

# PRODUCT DATA

**PULSE WorkFlow Manager — Type 7756  
Version 7.0**



## ***PULSE WorkFlow Manager***

WorkFlow Manager Type 7756 provides a range of tools for automating measurement and analysis tasks performed with Brüel & Kjær PULSE™. This makes it particularly suited to doing repetitive measurements.

Type 7756 allows the user to define both the look and functionality of the user interface and, by combining with other applications on PULSE, provides a full and dedicated test solution. This covers test administration, measurement, documentation, reporting, data storage, data retrieval and comparison. The unique, electronic TestPlan facility provides an efficient and intuitive means of ordering and documenting your tests. Automated reporting is available via a range of suitable Windows® applications.

Saved data can be viewed directly in WorkFlow Manager and then reported in Microsoft® Word.

**7756**

## FEATURES

- Simplified operation of PULSE using WorkFlow Manager to control and automate measurements – ideal for running standard tests
- TestPlan facility for planning, communicating and executing multiple tests setups
- Execution of up to 26 separate measurement sequences per TestPlan
- All PULSE real-time analyzers supported including FFT, 1/nth Octave, Overall levels, Order, Loudness and SSR
- Automated saving of fully documented measurement data in PULSE ASCII formats
- Integration with PULSE Data Manager Type 7767 for saving measurement data and documentation directly to a database and then searching and retrieving using intelligent browsing tools
- Automated reporting using Excel, MATLAB<sup>®</sup> or any other OLE compliant software tool
- Display and reporting of completed measurements with the built-in graphical display in the WorkFlow Manager
- Links PULSE with other Windows<sup>®</sup>-based applications for further data display or post-processing
- Built-in web browser window for displaying instructions, custom GUIs and even live video
- Display and tagging of waterfall data of low-frequency process parameters
- Easy configuration of measurement system for specific tasks using supplied macro buttons or Visual Basic<sup>®</sup> scripts
- Fully customisable GUI including insertion of company logos and splash screens in the software
- Multi-language support (English, German, French, Spanish, Italian, Portuguese and user-defined, as well as support for Kenji characters<sup>1</sup>)

## BENEFITS

- Turns PULSE into a powerful “test suite” supporting all stages of the test process
- Automated measurement, data storage and simplified data retrieval, suited to all work environments including field or networked office environments
- Simplified user controls for performing measurements and manipulating data, including support for Remote Control ZH0630 for in-vehicle operation
- Fast measurement cycle times for the complete test cycle including one button reporting using Excel
- Documented measurement data in open file formats making data available for inspection, comparison and reporting with Microsoft<sup>®</sup> Excel, Word, MATLAB<sup>®</sup> or any Windows<sup>®</sup> program that can read ASCII type data
- Real-time assessment of product performance using benchmark data
- Easy system configuration for user-defined test scenarios

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## Introduction

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WorkFlow Manager Type 7756 provides a suite of tools for improving the use of PULSE for standard, repetitive or specialised measurements. PULSE WorkFlow Manager streamlines the complete testing process including performing measurements, documenting and reporting results as well as archiving data. WorkFlow Manager integrates seamlessly with PULSE Data Manager Type 7767 allowing measurements to be saved directly to a database complete with meta-data<sup>2</sup>.

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<sup>1</sup> The correct fonts must be installed on the PC for Japanese or Korean characters to be available

<sup>2</sup> Meta-data is the data that documents the measurement, supplying user-defined test object and measurement setup information

WorkFlow Manager is a shell program that interacts with PULSE on several levels. You can choose from a range of macro buttons that instruct PULSE to perform specific tasks such as loading a specific project and then executing a measurement. Measurement data is saved by default as PULSE ASCII. To document the test, a meta-data window is supplied where you can define a range of labels and data input fields for data that will be saved as part of the measurement result file.

