

M-BAR & ANGLE CHANGERS



THE NEW MODULAR BAR SOLUTION FROM TPL VISION

For Machine Vision, Industrial Automation, Robotics, and Identification applications including:

DIRECT ILLUMINATION

DIFFUSE ILLUMINATION

DOME EFFECT

DARKFIELD

LOW ANGLE

NEW

22 PART NUMBERS COVER ALL POSSIBILITIES:

12x M-BARS



HIGH BRIGHTNESS
BARS

- Dimensions: 125, 250, 375 and 500mm long,
- Colours: WHI, Red (630nm), IR (850nm),
- Plug & Light – no external current control driver needed,
- Overdrive mode in-built – x4 brighter,
- Dimming 0-10 VDC in-built,
- Standard connector M12 – 5 pins,
- IP65 rated.

10x ANGLE CHANGERS



(5 STANDARD
+ 5 POLARISED)

- Allow you to change the illumination angle,
- Designed to securely clip on top of the BAR,
- Sustain 100g acceleration,
- No change in the BAR ingress protection level.



✓ Rapid Feasibility Testing for your new projects:

- Quickly & easily identify the best illumination solution with our Angle Changer Combos
- Ability to change the illumination angle without uninstalling the Barlight
- Have confidence in your product selection
- Eliminate delays from awaiting loan products for testing

✓ Protected IP65 design integrity

– no need to dismantle the product to change the illumination angle

✓ Huge flexibility

– quick & easy to change the illumination when your project changes



24V
±10%

CE

RoHS

IP65

TPL VISION IS AN **ISO9001**
CERTIFIED MANUFACTURER

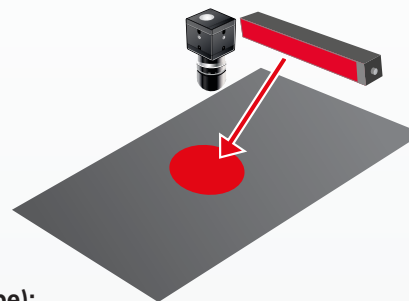
HOW TO USE THE M-EBAR AND ANGLE CHANGERS?

✓ WORKING FROM A DISTANCE

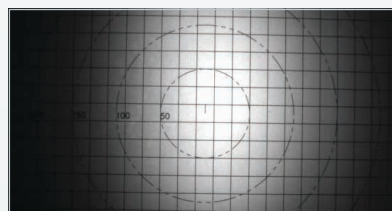
The M-EBAR is equipped with Ultra-Narrow lenses and is the best tool to illuminate anything from a distance. From a certain distance, any bar light acts almost like a spotlight.

Minimum distances for the M-EBAR to act as a spotlight, with according brightness (Strobe):

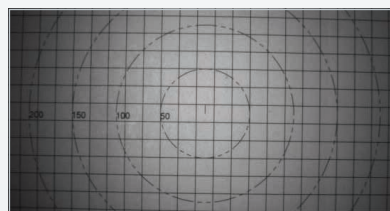
M-EBAR-125-WHI-UN		M-EBAR-250-WHI-UN		M-EBAR-375-WHI-UN		M-EBAR-500-WHI-UN	
1m	20 kLux	1m	41 kLux	1.5m	28 kLux	2m	23 kLux
		1.5m	24 kLux	2m	18 kLux	3m	11 kLux



✓ INCREASING THE HOMOGENEITY WITH ANGLE CHANGERS



M-EBAR alone



M-EBAR with the Medium Angle Changer

By increasing the light output angle, Angle Changers also **diffuse the light** and help achieve a **better homogeneity** across the FoV.

HIGH BRIGHTNESS EVEN WITH ANGLE CHANGERS: the table below shows the high brightness output of the M-EBAR alone, and with the Angle Changers, along with the equivalent exposure time required to achieve the same grey level on the image assuming all other parameters are fixed.

