

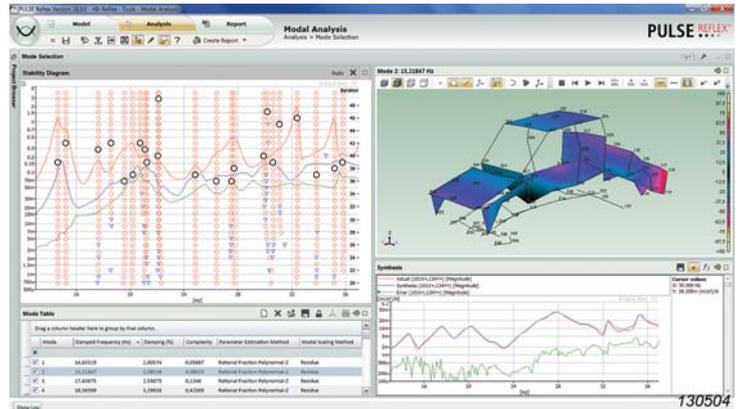
PRODUCT DATA

PULSE Reflex Structural Dynamics

Geometry Type 8719, Modal Analysis Types 8720, 8720-A and 8720-B, and Advanced Modal Analysis Types 8721, 8721-A and 8721-B

PULSE Reflex™ Modal Analysis is an easy-to-use post-processing application that enables you to perform single and polyreference Classical Modal Analysis even in the most demanding situations by using a targeted set of best-in-class mode indicator functions, curve-fitters and validation tools. Accurate results are quickly obtained by following an intuitive, yet flexible workflow process that guides you efficiently through measurement validation, parameter estimation setup, mode selection, analysis validation and reporting.

With a PULSE Reflex Structural Measurements license, geometry-guided hammer and shaker measurements can be performed. Setup and measurement tasks are embedded in the Modal Analysis interface, creating a fully integrated solution for modal measurements and analysis.



PULSE Reflex Modal Analysis also interfaces with PULSE Modal Test Consultant™ for an integrated modal measurement and analysis system.

Uses and Features

- Uses**
- Single and polyreference classical modal analysis from measured frequency response functions (FRFs)
 - Estimation of modal parameters to be used for finite element (FE) model correlation and updating, design verification, benchmarking, quality control and troubleshooting
 - Test planning using finite element analysis (FEA) results
 - Integrated solutions together with the following software:
 - From measurement to FEM correlation: With PULSE Reflex Structural Measurements Type 8729-B and PULSE Reflex Correlation Analysis Type 8722
 - From measurement to analysis: With PULSE Reflex Structural Measurements Type 8729-B or PULSE Modal Test Consultant Type 7753
 - Open, stand-alone application with your existing data acquisition system
- Features**
- Efficient workflow with just a few steps to perform a complete modal analysis
 - Quick searching, sorting and filtering of large amounts of data
 - Easy-to-use and powerful geometry drawing tools using built-in CAD models
 - Import of geometry in standard formats, including FE models
 - Animation of FE models for test planning and validation
 - Selection and validation of test nodes from FE models for test planning
 - Decimation of FE models to test models
 - Display of selected FRFs from excitation/response DOFs on geometry
 - Function-based animation for validation of test setup
 - Normal mode indicator function (NMIF), power mode indicator function (PMIF), complex mode indicator function (CMIF), multi-variate mode indicator function (MMIF)
 - SDOF curve-fitters: Least squares global partial fraction and quadrature picking
 - MDOF curve-fitters: Rational fraction polynomial-Z, polyreference frequency, polyreference time, eigensystem realization and alias-free polyreference
 - Global solve curve-fitters for modal parameter estimation in cases of consistent FRF data
 - Local solve curve-fitters for modal parameter estimation in cases of inconsistent FRF data
 - Clear stability diagrams for improved overview and straightforward mode selection
 - Enhanced mode solution for clear stability diagrams
 - Cluster diagrams and pole density diagrams for optimal curve-fitting and mode selection
 - Automated mode selection using your preferred curve-fitter
 - FRF synthesis including error function and frequency response assurance criteria (FRAC)
 - Complexity plots, AutoMAC and CrossMAC tables and 3D plots for validation of mode shape complexity and correlation
 - CoMAC geometry plots for comparing paired modal models
 - Integrated Microsoft® Office reporting capabilities

PULSE Reflex is the latest addition to the PULSE platform of software products. It provides real-time measurements, analysis and test-FEA integration in a modern, intuitive GUI environment and is the culmination of extensive customer surveys to resolve their most important issues when analysing sound and vibration data.

PULSE Reflex provides:

- Enhanced usability for high productivity with an intuitive user interface that puts the tools you need at your fingertips. The graphical user interface is built around a workflow model that leads you easily through any test setup, measurement and analysis process
- Open data policy that supports a wide range of native and third party formats for improved import and export of data
- Consistent user interface throughout all applications encouraging faster learning of new applications

PULSE Reflex Structural Dynamics allows you to observe, analyse and document the dynamic behaviour of structures using a single software platform covering setup, measurements, analysis and test-FAE integration. With PULSE Reflex Structural Measurements, you can set up and perform single or poly-reference hammer and shaker measurements, whereas PULSE Reflex Modal Analysis provides accurate and reliable results even in the most demanding situations using a targeted set of best-in-class mode indicator functions, curve-fitters and analysis validation tools.

Reflex Correlation Analysis adds the capability of correlating two modal models, for example, finite element model versus test model using tools such as Geometry Alignment, CrossMAC and Cross-orthogonality calculations.

