

Henson 9000

Perimeter



 **TOPCON** Healthcare

SEEING EYE HEALTH DIFFERENTLY

Optimized
perimetry for
practitioners
and patients



THE HENSON STORY

Over 30 years of innovation

Since 1986, the Henson brand has been driven by three clear principles,

- 1) Innovation
- 2) Improving operator efficiency
- 3) Ensuring patient comfort.

Professor David Henson invented the CFS 2000, the world's first computerized, multiple-stimulus, supra-threshold perimeter.

Revolutionizing the way in which visual field tests were performed, it produced a standard printout and allowed the electronic storage of results for future recall or transfer to other computers.

The CFS 2000 also made life easier for patients by introducing the concept of extending tests. This shortened the tests for those who were at low risk for glaucoma, thereby speeding up practice workflow.

Professor Henson was a clinical academic at Cardiff University, Manchester University and Manchester Royal Eye Hospital, and a practicing optometrist, so he has a close understanding of the practitioner's needs.

When you choose Henson you choose ground-breaking innovation that will benefit you and your patients.

Some notable firsts

In 1993, the Henson CFA 4000 became the first perimeter to allow operators to retest and/or add points during a visual field test for improved specificity.

In 2009, ZATA was the first threshold test to use prior test data for threshold tests, reducing test times and making tests more manageable for patients.

Improved sensitivity

The Smart Supra test allows the operator to include an additional 32 test locations in the central 10 degrees to improve detection of small, central often missed by 24-2 tests!."

Efficiency

The 86 point test can be completed in ~3.5 minutes.*

In addition, the Smart Supra test uses supra-threshold increments based upon probability limits, thus providing pattern and total deviation probability map outputs similar to those seen in threshold tests.



Professor David Henson, an innovator in the field of perimetry since 1986.

*Test times are approximations only and will differ according to patient response time and level of loss.



Henson 9000

Perimeter

All you would expect from your field analyzer and more

The Henson 9000 offers a lot to practitioners

- **Innovative tests for detecting and monitoring changes to visual fields**
- **Full suite of analytical tools (including progression analysis)**
- **Networking capabilities**
- **Compact, modern, low maintenance design**

Smart Supra

Smart Supra was uniquely developed in response to recent research which showed that 24-2 test patterns miss a large number of early field defects.¹

A fully extended Smart Supra test incorporates 86 test points (an additional 32 test locations in the central 10 degrees in addition to the 24-2 test locations). Its standard 30 point screening test can be completed in less than one minute.*

ZATA

Our alternative to SITA, ZATA can start a threshold test from prior patient data. It uses smart threshold-related terminating criteria to optimize test performance and includes powerful tools for analyzing progression.

Tests (24-2) can be completed in as little as three minutes per eye,** providing clear benefits to operator and patient alike.

* Test times are approximations only and will differ according to patient response time and level of loss.

** In patients with minimal or little visual field loss (MD>-5dB) the mean ZATA Standard test time is 3 minutes.

Supporting operator efficiency

Intuitive user interface with context-sensitive help supports ease-of-use for all staff and reduces training requirements. Operators also benefit from fast, easy, single-click access to the Henson Windows-based database.

Improving patient experience

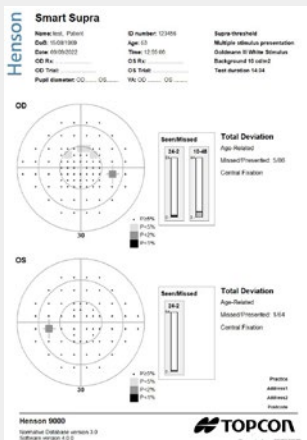
The unique facility to retest locations, add new locations or extend tests, without having to start from scratch, not only supports operator efficiency but improves specificity and reduces false positive test outcomes.

