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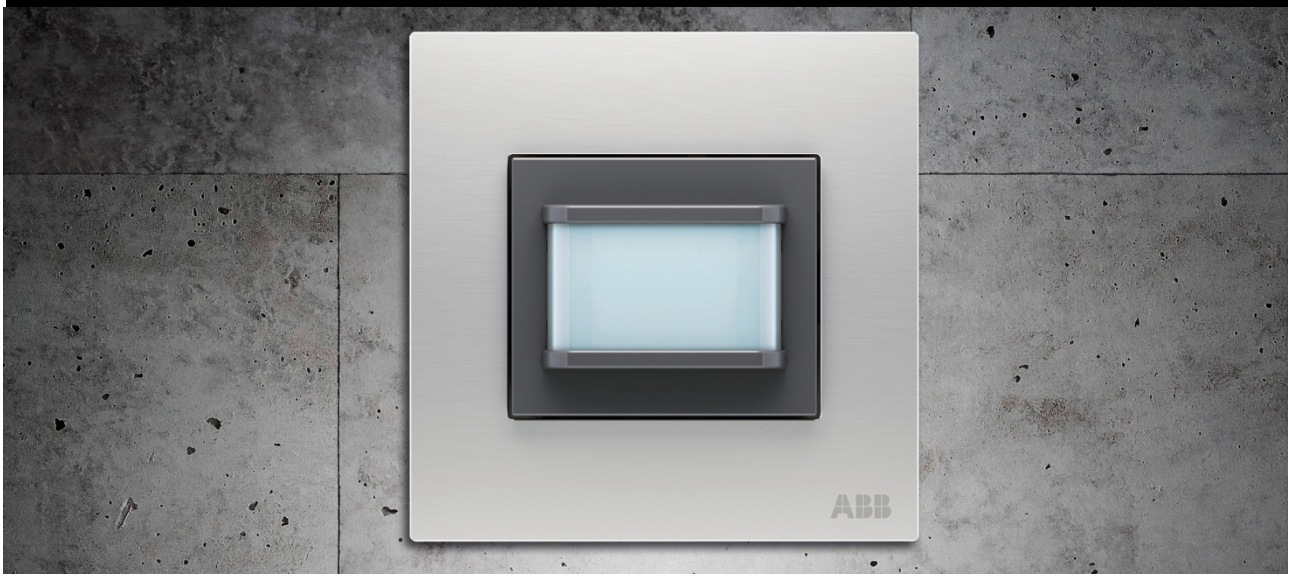
KNX Technical Reference Manual
ABB-i-Bus®-KNX Millenium



Busch-Watchdog® 180 incl. BAU
6122/20-981-500
AMD70153-AN

Power and productivity
for a better world™

1 Information on the manual

1.1 General information

Please read this manual through carefully and adhere to the information listed. This will ensure reliable operation and long service life of your product.
For reasons of clarity this manual does not contain all the detailed information on all the models of the product, nor can it take into consideration all conceivable circumstances related to installation, operation and maintenance. If additional information is required or problems arise that are not dealt with in this manual, the necessary information can be requested from the manufacturer.
The product has been constructed according to the latest valid regulations governing technology and is operationally reliable. It has been tested and left the factory in a technically safe and reliable state. To maintain this state for the period of its operation the specifications of this manual must be observed and adhered to. Modifications and repairs to the product must only be undertaken if the manual expressly permits this.
It is only the adherence to the safety instructions and all safety and warning symbols in this manual that will ensure the optimum protection of the user and the environment as well as the safe and trouble-free operation of the product.

1.2 Structure of the manual

- This manual provides you with the detailed technical information on the device, its installation and programming. The use of the device is explained by means of examples.
- The chapters "Information on the manual", "Safety" and "Overview of functions" contain general specifications and basic information as well as a description of functions.
- Chapters "Setup and function", "Technical data" and "Dimensional drawings and circuit diagrams" explain the device instrumentation.
- Chapter "Mounting and electrical connection" describes the installation, mounting and the electrical connections.
- Chapters "Commissioning" and "Operation" contain instructions on commissioning and how to operate the device.
- One or several chapters "Application ..." contain general information on the individual applications of the device, the setting options of all device parameters and a list of all objects.

