MX PARALLEL LASER MICROMETER

Features

Compact size

No Separate External Controllers

Measurement Range: 0 to 28mm

Sub-micron Resolution of 0.4375 µm

Non-Linearity <5µm

Repeatability <3µm

Very Fast 2500 measurements/s

Parallel TTL interface

Laser diode 670nm Class I

Applications

Measurement of various types of materials in a wide range of industries (metal ,plastic, glass, ceramics, wood and others)

Measurement of Edge, Gap, Diameter, Position, Thickness, Height, Profile, and Vibration of objects.

Diameter measurement of tube and pipe (in process or sampling)

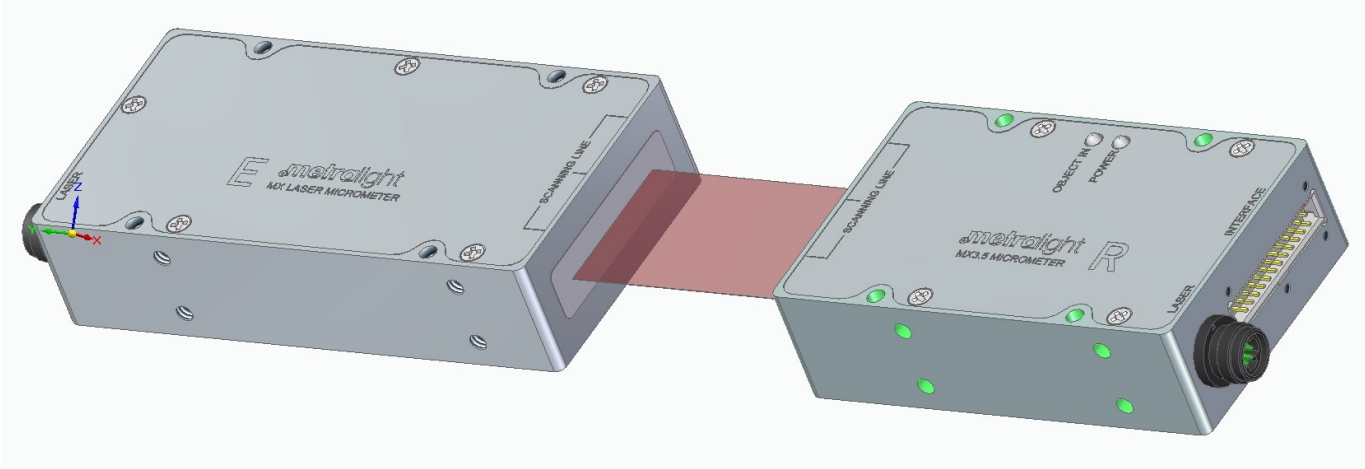
Precise and fast online/offline non-contact measurement of objects.

