

# M18 AC Photoelectric Switches MV



Compact ø18 x 80 mm barrel type photoelectric switches for AC operation

- Diffuse, retro-reflective, polarised, through-beam optical fibre models and background suppression
- 16m and 32m through-beam types
- Wide AC supply voltage 20-240VAC
- IP67 plastic housing
- Rear mounted LED operation indicator
- Low leakage triac output with transient protection
- Plug-in models for use with low voltage
- UL and CUL approved



## Options and ordering codes

<b>MV</b>		<b>2</b>	<b>/</b>	<b>A</b>	<b>0</b>	<b>-</b>	<b>0</b>	<b>A</b>
AC multivoltage photoelectric switches ø18mm								
	<b>MV</b>							
10cm diffuse		<b>2</b>						
20cm diffuse		<b>4</b>						
40cm diffuse		<b>6</b>						
50mm sensing background suppression		<b>0</b>						
100mm sensing background suppression		<b>1</b>						
4m retro-reflective		<b>C</b>						
3m polarised retro-reflective		<b>P</b>						
Transmitter		<b>E</b>						
16m standard receiver		<b>R</b>						
32m long distance receiver		<b>D</b>						
Optical fibre		<b>F</b>						
				<b>A</b>				
				<b>0</b>				
								<b>A</b> Standard cable exit
								<b>E</b> M12 plastic plug*
							<b>0</b>	Plastic housing
				<b>A</b>				NO output state
				<b>0</b>				Transmitter

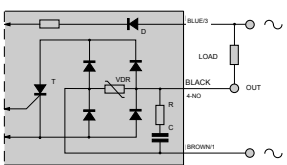
Please contact IMO for details of the many other options available, including the MQ range which gives right angle viewing with no loss of performance

**Add suffix 'UR' for UL approved models**  
\*Plug exit E for 24VAC supply only

## Output circuit

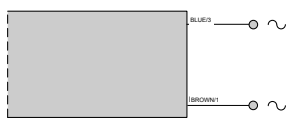
### TRIAC output

MV\*/0-\*\* model



### Transmitter

MVE/00-\*\* model



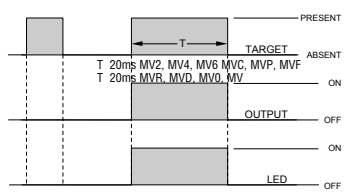
**PARALLEL connection**  
In the parallel connection of more outputs it is necessary to consider the maximum leakage current (1.5mA to 240 VAC) referred to load and supply values for computing the maximum number of sensors which can be connected.

Note: in order to ensure a long life of the output stage it is necessary to avoid short circuits. Further, the load current should never exceed the specifications value.

## Timing chart

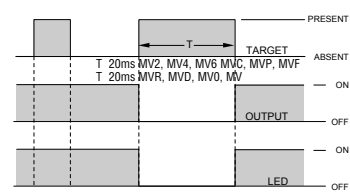
### NO output (normally open)

MV\*/A0-\*\* model



### NC output (normally closed)

MV\*/C0-\*\* model



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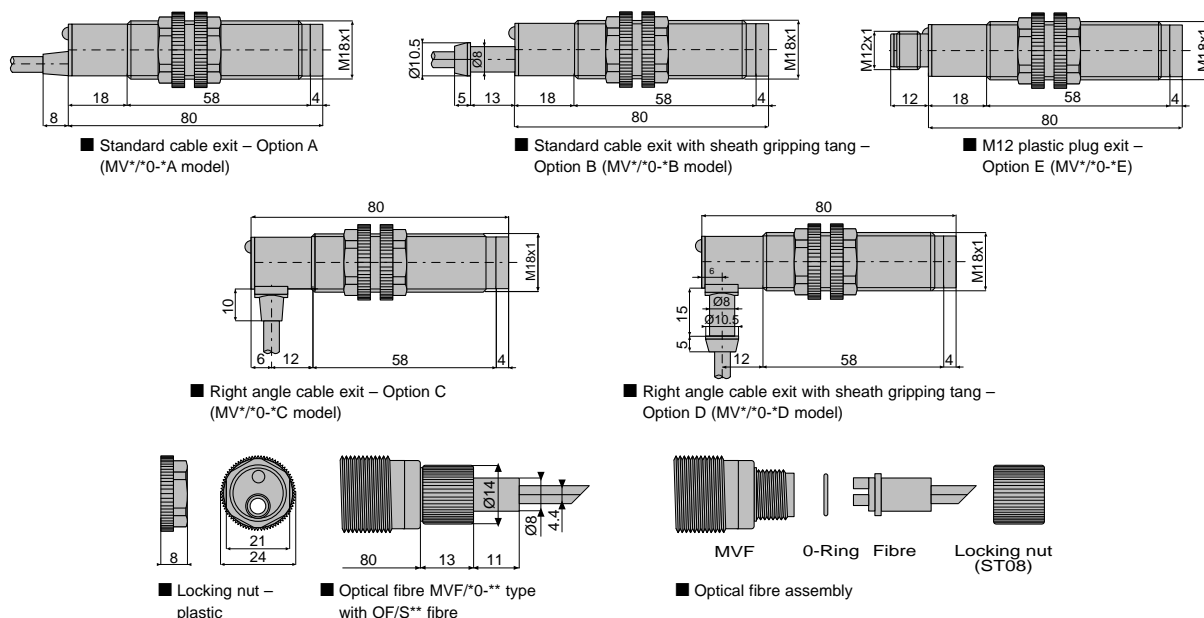
continued

