KISSsoft Release 2021

Modules List

For more details, please contact:
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## Base packages

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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</thead>
</table>
| **ZPK** | Cylindrical gear package  
- Geometry, control measures (DIN 3960, DIN 3962, DIN 3963, DIN 58400)  
- Tolerances as specified in updated ISO 1328-1, 2:2020 **NEW!**  
- Reference profiles according to JIS 1701-1  
- Calculation and presentation 2D and 3D of the tooth form for external and internal toothing  
- Graphical display of specific sliding  
- One strength calculation for a cylindrical gear, either as specified in ISO 6336 (ZA10) or DIN 3990 (ZA11) or AGMA 2001 (ZA12) or VDI 2545 (ZA17) or VDI 2736 (ZA21) or GOST 21354-87 (ZA22)  
- Input of speed for epicyclic gears configuration  
- Tooth friction / power loss acc. to Niemann  
- Deep tooth form/short cut tooth form, tools and final machining  
- Grinding the tooth root  
- Flash temperature course  
- Scuffing according to DIN 3990 and ISO/TS 6336-20/21  
- Micropitting according to ISO/TS 6336-22 (Method B)  
- Input of individual flank line modifications per tooth  
- Creation of variants for modifications  
- Arc of circle and spline approximation for 2D export (requires CA1)  
- Extended 2D and 3D presentation of the tooth form (ZY1)  
- Tip shortening for involute or imported tooth forms  
- Animation of gears when meshing, simultaneous display of more than one manufacturing step, measuring function in the graphics, function for saving data for A – B comparison  
- Manual input of active tip and active root diameters in the single gear calculation  
- Tooth form and tool in normal section  
- Collision check, marking of contact point, marking of collision  
- Manufacturing drawings  
- Extensive material database  
- Rights: Z01, Z05, Z05i, Z05t, Z05v, Z19e, Z19m, Z01z |
| **WPK** | Shafts and bearing standard package  
- Calculation of deformations also for statically overdetermined systems and line loads  
- Shaft rough sizing  
- 3D display of forces and diagrams of bending also during shaft modeling  
- Pressure angle and transverse shear  
- Mirror shaft  
- Read-in of a background drawing and show millimeter grid  
- Tooth trace modification (WA2)  
- Shaft support with rolling bearings, plain bearings or general supports  
- One shaft strength calculation either according to DIN 743 (WA6) or FKM Richtlinie (WA7) or Hänchen&Decker (WA5) or AGMA 6101-F19 and AGMA 6001-F19 (WA10)  
- Smith and Haigh diagram  
- Rolling bearing rating life (ISO 281, L10) with sizing function  
- Bearing power loss, input of linear bearing stiffness  
- Extensive bearings database, partly with indications about internal geometry  
- Rights: W01, W01c, W01f, W03, W03a, W05, W12, **W15**, K07b |
| **MPK** | Shaft-Hub connections  
- Cylindrical interference fit |
| SPK   | Bolt calculation according to VDI 2230, Sheet 1, 2015 and Sheet 2, 2014  
|       | Cylindrical flange  
|       | General connections with user-defined screw configurations (Sheet 2)  
|       | Calculation according to input FEM results (Sheet 2)  
|       | Considers high and low temperatures, temperature differences  
|       | Rights: M01a, M01b, M01c, M02a, M02b, M02c, M02d, M02e, Z09, M03a, M05, M06, M08, M09a, Z05i, Z05n,  
| APK   | Elements for shift gearboxes  
|       | Friction clutches according to VDI 2241:1982  
|       | Synchronization as specified by Borg/Warner  
|       | Allows for the calculation of either time or force during gear shifting  
|       | Rights: A10, A20  
| FPK   | Springs:  
|       | Tension springs, compression springs (cylindrical and conical compression springs), disc springs (DIN EN 16984:2017, DIN EN 16983:2017 **NEW!**)  
|       | leg springs, torsion springs  
|       | Rights: F01, F02, F03, F04, F05, F06  
| RPK   | V-belts, toothed belts, chain drives  
|       | Strength and dimensioning, roller diameter, distance between axes, number of belts, with or without tensioning pulley  
|       | Rights: Z90, Z91, Z92  
| LPK   | Stress analysis with local stresses according to FKM Guideline 2020, 7th edition  
|       | Consideration of support effect, for fatigue and static load  
|       | For calculation of safety factor and service life on basis of an external FEM calculation  
|       | Rights: K12  
| VPK   | Linear drive trains with spindles  
|       | Calculation according to Roloff/Matek of safeties against buckling, flank pressure and more, for the operation modes tightening and loosening  
|       | Rights: K15  
| TPK   | Chain of tolerances: Maximum- minimum dimension analysis, statistic analysis, tolerances: ISO / own input. Rights: K10  
| RCK   | Hardness conversion  
|       | Hardness conversion according to DIN EN ISO 18265: 2014 |
from and to HB, HRC, HV, Rm, etc.
Rights: K09

HPK
Hertzian pressure
Calculation of hertzian pressure for rolls, balls and planes
Rights: K14

Base packages

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>KPK-G</td>
<td>Base package Gearbox</td>
</tr>
<tr>
<td></td>
<td>ZPK, WPK, MPK, TPK, HPK, RCK</td>
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</tbody>
</table>

Base packages complete

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPK</td>
<td>Base packages complete</td>
</tr>
<tr>
<td></td>
<td>ZPK, WPK, MPK, SPK, APK, FPK, RPK, LPK, TPK, HPK, VPK, RCK</td>
</tr>
</tbody>
</table>

