

# RF short-travel keyswitches



## General data

RF 15 (15 x 15 mm) and RF 19 (19 x 19 mm) with distinct key click, for use under an overlay or with RK 90 keycaps. Can be fully illuminated.

## Content

|                                                              |               |
|--------------------------------------------------------------|---------------|
| <b>RF 15 short-travel keyswitch</b>                          | <b>4 - 26</b> |
| RF 15 short-travel keyswitch, non-illuminated                | 4 - 28        |
| RF 15 short-travel keyswitch, fully illuminated with 2 LEDs  | 4 - 29        |
| RF 15 short-travel keyswitch, 1 LED spot-illumination        | 4 - 30        |
| <b>RF 15 N short-travel keyswitch</b>                        | <b>4 - 32</b> |
| RF 15 N short-travel keyswitch, non-illuminated              | 4 - 35        |
| <b>RF 15 R short-travel keyswitch</b>                        | <b>4 - 36</b> |
| RF 15 R low short-travel keyswitch, non-illuminated          | 4 - 39        |
| RF 15 R high short-travel keyswitch, non-illuminated         | 4 - 39        |
| RF 15 R low short-travel keyswitch, 1 LED spot-illumination  | 4 - 40        |
| RF 15 R high short-travel keyswitch, 1 LED spot-illumination | 4 - 41        |
| <b>RF 15 H short-travel keyswitch</b>                        | <b>4 - 42</b> |
| RF 15 H short-travel keyswitch, non-illuminated              | 4 - 44        |
| RF 15 H short-travel keyswitch, fully illuminated            | 4 - 45        |
| <b>RF 15 signal indicator</b>                                | <b>4 - 46</b> |
| RF 15 signal indicator, fully illuminated, 1 LED             | 4 - 48        |
| <b>RF 19 short-travel keyswitch</b>                          | <b>4 - 50</b> |
| RF 19 short-travel keyswitch, non-illuminated                | 4 - 53        |
| RF 19 short-travel keyswitch, fully illuminated with 2 LEDs  | 4 - 54        |
| RF 19 short-travel keyswitch, 1 LED spot-illumination        | 4 - 55        |
| <b>RF 19 short-travel keyswitch, 1 NC + 1 NO</b>             | <b>4 - 56</b> |
| RF 19 short-travel keyswitch, non-illuminated                | 4 - 58        |
| <b>RF 19 H short-travel keyswitch</b>                        | <b>4 - 60</b> |
| RF 19 H keyswitch, non-illuminated                           | 4 - 63        |
| RF 19 H short-travel keyswitch, fully illuminated            | 4 - 64        |

## Content

|                                                                |               |
|----------------------------------------------------------------|---------------|
| <b>RF 19 signal indicator</b>                                  | <b>4 - 66</b> |
| RF 19 signal indicator, $\frac{1}{2} \times 1$ -module         | 4 - 68        |
| RF 19 signal indicator, $\frac{1}{2} \times 2$ -module         | 4 - 68        |
| RF 19 signal indicator, 1 $\times$ 1-module                    | 4 - 69        |
| RF 19 signal indicator, 1 $\times$ 2-module                    | 4 - 69        |
| <b>RF special accessories</b>                                  | <b>4 - 70</b> |
| Extension plunger for RF 15 N, round head                      | 4 - 70        |
| Extension plunger for RF 15 N, round head, with recess for LED | 4 - 71        |
| Keycap for RF 15, snap-on, for overall height 12.5 mm          | 4 - 71        |
| Spacers, round, for RF 15, RF 19                               | 4 - 72        |
| Spacers, triangular, for RF 15, RF 19                          | 4 - 73        |
| LED spacer for RF 15 N                                         | 4 - 74        |

## Specifications LED

### 3 mm LED

| (valid for 25 °C)                              | Red LED             | Green LED           | Yellow LED          |
|------------------------------------------------|---------------------|---------------------|---------------------|
| Max. forward current $I_F$ :                   | 30 mA               | 30 mA               | 20 mA               |
| Current reduction from: $T_0 = 50\text{ °C}$ : | approx 0.5 mA/°C    | approx 0.5 mA/°C    | approx 0.2 mA/°C    |
| Wavelength typ:                                | 635 nm              | 565 nm              | 586 nm              |
| Forward voltage $U_F/I_F$ typ:                 | 2 V/10 mA           | 2 V/10 mA           | 2 V/10 mA           |
| Reverse voltage $U_R/I_F$ typ:                 | 5 V/100 µA min.     | 5 V/100 µA min.     | 5 V/100 µA min.     |
| Ambient temperature, operating:                | - 20 °C ... + 80 °C | - 20 °C ... + 80 °C | - 20 °C ... + 80 °C |
|                                                | Blue LED            | Red low-current LED |                     |
| Max. forward current $I_F$ :                   | 20 mA               | 30 mA               |                     |
| Current reduction from: $T_0 = 50\text{ °C}$ : | approx 0.6 mA/°C    | approx 0.5 mA/°C    |                     |
| Wavelength typ:                                | 470 nm              | 645 nm              |                     |
| Forward voltage $U_F/I_F$ typ:                 | 2.7 V/10 mA         | 1.6 V/1 mA          |                     |
| Reverse voltage $U_R/I_F$ typ:                 | 5V/100 µA min.      | 5 V/100 µA min.     |                     |
| Ambient temperature, operating:                | - 20 °C ... + 80 °C | - 20 °C ... + 80 °C |                     |

### 2 mm LED

| (valid for 25 °C)                              | Red LED              | Green LED            | Green LED superbright |
|------------------------------------------------|----------------------|----------------------|-----------------------|
| Max. forward current $I_F$ :                   | 30 mA                | 30 mA                | 30 mA                 |
| Current reduction from: $T_0 = 50\text{ °C}$ : | 0.5 mA/°C            | 0.5 mA/°C            | -                     |
| Light current $f_v/I_F$ typ:                   | -                    | -                    | -                     |
| Wavelength typ:                                | 637 nm               | 569 nm               | 510-545 nm            |
| Forward voltage $U_F/I_F$ typ:                 | 1.8 V/20 mA          | 2.1 V/10 mA          | 3.5 V/20 mA           |
| Reverse voltage $U_R/I_F$ typ:                 | 5 V/100 µA min.      | 5 V/100 µA min.      | -                     |
| Ambient temperature, operating:                | - 55 °C ... + 100 °C | - 40 °C ... + 100 °C | -30 °C ... + 100 °C   |
|                                                | Yellow LED           | White LED            | Blue LED              |
| Max. forward current $I_F$ :                   | 50 mA                | 25 mA                | 30 mA                 |
| Current reduction from: $T_0 = 50\text{ °C}$ : | 0.8 mA/°C            | -                    | -                     |
| Light current $f_v/I_F$ typ:                   | 250 mIm/20 mA        | -                    | -                     |
| Wavelength typ:                                | 590 nm               | -                    | 464-485 nm            |
| Forward voltage $U_F/I_F$ typ:                 | 1.9 V/20 mA          | 3.6 V/20 mA          | 3.6 V/20 mA           |
| Reverse voltage $U_R/I_F$ typ:                 | 5 V/100 µA min.      | -                    | -                     |
| Ambient temperature, operating:                | -40 °C ... + 100 °C  | - 20 °C ... + 80 °C  | - 20 °C ... + 80 °C   |
|                                                | Multi-colour LED     |                      |                       |
| Max. forward current $I_F$ :                   | 30 mA                |                      |                       |
| Current reduction from: $T_0 = 50\text{ °C}$ : | approx 0.6 mA/°C     |                      |                       |
| Light current $f_v/I_F$ typ:                   | -                    |                      |                       |
| Wavelength typ:                                | 635/565 nm           |                      |                       |
| Forward voltage $U_F/I_F$ typ:                 | 2 V/10 mA            |                      |                       |
| Reverse voltage $U_R/I_F$ typ:                 | -                    |                      |                       |
| Ambient temperature, operating:                | - 20 °C ... + 80 °C  |                      |                       |

|                                  |                          |                                                                          |
|----------------------------------|--------------------------|--------------------------------------------------------------------------|
| Calculating the series resistor: | Rated power of series:   | Example for 5 Volt:                                                      |
| $R_V = \frac{U_B - U_F}{I_F}$    | $P_V = I_F^2 \times R_V$ | $R_V = \frac{5V - 2.0 V}{0.02 A} = 150 \Omega (= \text{standard value})$ |

### RF 15 short-travel keyswitch



### General data

Low-profile keyboards with RF 15 components should be designed with a 19.05 mm grid. With this grid, frame webs remain free between the individual keys. The overlay can be glued onto these frame webs; we recommend area embossing over the keys for the overlays.

### Technical data

#### General information

|                      |                 |
|----------------------|-----------------|
| Colour of lens       | see order block |
| Recommended key grid | 19.05 mm        |

#### Dimensions

|                |        |
|----------------|--------|
| Length         | 15 mm  |
| Width          | 15 mm  |
| Overall height | 9.7 mm |

#### Mechanical design

|                     |                                            |
|---------------------|--------------------------------------------|
| Mounting            | soldering into PCB                         |
| Terminals           | contacts tin-plated, fix contact Ag plated |
| Contact system      | snap-action contact                        |
| Contact arrangement | 1 NO                                       |
| Contact materials   | Au/Ag                                      |
| Illumination        | spot-/fully illuminated                    |
| LED colour          | see order block                            |
| LED type            | see order block                            |

#### Mechanical characteristics

|                      |                         |
|----------------------|-------------------------|
| Operating force max. | 2 ... 3 N               |
| Operating travel     | 0.5 mm                  |
| Switching travel     | 0.5 mm                  |
| Robustness min.      | with through-plated PCB |
|                      | 100 N                   |

#### Electrical characteristics

|                    |                         |
|--------------------|-------------------------|
| Rated voltage min. | Au: 0.02 V, Ag: 3 V     |
| Rated voltage max. | Au: 42 V, Ag: 50 V      |
| Rated current min. | Au: 0.01 mA, Ag: 0.1 mA |
| Rated current max. | Au: 100 mA, Ag: 250 mA  |

|                                      |                     |
|--------------------------------------|---------------------|
| Rated power max. (ohmic load)        | Au: 2 W, Ag: 12.5 W |
| Contact resistance when new max.     | 100 mΩ              |
| Contact resistance acc. to life max. | 3 Ω                 |
| Insulation resistance                | 10 <sup>9</sup> Ω   |
| ESD strength (underneath overlay)    | 15 kV               |
| Bouncing time max.                   | 5 ms                |

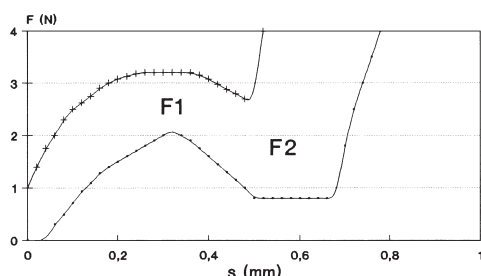
#### Other specifications

|                                    |                                       |
|------------------------------------|---------------------------------------|
| Ambient temp. operating min.       | -25 °C                                |
| Ambient temp. operating max.       | +70 °C                                |
| Storage temperature min.           | -40 °C                                |
| Storage temperature max. (product) | +80 °C                                |
| Storage temperature max. (in tube) | +50 °C                                |
| Resistance to constant environment | according to IEC 600 68-2-3 and 2-33  |
| Resistance at variable environment | according to IEC 600 68-2-14 and 2-33 |
| Operating life min.                | 1000000                               |
| Soldering time max.                | 2.5 sec.                              |
| Soldering temperature max.         | 250 °C                                |
| Flammability of materials          | UL 94 HB                              |

## RF short-travel keyswitches

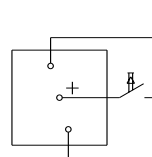
### Force/Travel Diagram – Keyswitch RF 15

### Operation characteristic limits RF

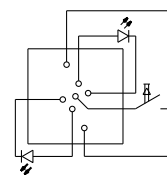


F 1 = Max. operating force  
F 2 = Force at contact  
F 2 is max. 55% of F 1

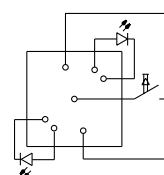
## Circuit Diagram – Keyswitch RF 15



Keyswitch,  
non-illuminated

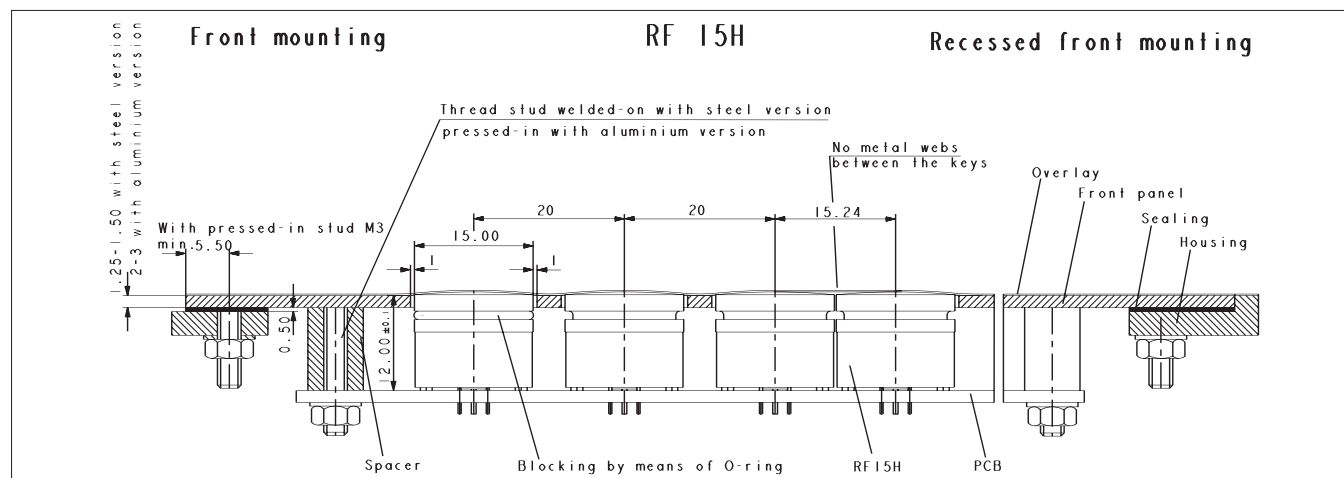


Keyswitch,  
fully illuminated

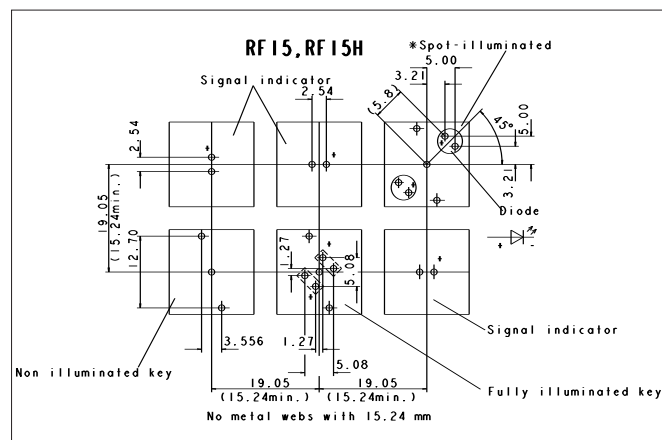


Keyswitch,  
spot-illuminated

## Dimensional Drawing RF 15

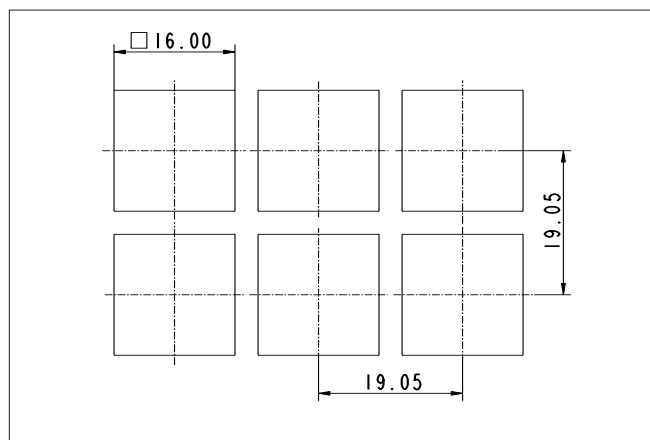


## Hole Pattern RF 15

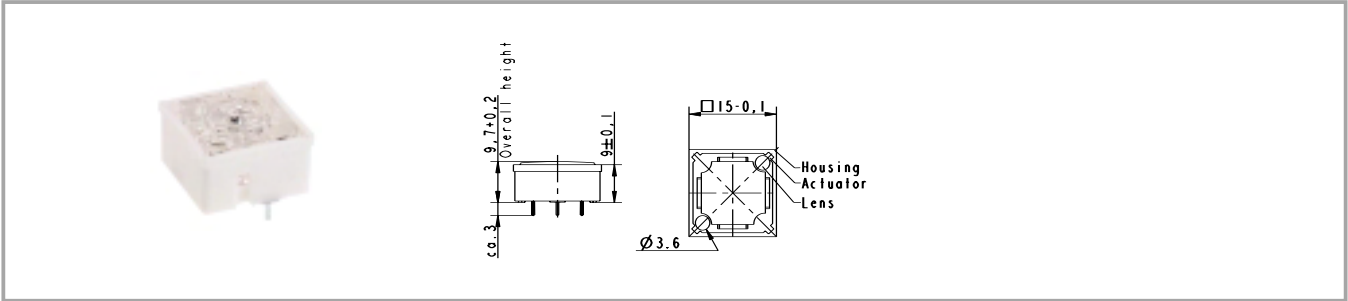


View on component side, all hole diameters  $1,1^{+0,1}_{-0,1}$  mm

## Hole Pattern – Front Panel



**RF 15 short-travel keyswitch, non-illuminated**



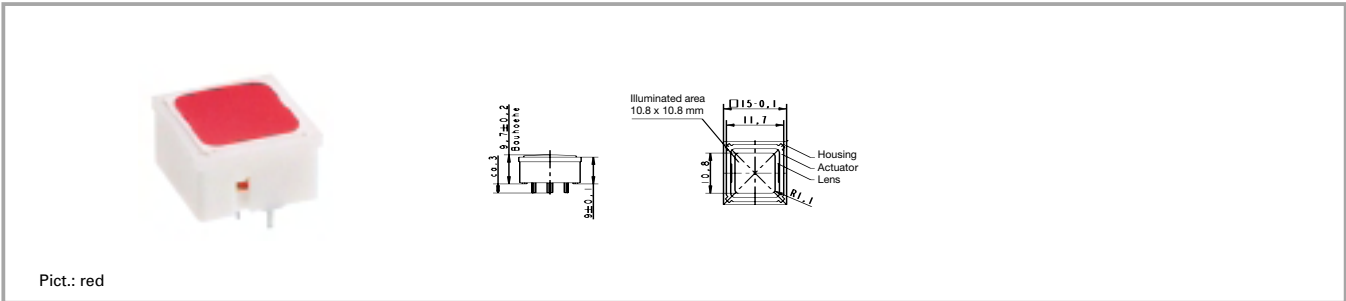
| Contact materials | Illumination    | Colour of lens | LED colour | LED type | Order no.                |
|-------------------|-----------------|----------------|------------|----------|--------------------------|
| Au                | not illuminated | transparent    |            |          | <b>3.14.100.001/0000</b> |
| Ag                | not illuminated | transparent    |            |          | <b>3.14.100.006/0000</b> |

