ADAPTICA

VISIONFIT

Wearable Adaptive Refractor

Innovative, Electronic, Mobile
and Wearable System of Adaptive Lenses.

ADAPTICA

Adaptica was founded in 2009 as a spin-off of the University of Padova, Italy specialising in adaptive optics and optoelectronics applied to Industry and astronomical research.

Adaptica leverages on its technological know-how and competences in astronomy to move from a better vision of the universe and its galaxies towards exploring vision and the human eye.

Adaptica soon expanded into health-care, with a particular focus on vision and eye-care. It develops and manufactures smart, mobile, easy to use diagnostic pieces of equipment that are currently distributed in over 40 countries worldwide.

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Technology Evolution in Subjective Refraction

Subjective Refraction began a long time ago using trial frames with trial lenses. Manual and automated phoropters were then developed to speed up the process at the cost of less freedom for the patient and other disadvantages. VisionFit brings subjective refraction back to the trial frames modality and well combines the advantages of both methodologies (speed of operation and maximum freedom for the patient).

Revolutionizing the Measurement of Subjective Refraction

VisionFit™ is an innovative electronic, tunable, all-in one, solid state, mobile and wearable system of lenses. It performs a subjective sight examination and it effectively replaces both the trial glasses and the manual/electronic phoropter functionality.

By using the VisionFit in combination with Adaptica's 2WIN binocular handheld refractometer and vision analyzer, the operator performs an objective and subjective refraction exam in a few minutes only, with maximum mobility and flexibility.

The system provides final guidance for the production of standard and customized prescription lenses and also allows subjective refraction to be performed in association with other biomedical devices (e.g. stabilometric platform) and with other devices used by the patient.

The Objective and Subjective Refraction Exam

VisionFit™ Benefits

VisionFit effectively combines all the features and advantages of both the trial frame and the manual/automated phoropters.

1. Wearable and mobile - it fits just like a trial frame.
2. Enables examining in free posture.
3. Small footprint and reduced exam time.
4. Increases peripheral vision.
5. Doesn't require control of the patient's position.
6. Ideal with non-cooperative patients.
7. Connectivity, broad recording and printing capabilities.
8. Adjustable step resolution for spherical lens down to 0.05 D.
9. Same standards of speed, fluidity and symmetry of digital phoropters.
10. Subjective refraction can be performed with the patient in his/her usual working environment and posture.
11. The aberration lens extends the accuracy of the correction thanks to a high order aberration system.
12. Does not require any infrastructure nor any special installation procedure.
13. Subjective refraction can be performed in association with other biomedical devices (e.g., stabilometric platform).
14. Subjective refraction can be performed in association with other devices in use by the patient (e.g., bite, planters).

VisionFit™ in Detail

VisionFit includes a computer integrated control unit featuring a display screen, keyboard controller, commands and connectivity capabilities. The wearable electronic trial frame features two tunable lens sets each composed of three adaptive lenses (spherical, cylindrical and aberration) with add-on lens support.

