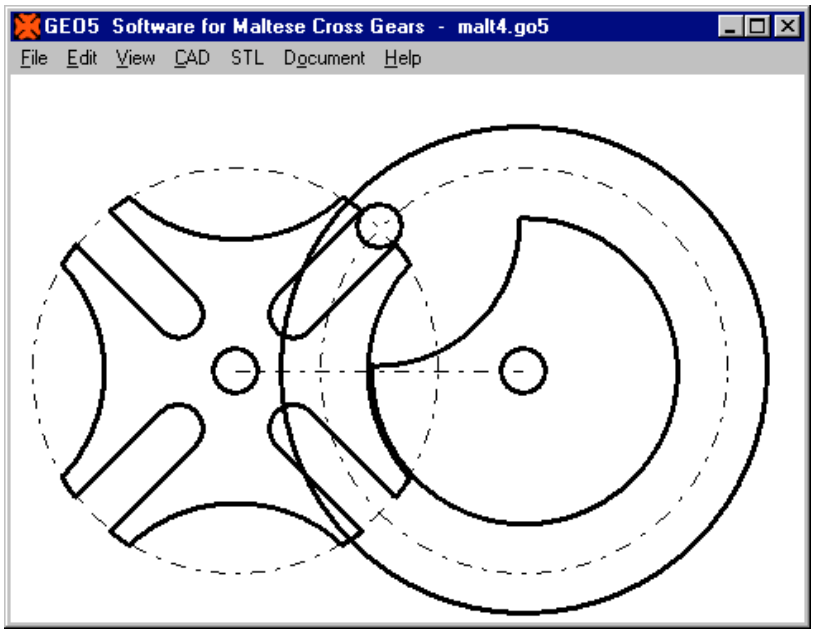
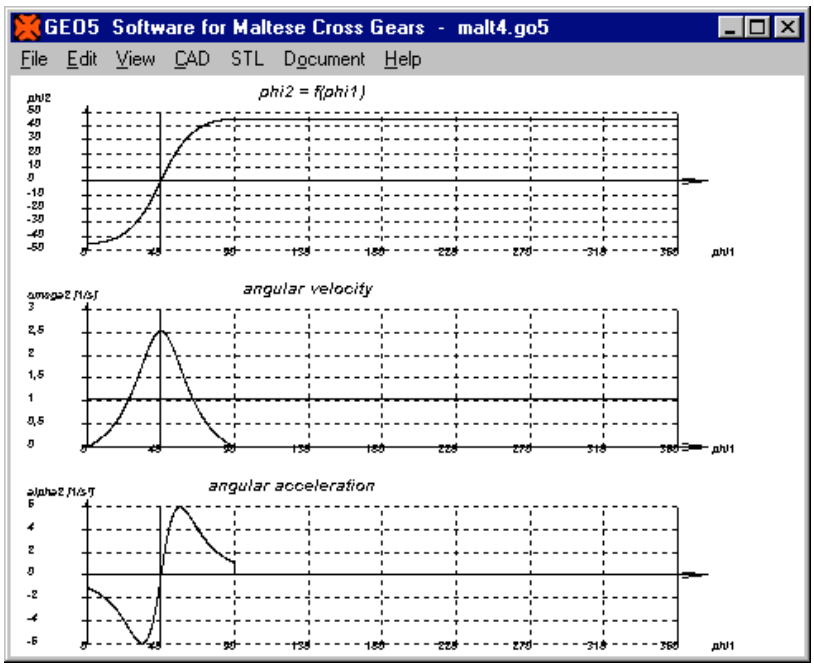
HEXAGON Newsletter 162 **March / April 2017**

by Fritz Ruoss

GEO5 – New Software for Geneva Drive Mechanism (Maltese Cross Drive)
Our new software calculates dimensions of Geneva drive mechanism with 3, 4, 5, 6, 8 or more beams.



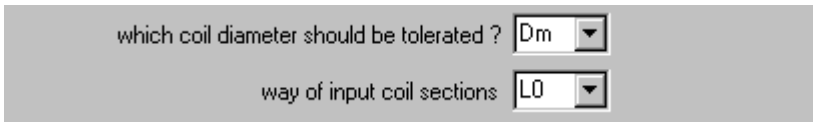
In an animation you can watch the motion of driving wheel and Maltese cross wheel on screen. Curves of travel, speed and acceleration are shown as diagram.



Finally you can print all components of the Geneva drive (except bolts and shafts) on your 3D printer and assemble a functioning model. GEO5 is available now for 218 EUR.

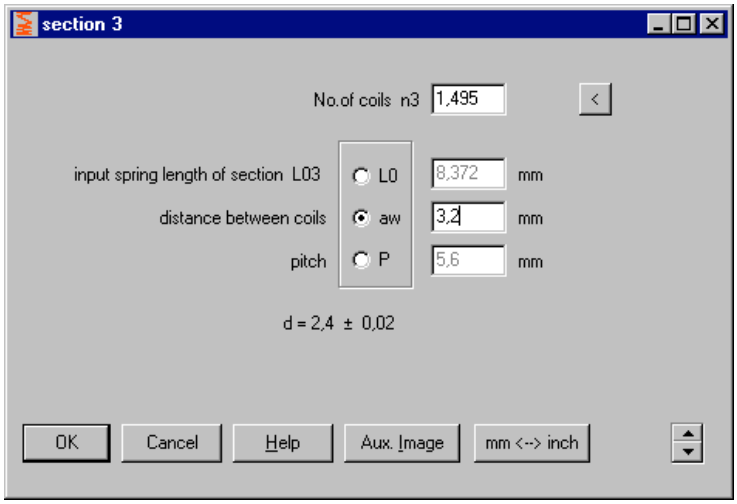
FED6 – Input Dm, Di, De

Same as in FED1+, you now can in FED6 choose between input of mean coil diameter Dm, external coil diameter De, or inner coil diameter Di. The selected diameter is printed with tolerances.



