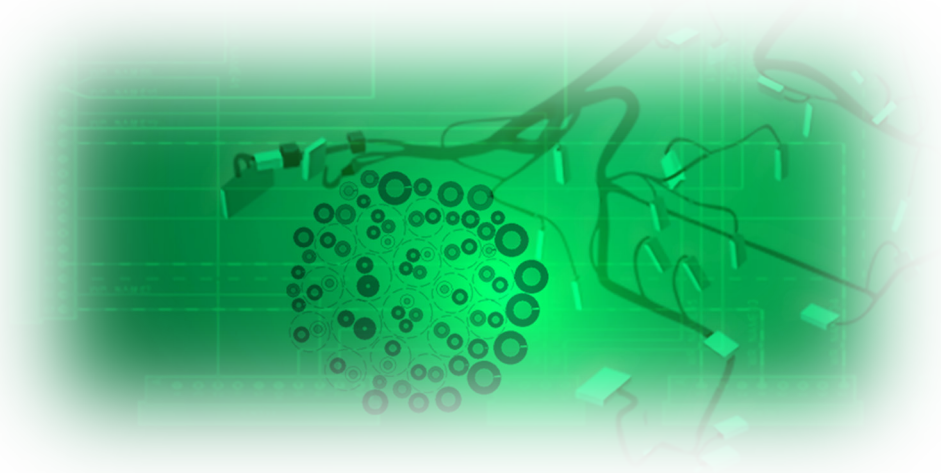
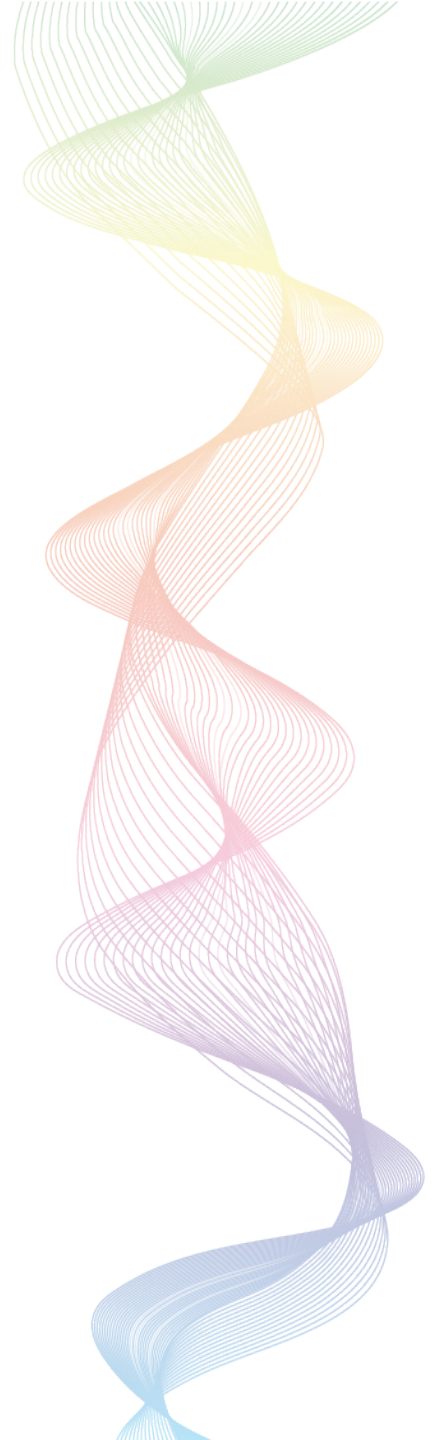


# Harness Studio 2025

## New Features and Improvements



May 2025



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- Updated Documentation Package and Online Video Tutorials



# **New Features and Improvements**

## **Data Import & Handling**

# Data Import & Handling – VEC Data Support

## Harness Data Import from VEC v1.1.3 (Vehicle Electric Container)

1 `<?xml version="1.0" encoding="UTF-8" ?>`  
2 `<ns2:VecContent xmlns:ns2="http://www.prostep.org/ecad-if/2011/vec" id="id_vec_content_1" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.w3.org/2001/XMLSchema-instance http://www.w3.org/2001/XMLSchema-instance" >`  
3 `<VecVersion>1.1.3</VecVersion>`  
4 `<GeneratingSystemName>VOBES NG</GeneratingSystemName>`  
5 `<DateOfCreation>2018-07-20T09:38:39.228+02:00</DateOfCreation>`  
6 `<GeneratingSystemVersion>1.1.43</GeneratingSystemVersion>`  
7 `<CopyrightInformation id="id_cpy_right_2">`  
13 `<CopyrightInformation id="id_cpy_right_4">`  
20 `<DocumentVersion id="id_docu_ver_1">`  
  
1496 `<DocumentVersion id="id_docu_ver_829">`  
1497 `<CompanyName>GCMC</CompanyName>`  
1498 `<Approval id="id_approval_830">`  
1501 `<DocumentNumber>5Ga15241a421</DocumentNumber>`  
1502 `<DocumentType>PartMaster</DocumentType>`  
1503 `<DocumentVersion>1</DocumentVersion>`  
1504 `<CreatingSystem>PartMasterSystem</CreatingSystem>`  
1505 `<ReferencedPart id="id_part_ver_821">`  
1506 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:TerminalSpecification" id="id_terminal_spec_831">`  
1512 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:MappingSpecification" id="id_mapping_spec_833">`  
1547 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:TerminalReceptionSpecification" id="id_terminal_reception_spec_842">`  
1554 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:ConnectorHousingSpecification" id="id_connect_hous_spec_844">`  
1569 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SlotSpecification" id="id_slot_spec_846">`  
1573 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SignalSpecification" id="id_signal_spec_849">`  
1584 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:EComponentSpecification" id="id_ecomponent_spec_852">`  
1628 `</DocumentVersion>`  
1629 `<DocumentVersion id="id_docu_ver_872">`  
  
1487 `<DocumentVersion id="id_docu_ver_11372">`  
1488 `<Description xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:LocalizedString" id="id_localizedString_11373">`  
1492 `<CompanyName>GCMC</CompanyName>`  
1493 `<DocumentNumber>000971228</DocumentNumber>`  
1494 `<DocumentType>HarnessDescription</DocumentType>`  
1495 `<DocumentVersion>1</DocumentVersion>`  
1496 `<CreatingSystem>HarnessDesignSystem</CreatingSystem>`  
1497 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:TerminalSpecification" id="id_terminal_spec_11374">`  
1593 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:TerminalReceptionSpecification" id="id_terminal_reception_spec_11375">`  
1633 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:ConnectorHousingSpecification" id="id_connect_hous_spec_11376">`  
1650 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SlotSpecification" id="id_slot_spec_11377">`  
1787 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SignalSpecification" id="id_signal_spec_11378">`  
1797 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:EComponentSpecification" id="id_ecomponent_spec_11379">`  
1816 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:TerminalSpecification" id="id_terminal_spec_11380">`  
1838 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:TerminalReceptionSpecification" id="id_terminal_reception_spec_11381">`  
1849 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:ConnectorHousingSpecification" id="id_connect_hous_spec_11382">`  
1861 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SlotSpecification" id="id_slot_spec_11383">`  
1868 `<Specification xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SignalSpecification" id="id_signal_spec_11384">`  
1885 `</DocumentVersion>`  
1886 `<DocumentVersion id="id_docu_ver_11374">`  
1886 `<DocumentVersion id="id_docu_ver_11376">`  
  
1129 `<PartVersion id="id_part_ver_510">`  
1130 `<CompanyName>GCMC</CompanyName>`  
1131 `<PartNumber>5Fa1a4616871E</PartNumber>`  
1132 `<PartVersion>4</PartVersion>`  
1133 `<PrimaryPartType>ConnectorHousing</PrimaryPartType>`  
1134 `</PartVersion>`  
1135 `<PartVersion id="id_part_ver_3287">`  
  
1179 `<PartVersion id="id_part_ver_35751">`  
1193 `<Project id="id_proj_8">`  
1203 `<Unit xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SIUnit" id="id_si_unit_8">`  
1208 `<Unit xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SIUnit" id="id_si_unit_9">`  
1211 `<Unit xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SIUnit" id="id_si_unit_10">`  
1215 `<Unit xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SIUnit" id="id_si_unit_11">`  
1218 `<Unit xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SIUnit" id="id_si_unit_12">`  
1221 `<Unit xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SIUnit" id="id_si_unit_13">`  
1224 `<Unit xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ns2:SIUnit" id="id_si_unit_14">`  
1228 `</ns2:VecContent>`

File Edit View Tools Objects Expert Measurements Report Window Help

New Ctrl+N  
Open Ctrl+O  
Save Ctrl+S  
Save As...  
Close Project

Import > Harness > KBL...  
Part Data > KBL (with Modules Configuration)  
Mesh > ASC...  
Connector Data... > VEC...  
Segments List (\*.NAS)  
CATIA V5...  
Wire Table...

Print Preview  
Print... Ctrl+P  
Print Setup...  
Page Setup...  
Recent Files  
Exit Alt+F4

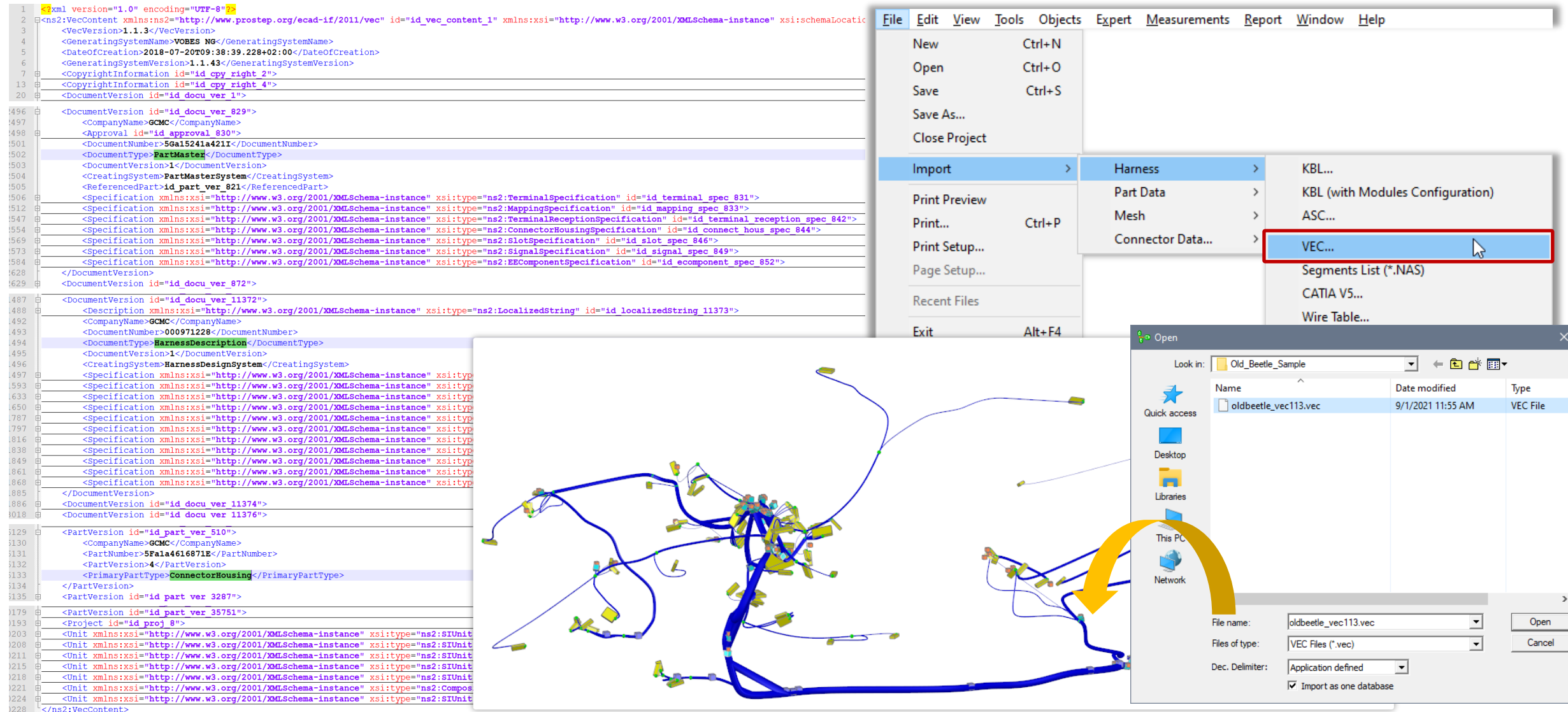
Open

Look in: Old\_Beetle\_Sample

Name	Date modified	Type
oldbeetle_vec113.vec	9/1/2021 11:55 AM	VEC File

File name: oldbeetle\_vec113.vec  
Files of type: VEC Files (\*.vec)  
Dec. Delimiter: Application defined  
☒ Import as one database

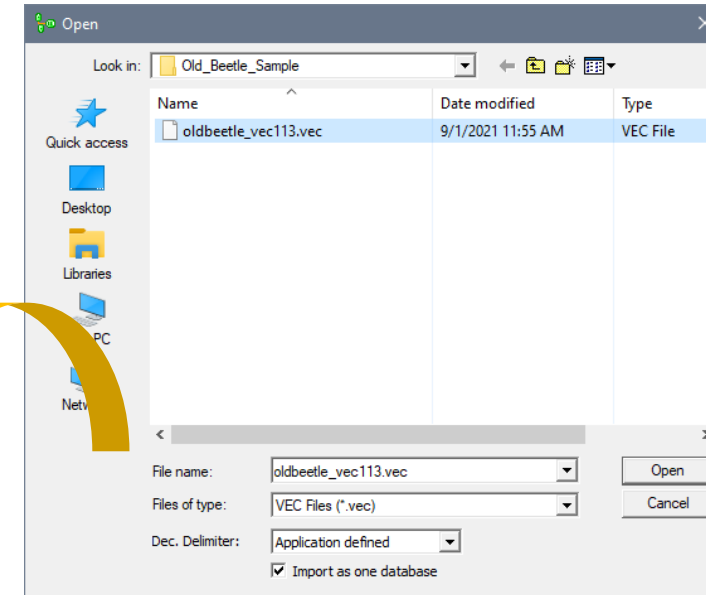
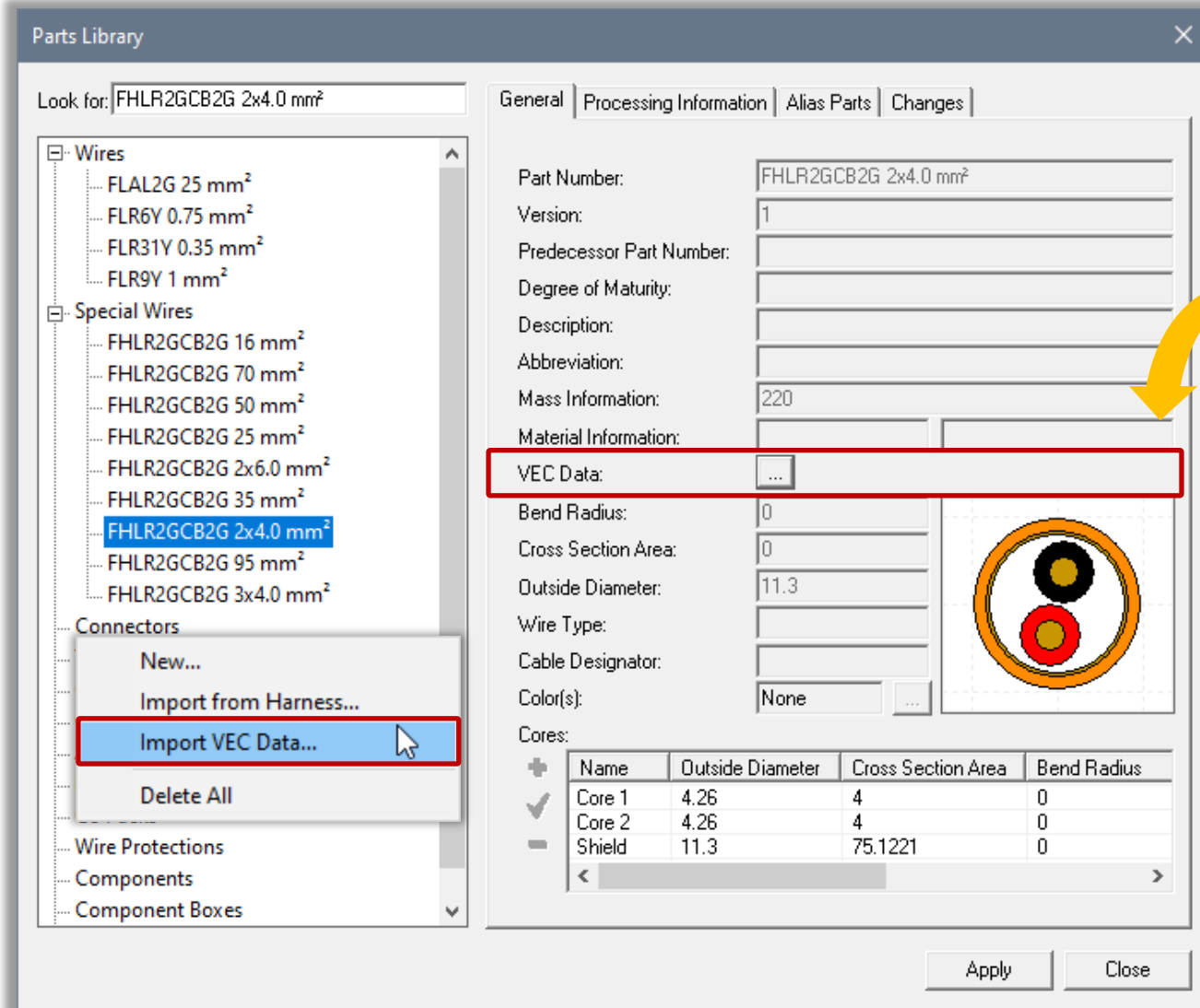
Open Cancel