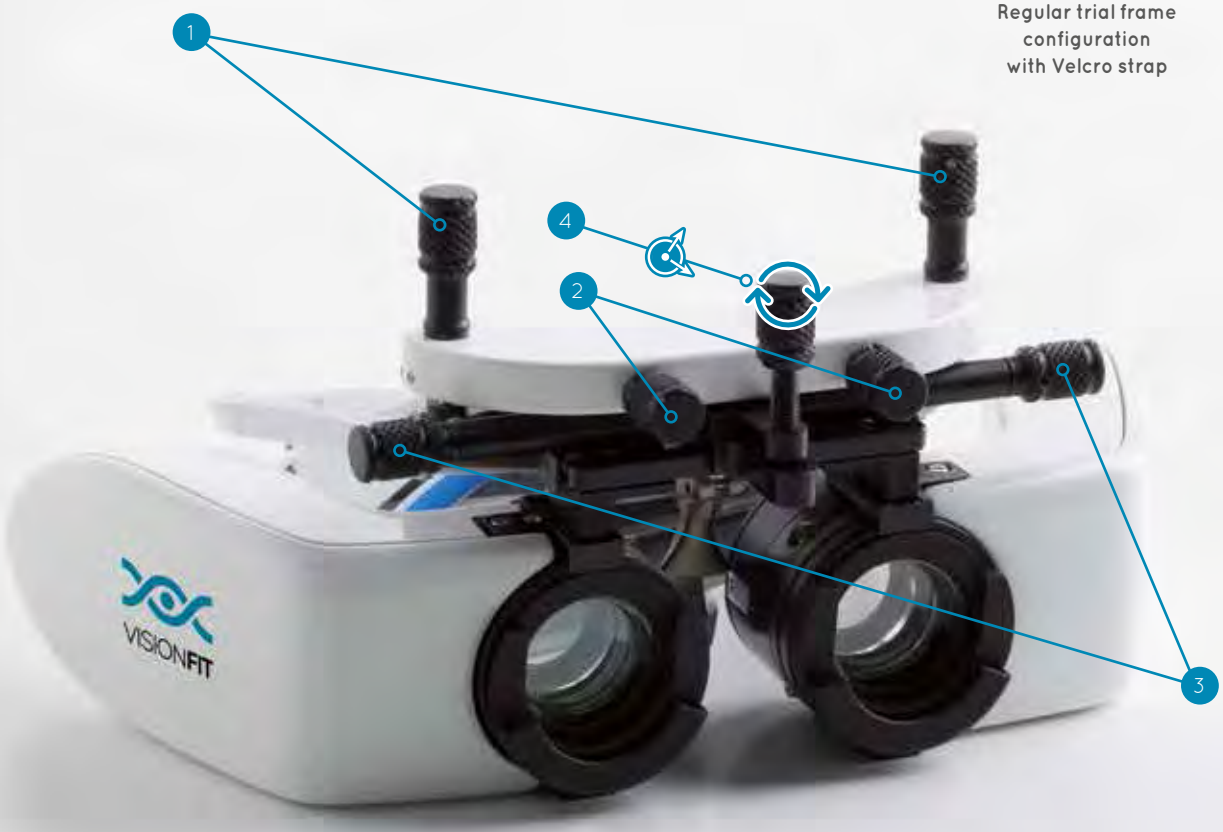
The Electronic Trial Frame

1. Bridge height adjustment
2. Vertex distance adjustment
3. Pupil distance adjustment
4. Pantoscopic tilt

The Electronic Trial Frame Comes in Two Options

Adjustable Helmet

Regular trial frame configuration with Velcro strap



The Electronic Trial Frame

Wearing the VisionFit electronic trial frame as a traditional trial frame, the subject looks at the eye chart or any other near or far target in any environment, either sitting or standing, thus allowing subjective refraction to be performed with the subject in his/her usual working environment and posture. Thanks to VisionFit lens technology, the subject can also move around with no operator intervention.

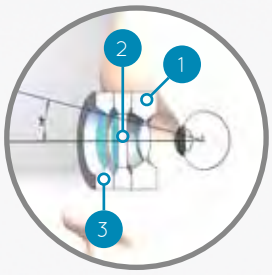
The wearable trial frame; each tunable lens set includes a stack of 4 elements:

- Adaptive Spherical Lens
- Adaptive Cylindrical Lens
- Adaptive Aberration Lens
- Additional Lens Support

The adaptive lenses of the stack are electronically tuned by the Control Unit without any other operator action.

The Adaptive Lenses Stack

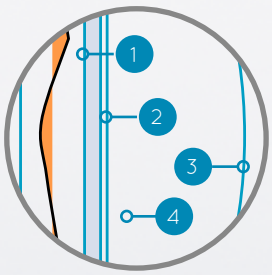
1. Adaptive Spherical Lens
2. Adaptive Cylindrical Lens
3. Adaptive Aberration Lens



VisionFit Aberration Lens

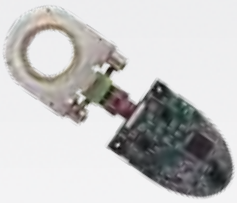
Aberration lens technology: liquid lens with 32 transparent actuators on a glass surface; this improves the performance of the optical system to correct aberrations.

