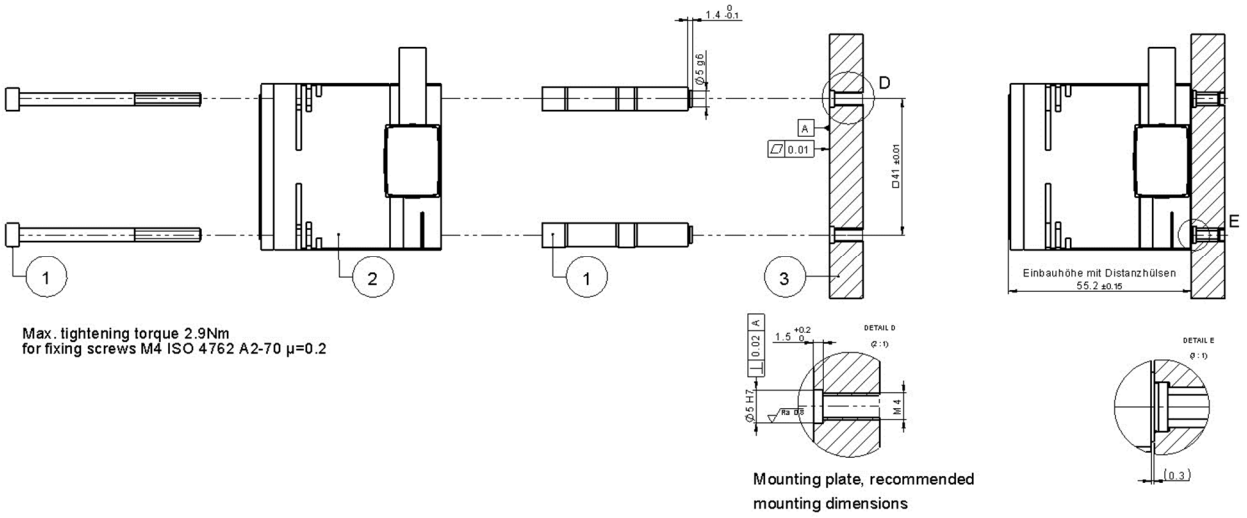

### 1.2.2 Centering rings

Centering rings for boreholes Ø6H7x1 in
Pitch circle diameter 30



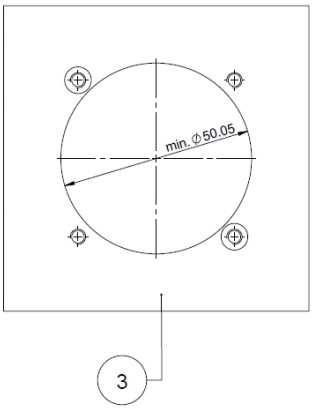
## 1.3 Installation options

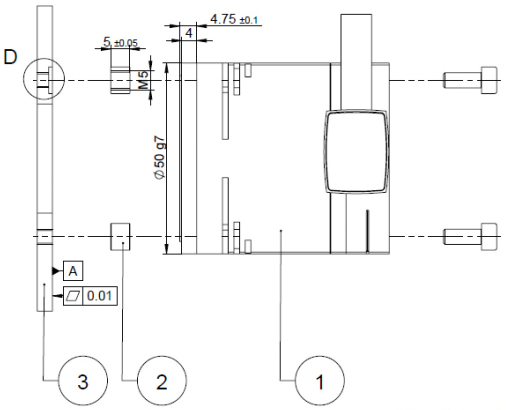
### 1.3.1 Installation rear side with distance sleeves

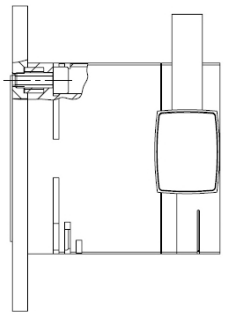



| Pos. | QTY | Designation |
|---|---|---|
| 1 | 4 | Fixing screws with distance bushings ROTAX® Rxhq 50-12 |
| 2 | 1 | ROTAX® Rxhq 50-12 |
| 3 | 1 | Mounting plate, customer |

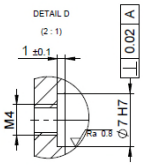
## 1.3.2 Installation flange side with centering ring



