KISSsoft
Drivetrain Design Solutions

KISSsoft 2019 – Instruction 015

KHb settings from KISSsys

KISSsoft AG
A Gleason Company
Rosengartenstr. 4, 8608 Bubikon
Switzerland

T. +41 55 254 20 50
F. +41 55 254 20 51
info@KISSsoft.com
www.KISSsoft.com

Sharing Knowledge

Contents

1 Description

1.1 Situation

It is not possible to set “KHb” (Face load coefficient) value automatically in details at the moment between KISSsoft modules. “KHb” can be calculated in details in shaft module, but the value needs to be manually transferred to the gear calculation and standard based value needs to be overwritten. In gear calculation some simple dimensions for the shaft and gear position can be anyway added to make the calculation according to the standard. These values can be operated from the KISSsys and shaft length and diameter can be taken from the shaft geometry. This allows user to do the calculation of the “KHb” with “real” values. Standard has some limitations for the gear arrangement and therefore this method can be only used in simple cases and therefore more detailed calculation is recommended to be done in shaft module.

2 Model setup

2.1 TranslationTable

To be able to modify “l”, “s” and “dsh” values for “KHb” calculation, “Own Input” needs to be flagged in gear calculation.

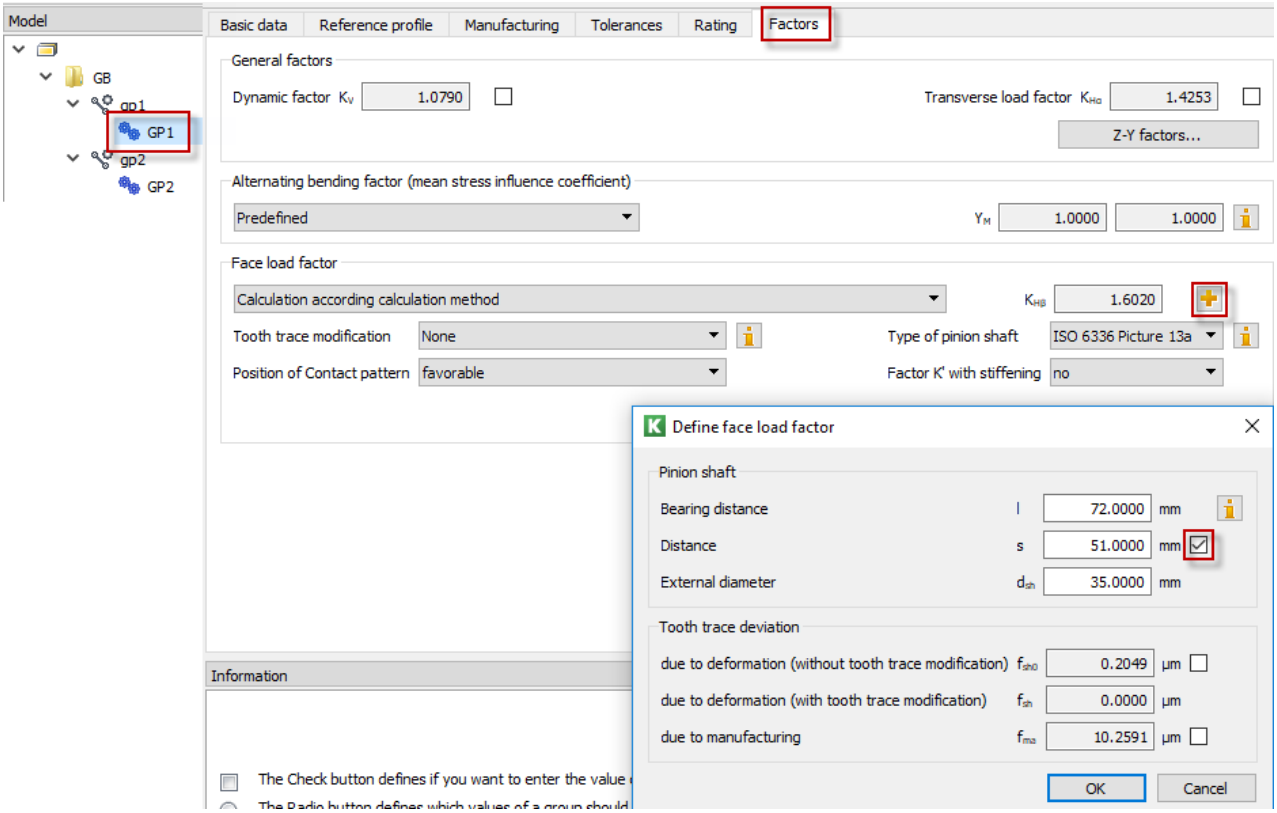

Figure 1. Flag "Own inputs" to change values

Then new variable type “array” and named “TranslationTable” needs to be created for the calculation file.

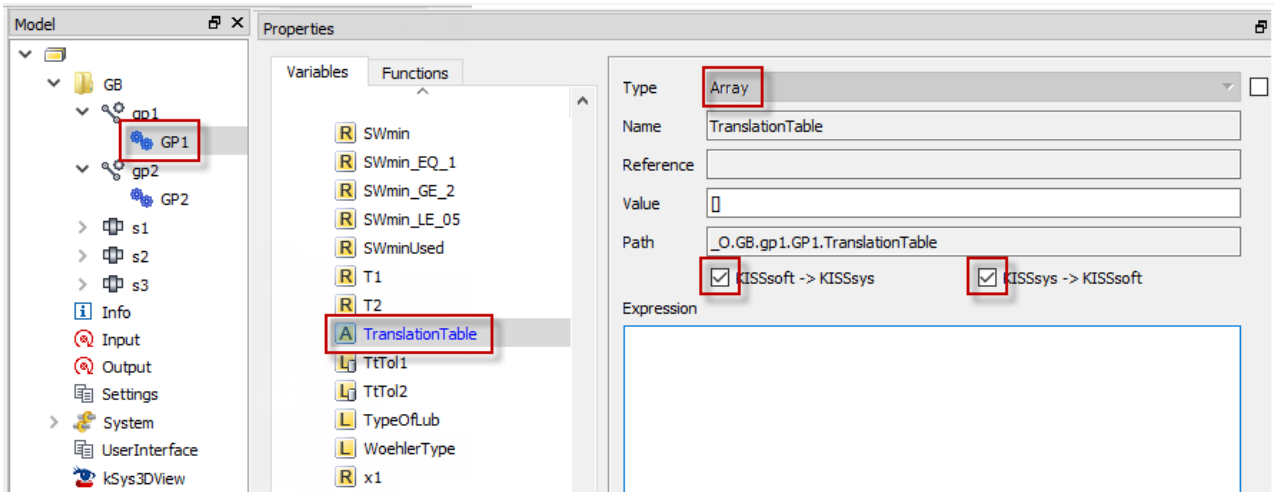

Figure 2. Creating a new array “TranslationTable” in the gearpair calculation

New variables to translate can be found from the protocol template.

Name	KISSsoft name
l	ZP[0].KHdat.l
s	ZP[0].KHdat.S
dsh	ZP[0].KHdat.dsh

Now open the report and check the description of the relevant variables:

General influence factors

		------- Gear 1 -------- Gear 2 --
Nominal circum. force at pitch circle (N)	[Ft]	492.4
Axial force (N)	[Fa]	86.8
Radial force (N)	[Fr]	182.0
Normal force (N)	[Fnorm]	532.1
Nominal circumferential force per mm (N/mm)	[w]	32.83
Only as information: Forces at operating pitch circle:		
Nominal circumferential force (N)	[Ftw]	500.0
Axial force (N)	[Faw]	86.8
Radial force (N)	[Frw]	159.9
Circumferential speed reference circle (m/s)	[v]	4.25
Circumferential speed operating pitch circle (m/s)	[v(dw)]	4.19
Running-in value (µm)	[yp]	0.5
Running-in value (µm)	[yf]	0.5
Correction factor	[CM]	0.800
Gear blank factor	[CR]	1.000
Basic rack factor	[CBS]	0.975
Material coefficient	[E/Est]	1.000
Singular tooth stiffness (N/mm/µm)	[c']	9.411
Meshing stiffness (N/mm/µm)	[cγα]	14.115
Meshing stiffness (N/mm/µm)	[cγβ]	11.998
Reduced mass (kg/mm)	[mRed]	0.00415
Resonance speed (min-1)	[nE1]	27855
Resonance ratio (-)	[N]	0.072
Subcritical range		
Running-in value (µm)	[yα]	0.5
Bearing distance l of pinion shaft (mm)	[l]	72.000
Distance s of pinion shaft (mm)	[s]	51.000
Outside diameter of pinion shaft (mm)	[dsh]	35.000

Figure 3. Variables to be changed from the report

Open the main-report .RPT file:

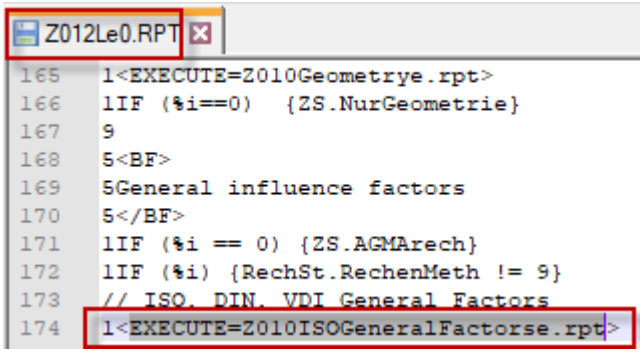

Figure 4. Main-report.RPT

Search for the Z010GeneralFactorse.rpt file

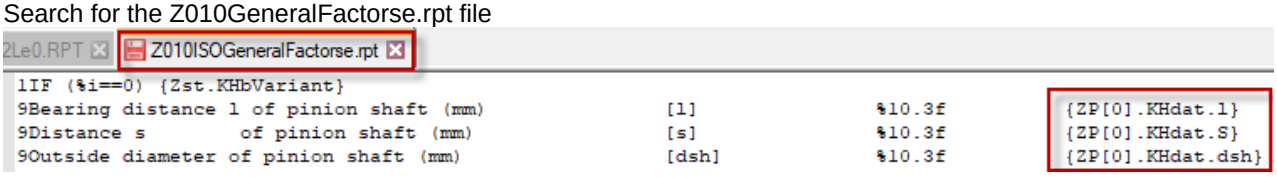

Figure 5. Variable names from KISSsoft protocol template

See more detailed information on the use of the “TranslationTable” in the instruction on the homepage “ins-006-TranslationTable.pdf”.

2.2 Add variables

Add new variables to the gear-pair calculation:

