

Occupancy detector

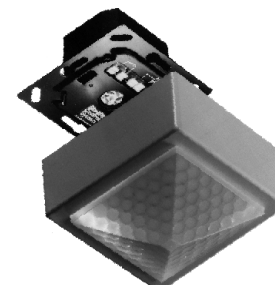
with daylight sensor

FR-A180

FR-A360



FR-A180



FR-A360

Occupancy detector with integral daylight sensor for demand-based control of HVAC systems and lighting.

- Adjustable switch-on and switch-off delay
- Adjustable daylight-response threshold
- Direct switch-control of lighting up to 1800 W.
- Suitable for connection to controllers with stand-by or energy hold-off inputs

Use

Scope and limitations

The occupancy sensors are ideal for use in areas where moving infrared sources (people, vehicles etc.) represent a significant criterion for the control of lighting and HVAC systems. Typical fields of application include school buildings, hospitals, museums, offices, laboratories, conference rooms, side rooms, factories and warehouses.

Fluorescent lighting up to 1800 watts (and filament or halogen lamps up to 1150 watts) can be switched on and off without auxiliary relays. In principle, there is no need to install conventional light-switches. In areas where occupants are seated, it essential that full coverage is provided by occupancy sensors to ensure that every movement is registered. Aisles, gangways or infrequently used perimeter areas, by contrast, may be allowed to fall outside the coverage area.

The following restrictions should be noted :

- The use of occupancy sensors in libraries, reading rooms or in archive rooms with shelves arranged in close proximity should be avoided.
- A manual switch or independently operated desk-lamp should be provided in areas where lighting is critical.
- For special applications (e.g. cold stores) please consult your local Landis & Staefa office.

Suitable lamps and luminaires

Operation with dimmers and electronic low-voltage transformers does not present any problems. The type of ballast device used (capacitive, inductive, electronic) is irrelevant.

- The following are suitable: fluorescent lamps or energy-saving lamps
- Use with the following is not recommended: filament or halogen lamps

Note

Although not recommended, it is possible to use the daylight control function in conjunction with filament or halogen lamps, but only if the artificial lighting level is below the preset lux value, or where the daylight sensor is located sufficiently far away from the source of artificial light. (Otherwise oscillation (flashing at 10-minute intervals) can be set up).

Functions

The FR-A180 and FR-A360 occupancy sensors combine a PIR (**Passive InfraRed**) sensor and a daylight sensor in a single compact unit.

- The occupancy sensor (PIR sensor) responds to moving heat sources (people, vehicles etc.). It is optimised to enable it to detect the low-level activity of sedentary workers.
- The light sensor measures daylight intensity. It is capable of distinguishing between daylight and fluorescent lighting or lighting from energy-saving lamps.

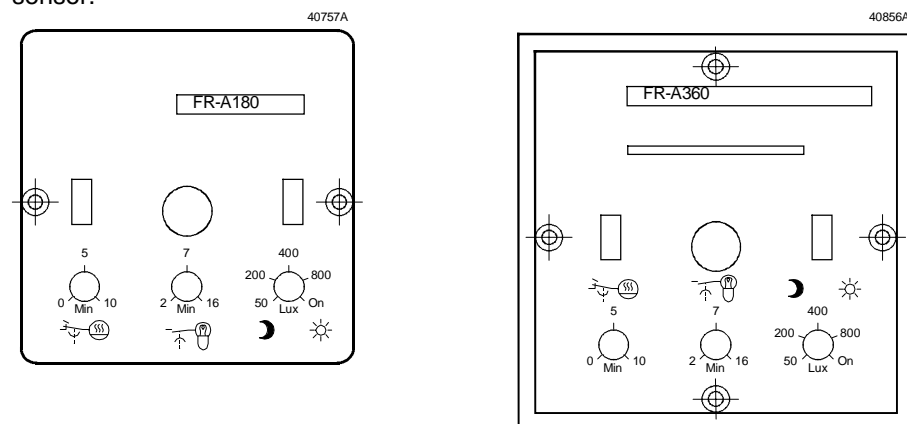
Two switching outputs are provided, to enable lighting and HVAC to be controlled independently :

- The **N/O lighting** contact closes when the measured daylight intensity is below the preset value and when movement is detected by the occupancy sensor. It opens either when the daylight intensity is above the preset value or when no movement is detected by the occupancy sensor.
- The **HVAC** contact (N/C) opens when the occupancy sensor detects movement and closes when no movement is detected. It is therefore suitable for occupancy-based control in individual room control systems.

