Eagle PIR-018 / PIR-045 / PIR-100 Outdoor Passive Infrared Detectors

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Description

The Eagle Series of PIR-018, PIR-045 and PIR-100 Outdoor Passive Infrared Detectors are designed for detection of intruders at distances 18, 45 or 100 metres respectively. The Eagle PIR-018 is a so-called volumetric detector, i.e. it covers a large surface with a wide angle. It has a nominal range of 18 metres. The Eagle PIR-045 and PIR-100 are long range curtain type detectors, i.e. they cover a long narrow area with a nominal range of up to 45 and 100 metres.

The detectors incorporate microprocessor controlled signal processing including signal shape analysis, adaptive threshold level by feedback of environmental effects, temperature compensation and rejection of disturbance signals.

The Eagle PIR detectors are designed to be used in conjunction with a CCTV system where they can alert the operator of any motion in the covered area. They are also very useful in combination with a Video Motion Detector (VMD) where the two units provide a mutual alarm verification, i.e. both units must detect an intruder before an alarm is raised.

The Eagle PIR-045 and PIR-100 are typically used for perimeter protection and securing of long buildings whereas the Eagle PIR-018 is used for securing open spaces e.g. in front of a building.

Since the Eagle PIRs only react to infrared radiation, they can be used during day and night as well as under changing climatic conditions such as fog, rain and snow.

The Ernitec Eagle PIRs are truly passive devices which detect objects entering or crossing their field of view. The detectors are designed to detect any intruder by his movement and infrared contrast against the background. The detectors do not emit any signal, nor do they require a transmitter to be located nearby. This eliminates interference between detectors and prevents potential intruders from detecting the coverage area. Multiple detectors can be combined in order to increase the coverage area.

Detection Algorithm

The background noise is sampled at a rate of approx. 300 per second and averaged over a large number of cycles giving a noise dependent value for the alarm threshold and to start the signal shape analysis whenever a certain amplitude value is exceeded.

If the threshold has temporarily been increased by high background noise or repeated movements in the field of view, the exponential decay of the threshold level to its original value will take approx. 1-2 minutes from the end of the event.

Once the first threshold level value has been exceeded, the microprocessor starts its signal shape analysis routine where a number of interdependent parameters including peak amplitude, rate of rise, time windows and overall shape are calculated and analysed.

If the rate of rise of the signal is too high, as may happen as a result of RF interference, lightning, shock waves or birds flying across the field of view close to the unit, a possible alarm will be rejected. This also means that a very fast movement directly in front of the detector may not lead to an alarm even though the amplitude would be large enough.

Only if a signal meets all the predetermined criteria an alarm will be generated.

The Eagle PIR detectors have differential sensors which - in combination with the Adaptive Threshold Decoding - minimize the probability of nuisance alarms. Any change in the background temperature will be detected by both parts of the differential sensors and will not give an alarm, whereas an intruder will provoke a sequential change of infrared radiation in the two parts of

the differential sensors, hence generating an alarm.

The Eagle PIR-100 has three Zones for long, medium and short range detection with individual signal processing of the three channels for exceptional detection to nuisance alarm ratio.

The three Eagle PIRs are furthermore equipped with automatic temperature compensation circuits. The Eagle PIRs detect radiation differences of a target against its background. In the course of the day and year the contrast of a person will vary considerably and affect the signal strength. To compensate for this contrast variation, the Eagle PIRs have internal temperature compensation with maximum sensitivity at approx. 30°C (where the contrast of a human target is weakest) and gradual reduction at higher and lower temperatures. Finally, the Eagle PIRs are also equipped with Adaptive Threshold Decoding (ATD). The background noise is constantly averaged and used to adjust the threshold levels for the alarm. This special feature is reducing the probability of nuisance alarms caused by wind, moving vegetation or objects that have a thermal contrast although usually weaker than a person.