Semiconductor atmospheric/vacuum prealigner

metralight

USER'S GUIDE

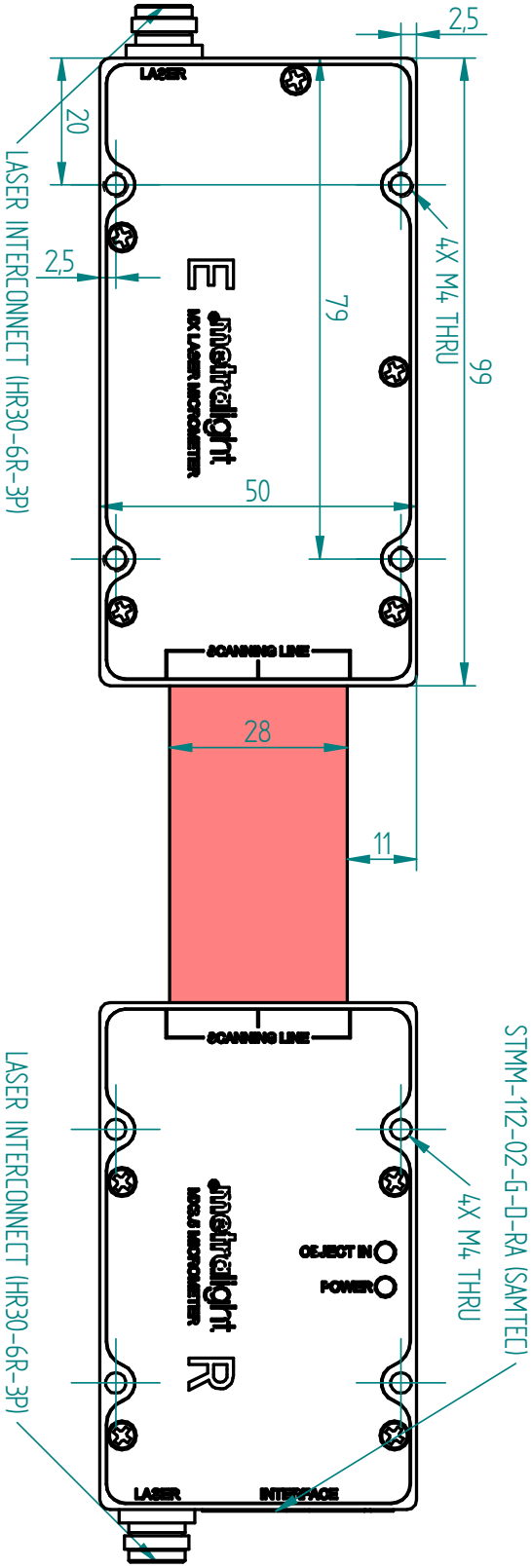
November 2021 rev.A

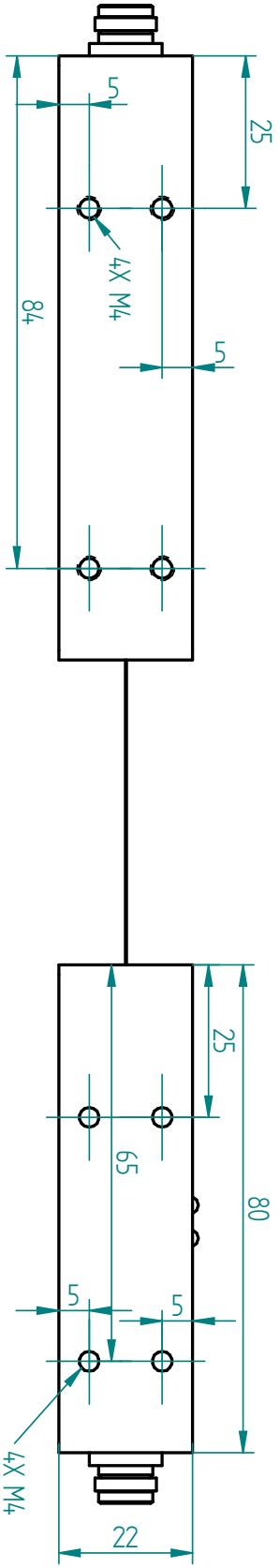


Options

| Custom Modes: Centering, MIN/MAX measurement, Thickness, Range of Tolerances, Runout, object filtering, eccentricity | Integrated OLED display | Custom Sensor Size and Package available | Custom Applications |

2. DIMENSIONS





For detailed dimensions, please download 2D drawing or 3D model from http://www.metralight.com or email at: info@metralight.com

3. SPECIFICATION | MX PAR MICROMETER

Measurement

Sensor Range	140µm (0.006 in) up to 28 mm (1.1 in)
Resolution (Pixel size)	0.4375 µm
Repeatability	3 µm (Edge position, calibrated distance) *
Response Time	0.391 ms
Non-Linearity	<5 µm (Edge position, calibrated distance) *
Measuring Modes	Edge1, Edge2, Diameter, Gap, Center, Solid
Custom Modes	*Call Metralight for additional custom modes*

Interface

Indicators	Green LED = Sensor ON ; Blue LED = Object Present
I/O connectors	STMM-112-02-G-D-RA (Samtec)
Interface (I/O)	Parallel binary (TTL)
Power supply	12 to 24 VDC / 80mA