1.3 Symbols in the manual

Danger - danger to life

This symbol in connection with the signal word "Danger" indicates dangerous situations which could lead to immediate death or to serious injury.

Warning - danger to life

This symbol in connection with the signal word "Warning" indicates a dangerous situation which could lead to immediate death or to serious injury.

Caution - risk of injury

This symbol in connection with the signal word "Caution" indicates a possibly dangerous situation which could lead to slight or moderately serious injury.

Attention - damage to property

This symbol indicates a possibly harmful situation. Non-observance of the safety instructions can lead to damage or destruction of the product.

Note ...

This symbol indicates information or references to additional useful topics. This is not a signal word for a dangerous situation.

This symbol refers to integrated videos with additional information on the respective chapter. An Acrobat Reader from Version 9.0 is required to view the videos.

This symbol indicates information on the protection of the environment.

Examples on application, installation and programming are displayed with a grey background.

2 Safety

Warning

Electric voltage!
Risk of death and fire due to electrical voltage of 230 V.
– Work on the 230V supply system may only be performed by authorised electricians!
– Disconnect the mains power supply prior to installation and/or disassembly!

Caution

Risk of damaging the device due to external factors!
Moisture and contamination can damage the device.
That is why the device must be protected against humidity, dirt and damage during transport, storage and operation!

2.1 Intended use

The device must only be operated within the specified technical data!
Depending on the setting, the flush-mounted movement detector responds to body heat and switches on the lights. Extensive functions are available for the movement detector. The scope of applications is contained in chapter "Application ..." (only in languages of the countries DE, EN, ES, FR, IT and NL). The integrated bus coupler makes connection to a KNX bus line possible.

Note

They may only be installed in dry interior rooms in flush-mounted sockets according to BS 4662:2006+A1:2009.

2.2 Improper use

The device represents a danger if it is improperly used. Each non-intended use is deemed improper use. The manufacturer is not liable for damages resulting from such improper use. The associated risk is borne by the user/operator.
The device must never be used outdoors or in bathroom areas. Do not push objects through the openings in the device. The device has an integrated bus coupler. The use of an additional bus coupler is therefore not admissible.

2.3 Target groups and qualifications

Installation, commissioning and maintenance of the product must only be carried out by trained and properly qualified electrical installers. The electrical installers must have read and understood the manual and follow the instructions provided. The operator must adhere to the valid national regulations in his country governing the installation, functional test, repair and maintenance of electrical products.

2.4 Liability and warranty

Improper use, non-observance of this manual, the use of inadequately qualified personnel, as well as unauthorized modification excludes the liability of the manufacturer for the damages caused. It voids the warranty of the manufacturer.

2.5 Environment

Consider the protection of the environment!

Used electric and electronic devices must not be disposed of with domestic waste.

– The device contains valuable raw materials which can be recycled. Therefore, dispose of the device at the appropriate collecting depot.

All packaging materials and devices bear the markings and test seals for proper disposal. Always dispose of the packaging material and electric devices and their components via the authorized collecting depots and disposal companies.
The products meet the legal requirements, in particular the laws governing electronic and electrical devices and the REACH ordinance.
(EU Directive 2002/96/EC WEEE and 2002/95/EC RoHS)
(EU REACH ordinance and law for the implementation of the ordinance (EC) No.1907/2006)