Modules for System design and analysis

Module for various gearbox kinematics

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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<tbody>
<tr>
<td>SYS</td>
<td>KISSsys</td>
</tr>
<tr>
<td></td>
<td>Software extension for the calculation of complete systems with power flow</td>
</tr>
<tr>
<td></td>
<td>transmission calculation, administration of variants and integrated</td>
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<tr>
<td></td>
<td>programming language</td>
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<td></td>
<td>Group-based modeling with new assemblies (e.g. Wolfram, Ravigneaux)</td>
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<tr>
<td></td>
<td>Import of CAD data, collision check</td>
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<td></td>
<td>Assistant for input of parallel shafts and planetary stages</td>
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<td></td>
<td>Automated 3D modeling</td>
</tr>
<tr>
<td></td>
<td>Adding complete stages to an existing model</td>
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<tr>
<td></td>
<td>Damage calculation results displayed in tables</td>
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<tr>
<td></td>
<td>Template for taking into account help results (moment of inertia, etc.)</td>
</tr>
<tr>
<td></td>
<td>Call the planet carrier deformation calculation in KISSsys</td>
</tr>
<tr>
<td></td>
<td>Interface to GEMS® (requires CD3)</td>
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<tr>
<td></td>
<td>Template for bevel gear displacements (EPG, VHJ)</td>
</tr>
<tr>
<td></td>
<td>Load spectrum determined from measured torque curve (requires ZZ6) NEW!</td>
</tr>
<tr>
<td></td>
<td>Includes GPK</td>
</tr>
<tr>
<td></td>
<td>The corresponding KISSsoft modules (minimum WPK, ZPK) are needed</td>
</tr>
<tr>
<td></td>
<td>Rights: K11, K11a, K11c</td>
</tr>
</tbody>
</table>

Module for standard gearboxes

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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</thead>
</table>
GPK
Package for sizing and rating of complete gearboxes (bearings, shafts, gears) based on KISSsys
One to five stage cylindrical gearbox
One to four stage bevel and cylindrical gear unit (requires at least ZC1)
One to four stage worm and cylindrical gear unit (requires at least ZD1)
One and two stage planetary gear unit (requires ZA1), also with coaxial shafts (requires WA1)
Load spectra (requires ZZ1, WA8)
The corresponding KISSsoft modules (minimum WPK, ZPK) are needed
Rights: K11, K11c

Expertmodules for system design and analysis

Sizing of standard gearboxes

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| KS1    | KISSsys model for the sizing of Gearbox variants  
Automatically generates gear unit variants with different stages and transmission ratios  
from the overall transmission ratio and the torque  
Results are displayed in 3D  
For cylindrical gear units with first stage as a cylindrical, bevel, worm or crossed helical  
gear stage, and for planetary gear units  
This function needs a KISSsys or GPK license and requires the appropriate KISSsoft  
modules (at least WPK and ZPK)  
Rights: K11f |

Efficiency

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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</thead>
</table>
| KS2    | Calculation of efficiency and thermal power  
Power losses can be changed by predefined factors.  
Range of options for evaluating thermal power etc.  
Transferring meshing losses from the contact analysis  
Power loss and efficiency for plain bearings  
This function needs a KISSsys or GPK license and requires the appropriate KISSsoft  
modules (at least WPK and ZPK)  
Rights: K11h |

Modal analysis

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| KS3    | Calculation of the drives eigenfrequencies and vibration modes in shaft systems,  
Three-gear chains, four-gear chains and planetary systems  
Takes into account the contact stiffness of the gears  
Outputs of torsional and coupled (torsional, flexural and axial) vibrations  
Vibration calculation with unbalance response and amplitude via speed  
Calculation of the Campbell diagram for shaft systems |
This function needs a KISSsys or GPK license and requires the appropriate KISSsoft modules (at least WPK, ZPK, WA1)
Rights: K11i1, K11i2, K11i3

Housing deformation

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| KS4    | Calculation of housing deformation using the bearings’ reaction forces  
         Calculates and modifies the bearings offset and tilting  
         The housings’ stiffness matrix is used to perform the calculation. This matrix is derived from an FE calculation. (ANSYS, ALTAIR OptiStruct. etc.)  
         This function needs a KISSsys or GPK license and requires appropriate KISSsoft modules (at least WPK, ZPK)  
         Rights: K11j, K20a, K20b, K20c, K20d, K20e |

Reliability

<table>
<thead>
<tr>
<th>Module</th>
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</tr>
</thead>
</table>
| KLR    | Reliability calculation and display according to Bernd Bertsche, with 3-parameter Weibull distribution, VDMA 23904 and AGMA 6006  
         Input of Weibull shape parameter and coefficient for failure free time  
         For cylindrical gears, planetary gear stages, bevel gears and rolling bearings  
         Results for gears (bending, pitting) and rolling bearings are displayed in reports and graphics in KISSsoft.  
         Rights: K18 |

KISSsys Interfaces

<table>
<thead>
<tr>
<th>Module</th>
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</tr>
</thead>
</table>
| KS10   | MSC Adams Gear AT Integration  
         Export of KISSsys data into Gear AT. Exports data of the system, bearings, shafts, connecting elements, loads and cylindrical gears (macro and micro geometry)  
         Rights: K11k, K11k1 |
| KS20   | REXS export Version 1.1  
         Export of system data from gear pairs (bevel and hypoid gears, shafts and rolling bearings) with positioning in REXS format  
         Rights: K11k, K11k7 |
# Expert Modules Gears