The TestPlan in WorkFlow Manager supports the organisation of the test process by providing a table of the types of measurements to be performed and the test objects these measurements are to be performed on. A cell in a TestPlan represents a measurement using a specific test setup and performed on a specific test object. A cell can be subdivided into a number of runs. This is useful when several measurements need to be made for averaging purposes.

**Fig. 1**  
A typical layout for a TestPlan running one test setup. The meta-data window is shown in the bottom, right-hand corner and the data view window with explorer is shown across the bottom. A note from the test engineer to the test operator is shown in the explorer window



A display, complete with explorer, allows you to select, view, and compare measurement data in the TestPlan. Select a cell and open the display and the measurement is loaded into the display explorer. Here you can select multiple 2D or 3D data sets for display complete with legends and meta-data. Cursors in the display allow you to extract additional information or zoom the data. The display

can then be copied to the clipboard and pasted into Word, Excel, PowerPoint or some other program. An align function allows the automated comparison of several measurements runs at the same time.

WorkFlow Manager is suitable for a range of standard test types such as:

- Benchmark testing and target setting
- Homologation tests
- In-vehicle testing
- Specialised (custom) repetitive tests

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## WorkFlow Manager Software

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The WorkFlow Manager interface consists of several elements: the TestPlan, Meta-data Window, the Banner Menu, the WorkFlow Manager Tool and Data Viewer.

### Banner Menu

Whenever WorkFlow Manager is running, the Banner Menu is visible along the top of the screen. You select the other elements of the WorkFlow Manager user-interface from the left-hand side of the banner menu. The rest of the banner menu is occupied by the analyzer status window and user-definable buttons. You can create up to four different sets of buttons. Each set can hold up to 12 buttons.

**Fig. 2**  
The banner menu showing buttons in the TestPlan



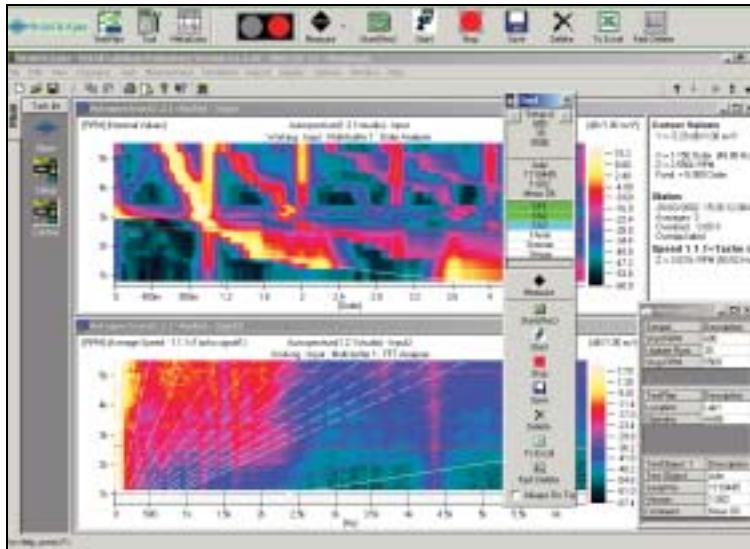
For each TestPlan, you can define a series of buttons to perform operations related to the measurement, such as loading the PULSE project into PULSE or stopping the measurement and creating a report in Excel on selected, measured functions. This allows simplified operation, so operators can be shown how to use the system in a matter of minutes.

Each button executes a Visual Basic<sup>®</sup> script and is shown as a user-selected icon in the banner menu and Tool. A library of standard buttons is delivered with Workflow Manager so that you can easily configure the TestPlan's functionality to your liking.

The banner menu turns red if an overload occurs on any channel during the measurement. It is possible to perform a measurement while keeping PULSE completely hidden, using the analyzer status window to monitor the measurement status and the overload monitor to check on channel overloads.

### The Tool

**Fig. 3**  
Here, the TestPlan is hidden but the operator can still select where to save the data in the TestPlan via the tool.



