Johnson Controls

Object Library

Elevator Object

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ELEVATOR OBJECT

INTRODUCTION

The Elevator object manages the elevator-specific access control functions of a single elevator cab. It determines which entity is allowed access to which floors in an elevator cab, and logs which floor buttons in an elevator cab are pressed by an entity. The reader input is delivered to the Elevator object through an Access Control object. The Elevator object may monitor a Door Sequence object to detect the override mode. When in override, all floors are accessible as if they were in public access.

In a low level elevator integration, the access control system interfaces with the elevator control system through a multitude of binary inputs and outputs. Granting access to floors is achieved by activating outputs, reporting the pressed floor buttons is achieved by monitoring inputs.

The arrows in the diagram show the message flow between the different components of the elevator interface. In a low level elevator integration, the Elevator object is a child of the controller's device object.

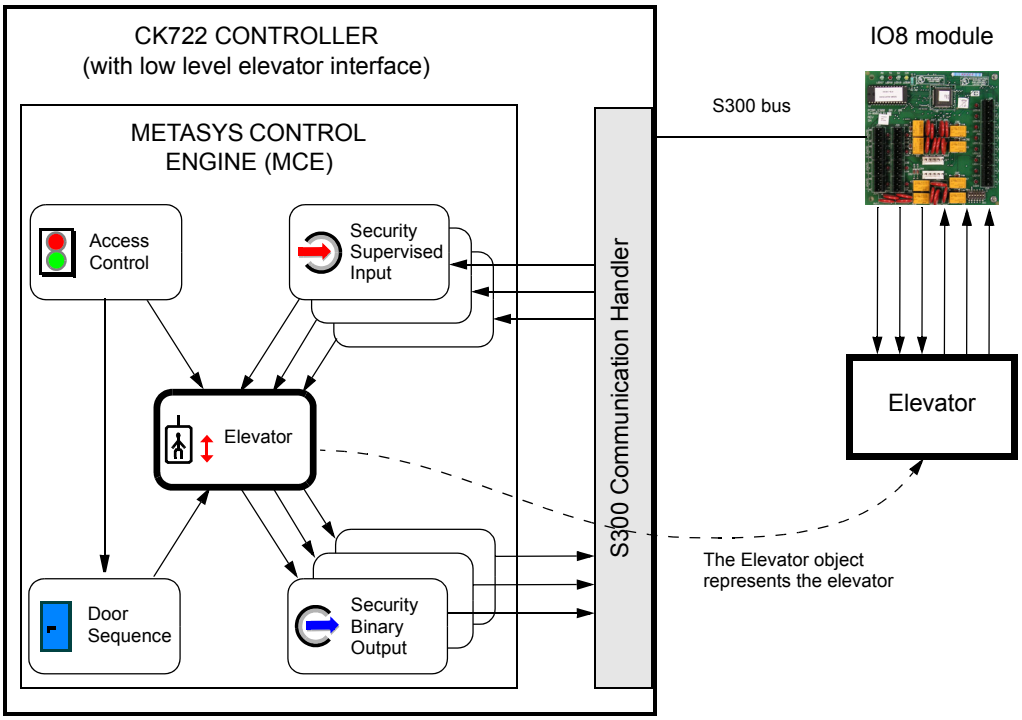

Figure 1: Elevator Object

ATTRIBUTES

This section describes visible attributes specific to the Elevator object. This object also contains:

- Attributes common to all objects in the P2000 Security Management System. For details, see the *General Object Information* document.
- Internal attributes, which are invisible to the user and cannot be modified directly, but may be referred to throughout this document.

Table 1: Elevator Object Attributes

Attribute Name	Attribute Number	Data Type	Notes	Initial Value	Values/Options /Range
Access Control Object	4072	Object Reference	WCAN	-	-
Access Time	2268	Unsigned16	WCA	5	In seconds
Anti-Tailgating	2917	Boolean	WCA	-	-
Door Sequence Object	3022	Object Reference	WCAN	-	-
Error Notification	3040	Boolean	WCA	1	-
Floor List	4073	List of Floors	WCAN	-	Max. 512 entries
Floor Tracking	4074	Boolean	WCA	1	-
Low Level Mode	4075	Enumeration	WCA	-	0 = Activate Only Selected Floor 1 = Activate All Allowed Floors
Notification Class	17	Unsigned32	WCA	1	-
Notify Priority	3644	Unsigned8	WCA	-	-
Track On Transition Only	4076	Boolean	WCA	-	-

A - Archive, C - Configurable, N - Value not required, W - Writable

Access Control Object – Specifies which Access Control object the Elevator object shall use to obtain input from the reader(s).

