Access Control

Specification

Power supply	12VDC or 5VDC
Controller size	• 95x120 mm (PCB only) • 110x120 mm (with the box)
Current	Less than 250 mA @ 12VDC
Readers	2x Wiegand
Time zones	Limited by controller storage size
Control channels	Two options: 1. 4x open collectors 24VDC, 0.5A 2. 2x low-power relays 24VDC-AC, 1.0A
Inputs	8x with flexibly assignable functions
Users	Limited by controller storage size
Events	Limited by controller storage size

Application

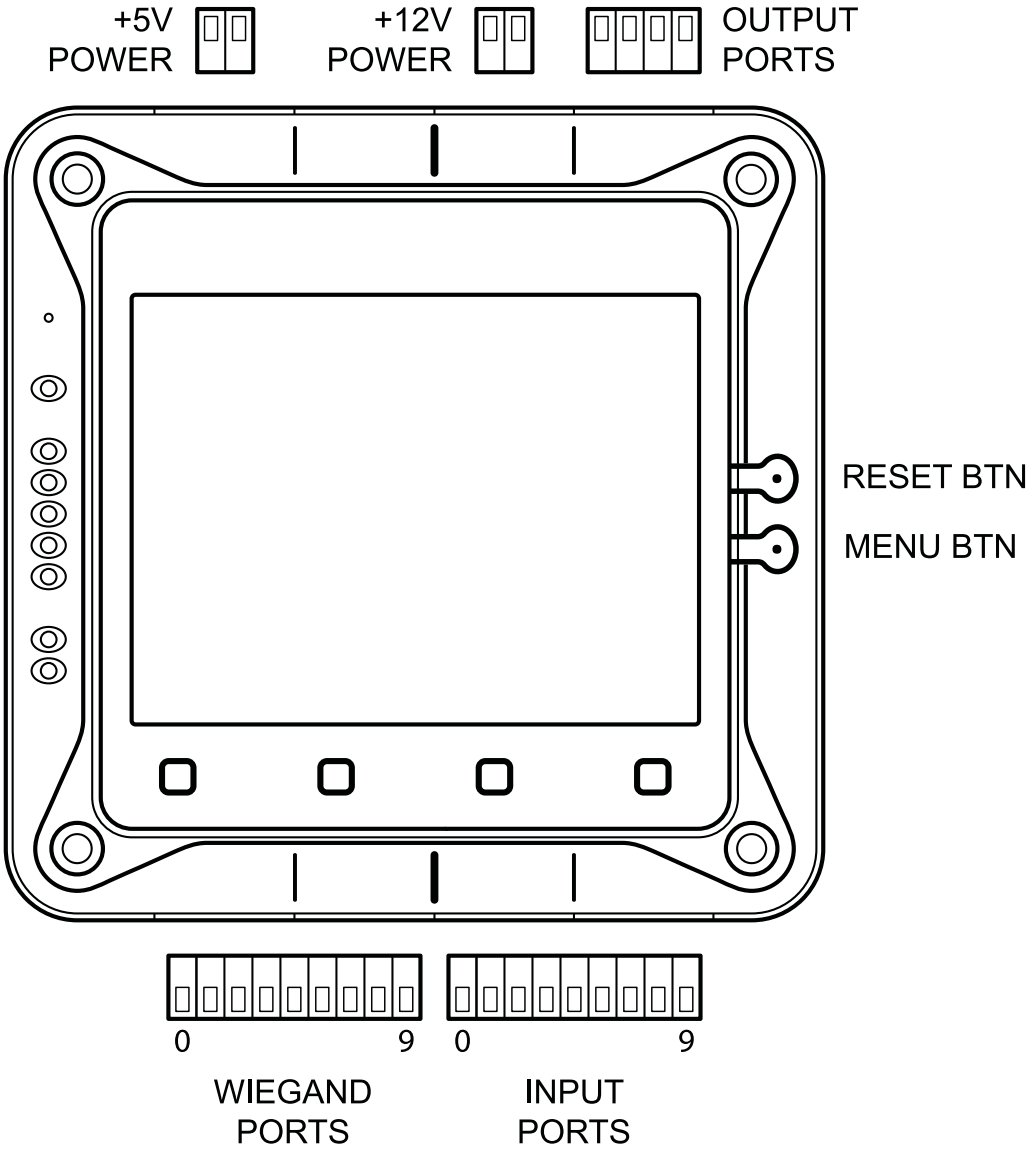
Tibbo Access Control controller is designed for running with AggreGate Access Control and Time & Attendance modules. It can manage a single access object (door, turnstile, gate, etc.), as well as time and attendance terminals. The device supports various reader connections for Wiegand26, Wiegand32, and Wiegand46 protocols.

Tibbo Access Control controller features the following functionality:

1. Storing lists with RFID IDs, access policies, time zones
2. Storing events in AggreGate logging system
3. Reading card IDs and making decisions through protected object-based access policies and time zones
4. Managing door actuators, turnstiles, and other access control devices
5. Monitoring doors, turnstiles, etc. using terminal contacts
6. Generating events for time and attendance systems.

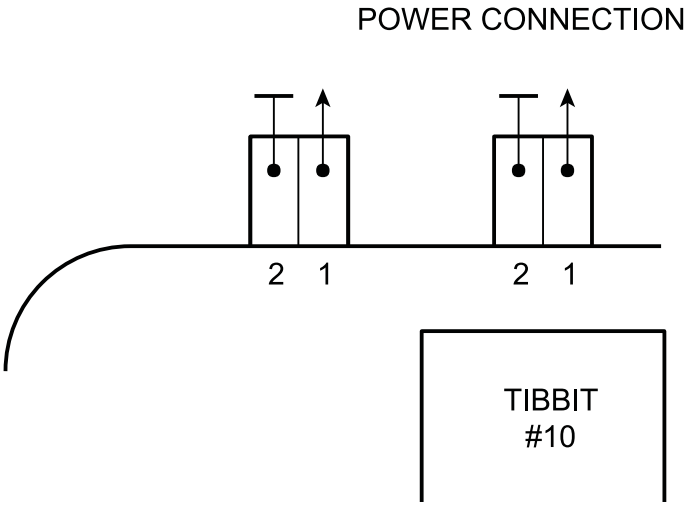
Description

Access Control controller is a standard Tibbo board with a set of necessary Tibbit modules and firmware for implementing Access Control functionality along with AggreGate server. The controller incorporates two channels for connecting readers via Wiegand protocol and eight channels for connecting external sensors. It also manages the controller state (button opening, emergency opening, controller locks, terminal door sensors, etc.). One more important feature is incorporating 2-4 channels for external device control. The channel count depends on current consumption. All controller settings should be tuned via AggreGate server, which provides great flexibility for managing the controller operating modes.



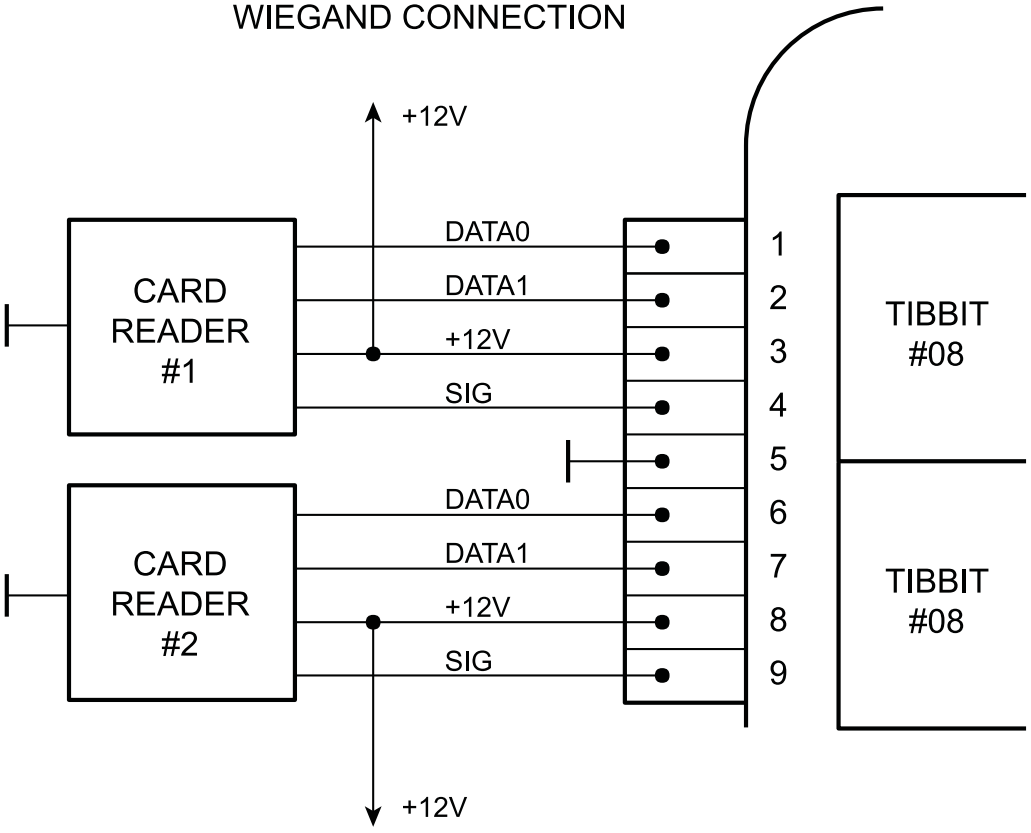
Power Supply

The controller is powered by an external source of 12VDC or 5VDC.



Connecting Readers

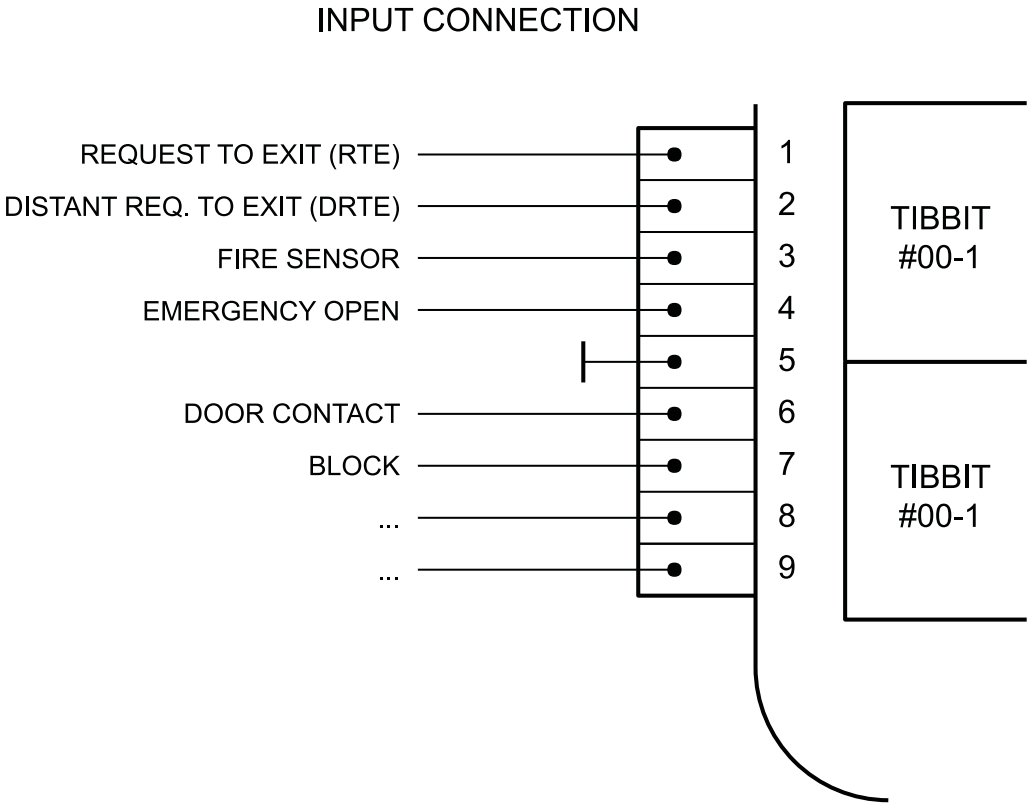
Connecting readers is carried out as follows:



Inputs Data0 and Data1 of Wiegand interfaces are optocouplers. The reader's SIG signal is used to indicate denied access with red lights and (or) buzzers.

