

# Goniophotometer T2

## Data Sheet

### Lamp Turning Goniophotometer T2

The **Goniophotometer T2**, with device to turn the light source, is a highly precise photometer for the measurement of light distributions of luminaires and lamps.

The Goniophotometer T2 allows measurements either in the C- $\gamma$  measuring system, typical for indoor and street lighting luminaires, or in the V-H (B- $\beta$ ) one, typical for floodlights: so any kind of luminaire and lamp can be considered. Some sophisticated software features allow to convert one measurement from one system to the other.

#### Characteristics

The Goniophotometer T2 is realized in accordance with EN 13.032 Norm type 1.1, 1.2, and 1.3, corresponding to Recommendation CIE n.70 Type 1 and 2 (Goniophotometer with Facility for Turning the Light Source).

Maximum dimensions of the luminaires to be measured:

- ❑ weight: kg 50
- ❑ dimensions: mm 2000x800x400.

#### 1. Mechanical Equipment

The mechanical equipment allows the measurements following the measuring systems (C- $\gamma$ ) for lamps and indoor and street luminaires and (V-H) for floodlights.

In the first case (C- $\gamma$ ) the luminaire is turned out of the horizontal plane and generally the rotation axis is coincident with the luminaire luminous axis. This kind of measurement is not suggested for luminaires with lamps whose flux can change with the relative position in the space.

The V-H system solves this problem because the lamp axis is parallel with the rotation axis so the lamp is not rotated out of the horizontal plane. It means that we can perform a V-H measurement for an indoor luminaire and then convert the V-H measurement to C- $\gamma$ .

The mechanical structure is based on two parts, an upper and a lower one:

- ❑ **upper part:** n.1 horizontal slide, n.1 endless screw, n.1 manual steering wheel, n.1 movable iron castle to hold the luminaires and lamps with bearings, n.1 goniometric reference system, n.1 iron shaft, n.1 electromagnetic clutch, n.1 stepping motor with absolute encoder;
- ❑ **lower part:** n.1 vertical shaft (for the movement of the angles  $\gamma$  or H) and bearings, n.1 stepping motor with absolute encoder.

Total weight: approx. 300 Kg

Maximum dimensions covered: mm 3.500 x 1.500 x 2.200

Rotation speed 1 min<sup>-1</sup> (for both axis)



Gonio T2 – C- $\gamma$  Measuring System

# Goniophotometer T2

## Data Sheet

### 2. Motors

The system works with 2 stepping motors with absolute encoders driven by 2 Siemens robotic electronic cards. The motors can also be moved independently with a manual steering command system.

The gonio stops at any measuring position in order to avoid luminaire vibrations and achieve a better measuring condition; during the stop the computer takes 2 different illuminance values, comparing them: in case the differences are higher than a fixed range the computer orders to take other values until the stability is reached. It's also possible to measure in continuous.

### 3. Angles Measurements

The measurement is done via n.2 absolute encoders on both axis (vertical and horizontal) to obtain the value of the corresponding angle  $\gamma$  or H, C or V. The angles are firstly set by the stepping motor electronic cards and the encoders are used only to check the correctness of the angles reached.

The angular resolution is  $(1/10)^\circ$ .

### 4. Photometer Head

The photometer head consists of a selected  $V(\lambda)$ -Si-photovoltaic cell with its relative spectral responsivity corrected precisely to the  $V(\lambda)$  function by the full filtering method. This guarantees a nearly perfect independence of the reading (absolute and relative spectral responsivity) if the photometer head is non-uniform lighted. This is important especially for the measurement of sources with narrow light distribution. The photometer head is thermostatically controlled.

- Error on the correspondence to the  $V(\lambda)$  curve:  $f1 < 1,5\%$
- Error on the cosine correction:  $f2 < 1\%$
- Photometer head accepting diameter: mm 8

The photometer head is delivered with a laser to be used in order to align the luminaire/lamp with the photometer head.

### 5. Luxmeter

The  $V(\lambda)$  photovoltaic cell is driven in a virtual short circuit in order to ensure best linearity between illuminance and photocurrent. The voltage, proportional to the illuminance obtained by the photometer head, is transmitted with low impedance to the A/D converter and then into the computer via the IEEE 488. The illuminance value is also shown on the display of the luxmeter.

