

**KNX RFID Card Holder
MTN6903-61xx**

Application Description 7522/1.0



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1 Product and functional overview

The **KNX RFID Card Holder** (Art. no. **MTN6903-61xx**) is an EIB/KNX wall mounting device used for access and control detection of users inside a room as well being used as a holder of a user's transponder card.

The device is equipped with two binary inputs (potential free contacts) that can be used to control whether the door lock has been opened or closed or other signals coming from external switches / contacts (such as Windows or bathroom emergency alarms).

The Card Holder is also equipped with two output relays which can be used for several purposes, typically to open the door or turn on the lighting inside the room or as normal binary outputs controlled by their associated communication objects.

The front of the Card Holder is illuminated by an LED when no card is present, this LED switches off when a card has been accepted and flashes for 3 seconds when a card has been refused (entrance denied). The Card Holder reads the card once it has been inserted into the slot.

The access control follows a checking sequence where the "build number" is firstly checked, then the expiration data, then the password ID for client / guest / service identification, then the enabled days of week and hours range. Should all information be successfully confirmed then the Card Holder can open the door, switch ON the lighting and enable all room services and loads inside the room.

At the same time the Card Holder sends the access response to the bus in order to be detected and stored by visualization or management software.

The device can identify four classes of users depending on password detection and a 1 bit object "Scene" is available for each of them. As one user is identified and their access confirmed the Card Holder sends the object "Scene X" corresponding to the user class detected, activating a scene inside the room conforming to the user profile.

In a Hotel application, for instance, these 4 categories can be used to identify clients, service staff, maintenance staff or emergency services.

Once the card is removed from the Card Holder (e.g. upon exit of user) the current scenario is switched OFF and after a programmed timeout also the energy and lights inside the room can be switched OFF.

The energy and light enable commands as well as the "Scene 1" (corresponding to client password category) can be activated simulating a client card insertion while receiving the 1 bit object "Enable Insert Card". This feature can be used for instance, in case of Hotel application, to enable all room services from the reception (i.e. from the Hotel management software) for testing or maintenance purposes.

This device also provides an alarm function by sending an "Alarm" object (1bit) to the alarm, for instance, centralized visualization software (e.g. "eAccess" or "eHotel") that a power failure has occurred and that power had been recovered. This information can be useful as it allows visualization and monitoring software to update configuration data to the readers and the card holders.

The physical address, group address and parameters are assigned and programmed with the ETS software tool. In order to commission the device, a PC with ETS2 version V1.3 or higher is required as well as an interface to the bus, e.g. via an RS232 interface or via a USB interface.

This device must be configured and loaded with the following application program:
7522_1_0 RFID Card Holder

With this application program the following functions can be parametrized and configured:

Application Program: 7522_1_0 RFID Card Holder

- Max number of group addresses: 35
- Max number of group address associations: 32

General Configurations	<ul style="list-style-type: none"> • <i>Time base OFF delay</i> • <i>Operational LED</i> • <i>Grant date control</i> • <i>Grant days control</i> • <i>Grant hour control</i> • <i>Send alarm</i>
Input 1 (and 2) Configuration	<ul style="list-style-type: none"> • <i>Switching states ON or OFF can be set depending on input pulse edge evaluation (rising or falling edge).</i> • <i>Cyclical sending option at adjustable intervals</i>
Output 1 Configuration	<ul style="list-style-type: none"> • <i>“General” or “Door Opener” function selection</i> • <i>Normally open or close contact setting</i> • <i>Time switching (e.g.: “Door lock timing release”)</i>
Output 2 Configuration	<ul style="list-style-type: none"> • <i>“General” or “Lighting” function selection</i> • <i>Normally open or close contact setting</i> • <i>Time switching (e.g.: “Lighting timeout”)</i>

Note: The default settings for the options are underlined (e.g. Values: no/yes)

2 Parameters

2.1 Parameter window “General Configurations”

Device: x.x.x Access Control RFID Card holder

Output 1 configuration	Time base	1 s
Output 2 configuration	Factor	30
Input 1 configuration	Operational LED	ON
Input 2 configuration	Grant Date Control	ON
General configuration	Grant Days Control	OFF
	Grant Hour Control	OFF
	Send alarm	ON

- **Time base OFF delay**

This parameter and the next are used to set up a timeout for switching OFF energy, lighting and the current activated scenario inside the room when the card is extracted from the holder.

