MetalMiracle®

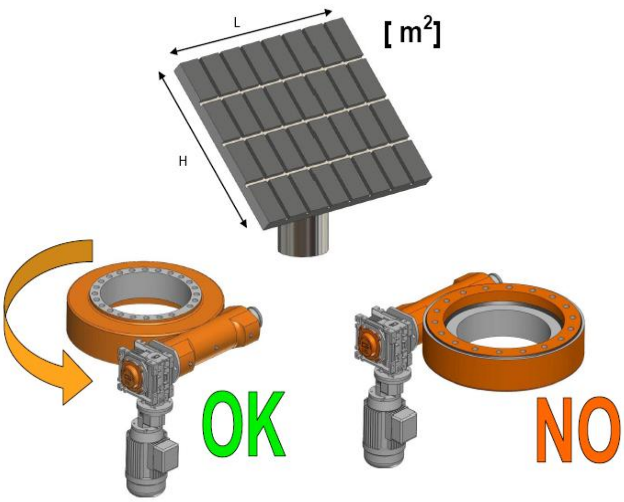
GUIDELINES FOR SELECTING SLEWING DRIVE

Please read all instructions and manual carefully before selection

Version A

Mode of installation

It is advised to mount the slewing drives upside down on the azimuth axis in solar applications for better protection and add protection for the elevation axis.



For other applications, the mounting directions shall be based on the evaluation of the protection level and it shall be better for better protection.

Ambient temperature

All the slewing drive can be used for an ambient temperature from -40℃ to +80℃。

Loads

For the permissible loads of the respective slewing drive, please refer to the new load diagrams from our sales print.

Efficiency η

The efficiency levels entered for the slewing drive are average or guideline values. They apply to well-run in slewing drive with proper lubrication and the respective operation speed at nominal load. Efficiency improves with rising sliding velocity at the gear teeth, with increasing mean helix angel and with improvement of the surface quality of the worm shafts tooth flanks. The efficiency we recommend for the slewing drive is from 35% to 40% (not including efficiency of the driving part), only under well lubrication condition, it can work well, and the degree of efficiency in new slewing drive is lower than that given in the performance tables.

Self-locking

For slewing drive, a distinction is made between a static and dynamic self-locking feature. Static self-locking exists, if the starting efficiency is $\eta_A \le 0.5$ Starting the worm shaft with driving slewing ring is therefore not possible. This self-locking effect can sometimes be cancelled with external excitation of vibrations, starting the worm shaft with driving slewing ring is possible in this case. Dynamic self-locking (automatic interlocking while in motion) occurs if the operation efficiency is $\eta_A \le 0.5$. It occurs in slewing drive depending on contiguity stress and friction of the gear surface, at mean helix angles of γ_m=2.5° to 4°

In drive cases where self-locking is necessary, the mounting of a back stop or a brake as a more favorable solution should always be checked first. A self-locking slewing gear unit can not take the place of a brake.

⚠ Slewing drive is statically self-locking; under unfavorable conditions, e.g. vibration, reverse motion may, however, be possible.

Starting efficiency η_A

The starting efficiency η_A of a slewing dive always less than the efficiency at operating rotation speed nominal load and continuous duty due to the large coefficient of tooth friction μ_z at low sliding velocity. When starting the slewing drive under load, a higher driving torque T_{1A} is necessary due to the reduced starting efficiency.

T_{1A} is calculated as follows：

$T_{1A} = T_{2} / i \times \eta_A$（Nm）

The starting efficiency and the operating efficiency is a factor of the size of the mean helix angle of the worm shaft. The favorable influence of a large mean helix angle on starting is also applicable in this case.

Lubrication

On delivery, ring raceway, worm gear thread and bearing are filled with grease. Re–lubrication of the slewing drive at regular intervals is required to ensure fault-free operation of the slewing drive. Ensure that the grease used for re-lubrication is compatible with the grease used for initial filling. The details can be found in the 2.8 item of the slewing drive manual.

Calculation of selection

The torque T_2 is calculated using the following equation

$T2=9550\times P2/n2$

T2=Required torque of the slewing drive [Nm]

P2= Required power of the slewing drive [KW]

n2= Output speed of the slewing drive [rpm]

Calculation according to outside load

$T_{2/mech.erf}=T_2\times f_B$

$T_{k/mech.erf}=F_R\times l_H\times f_B$ $F_{A/mech.erf}=F_A\times f_B$ $F_{R/mech.erf}=F_R$

$T_{2/mech.erf}$ =Required output torque of the slewing drive on the load condition

T_2 =Required torque of the slewing drive

$T_{k/mech.erf.}$ = Required tilting moment torque

$F_{A/mech.erf}$ =Required axial force

$F_{R/mech.erf}$ =Required radial force

F_R =Radial force

F =Axial force

l_H =Level arm of the acting radial force f_B

f_B = Safety factor（table1）

Selecting the slewing drive size

$T_{2/mech.erf}\leq T_{2N}$

$T_{k/mech.erf}\leq T_{Kzul}$ $F_{A/mech.erf}\leq F_{Azul}$ $F_{R/mech.erf}\leq F_{Rzul}$

T_{2N} =output torque of the slewing drive

T_{Kzul} =Permissible tilting moment torque

F_{Azul} =Permissible axial force

F_{Rzul} = Permissible radial force

Application factor f_B

The selected application factor accounts for the special characteristics of the different service conditions when sizing the slewing drive.

Table1

Application	operation mode	Type of impacts	factor f_B
Rotary tables (light-weight applications)	uniform rotary movement	slight	1.0…1.1
Solar power systems			
Elevating work platforms	back and forth movements	average	1.2…1.5
Foundry machines			
Engineering machines	back and forth, impact movement	strong	1.6…2.0

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