

Neugart Calculation Program



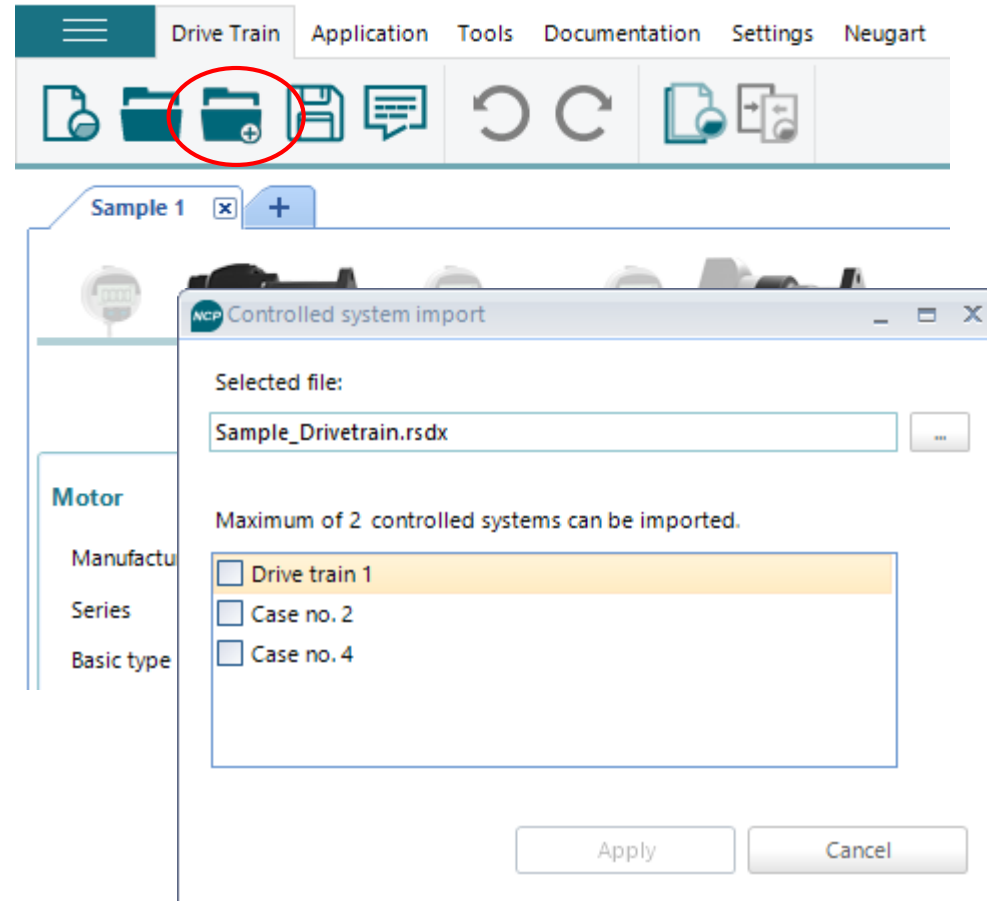
NCP[®] 4.2



D

Drive train – adding existing ones

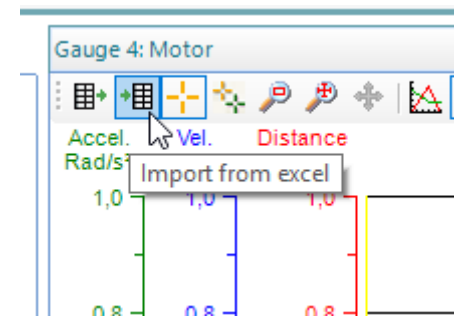
- + Add drive trains of NCP 3.x (.rsd) or NCP 4.x to the existing project
- + Ideal for comparison of new and old dimensionings



CL

Custom load input – data import

- + Import motor trace files at the motor gauge directly
 - + Choose „General load case“
 - + Choose gearbox
 - + Click on gauge 4
 - + In the diagramm you can select „Import from Excel“





Custom load input – data import

NCP 4.1

Data structure must be adhered to.

	A	B	C	D	E	F	G	H	I	J	K	L
1	POS	t	n_a	n_e	J2_a	J2_e	Tp_a	Tp_e	Fa_a	Fa_e	Fr_a	Fr_e
2		s	U/min	U/min	kgcm ²	kgcm ²	Nm	Nm	N	N	N	N
3	1	0	0	3,06	0	0	3,142	3,142	0	0	0	0
4	2	0,01	3,06	5,94	0	0	3,142	3,142	0	0	0	0
5	3	0,02	5,94	9	0	0	3,142	3,142	0	0	0	0
6	4	0,03	9	12,06	0	0	3,142	3,142	0	0	0	0
7	5	0,04	12,06	14,94	0	0	3,142	3,142	0	0	0	0
8	6	0,05	14,94	18	0	0	3,142	3,142	0	0	0	0

NCP Import from excel

Select CSV file...