Max. tightening torque 2.9Nm
for fixing screws M4 ISO 4762 A2-70 μ=0.2




Mounting plate, recommended
mounting dimensions

| Pos. | QTY | Designation |
|---|---|---|
| 1 | 1 | ROTAX® Rxhq 50-12 |
| 2 | 4 | Centering ring D7x5 ROTAX® |
| 3 | 1 | Mounting plate, customer |

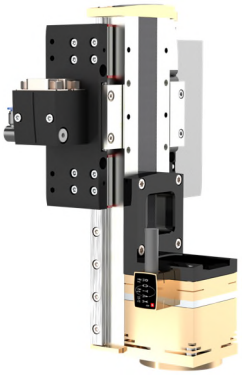
## 2 Modular Sytem

### 2.1 Angle bracket to LINAX® Lxu F60

Mounting to LINAX® Lxu F60 base plate
Grid 40 x 40mm *(1.57" x 1.57")*

2 x Dowel pin Ø4 x 8
4 x Torx, M4 x 14

4 x Distance bushings with centering Rxhq 50-12
4 x Hexagon socket screws, M4 x 55



### 2.2 Angle bracket to LINAX® Lxc F10/F40

Mounting to LINAX® Lxc F10/F40 slider
Grid 33 x 28mm *(1.30" x 1.10")*

2 x Dowel pin Ø2.5 x 6
4 x Torx, M3 x 12

4 x Distance bushings with centering Rxhq 50-12
4 x Hexagon socket screws, M4 x 55

### 2.3 Angle bracket to ELAX® Ex F20

Mounting to ELAX® Ex F20 slider
Grid 20 x 25mm *(0.79" x 0.98")*

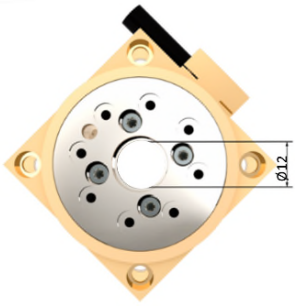
2 x Centering ring Ø6
4 x Torx, M3 x 12

4 x Distance bushings with centering Rxhq 50-12
4 x Hexagon socket screws, M4 x 55

## 3 Smart Praxis Oriented Details

### 3.1 Hollow shaft diameter

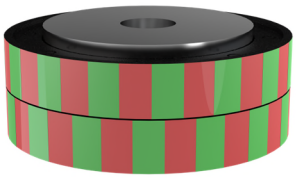
The large hollow shaft with a diameter of 12mm *(0.47")* offers generous space for cables, vacuum or compressed air lines, light and laser beams, glass fibres and other media.




### 3.2 Single-Turn Absolut Encoder

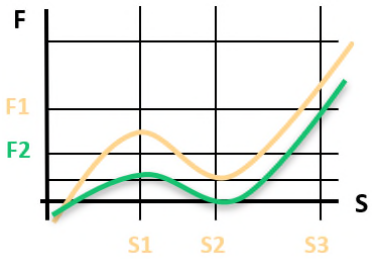
Thanks to the integrated absolute encoder with a resolution of 120'000inc. per revolution, repeatability of ± 11arcsec can be achieved. The optical measuring systems with 162'000 inc. or 2'592'000 inc. then achieve ± 10 arcsec and ± 1 arcsec repeatability.

Due to the absolute position, the ROTAX® Rxhq is immediately ready for operation after power-on, no reference drive is necessary.



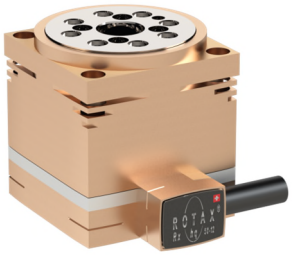
### 3.3 Record and Limit Forces

The patented function „Force Calibration" is able to compensate the magnetic cogging forces, the load and the friction forces of the Rotax® direct drive in a very simple way. This is how it becomes possible to control, to limit and to monitor forces in process. Together with the XENAX® servo controller it is also possible to record complete force/way diagrams. No need for an additional force sensor.



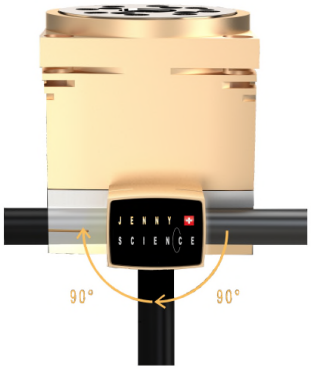
## 3.4 One-Cable connection reduces cabling requirements

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.



