



 made  
in  
Germany



ACCURATE



COMPATIBLE



AWARD-WINNING



RELIABLE



# ACCURATE

## PEER-REVIEWED AND VALIDATED TECHNOLOGY

Numerous peer-reviewed clinical studies validate that Plusoptix devices consistently deliver highly accurate, reliable refractive readings. Please refer to our homepage for an up-to-date reference list of peer-reviewed studies. Once a measurement result is delivered by the device, it does not need to be repeated.

## STATE-OF-THE-ART PHOTOREFRACTION

Photorefraction is a measurement technology that is known since the 60s. But it took until the end of the 90s to develop the first automated prototypes. Founded in 2001, Plusoptix is a pioneer in developing and manufacturing a variety of measurement instruments based on photorefraction technology. They include vision screening devices for primary health care providers, autorefractors for eye care professionals, and accommodation meters for scientists.

In photorefraction, measurement results are derived from brightness patterns in the pupil in a similar manner as in retinoscopy. Therefore three components are keys to a precise measurement:

- ✕ the light to illuminate the eye,
- ✕ the camera taking a photo, and
- ✕ the algorithm providing measurement results.

Precise measurement results can only be obtained if brightness patterns in the eyes are clearly visible on the photo in the first place. Therefore, illumination is the basis for all subsequent steps that lead to a precise measurement result, finally.

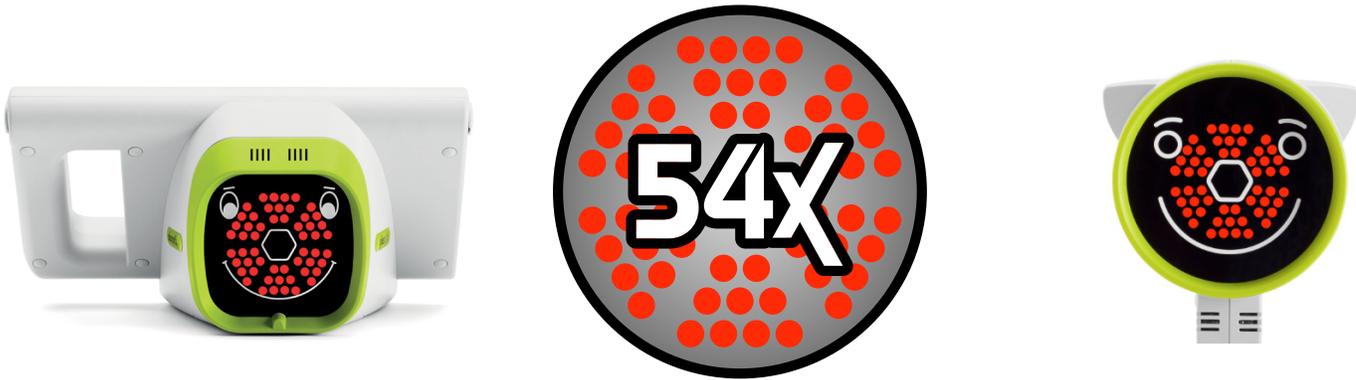


Illustration of 54 hidden LEDs

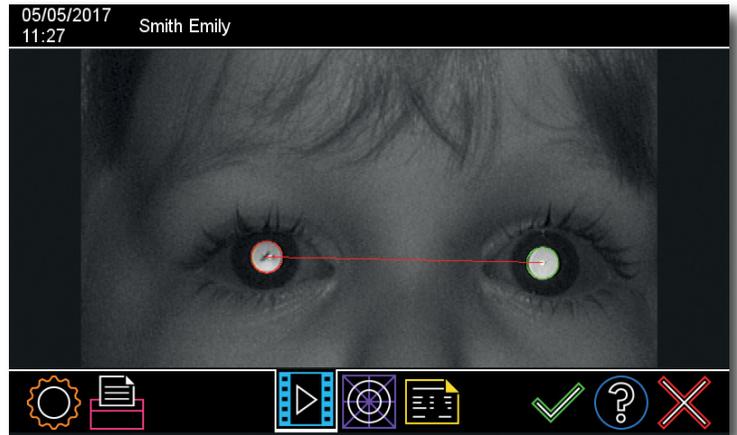
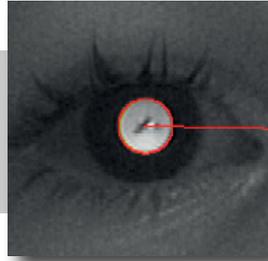
All Plusoptix instruments are using an unique 54 LED strong flashlight in order to optimize the representation of brightness patterns on the photos taken. These 54 LEDs are grouped in 6 segments at 9 LEDs each. This way a homogeneous illumination and thus refined representation of the brightness patterns in the eye is assured.