	POS	t	n_a	n_e	J2_a	J2_e	Tp_a	Tp_e	Fa_a	Fa_e	Fr_a	Fr_e
		s	U/min	U/min	kgcm	kgcm	Nm	Nm	N	N	N	N
→	1	0	0	3,06	0	0	3,14	3,14	0	0	0	0
	2	0,01	3,06	5,94	0	0	3,14	3,14	0	0	0	0
	3	0,02	5,94	9	0	0	3,14	3,14	0	0	0	0
	4	0,03	9	12,1	0	0	3,14	3,14	0	0	0	0
	5	0,04	12,1	14,9	0	0	3,14	3,14	0	0	0	0

CL Custom load input – data import

NCP 4.2

No complex preparation of the data is necessary.

	A	B	C	D	E	F	G
1	Messung am Motor mit Last 65 kg						
2							
		Zeit [ms]	Drehmoment [Nm]	Speed Messwert Signal	Drehzahl Motor [rpm]		
3							
4		0	1,136304	0	0		
5		10	1,19808	0	0		
6		20	1,257984	0	0		
7		30	1,257984	0	0		
8		40	1,257984	0	0		
9		50	1,262664	0	0		
10		60	1,223352	0	0		
11		70	1,136304	0	0		
12		80	1,0764	0	0		
13		90	1,026792	0	0		
14		100	0,981864	2	145		
15		110	0,96408	2	145		

Import from excel

Select CSV file...

incremental (10 ms / 10 ms / 10 ms / 10 ms ...)
 absolute (10 ms / 20 ms / 30 ms / 40 ms ...)

POS	t	TP_a	n_a
-	ms	-	U/min
0		0	Rad/s
10		0	Rad/min
20		0	Rad/h
30		0	U/h
40		0	U/min
50		0	U/s
60		0	Hz
70		0	Rpm

The columns and units can be freely assigned.

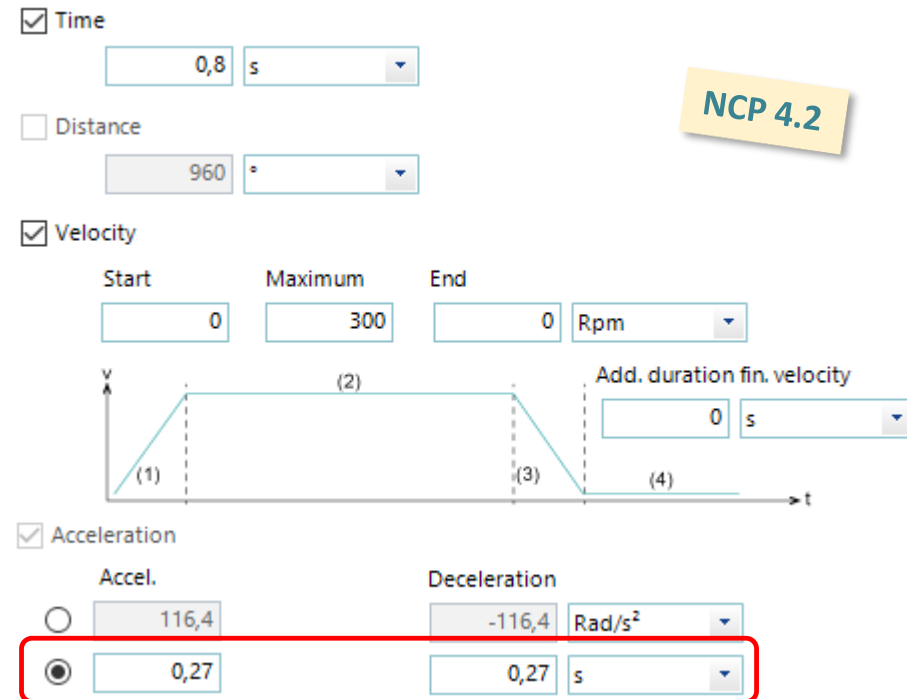
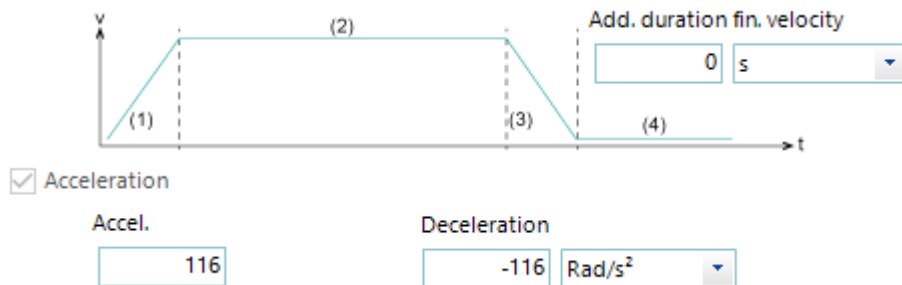


Custom load input – define duration of acceleration

In a movement you can now specify the time in which acceleration is to take place.