If the level of illumination in an **occupied** room exceeds the preset lux value a switch-off delay is activated; if it falls below the preset value, a switch-on delay is activated. This prevents the lighting being switched on and off in response to very short-term changes, such as passing clouds.

Adjustments

The response threshold for the daylight sensor and the switch-on and switch-off delays for lighting and HVAC can be adjusted on potentiometers located on the back of the sensor.



- "**Lux**" potentiometer (right)
Daylight sensor threshold: 50 lux ... ∞ lux. In work areas the setting should be 400 lux, while in perimeter areas, a setting of 50 lux is sufficient.
- "**Min**" potentiometer (centre)
Minimum switch-off delay for lighting: range 2 ...15 minutes
HVAC switch-off delay: 8 ... 60 minutes. The switch-off delays for lighting and HVAC are permanently linked. The selected minimum delay-times define the period after which the lighting and the HVAC system will be switched off if no movement is registered by the occupancy sensor.
The switch-off delay for the lighting is adaptive (self-learning). If the occupancy sensor detects only slight and infrequent movements, the programmed minimum switch-off delay is increased to 15 minutes. The device also "learns" from incorrect decisions. Thus, the switch-off delay will also be increased if the sensor detects a movement shortly after the lighting has been switched off.
- "**Min**" potentiometer (left)
HVAC switch-on delay: 0 ...10 minutes
The lighting is switched on without a delay.

Type summary

The occupancy detectors are available in 2 versions:

FR-A180 Detector for wall-mounting, coverage 180°, 45° vertical

FR-A360 Detector for ceiling-mounting, coverage 360°, 30° angle of incidence

Ordering

When placing an order, please specify the quantity, product description and type code.

Example :

6 occupancy detectors FR-A180

Equipment combinations

Operation with dimmers and electronic low-voltage transformers is trouble-free. The occupancy detectors are suitable for direct switching of fluorescent lamps (FL) or energy-saving lamps (PL). Any type of ballast device is suitable (capacitive, inductive, electronic). Filament or halogen lamps are unsuitable.

Technical design

Both devices consist of an identical power section which also accommodates the connection terminals, and a plug-in sensor unit. The FR-180 and FR-A360 are distinguished by their shape, coverage and location in the room. The sensors have a white plastic cover plate fitted with a transparent Fresnel lens.

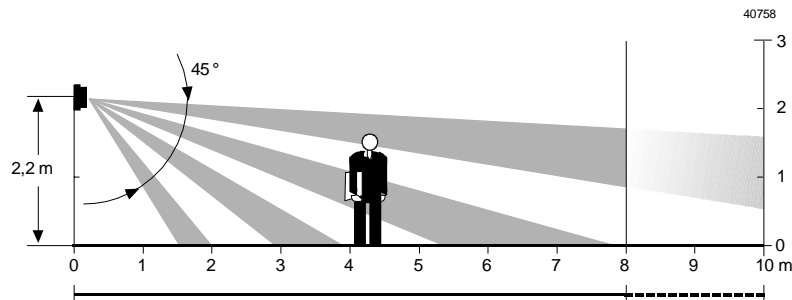
Engineering notes

FR-A180 wall-mounted sensor

Positioning the occupancy sensors

Installed at a height of 1.6 ... 2.2 m, the FR-A180 occupancy sensor detects movement within an area of 8 x 8 metres. In smaller spaces, it can be installed lower (in the place normally occupied by the light switch). In public areas or locations where there is a risk of vandalism, the sensors should be installed out of reach.

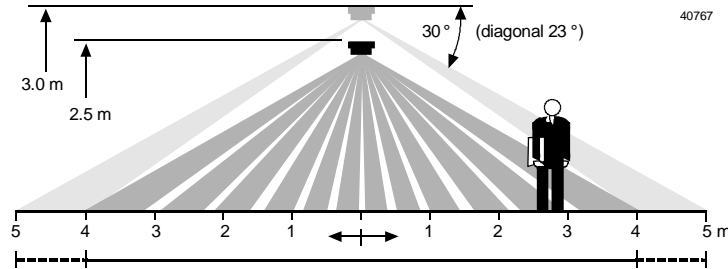
Sensitivity is reduced when the range to be monitored exceeds 8 m. By careful positioning of the sensor, the coverage range can be extended to 10 m (length) x 16 m (width). In corridors and in warehouse aisles, it can be useful to fit the FR-A180 to the ceiling, using the normally horizontal fan-shaped coverage as a vertical "curtain".



