PRODUCT DATA

PULSE Pass-by Conformance Test System
Vehicle Pass-by Software Type 7788-A and Pass-by Ground Station
(with PULSE Multi-analyzer Type 3560-B and Advanced Connection Box Type 7451)

PULSE™ Pass-by Conformance Test System is a system for measuring operational exterior vehicle noise built on powerful PULSE multi-analyzer solutions. The system consists of Vehicle Pass-by Software Type 7788-A together with PULSE hardware and a selection of dedicated pass-by accessories.

The system covers common pass-by test standards including: ISO 362:1998 – 2007 accelerating road vehicles, ISO 13325 tyre noise and ISO 5130 exhaust noise.

The complete measurement chain can be traceably calibrated.

Uses and Features

Uses
- Pass-by noise testing of accelerating road vehicles according to a variety of international standards: ISO 362:1998 and ISO 362 – 1:2007
- Measurement of operational exterior vehicle noise according to ISO 3325 and ISO 5130

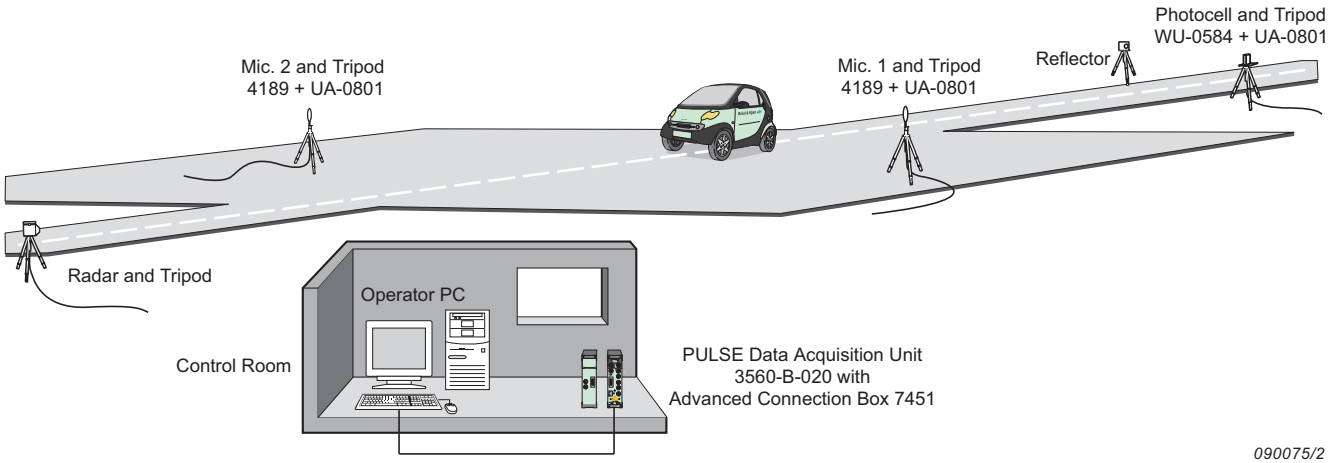
Features
- System for pass-by measurements including exterior noise measurements such as tyre and exhaust noise
- Real-time acquisition of noise levels, vehicle position, velocity, RPM (optional), and weather station data (optional)
- Export of results to Microsoft® Word and Excel®
- Advanced graphical displays with live cursor functionality when embedded in Microsoft® Office applications
- Easy upgrade to Type 7788-B and 7788-C systems, which include troubleshooting and data management features
- User-definable calculations of final result to adapt to different standards and regulations

Introduction

The evolution of exterior vehicle noise tests to reflect typical driving patterns in urban traffic more accurately, has resulted in more complex test procedures. More measurements need to be taken, accuracy requirements have become stricter, and full documentation of the measurement is required. This has added to the test burden for vehicle manufacturers and sub-suppliers. Brüel & Kjær's goal with the pass-by conformance test system is to make it straightforward also for non-experts to set up, carry out and document the standardised pass by tests.