# Data Import & Handling – VEC Data Support

## Import Part Master Data from VEC to Parts Library



- KBL data Part Number element is created based on VEC data
- All part number related information is not editable, when VEC data is attached
- VEC Data button is active to allow access to VEC Viewer

# Data Import & Handling – VEC Data Support

## Parts Library and VEC Data Viewer

**Parts Library**

Look for: FHRL2GCB2G 2x4.0 mm²

**Wires**

- FLAL2G 25 mm²
- FLR6Y 0.75 mm²
- FLR31Y 0.35 mm²
- FLR9Y 1 mm²

**Special Wires**

- FHRL2GCB2G 16 mm²
- FHRL2GCB2G 70 mm²
- FHRL2GCB2G 50 mm²
- FHRL2GCB2G 25 mm²
- FHRL2GCB2G 2x6.0 mm²
- FHRL2GCB2G 35 mm²
- FHRL2GCB2G 2x4.0 mm²**
- FHRL2GCB2G 95 mm²
- FHRL2GCB2G 3x4.0 mm²

**Connectors**

- Terminals
- Cavity Plugs
- Cavity Seals
- Accessories
- Fixings
- Co Packs
- Wire Protections
- Components
- Component Boxes

**General** | Processing Information | Alias Parts | Changes

Part Number: FHRL2GCB2G 2x4.0 mm²

Version: 1

Predecessor Part Number:

Degree of Maturity:

Description: Shielded cable for automotive electric powertrain FHRL2GCB2G 2\*4.0 mm² / 0.21

Abbreviation:

Mass Information: 220

Material Information:

**VEC Data:** ...

Bend Radius: 0

Cross Section Area: 0

Outside Diameter: 11.3

Wire Type:

Cable Designator:

Color(s): None

Cores:

Name	Outside Diameter	Cross Section Area
Core 1	4.26	4
Core 2	4.26	4
Shield	11.3	75.1221

**VEC Viewer Of Wire Part**

Document: 1 Version: 1

Part number: FHRL2GCB2G 2x4.0 mm² Version: 1

Description: Shielded cable for automotive electric powertrain FHRL2GCB2G 2\*4.0 mm² / 0.21

**Details** | Specifications | Part Versions

ID	PartVers_1_Ref
General	
CompanyName	Coroplast
PrimaryPartType	Wire

**VEC Viewer Of Wire Part**

Document: 1 Version: 1

Part number: FHRL2GCB2G 2x4.0 mm² Version: 1

Description: Shielded cable for automotive electric powertrain FHRL2GCB2G 2\*4.0 mm² / 0.21

**Details** | Specifications | Part Versions

**TechnicalPart Information**

- Cable
  - Wire Element
    - Insulation
    - Wire Element
      - Shield
      - Wire Element
        - Shield
        - Wire Element
          - Insulation
          - Conductor
          - Wire Element
            - Conductor
            - Insulation

Property	Value
General (GenTechPartSpec_34649_Leitung)	
Identification	GenTechPartSpec
MassInformation (Mass_11)	
Value (NumVal_10)	
Unit	GRAM METER
ValueComponent	220
TemperatureInformation (TempInfo_13)	
TemperatureRange (ValueRange_12)	
Unit	DegreeCelsius
SiUnitName	DegreeCelsius
Minimum	-40
Maximum	180
TemperatureType	Operating temperature

Apply

Close

### VEC Viewer Key Functions:

- Represents information from Part Master document and linked Part Version document(s)
- Distributes information to Details, Specifications and Part Versions tabs
- Provides collapse/expand for VEC data overview

# Data Import & Handling – VEC Data Support

## Update KBL Harness Database with VEC Part Master Data

**Table View [Special Wires]**

Name	Part Number	Embedded Wire ...	Embedded ...	Embedded ...	Wire Type	Description	Abbreviation	Mass Information	Mat
SL2827	O102217971a2	V.30U.SZS1034...	301	4	multicore wire	Mehradriges Kabel	/NULL	0.08	
SL8952	O10a010451a2	X.DEQ1LV11S.S...	268003,268...	0.35,0.5	multicore wire	Mehradriges Kabel	/NULL	0.019	
SL6106	O10a010451a2	X.LV1QCBS1S...	268007,268...	0.35,0.5	multicore wire	Mehradriges Kabel	/NULL	0.019	
SL6104	O10a010451a2	X.WQ1Suvwbj...	268005,268...	0.5,0.35	multicore wire	Mehradriges Kabel	/NULL	0.019	
SL24	O10a210221a2	X.UW.SZS1047...	5027,5030	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL21	O10a210221a2	S.KFaxr.SZS104...	5037,5038	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL20	O10a210221a2	S.KFaxr.SZS104...	5023,5031	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	

**VEEC Data Import Log**

```
Importing VEC Part Data
Component Box '202104816a2' updated in database: 'kblxml_2.4sr-1_tab016120_modulare_itgs._160718'
Component Box '8Ma104816a4' updated in database: 'kblxml_2.4sr-1_tab016120_modulare_itgs._160718'
Component Box '4E310481500' updated in database: 'kblxml_2.4sr-1_tab016120_modulare_itgs._160718'
Component Box '6Ra104816a81B' updated in database: 'kblxml_2.4sr-1_tab016120_modulare_itgs._160718'
Fixing '2Da10821959' updated in database: 'kblxml_2.4sr-1_tab016120_modulare_itgs._160718'
Fixing 'YY1Fa21aa5' updated in database: 'kblxml_2.4sr-1_tab016120_modulare_itgs._160718'
```

**Import Data**

Data File(s): D:\Demo\Old\_Beetle\_Sample\oldbeetle\_vec113.vec

Property	Value
<b>General</b>	
Import only existing parts	Yes
Import Schematic Symbols	Yes
<b>Additional</b>	
Choose element to import	Yes
Wires	Yes
Connectors	Yes
Accessories	Yes
Assemblies	Yes
Cavity Plugs	Yes

Status	Database Name
<input checked="" type="checkbox"/>	kblxml_2.4sr-1_tab016120_modulare_itgs._160718
<input checked="" type="checkbox"/>	Parts Library

Advanced OK Cancel



# Data Import & Handling – VEC Data Support

## Update KBL Harness Database with VEC Part Master Data

Table View [Special Wires]

Name	Part Number	Embedded Wire ...	Embedded ...	Embedded ...	Wire Type	Description	Abbreviation	Mass Information	Mal
SL5	O10a210221a2	S.CV8.SZS1047...	5050,5052	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL3	O10a210221a2	S.KFaoj.SZS104...	5049,5051	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL23	O10a210221a3	X.PIC1311r.SZS...	5035,5036	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL22	O10a210221a3	X.PIC1311r.SZS...	5025,5026	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL18	O10a210221a3	X.PIC1311j.SZS...	5020,5022	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL17	O10a210221a3	X.PIC1311j.SZS...	5013,5017	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	
SL16	O10a210221a3	X.PIC1311i.SZS...	5005,5006	0.75,0.75	multicore wire	Mehradriges Kabel	/NULL	0.024	

Special Wire Properties

Name: SL23

Part Number: O10a210221a3

Wire Number: 5035, 5036

Wire Type: multicore wire

Description: Mehradriges Kabel

Abbreviation: /NULL

Version: 2

Degree of Maturity:

Predecessor:

Copyright Notes:

Mass Information: 0.024

Material Information:

Wire Type: multicore wire

Bend Radius: 0

Outside Diameter: 0

Cross Section Area: 0

Cable Designator:

VEC Data: ...

Color: /NULL Grundfarbe

Length Information: 3684.52 DMU

Output

Importing VEC Part Data

Component Box '202104816a2' updated in database: 'kblxml\_2.4sr-1\_tab016120\_modulare\_Itgs\_160718'

Component Box '8Ma104816a4' updated in database: 'kblxml\_2.4sr-1\_tab016120\_modulare\_Itgs\_160718'

Component Box '4E310481500' updated in database: 'kblxml\_2.4sr-1\_tab016120\_modulare\_Itgs\_160718'

Component Box '6Ra104816a81B' updated in database: 'kblxml\_2.4sr-1\_tab016120\_modulare\_Itgs\_160718'

Fixing '2Da10821959' updated in database: 'kblxml\_2.4sr-1\_tab016120\_modulare\_Itgs\_160718'

Fixing 'YY1Fa21aa5' updated in database: 'kblxml\_2.4sr-1\_tab016120\_modulare\_Itgs\_160718'

VEC Viewer of Wire Part

Document: O10a210221a3 Version: 2

Part number: O10a210221a3 Version: 2

Description:

Details Specifications Part Versions

Property Value

General

CompanyName: GCMC

Approval (id\_approval\_15656): Approved

Status: PartMaster

DocumentType: PartMasterSystem

CreatingSystem: id\_part\_ver\_15654

ReferencedPart:

VEC Viewer of Wire Part

Document: O10a210221a3 Version: 2

Part number: O10a210221a3 Version: 2

Description:

Details Specifications Part Versions

TechnicalPart Information

Cable

Wire Element

Wire Element

Property Value

General (id\_tech\_part\_spec\_15685)

Identification: Huq3010a210221a333

DescribedPart: id\_part\_ver\_15654

VEC Viewer of Wire Part

Document: O10a210221a3 Version: 2

Part number: O10a210221a3 Version: 2

Description:

Details Specifications Part Versions

id\_part\_ver\_15654\_Ref

Property Value

General

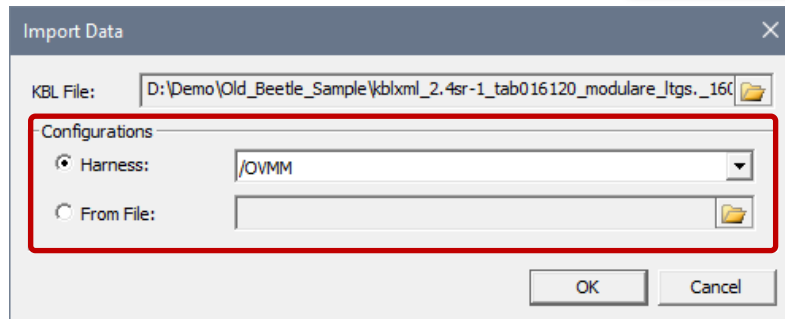
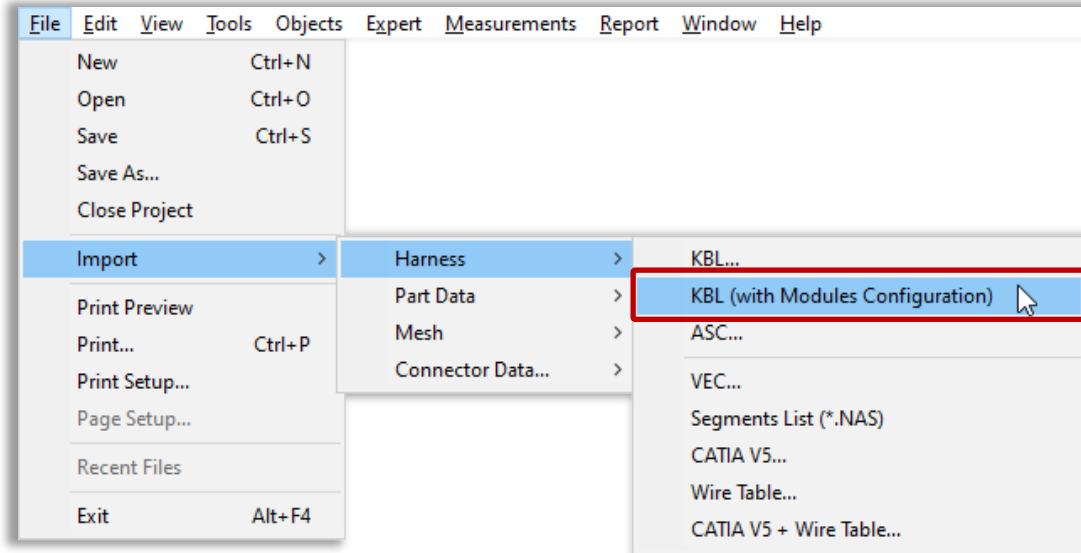
CompanyName: GCMC

PrimaryPartType: Wire

IsPreferredPart: forbidden

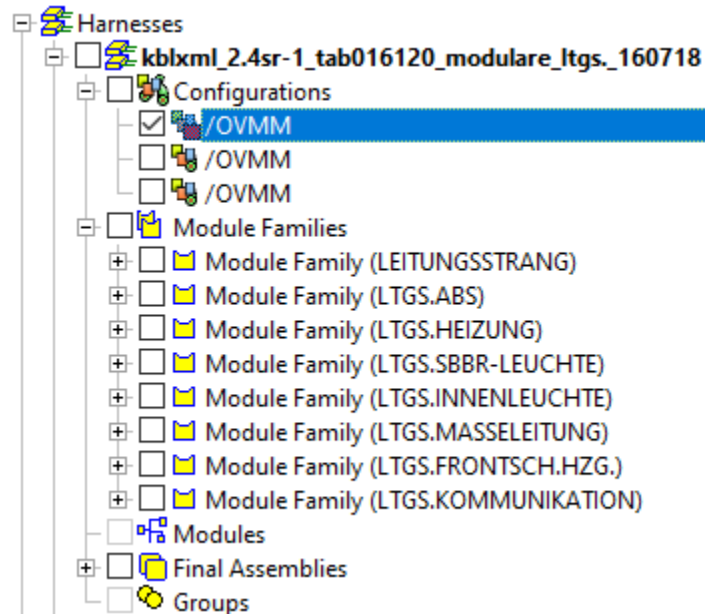
# Data Import & Handling – Import Harness Configurations

