



RF

Tactile switches

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. All products are RoHS compliant.

PCB KEY SWITCHES

RF - TACTILE SWITCHES

Content

RF 15 - Tactile switches	4 - 58
RF 15 - Tactile switch, non-illuminated	4 - 60
RF 15 - Tactile switch, fully illuminated with 2 LED	4 - 60
RF 15 - Tactile switch, 1 LED spot-illumination	4 - 61
RF 15 N - Tactile switches	4 - 62
RF 15 N - Tactile switch, non-illuminated	4 - 66
RF 15 R - Tactile switches	4 - 67
RF 15 R - Low tactile switch, non-illuminated	4 - 70
RF 15 R - High tactile switch, non-illuminated	4 - 70
RF 15 R - Low tactile switch, 1 LED spot-illumination	4 - 71
RF 15 R - High tactile switch, 1 LED spot-illumination	4 - 71
RF 15 H - Tactile switches	4 - 73
RF 15 H - Tactile switch, non-illuminated	4 - 76
RF 15 H - Tactile switch, fully illuminated	4 - 76
RF 15 - Signal indicators	4 - 78
RF 15 - Signal indicator, fully illuminated, 1 LED	4 - 80
RF 19 - Tactile switches	4 - 81
RF 19 - Tactile switch, non-illuminated	4 - 84
RF 19 - Tactile switch, fully illuminated with 2 LED	4 - 84
RF 19 - Tactile switch, 1 LED spot-illumination	4 - 85
RF 19 H - Tactile switches	4 - 86
RF 19 H - Tactile switch, non-illuminated	4 - 89
RF 19 H - Tactile switch, fully illuminated	4 - 89
RF 19 - Signal indicators	4 - 91
RF 19 - Signal indicator, 1/2 x 1-module	4 - 93
RF 19 - Signal indicator, 1/2 x 2-module	4 - 93
RF 19 - Signal indicator, 1 x 1-module	4 - 94
RF 19 - Signal indicator, 1 x 2-module	4 - 94
RF 15/19 - Special accessories	4 - 95
RF 15 N - Extension plunger, round head	4 - 95
RF 15 N - Extension plunger, round head, with recess for LED	4 - 96
RF 15 - Keycap, snap-on, for overall height 12.5 mm	4 - 96
Spacer, round	4 - 97
Spacer, triangular	4 - 98
RF 15 N - LED spacer	4 - 99

Specifications LED

LED brightness classes

LEDs are subject to production-related variations in brightness over which we have no control with the manufacturers. It is therefore not possible to arrange a delivery in a specific brightness class, and deviations accordingly do not constitute grounds for complaint regarding our products. The majority of the LEDs we use are delivered from

our suppliers in selected brightness classes. In this case, the brightness class is shown on a label on the switch's rack packaging. Where the lighting is required to have a uniform brightness – for aesthetic reasons, for example – this can be achieved in the system by means of the circuitry (with a series resistance, for example).

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 °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	White LED	Green LED superbright
Max. forward current I _F :	20 mA	25 mA	30 mA
Current reduction from: T ₀ = 50 °C:	approx 0.6 mA/°C	-	-
Wavelength typ:	470 nm	-	510-545 nm
Forward voltage U _F /I _F typ:	2.7 V/10 mA	3.6 V/20 mA	3.5 V/20 mA
Reverse voltage U _R /I _F typ:	5V/100 µA min.	-	-
Ambient temperature, operating:	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C	-30 °C ... + 100 °C

2 mm LED (full illumination of RF 15/19)

(valid for 25 °C)	Red LED	Green LED	Yellow LED
Max. forward current I _F :	30 mA	30 mA	50 mA
Current reduction from: T ₀ = 50 °C:	0.5 mA/°C	0.5 mA/°C	0.8 mA/°C
Light current f _V /I _F typ:	-	-	250 mlm/20 mA
Wavelength typ:	637 nm	569 nm	590 nm
Forward voltage U _F /I _F typ:	1.8 V/20 mA	2.1 V/10 mA	1.9 V/20 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:	- 55 °C ... + 100 °C	- 40 °C ... + 100 °C	-40 °C ... + 100 °C

	Blue LED	Multi-color LED
Max. forward current I _F :	30 mA	30 mA
Current reduction from: T ₀ = 50 °C:	-	approx 0.6 mA/°C
Light current f _V /I _F typ:	-	-
Wavelength typ:	464-485 nm	635/565 nm
Forward voltage U _F /I _F typ:	3.6 V/20 mA	2 V/10 mA
Reverse voltage U _R /I _F typ:	-	-
Ambient temperature, operating:	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C

Calculating the series resistor:

$$R_V = \frac{U_B - U_F}{I_F}$$

Rated power of series:

$$P_V = I_F^2 \times R_V$$

Example for 5 Volt:

$$R_V = \frac{5V - 2,0V}{0,02A} = 150 \Omega (= \text{standard value})$$

PCB KEY SWITCHES

RF 15 - TACTILE SWITCHES



RF 15 Tactile switches

- 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

Color 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 in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	see order block
LED color	see order block
LED type	see order block

→ Mechanical characteristics

Operating force max.	2.9 ^{+0.6} N
Switching travel	0.5 ^{+0.2} mm
Robustness max.	with through-plated PCB 100 N

→ Electrical characteristics

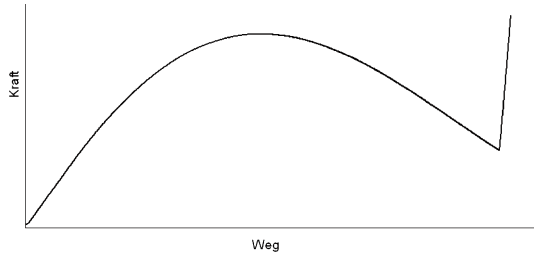
Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	35 V
Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Rated current max.	Au: 100 mA, Ag: 250 mA
Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Contact resistance when new max.	100 mΩ
Insulation resistance	10 ⁹ Ω

→ Other specifications

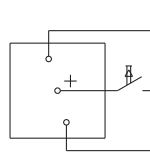
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes

Typical force travel diagram

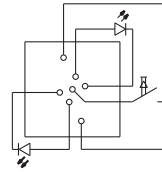
Actuating characteristics
Force travel diagram



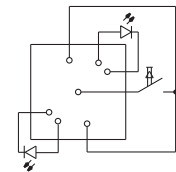
Circuit diagrams RF 15



Tactile switch, non-illuminated

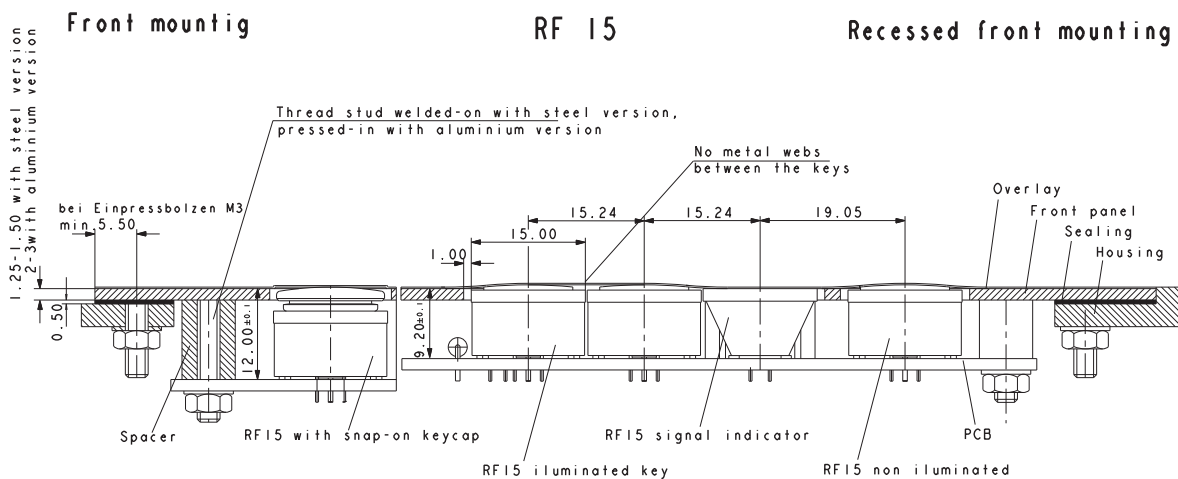


Tactile switch, fully-illuminated



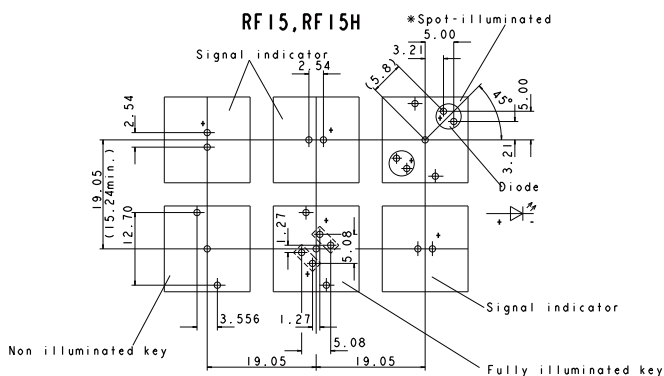
Tactile switch, spot-illuminated

System assembly RF 15

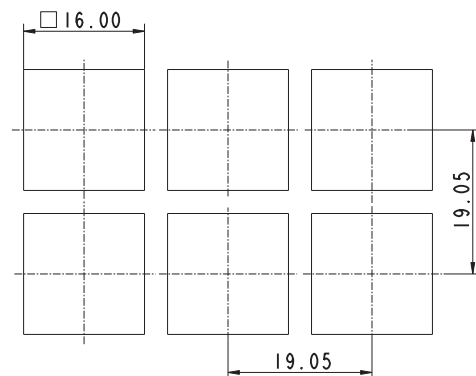


4

PCB hole patterns RF 15



Hole patterns front panel RF 15



RF

View on component side, all hole diameters 1.1 ± 0.1 mm

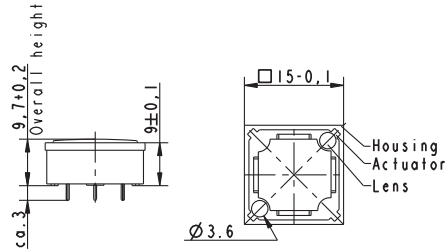
PCB KEY SWITCHES

RF 15 - TACTILE SWITCHES



RF 15 Tactile switch, non-illuminated

Technical data see page 4 - 58



→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	not illuminated	transparent	-	-	3.14.100.001/0000
Ag	not illuminated	transparent	-	-	3.14.100.006/0000

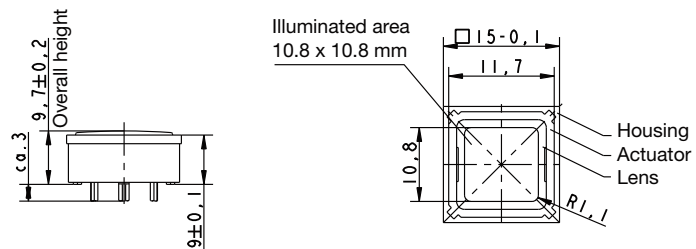
For keycaps, refer to chapter accessories and system RK 90.

