

POLIFEMO

USER MANUAL

Release 2.0



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2. INTRODUCTION

The new Microgate reflection photocell Polifemo is outstanding for its attractive design, conceived to meet the requirements of accident-prevention safety norms. Its unique optical design guarantees a high range and greater accuracy of measurement. In addition, special optical and electronic features guarantee maximum reliability also in poor external light conditions.

Internal power supply is provided by rechargeable batteries (the smartly 'smart' recharge circuit is built into the photocell) which can be replaced with two normal AA size batteries and which allow 18 hours of autonomous functioning. Its microprocessor management and programming switches also make it a very versatile instrument.:



The Microgate Photocell Polifemo

3. POLIFEMO

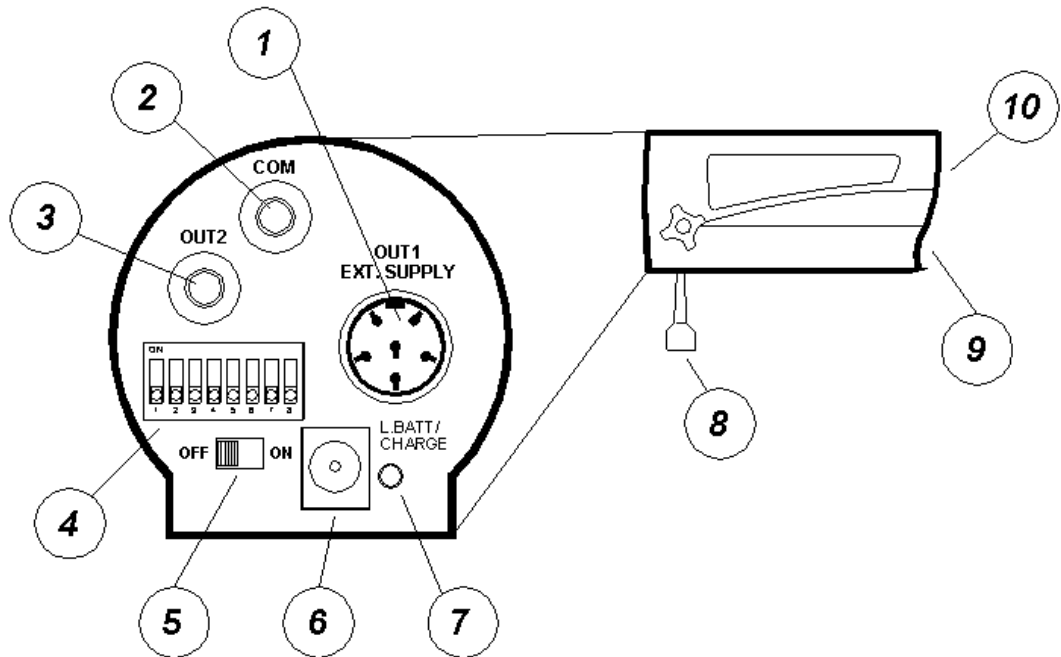


Figure 1

- 1. OUT: 6 pole Amphenol socket
- 2. COM: Black banana socket
- 3. OUT2: Green banana socket
- 4. DIP-SWITCHES FOR SELECTING SETTINGS
- 5. ON/OFF SWITCH
- 6. RECHARGE SOCKET
- 7. SIGNAL LED
- 8. BALL-JOINT
- 9. BATTERY COMPARTMENT
- 10. LENSES

3.1. CONFIGURATION DIP SWITCHES

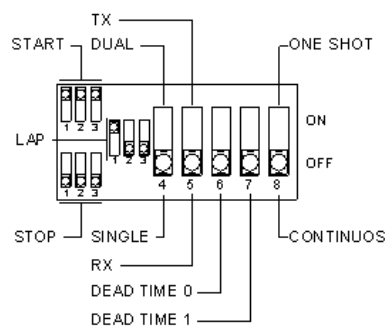


Figure 2

4. OPERATING MODES

Depending on requirements, the Polifemo photocell can be used in two modes:

- reflection mode
- with facing photocells

Switch n° 5 determines functioning mode (OFF= reflection mode, ON= with facing photocells) while switch n° 4 determines which is the transmitter and which the receiver when two photocells are used (ON= Transmitter, OFF= Receiver).