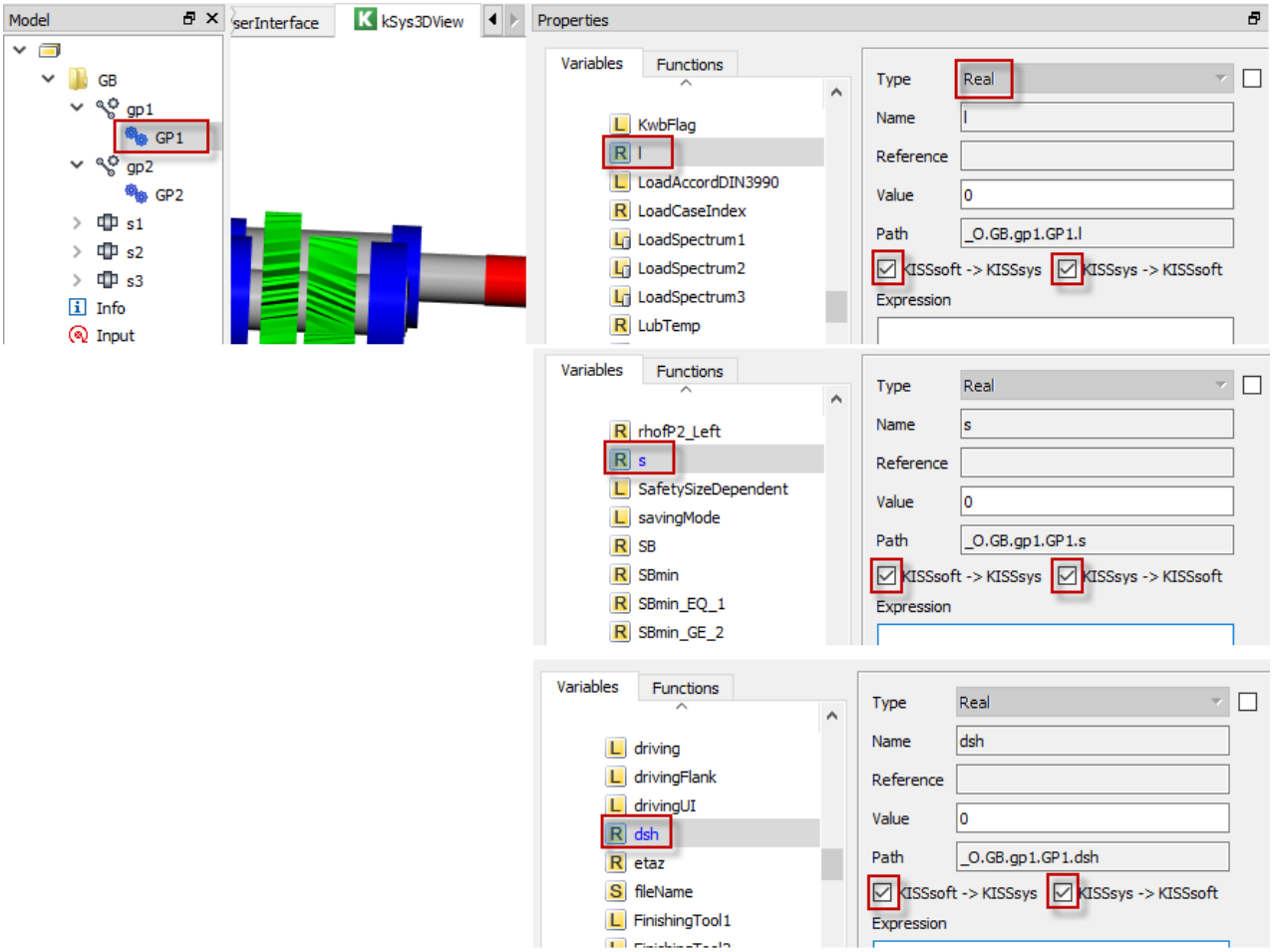

Figure 6. Adding new variables l,s and dsh

2.3 TranslationTable definition

When variable names and new variables in KISSsys are known, those can be added in the TranslationTable use following method for each new variable separated with comma:

[“new variable in KISSsys”,”Variable name from KISSsoft”]

[["l","ZP[0].KHdat.l"],["s","ZP[0].KHdat.S"],["dsh","ZP[0].KHdat.dsh"]]

