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# Digital C.R.P.

## Optical principle

### Measuring the inter-pupillary distance

The Patient (P), looks at the image of a target, with both eyes open, through a lens ①.

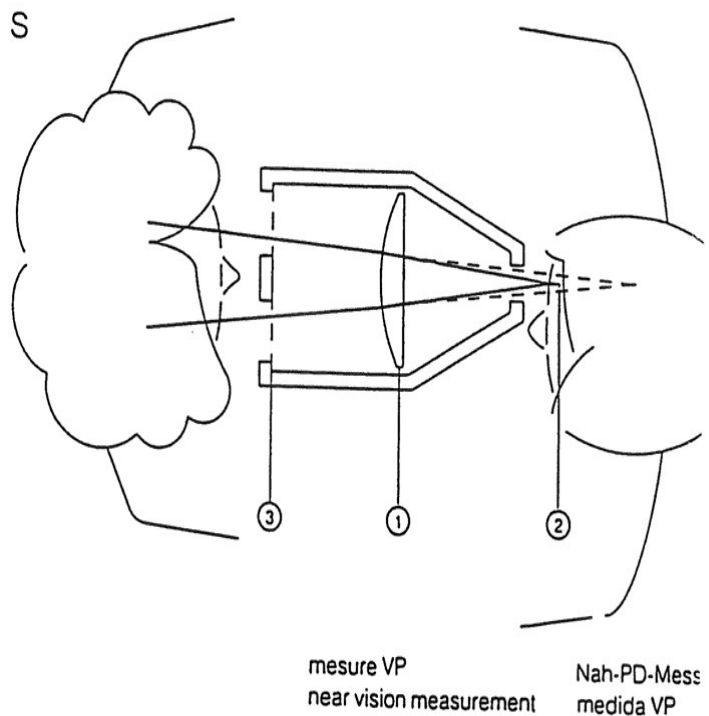
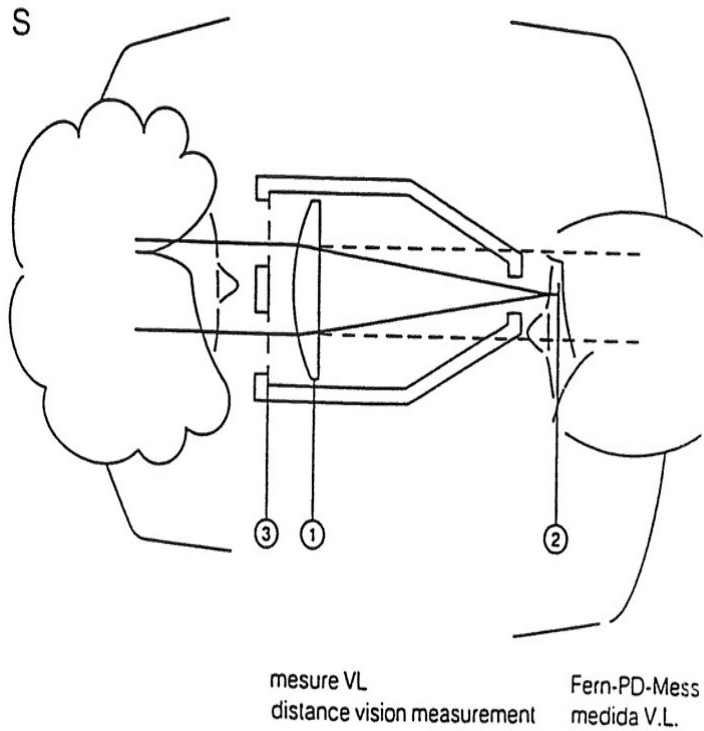
By moving the lens, the Optician at O may change the patient's viewing distance from 35 cm to infinity. The target light is reflected on the outer surface of each cornea. These are the corneal reflections and they can be seen by the Optician from point ②.

Parallax is not induced by this system.

This point is located on the patient's visual axis.

The Optician is able to move a vertical graticule along the plane ③, taking one eye at a time, to align it with the corneal reflection.

The measurements for monocular distances and for the total distance will be automatically recorded on the instrument.