M-EBAR	M-EBAR+N	M-EBAR+M	M-EBAR+W	M-EBAR+L
87,000 Lux	43,500 Lux	34,500 Lux	17,400 Lux	43,000 Lux

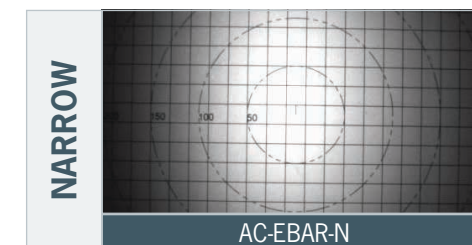
(Measurements made at WD=500mm with M-EBAR-250-WHI, measured in the middle of the FoV - Strobe and Overdrive operation).

IMPACT ON EXPOSURE TIME: the table below shows the high brightness output of the M-EBAR both with and without Angle Changers, along with the equivalent exposure times required to achieve the same grey level on the image, assuming all other parameters remain fixed.

M-EBAR	M-EBAR+N	M-EBAR+M	M-EBAR+W	M-EBAR+L
100 μ s	200 μ s	250 μ s	500 μ s	200 μ s
x1	x2	x2.5	x5	x2

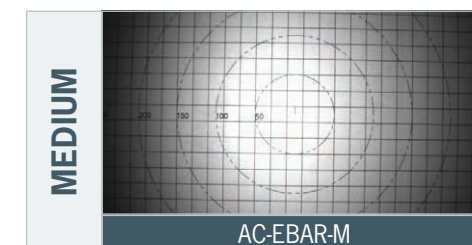
✓ EXTENDING THE FOV WITH ANGLE CHANGERS

Angle Changers change the native Ultra Narrow M-EBAR angle into 4 wider options:



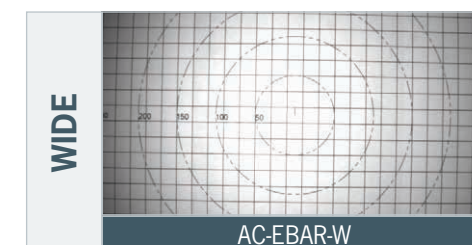
NARROW

AC-EBAR-N



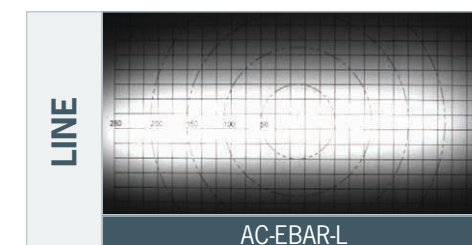
MEDIUM

AC-EBAR-M



WIDE

AC-EBAR-W



LINE

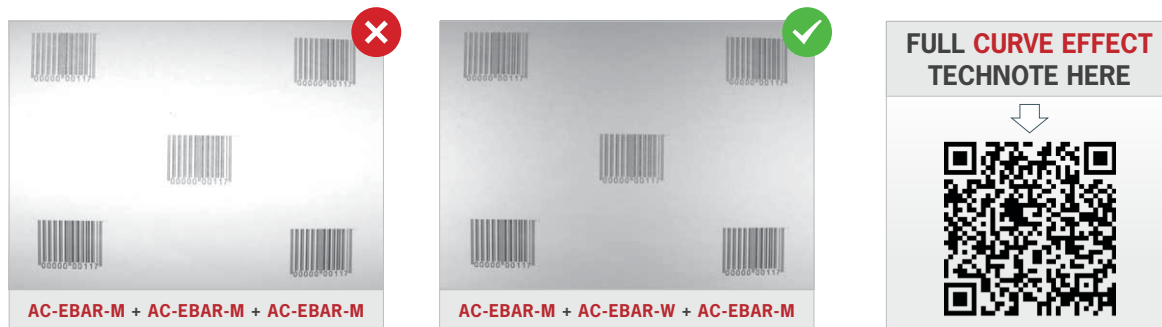
AC-EBAR-L

The exposure time has been adjusted to demonstrate the Field of View covered when using the Angle Changers, whilst keeping the grey level the same in the centre.