Until now, the acceleration value had to be specified concretely.

NCP 4.1



Software interface for NCP 4.2 showing configuration options for Time, Distance, Velocity, and Acceleration. The 'Time' checkbox is checked, with a value of 0,8 s. The 'Distance' checkbox is unchecked, with a value of 960 °. The 'Velocity' checkbox is checked, with Start 0, Maximum 300, and End 0 Rpm. The 'Acceleration' checkbox is checked, with 'Accel.' set to 116,4 and 'Deceleration' set to -116,4 Rad/s². A red box highlights the 'Time' input field for acceleration, which is set to 0,27 s. A yellow callout box labeled 'NCP 4.2' is positioned above the interface.



Custom load input: showing cumulated time

Showing the cumulated time of the complete cycle

	Pos.	Description	Profile type	Start time (s)	Period (s)	cumulated (s)
→	1	Motion control	Linear	0	0,5	0,5
				0,5	0,5	1
				1	0,5	1,5
				1,5	0	1,5
	2	Motion control	Linear	1,5	0,5	2
				2	0,5	2,5
				2,5	0,5	3

NCP[®] 4.2 Features in detail



CL

Custom load input – message concerning saving

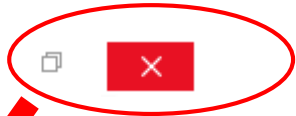
NCP 4.1



Pos.	Beschreibung	Profiltyp	Startzeit (s)	Dauer (s)	fortlaufend (s)	Weg (°)	Geschwindigkeit Start (U/min)	Geschwindigkeit End (U/min)
1	Segment	Mod. Sinus	0	1	1	341	0	100
2	Segment	Konst. Geschw.	1	0,5	1,5	300	100	100
3	Segment	Mod. Sinus	1,5	1	2,5	341	100	0

data loss possible

NCP 4.2



Weg (°)	449
Ges (U/min)	-300
Bes. (Rad/s²)	62,8
Ruck (Us²)	0

Closing the custom load input editor gives a message concerning saving the changes.

MC

Mass inertia calculator – saving body in drive train

Inertia & Mass Calculator

Individual object

Cylinder - vertical

Description: TEst body

L: 200 mm
D: 80 mm
d: 20 mm
Z: 0 mm
Material: Steel
Density: 7.85 kg/dm³
Mass: 7.398 kg
Inertia: 278,1 kgcm²

Number: 1

On one point
 Evenly over 360°
 Angle distribution

alpha: 0°
delta: 0°
A*: 0 mm

Object: Add Subtract

As: 0 mm

Complete system

Description	No.	Type	Mass [kg]	Inertia [kgcm ²]	R [mm]	Angle [°]	SP [mm]
+ TEst body	1	Cylinder - vertical	7,398	278,1	0	0	100
=			7,398	278,1	0	0	100

Close

Load



Saves automatically



Manual saving

Previously, only the result was saved in NCP. Now the corresponding body is also stored, so that it can be traced how the mass inertia was calculated. In custom load, the body must still be saved manually.

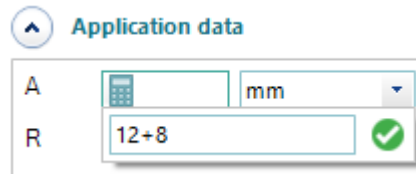


Overall improvements

Calculator in input fields

It's possible to do calculations within the input fields.

This can be done by clicking on the calculator icon or with the key F2.



Operations which can be done

operation	character to use	example
addition	+	5 + 32
subtraction	-	120 - 23
multiplication	*	5 * 23
division	/	120 / 23
brackets	()	(3 + 2) / 2
Power	Pow(x;y) *	Pow(3;2) $\hat{=}$ 3 ²

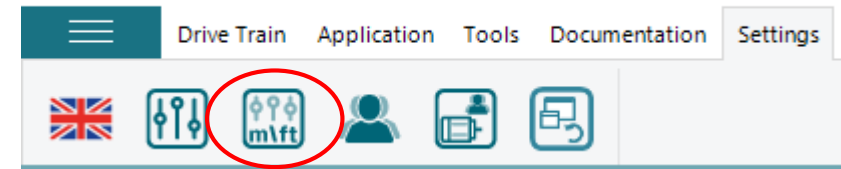
* Note: it's case-sensitive



Overall Improvements

Conversion of input data

You can set whether the input values are to be converted to the new unit after changing the unit or whether they are to remain unchanged.