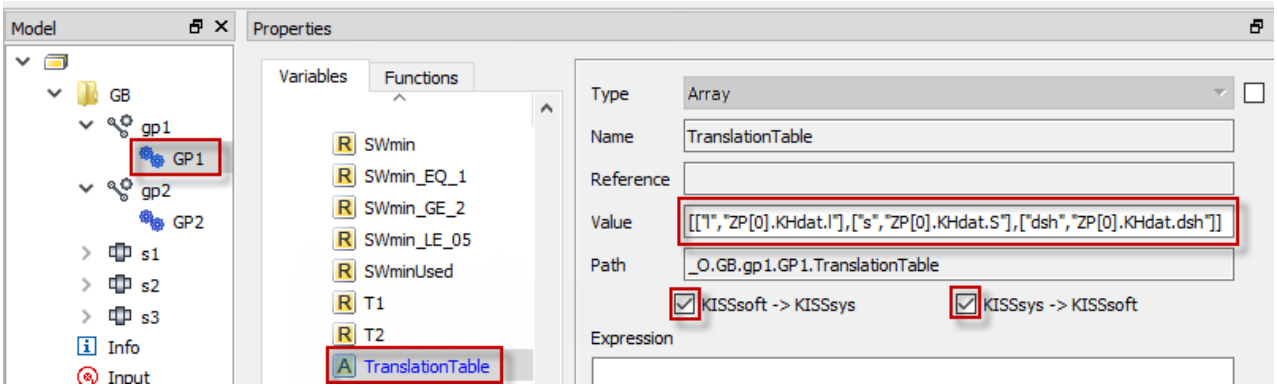

Figure 7. “TranslationTable” definition

2.4 Expressions for the variables

Expression to the new variables can be then created to make them changeable automatically according to geometry.
Note: In the example only case “A” defined of pinion shaft configurations.

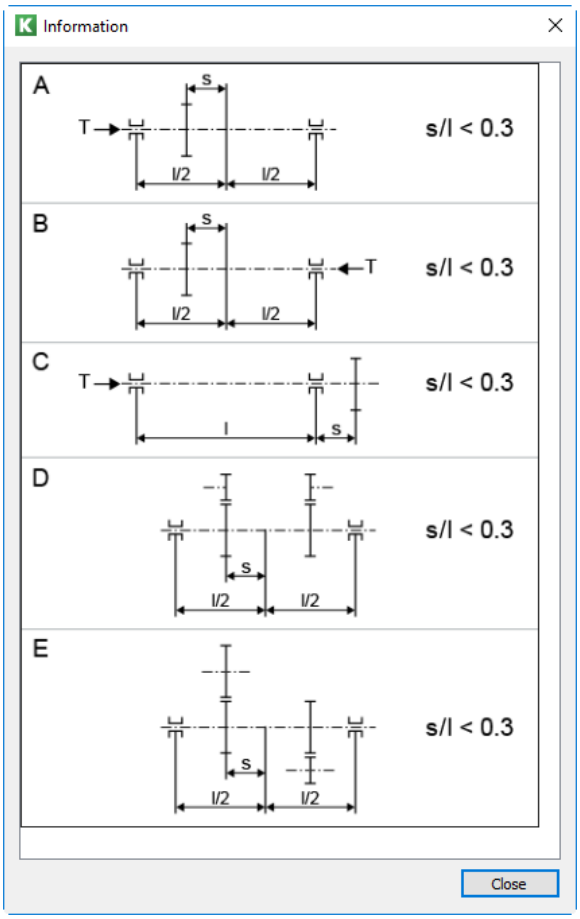

Figure 8. Pinion shaft configuration cases

- Variable “l” pinion shaft bearing distance.

Expression for variable “l”:
_O.GB.s1.b2.position - _O.GB.s1.b1.position

- Variable “s” is gear distance from the center of the bearings.

Expression for variable “s”:
l - (_O.GB.s1.z1.position-_O.GB.s1.b1.position)

- Variable “dsh” is shaft diameter in the place of the pinion.

Expression for variable “dsh”:
kSoft_RotCADDiameter(_O.GB.s1.OBJ_GetMember("outerGeometry"),_O.GB.s1.z1.position)