3 Setup and function

3.1 Features of function and equipment

The flush-mounted movement detector is part of the "Millenium" KNX sensor program. It is a monoblock application module which is suitable for installation in flush-mounted boxes according to BS 4662:2006+A1:2009. The device is equipped with an integrated bus coupler.
The movement detector (passive infrared detector) responds as soon as heat is registered in the detection range and triggers a switching process. It can send switch-control telegrams to KNX actuators. To switch on the lighting, for example. If the heat source leaves the detection range or remains motionless, the lighting is switched off after an adjustable switch-off delay. Also dimming processes can be started in connection with a Busch universal dimming actuator. It can also be used for storing and/or sending light scenes.
In addition to the detection of movement, the sensor can with the aid of its integrated message function detect movements within a specific time with only a minimum of sensitivity. This allows the sensor to be integrated in message systems.
The movement detector also has a twilight sensing function. This function triggers the surveillance function when the adjustable brightness values are exceeded or fall short (ambient brightness). The parameters in the Engineering Tool Software ETS can be used to set the switch-off delay and the brightness limit value of the installed twilight switch.
The movement detector is anti-glare, i.e. when a light beam enters (e.g. with a flashlight), the surveillance function is maintained for approximately 90 seconds.

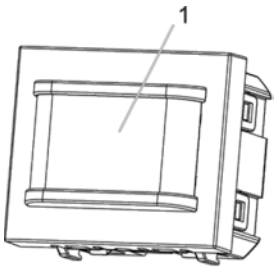
The following table lists the options for use:

Special features	Function	General functions
• 4 channels • Opening angle 180° • Freely programmable • Protection IP 20 • 5 ...150 lux	• Switching • Value sender	• Light scene actuator • Sequence • Logic • Delay • Staircase lighting • Preset • Cyclic telegram • Flashing • Gate • Min/max value transducer • Threshold value / hysteresis • PWM inverter • Priority

3.2 Overview of devices

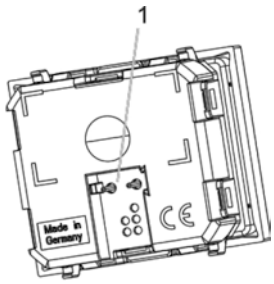
3.2.1 Front

Position	Function
1	View window / movement detector



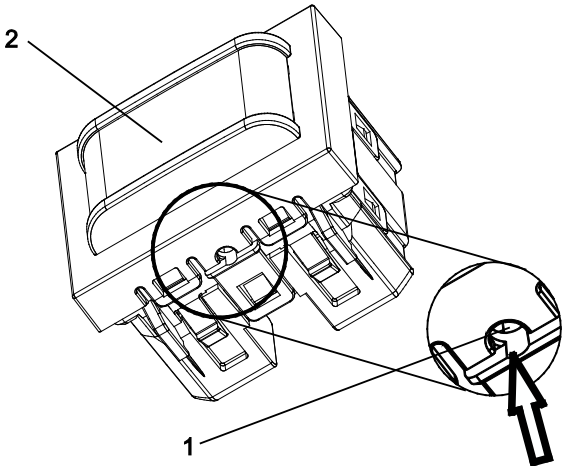
3.2.2 Rear

Position	Function
1	KNX connection



3.2.3 Front and bottom side

Position	Function
1	Programming button
2	View window / programming LED



3.3 Cover frame and support ring

Note

A cover frame and a support ring from the "Millenium" program are additionally required (see the following illustration). These must be ordered separately.

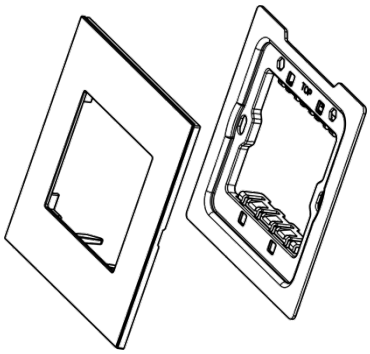


Fig. 1: Cover frame and support ring

4 Technical data

Designation	Value
Power supply (via KNX bus line)	24 V DC
Bus subscribers	1 (12 mA)
KNX connection	Bus connecting terminal, screwless
Opening angle	180°
Brightness limit value	5 … 150 lux
Mounting height	1.1 … 1.3 m
Protection type	IP20 according to DIN EN 60529
Ambient temperature range	-5 … 45°C
Storage temperature range	-20 … 70°C
Dimensions (H x W x D)	51.5 x 43.6 x 7.8 mm

