



## Technical specifications

Electrical characteristics	Module ML	Module MX
Switching voltage	12 VAC/DC max.	12 VAC/DC max.
Switching current	10 mA AC/DC max.	10 mA AC/DC max.
Dielectric strength	500 V/50 Hz	500 V/50 Hz
Durability at 5V, 1mA linear actuation	–	50x10 <sup>6</sup>
Durability at 5V, 1mA tactile feel click	20x10 <sup>6</sup>	50x10 <sup>6</sup>
Durability at 5V, 1mA alternate action	–	0,5x10 <sup>6</sup>
Durability at 5V, 1mA alternate action		50x10 <sup>6</sup>
Mechanical characteristics		
Contact configuration	Single-pole contact	Single-pole contact
Action	Pressure point click	Linear, pressure point click, alternate action, ergonomic
Actuator travel	3,0–0,5 mm	4,0–0,4 mm Impuls/4,2 0,3 mm Rast/4–0,5 mm click
Pretravel	1,5 ± 0,5 mm	2 ± 0,6 mm Impuls/1,4 0,4 mm Rast/2,2 0,6 mm click
Initial force	30 cN min	25 cN min.
Actuation force	45 ± 20 cN	60 ± 20 cN linear a. Rast; 45 20 cN, ergonom. and 50 15 cN click
Pressure point force	50 ± 20 cN	55 ± 20 cN, pressure point ergonomic/60 15 cN pressure point click
Bounce time during actuation with 0,4 m/s	≤5 ms	≤5 ms
Standard lead spacing	18 mm (16 mm min.)	19,05 mm (16 mm min.)
Fastening	Fixing pins in the printed circuit board	Snap fastening in frame or fixing pins in the printed circuit board
Lighting (optional)	–	LED in red, green or yellow
Decoupling diode	–	optional
Wire jumper	optional	optional
Materials		
Insulation materials	Thermoplastics (min.UL 94 HB)	Thermoplastics (min.UL 94 HB)
Spring	Stainless steel	Stainless steel
Contacts	High-quality gold alloy	High-quality gold alloy
Other Characteristics		
Protection class	IP 40	IP 40
Operating temperature	–10 °C to +70 °C	–10 °C to +70 °C
Storage temperature	–40 °C to +70 °C	–40 °C to +70 °C
Humidity (without condensation)	5 % to 95 %	5 % to 95 %
Soldering capability	see soldering specifications	see soldering specifications

For detailed information and the layout of the details described above, please do not hesitate to ask for our technical specifications and drawing.



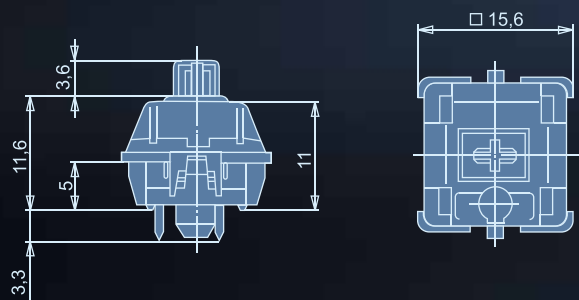
## Keymodule MX

### Features

The constructive design of the key and the design of the associated keycaps fulfil the ergonomic requirements for data input workstations. Long operating life with gold crosspoint contact and high reliability with quick actuation. Optionally with integrated colour LED decoupling diode or wire bridge. 4 mm actuation travel.

Size of keycap	1x2 1x2,25 1x2,75	1x3	1x8
Type of keycap	8 mm/CylIn	8 mm/CylIn	8 mm/CylIn
„A“ (in mm)	23,8	38,1	133,35
Part-No. (without Pins)	G99-0224	G99-0225	G99-0226
Part-No. (with Pins)	G99-0742	G99-0743	G99-0744

### View of keymodule



### Keyswitch assembly



### Drilling patterns

with fixing pins



with fixing pins  
and LED

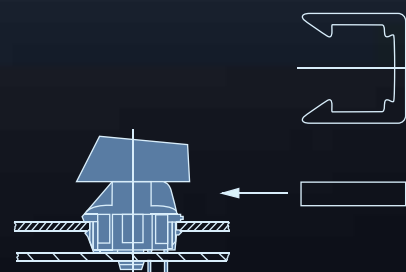


with fixing pins and  
diode or wire bridge



- $\varnothing 1,7 - 0,05$
- $\varnothing 1,5 \pm 0,05$
- $\varnothing 1,0 + 0,1$

### Locking unit



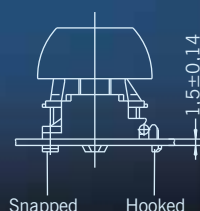
Keycap 8mm

Support bracket

PC-board

Housing

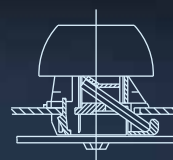
Wire yoke



Technical drawing of a module layout showing dimensions and tolerances:

- Overall width:  $15,24 \pm 0,1$
- Overall height:  $7 \pm 0,1$
- Module diameter:  $\varnothing 4 \pm 0,05$
- Module spacing:  $\varnothing 3,05 \pm 0,1$
- Module center line: Center line of module
- Module spacing:  $"A" \pm 0,1$

A cross-sectional diagram of a keyboard assembly. The components are labeled as follows: Keycap 8mm (top), Faceplate (below keycap), PC-board (below faceplate), Support bracket (below PC-board), Housing (bottom), and Wire yoke (bottom center). The diagram shows the internal structure of the keyboard, including the key mechanism and the support structure.



Technical drawing of a mechanical part with dimensions and tolerances:

- Overall width:  $6,65 \pm 0,1$
- Overall height:  $14 \pm 0,05$
- Top left corner radius:  $R 0,3$  max.
- Top right corner radius:  $R 0,3$  max.
- Bottom left corner radius:  $R 0,3$  max.
- Bottom right corner radius:  $R 0,3$  max.
- Dimensions from the left edge:
  - $0,8 \pm 0,1$
  - $2,8 \pm 0,2$
  - $0,5$
  - $3 \pm 0,1$
- Dimensions from the right edge:
  - $12,3 \pm 0,05$
  - $13,5 \pm 0,15$
  - $6,77 \pm 0,05$
  - $0,8 \pm 0,1$
  - $4,2 \pm 0,1$
- Overall length:  $A \pm 0,1$

Technical drawing of a mechanical part showing dimensions:

- $6,65 \pm 0,1$
- $2,8 \pm 0,2$
- $0,5$
- $4,6 \pm 0,2$
- $\square 14 \pm 0,05$
- $R\ 0,3$  max.
- $6,77 \pm 0,05$
- $12,3 \pm 0,05$
- $12,5 \pm 0,15$
- $R\ 0,3$  max.
- $R\ 0,3$  max.
- $3 \pm 0,1$
- "A"  $\pm 0,1$
- $4,2 \pm 0,1$