If exchangeable legends are required, or if an overall height of 12.5 mm is required, a keycap can be mounted on the non-illuminated keys. The keycap legend is visible through a window in the overlay. You can change the legend by replacing the keycap.



RF 15 Tactile switch, fully illuminated with 2 LED

Technical data see page 4 - 58



→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.200.011/0000
Au	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.200.013/0000
Au	fully illuminated 2 LED	orange	yellow	2 mm	3.14.200.014/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.200.012/0000
Au	fully illuminated 2 LED	blue	blue	2 mm	3.14.200.015/0000
Ag	fully illuminated 2 LED	red	red	2 mm	3.14.200.021/0000
Ag	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.200.023/0000
Ag	fully illuminated 2 LED	orange	yellow	2 mm	3.14.200.024/0000

– Table (continued) –
RF 15 - Tactile switch, fully illuminated with 2 LED

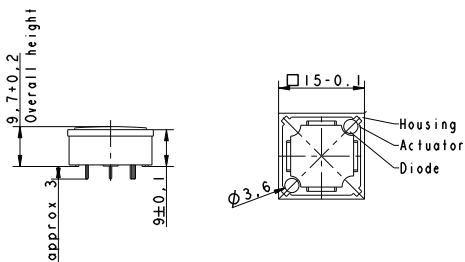
→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Ag	fully illuminated 2 LED	green	green	2 mm	3.14.200.022/0000
Ag	fully illuminated 2 LED	blue	blue	2 mm	3.14.200.025/0000

For keycaps, refer to RK 90 system design.

Technical data of LED see separate page at the beginning of this chapter.

RF 15 Tactile switch, 1 LED spot-illumination

Technical data see page 4 - 58



→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	spot illumination 1 LED	transparent	red	3 mm	3.14.100.031/0000
Au	spot illumination 1 LED	transparent	yellow	3 mm	3.14.100.033/0000
Au	spot illumination 1 LED	transparent	green	3 mm	3.14.100.032/0000
Au	spot illumination 1 LED	opaque white	blue	3 mm	3.14.100.030/0000
Ag	spot illumination 1 LED	transparent	red	3 mm	3.14.100.041/0000
Ag	spot illumination 1 LED	transparent	yellow	3 mm	3.14.100.043/0000
Ag	spot illumination 1 LED	transparent	green	3 mm	3.14.100.042/0000
Ag	spot illumination 1 LED	transparent	blue	3 mm	3.14.100.040/0000

Double-spot LED illumination available on request

Technical data of LED see separate page at the beginning of this chapter.

PCB KEY SWITCHES

RF 15 N - TACTILE SWITCHES



RF 15 N Tactile switches

→ The RF 15N key switch 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 key switches up to an overall height of 10 mm (i.e. without plunger or with small plunger).

Key switches 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 key switch housing. LEDs of key switches 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

Color 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 in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	external 3 mm LED possible if height more than 12 mm

→ Mechanical characteristics

Operating force max.	2.9 ^{±0.6} N
Switching travel	0.5 ^{±0.2} mm
Robustness max.	100 with through-plated PCB N

→ Electrical characteristics

Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	35 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
Insulation resistance	10 ⁹ Ω

→ Other specifications

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Storage temperature max. (in tube)	+50 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes





4

RF

PCB KEY SWITCHES

RF 15 N - TACTILE SWITCHES

Accessories RF 15 N - Tactile switch

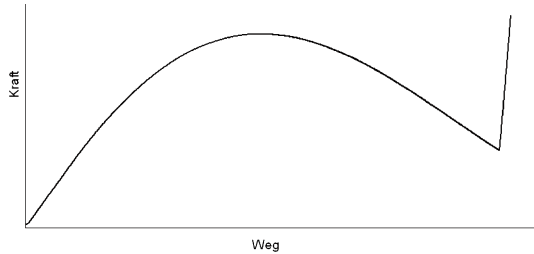
→ Description	Photo	Order no.	Additional accessories see page
RF 15 N - LED spacer Ø 5 mm, spacing length 2.2 mm, light grey, for use with overall height of 12.5 mm		5.30.109.010/0756	4 - 99
RF 15 N - Extension plunger, Ø 10 mm, overall height 22.5 mm		5.46.011.028/0710	4 - 95
RF 15 N - Extension plunger, Ø 15 mm, overall height 22.5 mm		5.46.017.028/0710	4 - 96
RF 15 N - Extension plunger, Ø 15 mm, overall height 22.5 mm		5.46.017.029/0710	-

PCB KEY SWITCHES

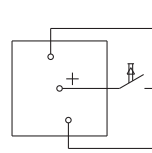
RF 15 N - TACTILE SWITCHES

Typical force travel diagram

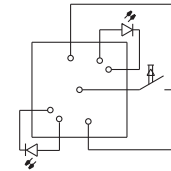
Actuating characteristics
Force travel diagram