## Cylindrical gears

### Configuration / Dimensioning

<table>
<thead>
<tr>
<th>Module</th>
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</tr>
</thead>
</table>
| ZA1    | Planetary gear, Three gears, Four gears  
Rights: Z01a, Z19g |
| ZA2    | Rack  
Rights: Z01b |
| ZA3    | Rough sizing  
Cylindrical gear pre-sizing (gear pairs, planetary trains)  
Sizing acc. to required safeties, determination of the possible range for center distance and tooth thickness for solutions with the same torque capacity, Display of several suggestions with indication of the total weight (cost optimization)  
Rights: Z03 |
| ZA4    | Fine sizing (macro geometry)  
Gear pairs, planetary trains, three-gear chain, four-gear chain  
The optimization produces a list of all possible variants with various parameters, varying of gear module, number of teeth, profile shift, pressure angle, helix angle, center distance  
Considers assembly conditions  
For each solution a separate strength calculation is performed  
Automatic sizing of deep tooth form (requires module ZA5)  
Calculation of transmission error for all variants (requires module ZA30)  
Varying the reference profile  
Individual definition of cutter and pinion type cutter list for each gear  
All feasible solutions regarding geometry are listed  
All solutions are classified as to various criteria  
Display of results in tables and graphics  
Rights: Z04, Z04a |
| ZA5    | Geometry sizing functions and special calculations  
Sizing of profile shift related to various criteria  
Calculation of profile shift based on measured tooth geometry  
Calculation of tooth thickness allowances based on measured tooth geometry  
Pre-machining tools with grinding allowance, Topping tools  
Sizing for tooth height regarding transverse contact ratio  
Rough sizing modifications (microgeometry). Tip and root relief (linear, progressive and logarithmical), flank line crowning and helix angle modification sized taking into account axis inclinations as specified in ISO 6336-1, Appendix B or in ISO 6336-1, Appendix E (requires ZA35)  
Report for tolerances In accordance with ISO 1328, DIN 3961, DIN 58405, BS 436, AGMA 2001, AGMA 2015  
Calculation with manufacturing profile shift  
Sizing of center distance regarding balanced specific sliding  
Sizing of helix angle regarding various criteria  
Profile and tooth trace diagram (K diagrams)  
Rights: Z01x, Z15, Z19a, Z19d, Z19f, Z19h, Z19i, Z19n |
Profile modifications with worm grinding wheels and dressing wheels
You can check whether a required gear with tip relief can be generated with an available worm grinding wheel/dressing wheel
Includes the available grinding worms / dressing wheels from a user-defined file.
Displays the suitable grinding worms / dressing wheels in a table
Rights: Z19j

Asymmetrical gears
Sizing of asymmetrical tooth forms for all cylindrical gear configurations
Strength calculation as defined in ISO 6336, VDI 2545, VDI 2736 (requires ZA10, ZA17 or ZA21)
Sizing of root rounding / tool with different radii
Rights: Z01y

Double pinion planetary stage calculation
Kinematics as double pinion in a four gears chain (needs ZA1)
Check for collision
With sizing of the center distances (needs ZA4)
Rights: Z01c

Strength calculation methods

<table>
<thead>
<tr>
<th>Module</th>
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<tbody>
<tr>
<td>ZA11</td>
<td>DIN 3990: 1988 Rights: Z02</td>
</tr>
<tr>
<td>ZA12</td>
<td>AGMA 2001, AGMA 2101 Rights: Z13</td>
</tr>
<tr>
<td>ZA13</td>
<td>VDI 2737: 2016 tooth root load capacity of internal gears with influence of rim thickness Rights: Z23</td>
</tr>
<tr>
<td>ZA15</td>
<td>Graphical method for calculating the tooth root stress Rights: Z19i</td>
</tr>
<tr>
<td>ZA16</td>
<td>AGMA 925: 2003, lubrication gap and flash temperature course according to AGMA Rights: Z19k</td>
</tr>
<tr>
<td>ZA17</td>
<td>VDI 2545: 1981, for plastics, wear calculation with safety against shearing according to Fürstenberger Rights: Z14</td>
</tr>
<tr>
<td>ZA18</td>
<td>Static strength (metal and plastic) Rights: Z02x</td>
</tr>
<tr>
<td>ZA19</td>
<td>BV-RINA for military vessels, RINA 2010 for commercial vessels, Lloyds Register: 2013, DNV41.2, DNVGL-CG-0036 (2015), (requires ZA10) Rights: Z02b, Z02d</td>
</tr>
<tr>
<td>ZA20</td>
<td>AGMA 6011, AGMA 6014, AGMA 6011-J14, AGMA 6004, API 613, AGMA 6015 Rights: Z13b</td>
</tr>
<tr>
<td>ZA21</td>
<td>VDI 2736: 2014, for plastics (Sheet 2), wear calculation with safety against shearing according to Fürstenberger Rights: Z14a</td>
</tr>
</tbody>
</table>
ZA22  GOST 21354-87: 1987, including manufacturing tolerances and tooth thickness allowances  
Rights: Z02e

ZA23  ISO 13691: 2001, for „High speed, special purpose gear units”.  
Rights: Z02f

ZA24  Tooth root stresses with 2D FEM  
Calculation of the tooth root stresses for cylindrical gears (with straight or helical teeth)  
using 2D-FEM via integrated FEM Solver NEW!  
FE results display in KISSsoft NEW! or SALOME  
Rights: Z38a