Each signal exceeding a certain minimum value will activate the ATD and increase the threshold levels depending on its strength. The time constants for increase and decrease are chosen in a way to adapt to gradual changes. Signals generated by a person moving within the specified speed range, however, are fast enough for detection.

Repeated movement of any kind within the field of view is therefore activating the ATD, reducing the overall sensitivity.

The Eagle PIR detectors feature a tamper switch which is activated whenever the device is opened. This allows the security guards to identify any attempt to disable the Eagle PIR detector. Moreover, the guards will be alerted if the unit is out of service due to maintenance work.

Installation
These Eagle PIRs feature an integrated bracket suitable for either pole or wall mount installation.

An optional PC-based software is available for installation and servicing purposes. The software is included with the PIR-IF485 Interface Module which provides an interface between the PC and up to 32 Eagle PIRs.

The installation software provides a possibility for changing the settings of the Eagle PIRs without having to open the device itself. The software also incorporates a "scope" function which shows the amplitude of the measured infrared signal as well as the thresholds. This makes the fine-tuning of the detectors much easier and more accurate.
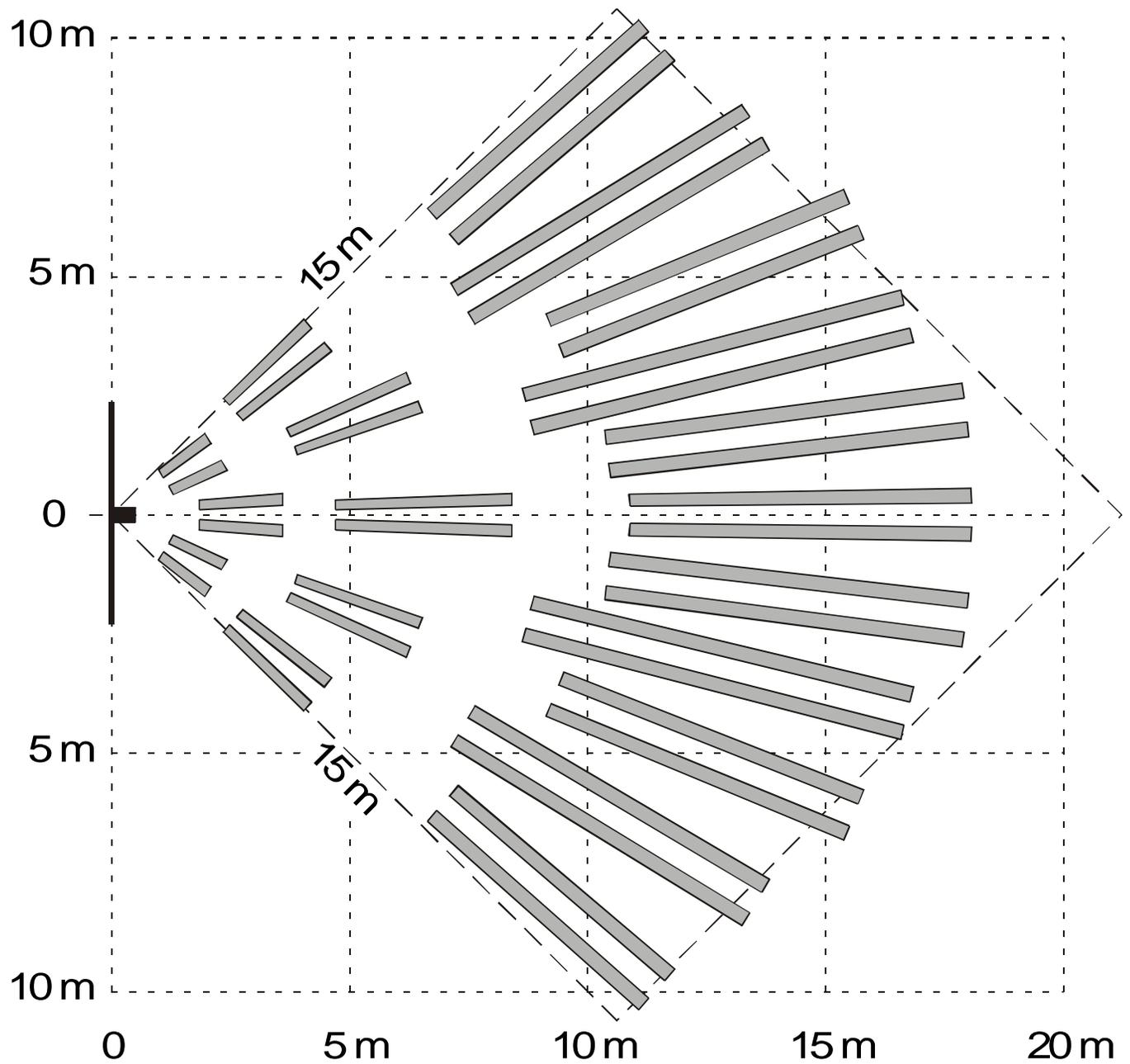
Accessory PIR-IF 485A Interface module and communication software for use with a PC.
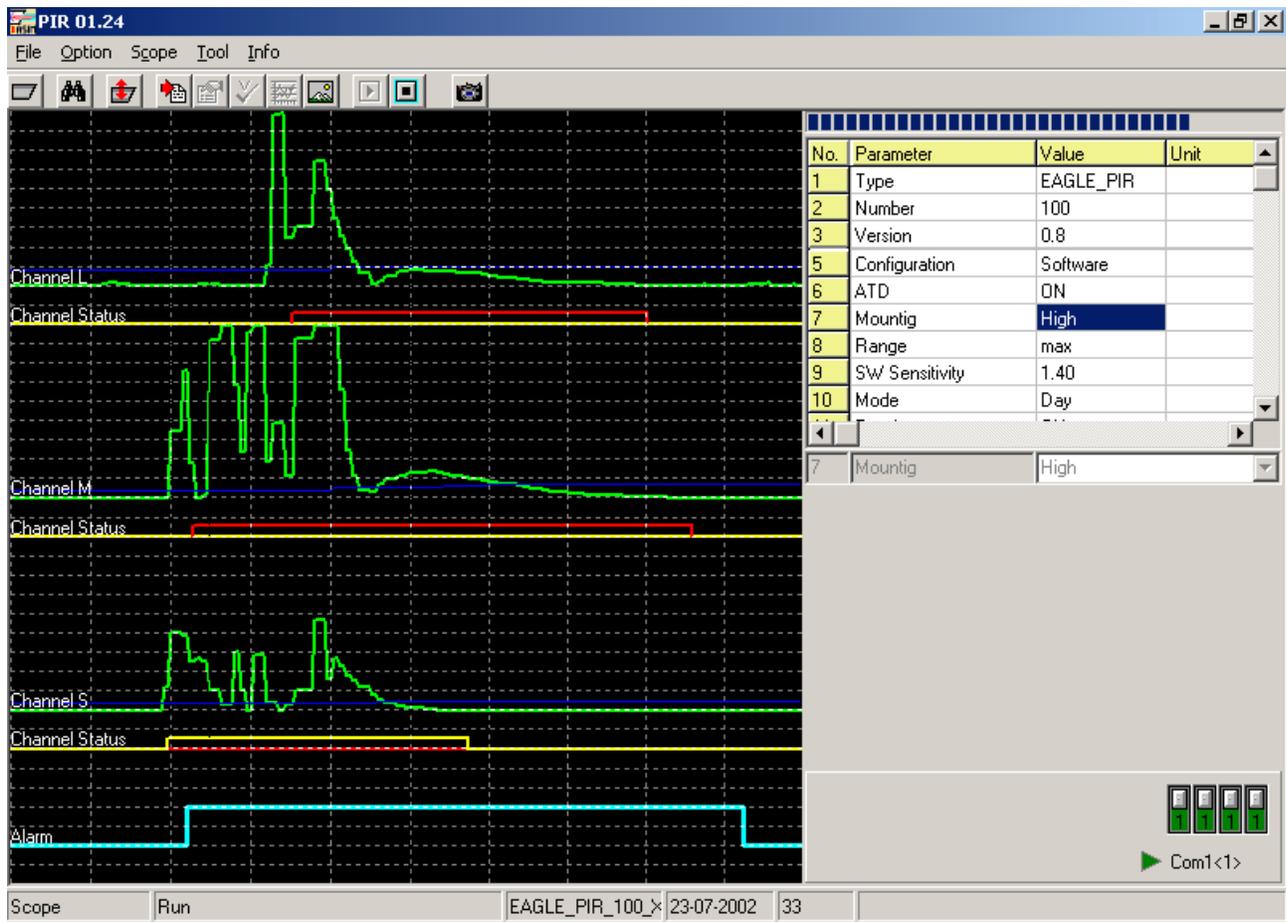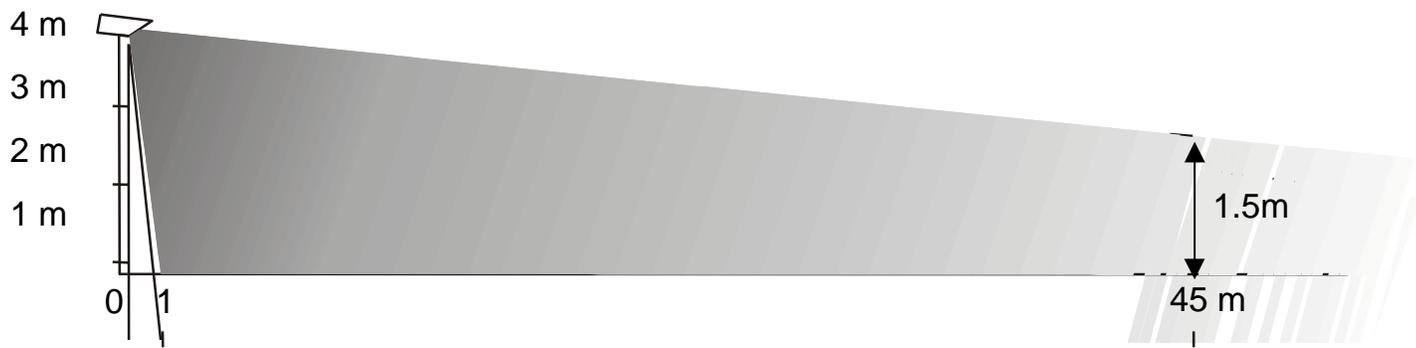