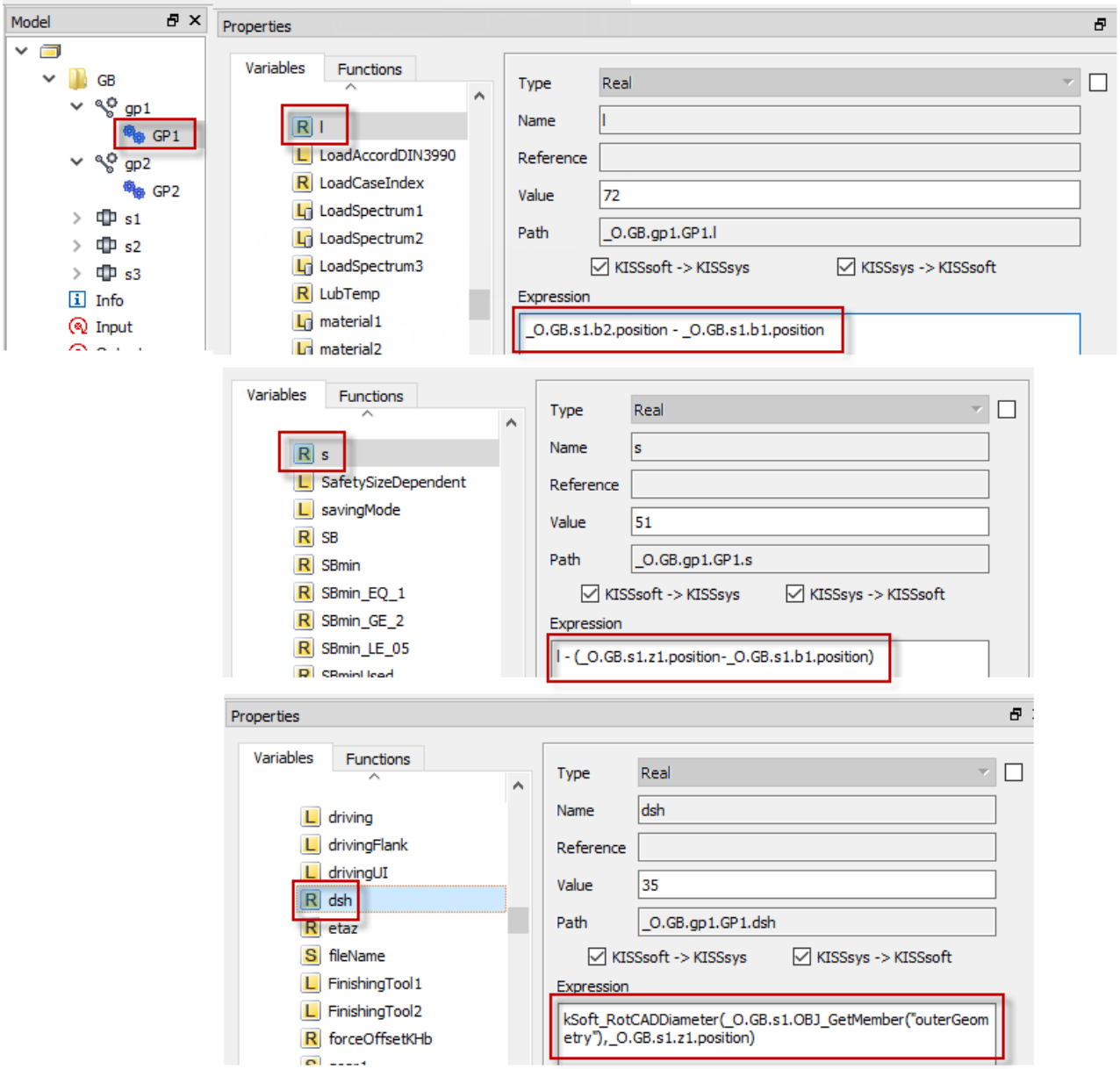

Figure 9. Definition of the expression of the variables “l”, “s” and “dsh”

Once either shaft geometry is changed or position of the components are changed, new values for the “KHb” calculations are adopted and used in the gear calculation.

See also referenced model “015-KHb-settings-simplified.ks” for the functionality in KISSsys.

Note! This method is very much simplified and to do the “KHb” calculation precisely, select calculation method according to ISO 6336-1 Annex E, and use the shaft files (module “W10”) from the gearpair calculation.