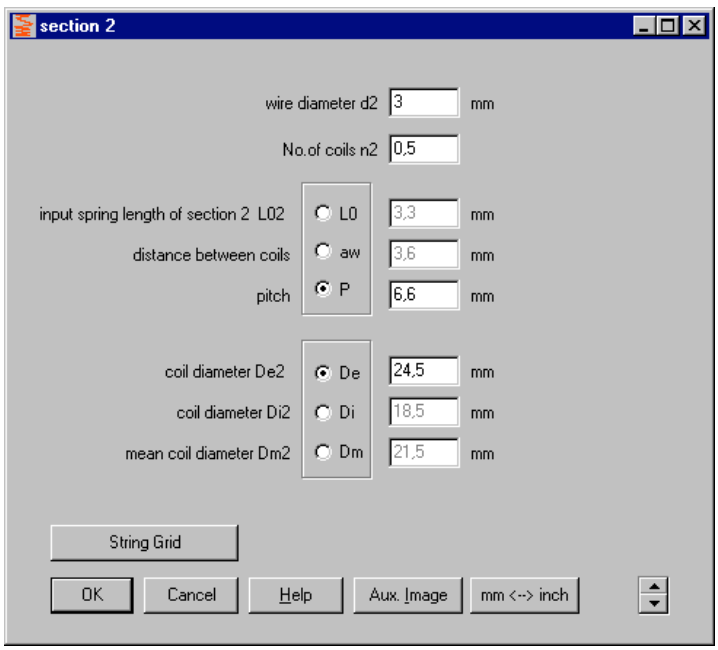
FED6 – Input either L0 or aw or P for coil sections

As alternative to unloaded length of coil section, you can now enter distance between coils aW or pitch P of each coil section. Input influences table in production drawing: selected value is printed in the table.



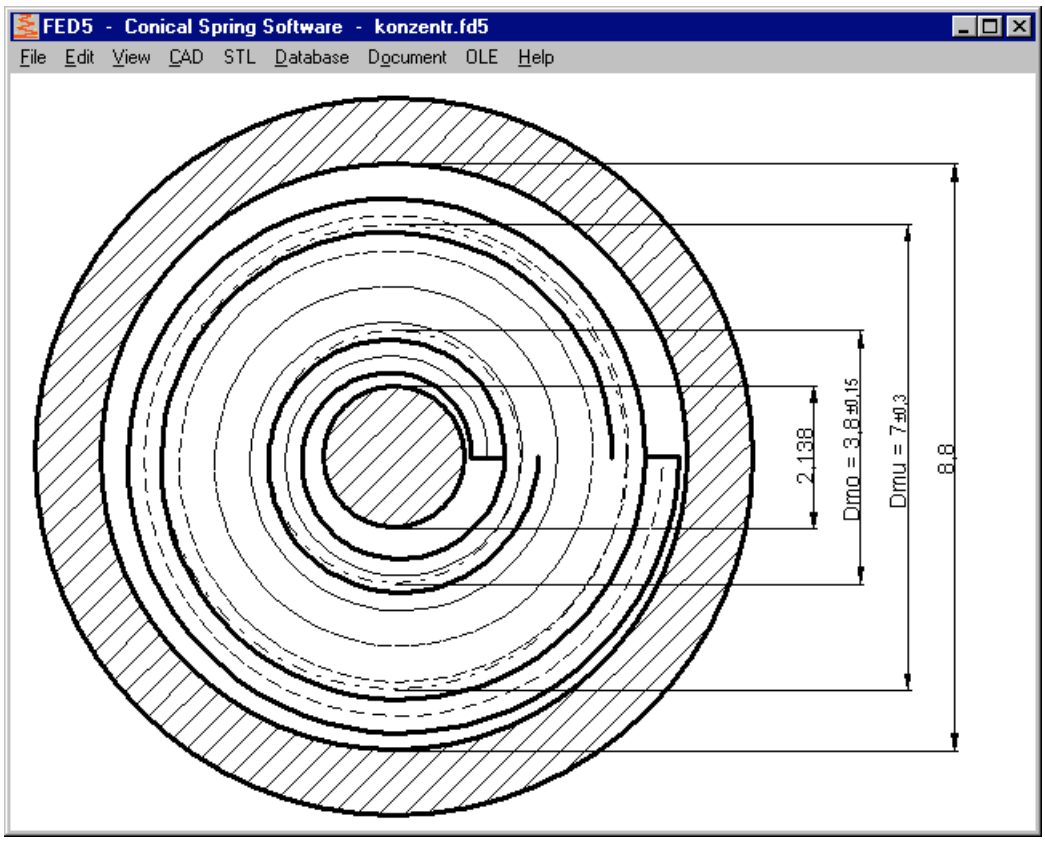
FED7 – Input L0 or aW or P and Dm, Di, De for coil sections

Input of coil sections became more flexible in FED7: as alternative to unloaded length L0i of each coil section, you can enter distance between coils awi or coil pitch Pi. And as alternative to center coil diameter Dm you can enter inner coil diameter Di or external coil diameter De. Input influences production drawing: chosen values are printed in the coil section table.



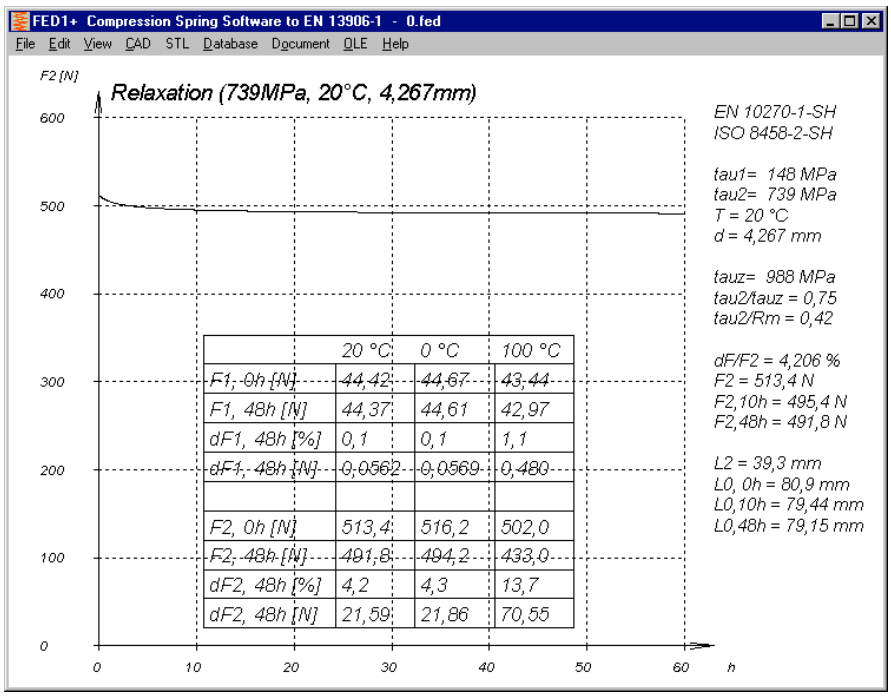
FED5: Upper View

By means of the new top view in FED5 you can evaluate guidance of the conical spring by mandrel and bore, especially for concentric end coils. Drawing includes mandrel and bore together with the end coils of the conical spring. Active coils are indicated as spiral center line.