Circuit diagrams RF 15 N

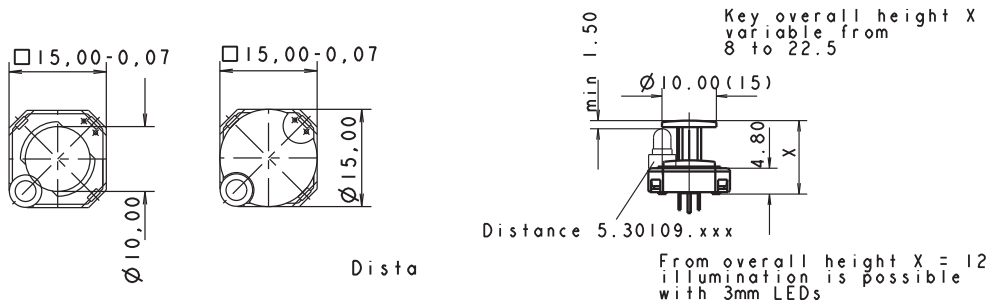


Tactile switch, non-illuminated



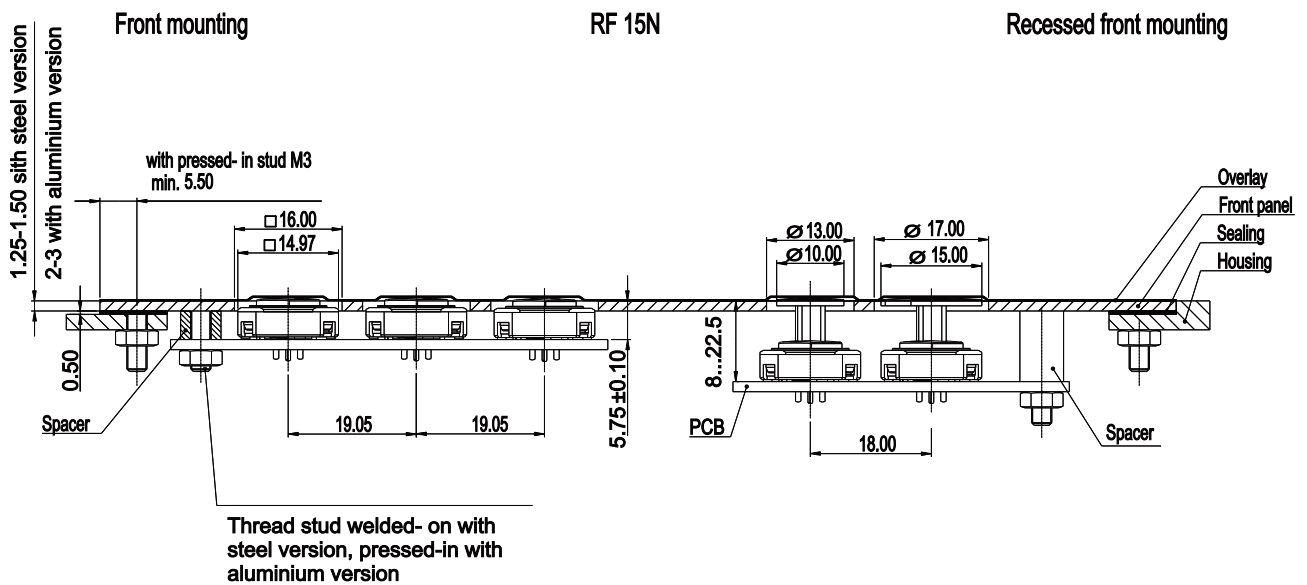
Tactile switch, spot-illuminated

Dimensional drawing RF 15 N



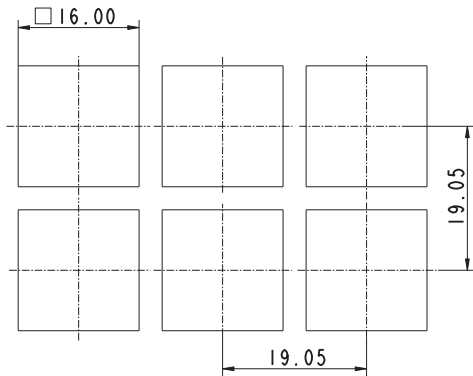
4

RF

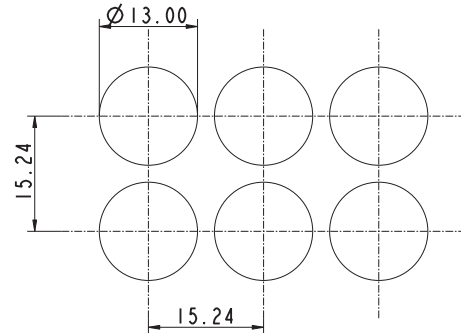


Hole patterns front panel RF 15 N

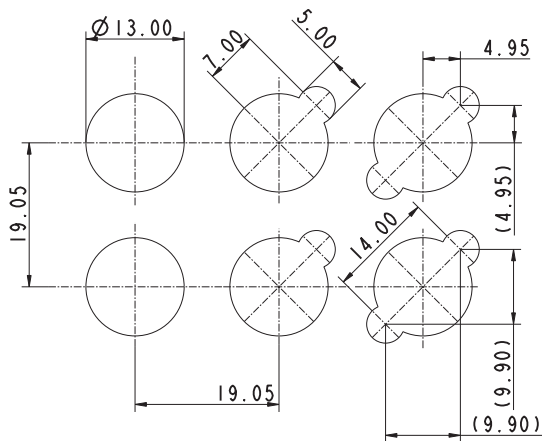
RF 15 N without plunger



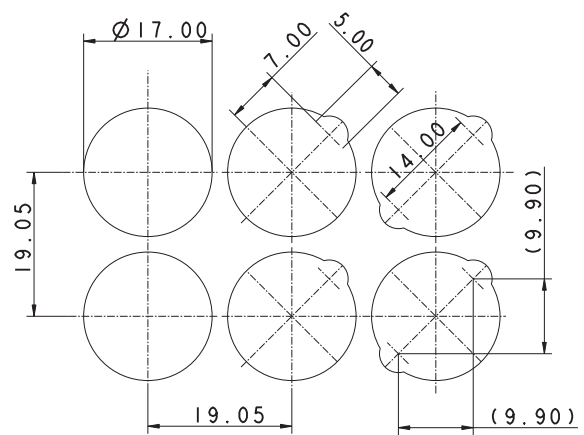
RF 15 N with plunger \varnothing 10 mm, not illuminated



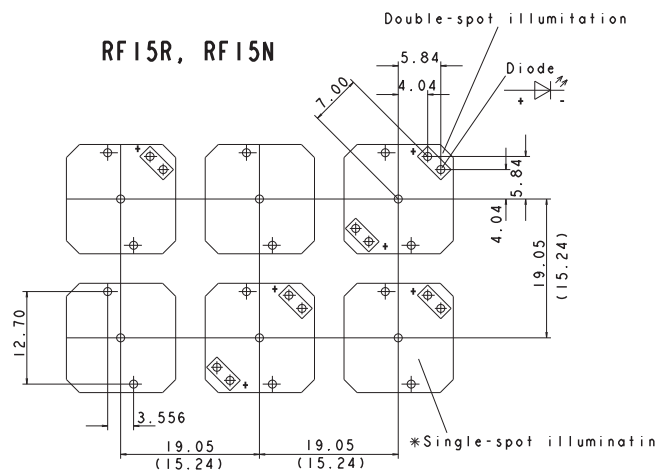
RF 15 N with plunger \varnothing 10 mm, illuminated



RF 15 N with plunger \varnothing 15 mm, illuminated



PCB hole patterns RF 15 N



View on component side,
all hole diameters $1.1^{+0.1}$ mm
PCB layout switch 1/400" grid

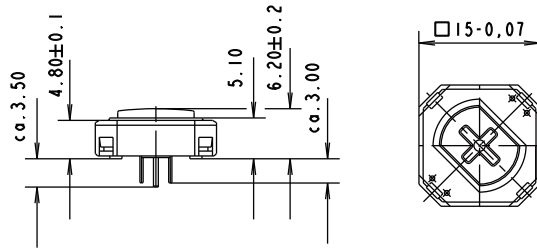
PCB KEY SWITCHES

RF 15 N - TACTILE SWITCHES



RF 15 N Tactile switch, non-illuminated

Technical data see page 4 - 62



→ Contact materials	Illumination	Recommended key grid	Overall height	Order no.
Au	external 3 mm LED possible if height more than 12 mm	19.05 mm	6.2 mm	3.14.100.601/0000
Ag	external 3 mm LED possible if height more than 12 mm	19.05 mm	6.2 mm	3.14.100.606/0000

For keycaps, refer to RK 90 system design.
Double-spot LED illumination available on request.

RF 15 R Tactile switches

→ The round actuator of the RF 15 R key switch 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	see order block

→ Mechanical design

Mounting	soldering in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	see order block
LED color	see order block
LED type	see order block

→ Mechanical characteristics

Operating force max.	2.9 ^{±0.6} N
Switching travel	0.5 ^{+0.2} mm
Robustness max.	with through-plated PCB 100 N

→ Electrical characteristics

Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	35 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
Insulation resistance	10 ⁹ Ω

→ Other specifications

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes

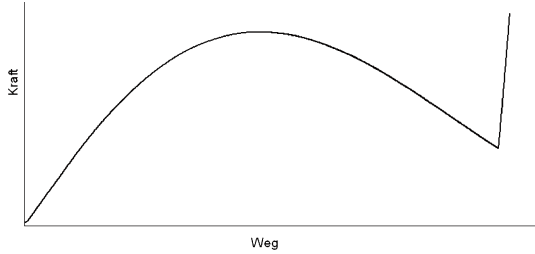


PCB KEY SWITCHES

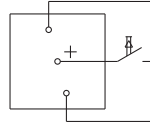
RF 15 R LOW - TACTILE SWITCHES

Typical force travel diagram

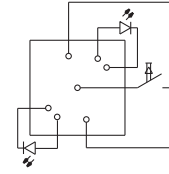
Actuating characteristics
Force travel diagram



Circuit diagrams RF 15 R

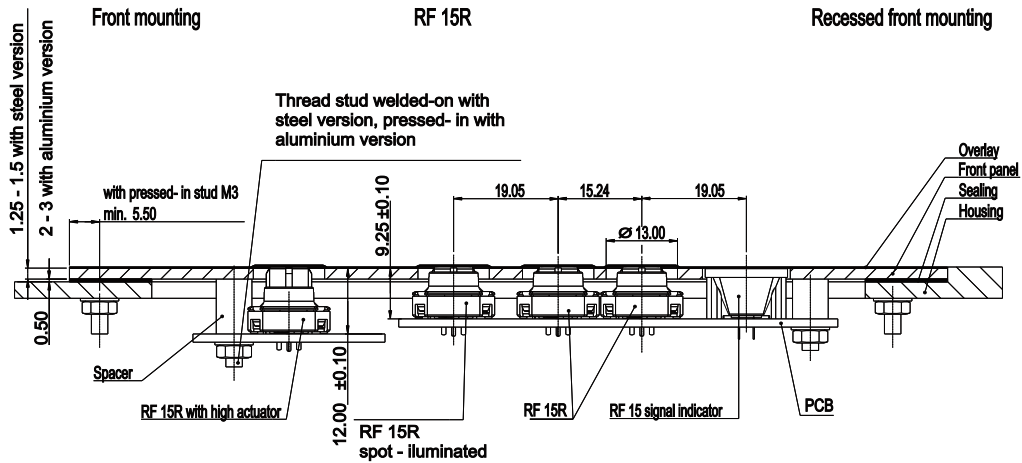


Tactile switch, non-illuminated



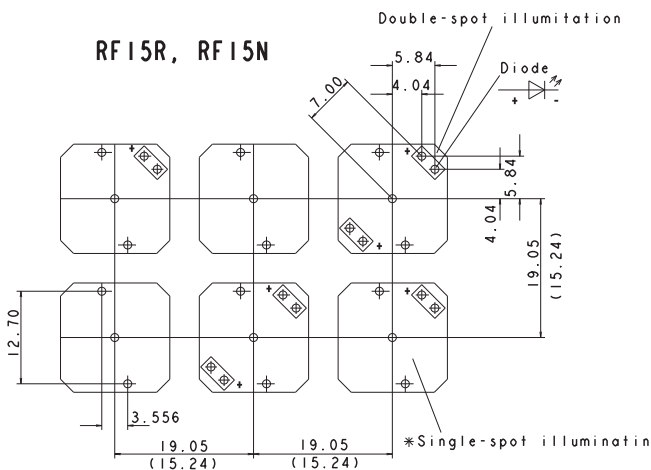
Tactile switch, spot-illuminated

Dimensional drawing RF 15 R



4

PCB hole patterns RF 15 R



View on component side,
all hole diameters 1.1 ± 0.1 mm
PCB layout switch 1/400" grid