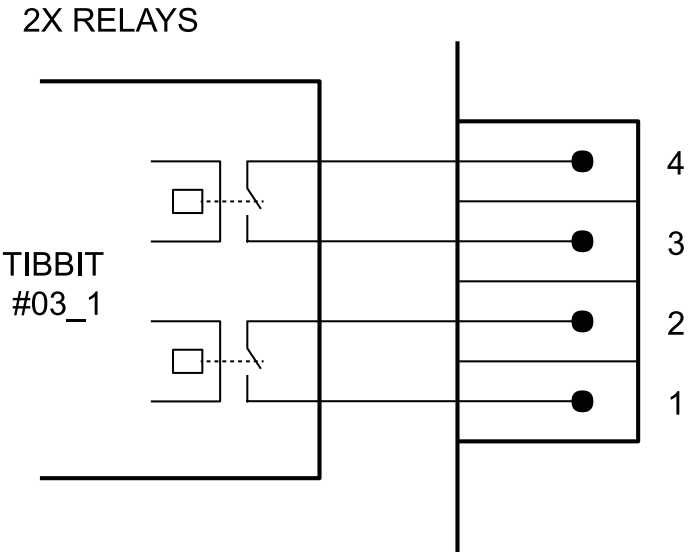
Connecting External State Control Devices

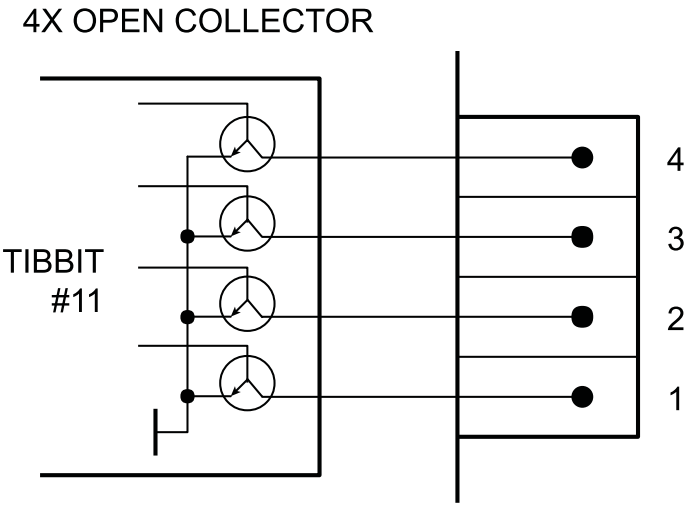
For connecting external state control devices, use 9-pin according to the following scheme:



Each external control input can have various functions. The function name displayed in the diagram is just an example, while the list of all possible functions is described in the Settings section. The normal input status is “open over ground”.

Connecting Actuators

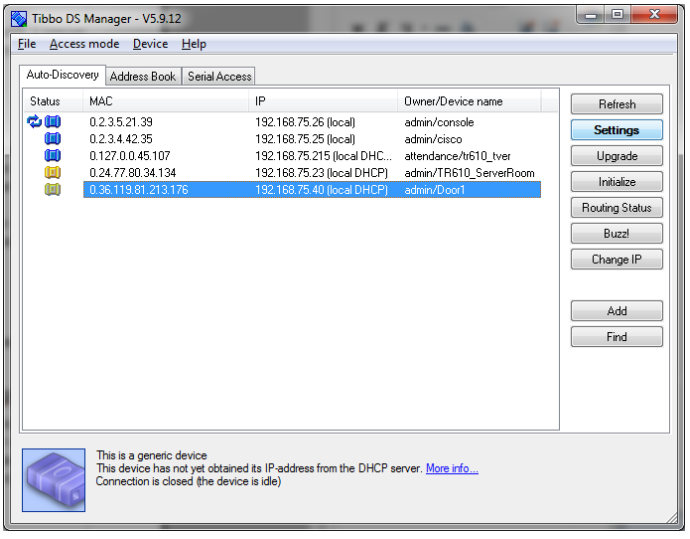




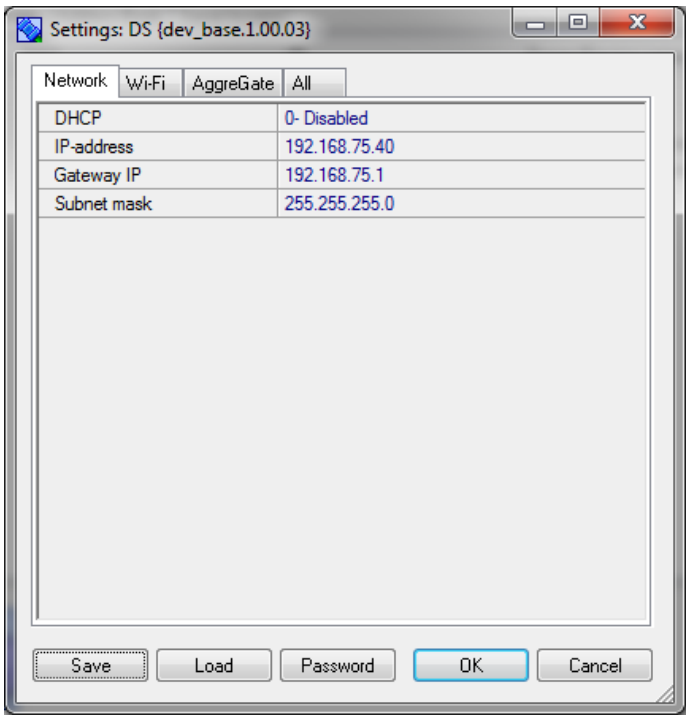
Several controller design options are used for connecting to actuators. The option with 4 open collector outputs is employed for turnstiles with embedded controller management via an open collector. The option with two relays is applied for devices with rated current up to 1A. There is an option with two high-power relays (up to 16A) in this embodiment. However, the controller should be powered by stabilized 5VDC source voltage.

Setup

Initial Controller Settings for Connecting to AggreGate



For initial setup, use Tibbo DS Manager Utility. Turn the controller on after connecting it to a power cord and Ethernet network. Start Tibbo DS Manager Utility. After a short while, the following network scanning tool will display the list of available devices to control. Find and select a new device in the list, and press the Settings button.



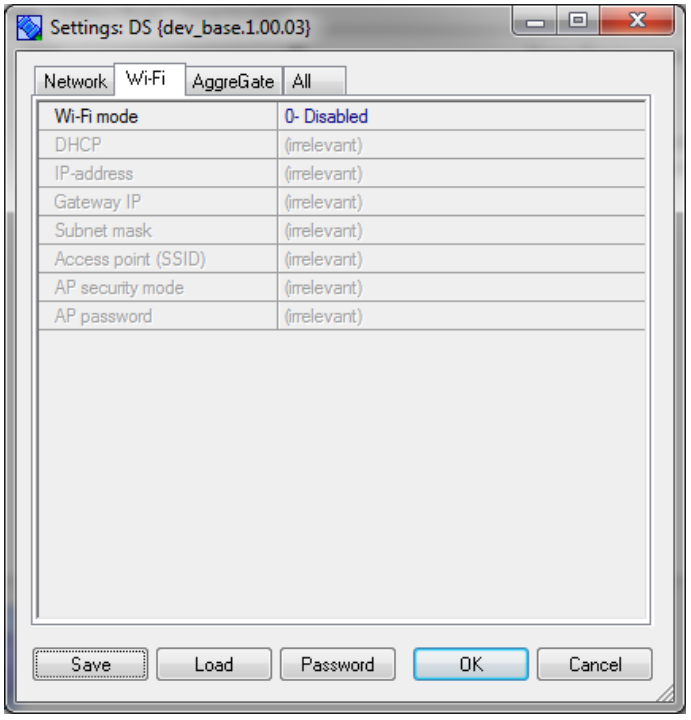
A window with the list of controller settings opens. The first tab has the following network connection settings:

DHCP - switching to automatically obtain IP address from DHCP server on your network

IP-address – manually specified IP address

Gateway IP – manually specified gateway address

Subnet mask – manually specified network mask.



The controller can be supplied with a WiFi module. The second tab enables WiFi connection management.

Attention! The initial settings are only available when connected to Ethernet cable!

WiFi mode - WiFi module mode (off, on-demand, continuous)

DHCP - automatically obtains IP address from DHCP server on your network

IP address – manually specified IP address

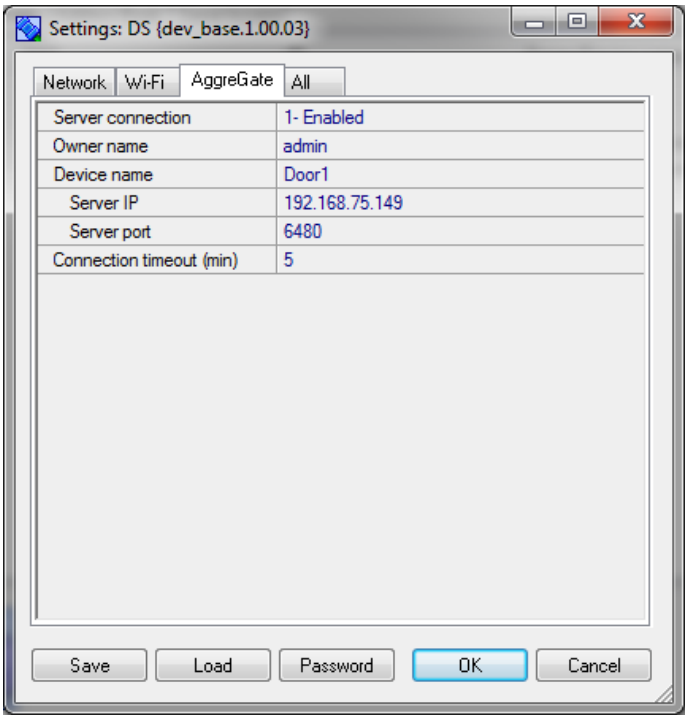
Gateway IP - manually specified gateway address

Subnet mask - manually specified subnet mask

Access point (SSID) - SSID network

AP security mode - security mode (Disable, WEP64, WEP128, WPA_PSK (TKIP), WPA2_PSK (AES))

AP password - password for connecting to access point



The third tab is for AggreGate server connection settings:

Server connection - On / Off

Owner name – login device owner

Device name – device name

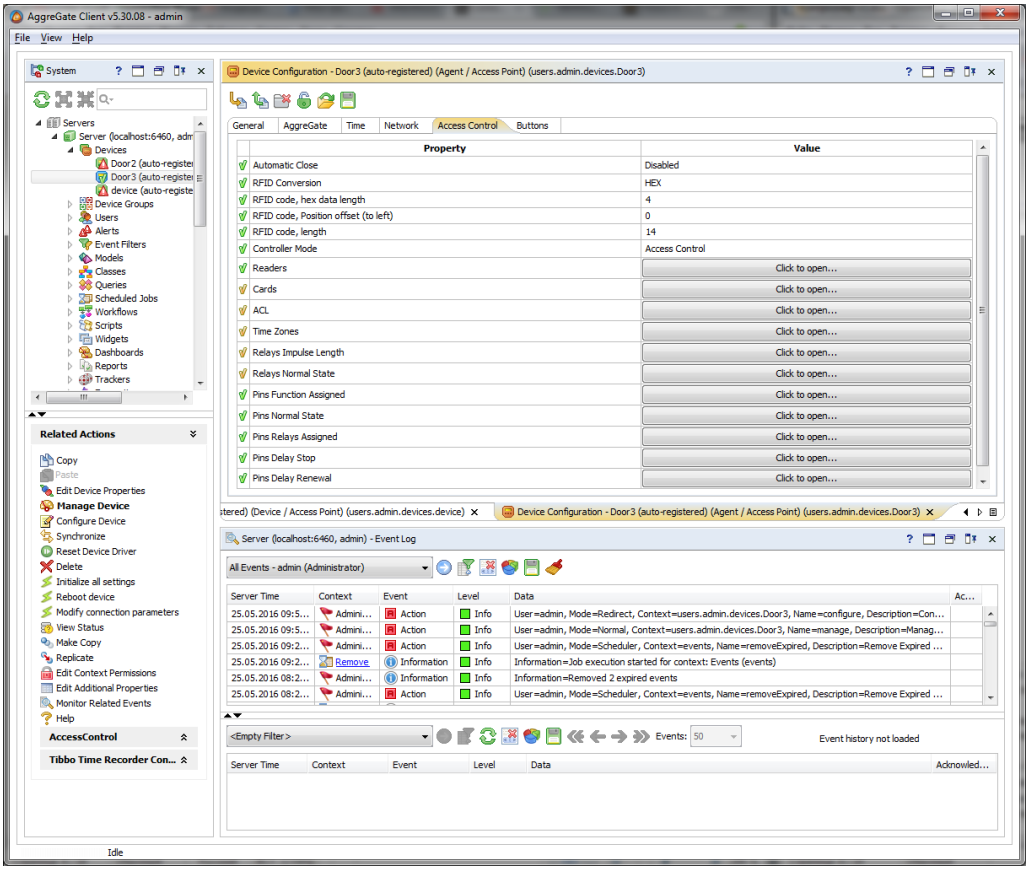
Server IP – server IP address

Server port - server port

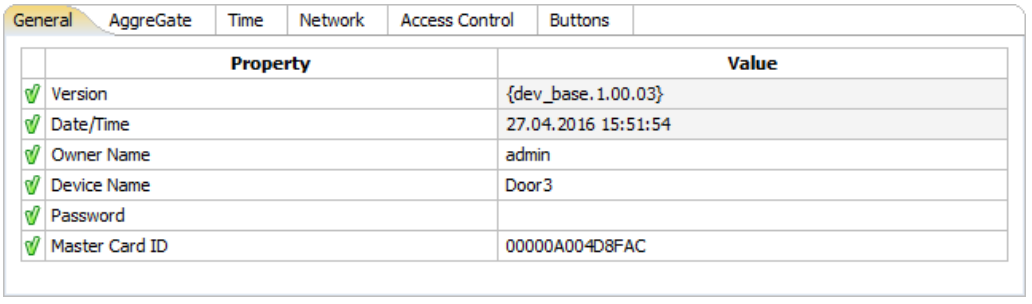
Connection timeout (min) – time spent for the server to respond.

When the required initial settings are made, press OK button and wait for device settings to download. The device will reboot.

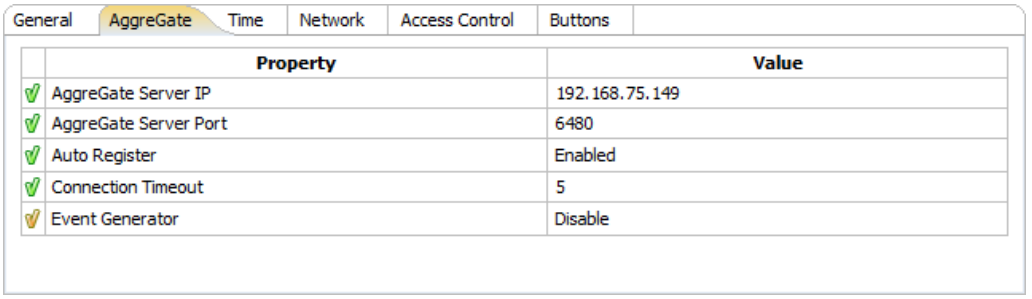
Setting the controller via AggreGate



After rebooting, the controller will try to connect to AggreGate server. If the controller connects to the server successfully, a new device appears in the device list. Double-click on the device in the open tabs with device settings (General, AggreGate, Time, Network, Access Control, Buttons).



The General tab contains data about firmware version, current controller time, name, login and password to connect to AggreGate server, as well as Master Card ID. The controller time synchronizes with AggreGate server automatically.



In the second tab, you can find controller settings to connect to AggreGate sever:

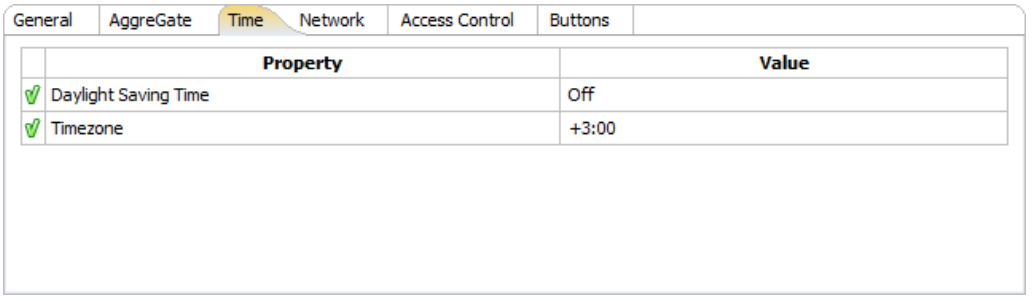
AggreGate Server IP - AggreGate server IP address

AggreGate Server Port - AggreGate server port

Auto Register - automatic registration in AggreGate server

Connection Timeout - timeout period for AggreGate server to respond

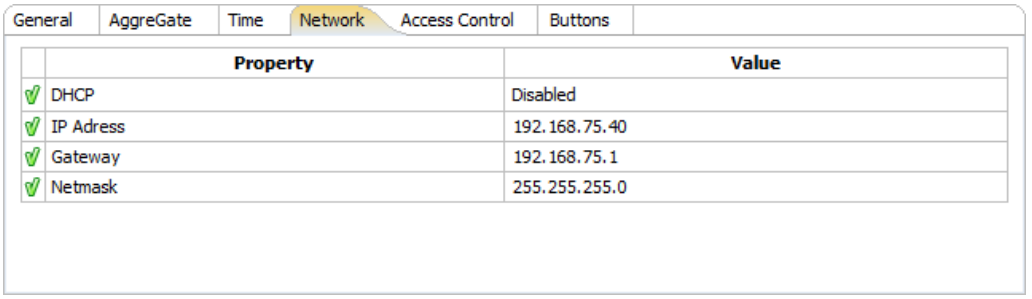
Event Generator - when set to Enable, transferring events to AggreGate server is enabled.



The third tab is used to set the controller time:

Daylight Saving Time - switches to daylight saving time

Timezone – current timezone.



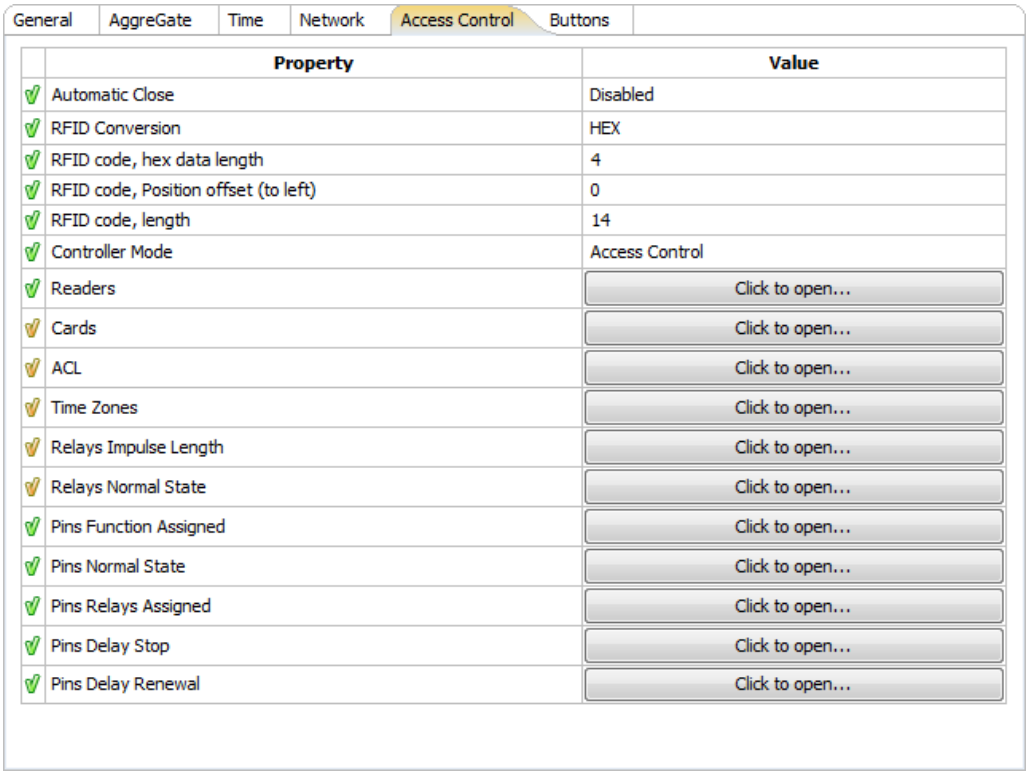
The Network tab allows you to manage network connection settings:

DHCP - automatically obtains IP address from DHCP server on your network

IP Address - manually specified IP address of the controller

Gateway - manually specified gateway address

Netmask - manually specified subnet mask.



The Access Control tab contains the controller behavior settings. Cards, ACL and Time Zones tables are filled out from AggreGate server automatically upon every synchronization and do not require manual editing. In case of manual editing, data generated on the server during standard device synchronization will be overwritten automatically. The content of these tables is generated based on Cardholders, Organizations, Departments, Access Policies, Time Zones data, their hierarchies, and relationships existing in AggreGate server. The other parameters must be set manually for proper controller functioning.

Table of Readers - manually specified, it describes readers connected to the controller (this controller can contain 2 or less readers)

Name – reader name, must comply with AggreGate server object naming requirements

Channel - specifies the number of channels the reader is connected to (1 or 2)

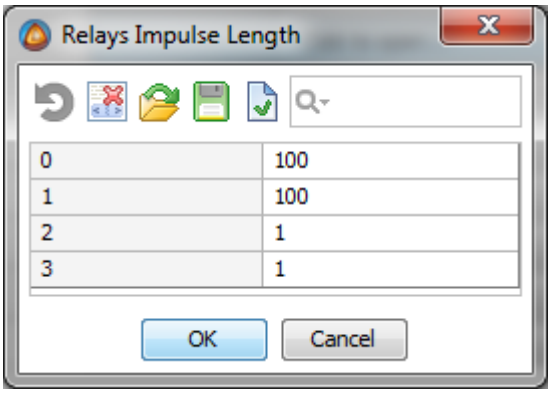
Direction - specifies the type of event for Time & Attendance component of a certain reader (IN – entering the room, OUT – leaving the room, NOT_APPLICABLE – time and attendance events aren't used for this reader)

Relay Channel - list of relays to be activated by this reader

Enable – whether the reader is on or off

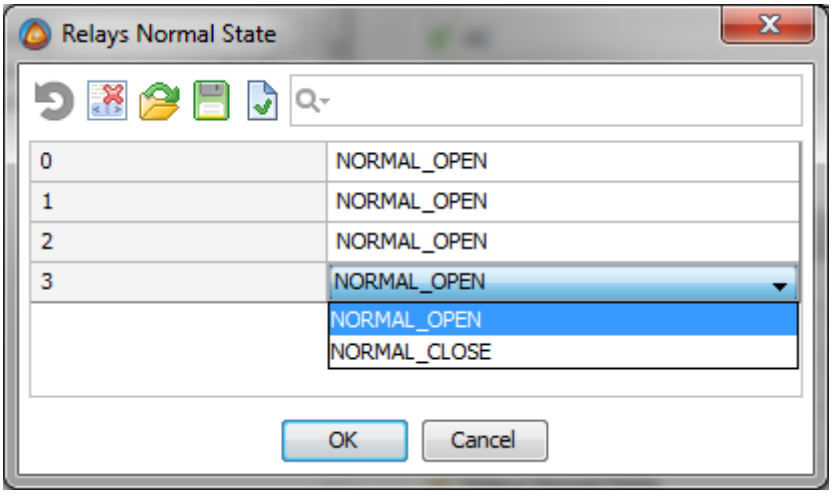
Description – reader description.