Compact design

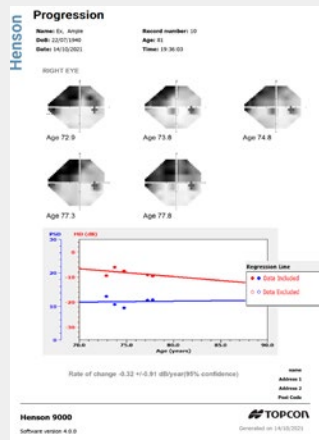
The ergonomic, relatively small size of the Henson 9000 is ideal for space-constrained environments and allows for flexible positioning in any consulting room.

More as standard

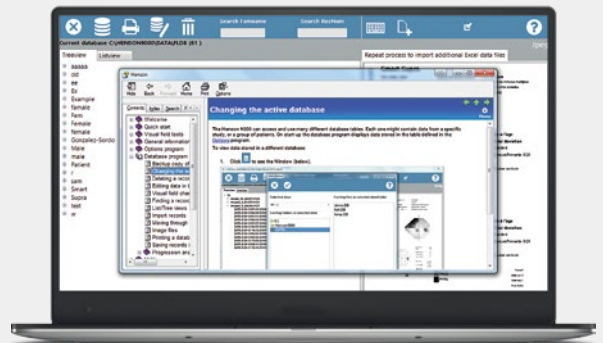
Full facilities for networking, linking to practice management systems and importing and exporting historic patient data are available as standard.