- Linearity error:  $f3 < 0,1\%$
- Display unit error:  $f4 < 0,1\%$
- Fatigue:  $f5 < 0,2\%$  (at 10 lx)
- Modulated light error:  $f7 < 0,1\%$
- Range setting error:  $f11 < 0,1\%$
- Conversion rate: 2,5/s
- Integration period: ms 200



Gonio T2 – V-H (B- $\beta$ ) Measuring System

# Goniophotometer T2

## Data Sheet

### 6. Control Unit and Data Acquisition System

The control unit organizes and manages the movement and positioning of the 2 motors through 2 electronic cards and is connected to the computer via a USB interface. It includes the power unit and the electronics of both motors and the power unit for the analogic circuits.

The voltage can be stabilized with a voltage stabilizer of 2.2 KVA with voltage variations below 0.03% (Optional). The source voltage is 230 V (others on request)

The data acquisition system organizes the measurements of illuminances values and transfers a signal to the computer via an IEEE 488 interface.

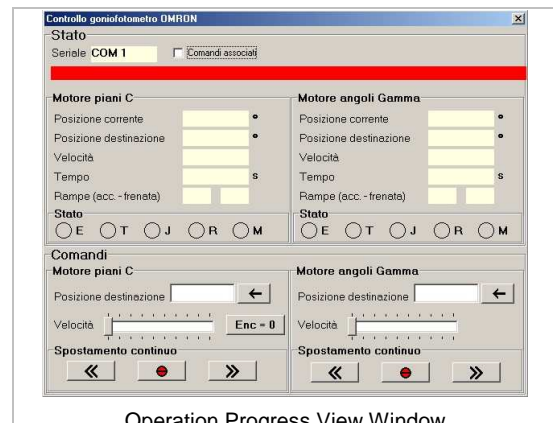
### 7. Management Software Gonwin

The machine is supplied with management software, called **Gonwin** in Windows 2000, XP and Vista and allows the operator to:

- carry out a complete measurement according to standards (EN 13.032 and CIE Recommendations) and matrices freely set by the user, saving the data on conclusion
- effect a precise measurement
- define whether the measurement should be effected continuously or with machine stop in each position and subsequent measurement of at least 2 values, then compared with each other
- regulate the start of measurement (lamps fully on) and the length of the intervals between one plane and the other
- carry out automatic calibration (machine alignment)
- manage all control and data acquisition functions
- acquire electrical parameters of the luminaire under measurement and the lamp current (optional).

**Gonwin** is an autonomous program that reads the measurement matrices realized with LITESTAR Photowin, the latter then being able to import the measurement results.

The software functions on PC in Windows 2000, XP and Vista.



Operation Progress View Window

# Goniophotometer T2

## Data Sheet

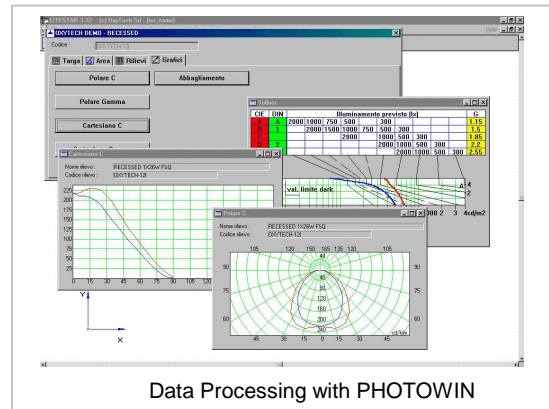
### 8. Matrices Processing Software Photowin

Processing of the measurement results is done with the Photowin module of the LITESTAR program.

Photowin allows the operator to:

- import measurement data saving it in file groups defined by the operator
- convert a C- $\gamma$  measurement in V-H and vice versa (the operation is only possible when the starting measurement has a sufficient number of planes)
- export the measurements in the standard Eulumdat formats, IES (86, 91 and 95) and TM14
- process and print the polar, Cartesian and Soellner glare diagrams, available in 14 languages.

The software functions on PC in Windows 2000, XP and Vista.



### 9. Photometric Data Visualization Software Photoview (supplied separately)

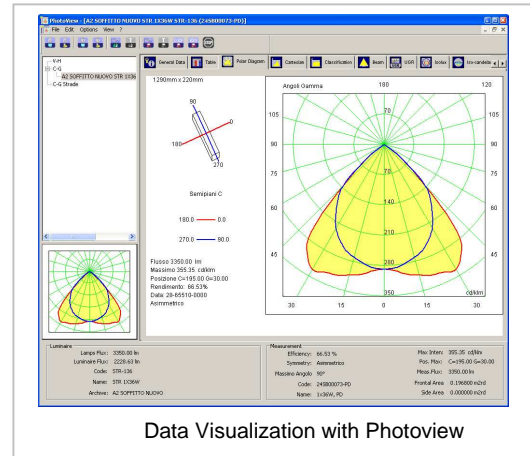
The visualization, both graphical and table, of photometric matrices is effected with the Photoview plug-in of Photowin (supplied apart).

