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# Window lifter requirements:

ID code: WL- XX-000 -11 WL Window Lifter

XX Section

000 General number

11 Section number

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| ID | Requirements |
| WL-GB-001-01 | Window lifter is the module responsible to control the window movement. |
| WL-GB-002-02 | Window lifter is controlled by two switches that indicate the direction of the window movement. |

## Window behavior:

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| ID | Requirements |
| WL-WB-003-01 | For this purpose the window has to be emulated using a 10 led bar. |
| WL-WB-004-02 | The color of this led bar has to be RED. |
| WL-WB-005-03 | The movement of the window has to be simulated turning on/off the LEDS creating the animation of the window movement. |
| WL-WB-006-04 | The time between each transition shall be 400 msec. |
| WL-WB-007-05 | Window movement graphical description Image 1 |
| WL-WB-008-06 | There are two possible window movements:  UP  Down |
| WL-WB-009-07 | Each window movement has to be indicated trough a led color. Depending on movement each led has to be turn on.   |  |  | | --- | --- | | Movement | LED indicator color | | UP | BLUE | | Down | GREEN | |

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CLOSED OPEN

Image 1. Window movement graphical description.

## Button Behavior:

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| ID | Requirements |
| WL-BB-010-01 | In order to consider a validate button press; the button has to be pressed at least 10 msec. |
| WL-BB-011-02 | The module has to be able to detect fail button press. In that case the button press or button combination has to be considered as invalid. |
| WL-BB-012-03 | In case than a valid button press is detected the module has to follow the next behavior depending on the button pressed.   |  |  |  | | --- | --- | --- | | Button Press | Time | Action | | UP | >500 msec | The window shall UP until get totally CLOSED while the button keep press. | | DOWN | >500 msec | The window shall DOWN until get totally OPEN while the button keep press. | | UP | <500 msec | The window shall UP until get totally CLOSED automatically. (Function one touch) | | DOWN | <500 msec | The window shall DOWN until get totally OPEN automatically. (Function one touch) | |

## Anti pinch functionality:

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| ID | Requirements |
| WL-AF-013-01 | Anti-pinch is a feature than prevents accidents between window and some human body parts like arms, hands, head…. |
| WL-AF-014-02 | In this case the signal than indicates to the module the detection of a pinch will be a push button. |
| WL-AF-015-03 | Anti-pinch button press has to follow the same characteristics than UP and DOWN buttons for valid press. |
| WL-AF-016-04 | This signal just can be considered as valid when the movement is UP. |
| WL-AF-017-05 | If this signal is valid then the module has to stop the UP Movement and then DOWN the window until the window get totally OPEN. |
| WL-AF-018-06 | After window is totally OPEN the module has to ignore during 5 seconds all button press. |
| WL-AF-019-07 | After this time the module has to recognize every button press. |

**Additional requirements:**

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| ID | Requirements |
| WL-AR-020-01 | The window lifter module should have another extra led to indicate the Anti-pinch button action. |
| WL-AR-021-02 | The Anti-pinch led indicator should be red color to identify the push button. |
| WL-AR-022-03 | The Anti-pinch red led should remain on for the 5 seconds, when the module is completely stop of any other action. |
| WL-AF-023-04 | The module when the One Touch signal is operating shall to stop if it is pressed the same function signal but in the opposite direction, just can be considered as valid respecting the validation of the button press action.  If One Touch Up is On and press Down Button then Stops One Touch Up.  If One Touch Down is On and press Up Button then Stops One Touch Down.  The module continues with its normal working after any of this actions. |

**State Machine Window Lifter:**

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| ID | Requirements |
| WL-SM-024-01 | The window lifter module shall became into a Scheduler module where there is going to be working 6 tasks. |
| WL-SM-025-02 | The principal functions of the window lifter module shall exist in a State Machine order, with the number of states than you wish to satisfied the complete work: UP , DOWN and ANTIPINCH. |
| WL-SM-025-03 | The state machine must to have an idle state when the task will be no running |