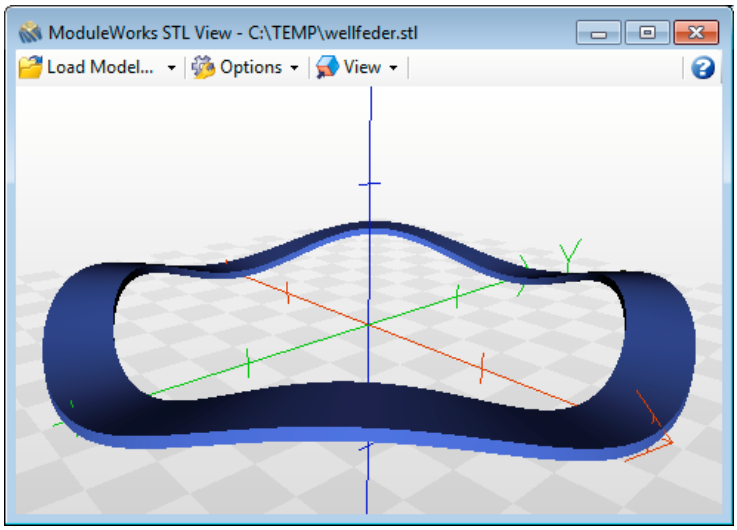
FED1+: Relaxation table

In the relaxation diagram f(t), spring load F1 was wrong, printed as F2. Error was corrected, thanks to Mr. Balic of Joos springs. If you received your software between August 2016 and April 2017 and you get wrong value for F1 in relaxation table, please request a free update.

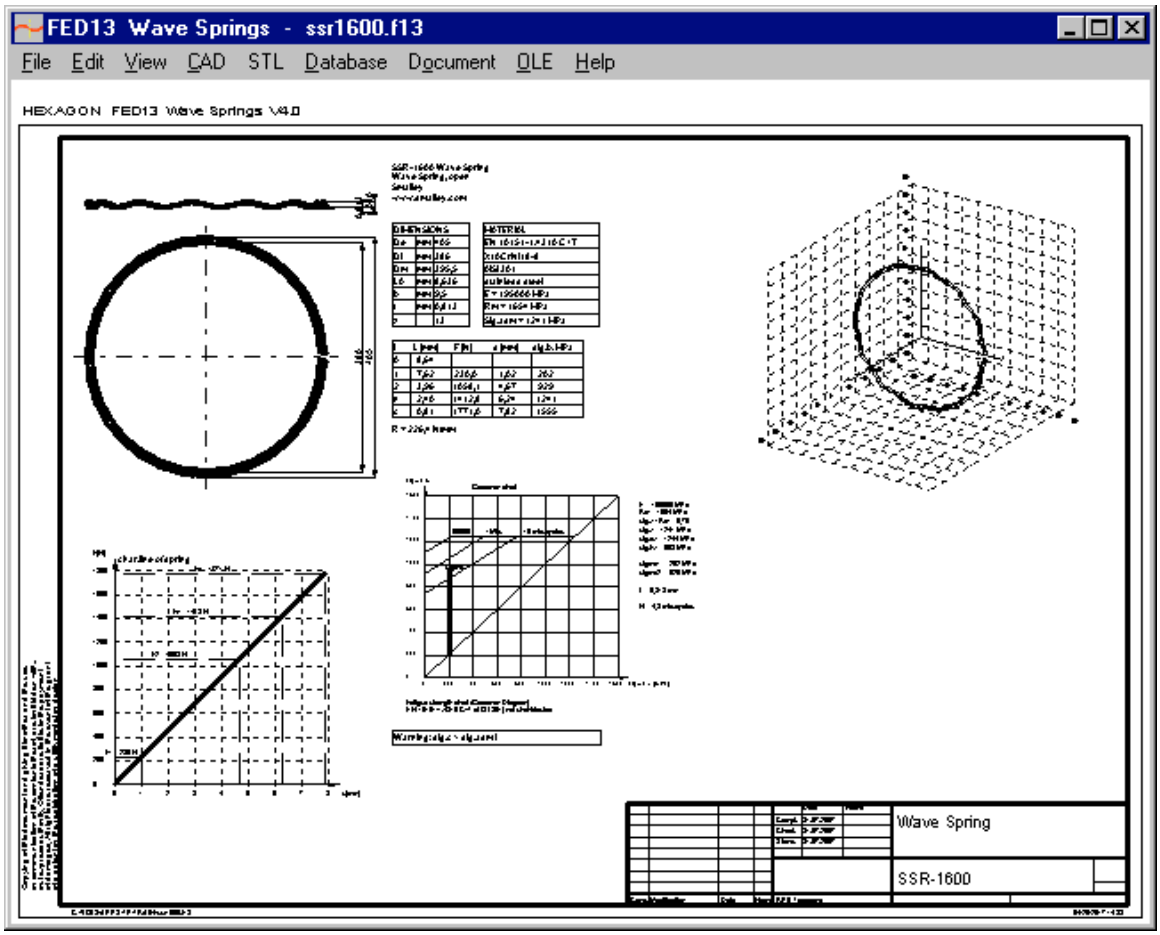


	20 °C	0 °C	100 °C
F1, 0h [N]	44,42	44,67	43,44
F1, 48h [N]	44,37	44,61	42,97
dF1, 48h [%]	0,1	0,1	1,1
dF1, 48h [N]	0,0562	0,0569	0,480
F2, 0h [N]	513,4	516,2	502,0
F2, 48h [N]	491,8	494,2	433,0
dF2, 48h [%]	4,2	4,3	13,7
dF2, 48h [N]	21,59	21,86	70,55

FED13 - 3D STL-Model
A 3D model of a wave spring can be generated as STL file and displayed with a 3D viewer or printed with a 3D printer.