- *reflection mode* (SW_5=OFF)

using a photocell and a reflector. The maximum working distance (between the photocell and the reflector) is about 30 meters.

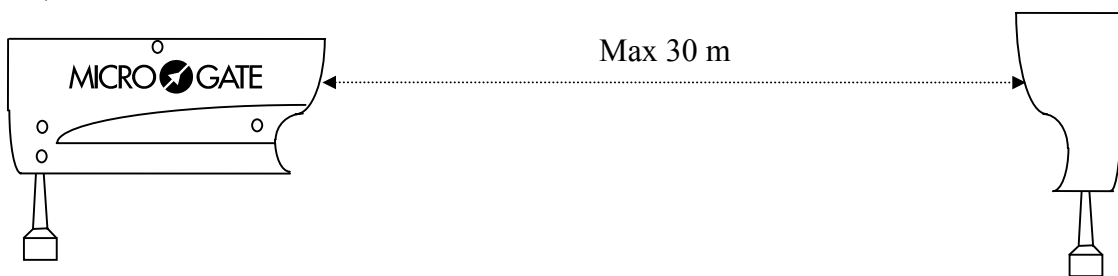


Figure 3

- *with facing photocells* (SW_5=ON)

using one photocell for transmission and one for reception. This mode is particularly useful if the photocells have to be positioned at a great distance from each other (the maximum distance is about 90m)

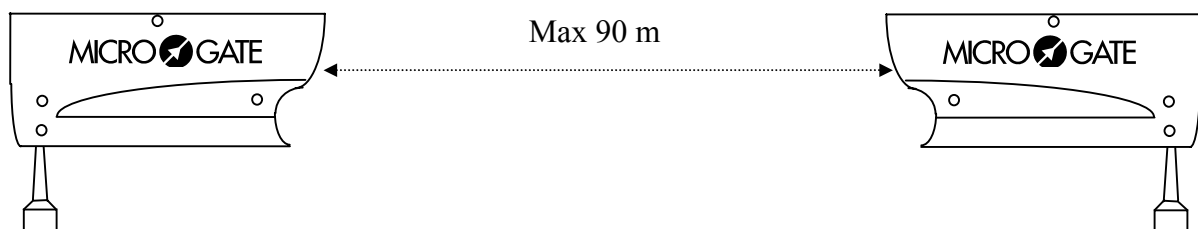


Figure 4

4.1. CENTERING

Centering takes place in the following way: as soon as it has been switched on, the photocell emits a continuous BEEP. When the photocell is pointed at the reflector or the photocell which is transmitting (in dual mode), the BEEP stops, thus indicating that correct centering has been attained.

5. THE OUTPUTS

The Polifemo photocell emits an output, a signal which is normally open and is brought to the reference level when the infrared beam is interrupted. In addition, the signal is duplicated, both on the 6 pole Amphenol socket (OUT1) and on the green banana jack (OUT2).

- *6 POLE Amphenol socket (OUT1)*

This type of connector is the standard Microgate connector and is always structured according to the following convention:

Pole n°	Description
1	START
2	4 - 13V
3	GND
4	LAP
5	STOP
6	Not Used

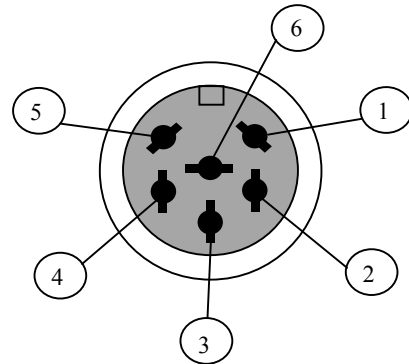


Figure 5

With the DIP SWITCHES 1, 2, 3 it is possible to select the line on which to send the signal emitted by the photocell

SWITCH 1	SWITCH 2	SWITCH 3	LINE
ON	ON	ON	START
OFF	ON	ON	LAP
ON	OFF	ON	LAP
OFF	OFF	ON	LAP
ON	ON	OFF	LAP
OFF	ON	OFF	LAP
ON	OFF	OFF	LAP
OFF	OFF	OFF	STOP