General

Detection Method	670nm Class I Laser Diode through-beam with CCD
Overall Dimension	99 x 50 x 22 mm (3.9" x 1.9" x 0.9") | 80 x 50 x 22 mm (3.15" x 1.9" x 0.9")
Mounting holes	M4 (8 positions) each box
Weight	236g (8oz)
Operating Temp.	0°C to 50°C (32°F to 122°F)
Storage Temp.	-20°C to 70°C (-4°F to 158°F)

**) If mounted on Rail.*

4. SPECIFICATION | MX PAR MICROMETER

MX Parallel Laser Micrometer uses a parallel beam to measure position or size of objects. An object is simply placed in the detection line, and the measured edge (in case of diameter - both edges) must be in the active area.
The position and size of the shadow is measured via the CMOS line image sensor. Gap and Center can also be measured (see picture bellow).

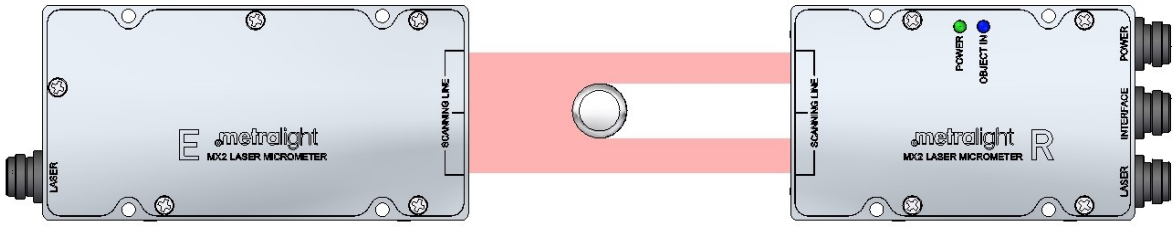


Figure: Parallel beam and shadow of an object

The Receiver and the Emitter part must be aligned properly. Since the emitted light is wider than the CMOS detector line, alignment is simple and easy.
If the requirements of the application are for the highest accuracy, it is recommended that the unit be mounted on a rail from the factory.

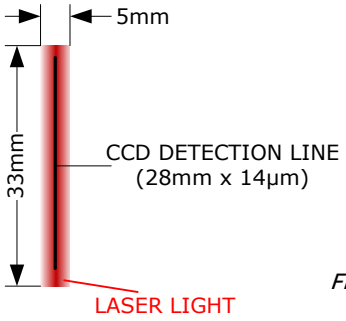


Figure: Size of emitted light and CCD detection line (notice intensity change towards sides)

Sensor processes CMOS data and outputs measurement in a binary pixel format representing position/size of object(s). Sensor processing can also be customized upon customer request, to include maximum/minimum, average values, etc.