If brightness patterns are masked by media opacities (e.g. cataracts), these opacities can be identified on the high quality photo taken by the Plusoptix camera.

### CAMERA IMAGE WITH PERFECTLY ILLUMINATED PUPILS

Always reviewing the last camera image helps you identifying the reason for an inconclusive measurement.

A red circle highlights unusual brightness pattern, here: cataract



Actual screenshot plusoptix A16

The measurement results are broken down and displayed in three consecutive results pages. To navigate from one page to the next just use the buttons in the navigation bar, located at the bottom central area of the screen.

### INSTANT AND ACCURATE READINGS

- 1 OD gaze map
- 2 OS gaze map
- 3 Measurement result
- 4 Sphere (SPH)  
in diopters
- 5 Cylinder (CYL)  
in diopters
- 6 Axis (A)  
in degrees
- 7 Pupil diameter (Ø)  
in millimeters
- 8 Asymmetry (ASY)  
of the line of vision in degrees



Actual screenshot plusoptix A16

-1.75	4	SPH [dpt]	-1.75
0.00		CYL [dpt]	5
41	6	A [°]	104
6.6		Ø [mm]	7
48	8	PD [mm]	ASY [°]
			9
			2.4



# COMPATIBLE

Plusoptix strives to provide the perfect individual solution for every customer requirement. All three device models share the very same measurement technology and algorithm, and therefore accuracy of measurements is identical for all available device models. The differences are in mobility and documentation options, ranging from printing self-adhesive labels for paper record to full integration with your Electronic Medical Records (EMR) via LAN or WLAN connection (please see device comparison on page 9). Beyond that, an A4 or letter-sized measurement report can be generated as a handout for parents.

## PATIENT DATA AND DOCUMENTATION OPTIONS

Specific to the plusoptiX A16 and A12C models, every successful measurement is automatically documented in the internal database in chronological order. This internal database saves up to 100,000 entries to be used as needed for follow-up management, studies and label printing at a later point in time.

- 1 **New measurement**
- 2 **Show previous measurement**
- 3 **Previously saved measurements**
- 4 **Documenting the measurement results**
- 5 **Patient data**
- 6 **Delete this patient**
- 7 **Preview of label**
- 8 **Delete this measurement**

Actual screenshot plusoptiX A16

Available measurement reports can be printed on any printer. Printing on any network printer can be automated by using the free software plusoptiXconnect.

Emily Smith		*06/24/2014
OD	Sphere	OS
-2,00 dpt	-0,50 dpt	+0,50 dpt
176°	Cylinder	-0,75 dpt
4,1 mm	Axis	13°
Pupil distance	Pupil Ø	4,0 mm
Gaze asymmetry		56 mm
		0,7°
Ver. 7.0.0.0		11/12/2016
www.plusoptix.com		

Self-adhesive label for paper file  
(2,9 x 2,2 in)

Measurement report for parents  
(A4 or letter sized)

Space for your logo  
and...

Measurement results

Name: Emily Smith  
 Patient ID:  
 Date of birth: 06/24/2014  
 Contact information:  
 Measurement date and location: 11/12/2016

OD		OS
 Refraction [dpt] -2.00 -0.50 179°	 Refraction [dpt] +0.50 -0.75 13°	
Gaze asymmetry [°] 0,7		
Pupil diameter [mm] 4,1		
Pupil distance [mm] 56		

