Tomorrow's aspirations.

A new generation of ABB Busch Watchdogs.

Installation guide

BJE 12013 / 1.03 / 0502-D, dpi 020829

Delivered today.

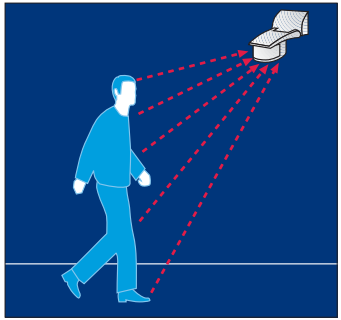
Table of contents

Introduction

A reliable infrared movement detector offers additional protection. It ensures that nobody can enter its surveillance zone without activating the lights. As a result, uninvited guests draw attention to themselves and can be readily observed.
This acts as a deterrent.

A passive infrared movement detector registers the movement of a heat source and switches on the connected lighting. When the surveillance zone is vacated, the lighting is switched off again after a specified delay time.

Principle of operation

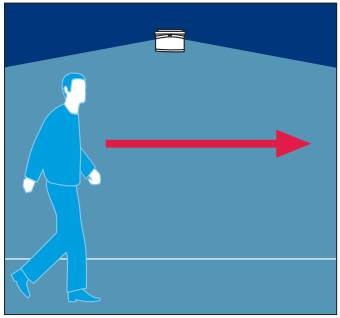


- The Busch Watchdog is a passive infrared movement detector. It registers invisible infrared heat radiation.
- If the registered energy pattern changes as the result of movement, a pulse is activated. The strength of the pulse depends on the intensity of the infrared radiation and on its direction of movement.
- The Busch Watchdog is purely a receiver and transmits no signals itself. The connection between the heat source and the Busch Watchdog is the ambient air. Under certain circumstances, the reception conditions are influenced by the prevailing weather conditions. As a result of the highly intelligent electronics, the Busch Watchdog can recognise this and largely compensates for ambient range fluctuations. Detection through obstacles such as glass or vegetation is not possible.

The detection principle

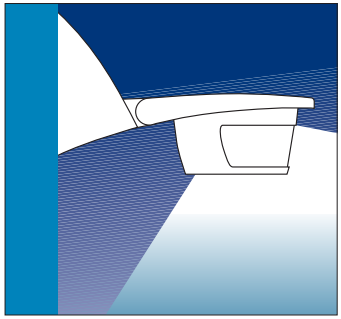
All bodies with internal heat emit infrared radiation. The sensors used in the Busch Watchdog can detect this infrared radiation. The more distinct the radiation in relation to the surrounding area, i.e. the colder the outside temperature, and the more intensive the radiation of the detected body, the larger the sensor signal.

The Busch Watchdog reacts to large, rapid changes in temperature. Slow temperature changes and constant temperatures, such as the cooling of a car engine, do not activate the device.

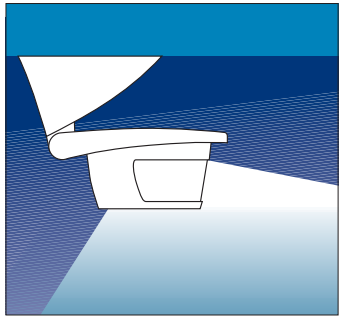


If a person moves directly towards the sensor, the increase in heat intensity is slow, and the unit does not, therefore, activate immediately. Where possible, the device should therefore be fitted **at a right angle to the likely direction of movement** to ensure reliable activation. Humid air (for example fog) can reflect the infrared radiation, resulting in a reduced device sensitivity.

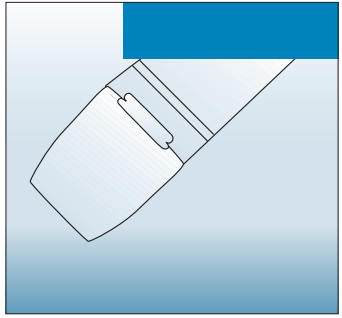
Wall-mounted
Busch Watchdog
Professional/Alarmtech



Ceiling-mounted
Busch Watchdog
Professional/Alarmtech



Corner-mounted
Busch Watchdog
Professional 280



Corner adapter

With the corner adapter (order no. 6886), the unit can be fitted to a house corner.

Connection and settings

The watchdog is connected with the wall-mounted bracket and simply screwed onto the fixing surface. To match the Busch Watchdog Professional 220/280 and Alarmtech 220 units perfectly to the ambient conditions, the following variables are externally adjustable:

- **Operating modes**
  With the operating mode selector, the numerous functions of the Busch Watchdog Professional 220/280 and Alarmtech 220 can be selected easily and clearly.

- **Time setting**
  Specifies the delay time during which the light remains on after the surveillance zone is vacated. In addition to the exact time setting, a short-time pulse (⎍), for example for actuating an audible alarm, is issued.

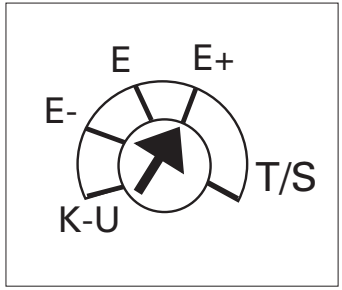
- **Sensitivity (E)**
  The Busch Watchdog has three sensitivity level settings. The standard level is E. The higher level, E+, is intended, for example, for indoor applications, and level E–, has a reduced sensitivity for a busy environment (trees or bushes).