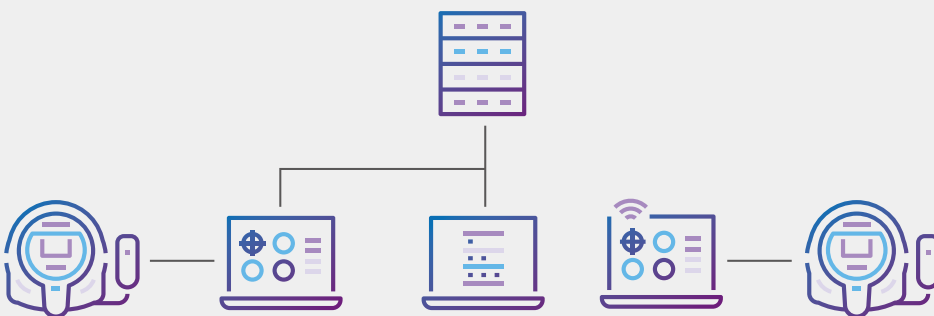
Smart Supra printout



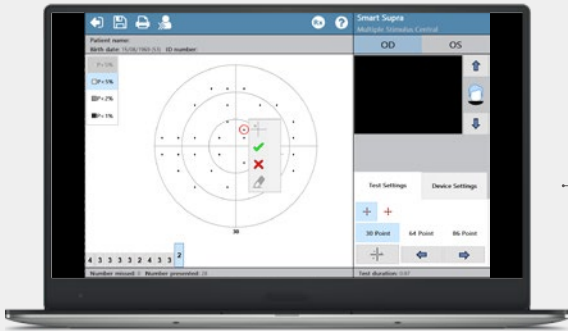
ZATA Progression printout



Context-sensitive help supports operator efficiency



Full facilities for networking available as standard

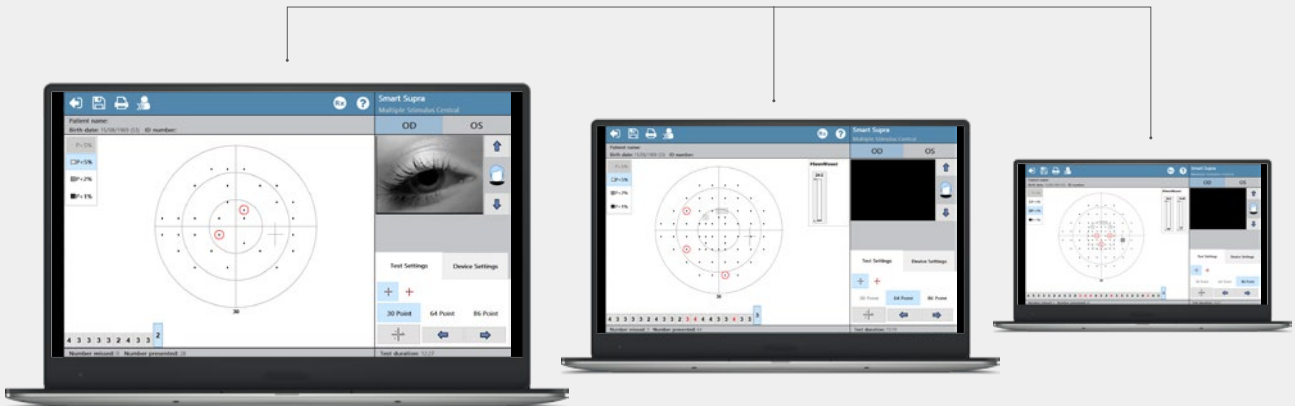


The ability to add/retest points during Smart Supra tests reduces false positives and improves spatial mapping.

Step 1

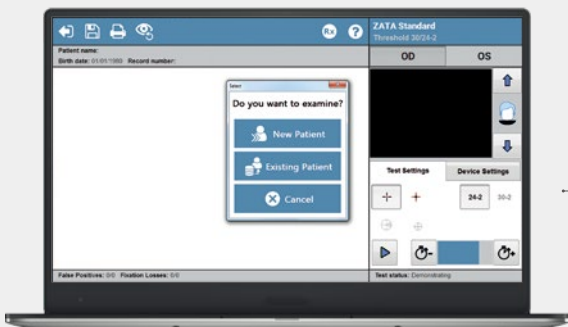
Step 2

Step 3



Henson Smart Supra can auto-extend from a 30 to a 64 point test and manually extend further to an 86 point test.

*ZATA can extend from the 24-2 to the 30-2 test pattern.



ZATA uniquely starts threshold tests for existing patients using values from the most recent test in the Henson 9000 database.

Leading the field

Innovating to improve workflow and patient experience

Drawing on the core principles of the Henson brand, our suite of visual field tests for both detecting and managing loss – use a number of unique innovations to deliver an intuitive and efficient user experience for operators, while ensuring ease-of-use for patients too.

Flexibility for operator and patient

Minimizing confusion and response errors for older patients while offering enhanced test speed for low risk ones, multiple stimulus is often a patient's preferred choice. And can be completed in under 30 seconds; single stimulus is also available for fully automated testing.

Enhanced sensitivity and specificity

A fully extended Smart Supra test incorporates 86 test points (an additional 32 test locations in the central 10 degrees) in addition to the 24-2 test locations. It also allows operators to retest or add points during any test, reducing false positives and improving spatial mapping.

Convenience of auto-extending tests

Saving valuable time for operators and patients, Smart Supra test can be set to auto-extend from 30 points (Screen) to 64 if a point is missed. A further extension from 64 to 86 points is possible.

Unique use of prior data

Operators can load prior ZATA threshold test values from existing patient records, enabling tests to start nearer threshold. This helps negate false positive (unseen) responses in the early stages of a test by patients with established loss thereby reducing anxiety, too. It can also speed up test times, benefiting patients and enhancing workflow.