## Extension of KBL Harness Import Engine



**Configurations can be selected directly from harness data or based on external list**

```
<Harness_configuration id="id_355_2">
  <Part_number>/OVMM</Part_number>
  <Company_name>GCMC</Company_name>
  <Version>/NULL</Version>
  <Abbreviation>/NULL</Abbreviation>
  <Description>/NULL</Description>
  <Car_classification_level_2>/NULL</Car_classification_level_2>
  <Car_classification_level_3>Derivat_MIN</Car_classification_level_3>
  <Car_classification_level_4>Kombination_MINI</Car_classification_level_4>
  <Model_year>/NULL</Model_year>
  <Modules>id_331_0 id_331_14 id_331_17 id_331_19 id_331_2 id_331_26 id_331_28</Modules>
</Harness_configuration>
```



# Data Import & Handling – Support of KBL 2.5

## Extension of KBL Harness Import Engine

Wire Properties

Wire Number: 45

General | Information | References | Module References

Description: Unspezifizierter Draht  
Abbreviation: /NULL  
Version: 2  
Degree of Maturity:  
Predecessor:  
Copyright Notes:  
Mass Information: 0.011  
Material Information:  
Wire Type: individual wire  
Cable Designator:

Name: M.31.SZS1033.MI45111C11  
Part Number: 01a481a3912  
Bend Radius: 6.3  
Outside Diameter: 2.1  
Cross Section Area: 1  
Signal Name: M.31.SZS1033.MI45111C1  
Signal Type:  
Start Connector: XA.V.1  
End Connector: 278  
Start Cavity: default:5  
End Cavity: none:1

Advanced <<

OK Apply Cancel

Color

+	BR	base colour
✓	GE	second identification

Length Information

+	541.899	Calculated
✓	541.87	DMU

- ✓ Harness engine is extended with KBL 2.5 support
- ✓ Corrections of inaccuracies in support of KBL 2.3 and KBL 2.4
- ✓ Extension of GUI for wire color and length information
- ✓ Extension of wire protection properties window with KBL 2.5 attributes
- ✓ Installation information properties for all related harness objects

Colors

Value

- RD
- RED
- ROT
- OR
- OG
- ORANGE
- GE
- YE
- YELLOW
- GELB
- ...

Type

- second identification
- base colour
- first identification
- second identification
- label identification

Length

Value: 165

Type

- Drawing
- Contract
- DMU
- Drawing
- Production

# Data Import & Handling – CATIA V5, Wire Table

## Import Harness from CATIA V5, Wire Table, CATIA V5 + Wire Table

Import Data

Geometry Data: D:\Temp\Data\3D\_CAD\_harness\_data.CATProduct

Output Data Name: harness\_database\_with\_3D\_data

- Property
- 3D settings
    - Read hidden elements
    - Determine Fixings
    - Store CAD representation
  - KBL default settings
    - Connector
      - Name prefix
      - Part number prefix
      - Slot name prefix
      - Cavity name prefix
    - Fixing
      - Name prefix
      - Part number prefix
    - Segment
      - Name prefix
    - Node
      - Name prefix
      - Coincidence tolerance [mm]

Advanced

Import Data

Geometry Data: D:\Temp\Data\3D\_harness-data.CATProduct

Wire Table: D:\Temp\Data\2D\_harness-data.csv

Output Data Name: merged\_3D&2D\_database

Property	Value
3D settings	
Read hidden elements	Yes
Determine Fixings	Yes
Store CAD representation	Yes
KBL default settings	
Connector	
Name prefix	Connector
Part number prefix	Connector PrtN_
Slot name prefix	A
Cavity name prefix	J_
Wire	
Name prefix	Wire
Part number prefix	Wire PrtN_
Cross section area [mm²]	0.5
Outside diameter [mm]	0.9
Bend radius [mm]	26.1
Fixing	
Name prefix	Fixing
Part number prefix	Fixing PrtN_
Segment	
Name prefix	BNS_U
Node	
Name prefix	BSJ_U
Coincidence tolerance [mm]	1

Advanced

- ✓ **Read Hidden Elements**  
Identify and process hidden elements within the dataset
- ✓ **Determine Fixings**  
Separate fixing elements from connectors based on naming rules derived from user-provided data files

- ✓ **Store CAD Representation**  
Preserve geometry information to enable visual representation
- ✓ **KBL Default Settings**  
Apply default naming rules for harness elements when original data lacks name information

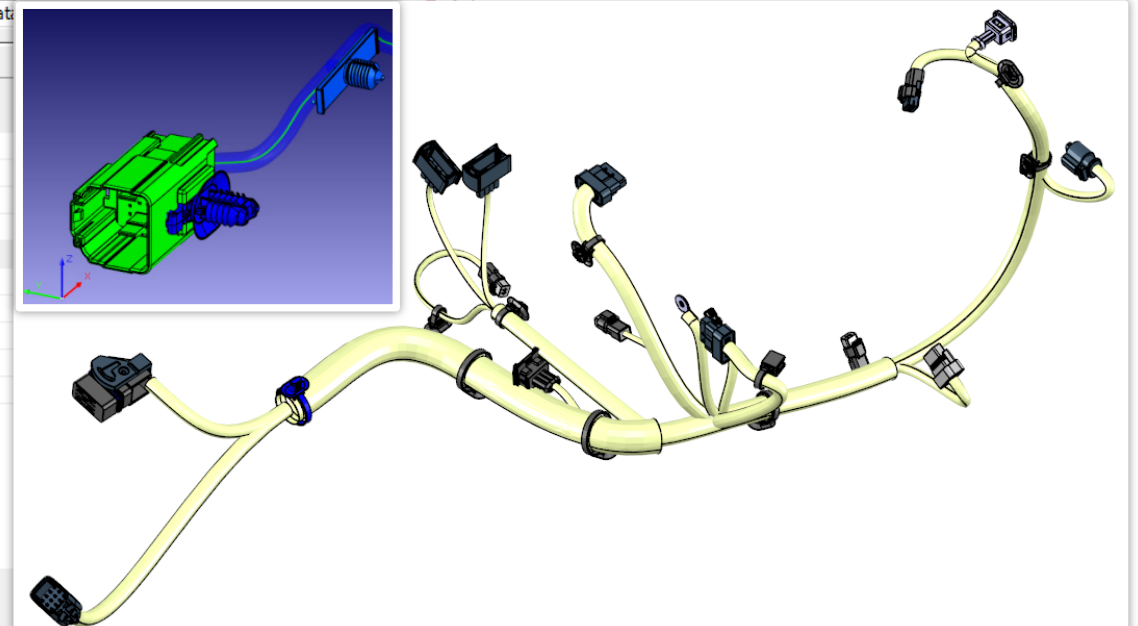
Import Data

Wire Table: D:\Temp\Data\2D\_electrical\_data.csv

Output Data Name: 2D\_electrical\_data

- Property
- KBL default settings
    - Connector
      - Name prefix
      - Part number prefix
      - Slot name prefix
      - Cavity name prefix
    - Wire
      - Name prefix
      - Part number prefix
      - Cross section area [mm²]
      - Outside diameter [mm]
      - Bend radius [mm]

Advanced





# **New Features and Improvements**

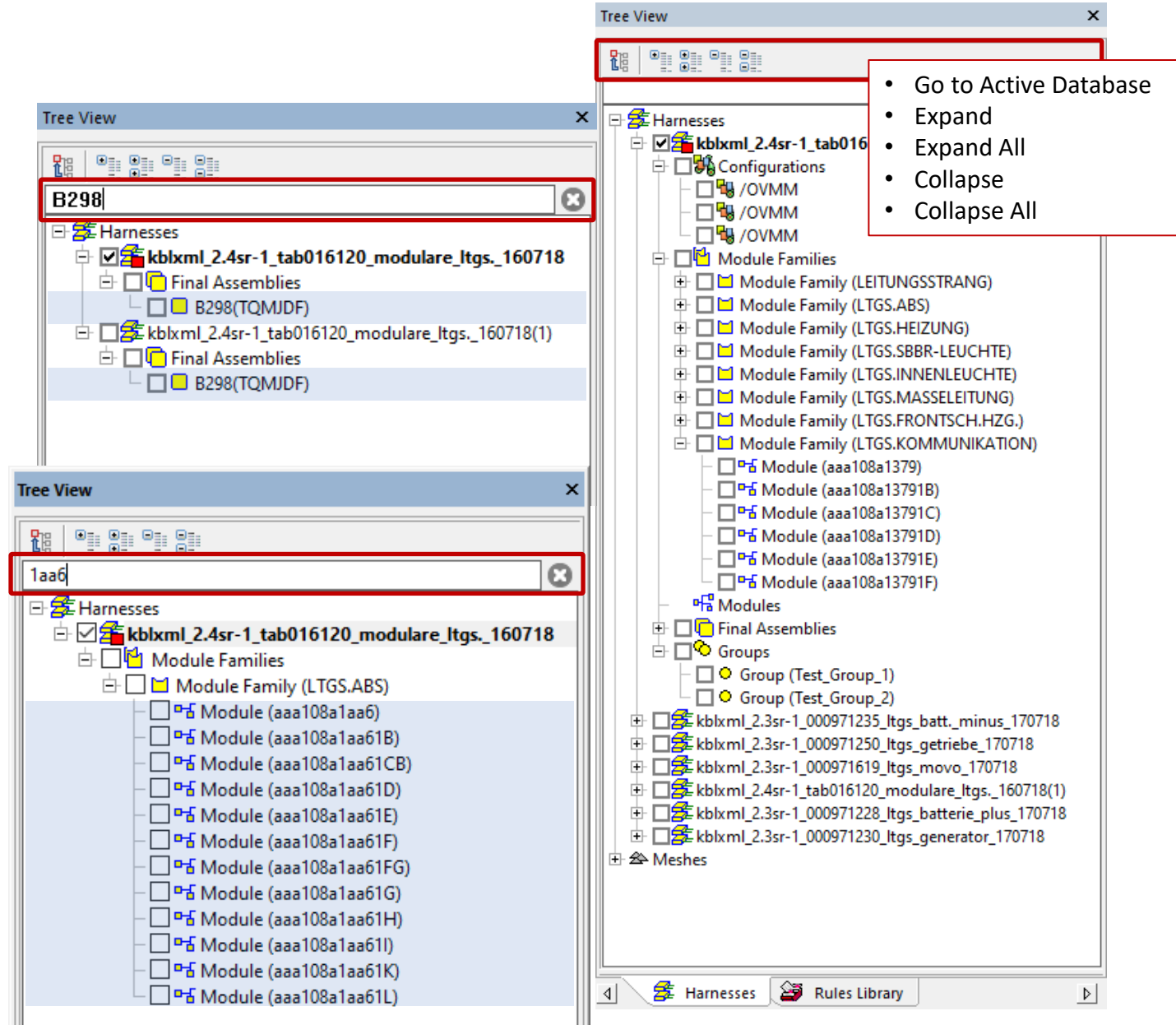
## **Harness Data Visualization and Navigation**



# Improved Navigation in Harness Database

## Extended Operations in Tree View

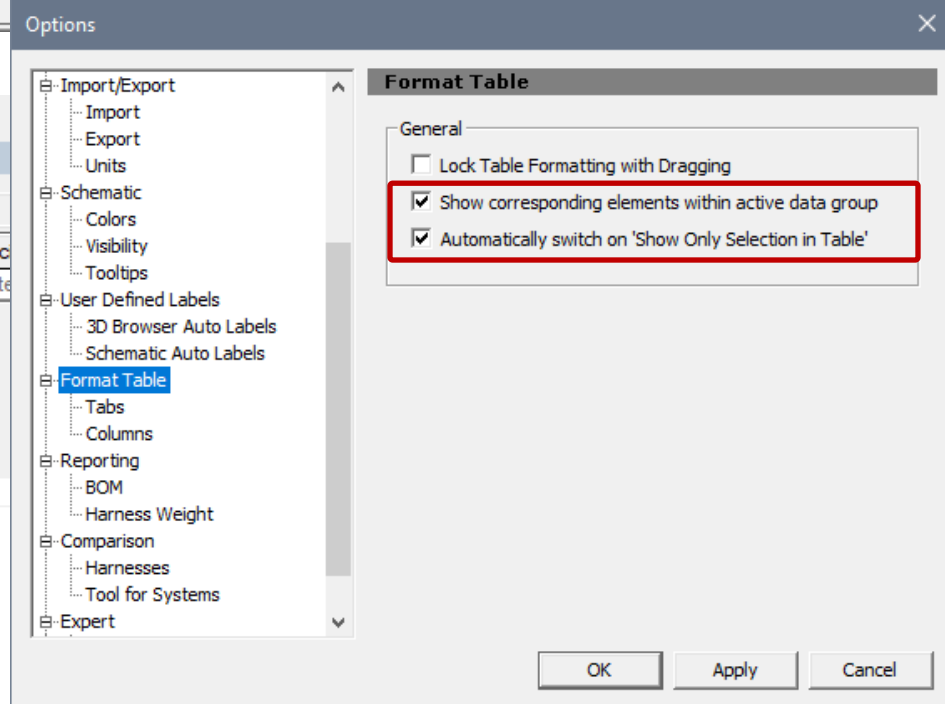
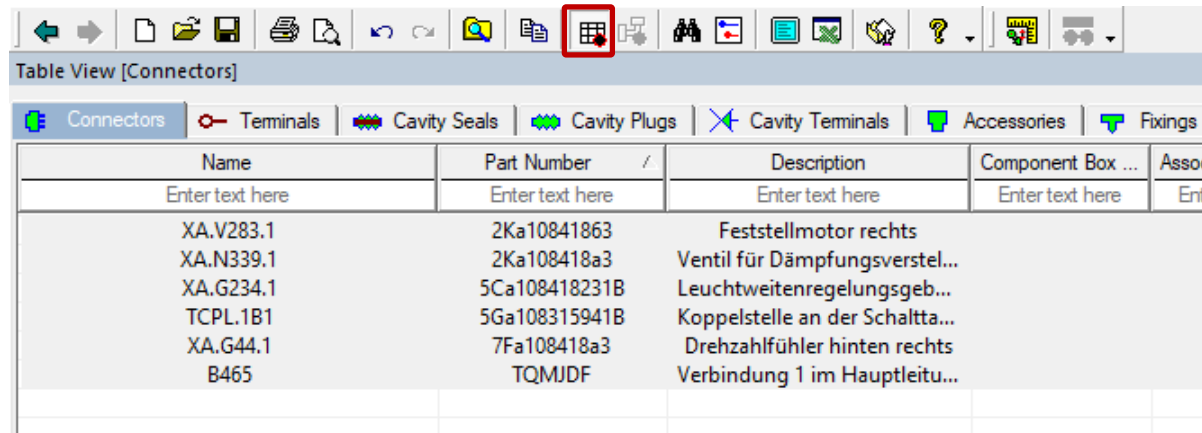
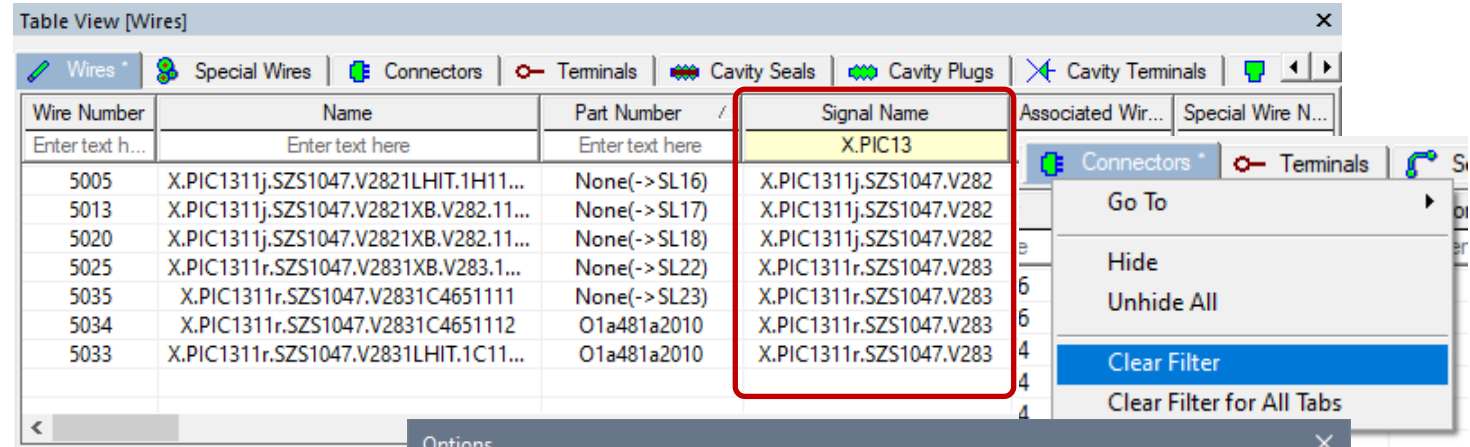
- Support of filtering in Tree View contents for better navigation
- New commands in Tree View: Go to Active Database / Expand / Expand All / Collapse / Collapse All
- Active database is now highlighted with bold in Tree View
- Harness part (module, module family, configuration or group) shown in Table View is indicated with check-box in Tree View