5 Circuit diagrams and dimensional drawings

5.1 Circuit diagram

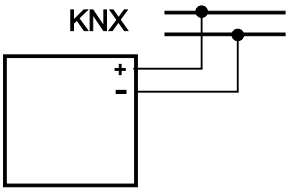


Fig. 2: Circuit diagram

5.2 Dimensional drawings

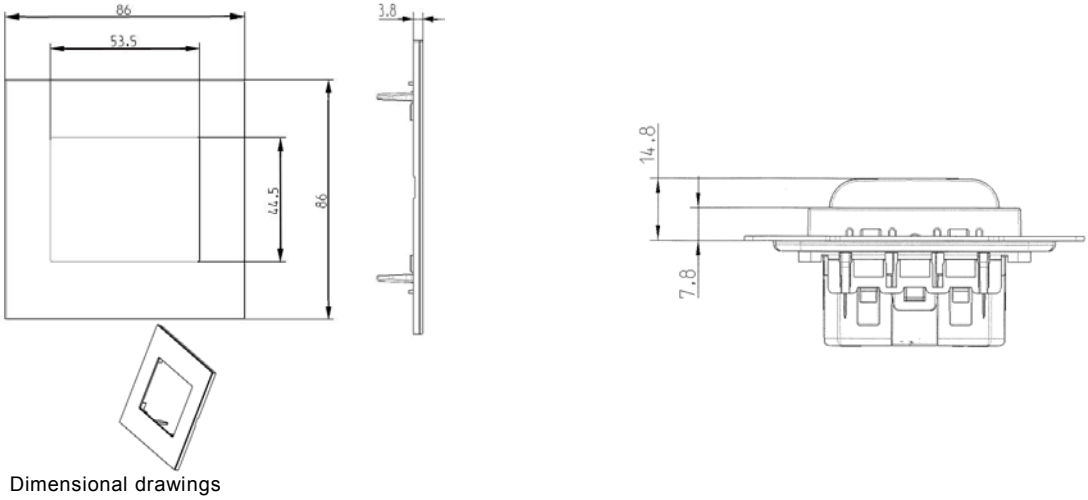


Fig. 3: Dimensional drawings

6 Installation and electrical connection

Warning

Electric voltage!

Risk of death due to electrical voltage of 230 V during short-circuit in the low-voltage line.

– Low-voltage and 230 V lines must not be installed together in a flush-mounted socket!

6.1 Requirements for the electrician

Warning

Electric voltage!

Install the device only if you have the necessary electrical engineering knowledge and experience.

- Incorrect installation endangers your life and that of the user of the electrical system.
- Incorrect installation can cause serious damage to property, e.g. due to fire.

The minimum necessary expert knowledge and requirements for the installation are as follows:

- Apply the "five safety rules" (DIN VDE 0105, EN 50110):
  1. Disconnect from power;
  2. Secure against being re-connected;
  3. Ensure there is no voltage;
  4. Connect to earth and short-circuit;
  5. Cover or barricade adjacent live parts.
- Use suitable personal protective clothing.
- Use only suitable tools and measuring devices.
- Check the supply network type (TN system, IT system, TT system) to secure the following power supply conditions (classic connection to ground, protective earthing, necessary additional measures, etc.).

6.2 Mounting

Note

Ensure that there is sufficient distance between movement detector and heat sources such as lighting, heaters, etc., since these devices can cause incorrect switching.

6.2.1 Installing the unit

The devices with integrated bus coupler have been prepared for installing in flush-mounted boxes according to BS 4662:2006+A1:2009 in connection with the corresponding support ring and cover frame (see also chapter "Cover frame and support ring", on page 9).

1. The side of the support ring with the marking "TOP" must be aligned toward the top. Now insert the device into the support ring in such a way that both sides with the marking "TOP" (on the device and the support ring) are aligned parallel to each other.