1. Glass (electrostatic effect)
2. Transparent actuators layer
3. Membrane
4. Liquid lens, flow pressure



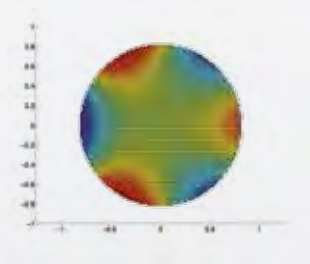
VisionFit Adaptive Technologies

Adaptive spherical lens technology: Membrane deformation, liquid within 2 surfaces and electronic control.



Adaptive cylindrical lens technology: Rotating cylinders, continuous power, position adjustments, and electronic control.

Adaptive Aberration lens.

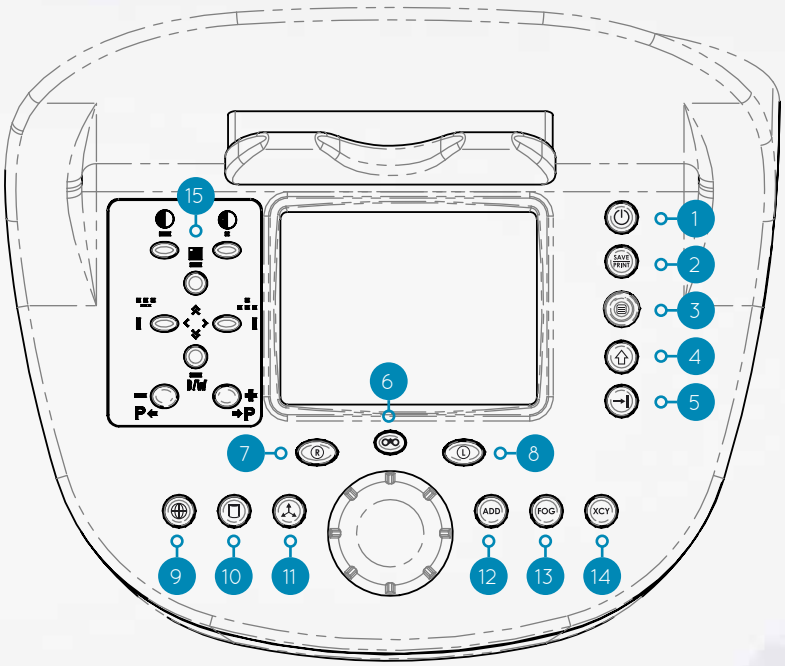


An example of a trifoil wave-front correction by VisionFit.

VISIONFIT

The Control Unit and How to Read the Display

The Control Unit is a tabletop driver featuring a computer-integrated unit, a display, keyboard controller commands and connectivity capabilities.



1. On-off / Clear
2. Save / Print
3. Menu
4. Shift
5. Tab
6. Both Eyes
7. Right Eye
8. Left Eye
9. Sphere
10. Cylinder
11. Axis
12. Addition
13. Fog / Retinoscopy Function
14. Cross Cylinder Function
15. External Chart Buttons

Self-calibration

VisionFit features a self-calibration procedure to ensure accuracy and reliability.

- Physical Adjustment
- Refraction Data Window
- Values from 2WIN - Autoref
- Status Bar
- Cross Cylinder and Axis Orientation

1. Values from 2WIN - Autoref
2. Right Eye Indicator
3. Left Eye Indicator
4. Pupillary Distance
5. Vertex Distance
6. Sphere
7. Cylinder
8. Axis
9. Addition
10. Visual Acuity
11. Fogging
12. Axis / Cross Cylinder Fields
13. WiFi activity flag
14. Adaptive lenses status flag

VisionFit™ - the unique wearable adaptive refractor for the most advanced subjective sight examination.