- *Banana jack output (OUT2 AND COM)*

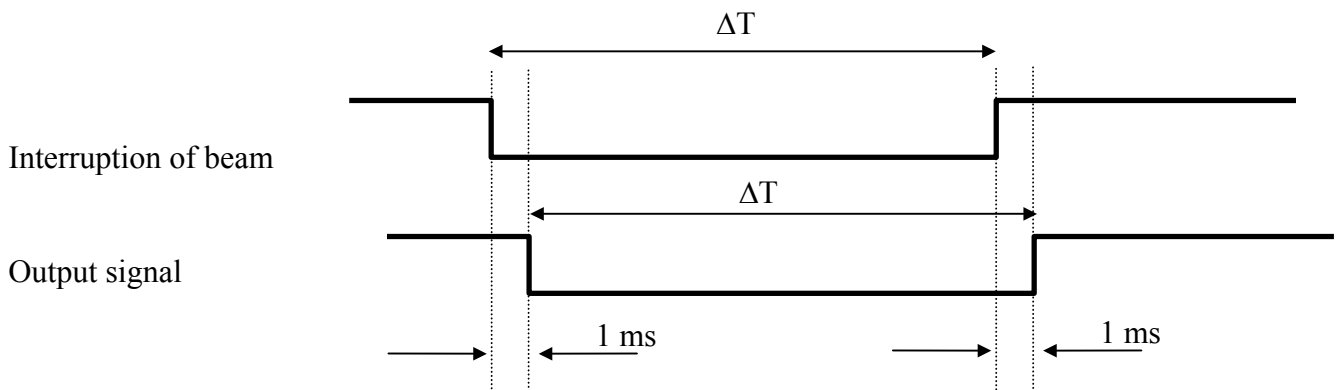
The OUT2 output is completely uncoupled (optoinsulated) from the 6 pole output. This makes it possible to refer the signal (by means of the COM socket, BLACK banana jack) to any voltage, making the photocell compatible with every kind of timing device.

5.1. OUTPUT SIGNAL

The output signal has a minimum duration of 3 hundredths of a second and has a constant delay relative to the event of a thousandth of a second. Of course the delay does not affect resolution, which for Polifemo is 125 μ s (0.125 milliseconds). With switch n° 8, it is possible to select two different kinds of output signal behavior:

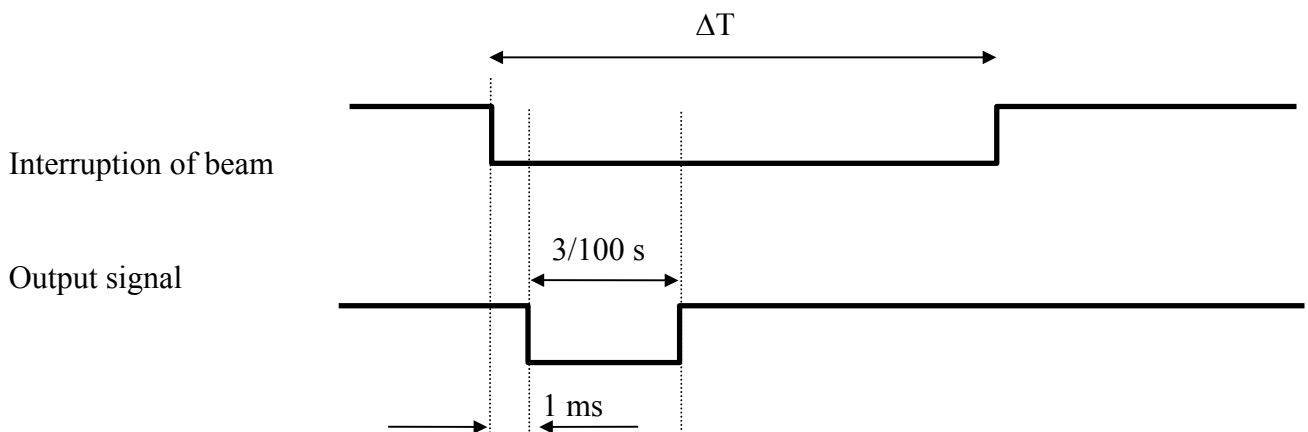
- *normal* (SW_8=OFF)

The output level passes from high to low (closing of contact) and is kept in this situation until the end of the interruption of the infrared beam.