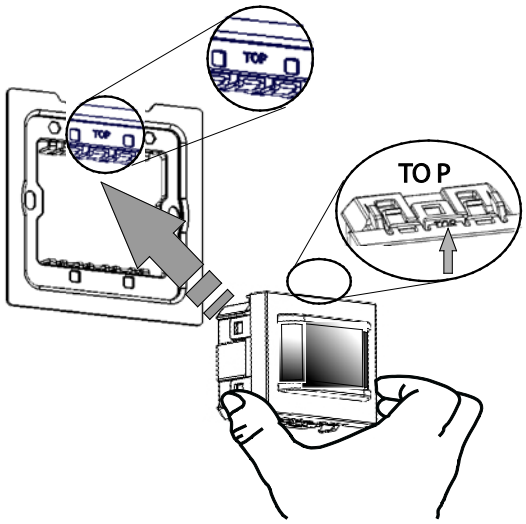


Fig. 4: Inserting the device into the support ring

2. The connection to the KNX bus line is made with the enclosed bus connection terminal (see also chapter "Commissioning", section "Software" on page 15). Now install the support ring with the inserted device in the flush-mounted box ("TOP" toward the top) and screw it on securely.

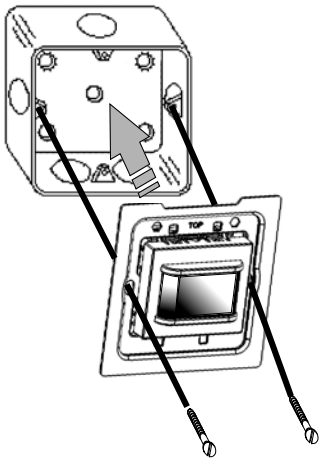


Fig. 5: Inserting into the flush-mounted box

3. Then plug the cover frame onto the support ring.
   – Separate order, see also chapter "Cover frame and support ring", on page 9.

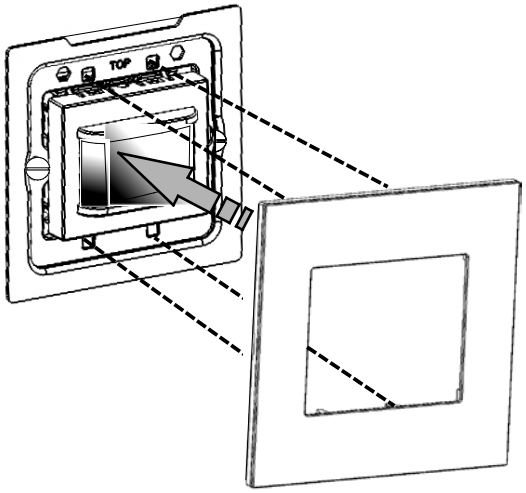


Fig. 6: Attaching the cover frame

6.3 Electrical connection

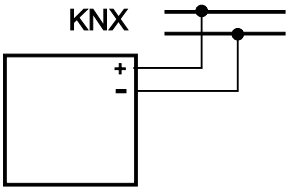
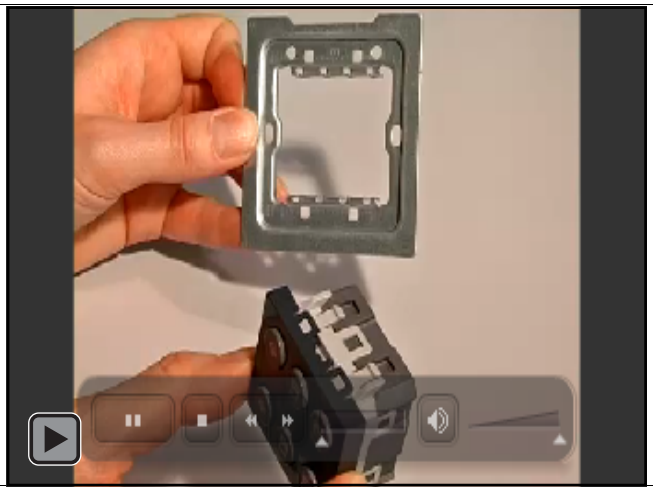


Fig. 7: Circuit diagram

Video for mounting and connecting the device (using the "Millenium" control element as example).



7 Commissioning

Note

The devices are a product of the KNX system and meet KNX guidelines. Detailed expert knowledge by means of KNX training sessions for a better understanding is assumed.