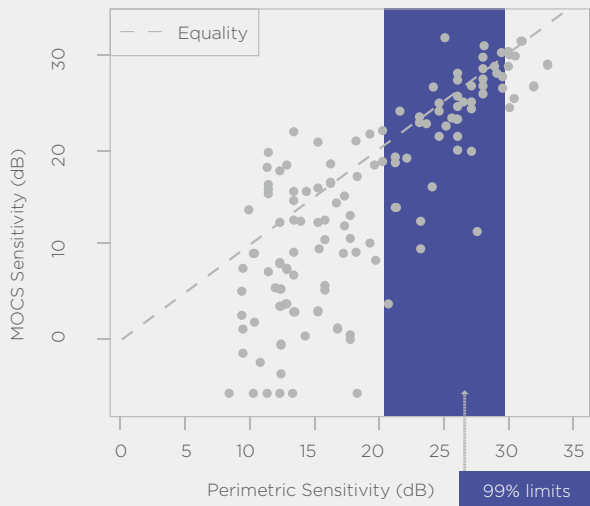
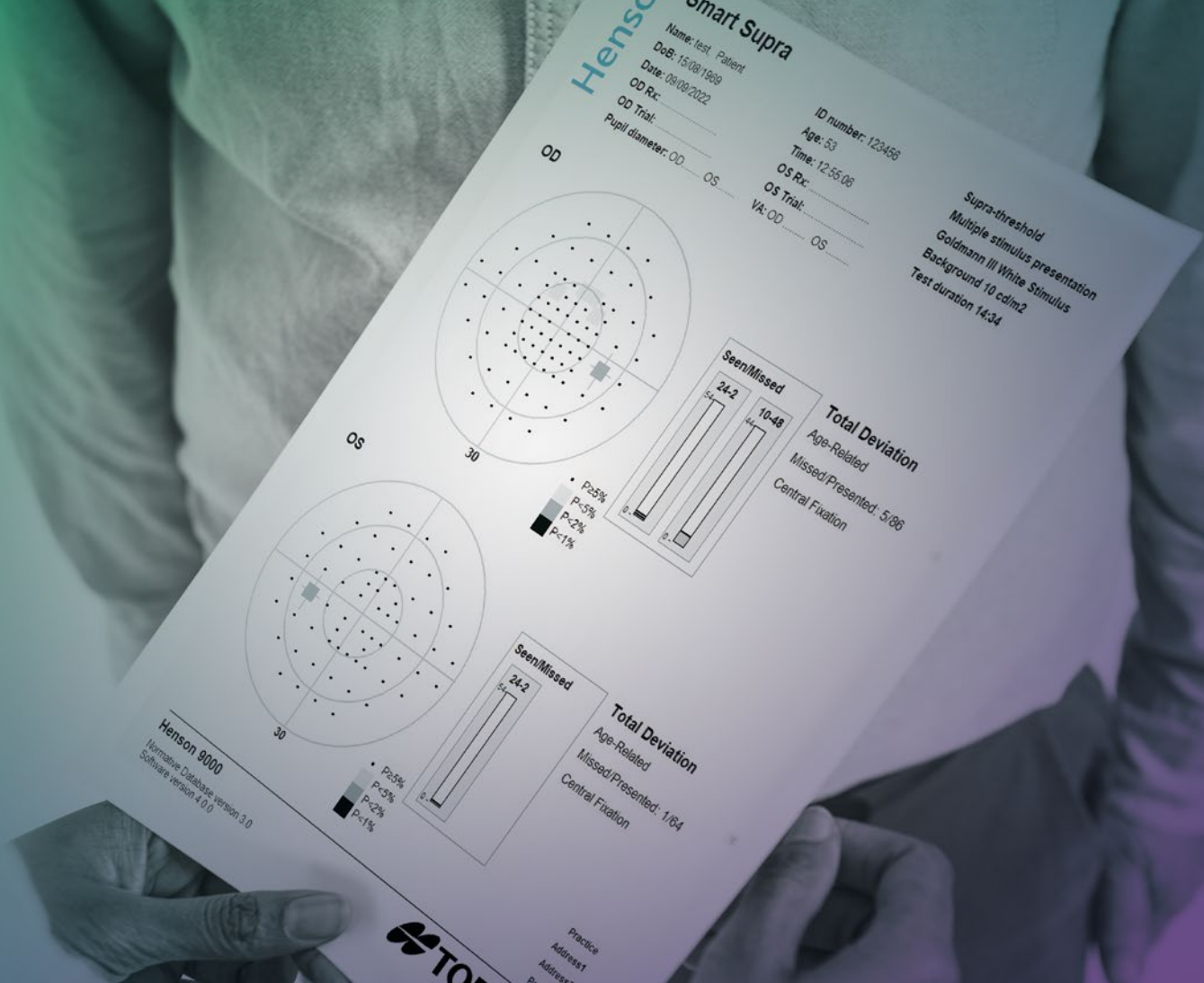


Figure 1: Test retest variability at different levels of loss, redrawn from Gardiner.³