a)

Input value conversion in the event of unit change

- Convert input values in new units
- Only change the units, do not convert the values



b)

Input value conversion in the event of unit change

- Convert input values in new units
- Only change the units, do not convert the values

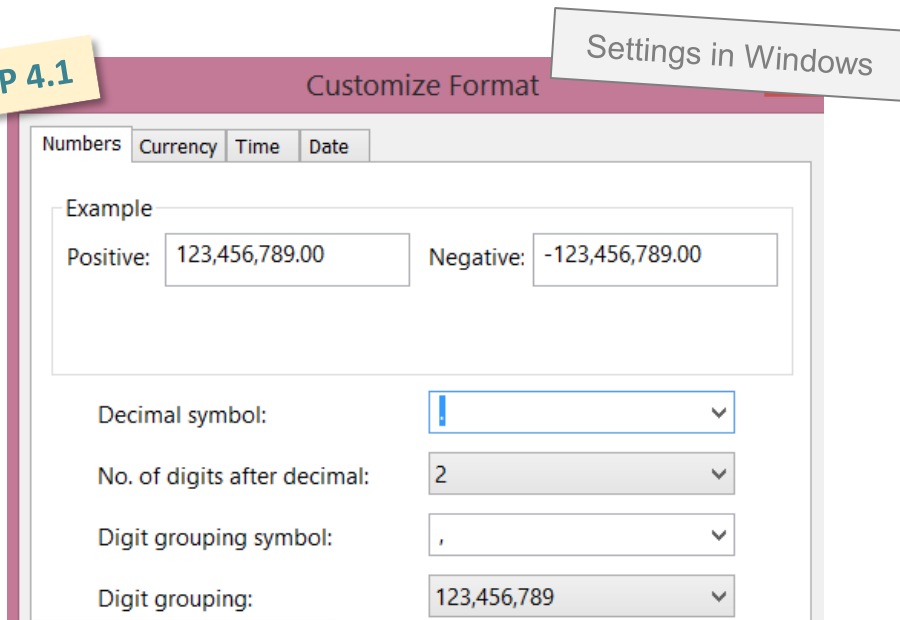


Overall improvements

Decimal separator

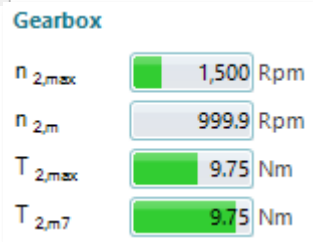
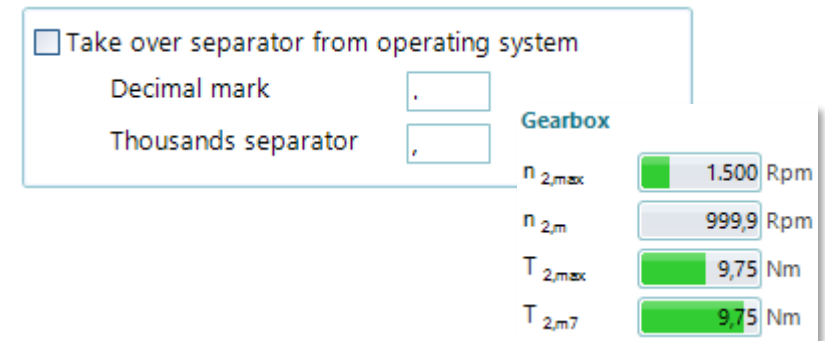


NCP 4.1



NCP 4.2

The decimal separator can be set up. NCP is no more limited by the system settings of Windows.



Decimal separator of Windows is used.






However, designer engineers often work with CAD software in which the separator is the point "."







Overall improvements



Showing number of gearbox stages


NCP 4.1


Gearbox     

Series  

Frame size  

Ratio  

 **Properties**






 **Technical data**



T _{2N}	<input type="text" value="44"/>	<input type="text" value="Nm"/>
T _{2max}	<input type="text" value="70"/>	<input type="text" value="Nm"/>
n _{1N}	<input type="text" value="4.500"/>	<input type="text" value="U/min"/>
n _{1max}	<input type="text" value="13.000"/>	<input type="text" value="U/min"/>
J ₁	<input type="text" value="0,076"/>	<input type="text" value="kgcm<sup>2</sup>"/>



This was a wish of many users.