Technical data see page 4 - 26

**Accessories:**  
 Keycap for RF 15, snap-on, for overall height 12.5 mm: 5.46.654.059/0227  
 Other keycaps see chapter RK90

# RF short-travel keyswitches

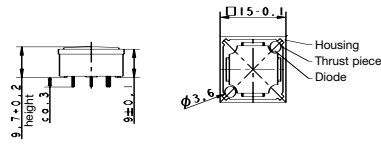
## RF 15 short-travel keyswitch, fully illuminated with 2 LEDs



| Contact materials | Illumination                | Colour of lens | LED colour | LED type | Order no.                |
|-------------------|-----------------------------|----------------|------------|----------|--------------------------|
| Au                | fully illuminated<br>2 LEDs | red            | red        | 2 mm     | <b>3.14.200.011/0000</b> |
| Au                | fully illuminated<br>2 LEDs | green          | green      | 2 mm     | <b>3.14.200.012/0000</b> |
| Au                | fully illuminated<br>2 LEDs | yellow         | yellow     | 2 mm     | <b>3.14.200.013/0000</b> |
| Au                | fully illuminated<br>2 LEDs | orange         | yellow     | 2 mm     | 3.14.200.014/0000        |
| Au                | fully illuminated<br>2 LEDs | blue           | blue       | 2 mm     | 3.14.200.015/0000        |
| Ag                | fully illuminated<br>2 LEDs | red            | red        | 2 mm     | <b>3.14.200.021/0000</b> |
| Ag                | fully illuminated<br>2 LEDs | green          | green      | 2 mm     | <b>3.14.200.022/0000</b> |
| Ag                | fully illuminated<br>2 LEDs | yellow         | yellow     | 2 mm     | <b>3.14.200.023/0000</b> |
| Ag                | fully illuminated<br>2 LEDs | orange         | yellow     | 2 mm     | 3.14.200.024/0000        |
| Ag                | fully illuminated<br>2 LEDs | blue           | blue       | 2 mm     | 3.14.200.025/0000        |

Technical data see page 4 - 26

### RF 15 short-travel keyswitch, 1 LED spot-illumination



Pict.: red

| Contact materials | Illumination               | Colour of lens | LED colour | LED type | Order no.                |
|-------------------|----------------------------|----------------|------------|----------|--------------------------|
| Au                | spot illumination<br>1 LED | opaque white   | blue       | 3 mm     | 3.14.100.030/0000        |
| Au                | spot illumination<br>1 LED | transparent    | red        | 3 mm     | <b>3.14.100.031/0000</b> |
| Au                | spot illumination<br>1 LED | transparent    | green      | 3 mm     | <b>3.14.100.032/0000</b> |
| Au                | spot illumination<br>1 LED | transparent    | yellow     | 3 mm     | <b>3.14.100.033/0000</b> |
| Ag                | spot illumination<br>1 LED | opaque white   | blue       | 3 mm     | 3.14.100.040/0000        |
| Ag                | spot illumination<br>1 LED | transparent    | red        | 3 mm     | <b>3.14.100.041/0000</b> |
| Ag                | spot illumination<br>1 LED | transparent    | green      | 3 mm     | <b>3.14.100.042/0000</b> |
| Ag                | spot illumination<br>1 LED | transparent    | yellow     | 3 mm     | <b>3.14.100.043/0000</b> |

Technical data see page 4 - 26

Double-spot LED illumination available on request.



### RF 15 N short-travel keyswitch



### General data

The RF 15N keyswitch provides a minimum overall height of 6.2 mm. The overall height can be varied by extension plungers which are inserted into the cross-like notches on the actuator tops.

LEDs can only be arranged separately next to the keyswitches up to an overall height of 10 mm (i.e. without plunger or with small plunger).

Keyswitches with overall heights of 12 mm or more can be provided with a maximum of 2 LEDs which are inserted into the recesses of the keyswitch housing. LEDs of keyswitches with overall heights of 12.5 mm or more should be placed onto LED spacers in order to obtain satisfactory illumination.

### Technical data

#### General information

|                      |                 |
|----------------------|-----------------|
| Colour of lens       | see order block |
| Recommended key grid | 19.05 mm        |

#### Dimensions

|                |        |
|----------------|--------|
| Length         | 15 mm  |
| Width          | 15 mm  |
| Overall height | 6.2 mm |

#### Mechanical design

|                     |                                                 |
|---------------------|-------------------------------------------------|
| Mounting            | soldering into PCB                              |
| Terminals           | contacts tin-plated,<br>fix contact Ag plated   |
| Contact system      | snap-action contact                             |
| Contact arrangement | 1 NO                                            |
| Contact materials   | Au/Ag                                           |
| Illumination        | external 3 mm LED<br>possible if height < 12 mm |

#### Mechanical characteristics

|                      |                                  |
|----------------------|----------------------------------|
| Operating force max. | 2 ... 3 N                        |
| Operating travel     | 0.5 mm                           |
| Switching travel     | 0.5 mm                           |
| Robustness min.      | with through-plated PCB<br>100 N |

#### Electrical characteristics

|                                  |                         |
|----------------------------------|-------------------------|
| Rated voltage min.               | Au: 0.02 V, Ag: 3 V     |
| Rated voltage max.               | Au: 42 V, Ag: 50 V      |
| Rated current min.               | Au: 0.01 mA, Ag: 0.1 mA |
| Rated current max.               | Au: 100 mA, Ag: 250 mA  |
| Rated power max.<br>(ohmic load) | Au: 2 W, Ag: 12.5 W     |

|                                         |                   |
|-----------------------------------------|-------------------|
| Contact resistance when<br>new max.     | 100 mΩ            |
| Contact resistance acc.<br>to life max. | 3 Ω               |
| Insulation resistance                   | 10 <sup>9</sup> Ω |
| ESD strength<br>(underneath overlay)    | 15 kV             |
| Bouncing time max.                      | 5 ms              |

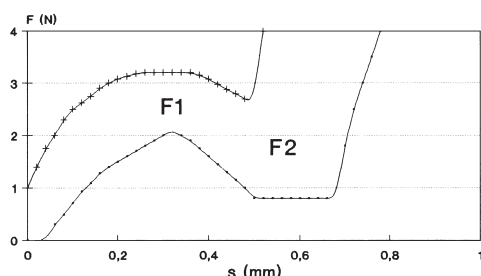
#### Other specifications

|                                       |                                          |
|---------------------------------------|------------------------------------------|
| Ambient temp. operating<br>min.       | -25 °C                                   |
| Ambient temp. operating<br>max.       | +70 °C                                   |
| Storage temperature min.              | -40 °C                                   |
| Storage temperature max.<br>(product) | +80 °C                                   |
| Storage temperature max.<br>(in tube) | +50 °C                                   |
| Resistance to constant<br>environment | according to<br>IEC 600 68-2-3 and 2-30  |
| Resistance at variable<br>environment | according to<br>IEC 600 68-2-14 and 2-33 |
| Operating life min.                   | 1000000                                  |
| Soldering time max.                   | 2.5 sec.                                 |
| Soldering temperature<br>max.         | 250 °C                                   |
| Flammability of materials             | UL 94 HB                                 |

## RF short-travel keyswitches

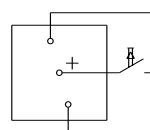
### Force/Travel Diagram – Keyswitch RF 15 N

Operation characteristic limits RF

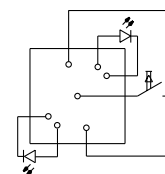


F 1 = Max. operating force  
F 2 = Force at contact  
F 2 is max. 55% of F 1

### Circuit Diagram – Keyswitch RF 15 N

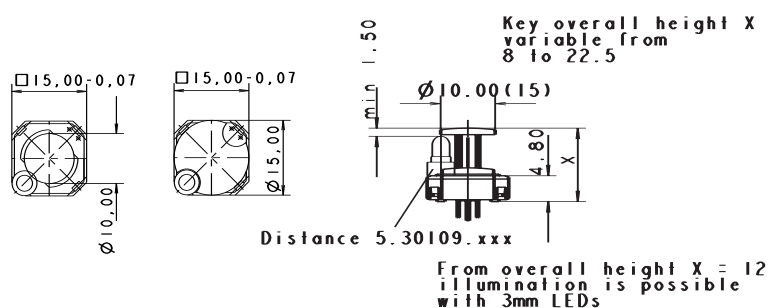


Keyswitch,  
non illuminated



Keyswitch,  
spot-illuminated

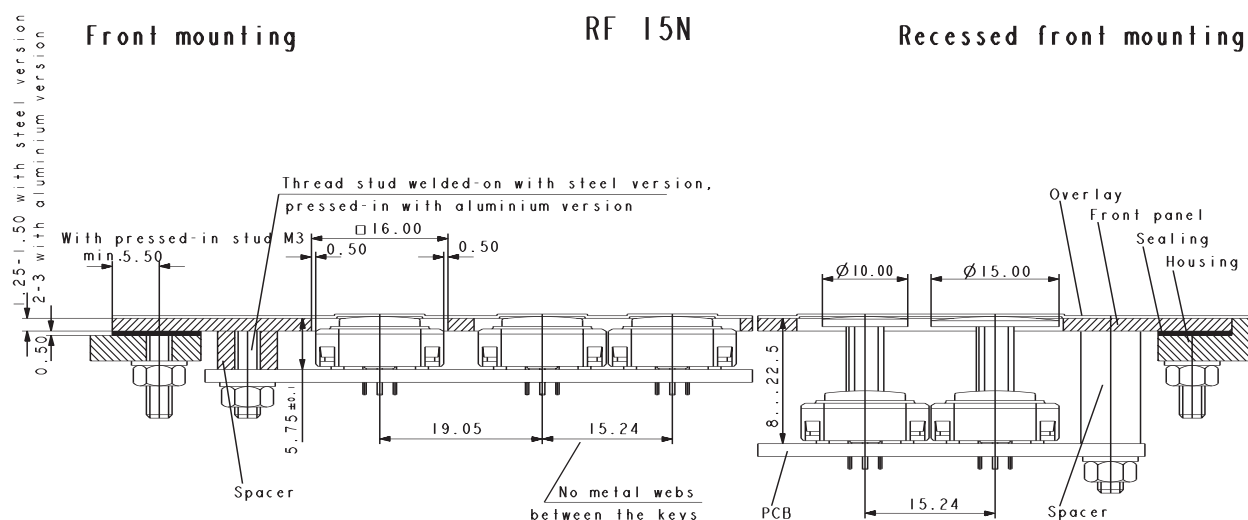
### Dimensional Drawings RF 15 N



Front mounting

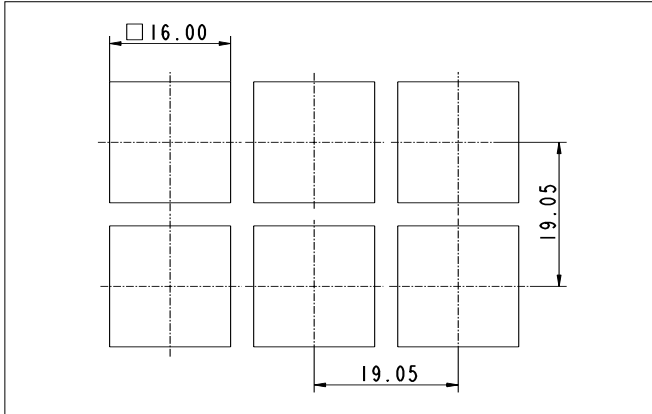
RF 15N

Recessed front mounting

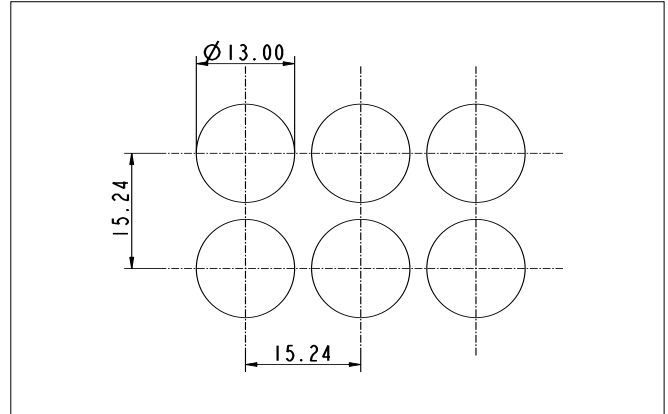
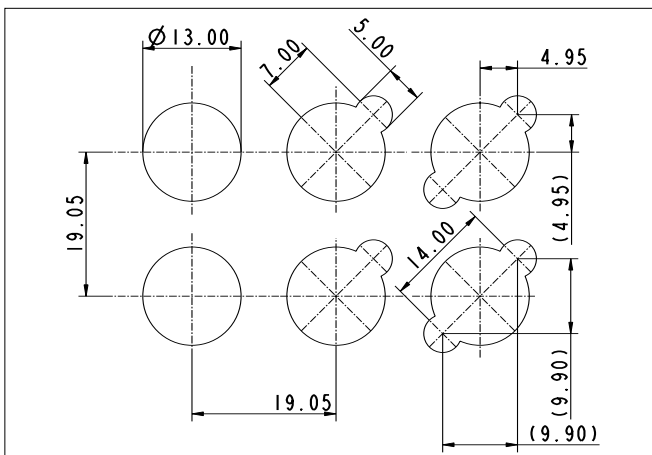
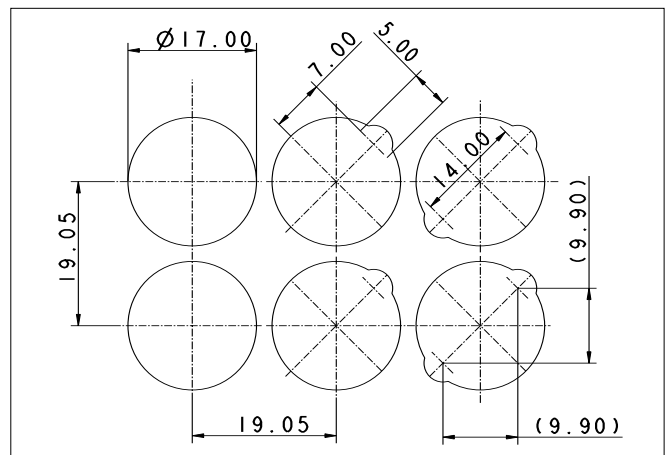


## Hole Patterns – Front Panel RF 15 N

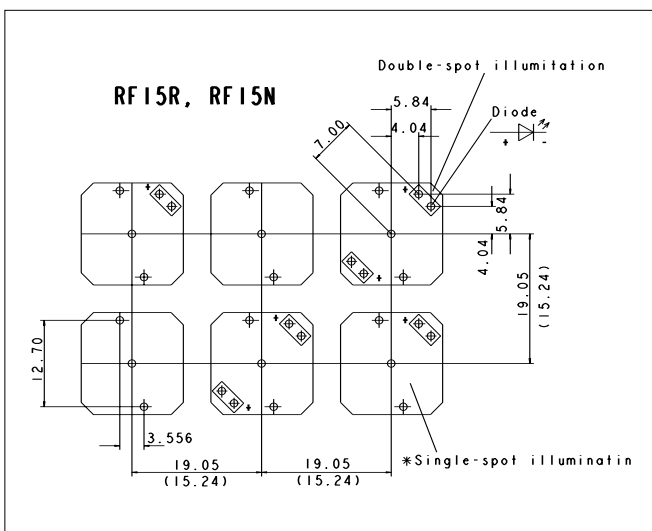
RF 15 N without plunger



RF 15 N with plunger  $\varnothing$  10 mm, non-illuminated

RF 15 N with plunger  $\varnothing$  10 mm, illuminatedRF 15 N with plunger  $\varnothing$  15 mm, illuminated

## Hole Pattern RF 15 N



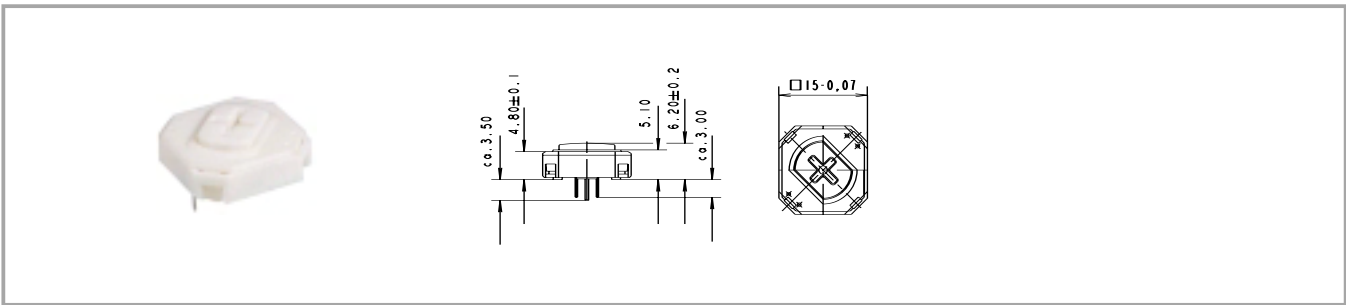
View on component side  
All hole diameters 1,1  $\pm$  0,1 mm  
PCB layout Keyswitch 1/400" grid

# RF short-travel keyswitches

## Accessories RF 15 N short-travel keyswitch

| Description                                                                                               | Photo | Order no.                | Page |
|-----------------------------------------------------------------------------------------------------------|-------|--------------------------|------|
| LED yellow, 3mm                                                                                           |       | 1.90.690.103/0000        |      |
| LED spacer for RF 15 N, Ø 5 mm, spacing length 2.2 mm, light grey, for use with overall height of 12.5 mm |       | 5.30.109.010/0756        |      |
| Extension plunger for RF 15 N, Ø 10 mm, overall height 22.5 mm                                            |       | <b>5.46.011.028/0710</b> |      |
| Extension plunger for RF 15 N, Ø 15 mm, overall height 22.5 mm                                            |       | <b>5.46.017.028/0710</b> |      |

## RF 15 N short-travel keyswitch, non-illuminated



| Contact materials | Illumination                         | Recommended key grid | Overall height | Order no.                |
|-------------------|--------------------------------------|----------------------|----------------|--------------------------|
| Au                | external 3 mm LED possible if height | 19.05 mm             | 6.2 mm         | <b>3.14.100.601/0000</b> |
| Ag                | external 3 mm LED possible if height | 19.05 mm             | 6.2 mm         | <b>3.14.100.606/0000</b> |

Technical data see page 4 - 32

### RF 15 R short-travel keyswitch



### General data

The round actuator of the RF 15 R keyswitch requires round front panel cut-outs. These make it possible to use a narrow keyboard grid of only 15.24 mm with sufficiently large frame webs between the individual keys. We recommend area embossing over the actuators for the overlay.