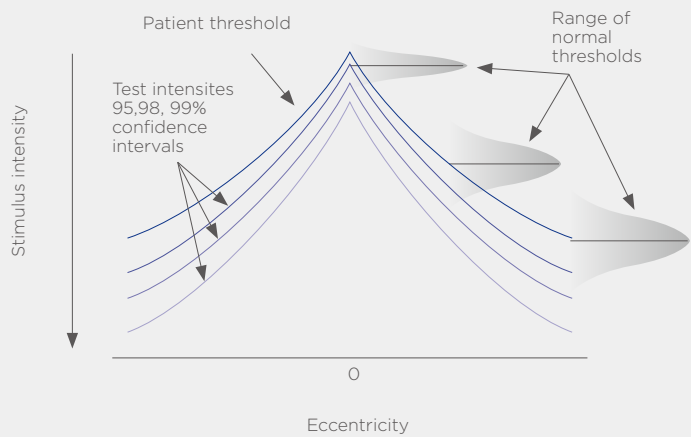


Figure 2: Test levels based on 95, 98 and 99% probability of being seen by an age-matched eye with no visual field loss*

*Use of probability-based increments means that the supra-threshold increment increases with eccentricity, accounting for the known issue of increased variability at eccentric locations.

Smart Supra: the best of supra-threshold and threshold perimetry

The Henson 9000 includes a unique supra-threshold algorithm designed to provide a solution to the three main problems affecting visual field tests today.

3 main problems

with current visual field tests

High variability at moderate to severely damaged test locations (<20 dB).^{2,3}

Poor sensitivity to small central defects when testing with the 24-2 test pattern.

Long test times only get longer with the inclusion of more test locations.

3 solutions

from Smart Supra

Smart Supra **replaces the need to test at locations below 20 dB** where variability is so high that meaningful measures of threshold are not attainable [Fig.1]. It does so by setting the threshold increment according to the normal variability found at each location** allowing it to test at levels which have a 95, 98 and 99% probability of being seen [Fig. 2].

Smart Supra includes **32 additional points in the central 10 degrees** in response to recent research showing that small central defects can be missed by 24-2 field tests.¹

Smart Supra is **fast** even with three levels of testing. Its easy, in-test extension from 30 points (sufficient to screen low-risk patients in under a minute) to 64, then 86 points (3.5 minutes) as required, allows Smart Supra to test more points in less time.