# Improved Navigation in Harness Database

## Extended Operations in Table View

- Support of filtering in Table View contents for better navigation
- Show corresponding elements within active data group
- Automatically switch to "Show Only Selection is Table" mode



# Improved Navigation in Harness Database

## Extended Operations in Search Engine

- Search within defined harness element type
- Search conditions (All / Any)
- Number of digits control for comparison of numerical values
- Show only parameters visible in table

Table View [Wires]

Wire Num...	Name	Part Number	Signal Name	Abbreviation	Mass Information	Start Connector	Start Connector Description	Start Connector ...	Start Connector ...	Start Connector ...
Enter text here	Enter text here	Enter text here	Enter text here	Enter text h...	Enter text here	Enter text here	Enter text here	Enter text here	Enter text here	Enter text here
1	V.15B.SZS1090....	O1a481a5017	V.15B.SZS1...	/NULL	0.026	XA.SA.1 (A_1)				
101	V.58.SZS1034.1...	O1a481a4817	V.58.SZS10...	/NULL	0.016	B642	Plusverbindung (58) im Haup...	/NULL	/NULL	
102	V.58.SZS1034.1...	O1a481a4817	V.58.SZS10...	/NULL	0.016	XA.SA.1 (A_1)				
103	V.58.SZS1034....	O1a481a5812	V.58.SZS10...	/NULL	0.026	XA.SA.1 (A_1)				
104	V.58.SZS1034....	O1a481a3812	V.58.SZS10...							
105	V.58.SZS1034....	O1a481aa812	V.58.SZS10...							
106	V.58.SZS1034....	O1a481aa812	V.58.SZS10...							
107	M.PM.SZS1035...	O1a481aa912	M.PM.SZS1...							
108	S.U.SZS1090.1X...	O1a481aa416	S.U.SZS1090.							
109	S.WC@Suw.SZ...	O1a481aa514	S.WC@Su...							
11	V.15B.SZS1090....	O1a481a5016	V.15B.SZS1...							
110	F.RFDBU.SZS10...	O1a481aa81a	F.RFDBU.S...							
111	F.RFDBU.SZS10...	O1a481aa81a	F.RFDBU.S...							
112	F.RFDBU.SZS10...	O1a481aa81a	F.RFDBU.S...							
113	V.T.SZS1035.1X...	O1a481aa81a	V.T.SZS1035...							

Search (kblxml\_2.4sr-1\_tab016120\_modulare\_lts\_160718)

Harness Elements: Wires

N	Parameter	Operation	Value
<input type="checkbox"/>	End Connector Pin Number	=	
<input type="checkbox"/>	End Connector Contact Point	=	
<input type="checkbox"/>	End Connector EQT Part Num...	=	
<input type="checkbox"/>	Wire Type	=	
<input checked="" type="checkbox"/>	Cross Section Area	>	2.5
<input type="checkbox"/>	Outside Diameter	=	
<input checked="" type="checkbox"/>	Length	>	600
<input type="checkbox"/>	Color	=	
<input type="checkbox"/>	OverAll Weight	=	
<input type="checkbox"/>	Cu Weight	=	
<input type="checkbox"/>	Wiring Groups	=	
<input type="checkbox"/>	Module References	=	
<input type="checkbox"/>	Used with Modules	=	

Search conditions

☒ All ☐ Any

☒ Show only parameters visible in table view

☐ Case sensitive

Number of digits for comparison of numerical values: 6

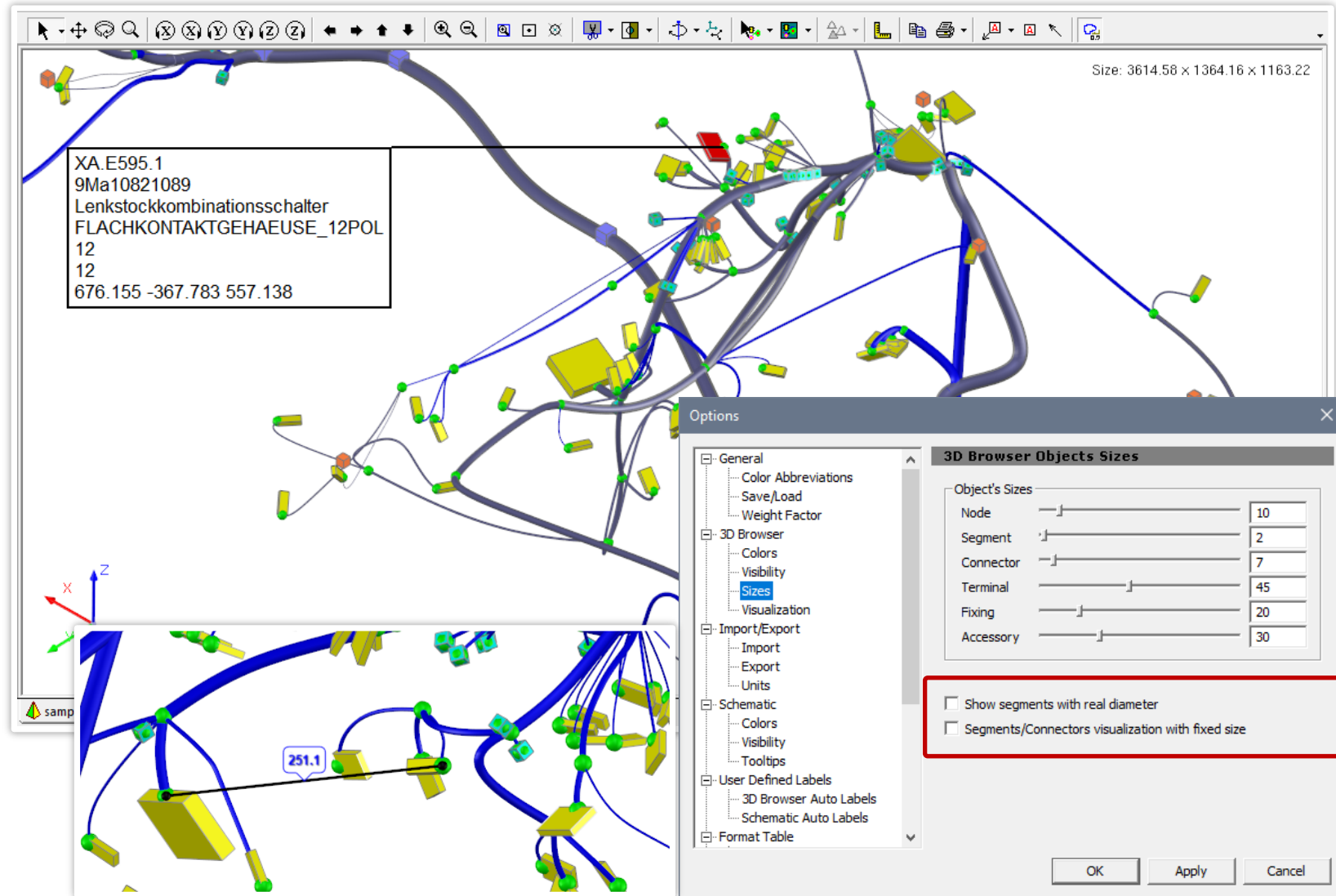
☒ Add results to group: Wires\_Group\_1

Search Close

# New Features and Improvements in 3D Browser

## New Engine for Harness Data 3D Visualization

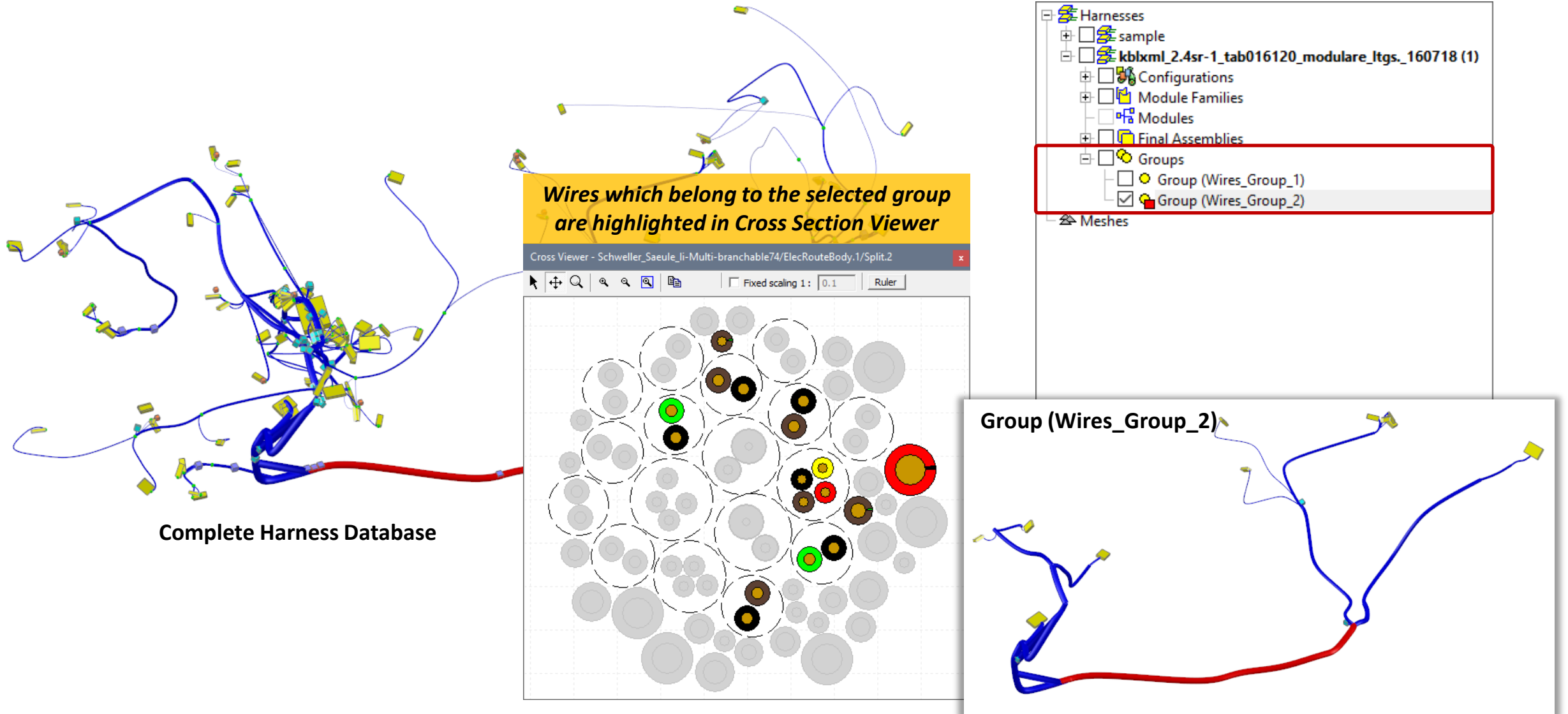
- Advanced rendering techniques to provide high-quality visuals, including realistic lighting and customizable color schemes
- Support of new 'Treat B-spline curves as clamped uniform B-splines' option for better handling of segments visualization
- Possibility to visualize segments with real diameter
- Possibility to visualize segments and connectors with fixed size
- Improved visualization of auto and user-defined labels
- Improved Ruler to measure distance between model object





