



# 4000 *Optima*

**Bondtesting Optimized**

The Nordson DAGE 4000 *Optima* is optimized for fast, accurate and reliable bond testing in the volume manufacturing environment.

The combination of patented technology and superior ergonomics with intelligent and intuitive software makes the 4000 *Optima* the number one production bond tester; providing repeatable and reproducible results.

The 4000 *Optima* delivers unrivalled performance, to meet and exceed test standards, combined with ultimate speed and flexibility. Whilst heralding progression in bond testing technology, its heritage is built upon the established Nordson DAGE 4000 test platform, so you can be assured that your test data will correlate between the two systems with no compromise to data integrity.

What's more, the 4000 *Optima* is compatible with many of the 4000 and 4000*Plus* load cartridges including the unique multi-function cartridge.

**Faster Testing**

Maximize your throughput with quick load tool to bond positioning, superior ergonomics and quick test speeds. Typical test times less than 2 seconds per bond for wire pull and ball shear.

**Superior Accuracy**

Gain repeatable and reproducible test results, which are guaranteed and qualified with MSA and GR&R studies.

**Ultimate Flexibility**

Perform pull tests from 0.25 grams to 50 kilograms and shear testing from 0.25 grams right through to 200 kilograms.

# The Fastest and Most Accurate Bond Tester

**Optics optimized for small geometry**



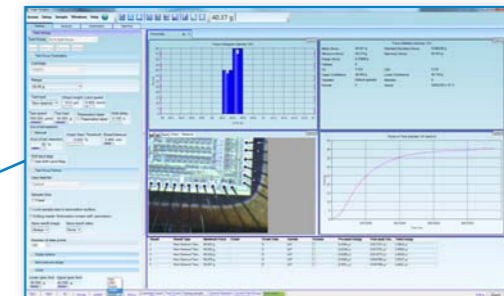
**Integrated image capture**



**Nudge control**



**Paragon™ software**



**Unique multi-function cartridges**



# Ultimate Speed and Flexibility

## Switch Applications in Just Seconds

Nordson DAGE's thorough understanding of bond testing in the volume manufacturing environment underpins the no-compromise development of industry-unique multi-function cartridges (MFC's).\*

Initially designed to be used in conjunction with automatic test routines on the 4000Plus bondtester, the uniquely designed MFC's expand the versatility of manual testing on the 4000 Optima, enabling ultra-quick application changeover.

Two multi-function cartridges are available:

**Semiconductor** 250 gram shear / 5kg shear and wire pull 100 gram

**Hybrid** 20kg shear / 1kg pull and 10kg pull



Cartridge window displays the active transducer or indicates that it is in 'Park Position'

## Unique Features of the Industry Leading Multi-Function Cartridges\*

- Guaranteed correlation with both 4000 and 4000Plus cartridges
- Operators can easily identify, which transducer is active when not in use, via the cartridge window
- 'Park Position' protects the transducers inside the cartridge rather than leaving one of them exposed and susceptible to damage
- Ergonomic and low-mass with grab handles for safe and secure removal
- Quick and easy to interchange with single load cartridges
- Frictionless pull to record true load
- Patented air bearing technology for shear testing
- Minimum off-axis tool deflection
- Sealed load cells for high reliability applications
- Compliant load cells for collision detection and controlled load application
- Automatic electromagnetic damping at low loads
- Dual application calibration jigs



\*Patent pending.

## Optimized for Speed and Efficiency

At Nordson DAGE, we understand the importance of operator comfort and its correlation to fast and efficient testing. Therefore, great attention has been given to the ergonomics and usability of the 4000 Optima bondtester.

You can test faster with the 4000 Optima's unique vector nudge controls, utilizing the newly styled key pad featuring programmable nudge buttons for precise positional alignment.



Optional quick XY stage jog speeds



Operator programmable nudge controls

To test bonds quickly and accurately, it is essential to have a stable image for load tool to bond alignment. The 4000 Optima's advanced optics combined with the microscope's dual vibration reduction mount and adjustable eye-line, provides unparalleled image stability. What's more, it is possible to include a camera through the microscope to record the test.