ANGLE CHANGERS CAN BE USED TO CREATE THE CURVE EFFECT

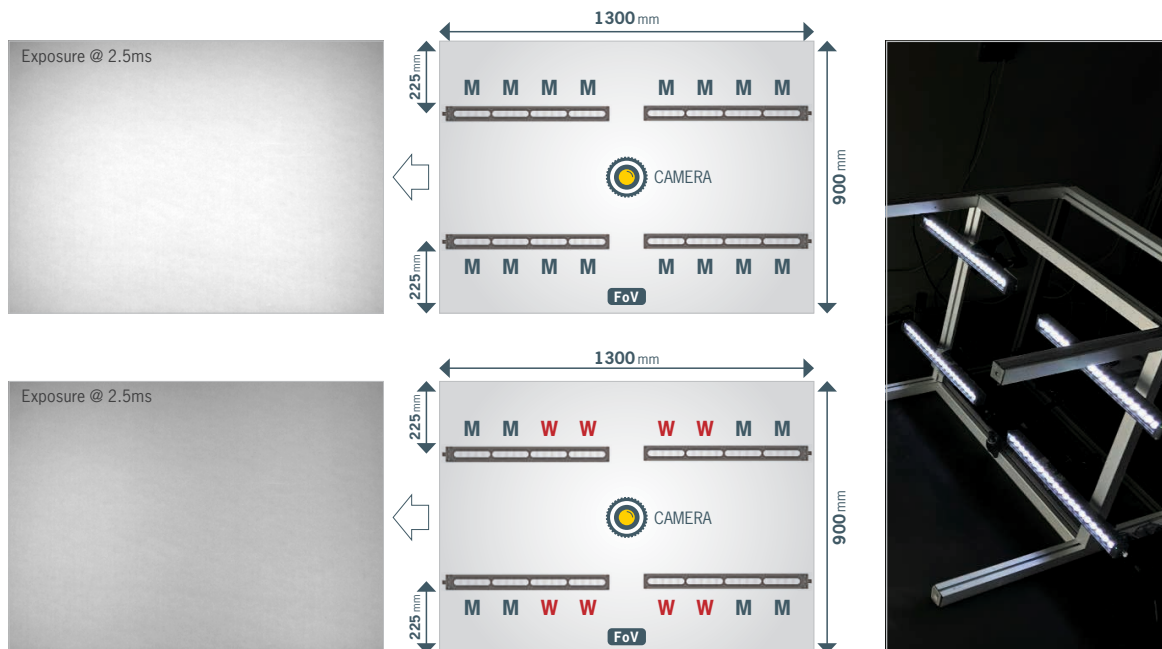
✓ 400mm WORKING DISTANCE – 200x150 FOV

For this FoV, a single M-BAR-375-WHI-UN was used with Angle Changers.