The Tool holds an exact copy of the user-defined buttons found in the banner menu. In addition to this, the Tool comes equipped with a TestPlan navigator window. This window displays a complete TestPlan measurement cell. This includes all the runs relating to the measurement as well. Spin buttons allow you to move horizontally across the TestPlan working with a given test object. You

can run a complete measurement from the Tool with the TestPlan closed, using the buttons in the tool to control the measurement, and the navigator window to move between the various measurements that need to be made.

### The TestPlan and Meta-data Window

Opening a test takes you into a TestPlan. For existing TestPlans, the meta-data held against a particular cell is displayed in the Meta-data Window, this can be attached to the bottom of the TestPlan or located as a free-floating window. Meta-data can be added or edited by simply double clicking in the correct pane of the Meta-data Window. This opens a dialog box with the correct fields.

The exact nature of the test, i.e., analyzers used, channel setup, measurement bandwidth, etc., is defined by the PULSE project used for the measurement. The PULSE project used is related to the test setup (column) of the selected cell.

The measurement data along with meta-data is stored in a directory that is labelled according to the cell in the TestPlan. After the data has been saved, the cell turns bright



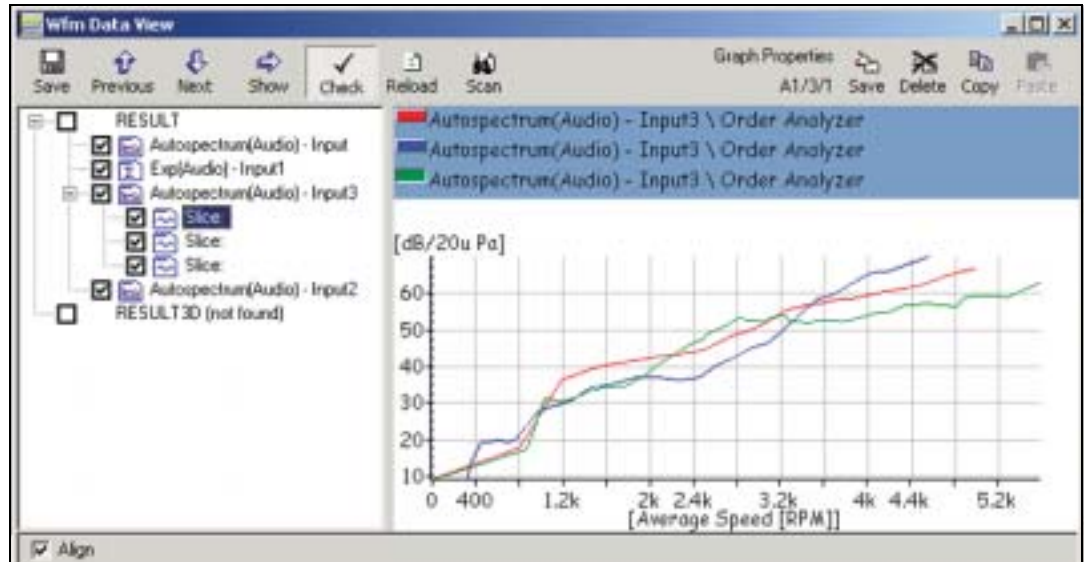
green to confirm that this particular measurement has been completed. If a time file is stored instead of analysis results, the cell turns blue.

The right-hand side of the TestPlan is a scalable web browser window. This provides a range of options including:

- Creating specialised user-interfaces as HTML pages
- Adding an additional interface to the PULSE Data Manager
- Displaying instructions and documentation

### Data View Window

**Fig. 4**  
The data view display allows you to select the groups or individual traces you wish to view. An align function overlays the results of different runs in the same view



Any saved measurement in the TestPlan (green cells) can be viewed directly in the TestPlan using the Data Viewer. This window is activated by a button in the banner menu and automatically displays all the data sets in the given measurement in an explorer window. Check a box in the explorer and the corresponding data set is immediately shown in the GCX display with the appropriate axes and a selection of display options. Several different measurements can be loaded into the display at once for comparison purposes.