PULSE Pass-by Conformance Test System builds on experience gained during the development of previous generations of the Pass-by solution.The result is a functionally innovative, user friendly, safe design. The system includes all required accessories such as photocells giving absolute position reference and a speed sensor (radar) provides continuous speed and position information.

Fig. 1 *Pass-by system overview*



Software

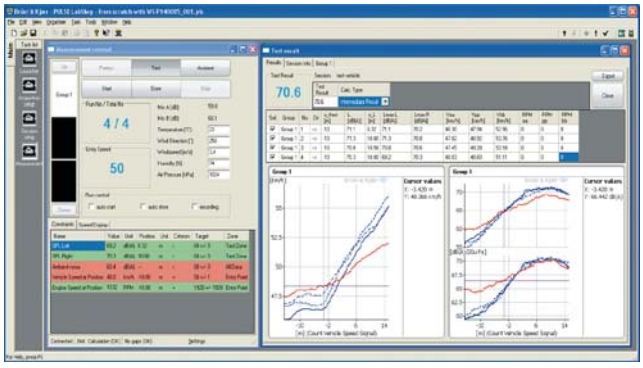
Selection of a test standard via the user interface fully configures the system to acquire the required data and calculate the result according to that particular standard. Built-in configuration validation ensures that all of the system settings conform to the requirements of the standard, by auto-correcting any wrong settings or accidental manual input. This guarantees correctly calculated results. The system gives feedback on the driving and test conditions during the measurement to ensure compliance. An example of this could be the vehicle entry speed occurring during the test.

All results are available for inspection immediately after measurement.

Graphical User Interface (GUI)

The main test controls are easily accessible on the screen with all the buttons and controls required to carry out measurements. A 'Speed display' helps the operator monitor the vehicle speed during the test.

Fig. 2
Graphical user interface showing measurement control and test results



The Test Result component in Fig. 2 has a table showing the summary of all results. It also has graphs with noise level, speed and RPM vs. position for each gear. The Test Result view can be exported to Microsoft® Office products, providing powerful reporting on the fly.

As part of its full support of the ISO 362 – 1:2007 standard, the software includes a pre-test function for choosing the correct entry speed and the correct gear(s) for testing.

Ground Station

Fig. 3
The Pass-by Ground Station consists of a 5-channel data acquisition unit with BNC connectors, PULSE Mutli-analyzer Type 3560-B, and Advanced Connection Box Type 7451

The Pass-by Ground Station, typically located in a stationary vehicle or in an office near the test track, consists of PULSE Multi-analyzer Type 3560-B and Advanced Connection Box Type 7451 for powering and conditioning the photocells, radar and a five-parameter weather station. The acoustic channels, speed sensor and weather station can be traceably calibrated. The solution can be upgraded with an additional weather station and a telemetry-based RPM sensor for acquiring engine RPM during the test.

Compliance with Standards – Multi-analyzer Type 3560-B and Advanced Connection Box Type 7451

CE, C-Tick	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive. C-Tick mark indicates compliance with the EMC requirements of Australia and New Zealand.
Safety	EN/IEC 61010–1: Safety requirements for electrical equipment for measurement, control and laboratory use. UL 61010–1: Standard for Safety – Electrical measuring and test equipment.
EMC Emission	EN/IEC 61000–6–3: Generic emission standard for residential, commercial and light industrial environments. EN/IEC 61000–6–4: Generic emission standard for industrial environments. CISPR 22: Radio disturbance characteristics of information technology equipment. Class A Limits. FCC Rules, Part 15: Complies with the limits for a Class A digital device.
EMC Immunity	EN/IEC 61000–6–1: Generic standards – Immunity for residential, commercial and light industrial environments. EN/IEC 61000–6–2: Generic standards – Immunity for industrial environments. EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements. **Note:** The above is only guaranteed using accessories listed in this Product Data sheet.
Temperature	IEC 60068–2–1 & IEC 60068–2–2: Environmental Testing. Cold and Dry Heat. Operating Temperature: –10 to +50°C (+14 to +122°F) Storage Temperature: –25 to +70°C (–13 to +158°F)
Humidity	IEC 60068–2–78: Damp Heat: 80% RH (non-condensing at 40°C (104°F))
Mechanical	Non-operating: IEC 60068–2–26: Vibration: 0.3 mm, 20 m/s^2, 10 – 500 Hz IEC 60068–2–27: Shock: 500 m/s^2 IEC 60068–2–29: Bump: 1000 bumps at 250 m/s^2
Enclosure	IEC 60529: Protection provided by enclosures: Type 3560-B: IP 40D; Type 7451: IP 40D

