A: Simplified sizing for servo motors based on the maximum motor torque: $\mathbf{M_{max} * i \leq T_{2\alpha}}$

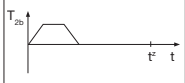
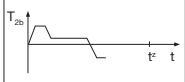
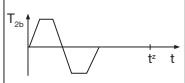
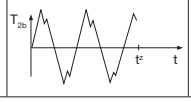
B: Sizing based on the application

Step 1:

Determine the maximum application torque: $\mathbf{T_{2b}}$= _____ **[Nm]**

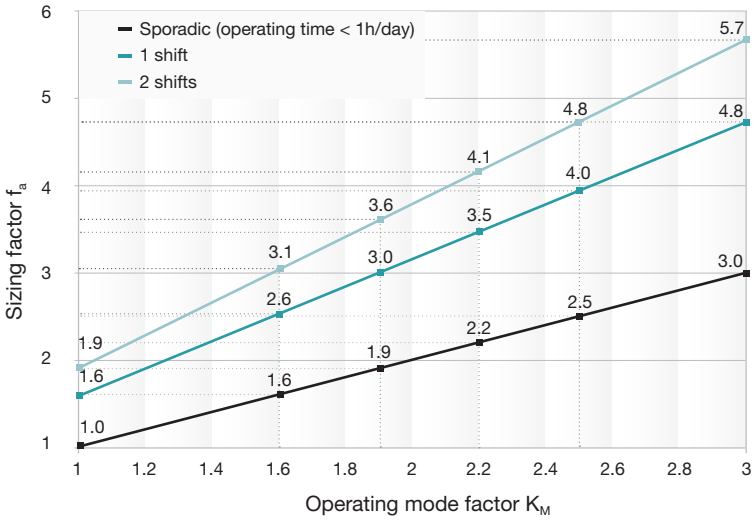
Step 2:

Determine the operating mode factor $\mathbf{K_M}$= _____

Typical applications	Cycle	Torque characteristic	Operating mode factor K_M
Format changing, e.g. in packaging machines, drives for processing equipment, actuators, etc.	**S5 operation:** Low duty cycle Small number of cycles Low dynamics		1.0
Tool changers with low dynamics, pick & place gantry axes, tire building machines, etc.	**S5 operation:** Medium duty cycle Small number of cycles Medium dynamics		1.6
Linear modules, linear axes in woodworking machines, ball screw drives, etc.	**S5 operations:** Medium duty circle Medium number of cycles Meduim dynamics		1.9
Roller drives in printing presses, star drives in rackers, etc.	**S1 operation:** High duty cycle		2.2
Linear axes in plasma, laser or water jet cutters, portals, tool changers with high dynamics	**S5 operation:** Medium duty circle Medium number of cycles High dynamics		2.5
SCARA robots, gantry robots, machining spindles, etc.	**S5 operation:** High duty cycle High number of cycles High dynamics		3.0

Step 3:

Determine the sizing factor with the operating mode factor K_M $\mathbf{f_a}$= _____



Step 4:

Compare the equivalent application torque with the maximum gearhead $\mathbf{T_{2\alpha}}$ (see table, Step 5)

$\mathbf{T_{2\_eq} = f_a * T_{2b} \leq T_{2\alpha}}$

$\mathbf{T_{2\_eq}}$ = _____ * _____ ≤ $\mathbf{T_{2\alpha}}$

$\mathbf{T_{2\_eq}}$ = _____ **[Nm]** ≤ _____ **[Nm]**

Step 5: Quick selection of the technical data

			NP 005		NP 015		NP 025		NP 035		NP 045	
			1-stage	2-stage	1-stage	2-stage	1-stage	2-stage	1-stage	2-stage	1-stage	2-stage
Ratio [a]	i		4 - 10	16 - 100	3 - 10	12 - 100	3 - 10	9 - 100	3 - 10	9 - 100	5 - 10	15 - 100
Maximum torque [a] **MF**	$T_{2\alpha}$	Nm	18-22		51-64		128-160		320-408		640-800	
		in.lb	160-200		450-570		1130-1420		2860-3610		5660-7080	
Maximum torque [a] **MA**	$T_{2\alpha}$	Nm	-		62-88		184-200		432-488		-	
		in.lb	-		550-780		1170-1770		3820-4320		-	
Max. input speed	n_{1max}	min^{-1}	10000	10000	8000	10000	7000	8000	6000	7000	4000	6000
Nominal input speed	n_{1N}	min^{-1}	3800	4000	3300	3800	3100	3300	2300	3100	2000	2600
Max. radial force	F_{2RMax}	N	800		1700		2800		5000		8000	
		lb_f	180		380		630		1130		1800	
Mean operating noise	L_{PA}	dB(A)	58		58		60		63		66	
Paint			Paint Pearl dark grey – innovation blue									
Direction of rotation			Motor and gearhead same direction									
Protection class			IP 64									
Page			6		8		10		12		14	

[a] The maximum torques depend on the ratio

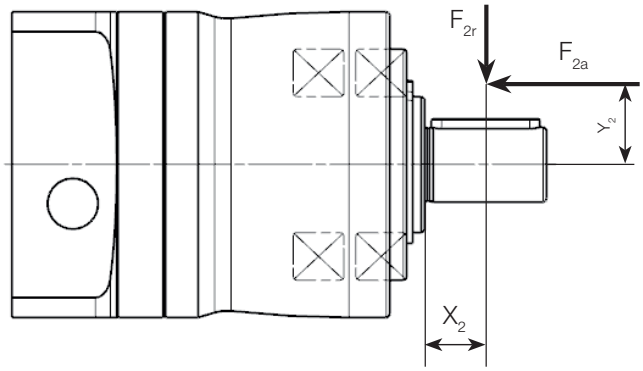
You can select a suitable adapter plate using the online configurator on **www.wittenstein-alpha.com**
For application-specific sizing with cymex®, see **www.cymex.com** Please refer to the product pages for detailed information on individual gearhead sizes

Account must be taken of the radial and axial forces at the output:

Please also carry out steps 6 and 7 if forces are present at the output (e.g. if timing belt pulleys, pinions or levers are mounted there).

Step 6 (if external forces are present):

Determine the forces acting on the output and check the boundary conditions



Radial force F_{2r} = _____ [N]
Radial force distance x_2 = _____ [mm]
Axial force F_{2a} = _____ [N]
Axial force distance y_2 = _____ [mm]
(required if F_{2a} is present)

Conditions if axial force F_{2a} is present:

1. $F_{2a} \leq 0.25 * F_{2r} \Rightarrow$ (_____ ≤ 0.25 * _____) ☐ **Met** ☐ **Not met:** Sizing with cymex®

2. $y_2 \leq x_2 \Rightarrow$ (_____ ≤ _____) ☐ **Met** ☐ **Not met:** Sizing with cymex®

Step 7:

Determine the maximum equivalent force acting on the output F_{2_eq}

F_{2_eq} = F_{2r} + 0.25 * F_{2a} ≤ F_{2RMax} (F_{2RMax} can be determined from the diagram below)

F_{2_eq} = _____ + 0.25 * _____ ≤ _____

F_{2_eq} = _____ [N] ≤ _____ [N] ☐ **Met**

☐ **Not met:** Higher axial and radial forces with the NPS, NPL and NPR.