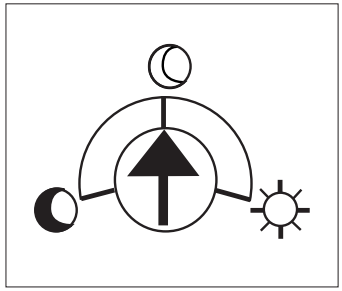
- **Dusk setting (N)**
  Definition of the activity of the device depending on the ambient brightness in operating mode N (0.5 to 1000 lux, daylight mode).

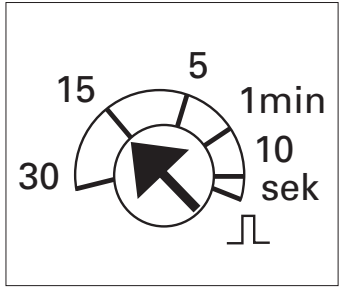
- **Test/standard operation (T/S)**
  In this operating mode, the shortest time setting of two seconds always applies in the daytime to define the surveillance zone irrespective of the set delay time. After the test phase, the Watchdog automatically changes back to the Standard operating mode.

The delay time of three minutes and the light level of 4 lux are fixed.

- **Comfort and vacation (K-U)**
  This operating mode combines the functions of a movement detector and those of a conventional dusk switch. The connected lighting is initially switched on for 80 minutes at dusk. Over the next 24 hours, the Busch Watchdog measures the ambient light and "learns" the time of year. The fixed delay time is then adjusted accordingly (e.g. extended in autumn/winter). At the end of this permanent light phase, the device reverts to normal detection.







- **The masking strips**
  With the masking strips, areas that are not to be monitored can be specifically excluded from the surveillance zone. The masking strips can also be used to adjust the surveillance range for distinct surveillance zones.

The optical system

The range and detection angle of a movement sensor are determined mainly by its optics – i.e. the arrangement and design of the sensors used and of the lens.
In the Busch Watchdog Professional 220, three highly-sensitive sensors in combination with a mirror system and the perfectly matched lens result in a detection angle of 220 degrees.

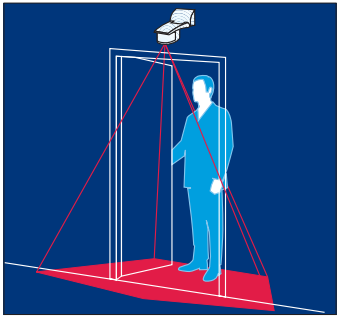
The lens and the mirror system receive and bundle the infrared radiation and project it onto the sensor. The sensitivity to movement within the detection zone is determined mainly by the number of lens segments and their optical design. The available range depends on the size of the lens segments (optical magnification) and the electrical amplification factor.

The lens system of the Busch Watchdog, which is permanently connected to the sensor housing to provide a good seal for the unit, has an exceptionally high resolution for movement detectors.

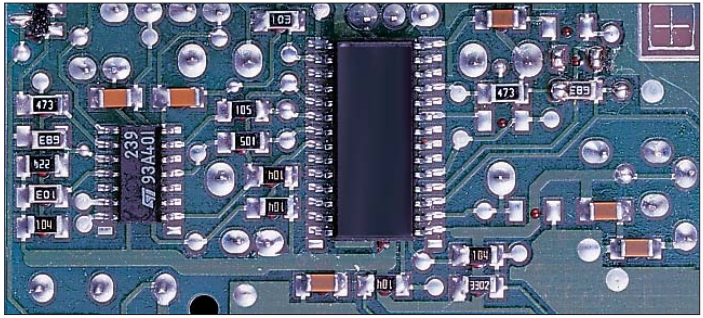
The possibility of monitoring "backwards" beyond the frame without loss of frontal range, for installation directly above doors or windows, is also unique. This is especially convenient when leaving the house.

The following factors should be taken into account at the planning stage:

- Most frequent direction of movement of an "object" in relation to the mounting location
  – Most readily detected is movement which is diagonal to the detection levels (see fig. on p. 6).



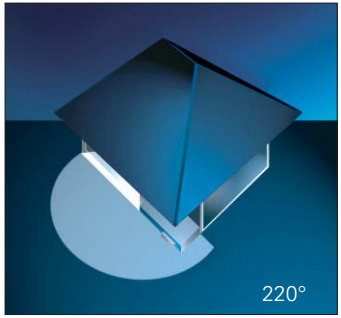
- Mounting height of 2.5 m
  – This height ensures an optimum monitoring function and forms the basis of the range specifications.

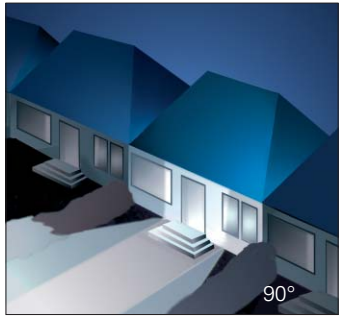


The microprocessor

The use of a microprocessor to control the Busch Watchdog provides a series of valuable features:

- Range stabilisation in a variety of weather conditions
- Inadvertent operations such as movement of trees,wind, etc. are largely filtered out
- Dazzleproof e.g. against car headlights and torches
- Short-time pulse, e.g. for staircase timer switch
- Precise digital time and dusk setting
- Selectable comfort and vacation mode
- Continuous light through break switch
- Intelligent alarm function (separate surveillance zone)

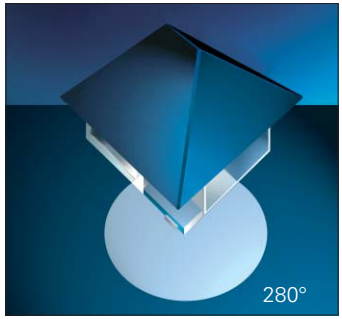




The detection angle

Additional protection for windows and doors up to the wall of the house, even in case of installation directly above doors and windows, is provided by the integral rearfield detection.