FR-A360 ceiling-mounting sensor

Mounted at a height of 2.5 m, the FR-A360 occupancy sensor registers movement within an area of 8 x 8 metres (or 6 x 6 m if the occupants are seated). The area monitored can be extended to 10 x 10 metres (or 8 x 8 m if occupants are seated) by installing the sensor at a height of 3 metres.

There are several advantages to ceiling-mounting: cabling is simpler in suspended ceilings, the height of the sensors protects them from vandalism, and the sensors are less likely to be masked by furniture and fittings.



Coverage area of the occupancy sensors

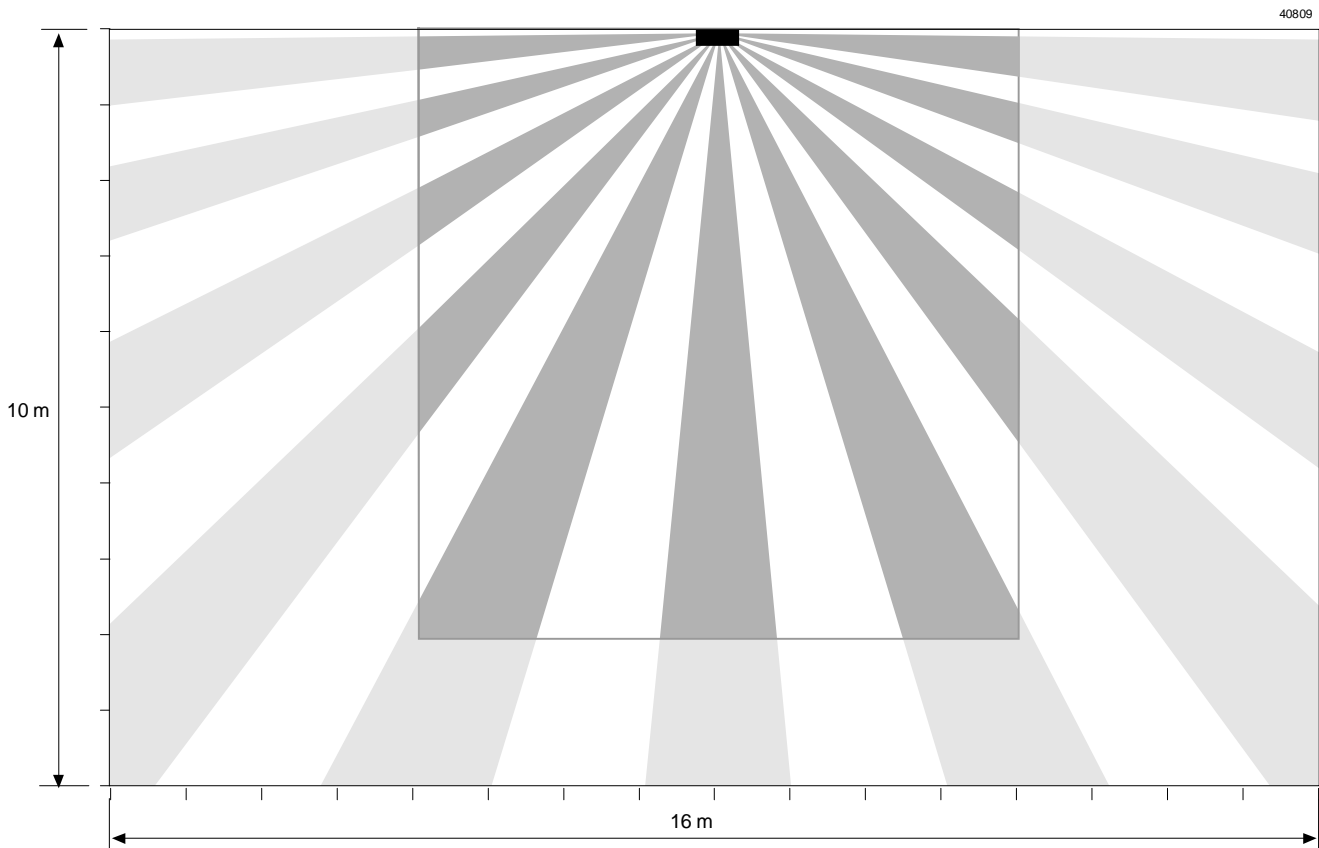
The overlay diagrams on the next page can be used to determine the ideal position of the sensors. The diagrams (scale 1 : 100) showing the sensor detection range, will enable the user to visualise the optimum location for the sensor on the ceiling (FR-A360) or wall (FR-A180).