Relays Impulse Length Table:



In this table you can set the time when the relay is open and triggered for its activation. The measurement unit is about 0,5 seconds.

Relays Normal State Table:



This table sets normal state for each control channel:

NORMAL_OPEN - relay is usually open in the normal state, the output status for this open collector is closed (default)

NORMAL_CLOSE - relay is usually closed in the normal state, the output status for this open collector is open

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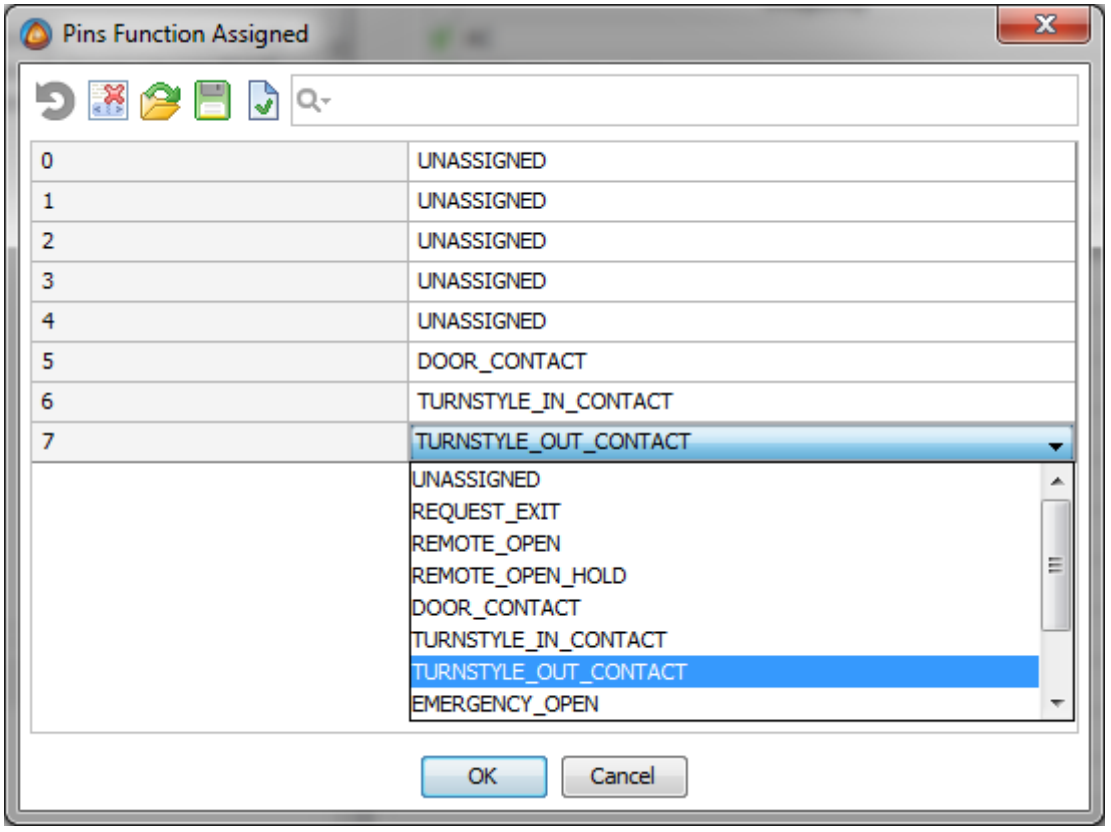
Pins Function Assigned Table:



You can specify any function for each entry. Multiple inputs can have same functions. For example, two emergency opening inputs: one is from a guard post with the emergency release button, another input is from a fire sensor. Available functions:

UNASSIGNED - no function is available for this input (but a change in this input potential will generate an event) (default)

REQUEST_EXIT – request for exit. It is used for access door button with one door reader

REMOTE_OPEN - remote opening (e.g. a button in the guard post opening the door)

REMOTE_OPEN_HOLD - remote opening and holding the door, control channel will remain open until this feature is active

DOOR_CONTACT - allows you to monitor the door state and implement automatic locking after the door is closed

TURNSTILE_IN_CONTACT - contact turning the turnstile for entering. It allows you to monitor the status of the turnstile and implement automatic locking function

TURNSTILE_OUT_CONTACT - contact turning the turnstile for exiting. It allows you to monitor the turnstile status and implement automatic locking function

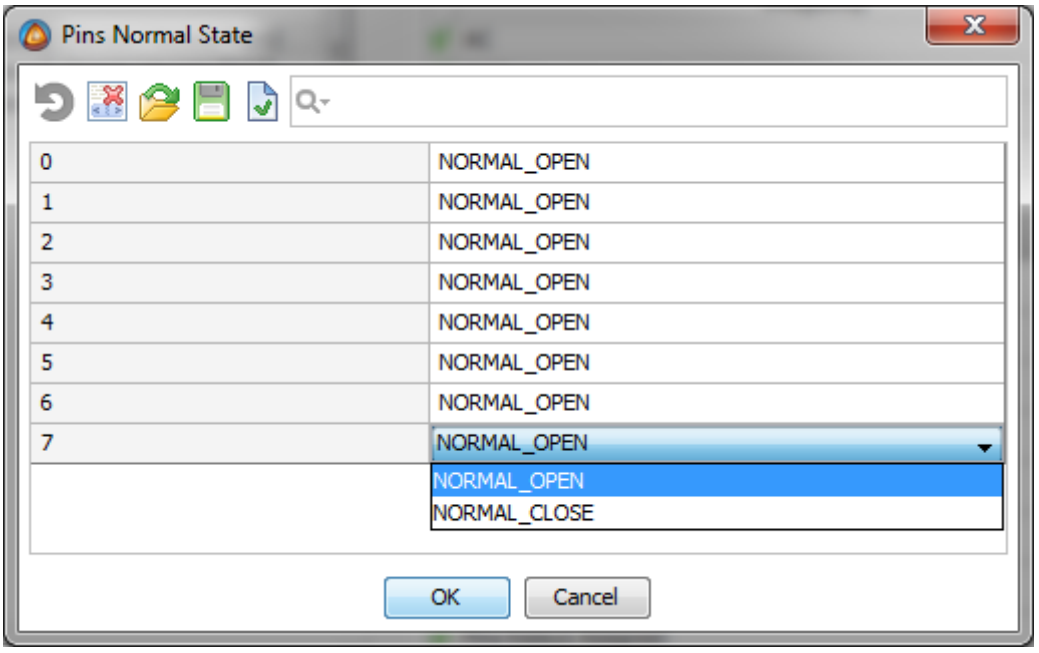
EMERGENCY_OPEN - emergency door opening, the pass through the managed object opens fully when this function is activated, other control signals do not change the status of the controller at that time. Valid at all times while the signal is active on the input. Once the signal is removed, the function is deactivated

EMERGENCY_TOGGLE - this function is similar to EMERGENCY_OPEN, except that it changes the state of emergency opening reversed each time it triggers

BLOCK - blocks the pass through the managed object. It can be overridden only by triggered emergency opening function

BLOCK_TOGGLE - changes the state of the lock function reversed each time it triggers.

Pins Normal State Table:

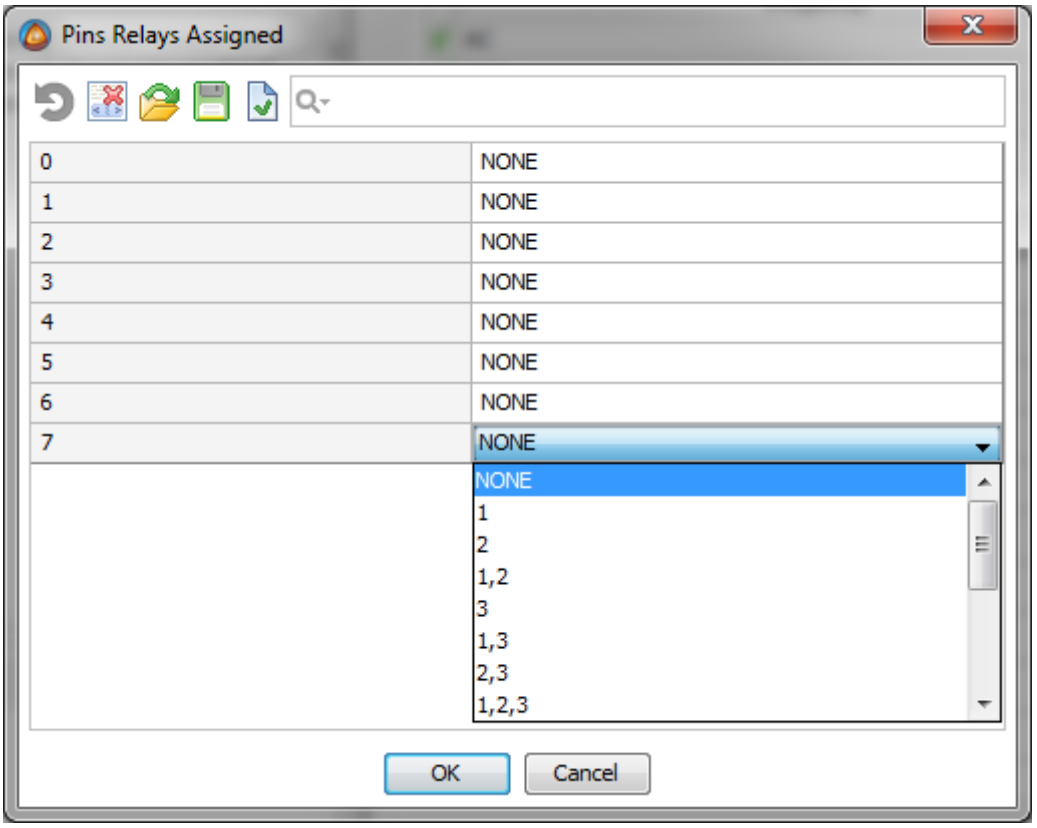


The table is set to normal state for each input.