### Technical data

#### General information

Recommended key grid 15.24 mm

#### Dimensions

Length 15 mm  
Width 15 mm  
Overall height 9,7/12,5 mm

#### Mechanical design

Mounting soldering into PCB  
Terminals fix contact Ag plated

Contact system snap-action contact  
Contact arrangement 1 NO  
Contact materials Au/Ag  
Illumination spot illumination  
LED colour see order block  
LED type see order block

#### Mechanical characteristics

Operating force max. 2 ... 3 N  
Operating travel 0.5 mm  
Switching travel 0.5 mm  
Robustness min. with through-plated PCB 100 N

#### Electrical characteristics

Rated voltage min. Au: 0.02 V, Ag: 3 V  
Rated voltage max. Au: 42 V, Ag: 50 V  
Rated current min. Au: 0.01 mA, Ag: 0.1 mA  
Rated current max. Au: 100 mA, Ag: 250 mA  
Rated power max. (ohmic load) Au: 2 W, Ag: 12.5 W

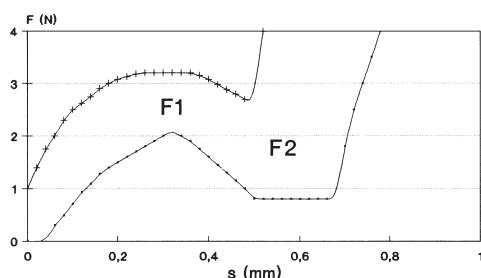
Contact resistance when new max. 100 mΩ  
Contact resistance acc. to life max. 3 Ω  
Insulation resistance 10<sup>9</sup> Ω  
ESD strength (underneath overlay) 15 kV  
Bouncing time max. 5 ms

#### Other specifications

Ambient temp. operating min. -25 °C  
Ambient temp. operating max. +70 °C  
Storage temperature min. -40 °C  
Storage temperature max. (product) +80 °C  
Storage temperature max. (in tube) +50 °C  
Resistance to constant environment according to IEC 600 68-2-3 and 2-30  
Resistance at variable environment according to IEC 600 68-2-14 and 2-33  
Operating life min. 1000000  
Soldering time max. 2.5 sec.  
Soldering temperature max. 250 °C  
Flammability of materials UL 94 HB

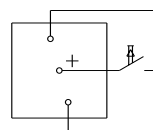
### Force/Travel Diagram – Keyswitch RF 15 R

### Operation characteristic limits RF

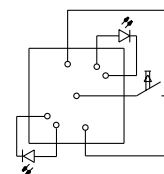


F 1 = Max. operating force  
F 2 = Force at contact  
F 2 is max. 55% of F 1

## Circuit Diagram – Keyswitch RF 15 R

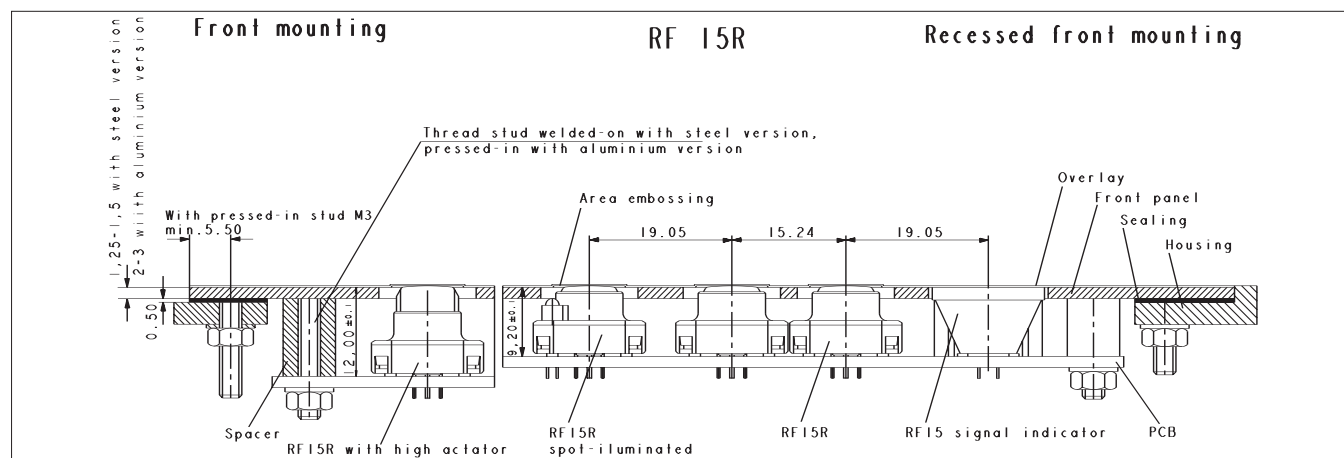


Keyswitch,  
non-illuminated

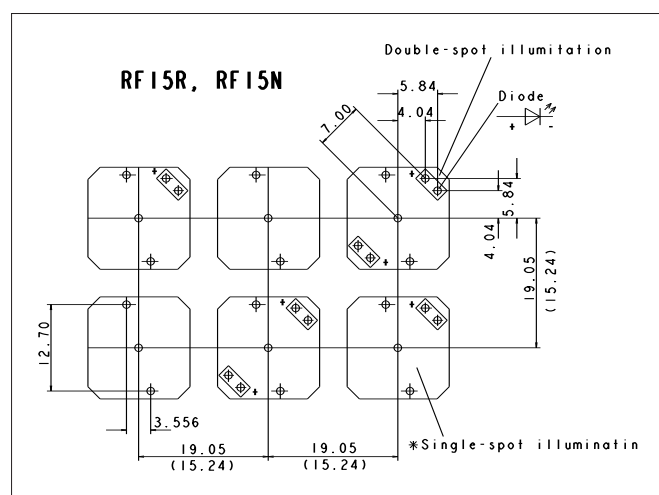


Keyswitch,  
spot-illuminated

## Dimensional Drawing RF 15 R



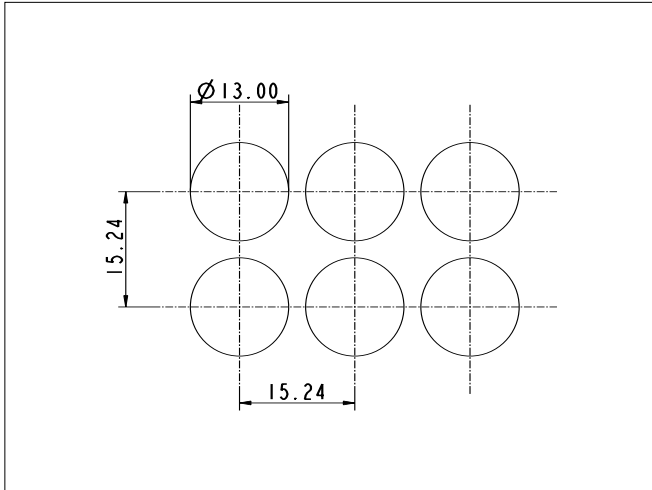
## Hole Pattern RF 15 R



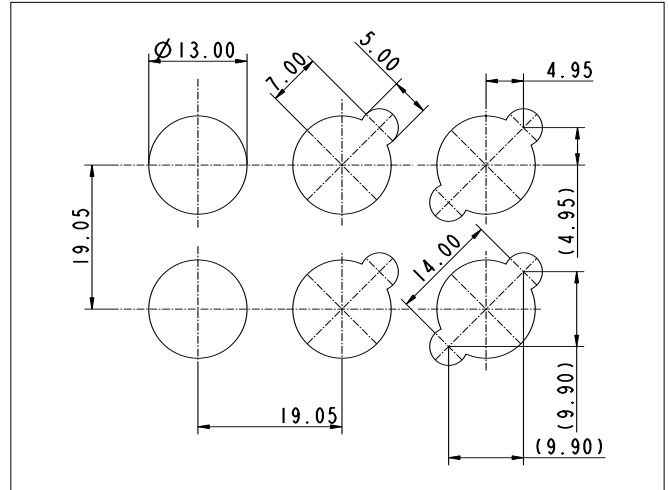
View on component side  
All hole diameters 1,1  $\pm$  0,1 mm  
PCB layout Keyswitch 1/400" grid

**Hole Pattern – Front Panel RF 15 R**

RF 15 R, non-illuminated

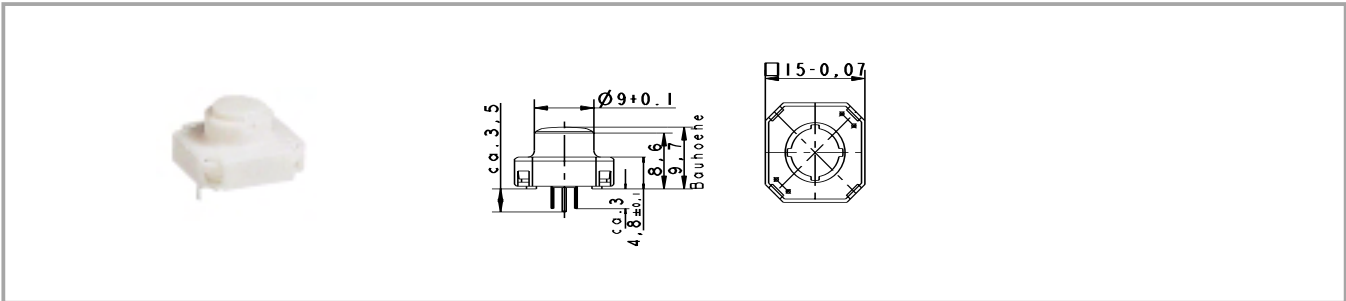


RF 15 R, illuminated



# RF short-travel keyswitches

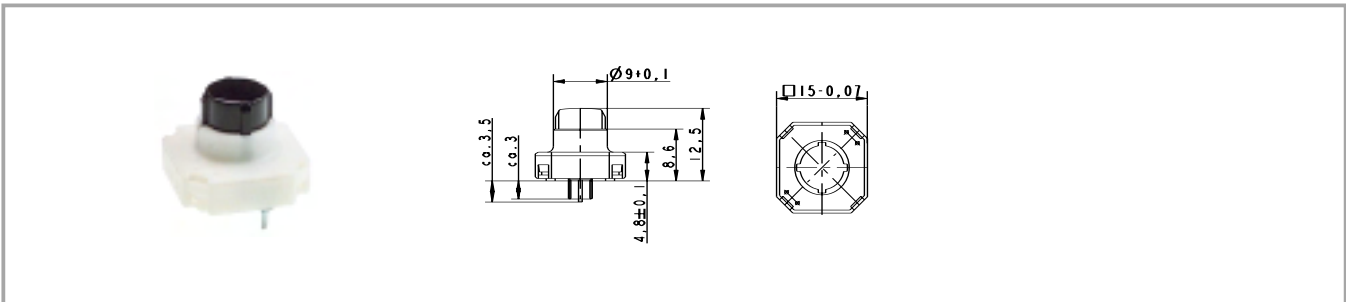
## RF 15 R low short-travel keyswitch, non-illuminated



| Contact materials | Overall height | Illumination    | LED type | LED colour | Order no.                |
|-------------------|----------------|-----------------|----------|------------|--------------------------|
| Au                | 9.7 mm         | not illuminated |          |            | <b>3.14.100.501/0000</b> |
| Ag                | 9.7 mm         | not illuminated |          |            | <b>3.14.100.506/0000</b> |

Technical data see page 4 - 36

## RF 15 R high short-travel keyswitch, non-illuminated

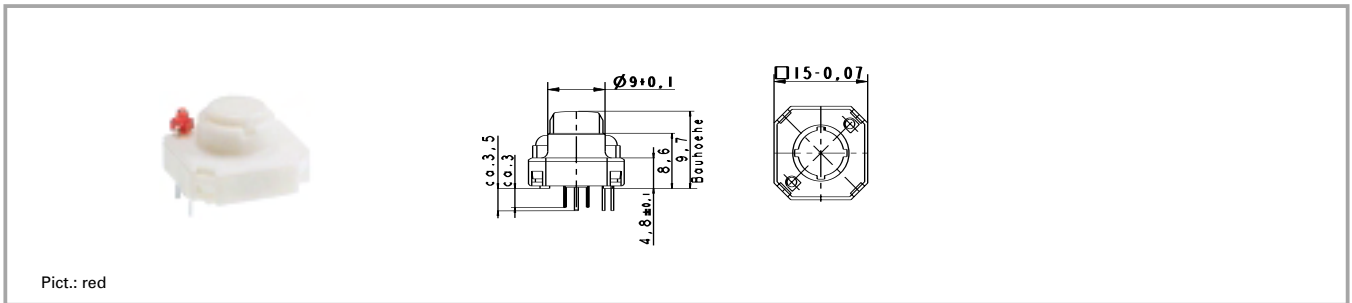


| Contact materials | Overall height | Illumination    | LED type | LED colour | Order no.                |
|-------------------|----------------|-----------------|----------|------------|--------------------------|
| Au                | 12.5 mm        | not illuminated |          |            | <b>3.14.100.801/0000</b> |
| Ag                | 12.5 mm        | not illuminated |          |            | <b>3.14.100.806/0000</b> |

Technical data see page 4 - 36



### RF 15 R low short-travel keyswitch, 1 LED spot-illumination



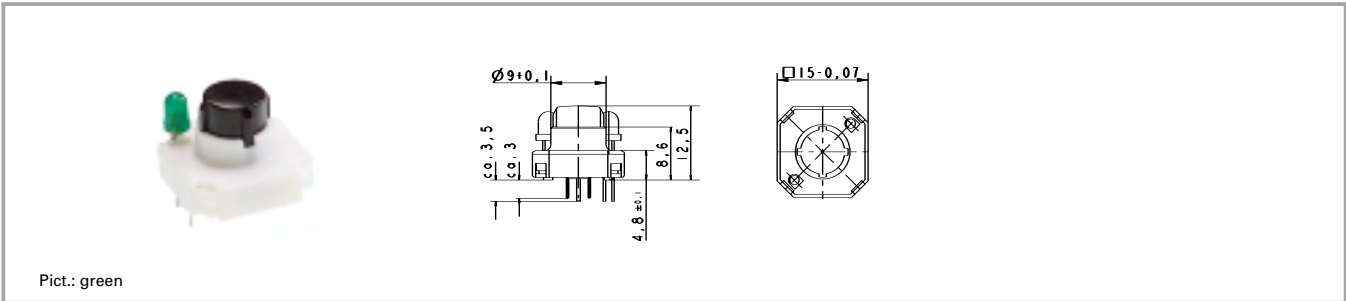
| Contact materials | Overall height | Illumination               | LED type | LED colour | Order no.                |
|-------------------|----------------|----------------------------|----------|------------|--------------------------|
| Au                | 9.7 mm         | spot illumination<br>1 LED | 2 mm     | red        | <b>3.14.100.531/0000</b> |
| Au                | 9.7 mm         | spot illumination<br>1 LED | 2 mm     | green      | <b>3.14.100.532/0000</b> |
| Au                | 9.7 mm         | spot illumination<br>1 LED | 2 mm     | yellow     | <b>3.14.100.533/0000</b> |
| Ag                | 9.7 mm         | spot illumination<br>1 LED | 2 mm     | red        | 3.14.100.541/0000        |
| Ag                | 9.7 mm         | spot illumination<br>1 LED | 2 mm     | green      | 3.14.100.542/0000        |
| Ag                | 9.7 mm         | spot illumination<br>1 LED | 2 mm     | yellow     | 3.14.100.543/0000        |

Technical data see page 4 - 36

Versions with 2 LEDs available on request.