# New Features in Segments Cross Section Viewer

## Indication of Wires from Selected Data Group





## Support of Topology View Visualization for Groups



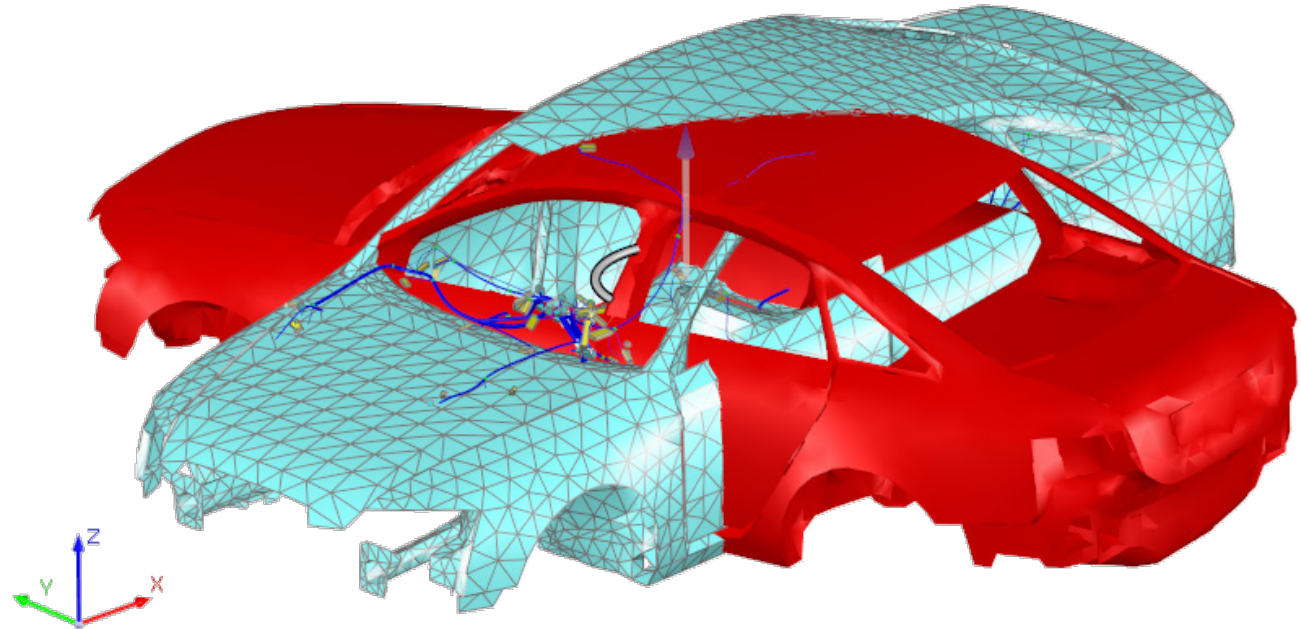
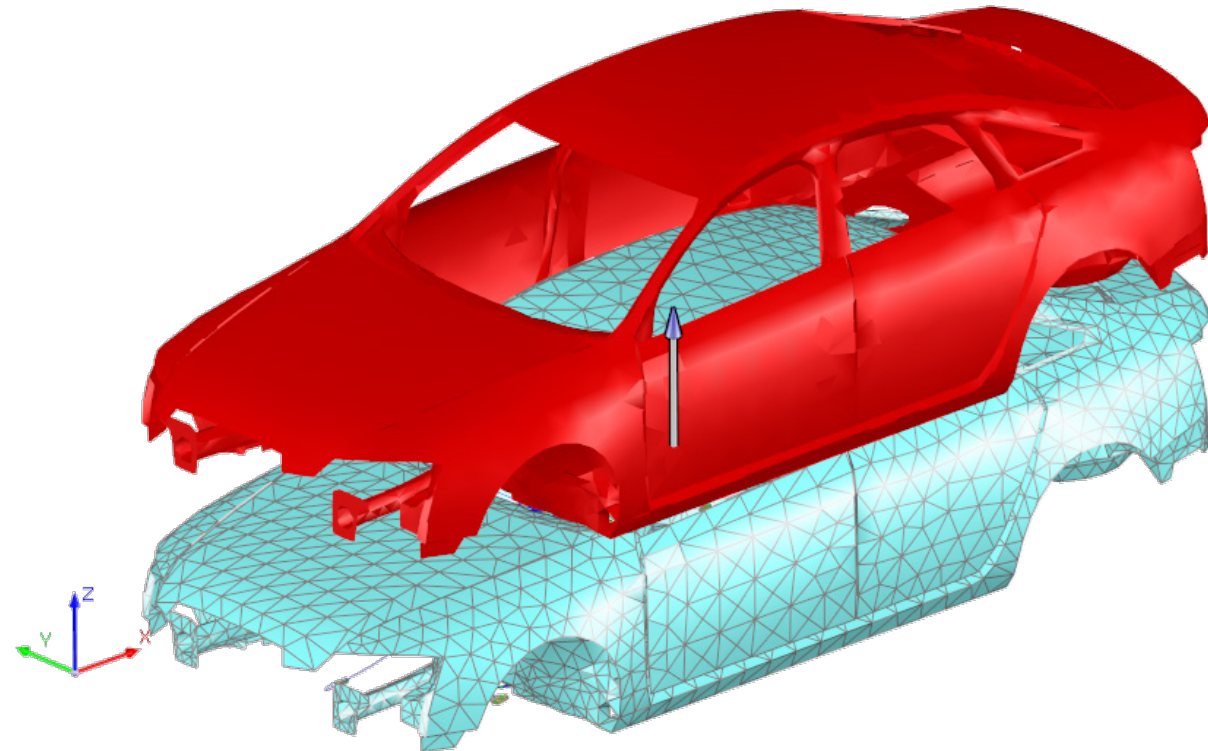
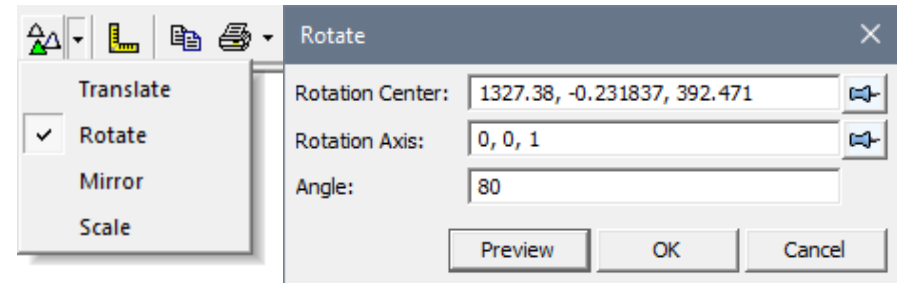
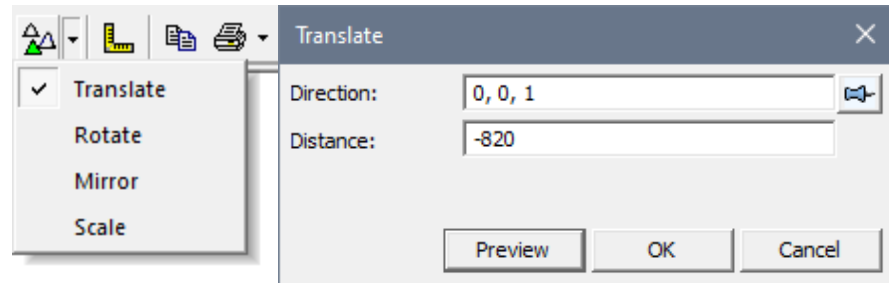


# **New Features and Improvements**

## **Model Handling Functionality**

# Support of Transformation Operations for Meshes

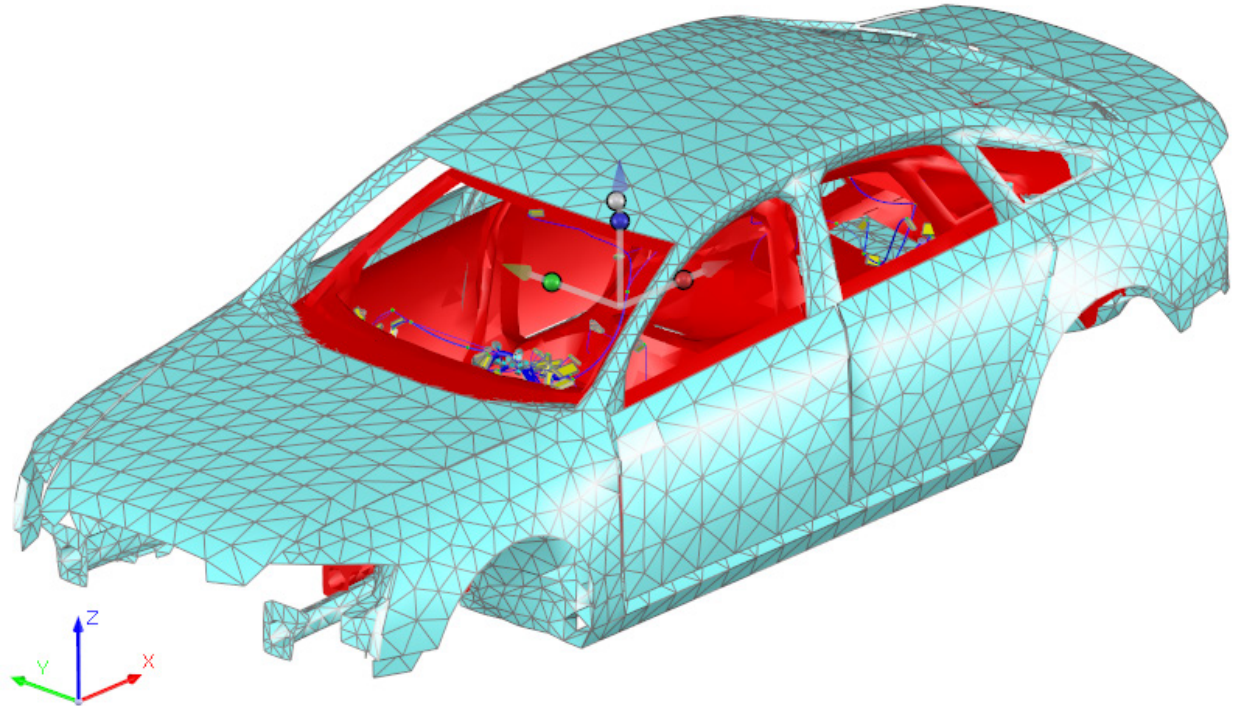
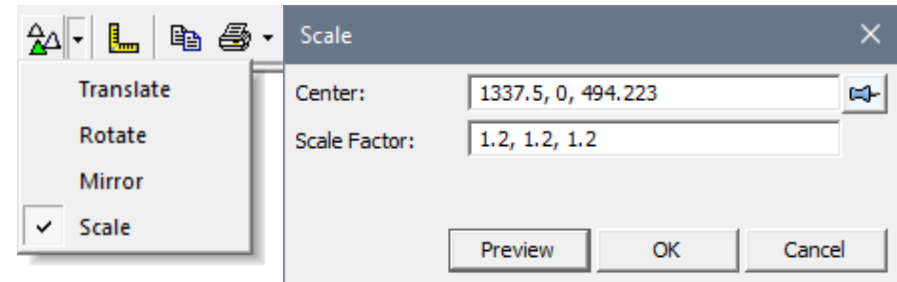
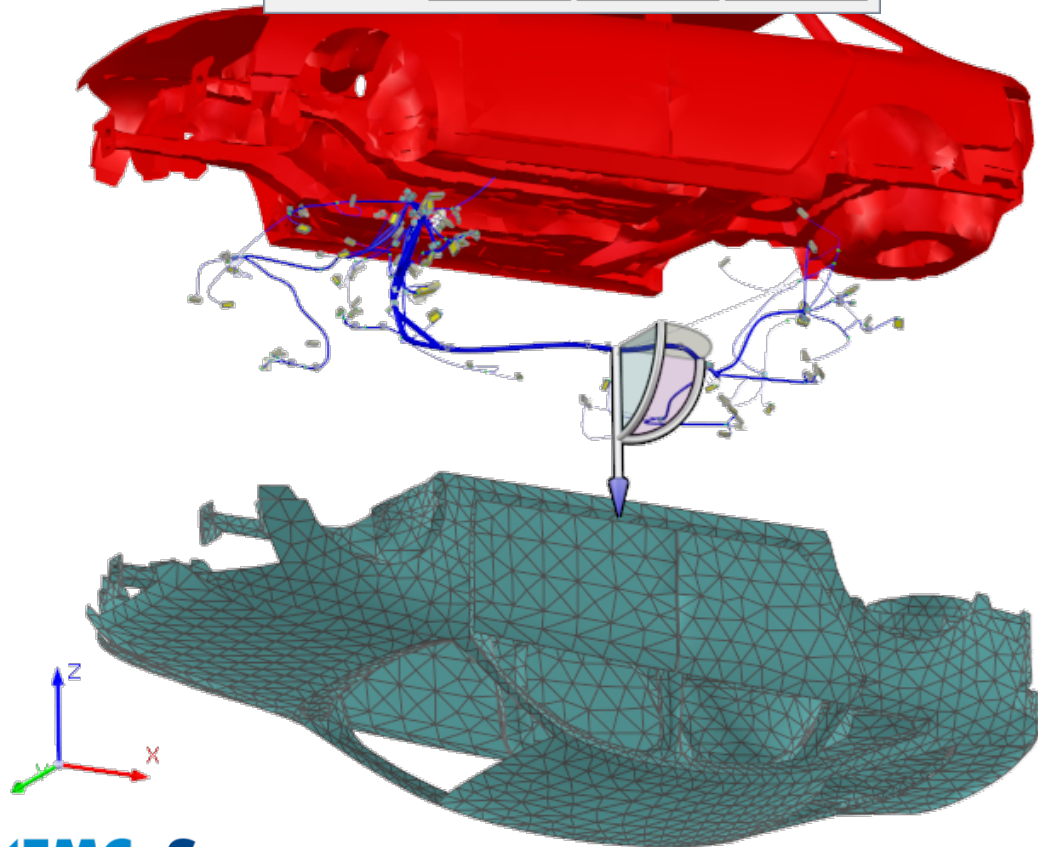
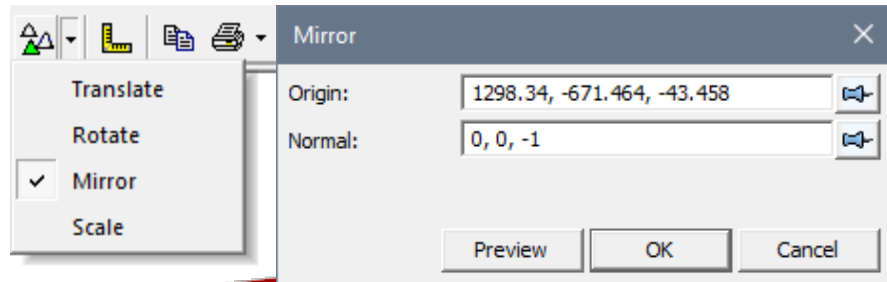
## Translate and Rotate Operations





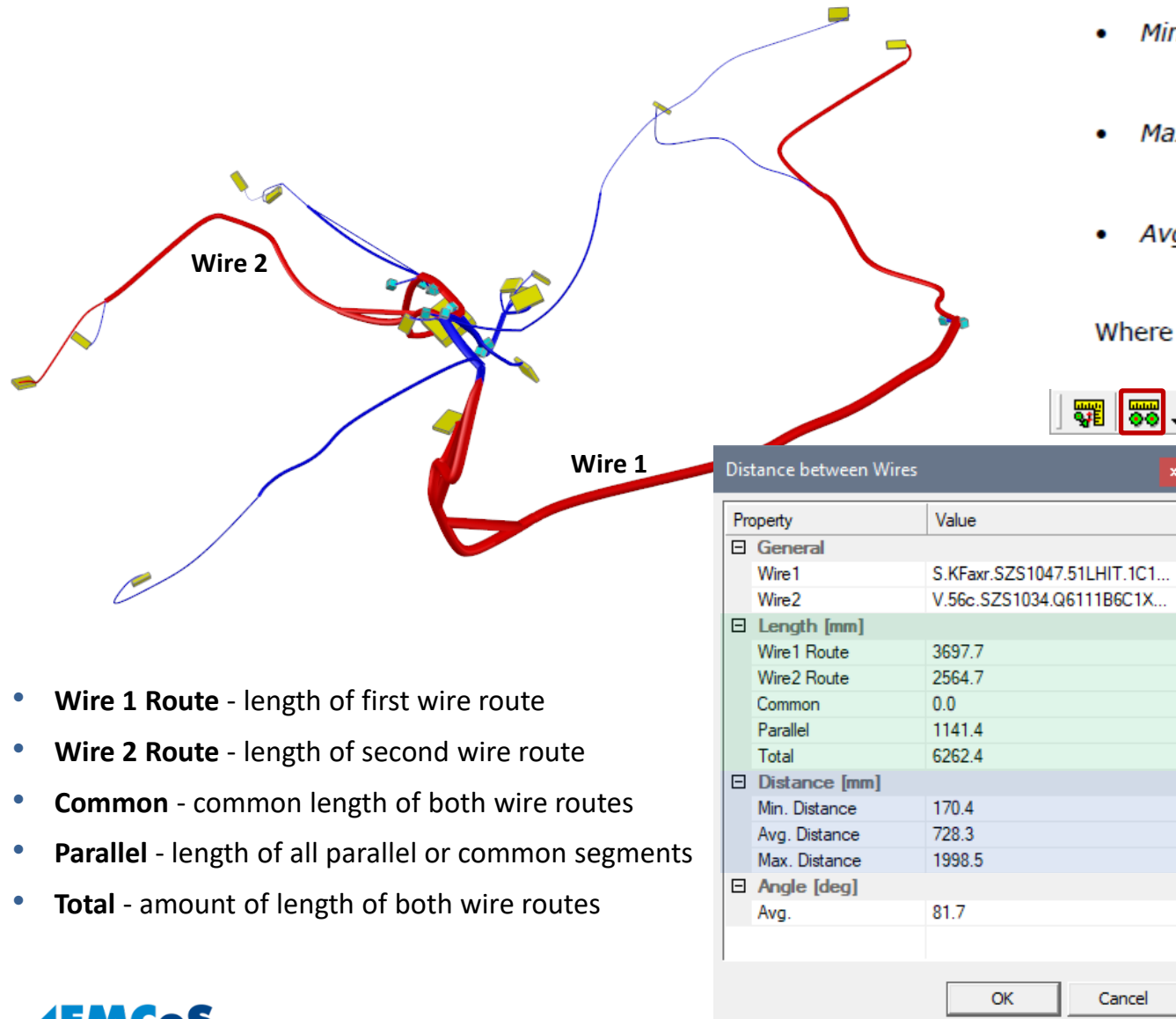
# Support of Transformation Operations for Meshes

