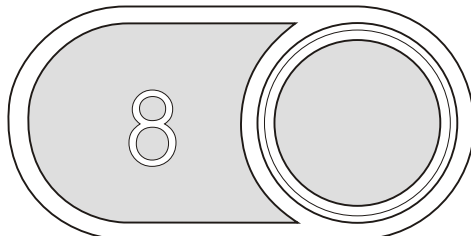


SINGLE / DUAL-COLOR TOUCHLESS BUTTON AL-70Dx



Description

Touchless elevator button AL-70-D operates from a low-voltage power source and provides a simple digital output when an object is detected in front of the button.

The button sensor works through most materials and is resistant to dirt deposits on the surface of the sensor, such as dust and grease. It can reliably detect a hand or a finger even through clothing.

Unlike optical (IR) touchless elevator buttons, AL-70-D uses patent-pending capacitive sensing technology and is completely unaffected by ambient light or reflective surface, that can false-trigger optical sensors.

Unique sensing technology also enables extremely fast response. Due to this, the button typically triggers before the user touches the surface of the button, indicating to the user, that the button is touchless. Even slightly slower detection, typical for most touchless solutions currently on the market, diminishes this important feature, as most users will touch and press the button before noticing its touchless features.

The button features a stainless steel label plate and button on a black plastic casing. It is indistinguishable from regular mechanical elevator buttons. This makes it perfect for the direct replacement of existing buttons while maintaining the same aesthetics and mechanical strength. The stainless steel front plate can include backlit symbols such as numbers, letters, and glyphs to indicate button function. It can also include a Braille symbol, which is useful when the elevator button is operated in the mechanical mode.

In addition to touchless operation, the AL 70-D elevator button offers a fallback to mechanical operation if needed. By disabling the electronics inside of the button, it can operate as a regular mechanical button. In case of power failure, it automatically falls back to mechanical operation.

The button also features dual-color LED backlighting in various standard colors. The primary color is active while the power is applied. The color changes to the secondary color when the button is activated. The change between the primary and secondary LED colors can also be made via a dedicated LED input, giving the elevator control electronics control over the LED color.

The range of the button can be changed via a trimmer on the back of the button or via a control input. The control input enables changing the range or disabling the touchless operation of multiple buttons via a single wire.

Features

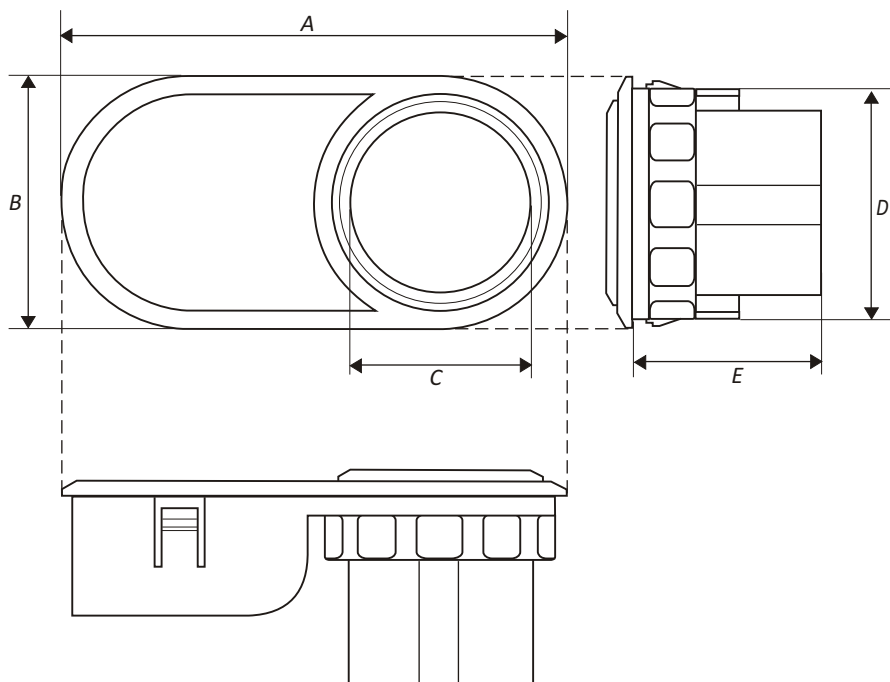
- An innovative alternative to mechanical lift/elevator buttons.
- Extremely fast response.
- No-touch operation eliminates users' exposure to cross-contamination with pathogens
- Unaffected by ambient light and reflective surfaces
- Option to operate as a mechanical elevator button if touchless operation is disabled or in case of a power failure
- It can directly replace standard mechanical elevator buttons
- Stainless steel front plate design makes it indistinguishable from mechanical elevator buttons
- Dual LED backlighting in various standard colors, with full user control
- Resistant to vandalism
- Option to control range, or disable touchless operation of multiple elevator buttons via a single control wire
- Excellent EMI noise immunity.