After the user removes the card the timeout is started and any active objects “Energy Enabled”, “Room Light Enabled” and “Scenario X” receive value “0” (OFF).

This timeout is calculated from the selected base “Time base OFF delay” multiplied by the factor “Factor TIMEOUT” that is entered here:

$$T_{OFF} = \text{Time base OFF delay} \times \text{Factor for OFF delay}$$

Values: 250ms, 500ms, **1s**, 1min, 1 h

- **Factor for OFF delay**

Values: 0...**30**...255

Note: An attempt should always be made to set the required time with the smallest possible base, as the base that is selected here also simultaneously specifies the maximum timing error.

- **Operational LED**

Values: OFF / **ON**

Value “ON”: the Operational LED (blue) lights the card insertion slot. This feature can be useful for device localization while the surroundings are dark. The

Operational LED is always ON when no card is inserted, OFF when a card is inserted and flashes for three seconds in the case of a card reading error or a card not being acknowledged (entrance denied).

Value “OFF”: With this setting the Operational LED is always OFF. The Operational LED also flashes for three seconds in the case of a card reading error or a card not being acknowledged.

- **Grant Date Control**

Values: **OFF / ON**

Value “ON”: enables expiration date control during transponder card or key reading.

Value “OFF”: disables expiration date control

- **Grant Days Control**

Values: **OFF / ON**

Value “OFF”: the days of week allowed for entrance are not checked.

Value “ON”: enables the days of week control.

- **Grant Hour Control**

Values: **OFF / ON**

Value “OFF”: the permitted hours range is not checked during card reading. This information is normally transmitted together with the user password by visualization or building management software (e.g. “eHotel” or “eAccess”) during commissioning and start-up or, in the case of usage in a Hotel, during client check-in.

Value “ON”: enables hours range checking during Card Holder card reading.

- **Send Alarm**

Values: **OFF / ON**

Value “OFF”: the device does not send the object “Alarm”

Value “ON”: in case of power failure the device sends the object “Alarm” once the power supply has been recovered.

Note: this feature is useful for visualization software in order to re-send data to the readers after a power failure in order to re-synchronize data and time with the central unit (PC).

2.2 Parameter Window “Output 1 Configuration”

The Output 1 configuration parameters are illustrated below:

Device: x.x.x Access Control RFID Card holder

Output 1 configuration	Function	Door opener
Output 2 configuration	Contact	Normally Open
Input 1 configuration	Mode	Normal
Input 2 configuration	Time base	1 s
General configuration	Factor	2

▪ Function

Values: *General / Door Opener*

Value “*General*”: Output 1 is controlled only by the “Output 1” (1 bit) communication object as normal independent binary output channel.

Option “*Door Opener*”: the Output 1 is switched (ON or OFF depending on option selected in the next parameter “Contact”) if a valid transponder card is read or via the “Door/Courtesy Light” (1 bit) communication object.

With this option in case the Output 2 is configured with function “Lighting”, the 1 bit object “Door / Lighting” controls both relays simultaneously (e.g. Output 1 to open the door, Output 2 to switch on the lighting inside the room).

▪ Contact

Values: *Normally Open / Normally Close*

Value “*Normally Open*”:

Off telegram = contact open
On telegram = contact closed.

Value “*Normally Close*”:

Off telegram = contact closed
On telegram = contact open.

- **Mode**

Values: *Normal / Timing*

Value “*Normal*”: Output1 will be switched ON by sending an ON command and will be switched OFF by sending an OFF command from the associated object “Output 1”.