Method :

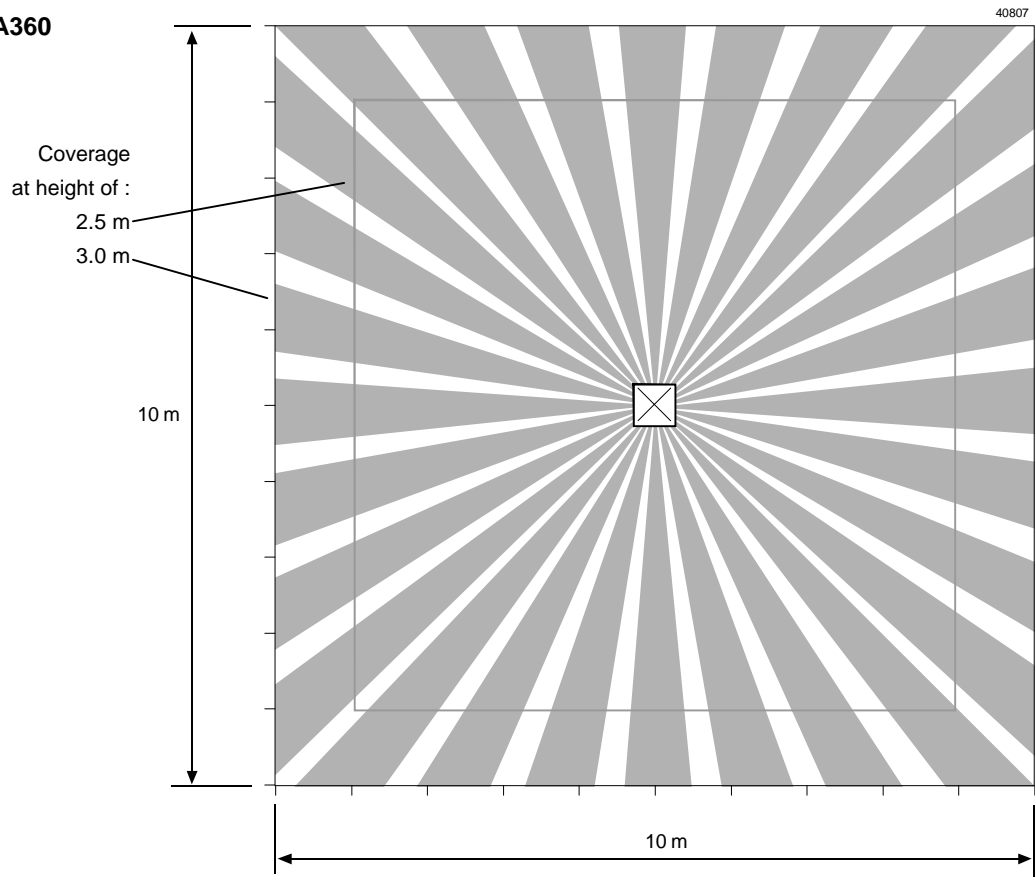
Photocopy the diagram onto a transparent sheet and place this over a floor plan (same scale, 1 : 100) of the area to be covered. Reposition the transparency until the optimum coverage / detection area is achieved.

See example on page 5.

Coverage of FR-A180 (Scale 1 : 100)