## Mirror and Scale Operations



# Distance Measurement Tools

## Distance between Wires



- **Wire 1 Route** - length of first wire route
- **Wire 2 Route** - length of second wire route
- **Common** - common length of both wire routes
- **Parallel** - length of all parallel or common segments
- **Total** - amount of length of both wire routes

### Distance:

- *Min. Distance* - minimum distance between wires routers:

$$\min(D(P1(i), Cb2), D(P2(j), Cb1))$$

- *Max. Distance* - maximum distance between wires routers:

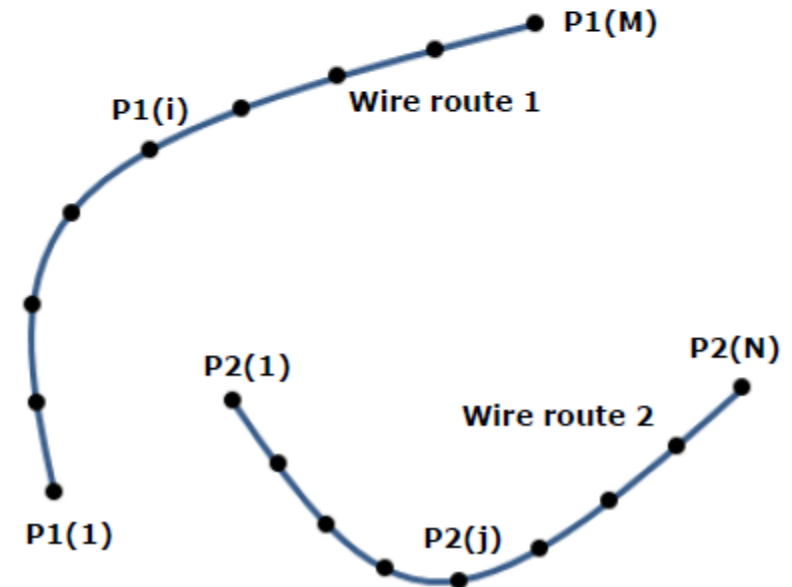
$$\max(D(P1(i), Cb2), D(P2(j), Cb1))$$

- *Avg. Distance* - average distance between wires routes:

$$\text{average}(D(P1(i), Cb2), D(P2(j), Cb1))$$

Where  $D$  is distance from point to curve and calculated as:

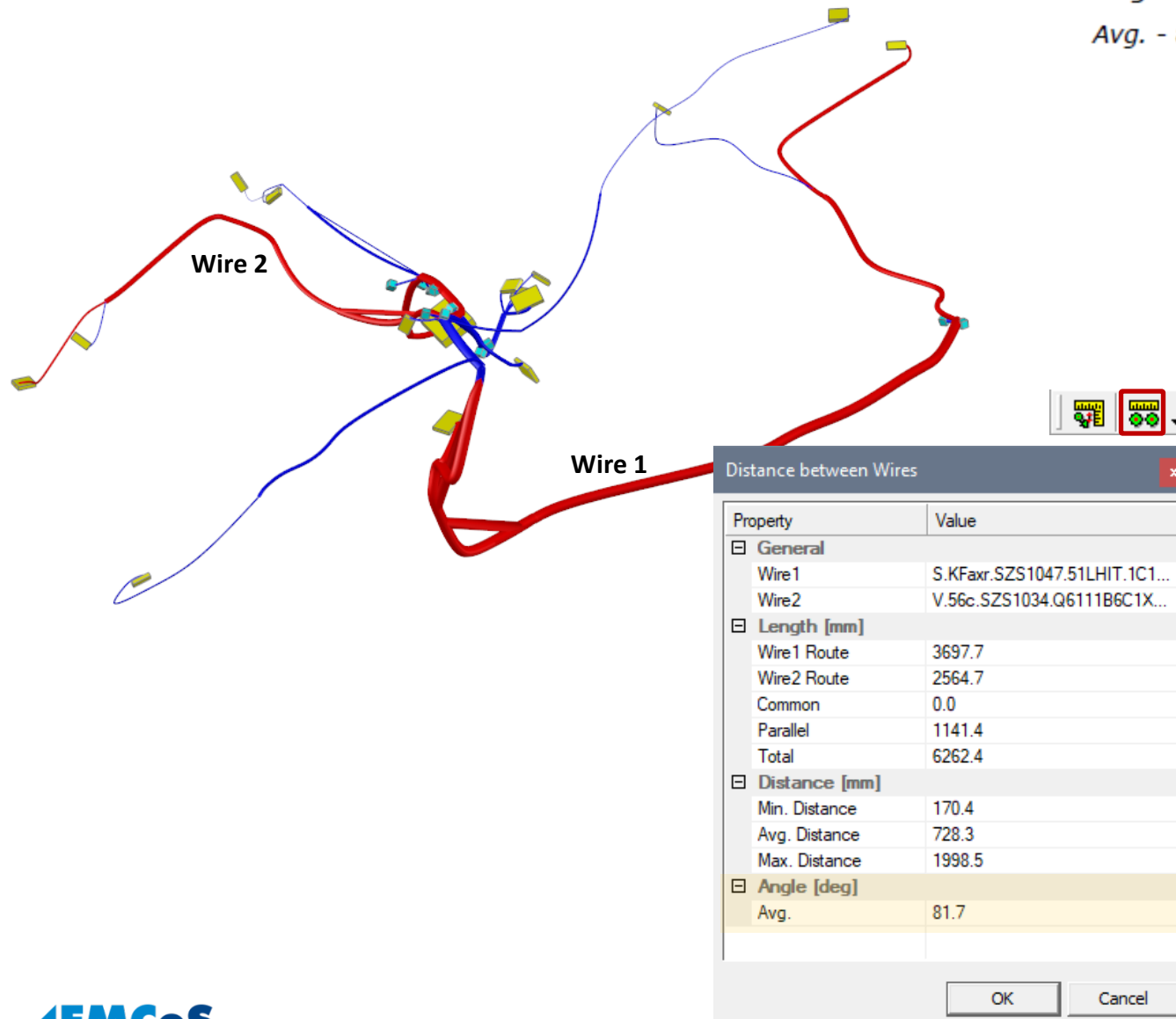
$$D(P1(i), Cb2) = \min(D(P1(i), P2(j)))$$





# Distance Measurement Tools

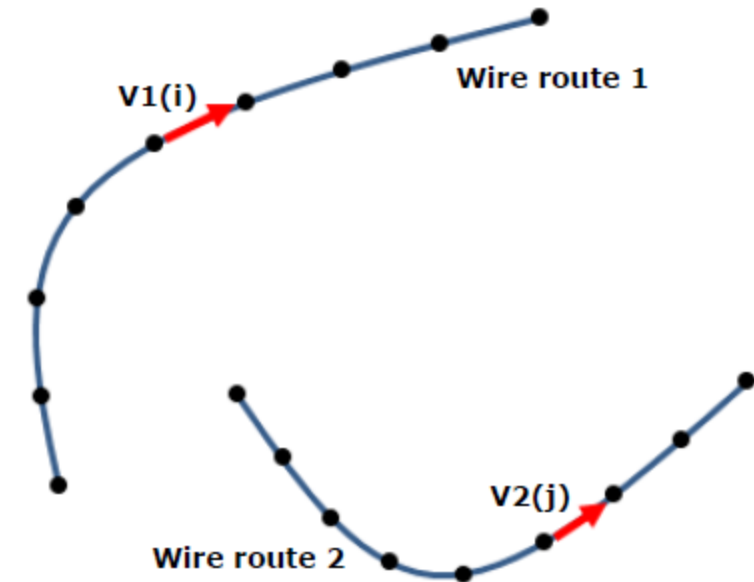
## Distance between Wires



**Angle:**

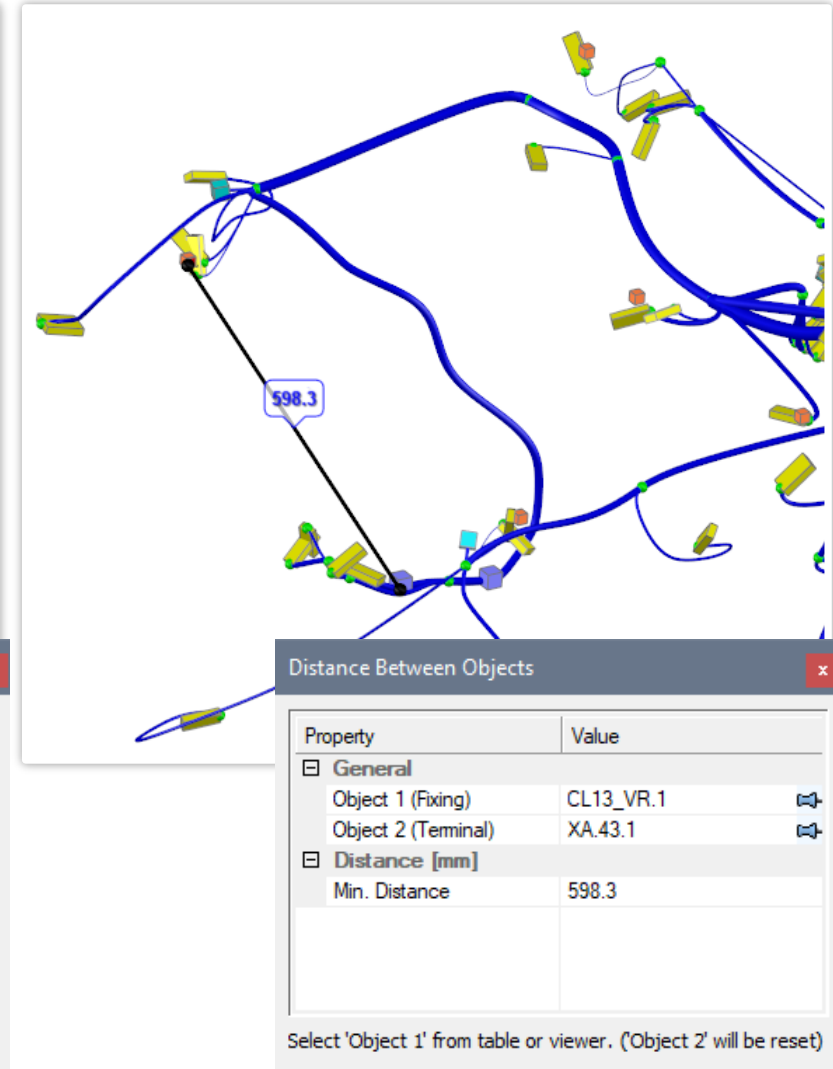
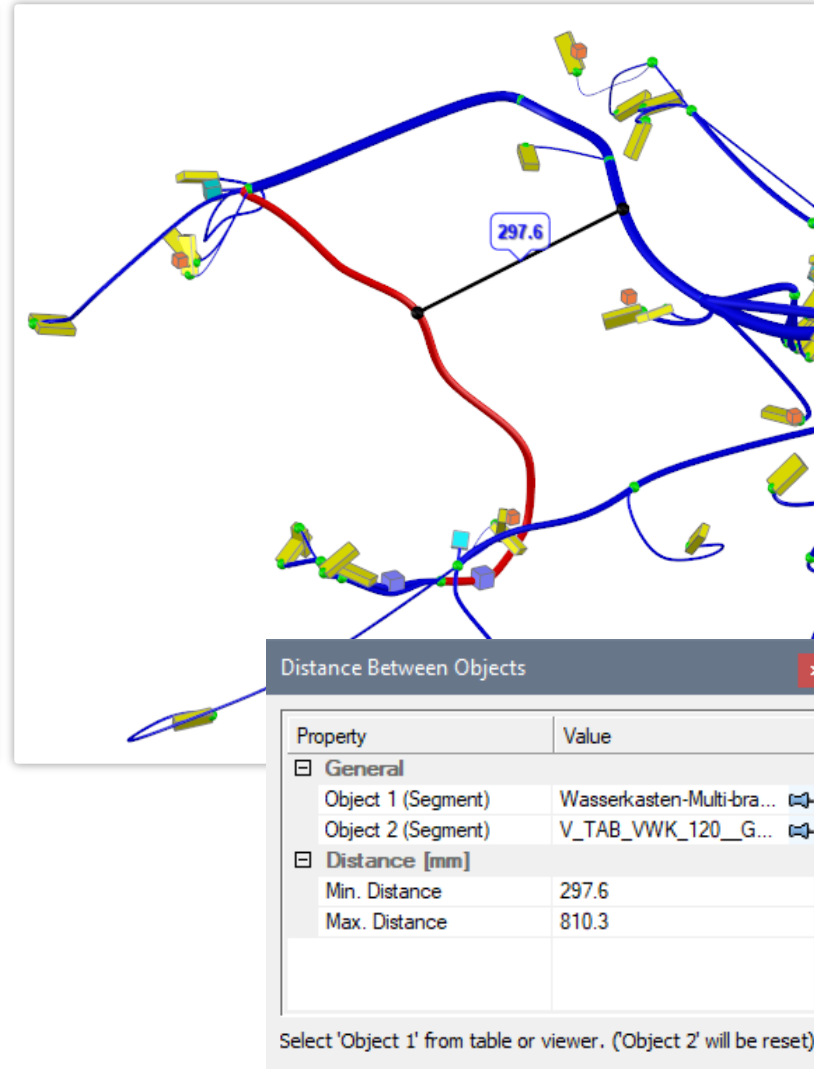
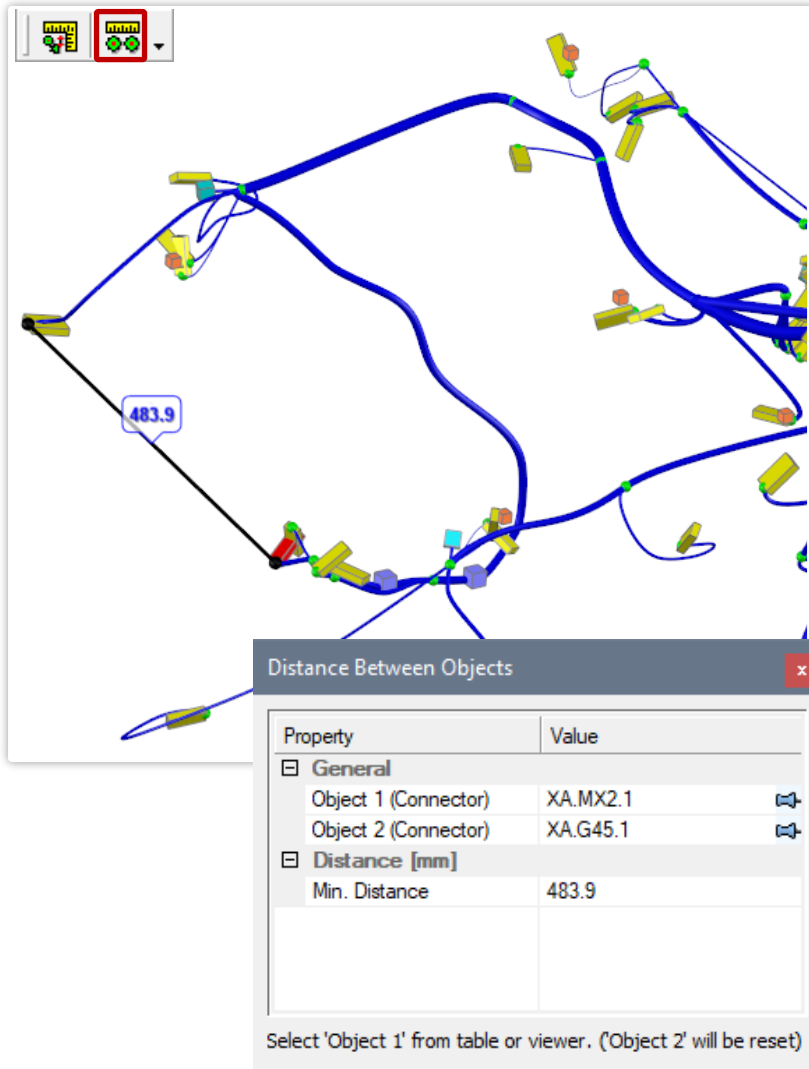
Avg. - average angle between wires routes in degrees. Average angle is calculated as:

$$\frac{\sum_{i=1}^{M-1} \sum_{j=1}^{N-1} \text{angle}(V1(i), V2(j))}{M + N}$$



# Distance Measurement Tools

## Distance between Harness Objects





# **New Features and Improvements** **Reporting Engine**

# New Features and Improvements in Reporting Engine

## Key Improvements in Report Generation Procedure

LIST REPORT | DETAILS REPORT | SUMMARY REPORT | HARNESS WEIGHT REPORT | BOM REPORT | SPECIAL REPORT

- ✓ **No Excel Required:** reports can now be generated independently of whether Excel is installed on the user's machine
- ✓ **Improved Performance:** enhanced speed and efficiency of report generation