- *monostable* (SW_8=ON)

The output level passes from high to low and is kept in this situation for 3 hundredths of a second, excluding the time during which the infrared beam is interrupted. This mode is particularly useful when it is necessary to acquire two or more signals on the same line without the danger of the permanent interruption of one of the photocells (e.g. a photocell not correctly centered) blocking the whole line permanently.



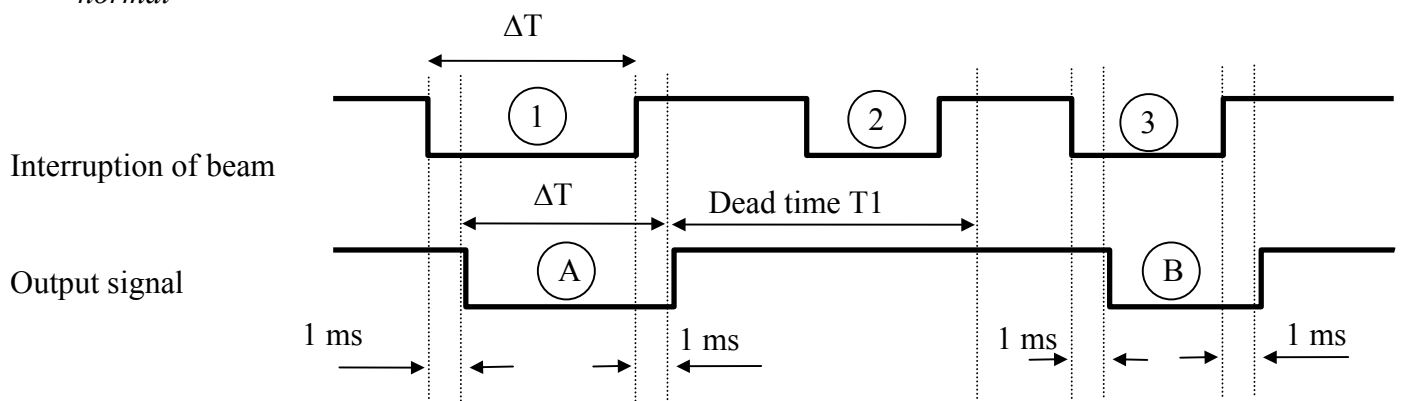
5.2. DEAD TIMES

By using switches n° 6 and 7 it is possible to set dead times. In hardware mode, periods of time subsequent to an impulse are defined, within which no signal is accepted or valid. The selections possible are as follows:

SWITCH 6	SWITCH 7	DEAD TIME
OFF	OFF	None (Default)
ON	OFF	0.2s
OFF	ON	0.5s
ON	ON	2s

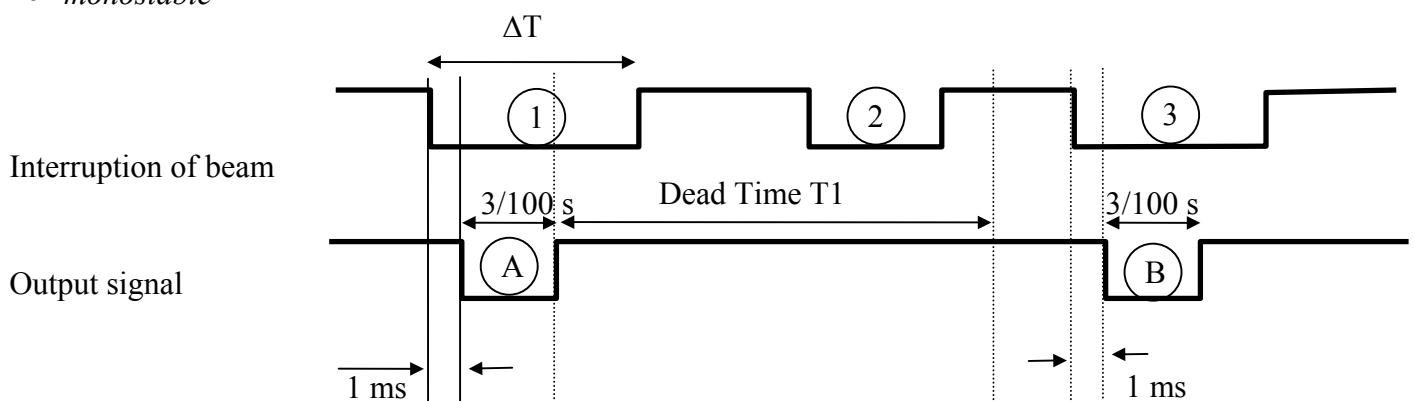
Also in this case, the behavior of the output depends on the type of output set (normal or monostable).