Specifications

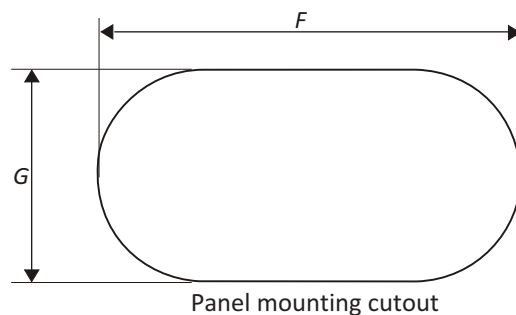
TECHNICAL DATA	AL-70-DM (dual color)	AL-70-DS (single color)
Supply input voltage range nom:	24V DC	
Supply input voltage (min - max):	21.6 - 26.4 V DC	
LED backligh activation voltage	0V - Primary LED on 24V - Secondary LED on	0V - LED off 24V - LED on
Supply current:	max. 20mA @ 24V	
Output:	Isolated solid state relay (NO), or mechanical push button (NO)	
Relay output rating:	Current: 0.2A max, Voltage: 48 VDC max	
Detection frequency:	5 Hz	
Detection range :	5-30 mm* (adjustable)	
Mounting method:	Plastic clip	
Mounting plate thickness:	1.6, 3 mm (two level clip)	
Input/Output connections:	JST PH 7-pin connector (20cm wire harness included)	
Operating temperature range:	0 °C to +55 °C	
Mechanical button lifespan:	> 5 million operations	
Housing dimensions (W x D):	70mm x 35mm x 27mm	

* range is measured using a human hand equivalent as a trigger. Using a single finger could decrease the range by 10-15%

Dimensions



A (overall width)	70 mm
B (overall height)	35 mm
C (front button width)	25 mm
D (back housing width)	32 mm
E (back housing depth)	27 mm
F (mount. hole width)	67mm
G (mount. hole height)	33mm



Operating Modes

The button has three operating modes, one touchless mode and two modes with touchless operation disabled. Modes can be selected by wire connections, switches or via a control signal on the Control (white) wire.

MODE 1 - touchless operation

The button in Mode 1 acts as a touchless button. The touchless sensor detects a finger in front of the button and activates the output relay contacts. If the finger reaches the button surface and (mechanically) pushes the button, the mechanical push-button will have no effect as the sensor already activated the contacts before the finger reached the button. Solid state relay, controlled by the sensor electronic and mechanical button, controlled by a mechanical push on the button are connected in parallel.

The button enters Mode 1 when:

- power is connected
- white wire (Control) is disconnected or signal/voltage level on the white Control wire determines touchless operation (see Control signal section for details)

MODE 2 - mechanical operation (soft sensor disable)

The button in Mode 2 has the touchless sensor disabled by a control input. The button in this mode acts as a regular mechanical elevator button, where the push on the button surface activates an internal mechanical button. The operation in this mode is identical to any mechanical button. The difference between Mode 2 (soft sensor disable) and Mode 3 (hard sensor disable) is that in Mode 2 the sensor electronics and LED drive circuitry are still powered. The LED+ control wire can still switch between Primary and Secondary LED colors (two-color operation). Re-enabling the touchless operation via a control input makes the touchless operation resume immediately.