Calculation with load distribution

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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</table>
| ZA30   | Contact analysis for cylindrical gears, taking into account tooth profile and tooth flank modifications, and shaft deformation  
Tooth flank fracture according to ISO/TS 6336: 4 2019 (requires ZZ4)  
Calculation of the excitation force according to FVA-No. 487  
Path of contact under load  
Graphical display of the results in the excitation force, efficiency, forces and stresses groups  
Calculation and display of Hertzian pressure, contact patterns and tooth root stresses along the actual tooth flank  
Load-free contact pattern and display of the assembly contact pattern  
Calculation using conical profile shift  
Calculation of tooth mesh stiffness and transmission error under load based on the actual tooth form  
Display of specific sliding, sliding velocity and sliding factors for gears under load from actual tooth form  
Display of friction loss and local heat generation along the meshing  
Calculates wear for plastics (dry run) and steel (cold wear)  
Calculation and display of progression of wear  
Calculation of safety against micropitting according to ISO/TS 6336: 22,  
Calculation of lubrication gap according to ISO/TS 6336: 22 and AGMA 925 with actual normal force  
Calculation of power loss and speed using meshing  
| ZA34   | Contact analysis for planetary gears, taking into account tooth profile and tooth flank modifications, and shaft deformation  
Floating sun wheel. Additional functionality as described in ZA30.  
| ZA33   | Optimization of tooth flank and tooth profile modifications  
Optimized options for varying and combining data, such as cross-variations of amounts and coefficients  
All solutions are classified as to various criteria  
Graphical display of the classification  
Enhanced graphical representation according to the fine sizing method  
(requires at least ZA30 or ZA34)  
Rights: Z33 |
ZA35  Load distribution coefficient KHbeta according to ISO 6336-1, Annex E
Gapping and load distribution with shaft deformation and for every variation of tolerances
with (+/-)fma and (+/-)fhb displayed as a graphics and listed in the report. Also for
individual planets
Rights: Z02c

ZA36  Planet carrier deformation
with open-source FE library Code_Aster and using integrated FEM-Solver NEW!
for parametrized geometry, import of planet carrier data in STEP format
Import of calculation results from ABAQUS
FE results displayed in KISSsoft or with SALOME
Rights: Z37 (requires at ZA35 or ZA34)

ZA37  Tooth root stresses with 3D FEM
Takes into account the load distribution across the facewidth
Calculation of the local tooth root stresses using integrated FEM-Solver NEW!
FE results display in KISSsoft or in Salome
Rights: Z38b (requires ZA24 and ZA30 or ZA34)

ZA38  Contact analysis for asymmetric gears
Contact stiffness according to Weber/Banaschek and Langheinrich
Specification of the tooth fixing position M NEW!
Rights: Z32a (requires ZA30 or ZA34 and ZA7)

Contact analysis package

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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<tbody>
<tr>
<td>KAP</td>
<td>ZA30 and ZA34</td>
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Contact analysis package complete

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KAPK</td>
<td>ZA30, ZA33, ZA34, ZA35, ZA36, ZA37, ZA38</td>
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Master gears

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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<tbody>
<tr>
<td>ZA40</td>
<td>Master gears analysis and design</td>
</tr>
<tr>
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<td>Rights: Z29</td>
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Gear pumps

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB1</td>
<td>Gear pumps, Basic calculation</td>
</tr>
<tr>
<td></td>
<td>Calculation of the transported volume of oil for gear pumps (without consideration of any feed-back volume)</td>
</tr>
<tr>
<td></td>
<td>for internal and externally geared pumps</td>
</tr>
<tr>
<td></td>
<td>for both standard involute and non-involute profiles</td>
</tr>
<tr>
<td></td>
<td>can be combined with fine sizing</td>
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<td></td>
<td>Rights: Z26</td>
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</tbody>
</table>
ZB2  Gear pumps, Enhanced calculation
Calculation and presentation of the pump characteristics during contact for detailed analysis and optimization
Enclosed volume during mesh (feed-back volume), volume under critical in-flow speed at the narrowest point in entry chamber, total volume under entry pressure, torque on both gears (including option for calculation with or without Hertzian Pressure consideration), sliding velocity, wear number
Alternatively, the Hertzian flattening due to tooth contact can be considered (requires ZB1)
Right: Z26a, Z32

Bevel gears

<table>
<thead>
<tr>
<th>Module</th>
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</table>
| ZC1    | Bevel and hypoid gears geometry  
Geometry according to DIN 3971 and ISO 23509  
dimensions of bevel gears (measurements for manufacturing), for straight, helix- and spiral bevel gears,  
Conventional production, Klingelnberg or Gleason  
Conversion of Gleason Dimension Sheet for bevel-gear geometry data to DIN 3971 and vice versa  
Conversion of Gleason Dimension Sheet for parallel tooth height (Klingelnberg, Oerlikon)  
Rough sizing  
Calculation of the involute point  
Verification of the tooth form separately for inside and outside (toe/heel)  
Right: Z07, Z07d, Z07m, Z07s1 |
| ZC10   | Generate 3D model of bevel gears for export  
(requires CB1)  
straight and helical toothed bevel gears with modifications (apexes not in one point), and spiral bevel gears with modifications  
3D model based on the virtual cylindrical gear tooth form  
Visual examination of the path of contact by rotating either one gear or both  
Right: Z07p |
| ZC2    | Strength according to ISO 10300: 2001 and ISO 10300: 2014 Method B and C  
Calculates scuffing for bevel gears according to ISO/TS 10300-20: 2018 (draft)  
Right: Z07e |
| ZC3    | Strength according to DIN 3991  
Right: Z07g |
| ZC4    | Strength according to AGMA 2003-B97 and AGMA 2003-C10  
Calculation of bevel gears strength factor Q  
Right: Z07j |
| ZC5    | Strength calculation according to Klingelnberg KN3030 1.2  (Spiral bevel gear, palloid and cyclo-palloid gears)  
Right: Z07a |
| ZC6    | Strength calculation according to Klingelnberg KN3030 1.2  (hypoid bevel gear, palloid and cyclo-palloid gears)  
Right: Z07b |
ZC7 Strength according to VDI 2545
Rights: Z07h

