Test Equipment Since 1976...
...Making Our World More Reliable

PARTICLE IMPACT NOISE DETECTOR

BW–LPD–D4000 Particle Impact Noise Detection System

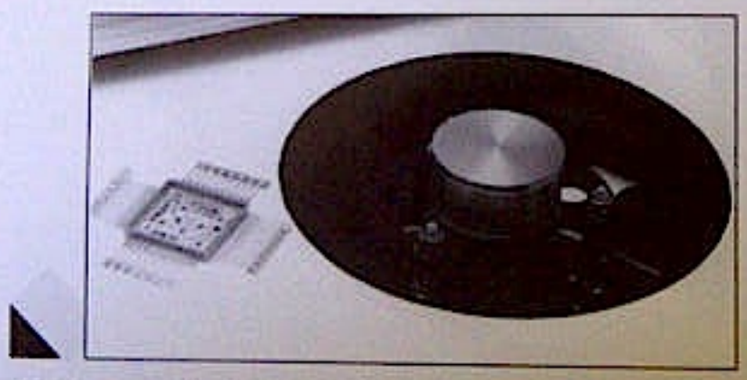
The **QUALITY** you expect . . . . . and the **ASSURANCE** you need

B&W Engineering Corporation, originators of the first fully MIL–STD compliant PIND system, is pleased to introduce a new generation in Particle Impact Noise Detection (**PIND**) systems, the **BW–LPD–D4000**. Our new test system is the one you will need to accurately test cavity devices for particle contamination with the ease you want and reliability that you demand.

Programming of the new **BW–LPD–D4000** is so simple that any operator can be trained with ease. Our new digital controller provides the **flexibility to comply with the evolving MIL–STDs** or your in–house tests at **no additional cost.** The constantly digitally displayed frequency and acceleration may be set at any time by the user without reprogramming.

After mounting the device with either the ultrasonic couplant or tape dots supplied, simply depress the footswitch or Start button (or set the **Auto Restart** feature) and let the testing begin. The Auto Restart feature allows the operator to program a delay between tests for device placement. Throughput can exceed 200 parts per hour. **Production is enhanced** and your **product is protected** by using the optional PIND station Test Bench with ESD work surface and operator grounding wrist strap.

Any signal derived from loose particles is transmitted by our patented Particle Sensor with **built–in pre–amplifier**. The pre–amplification allows low impedance signal transmission which does away with interference caused by cable noise etc. The assembly is **acoustically isolated** to suppress the reception of mechanical noise.



Some manufacturers of hybrid devices include a vibration cleaning cycle to evacuate any particles prior to final seal.

MORE FEATURES FOR . . . . . BETTER TEST RESULTS

The optional **Transient Detector** provides an independent sensor which detects environmental failure stimulus (RFI/EMI) so that you can be assured that **only devices with particles are rejected.** The detection of such stimuli is presented on the SPIKE indicator.

The **BW–LPD–D4000** also provides **two preset threshold levels**, and operators can simply switch between them. This feature allows for **compliance with multiple MIL–STDs without recalibration**. These levels may be calibrated as required between 0–infinity.

Our **patented PIND Shock Test Fixture** produces true co–test shocks with or without stopping the vibration. Select the shock application on the Controller front panel. In the **DYNAMIC** position, the shock is applied simultaneously with the vibration. The vibration stops for less than 250 milliseconds during the shock while in the **STATIC** position.

To measure the shock level, a **Shock Capture and Display** circuit is available as an option. This circuit also permits the **adjustment of the shock level** using the shock accelerometer feedback. This circuit has a high–speed peak detector to capture and store the less than 100 microsecond shock pulse. The peak amplitude is then presented in Gs on the controller's SHOCK LEVEL display. The resolution of this display is accurate within ± 8 Gs.