## Digital C.R.P.

### Description

(4) Viewing distance selection knob

(5) Viewing distance display

(6) Left eye measurement control button

(7) Right eye measurement control button

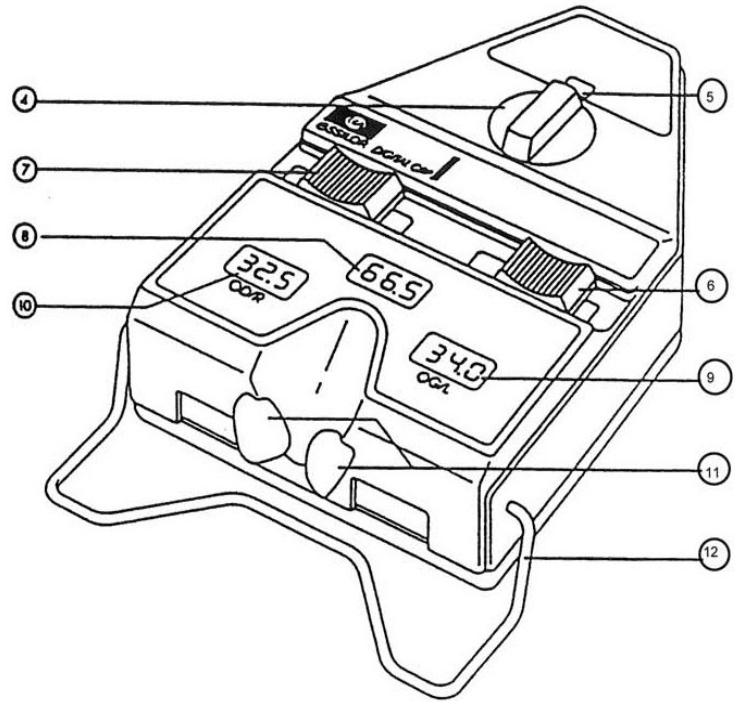
(8) Total pupillary distance  
Digital display for binocular pupillary distances (range : 48 mm to 77 mm in 0,5 mm steps)

(9) Left eye monocular PD

(10) Right eye monocular PD

(11) Changeable nose pads

(12) Forehead rest



### Important

The digital display switches itself off if the pupillometer has not been used for more than 1 minute and a half.

### Note

When the pupillometer displays 77 mm of pupillary binocular gap, we recommend that you verify the measurement by another operating procedure. Actually, the real measurement can be slightly different from 77 mm.

Complies with **CE N°0459**

Date of first marking : 1998

## Digital C.R.P.

### Use

The working distance at which the measurements should be taken are selected.

Hold the instrument in both hands and rest it against the patient's nose and forehead. Ask him to focus on the illuminated target and align the mobile graticules with the corneal reflection.

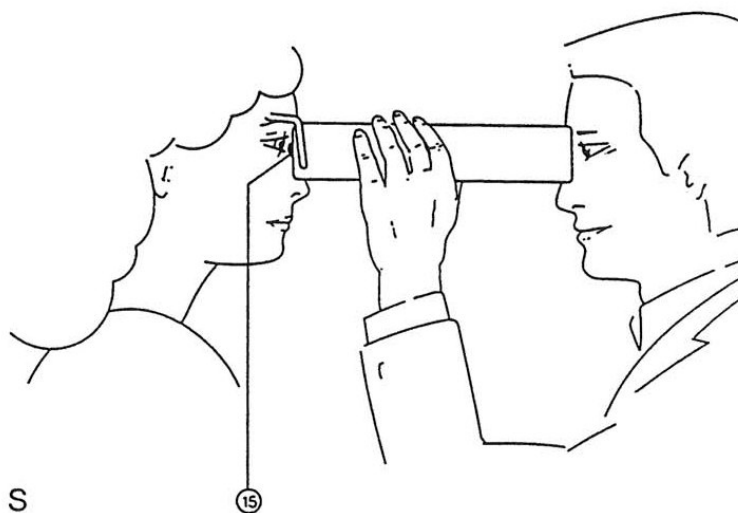
In this position the instrument is automatically on. It switches itself off when it is turned upside down with the measurement scales above.

NB : In the operating position, an indicator light shows the instrument is on.

All instruments will appear on the scale (the left and right eye monocular papillary distances, the total distance PD and the viewing distance).

Such data should be recorded on the card to minimise the risk of error.

In cases of defective binocular vision, a LE or RE occluder can be used to take separate measurements of each eye. (The control switch for this is underneath the instrument on the opposite side from the head rest.)



## Digital C.R.P.

### Maintenance

#### Cleaning

The machine is of a light colour and should be kept clean.