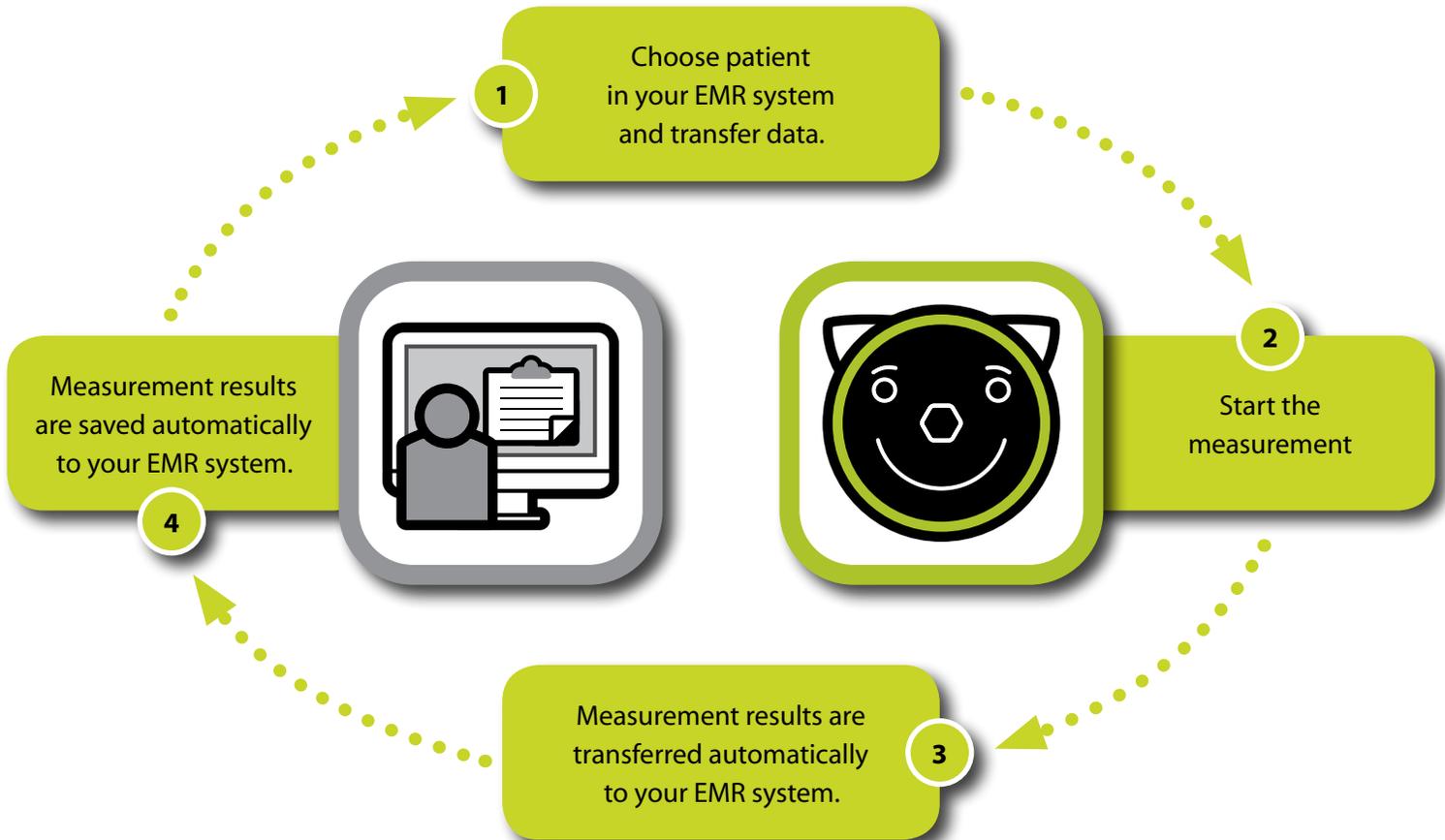
Ver. 7.0.0.0 www.plusoptix.com

... your contact details

The devices are equipped with several interfaces to enable the user to perfectly integrate them into his individual workflow. Choose your favorite way to print labels and measurement reports or just connect the device to your Electronic Medical Record (EMR) via LAN / WLAN connection.



**CONNECTION TO YOUR ELECTRONIC MEDICAL RECORD (EMR) VIA LAN / WLAN FOR CSV DATA EXCHANGE**



**HAVE A LOOK AT OUR VARIOUS PRINTING OPTIONS:**



Measurement report printing via your workplace computer after insertion of USB stick / SD card



Measurement report printing via your workplace computer after access via LAN / WLAN



Automatic measurement report printing with the freeware "plusoptiXconnect"



Self-adhesive label printing with the optional wireless label printer "plusoptiX P12"



## AWARD-WINNING

Plusoptix devices have been awarded for their child-friendly product design. They feature an excellent concept of operations and ergonomics, complimented by steady operation through rechargeable standard AA batteries. The unique Plusoptix smiley face and the attention-grabbing warble sound, attract the child's attention and lessen fears about the measurement.



reddot award 2014  
winner

*"The friendly appearance of this auto refractometer instills trust and encourages children to get involved in the examination in a playful way."*

*(RedDot Award Jury)*



GERMAN  
DESIGN  
AWARD  
WINNER  
2017

*"A lovely tool that takes focus not only on technology and ergonomics in its design, but also the needs of the child being treated."*

*(GermanDesignAward Jury)*



# RELIABLE

Plusoptix was founded in Nuremberg, Germany, in 2001. From the start, the company focused on developing and manufacturing state-of-the-art handheld autorefractors. All product development (hardware and software) as well as manufacturing are performed in-house in Nuremberg. Today, Plusoptix devices are already in their 5th product generation and more than 10.000 devices have been installed. Because of its extensive specialized experience, excellence in engineering and manufacturing combined with outstanding service and hassle-free warranty, Plusoptix is by design your reliable partner in the field of handheld autorefractors.