NORMAL_OPEN – normal state is open over ground (default)

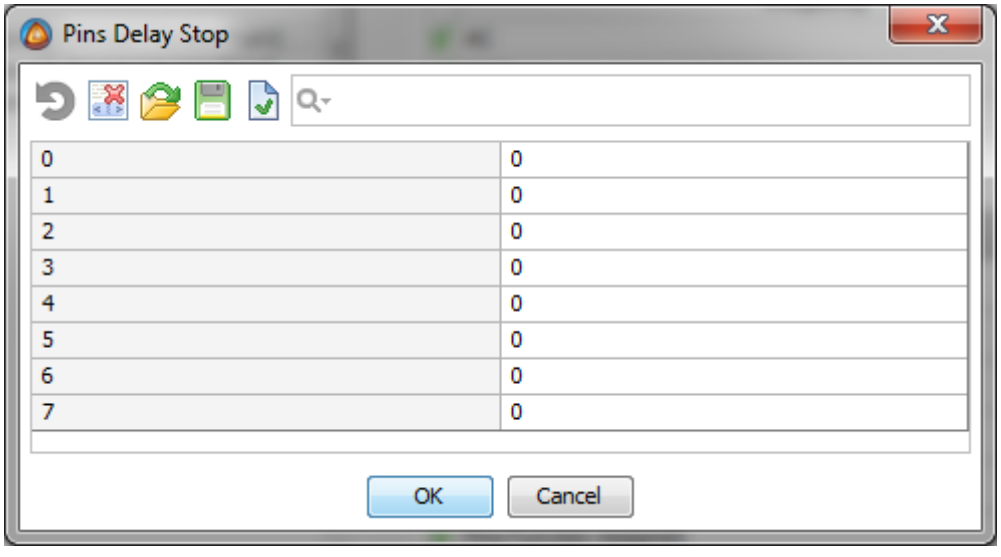
NORMAL_CLOSE – normal state is closed to the ground.

Pins Relays Assigned Table:



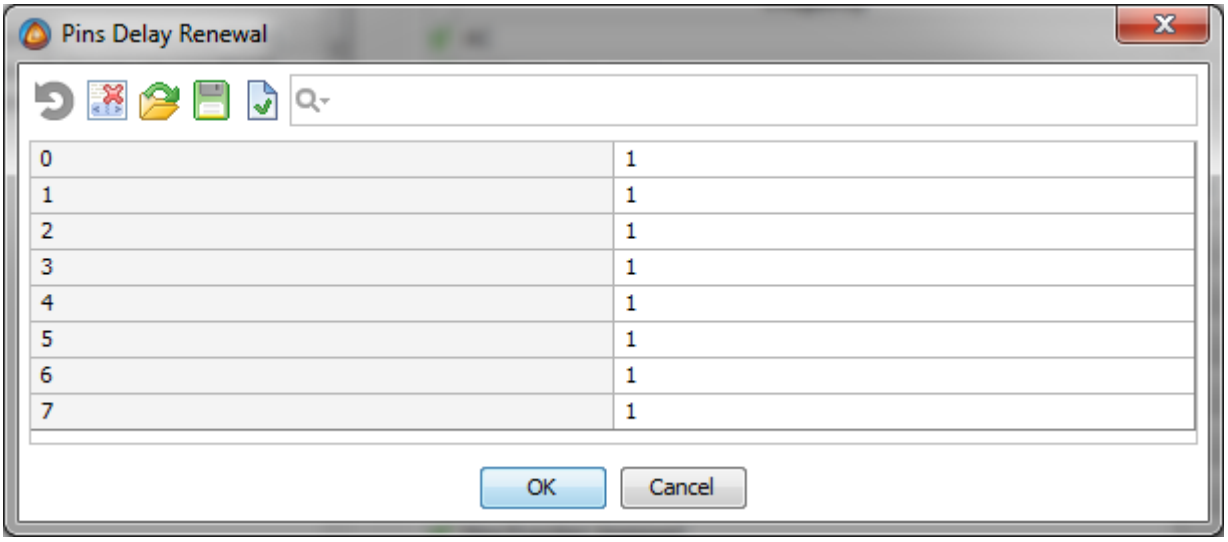
This table specifies the group of relays affected by this input. It is selected from any combination of four control channels. For instance, we set the first REQUEST_OPEN input feature and select channel 1 in this table. Thus, we get the input that will open the control channel 1 when the signal on this input is activated.

Pins Delay Stop Table:



This table specifies the time interval after which the function is disabled when removing the signal on the input. The measurement unit is about 0,5 seconds.

Pins Delay Renewal Table:



This table specifies the time interval after which the input accepts the state change by the end of the function. The measurement unit is about 0,5 seconds.

Single parameters:

Automatic Close - automatic door locking is activated upon door or turnstile contact. It closes opened door lock control channels in case of contacts actuation

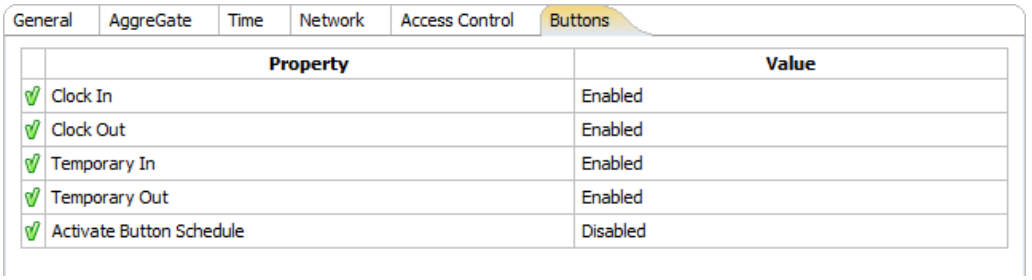
RFID Conversion - HEX - identifier in hexadecimal format, DEC - in decimal format

RFID code, hex data length - length of a larger part taken from the resulting ID reader binary code, in bits (for decimal representation only)

RFID code, Position offset (to left) - displacement of a larger part from the right edge of a binary code obtained by the reader identifier (for decimal representation only)

RFID code, length - resulting identifier length in characters. The missing characters are supplemented with leading zeros

Controller Mode - Access Control is a controller in Access Control mode, Time Recorder is time and attendance terminal.



The Buttons tab allows you to configure buttons for the Time Recorder mode:

Clock In - entry button (Enable by default)

Clock Out - exit button (Enable by default)

Temporary In - temporary entry button (Enable by default)

Temporary Out - temporary exit button (Enable by default).

Attention! Not all settings can be applied immediately after synchronization, you have to restart the device after changing certain settings.

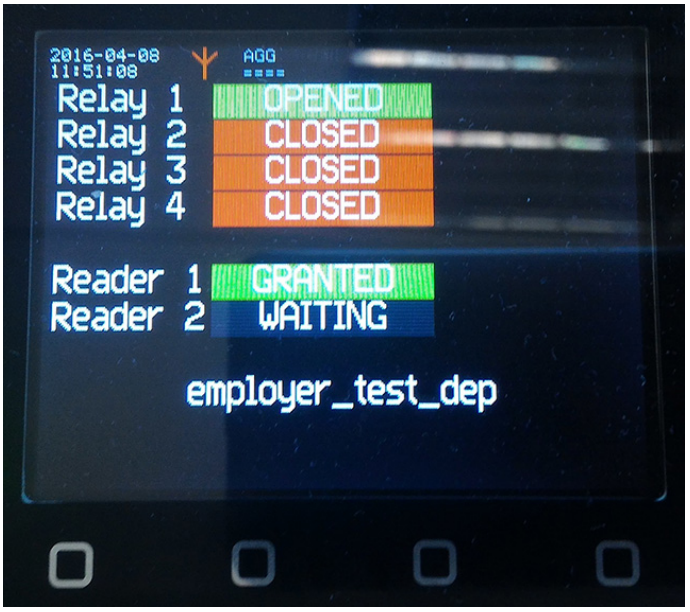
Difference between Access Control and Time Recorder Modes

In Access Control mode, all settings in the Buttons tab are ignored. The type of events for Time and Attendance system depends on Direction setting for each reader channel.

In Time Recorder mode, ACL and Time Zones table settings are ignored. The settings of all relays and input channels are ignored, too. Events for Time and Attendance system are generated according to Direction settings for each channel reader. For Setting Not Applicable, the pass mode is set depending on the active button on the controller screen. The Time Recorder mode is only possible for the controller with a display option.

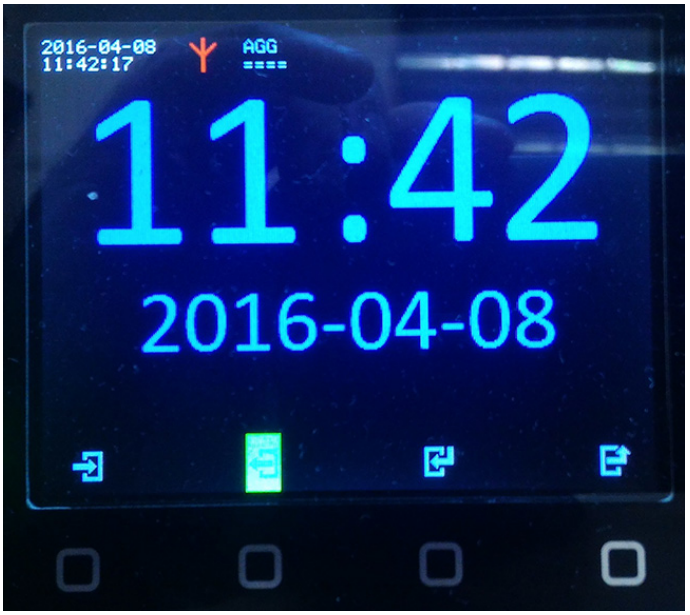
Display

When the controller runs in Access Control mode, the display is as follows:



The monitor displays current time and date, connection status with AggreGate server, status of relays and readers. If ID reading operation allows to pass, the ID owner's name appears at the bottom of the screen.

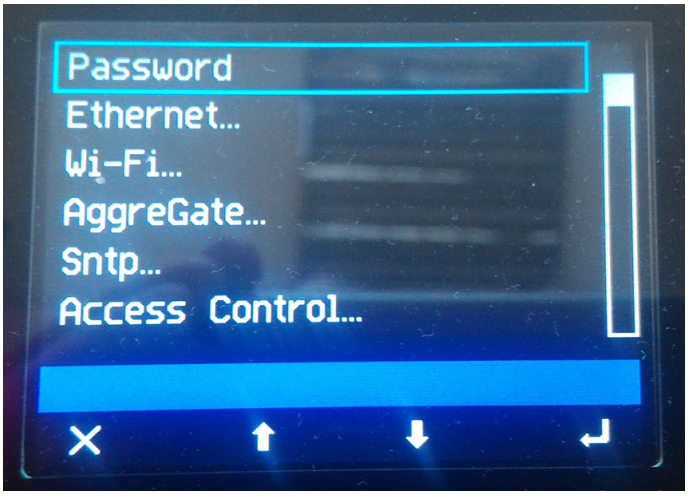
When the controller runs in Time Recorder mode, the display is as follows:



The screen displays time and date, connection state to AggreGate server, and icon functions (entry, exit, temporary entry and temporary exit). Depending on the key configuration, the icon may be unavailable (the button is disabled), and the background is highlighting the currently active function. For example, the controller in the picture is in the exit mode.

Settings Menu

The controller Settings menu works only if there is a display option. To enter the menu, hold the Master Card for any reader. The Master Card ID is set via AggreGate under the General tab. Then, press the Menu button on the controller within the next minute.