The button enters Mode 2 when:

- power is connected
- white wire (Control) is connected to a positive voltage (+3.3V to +24V) or signal on the white Control wire determines disabled touchless operation (see Control signal section for details)

MODE 3 - mechanical operation (hard sensor disable, power failure mode)

The button in Mode 3 has the touchless sensor disabled by removing the power. The button in this mode acts as a regular mechanical elevator button, where the push on the button surface activates an internal mechanical button. The operation in this mode is identical to any mechanical button. In Mode 3 the sensor electronics and LED drive circuitry are not powered. The LED+ control wire can only turn on the Secondary LED (single-color operation). When the power is re-applied, the touchless operation doesn't resume immediately as the sensor needs some time to recalibrate and stabilize (1-3s typically).

The button enters Mode 3 when:

- power to the button is disconnected

LED Backlighting

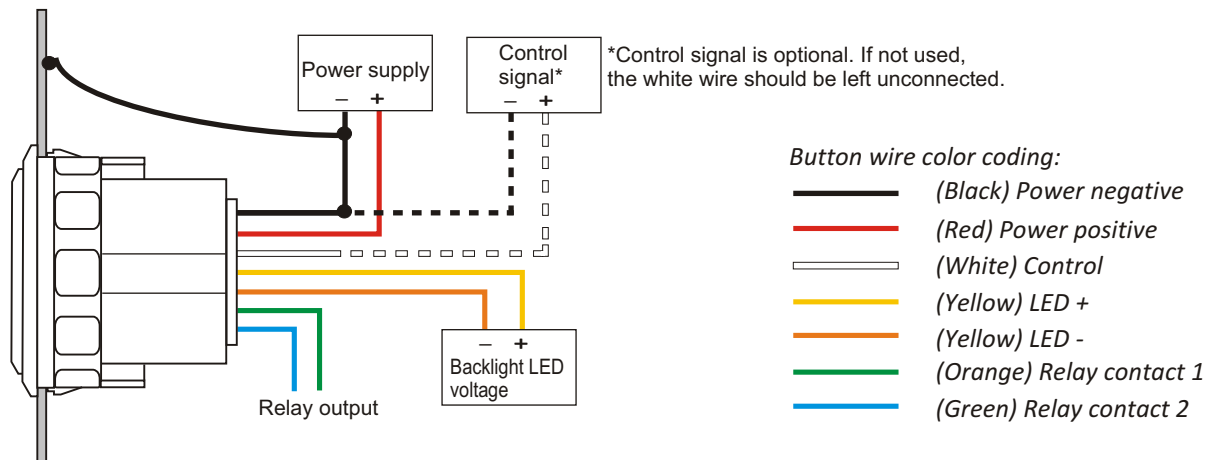
LED backlighting activates (switches from the primary to the secondary LED) automatically whenever the button sensor detects an object (a finger or a hand), independent of the LED control voltage.

If the LED control voltage is inactive, the primary LED will switch "off" when the user moves the hand out of the sensor range.

If the LED control voltage is active the secondary LED will switch on and will remain on, while this input is active.

Touchless sensor	LED Control voltage	Dual color button	Single color button
inactive	0V	PRIMARY	OFF
inactive	active	SECONDARY	SECONDARY
active	0V	SECONDARY	SECONDARY
active	active	SECONDARY	SECONDARY

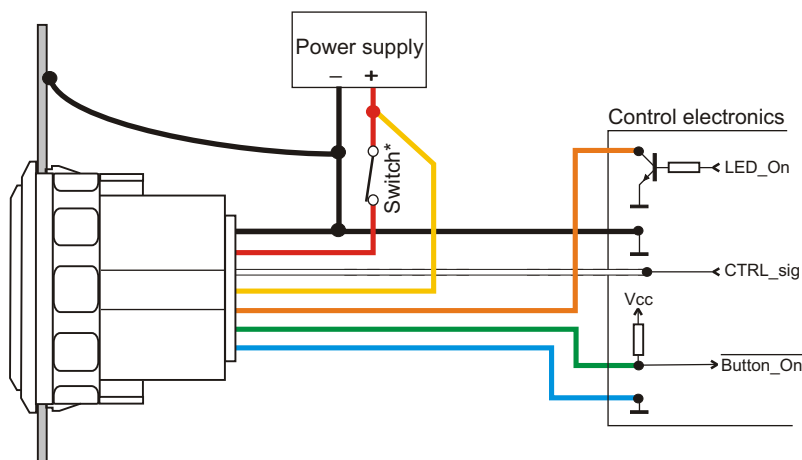
Installation



Wiring diagram

IMPORTANT: The chassis (mounting panel) should be connected to the PSU negative wire. It is recommended that the ground is connected to the chassis as close as possible to the buttons to reduce ground loops. GS-27 (button ground connection ring) accessory can be used to connect the ground directly at the button mounting hole. Make sure that wire connections are secure, any loose contact in any connection could lead to unstable operation.