With its many mounting and alignment options, the Busch Watchdog can be adapted to suit the optimum local conditions.

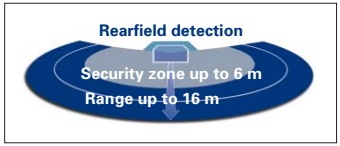


The surveillance density and range

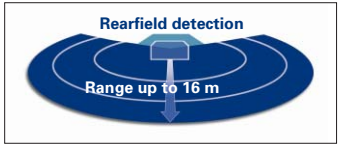
A high surveillance density is crucial to guarantee the detection quality of a movement detector. In the Busch Watchdog, up to 464 closely packed, large-area switching segments monitor the surveillance zone in up to 116 sectors. This large number of operating points guarantees reliable switching even for small movements. Its wide range of up to 16 m at the front and to both sides is unique.

The detection range is affected by the following factors:

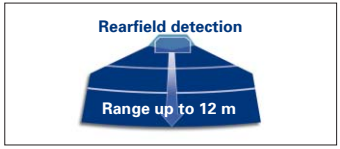
- Installation site and height
- Horizontal and vertical alignment
- Direction of movement in the detection zone
- Local weather conditions



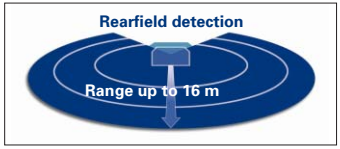
Busch Watchdog Alarmtech 220



Busch Watchdog Professional 220
Busch Watchdog Professional 220 EIB

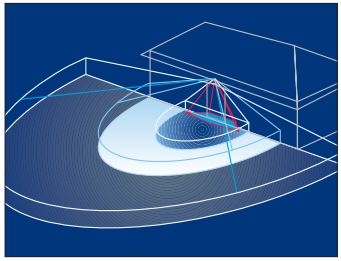


Busch Watchdog Professional 90

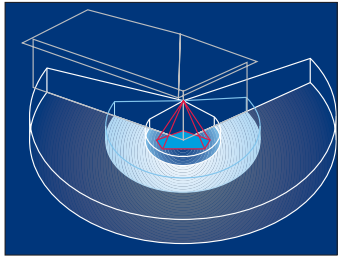


Busch Watchdog Professional 280

In addition to the basic functions, the Busch Watchdog Professional offers numerous advantages in day-to-day operation.



Detection zone 220°



Detection zone approx. 280°

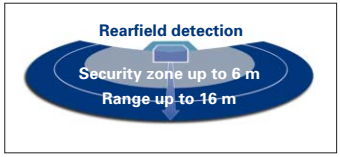
The various detection levels

To fully cover the surveillance zone, the Fresnel lens splits the zone into several overlapping levels.

Level 4 covers the rearfield detection, which activates when the front door is opened from the inside. (for installation over door frame, see figure on page 11).

Level 3 covers close-range detection to prevent undetected entry of the surveillance zone close to the wall.

Levels 1 and 2 cover remote surveillance and ensure seamless detection when the surveillance zone is entered from the outside.



Busch Watchdog Alarmtech 220 Range

Alarm function

The security provided by the Busch Watchdog Alarmtech 220 is unsurpassed. The light gives anyone approaching the house the impression that they have been seen. This is made possible with the additional security zone. The range of the security zone is about six metres to the front and to both sides.
If someone enters this inner zone, the red warning light is activated (can be switched off with the optional remote control) and a signal applied to an additional output, which can be used, for example, to activate a second light or another signalling device.

Remote control

The main functions can be controlled with a hand-held infrared remote control unit.

- Light On/Off (for four hours; then the detector returns to automatic mode).
- Automatic On
- Alarm On/Off (warning light On/Off)
- Comfort/vacation function On/Off
- Save dusk value

Automatic range stabilisation

The range normally fluctuates between 50 and 100% depending on the prevailing ambient conditions.

The Busch Watchdog recognises the ambient conditions. A built-in microprocessor with intelligent software then controls the internal amplification to reduce weather-induced range fluctuations to a minimum.

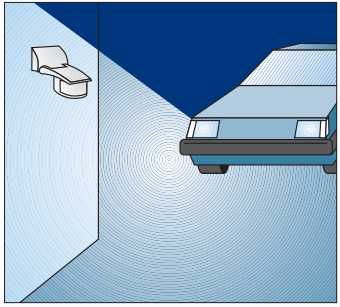
If, for example, the detector switches on due to sunlight, wind and moving branches, the detection logic recognises this and suppresses many of the unwanted operations by adjusting the operating mode.

External light protection

With the dusk sensor set to "dark", the Busch Watchdog could be deactivated by a light source (torch or car headlights).

Automatic interference suppression

This is another feature made possible by the built-in microprocessor of the Busch Watchdog.