The following sections are available in the menu:

- **Password** – password to access the controller

Ethernet:

- **DHCP** - DHCP enabled for Ethernet port
- **IP-address** - manually configured IP address
- **Gateway IP** - manually configured network gateway IP address
- **Subnet mask** - manually configured network mask

Wi-Fi:

- **Wi-Fi mod** - WiFi module mode: Disabled, Enabled (on demand), Enabled (permanently)
- **DHCP** - DHCP enabled for WiFi
- **P-address** - manually configured IP address for WiFi module
- **Gateway IP** - manually configured gateway IP address
- **Subnet mask** - manually configured network mask
- **Access point (SSID)** - access point (AP) name
- **AP security mode** - encryption mode: Disable, WEP64, WEP128, WPA-PSK (TKIP), WPA2-PSK (AES)
- **AP password** - password for AP access

AggreGate:

- **Server connection** - connection to AggreGate server: Disable, Enable
- **Owner name** - login for connecting to AggreGate server
- **Device name** - device name
- **Server IP** - AggreGate server IP address
- **Server Port** - connection port to AggreGate server
- **Connection timeout** - response timeout from AggreGate server
- **Event generator** - using events in AggreGate server

Sntp:

- **Enable/disable** - using SNTP server
- **Time server IP** - SNTP server IP address
- **Time zone** - time zone for this controller
- **Daylight saving time** - using daylight saving time
- **Date (dd/mm/yyyy)** - current date
- **Time (hh:mm)** - current time

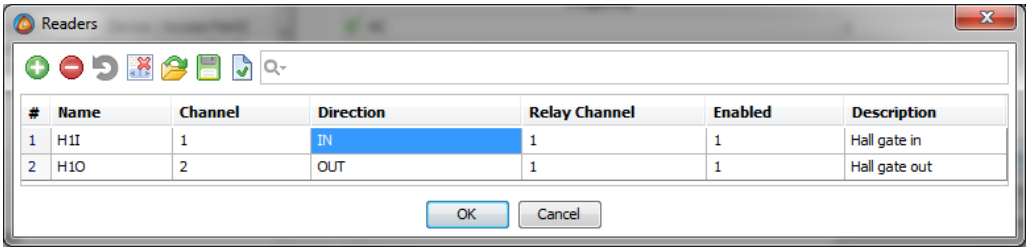
Access Control:

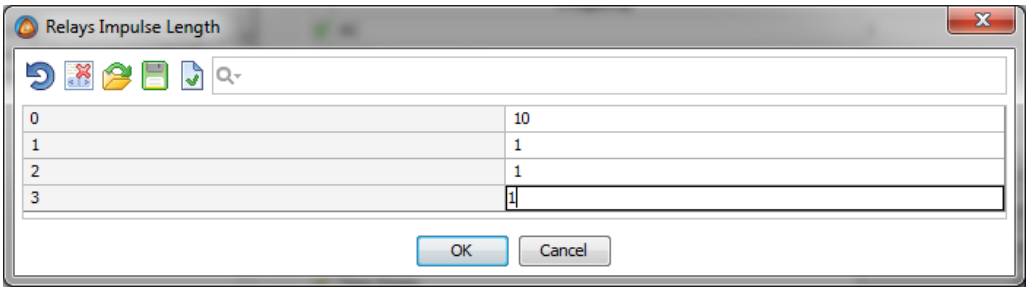
- **Controller Mode** - current controller mode: Access Control, Time Recorder
- **Buttons:** - button settings for the Time Recorder mode
  - **Clock In.** - entry button: Disable, Enable
  - **Clock Out.** - exit button: Disable, Enable
  - **Temporary In.** - temporary entry button: Disable, Enable
  - **Temporary Out.** - temporary exit button: Disable, Enable
- **RFID:**
  - **ID conversion** - HEX - represents identifier in hexadecimal format, - DEC- in decimal format
  - **ID length** - length of a larger part taken from the resulting ID reader binary code, in bits (for the decimal representation only)
  - **ID position offset** - displacement of a larger bit part from the binary code from the right edge obtained by the reader identifier (for decimal representation only)
  - **Code length** - length of resulting identifier in characters
  - **Initialize** - initializes all settings to default values

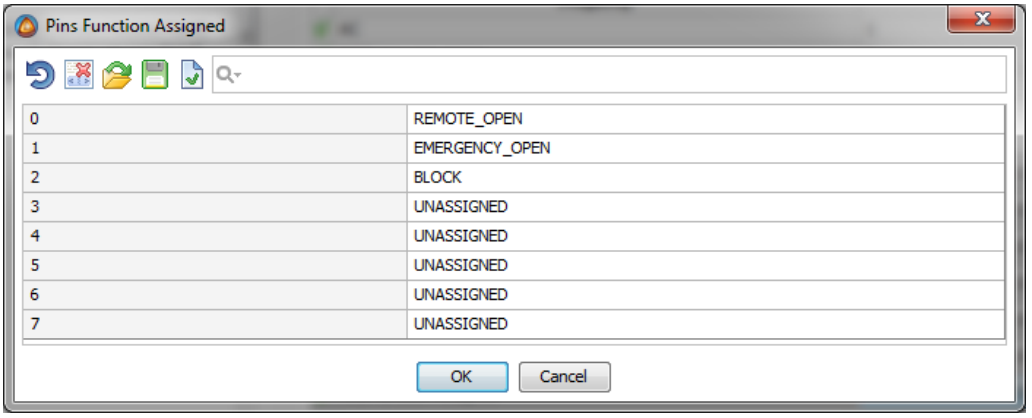
All available settings in the menu duplicate the controller properties settings in AggreGate server.

Settings Examples

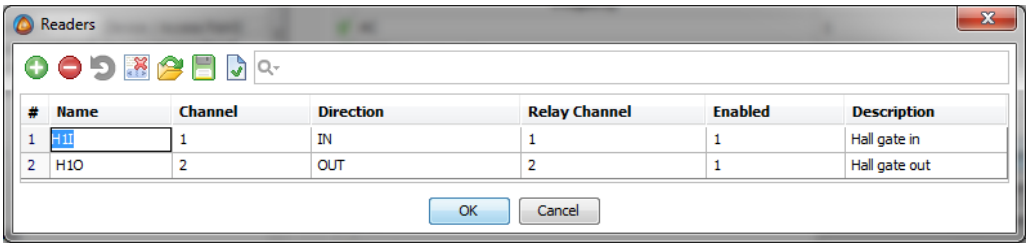
1. A door with two readers. The door deadbolt is connected to the control channel # 1. The deadbolt is unlocked when control channel contacts are closed (normal open contacts). Retention time for the relay to open door is 1 second. The controller has inputs for remote opening, emergency opening and blocking the door.

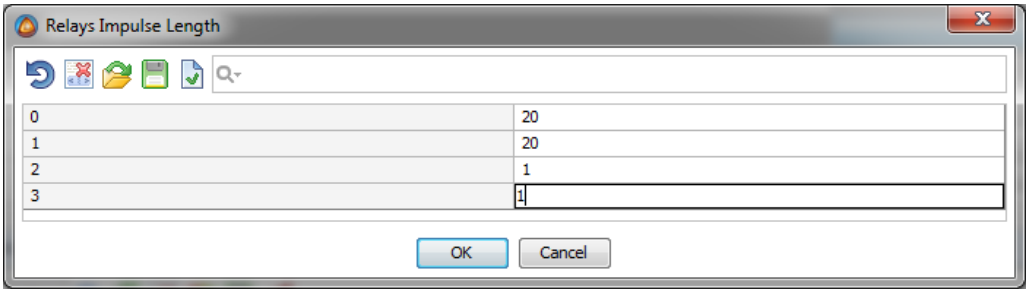


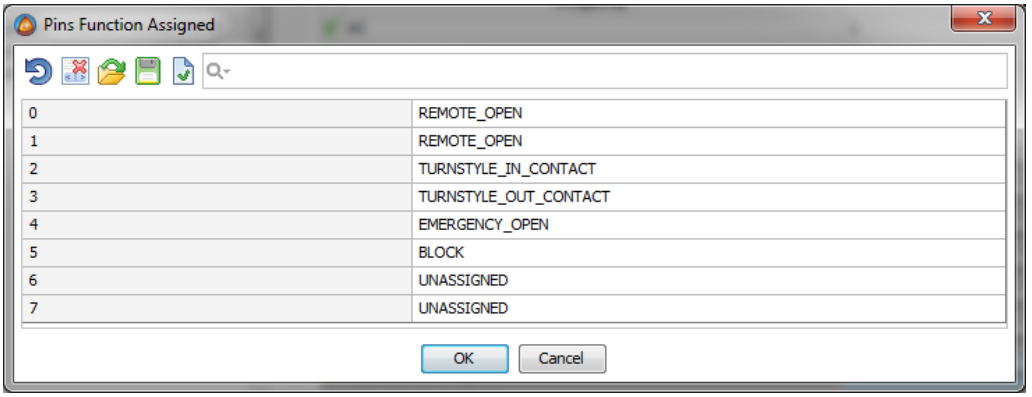


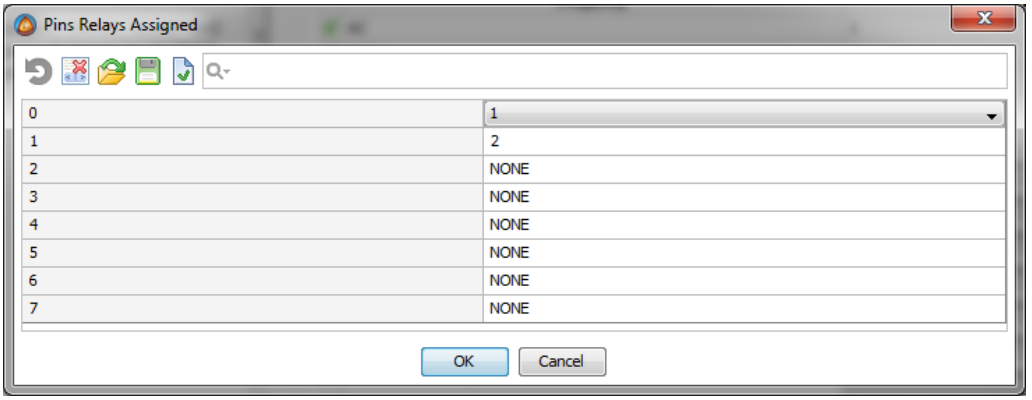


2. A turnstile and two readers. The turnstile has two inputs for controlling its state. The first input is applied for entering the turnstile and the second input is used for exiting the turnstile. The turnstile has two terminal contacts, each of which is triggered after the turnstile is turned to one of the two directions. The first terminal contact is triggered for entering and the second for exiting. The turnstile is open while one of two or all inputs are active for certain directions. For letting a person through this turnstile, one should activate one of the two inputs and deactivate it after the certain terminal contact. Before the turnstile is unlocked and if no one passed through the turnstile, the controller deactivates the turnstile in 10 seconds. The turnstile control input for entering is connected to the controller by channel 1. The control input for exiting is connected to channel 2. It is also necessary to provide remote opening functions for the two directions separately, as well as emergency turnstile opening and blocking.