Our warranty is a "Hassle-free warranty", because it even covers all damages that result from accidental damage (e.g. device dropped). This hassle-free warranty is valid for the US, Canada and EU.

*"This warranty is really quite unique and it's one of the reasons we have stayed exclusively with Plusoptix for our vision screeners."  
(Bryson McCool, Secretary/Treasurer of New Mexico Lions Operation KidSight)*

**PLUSOPTIX IS LOCATED IN ALREADY 5 SERVICE CENTER AND REPRESENTED BY OVER 60 SALES REPRESENTATIVES THROUGHOUT THE WORLD. SO NO MATTER WHERE YOU LIVE, WE ARE JUST AROUND THE CORNER.**



# APPLICATION

Plusoptix is the world leader in Pediatric Autorefractor solutions. Used in un-dilated pupils, Plusoptix devices provide eye care professionals with a reliable baseline refraction in the context of an initial exam, to identify false-positive referrals.

If a cycloplegic retinoscopy is required, the baseline refraction provides a valuable starting point for myopia, astigmatism and axis measurements. Performing a cycloplegic retinoscopy with these measurements at hand is quick and easy, thus saving precious chair time.

## INSTANT READINGS

- ✗ Binocular readings with simultaneous measurement of both eyes
- ✗ Monocular readings (e.g. in strabismic or aphacic patients)
- ✗ Children can be measured starting at 6 months of age

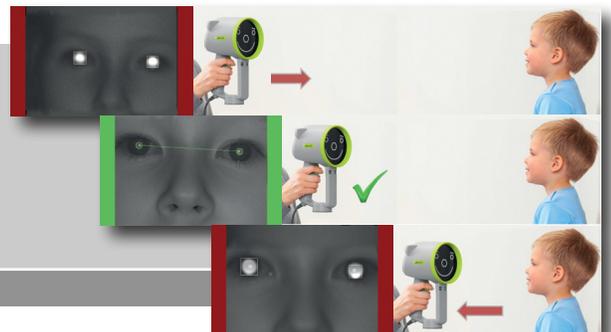


## FAST AND RELIABLE MEASUREMENT

- ✗ In less than one second
- ✗ Measurement from 1m (3.3 ft.) distance to the child
- ✗ Ability to measure through glasses and contact lenses

## FULLY AUTOMATED WORKFLOW

- ✗ Measurement can easily be performed by an ophthalmic technician
- ✗ Graphical support for eye alignment
- ✗ Automated data exchange via LAN / WLAN connection to your EMR system (please refer to page 5)



# AVAILABLE MODELS

Every Plusoptix Pediatric Autorefractor shares the same measurement technology and algorithm, and therefore accuracy of measurements is the same across all available device models. The differences are in mobility and data management options, which are specified below.

	STATIONARY	MOBILE	
	IN ONE EXAM ROOM	BETWEEN MULTIPLE EXAM ROOMS OR LOCATIONS	
	 <p><b>P 10</b></p> <p>Pediatric Autorefractor plusoptiX A16</p>	 <p><b>P 11</b></p> <p>Mobile Pediatric Autorefractor plusoptiX A12C</p>	 <p><b>P 12</b></p> <p>Mobile Pediatric Autorefractor plusoptiX A12R</p>
EMR interface & Patient database	yes	yes	no
Letter-size report & self-adhesive label	yes	yes	yes
plusoptiXconnect compatibility	yes	yes	no
LAN / WLAN interface	yes / yes	no / yes	no / no
External monitor interface	yes	no	no
Power supply	Medical power adapter	6x rechargeable AA batteries	6x rechargeable AA batteries
HARDWARE FEATURES			
Touchscreen operation	4.3 Inch (resistive)	5.7 Inch (capacitive)	4.3 Inch (resistive)
Weight	26.5 oz (0.75 kg)	35.3 oz (1.0 kg)	28.2 oz (0.8 kg)
Interfaces	4 x USB, IR, DVI, LAN (RJ-45), WLAN	2 x USB, IR, SD, WLAN	2 x USB, IR, SD
IDENTICAL FEATURES			
Measurement Technology	Binocular infrared photo retinoscopy with unique 54 LED illumination		
Measurement Range	-7.00 to +5.00 dpt in 0.25 dpt increments		
Pupil Size	4.0 to 8.0 mm in 0.1 mm increments		
Certifications	FDA (USA), Health Canada (Canada), CE (Europe)		
SERVICE FEATURES			
Warranty	1 year hassle-free warranty (only USA, Canada and EU; extensions are available for purchase)		
Software Updates	Free of charge (can be downloaded from our website)		
Operating Cost	No need for calibration and maintenance		