To avoid this situation and therefore increase security, the Busch Watchdog leaves its current monitoring function unchanged for 90 seconds if the light conditions suddenly change.

High-capacity relay

To allow the connection of high loads without needing an additional auxiliary relay high capacity relays have been used which guarantees a long service life of the unit.

Test function

To simplify adjustment during installation, the delay time is set to two seconds in the Test position. The dusk sensor is then disabled. Once the desired setting has been found after testing the settings, select the desired delay time and the dusk value to complete the installation.

Self-test

A further advantage of the microprocessor used in the Busch Watchdog Professional 220/280 and Busch Watchdog Alarmtech 220 is its built-in test function.

Every time the supply voltage is connected or a restart occurs, an internal test program carries out a complete self-test. If this test is positive, the Busch Watchdog switches itself on for at least one minute or the set delay time. This confirms that the device is fully operable.

Inadvertent operation

The principle of operation of a passive infrared movement detector means that its function depends on the physical conditions in the detection zone.

When heat sources move and the response threshold of the Busch Watchdog is exceeded, operation is triggered. Sunlight has a high percentage of natural infrared radiation. If the sun shines, for example, onto a bush or a tree in the detection zone and this bush or tree moves in the wind, this may cause a movement detector to trigger. Sunlight reflecting off glass or water, a heat source cooling down (e.g. a lamp mounted nearby) or animals in the detection zone can also trigger detection.

Mains voltage peaks, caused, for example, by switching inductances such as relays and contactors on and off, can also activate a movement detector. This can be prevented by using surge voltage protectors or a special RC element. For further information about this, see the troubleshooting section.

Range fluctuations

In extreme weather conditions, the size of the detection zone may change. High outside temperatures and poor visual conditions due to fog, rain or snow can temporarily reduce the range.

Excessively long ranges are caused by close-by sources of extreme heat, such as lorries or buses, and at very low outside temperatures and good visual conditions. It is important here to set the detection range to the required distance during installation by adjusting the angle of the Busch Watchdog sensor and, if necessary, by using Busch Watchdog masking strips.

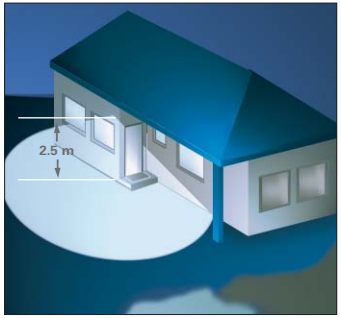
The automatic range stabilisation of the Busch Watchdog counteracts the effects described above, but, for physical reasons, it cannot guarantee a complete elimination of all unwanted switching operations under all conditions.

Applications

This table lists only some of the many possible applications.

You will also find the appropriate version for your specific application.

Busch Watchdog devices **Standard/Comfort II**	**Busch Watchdog Professional 220/ 90/280/220 EIB**	**Busch Watchdog Alarmtech 220**	**Busch Watchdog 180 UP Comfort II**
Applications buildings	Corridors, hallways, cellars, changing rooms, rest rooms, loading bays, showrooms, outdoor areas, garages, terraces	Outdoors, terraces, loading ramps	Hallways, corridors, cellars, libraries offices
Private house	•	•	•
Administrative buildings	•	•	•
Hotels	•	•	•
Schools	•	•	•
Sports facilities	•	•	•
Industrial buildings	•	•	•
Multi-storey car parks, basement garages	•		
Shops	•	•	•
Transportation companies	•		•
Car parks	•		
Hospitals, old people's homes	•		•
Furniture stores,	•		•
trade fairs, Exhibitions	•	•	
Tennis and squash courts	•		



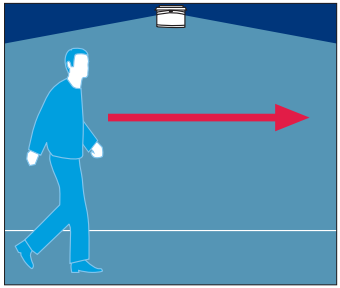
Installation at a height of 2.5 m

This is the **optimum** installation height. The readings given here (see p. 28 – 29) were taken at an ambient temperature of 20 °C with an approach from the side (for ambient conditions, see p. 18).

Installation instructions

1. The Busch Watchdog must be mounted on a **solid wall**, since each detector movement has the same effect as a movement of a heat source in the surveillance zone.

2. When specifying the mounting location and height, take into account the **distances** to the road and to neighbouring properties etc. to avoid unwanted triggering.



3. To **optimise detection**, install the device at an angle to the detection levels. A directly approaching heat source is not detected as reliably as one moving across the detection zone. Since infrared waves cannot penetrate solid objects, make sure that nothing obstructs the line of vision of the Busch Watchdog.

4. **Every** passive infrared movement detector responds to a fast change in local heat radiation. As all passive infrared movement detectors, To prevent inadvertent switching operations, the Busch Watchdog should therefore be installed so that it is protected from **rain, wind** and **direct sunlight** as far as possible. The housing of the Busch Watchdog is adequately protected against water spray, allowing an outdoor installation without additional water protection.

5. The **minimum distance** between the Busch Watchdog and the switched lights is 1.5 m. The temperature change of a light installed near the sensor could otherwise cause the sensor to re-activate after it has been switched off. Spotlights should not be aimed directly at the Busch Watchdog.