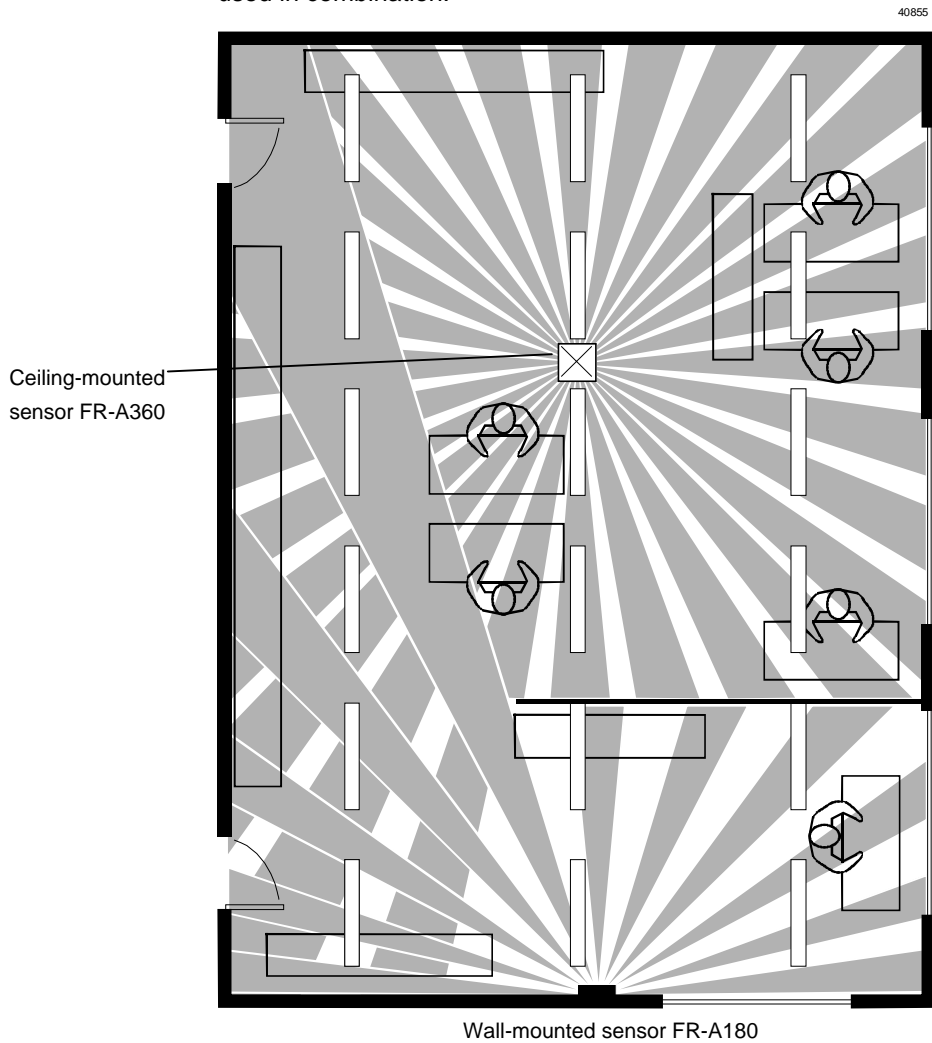


Coverage of FR-A360
(Scale 1 : 100)



Example

For complete coverage of partitioned rooms, the FR-A180 and FR-A360 can also be used in combination.



Mounting notes

Mounting instructions (Ref. 35662) are enclosed with the sensor.

The sensor can be mounted in a standard flush-mounting box or surface-mounting frame (depth 50 mm). If installed in metallic structures (perimeter ducts, ceiling plates etc.) the fixing plate must be earthed. When building works are in progress, it is recommended that, initially, only the power supply unit should be mounted. The sensor unit can then be fitted in the commissioning phase.

Commissioning notes

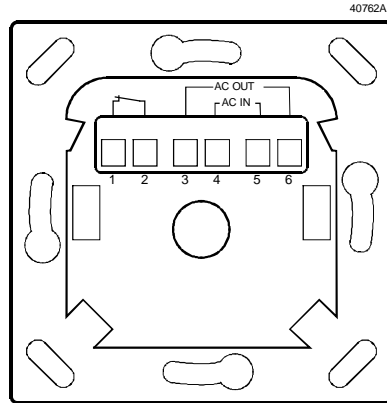
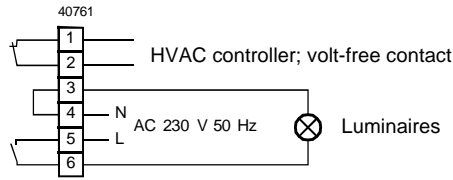
The three potentiometers on the back of the sensor unit, for daylight threshold and switch-on and switch-off delays, must be set (see "Adjustments", page 2).

The sensor can be switched on either by switching on the power or by plugging in the sensor unit. Ensure that the orientation of the sensor is correct (use the lettering on the wall-mounted sensors to ensure it is the right way up; for the ceiling-mounted version, align the mating contacts with the terminals). Avoid the use of force when fitting the sensor unit. The occupancy sensor will then switch the lighting ON for 1½ minutes, after which it is ready for operation. Over the next 9 minutes, the device will respond without any delay to changes in the lighting level in the room. This permits easy checking of the daylight switching point (set on the "lux" potentiometer).