Access Time – Specifies how long the elevator accepts floor button presses after elevator access was granted.

Anti-Tailgating – Specifies whether the access grant shall be revoked as soon as the first allowed floor button is pressed.

Door Sequence Object – Specifies which Door Sequence object the Elevator object shall consult for elevator override status.

Error Notification – Specifies whether the Elevator object sends out extra notifications every time an error is encountered, such as missing data records or objects. These error notifications are in addition to all other notifications the Elevator object may generate.

Floor List – Specifies the elevator's floor configuration. Only floors that are actually served by the elevator need to be entered. There is no requirement to adhere to a certain order of the floor entries. See “Floor A Data Type” on page 1-3 for details.

Floor Tracking – Specifies whether pressed floor buttons shall be reported to the host.

Low Level Mode – Specifies how the elevator handles outputs in a low level elevator integration.

- Activate Only Selected Floor - In this mode, activating an output informs the elevator that an entity is granted access to the floor whose floor button has just been pressed. The elevator cab may now move to that floor. This mode is faster, as only a single output needs to be activated for each allowed floor button that is pressed, but provides no indication to the entity in the cab which floors are allowed.
- Activate All Allowed Floors - In this mode, activating an output informs the elevator that an entity has access rights to the floor, and whenever the corresponding floor button is pressed, the elevator may take the entity to that floor. This mode provides an indication to the entity in the cab of which floors are allowed, but potentially requires the activation and deactivation of all outputs for that elevator for each access request.

Notification Class – Specifies which Security Notification Class object the Elevator object shall use to send its notifications.

Notify Priority – Specifies the Priority parameter of all notifications generated by the Elevator object.

Track On Transition Only – Specifies whether or not a floor tracking notification shall be generated when an input indicates an already pressed floor button at the time access is granted. To generate a notification in this case, this attribute must be set to “False.”

Floor A Data Type

The Elevator object uses Floor A for its *Floor List* attribute.

Table 2: Floor A Data Type

Floor	Data Type	Values/Options /Range
Floor Number	Unsigned16	1 - 512
Public Access Attribute	Attribute reference	-
Output Attribute	Attribute reference	
Input Attribute	Attribute reference	

Floor Number – Specifies the 1 based floor descriptor as defined by the P2000 host. At the SCT (System Configuration Tool) this floor descriptor is displayed as the floor name defined at the P2000 host.

Public Access Attribute – Specifies a numerical attribute that enables public access to this floor when equal to 1. This attribute member may be left blank if no public access is desired.

Output Attribute – Specifies a numerical attribute that, when written to 1, enables access to this floor by activating an electrical output, and when written to 0, disables access to this floor by deactivating that electrical output. This attribute is typically used to reference the *Present Value* attribute of a Security Binary Output object, but can also reference any other numerical attribute that matches the above criteria.

Input Attribute – Specifies a numerical attribute that, when its value is 1, indicates that this floor's button is pressed, and in all other cases indicates that this floor's button is not pressed. This attribute is typically used to reference the *Present Value* attribute of a Security Supervised Input object, but can also reference any other numerical attribute that matches the above criteria. This attribute may be left blank if no floor tracking or anti-tailgating is desired.

COMMANDS

This section describes commands that can be issued to this object from SCT.

Table 3: Elevator Object Commands

Command Name	Description
`Change Attribute`	See the description below.