# RF short-travel keyswitches

## RF 15 R high short-travel keyswitch, 1 LED spot-illumination

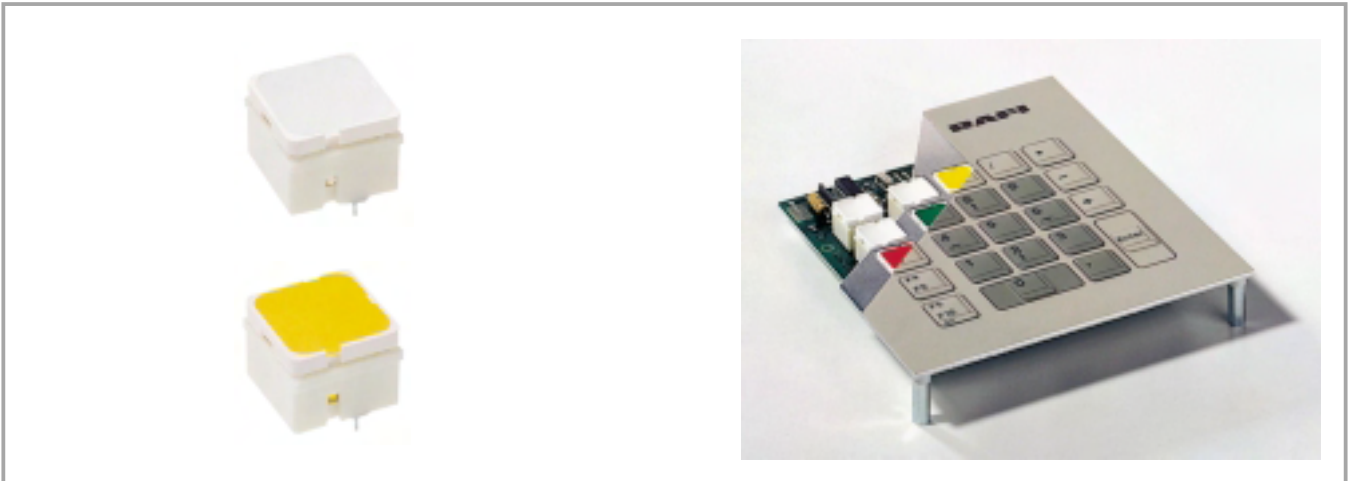


| Contact materials | Overall height | Illumination               | LED type | LED colour | Order no.         |
|-------------------|----------------|----------------------------|----------|------------|-------------------|
| Au                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | blue       | 3.14.100.830/0000 |
| Au                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | red        | 3.14.100.831/0000 |
| Au                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | green      | 3.14.100.832/0000 |
| Au                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | yellow     | 3.14.100.833/0000 |
| Ag                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | blue       | 3.14.100.840/0000 |
| Ag                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | red        | 3.14.100.841/0000 |
| Ag                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | green      | 3.14.100.842/0000 |
| Ag                | 12.5 mm        | spot illumination<br>1 LED | 3 mm     | yellow     | 3.14.100.843/0000 |

Technical data see page 4 - 36

Versions with 2 LEDs available on request.

### RF 15 H short-travel keyswitch



### General data

#### Application notes:

The RF 15 H key has an overall height of 12.5 mm and can be fully illuminated. When designing membrane keyboards, we recommend using a key grid of at least 19.05 mm and a 0.13 mm overlay with area embossing over the keys. You can use the O-ring (accessory) to block the key and use it as an indicator field or blank spaceholder.

### Technical data

#### General information

|                      |                 |
|----------------------|-----------------|
| Colour of lens       | see order block |
| Recommended key grid | 20 mm           |

#### Dimensions

|                |         |
|----------------|---------|
| Length         | 15 mm   |
| Width          | 15 mm   |
| Overall height | 12.5 mm |

#### Mechanical design

|                     |                                        |
|---------------------|----------------------------------------|
| Mounting            | soldering into PCB                     |
| Terminals           | see order block                        |
| Contact system      | snap-action contact                    |
| Contact arrangement | 1 NO                                   |
| Contact materials   | Au/Ag                                  |
| Illumination        | not illuminated /<br>fully illuminated |
| LED colour          | see order block                        |
| LED type            | see order block                        |

#### Mechanical characteristics

|                      |                                  |
|----------------------|----------------------------------|
| Operating force max. | 2 ... 3 N                        |
| Operating travel     | 0.5 mm                           |
| Switching travel     | 0.5 mm                           |
| Robustness min.      | with through-plated PCB<br>100 N |

#### Electrical characteristics

|                    |                         |
|--------------------|-------------------------|
| Rated voltage min. | Au: 0.02 V, Ag: 3 V     |
| Rated voltage max. | Au: 42 V, Ag: 50 V      |
| Rated current min. | Au: 0.01 mA, Ag: 0.1 mA |
| Rated current max. | Au: 100 mA, Ag: 250 mA  |

|                                         |                     |
|-----------------------------------------|---------------------|
| Rated power max.<br>(ohmic load)        | Au: 2 W, Ag: 12.5 W |
| Contact resistance when<br>new max.     | 100 mΩ              |
| Contact resistance acc.<br>to life max. | 3 Ω                 |
| Insulation resistance                   | 10 <sup>9</sup> Ω   |
| ESD strength<br>(underneath overlay)    | 15 kV               |
| Bouncing time max.                      | 5 ms                |

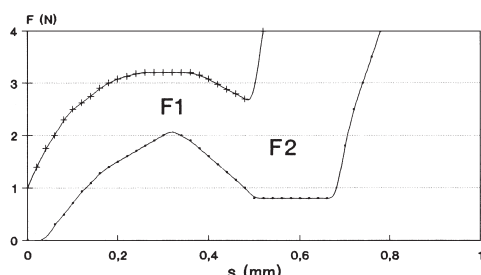
#### Other specifications

|                                       |                                          |
|---------------------------------------|------------------------------------------|
| Ambient temp. operating<br>min.       | -25 °C                                   |
| Ambient temp. operating<br>max.       | +70 °C                                   |
| Storage temperature min.              | -40 °C                                   |
| Storage temperature max.<br>(product) | +80 °C                                   |
| Storage temperature max.<br>(in tube) | +50 °C                                   |
| Resistance to constant<br>environment | according to<br>IEC 600 68-2-3 and 2-30  |
| Resistance at variable<br>environment | according to<br>IEC 600 68-2-14 and 2-33 |
| Operating life min.                   | 1000000                                  |
| Soldering time max.                   | 2.5 sec.                                 |
| Soldering temperature<br>max.         | 250 °C                                   |
| Flammability of materials             | UL 94 HB                                 |

## RF short-travel keyswitches

### Force/Travel Diagram – Keyswitch RF 15 H

Operation characteristic limits RF

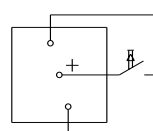


F 1 = Max. operating force

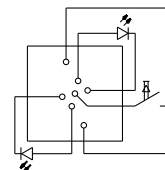
F 2 = Force at contact

F 2 is max. 55% of F 1

### Circuit Diagram – Keyswitch RF 15 H

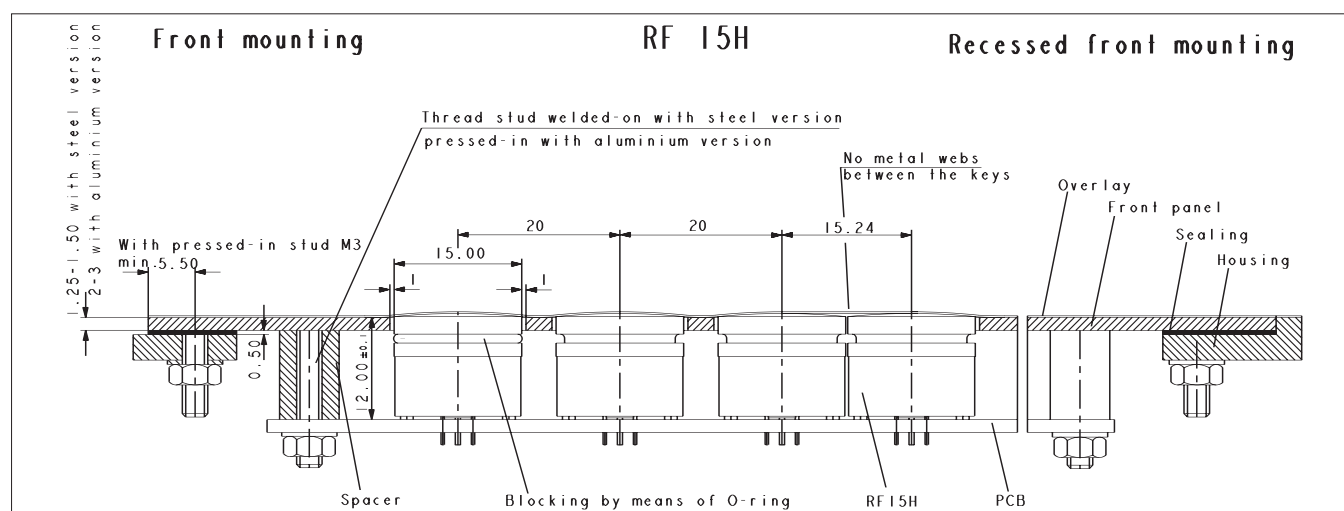


Keyswitch,  
non-illuminated

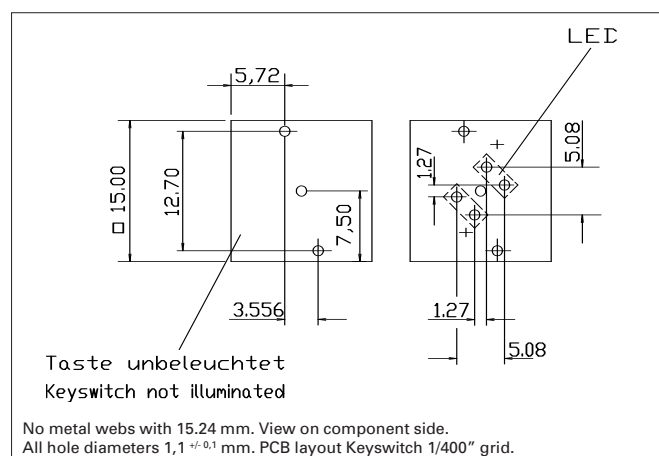


Keyswitch,  
fully illuminated

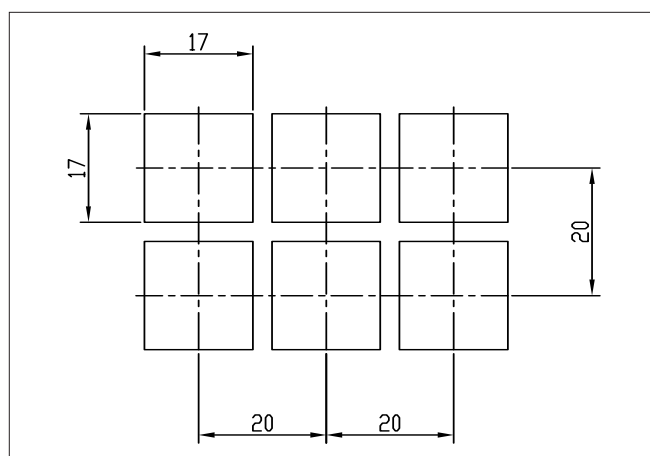
### Dimensional Drawing



### Hole Pattern



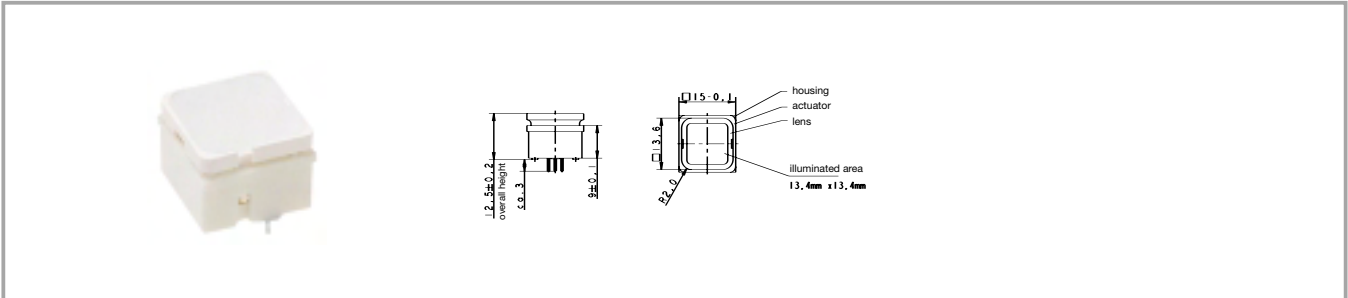
### Hole Pattern – Front Panel



### Accessories RF 15 H short-travel keyswitch

| Description                                      | Photo                                                                             | Order no.         | Page |
|--------------------------------------------------|-----------------------------------------------------------------------------------|-------------------|------|
| O-ring, black, for blocking the operating stroke |  | 5.30.120.009/0100 |      |

### RF 15 H short-travel keyswitch, non-illuminated



| Contact materials | Illumination    | Colour of lens | LED colour | LED type | Order no.                |
|-------------------|-----------------|----------------|------------|----------|--------------------------|
| Au                | not illuminated | white          |            |          | <b>3.14.100.702/0000</b> |
| Ag                | not illuminated | white          |            |          | <b>3.14.100.707/0000</b> |

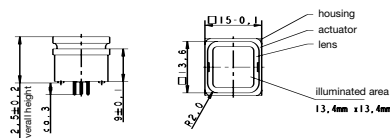
Technical data see page 4 - 42

## RF short-travel keyswitches

### RF 15 H short-travel keyswitch, fully illuminated



Pict.: yellow



| Contact materials | Illumination                | Colour of lens | LED colour         | LED type | Order no.                |
|-------------------|-----------------------------|----------------|--------------------|----------|--------------------------|
| Au                | fully illuminated<br>2 LEDs | red            | red                | 2 mm     | <b>3.14.200.731/0000</b> |
| Au                | fully illuminated<br>2 LEDs | green          | green              | 2 mm     | <b>3.14.200.732/0000</b> |
| Au                | fully illuminated<br>1 LED  | green          | green super bright | 3 mm     | <b>3.14.200.736/0000</b> |
| Au                | fully illuminated<br>2 LEDs | yellow         | yellow             | 2 mm     | <b>3.14.200.733/0000</b> |
| Au                | fully illuminated<br>1 LED  | white          | white              | 3 mm     | <b>3.14.200.735/0000</b> |
| Au                | fully illuminated<br>2 LEDs | orange         | yellow             | 2 mm     | <b>3.14.200.738/0000</b> |
| Au                | fully illuminated<br>1 LED  | blue           | blue               | 3 mm     | <b>3.14.200.739/0000</b> |
| Au                | fully illuminated<br>2 LEDs | white          | multi colour       | 3 mm     | 3.14.100.734/0000        |
| Ag                | fully illuminated<br>2 LEDs | red            | red                | 2 mm     | <b>3.14.200.741/0000</b> |
| Ag                | fully illuminated<br>2 LEDs | green          | green              | 2 mm     | <b>3.14.200.742/0000</b> |
| Ag                | fully illuminated<br>1 LED  | green          | green super bright | 3 mm     | <b>3.14.200.746/0000</b> |
| Ag                | fully illuminated<br>2 LEDs | yellow         | yellow             | 2 mm     | <b>3.14.200.743/0000</b> |
| Ag                | fully illuminated<br>1 LED  | white          | white              | 3 mm     | <b>3.14.200.745/0000</b> |
| Ag                | fully illuminated<br>2 LEDs | orange         | yellow             | 2 mm     | <b>3.14.200.748/0000</b> |
| Ag                | fully illuminated<br>1 LED  | blue           | blue               | 3 mm     | <b>3.14.200.749/0000</b> |
| Ag                | fully illuminated<br>2 LEDs | white          | multi colour       | 3 mm     | 3.14.100.744/0000        |

Technical data see page 4 - 42

When using the keyswitches with multicolour LEDs the illumination colour can be varied from red to green by change of polarity. Due to the frequency of the polarity-changes the colours red, green, yellow as well as all secondary colours from these are possible.