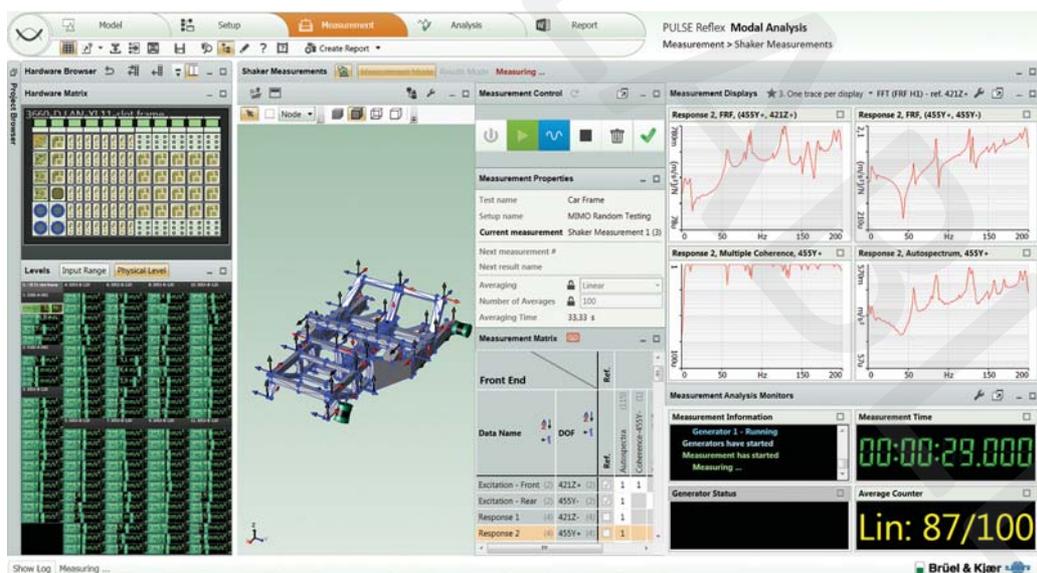
The open data policy behind the PULSE Reflex Structural Dynamics suite also allows the post-processing applications to be used as stand-alone applications together with your existing measurement and analysis system.

Measurement and Integration

PULSE Reflex Structural Measurements

PULSE Reflex Structural Measurements Type 8729-B contains tasks for setup and measurement to perform hammer and shaker testing. The tasks are fully embedded into PULSE Reflex Modal Analysis – creating a single application for modal setup, measurement and analysis. Measurement setup, execution and validation can be performed manually, table-based or geometry-guided.

Fig. 1
Shaker Measurements task for easy setup and monitoring of time and frequency functions



PULSE Modal Test Consultant

PULSE Reflex Modal Analysis also seamlessly integrates with PULSE Modal Test Consultant (MTC) creating a highly consolidated solution for modal data acquisition and analysis. PULSE MTC supports geometry-guided hammer and shaker testing and exports the geometry and measurement data to PULSE Reflex Modal Analysis.

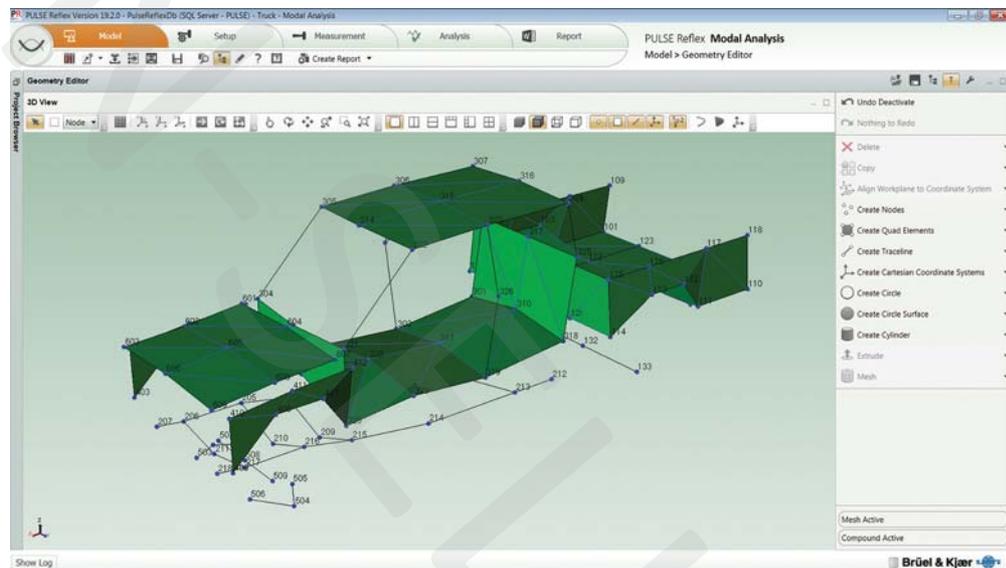
Support for Other Systems

The open data policy behind the PULSE Reflex Structural Dynamics suite also allows each application to be used as stand-alone applications together with your existing measurement and analysis system.

Geometry Creation, Import and Decimation

With PULSE Reflex Modal Analysis, geometries can be created from scratch using the embedded drawing tools. You can work with various elements like points, lines, triangular or quad surfaces and you can create 2D and 3D CAD models and mesh them. The geometry can also be created from table entries.