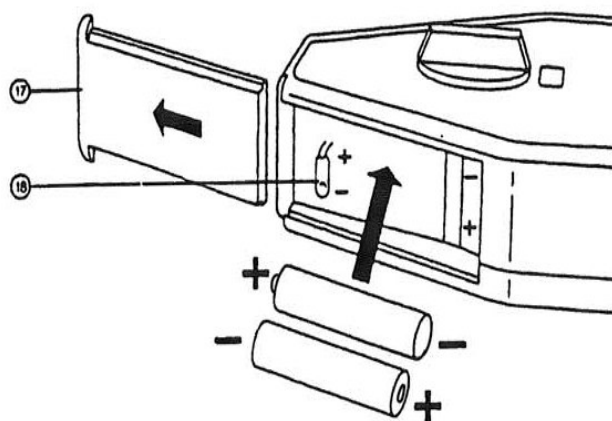
To avoid accidents, disconnect before cleaning.

Wipe external surfaces lightly with a damp cloth using water or dish washing liquid.

To avoid all danger of discolouration and incidents related to machine functions, never use diluting agents, solvents, alcohol, benzene, acetone or any other organic or mineral solvents.

The nose pads may be removed to be replaced and a spare set is provided in the box.

The nose rest and the chin rest should be cleaned after each patient. To do so, use a cloth or tissue paper moistened with an antiseptic solution non-alcoholic and non-aggressive.



#### Loading the batteries

Open the flap (17) and place the two batteries 1,5V LR06 head to tail between the flexible metal strips.

NB : If you are not using the product for a long time, do not forget to take off the batteries from their original position.

## Digital C.R.P.

### Precautions to be taken

The machine should not be exposed to direct sunlight or any strong light source. For best results the machine should be used with a constant degree of light. Do not place in a dusty atmosphere, or in conditions of high humidity.

Protect the machine from all vibrations and sudden impacts.

Keep well away from all chemical products and gases.

We advise you to manipulate this instrument with extreme care. Any fall could damage one of its components.

### Conditions for Use and Storage

The temperature of the room where the instrument is used or stored should be between :

Operation : 10°C to 40°C

Storage : -10°C to 50°C

### Disposal of the batteries and instrument

This appliance operates on 2 batteries of type LR06. Essilor draws your attention to the fact that commercially available batteries may contain heavy metals (mercury, cadmium or lead) which are harmful for the environment.

Useful life : 10 years

## Digital C.R.P.

### Symbols



LF (Low Frequency)-type machine.



Warning of possible HAZARD in the event of improper use (see user manual).



Selective collection of this electrical and electronic equipment.

## Digital C.R.P.

### Indications on electromagnetic compatibility

Portable and mobile RF communication devices may interfere with the Pupillometer. The Pupillometer is designed for use in the electromagnetic environment specified below. Customers and users of the Pupillometer must ensure that it is used in this type of environment.

**Table 1 – Electromagnetic emissions**

| Emission test   | Conformity     | Electromagnetic environment – directives   |
|---|----------------|--|
| RF emissions CISPR 11   | Group 1        | The Pupillometer uses RF energy only for its internal functions. Consequently, its RF emissions are very low and are not likely to generate interference in a nearby electronic device.    |
| RF emissions CISPR 11   | Class B        | The Pupillometer is suitable for use in all premises other than domestic premises and those directly connected to the low voltage power supply mains supplying buildings for domestic use. |
| Limits for harmonic current emissions IEC 61000-3-2                           | Not applicable |  |
| Limitation of voltage changes, voltage fluctuations and flicker IEC 61000-3-3 | Not applicable |  |

**Table 2 – Electromagnetic immunity**

| Emission test  | Test level IEC 60601   | Conformity level                 | Electromagnetic environment – directives   |
|--|--|----------------------------------|--|
| Electrostatic discharge immunity test IEC 61000-4-2                                    | ±6 kV in contact<br>±8 kV in air   | ±6 kV in contact<br>±8 kV in air | Floors must be made from wood, concrete or ceramic tiles. If the floors are covered with synthetic materials, the relative humidity must be at least 30 %. |
| Electrical fast transient/burst immunity test IEC 61000-4-4                            | ±2 kV for electricity supply lines<br>±1 kV for input / output lines   | Not applicable                   |  |
| Surge immunity test IEC 61000-4-5  | ±1 kV between phases<br>±2 kV between phase and earth  | Not applicable                   |  |
| Voltage dips, short interruptions and voltage variations immunity tests IEC 61000-4-11 | < 5 % $U_T$<br>(> 95 % drop in $U_T$ ) for 0.5 cycle<br>40 % $U_T$ (60 % drop in $U_T$ ) for 5 cycles<br>70 % $U_T$ (30 % drop in $U_T$ ) for 25 cycles<br>< 5 % $U_T$ (> 95 % drop in $U_T$ ) for 5 s | Not applicable                   |  |
| Power frequency magnetic field immunity test IEC 61000-4-8                             | 3 A/m  | 3 A/m                            | Power frequency magnetic fields must exhibit the levels characteristic of a representative site located in a typical commercial or hospital environment.   |