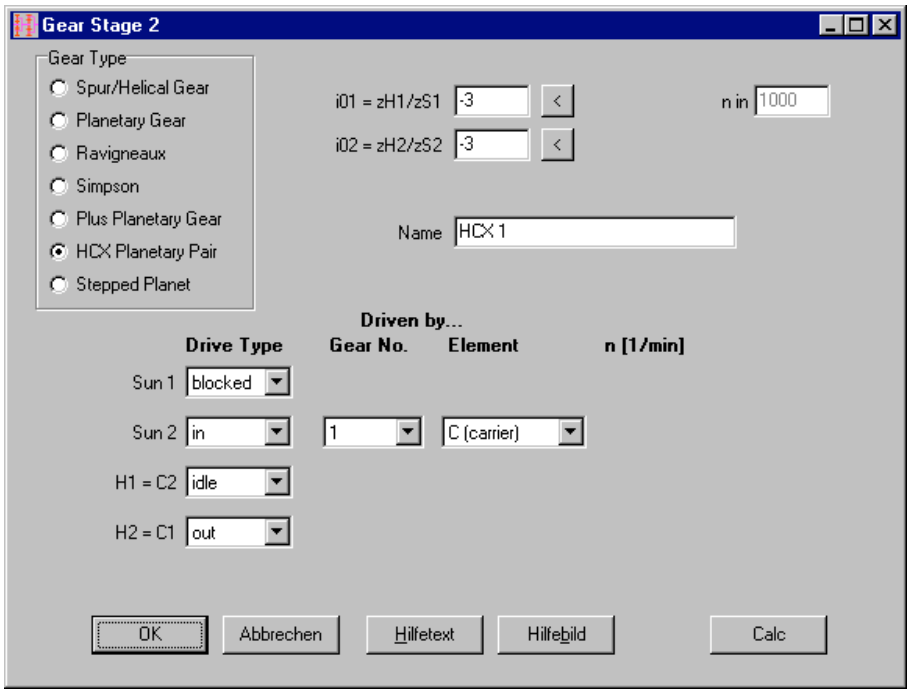


FED13 – Quick4 View
Quick4 View includes wave spring data, drawings and diagrams altogether in an A3 drawing frame.

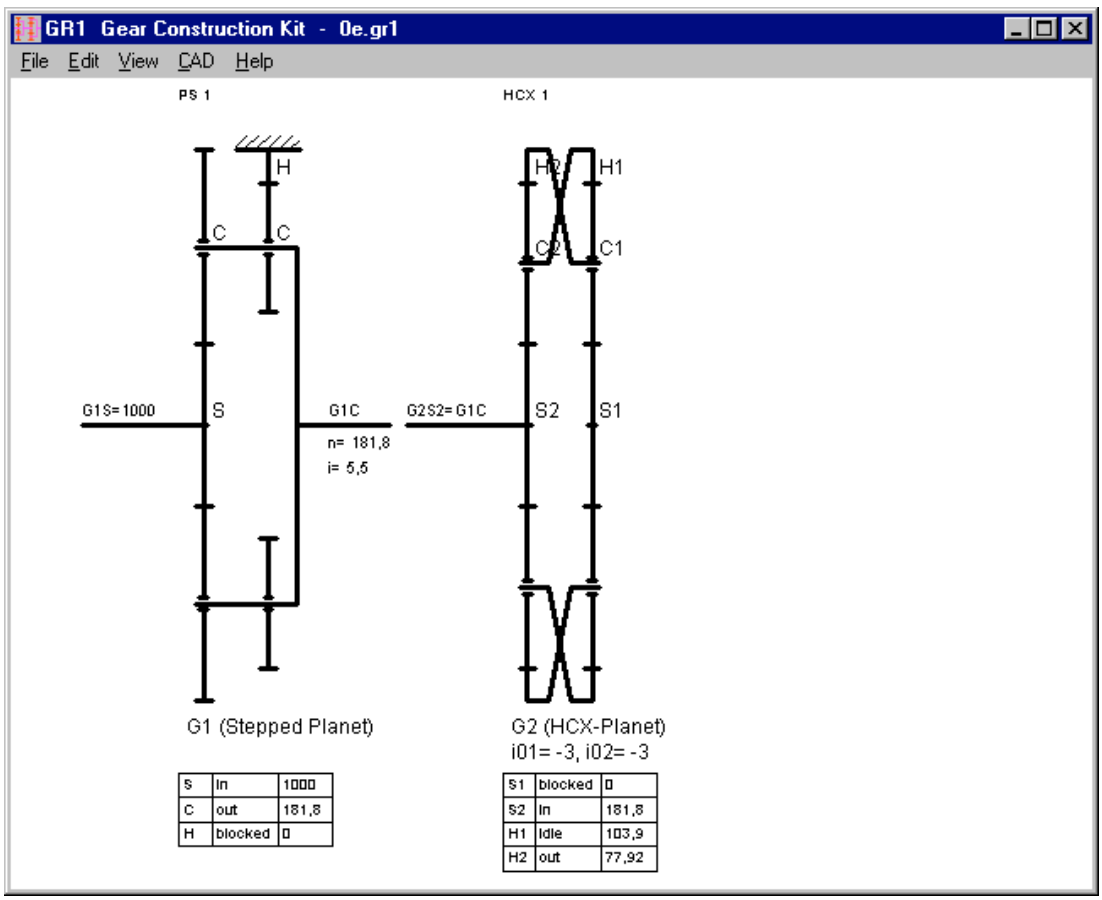


FED13 – New Price
New price of FED13 (individual license) is 228 EUR (instead of 185).