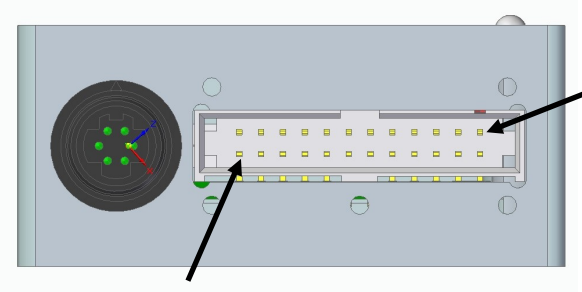
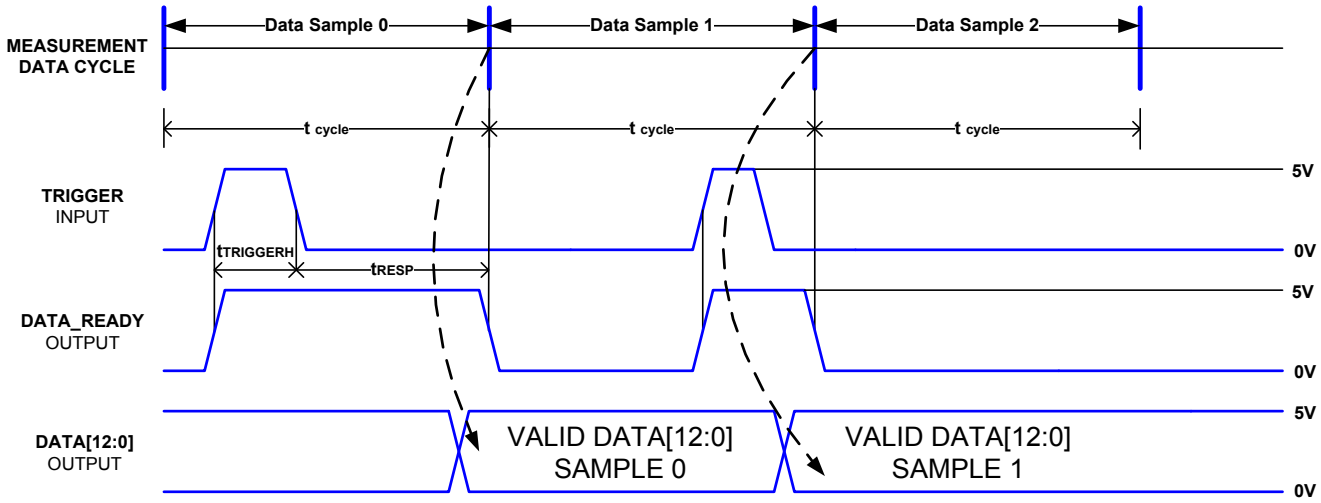


Figure: MX2 RS232, Analog interface

MX Parallel 3.5µm resolution		
PIN #	**PIN TYPE**	**Description**
1	OUT	Data bit 0 (LSB)
2	OUT	Data bit 1
3	OUT	Data bit 2
4	OUT	Data bit 3
5	OUT	Data bit 4
6	OUT	Data bit 5
7	OUT	Data bit 6
8	OUT	Data bit 7
9	OUT	Data bit 8
10	OUT	Data bit 9
11	OUT	Data bit 10
12	OUT	Data bit 11
13	OUT	Data bit 12 (MSB)
14	OUT	DATA READY
15	IN	TRIGGER
16	OUT	OBJECT IN
17	IN	MODE0
18	IN	MODE1
19	IN	MODE2
20	IN	MODE3
21,22	PWR	+12 to 24VDC
23,24	GND	GND

MX Parallel 0.4375µm resolution		
PIN #	**PIN TYPE**	**Description**
1	OUT	Data bit 0 (LSB)
2	OUT	Data bit 1
3	OUT	Data bit 2
4	OUT	Data bit 3
5	OUT	Data bit 4
6	OUT	Data bit 5
7	OUT	Data bit 6
8	OUT	Data bit 7
9	OUT	Data bit 8
10	OUT	Data bit 9
11	OUT	Data bit 10
12	OUT	Data bit 11
13	OUT	Data bit 12
14	OUT	DATA READY
15	IN	TRIGGER
16	OUT	OBJECT IN
17	OUT	Data bit 13
18	OUT	Data bit 14
19	OUT	Data bit 15 (MSB)
20	IN	MODE
21,22	PWR	+12 to 24VDC
23,24	GND	GND



SYMBOL	Description	Min.	Max.
tCYCLE (µs)	1 cycle time	——	391
tRESP (µs)	Response time	10	389
tTRIGGERH (µs)	TRIGGER HIGH time	2	—-