IMPORTANT: Touchless buttons solid state relay output is SIGNAL only. It should NOT be used to switch loads.



Connection with typical Control electronics input/output stages

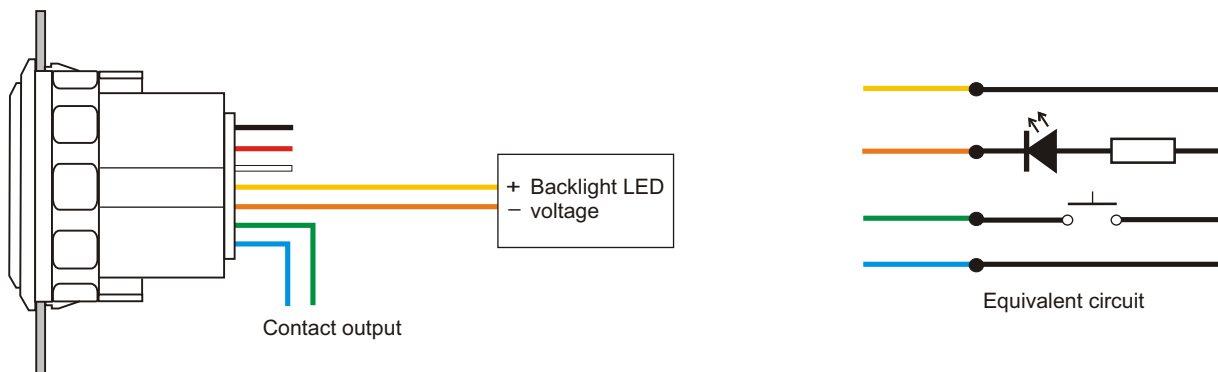
A typical button LED drive circuit consists of an Open-Collector output, that connects the LED- to the ground when the button LED is activated. The LED+ input should be tied to the +V in that case.

The button control input can be driven directly by a digital signal output. The typical Control input impedance is 10k Ohm. The control output can control a single button or a group of buttons. Digital "1" on this output disables the touchless operation, digital "0" enables the touchless operation. A PWM signal on this output controls the button(s) range.

The solid-state relay output is isolated from the rest of the circuit so either a pull-up or pull-down resistor can be used to convert relay contact-closure to a digital input signal.

An optional disconnect switch (marked as switch* in the above diagram) can be used to disconnect the power to the switch sensor electronics. This disables the touchless operation of the button by removing the power. To maintain control over the backlight LEDs, the LED+ wire should be connected before the disconnect switch. A relay or a transistor can be used instead of a switch.

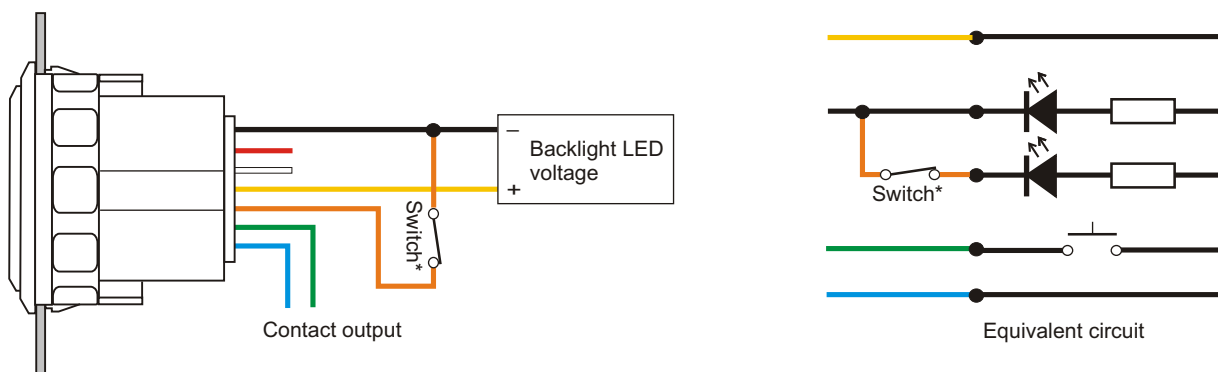
Installation as a mechanical button (single color mode)



Wiring diagram for mechanical operating mode

If the button power supply wires are not connected, the button acts as a regular mechanical button.