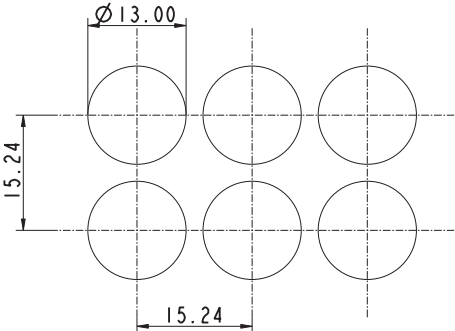
RF

PCB KEY SWITCHES

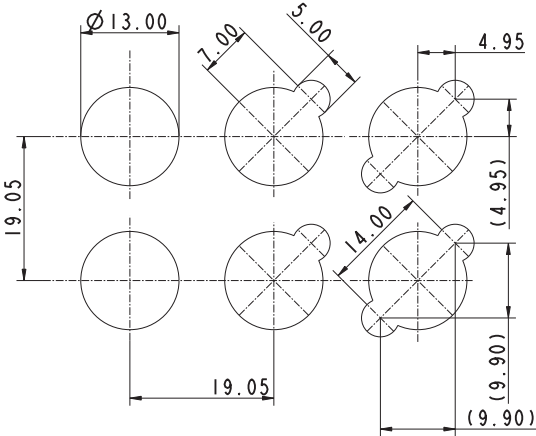
RF 15 R LOW - TACTILE SWITCHES

Hole patterns front panel RF 15 R

RF 15 R, not illuminated



RF 15 R, illuminated



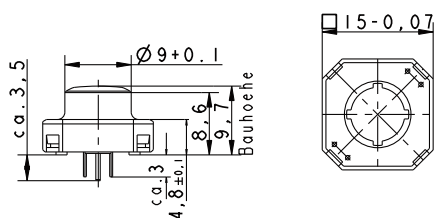
PCB KEY SWITCHES

RF 15 R LOW - TACTILE SWITCHES



RF 15 R Low tactile switch, non-illuminated

Technical data see page 4 - 67

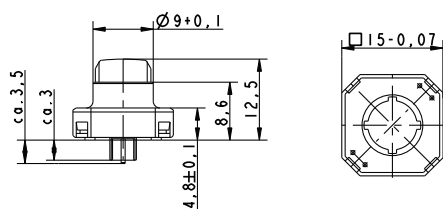


→ Contact materials	Overall height	Illumination	LED type	LED color	Order no.
Au	9.7 mm	not illuminated	-	-	3.14.100.501/0000
Ag	9.7 mm	not illuminated	-	-	3.14.100.506/0000



RF 15 R High tactile switch, non-illuminated

Technical data see page 4 - 67



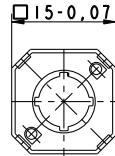
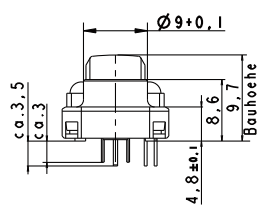
→ Contact materials	Overall height	Illumination	LED type	LED color	Order no.
Au	12.5 mm	not illuminated	-	-	3.14.100.801/0000
Ag	12.5 mm	not illuminated	-	-	3.14.100.806/0000

4

RF

RF 15 R Low tactile switch, 1 LED spot-illumination

Technical data see page 4 - 67



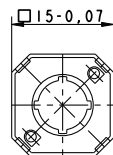
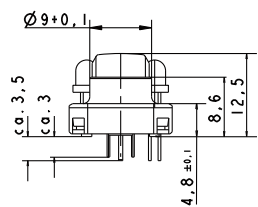
→ Contact materials	Overall height	Illumination	LED type	LED color	Order no.
Au	9.7 mm	spot illumination 1 LED	2 mm	red	3.14.100.531/0000
Au	9.7 mm	spot illumination 1 LED	2 mm	yellow	3.14.100.533/0000
Au	9.7 mm	spot illumination 1 LED	2 mm	green	3.14.100.532/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	red	3.14.100.541/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	yellow	3.14.100.543/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	green	3.14.100.542/0000

Versions with 2 LEDs available on request.

Technical data of LED see separate page at the beginning of this chapter.

RF 15 R High tactile switch, 1 LED spot-illumination

Technical data see page 4 - 67



→ Contact materials	Overall height	Illumination	LED type	LED color	Order no.
Au	12.5 mm	spot illumination 1 LED	3 mm	red	3.14.100.831/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	yellow	3.14.100.833/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	green	3.14.100.832/0000

PCB KEY SWITCHES

RF 15 R LOW - TACTILE SWITCHES

– Table (continued) –

RF 15 R - High tactile switch, 1 LED spot-illumination

→ Contact materials	Overall height	Illumination	LED type	LED color	Order no.
Au	12.5 mm	spot illumination 1 LED	3 mm	blue	3.14.100.830/0000

Versions with 2 LEDs available on request.

Technical data of LED see separate page at the beginning of the chapter.

RF 15 H Tactile switches

→ 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 20 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

Color 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 in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	see order block
LED color	see order block
LED type	see order block

→ Mechanical characteristics

Operating force max.	2.9 ^{+0.6} N
Switching travel	0.5 ^{+0.2} mm
Robustness max.	with through-plated PCB 100 N

→ Electrical characteristics

Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	35 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
Insulation resistance	10 ⁹ Ω

→ Other specifications

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes



PCB KEY SWITCHES

RF 15 H - TACTILE SWITCHES

Accessories RF 15 H - Tactile switch

→ Description	Photo	Order no.	Additional accessories see page
O-ring, black, 16.0 x 1, for blocking RF 19H keys		5.30.125.007/0100	5 - 31

4

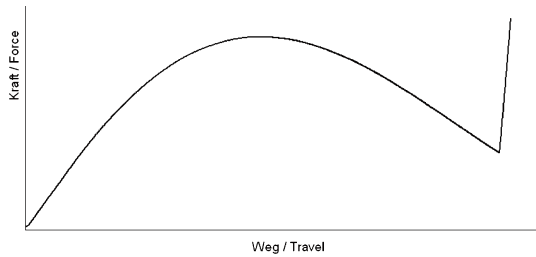
RF

PCB KEY SWITCHES

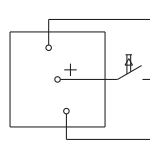
RF 15 H - TACTILE SWITCHES

Typical force travel diagram RF 15 H

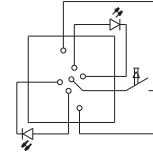
Actuating characteristics
Force travel diagram



Curcuit diagram RF 15 H

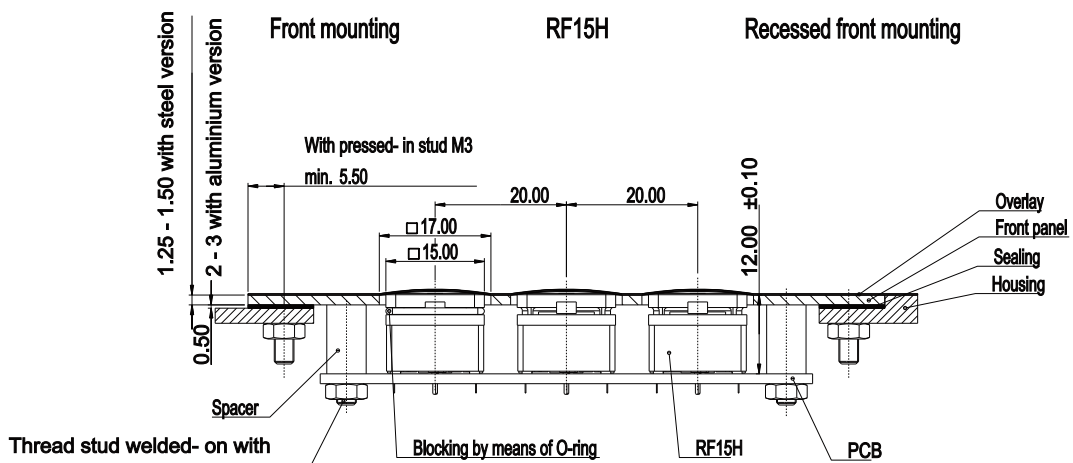


Tactile switch, non-illuminated

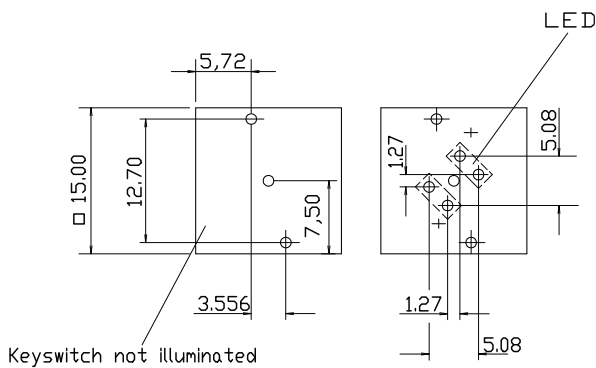


Tactile switch, fully-illuminated

Dimensional drawing RF 15 H

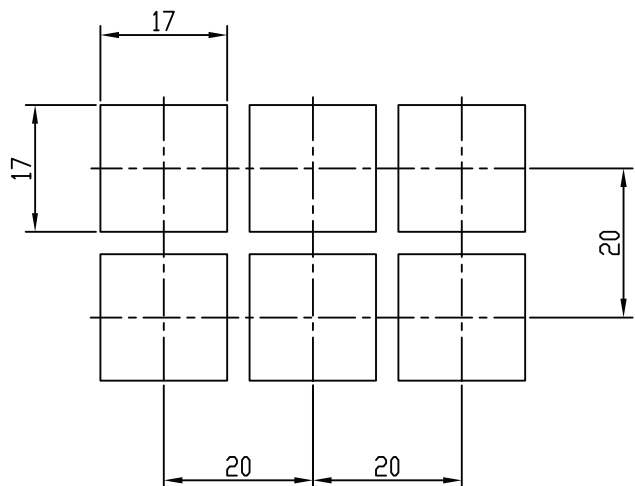


Hole Pattern



View on component side.

Hole Pattern – Front Panel



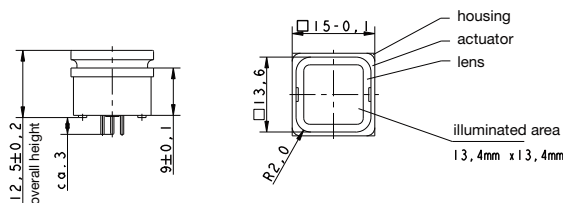
PCB KEY SWITCHES

RF 15 H - TACTILE SWITCHES



RF 15 H Tactile switch, non-illuminated

Technical data see page 4 - 73

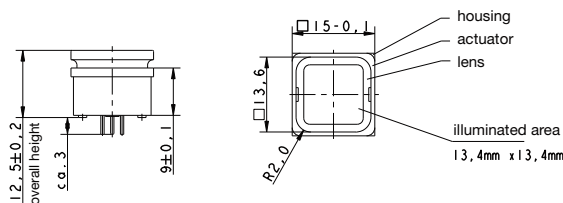


→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	not illuminated	white	-	-	3.14.100.702/0000
Ag	not illuminated	white	-	-	3.14.100.707/0000



RF 15 H Tactile switch, fully illuminated

Technical data see page 4 - 73



→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.200.731/0000
Au	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.200.733/0000
Au	fully illuminated 2 LED	orange	yellow	2 mm	3.14.200.738/0000
Au	fully illuminated 1 LED	green	green super bright	3 mm	3.14.200.736/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.200.732/0000
Au	fully illuminated 1 LED	blue	blue	3 mm	3.14.200.739/0000
Au	fully illuminated 1 LED	white	white	3 mm	3.14.200.735/0000
Ag	fully illuminated 2 LED	red	red	2 mm	3.14.200.741/0000
Ag	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.200.743/0000
Ag	fully illuminated 2 LED	orange	yellow	2 mm	3.14.200.748/0000
Ag	fully illuminated 1 LED	green	green super bright	3 mm	3.14.200.746/0000

– Table (continued) –
RF 15 H - Tactile switch, fully illuminated

→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Ag	fully illuminated 2 LED	green	green	2 mm	3.14.200.742/0000
Ag	fully illuminated 1 LED	blue	blue	3 mm	3.14.200.749/0000
Ag	fully illuminated 1 LED	white	white	3 mm	3.14.200.745/0000

When using the key switches with multicolor LEDs the illumination color can be varied from red to green by change of polarity. Due to the frequency of the polarity-changes the colors red, green, yellow as well as all secondary colors from these are possible.