(For environmental specifications and compliance with standards for PCs, see the specifications given by their respective manufacturers.)

Specifications – Ground Station (with Multi-analyzer Type 3560-B and Advanced Connection Box Type 7451)

STANDARD PASS-BY GROUND STATION
- Advanced Connection Box Type 7451
- 5-channel PULSE Multi-analyzer Type 3560-B

POWER REQUIREMENTS
Type 3560-B fulfils the requirements of ISO 7637 – 1 and 7637 – 2 with batteries
Voltage: 230 V AC @ 50 Hz and 110 V AC @ 60 Hz
Power Consumption:
- Nominal: 20 W
- Maximum: 37 W
- With Radar and two Photocells Attached: 25 W

Ext. Power Connector: LEMO coax., FFA.00.113, ground on shield

ACOUSTIC NOISE EMISSION (at 1 m)
Silent operation to 35°C (95°F) when not charging batteries. When charging batteries, fan operation may start at a lower ambient temperature

DIMENSIONS
Type 3560-B:
- Height: 182 mm (7.2″)
- Width: 64 mm (2.5″)
- Depth: 270 mm (10.6″)
- Weight: 2.5 kg (5.5 lb.) without batteries

Type 7451:
- Height: 182 mm (7.2″)
- Width: 64 mm (2.5″)
- Depth: 270 mm (10.6″)
- Weight: 2 kg (4.4 lb.)

Specifications – PULSE Vehicle Pass-by Software Type 7788-A

PULSE Vehicle Pass-by Software Type 7788-A works with PULSE Multi-analyzer System Type 3560. Note, the license for this system is node locked

SYSTEM REQUIREMENTS
- Pentium® III 1.4 GHz or better with 1024 MB RAM
- Windows® XP or Windows® 7
- Microsoft® Office 2003 or later

MEASUREMENT
Vehicle speed and position measured relative to a reference (photocell), noise measured via two microphones (left and right) and additional parameters
- Vehicle speed using radar (WQ-2856) or GPS speed sensor (WQ-3207)
- Noise: Overall level as functions of distance, speed or time
- Auxiliary Parameters: Air temperature, Relative humidity, Wind speed, Wind direction, Ambient pressure, and Road surface temperature
- 1/3-octave spectrum at maximum level

CALIBRATION
Calibration of dynamic channels is easily carried out on site using the PULSE Calibration Master. Calibration histories are available from the Global Calibration Database

USER INTERFACE
- Standard Windows®-based GUI
- Three-button operation (Start, Store, Stop)
- Automatic display of summarised measurement results including validation criteria with notification on non-compliance
- User-configurable test documentation, input window

AVAILABLE DISPLAYS
- Level vs. Position
- Speed vs. Position
- Instantaneous speed and RPM
- RPM vs. position (with optional RPM telemetry hardware)
- Auxiliary data (2D and read-out) (with optional weather station hardware)
- 1/3-oct. spectrum vs. position
- 1/3-oct. spectrum at maximum level

REPORTS
- On-the-fly reporting direct from measurement GUI
- Displays of all measured data available in Microsoft® Word with live cursors in displays
- Export of all measured data to Microsoft® Excel®