# PLUSOPTIX A16 PEDIATRIC AUTOREFRACTOR

- ✘ Designed for stationary use (allows user to design optimal room settings; avoids device misplacement).
- ✘ Displays measurement results on an external DVI monitor to ease communication with parents (optional DVI monitor required).
- ✘ Needs to be connected to a power outlet (never runs out of battery power).
- ✘ Internal patient database for up to 100,000 entries for follow-up management and studies (please refer to page 4).
- ✘ Intuitive patient data entry (optional USB keyboard required).
- ✘ Saves measurement report to USB stick (please refer to page 4).
- ✘ Can be connected to a network server using a LAN or WLAN connection for CSV data exchange (EMR) and measurement report printing (please refer to page 5).
- ✘ Prints self-adhesive labels to provide documentation in paper file (optional printer required - please refer to page 13).
- ✘ Award-winning child-friendly design (please refer to page 6).
- ✘ One year hassle-free warranty and continuous free software updates available on our website (please refer to page 7).



Optional connection of an external monitor



Reliable and fast measurement



LAN / WLAN connection to your EMR system and measurement report printing



Prints self-adhesive labels with plusoptix P12



Intuitive patient data entry via USB keyboard and mouse

# PLUSOPTIX A12C MOBILE PEDIATRIC AUTOREFRACTOR

- ✕ Designed to be transportable between different exam rooms or different locations with access to a WLAN.
- ✕ Runs on rechargeable, standard AA size batteries (operational while charging).
- ✕ Internal patient database for up to 100,000 entries for follow-up management and studies (please refer to page 4).
- ✕ Data entry via screen keyboard or connection of an optional USB keyboard.
- ✕ Saves measurement reports to SD card (please refer to page 4).
- ✕ Can be connected to a network server using a WLAN connection for CSV data exchange (EMR) and measurement report printing (please refer to page 5).
- ✕ Prints self-adhesive labels to provide documentation in paper file (optional printer required - please refer to page 13).
- ✕ Award-winning child-friendly design (please refer to page 6).
- ✕ One year hassle-free warranty and continuous free software updates available on our website (please refer to page 7).



reddot award 2014  
winner



Reliable and fast measurement



WLAN connection to your  
EMR system and measurement  
report printing



Prints self-adhesive labels  
with plusoptix P12



Battery-operated (rechargeable  
standard AA batteries)



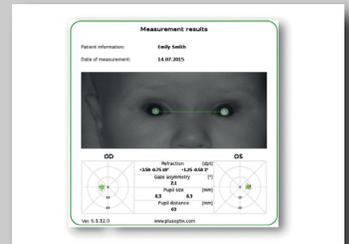
Optional carrying case

# PLUSOPTIX A12R MOBILE PEDIATRIC AUTOREFRACTOR

- ✗ Designed to be transportable between different locations without access to a WLAN.
- ✗ Runs on rechargeable, standard AA size batteries (operational while charging).
- ✗ No internal patient database and no LAN / WLAN interface.
- ✗ Saves measurement reports to SD card (please refer to page 4).
- ✗ No EMR capability or connectivity.
- ✗ Prints self-adhesive labels to provide documentation in paper file (optional printer required - please refer to page 13).
- ✗ One year hassle-free warranty and continuous free software updates available on our website (please refer to page 7).



Reliable and fast measurement



Measurement report printing  
No connection to EMR



Prints self-adhesive labels  
with plusoptix P12



Battery-operated (rechargeable  
standard AA batteries)



Optional carrying case

# PLUSOPTIX P12 WIRELESS LABEL PRINTER

- ✕ Thermal printer – no printer cartridge required.
- ✕ Prints self-adhesive labels (width 2,9 x height 2,2 in) for documentation in paper records.
- ✕ 60 self-adhesive labels on one paper roll (available through Plusoptix only).
- ✕ Alternative: Non-adhesive, regular thermal paper (Measurements of paper roll: length 2,2 x diameter 1,2 x core 0,47 in, available at office supply retailers).
- ✕ Runs on rechargeable, standard AA size batteries (operational while charging).
- ✕ Infrared direct connectivity with your Plusoptix device.
- ✕ Same medical power adapter as plusoptiX A16, A12C and A12R.



Battery-operated (rechargeable standard AA batteries)



Thermal Printer – no printer cartridge required



Label printing with plusoptiX A16



Label printing with plusoptiX A12C



Label printing with plusoptiX A12R