PLN 70 – 3 / Motor – OP 5 + 14

Gearbox type	Type-Size	ratio i	motor designation	Options	page
PLN					
	PLN 70	3 – 100	(Manufacturer-Model)	OP 2	12
	PLN 90			OP 5	13
	PLN 115			OP 7	13
	PLN 142			OP 8	13
	PLN 190			OP 14	14
				OP 16	77
				OP 17	77
				OP 18	77
WPLN					
	WPLN 70	4 – 100	(Manufacturer-Model)	OP 2	24
	WPLN 90			OP 5	25
	WPLN 115			OP 7	25
	WPLN 142			OP 8	25
				OP 14	26
				OP 16	77
				OP 17	77
PLFN					
	PLFN 64	4 – 100	(Manufacturer-Model)	OP 2	36
	PLFN 90			OP 16	77
	PLFN 110			OP 17	77
	PLFN 140			OP 18	77
PLE					
	PLE 40	3 – 512	(Manufacturer-Model)	OP 1	50
	PLE 60; PLE 60/70			OP 2	52
	PLE 80, PLE 80/90			OP 6	77
	PLE 120, PLE 120/115			OP 12	77
	PLE 160			OP 16	77
				OP 17	77
WPLE					
	WPLE 40	3 – 512	(Manufacturer-Model)	OP 2	66
	WPLE 60			OP 6	77
	WPLE 80, WPLE 80/90			OP 12	77
	WPLE 120, WPLE 120/115			OP 16	77
				OP 17	77
PLFE					
	PLFE 64	3 – 64	(Manufacturer-Model)	OP 2	74
	PLFE 90			OP 12	77
	PLFE 110			OP 16	77
				OP 17	77

OP 1: **Solid input shaft** [1]

OP 2: **Motor mounting**

OP 5: **Splined shaft** [1]

OP 6: **Smooth output shaft**
Smooth shaft without key/keyway or threaded bore in shaft end

OP 7: **Output shaft with key DIN 6885 T1** [1]

OP 8: **Special / custom shaft** [1]

OP 12: **ATEX** [1]
qualified after ATEX 94/9 EG for group II
category 2G/3G
temperature class: T4 X
Rating data could be updated, Please request separate data sheet!

OP 14: **Output flange and shaft similar to the (W)PLS output**

OP 16: **Food-grade lubrication**
special lubrication for application with special hygienic regulations

OP 17: **Low temperature lubrication**
special lubrication for application at extremely low temperatures; observe special conditions

OP 18: **Reduced backlash**

Other options on inquiry

[1] on inquiry

Conversion table	1 mm	0.0394 in
	1 N	0.225 lb_f
	1 kg	2.205 lb
	1 Nm	8.85 in lb
	1 $kgcm^2$	8.85 x 10^{-4} in lb s^2

1) required gearhead torque rating

detailed application data available? (acceleration- deceleration- torque, load and - motor inertias, speeds, cycle times, etc.)

yes → I: required gearhead torque rating

$T_{RGRT} = T_{MAT}$ (max. application torque)

no ↓

some basic application data available? (motor peak torque, load and motor inertia or inertia match ratio)

yes → II: required gearhead torque rating

$T_{RGRT} = [(T_{Mpeak}-T_{LR}) * (1-k)+T_{LR}] * i$

no ↓

selection only based on motor torque (peak-torque, continuous duty torque)