6. The range to the front can be adjusted by turning and tilting the sensor part, and to the side by **partially covering** the lens with masking strips. If parallel inductances such as relays, fluorescent lamps or transformers are switched with the Busch Watchdog, we recommend the use of an RC suppressor (order no. 6899) parallel to the load. As the Busch Watchdog is an electronic device, the installation of a surge arrester parallel to the power supply is advisable, since parallel inductances can cause overvoltages in the range of 3000 to 4.000 volts.

7. The adjustment screws must **always** point **downwards** after installation, otherwise the direction of detection is upwards.

8. Movement detectors are **not suitable** as special burglar alarm systems, as they do not have the tamper protection required for this function.

9. **Ceiling installation**
   The Busch Watchdog Professional and Alarmtech units are ideally suited for installation, for example, under
   – roof overhangs
   – canopies
   – balconies.
   The devices can be prepared for the respective mounting position by simply rotating the sensor housing. Again, the adjustment screws must point downwards after installation.

   Important: Observe correct installation height! (approx. 2.5 m)

10. **Installation in lighting control systems**
    The detection zone must be adapted to the local conditions. For installation, for example, in entrance halls and corridors of office buildings, note that the best results are obtained with movements **across the surveillance zone**. To bridge downtimes, the time should be set as high as possible.

Busch Watchdog AP	Professional 90	Professional 220	Professional 220 EIB	Professional 280	Alarmtech 220
Angular detection coverage	90°	220°	220°	> 280°	220°
Surveillance levels	4	4	4	4	4[1]
Range, frontal (max.)	12 m	16 m	16 m	16 m	16 m
Range, to sides (max.)	6 m	16 m	16 m	16 m	16 m
Close-range detection	●	●	●	●	●
Rearfield detection	●	●	●	●	●
Reflector system	●	●	●	●	●
Microprocessor		●	●	●	●
Autom. range stabilisation		●	●	●	●
Autom. interference suppression		●	●	●	●
Dazzleproof		●	●	●	●
Int. test function	●	●	●	●	●
AX high-performance relay [3]	16	16	16		10[4]
Temperature range in °C	–25 to +55	–25 to +55	–25 to +55	–25 to +55	–25 to +55
Dusk sensor	●	●	●	●	●
Off-delay	●[2]	●	●	●	●
Short-time pulse (1 sec)		●	●	●	●
Suitable for incandescent lamps	●	●		●	●
Suitable for fluorescent lamps	●	●		●	●
Suitable for low-voltage halogen lamp	●	●		●	●
Protection against water	IP 55	IP 55	IP 55	IP 55	IP 55
Wall mounting	●	●	●	●	●
Ceiling mounting	●	●	●	●	●
Corner mounting [5]	●	●	●	●	●
Masking strip	●	●	●	●	●
EIB functionality			●		
Anthracite	6852-AGM-35	6878-AGM-35		6880-AGM-35	6879-AGM-35
Brown	6852-AGM-201	6878-AGM-201		6880-AGM-201	6879-AGM-201
White	6852-AGM-204	6878-AGM-204	6178-AGM-204	6880-AGM-204	6879-AGM-204

[1] Separate in surveillance zone and security zone.
[2] Dusk sensor and Off-delay.
[3] x marking: relay can also switch capacitive loads.
[4] Second output: 120 W/VA filament bulb/230 V halogen/l.v. halogen with conventional transformer > φ 0.5.
[5] With additional adapter.

The Busch Watchdog flush mounting range

Comfort II *

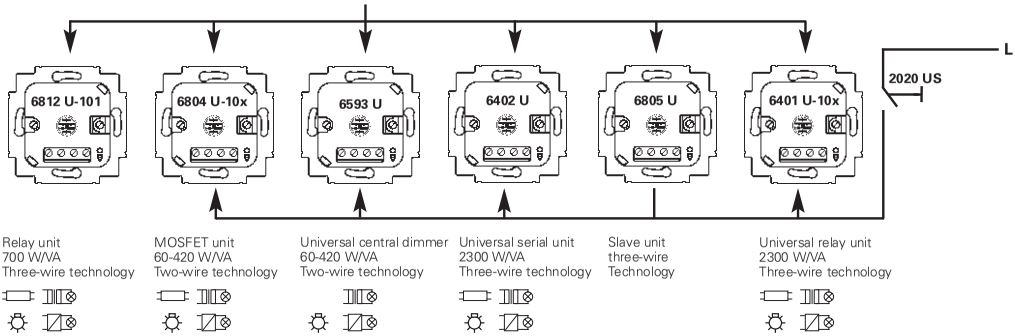
Select lens

6800-2X-104

Multi lens

6800-2X-104M

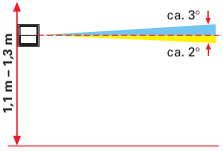
***Switch-off behaviour:**
In combination with 6593 U (soft Off function), the Komfort II sensor dims down and switches off within 60 seconds.