### RF 15 signal indicator



### Technical data

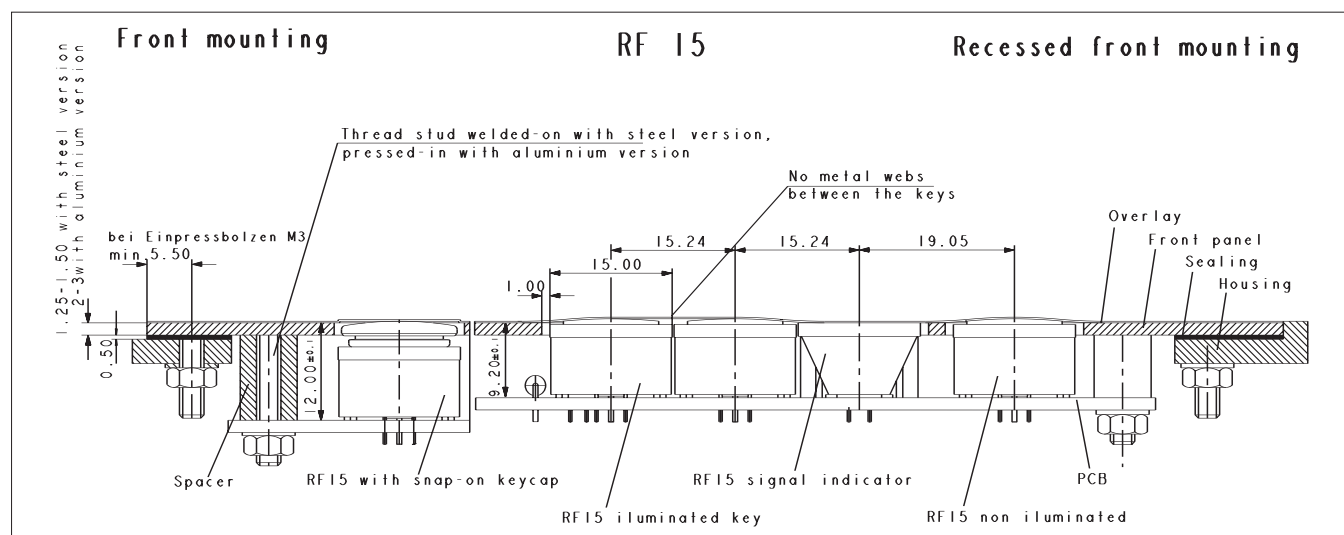
|                              |                         |                                    |                                       |
|------------------------------|-------------------------|------------------------------------|---------------------------------------|
| <b>General information</b>   |                         | Storage temperature min.           | -40 °C                                |
| Colour of lens               | see order block         | Storage temperature max. (product) | +80 °C                                |
| Recommended key grid         | 19.05 mm                | Storage temperature max. (in tube) | +50 °C                                |
| <b>Dimensions</b>            |                         | Resistance to constant environment | according to IEC 600 68-2-3 and 2-30  |
| Length                       | 15 mm                   | Resistance at variable environment | according to IEC 600 68-2-14 and 2-33 |
| Width                        | 15 mm                   | Soldering time max.                | 2.5 sec.                              |
| Overall height               | 9.7 mm                  | Soldering temperature max.         | 250 °C                                |
| <b>Mechanical design</b>     |                         | Flammability of materials          | UL 94 HB                              |
| Mounting                     | soldering into PCB      |                                    |                                       |
| Illumination                 | fully illuminated 1 LED |                                    |                                       |
| LED colour                   | see order block         |                                    |                                       |
| LED type                     | 2 mm                    |                                    |                                       |
| <b>Other specifications</b>  |                         |                                    |                                       |
| Ambient temp. operating min. | -25 °C                  |                                    |                                       |
| Ambient temp. operating max. | +70 °C                  |                                    |                                       |

4

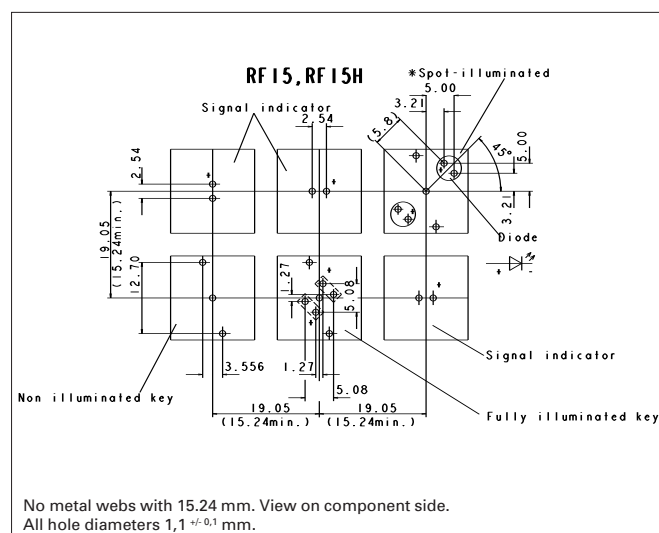
RF

## RF short-travel keyswitches

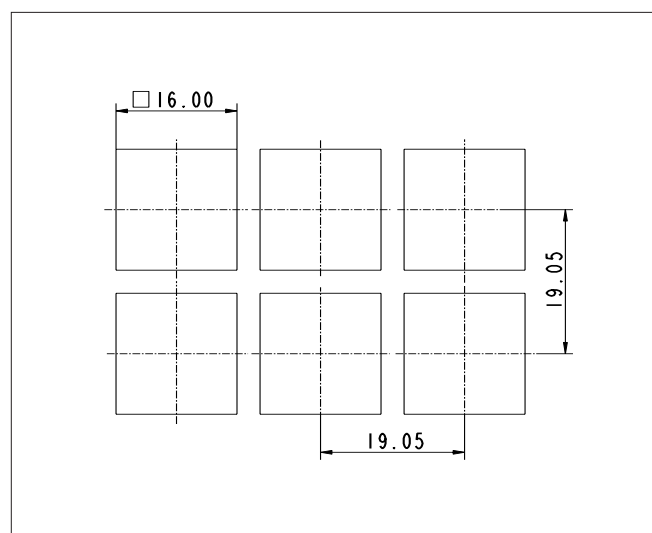
### Dimensional Drawing Signal Indicator RF 15



### Hole Pattern



### Hole Pattern – Front Panel



4

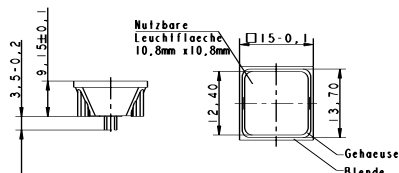
RF



### RF 15 signal indicator, fully illuminated, 1 LED



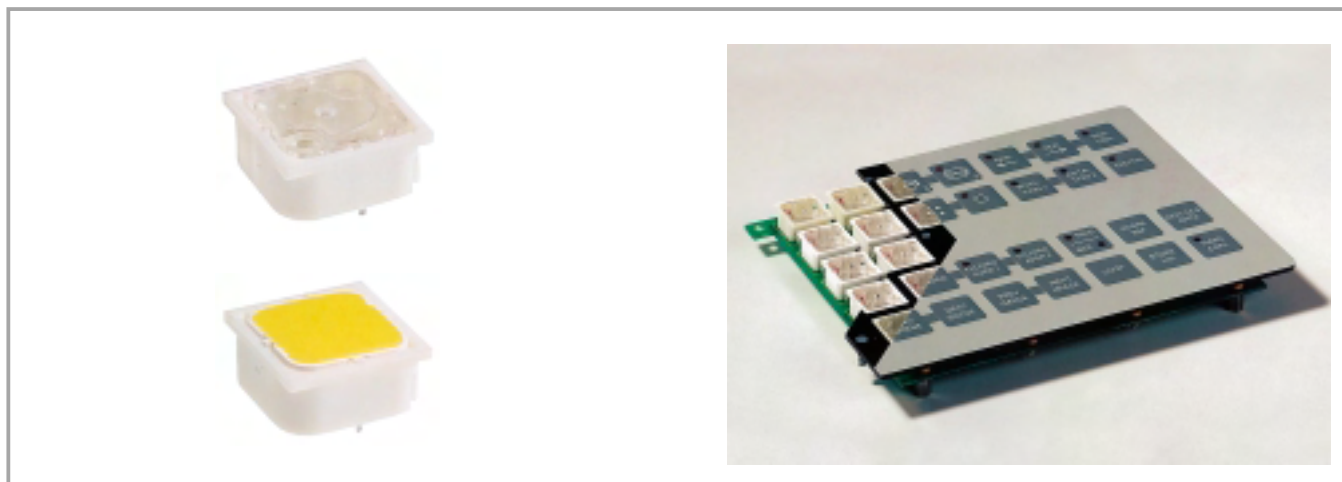
Pict.: green



| Overall height | Illumination               | Colour of lens | LED colour | LED type | Order no.                |
|----------------|----------------------------|----------------|------------|----------|--------------------------|
| 9.7 mm         | fully illuminated<br>1 LED | red            | red        | 2 mm     | <b>3.14.200.051/0000</b> |
| 9.7 mm         | fully illuminated<br>1 LED | green          | green      | 2 mm     | <b>3.14.200.052/0000</b> |
| 9.7 mm         | fully illuminated<br>1 LED | yellow         | yellow     | 2 mm     | <b>3.14.200.053/0000</b> |
| 9.7 mm         | fully illuminated<br>1 LED | orange         | yellow     | 2 mm     | 3.14.200.054/0000        |
| 9.7 mm         | fully illuminated<br>1 LED | blue           | blue       | 2 mm     | 3.14.200.055/0000        |

Technical data see page 4 - 46

### RF 19 short-travel keyswitch



### General data

#### Application notes:

RF 19 keys offer a large actuation area. When designing low-profile keyboards with a grid of  $\geq 23$  mm, frame webs remain free between the individual keys.

The overlay can be glued onto these frame webs; we recommend area embossing over the keys for the overlay.

### Technical data

#### General information

|                      |                 |
|----------------------|-----------------|
| Colour of lens       | see order block |
| Recommended key grid | 23 mm           |

#### Dimensions

|                |          |
|----------------|----------|
| Length         | 19.05 mm |
| Width          | 19.05 mm |
| Overall height | 9.7 mm   |

#### Mechanical design

|                     |                                            |
|---------------------|--------------------------------------------|
| Mounting            | soldering into PCB                         |
| Terminals           | contacts tin-plated, fix contact Ag plated |
| Contact system      | snap-action contact                        |
| Contact arrangement | 1 NO                                       |
| Contact materials   | Au/Ag                                      |
| Illumination        | spot-/fully illuminated                    |
| LED colour          | see order block                            |
| LED type            | see order block                            |

#### Mechanical characteristics

|                      |                               |
|----------------------|-------------------------------|
| Operating force max. | 2 ... 3 N                     |
| Operating travel     | 0.5 mm                        |
| Switching travel     | 0.5 mm                        |
| Robustness min.      | with through-plated PCB 100 N |

#### Electrical characteristics

|                    |                         |
|--------------------|-------------------------|
| Rated voltage min. | Au: 0.02 V, Ag: 3 V     |
| Rated voltage max. | Au: 42 V, Ag: 50 V      |
| Rated current min. | Au: 0.01 mA, Ag: 0.1 mA |
| Rated current max. | Au: 100 mA, Ag: 250 mA  |

|                                      |                          |
|--------------------------------------|--------------------------|
| Rated power max. (ohmic load)        | Au: 2 W, Ag: 12.5 W      |
| Contact resistance when new max.     | 100 m $\Omega$           |
| Contact resistance acc. to life max. | 3 $\Omega$               |
| Insulation resistance                | 10 <sup>9</sup> $\Omega$ |
| ESD strength (underneath overlay)    | 15 kV                    |
| Bouncing time max.                   | 5 ms                     |

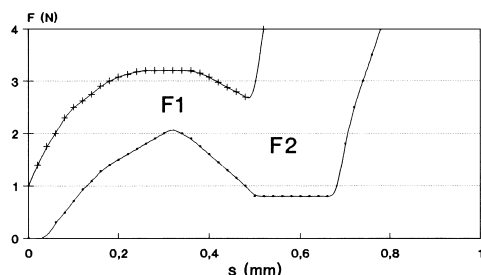
#### Other specifications

|                                    |                                       |
|------------------------------------|---------------------------------------|
| Ambient temp. operating min.       | -25 °C                                |
| Ambient temp. operating max.       | +70 °C                                |
| Storage temperature min.           | -40 °C                                |
| Storage temperature max. (product) | +80 °C                                |
| Storage temperature max. (in tube) | +50 °C                                |
| Resistance to constant environment | according to IEC 600 68-2-3 and 2-30  |
| Resistance at variable environment | according to IEC 600 68-2-14 and 2-33 |
| Operating life min.                | 1000000                               |
| Soldering time max.                | 2.5 sec.                              |
| Soldering temperature max.         | 250 °C                                |
| Flammability of materials          | UL 94 HB                              |