Example:
PLQE060-064: p = 2
PLQE060-060: p = 3


NCP 4.2


Gearbox     

Series  

Frame size  

Ratio  

 **Properties**

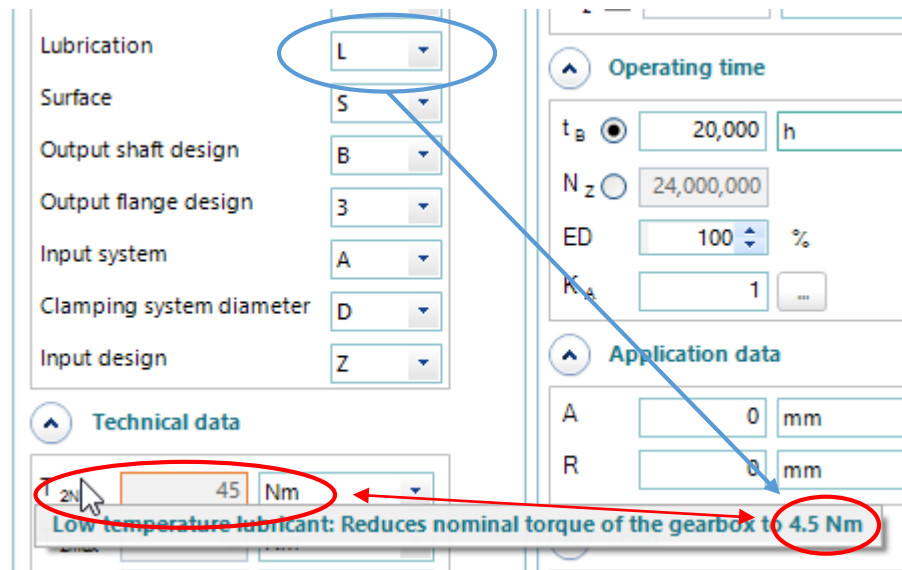
 **Technical data**

T _{2N}	<input type="text" value="44"/>	<input type="text" value="Nm"/>
T _{2max}	<input type="text" value="70"/>	<input type="text" value="Nm"/>
n _{1N}	<input type="text" value="4,500"/>	<input type="text" value="Rpm"/>
n _{1max}	<input type="text" value="13,000"/>	<input type="text" value="Rpm"/>
J ₁	<input type="text" value="0,076"/>	<input type="text" value="kgcm<sup>2</sup>"/>
p	<input type="text" value="3"/>	



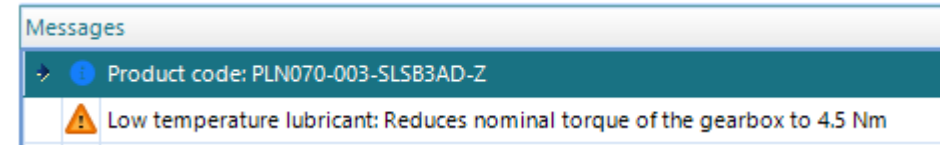
Overall improvements

Deep temperature lubrication



If the gearbox uses deep temperature lubrication the nominal torque can be limited. This is better visualized in 4.2:

- Additional frame to the nominal torque
- Tooltip at T_{2N}
- Like in 4.1: message in the lower area