## Specification

Type	diffuse			b/supp		retro-reflective	polarised	through-beam		optical fibre
Models	MV2	MV4	MV6	MV0	MV1	MVC	MVP	MVE-MVR	MVE-MVD	MVF
Sensing range	10cm <sup>(1)</sup>	20cm <sup>(1)</sup>	40cm <sup>(2)</sup>	50mm	100mm	4m <sup>(3)</sup>	3m <sup>(3)</sup>	16m <sup>(4)</sup>	32m <sup>(4)</sup>	20-400mm
Emission	infra-red					red		infrared		red
Hysteresis	10%									
Repeatability	5%									
Tolerance	+15% - 5% of the sensing range									
Supply voltage	20 - 240 VAC									
Frequency	50 - 60 Hz									
Max consumption	MVR/MVD, 15mA rms Other models 30mA rms									
Response time	20ms	20ms	20ms	20ms	20ms	20ms	20ms	20ms	20ms	20ms
Output type	TRIAC - NO or NC									
Load current	300 mA RMS (at 50 °C)									
Residual output voltage	3V max. IL = 300 mA									
Leakage current	1.5 mA RMS max (V supply = 240VAC)									
Non-repeating current peak	6 A (Ton = 10ms)									
Minimum load current	5 mA RMS									
Time before switch operation	200 ms									
LED status indicator	yes (at the rear)									
Insulation resistance	> 1000M Ohm to 1000VDC									
Dielectric strength	2000VAC 50Hz for 1 Minute									
Noise immunity	1000V (IEC 801-4, II)									
Protection degree	IEC IP67									
Materials	housing: polyamide (nylon), lenses - acrylic, cable exit: polycarbonate									
Operating temperature	-25° + 70 °C (without freeze)									
Interference by external light	3000 lux (artificial light), 10000 lux (sunlight)									
Tightening torque	1 Nm (10kgcm), (plastic housing); 40Nm (408 kgcm), (metal housing)									
Ambient humidity	35-85% r.h.									
Weight (approx.)	90 gr.	90 gr.	90 gr.	90 gr.	90 gr.	90 gr.	175 gr.	175 gr.	175 gr.	90 gr.

<sup>(1)</sup> referred to 100x100mm white matt paper; <sup>(2)</sup> referred to 200x200mm white matt paper; <sup>(3)</sup> with ø80mm reflector (RL110 supplied separately); <sup>(4)</sup> minimum detectable target ø7.5mm

## Dimensions (mm)



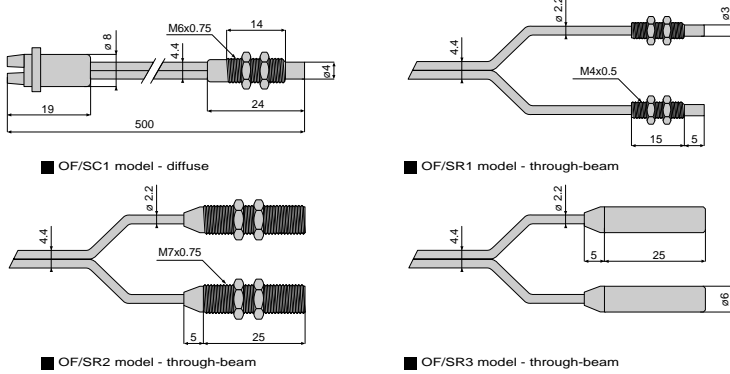
# M18 AC Photoelectric Switches MV



continued

## Dimensions (mm) continued

Red LED showing the output state on MV2, MV4, MV6, MVC, MVP, MVR, MVD, MVF models;  
MVE model equipped with LED showing the presence of power supply.  
Cable:  $\phi 4.7$ mm, 2m length, 0.34mm<sup>2</sup> conductor section PVC material