## RF short-travel keyswitches

### Force/Travel Diagram – Keyswitch RF 19

Operation characteristic limits RF

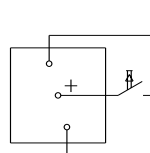


F 1 = Max. operating force

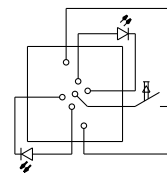
F 2 = Force at contact

F 2 is max. 55% of F 1

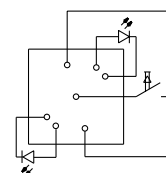
### Circuit Diagram – Keyswitch RF 19



Keyswitch,  
non-illuminated

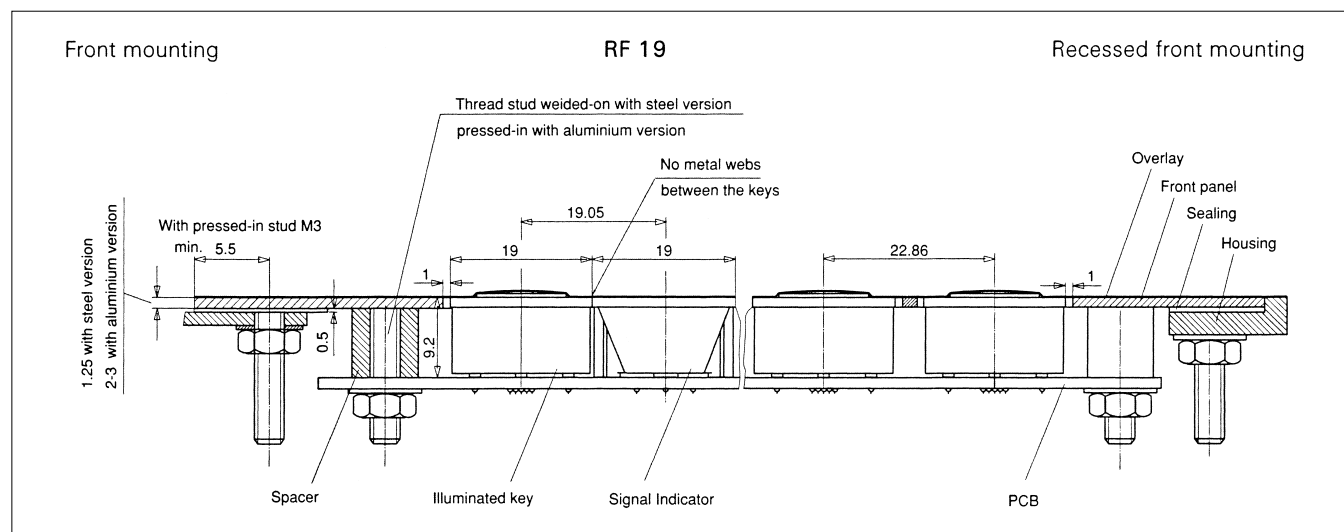


Keyswitch,  
fully illuminated

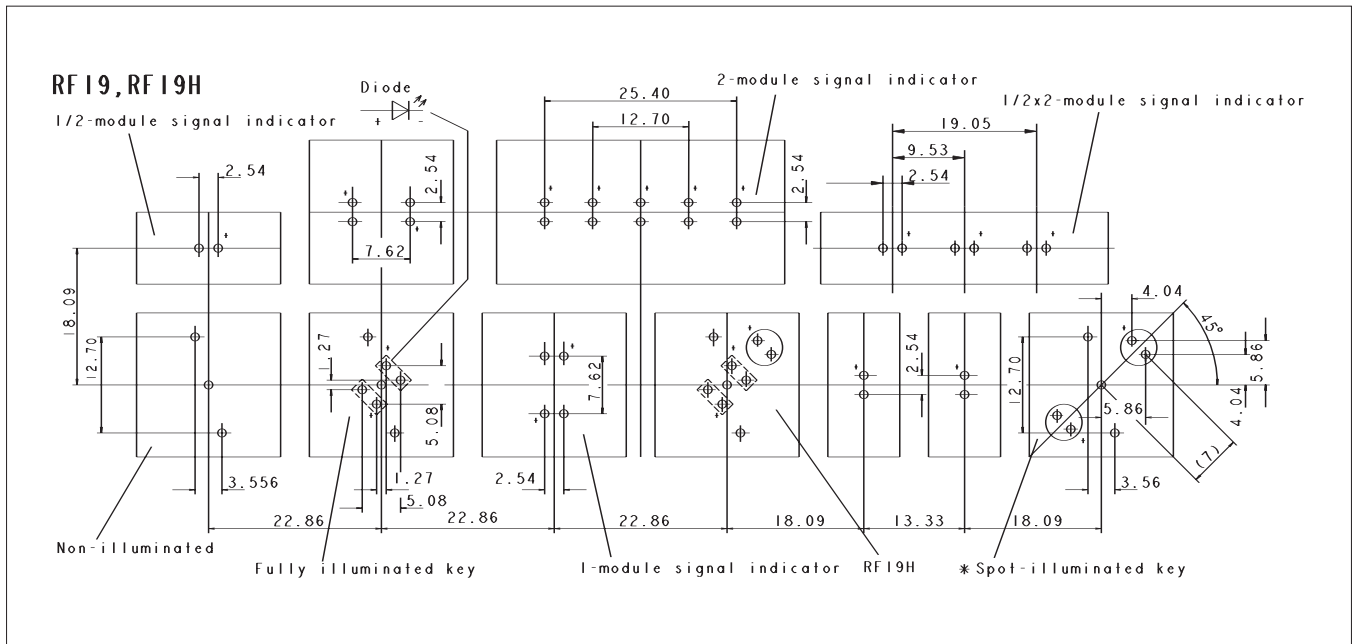


Keyswitch,  
spot-illuminated

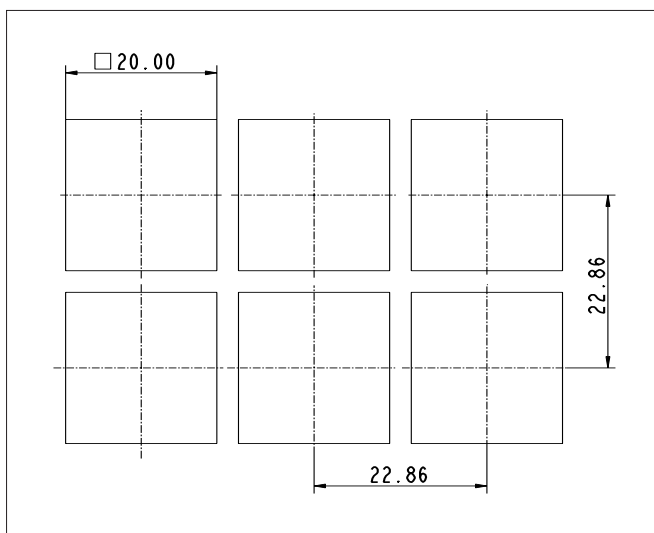
### Dimensional Drawing



### Hole Patterns RF 19

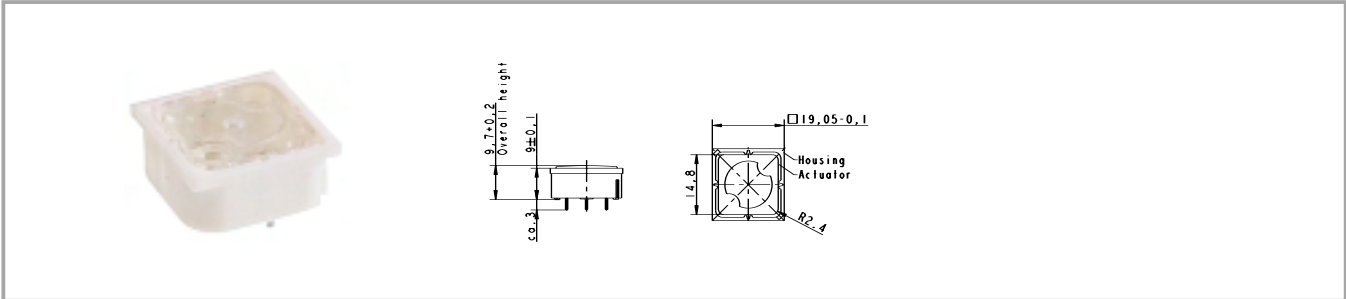


### Hole Patterns – Front Panel RF 19



RF short-travel keyswitches

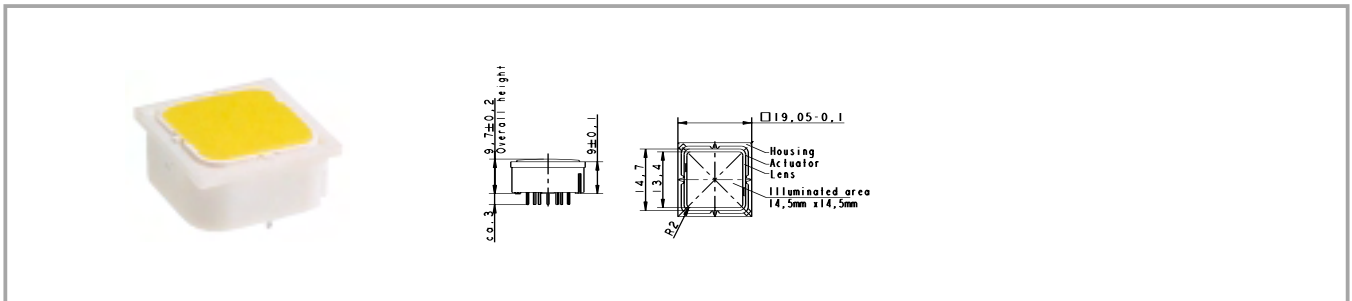
RF 19 short-travel keyswitch, non-illuminated



| Contact materials | Illumination    | Colour of lens | LED colour | LED type | Order no.         |
|-------------------|-----------------|----------------|------------|----------|-------------------|
| Au                | not illuminated | transparent    |            |          | 3.14.001.001/0000 |
| Ag                | not illuminated | transparent    |            |          | 3.14.001.006/0000 |

Technical data see page 4 - 50

### RF 19 short-travel keyswitch, fully illuminated with 2 LEDs

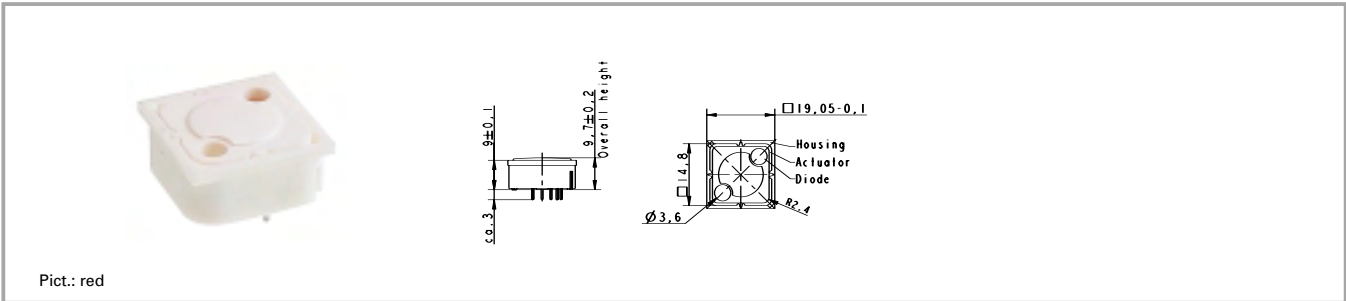


| Contact materials | Illumination                | Colour of lens | LED colour | LED type | Order no.                |
|-------------------|-----------------------------|----------------|------------|----------|--------------------------|
| Au                | fully illuminated<br>2 LEDs | red            | red        | 2 mm     | <b>3.14.002.011/0000</b> |
| Au                | fully illuminated<br>2 LEDs | green          | green      | 2 mm     | <b>3.14.002.012/0000</b> |
| Au                | fully illuminated<br>2 LEDs | yellow         | yellow     | 2 mm     | <b>3.14.002.013/0000</b> |
| Au                | fully illuminated<br>2 LEDs | orange         | yellow     | 2 mm     | 3.14.002.014/0000        |
| Au                | fully illuminated<br>2 LEDs | blue           | blue       | 2 mm     | 3.14.002.015/0000        |
| Ag                | fully illuminated<br>2 LEDs | red            | red        | 2 mm     | 3.14.002.021/0000        |
| Ag                | fully illuminated<br>2 LEDs | green          | green      | 2 mm     | 3.14.002.022/0000        |
| Ag                | fully illuminated<br>2 LEDs | yellow         | yellow     | 2 mm     | 3.14.002.023/0000        |
| Ag                | fully illuminated<br>2 LEDs | orange         | yellow     | 2 mm     | 3.14.002.024/0000        |
| Ag                | fully illuminated<br>2 LEDs | blue           | blue       | 2 mm     | 3.14.002.025/0000        |

Technical data see page 4 - 50

# RF short-travel keyswitches

## RF 19 short-travel keyswitch, 1 LED spot-illumination



| Contact materials | Illumination               | Colour of lens | LED colour | LED type | Order no.                |
|-------------------|----------------------------|----------------|------------|----------|--------------------------|
| Au                | spot illumination<br>1 LED | opaque white   | blue       | 3 mm     | 3.14.001.030/0000        |
| Au                | spot illumination<br>1 LED | transparent    | red        | 3 mm     | <b>3.14.001.031/0000</b> |
| Au                | spot illumination<br>1 LED | transparent    | green      | 3 mm     | <b>3.14.001.032/0000</b> |
| Au                | spot illumination<br>1 LED | transparent    | yellow     | 3 mm     | <b>3.14.001.033/0000</b> |
| Ag                | spot illumination<br>1 LED | opaque white   | blue       | 3 mm     | 3.14.001.040/0000        |
| Ag                | spot illumination<br>1 LED | transparent    | red        | 3 mm     | <b>3.14.001.041/0000</b> |
| Ag                | spot illumination<br>1 LED | transparent    | green      | 3 mm     | <b>3.14.001.042/0000</b> |
| Ag                | spot illumination<br>1 LED | transparent    | yellow     | 3 mm     | <b>3.14.001.043/0000</b> |

Technical data see page 4 - 50

Versions with 2 LEDs available on request.

### RF 19 short-travel keyswitch, 1 NC + 1 NO



### Technical data

#### General information

Recommended key grid 23 mm

#### Dimensions

Length 19.05 mm  
Width 19.05 mm  
Overall height 9.7 mm

#### Mechanical design

Mounting soldering into PCB  
Terminals contacts tin-plated,  
fix contact Ag plated  
bridge contact  
Contact system 1 NC + 1 NO  
Contact arrangement Au/Ag  
Contact materials none  
Illumination

#### Mechanical characteristics

Operating force max. 2 ... 3 N  
Operating travel 0.5 mm  
Switching travel 0.5 mm  
Robustness min. with through-plated PCB  
100 N

#### Electrical characteristics

Rated voltage min. Au: 0.02 V, Ag: 3 V V  
Rated voltage max. Au: 42 V, Ag: 50 V V  
Rated current min. Au: 0.01 mA,  
Ag: 0.1 mA mA  
Rated current max. Au: 100 mA,  
Ag: 250 mA mA  
Rated power max.  
(ohmic load) Au: 2 W, Ag: 12.5 W

Contact resistance when  
new max.

100 mΩ

Contact resistance acc.  
to life max.

3 Ω

Insulation resistance

$2 \times 10^6 \Omega$

ESD strength  
(underneath overlay)

15 kV

Bouncing time max.

5 ms

#### Other specifications

Ambient temp. operating  
min.

-25 °C

Ambient temp. operating  
max.

+70 °C

Storage temperature min.  
Storage temperature max.  
(product)

-40 °C

+80 °C

Storage temperature max.  
(in tube)

+50 °C

Resistance to constant  
environment

according to  
IEC 600 68-2-3 and 2-30

Resistance at variable  
environment

according to  
IEC 600 68-2-14 and 2-33

Operating life min.

100000

Soldering time max.

5 sec.

Soldering temperature  
max.

265 °C

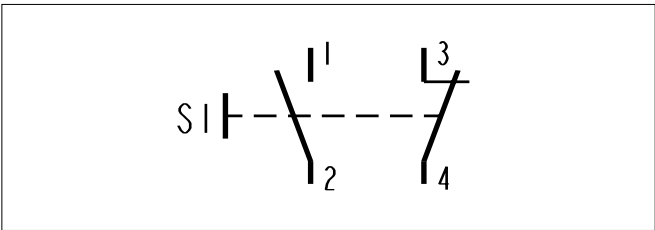
Flammability of materials

UL 94 HB

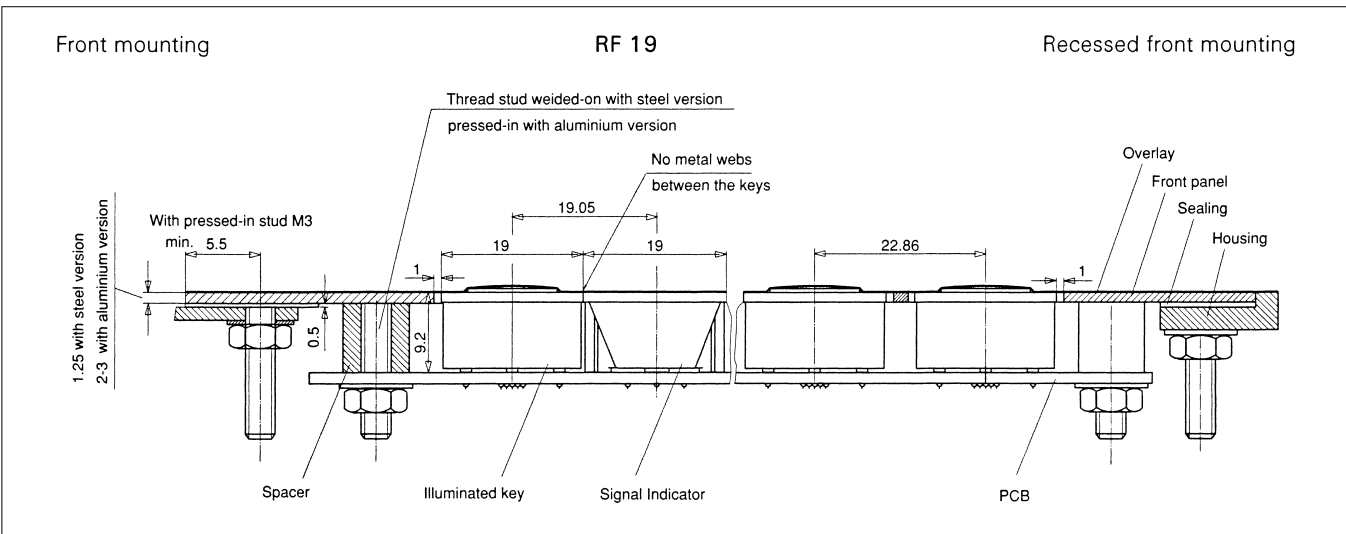


## RF short-travel keyswitches

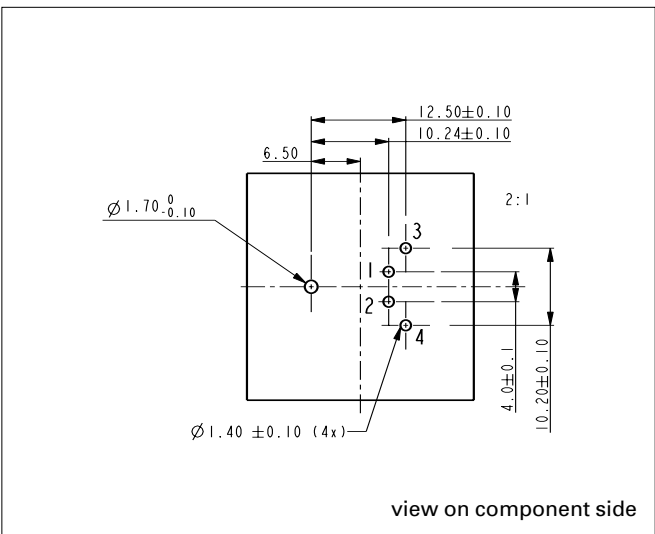
### Circuit Diagram



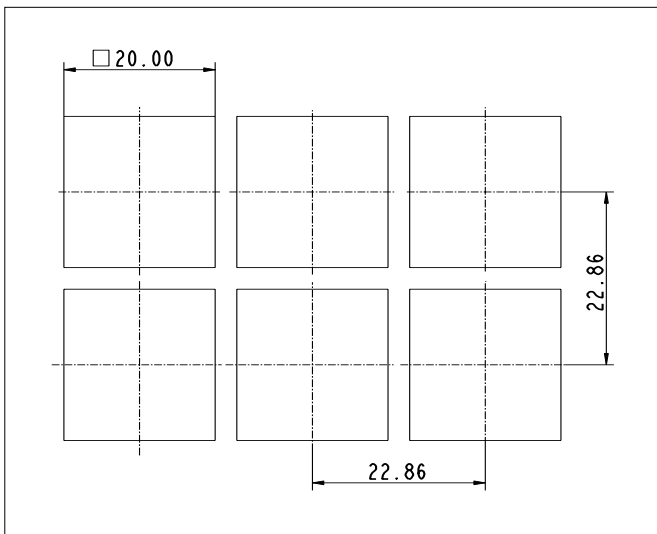
### Dimensional Drawing



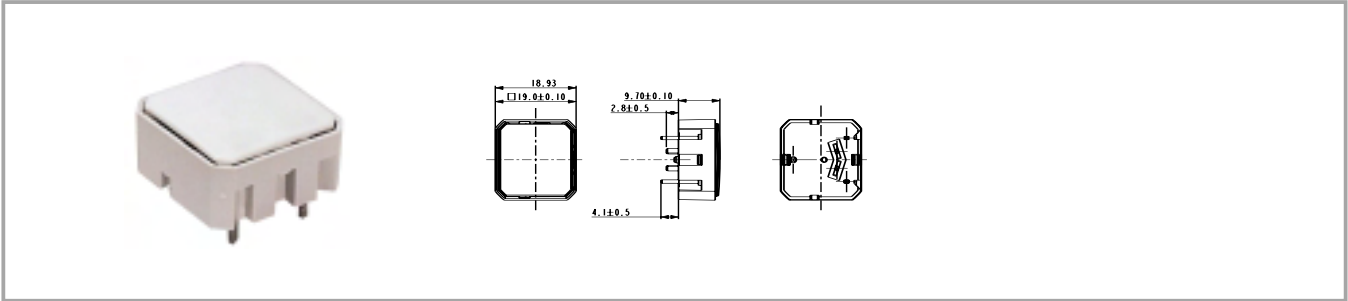
### Hole Pattern



### Hole Pattern – Front Panel



**RF 19 short-travel keyswitch, non-illuminated**



| Contact materials | Contact arrangement | Illumination    | Colour of lens | Order no.         |
|-------------------|---------------------|-----------------|----------------|-------------------|
| Au                | 1 NC + 1 NO         | not illuminated | opaque white   | 1.16.000.991/0000 |
| Ag                | 1 NC + 1 NO         | not illuminated | opaque white   | 1.16.000.990/0000 |

Technical data see page 4 - 56

### RF 19 H short-travel keyswitch



### General data

#### Application notes:

The RF 19H key has an overall height of 12.5 mm and can be fully illuminated. When designing membrane keyboards, we recommend using a key grid of at least 23 mm and a 0.13 mm overlay with area embossing over the keys. You can use the O-ring (accessory) to block the key and use it as an indicator field or blank spaceholder.