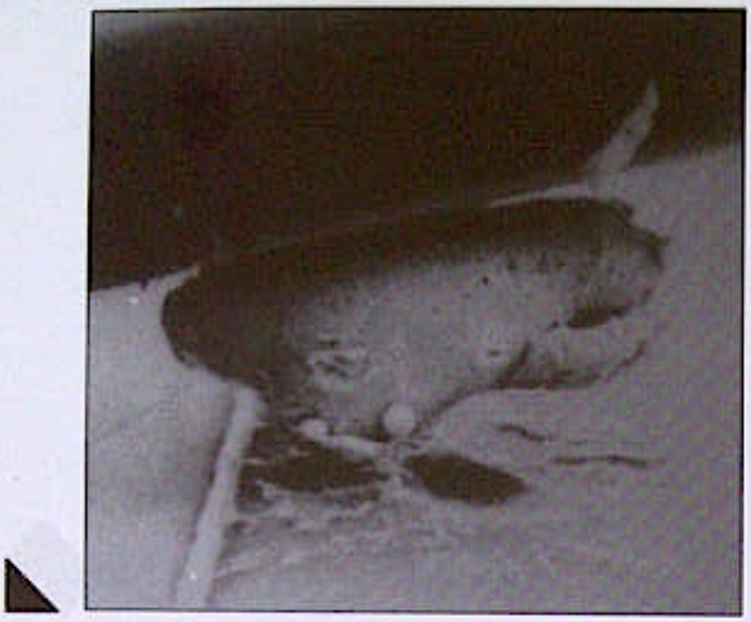
ENGINEERED FOR . . . . . PERFORMANCE AND RELIABILITY

As a standard feature B&W supplies a **50 force pound vibration shaker** which can easily handle even your largest packages.

Sinusoidal vibration between 40 Hz and 250 Hz is standard and may be extended to 27 Hz at no additional cost (upon request). You may also **frequency sweep** through this range at any time during the test. The linear oscillator is **accurate at all G levels** throughout the frequency range. The magnitude and frequency are **constantly presented on the digital displays.**

The **Degaussing Magnet** reduces the magnetic field at the **Device Under Test (DUT)** location to less than 5 gauss to insure the detection of ferrous particles.

COMPONENT FAILURE DUE TO PARTICLE CONTAMINATION



This particle caused a short circuit at a 1 mil wire bond

Any noise bursts as detected by any one of the three detection systems is cause for the device to be rejected. You may discover these defects visually as spikes on the oscilloscope, audibly as clicks or pops on the speaker, or by simply observing a lit threshold detector **FAIL** lamp. Although the **FAIL** lamp acts as the prime failure indicator, the other indicators provide useful evidence in failure analysis.

To assist in your evaluation of devices, we recommend that you retain two samples of each device type as "check units." One of these devices should be known to be free of particles; the other seeded with particles of the type expected to be most prevalent in that package and of minimum size. You will use these two samples to evaluate the mounting means, confirm the vibration frequency to be used, and to identify any noises generated by other than loose particles. The device should be visually inspected for cleanliness immediately prior to performing the PIND test.

Devices that are particularly prone to particle contamination can be decontaminated by a PIND test immediately prior to final seal. The product manufacturer can apply this type of test in all production processes to help determine weld schedules, sealing techniques, cleaning processes, and other means of controlling contamination.

COMMITMENT TO SERVICE AND PRICE ADVANTAGE

Each of our systems comes with a **full one year warranty**, Calibration Certification in accordance with MIL–STD–45662A and meets or exceeds all the requirements of MIL–STD–883, 750, and 202 for PIND. The Maintenance Manual contains all calibration procedures and outlines the instruments required. A well–equipped calibration lab will have adequate instruments for most procedures. B&W Engineering provides **complete system calibration** including preventative maintenance and is completed typically **within 5 days from receipt**. Transducers are completed within 3 days.

FACILITY REQUIREMENTS OPERATOR CONSIDERATIONS

PIND relies on audio and visual indications to determine the acceptability of the DUT. To a certain extent, the sensor may pick up acoustical energy and static discharge energy causing a false indication. Physical location in the test area should consider these factors. Locating the system in a relatively quiet area, away from noise and pulsed electrical equipment allows for minimal distraction of the operator and test equipment. Operator and system should be well grounded. 117 VAC minimum 50/60 Hz @ 5 Amps is required and isolation is recommended.

The operator is required to monitor both the audio and visual displays. A fair degree of dexterity is also required to ensure proper placement of the DUT on the mounting surface. The operator's comfort should be considered when setting up the PIND station, particularly when the test is to be run on large lots or for extended periods of time.

The Sensitivity Test Unit (STU) provides adjustable output to assist in sensitivity analysis.