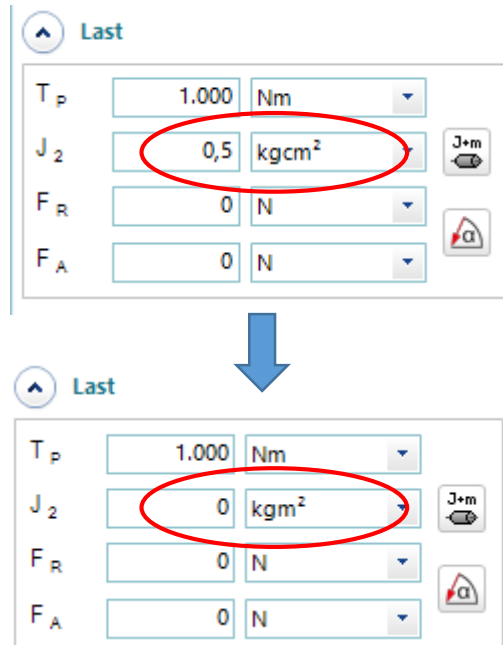




Overall improvements

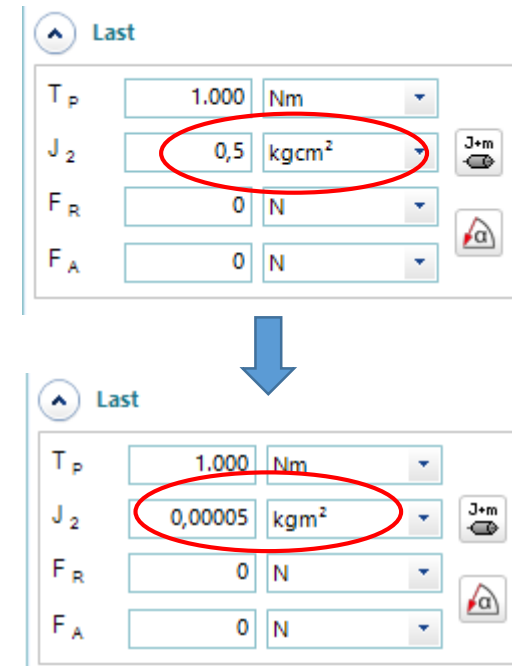
Decimal place, rounding function

NCP 4.1



The screenshot shows the NCP 4.1 interface with a 'Last' button at the top left. Below it are four rows of input fields: T_P (1.000 Nm), J_2 (0,5 kgcm²), F_R (0 N), and F_A (0 N). A red oval highlights the J_2 field. A blue arrow points down to a second screenshot where the J_2 field now displays '0' instead of '0,5', indicating a rounding error.

NCP 4.2



The screenshot shows the NCP 4.2 interface with the same 'Last' button and input fields. The J_2 field is highlighted with a red oval and displays '0,5 kgcm²'. A blue arrow points down to a second screenshot where the J_2 field displays '0,00005 kgcm²', showing the correct value with more decimal places.

The rounding function in 4.1 sometimes results in an adverse display: 0,00005 is shown as „0“. Nevertheless NCP is calculating with the correct value.







Depending on the decimal place NCP shows the correct value.



Spindle application

Friction torque

Various manufacturers show the friction torque of their spindles. It is now possible to consider that in NCP.

Load      

▼ Dynamics

▼ Operating time

▲ Application data

P	<input type="text" value="20"/>	<input type="text" value="mm"/>	<input type="button" value="J+m"/>
d	<input type="text" value="10"/>	<input type="text" value="mm"/>	
J _s	<input type="text" value="0"/>	<input type="text" value="kgcm<sup>2</sup>"/>	<input type="button" value="J+m"/>
μ _s	<input type="text" value="0.1"/>		
α	<input type="text" value="0"/>	<input type="text" value="°"/>	
m _T	<input type="text" value="0"/>	<input type="text" value="kg"/>	<input type="button" value="J+m"/>
m _c	<input type="text" value="0"/>	<input type="text" value="kg"/>	<input type="button" value="J+m"/>
μ _T	<input type="text" value="0"/>		
M_r	<input type="text" value="0.6"/>	<input type="text" value="Nm"/>	
η	<input type="text" value="100"/>	<input type="text" value="%"/>	

No-load torque

	[Nm]	
Type	with ball bearing	with slide bearing
EP 18	0.30	*
EP 30	0.60	0.75
EP 40	0.70	0.85
EP 50	1.10	1.25
EP 60	1.40	*
EP 80	1.00	*

NCP[®] 4.2 Features in detail



Individual object

Cylinder - horizontal

Description: Table_Tisch

L: 25 mm
D: 400 mm
d: 0 mm
Z: 0 mm

Material: Steel
Density: 7.85 kg/dm³
Mass: 0 kg
Inertia: 0 kgcm²

Number: 1

On one point
 Evenly over 360°
 Angle distribution

alpha: 0°
delta: 0°
A*: 0 mm

Object: Add Subtract

As: 0 mm

Complete system

	Description	No.	Type	Mass [kg]	Inertia [kgcm ²]	R [mm]	Angle [°]	SP [mm]
+	Table_Tisch	1	Cylinder - horizontal	24.66	4.932	0	0	12.5
+	Tools_Werkzeuge	4	Cylinder - horizontal	14.5	3.352	97.99	67.5	60
=				39.16	8.284	36.28	67.5	30.09

39.16 8.284 36.28 67.5 30.09

Apply Cancel



Rotary table application

Transfer of mass inertia calculator values



Load

▼ Dynamics

▼ Operating time

▼ Application data

▲ Load

T_p: 0 Nm

J₂: 8,284 kgcm²

m: 39.16 kg

R_{er}: 36.28 mm

All necessary results are transferred to the corresponding fields on the main screen.