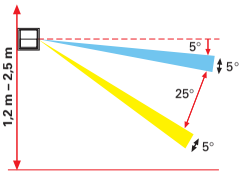
Relay unit 700 W/VA Three-wire technology	MOSFET unit 60-420 W/VA Two-wire technology	Universal central dimmer 60-420 W/VA Two-wire technology	Universal serial unit 2300 W/VA Three-wire technology	Slave unit three-wire Technology	Universal relay unit 2300 W/VA Three-wire technology

Detection levels

Select lens



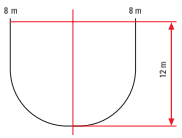
Multi lens



Surveillance zone

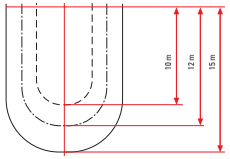
Select lens

Mounting height	Front	Side
1.1 – 1.3 m	12 m	8 m



Multi lens

Mounting height	Front	Side
1.2 m	10 m	2.5 m
2.0 m	12 m	4 m
2.5 m	15 m	5 m

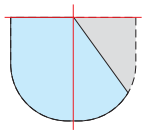


Narrowing the detection zone

Select lens

Horizontal

Fit masking strips on sides.

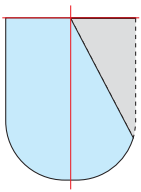


Vertical

No narrowing possible since there is only one detection level.

Multi lens

Fit masking strips on sides.



By covering the wide range, detection can be limited to the close range.

Mounting height	Remote	Near
1.2 m	10 m	2 m
2.0 m	12 m	3 m
2.5 m	15 m	3.5 m

Busch Watchdog range
AP devices

Busch Watchdog Professional 220/220 EIB

Busch Watchdog Professional 90

Busch Watchdog Professional 280

Busch Watchdog Alarmtech 220

UP devices/presence indicators

Busch Watchdog Comfort II

Busch Watchdog Presence Detector[1)]

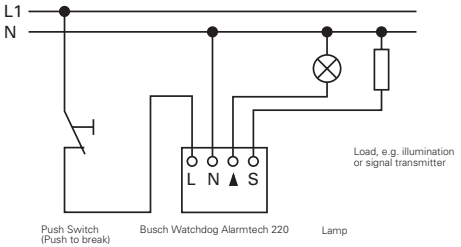
[1)] Please ask for revised user manual.

Corner adapter

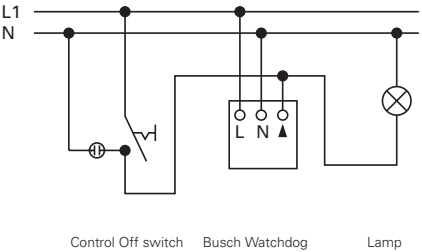
RC element

Surface mounting enclosure for Busch Watchdog Presence Detector

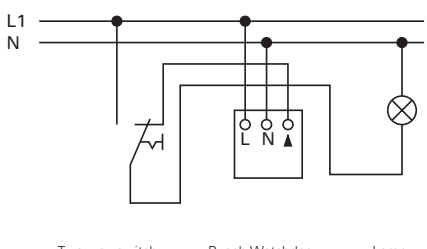
Typical circuits for AP



Busch Watchdog Alarmtech 220 switched on through a push switch. If the power supply of the Busch Watchdog Alarmtech 220 is intermittently interrupted in standby mode and then reconnected, the lights are switched on automatically for the set delay time.
When you press the push switch twice, the light is switched on for four hours.

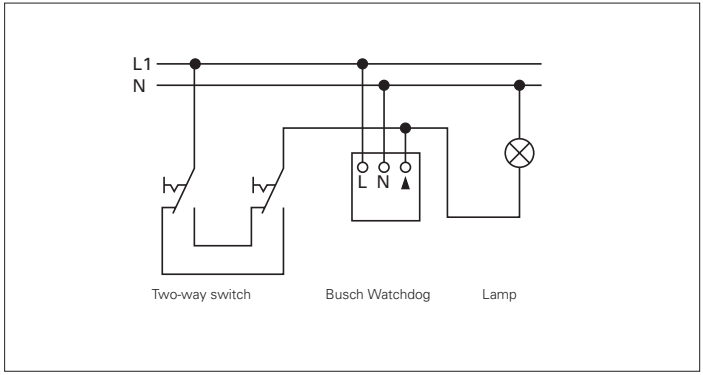


Switch with neon indicator for switching over to PERMANENTLY ON. In Busch Watchdog operation, the control lamp signals that the connected light has been switched on (status signal).

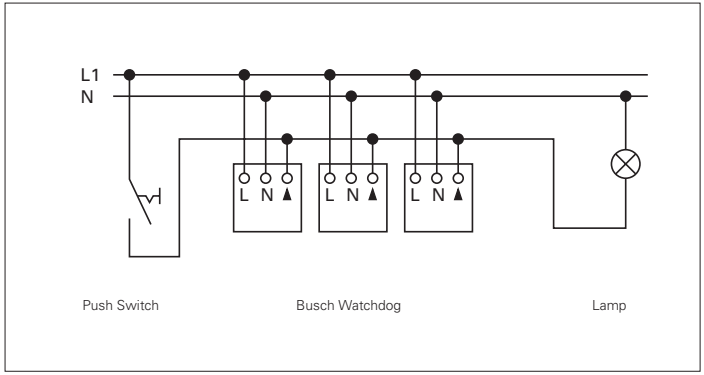


Changeover through two-way switch to PERMANENTLY ON or Busch Watchdog mode.