Fig. 2
Geometry Editor.
Geometries can be created using basic drawing elements, meshed CAD models or in tabular form



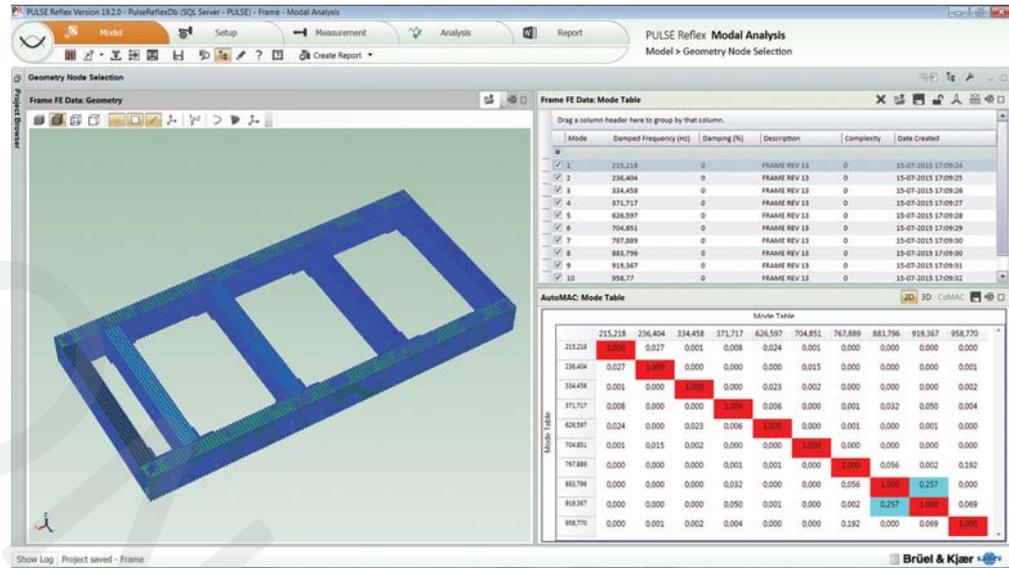
Alternatively, import a geometry in standard data formats like UFF and CSV. Measurement DOFs contained in the imported measurement files are automatically added to and shown on the geometry in subsequent tasks.

Finite element (FE) models can be imported and used in PULSE Reflex Modal Analysis for test planning and validation.

- Animate FE models to investigate frequency range of interest, mode density/order, critical modes, etc.
- Based on the animations, select optimal excitation and response locations for modal testing
- Select test node locations on an FE model until a satisfactory finite element AutoMAC is created
- Decimate FE models to test models for modal testing
- Compare test results with FEA results

Fig. 3
Geometry Node Selection.

By selecting nodes on a FE model, you can investigate how the AutoMAC builds up for the reduced geometry consisting of the selected nodes (highlighted)



Selecting nodes on a FE model helps determine which nodes on the FE model to include in a test geometry to identify and separate the modes of interest. The geometry with highlighted nodes is automatically loaded into the Geometry Decimation task for connecting the selected nodes with trachelines and/or elements.

Analysis and Reporting

By logically grouping features and display of results, PULSE Reflex Modal Analysis allows you to do a complete modal analysis in just four main steps:

- Measurement Validation
- Parameter Estimation Setup
- Mode Selection
- Analysis Validation

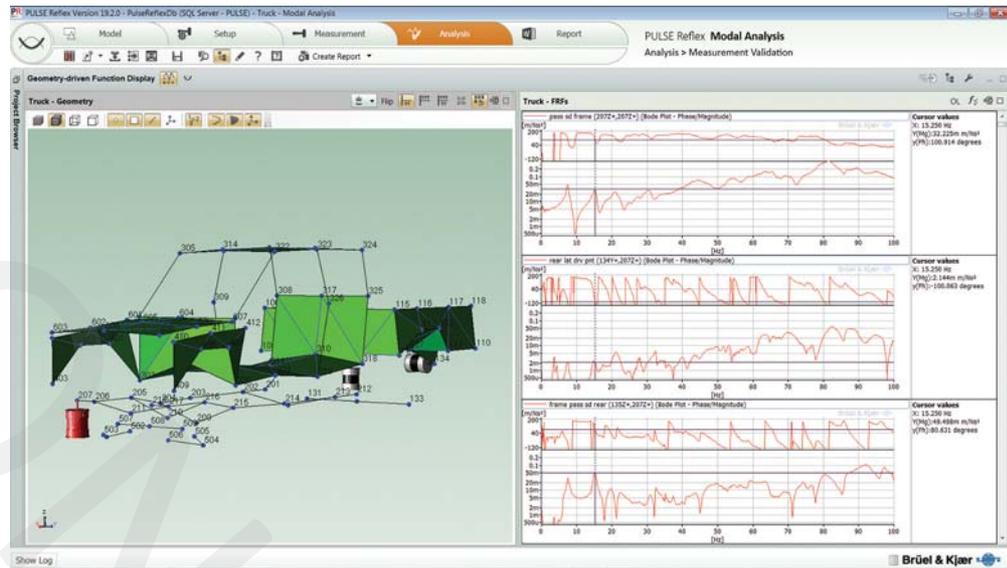
In addition, a User Defined Layouts task is available, and extensive live reporting can be done in Microsoft® Word, Excel® or PowerPoint® at any time in the analysis using integrated reporting functions.

Measurement Validation

The Measurement Validation task is used to check the quality of the measurement data prior to performing the modal parameter extraction. Functions like ordinary and multiple coherence, reciprocity and driving point FRFs, or all FRFs from selected references can easily be shown by simply dragging the functions from the Project Browser.

The Geometry Driven Function Display provides a graphical tool that allows you to select on the geometry the DOFs that are to be used for the displayed function types. Data can also be sorted and filtered in a table to easily select individual functions to be displayed.