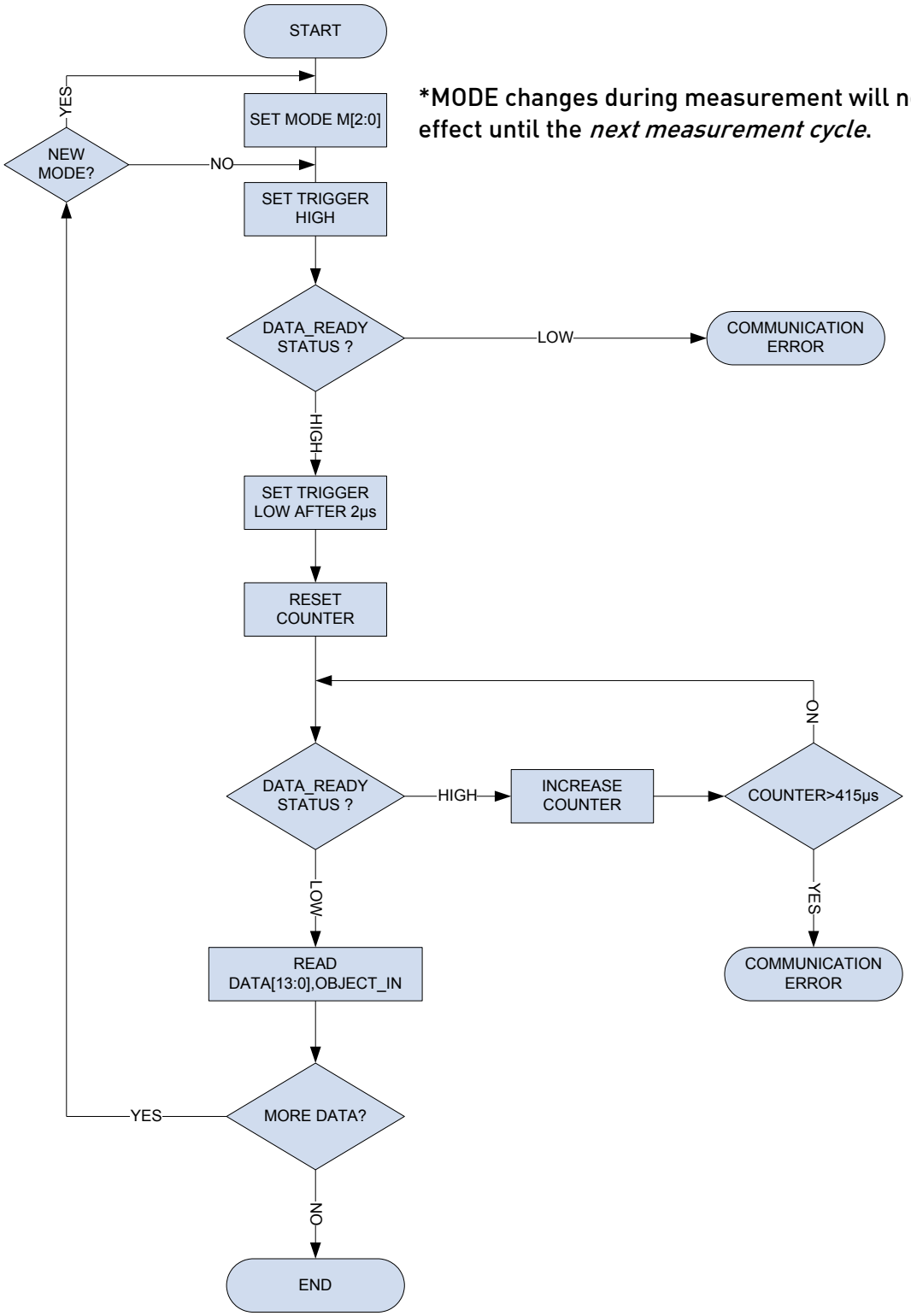
Table 3: Timing Diagram

MX Parallel 3.5µm resolution, measuring modes				
MODE3	**MODE2**	**MODE1**	**MODE0**	**Mode description**
0	0	0	0	Edge 1
0	0	0	1	Edge 2
0	0	1	0	Diameter
0	0	1	1	Gap
0	1	0	0	Center
0	1	0	1	Solid Edge

MX Parallel 0.4375µm resolution, measuring modes	
MODE0	**Mode description**
0	Edge 1
1	Diameter

HIGH to LOW transition on the TRIGGER, commences a data output at the end of the current measurement cycle. The HIGH to LOW signal on the DATA_READY confirms a Valid Data event. The maximum response time between the TRIGGER input and the DATA_READY output is 391µs. This DATA is presented to the output pins and retained until the next TRIGGER event. In the absence of a TRIGGER event, the previous data will be held indefinitely. This process allows slow processing computers to bypass several measurement cycles between measurement readings. MODE changes during measurement will not take effect until the *next measurement cycle*.
See Flowchart on next page for typical operation.