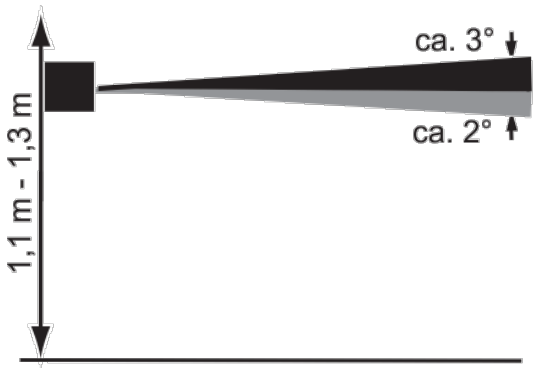
7.1 Hardware

The movement detectors must be mounted to a solid wall, since each movement of the device has the same effect as the movement of a heat source in the detection range.

– The optimum function of the movement detector is assured when it is mounted laterally to the direction of movement (tangential approach).
– Since infrared waves cannot penetrate solid objects, ensure that nothing obstructs the line of vision of the movement detector.
– A minimum distance of 2 m is to be kept from the direct light of lamps and from heat sources.

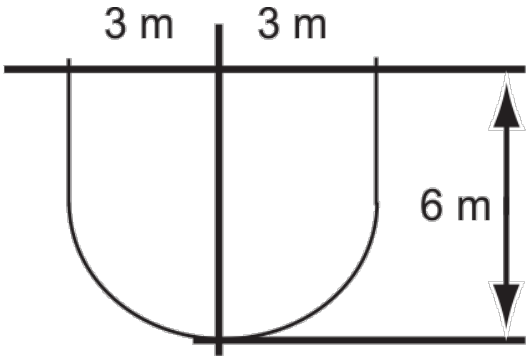
Mounting height / detection levels

The movement detector has a selective lens which has a detection level of approximately 3° upwards and approximately 2° downwards.



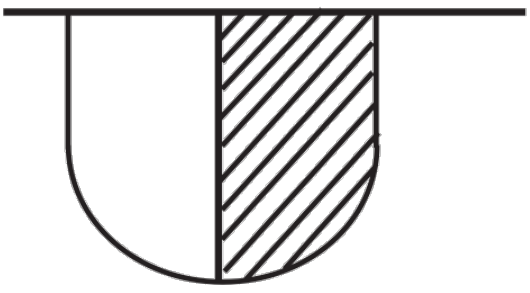
Detection range

The detection range is 180°, which is composed of two 90° segments.
The coverage at a tangential / vertical approach amounts to at least 6 m.



Limitation of the detection range

The detection range is adjusted via the parameter setting within the Engineering Tool Software ETS (Power-Tool).



7.2 Software

Note

The devices are products of the KNX system and meet KNX guidelines. Detailed expert knowledge by means of KNX training sessions for a better understanding is assumed.

To start the device a physical address must be assigned first. The physical address is assigned and the parameters are set with the Engineering Tool Software ETS (from version ETS 3.0 f). Use the appropriate commissioning tool (Power-Tool) for the parameter settings.

7.2.1 Preparatory steps

1. Connect a PC via the KNX interface, e.g. the commissioning interface / adapter 6149/21-500, to the KNX bus line. The Engineering Tool Software ETS (from version ETS 3.0 f) must have been installed on the PC.

2. Switch on the bus voltage.

7.2.2 Assigning a physical address

1. Press the programming button (Fig. 8, pos. 1) on the device.

   The red (programming) LED (Fig. 8, pos. 2) lights up.