Technical data of LED see separate page at the beginning of this chapter.

PCB KEY SWITCHES

RF 15 - SIGNAL INDICATORS



RF 15 Signal indicators

Technical Data

→ **General information**

Color of lens	see order block
Recommended key grid	19.05 mm

→ **Dimensions**

Length	15 mm
Width	15 mm
Overall height	9.15 mm

→ **Mechanical design**

Mounting	THT soldering in PCB
Illumination	fully illuminated 1 LED
LED color	see order block
LED type	2 mm

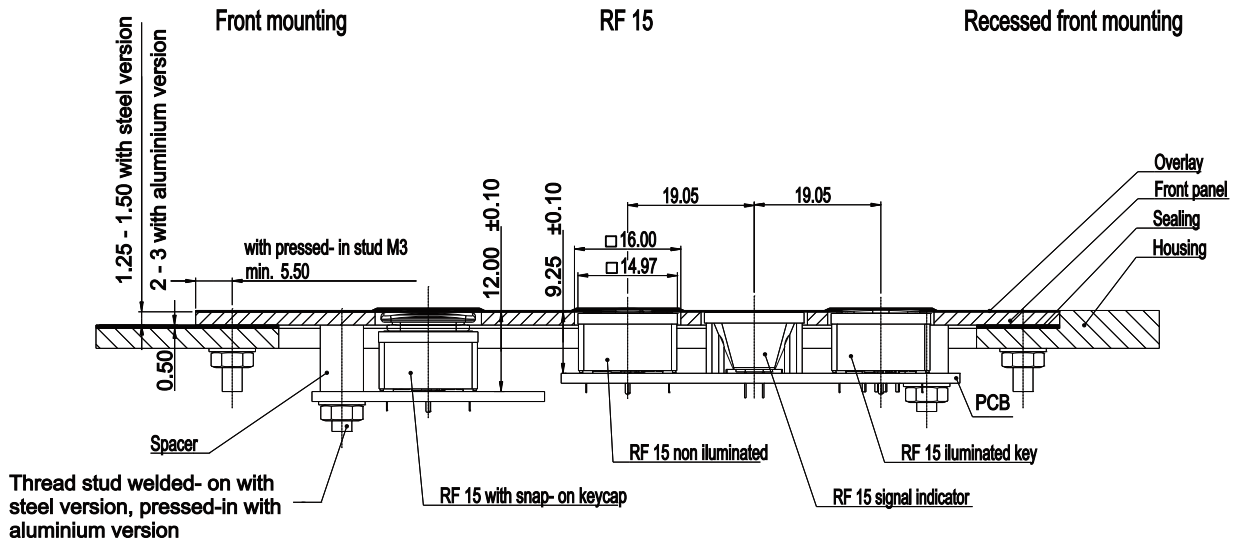
→ **Other specifications**

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes

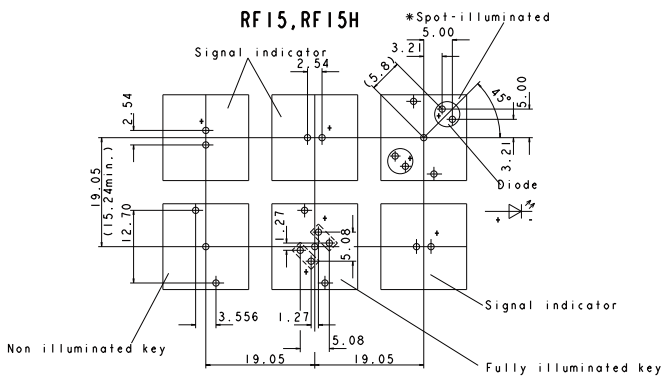
PCB KEY SWITCHES

RF 15 - SIGNAL INDICATORS

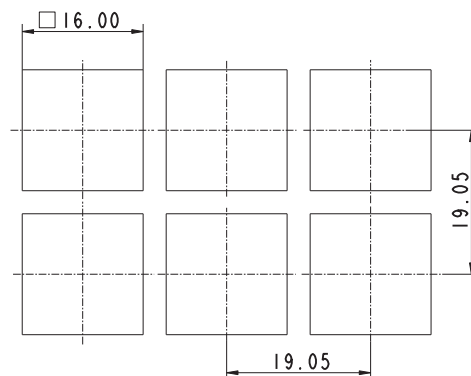
System assembly RF 15 signal indicator



PCB hole patterns RF 15



Hole patterns front panel RF 15



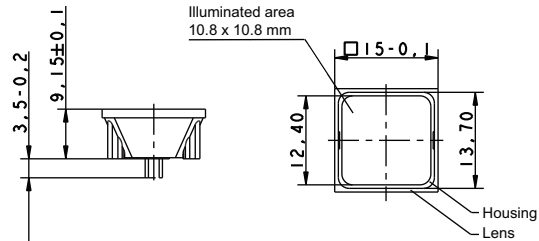
PCB KEY SWITCHES

RF 15 - SIGNAL INDICATORS



RF 15 Signal indicator, fully illuminated, 1 LED

Technical data see page 4 - 78



→ Overall height	Illumination	Color of lens	LED color	LED type	Order no.
9.15 mm	fully illuminated 1 LED	red	red	2 mm	3.14.200.051/0000
9.15 mm	fully illuminated 1 LED	yellow	yellow	2 mm	3.14.200.053/0000
9.15 mm	fully illuminated 1 LED	orange	yellow	2 mm	3.14.200.054/0000
9.15 mm	fully illuminated 1 LED	green	green	2 mm	3.14.200.052/0000
9.15 mm	fully illuminated 1 LED	blue	blue	2 mm	3.14.200.055/0000

Technical data of LED see separate page at the beginning of chapter 4 PCB Key switches.

RF 19 Tactile switches

→ Application notes:

RF 19 keys offer a large actuation area. When designing low-profile keyboards with a grid of ≥ 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

Color 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 in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	see order block
LED color	see order block
LED type	see order block

→ Mechanical characteristics

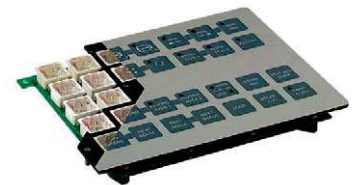
Operating force max.	2.9 ^{+0.6} N
Switching travel	0.5 ^{+0.2} mm
Robustness max.	with through-plated PCB 100 N

→ Electrical characteristics

Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	35 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
Insulation resistance	10 ⁹ Ω

→ Other specifications

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes

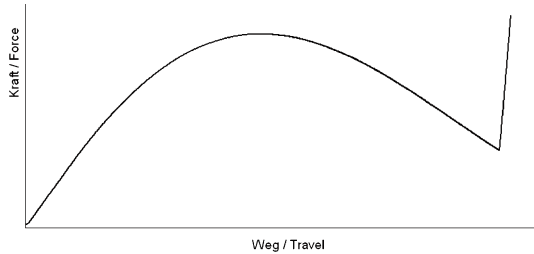


PCB KEY SWITCHES

RF 19 - TACTILE SWITCHES

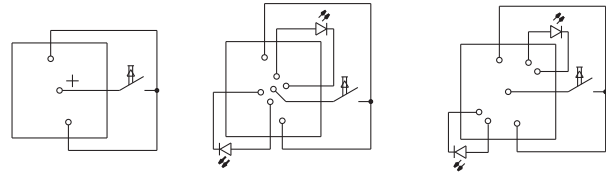
Typical force travel diagram RF 19

Actuating characteristics
Force travel diagram



Circuit diagrams RF 19

Hole patterns (view on component side)

