



## Keypads with backlight

A unique technology that allows us to combine uniform key backlighting with tactile effect (clicking) of the metallic membrane.

### Table of contents

Technology description.....	2
Front membrane molding.....	2
Light filters.....	2
Electrical parameters.....	2
Technological limitations and other features .....	2

## Technology description

LEDs are soldered into the printed circuit board of a membrane keypad (the board can be flexible or rigid) and upon assembly get located inside the keypad, under the front membrane. In case of keypads on a printed circuit board diodes can also be installed on the back side of the keypad.

Most commonly, surface mount diodes (SMD) of the sizes 0805 (2x1,25 mm) or 0603 (1,6x0,8 mm) are used. The type, color and light intensity are selected according to the customer's preferences. Optionally, installation of multicolored LEDs, as well as of photodetectors (photodiodes, phototransistors) is possible.

In case of rigid printed circuit boards, the variety of applicable types of diodes is much wider and is determined by the constructional requirements for the keypad.

## Front membrane molding

If the level of the surface of a diode exceeds the level of the membrane keypad, as well as for the purpose of better visibility of diodes, the front membrane can be embossed to the shape of a lens. The radius of molding is selected according to the type of diodes.

## Light filters

Light filters enhance the look of the keypad and improve uniformity of the LED illumination. Most commonly, matte filters (also called "colorless" or "milky" sometimes) are used, but a light filter can also be colored.

- a light filter almost does not affect light intensity
- if you use an SMD with a transparent window for LEDs, the diode's structure, connections and solder pads will be visible, which will negatively affect the look of the keypad.

You can find a list of typical light filter colors in our [Palette](#) (in the "Membrane keypads" section on our website).

## Electrical parameters

- 1) LED power supply is usually performed by an extra flat cable of a keypad.
- 2) LED current limiting resistors can be placed on a flexible circuit board of a keypad; however, it is preferable to mount them on a rigid printed circuit board (instrument board). Mounting resistors on a flexible circuit board results in a higher price of the membrane keypad.
- 3) Switching of LEDs by the keys of a membrane keypad is possible; however, it is important to take into account the contact resistance of a key which can reach 10 to 300 Ohm.
- 4) Typical (recommended) parameters for built-in diodes:
  - luminous intensity: 50-200 mCd
  - illumination angle: 120°
  - power consumption: 10-20 mA

## Technological limitations and other features

Unipad Group s.r.o.  
Krymska 18, Prague, Czech Republic  
www.unipad.cz  
Tel.: +420 267 314 034  
E-mail: info@unipad.cz

1) LEDs are normally placed next to keys. The minimum distance between a key and a LED is 2mm (Illustration 1).

2) A LED can also be placed in the middle of a key, but in such a case the keypad will be thicker (at least 1,5 mm). The backlight will however remain local, which means a light spot 2-3 mm in diameter in the middle of the key. If you need to illuminate a key inscription, use electroluminescent backlight instead.

3) LEDs can only be used in keypads with wiring based on a flexible or rigid printed circuit board. It is possible to install LEDs in keypads with wiring on polyester film; however, it is not recommended due to low reliability.