Fig. 4
Measurement Validation.
 In the Geometry Driven Function Display, functions are selected by clicking on the desired excitation and response DOFs on the geometry. In this example, the FRFs are those related to the shaker at the front. You can easily scroll up and down to view all selected FRFs related to this shaker



For validation of test setups, such as identifying cable breaks and faulty and incorrectly mounted transducers, animations can be done based on FRFs. For structures with lightly damped and well-separated modes, the FRF shapes will resemble mode shapes.

Operating deflection shapes (ODS) from phase-assigned spectra can also be shown and saved, for example, to compare with mode shapes.

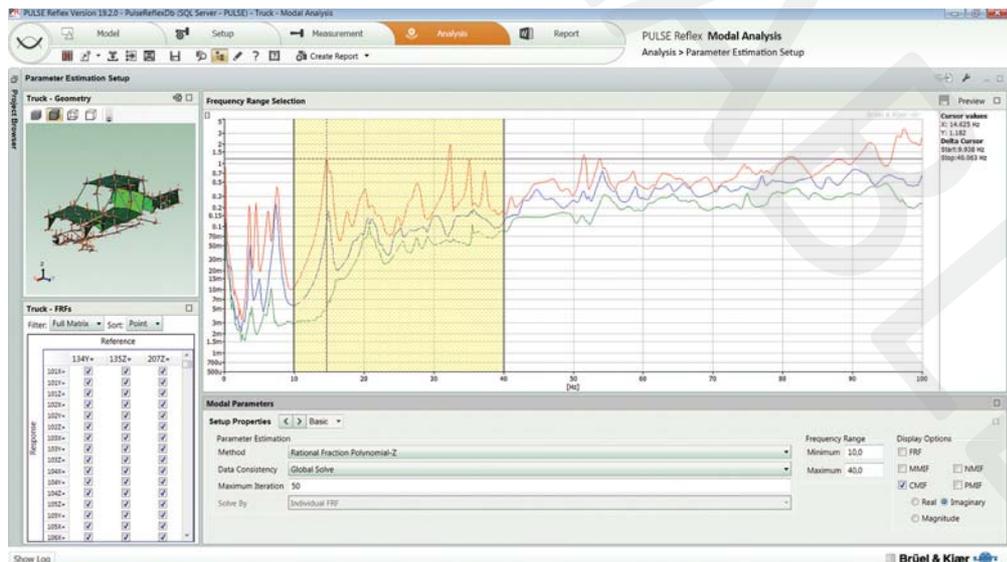
Parameter Estimation Setup

The Parameter Estimation Setup task is where you prepare and execute the curve-fitting. FRF data to include in the analysis are easily filtered, sorted and then selected using the Data Matrix Selector table. In the same screen layout, the geometry with DOF information is shown together with a graph area for investigating potential modes using different mode indicator functions. Various SDOF and MDOF curve-fitters can be selected and the frequency range of interest can be set, including the time range, when using time domain curve-fitters. Both global and local solve curve-fitters are available.

Previews of the stability diagram for the different curve-fitters aid in the selection of the preferred curve-fitter for the task. To assist in this, powerful tools like cluster diagrams and pole density plots are also available.

The unique enhanced mode solution algorithm provides very clear stability diagrams, making it easy to discriminate true physical modes from non-physical modes.

Fig. 5
Parameter Estimation Setup. Prepare and preview curve-fitting. This example shows the CMIF

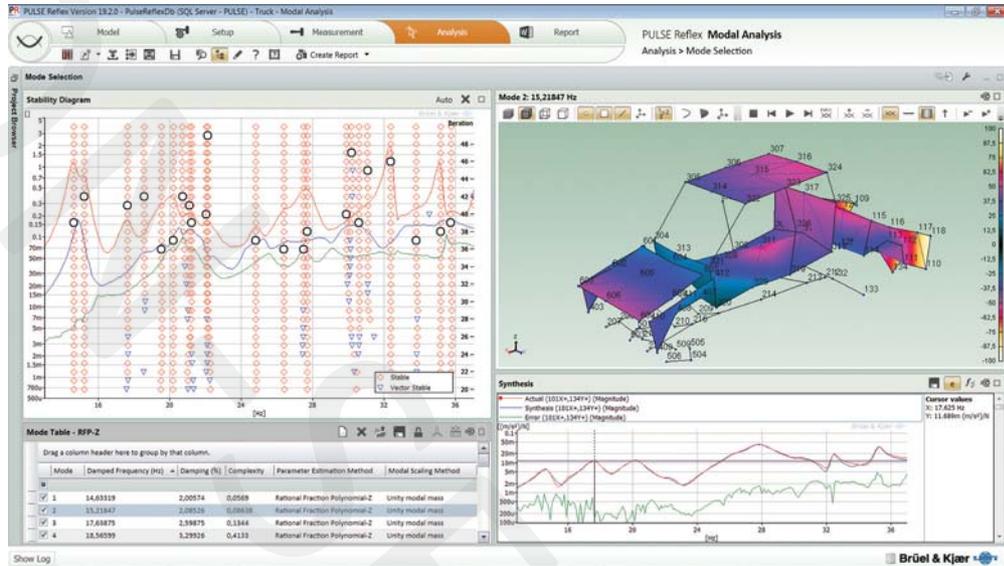


The powerful set of mode indicator functions and curve-fitters gives you the best possible tools in any given situation whether weakly excited modes, heavily damped modes, repeated roots or inconsistent FRF data are present.