The status of the relay contact can be inverted through use of parameter setting “Contact”: Normally Close”.

Value “*Timing*”: enables the time switch function (e.g. electrical lock control).

When an On telegram is received via the output object, it is routed directly to the relay. The Off delay that has been assigned starts at the same time. Every further “1” (ON) that is received before the timer has elapsed, resets the delay and restarts it. Once the period has elapsed, a “0” is passed to the output. An Off telegram deletes the Off delay and is immediately routed to the output.

The timeout is calculated from the selected base “Time base” multiplied by the “Factor” that is entered here:

$$T_{ON} = \text{TimeBase} \times \text{Factor}$$

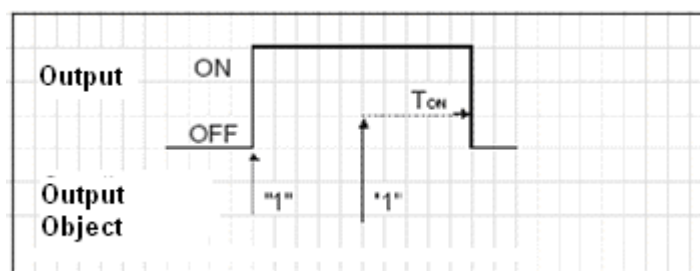
Note: An attempt should always be made to set the required time with the smallest possible base as the base that is selected here also simultaneously specifies the maximum timing error.

- **Time base**

Values: *250ms, 500ms, 1s, 1mn, 1h*

- **Factor (1-255)**

Values: *0...2...255*



2.3 Parameter Window “Output 2 Configuration”

Output 2 differs from Output 1 only in the first parameter setting “Function”.

The Output 2 configuration parameters are shown in the next window:

Device: x.x.x Access Control RFID Card holder

Output 1 configuration		
Output 2 configuration	Function	Lightning ▼
Input 1 configuration	Contact	Normally Open ▼
Input 2 configuration	Mode	Timing ▼
General configuration	Time base	1 s ▼
	Factor	2 ▲▼

▪ Function

Values: *General* / *Lighting*

Value “*General*”: Output 2 is controlled only by the “Output 2” (1 bit) communication object as a normal independent binary output channel.

Value “*Lighting*”: the Output 2 is switched (ON or OFF depending on option selected in the next parameter “Contact”) if a valid transponder card is read or via the “Lighting” (1 bit) communication object or, in case the function “Door Opener” has been assigned to Output 1, with the “Door / Lighting” 1 bit object.

All the other parameters are as per “Output 1 Configuration” settings, please see functional descriptions in the previous section.

Note: please see Outputs timing diagrams in “Application Notes”.

2.4 Parameter Window “Input 1 Configuration”

Parameters associated with channel Input 1 are the same as those associated with Input 2.

Device: x.x.x Access Control RFID Card holder

Output 1 configuration		Mode	Toggle ON/OFF ▼
Output 2 configuration		Cyclical sending	OFF ▼
Input 1 configuration			
Input 2 configuration			
General configuration			

- **Mode**

Values:

Rising ON
Rising OFF
Falling ON
Falling OFF
Rising ON / Falling OFF
Rising OFF / Falling ON
Toggle ON/OFF
Toggle OFF/ON

This parameter programs which status is sent to the bus (ON/OFF; TOGGLE) when a rising or falling edge is detected in the input signal.

Behaviour:

“Rising On”: A rising edge causes a logic “1” to be transferred to the communication object. A falling edge does not alter the object value.

“Rising Off”: A rising edge causes a logic “0” to be transferred to the communication object. A falling edge does not alter the object value.

“Falling On”: A falling edge causes a logic “1” to be transferred to the communication object. A rising edge does not alter the object value.

“Falling Off”: A falling edge causes a logic “0” to be sent to the communication object. A rising edge does not alter the object value.

“Rising On, Falling Off”: A rising edge causes a logic “1” to be transferred to the communication object. A falling edge causes a logic “0” to be sent.