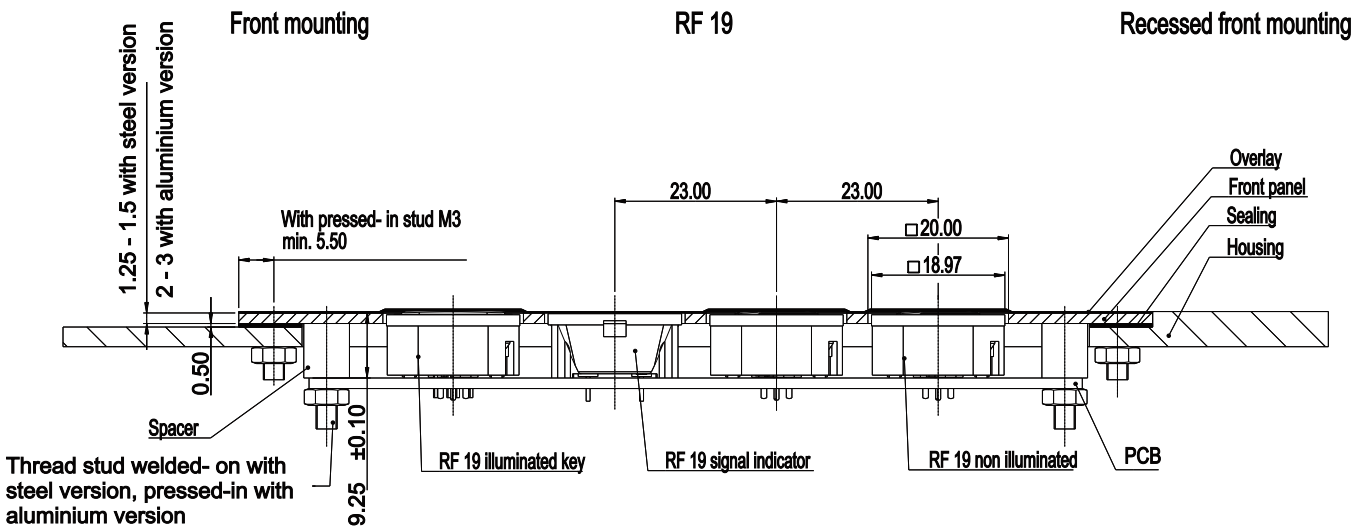


Tactile switch, non-illuminated

Tactile switch, fully-illuminated

Tactile switch, spot-illuminated

System assembly RF 19



4

Thread stud welded-on with steel version, pressed-in with aluminium version

RF

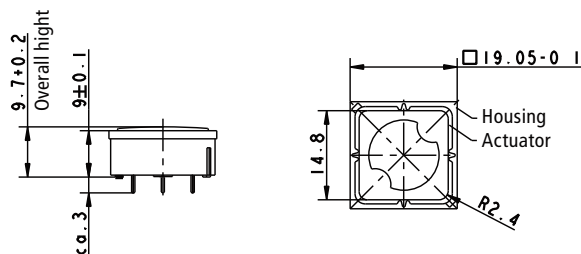
PCB KEY SWITCHES

RF 19 - TACTILE SWITCHES



RF 19 Tactile switch, non-illuminated

Technical data see page 4 - 81

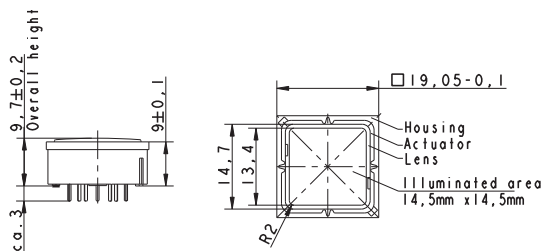


→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	not illuminated	transparent	-	-	3.14.001.001/0000
Ag	not illuminated	transparent	-	-	3.14.001.006/0000



RF 19 Tactile switch, fully illuminated with 2 LED

Technical data see page 4 - 81



→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.002.011/0000
Au	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.013/0000
Au	fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.014/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.002.012/0000
Au	fully illuminated 2 LED	blue	blue	2 mm	3.14.002.015/0000
Au	fully illuminated 2 LED	opaque white	green	2 mm	3.14.002.901/0000
Ag	fully illuminated 2 LED	red	red	2 mm	3.14.002.021/0000
Ag	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.023/0000
Ag	fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.024/0000
Ag	fully illuminated 2 LED	green	green	2 mm	3.14.002.022/0000

4

RF

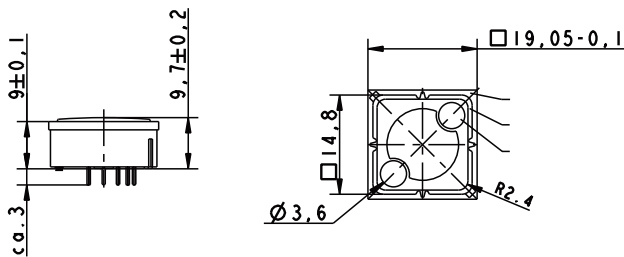
– Table (continued) –
RF 19 - Tactile switch, fully illuminated with 2 LED

→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Ag	fully illuminated 2 LED	blue	blue	2 mm	3.14.002.025/0000
Ag	fully illuminated 2 LED	white	yellow	2 mm	3.14.002.027/0000
Ag	fully illuminated 2 LED	white	green	2 mm	3.14.002.026/0000
Ag	fully illuminated 2 LED	opaque white	green	2 mm	3.14.002.944/0000

Technical data of LED see separate page at the beginning of this chapter.

RF 19 Tactile switch, 1 LED spot-illumination

Technical data see page 4 - 81



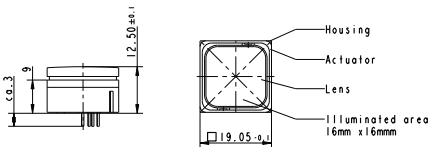
→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	spot illumination 1 LED	transparent	red	3 mm	3.14.001.031/0000
Au	spot illumination 1 LED	transparent	yellow	3 mm	3.14.001.033/0000
Au	spot illumination 1 LED	transparent	green	3 mm	3.14.001.032/0000
Au	spot illumination 1 LED	opaque white	blue	3 mm	3.14.001.030/0000
Ag	spot illumination 1 LED	transparent	red	3 mm	3.14.001.041/0000
Ag	spot illumination 1 LED	transparent	yellow	3 mm	3.14.001.043/0000
Ag	spot illumination 1 LED	transparent	green	3 mm	3.14.001.042/0000
Ag	spot illumination 1 LED	transparent	blue	3 mm	3.14.001.040/0000

Versions with 2 LEDs available on request.

Technical data of LED see separate page at the beginning of this chapter.

PCB KEY SWITCHES

RF 19 H - TACTILE SWITCHES



RF 19 H Tactile switches

→ 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 24 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

Color 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 in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	see order block
LED color	see order block
LED type	see order block

→ Mechanical characteristics

Operating force max.	2.9 ^{±0.6} N
Switching travel	0.5 ^{±0.2} mm
Robustness max.	with through-plated PCB 100 N

→ Electrical characteristics

Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	35 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
Insulation resistance	10 ⁹ Ω

→ Other specifications

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes

4

RF

PCB KEY SWITCHES

RF 19 H - TACTILE SWITCHES

Accessories RF 19 H - Tactile switch

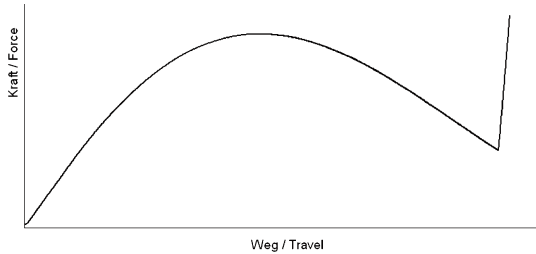
→ Description	Photo	Order no.	Additional accessories see page
O-ring, black, 16.0 x 1, for blocking RF 19H keys		5.30.125.007/0100	5 - 31

PCB KEY SWITCHES

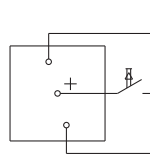
RF 19 H - TACTILE SWITCHES

Typical force travel diagram RF 19 H

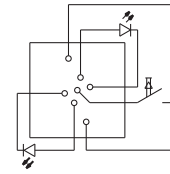
Actuating characteristics
Force travel diagram