VisionFit is a true technology revolution, a step forward that completely changes the paradigms of subjective refraction measurement.

VisionFit combines the advantages of the classical trial frames examination (eg. ability to perform subjective refraction in free positions of the patient and of the instrument) with the benefits of the examination conducted by manual or automatic phoropters (eg. exam speed and continuity/fluidity in changing the lenses power).

The exam is performed directly in the subject's environment and allows to analyze the effects of different prescriptions on the postural behavior.

VisionFit performs a subjective sight examination by electronic and software control and in natural conditions, in a non-invasive way that is not bound by the size and postural difficulties inherent to the use of traditional instruments.

The ergonomics of VisionFit allows a great versatility of use and transportability in wide range of environments and diagnostic contexts, with no need of dedicated infrastructures and complicated installations.

VisionFit represents a turning point in the optimized assessment of refractive defects, as it takes into account and corrects high-order aberrations such as spherical, coma and trefoil, thus determining the optimal value of sphere, cylinder and axis.

Moreover, thanks to the "High Order Aberration Setup" (a special software application under development) the versatile VisionFit optical system enables the operator to preset and/or compensate high order aberrations in order to make the best possible viewing experience possible.

Operating VisionFit™

VisionFit™ features a self-calibration procedure to ensure accuracy and reliability. It does not require any special installation procedure.

1

The patient wears the VisionFit lens frame like a regular trial frame and looks through it at an eye chart – or any other near or far target.

2

The patient can be sitting, standing or in any other desired position and/or environment.

3

The eye chart and/or target can be placed at different distances, depending on the type of exam.

4

The operator adjusts the device in order to change the position and configuration of the optics, asking the patient for a subjective feedback.

5

The operator selects the output values for both glasses and contact lenses prescriptions.

6

VisionFit provides versatile prescription printing options.

All-in-one objective and subjective refraction. The 2WIN measures binocular refraction and data is transferred to VisionFit via WiFi.

Once set-up, VisionFit operates just like an automated phoropter with the same or improved standard of speed and fluidity, while offering numerous benefits in terms of patient freedom and operator interaction.

VisionFit performs all the regular steps of subjective refraction, such as variable distances retinoscopy, presbyopia and cross cylinder exam. It is also compatible with the standard add-on lenses, occluders or filters.

VisionFit offers a broad range of optical evaluation with different static and dynamic visuo-postural conditions to achieve the best dioptric correction.

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Technical Specifications

Spherical correction range	-10/+10 D and -20/+20 D with the use of an additional lens with prescription steps of 0.125 D and variable fluidity steps (adjustable from 0.05 to 0.25 D) with the use of the basic spherical lens.
Cylindrical correction range	0 to 10 D by steps of 0.25 D
Axis adjustment range	1-180° by steps of 1°
Additional prismatic lenses range (optional)	0 to 10 Δ, steps 1 Δ (add on – no automatic)
Tolerances range of lenses	according to ISO 10341, §4.3
Corneal vertex distance range	10-18 mm
Manual pupil distance adjustment range	50-80 mm, separated right and left
Device free aperture	30 degrees
Display	color LCD, 3.5 inches
WiFi Module	Radicom, model: WiFiHU-a
Bluetooth Module	IDATA, USB 2.0 Bluetooth Mini Class 2+EDR
Power requirement	Voltage: 100-240 VAC, 50-60 Hz - Power consumption: 60 VA

Additional Features

Add-Ons

A set of add-on lenses is included in the VisionFit basic package to perform all the tests of refraction procedure.

Storage

VisionFit features data storage capability (micro SD card).

Wireless

VisionFit easily connects to a local Wireless network to communicate with the 2WIN refractometer and/or other WiFi devices.

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VisionFit™ - the unique
wearable adaptive refractor
for the most advanced
subjective sight examination.

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