3 key benefits

of Smart Supra

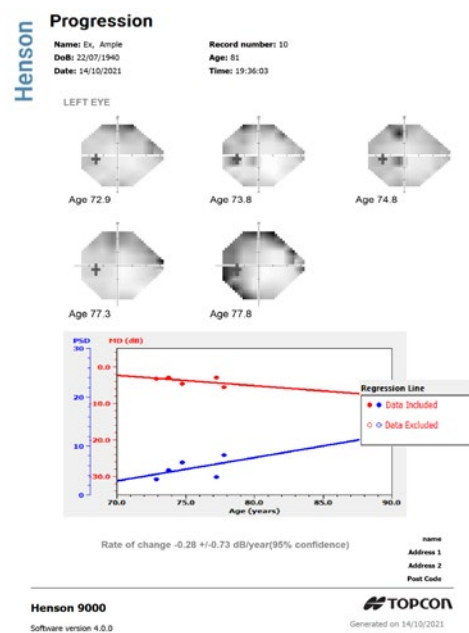
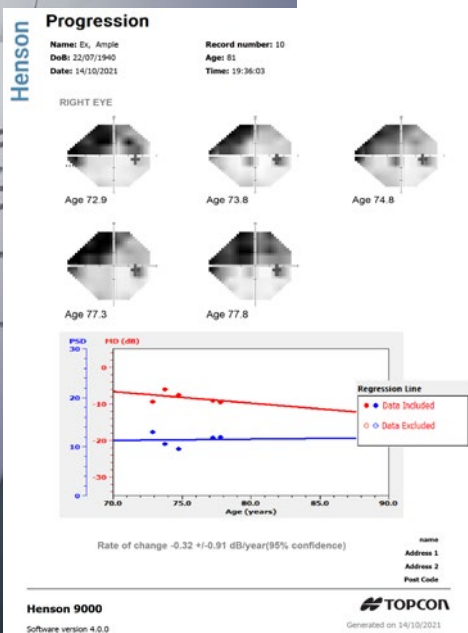
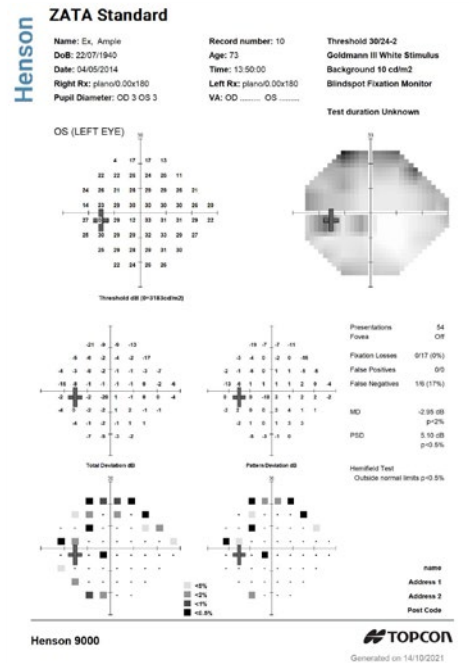
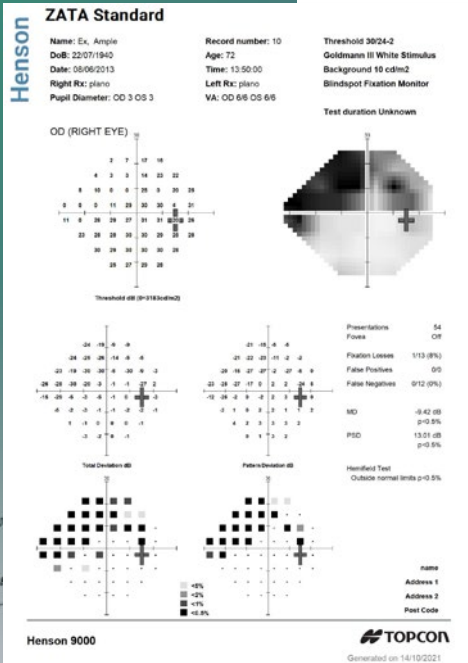
Smart Supra improves clinic workflow. Fast test times increase patient throughput enabling more efficient day-to-day practice management.

The test pattern and probability-based increments increases sensitivity in the previously under-sampled central 10 degrees.

Smart Supra generates globally accepted data. Printouts include pattern deviation and total deviation probability maps similar to those produced by threshold testing.

*Test times are approximations only and will differ according to patient response time and level of loss.

**Derived from an age-normative database within the Henson software.



Management with ZATA threshold testing

Further to the advantages of Henson Smart Supra, the Henson 9000 also offers a threshold test for the detection and monitoring of visual field loss .

The Zippy Adaptive Threshold Algorithm (ZATA) developed by Professor David Henson uses the more efficient Bayesian method to derive threshold values. Bayesian methods were first introduced into perimeters in the SITA algorithm of the Humphrey Field Analyzer. ZATA further developed this method with reference to research demonstrating enhanced variability at test locations with depressed sensitivity.^{3,4} The ZATA test can typically be completed in as little as 3 minutes per eye.*

5 reasons to choose ZATA

Speeds up threshold testing through better use of prior test data

In instances where patients have been tested previously, ZATA will build on this prior data for subsequent tests, rather than starting a new test from age normative data as is common in other perimeters. This helps negate false positive responses early in a test by patients with established loss and serves to reduce patient anxiety, too, by reducing the number of unseen presentations. It can also speed up test times – benefiting patients and enhancing practice workflow.

Does not just use single terminating criteria

ZATA varies the terminating criteria to give more accurate thresholds at damaged and neighboring locations. This reduces test times, both for patients with advanced visual field loss and for those with no loss at all.

Uses looser terminating criteria in severely damaged locations (<10 dB)

ZATA does not attempt an accurate measurement of thresholds below 10 dB where variability is high and attempts at accurate measures do not yield any useful additional data.