A					B		C		D		E		F		G		H	
Harness					Module		Wires		Special wires		Connectors		Terminals					
							Cu		Total		Cu		Total		Total		Total	
37	5Ca108210891C	STECKERGEHAEUSE_6POL_SCHWARZ	Connector	1	1													
38	46810601656	-	Connector	1	1													
39	5Fa108418a3	FLACHKONTAKTGEHAEUSE_2POL	Connector	2	2													
40	468108318631F	ZSB-Gehaeuse	Connector	2	2													
41	6Ka10661760	Winkelstueck schwarz	Connector	1	1													
42	7Ra1a4617a91F	HF_KONTAKTGEHAEUSE_NUSSBRAUN_4POL_COD	Connector	1	1													
43	01a28162716	KABELSCHUH_A6-2.5	Connector	2	2													
44	5Ga108315941C	BUCHSENGEHAEUSE_17POL_RT_KOD3	Connector	1	1													
45	2Ka10841833	FLACHKONTAKTGEHAEUSE_2-POLIG_2.8MM	Connector	1	1													
46	01a2816a716	KABELSCHUH A6-1	Connector	4	4													
47	46810621883	FLACHKONTAKTGEHAEUSE 2-POLIG 6.3MM	Connector	1	1													
48	2Da108219591E	LEITUNGSClip	Fixing	2	2													
49	2Da10821959	LEITUNGSClip LOCHBEFESTIGUNG 6,5	Fixing	2	2													
50	5Ma108219591H	VERSTEIFUNGSSSTIFT	Fixing	1	1													
51	9501082196a	KABELBINDER	Fixing	2	2													
52	9La108219351T	KABELFUEHRUNG_ADS_LL	Fixing	1	1													
53	0102a15771a2	HALTERUNGSSCHELLE_D1-16X20	Fixing	1	1													
54	2Ka10681929	KABELBINDER M. TANNENBAUMFUSS (BIS DURCHM	Fixing	2	2													
55	012a2178a1a2	-	Cavity Terminal	2	2													
56	010a814381a2	-	Cavity Terminal	31	31													
57	010a819801a2	nicht fuer Neukonstruktionen	Cavity Terminal	2	2													
58	012a615a21a3	LWL Kontakt	Cavity Terminal	4	4													
59	012a312551a2	-	Cavity Terminal	8	8													

A					B		C		D		E	
Harness: kblxml_2.4sr-1_tab016120_modulare_lts_160718 (1)												
WIRES ( 254 )												
Wire Number					Name		Part Number		Signal Name		Associated Wire(s)	
30002					S.USL11.SZS1055.1XB.P9.11511		None(->SL1)		S.USL11.SZS1055.		30003	
30003					S.USL12.SZS1055.1XB.P9.11411		None(->SL1)		S.USL12.SZS1055.		30002	
5055					S.KFaor.SZS1047.11LHIT.1F11711		None(->SL10)		S.KFaor.SZS1047.1		5056	
5056					S.KFaor.SZS1047.21LHIT.1F11811		None(->SL10)		S.KFaor.SZS1047.2		5055	
5042					S.KFaoj.SZS1047.21LHIT.1F11211		None(->SL101)		S.KFaoj.SZS1047.2		5043	
5043					S.KFaoj.SZS1047.11LHIT.1F11111		None(->SL101)		S.KFaoj.SZS1047.1		5042	
5059					S.KFaor.SZS1047.11XB.U45.11111		None(->SL11)		S.KFaor.SZS1047.1		5060	
5060					S.KFaor.SZS1047.21XB.U45.11211		None(->SL11)		S.KFaor.SZS1047.2		5059	
5062					S.CVB.SZS1047.U35@1IL1B21LHIT.1F111211		None(->SL12)		S.CVB.SZS1047.U35@1IL1B2		5061	
5061					S.CVB.SZS1047.U35@1IL1B11LHIT.1F111111		None(->SL12)		S.CVB.SZS1047.U35@1IL1B1		5062	
5003					S.KFaxj.SZS1047.21LHIT.1H11311		None(->SL13)		S.KFaxj.SZS1047.2		5009	
5009					S.KFaxj.SZS1047.11LHIT.1H11111		None(->SL13)		S.KFaxj.SZS1047.1		5003	
5014					S.KFaxj.SZS1047.21XB.U46.11211		None(->SL14)		S.KFaxj.SZS1047.2		5018	
5018					S.KFaxj.SZS1047.11XB.U46.11111		None(->SL14)		S.KFaxj.SZS1047.1		5014	
5019					S.KFaxj.SZS1047.21XB.U46.11212		None(->SL15)		S.KFaxj.SZS1047.2		5021	
5021					S.KFaxj.SZS1047.11XB.U46.11112		None(->SL15)		S.KFaxj.SZS1047.1		5019	
5006					X.34.SZS1047.V2821LHIT.1H11411		None(->SL16)		X.34.SZS1047.V282		5005	
5005					X.PIC1311j.SZS1047.V2821LHIT.1H11611		None(->SL16)		X.PIC1311j.SZS1047.V282		5006	
5013					X.PIC1311j.SZS1047.V2821XB.V282.11211		None(->SL17)		X.PIC1311j.SZS1047.V282		5017	



# **New Features and Improvements** **KBL Configurator**



# New Features and Improvements in KBL Configurator

## Harness Configurations and Modules Handling

**KBL Configurator**

File Edit View Tools Help

Tree

- kblxml\_2.4sr-1\_tab016120\_modulare\_ltg...
  - /OVMM
  - /OVMM
  - /OVMM
  - Configuration\_1
  - Configuration\_2
  - sample
  - Configuration\_1
  - Configuration\_2
  - harness\_database
  - Configuration\_2
  - Configuration\_4

Families

Family Name	Description
219	LTGS.FRONTSCH.HZG.
268	LTGS.KOMMUNIKATION
113	LTGS.INNENLEUCHTE
190	LTGS.MASSELEITUNG
030	LTGS.HEIZUNG
082	LTGS.SBBR-LEUCHTE
000	LEITUNGSSTRANG
005	LTGS.ABS

Modules

Part Number	Description	Logistic Control Information	Family Name
aaa108a1320	Modul	L0L+4GC	219
aaa108a1320B	Modul	L0L+4GK	219
aaa108a1379	Modul	L0L+QV0/QV3/QU8+I8K	268
aaa108a13791B	Modul	L0L+QV0/QV3/QU8+I8L	268
aaa108a13791C	Modul	L0L+QV1/QU1+I8K	268
aaa108a13791D	Modul	L0L+QV0/QV3/QU8+9VJ	268
aaa108a13791E	Modul	L0L+QV1/QU1+I8L	268
aaa108a13791F	Modul	L0L+QV0/QV3/QU8+9VK/...	268
aaa108a1224	Modul	L0L+QQ0	113
aaa108a12241B	Modul	L0L+QQ1	113
aaa108a12241C	Modul	L0L+QQ2	113
aaa108a1aaa1BB	Modul	L0L+K8S/K8D+B0L	190
aaa108a1aaa1BC	Modul	L0L+K8S/K8D+B1C/B1D/B2E	190
aaa108a1aaa1BD	Modul	L0L+K8S/K8D+B1P	190
aaa108a1aaa1BE	Modul	L0L+K8S/K8D+B2G/B2H/B...	190
aaa108a1a4a	Modul	L0L+0Y3	030
aaa108a1a4a1B	Modul	L0L+0Y1	030
aaa108a1a4a1C	Modul	L0L+0Y1/0Y3//L0L+VC1/V...	030
aaa108a1a93	Modul	L0L+8SA	082

Modules in configurations

Part Number	Description	Logistic Control Information
aaa108a1224	Modul	L0L+QQ0
aaa108a1320	Modul	L0L+4GC
aaa108a1379	Modul	L0L+QV0/QV3/QU8+I8K
aaa108a1a4a	Modul	L0L+0Y3
aaa108a1a93	Modul	L0L+8SA
aaa108a1aa6	Modul	L0L+K8S+1LC/1LJ/1LK/1LM/1L...
aaa108a1aaa	Modul	L0L+K8S

Ready

CAP NUM SCRL

**KBL Configurator now supports simultaneous configuration and modules extraction for multiple loaded harness databases**

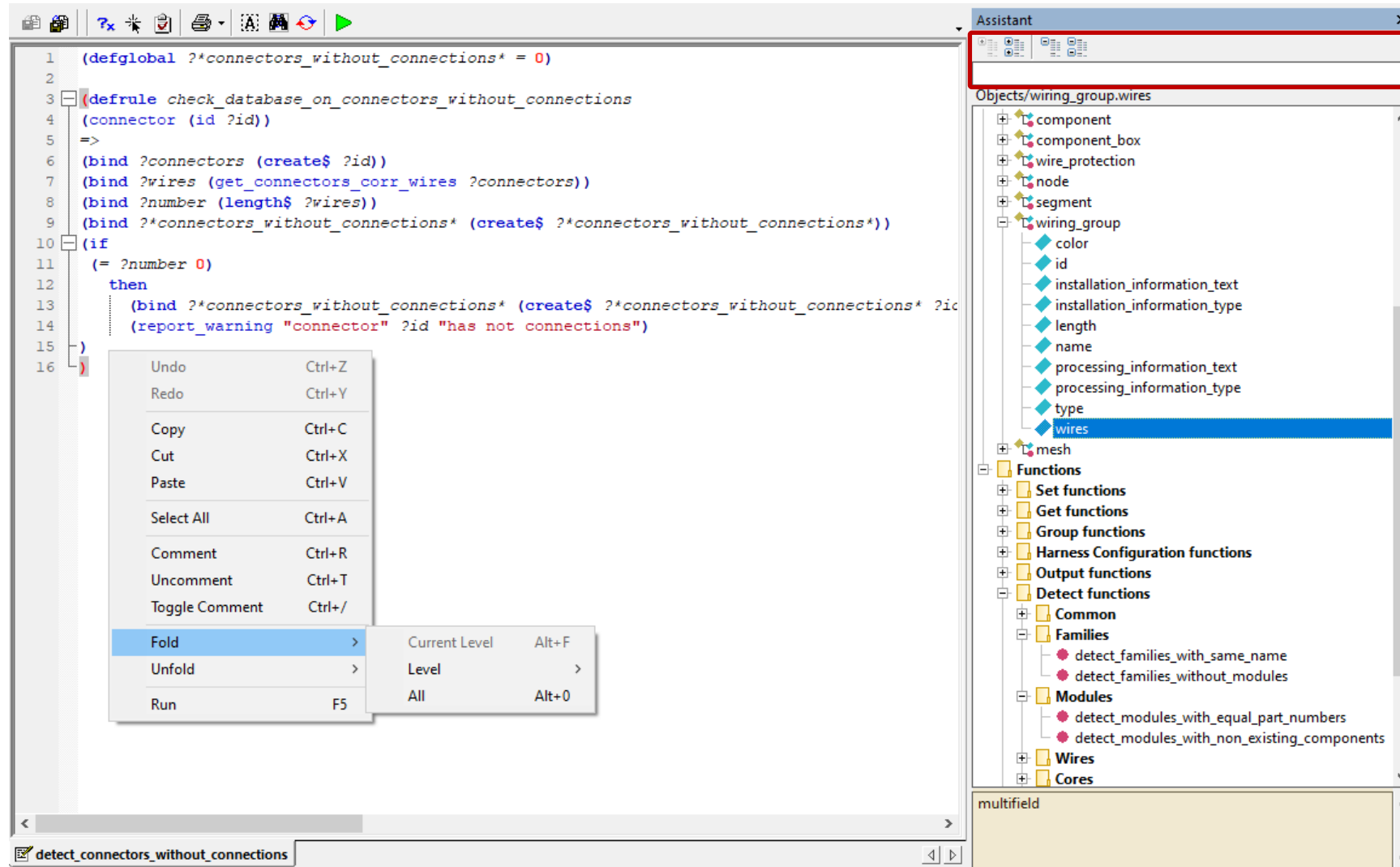
- Export/import/save operations for multiple datasets
- Extract modules manually or with configuration file
- Configure database using Primary Features Numbers



# **New Features and Improvements** **Expert System Engine**

# New Features and Improvements in Expert System Engine

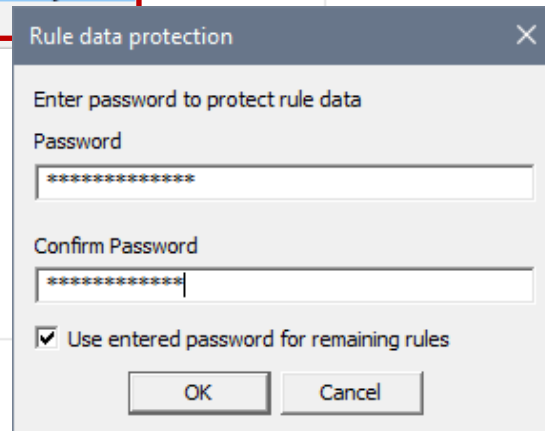
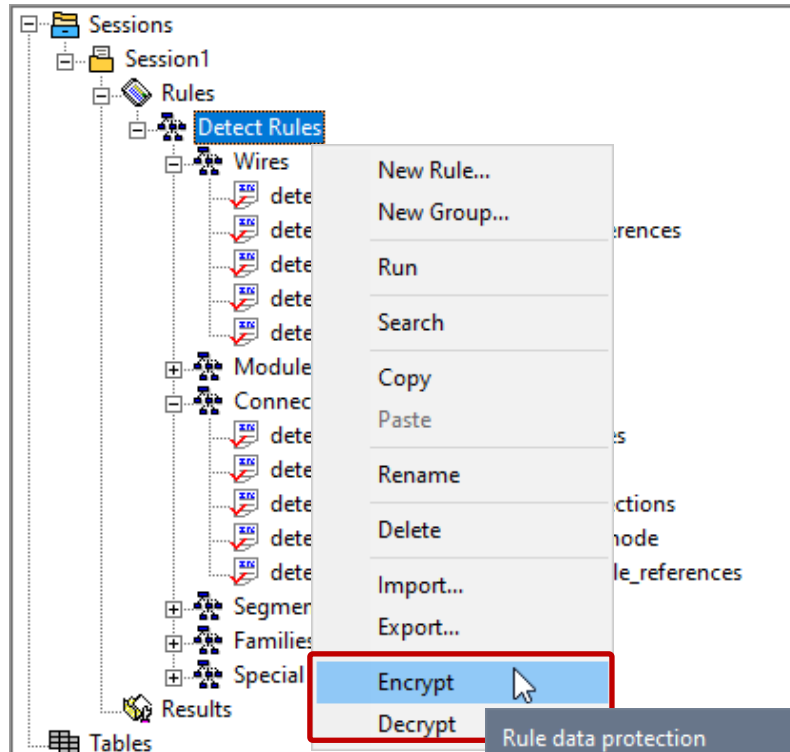
## Improved Rule Editor and CLIPS Functions Assistant