ZC8 Static strength bevel gears / differentials
Rights: Z07i

ZC9 Strength according to ISO 10300: 2014 Method B for Hypoid gears
Calculates scuffing for hypoid gears according to ISO/TS 10300-20:2018 (draft)
Rights: Z07f

ZC11 Strength acc. to DNV 41.2, root and flank strength, flank breaking, safety hardening depth
Rights: Z07l

ZC12 Fine sizing for bevel, hypoid and differential bevel gears
Rights: Z07n

ZC13 Sizing of topological modifications
Rights: Z07s3

ZC14 Sizing of the webbing for differentials
For forged steel bevel gears, based on inside diameter, pressing of the thrust washer
Calculation of the virtual gear on front and back side
Fine sizing of the webbing (requires ZC12)
Rights: Z7t

ZC30 Contact analysis under load for bevel gears with straight, helical and spiral teeth.
Takes into account microgeometry
Graphical display of the results in the excitation force, efficiency, forces and stresses groups
Calculation of contact lines, transmission error and stress ratios
Display of the load-free contact pattern
Calculation of wear
Tooth flank fracture according to ISO/DTR 10300-4: 2019 (draft) (requires ZZ4)
Calculation of the relative positions VHJ and axis angle errors directly from the shaft deformation
Calculation of the excitation force according to FVA-No. 487 1.2.3

ZC33 Modification sizing for bevel gears with straight, helical and spiral teeth.
Optimization of tooth flank and tooth profile modifications
Optimized combinations and different variations (cross-variations of amounts and coefficients, etc.) works also with topological modifications
Classification of all solutions relative to different criteria
Graphical display of the classification
Rights: Z7o

Worms (Globoid)

<table>
<thead>
<tr>
<th>Module</th>
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<tbody>
<tr>
<td>ZD1</td>
<td>Worm gear geometry</td>
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<tr>
<td></td>
<td>Cylindrical Worms with enveloping worm wheels, geometry according to ISO14521 and DIN 3975</td>
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<tr>
<td></td>
<td>Control measures for worms (measurement over 3 pins) and worm wheels (measurement over balls)</td>
</tr>
<tr>
<td></td>
<td>Worm sizing with tool module</td>
</tr>
<tr>
<td>Rights: Z08</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

**ZD10**  
Generate 3D model for export  
(requires CB1)  
For flank forms ZA, ZI and ZN, ZC, ZK  
Visual examination of the path of contact by rotating either one gear or both  
Right: Z08p, Z08s

**ZD2**  
Strength according to ISO/TR 14521: 2010  
Rights: Z08b

**ZD3**  
Strength according to DIN 3996  
Rights: Z08a

**ZD4**  
Strength according to AGMA 6034 and AGMA 6135  
Rights: Z08c

**ZD5**  
Fine sizing for worm gears  
Rights: Z08n

---

**Crossed helical gears or Worm gears (Cylindrical-Worm gear)**

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| ZE1 | Geometry of crossed helical gears  
Calculation of crossed helical gear and worm (cylindrical worm and cylindrical worm gear– as e.g. usual in precision mechanics)  
Crossed helical gears with external and internal teeth  
Control measures for worms (measurement over 3 pins) and worm wheels (measurement over balls)  
Graphical analysis of mesh with shaft angles not equal to 90° and in various sections  
NEW!  
Graphical display of specific sliding NEW!  
Collision check  
Rights: Z17, Z17h, Z17l |
| ZE2 | Strength calculation on the basis of ISO 6336/Niemann, method Hirn  
Rights: Z17a |
| ZE3 | Strength calculation on the basis of VDI 2545 and method Hoechst  
Rights: Z17b, Z17c |
| ZE4 | Static strength (bending and shearing) for metal and plastic  
Rights: Z17d |
| ZE5 | VDI 2736 for plastics (Sheet 3), wear calculation according to Pech  
Rights: Z17e, Z17f |
| ZE6 | Fine sizing for crossed helical gear  
Rights: Z17n |
| ZE7 | Crossed helical gear with rack  
Rights: Z17g |
# Face gears

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| ZF1    | Face gears geometry  
Geometry of face gears mated with cylindrical pinion gears. 2D views with tooth form simultaneously on the inside, at the center and on the outside. Checking undercut and pointed tooth tip is performed graphically in the 2D view, while tooth addendum height can be varied to prevent pointed tooth tip (including sizing function). Sizing of optimal facewidth  
Rights: Z06 |
| ZF10   | Generate 3D model for export  
(requires CB1)  
With offset and shaft angle by choice  
Visual examination of the path of contact by rotating either one gear or both  
Rights: Z06f |
| ZF2    | Strength calculation on the basis of ISO6336 and literature  
Rights: Z06a |
| ZF3    | Strength calculation on the basis of CrownGear/DIN 3990  
Rights: Z06b |
| ZF4    | Strength on the basis of ISO 10300, Method B  
Rights: Z06c |
| ZF5    | Strength on the basis of DIN 3991, Method B  
Rights: Z06d |
| ZF6    | Static strength  
Rights: Z06e |

# Non-circular gears

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| ZG1    | Calculation of non-circular gears  
Only sold together with engineering services performed by KISSsoft AG.  
Rights: Z40 |