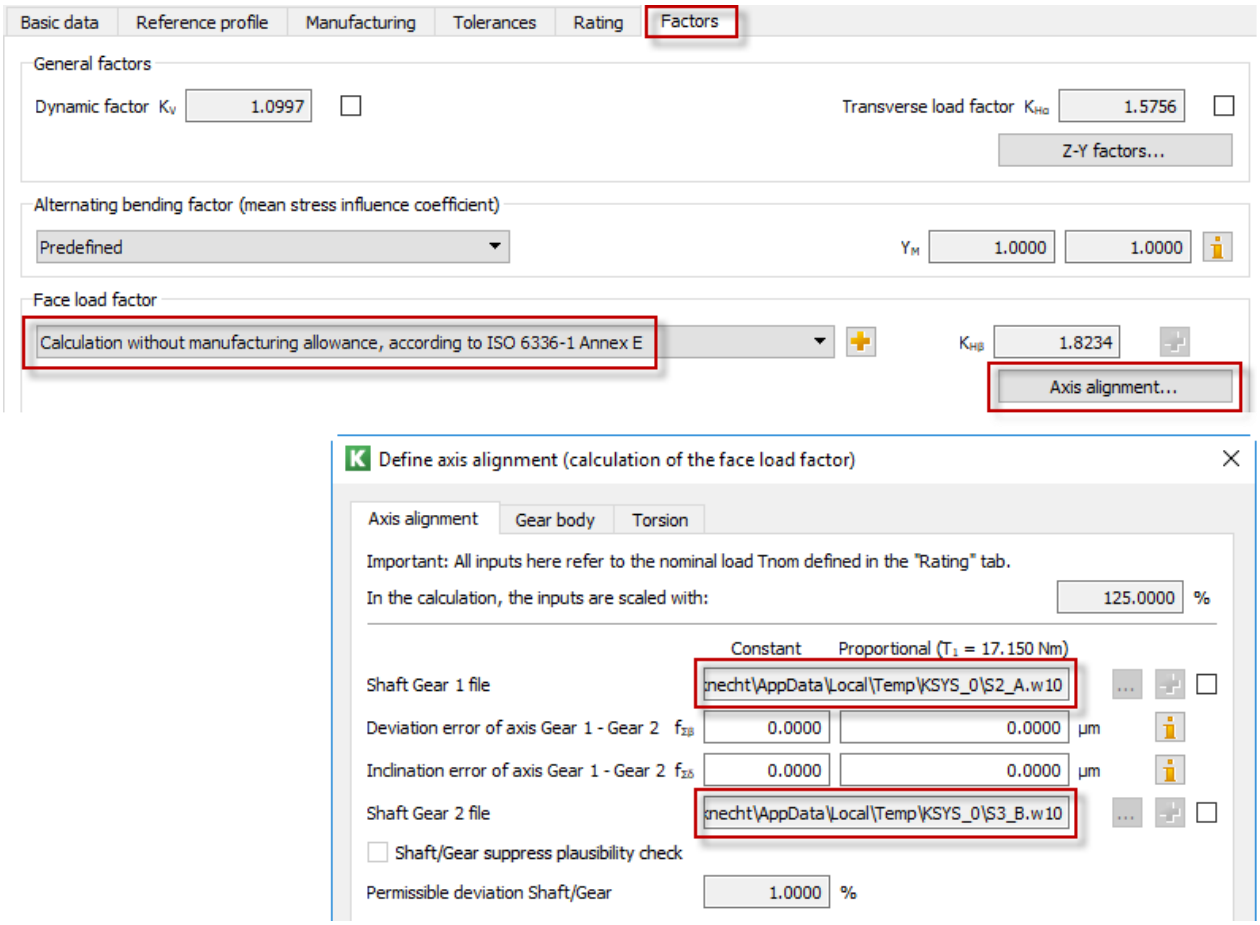

Figure 10. Calculation of KHbeta according to ISO 6336-1 Annex E with using the shaft files