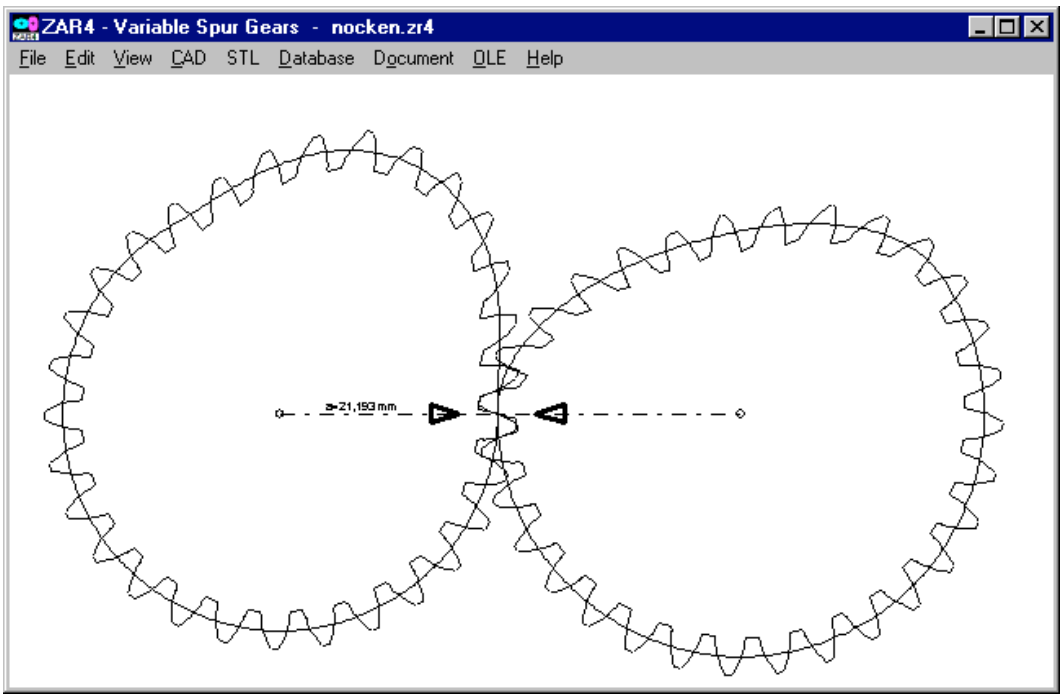
GR1: New gear elements "Stepped Planet" and "HCX Planetary Pair"
By means of our GR1 gear construction kit software you can now also assemble stepped planetary gears and "HCX" planetary gear pairs with crosswise connected carriers and hollow gears.



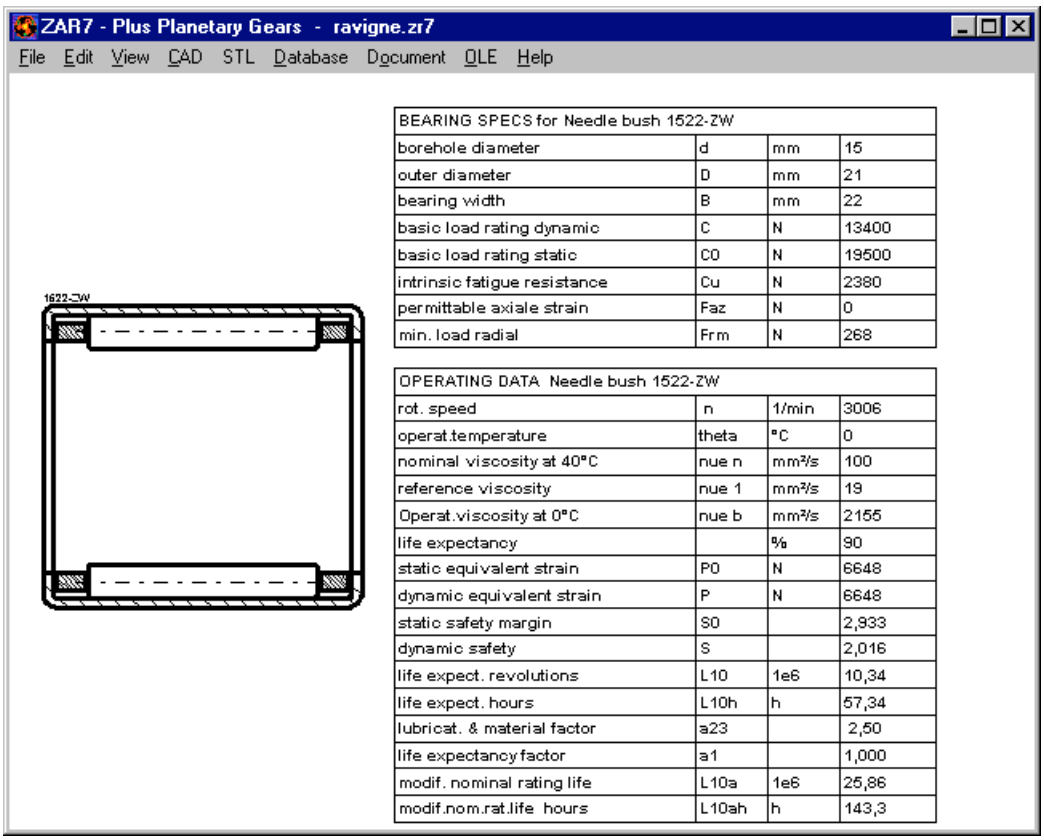
HCX planetary pair has, similar than Simpson or Ravigneux set, one or two input shafts, one output shaft and one idle shaft. Stepped planetary gears compared with simple planetary gears are used for larger transmission ratio.



ZAR4: Noncircular Gears with Mounting Mark
To avoid error in assembly, gears are now marked by an arrow.
And a new demo version of ZAR4 was made with the possibility to produce noncircular gears on 3D printers.



ZAR5, ZAR7, ZAR8: Roller Bearing Drawing
Same as known from LG1 and WL1+, drawing of roller bearing together withwith bearing data table can be shown and printed in the planetary gear software now. Thanks for the suggestion to Mr. Schulze of BS Antriebstechnik.