- Enhanced visual style for Rule Functions Assistant
- New commands: Expand / Expand All / Collapse / Collapse All
- Support of filtering to improve navigation and usability
- Description field for better visibility of object parameter types
- 'Delete Unused Variables' command in Global Variables dialog

# New Features and Improvements in Expert System Engine

## Encryption/Decryption of Sensitive CLIPS Rules



;Harness Studio Rules

;%RULE% detect\_connectors\_without\_cavities

;%PRIORITY% 1

;%READ\_ONLY% 0

;%DESCRIPTION%

;%COMMENT%

;%GROUP% Session1/Rules/Detect Rules/Connector/detect\_connectors\_without\_cavities

;%DATE% 23/07/2005

00000020a197bb2ea9290128ab10a88a3a2ede5b0579f21c3f2c6f61ff29b56d448b1d11c9dfb9998a1da73

;%RULE% detect\_connectors\_with\_equal\_ids

;%PRIORITY% 1

;%READ\_ONLY% 0

;%DESCRIPTION%

;%COMMENT%

;%GROUP% Session1/Rules/Detect Rules/Connector/detect\_connectors\_with\_equal\_ids

;%DATE% 23/07/2005

00000020a197bb2ea9290128ab10a88a3a2ede5b0579f21c3f2c6f61ff29b56d448b1d11c9dfb9998a1da73

;%RULE% detect\_connectors\_without\_connections

;%PRIORITY% 1

;%READ\_ONLY% 0

;%DESCRIPTION%

;%COMMENT%

;%GROUP% Session1/Rules/Detect Rules/Connector/detect\_connectors\_without\_connections

;%DATE% 23/07/2005

00000020a197bb2ea9290128ab10a88a3a2ede5b0579f21c3f2c6f61ff29b56d448b1d11c9dfb9998a1da73

;%RULE% detect\_connectors\_without\_base\_node

;%PRIORITY% 1

;%READ\_ONLY% 0

;%DESCRIPTION%

;%COMMENT%

;%GROUP% Session1/Rules/Detect Rules/Connector/detect\_connectors\_without\_base\_node

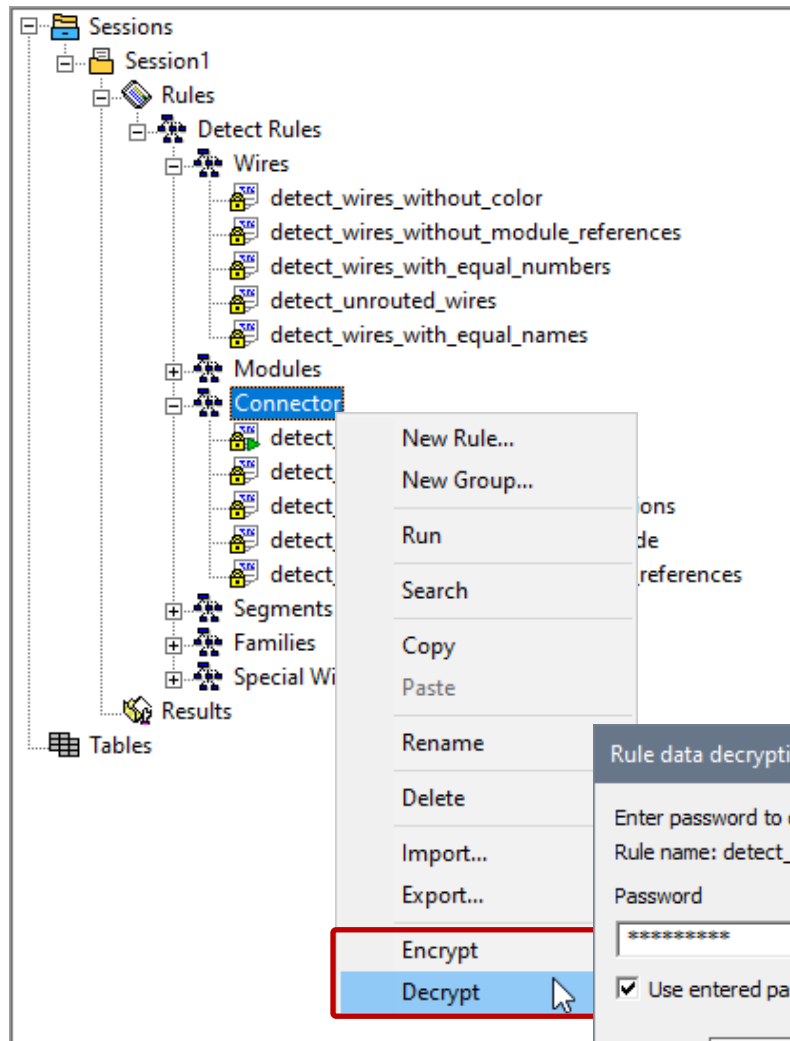
;%DATE% 23/07/2005

00000020a197bb2ea9290128ab10a88a3a2ede5b0579f21c3f2c6f61ff29b56d448b1d11c9dfb9998a1da73

**Encrypted Rules**

# New Features and Improvements in Expert System Engine

## Encryption/Decryption of Sensitive CLIPS Rules

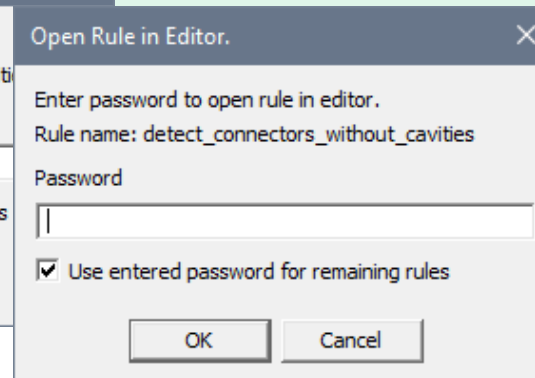
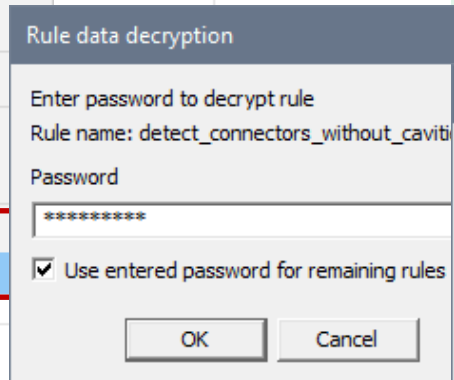


;Harness Studio Rules

```
;%RULE% detect_wires_without_color
;%PRIORITY% 1
;%READ_ONLY% 0
;%DESCRIPTION%
;%COMMENT%
;%GROUP% Session1/Rules/Detect Rules/Wires/detect_wires_without_color
;%DATE% 23/07/2005
(defglobal ?*wires_without_colors* = 0)
```

**Decrypted Rules**

```
(defrule check_database_on_wires_without_colors
(wire (id ?id) (color $?wire_colors))
=>
(bind ?colors (length$ $?wire_colors))
(bind ?*wires_without_colors* (create$ ?*wires_without_colors*))
(if
  (not ?colors 0)
  (create$ ?*wires_without_colors* ?id))
(not colors"))
```





# New Features and Improvements in Expert System Engine

## Support of Output > Table Functions

The screenshot displays the Expert System Engine interface with several components:

- Code Editor:** Contains two rules. Rule 1, named 'example', declares a salience of 3 and uses 'set\_table\_columns' and 'set\_table\_row' to create a table with columns 'Wire' and 'Wires Length'. Rule 2, named 'printtable', declares a salience of 2 and uses 'get\_table\_rows\_count' and 'while' to iterate through the table rows.
- Assistant:** A sidebar showing a tree view of functions. Under 'Output functions', the 'Table' category is expanded, listing various table-related functions like 'bind\_table\_to\_element', 'get\_element\_corr\_tables', etc.
- Results:** A window showing a table of results. The table has columns 'Wire' and 'Wires Length' and contains 15 rows of data.
- Rule Properties:** A dialog box for configuring a rule. It has two tabs: 'General' and 'Linked Tables'. The 'Linked Tables' tab is active, showing a list of tables in the rule ('Wires Length') and a list of all tables ('Total Length').

Wire	Wires Length
M.31rfg.SZS1055.311XB.P279.11311	4043.35
V.15B.SZS1090.Q11111B11C1XB.P279.11111	685.945
G.YYT.SZS1055.1XY.a20.11111	588.855
M.31rfg.SZS1055.311XB.V5.11211	3979.72
V.15B.SZS1090.Q11111B11C1XB.V5.11111	622.321
F.MGSL1CNS.SZS1077.11XC.K161.11211	1595.37
F.MGSL1CNS.SZS1077.21XC.K161.11111	1595.37
V.30B.SZS1055.XaB111C1381114	287.187
V.30BS.SZS1035.1B501112	3999.29
M.31.SZS1033.MI45111F11XB.O9.113P11	89.2122
V.30BS.SZS1035.1XB.O9.113F11	103.515
V.30BS.SZS1035.1B501111	3609.11
V.30B.SZS1034.XaB1XB.P15.11211	3009.89
V.30B.SZS1055.XaR111C1381113	254.042

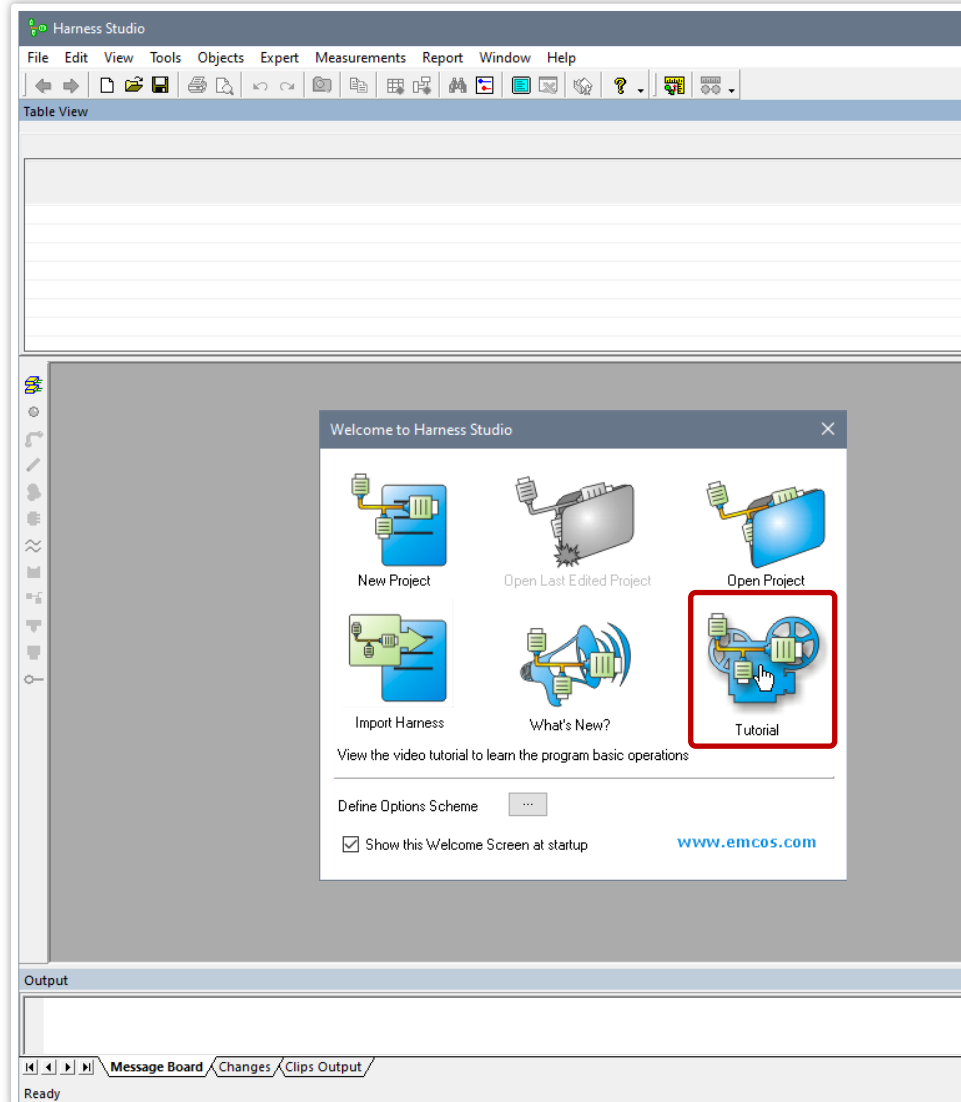
- Output > Table functions enables user to add new, user-defined tables to the Results window
- All generated tables are automatically added to the Tree View and saved within the project
- User-defined tables can be linked to specific rules, enhancing traceability of the generated results




# Updated Documentation Package & Online Video Tutorials

# Updated Documentation Package and Online Video Tutorials

## Online Resources > Video Tutorials





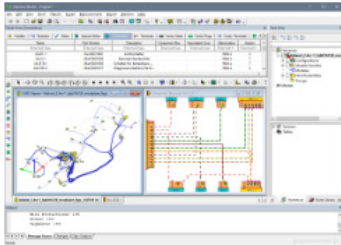
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### Harness Studio and EMC Expert Video Tutorials

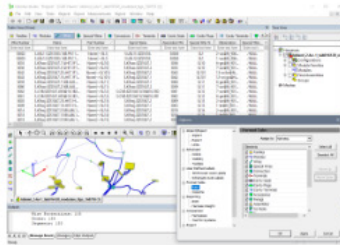
EMCoS > Harness Studio and EMC Expert Video Tutorials

#### General Operations

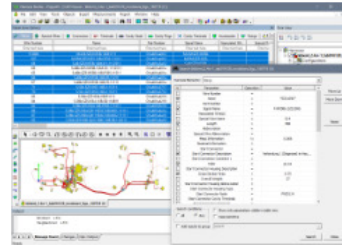
##### Harness Studio Environment Overview

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##### Working with Table View

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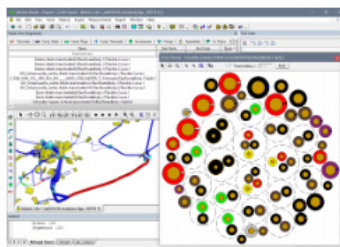
##### Search Objects by Parameters

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#### Working with 3D Browser

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#### Working with Cross Section Viewer

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#### Working with Schematic Browser

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Thank you for your attention!