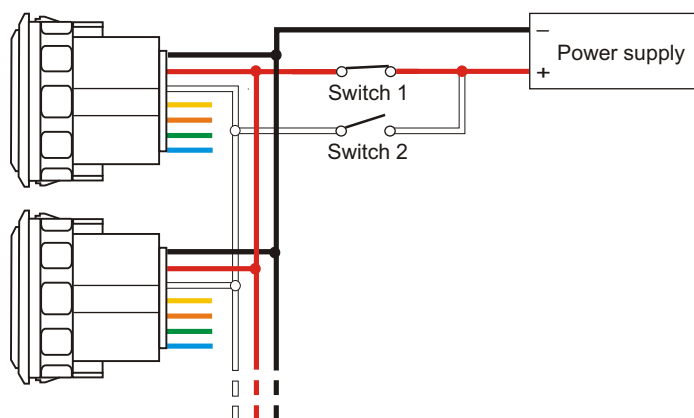
Installation as a mechanical button (dual color mode)



Wiring diagram for mechanical operating mode with dual color support

When the Switch is open, the primary color is active. When the Switch* closes, the LED color changes from primary to secondary color. The internal circuit prevents both LEDs from activating, only one can be active at a time.*

Selecting Operating Mode using switches



Switch 1	Switch 2	Operating Mode
Closed	Closed	Mechanical (Mode 2)
Closed	Open	Touchless (Mode 1)
Open	Closed	Mechanical (Mode 3)
Open	Open	Mechanical (Mode 3)

Control Signal

The control signal can be used to control the touchless operation of a button or a group of buttons. The control signal can set the button range (sensitivity) or disable touchless operation. Each button has a trimmer on the back to set the range, but when dealing with a large group of buttons (for example in an elevator cabin) it is advantageous to change the range on all buttons with a single signal, instead of setting each button individually, by hand. It also enables the elevator control electronics to set the range or disable touchless operation remotely.

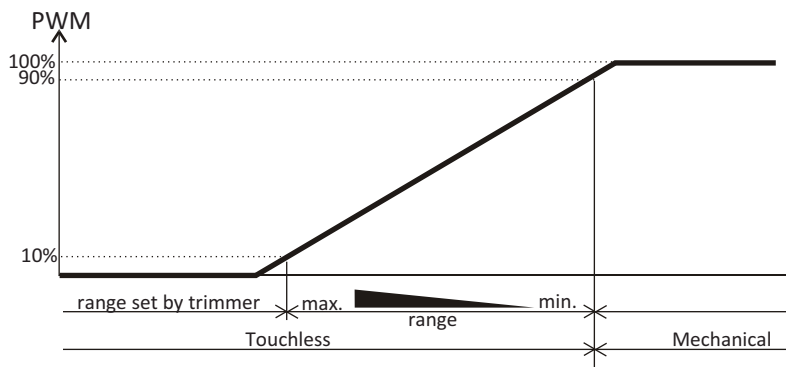
The control signal uses voltage levels and/or low-frequency PWM signal to control the button.

Voltage level on the Control input:

0V	Touchless operation, range determined by the trimmer
$\geq 3.3V$	Touchless operation is disabled (soft disable) The button works as a mechanical button

PWM control signal (positive pulse %):

0-10%	Touchless operation, range determined by the trimmer
10% - 90%	Touchless operation, range is determined by the PWM %: 10% (max. range) $\longleftrightarrow$ 90% (min. range)
90-100%	Touchless operation is disabled (soft disable) The button works as a mechanical button



PWM control signal specifications

Pulse voltage	3.3V - 24V
Frequency	400 Hz +/- 20%

NOTE: If the control input wire is not connected or if the PWM frequency is out of the specified range, the button operates as a touchless button, with a range determined by the trimmer.