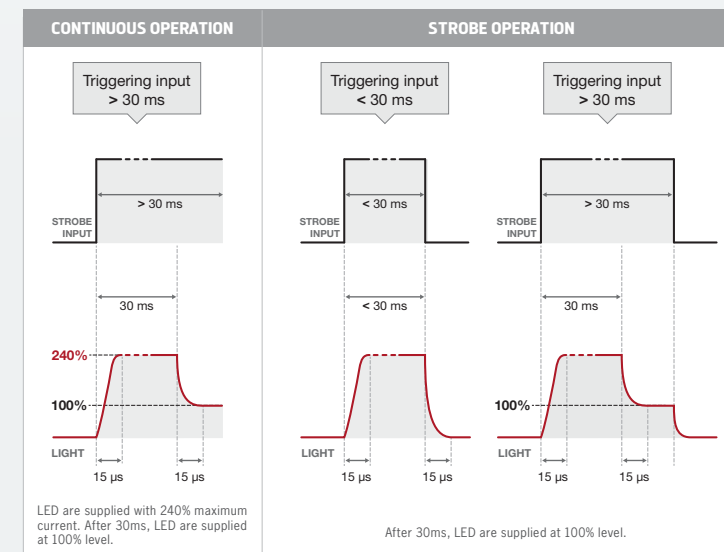
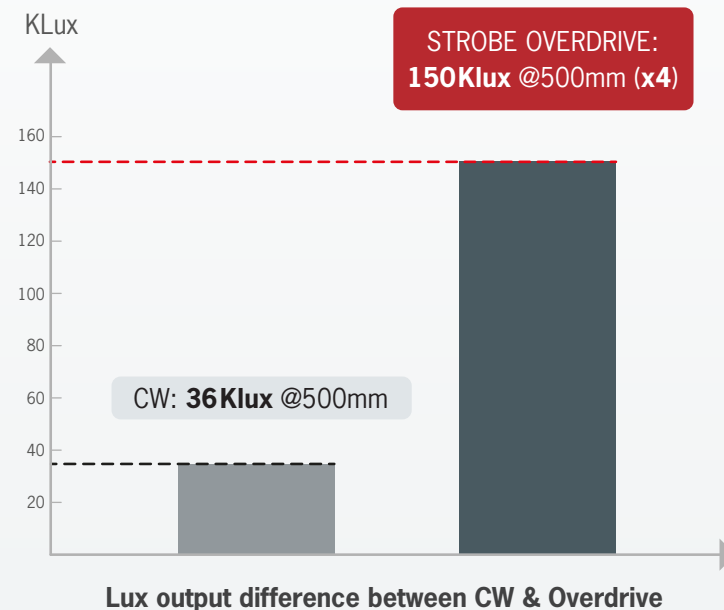


✓ 2000mm WORKING DISTANCE – 1300x900 FOV

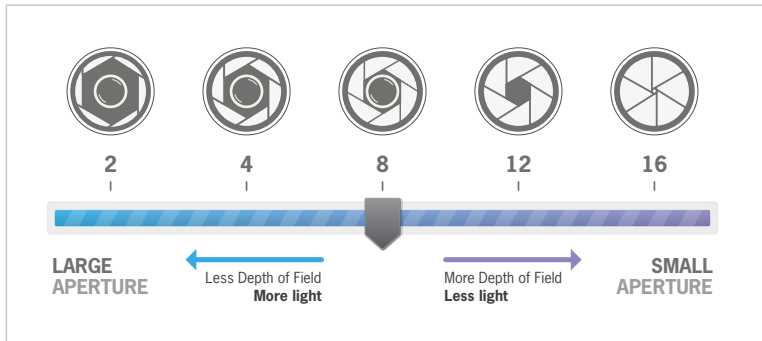
Using multiple bars and Angle Changers it's possible to illuminate large FoVs at big working distances.



OVERDRIVE BY DEFAULT



LENS APERTURE



If you need a large DoF you will need to close the aperture. If the aperture is small the amount of light entering the lens and going to the sensor is also small.

A BRIGHT ILLUMINATION allows the user to close the aperture, and increase the DoF.

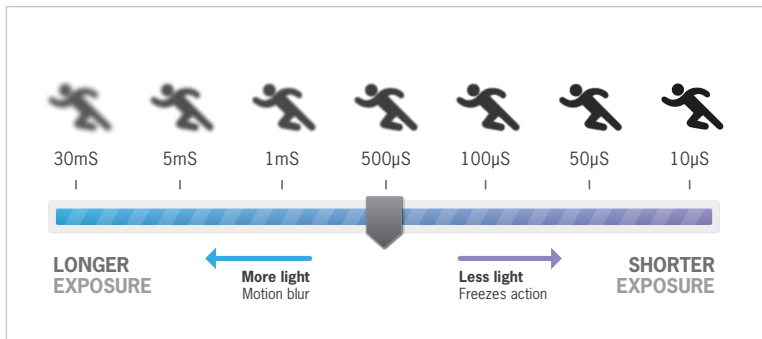
DEPTH OF FIELD



The Depth of Field (DoF) is the range of distances where the image is sharp and contrasted.