Circuit diagrams RF 19 H

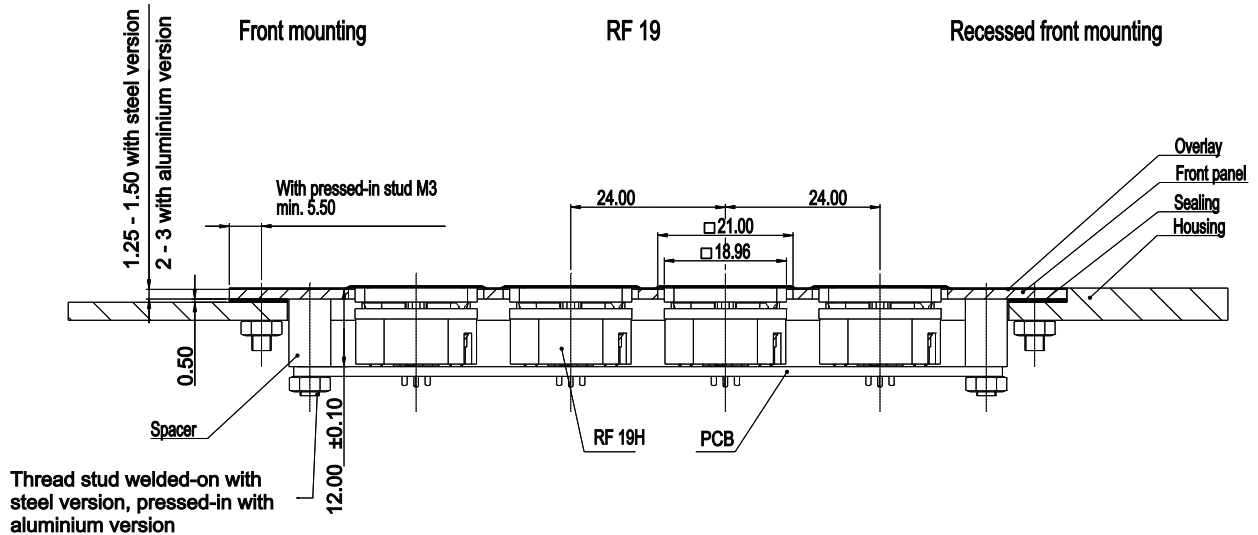


Tactile switch, non-illuminated

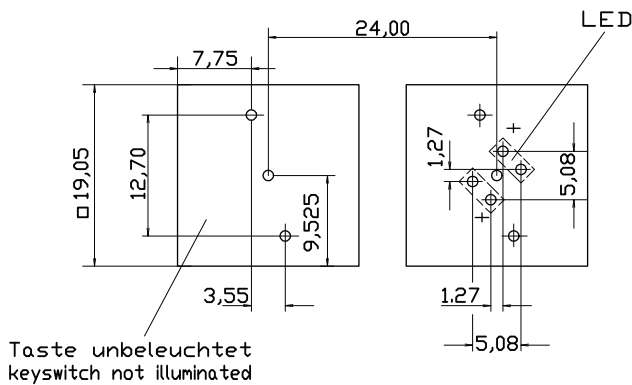


Tactile switch, fully-illuminated

System assembly RF 19 H

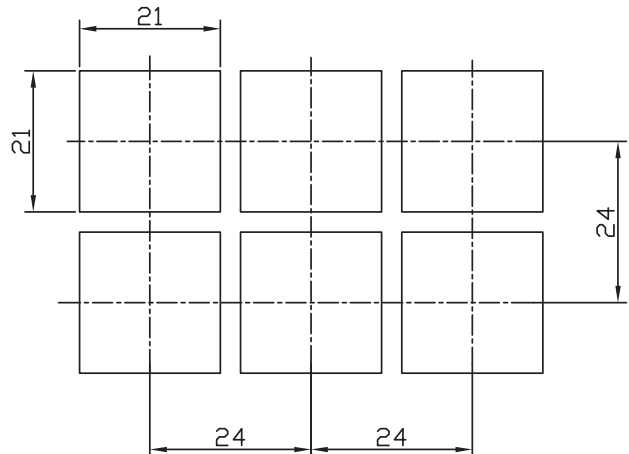


PCB hole patterns RF 19 H



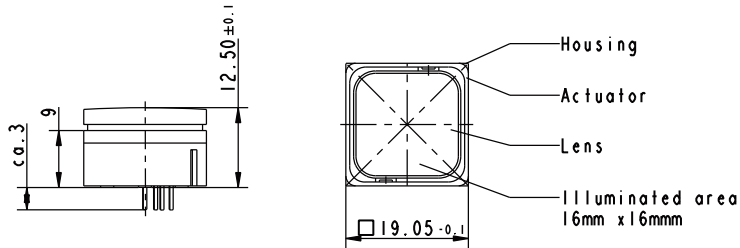
View on component side, all hole diameters $1.1^{+0.1}$ mm

Hole patterns front panel RF 19 H



RF 19 H Tactile switch, non-illuminated

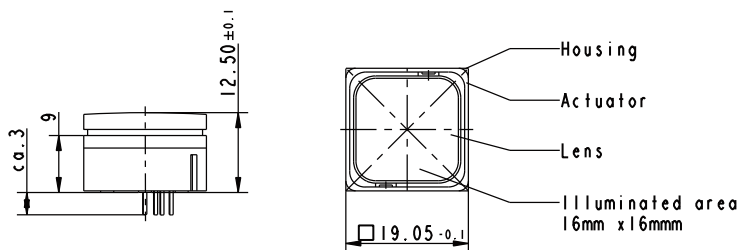
Technical data see page 4 - 86



→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	not illuminated	white	-	-	3.14.001.501/0000
Ag	not illuminated	white	-	-	3.14.001.506/0000

RF 19 H Tactile switch, fully illuminated

Technical data see page 4 - 86



→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.002.613/0000
Au	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.653/0000
Au	fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.673/0000
Au	fully illuminated 1 LED	green	green super bright	3 mm	3.14.002.633/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.002.632/0000
Au	fully illuminated 1 LED	blue	blue	3 mm	3.14.002.683/0000
Au	fully illuminated 1 LED	white	white	3 mm	3.14.002.684/0000
Ag	fully illuminated 2 LED	red	red	2 mm	3.14.002.623/0000
Ag	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.663/0000
Ag	fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.678/0000
Ag	fully illuminated 1 LED	green	green super bright	3 mm	3.14.002.643/0000

PCB KEY SWITCHES

RF 19 H - TACTILE SWITCHES

– Table (continued) –
RF 19 H - Tactile switch, fully illuminated

→ Contact materials	Illumination	Color of lens	LED color	LED type	Order no.
Ag	fully illuminated 2 LED	green	green	2 mm	3.14.002.642/0000
Ag	fully illuminated 1 LED	blue	blue	3 mm	3.14.002.688/0000
Ag	fully illuminated 1 LED	white	white	3 mm	3.14.002.689/0000

When using the key switches with multicolor LEDs the illumination color can be varied from red to green by change of polarity. Due to the frequency of the polarity-changes the colors red, green, yellow as well as all secondary colors from these are possible.

Technical data of LED see separate page at the beginning of this chapter.

RF 19 Signal indicators

Technical Data

→ **General information**

Color 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	THT soldering in PCB
Illumination	see order block
LED color	see order block
LED type	see order block

→ **Other specifications**

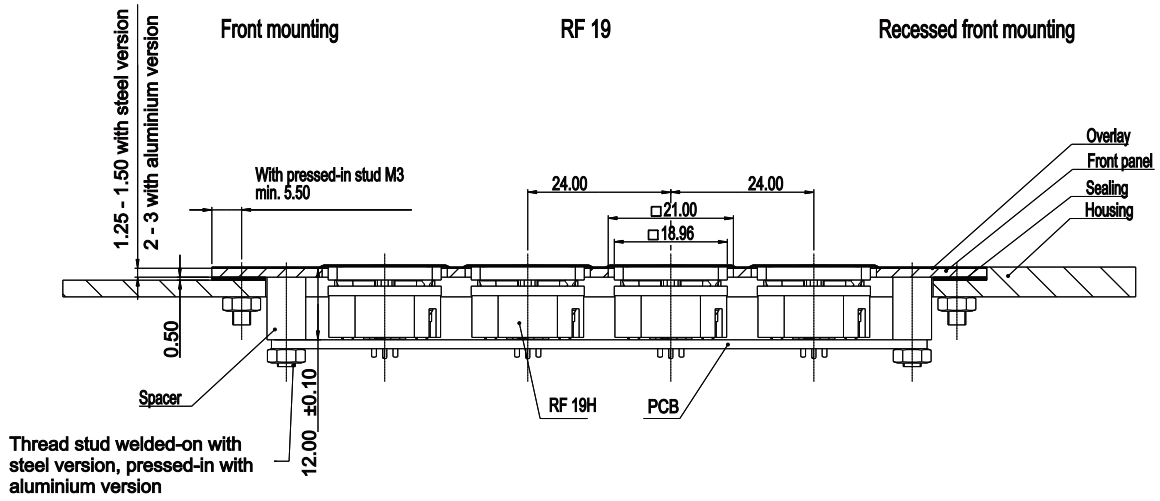
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Solderability / solder heat resistance	according to DIN EN 60068-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.
ROHS compliant	yes
REACH compliant	yes



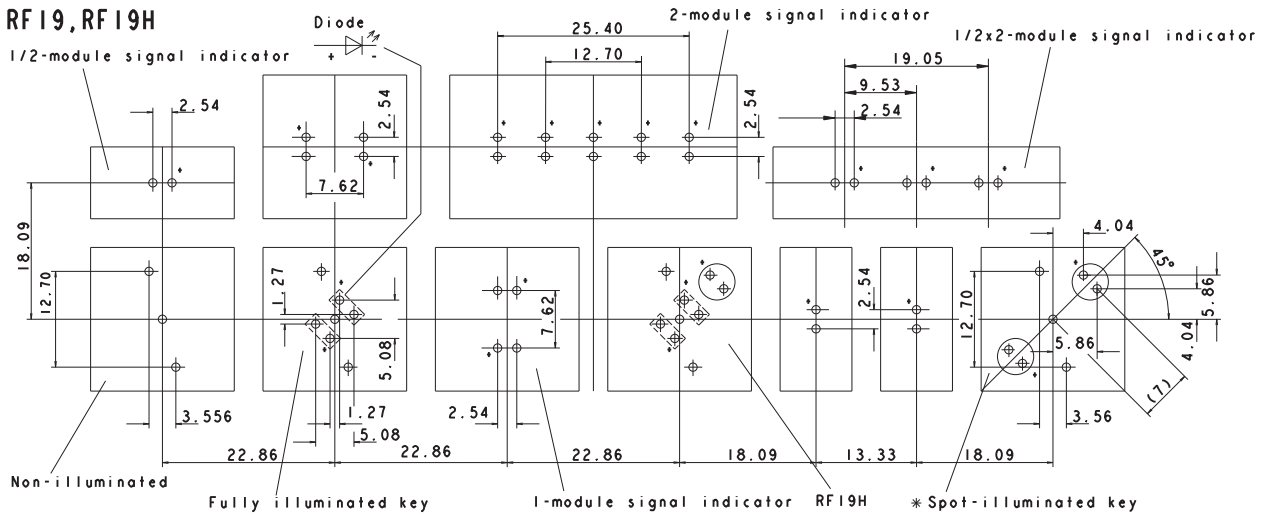
PCB KEY SWITCHES

RF 19 - SIGNAL INDICATORS

System assembly RF 19 signal indicator



PCB hole pattern 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

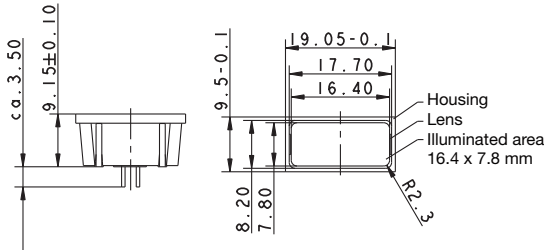
Hole patterns front panel = size of indicator + 1 mm

4

RF

RF 19 Signal indicator, 1/2 x 1-module

Technical data see page 4 - 91

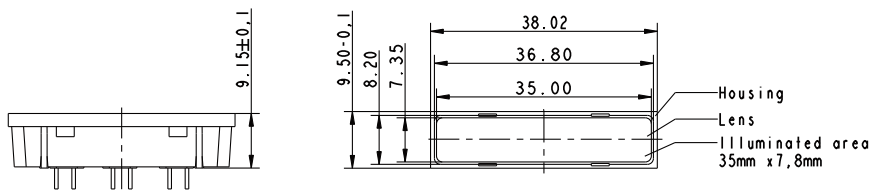
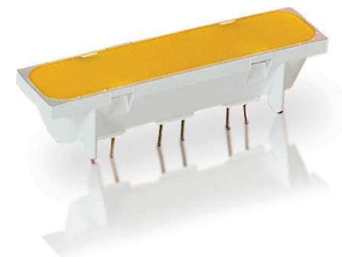


→ Illumination	Color of lens	LED color	LED type	Order no.
fully illuminated 1 LED	red	red	2 mm	3.14.002.061/0000
fully illuminated 1 LED	yellow	yellow	2 mm	3.14.002.063/0000
fully illuminated 1 LED	orange	yellow	2 mm	3.14.002.064/0000
fully illuminated 1 LED	green	green	2 mm	3.14.002.062/0000

Technical data of LED see separate page at the beginning of chapter 4 PCB Key switches.