Default measuring mode is DIAMETER. For mode change it's necessary to make a transition on MODE[] pins.



*MODE changes during measurement will not take effect until the *next measurement cycle*.

5. SAMPLE APPLICATION | MX PAR MICROMETER

Metralight provides sample application (MX_Terminal, see below), this is a demonstration application which reads and display/save data (and export to Excel). Source code is included for custom modification. Please contact Metralight for any SW modification/development. Metralight provides a complete solution HW+SW and mechanical.

Figure: MicroStudio SW

- USE APPROPRIATE MOUNTING SCREWS (SEE MECHANICAL DRAWING)
- AVOID DIRECT SUNLIGHT !!! AND ALL OTHER LIGHT SOURCES WITH WAVELENGTH CLOSE TO 670nm (see Optical filter transmittance on figure below).
- ALWAYS KEEP OPTICAL WINDOWS CLEAN, FREE FROM DUST AND FINGERPRINTS , AVOID SCRATCHES ON THE OPTICAL WINDOWS.
- APPLY CORRECT VOLTAGE - SEE ELECTRICAL SPECIFICATION

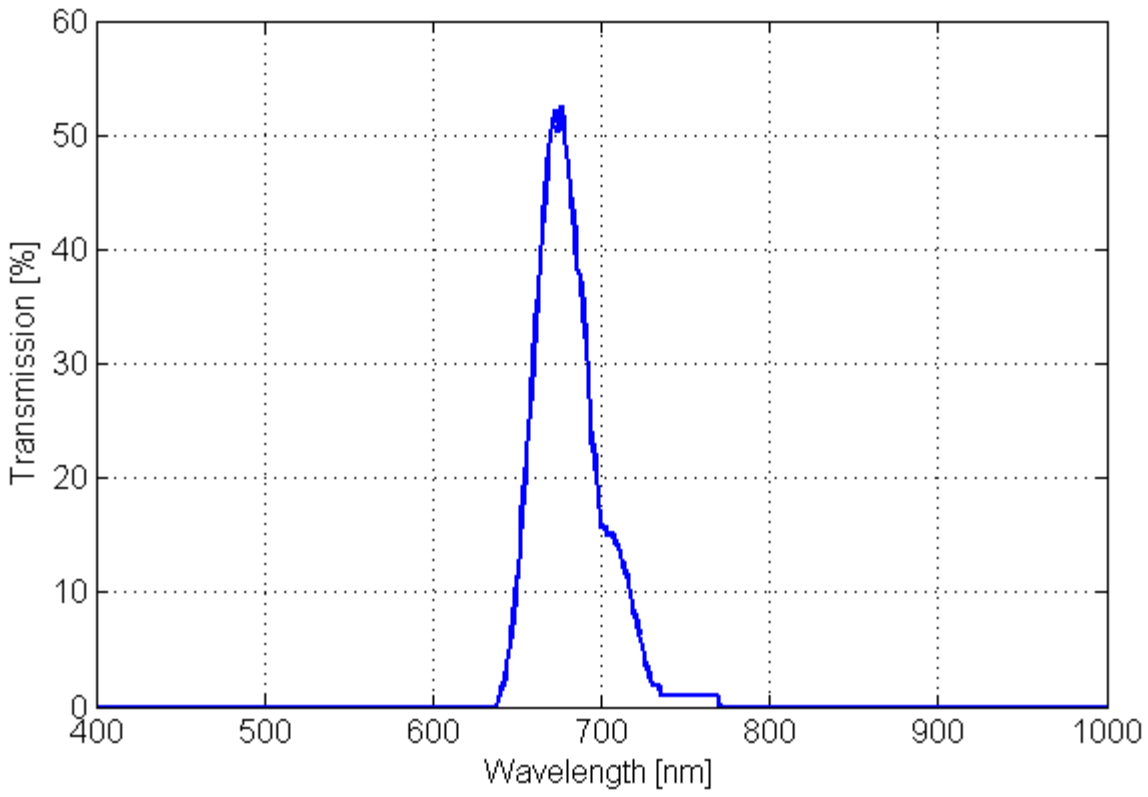


Figure: Ambient light optical filter

Package components

- Sensor units: 1x Laser light source and 1x Receiver
- Interconnect cable
- Parallel output cable (Flat ribbon)

Warranty

METRALIGHT provides a **ONE YEAR** manufacturer's limited warranty against defective materials and workmanship. Please do not attempt to open the unit, as this will void all warranties.