2. After the physical address has been programmed, the red (programming) LED goes off.

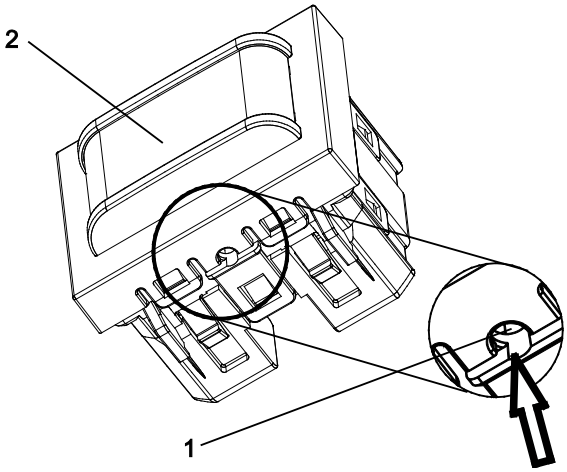


Fig. 8: Position of the programming button and the LED.

Video for assigning the physical address.

7.2.3 Assigning the group address(es)

The group addresses are assigned in connection with the ETS.

7.2.4 Selecting the application program

Please contact our Internet support unit (www.Busch-Jaeger.com). The application is loaded into the device via the ETS.

7.2.5 Differentiating the application program

Various functions can be implemented via the software application (ETS / Power-Tool) (detailed descriptions of parameters are contained as Help text in Power-Tool or in chapter "Application ..." (only in languages of the countries DE, EN, ES, FR, IT and NL).

8 Operation

The device is operated only via the programming button. Details about how to operate the programming button are contained in chapter "Commissioning", paragraph "Assigning a physical address". Further manual operations are not necessary.
The function is fixed via the assigned function and its parameter settings.
Extensive functions are available for the movement detector. The scope of applications is contained in chapter "Application ..." (only in languages of the countries DE, EN, ES, FR, IT and NL).

9 Cleaning

Dirty units can be cleaned with a dry cloth. If this is not sufficient, a cloth slightly moistened with a soap solution can be used. Caustic cleaning agents or solvents must not be used. Do not use objects with sharp edges to clean the lens system.

10 Maintenance

The unit is maintenance-free. In case of damage (e.g., during transport or storage), do not perform repairs. Once the unit is opened, the warranty is void!
Access to the device must be guaranteed for operation, testing, inspection, maintenance and repairs (according to DIN VDE 0100-520).

11 Description of applications / objects

11.1 Overview of applications

The application program for the movement detector contains the applications listed in the following:

KNX application	Page
Movement detector	18

Depending on which device and application are selected, the Power-Tool software shows different parameters and communication objects. This allows the movement detector to be set accordingly.

Note

A detailed description of parameters is available in the Help texts of the "Power-Tool" software.

11.2 "Movement detector" application

The "Movement detector" application can trigger telegrams on the bus when a movement is detected in the detection range. Telegrams can also be sent on the bus when telegrams are received on the "external Push button input" 1-bit communication object. This means that a device can be activated by additional KNX devices as if a movement was detected. The time for sending out a telegram depends especially on the operating mode that has been set.

11.3 Parameters

Parameter "General"	Settings	Comments
Type of output	• Master • Slave	–
Input Slave	• activated • deactivated	–
Output object	• 1 bit • 1-byte 0..100% • 1-byte 0..255 • Light scene number (1-64)	Only available when parameter "Type of output" is set on "Master".
Output object sends at	• Switching On / Off • Switch on • Switch off	
Value for switch on	• On • Off	
Sending value for switch-on cyclic	• activated • deactivated	
Value for switch off	• On • Off	
Send value for switch-off cyclic	• activated • deactivated	
Cyclical repeating time (hh:mm:ss)	• 00:00:10 – 18:12:15	Only available when cyclic sending of the output value has been activated, i.e. when parameter "Type of output" is set on "Master" or "Slave".
Switch-OFF delay (hh:mm:ss)	• 00:00:10 – 18:12:15	Only available when parameter "Type of output" is set on "Master".
Brightness threshold extern	• 1 – 500	Only available for operating modes "Automatic" and "Automatic switch-on" and for operating mode "Normal" of the movement detector.
Sensitivity of watchdog	• High • Mean • Low	–
Extended parameter settings	• activated • deactivated	–
Extended parameters status	• activated • deactivated	Only available when parameter "Type of output" is set on "Master".
Extended parameters Brightness	• activated • deactivated	–
Extended parameters external button	• activated • deactivated	Only available when parameter "Type of output" is set on "Master".