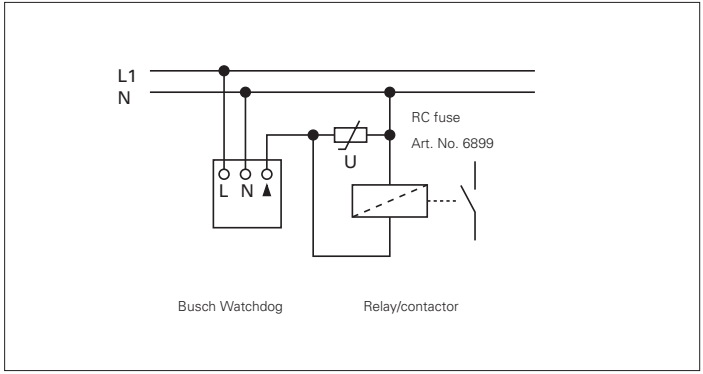
Typical circuits for AP



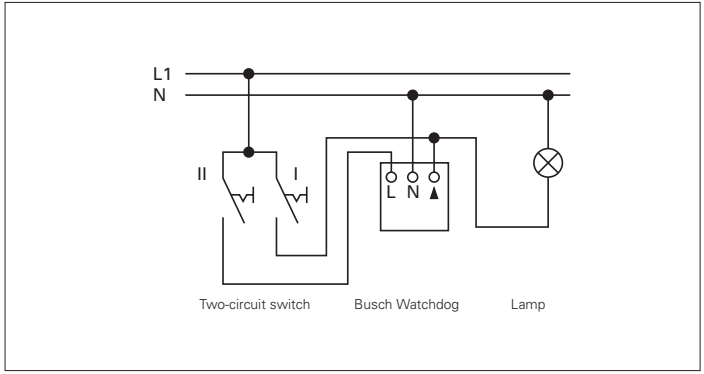
Combination of an existing two-way circuit with a Busch Watchdog. Two-way circuit and Busch Watchdog have the same priority.



Parallel operation of several Busch Watchdogs, for example in conjunction with a push switch for several sides of the house

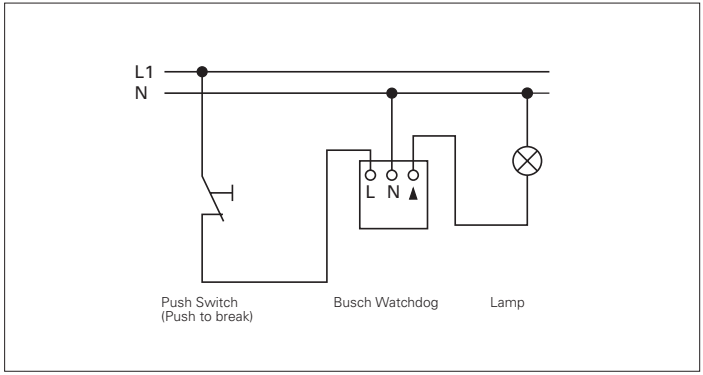


Connection of an external relay/contactor
– for use with floating make and break contacts
– to increase the switching capacity to more than 2300 W/3500 W

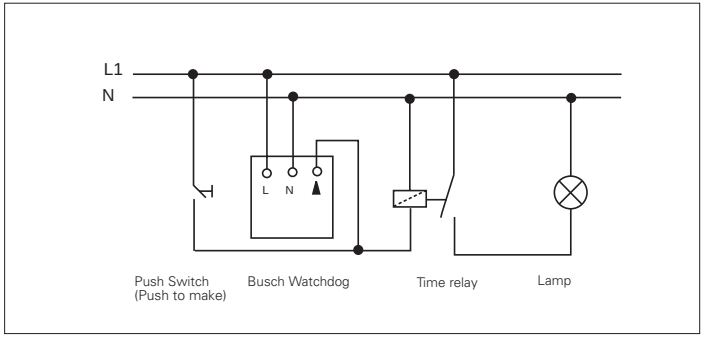


Operating mode selection with two-circuit switch. Functions:
1. I On, II On/Off: continuous light without Busch Watchdog function,
2. I Off, II Off: system switched off,
3. I Off, II On: Busch Watchdog switches on. It switches off or goes into standby mode when the set time has expired.

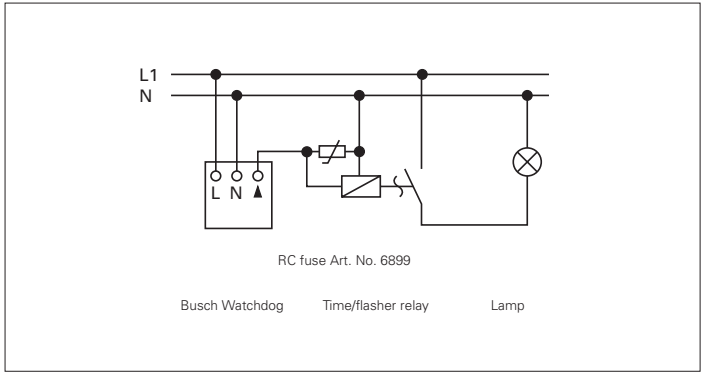
Typical circuits for AP



Busch Watchdog switched on through a push switch. If the power supply of the Busch Watchdog is intermittently interrupted in standby mode and then reconnected, the lights are switched on automatically for the set delay time. When you press the push switch twice, the light is switched on for four hours.