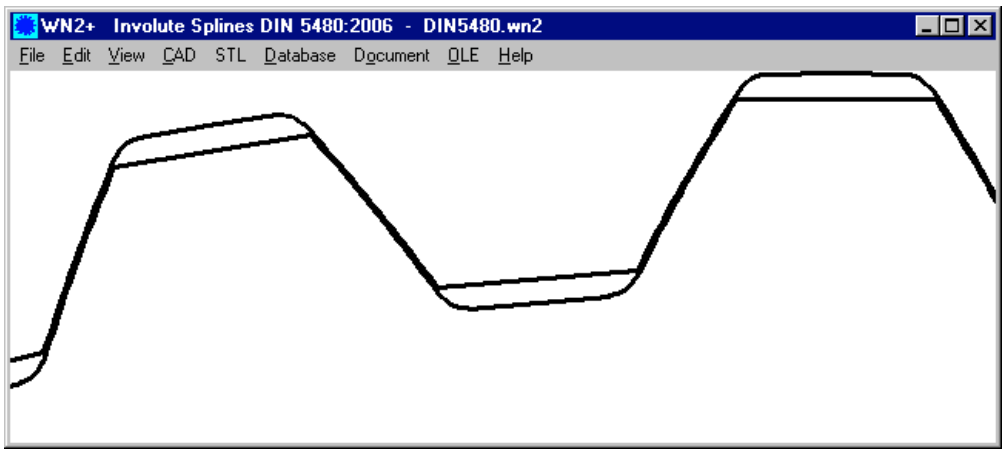


BEARING SPECS for Needle bush 1522-ZW			
borehole diameter	d	mm	15
outer diameter	D	mm	21
bearing width	B	mm	22
basic load rating dynamic	C	N	13400
basic load rating static	C0	N	19500
intrinsic fatigue resistance	Cu	N	2380
permittable axiale strain	Faz	N	0
min. load radial	Frm	N	268

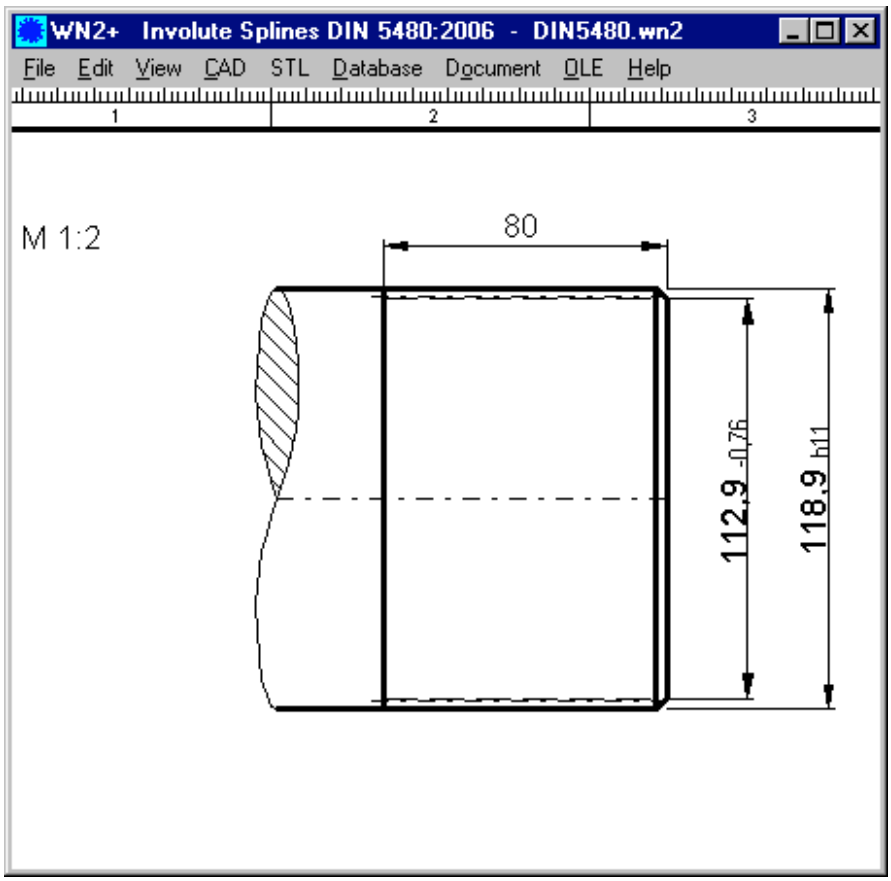
OPERATING DATA Needle bush 1522-ZW			
rot. speed	n	1/min	3006
operat.temperature	theta	°C	0
nominal viscosity at 40°C	nue n	mm²/s	100
reference viscosity	nue 1	mm²/s	19
Operat.viscosity at 0°C	nue b	mm²/s	2155
life expectancy		%	90
static equivalent strain	P0	N	6648
dynamic equivalent strain	P	N	6648
static safety margin	S0		2,933
dynamic safety	S		2,016
life expect. revolutions	L10	1e6	10,34
life expect. hours	L10h	h	57,34
lubricat. & material factor	a23		2,50
life expectancy factor	a1		1,000
modif. nominal rating life	L10a	1e6	25,86
modif.nom.rat.life hours	L10ah	h	143,3

ZAR1+: Calculation to DIN 3390 Part 41
Apparently some users always calculate gear strength according to DIN 3990 part 41 because this is the most convenient way with only few input data. However, DIN 3990 part 41 is valid only for automotive gears of case hardening steel, surface hardened or carbonitrided, and for gear quality 5 to 7 according to DIN 3961 or 4 till 6 according to ISO 1328. New error message „DIN 3990-41!“ appears now if one or more of these criteria are not fulfilled.