Unparalleled image stability

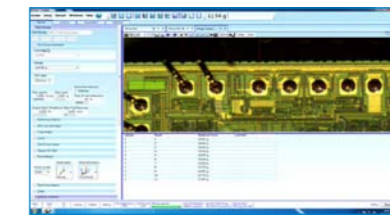
The customizable software allows specific user profiles to be set-up, making the changeover between operators quicker and easier.

The lights can be configured to dim to confirm key pad actuation; a user friendly indication providing peace of mind and increasing speed and efficiency.

At the end of the test, you can rely on Paragon™ test software for quick data acquisition and test result output.

## Fast Post Test Inspection

The unique ability to save images and videos with your test results aids failure analysis at different magnifications.

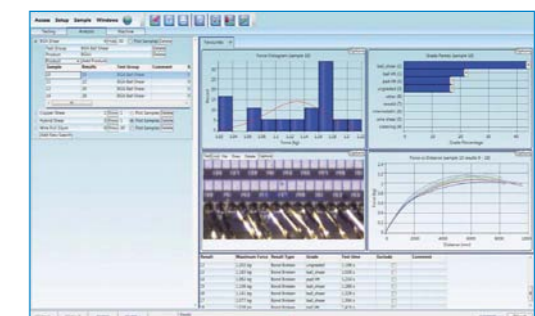


Integrated camera view within Paragon software

## Powerful Paragon™ Software with Intuitive Interface

Paragon software enables quick test set-up and provides easy access to advanced functionality, increasing efficiency and providing 100% confidence in your bond testing results.

- The fast search wizard eliminates wasted time trawling through the database
- The Paragon software database is designed around the Microsoft SQL Server to provide full network capability. The structure allows for fast saving and retrieval of test data and enables multiple machines to seamlessly use the same database
- Paragon can be configured to output results in Third Party Statistical Process Control (SPC) packages
- Data can be manipulated in a number of ways including; ODBC compatibility, RS232 including a fixed field option, CSV file, copy results to the clip board and paste directly into another package or save direct to Excel™ or Word™



Customizable views for test data analysis

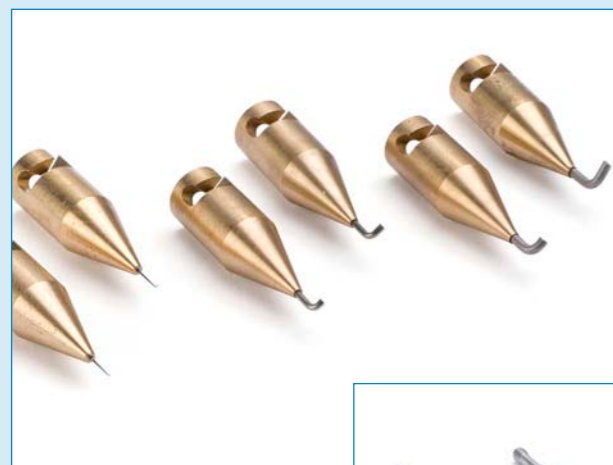
# Extensive Application Capability

## Wire and Ribbon Pull

Wire pull is a long established technique for testing the integrity of wire bond interconnects within microelectronic packages. Nordson DAGE has been at the forefront of such testing since its inception and continues to be with the 4000 *Optima*, which fully conforms to all recognized industry standards.

A wide range of wire pull cartridges span measurement loads from just a few grams up to 50kg. Controlled loading rates are ensured through our zero friction load cell design, which ensures minimal off-axis movement of the tool. All our load cells can be calibrated in situ using standard weights. Equal care is taken with regard to the signal processing path, with automatic detection of load cell failure and built-in calibration of signal gain. These features are essential for high reliability pull measurements.

Interchangeable hooks ensure that wires and ribbons can be firmly held. For wide ribbons, tweezers and special load cartridges are available.



Dedicated range of hook tools

Customizable cold bump pull jaw options



## Ball Shear

The 4000 *Optima* provides ball shear and solder ball shear testing performed in accordance with; solder ball shear - JEDEC JESD22-B117A and wire bond ball shear - JEDEC JESD22-B116 and ASTM F1269.

The ball shear test methodology involves the precision alignment of the load tool to the bond through the use of stable viewing optics and precise and responsive joystick control of the XY stage. Image capture optics provides a high magnification top view of the failure, so that a failure mode can be graded.