### Technical data

#### General information

|                      |                 |
|----------------------|-----------------|
| Colour of lens       | see order block |
| Recommended key grid | 24 mm           |

#### Dimensions

|                |          |
|----------------|----------|
| Length         | 19.05 mm |
| Width          | 19.05 mm |
| Overall height | 12.5 mm  |

#### Mechanical design

|                     |                                               |
|---------------------|-----------------------------------------------|
| Mounting            | soldering into PCB                            |
| Terminals           | contacts tin-plated,<br>fix contact Ag plated |
| Contact system      | 1 NO                                          |
| Contact arrangement | 1 NO                                          |
| Contact materials   | Au/Ag                                         |
| Illumination        | spot-/fully illuminated                       |
| LED colour          | see order block                               |
| LED type            | see order block                               |

#### Mechanical characteristics

|                      |                                  |
|----------------------|----------------------------------|
| Operating force max. | 2 ... 3 N                        |
| Operating travel     | 0.5 mm                           |
| Switching travel     | 0.5 mm                           |
| Robustness min.      | with through-plated PCB<br>100 N |

#### Electrical characteristics

|                    |                         |
|--------------------|-------------------------|
| Rated voltage min. | Au: 0.02 V, Ag: 3 V     |
| Rated voltage max. | Au: 42 V, Ag: 50 V      |
| Rated current min. | Au: 0.01 mA, Ag: 0.1 mA |
| Rated current max. | Au: 100 mA, Ag: 250 mA  |

|                                         |                     |
|-----------------------------------------|---------------------|
| Rated power max.<br>(ohmic load)        | Au: 2 W, Ag: 12.5 W |
| Contact resistance when<br>new max.     | 100 mΩ              |
| Contact resistance acc.<br>to life max. | 3 Ω                 |
| Insulation resistance                   | 10 <sup>9</sup> Ω   |
| ESD strength<br>(underneath overlay)    | 15 kV               |
| Bouncing time max.                      | 5 ms                |

#### Other specifications

|                                       |                                          |
|---------------------------------------|------------------------------------------|
| Ambient temp. operating<br>min.       | -25 °C                                   |
| Ambient temp. operating<br>max.       | +70 °C                                   |
| Storage temperature min.              | -40 °C                                   |
| Storage temperature max.<br>(product) | +80 °C                                   |
| Storage temperature max.<br>(in tube) | +50 °C                                   |
| Resistance to constant<br>environment | according to<br>IEC 600 68-2-3 and 2-30  |
| Resistance at variable<br>environment | according to<br>IEC 600 68-2-14 and 2-33 |
| Operating life min.                   | 1000000                                  |
| Soldering time max.                   | 2.5 sec.                                 |
| Soldering temperature<br>max.         | 250 °C                                   |
| Flammability of materials             | UL 94 HB                                 |

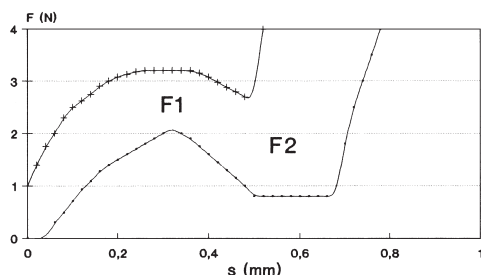
4

RF

## RF short-travel keyswitches

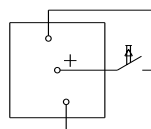
### Force/Travel Diagram – Keyswitch RF 19 H

Operation characteristic limits RF

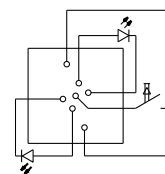


F 1 = Max. operating force  
F 2 = Force at contact  
F 2 is max. 55% of F 1

### Circuit Diagram – Keyswitch RF 19 H

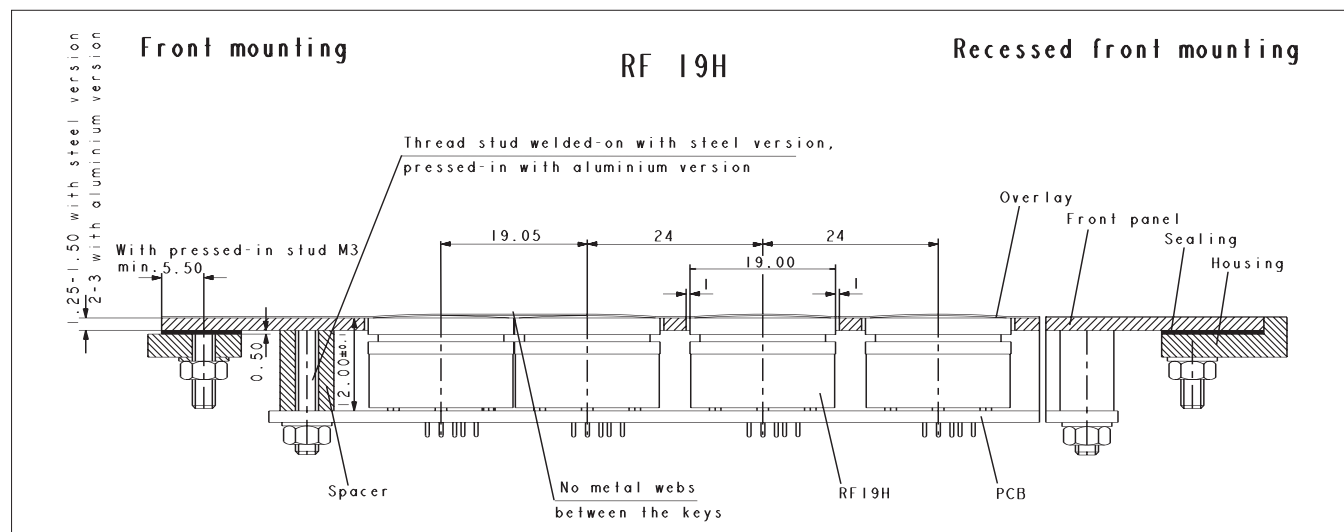


Keyswitch,  
non illuminated

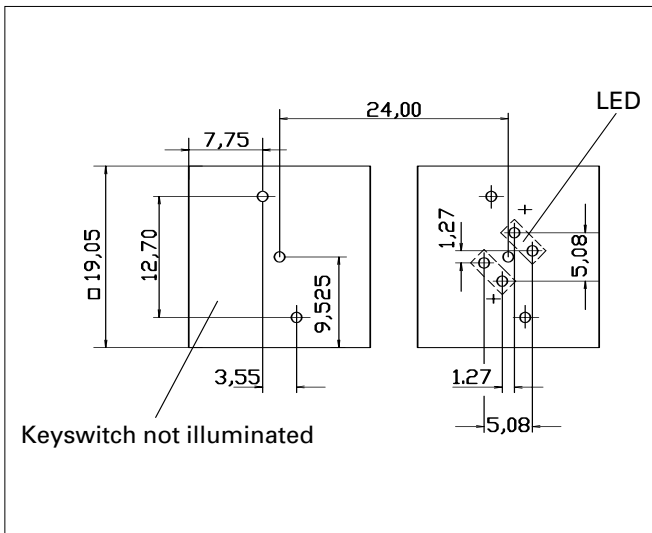


Keyswitch,  
fully illuminated

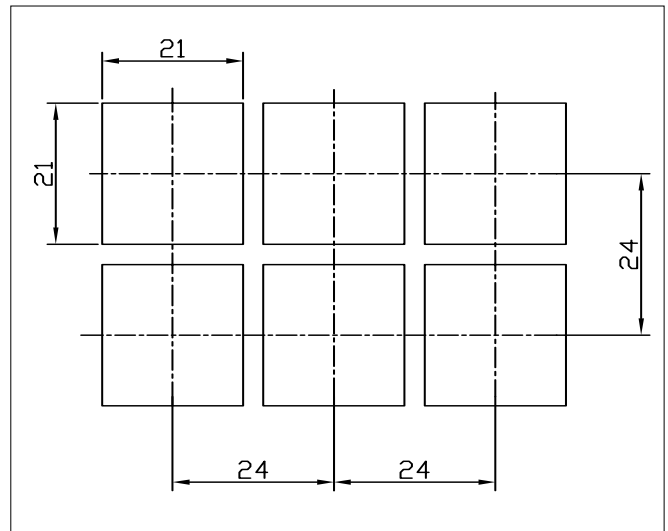
### Dimensional Drawing



### Hole Pattern RF 19 H



### Hole Pattern – Front Panel RF 19 H



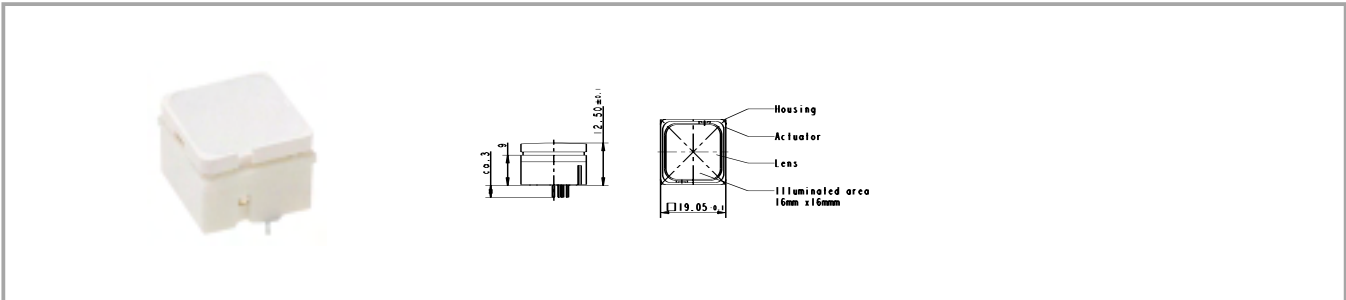
\* The LED may be positioned either on the left-hand or right-hand side.  
Standard version: LED on left-hand side  
View on component side, all hole diameters  
1,1 +/- 0,1 mm

# RF short-travel keyswitches

## Accessories RF 19 H short-travel keyswitches

| Description                                         | Photo                                                                              | Order no.         | Page |
|-----------------------------------------------------|------------------------------------------------------------------------------------|-------------------|------|
| O-ring, black, 17.0 x 1.5, for blocking RF 19H keys |  | 5.30.125.003/0100 |      |

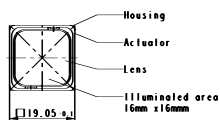
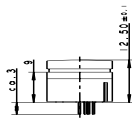
## RF 19 H keyswitch, non-illuminated



| Contact materials | Illumination    | Colour of lens | LED colour | LED type | Order no.         |
|-------------------|-----------------|----------------|------------|----------|-------------------|
| Au                | not illuminated | white          |            |          | 3.14.001.501/0000 |
| Ag                | not illuminated | white          |            |          | 3.14.001.506/0000 |

Technical data see page 4 - 60

### RF 19 H short-travel keyswitch, fully illuminated



| Contact materials | Illumination                | Colour of lens | LED colour         | LED type | Order no.         |
|-------------------|-----------------------------|----------------|--------------------|----------|-------------------|
| Au                | fully illuminated<br>2 LEDs | red            | red                | 2 mm     | 3.14.002.613/0000 |
| Au                | fully illuminated<br>2 LEDs | green          | green              | 2 mm     | 3.14.002.632/0000 |
| Au                | fully illuminated<br>1 LED  | green          | green super bright | 3 mm     | 3.14.002.633/0000 |
| Au                | fully illuminated<br>2 LEDs | yellow         | yellow             | 2 mm     | 3.14.002.653/0000 |
| Au                | fully illuminated<br>1 LED  | white          | white              | 3 mm     | 3.14.002.684/0000 |
| Au                | fully illuminated<br>2 LEDs | orange         | yellow             | 2 mm     | 3.14.002.673/0000 |
| Au                | fully illuminated<br>2 LEDs | white          | multi colour       | 3 mm     | 3.14.001.672/0000 |
| Au                | fully illuminated<br>1 LED  | blue           | blue               | 3 mm     | 3.14.002.683/0000 |
| Ag                | fully illuminated<br>2 LEDs | red            | red                | 2 mm     | 3.14.002.623/0000 |
| Ag                | fully illuminated<br>2 LEDs | green          | green              | 2 mm     | 3.14.002.642/0000 |
| Ag                | fully illuminated<br>1 LED  | green          | green super bright | 3 mm     | 3.14.002.643/0000 |
| Ag                | fully illuminated<br>1 LED  | blue           | blue super bright  | 3 mm     | 3.14.002.688/0000 |
| Ag                | fully illuminated<br>2 LEDs | yellow         | yellow             | 2 mm     | 3.14.002.663/0000 |
| Ag                | fully illuminated<br>1 LED  | white          | white              | 3 mm     | 3.14.002.689/0000 |
| Ag                | fully illuminated<br>2 LEDs | orange         | yellow             | 2 mm     | 3.14.002.678/0000 |
| Ag                | fully illuminated<br>2 LEDs | white          | multi colour       | 3 mm     | 3.14.001.682/0000 |

Technical data see page 4 - 60

When using the keyswitches with multicolour LEDs the illumination colour can be varied from red to green by change of polarity. Due to the frequency of the polarity-changes the colours red, green, yellow as well as all secondary colours from these are possible.

### RF 19 signal indicator



### Technical data

#### General information

Colour of lens see order block  
 Recommended key grid 23/x mm

#### Dimensions

Length see order block  
 Width see order block  
 Overall height 9.15 mm

#### Mechanical design

Mounting soldering into PCB  
 Illumination see order block  
 LED colour see order block  
 LED type see order block

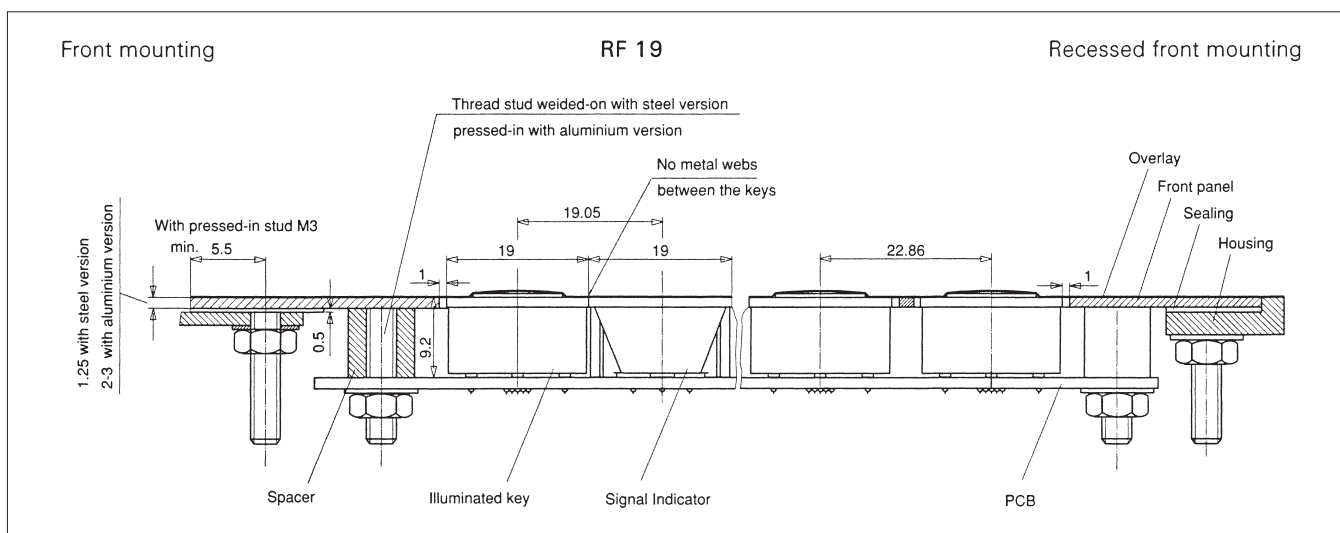
#### Other specifications

Ambient temp. operating min. -25 °C  
 Ambient temp. operating max. +70 °C  
 Storage temperature min. -40 °C  
 Storage temperature max. (product) +80 °C  
 Storage temperature max. (in tube) +50 °C  
 Resistance to constant environment according to IEC 600 68-2-3 and 2-30  
 Resistance at variable environment according to IEC 600 68-2-14 and 2-33  
 Soldering time max. 2.5 sec.  
 Soldering temperature max. 250 °C  
 Flammability of materials UL 94 HB