Ordering Information

Type 3560-B-X39 Pass-by Conformance Test System
includes:
- Type 3560-B-120: PULSE Data Acquisition Unit
- Type 7451: Advanced Connection Box
- Type 7788-A-N: PULSE Pass-by Conformance Test Software (node-locked license)
- Type 7770-N3: PULSE FFT Analysis (3-channel, node-locked license)
- Type 7771-N2: PULSE CPB Analysis (2-channel, node-locked license)
- 2 × AO-0087-D-012: Screened Connection Cables, BNC to BNC connector, 1.2 m (4 ft)
- Type 3099-A-N1: PULSE Single Module Front-end Driver (node-locked license)
- M1-7788-A-N: Software Maintenance and Support Agreement for Type 7788-A-N
- M1-7770-N3: Software Maintenance and Support Agreement for Type 7770-N3
- M1-7771-N2: Software Maintenance and Support Agreement for Type 7771-N2
- M1-3099-A-N1: Software Maintenance and Support Agreement for Type 3099-A-N1

Required Accessories

MICROPHONE CONFIGURATION

Type 4189-A-T39 Prepolarized ½” Microphone Configuration for Pass-by

includes:
- 2 × Type 4189-A-021: Prepolarized ½” Microphone with Preamplifier Type 2671 with TEDS
- WL-1391-D-200: Cable Drum with Double-screened BNC Cable, 20 m (66 ft)
- WL-1391-D-400: Cable Drum for Microphones, 40 m (132 ft)
- 2 × UA-0237: Windscreen
- 2 × UA-0801: Lightweight Tripod
- 2 × UA-0588: Microphone Holder

SPEED RADAR CONFIGURATION

WQ-2856	Speed Sensor (Tescon 3210)
WQ-2857	Tripod for Sensor (Tescon 3210-2)
WQ-2859-M-100	Speed Sensor Cable (Tescon 3248-100), 100 m (328 ft)
WQ-3292	Signal Adaptor, for mobile use of WQ-2856
WL-3529	Adaptor Cable, for use between WQ-2856 and Advanced Connection Box Type 7451, Lemo 7-pin (F) to DIN 5-pin (M), 0.5 m (1.6 ft)

PHOTOCELL CONFIGURATION

WU-0584-T39 Photocell Configuration for Pass-by

includes:
- WU-0584-W-002: Photocell with 2 m (6.6 ft) Cable
- WL-1194: Cable Roller for Photocell, 60 m (197 ft)
- SB-1537: Light Reflector
- 2 × UA-0801: Lightweight Tripod

HIGH-END LAPTOP

Type 7201-F-xx2* Dell® Latitude® High-End Notebook with Microsoft® Office Professional (without manuals)

Optional Accessories

WEATHER STATION CONFIGURATION

WQ-1256-T39 Weather Station Configuration for Pass-by

includes:
- WQ-3070-W-001: Weather Station (air temperature, relative humidity, wind speed, wind direction, ambient pressure)
- WL-3423: Cable for WQ-3070, drum 60 m (197 ft)
- UA-1522: Tripod for Weather Station

IN-VEHICLE OPTIONS

WQ-2350	Cigarette Lighter Tacho Sensor (RPM 8000)
WQ-2410	Power Splitter (1 to 2) for Cigarette Lighter Socket
WQ-3207	100 Hz Speed Sensor (VBOX), incl. display
WQ-3208	2-ch. Telemetry, 3.2 kHz
AO-0087-D-012	Screened Connection Cable, BNC to BNC connector, 1.2 m (4 ft)

CALIBRATION FOR PASS-BY

BK-0115	Accredited Calibration as SLM (IEC 60651) for PULSE Front-end, 1 channel
BK-0115-001	Accredited Calibration as SLM (IEC 60651) for PULSE Front-end, Additional channels

OTHER ACCESSORIES

2 × QB-0048	Data Acquisition Unit Battery
WQ-2809	Road Surface Temperature sensor (including conditioning, cabling and accessories)

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HEADQUARTERS: Brüel & Kjær Sound & Vibration Measurement A/S · DK-2850 Nærum · Denmark
Telephone: +45 7741 2000 · Fax: +45 4580 1405 · www.bksv.com · info@bksv.com

Local representatives and service organisations worldwide

Brüel & Kjær