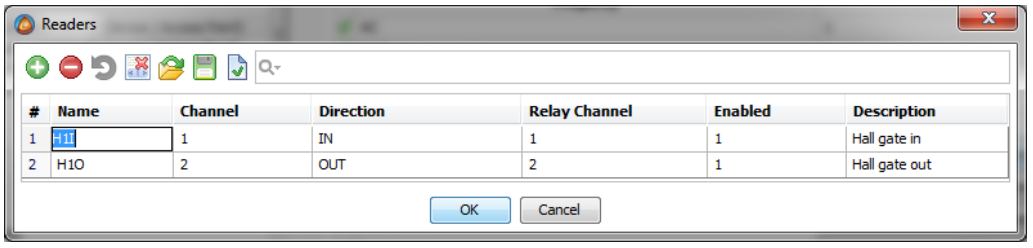


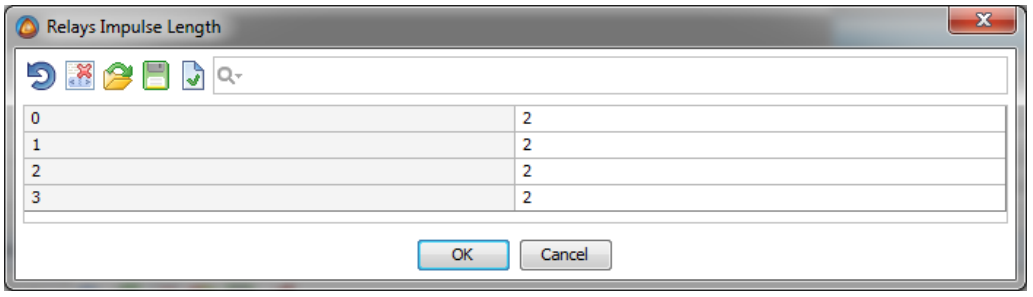


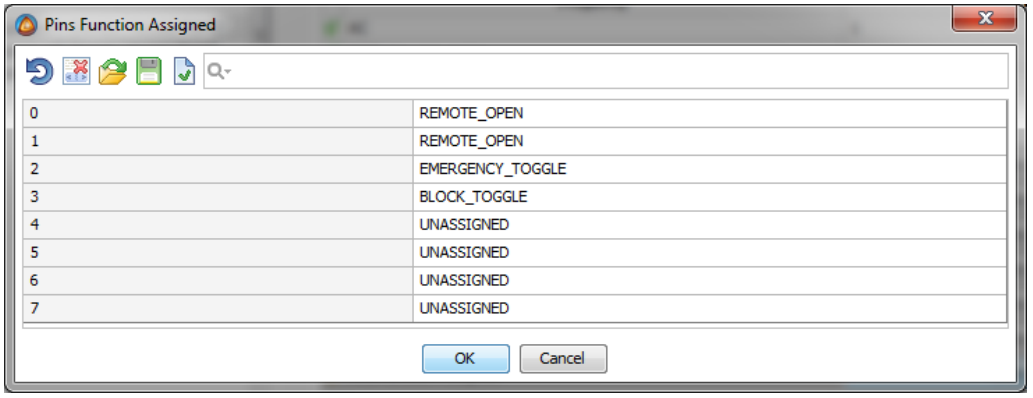


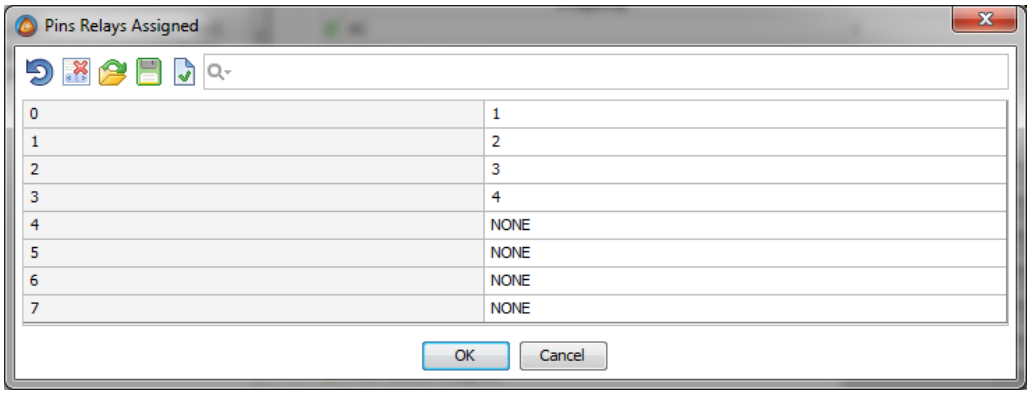
Set Enable in AutoClose setting for automatic control relay channels deactivation.

3. A turnstile with an embedded controller and two readers. The embedded controller has four control inputs: open for entering, open for exiting, emergency opening and blocking this turnstile. The two inputs for opening in any directions are activated to connect to ground at 1 second length. The inputs for emergency opening and blocking the turnstile are activated to connect to ground at 1 second length, and are deactivated in the same way.



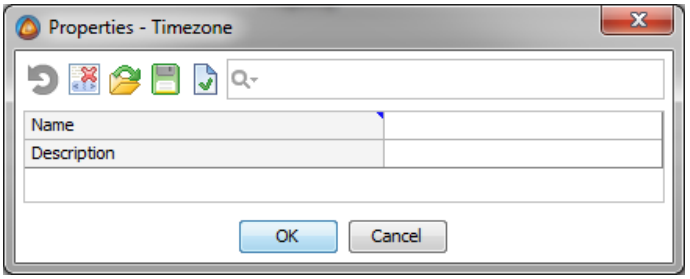




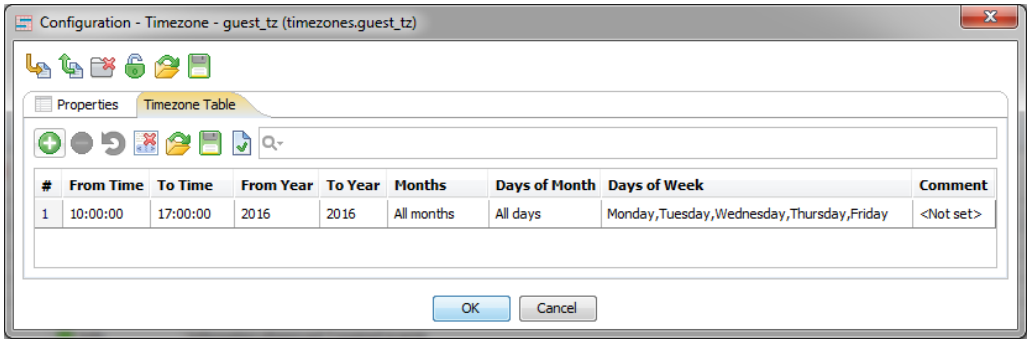


Hierarchical Organizations, Cardholders, Cards, Access Policies, and Time Zone Management

1. Time zones Each time zone contains one or more flexibly defined time ranges. Time zones are managed by AggreGate Client in the Time Zones section. To add a new time zone, double-click on the Time Zones node.



You need to enter the new time zone name and, if necessary, description. After you click the OK button, the time zone is created, and the window with time zone settings opens.



You must click the button on the Timezone tab for adding a new time range.

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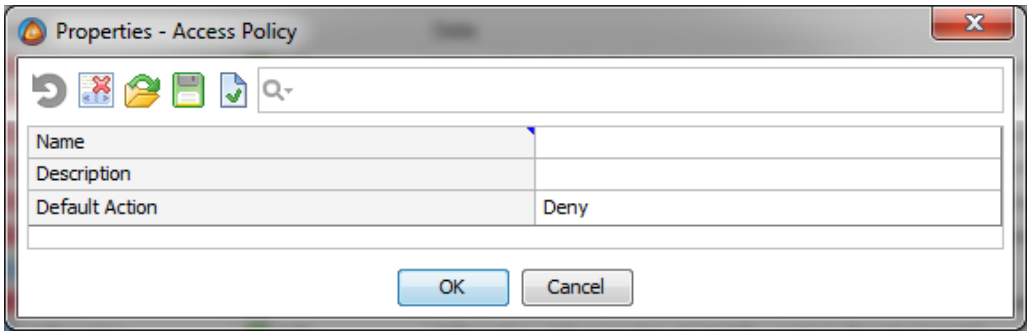
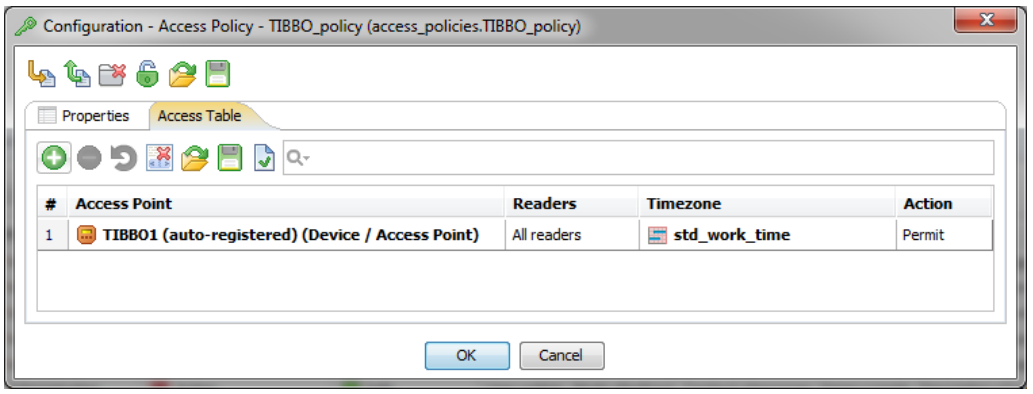
2. Access policies

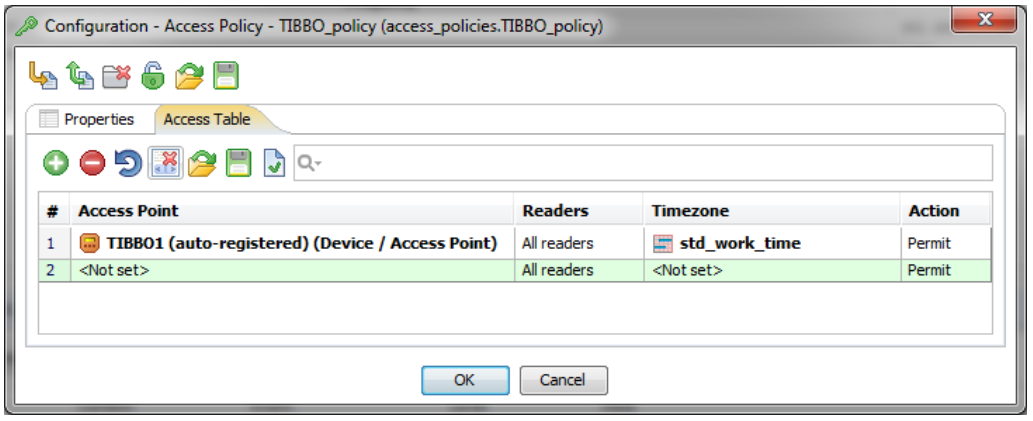
Access Policy contains the list of readers installed in the controller and the list of time zones. To create an access policy, double-click on the Access Policies node.

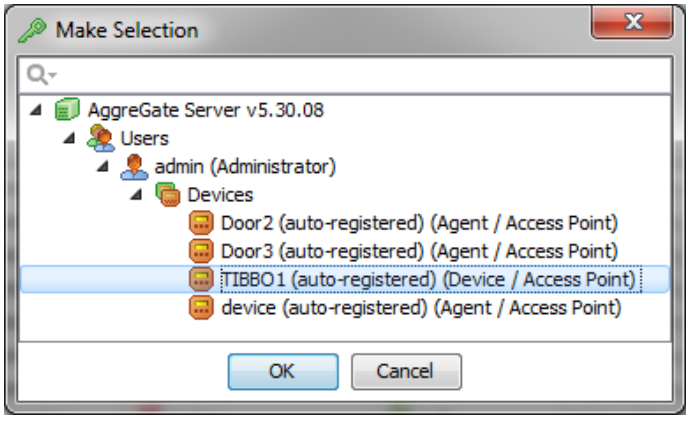


Enter the name of a new access policy. After you click OK button, the new access policy is created and the window with access policy settings opens.

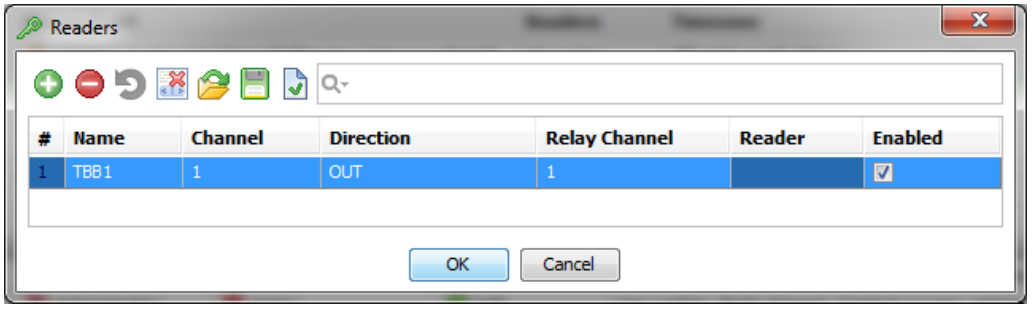


You must click the button on the Timezone tab for adding a new time range.