NCP[®] 4.2 Features in detail



NCP 4.1

7.2 Gearbox

Description	Symbol	Value	Unit	Load capacity
Max. output speed	$n_{2, max}$	100	U/min	2%
Average output speed	$n_{2, m}$	66,7	U/min	
Maximum output torque	$T_{2, max}$	1,74	Nm	10%
Average output torque (^{^7})	$T_{2, m7}$	1,57	Nm	14%
Max. radial force	$F_{R, max}$	156	N	
Average radial force	$F_{R, m}$	133	N	
Max. axial force	F_{Amax}	384	N	
Average axial force	F_{Am}	384	N	
Bearing service life	L_{10h}	122.180	h	16%
Dynamic shaft safety factor	S_d	1,35	-	89%
Static shaft safety factor	S_f	3,61	-	33%
Feather key safety factor	S_p	13,3	-	11%
Thermal capacity	$^{\circ}C$	25	-	4%



Documentation
Visualization of work load

NCP 4.2

Symbol	Value	Unit	Load capacity
$n_{2, max}$	100	Rpm	2%
$n_{2, m}$	66.66	Rpm	
$T_{2, max}$	1.735	Nm	10%
$T_{2, m7}$	1.571	Nm	14%
$F_{R, max}$	155.8	N	
$F_{R, m}$	133.2	N	
F_{Amax}	384.2	N	
F_{Am}	384.2	N	
L_{10h}	122,180	h	16%
S_d	1.349	-	89%
S_f	3.614	-	33%
S_p	12.74	-	12%
$^{\circ}C$	25	-	4%

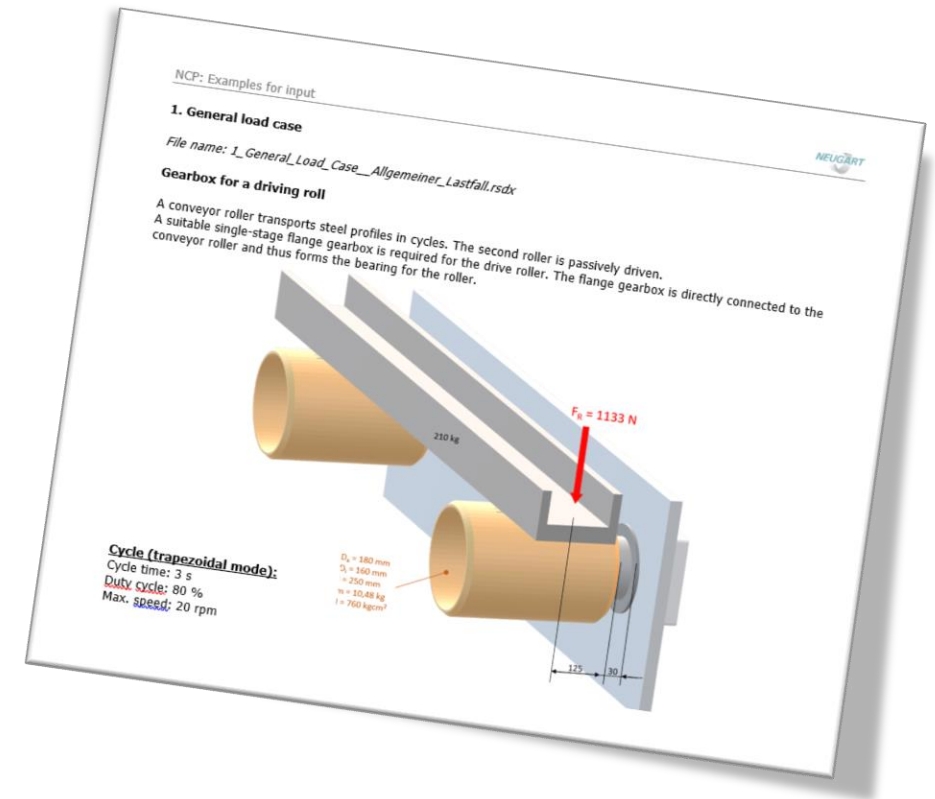
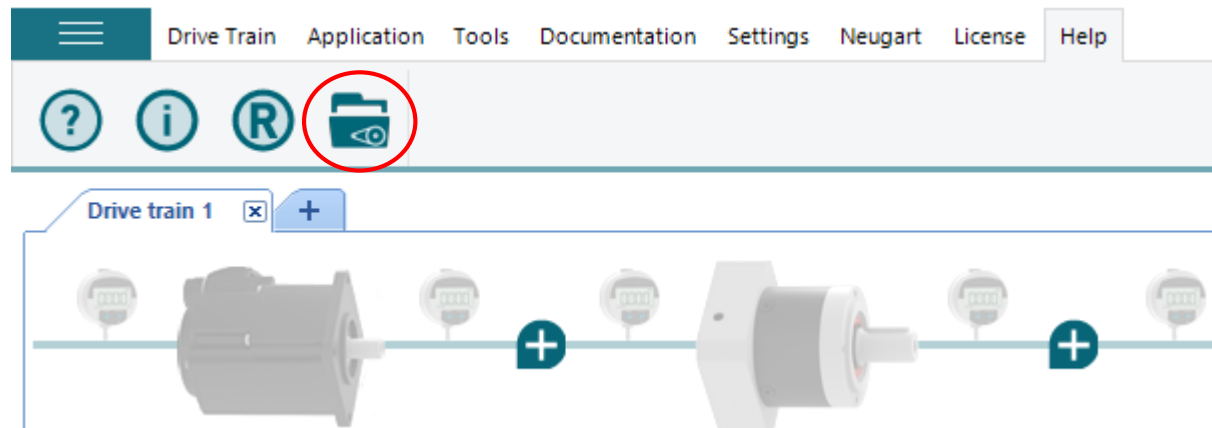
The results are highlighted with color bars.