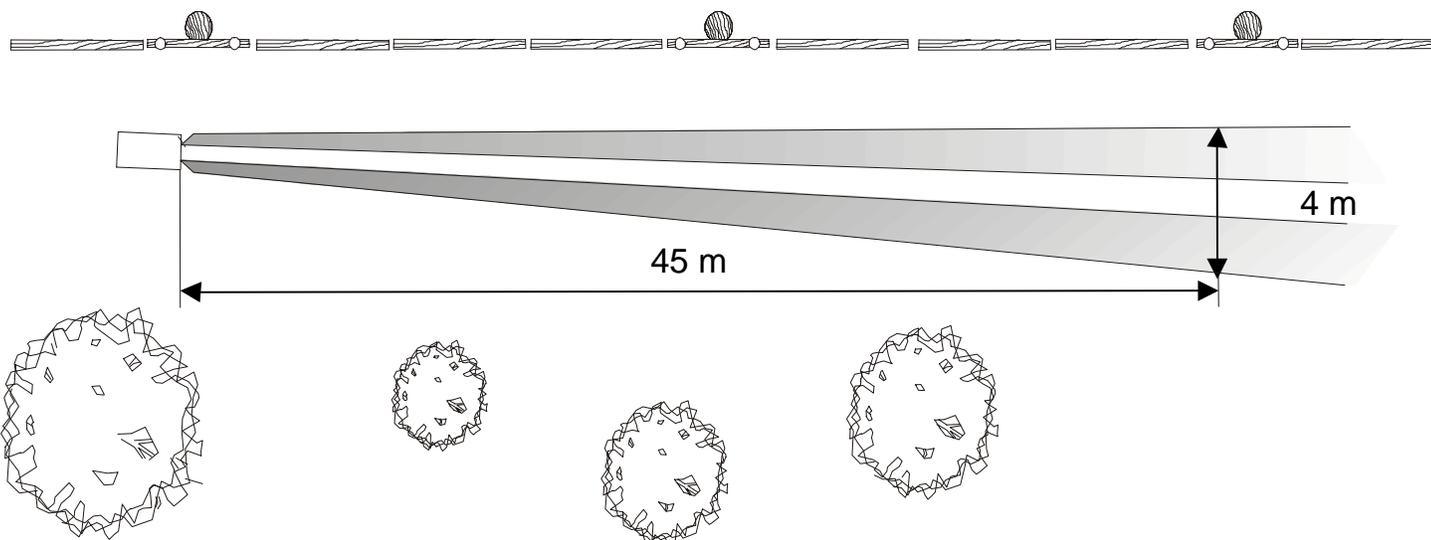*Example of the scope function display included in the PC software*
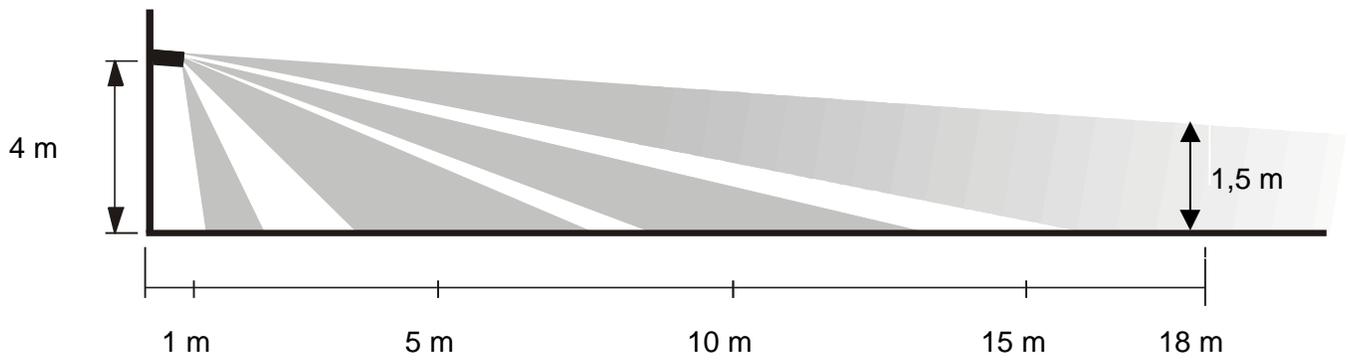
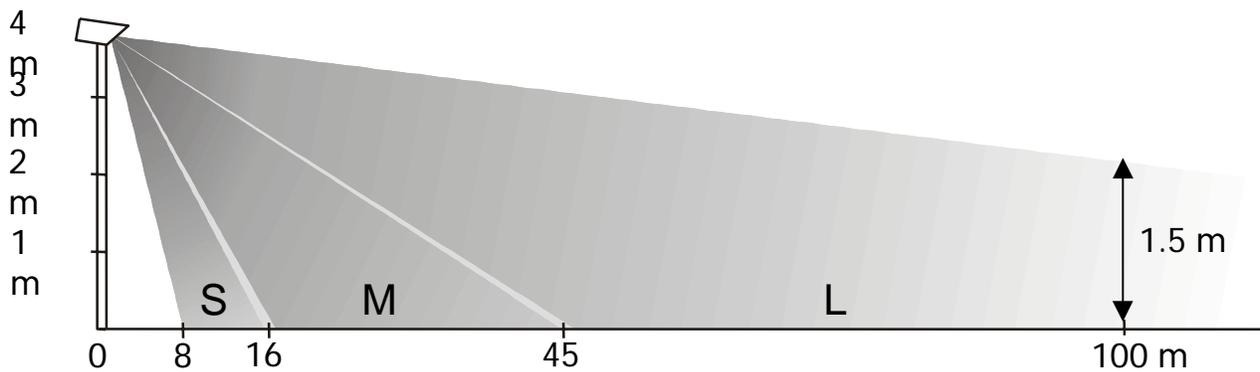*Typical side view of the detection area of the Eagle PIR-018*