# Beveloid gears

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| ZH1    | Beveloid geometry and strength (only for external toothing)  
The strength calculation is covered by a cylindrical gear calculation strength calculation  
Profile and tooth trace modifications, e.g. negative crowning etc.  
Rights: Z50 |
| ZH10   | Generate 3D model for export  
(requires CB1)  
Visual examination of the path of contact by rotating either one gear or both  
Rights: Z50p |
Gear manufacturing

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| ZM1    | Power skiving, feasibility check for manufacturing  
Estimation of the collision of tool and gear, for internal and external gears  
Fine sizing of the gears with assessment of the collision risk (needs ZA4)  
Consider tool shank  
Rights: Z19p |
| ZM2    | Honing, feasibility check for manufacturing  
NEW!  
Estimation of the collision of tool and gear, for external gears  
Fine sizing of the gears with assessment of the collision risk (needs ZA4)  
Rights: Z19h1 |
| ZM3    | Calculation of topological modifications based on measurement grid data  
NEW!  
Using topological measurement data (from measurement grid) of cylindrical gear tooth flank  
Requires measurement data in GAMA CMM format  
For the verification of noise excitation of manufactured gears by means of the loop ‘Design – Manufacture - Measure’  
Rights: Z19x |

Tooth form calculation

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| ZY1    | Extended 2D and 3D tooth form display  
Animation of gears when meshing, simultaneous display of more than one manufacturing step, measuring function in the graphics, function for saving data for A – B comparison,  
Tooth form and tool in normal section  
Collision check, marking of contact point, marking of collision  
Rights: Z05x, Z05j, Z05k |
| ZY2    | Import of tooth form or tool geometry  
Import of any kind of non-involute tooth shape or tool (e.g. from CAD or 3D measuring machine or DXF), approximation of the normal vectors  
Indication of the base tangent length of non-involute tooth forms  
Rights: Z05a |
| ZY3    | Calculation of hobbing cutter/hob and pinion type cutter reference profiles (also for designing special tools)  
Rights: Z05c |
| ZY4    | Calculation of counter gear’s tooth form by generating with actual gear  
Rights: Z05d |
| ZY5    | Addition for moulding  
Compensation of shrinking, spark gap, modification of pinion type cutter  
Rights: Z05e |
| ZY6    | Manufacturing specific flank line and root modifications  
Twist due to manufacturing, Circle-shaped running-in curve, elliptical root fillet (cylindrical and bevel gears NEW!)  
Variable tip relief for side I and II for bevel gears NEW!  
Rights: Z05f, Z05g |
Cycloid- and arc of circle tooth forms, designed Involute, Straight line flank
Rights: Z05h, Z05n

Tool scaling
Scaling the DXF tool or tooth form with the gear's normal module, Rights: Z05q

Elliptical deformation for spur gears.
Cylindrical gear pair, gear 1 as elliptically deformed external gear, gear 2 as circular internal gear.
Input of half axis ratio, calculation of the shorter half axis.
The 2D graphic shows the elliptically deformed gear 1 meshing with the circular gear 2.
Meshing interference checks can be performed. No 3D graphics.
For the development of "wave gears" or "harmonic drives"
Rights: Z05p

Further gear specific modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| ZZ1    | Load spectra, service life, transmissible torque/power  
Calculation of transmissible power with and without load spectra  
Calculation of service life with and without load spectra  
Calculation of safeties with load spectra (for cylindrical, bevel, and cross helical gears)  
Taking into account the direction of rotation and load of the individual stages (for cylindrical gears)  
Graphical display of speed and torque classes **NEW!**   |
| ZZ2    | Hardening depth  
Proposal of required hardening depth based on Hertzian pressure (for cylindrical gears, bevel gears)  
Graphical display of the results   |
| ZZ3    | Backlash  
Calculation of acceptance-backlash and operating-backlash  
Takes into account tooth and shaft bending (requires ZA35) (for cylindrical-, crossed helical- and worm gears)   |
| ZZ4    | Tooth flank fracture calculation for cylindrical and bevel gears  
According to ISO/TS 6336-4  
For bevel and hypoid gears according to ISO/DTS 10300-4: 2019 (draft)   |
| ZZ5    | Measurement grid points for measuring topology, flank and root, for cylindrical, bevel and crossed helical gears, for worms and globoid worm wheels, splines and beveloid  
For measurement machines: Klingelnberg and Gleason (requires CB1)   |
ZZ6  Plastics Manager
Easy way to generate plastics material files (DAT files) based on the material properties
and measured test bench data according to VDI 2736-4
and VDI 2736 modified (requires module ZA21 or ZE5).
Save the new materials directly to the KISSsoft database in the right format for
calculations
Calculation for dry run
Evaluation of results from pulsator test machine
Rights: K17

ZZ7  Normal backlash based on the effective tooth form
This calculates the normal backlash for each point of contact for pitch based on the
effective tooth form over complete facewidth. This calculation is especially important for
the watch manufacturing industry, and for special tooth forms (cycloid, arc of circle or
tooth form via DXF), and is available for all cylindrical gear configurations (except for
racks)
Rights: Z19v

ZZ8  Special functions for the watch-making industry
Import of DXF files in special format for the watch industry
Dry run for gears
Various special functions for very small gears
Rights: Z19w

ZZ9  Load spectrum from measured torque curve
"Simple count" method to determine a torque/speed load spectrum without considering
alternating torques
"Rainflow" method to determine a speed load spectrum including alternating factors for
the tooth root considering positive and negative torques (requires ZZ1)
Rights: Z18b, Z18br