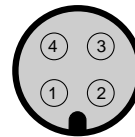
Each model is also available with fibre length of 1m (OF/S\*\*1 model) and 2m (OF/S\*\*2 model)

## Optical fibre

type	diffuse <sup>(2)</sup>	through-beam	through-beam	through-beam
models	OF/SC1	OF/SR1	OF/SR2	OF/SR3
sensing range <sup>(1)</sup>	20mm	40mm	400mm	400mm
fibre head	M6x0.75	M4x0.5	M7x0.75	$\phi 6$ mm unthreaded
fibre	500mm standard length - 1mm $\phi$ active fibre			
operating temperature	-10° +70 °C			
materials	fibre: methacrylate - sheath: polyethylene - fibre head: aluminium			

## Connectors

M12

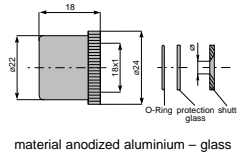


(1) referred to MVF photoelectric switch – (2) can be used in retro-reflective version also

## Accessories

Type	Code
Swing mount bracket	ST02
Axial mount bracket	ST18-A
Right-angle mount bracket	ST18-C
Antidust front	ST30
Right angle beam adapter	ST03
Shutter	ST0S*
Protective front	ST50
Reflectors	see RL leaflet
Right angle beam adapter for OF/SR2 fibre	ST28

### Shutter $\phi 18$ mm

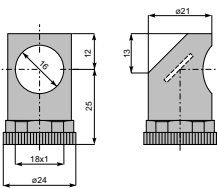


material anodized aluminium – glass

This accessory, available for through-beam photoelectric switches  $\phi 18$ mm, reduces the emitted beam allowing the detection of small targets (down to 1mm). The shutter consists of a threaded ring nut, a protection glass, an O-ring and an aperture to be screwed on the optical head of both transmitter and receiver.

Shutter code	ST0S2	ST0S3	ST0S4	ST0S6	ST0S8
$\phi$ shutter aperture (mm)	2	3	4	6	8
MVE/MVR sensing range (m)	0.8	1.8	3.2	6.5	N/A
$\phi$ min. detectable object (mm)	1	1.5	2	3	N/A
MVR/MVD sensing range (m)	1.5	3.5	6.5	15	26
$\phi$ min. detectable object (mm)	1	1.5	2	3	4

### Right angle beam adapter $\phi 18$ mm



material ABS

For directing the photoelectric detection at 90° to the photoelectric switch optical axes for  $\phi 18$ mm\* sensors.

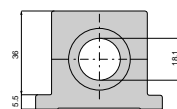
This accessory consists of an internal threaded body to be screwed on the optical head of the photoelectric switch.

The mirror inside the body is set at 45° to the optical axes of the sensor allowing detection at 90°.

The sensitivity loss is approx. 20-30%.

\*Not for diffuse types.

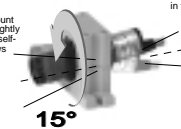
### Swing mount bracket $\phi 18$ mm



material ABS

For easy mounting and alignment of retro-reflective and through-beam photoelectric switches  $\phi 18$ mm:

- fasten the mount bracket and tightly tighten the 4 self-tapping screws
- direct the photoelectric switch to find the optimum position. The accessory allows rotation in all directions at an angle of 15° max.
- clamp the 4 screws in the defined position



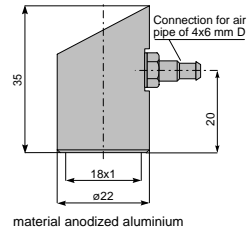
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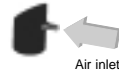
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## Accessories continued

### Antidust front $\varnothing 18\text{mm}$ (ST3 $\varnothing$ model)

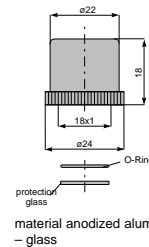


This is used to prevent dust or other deposits on the lenses of photoelectric switches  $\varnothing 18\text{mm}^*$ , thus ensuring constant detection is maintained. It consists of a threaded body with a side air inlet pipe. The sensitivity loss is approx. 30%.