“Rising Off, Falling On”: A rising edge causes a logic “0” to be transferred to the communication object. A falling edge causes a logic “1” to be sent.

“Toggle ON/OFF”: Each rising edge causes the object value to be inverted. This means that a logic “1” is sent to the communication object after the first rising edge. The next one sends a logic “0” and so on. A falling edge does not alter the object value.

“Toggle OFF/ON”: Each falling edge causes the object value to be inverted. This means that a logic “1” is transferred to the communication object after the first falling edge. The next one sends a logic “0” and so on. A rising edge does not alter the object value.

- **Cyclical sending**

Values: **OFF / ON**

This parameter enables the cyclical sending of current value of Input1 to the bus at a set interval.

- **Cycle Time (min)**

Values: **1...10...255**

The cycle time for sending telegrams repeatedly on the bus with Input1 current value is specified here.

The time units are measured in minutes.

Note: please see *Inputs timing diagrams* in “Application Notes”.

3 Communication Objects

The EIB/KNX communication objects provided within the application program “7522_1_0 RFID Card Holder” are shown below:

Number	Name	Object Function	De...	Length	C	R	W	T	U
0	Door/Courtesy Light	1.001 DPT_Switch		1 bit	C	R	W	T	-
1	Courtesy Light	1.001 DPT_Switch		1 bit	C	R	W	T	-
2	Enable Insert Card	1.003 DPT_Enable		1 bit	C	R	W	T	-
3	Date	11.001 DPT_Date		3 Byte	C	-	W	T	-
4	Time	10.001 DPT_Time		3 Byte	C	-	W	T	-
5	Build Number	7.001 DPT_Value_2_UCount		2 Byte	C	-	W	T	-
6	Guest Data	NO_DPT		10 Byte	C	-	W	T	-
7	Access Code	15.000 DPT_Access_Data		4 Byte	C	-	-	T	-
8	Scenario 1	1.003 DPT_Enable		1 bit	C	R	-	T	-
9	Scenario 2	1.003 DPT_Enable		1 bit	C	R	-	T	-
10	Scenario 3	1.003 DPT_Enable		1 bit	C	R	-	T	-
11	Scenario 4	1.003 DPT_Enable		1 bit	C	R	-	T	-
12	Energy Enabled	1.003 DPT_Enable		1 bit	C	R	-	T	-
13	Room Light Enabled	1.003 DPT_Enable		1 bit	C	R	-	T	-
14	Input 1	1.001 DPT_Switch		1 bit	C	R	-	T	-
15	Input 2	1.001 DPT_Switch		1 bit	C	R	-	T	-
16	Allarm	1.005 DPT_Alarm		1 bit	C	R	-	T	-

Nr.	Function	Name	Object Function	Length
0	On/Off	Output 1 / Door / lighting	DPT_Switch 1.001	1 bit

This object is received from the bus to control Output 1 or, in case of “Lighting” setting on Output 2 configuration parameters, also Output 2.

In case the “Door Opener” function is enabled this object is named “Door / lighting” and Output 1 is switched ON/OFF also in case of valid transponder card reading and consequent successful entrance acknowledgement (for this usage Output 1 should be connected to a door lock).

If Output 2 has been configured with function “Lighting” this object also controls Output 2 (e.g. in case of Hotel application, as this object is sent by the bus the Card holder switches ON Output 1 opening the door and Output 2 switching ON the lighting).

In case of “General” functional setting this object controls only Output 1 as a normal independent binary output channel.

In case the Output is set as “Normally Open” contact the relay is closed when value “1” is received and it is opened when value “0” is received (and vice versa in case of “Normally close” contact).

If Timing Mode is enabled when an On telegram is received via the Output object (“Output 1” or “Door / lighting”), it is routed directly to Output 1. The Off delay that has been assigned starts at the same time. Every further “1” (ON) that is received before the timer has elapsed, resets the delay and restarts it. Once the period has elapsed, a “0” is sent to the output. An Off telegram deletes the Off delay and is immediately routed to the output.