## Shafts and Bearings expert modules

### Shafts

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| WA1    | System of shafts composed of various coaxial shafts  
Calculation of the deformation in the shaft system  
Taking into account the bearing offset, bearing clearance, thermal expansion, linked  
shafts, nonlinear bearing stiffness calculated from the internal geometry  
Calculation with stiffness matrix of rolling bearings from SKF Cloud **NEW!**  
Temperature conditions for inner and outer ring and for rolling body  
Approximation of internal bearing geometries with optional input of the number of rolling  
bodies and data from bearing manufacturers  
Radial bearing can be calculated either with or without an inner or outer ring  
Rights: W01a, W01b, W03b, W03c, W03d, W05d |
| WA2    | Tooth trace modifications  
Calculation of longitudinal deformation  
Load distribution with and without modification  
Sizing of the optimal tooth trace modification  
Take into account gear body deformation |
Implementation of the displacement matrix from the gear body deformation calculation in DPK Calculation of the displacement matrix with DPK
Rights: W10

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA3</td>
<td>Buckling (for beams and shafts) Rights: W13</td>
</tr>
<tr>
<td>WA4</td>
<td>Critical speeds and frequencies  Torsions-, bending-, longitudinal frequencies  Campbell diagram Rights: W04, W04x</td>
</tr>
<tr>
<td>WA5</td>
<td>Strength calculation according to Hänchen &amp; Decker  Shaft design regarding constant equivalent stress and maximal deformation Rights: W06a, W12</td>
</tr>
<tr>
<td>WA6</td>
<td>Strength calculation acc. to DIN 743, 2012 edition  Shaft design regarding constant equivalent stress and maximal deformation  Verification for multiple notches including an input option for FE results according to FVA 700 I Rights: W06b, W06r, W12</td>
</tr>
<tr>
<td>WA7</td>
<td>Strength calculation acc. to FKM, 2020 edition NEW!  Shaft design regarding constant equivalent stress and maximal deformation, Endurance limit calculation for surface treated parts according to section 5.5  Options for coefficient Kf according to sections 4.3.2 and 4.3.3, determining of the core hardness from the tensile strength Rm Rights: W06c, W12</td>
</tr>
<tr>
<td>WA10</td>
<td>Strength calculation based on AGMA 6101-F19 and AGMA 6001-F19 Rights: W06d, W12</td>
</tr>
<tr>
<td>WA8</td>
<td>Load spectra for shafts and bearings  Calculation for shaft limited life- and endurance strength  Bearing calculation with load spectra  Setting of separate temperatures for each load bin with consideration in the calculation of bearing clearance and lifetime according to ISO/TS 16281  Definition of load spectrum dependent degrees of freedom Rights: W01s, W06s, W06t</td>
</tr>
<tr>
<td>WA11</td>
<td>Forced response  Shaft vibration calculated on the basis of the unbalance response  Compensation for imbalances by defining the angular position in the &quot;eccentric mass&quot; force element Rights: W14</td>
</tr>
</tbody>
</table>

Other shaft-specific modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPK</td>
<td>Gear body deformation  For asymmetric gear bodies, the resilience of the gear body is calculated using the integrated FE Software Code Aster (flexibility of gear rims and webs in axial plane)  Prediction of the gear flank misalignment.  FE results display in KISSsoft or in Salome  Output of the stiffness matrix. Also for internal toothing.  Gear body geometry for inclined webs Display the gear body in a preview, and check</td>
</tr>
</tbody>
</table>
independently of the FE calculation
Rights: K16

## Bearings

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| **WB1** | Enhanced bearing calculation (L10m, Lnm)  
Influence of lubrication according to ISO 281-1  
Thermally permissible service speed acc. DIN 732  
Lubrication, lubricant temperature, friction and contamination for each individual rolling bearing definable  
Bearing rating life and modified rating life calculation using SKF Cloud® Calculation for hybrid bearings according to the GBLM method in SKF Cloud®  
Rights: W05a |
| **WB2** | Reference rating life calculation according to ISO 16281 (L10r or Lnmr if combined with Module WB1)  
Diagram of the load distribution in the bearing  
Diagram of the load distribution over the rolling bodies and races  
User specified input of roller profiles  
Works for thrust needle roller bearings  
Graphic showing stresses under the contact surface  
Calculation of bearing rating life L10r and L10mr (benötigt WB1) using SKF Cloud® NEW!  
(This module requires WA1)  
Rights: W05b, W05c |
| **WB3** | Plain hydrodynamic bearings  
Hydrodynamic plain journal bearings: Oil or grease lubricated, according to DIN 31657, DIN 31657-4:2019, DIN 31652, ISO 7902:2020 NEW! and Niemann  
Hydrodynamic axial plain bearings: Calculation of pad thrust bearings, tilting-pad thrust bearings, according to ISO 12130  
Rights: W07, W07a, W07b, W07c, W07d, W07e, W08 |
| **WB4** | Calculation of a single bearing with internal geometry according to ISO/TS 16281  
Own input of the inner and outer ring deformation (possible without the WPK)  
Deformation of bearing rings through external load  
Input loads from the planetary stage calculation  
Tilting of elastic bearing rings is taken into account  
Rights: W51 |
| **WB5** | Rolling bearing fine sizing  
Optimization of the internal geometry of bearings through variation calculation  
Variants are displayed in a list, or graphically (needs the WB4 module)  
Rights: W51a |
## CAD Interfaces

### 2D Export

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA1</td>
<td>2D DXF and IGES Export</td>
<td>K05a, K05e</td>
</tr>
</tbody>
</table>