Technical data

Supply voltage	AC 230 V, 50 Hz
– Max. voltage tolerance	+10/–14 %
Intrinsic consumption with contact made	1.5 W
Outputs:	
HVAC: Relay contact	N/C Min. 5 mA at DC5 V Max. AC 230 V, 2 A, volt-free
Lighting: Relay contact	N/O AC 230 V, 8 A for fluorescent lighting AC 230 V, 5 A for filament and halogen lamps
Service life of contact (lighting)	100 000 switching operations with inductive load of 8 A, $\cos \varphi > 0.4$
Switch-on delay: (occupancy)	
Lighting	No delay
HVAC	0 ...10 mins, adjustable
Switch-off delay: (occupancy)	
Lighting	2 ...15 mins, combined with HVAC
HVAC	8 ... 60 min.
Adaptive mode (lighting contact only)	Self-adaptive mode extends switch-off delay up to max. 15 mins if required
Daylight control	Lighting output switched automatically Daylight threshold adjustable from 50 ... ∞ lux
Materials:	
Housing	ABS, flame retardant, recyclable
Optics	Fresnel lens
Weight (including packaging):	FR-A180 : 0.18 kg / FR-A360 : 0.32 kg
Colour	White, RAL 9016
Maintenance	None required
Terminals	Plug-in terminals for rigid and flexible conductors max. 2.5 mm ²
Environmental conditions	
Ambient temperature:	
– Operation	0 ... 50 °C
– Storage / Transport	– 25 ... 70 °C
Ambient humidity:	
– Operation / storage / transport	< 95 %rh (without condensation)
Protection class	IP50 to IEC529
Security	Relay contact 3.75 kV against mains voltage
Conformity	Meets the requirements for CE marking

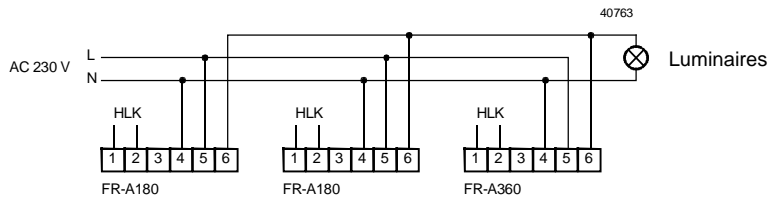
Connection terminals



Application examples

For coverage of large areas or rooms with recesses, several sensors may be connected in parallel. Since the load is switched by one device only, the total admissible load remains unchanged.

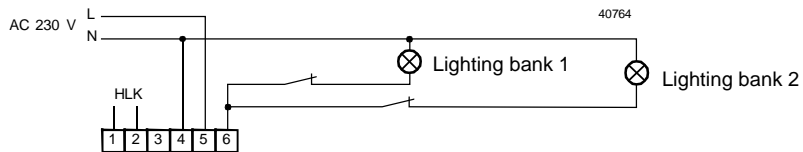
Parallel connections



Manual OFF control

Caution : GND connections between the PRU and other controllers are only permitted if the PRU is supplied from a separate transformer.

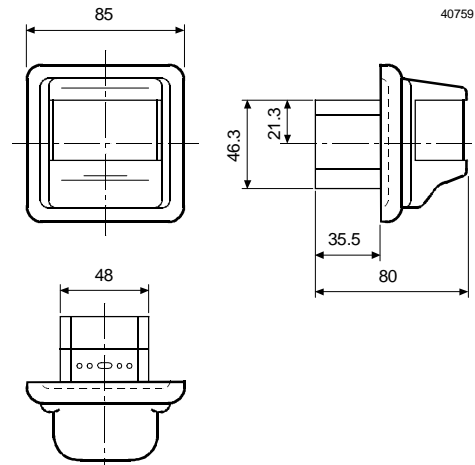
To prevent the automatic function from being disabled by tampering, the sensor is not fitted with a manual switch. Where manual switching is required (e.g. to darken a room for slide projection etc.), a conventional switch can be fitted. In rooms used by different occupants (conference rooms etc.) a rotary switch with "OFF" and "AUTO" positions should be provided to avoid potential confusion.



Dimensions

All dimensions in mm

FR-A180



FR-A360