Mode Selection

In the Mode Selection task, the modal results are shown in terms of natural frequency, damping ratio, mode shape animation and synthesis of FRFs. Once a mode is selected using one of the stability diagrams (with MDOF curve-fitters) or FRFs (with SDOF curve-fitters), it will immediately show up in the Mode Table, the mode will be animated and the synthesized FRFs will be compared to the measured ones.

Fig. 6
Mode Selection. Modes selected are shown in the mode table, animated, and the FRFs synthesized. In this example, automated mode selection was applied. The enhanced mode solution algorithm provides clear stability diagrams



Automated mode selection is supported for fast preliminary investigations of unknown structures or when conducting repetitive testing. It also eliminates the potential risk of user-dependent results. Automated mode selection works for all MDOF curve-fitters by indicating the modes in the stability diagrams, populating the Mode Table, animating the first mode and showing the synthesis functions.

The Mode Selection task provides full flexibility for selection and comparison of modes from different curve-fitting methods for creation of the best possible modal model.

Analysis Validation

The Analysis Validation task supplies you with a number of tools for further investigation of the obtained modal results for maximum confidence in your obtained modal model. This includes FRF Synthesis, Mode Shape Animation, AutoMAC and CrossMAC tables and 3D plots, CoMAC geometry plots and Complexity plots. Modes can be normalized to non-complex values (normal modes) for comparison with real-valued FE modes.

Reporting

The Report task enables reports to be prepared in parallel with the analysis process, linking important results as they are produced. Store geometries, displays, tables and text in the Project Browser as report elements and generate the report when you are ready. Reports can be based on standard embedded or customized templates you define, or on-the-spot. High-quality, active or static reports are easily created directly in Microsoft® Word, Excel® or PowerPoint®.

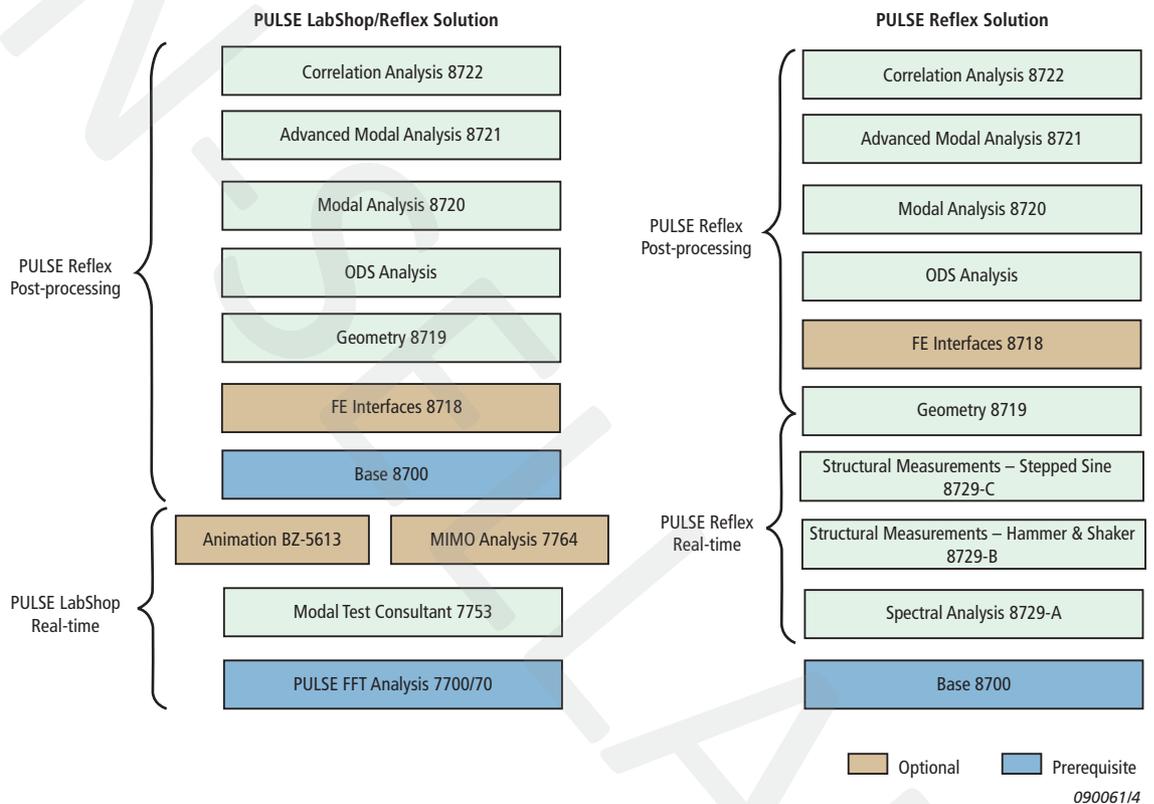
User-defined Layouts

The User Defined Layouts task enables you to create customized layouts consisting of graphs, geometries (with or without animation), shape tables, MAC tables/plots and complexity plots. Data can be linked between displays in the layout so that source data in one display is reflected in a result display. For example, when linking a mode table to a geometry, changes to the mode table will be automatically updated in the geometry. This allows for fast and flexible data viewing and ad hoc analysis.

Product Structure

Fig. 10

*PULSE structural dynamics product structure – from modal measurements to analysis and test-
FEA integration. Real-time measurements can be performed in the PULSE LabShop environment (left), or completely integrated in the PULSE Reflex environment (right)*



PULSE Reflex Base Type 8700

PULSE Reflex Base provides the framework, including Project Browser, Reporting, Notes and Help system. The Base module must be installed to run any PULSE Reflex application.