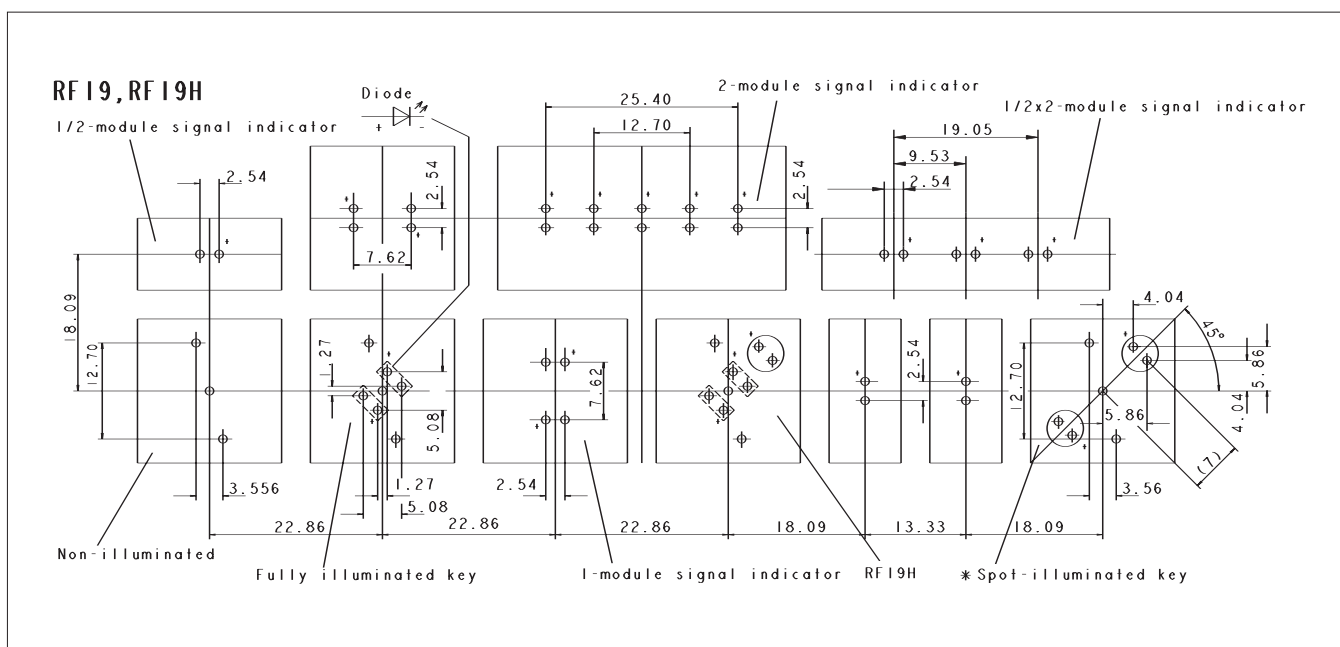


## RF short-travel keyswitches

### Dimensional Drawing Signal Indicator RF 19



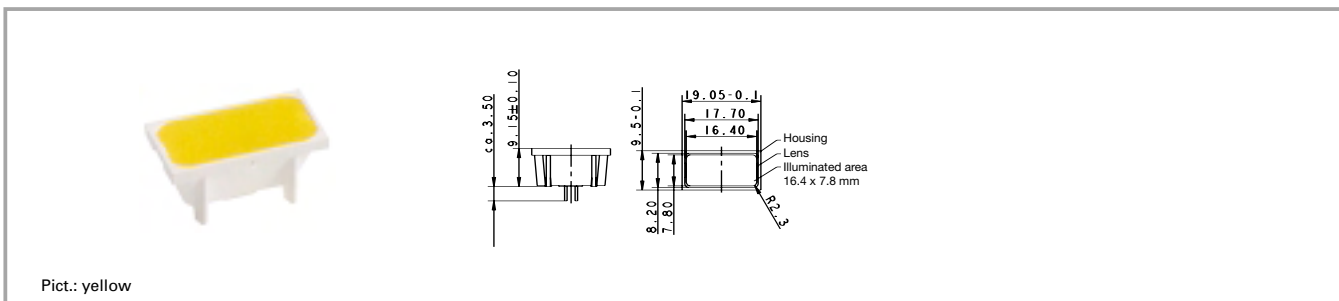
### Hole Patterns RF 19



\* The LED may be positioned either on the left-hand or right-hand side.  
 Standard version: LED on left-hand side  
 View on component side, all hole diameters 1,1 +/- 0,1 mm

Front panel cut-out = outer keyswitch size + 1 mm

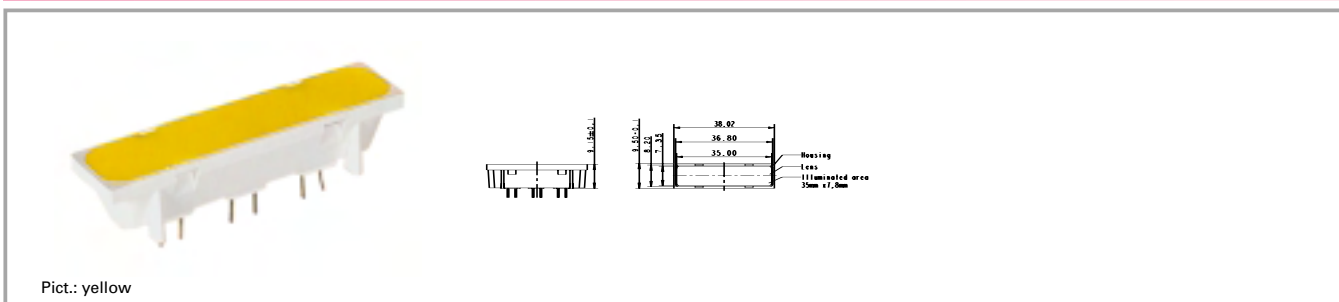
### RF 19 signal indicator, 1/2 x 1-module



| Illumination               | Colour of lens | LED colour | LED type | Order no.                |
|----------------------------|----------------|------------|----------|--------------------------|
| fully illuminated<br>1 LED | red            | red        | 2 mm     | <b>3.14.002.061/0000</b> |
| fully illuminated<br>1 LED | green          | green      | 2 mm     | <b>3.14.002.062/0000</b> |
| fully illuminated<br>1 LED | yellow         | yellow     | 2 mm     | <b>3.14.002.063/0000</b> |
| fully illuminated<br>1 LED | orange         | yellow     | 2 mm     | 3.14.002.064/0000        |

Technical data see page 4 - 66

### RF 19 signal indicator, 1/2 x 2-module



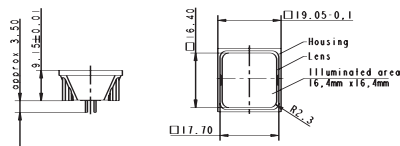
| Illumination                | Colour of lens | LED colour | LED type | Order no.         |
|-----------------------------|----------------|------------|----------|-------------------|
| fully illuminated<br>3 LEDs | red            | red        | 2 mm     | 3.14.002.908/0000 |
| fully illuminated<br>3 LEDs | green          | green      | 2 mm     | 3.14.002.909/0000 |
| fully illuminated<br>3 LEDs | yellow         | yellow     | 2 mm     | 3.14.002.910/0000 |
| fully illuminated<br>3 LEDs | orange         | yellow     | 2 mm     | 3.14.002.911/0000 |

Technical data see page 4 - 66

### RF 19 signal indicator, 1 x 1-module



Pict.: green



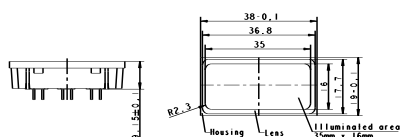
| illumination                | Colour of lens | LED colour | LED type | Order no.         |
|-----------------------------|----------------|------------|----------|-------------------|
| fully illuminated<br>2 LEDs | red            | red        | 2 mm     | 3.14.002.051/0000 |
| fully illuminated<br>2 LEDs | green          | green      | 2 mm     | 3.14.002.052/0000 |
| fully illuminated<br>2 LEDs | yellow         | yellow     | 2 mm     | 3.14.002.053/0000 |
| fully illuminated<br>2 LEDs | orange         | yellow     | 2 mm     | 3.14.002.054/0000 |
| fully illuminated<br>2 LEDs | blue           | blue       | 2 mm     | 3.14.001.659/0000 |

Technical data see page 4 - 66

### RF 19 signal indicator, 1 x 2-module



Pict.: red



| illumination                | Colour of lens | LED colour | LED type | Order no.         |
|-----------------------------|----------------|------------|----------|-------------------|
| fully illuminated<br>5 LEDs | red            | red        | 2 mm     | 3.14.002.071/0000 |
| fully illuminated<br>5 LEDs | green          | green      | 2 mm     | 3.14.002.072/0000 |
| fully illuminated<br>5 LEDs | yellow         | yellow     | 2 mm     | 3.14.002.073/0000 |
| fully illuminated<br>5 LEDs | orange         | yellow     | 2 mm     | 3.14.002.074/0000 |

Technical data see page 4 - 66

### RF special accessories



Pict.: light grey

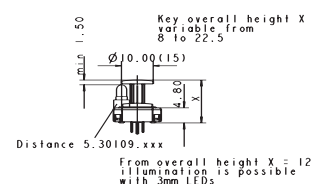
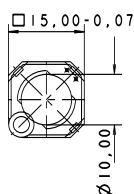


round and triangular versions

### Extension plunger for RF 15 N, round head



Pict.: light grey

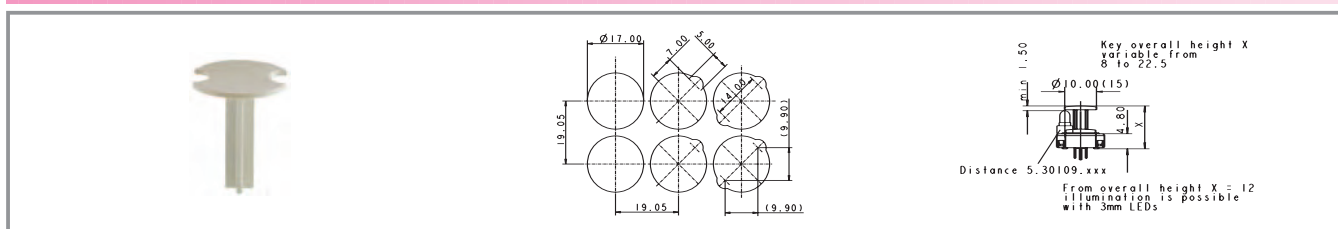


| Length | Width | Overall height | Diameter | Colour | Order no. complete       |
|--------|-------|----------------|----------|--------|--------------------------|
|        |       | 9 mm           | 10 mm    |        | <b>5.46.011.036/0710</b> |
|        |       | 9.7 mm         | 10 mm    |        | <b>5.46.011.030/0710</b> |
|        |       | 12.5 mm        | 10 mm    |        | <b>5.46.011.037/0710</b> |
|        |       | 13 mm          | 10 mm    |        | <b>5.46.011.038/0710</b> |
|        |       | 22.5 mm        | 10 mm    |        | <b>5.46.011.028/0710</b> |

Length of plunger = Overall height - 4.25 mm.

# RF short-travel keyswitches

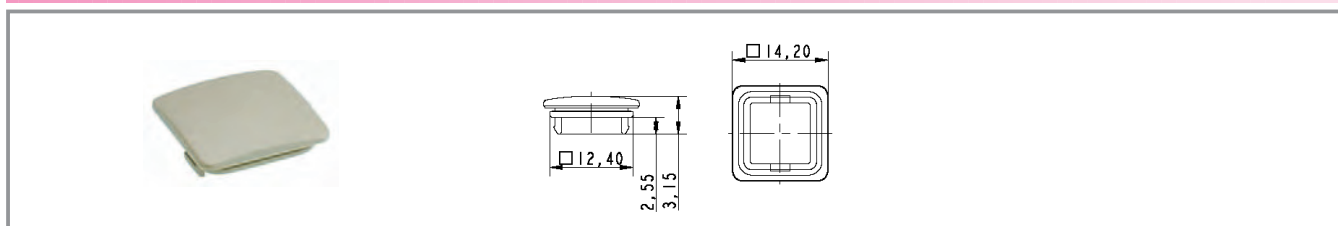
## Extension plunger for RF 15 N, round head, with recess for LED



| Length | Width | Overall height | Diameter | Colour | Order no. complete       |
|--------|-------|----------------|----------|--------|--------------------------|
|        |       | 9 mm           | 15 mm    |        | <b>5.46.017.036/0710</b> |
|        |       | 9.7 mm         | 15 mm    |        | <b>5.46.017.030/0710</b> |
|        |       | 12.5 mm        | 15 mm    |        | <b>5.46.017.037/0710</b> |
|        |       | 13 mm          | 15 mm    |        | <b>5.46.017.038/0710</b> |
|        |       | 22.5 mm        | 15 mm    |        | <b>5.46.017.028/0710</b> |

Length of plunger = Overall height - 4.25 mm.

## Keycap for RF 15, snap-on, for overall height 12.5 mm

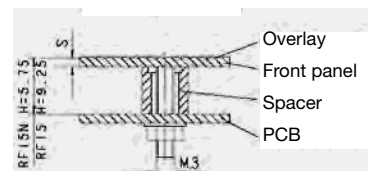
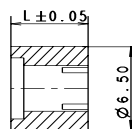
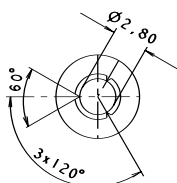


| Length  | Width   | Overall height | Diameter | Colour | Order no. complete |
|---------|---------|----------------|----------|--------|--------------------|
| 14.2 mm | 14.2 mm | 12.5 mm        |          | beige  | 5.46.654.059/0227  |

4

RF

### Spacers, round, for RF 15, RF 19

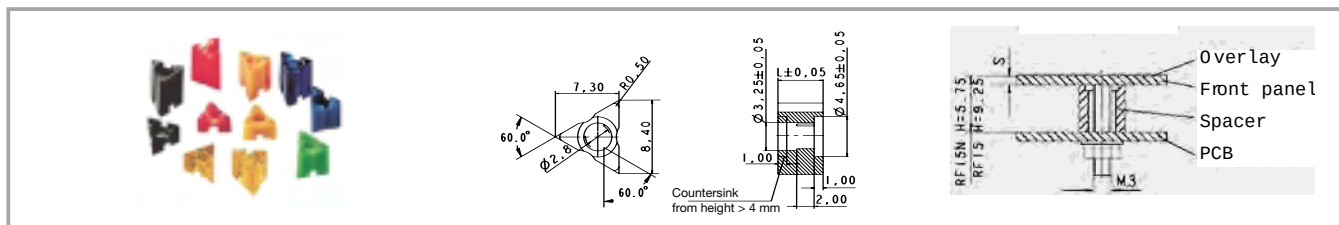


| Length   | Width | Overall height | Diameter | Colour                    | Order no. complete       |
|----------|-------|----------------|----------|---------------------------|--------------------------|
| 4 mm     |       |                |          | green                     | <b>5.30.759.025/0000</b> |
| 4.25 mm  |       |                |          | blue                      | <b>5.30.759.026/0000</b> |
| 4.50 mm  |       |                |          | red                       | <b>5.30.759.027/0000</b> |
| 4.75 mm  |       |                |          | blue transparent          | <b>5.30.759.028/0000</b> |
| 5 mm     |       |                |          | black                     | <b>5.30.759.029/0000</b> |
| 5.25 mm  |       |                |          | yellow orange transparent | <b>5.30.759.030/0000</b> |
| 5.50 mm  |       |                |          | yellow                    | <b>5.30.759.031/0000</b> |
| 5.75 mm  |       |                |          | green                     | <b>5.30.759.032/0000</b> |
| 6 mm     |       |                |          | blue                      | <b>5.30.759.033/0000</b> |
| 6.25 mm  |       |                |          | red                       | <b>5.30.759.034/0000</b> |
| 6.50 mm  |       |                |          | blue transparent          | <b>5.30.759.035/0000</b> |
| 6.75 mm  |       |                |          | black                     | <b>5.30.759.036/0000</b> |
| 7 mm     |       |                |          | yellow orange transparent | <b>5.30.759.037/0000</b> |
| 7.25 mm  |       |                |          | yellow                    | <b>5.30.759.038/0000</b> |
| 7.50 mm  |       |                |          | green                     | <b>5.30.759.039/0000</b> |
| 7.75 mm  |       |                |          | blue                      | <b>5.30.759.040/0000</b> |
| 8 mm     |       |                |          | red                       | <b>5.30.759.041/0000</b> |
| 8.25 mm  |       |                |          | blue transparent          | <b>5.30.759.042/0000</b> |
| 10.00 mm |       |                |          | black                     | <b>5.30.759.043/0104</b> |

Required spacer length = Overall height of key - front panel thickness - 0.5 mm (area embossing).

## RF short-travel keyswitches

### Spacers, triangular, for RF 15, RF 19



| Length  | Width | Overall height | Diameter | Colour                    | Order no. complete |
|---------|-------|----------------|----------|---------------------------|--------------------|
| 2.50 mm |       |                |          | blue                      | 5.30.759.094/0000  |
| 2.75 mm |       |                |          | red                       | 5.30.759.095/0000  |
| 3 mm    |       |                |          | blue transparent          | 5.30.759.096/0000  |
| 3.25 mm |       |                |          | black                     | 5.30.759.097/0000  |
| 3.50 mm |       |                |          | yellow orange transparent | 5.30.759.098/0000  |
| 3.75 mm |       |                |          | yellow                    | 5.30.759.099/0000  |
| 4 mm    |       |                |          | green                     | 5.30.759.100/0000  |
| 4.25 mm |       |                |          | blue                      | 5.30.759.101/0000  |
| 4.50 mm |       |                |          | red                       | 5.30.759.102/0000  |
| 4.75 mm |       |                |          | blue transparent          | 5.30.759.103/0000  |
| 5 mm    |       |                |          | black                     | 5.30.759.104/0000  |
| 5.25 mm |       |                |          | yellow orange transparent | 5.30.759.105/0000  |
| 5.50 mm |       |                |          | yellow                    | 5.30.759.106/0000  |
| 5.75 mm |       |                |          | green                     | 5.30.759.107/0000  |
| 6 mm    |       |                |          | blue                      | 5.30.759.108/0000  |
| 6.25 mm |       |                |          | red                       | 5.30.759.109/0000  |
| 6.50 mm |       |                |          | blue transparent          | 5.30.759.110/0000  |
| 6.75 mm |       |                |          | black                     | 5.30.759.111/0000  |
| 7 mm    |       |                |          | yellow orange transparent | 5.30.759.112/0000  |
| 7.25 mm |       |                |          | yellow                    | 5.30.759.113/0000  |
| 7.50 mm |       |                |          | green                     | 5.30.759.114/0000  |
| 7.75 mm |       |                |          | blue                      | 5.30.759.115/0000  |
| 8 mm    |       |                |          | red                       | 5.30.759.116/0000  |

## RF short-travel keyswitches

| Length   | Width | Overall height | Diameter | Colour                    | Order no. complete |
|----------|-------|----------------|----------|---------------------------|--------------------|
| 8.25 mm  |       |                |          | blue transparent          | 5.30.759.117/0000  |
| 10.00 mm |       |                |          | black                     | 5.30.759.124/0000  |
| 10.25 mm |       |                |          | yellow orange transparent | 5.30.759.125/0000  |

Required spacer length = Overall height of key - front panel thickness - 0.5 mm (area embossing).

### LED spacer for RF 15 N



| Length | Width | Overall height | Diameter | Colour     | Order no. complete |
|--------|-------|----------------|----------|------------|--------------------|
| 2.2 mm |       | 12.5 mm        | 5 mm     | light grey | 5.30.109.010/0756  |
| 12 mm  |       | 22.5 mm        | 5 mm     | black      | 5.30.109.019/0105  |