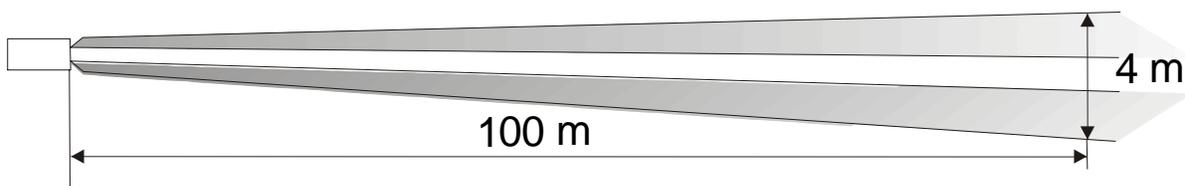*Typical top view of the detection area of the Eagle PIR-018*

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Typical side view of the detection area of the Eagle PIR-045

Typical top view of the detection area of the Eagle PIR-045

Typical side view of the detection area of the Eagle PIR-100

Typical top view of the detection area of the Eagle PIR-100

Specifications

Optical Specifications	Eagle PIR-018	Eagle PIR-045	Eagle PIR-100
Nominal/Max. range:	18/20 m	45/60 m	100/140 m
Spectral response:	8 – 14 µm, double filtering		
Sensor type:	Differential pyroelectric		
Field of view:	Please see diagrams showing field of view		
Min. speed of object for detection:	0.2 m/ sec.		
Max. speed of object for detection:	5 m/sec.		
Alarm Output			
Output types:	SPST Relay and Open Collector Transistor		
Maximum voltage, relay:	28 V DC / 20 VAC		
Maximum current, relay:	250 mA		
Maximum voltage, transistor:	60 V		
Maximum current, transistor:	20 mA		
Other alarm indications:	RS-485 Interface		
Electrical Specifications			
Supply voltage:	10.5 to 28.0 V DC		
Current consumption:	Typ. 20 mA @ 12 V DC		
Warm-up time:	Approx. 1 min.		
Environmental Specifications			
Operating temperature range:	- 20° C to + 60° C		
Relative humidity:	< 95%		
Sealing:	IP53 / IP64*		
EMC / EMI:	EN 50081, EN 50130-4		
Mechanical Specifications			
Weight:	Approx. 900 g		
Cable feed-through:	2 pcs PG11 (6 - 9 mm)		
Dimensions:	Please see diagram below		
Housing material:	Heavy duty plastic		
Recommended installation height:	2.5 to 4.0 m		
Mounting:	Pole or wall mount with integrated bracket		
Optional Accessories			
PC Installation software incl. 485 converter:	PIR-IF485		

*The housing itself is IP64. The cable gland is IP53. The cable entry may not be modified as this may cause condensation within the unit.

Due to Ernitec's continuous improvement of products, the specifications are liable to change without notice.