The Depth of Field is impacted by the lens aperture and the lens focal length.

EXPOSURE TIME



The shorter the exposure time, the more contrasted and sharp the image. Also, because of this short exposure time, less light is required to expose the camera's sensor.

A BRIGHT ILLUMINATION allows the user to reduce the exposure time, and to get a sharp picture.

MAXIMUM BRIGHTNESS

= lens aperture as closed as possible

= minimum exposure time



✓ **BEST DEPTH OF FIELD**

✓ **LESS DISTURBANCE FROM THE ENVIRONMENT**

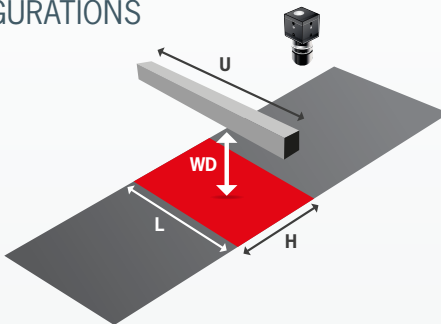
✓ **NO MOTION BLUR**

✓ ESTIMATING THE FOV COVERED FROM A DISTANCE ACCORDING TO THE CHOSEN M-BAR + ANGLE CHANGER CONFIGURATIONS

- **WD** is the Working Distance – distance between the M-BAR and the FoV
- **H** is the FoV size in a direction perpendicular to the bar length
- **L** is the FoV size in a direction parallel to the bar length
- **U** is the Useful length of the bar (125/250/375/500)

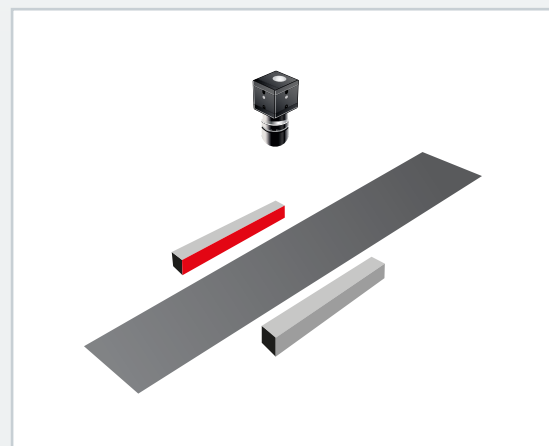
H and **L** can be estimated for a given **WD** by applying the following formulas:

	M-BAR	M-BAR+N	M-BAR+M	M-BAR+W
H =	$WD \times 24/100$	$WD \times 35/100$	$WD \times 60/100$	$WD \times 90/100$
L =	$(WD \times 24/100) + U$	$(WD \times 35/100) + U$	$(WD \times 60/100) + U$	$(WD \times 90/100) + U$



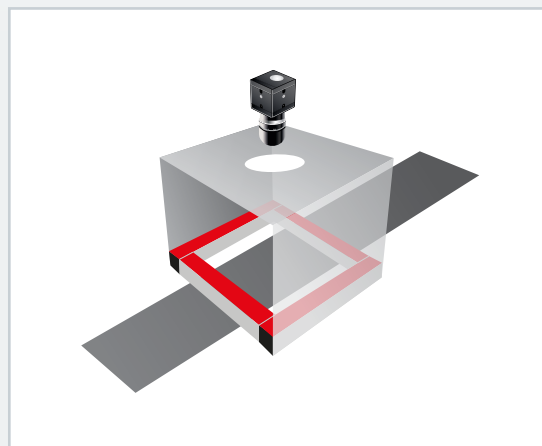
✓ USE THE **AC-EBAR-L** ANGLE CHANGER TO CREATE **DARKFIELD EFFECTS**

The Angle Changer Line version fitted on a M-BAR is the perfect combination when a darkfield effect is needed.