Nr.	Function	Name	Object Function	Length
1	On/Off	Output 2 / Lighting	DPT_Switch 1.001	1 bit
<p>This object is received from the bus to control Output 2.</p> <p>In case the "Lighting" function is enabled this object is named "Lighting" and controls Output 2 to be switched ON/OFF. Output 2 is also switched ON/OFF in case of a valid transponder card reading and consequent entrance acknowledgement (for this usage Output 2 should be connected to the Lighting) and also when Output 1 has been configured with function "Door Opener".</p> <p>In case of "General" function associated with Output 2, this object is named "Output 2" and controls Output 2 as a normal independent binary output channel.</p> <p>In case the output relay is set as "Normally Open" contact the relay is closed when value "1" is received and it is opened in case of value "0" (vice versa in case of "Normally Close" contact).</p> <p>If "Timing" Mode is enabled when an On telegram is received via the Output object ("Output 1" or "Lighting"), it is routed directly to Output 2. The Off delay that has been assigned starts at the same time. Every further "1" (ON) that is received before the timer has elapsed, resets the delay and restarts it. Once the period has elapsed, a "0" is sent to the output. An Off telegram removes the Off delay and is immediately routed to the output.</p>				
2	On/Off	Enable Insert Card	DPT_Enable 1.003	1 bit
<p>When this object is received (with value "ON") the device simulates a client card reading acknowledgement activating the following services:</p> <ul style="list-style-type: none"> ➤ Open the door and switch ON the lighting ➤ Enable energy inside the room (sending the 1 bit object "Energy enabled") ➤ Enable the lighting (sending the 1 bit object "Room light enabled") ➤ Switch ON "Scene 1" (scene associated with "Client" password category). <p>In case of a card extraction and next insertion the timeout associated with lighting and energy activation is reset.</p>				
3	Date	Date	DPT_Date 11.001	3 byte
<p>The Date object value is used to synchronize the Card Holder with visualization software and to verify the access qualification of a valid card.</p> <p>In the device and on the card the date is in DD,MM,YY format where "YY" is a number from 90 to 89 and corresponds to the years from 1990 to 2089.</p> <p>The updating is normally done via the bus at least one time a day and each time that the supervision centre receives an "Alarm" signal (i.e. after a power failure).</p>				
4	Time	Time	DPT_Time 10.001	3 byte
<p>The Time object value is used to verify the access qualification of a valid card and to control the timing hour valid range.</p> <p>The updating is normally done via the bus at least one time a day and each time that the supervision software (e.g. "eHotel" or "eAccess") receives an "Alarm" signal (i.e. after a power failure).</p>				

Nr.	Function	Name	Object Function	Length
5	Set Plant ID	Build Number	DPT_Value_2_UCount 7.001	2 Byte
<p>The object "Build Number" is used to identify the installation or the building where the Card Readers and Holders are installed.</p> <p>This code avoid any possible risk of the same card being used to gain entrance in two different buildings. It is sent by the building management software during commissioning.</p>				
6	Password	Guest Data	NO_DPT	10 Byte
<p>The object "Guest Data" is sent by the access control management software to the Card Readers and Holders in order to enable entrance and card identification once the transponder card is read.</p> <p>This object (non KNX standard object) contains the user password ID, the password / card expiration date, the enabled timing entrance ranges, the valid entrance days of week and the expiration data. After the "Build Number" reading and acceptance, the Card Reader or Holder controls the password and any other associated information in order to allow or deny entrance to the room.</p> <p>The "Guest Data" object is normally sent during configuration of Card Readers and Holders by the access control software ("eAccess" or "eHotel").</p>				
7	Access Data	Access Code	DPT_Access_Data 15.000	4 Byte
<p>This object is used to send the result of a transponder card reading to the bus.</p> <p>Within this object the password and some feedback on readings are sent to the centralized access control software (e.g. "eHotel" or "eAccess") to be managed or stored.</p>				
8..11	Scene Enable	Scene X	DPT_Enable 1.003	1 bit
<p>The card holder identifies each password within 4 users categories and after a card reading acknowledgement transmits its associated scene (Scene 1, 2, ..or 4).</p> <p>For instance, in case of Hotel room management, the four ranges of passwords can be associated to clients, service staff, maintenance staff and emergency services.</p> <p>As the card is extracted from the holder, the device switches OFF the current scene (so this object is sent to "0" = OFF).</p> <p>Object 8 "Scene 1" is the only scene that can be activated upon receipt of the "Enable Insert Card" object from the bus (simulation of client room entrance).</p>				