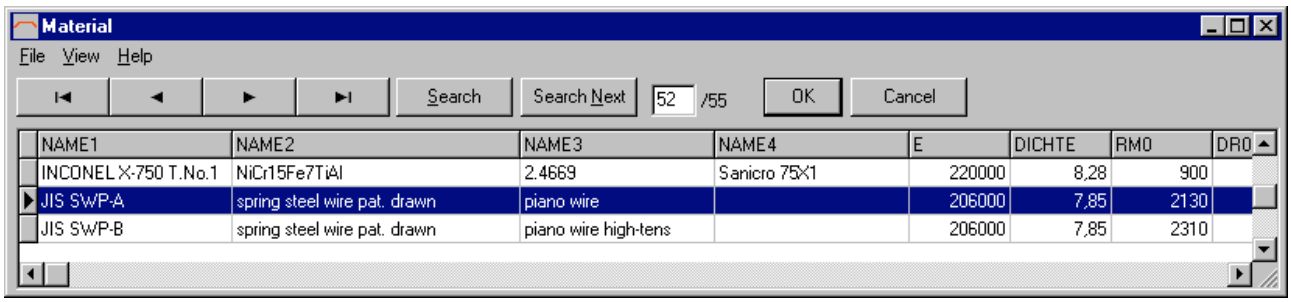
WN2+, WN4, WN5, WN10, WNXE: Plot direction
In a drawing it makes no difference in which direction lines, arcs and circles are drawn. Our DXF Manager software can be used in animation mode to show sequence and direction of DXF drawing elements. After each teeth there was a jump because drawing sense changed. This was unified now. If you convert tooth profile into a CNC track for wire eroding etc., track now runs without jump.



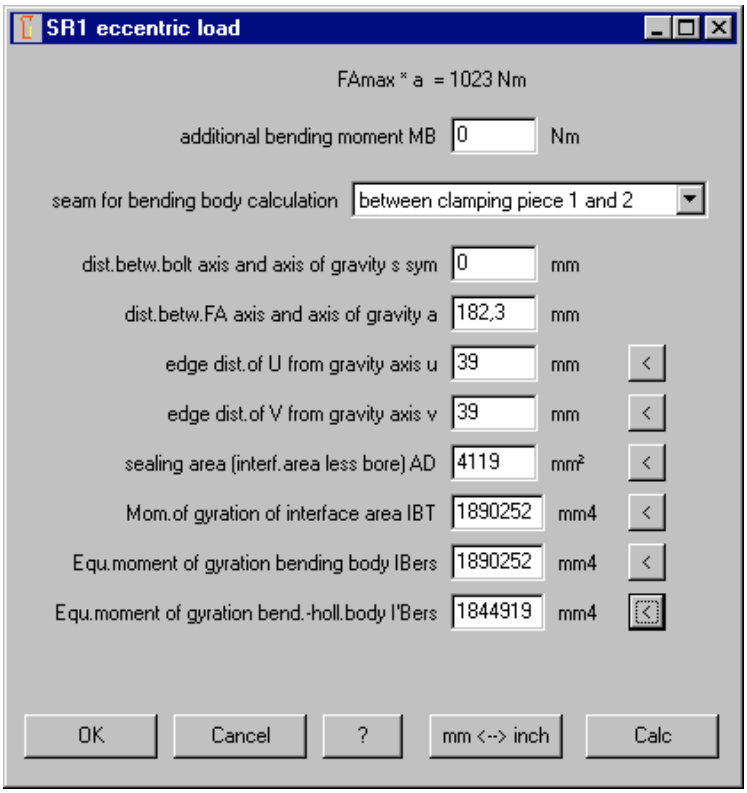
WN2,WN4,WN10,WNXE: Face width dimensioned in production drawings
Length of toothing is dimensioned now in production drawing of involute spline software.



FED4, FED9, FED10, FED14: SWP-A and SWP-B added
SWP-A and SWP-B wire according to JIS has been added in the material database.



SR1+ Sealing Area at Eccentric Load
Button „<“ at "AD" now calculates sealing area from minimum outside diameter and maximum bore diameter of both of the clamping plates that have been selected above. Thanks to Mr. Lederer of Vossloh Locomotives for the improvement suggestion.



Tip: Reduce file size of STL files
STL files of springs are very large because circles are drawn as polygons. Both, wire diameter as well as coil diameter. Resolution of coils can be configured at "Edit\Calculation Method", default is 2 deg. Resolution of wire diameter can be configured at "File\Settings\CAD". Not in degrees here, but in millimeters. Default is 0.1mm. STL file of a compression spring with d = 3 mm and 5 coils was by default 10 MB. By increase of angle to 10 deg and resolution to 0.5 mm, file size was reduced from 10 MB to 0.5 MB.

FAQ: What means Fn' in Load-deflection diagram of FED1+ ?
Fn' is the load with shear stress taun' = tauz (permissible). Fn´ is displayed and printed only for springs with shear stress at block length higher than permissible shear stress (tauc > tauz).