A → A: selected gearhead could be oversized

$T_{RGRT} = T_{Mpeak} * i$

B → B: selected gearhead could be undersized

$T_{RGRT} = T_{Mcont} * i$

C → C: gearhead selection adequate, slight probability of gearhead under-sizing

$T_{RGRT} = T_{Mcont} * 2,5 * i$

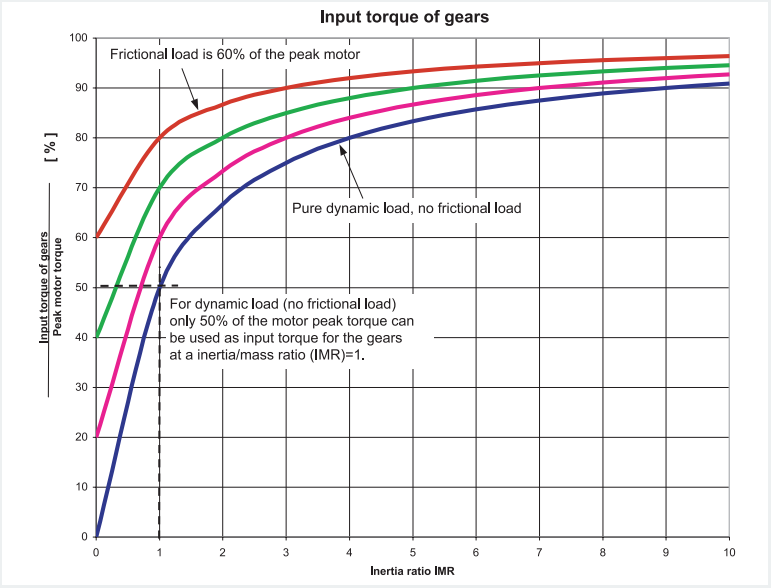
select gearhead size based on the criteria:

$T_{RGRT} \leq T_{2N}$ (2)

(1) it is recommended to compile data and use selection method I or II

(2) short cycle times and low cycle rates application the gearhead can be perhaps selected based on $T_{RGRT} < 1,6 * T_{2N}$. Contact Neugart for assistance.

T_{RGRT}	- required gearhead torque rating
T_{MAT}	- peak application torque
T_{Mpeak}	- peak motor torque
T_{Mcont}	- continuous duty motor torque
T_{2N}	- gearhead rated torque
i	- ratio
T_L	- friction load (non-dynamic load)
T_{LR}	- $T_{LR} = T_L / i$ load torque at the input
J_M	- motor inertia
J_L	- load inertia
J_{LR}	- $J_{LR} = J_L / i^2$ reflected load inertia to the input
k	- $k = J_M / (J_{LR} + J_M)$ inertia parameter
IMR	- $IMR = J_{LR} / J_M$ inertia match ratio; is closely related to inertia parameter ($k = 1 / (IMR+1)$



2) check motor / selected gearhead geometrical compatibility

- motor shaft diameter <= max possible input pinion (sun-gear) bore?
- motor weight permissible / support required?

3) check output shaft radial and axial loadability / output shaft bearing life (if applicable)

4) check application / ambient conditions -If In doubt please contact Neugart for assistance

- Is the IP class adequate?
- Is the mean input speed higher than recommended?
- Check if the operating temperature is higher than recommended?

Neugart's planetary gearboxes are designed for high-cycle operation. The listed T_{2N} nominal/rated torque relates to a continuous duty torque .
If the application torque is consistently lower than the nominal torque, then no further consideration is required.

If the application has a certain number of load cycles, at torque loads exceeding the rated torque value, the gearbox will function, but its life time will be reduced. Use the graph below to approximate the life, in number of output shaft rotations, for torque loads up to factor 1.6 higher than the rated torque.