Contacts

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Burlingame, CA 94010
phone: (650) 581 3088, fax: (650) 808 9830
email: sales@metralight.com
technical support: support@metralight.com
web site: http://www.metralight.com

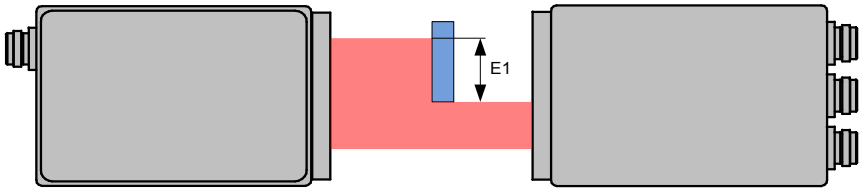

Figure: **EDGE1 MODE**, LEADING EDGE

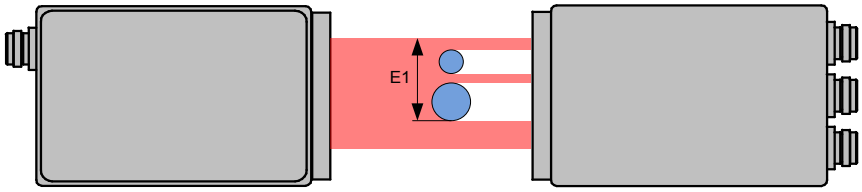

Figure: **EDGE1 MODE**, MULTIPLE OBJECTS

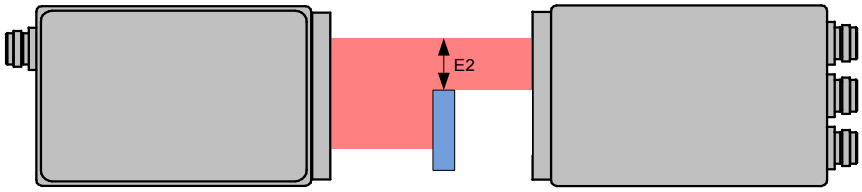

Figure: **EDGE2 MODE**, TRAILING EDGE

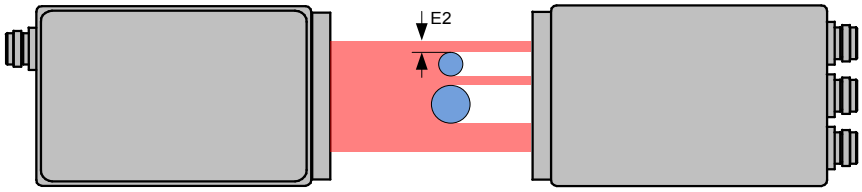

Figure: **EDGE2 MODE**, MULTIPLE OBJECTS

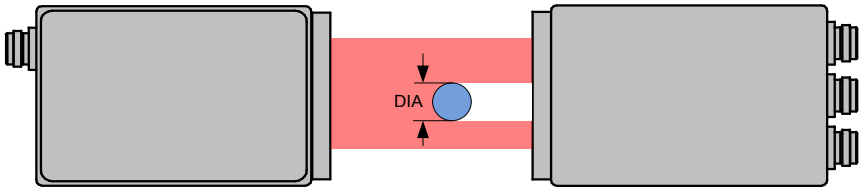

Figure: **DIA MODE**