### 3D Export

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB1</td>
<td>STEP and Parasolid format export in 3D through Parasolid kernel&lt;br&gt;Display and export cylindrical gears with modifications, and straight and helical toothed&lt;br&gt;bevel gears (apexes in one point, without modifications), beveloid gears, display as skin&lt;br&gt;model for checking tooth contact, spline (shaft-hub), shafts, rack</td>
<td>K05u</td>
</tr>
<tr>
<td>CB2</td>
<td>Integration with Solid Edge (versions ST10 - ST2021): Generation of 3D gears (cylindrical gears, worms, crossed helical gears, straight bevel gears, splines (shaft-hub), shafts and racks) directly from the calculation, using the KISSsoft menu in Solid Edge, includes CC1</td>
<td>K05d, K04</td>
</tr>
<tr>
<td>CB3</td>
<td>Integration with SolidWorks (versions 2018-2021): Generation of 3D gears (cylindrical gears, worms, crossed helical gears, straight bevel gears, splines (shaft-hub), shafts and racks) directly from the calculation, using the KISSsoft menu in SolidWorks, includes CC1</td>
<td>K05k, K04</td>
</tr>
<tr>
<td>CB4</td>
<td>Integration with Inventor (versions 2018-2021): Generation of 3D gears (cylindrical gears, worms, crossed helical gears, straight bevel gears, splines (shaft-hub), shafts and racks) directly from the calculation, using the KISSsoft menu in Inventor, includes CC1</td>
<td>K05m, K04</td>
</tr>
<tr>
<td>CB5</td>
<td>CATIA integration (versions V5 R20-R22, V5-6r2013-2020): Generation of 3D gears (cylindrical gears, worms, crossed helical gears, straight bevel gears, splines (shaft-hub)) (manufacturer: SWMS)</td>
<td>K05o*</td>
</tr>
<tr>
<td>CB6</td>
<td>Integration with Creo Parametric (Creo3 to 5): Generation of 3D gears (cylindrical gears, worms, crossed helical gears, straight bevel gears, splines (shaft-hub)) includes CC1, (manufacturer: Applisoft)</td>
<td>K05q*, K04</td>
</tr>
<tr>
<td>CB7</td>
<td>Integration with Siemens NX (versions NX1847 - NX1953): Generation of 3D gears (cylindrical gears, worms, crossed helical gears, straight bevel gears, splines (shaft-hub), shafts and racks) directly from the calculation, using the KISSsoft menu in NX, includes CC1</td>
<td>K05n, K04</td>
</tr>
</tbody>
</table>

* please refer to the conditions
## COM Interfaces

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC1</td>
<td>COM interface, basic Integration of KISSsoft in your own programs, via the COM interface. Basic KISSsoft functions for loading and saving files, creating reports, performing calculations, etc, can be called. Access to all the variables in a calculation and all the reports generated during the calculation. Rights: K04</td>
</tr>
<tr>
<td>CC2</td>
<td>Expert COM interface (Includes CC1) Access to numerous sizing and optimization functions. Calling scripts (requires CC3). Contact analysis can now be controlled via the COM interface. Rights: K04, K04a</td>
</tr>
</tbody>
</table>

## Scripting

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC3</td>
<td>Scripting Integrated programming language for loading and running scripts in a KISSsoft file. Basic KISSsoft functions and numerous sizing and optimization functions can be called. Runs automatically at specific time points during the calculation (after loading the file, before saving, before or after the calculation, before creating the report). Rights: K22</td>
</tr>
</tbody>
</table>

## Interfaces for data exchange

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD1</td>
<td>GDE exchange format: Gear Data Exchange GDE Version 2.6 in XML format according to VDI 2610, export available for cylindrical gears Rights: K05f</td>
</tr>
<tr>
<td>CD2</td>
<td>GAMA exchange format: GAMA export available for cylindrical gears (macrogeometry only) Rights: K05g</td>
</tr>
<tr>
<td>CD3</td>
<td>Interface to GEMS® Data can be exchanged with GEMS® (Gleason's bevel gear manufacturing and analysis software) via KISSsys and KISSsoft. It is now possible to export and import bevel and hypoid gear geometry data and misalignments due to loads. The results of the GEMS® contact analysis under load can then be displayed in KISSsys. Operating data transfer Rights: K11k6, K05j</td>
</tr>
<tr>
<td>CD4</td>
<td>Tooth form export Export of tooth form and tool geometry in X, Y coordinates (optionally also normal and</td>
</tr>
</tbody>
</table>
radius of curvature)
Data in the transverse section, normal section or axial section
Rights: Z05b

Languages

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA1</td>
<td>German, Rights: K02</td>
<td>included</td>
</tr>
<tr>
<td>LA2</td>
<td>English: Software user interface, reports, graphics, messages, Right: K02a</td>
<td>included</td>
</tr>
<tr>
<td>LA3</td>
<td>French: Software user interface, reports, graphics, messages, Right: K02b</td>
<td>included</td>
</tr>
<tr>
<td>LA4</td>
<td>Italian: Software user interface, reports, graphics, messages, Right: K02c</td>
<td>included</td>
</tr>
<tr>
<td>LA5</td>
<td>Spanish: Software user interface, reports, graphics, messages, Right: K02d</td>
<td>included</td>
</tr>
<tr>
<td>LA6</td>
<td>Russian: Software user interface, reports, graphics, messages, Right: K02e</td>
<td>included</td>
</tr>
<tr>
<td>LA7</td>
<td>Portuguese: Software user interface, reports, graphics, messages, Right: K02f</td>
<td>included</td>
</tr>
<tr>
<td>LA8</td>
<td>Chinese: Software user interface, reports, graphics, messages, Right: K02g</td>
<td>included</td>
</tr>
</tbody>
</table>