Shear height is absolutely critical and the 4000 *Optima* uses an optical sensor to detect the exact point at which the tool touches the surface of the sample. Exceptional control of step height is assured through our patented tool clamping technology and constant force, backlash free, drive system.



Wide range of shear tools to test up to 200kg

## Cold Bump Pull

The 4000 *Optima* supports our patented cold bump pull jaws, enabling a tensile load (up to 5kg) to be applied directly to a solder ball. The jaws contain a cavity that matches as closely as possible the diameter of the solder ball, reducing the possibility of extrusion during the test. The jaw grips the solder ball without damaging the bonding area and applies a load that is virtually symmetrical to the area of attachment. Tests are performed in accordance to JEDEC JESD22-B115A and JEITA EIAJ ET-7407.

## Ribbon Peel

The 4000 *Optima* uses active stage control to assess the adhesion of ribbons. Angle and pull speed are accurately controlled through the system's multi axis controller. The Paragon™ software, which drives the test platform, enables quick setup of test parameters and collection of force-displacement data. Peel rates from microns up to 5mm/s can be set.

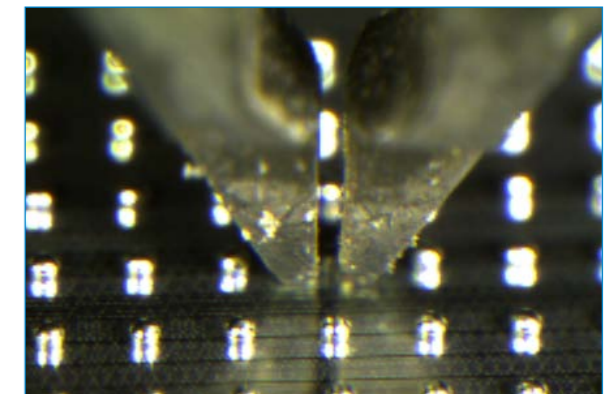
## Die and Zone Shear

The 4000 *Optima* will perform shear measurements with loads up to 200kg, enabling it to be used for both die and zone shear testing. Its +/-1 micron test height step back accuracy also proves very useful for performing aluminum wedge shear or low profile die shear.

Zone shear not only requires high forces, but shear height and speed must be maintained over long distances. Our work holders, stages and cartridges ensure these conditions are met even in the most demanding applications.

## Small Geometry Pull

The 4000 *Optima's* low force load cells and jaws enable testing of emerging interconnect technology such as copper ball bonds and stud bumps, as small as 50 microns in diameter. Stable optics and precise stage control ensure that the tool can be positioned accurately, avoiding damage to the bond area prior to testing.



80µm Copper pillars under test

## Specifications

Footprint	W= 630mm (including left and right joysticks), D=600mm, H=830mm
Weight	90kg including XY table
Power Supply	90-264VAC single phase
Pneumatic Supply	4 bar minimum, 6mm OD plastic pipe. Note some specialized applications may require increased pressure, clean dry air
Vacuum Supply	500mm Hg (67kPa) minimum, 6mm OD plastic pipe

## System Accuracy

Total system accuracy using load cartridges	+/- 0.1% full scale deflection for selected load range (see detailed load cell specifications)
Pull 50kg maximum	Please consult factory for full range of applications
Shear 200kg maximum	Please consult factory for full range of applications



## A Partner You Can Trust

Nordson DAGE is the market leading provider of award winning test and inspection systems for destructive and non-destructive mechanical testing of electronic components and are experts in small geometry testing, taking pride in delivering support to multinational organisations globally. Founded in 1961, with global headquarters in Aylesbury, UK, Nordson DAGE is part of the Nordson Corporation, which has direct operations in more than 30 countries.

With over 6,000 test systems installed globally, we use our extensive experience and application know-how to provide test systems and support that you can rely upon.

Nordson DAGE continues to invest significantly in research and development to remain at the cutting edge of test and inspection technology and is recognised as the industry standard for test and inspection technology.

For more information on the Nordson DAGE 4000 *Optima* bondtester, please contact your Nordson DAGE regional office or speak with your Nordson DAGE representative, all of which are listed on [www.nordsondage.com](http://www.nordsondage.com).

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