## 3.5 Cabel connection 90° pattern

The cable connection can be selected to the right, left and downwards. The corresponding article number must be specified when ordering. The cable outlet cannot be turned by yourself.



## 4 Performance data

### 4.1 Techniscal specification

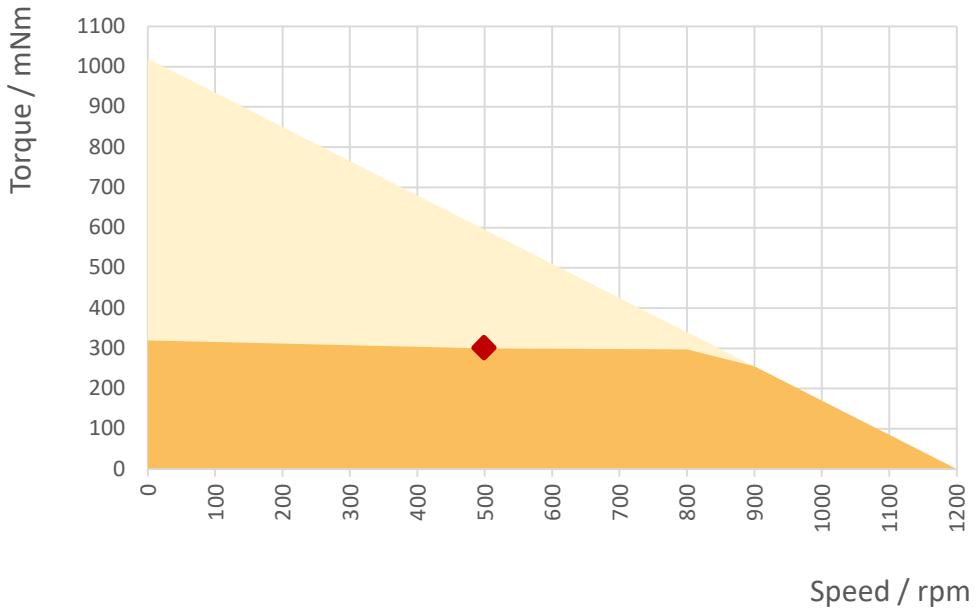
| Supply voltage | | | | | 24V DC | 48V DC |
|---|---|---|---|---|---|---|
| Nominal speed (1) | 120`000 Inc. | $n_N$ | rpm | | 500 | 1'500 |
| Nominal speed (1) | 162`000 Inc. | $n_N$ | rpm | | 500 | 1'300 |
| Nominal speed (1) | 2`592`000 Inc. | $n_N$ | rpm | | 200 | 200 |
| Stall torque | | $M_0$ | Nm | (lbf·in) | 0.32 (2.83) | 0.32 (2.83) |
| Nominal torque (1) | | $M_N$ | Nm | (lbf·in) | 0.30 (2.66) | 0.29 (2.57) |
| Peak torque (2) | | $M_P$ | Nm | (lbf·in) | 1.02 (9.03) | 1.02 (9.03) |
| Nominal current (1) | | $I_N$ | A | | 2.30 | 2.28 |
| Peak current (2) | | $I_P$ | A | | 7.85 | 7.85 |
| **Mechanical Data** | | | | | | |
| Max. axial load (3) | | | N | (lbf) | 1750 (393.4) | |
| Max. moment load (3) | | | Nm | (lbf·in) | 5 (44.25) | |
| Rotor moment of inertia | | $J_{Rot}$ | $g \cdot cm^2$ | ($lbf \cdot in^2$) | 400 (0.137) | |
| Total weight | | m | g | (lbs) | 440 (0.970) | |

(1) continuous operation with 25C° *(77°F)* ambient temperature and convection cooling (ambient air)
(2) peak operation (duty 10%)
(3) maximum load only with prescribed mounting according to point 1.3