| Emission test   | Test level IEC 60601        | Conformity level | Electromagnetic environment – directives   |
|---|-----------------------------|------------------|--|
|   |                             |                  | Portable and mobile RF communication devices should not be used closer to any part of the Pupillometer than the recommended separation distance, calculated according to the equation applicable to the transmitter frequency<br><b>Recommended separation distance</b>  |
| RF interference generated<br>IEC 61000-4-6  | 3 Vrms<br>150 MHz to 80 MHz | Not applicable   |  |
| Radiated RF interference<br>IEC 61000-4-3   | 3 V/m<br>80 MHz to 2.5 GHz  | 3 V/m            | $d = 1.17 \sqrt{P}$ 80 MHz to 800 MHz<br>$d = 2.33 \sqrt{P}$ 800 MHz to 2.5 GHz<br>where $P$ is the maximum output power characteristic of the transmitter in watts (W), depending on the transmitter manufacturer and $d$ is the recommended separation distance in metres (m).<br><br>The field intensities of the fixed RF transmitters, determined by electromagnetic investigation on site <sup>a</sup> , must be less than the conformity level in each frequency range. <sup>b</sup><br><br>Interference may occur near devices marked with the following<br><br>symbol: |
| NOTE 1: At 80 MHz and 800 MHz, the highest frequency range applies.   |                             |                  |  |
| NOTE 2: These directives may not always apply. Electromagnetic propagation is affected by absorption and reflections from structures, objects and persons.  |                             |                  |  |
| <sup>a</sup> The field intensities of fixed transmitters, such as base stations for radiotelephones (cell/wireless/phones) and terrestrial mobile radios, amateur radio, AM and FM radiobroadcasting and TV broadcasting cannot be theoretically predicted with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, electromagnetic investigation on site must be considered. If the field intensity, measured at the point where the Pupillometer is used, exceeds the applicable RF conformity level indicated above, observe the Pupillometer to check that it is operating normally. If abnormal performance is observed, additional measures may be required, such as redirecting or repositioning the Pupillometer. |                             |                  |  |
| <sup>b</sup> Over the frequency range 150 kHz to 80 MHz, the field intensities must be less than 3 V/m.   |                             |                  |  |
| NOTE U <sub>T</sub> is the AC mains voltage before application of the test level  |                             |                  |  |

Table 3 – Recommended separation distances between the RF portable and mobile communication devices and the Pupillometer

The Pupillometer is designed for use in an electromagnetic environment with controlled radiated RF interference. The Pupillometer customer or user can help prevent electromagnetic interference by keeping a minimum distance between the RF portable and mobile communication device (transmitters) and the Pupillometer, as recommended below, depending on the maximum transmission power of the communication device.

| Maximum output<br>Separation distance<br>depending on the<br>transmitter frequency and<br>power rating of the<br>transmitter in W | Separation distance depending on the transmitter frequency in m |  |   |
|---|---|--|---|
|   | 150 kHz to 80 MHz   | 80 MHz to 800 MHz<br>$d = 1,17 \sqrt{P}$ | 800 MHz to 2,5 GHz<br>$d = 2,33 \sqrt{P}$ |
| 0,01  | Not applicable  | 0,12                                     | 0,23                                      |
| 0,1   |   | 0,37                                     | 0,74                                      |
| 1   |   | 1,17                                     | 2,33                                      |
| 10  |   | 3,69                                     | 7,38                                      |
| 100   |   | 11,67                                    | 23,33                                     |

For transmitters whose maximum output power rating is not given above, the recommended separation distance  $d$  in metres (m) can be estimated using the equation applicable to the transmitter frequency, where  $P$  is the maximum output power rating characteristic of the transmitter in watts (W), according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the highest frequency range applies.

NOTE 2: These directives may not always apply. Electromagnetic propagation is affected by absorption and reflections from structures, objects and persons.



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