- *normal*



In the above example, a dead time T1 has been set; the interruption of beam n° 1 is correctly ascribed to output signal A, subsequently interruption n° 2 does not cause any signal, as it has occurred within dead time T1; interruption n° 3 on the other hand, causes output B as it has taken place outside dead time T1.

- *monostable*



The essential difference compared to the previous example lies in the fact that the dead time period is calculated from the end of the monostable impulse and not from the moment in which the line is emitted.

6. POWER SUPPLY

The Polifemo photocell can be powered in 3 different ways:

- with batteries
- from recharge power source
- from external power source

Before continuing, it would be better to make clear what the various terms mean:

- batteries: Size AA batteries, both rechargeable and non-rechargeable types;
 - rechargeable*: both NiCd and NiMH 1.2V
 - non-rechargeable*: Alkaline 1.5V
- recharge power source: power applied to recharge jack (see fig 1 n° 6). Voltage must be between 8V and 13V (we strongly advise you not to use voltages above 13V; for higher voltages a security mechanism - varistor – breaks the supply circuit. The circuit is restored when voltage has returned within the operative range).
- external power source: power supplied to the photocell by means of the 6 pole Amphenol socket (fig 1 n° 1). Voltage must be between 5V and 13V. Also in this case there is a safety mechanism like the one for the recharge power source.

Polifemo can manage all three types of power supply contemporaneously. If the photocell is on and powered from an external power source or from a recharge power source, the batteries are protected by using ‘external’ power sources; moreover, if recharge power is sufficient, the batteries are kept charged by a recharge current with an appropriate duty cycle.

6.1. RECHARGE MANAGEMENT

Recharging of Polifemo’s batteries can only take place with the photocell switched off, and is managed intelligently by the microprocessor built into the photocell. The standard procedure requires unloading of the batteries and then complete recharging. Recharging begins after plugging in a supply jack with a high enough voltage ($V_{ch} > 8V$) with the photocell switched off.

The steps carried out by the program which manages recharging are as follows:

STEP	ACTIONS	LED	DURATION	POSSIBLE ANOMALIES
1	Checking of presence of rechargeable batteries	Continuous red	1 minute	Presence of non-rechargeable batteries
2	Battery discharge	Continuous red	variable according to previous state of charge	Batteries removed or reach dangerous voltage levels (faulty batteries)

3	Battery recharge	Blinking green	7 hours	Batteries removed or reach dangerous voltage levels (faulty batteries)
4	End of recharge and maintenance of charge level	Continuous green		

Switching on the photocell or lack of recharge voltage result in interruption of the recharge procedure.

6.1.1. IMMEDIATE RECHARGE

If immediate battery recharge is required without first discharging the batteries, put the switch (Figure 2 n° 5) to ON for an instant and return rapidly to OFF. The recharge management program will not first discharge the batteries (steps 3 and 4)

Only in exceptional circumstances should the batteries be recharged straightaway without being first discharged as this shortens their life.

6.1.2. ANOMALIES

Any anomalies occurring during the recharge procedure are signalled by slow blinking of the red LED and the sound signal BOOP-pause-BOOP. When an anomaly is detected, the recharge cycle is interrupted.

7. TECHNICAL DATA

Weight	
Size	59 x 180 x 104 (1 x p x h)
Minimum resolution	0.125 ms
Delay in relation to event	1 ms
Temperature of use	-25°C/+70°C
Power supply:	
batteries	rechargeable: NiCd, NiMH 1.2V non-rechargeable: alkaline 1.5V
external power source	5V÷13V with overvoltage-protection
recharge	8V÷13V with overvoltage-protection
Battery recharge	Built-in 'smart' recharge device
Autonomy	18 hours
Processor	8 bit C-MOS microprocessor
Connections	Connections on polifunctional 6 pole plug, output on optoinsulated banana jack
Optical range	30 m (with reflector) / 90 m (with facing photocells)