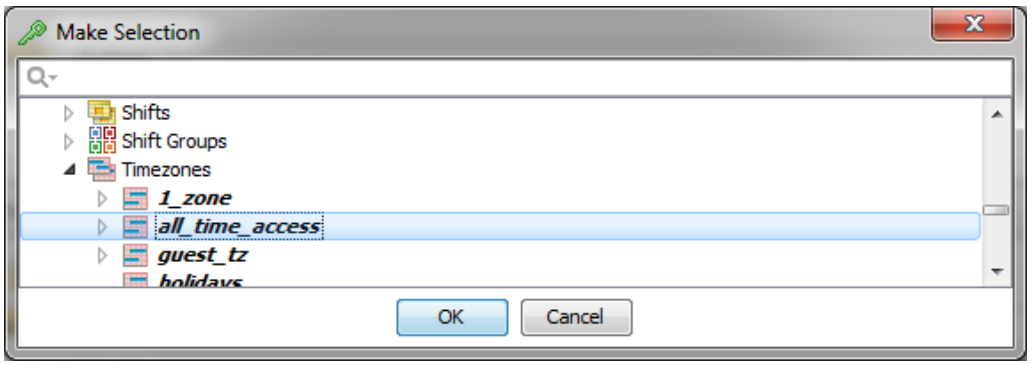




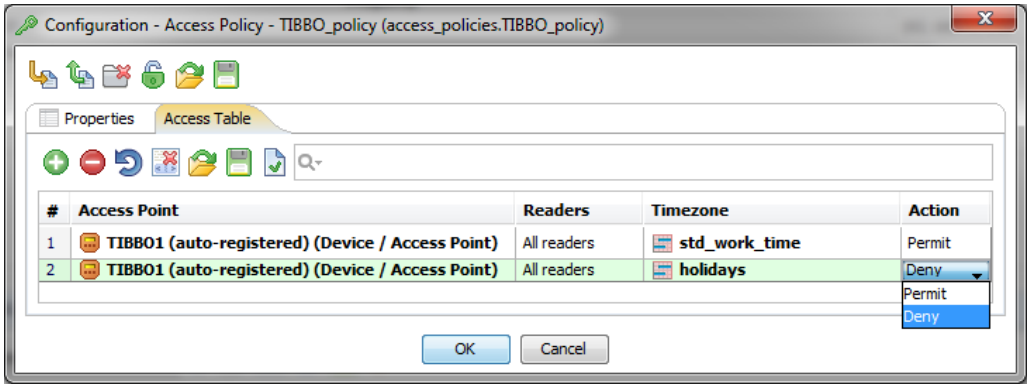
Select the access controller available in the Access Point column after adding a new Access Policy record



Then, select card readers available for the selected access controller. The selection is made in the Enabled column.



To continue configuration, select a time zone.



And finally, select Action for this Access Policy record.

The above example shows how Access Policy works for all readers of controller named TIBBO1. It also allows access to time ranges listed in the zone with the name std_work_time, as well as prohibits access for time ranges listed in the zone with the public holiday names.

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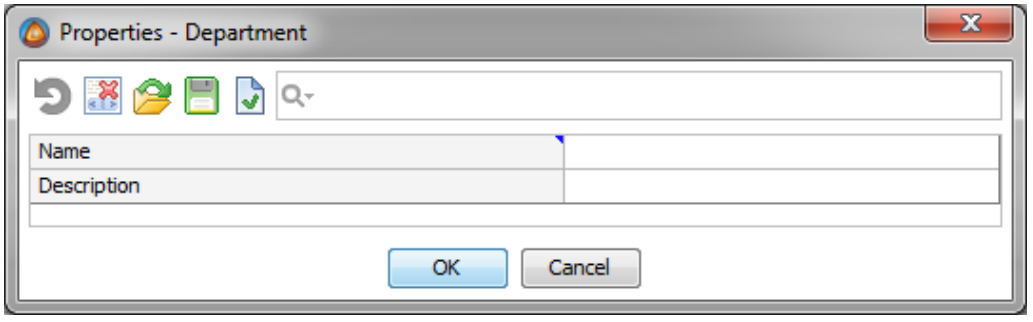
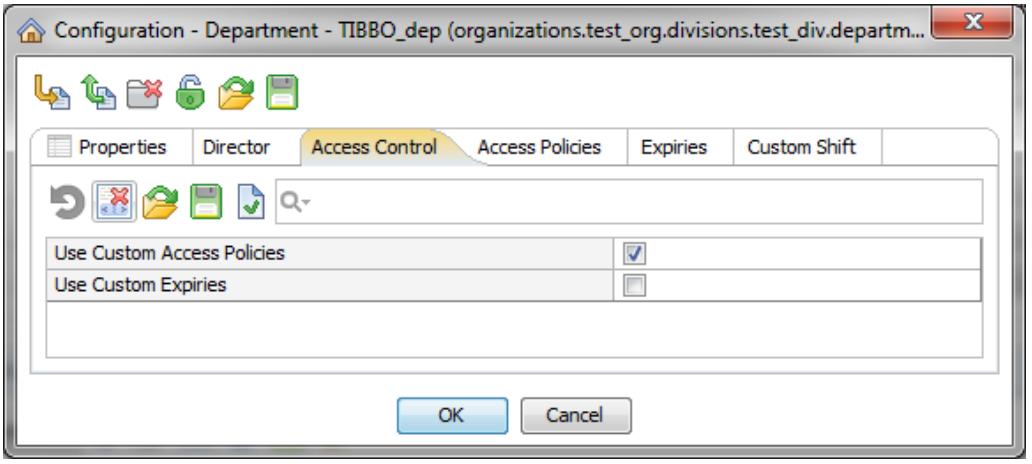
3. Hierarchical organization

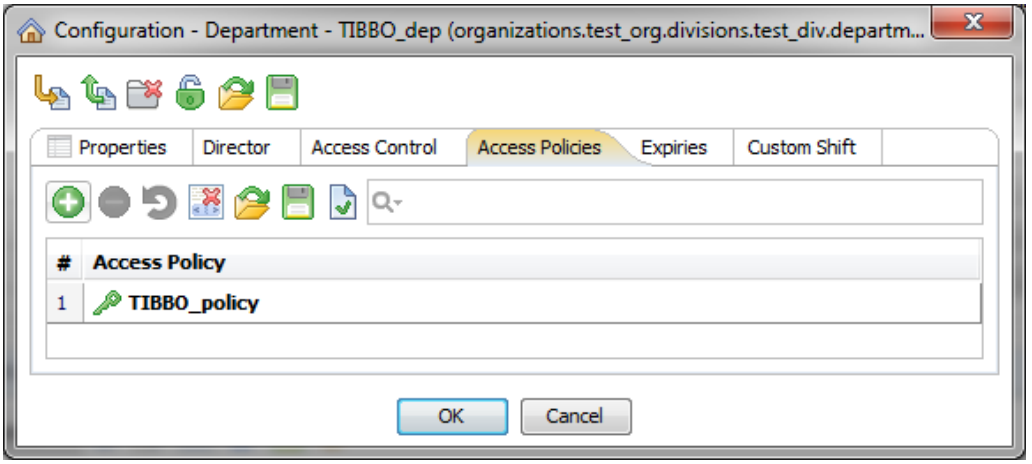
Organization section contains the organizational structure and has such sub-levels as Divisions and Departments. You can create new organizational elements at any level of hierarchy and in any organizational unit. You can also add access card owners to the Cardholders node.



To add an element of organizational structure, double-click on the element name where you want to create a new sub-element.



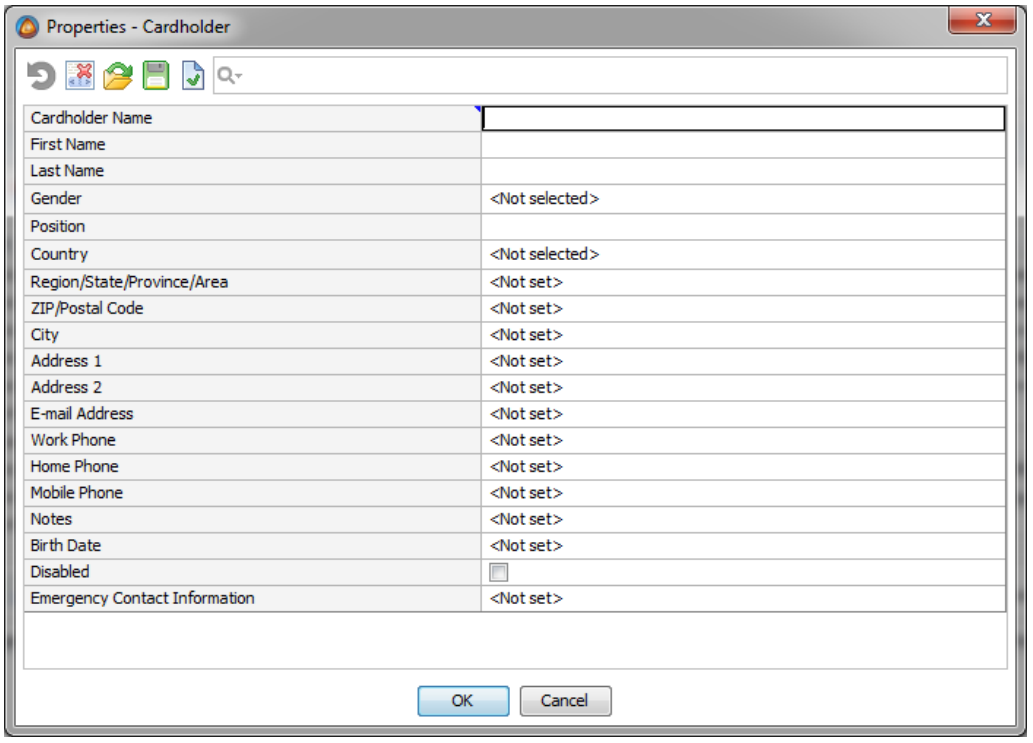
Next, enter the new element name and click OK. Each element of the organizational structure has Access Control and Access Policies tabs. If an item should have its own set of access policies, select Use Custom Access Policies in the Access Control tab.



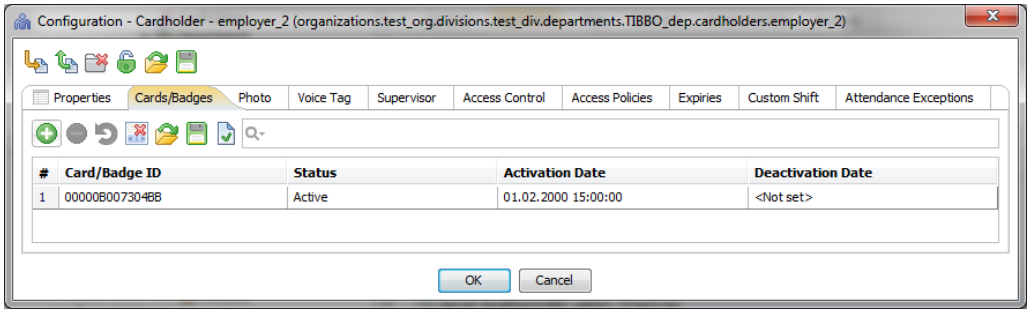
After selecting Use Custom Access Policies, add the list of access policies applied to the nested element structure in the Access Policies tab.

4. Cardholders and cards

To create a new cardholder, double-click on the Cardholders node on the right side of the organizational structure. After opening a new cardholder window, enter the cardholder's unique name and click OK.



After adding a new cardholder, you can edit other settings in the configuration window.



In Cards/Badges tab, add entries for all existing ID cards and their validity. If you do not know your card ID, you can read it on any controller and see the code in the system logs. Any cardholder may have personal access policy. Adding access policies for a cardholder is similar to adding policies