Photoview allows to:

- Process polar, Cartesian, beam and glare diagrams
- Process isolux, isocandela and efficiency diagrams
- Process the utilization, utillance, UGR, luminanze and international classification tables.

The program allows to print into 14 languages.

The software functions on PC in Windows 2000, XP and Vista.



### 10. Computer

The system includes the computer with Pentium processor.

# Goniophotometer T2

## Data Sheet

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### Room Dimensions

The dimensions of the room where to install the Goniophotometer T2 depend on the type of the luminaire to measure.

In general the distance photometer head/luminaire luminous center must be longer than 5 times the maximum dimension of the luminous area of the luminaire.

**Example:**

*Luminaire for linear fluorescent lamps 58W - maximum dimension of the luminous area is mm 1.500 so that the distance must be longer than m 7.5. We suggest to consider a distance a 5 times the maximum dimension of the luminous area also for small luminaires.*

It is also important to consider the luminous beam and the lamp power; infact, in case the beam is very narrow and the lamp power is higher than 400W it is useful to consider a distance photometr head/luminous center of the luminaire around m 15/20.

The length of the room is then equal to m 5-20 + m 2 (gonio movements) + m 2 (distance to consider the back wall not luminously disturbing).

The dimensions of the room are then: length m 8-23; width m 4; height m 3.

### Optional Accessories

The following optional accessories are available:

- Standard calibrated lamp for calibration of the goniophotometer including relative lampholder (4 wire technique) and certificate
- Direct current stabilizer for the calibrated lamp (flux sample) type TN 40-320
- Adapter for measuring luminous flux where the luminaire remains in normal functioning position, with cosine correction and thermostated photocell.
- Special brackets for fixing the luminaires and lamps to the machine.

### Notes

The installation of the machine, done by our technicians, is included in the price. Travel, board and lodging expenses are excluded.

OxyTech reserves the right to effect improvements to the machine at any time without notice.

# Goniophotometer T2

## Data Sheet

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### References

Our Goniophotometers are working at the following companies:

- AEC Spa – Subbiano AR – Italy (T2)
- Antares SA – Paiporta Valencia – Spain (T2) (under construction)
- Arcluce Srl – Melegnano MI – Italy (T2)
- Asselum SL (Grupo OxyTech) – Barcelona – Spain (T2)
- Detas Spa – Rezzato (BS) – Italy (T1)
- Disano Spa – Rozzano MI – Italy (T4)
- Faerber Lighting System – Orio al Serio BG – Italy (T2)
- FIV CA – Valencia – Venezuela (T2)
- GE Lighting Spa – Cavazzale VI – Italy (T2)
- Ghisa Mestieri – Bertinoro FC – Italy (T2) (under construction)
- Grechi Illuminazione Snc – Magenta MI – Italy (T2)
- IEP Iluminación SA – Barcelona – Spain (T2)
- Ivela Spa – Liscate MI – Italy (T2)
- Kreon NV/SA – Antwerpen – Belgium (T2)
- Martini Illuminazione Spa – Concordia MO – Italy (T2)
- Neri Illuminazione Spa (Gruppo Targetti) – Longiano FC – Italy (T4)
- OVA Bargellini – Pieve di Cento BO – Italy (T2)
- OxyTech Srl – Cornaredo MI – Italy (2 T2) + (T3)
- Paralux Ltda – Lisboa – Portugal (T2)
- Politecnico di Milano – Milano – Italy (T4)
- Prisma Illuminazione Spa – Colognola ai Colli VR – Italy (T2)
- Reggiani Illuminazione – Vedano al Lambro MI – Italy (T2)
- Robolight Fivep Spa (Cariboni Group) – Osnago LC – Italy (T4)
- SBP Spa – Ghisalba BG – Italy (T2)
- Side Spa – Lissone MI – Italy (T2)
- Sodirep SA - Wavre – Belgium (T2)
- Thorn AB – Landskrona – Sweden (T4)
- Troll S.A. – Canovellas – Spain (T2)