The `Change Attribute` is a generic command available for writing the attributes of an object. It is mainly used to change an attribute value from those features which work only with commands. For the sole purpose of giving a generic example, there is no command defined to change the *Notify Priority* attribute of an object. `Change Attribute` could, therefore, be used to change the *Notify Priority* attribute through an interlock or multiple command, both features which require commands to be entered. The `Change Attribute` command requires two parameters:

- Attribute - This parameter specifies which attribute of the object is to be written. Only writable attributes may be changed by this command.
- New value - This parameter specifies new value to be written and must be the same data type as the attribute. The only data types allowed in this command are those allowed as command parameters. A command priority can be specified if the attribute to be changed is a prioritized attribute.

VIEWS

This section illustrates how the System Configuration Tool displays properties of the Elevator object. These screens also allow you to set the values of configurable attributes. For more information refer to the *System Configuration Tool (SCT)* manual.

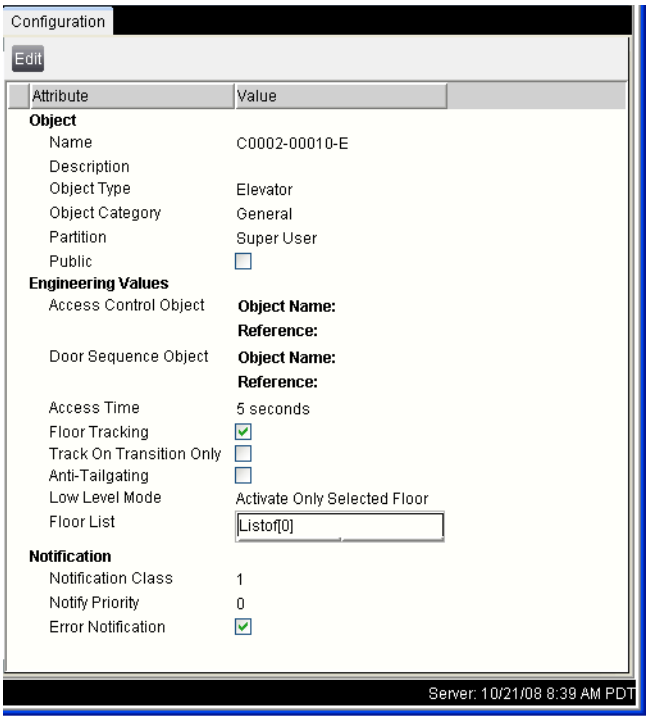

Figure 2: Configuration View

Floor Configuration Edit Box

The Floor Configuration Edit box has 4 data entry rows for a low level elevator integration, and 2 data entry rows for a high level elevator integration, with the Output Attribute and Input Attribute rows not being displayed.

To access the Floor Configuration Edit box click on the browse button by the *Floor List* attribute. The window initially appears blank; click **Add** to add floors.

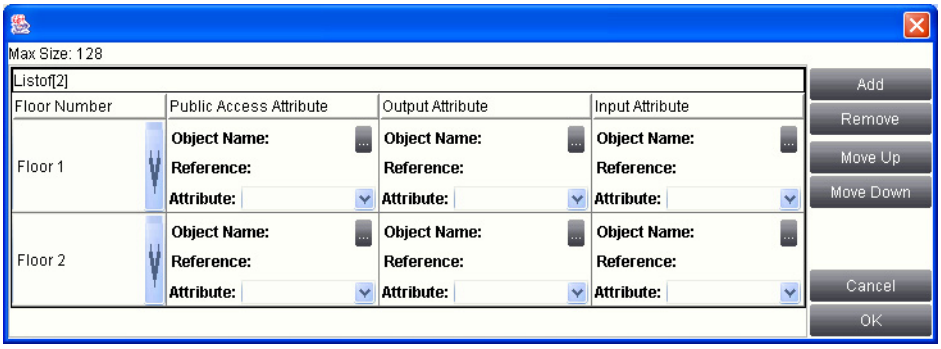

Figure 3: Floor Configuration Edit Box

Floor Name – The floor names are obtained from the P2000. This specification does not prescribe that floor names have to be global throughout a P2000 site. Floor names are global within a single controller, but do not have to be global throughout a P2000 site.

Public Access Attribute – Click the browse button to open the Select Item window for attribute references. The selection includes all numerical non-internal attributes of all non-internal on-box objects.

Output Attribute – Click the browse button to open the Select Item window for attribute references. The selection includes all writable numerical non-internal attributes of all on-box non-internal objects.