Torque (Increase) factor
number of output shaft rotations

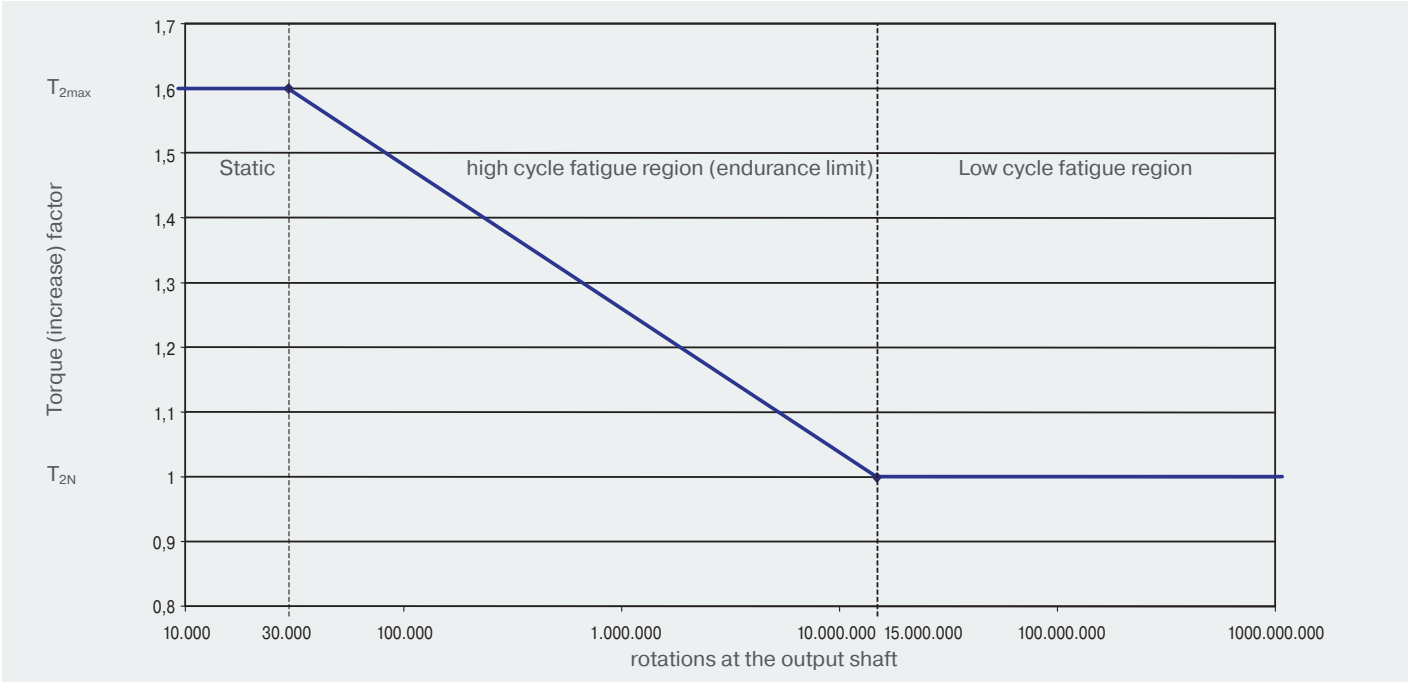


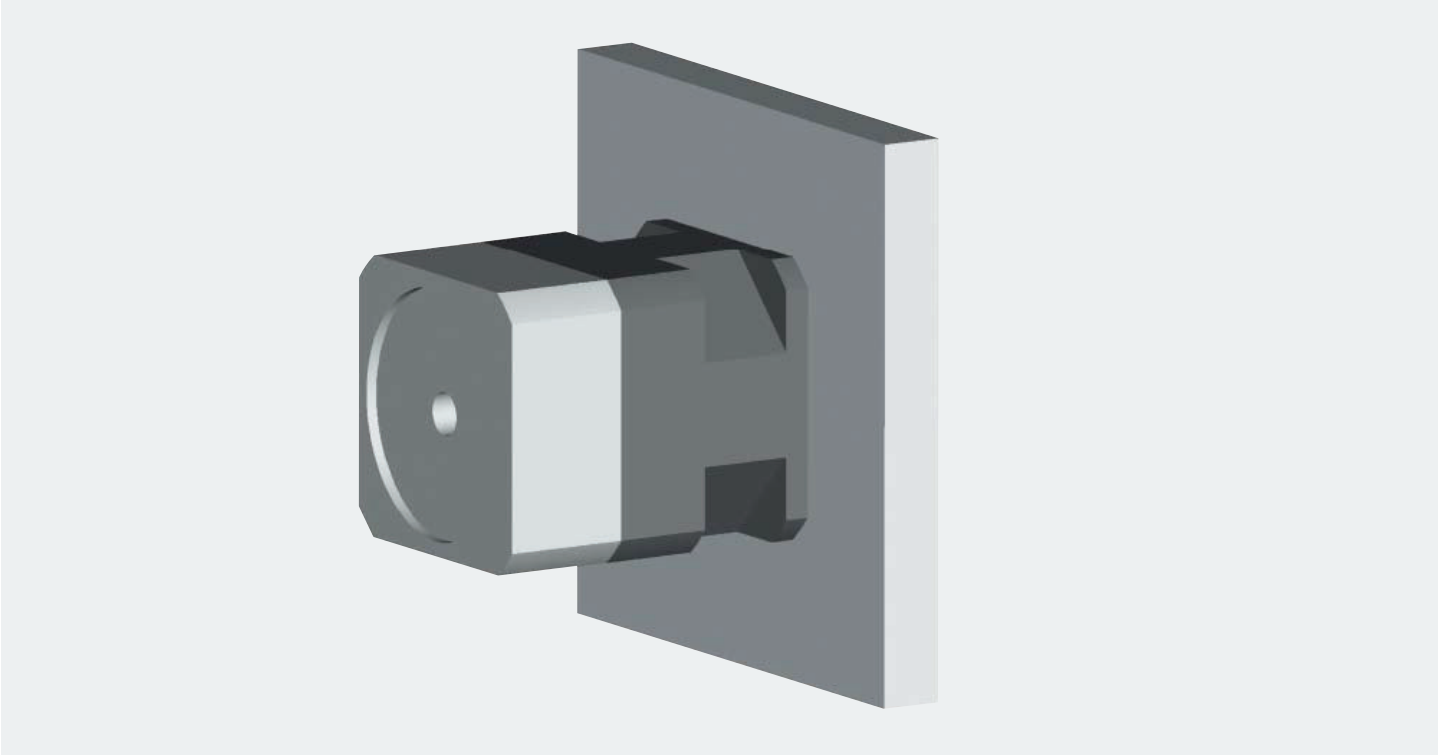
figure 1

Use the graph above or the formula below to determine the permissible transferable T_{2max} torque below, if the required number of output shaft rotations " Nrot." is between 30,000 and 15,000,000.

For 30,000 < Nrot. < 15,000,000 $f = -0{,}1039 \times \ln(100{,}000 / 30{,}000 \times \text{Nrot.}) + 2{,}79$

$T_{2max} = f * T_{2N}$

Note: if Nrot. > 15,000,000; $f = 1.6$
if Nrot. > 30,000; $f = 1$



Calculation of average (mean) rpm:

$$n_m = \frac{n_1 \cdot t_1 + \ldots + n_x \cdot t_x}{t_1 + \ldots + t_x}$$

n_m - average (mean) rpm
$n_1 \ldots n_x$ - different rpm's of an rpm- spectrum
$t_1 \ldots t_x$ - duration (sec) corresponding to the different rpm's

Assumed environmental conditions:

- Motor does not heat up the gearbox
- Mounting plate size (square) = 2 x gearbox size
- Mounting plate material: Steel
- Convection around the gearbox is not impaired/ obstructed
- Ambient temperature: 30°C
- Only one side of the gearbox is connected to the machinery (by the mounting plate)

For 100% rated torque:
Compare the calculated mean rpm n_m value to the listed max mean rpm at 100% torque;
Calculated mean rpm n_m shall be less than the listed rpm, otherwise, if no additional cooling is provided, there is a danger of overheating.

For 150% rated torque:
Compare the calculated mean rpm n_m value to the listed max mean rpm at 50% torque;
Calculated mean rpm n_m shall be less than the listed rpm, otherwise, if no additional cooling is provided, there is a danger of overheating.

The gearbox shall not exceed the listed max operating temperature of 90C.
If conditions are unfavorable, please reduce the speeds or consult Neugart.