Note

The following parameters are available only when parameter "Extended parameter settings" is set on "activated".

Parameter "Extended"	Settings	Comments
Operating mode	• Automatic • Automatic switch-off • Automatic switch-on	Only available when parameter "Type of output" is set on "Master".
Object for timeout	• activated • deactivated	Only available for operating modes "Automatic" and "Automatic switch-off".
Operating mode of the movement detector	• Test • Normal • standard	–
Activating sensors	• Both • Left • right	–
Enable object movement detector	• activated • deactivated	–
Enable with	• ON telegram • OFF telegram	Only available when enable object "Movement detector" is set on "activated".
Output sends at enable	• No telegram • Current status • Single value for switching on • Single value for switching off	
Output sends at blockage	• No telegram • OFF after expiration of the light-on time • immediately OFF • Single value for switching on	
Dead-time (ms)	• 100 – 60000	–
Overwrite settings for download	• activated • deactivated	–

Note

The following parameters are available only when parameter "Status display" is set on "activated" and parameter "Type of output" on "Master".

Parameter "Status display"	Settings	Comments
activating / connection int. or ext. brightness	• activated • deactivated	Only available when parameter "Status display" is set on "activated".
LED status	• activated • deactivated	Only available for operating modes "Automatic switch-on" and "Automatic switch-off".

Note

The following parameters are available only when parameter "Extended parameters Brightness" is set on "activated".

Parameter "Brightness"	Settings	Comments
Object for brightness-independant detection	• activated • deactivated	Only available when parameter "activating / connection int. or ext. brightness" is set on "internal only", "external only" or "internal or external".
Brightness-independent detection activation with	• ON telegram • OFF telegram	
Brightness independent detection after busvoltage return	• activated • deactivated	
Input Slave takes the brightness into consideration	• activated • deactivated	Only available when the input "Slave" is set on "activated".
activating / connection int. or ext. brightness	• Brightness-independent • internal only • external only • internal or external	–
Object for internal brightness threshold	• activated • deactivated	Only available when parameter "activating / connection int. or ext. brightness" is set on "internal only", "internal or external".
Object for external brightness threshold	• activated • deactivated	Only available when parameter "activating / connection int. or ext. brightness" is set on "external only", "internal or external".
Brightness threshold external (lux)	• 1 – 500	

Note

The following parameters are available only when parameter "Extended parameters external button" is set on "activated" and parameter "Type of output" on "Master".

Parameter "External button"	Settings	Comments
Object input external button	• activated • deactivated	–
External button switches on with	• ON telegram • OFF telegram	Only available when parameter "Object input external button" is set on "activated".
Object input manual operation	• activated • deactivated	
Manual mode is activated with	• ON telegram • OFF telegram	

11.4 Objects

11.4.1 Movement detector

No.	Object name	Data type	Flags
0	Enable movement	1 Bit EIS1 / DPT 1.001	C, W, U
1	Input switch-OFF delay	2 Byte / DPT 7.005	C, W, U
2	Input Slave	1 Bit EIS1 / DPT 1.001	C, W, U
3	Input actuator status	1 Bit EIS1 / DPT 1.001	C, W, U
4	Input independent detection of brightness	1 Bit EIS1 / DPT 1.001	C, W, U
5	Input External brightness	2 Byte EIS5 / DPT 9.0xx	C, W, U
6	Input brightness threshold external	2 Byte EIS5 / DPT 9.0xx	C, W, U
7	Input brightness threshold internal	2 Byte EIS5 / DPT 9.0xx	C, W, U
8	Output status LED	1 Bit EIS1 / DPT 1.001	C, T
9	Output movement (Master)	1 Bit EIS1 / DPT 1.001	C, T
10	Output movement (Slave)	1 Bit EIS1 / DPT 1.001	C, W, T
11	Input switchover manual operation	1 Bit EIS1 / DPT 1.001	C, W, U
12	Input external button	1 Bit EIS1 / DPT 1.001	C, W, U

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