\*not for diffuse types

### Protective front $\varnothing 18\text{mm}$ (ST5 $\varnothing$ model)

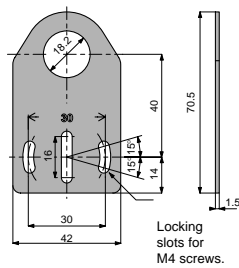


For the protection of the lenses of photoelectric switches  $\varnothing 18\text{mm}^*$ . It allows use of the sensor even in particularly aggressive conditions (presence of chemical solvents etc.)

The system consists of a threaded metal body, an O-ring and a protection glass. The sensitivity loss is approx. 25%.

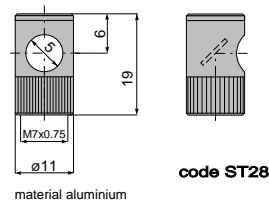
\*not for diffuse types

### Axial mount bracket (ST18-A model)



Locking slots for M4 screws.

### Right angle beam adapter for OF/SR2 fibre

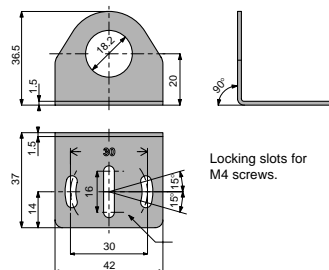


code ST28

The ST28 accessory is used for directing the photoelectric detection through  $90^\circ$  from the fibre optical axes. It consists of a threaded body to be screwed on the optical head of the sensor.

The mirror inside the body is set at  $45^\circ$  to the optical axes allowing detection at  $90^\circ$ . The sensitivity loss is approx. 20-30%.

### Right angle mount bracket (ST18-C model)



Locking slots for M4 screws.

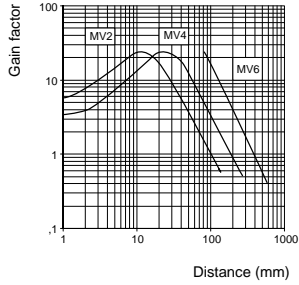
# M18 AC Photoelectric Switches MV



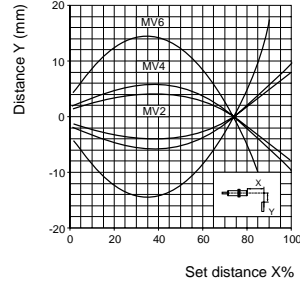
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## Characteristic curves