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## Special Features

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### Low-frequency Parameter Logging

WorkFlow Manager can display and log (@1 Hz) data values made available on the PC. These values are shown in the displays on the right of the banner menu. Here you can set up to 12 windows for displaying low-frequency parameters such as the coolant temperature or hydraulic pressure. The values can be annotated to the dynamic sound and vibration measurement channel data as “Tags” in the measurement result file. See the PULSE Software System Data (BU0229) for more details.

### Multi-run Averaging

Each cell within a TestPlan can be further subdivided into runs. This means that for a single measurement it is possible to perform several runs and then automatically average the different runs to obtain the average, maximum and minimum values for the measurement. The runs are averaged together using a special routine that can be called via a button.

## Automated Reporting

Reporting can be automated using the supplied Excel template, which contains several macros that greatly simplify the setting up of a custom report. Once a layout has been created in this template, all future reports are automatically generated in this format.

For more demanding report formats, MATLAB<sup>®</sup> can be employed as the reporting tool. This provides powerful post-processing options as well as sophisticated data display options. The process of reporting with MATLAB<sup>®</sup> can be automated using the Visual Basic<sup>®</sup> scripting functionality in WorkFlow Manager to address the OLE interface of MATLAB<sup>®</sup>.

## Multi-language Support

**Fig. 5**  
The WorkFlow Manager language selection page, and the user-interface shown in German



The WorkFlow Manager menus are available in a range of languages. This is selected in Options, and English, German, French, Spanish, Italian and Portuguese are currently

supported, as well as a user-defined language. Japanese/Korean/Chinese characters are supported if these fonts have been installed on the PC.

## Scripting Macros

To greatly accelerate the creation of custom buttons, a large range of macros that can be called in a script have been provided. These macros are documented in the Help of WorkFlow Manager with operation and syntax supplied. The supplied buttons can be used as script examples.

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## PULSE Features

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PULSE's unique real-time multi-analysis capabilities allow exceptionally fast measurement cycle times. Multi-analysis involves PULSE running its real-time analyzers (see the Software System Data for Types 3560 C, D and E, BU 0229, for a list of the real-time analyzers in PULSE) in parallel on the same or different measurement channels. For multispectrum measurements (waterfall data), PULSE's powerful multi-buffer functionality gives unmatched flexibility in how you measure and present your data. Make an engine run-up using order analysis, FFT analysis, octave analysis and overall levels (RMS values) on the same or different measurement channels at the same time, in real time.

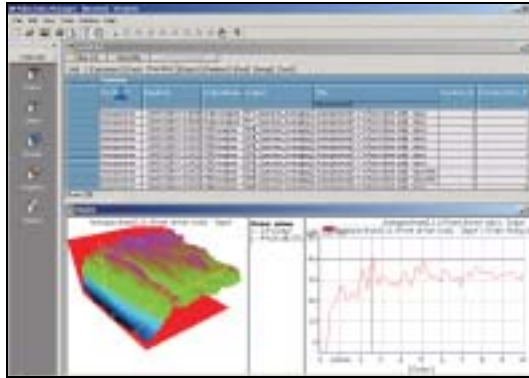
An extensive and well documented OLE interface make it very easy to control or extract measurement information from PULSE. This creates almost limitless opportunities to control PULSE via WorkFlow Manager using Visual Basic<sup>®</sup> scripts.

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## PULSE Data Manager Features

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**Fig. 6**  
The browser view of PULSE Data Manager with retrieved results shown in the built-in displays. PULSE Data Manager uses the same GCX display technology as seen in the WorkFlow Manager data viewer



PULSE Data Manager Type 7767 is the data management suite developed for PULSE. Type 7767 consists of a database server configurator for setting up a database according to your needs, and an export to database component that can reside directly in PULSE or be used to store PULSE ASCII files from WorkFlow Manager in a database. The browser tools allow users to browse over a network retrieve and report saved PULSE measurement data.