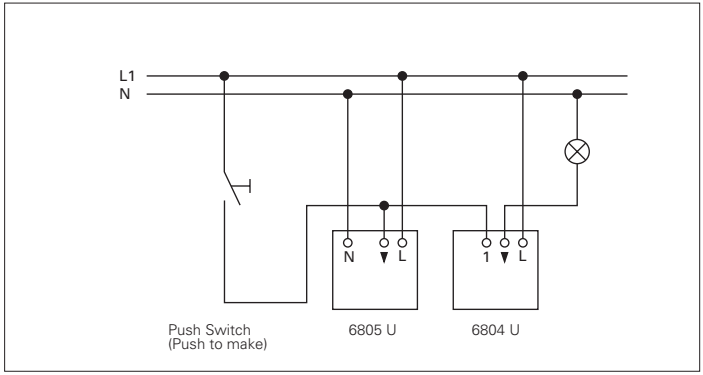


Busch Watchdog with staircase light timer switch
Busch Watchdog in short pulse setting (1 second)

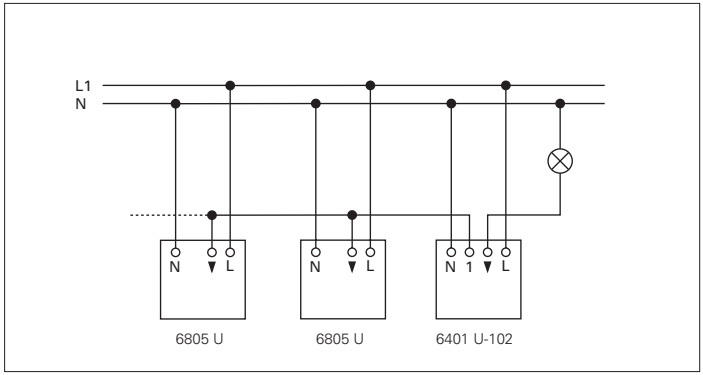


Extension of the Off delay or actuation of a pulse relay (e.g. for flashing lights)

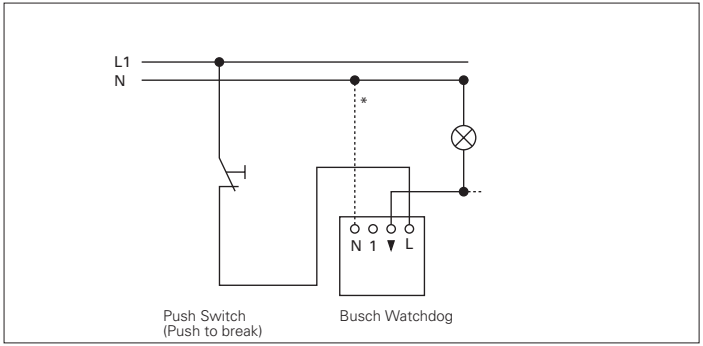
Examples of circuits, UP



Actuation of a light with Busch Watchdog 180 UP Comfort 6401 U-10x, 6804 U or 6593 U in conjunction with the Busch Watchdog 6805 U slave unit and a push switch

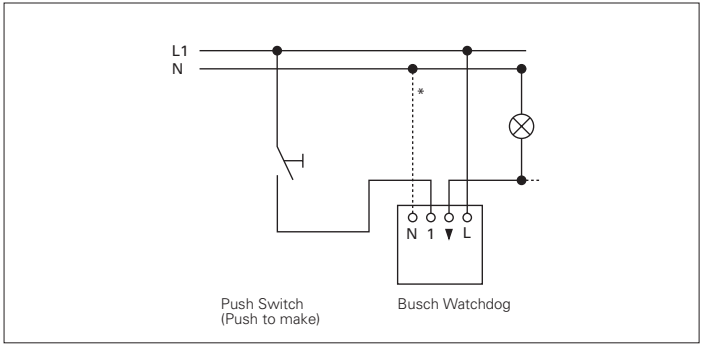


Expansion of the surveillance range with several 6805 U slave units in combination with a 6401 U-102 master unit



Activating the Busch Watchdog UP 180/6812 U, Standard or Comfort 6401 U-10x, 6804 U/6593 U with push switches. When the power to the Busch Watchdog is briefly interrupted by the switch, it is automatically activated for the specified time.

* Neutral conductor is required for the 6401 U-10x.



Activating the Busch Watchdog UP 180/6401 U-10x, 6804 U/6593 U with a push switch. When the switch is operated, the Watchdog is automatically switched on for the specified time (for example for staircase time switches). For illuminated switches, a separate N is required.

* Neutral conductor is required for the 6401 U-10x.

Fault	Possible cause/remedy
Light does not come on	- Connect supply voltage, check mains voltage - Lens obscured; clean lens or remove masking strip - No detection; adjust detection zone - Too bright; readjust dusk sensor - Change defective lamp
Light is always on	- Device bypassed with switch or similar; switch off - Heat source in the detection zone; realign the Watchdog or cover with masking strip - Device is in Continuous Light mode; operate the break switch in the power supply of the Busch Watchdog

Fault	Possible cause/remedy
Automatic undesired switching	- Switch-on after power failure; wait - Sunlight or heat reflection; readjust area detection or use shutter - Sudden temperature change (storm, rain, snow, fans, etc.) in the surveillance zone; Readjust surveillance zone or select more protected mounting location - Animals in the detection zone
Light continuously switches on and off by itself	- Voltage pulse from activated transformers, relays, contactors without overvoltage filters; connect RC element in parallel to the connected load - Distance to the activated light too small; increase distance or cover angle of incidence with masking strip

Fault	Possible cause/remedy
Watchdog does not respond to changes at the dusk sensor	- Watchdog is operating in dazzleproof mode; normal

Notes