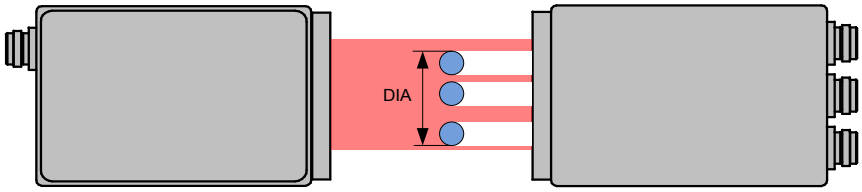

Figure: **DIA MODE**, MULTIPLE OBJECTS

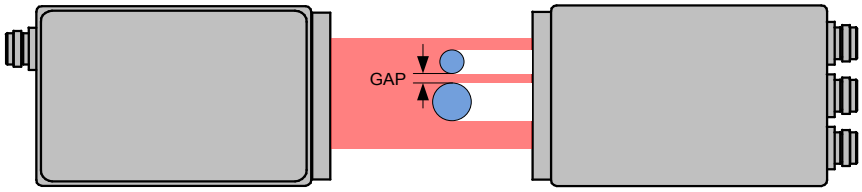

Figure: **GAP MODE**

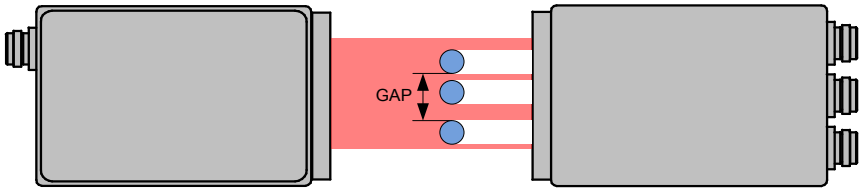

Figure: **GAP MODE**, MULTIPLE OBJECTS

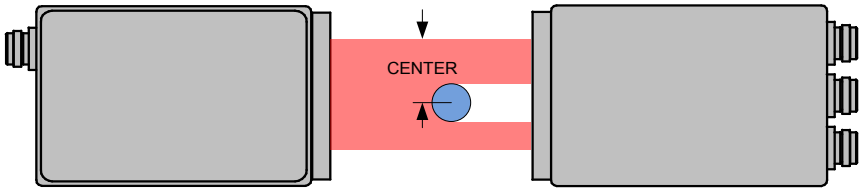

Figure: **CENTER MODE**

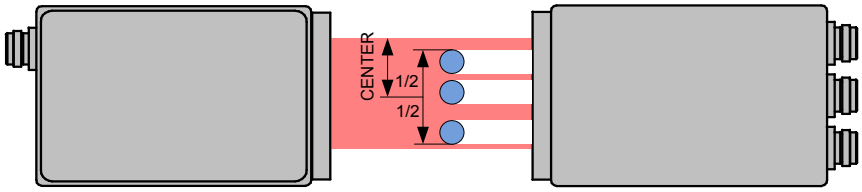

Figure: **CENTER MODE**, MULTIPLE OBJECTS

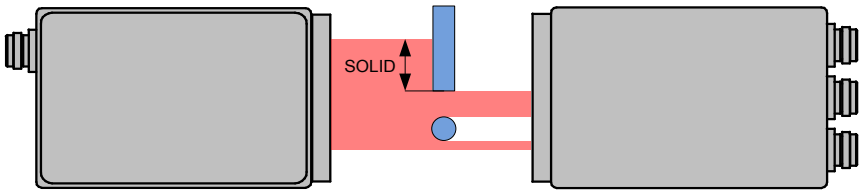

Figure: **SOLID MODE**, MULTIPLE OBJECTS

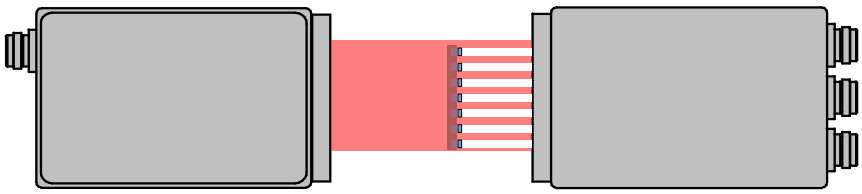

Figure: **CUSTOM MODE**, For Example IC LEADS Dimension measurement OR Detects BENT Leads or Missing Leads.