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## Summary

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PULSE WorkFlow Manager, along with PULSE Data Manager, builds on PULSE's strengths as a measurement engine to create a complete test system that caters for test program administration, efficient data archiving, distribution and improved turn around between measurements, while maintaining PULSE's exceptional measurement performance. The inherent flexibility of PULSE WorkFlow Manager allows it to be easily set up quickly for your specific testing needs as well as to form a basis for your custom sound and vibration measurement solution.

# Specifications – PULSE WorkFlow Manager Type 7756

OLE interface equipped  
Integrated with Microsoft® Visual Basic® Scripting Edition  
Version 4.0

## System Requirements

- PULSE Version 7.0 or later
- Windows® 2000, XP or Windows NT® 4.0
- Microsoft® Office 2000 or later

## Measurement

Works with all core analysis and measurement types available on PULSE along with a range of other real-time applications:

- Overall Levels
- CPB (1/n-octaves)
- FFT
- Stationary Loudness
- Articulation Index
- Data Recorder Type 7701
- Order Analysis Type 7702
- Steady State Response Analyzer Type 7772

**Channels:** According to 7700 license installed

### Low-frequency Parameters

Any data presentable in ASCII (c, s, f) on the PC on which WorkFlow Manager is installed (sampling rate 1 Hz)

## User Interface

### BANNER MENU

TestPlan and Tool buttons, analyzer status window  
User-defined "action buttons" (up to 48) with user-selectable icons

### TOOL MENU

TestPlan navigation window and user-defined "action buttons"

### META-DATA WINDOW

Configurable 3 pane window for inputting and viewing meta-data

### TESTPLAN

Up to 26 test setups per TestPlan  
Up to 100 (max. recommended) test objects  
Up to 10 runs per measurement

### INTERNET BROWSER WINDOW

Microsoft® Internet Explorer browser window

### WORKFLOW MANAGER DATA VIEW

Multimode data display window

### MULTI-LANGUAGE SUPPORT

User interface language selectable: English, French, German, Spanish, Italian, Portuguese and user-defined. Support of Kenji characters (Korean and Japanese)

### TRADEMARKS

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## Information Stored in WorkFlow Manager

- Annotated Project Structure
- TestPlan, including:
  - TestPlan meta-data
  - Test setup meta-data
  - Test Object meta-data
  - Assigned PULSE projects (up to 2 per test setup)
  - Signal names
  - Calibration history
  - Cursor values
  - Display settings
  - Action buttons Visual Basic® scripts

## Output

PULSE ASCII file containing:

Test setup and test object meta-data

PULSE measurement data including functions, function groups and cursor readings, version number, date and time, axes definitions, analyzers, etc.

Tags, i.e., parameters, that annotate data

Examples of tags are: overload, date, time, index, speed (RPM), Average speed (RPM), km/h, A&L values (CPB analyzer only)  
RPM-related tags may be used as Z-axis, when order slices are displayed

Low-frequency parameters (sampled @1 Hz) added as multi-buffer tags

Note that data measured in one or more overall analyzers may also be recorded as tags. This makes it possible to display, for example, order (sound or vibration) as a function of temperature or other measured parameters

Direct export of measurement and meta-data into PULSE Data Manager Type 7767 for storage in a database

## Reporting

**Manual:** Read file into any Windows-based program capable of reading ASCII data, e.g., Microsoft® Excel, Word or PowerPoint, Lotus® 1-2-3®, MATLAB® or Mathcad®

Copy to clipboard function available in WorkFlow Manager Data View for pasting displays into and program supporting the Paste function in Windows Clipboard

**Automated:** via included Excel template or using Visual Basic® scripting to any Windows® software capable of reading ASCII data and equipped with an OLE interface. Scripts for exporting to Excel and MATLAB® are included with installation.

**Note:** A preconfigured Excel Template is supplied to cover a range of reporting scenarios, with complete automation and no requirement for additional scripting

## Ordering Information

7756 A: PULSE WorkFlow Manager, Multi-channel License