Nr.	Function	Name	Object Function	Length
12	Power Supply ON/OFF	Energy enabled	DPT_Enable 1.003	1 bit
<p>This object is sent after a successful card reading in order to enable all room loads and services (i.e. the energy power supply circuit). This object is also sent when the client simulation room entrance object "Enable Insert Card" is received.</p> <p>After removing the card from the Holder, in case a timeout has been programmed with parameter in general configuration settings, this object is sent to OFF once the timeout has elapsed. In case the card is re-inserted into the holder the timeout is reset.</p>				
13	Light ON/OFF	Room Light Enabled	DPT_Enable 1.003	1 bit
<p>This object is sent (ON) after a successful card reading in order to switch ON all room lights (or some of them). This object is also sent when the client simulation room entrance object "Enable Insert Card" is received.</p> <p>After removing the card from the Holder, in case a timeout has been programmed with parameter "Time base OFF delay" and "Factor OFF delay" in general configuration settings, this object is sent to OFF once the timeout has elapsed. In case the card is re-inserted into the holder the timeout is reset.</p>				
14,15	ON/OFF/Toggle	Input 1, 2	DPT_Switch 1.001	1 bit
<p>Telegram Values</p> <p style="padding-left: 100px;">"0" OFF "1" ON</p> <p>The switching telegrams of Inputs 1 or 2 are sent via the group addresses associated with these objects.</p> <p>It is possible to select which signal edge detected at the input channels generates On or Off telegrams via the parameters of the corresponding inputs.</p> <p>With "Toggle" selection the object value is inverted (e.g. in case a push button is connected to an input channel at every push button pressing the status is inverted ON/OFF (or vice versa).</p> <p>In case "Cyclical sending" is enabled the current input value is transmitted to the bus at every timing interval set by the "Cycle time (min)" parameter (e.g. monitoring of a physical sensor status by Visualization software).</p>				
16	Power Failure alarm	Alarm	DPT_Alarm 1.005	1 bit
<p>Should the parameter "Send Alarm" be set to "ON" then this object is shown.</p> <p>This object is sent ("ON") in case of a device power failure once the power supply has been recovered.</p> <p>This alarm allows visualization and access control software to re-synchronize data end time to all Card Readers (and Holders) after a power failure.</p>				

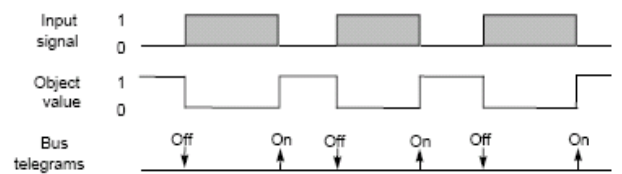
4 Application Notes

Examples of timing diagrams for Inputs

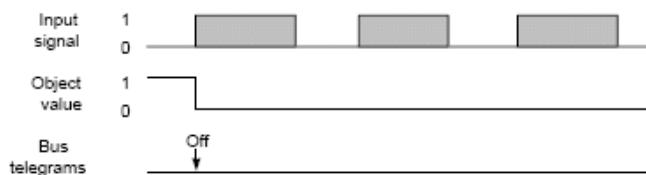
1. Configured with edge evaluation: "rising On"