Help

Examples of applications

A folder with examples is integrated.
There is one example with solution for each application.



NCP[®] 4.2 Features in detail



New application: traction drive

NCP 4.2 (Neugart GmbH)

Drive Train Application Tools Documentation Settings Neugart License Help

Leer_a_max/v_max voll_a_m/v_m AGV 3 +

Motor

Manufacturer:

Series:

Basic type:

Special type:

Technical data

T_N : 0 Nm

T_{max} : 0 Nm

n_N : 0 Rpm

n_{max} : 0 Rpm

J : 0 kgcm²

P : 0 W

Geometric data

D60: 0 mm

L60: 0 mm

D61: 0 mm

L61: 0 mm

D65: 0 mm

Flange:

Thread:

Gearbox

Series: PFHE

Frame size: 110

Ratio: 008

Properties

Torsional backlash: S

Lubrication: S

Surface: S

Output shaft design: D

Output flange design: 3

Input system: A

Clamping system diameter: F

Input design: E

Technical data

T_{2V} : 120 Nm

T_{2max} : 192 Nm

n_{2N} : 3,150 Rpm

n_{2max} : 6,500 Rpm

J_1 : 1.614 kgcm²

P : 1

Load

Load input: Open load definition...

Operating time

t_g : 20,000 h

N_z : 24,000,000

ED: 100 %

K_A : 1

Application data

Select wheel drive:

A: 0 mm

n_r : 2

d_r : 100 mm

J_r : 0 kgcm²

n_{rg} : 2

d_{rg} : 100 mm

J_{rg} : 0 kgcm²

α : 0 °

m_F : 0 kg

μ_R : 0.5

c_R : 0.02

η : 100 %

Gauge 0: Application

Calculation results

Application

t_G : 3 s

t_{acc} : 3 s

ED: 100 %

$n_{A,max}$: 2865 Rpm

$n_{A,m}$: 191 Rpm

$T_{A,max}$: 84.81 Nm

$T_{A,m7}$: 71.05 Nm

Gearbox

$n_{2,max}$: 2865 Rpm

$n_{2,m}$: 191 Rpm

$T_{2,max}$: 84.81 Nm

$T_{2,m7}$: 71.05 Nm

$F_{R,max}$: 4.978 N

$F_{R,m}$: 4.935 N

$F_{A,max}$: 0 N

$F_{A,m}$: 0 N

L_{10h} : 45,059 h

S_e : 15

S_f : 15

S_p : 0

t_c : 2.291

Motor

$n_{1,max}$: 0 Rpm

$n_{1,m}$: 0 Rpm

$T_{1,max}$: 0 Nm

$T_{1,m2}$: 0 Nm

$\lambda_{1,max}$: 0


Messages


Product code: PFHE110-008-SSSD3AF-E





New application: traction drive


Application data


Select wheel drive 


A mm 


n_r 


d_r mm 


J_r kgcm² 

n_{rg} 

d_{rg} mm 


J_{rg} kgcm² 


α ° 


m_F kg 

μ_R



c_R


η % 



Typ 

F_f N 

Load

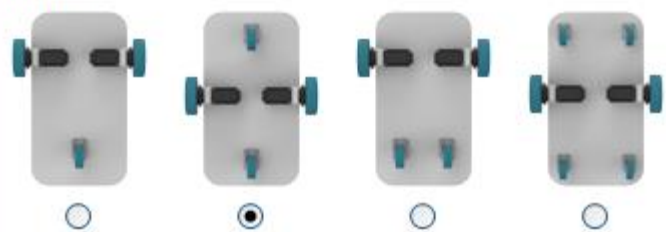
m kg  

F_p N 


F_z N  

Number of drive wheels

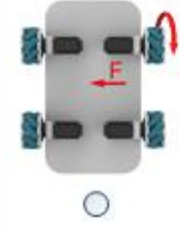
Direct



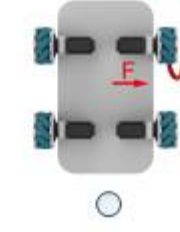
Spring-mounted



Mecanum left



Mecanum right



Apply Cancel

Thanks for using