Please note! For a reliable operation of the detector, an accurate alignment and a stable installation are required.
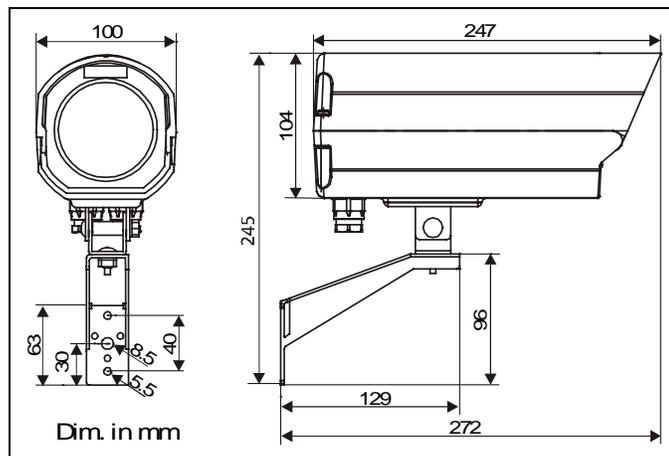

Dimensions for Eagle PIR-018, Eagle PIR-045 and Eagle PIR-100

Applications

The Eagle PIR is set up along perimeters and long buildings. The alarm output can trigger a CCTV system so that e.g. a PTZ camera automatically zooms in on the area covered by the Eagle PIR.
At the same time, the security staff is alerted and can follow the intruder on a monitor. The alarm output can also be used to initiate a call sequence on a PSTN or ISDN based video transmission system.
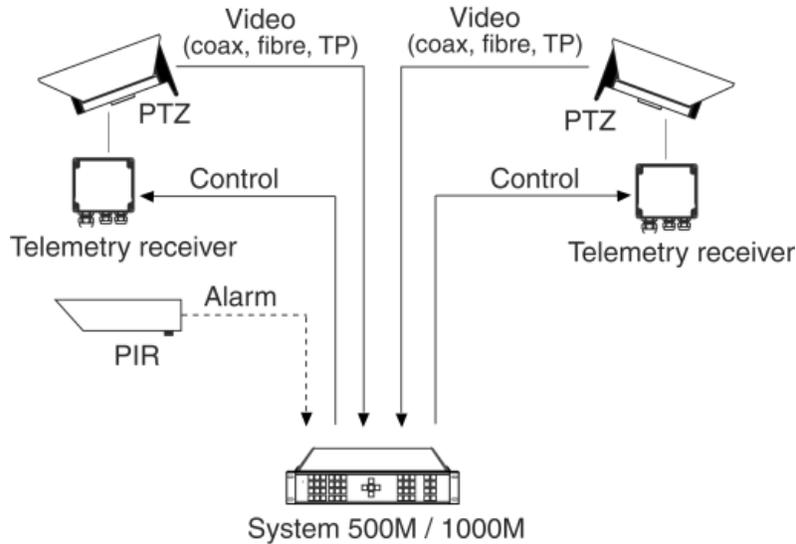
Application diagram of the Eagle Outdoor Passive Infrared Sensors
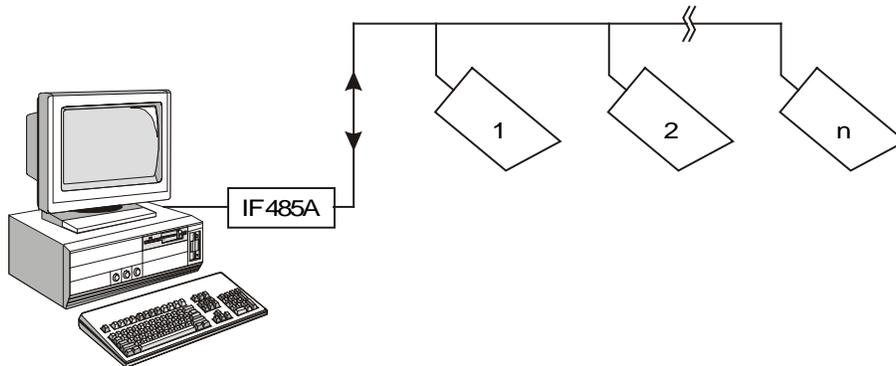
Application example showing how multiple Eagle PIRs can be connected to one PC with the installation software