Input Attribute – Click the browse button to open the Select Item window for attribute references. The permissible selection includes all numerical non-internal attributes of all on-box non-internal objects.

Add – Click this button to add a floor.

Remove – Click this button to remove the selected floor.

Move Up – Click this button to move the selected floor up the list.

Move Down – Click this button to move the selected floor down the list.

Cancel – Click this button to cancel the changes and close the Floor Configuration Edit box.

OK – Click this button to save the changes and close the Floor Configuration Edit box. If any of the attribute dependencies is violated, the Floor Configuration Edit box will not close and the violation will be indicated.

DESCRIPTION OF OPERATION

Public Access

The Elevator object monitors all attributes referenced by the *Public Access Attribute* members of the *Floor List* attribute. Any such attribute that is numerically 1 designates its floor to be on public access, every other condition means that floor is not on public access. The Elevator object maintains a list of all public access floors at all times.

Elevator Access

The Access Control object determines whether to grant access to an entity based on the value of the *Executive Privilege Mask* and *Time Zone Check* attributes.

After access is granted, the Elevator object builds a list of all elevator access floors, which combines all allowed floors during all allowed time zones.

If the Access Control object's *Time Zone Check* attribute is set to "False," the referenced Schedule objects are treated as if their *Present Value* attribute was 1, meaning that the request was made during a valid time zone.

Finally, the Elevator object starts its access timer based on the value of the *Access Time* attribute. This timer monitors the longest time, the floors may be allowed for elevator access.

Access Output

When the *Low Level Mode* attribute is set to "Activate All Allowed Floors," the list of allowed floors is constantly applied to the electrical outputs via the attributes referenced by the *Output Attribute* members of the *Floor List* attribute. This means that whenever a floor's status changes between allowed and not allowed, so will its corresponding output. An allowed floor has its output written to 1 at no priority, a not allowed floor has its output written to 0 at no priority.

When the *Low Level Mode* attribute is set to "Activate Only Selected Floor," the list of allowed floors has no direct effect on the electrical outputs. The only time an output is activated is in reaction to a floor button being pressed. See "Floor Button Input" below for details.

Floor Button Input

The Elevator object monitors all attributes referenced by the *Input Attribute* members of the *Floor List* attribute. Any such attribute that is numerically 1 designates its floor button to be pressed, every other condition means that floor button is not pressed.

The following logic is executed every time any such referenced attribute changes to 1.

When the *Low Level Mode* attribute is set to "Activate Only Selected Floor," the Elevator object checks whether the corresponding floor is an allowed floor based on public access or elevator access, or not allowed at all. If allowed, the corresponding *Output Attribute* member is written to 1 at no priority. This member typically references a Security Binary Output object, which is configured with a positive Duration attribute value, to create an output pulse long enough for the elevator control system to register.

Finally, the anti-tailgating and floor tracking functions are performed. See "Anti-Tailgating" below for details.

Anti-Tailgating

As soon as a pressed floor button is reported to the Elevator object the anti-tailgating function is performed.

When the Anti-Tailgating attribute is set to "True," the Elevator object clears its internal list of elevator access floors. When the *Low Level Mode* attribute is set to "Activate All Allowed Floors," the potential change in the list of allowed floors needs to be applied to the outputs. See "Access Output" on page 1-7 for details.

Floor Tracking

As soon as a pressed floor button is reported to the Elevator object the floor tracking function is performed. The *Floor Tracking* attribute is the master switch to turn floor tracking notifications on or off. If generated, a floor tracking notification assigns the pressed floor button's *Floor Number* member with the last entity that requested access.

When the *Floor Tracking* attribute is set to "True," a floor tracking notification is generated when the pressed floor button is allowed for elevator access, but not for public access. This filters out reports of entities going to public access floors, for which they would not have to request any elevator access in the first place.

When the *Track On Transition Only* attribute is set to "False," a notification is also generated for each floor button that is pressed at the time the elevator access request is made, while being allowed for elevator access, but not for public access.

Override

The Elevator object may monitor a Door Sequence object for its override condition. When in override, all floors are accessible as if they were in public access.