PULSE Reflex Measurements Type 8729

Spectral Analysis Type 8729-A

This is the prerequisite for measurements in PULSE Reflex. It provides the Hardware Matrix, the Hardware Setup Table and the Level Meter as well as the Transducer Manager and the Transducer Verification tasks.

Structural Measurements – Hammer and Shaker Type 8729-B

Structural Measurements adds dedicated setup and measurements tasks for hammer and shaker testing, including measurements for MIMO analysis. Geometry-guided measurement setup, execution and validation is supported.

Structural Measurements – Stepped Sine Type 8729-C

Type 8729-C adds dedicated setup and measurement tasks for single and multi-shaker stepped sine testing. Geometry-guided measurement setup, execution and validation is supported.

For information on PULSE Reflex Measurements, see Product Data [BP 2518](#).

Geometry Type 8719

Geometry allows the importation and creation of geometries and is used across the various PULSE Reflex Structural Dynamics solutions. FE models can be imported using UFF, and decimated to test models.

A variety of animation types are supported including wire frame, surface contour, point and arrow animation as well as overlaid, difference, top-bottom and side-by-side animation in single, dual or quad view format. The animations can be recorded as AVIs and included in Word and PowerPoint® reports.

FE Interfaces Type 8718

FE Interfaces enables you to import FE models from Nastran™, ANSYS® and ABAQUS®. For more information, see Product Data [BP 2395](#).

Modal Analysis Type 8720

An application designed for single-reference modal analysis with a basic, yet comprehensive, set of mode indicator functions (MIFs), curve-fitters and analysis validation tools. For use with single shaker FRF data and single reference hammer testing data.

Modal Analysis includes:

- Mode indicator functions: Normal MIF (NMIF) and Power MIF (PMIF)
- Curve-fitting:
 - SDOF: Least Squares Global Partial Fraction, Quadrature Picking
 - MDOF: Polyreference Time, Polyreference Frequency – limited to one reference
 - Global solve curve-fitting
 - Local solve curve-fitting (Polyreference Time)
 - Stability diagram with Enhanced Mode Solution (Polyreference Time)
 - Automated mode selection
- Analysis validation: AutoMAC and CrossMAC

Advanced Modal Analysis Type 8721

Advanced Modal Analysis adds polyreference modal analysis capabilities and advanced MIFs, curve-fitters and analysis validation tools to the Modal Analysis application. For use with shaker MIMO (Multiple Input Multiple Output) FRF data, polyreference hammer testing data or for advanced analysis and validation of both single and polyreference data.

Advanced Modal Analysis adds:

- Geometry Node Selection task
- Mode indicator functions: Complex MIF (CMIF) and Multi-variate MIF (MMIF)
- Curve-fitting:
 - MDOF Curve-fitters: Polyreference Time and Polyreference Frequency (no reference limitations), Rational Fraction Polynomial-Z (RFP-Z), Eigensystem Realization and Alias-Free Polyreference (AFPoly™)
 - Local solve curve-fitting (RFP-Z)
 - Stability diagram with Enhanced Mode Solution (RFP-Z)
 - Advanced stabilization diagrams: Cluster diagram and Pole Density plot
- Analysis validation: Complexity plot and CoMAC geometry plot

ODS Analysis

With licenses for Types 8700 and 8719 installed, a PULSE Reflex ODS Analysis application is available for frequency-based spectral ODS post-processing analysis or for viewing modal analysis results.

Correlation Analysis Type 8722

Correlation Analysis adds the ability to correlate two modal models: FEM vs Test, Test vs Test or FEM vs FEM. For more information, see Product Data [BP 2395](#).

Other Modules

For information on PULSE Reflex Base Type 8700, see Product Data [BP 2258](#).

For information on Modal Test Consultant Type 7753, MIMO Analysis Type 7764 and Animation Option BZ-5613, see Product Data [BP 1850](#).

For an overview of PULSE LabShop's software platform, see PULSE Software System Data [BU 0229](#).

Complete Measurement Chain

With Brüel & Kjær's complete and fully integrated measurement chain, including accelerometers, impact hammers, force transducers, modal exciter systems, data acquisition front ends and measurement and post-processing software, you can select the optimal solution for your structural dynamics needs. The openness and flexibility of PULSE Reflex Structural Dynamics applications support your needs today and in the future. You are never limited to a vendor-specific system configuration and can easily assemble the system of your choice.

Specifications – PULSE Reflex Modal Analysis

SYSTEM REQUIREMENTS

- PULSE v.21 or later
- Microsoft® Windows® 10 Pro or Enterprise (x64), Windows® 8.1 Pro or Enterprise (x64), or Windows® 7 Pro, Enterprise or Ultimate (SP1) (x64) operating system
- PC requirements for [PULSE Reflex Base Type 8700](#) must be fulfilled

RECOMMENDED PC FOR USE WITH FE MODELS

Intel® Core™ i7, 3 GHz or better with 16 GB RAM or more.