RF 19 Signal indicator, 1/2 x 2-module

Technical data see page 4 - 91



→ Illumination	Color of lens	LED color	LED type	Order no.
fully illuminated 3 LED	red	red	2 mm	3.14.002.908/0000
fully illuminated 3 LED	yellow	yellow	2 mm	3.14.002.910/0000
fully illuminated 3 LED	orange	yellow	2 mm	3.14.002.911/0000
fully illuminated 3 LED	green	green	2 mm	3.14.002.909/0000

Technical data of LED see separate page at the beginning of chapter 4 PCB Key switches.

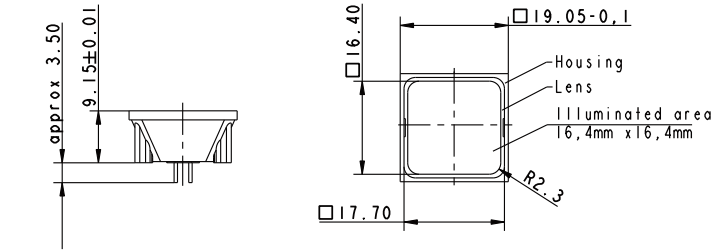
PCB KEY SWITCHES

RF 19 - SIGNAL INDICATORS



RF 19 Signal indicator, 1 x 1-module

Technical data see page 4 - 91



→ Illumination	Color of lens	LED color	LED type	Order no.
fully illuminated 2 LED	red	red	2 mm	3.14.002.051/0000
fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.053/0000
fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.054/0000
fully illuminated 2 LED	green	green	2 mm	3.14.002.052/0000
fully illuminated 2 LED	blue	blue	2 mm	3.14.001.659/0000

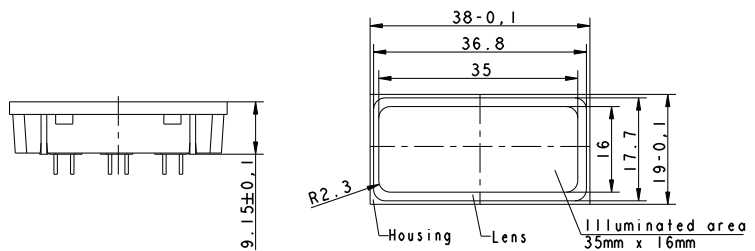
For technical data of the LED see separate page at the beginning of chapter „RF tactile switches“

Suitable for RK 90 system design, illuminated for 2-module keycap.



RF 19 Signal indicator, 1 x 2-module

Technical data see page 4 - 91



→ Illumination	Color of lens	LED color	LED type	Order no.
fully illuminated 5 LED	red	red	2 mm	3.14.002.071/0000
fully illuminated 5 LED	yellow	yellow	2 mm	3.14.002.073/0000
fully illuminated 5 LED	orange	yellow	2 mm	3.14.002.074/0000
fully illuminated 5 LED	green	green	2 mm	3.14.002.072/0000

For technical data of the LED see separate page at the beginning of chapter „RF tactile switches“

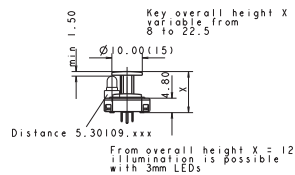
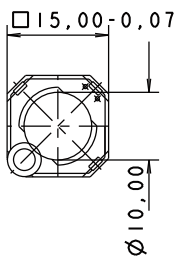
4

RF

RF 15/19 Special accessories



RF 15 N Extension plunger, round head



→ Length	Width	Overall height	Diameter	Color	Order no.
	-	9 mm	10 mm	-	5.46.011.036/0710
	-	9.7 mm	10 mm	-	5.46.011.030/0710
	-	12.5 mm	10 mm	-	5.46.011.037/0710
	-	13 mm	10 mm	-	5.46.011.038/0710
	-	22.5 mm	10 mm	-	5.46.011.028/0710

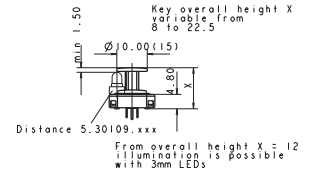
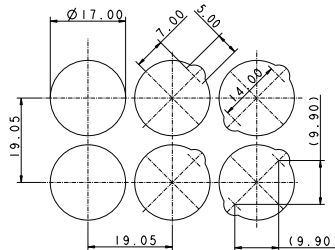
Length of plunger = Overall height - 4.25 mm.

PCB KEY SWITCHES

RF 15/19 - SPECIAL ACCESSORIES



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

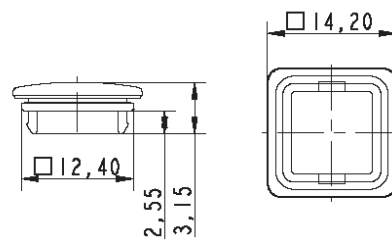


→ Length	Width	Overall height	Diameter	Color	Order no.
-	-	9 mm	15 mm	-	5.46.017.036/0710
-	-	9.7 mm	15 mm	-	5.46.017.030/0710
-	-	12.5 mm	15 mm	-	5.46.017.037/0710
-	-	22.5 mm	15 mm	-	5.46.017.028/0710
-	-	13 mm	15 mm	-	5.46.017.038/0710

Length of plunger = Overall height - 4.25 mm.



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

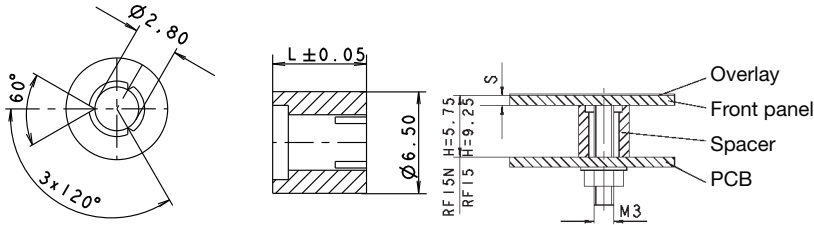


→ Length	Width	Overall height	Diameter	Color	Order no.
14.2 mm	14.2 mm	12.5 mm	-	beige	5.46.654.059/0227

4

RF

Spacer, round



→ Length L	Color	Order no.
3.50 mm	blue transparent	5.30.759.023/0000
4.75 mm	blue transparent	5.30.759.028/0000
5.25 mm	yellow orange transparent	5.30.759.030/0000
4.50 mm	red	5.30.759.027/0000
5.50 mm	yellow	5.30.759.031/0000
4 mm	green	5.30.759.025/0000
5.75 mm	green	5.30.759.032/0000
4.25 mm	blue	5.30.759.026/0000
6 mm	blue	5.30.759.033/0000
6.2 mm	blue	5.30.759.251/0000
5 mm	black	5.30.759.029/0000
10.00 mm	black	5.30.759.043/0104
6.25 mm	red	5.30.759.034/0000
6.50 mm	blue transparent	5.30.759.035/0000
6.75 mm	black	5.30.759.036/0000
7 mm	yellow orange transparent	5.30.759.037/0000
7.25 mm	yellow	5.30.759.038/0000
7.50 mm	green	5.30.759.039/0000
7.75 mm	blue	5.30.759.040/0000
8 mm	red	5.30.759.041/0000
8.25 mm	blue transparent	5.30.759.042/0000

Required spacer length

For keyboards: Overall height of key - front panel thickness - 0.5 mm (area embossing).

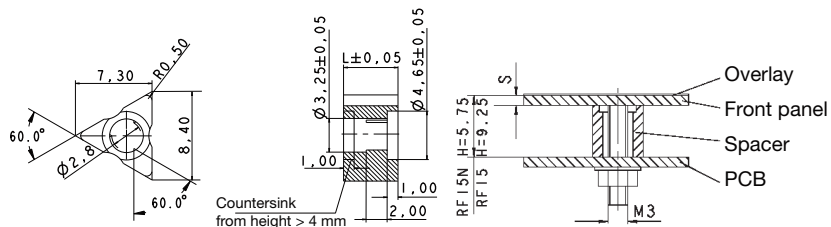
For RAFIX 22 FS: 9.25 mm - front panel thickness - thickness of overlay, if existing

PCB KEY SWITCHES

RF 15/19 - SPECIAL ACCESSORIES



Spacer, triangular



triangular version

→ Length L

Order no.

2.50 mm	5.30.759.094/0000
2.75 mm	5.30.759.095/0000
3 mm	5.30.759.096/0000
3.25 mm	5.30.759.097/0000
3.50 mm	5.30.759.098/0000
3.75 mm	5.30.759.099/0000
4 mm	5.30.759.100/0000
4.25 mm	5.30.759.101/0000
4.50 mm	5.30.759.102/0000
4.75 mm	5.30.759.103/0000
5 mm	5.30.759.104/0000
5.25 mm	5.30.759.105/0000
5.50 mm	5.30.759.106/0000
5.75 mm	5.30.759.107/0000
6 mm	5.30.759.108/0000
6.2 mm	5.30.759.253/0000
10.00 mm	5.30.759.124/0000
10.25 mm	5.30.759.125/0000
6.25 mm	5.30.759.109/0000
6.50 mm	5.30.759.110/0000
6.75 mm	5.30.759.111/0000
7 mm	5.30.759.112/0000
7.25 mm	5.30.759.113/0000
7.50 mm	5.30.759.114/0000
7.75 mm	5.30.759.115/0000
8 mm	5.30.759.116/0000
8.25 mm	5.30.759.117/0000
9 mm	5.30.759.254/0000

4

RF

– Table (continued) –
Spacers, triangular

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

RF 15 N LED spacer



→ Length	Width	Overall height	Diameter	Color	Order no.
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