SPECIFICATIONS: PARTICLE IMPACT NOISE DETECTOR MODEL BW-LPD-D4000

VIBRATION:

FREQUENCY	SINE WAVE 27Hz TO 265Hz
ACCELERATION	0 TO 20G PEAK
SHAKER	50 FORCE LBS., 0.75 IN. STROKE, 75 IN. PER/SEC VELOCITY
AMPLIFIER	240 WATTS MINIMUM
D.U.T. WEIGHT	200 GRAMS PRACTICAL LIMIT @ 20G

SHOCK:

DURATION	LESS THAN 100 MICROSECONDS HALF SINE
AMPLITUDE	TYPICAL 1000 ± 200 G, ADJUSTABLE 0 ~ 2000 G
APPLICATION	AUTO OR MANUAL WITH OR WITHOUT SIMULTANEOUS VIBRATION
AXIS	SAME AS VIBRATION, DIRECTION OPPOSING GRAVITY

DETECTION:

ULTRASONIC TRANSDUCER	SENSITIVITY= -77.5 ± 3dB re 1 VOLT per mBAR @ 155 ± 5KHz
AMPLIFIER	60 ± 2dB @ 155 ± 5KHz WITH LESS THAN 10mV PEAK NOISE
THRESHOLD DETECTOR	2 PRESET LEVELS, ADJUSTABLE 0 - INFINITE

CONTROLLER:

TYPE	DIGITAL DUAL MULTIPLEXED
SHOCK SEQUENCE	PROGRAMMABLE 16 POSITION, 1 - 4 SHOCKS EACH
TEST DURATION	PROGRAMMABLE 16 POSITION
AUTO RESTART	PROGRAMMABLE 9 POSITION
SYSTEM CLOCK	ADJUSTABLE 0.25Hz TO 4Hz

OUTPUTS:

ACCELERATION	3 DIGIT LED
FREQUENCY	3 DIGIT LED
PILOT	YELLOW LED
THRESHOLD DETECTOR	RED LED "FAIL"
TEST COMPLETE	GREEN LED "TEST COMPLETE"
TEST TIME	1-1/2 DIGIT LED
SHOCK MULTIPLIER TIMES	1 DIGIT LED
AUTO RESTART DELAY	1 DIGIT LED
SHOCK LEVEL DISPLAY (OPTIONAL)	4 DIGIT LED
TRANSIENT DETECTOR (OPTIONAL	RED LED "SPIKE"
SPEAKER	60 WATTS PEAK, 8 OHMS, HI FREQUENCY RESPONSE
OSCILLOSCOPE	VERTICAL = 20mV per CM, HORIZONTAL = 200mV per G

DIMENSIONS / WEIGHT:

CONTROLLER	19"W x 5-1/2"H x 15-1/2"D, 23 LBS.
OSCILLOSCOPE	13-3/8"W x 5-1/2"H x 14-5/8"D, 20 LBS.
SHAKER	10"H x 8"DIA., 50 LBS.
AMPLIFIER	15"W x 7"H x 10"D, 24 LBS.

SYSTEM INCLUDES:

BW-4000	FULLY PROGRAMMABLE DIGITAL CONTROLLER
BW-100C	50 FORCE POUND VIBRATION SHAKER
BW-020	DEGAUSSING MAGNET
BW-PA4000	240 WATT VIBRATION POWER AMPLIFIER
BW-004	PATENTED PIND SHOCK TEST FIXTURE
BW-4015	OSCILLOSCOPE WITH 6" CRT
BW-012	SENSITIVITY TEST UNIT
BW-TD-085	ULTRASONIC TAPE DOTS
50A4084	ULTRASONIC COUPLANT

REMOTE FOOTSWITCH
ASSOCIATED CABLES
27 Hz MODIFICATION (UPON REQUEST)
OPERATION/MAINTENANCE MANUAL
CALIBRATION CERTIFICATION TO MIL-TD-45662A
8 HOURS OF PIND TRAINING

ACCESSORIES:

BW-4017	PIND STATION WITH ESD SURFACE
BW-A3A4TD	TRANSIENT DETECTOR AND SENSOR
BW-4021	SHOCK LEVEL DISPLAY AND ADJUST
BW-021	SHOCK ACCERLEROMETER/POWER SUPPLY
BW-SWG-100	CALIBRATION SINE WAVE GENERATOR
BW-004XL	PIND SHOCK TEST FIXTURE WITH 3" PLATEN
BW-004A	CLAMP FOR UNUSUAL DEVICE MOUNTING

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