This supports FEM import, visualization and animation of models up to 1 M nodes

SOFTWARE REQUIREMENTS

- PULSE Reflex Base Type 8700
- PULSE Reflex FE Interfaces Type 8718: To import Nastran, ANSYS and ABAQUS models and results
- PULSE Reflex Geometry Type 8719: For all geometry functionality
- PULSE Reflex Modal Analysis Type 8720: To run Type 8721
- PULSE Reflex Spectral Analysis Type 8729-A and PULSE Reflex Structural Measurements Type 8729-B: For hammer and shaker measurements made inside PULSE Reflex Modal Analysis or PULSE Reflex Core
- PULSE Reflex Spectral Analysis Type 8729-A and PULSE Reflex Structural Measurements Type 8729-C: For stepped sine measurements made inside PULSE Reflex Modal Analysis or PULSE Reflex Core

Data Input

- Requires FRF data as input for the curve-fitting process
- Acquired using PULSE Reflex Structural Measurements inside PULSE Reflex Modal Analysis
- Measurement data and geometry seamlessly transferred from PULSE Modal Test Consultant (modal analysis) or from PULSE ODS Test Consultant (ODS analysis)
- Standard measurement data formats: UFF type 58 (Binary & ASCII), UFF type 1858 (damping correction)
- Test for I-deas data: Function (.afu) and shape (.ash) files

Geometry Creation, Import, Node Selection and Decimation

GEOMETRY CREATION AND EDITING

- Basic geometries using nodes, trachelines, triangle and quad elements
- Geometries based on built-in CAD models:
 - Curves: Circle, Circular Arc, Ellipse, Elliptical Arc, Hyperbolic, Parabolic, Line, Polyline, Interpolation Spline and Control Points Spline

- Surfaces: Circular, Circular Arc, Ellipse, Elliptical Arc, Hyperbolic, Parabolic, Triangular, Rectangular, Polygon, Interpolation Spline and Control Points Spline
- Solids: Cylinder, Hemisphere, Sphere, Box, Cone and Conical Frustum
- CAD models with selectable colour and transparency
- Move (translate, rotate) and copy (linear, radial) operators for CAD models and meshes using interactive handles or manual entry
- Definition of locations with three directions on a CAD model (Sites)
- Definition of locations with three directions on a CAD model (Sites)
- Meshing of CAD models
- Extrusion of CAD models: Curves can be extruded to surfaces. Plane surfaces can be extruded to solids. Preselection of colour is available
- Hierarchical geometry tree view with subfolders for Coordinate Systems, Nodes, Elements, Trachelines and Equations
- Tables for Coordinate Systems, Nodes, Elements, Trachelines and Equations with sorting, filtering, multiple selection and editing
- Support of Cartesian, Cylindrical and Spherical coordinate systems. Local and Global coordinate systems
- Automated point numbering. Partial or complete semi-automated point renumbering
- Visual link between selections in Geometry 3D View and Geometry Tree

GEOMETRY IMPORT FORMATS

UFF data set types 15, 18, 82, 2411 or 2412, Microsoft® Excel® (*.csv), UFF, NASTRAN (MSC, NX, NEI), ANSYS and ABAQUS FE models (requires Type 8718)

GEOMETRY EXPORT FORMATS

UFF data set types 15, 18, 2412 or 82, and Microsoft® Excel® (*.csv)

GEOMETRY NODE SELECTION (Advanced Modal Analysis only)

Select test node locations on a FE model until a satisfactory FE AutoMAC is created.

A-set nodes from an imported Reduced Mass Matrix or Reduced Stiffness Matrix from MSC Nastran (.op2) are automatically selected for validation and potential modification.

Nodes selected are automatically high-lighted in the Geometry Decimation task for connection with trachelines and/or elements

DECIMATION

Imported FE models can be decimated to test models by manually selecting nodes on the FE model or by entering the nodes directly in a table. Selected nodes can be connected with trace lines and/or elements

DYNAMIC POINT NUMBERING

Show more point numbers (IDs) when zooming in on parts of the geometry (user-definable) – also during animation

GEOMETRY VIEWS

- Single, Side-by-Side, Top-Bottom and various Quad views
- Definition of front, back, left, right, top and bottom view axis
- Isometric view
- Perspective, orthographic and stretched projections of geometry
- Hidden lines and transparency
- Pan, zoom and rotate options for viewing geometries
- Symbols for shaker, impact hammer, force transducer and accelerometer positions shown on geometry with customized colours and sizes

CUTTING PLANES

Cut through a geometry in three user-definable 2D planes to view the interior or exclude viewing parts of the geometry – also during animation

ANIMATION

- Deformed and undeformed animation with Max. Deformation
- Single, overlaid and difference animation
- Wireframe, contour (solid/solid edge), points and arrow animation
- Animation of non-measured DOFs using interpolation equations
- AVI file generation with selectable codec

Measurement Validation

Geometry Driven Function Displays: Show FRFs based on selected excitation and response DOFs on the geometry

Function-based Animation: Animate geometry using, for example, FRFs or PAS (ODS). Saving of shapes in Shape Table

Parameter Estimation Setup

FUNCTION SELECTOR

Selection of FRF data to be included in curve-fitting

MODE INDICATOR FUNCTIONS

Modal Analysis: Normal Mode Indicator Function (NMIF) and Power Mode Indicator Function (PMIF)

Advanced Modal Analysis: Complex Mode Indicator Function (CMIF) and Multi-variate Mode Indicator Function (MMIF)

CURVE-FITTERS

Modal Analysis:

- SDOF: Least Squares Global Partial Fraction, Quadrature Picking
- MDOF: Polyreference Frequency and Polyreference Time (with single reference)

Advanced Modal Analysis: MDOF: Polyreference Frequency and Polyreference Time (with multiple references), Rational Fraction Polynomial-Z (RFP-Z), Eigensystem Realization, Alias-Free Polyreference (AFPoly)

Enhanced Mode Solution: Optimal clarity of the stability diagrams with Polyreference Time and RFP-Z

Solve Method:

- Global: All curve-fitters
- Local: Polyreference Time and RFP-Z

Mode Selection

Mode Selection: Manual or Automatic

Shape Types: Real or Complex

DIAGRAMS

Stability Diagram: For indication and selection of modes. Plotted in an Iteration versus Frequency diagram