HEXAGON PRICELIST 2017-04-28

PRODUCT	EUR
DI1 Version 1.2 O-Ring Seal Software	190,-
DXF-Manager Version 9.0	383,-
DXFPLOT V 3.2	123,-
FED1+ V29.6 Helical Compression Springs incl. spring database, animation, relax., 3D,..	695,-
FED2+ V20.2 Helical Extension Springs incl. spring database, animation, relaxation, ...	675,-
FED3+ V19.0 Helical Torsion Springs incl. prod.drawing, animation, 3D, rectang.wire, ...	480,-
FED4 Version 7.3 Disk Springs	430,-
FED5 Version 15.7 Conical Compression Springs	741,-
FED6 Version 16.3 Nonlinear Cylindrical Compression Springs	634,-
FED7 Version 13.2 Nonlinear Compression Springs	660,-
FED8 Version 6.9 Torsion Bar	317,-
FED9 Version 6.0 Spiral Spring	394,-
FED10 Version 3.5 Leaf Spring (complex)	500,-
FED11 Version 3.3 Spring Lock and Bushing	210,-
FED12 Version 2.4 Elastomere Compression Spring	220,-
FED13 Version 4.0 Wave Spring Washers	228,-
FED14 Version 1.4 Helical Wave Spring	395,-
FED15 Version 1.3 Leaf Spring (simple)	180,-
FED16 Version 1.0 Constant Force Spring	225,-
FED17 Version 1.0 Magazine Spring	725,-
GEO1+ V6.1 Cross Section Calculation incl. profile database	294.-
GEO2 V2.6 Rotation Bodies	194,-
GEO3 V3.3 Hertzian Pressure	205,-
GEO4 V4.2 Cam Software	265,-
GEO5 V1.0 Geneva Drive Mechanism Software	218,-
GR1 V2.0 Gear construction kit software	185,-
HPGL-Manager Version 9.0	383,-
LG1 V6.4 Roll-Contact Bearings	296,-
LG2 V2.2 Hydrodynamic Plain Journal Bearings	460,-
SR1 V22.3 Bolted Joint Design	640,-
SR1+ V22.3 Bolted Joint Design incl. Flange calculation	750,-
TOL1 V11.8 Tolerance Analysis	506,-
TOL1CON V1.5 Conversion Program for TOL1	281,-
TOL2 Version 3.3 Tolerance Analysis	495,-
TOLPASS V4.1 Library for ISO tolerances	107,-
TR1 V4.0 Girder Calculation	757,-
WL1+ V20.0 Shaft Calculation incl. Roll-contact Bearings	945,-
WN1 Version 11.6 Cylindrical and Conical Press Fits	485,-
WN2 V10.0 Involute Splines to DIN 5480	250,-
WN2+ V10.0 Involute Splines to DIN 5480 and non-standard involute splines	380,-
WN3 V 5.4 Parallel Key Joints to DIN 6885, ANSI B17.1, DIN 6892	245,-
WN4 V 4.6 Involute Splines to ANSI B 92.1	276,-
WN5 V 4.6 Involute Splines to ISO 4156 and ANSI B 92.2 M	255,-
WN6 V 3.0 Polygon Profiles P3G to DIN 32711	180,-
WN7 V 3.0 Polygon Profiles P4C to DIN 32712	175,-
WN8 V 2.2 Serration to DIN 5481	195,-
WN9 V 2.2 Spline Shafts to DIN ISO 14	170,-
WN10 V 4.1 Involute Splines to DIN 5482	260,-
WN11 V 1.3 Woodruff Key Joints	240,-
WNXE V 2.0 Involute Splines - dimensions, graphic, measure	375,-
WNXK V 2.0 Serration Splines - dimensions, graphic, measure	230,-
WST1 V 10.0 Material Database	235,-
ZAR1+ V 25.4 Spur and Helical Gears	1115,-
ZAR2 V7.7 Spiral Bevel Gears to Klingelnberg	792,-
ZAR3+ V8.9 Cylindrical Worm Gears	620,-
ZAR4 V5.2 Non-circular Spur Gears	1610,-
ZAR5 V11.2 Planetary Gearings	1355,-
ZAR6 V3.7 Straight/Helical/Spiral Bevel Gears	585,-
ZAR7 V1.1 Plus Planetary Gears	1380,-

ZAR8 V1.1 Ravigneaux Planetary Gears	1950,-
ZARXP V2.1 Involute Profiles - dimensions, graphic, measure	275,-
ZAR1W V1.7 Gear Wheel Dimensions, tolerances, measure	450,-
ZM1.V2.5 Chain Gear Design	326,-

PACKAGES	**EUR**
HEXAGON Mechanical Engineering Package (TOL1, ZAR1+, ZAR2, ZAR3+, ZAR5, ZAR6, WL1+, WN1, WN2+, WN3, WST1, SR1+, FED1+, FED2+, FED3+, FED4, ZARXP, TOLPASS, LG1, DXFPLOT, GEO1+, TOL2, GEO2, GEO3, ZM1, WN6, WN7, LG2, FED12, FED13, WN8, WN9, WN11, DI1, FED15, WNXE, GR1)	8,500.-
HEXAGON Mechanical Engineering Base Package (ZAR1+, ZAR3+, ZAR5, ZAR6, WL1+, WN1, WST1, SR1+, FED1,+, FED2+, FED3+)	4.900,-
HEXAGON Spur Gear Package (ZAR1+ and ZAR5)	1,585.-
HEXAGON Planetary Gear Package (ZAR1+, ZAR5, ZAR7, ZAR8, GR1)	3,600.-
HEXAGON Involute Spline Package (WN2+, WN4, WN5, WN10, WNXE)	1,200.-
HEXAGON Graphic Package (DXF-Manager, HPGL-Manager, DXFPLOT)	741.-
HEXAGON Helical Spring Package (FED1+, FED2+, FED3+, FED5, FED6, FED7)	2,550.-
HEXAGON Tolerance Package (TOL1, TOL1CON, TOL2, TOLPASS)	945.-
HEXAGON Complete Package (All Programs of Engineering Package, Graphics Package, Tolerance Package, Helical Spring Package, Planetary Gear Package, TR1, FED8, FED9, FED10, ZAR4, GEO4, WN4, WN5, FED11,WN10, ZAR1W, FED14, WNXK, FED16, FED17, GEO5)	12,900.-

Quantity Discount for Individual Licenses

Licenses	2	3	4	5	6	7	8	9	>9
Discount %	25%	27.5%	30%	32.5%	35%	37.5%	40%	42.5%	45%

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Language Version:
- **German and English :** all Programs
- **French**: FED1+, FED2+, FED3+, FED4, FED5, FED6, FED7, FED9, FED10, FED13, FED14, FED15, TOL1, TOL2.
- **Italiano**: FED1+, FED2+, FED3+, FED4, FED5, FED6, FED7, FED9, FED13, FED14, FED17.
- **Swedish**: FED1+, FED2+, FED3+, FED5, FED6, FED7.
- **Portugues**: FED1+, FED17
- **Spanish**: FED1+, FED2+, FED3+, FED17

Updates:

Update prices	EUR
Software Update (software + pdf manual)	40,-
Software Update (software 64-bit Win + pdf manual)	50,-

Update Mechanical Engineering Package: 800 EUR, Update Complete Package: 1000 EUR
Maintenance contract for free updates: annual fee: 150 EUR + 40 EUR per program

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Conditions of payment: bank transfer in advance with 2% discount, or by credit card (Master, Visa) net.

Key Code
After installation, software has to be released by key code. Key codes will be sent after receipt of payment.

HEXAGON Industriesoftware GmbH
Stiegelstrasse 8 D-73230 Kirchheim Tel.+49 702159578 Fax +49 7021 59986
Kieler Strasse 1A D-10115 Berlin Mühlstr. 13 D-73272 Neidlingen
Mobile: +49 163 7342509 E-Mail: info@hexagon.de Web: http://www.hexagon.de