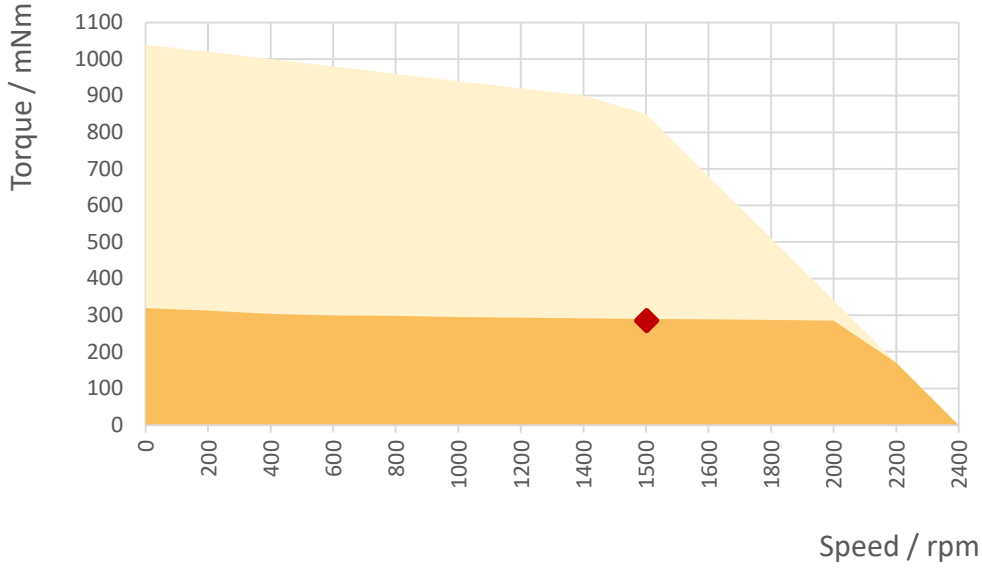
## 4.2 Torque/Speed curve

| Nominal operation | Continous operation | Peak operation |
|---|---|---|

Supply voltage $U_S$ = 24VDC (120'000Inc. encoder)




Supply voltage $U_S$ = 48VDC (120'000Inc. encoder)

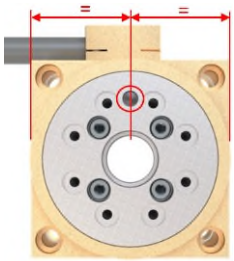


# 5 Accuracy

## 5.1 Positioning

| | |
|---|---|
| Standard resolution polring | 120`000 Inc., Vmax 1`500 rpm |
| Bi-directional repeatability | ± 11 arcsec |
| Optional optical resolution | 162`000 Ink., Vmax 1`300 rpm |
| Bi-directional repeatability | ± 10 arcsec |
| Optional optical resolution | 2'592`000 Ink., Vmax 200 rpm |
| Bi-directional repeatability | ± 1 arcsec |
| Reference drive | With the single-turn absolute encoder the position is available immediately after power-on. Therefore no reference drive is necessary. |

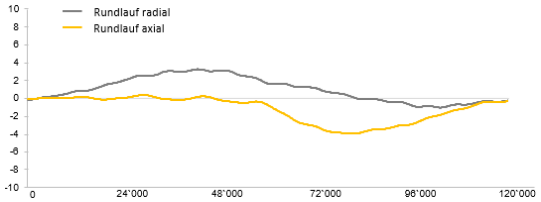
Zero point absolut



For the alignment of the rotor flange a single hole Ø4H7 is provided. With centric alignment of this hole on the side of the connector housing, the absolute zero point can be found.

## 5.2 Mechanical accuracy

Runout [µm]




Der ROTAX® Rxhq is delivered with the following tolerances as standard.

| | |
|---|---|
| Runout radial | 10µm |
| Runout axial(2) | 10µm |

(2) Measuring point 20mm radial from the centre of the front flange

# 6 Maintenance, Life time

## 6.1 Lubrication

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

## 6.2 Life time

The ROTAX® Rxhq is a direct drive. This means no wear and tear and therefore highest precision over the whole lifetime.

Basically, the preloaded double row angular contact ball bearing is the life-determining element.

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.

# 7 Safety, Environment

## 7.1 Safety with XENAX® Servo Controller

| | |
|---|---|
| **EN 61000-6-2:2005**<br>Electromagnetic compatibility (EMC), Immunity for industrial environments | EMC Immunity Testing, Industrial Class A |
| EN 61326-3-1<br>IFA:2012<br>EN 61326-1, EN 61800-3, EN 50370-1 | Immunity for Functional Safety<br>Functional safety of power drive systems<br>Electrostatic discharges ESD, Electromagnetic Fields, Fast electric transients Bursts, radio frequency common mode |
| **EN 61000-6-3:2001**<br>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<br>IFA:2012 | Radiated EM Field, Interference voltage<br>Functional safety of power drive systems |

## 7.1 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.<br>The mechanical mounting to a flange allows additional heat dissipation thanks to thermal conduction. This allows a higher performance. |
| Protection category | IP 40 |

## 8 Note



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