- Mode stability indication: Computational, New, Frequency Stable, Damping Stable, Vector Stable, All Stable
- Selectable mode symbols, colours and tolerance properties

Cluster Diagram (Advanced Modal Analysis only): For indication and selection of modes. Plotted in a Damping versus Frequency Diagram

- Mode stability indication: Computational, New, Frequency Stable, Damping Stable, Vector Stable, All Stable
- Selectable mode symbols, colours and tolerance properties

Pole Density Diagram (Advanced Modal Analysis only): For indication and selection of modes. Plotted in a colour-coded Damping versus Frequency diagram

MODE TABLE

Contains the modal model in terms of natural frequency, damping and mode shapes. Comprehensive documentation of modal results including:

- Mode number, Mode Description, Estimation Method, Mode Complexity, Stability Level, Mode Shape Scaling, etc.
 - Columns with Sorting and Filtering
 - Damping correction: Accurate damping estimates by correcting for the effects of exponential weighting in hammer testing
- Mode tables created using different parameters or curve-fitting algorithms can be combined into a single mode table

SYNTHESIS

Comparison of measured and synthesized FRFs; Error Function; Frequency Response Assurance Criteria (FRAC)

Analysis Validation

Synthesis:

- FRFs or Mode Indicator Functions
- Displacement, velocity or acceleration
- Mass, stiffness, both or none

MAC:

- AutoMAC and CrossMAC tables and 3D plots with animation of selected mode pairs
- CoMAC geometry plots (Advanced Modal Analysis only)

Complexity Plot: Display of mode complexity and Mode normalization functionality (Advanced Modal Analysis only)

User Defined Layouts

For user-specific definition of layouts. Supports geometries with animation, function data, tables (mode shapes and MAC), plots (Complexity and MAC), etc.

Reporting

Integrated live reporting using Microsoft® Word, Excel® and PowerPoint®. Reports can be prepared in parallel with the analysis process and generated at any time

Ordering Information

Table 1 Ordering information for PULSE Reflex Structural Dynamics suite software

Item No.*	Description
Type 8700-X	PULSE Reflex Base
Type 8718-A-X	PULSE Reflex Nastran Interface
Type 8718-B-X	PULSE Reflex ANSYS Interface
Type 8718-C-X	PULSE Reflex ABAQUS Interface
Type 8719-X	PULSE Reflex Geometry
Type 8720-X	PULSE Reflex Modal Analysis
Type 8721-X	PULSE Reflex Advanced Modal Analysis
Type 8722-X	PULSE Reflex Correlation Analysis
Type 8729-A-X	PULSE Reflex Spectral Analysis
Type 8729-B-X	PULSE Reflex Structural Measurements – Hammer and Shaker
Type 8729-C-X	PULSE Reflex Structural Measurements – Stepped Sine

* “X” indicates the license model, either N: Node-locked or F: Floating

Table 2 Overview of PULSE Reflex Modal Analysis packs (modal analysis packs and modal acquisition and analysis packs)

	Packs			
	8720-A	8720-B	8721-A	8721-B
	Modal Analysis	Modal Acquisition and Analysis	Advanced Modal Analysis	Advanced Modal Acquisition and Analysis
Comprises:				
PULSE Reflex Base Type 8700		•		•
Geometry Type 8719 (incl. animation)	•	•	•	•
Modal Analysis Type 8720	•	•	•	•
Advanced Modal Analysis Type 8721			•	•
Modal Test Consultant Type 7753		•		•
MIMO Analysis Type 7764*				•
Animation Option BZ-5613†		•		•

* Type 7764 is required for measuring MIMO FRFs in PULSE Modal Test Consultant Type 7753. Type 7764 is not required for polyreference curve-fitting in PULSE Reflex.

† For FRF animation in PULSE Modal Test Consultant Type 7753

Item No.*	Description
Packs	
Type 8720-A-XS	PULSE Reflex Modal Analysis Pack
Type 8720-B-XS	PULSE Reflex Modal Acquisition and Analysis Pack
Type 8721-A-XS	PULSE Reflex Advanced Modal Analysis Pack
Type 8721-B-XS	PULSE Reflex Advanced Modal Acquisition and Analysis Pack

Table 3 Ordering information for PULSE Reflex Structural Dynamics suite's maintenance and support agreements

Item No.*	Description
M1-8700-X	Software Maintenance & Support for Type 8700
M1-8718-A-X	Software Maintenance & Support for Type 8718-A
M1-8718-B-X	Software Maintenance & Support for Type 8718-B
M1-8718-C-X	Software Maintenance & Support for Type 8718-C
M1-8719-X	Software Maintenance & Support for Type 8719
M1-8720-X	Software Maintenance & Support for Type 8720
M1-8721-X	Software Maintenance & Support for Type 8721
M1-8720-A-XS	Software Maintenance & Support for Type 8720-A-XS
M1-8720-B-XS	Software Maintenance & Support for Type 8720-B-XS
M1-8721-A-XS	Software Maintenance & Support for Type 8721-A-XS
M1-8721-B-XS	Software Maintenance & Support for Type 8721-B-XS
M1-8722-X	Software Maintenance & Support for Type 8722
M1-8729-A-X	Software Maintenance & Support for Type 8729-A-X
M1-8729-B-X	Software Maintenance & Support for Type 8729-B-X
M1-8729-C-X	Software Maintenance & Support for Type 8729-C-X

* “X” indicates the license model, either N: Node-locked or F: Floating

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