Allows both 24-2 and 30-2 stimulus patterns in a single test

Via a simple 'extend' facility operators can extend the 24-2 test pattern to a 30-2 test pattern during or at the end of each test so avoiding the need to retest the 24-2 locations if later opting for a 30-2 test.

Uses standard printout for universal compatibility

The standard print format is used to aid interpretation and comparison with data from other perimeters. The Henson 9000 software also allows users to switch between multiple views – threshold, grayscale, or defect values – on screen at the end of each test.

*Test times are approximations only and will differ according to patient response time and level of loss.

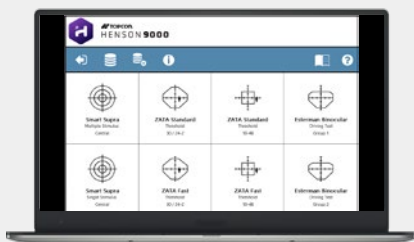
Putting it into practice

We understand that our equipment must fit seamlessly into your practice and processes. The Henson 9000 is a low maintenance, compact perimeter for flexible positioning with networking facilities available as standard. Its suite of tests and associated analytical techniques give you all the information you need to support the best patient outcomes.

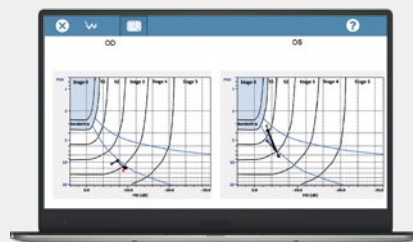
Small footprint allows for flexibility of positioning. The Henson 9000 has a compact footprint and sits easily on a standard instrument stand. The software runs on a separate device (touch screen, desktop or laptop), giving you more placement flexibility than is available from perimeters with fixed operator display screens.

Full networking support. The Henson 9000 application can make full use of the networking facilities within Windows® as standard. There is no need to purchase additional software to enable this. The Henson software can utilize the network for printing or to allow storage of the database, backup or output files on a network drive, enabling the sharing of test data between units. Networking also allows remote practice management systems to pass patient details to the Henson tests. The results of the tests can be stored in multiple locations as JPEG, PDF or DICOM images.

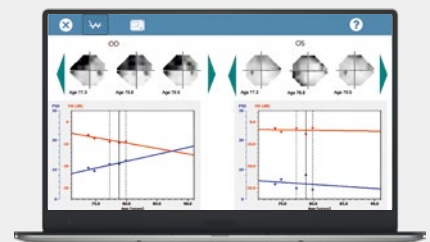
Fast, intuitive, multi-lingual software means minimal training time. Our software has been designed to be fast and easy to use. There are no extended start-up times with single touch operations for most actions. We also offer context-sensitive help.



Henson 9000 home screen



Progression GSS2 user interface



ZATA Progression line plot user interface

All the visual field tests and analytical tools you need

You have all the tools you need to detect and monitor functional loss with our range of supra-threshold and threshold tests, as well as monitoring the whole visual field with the Esterman binocular driving tests (Groups 1 & 2).

Smart Supra results are designed to be compatible with threshold results, while our ZATA results include recognized global indices (mean deviation, pattern standard deviation and hemifield) plus threshold and grayscale, total deviation and pattern deviation values.

Progression analysis tools display global indices (mean deviation and pattern standard deviation) against the age of the patient and the mean deviation rate of change displayed with confidence levels. Progression data can also be presented on Glaucoma Staging System II (GSS2). Using both the mean deviation and pattern standard deviation is better than using either index in isolation.

ZATA threshold test includes a foveal threshold measurement facility as standard.

Benefit from **low maintenance costs** – robust, solid-state electronics with degradation free light sources ensure the maintenance costs for your Henson 9000 are minimal year-on-year.



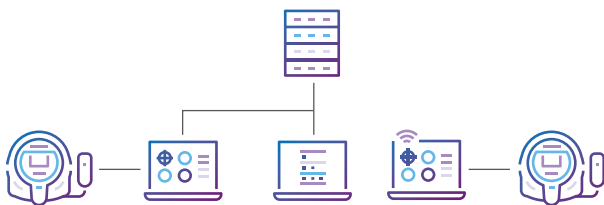
With the flexibility of using either a touch screen, laptop or desktop computer the Henson 9000 is convenient and easy to use.