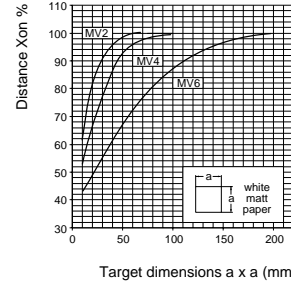
**MV2-MV4-MV6 Excess gain**



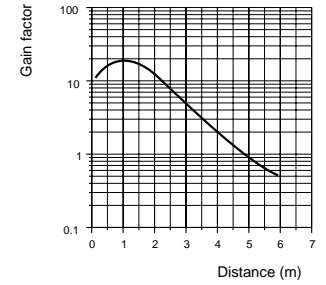
**MV2-MV4-MV6 Parallel displacement**



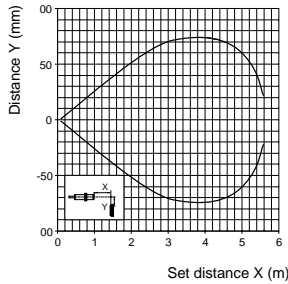
**MV2-MV4-MV6 Distance/target size**



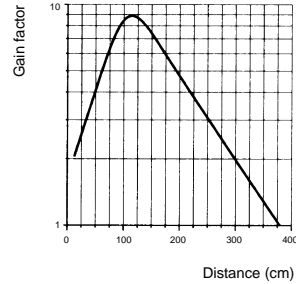
**MVC Excess gain**



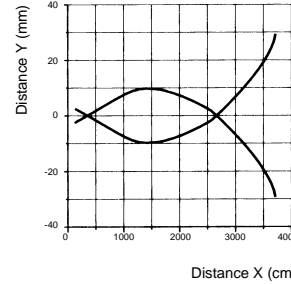
**MVC Parallel displacement**



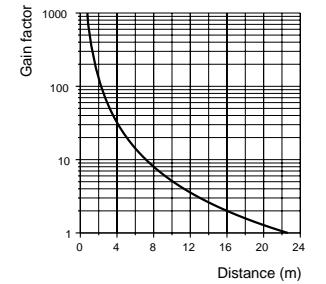
**MVP Excess gain**



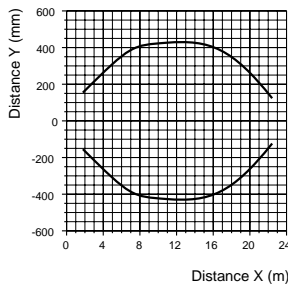
**MVP Parallel displacement**



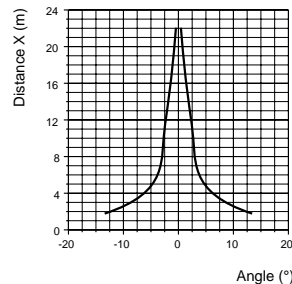
**MVE-MVR Excess gain**



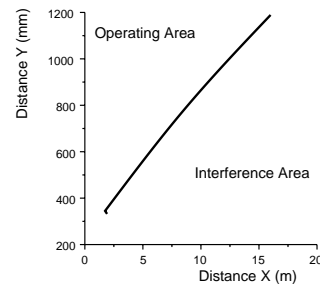
**MVE-MVR Parallel displacement**



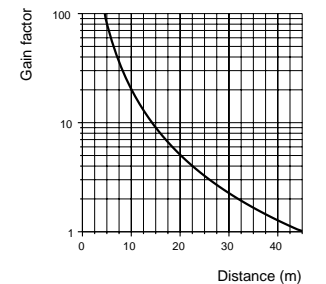
**MVE-MVR Angular displacement**



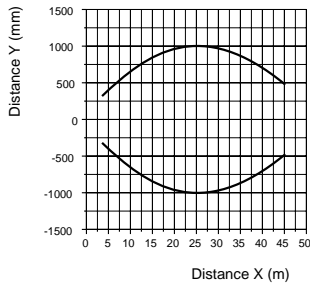
**MVE-MVR Mutual interference**



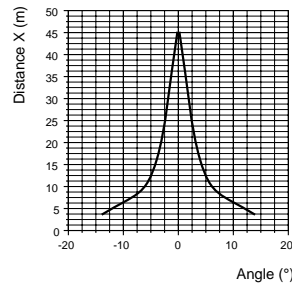
**MVE-MVD Excess gain**



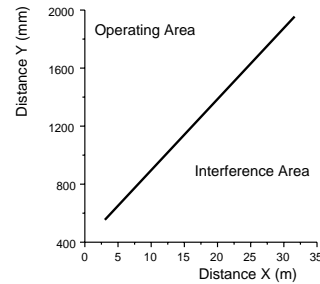
**MVE-MVD Parallel displacement**



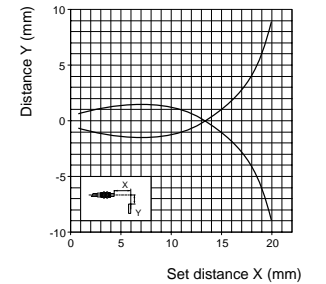
**MVE-MVD Angular displacement**



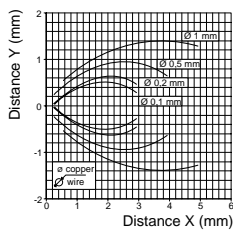
**MVE-MVD Mutual interference**



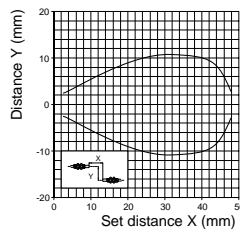
**OF/SC1 Parallel displacement**



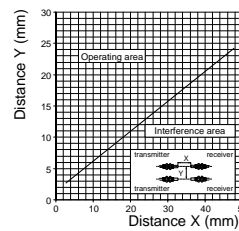
**OF/SC1 Min. target displacement**



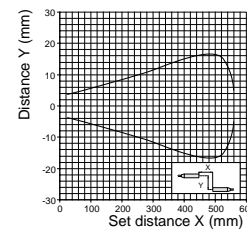
**OF/SR1 Parallel displacement**



**OF/SR1 Mutual interference**



**OF/SC2-OS/SR3 Parallel displacement**



**OF/SC2-OS/SR3 Mutual interference**