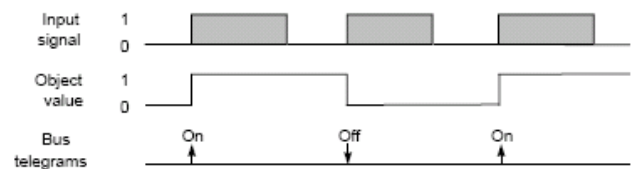
6. Configured with edge evaluation: "rising Off, falling On"



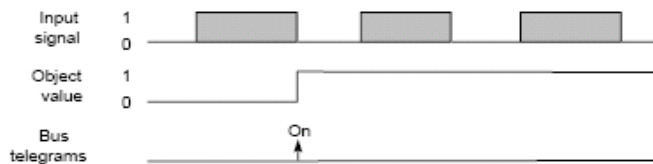
2. Configured with edge evaluation: "rising Off"



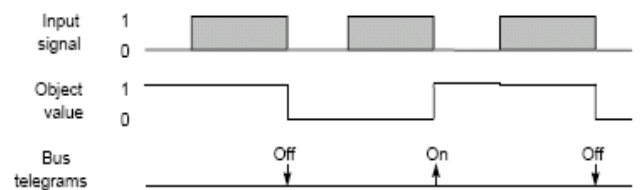
7. Configured with edge evaluation: "Toggle On Off"



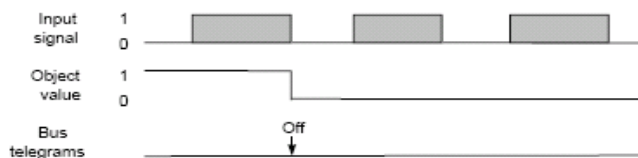
3. Configured with edge evaluation: "falling On"



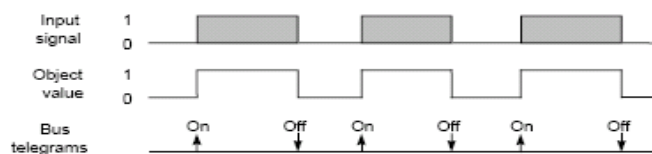
8. Configured with edge evaluation: "Toggle Off/On"



4. Configured with edge evaluation: "falling Off"

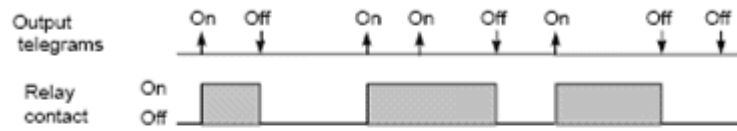


5. Configured with edge evaluation: "rising On, falling Off"

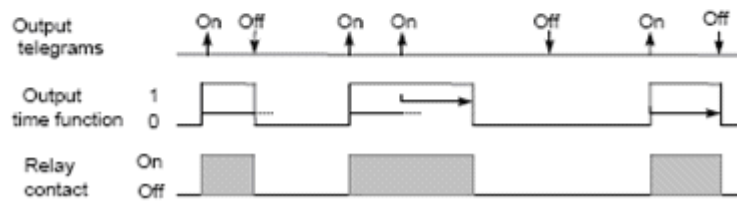


Examples of timing diagrams for Outputs

1. Switching



2. Switching with a time switch function



LED Signalling

The Card Holder has one blue LED to illuminate the card slot when dark.

This LED is enabled by the parameter “Operational LED” in the “General Configurations” parameters setting. Should the LED usage have been disabled the only LED signalling is due to a card reading error or card not valid or not acknowledged error.

Card Holder reading slot LED signalling

- If parameter “Operational LED” = ON
 - Amber lux fixed ON: card not inside (e.g. device localization when dark)
 - Light flashing for 3 sec.: reading error or card not valid
 - Light OFF: card inside

- If parameter “Operational LED” = OFF
 - Light OFF: always (with or without card inside)
 - Light flashing for 3 sec.: reading error or card not valid