Single touch operation for most actions along with context-sensitive help make the Henson 9000 easy to use for operators.



The Henson 9000 software supports multiple languages.



The Henson 9000 application can make full use of the networking facilities within Windows® as standard with no need for additional software.





References

1. De Moraes CG, Hood DC, Thenappan A, Girkin CA, Medeiros FA, Weinreb RN, Zangwill LM, Liebmann JM. 24-2 Visual Fields Miss Central Defects Shown on 10-2 Tests in Glaucoma Suspects, Ocular Hypertensives, and Early Glaucoma. *Ophthalmology*. 2017 Oct;124(10):1449-1456. PMID: 28551166
2. Henson DB, Chaudry S, Artes PH, Faragher EB, Ansons A. Response variability in the visual field: comparison of optic neuritis, glaucoma, ocular hypertension, and normal eyes. *Invest Ophthalmol Vis Sci*. 2000 Feb;41(2):417-21. PMID: 10670471
3. Gardiner SK, Swanson WH, Goren D, Mansberger SL, Demirel S. Assessment of the reliability of standard automated perimetry in regions of glaucomatous damage. *Ophthalmology*. 2014 Jul;121(7):1359-69. PMID: 24629617
4. Gardiner SK, Mansberger SL. Effect of Restricting Perimetry Testing Algorithms to Reliable Sensitivities on Test-Retest Variability. *Invest Ophthalmol Vis Sci*. 2016 Oct 1;57(13):5631-5636. PMID: 27784065



Henson 9000 Perimeter: Technical specifications

Test specifications

Visual field test range	60° (monocular) / 160° (binocular)
Visual field testing distance	25 cm
Stimulus intensity (maximum)	10,000 asb
Background illumination	31.4 asb
Stimulus duration	200 ms
Stimulus size	Goldmann III
Stimulus colour	White
Test method	Standard Automated Perimetry (SAP)

Screening tests/patterns

Smart Supra - single stimulus	30, 64 and 86 point tests
Smart Supra - multiple stimulus	30, 64 and 86 point tests
Esterman (Driving)	Groups 1 (120 point) and 2 (124 point) (EU standard)
Customised tests	Test locations can be manually added to all Smart Supra screening tests

Threshold tests/patterns

ZATA Standard - threshold central	10-48**; 24/30-2 (extendable in-test)
ZATA Fast - threshold central	10-48; 24/30-2 (extendable in-test)

Average test times*

Smart Supra - single stimulus	-1 min (30 points); -3.5 minutes for fully extended 86 point test
Smart Supra - multiple stimulus	Under 30 seconds (26 points)
ZATA (24-2)	- 3 minutes per eye
ZATA Fast (24-2)	- 2.5 minutes per eye

Fixation control

Fixation target	Single or 4-point LED diamond pattern
Heijl-Krakau	Yes (ZATA)
Video eye monitor	Yes

Software features

Patient management database	MS Windows* compatible; networkable
Practice management integration	EMR compatibility (parameter passing and text file)
Hemifield analysis	Yes
Progression analysis	Yes
HFA data import	Yes

Connectivity

DICOM	Yes (images)
Ethernet	Yes, via connected computer
Database backup	Removable, network or cloud storage

Dimensions

Weight	13.5 kg
Size, W x D x H	440 x 400 x 452 (mm)

Classification

Medical device	Class I
Applied part	Type B
Control device	External PC / laptop / tablet running MS Windows* Professional, v.8, and above
Patient unit inputs/outputs	C13 mains input; Patient Response Button; 2 x USB Type B connector
Electrical requirements	85 - 263 V AC, 50/60 Hz, 60 VA
Optional printer	Any compatible with controlling computer

* Test times are approximations only and will differ according to patient response time and level of loss.

**The 10-48 pattern presents 48 stimuli on a 3 degree square matrix, displaced 3 degrees from the horizontal and vertical mid-lines, within the central 10 degrees.

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