✓ USE THE **AC-EBAR-M** ANGLE CHANGER TO CREATE YOUR OWN **DOME**

Use 4x M-EBARs fitted with AC-EBAR-M angle changers inside a box, illuminating the ceiling of that box to create a good dome effect.



TECHNICAL DATA

M-EBAR	125	250	375	500
Connector	M12 – 5 pins – 24VDC/GND/PNP/NPN/DIM			
Power supply	24 VDC			
Consumption Continuous mode	0.3A	0.6A	0.9A	1.2A
Consumption Strobe mode	1.2A	2.4A	3.6A	4.8A
Overdrive max on-time*	30ms			
Max duty cycle (Overdrive)	20%			
Running modes	CW/Strobe Overdrive			
Useful length (mm)	126	251	376	501
Overall length (mm)	158	283	408	533
Weight (g)	255	476	698	919
Housing material	Aluminium/PMMA/PC/Brass			
LED colours	WHI 6500k , Red 630nm, Infrared 850nm			

*strobed with 20% duty cycle.

ANGLE CHANGERS

Size	125.45 x 38.60 x 3.3mm
Materials	ABS / PC / PVAL / TAC
Weight	max 7gr
Mounting method	Spring Clips
N° of filters needed per bar	Bar useful length / 125

OTHER TECHNICAL DATA

Temperature storing range	-20°C to +60°C (-4°F to +140°F)
Temperature use range	0°C to +40°C (32°F to +104°F)
Warranty	3 years see www.tpl-vision.com/warranty

ORDERING CODES

M-EBAR:

M-EBAR	LENGTH (mm)	COLOUR	ANGLE
	125	WHI	UN (ultra-narrow)
	250	630	
	375	850	
	500		

EXAMPLES:

- M-EBAR 125mm white LED → M-EBAR-125-WHI-UN
- M-EBAR 500mm red LED → M-EBAR-500-630-UN

M-EBAR + ANGLE CHANGERS (COMBO):

M-EBAR	LENGTH (mm)	COLOUR	ANGLE	COMBO
	125	WHI	UN (ultra-narrow)	CO
	250	630		
	375	850		
	500			

Each combo contains Angle Changers N, M, W, L with quantity of each = length/125. eg M-EBAR 500 mm contains 4x angle changers of each of the 4 types.

EXAMPLE: Combo M-EBAR 125mm white LED
→ M-EBAR-125-WHI-UN-CO

CONTENT:



ACCESSORIES

CABLES:

2 meters: **C-M12-5P-2M**

5 meters: **C-M12-5P-5M**

10 meters: **C-M12-5P-10M**

MOUNTING DEVICE:

ref: **SWIVEL-MOUNT**

ANGLE CHANGERS:

AC-EBAR	ANGLE	EXAMPLES:
	N (narrow angle)	• Narrow Angle Changer → AC-EBAR-N
	M (medium angle)	• Medium Angle Changer → AC-EBAR-M
	W (wide angle)	
	L (line light)	N° of Angle Changers needed = bar useful length/125
	T (TRANSPARENT)	

ANGLE CHANGERS POLARISED:

AC-EBAR	ANGLE	POLARISER
	N (narrow angle)	P1
	M (medium angle)	
	W (wide angle)	
	L (line light)	

EXAMPLE:

- Narrow AC with polariser
→ AC-EBAR-NP1

POLARISER ONLY:

AC-EBAR	POLARISER	RESULT:
	POL1	→ AC-EBAR-POL1

SMALL COMBO OF ANGLE CHANGERS:

AC	CO	SM	B
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CONTENT OF THE COMBO:

[8x AC-EBAR-N | 8x AC-EBAR-M | 8x AC-EBAR-W | 8x AC-EBAR-L
4x AC-EBAR-POL1 | 4x AC-EBAR-T | 4x AC-EBAR-BK* | 1x AC-EBAR-B**]

* AC-EBAR-BK = Black Angle Changer. Only available as part of Angle Changer Combos.

** AC-EBAR-B = Briefcase.