RF short-travel keyswitches

RAFI
SOLUTIONS WITH PASSION

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

4

RF

4

RF

Specifications LED

3 mm LED

(valid for 25 °C)	Red LED	Green LED	Yellow LED
Max. forward current I_F: Current reduction from: $T_0 = 50$ °C: Wavelength typ: Forward voltage U_F/I_F typ: Reverse voltage U_R/I_F typ: Ambient temperature, operating:	30 mA approx 0.5 mA/°C 635 nm 2 V/10 mA 5 V/100 µA min. - 20 °C . . . + 80 °C	30 mA approx 0.5 mA/°C 565 nm 2 V/10 mA 5 V/100 µA min. - 20 °C . . . + 80 °C	20 mA approx 0.2 mA/°C 586 nm 2 V/10 mA 5 V/100 µA min. - 20 °C . . . + 80 °C
	Blue LED	**White LED**	**Green LED superbright**
Max. forward current I_F: Current reduction from: $T_0 = 50$ °C: Wavelength typ: Forward voltage U_F/I_F typ: Reverse voltage U_R/I_F typ: Ambient temperature, operating:	20 mA approx 0.6 mA/°C 470 nm 2.7 V/10 mA 5V/100 µA min. - 20 °C . . . + 80 °C	25 mA - - 3.6 V/20 mA - - 20 °C . . . + 80 °C	30 mA - 510-545 nm 3.5 V/20 mA - -30 °C . . . + 100 °C

2 mm LED

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

4

RF

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

RF short-travel keyswitches

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	10^9 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.	1,000,000
Soldering time max.	2,5 sec.
Soldering temperature max.	250 °C
Flammability of materials	UL 94 HB

Force/Travel Diagram – Keyswitch RF 15

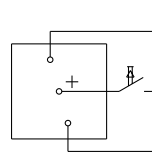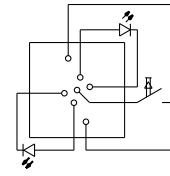### Operation characteristic limits RF
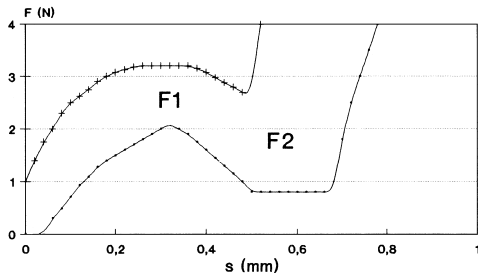
F 1 = Max. operating force
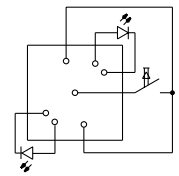F 2 = Force at contact
F 2 is max. 55% of F 1

Circuit Diagram – Keyswitch RF 15

Keyswitch,
non-illuminated

Keyswitch,
fully illuminated

Keyswitch,
spot-illuminated

Dimensional Drawing RF 15

Front mountig   RF 15   Recessed front mounting

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

No metal webs
between the keys

Overlay
Front panel
Sealing
Housing

bei Einpressbolzen M3
min 5.50

15.24   15.24   19.05

15.00

1.00

9.20±0.1

12.00±0.1

0.50

1.25-1.50 with steel version
2-3with aluminium version

Spacer   RF15 with snap-on keycap   RF15 signal indicator   PCB

RF15 iluminated key   RF15 non iluminated

4

RF

Hole Pattern RF 15

RF15,RF15H

Signal indicator

*Spot-illuminated
5.00
3.21
(5.8)
45°
5.00

2.54

2.54

3.21

Diode

19.05
(15.24min.)

12.70

1.27
5.08

3.556   1.27

5.08

19.05   19.05
(15.24min.)   (15.24min.)

No metal webs with 15.24 mm

Non illuminated key

Signal indicator

Fully illuminated key

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

Hole Pattern – Front Panel

□16.00

19.05

19.05
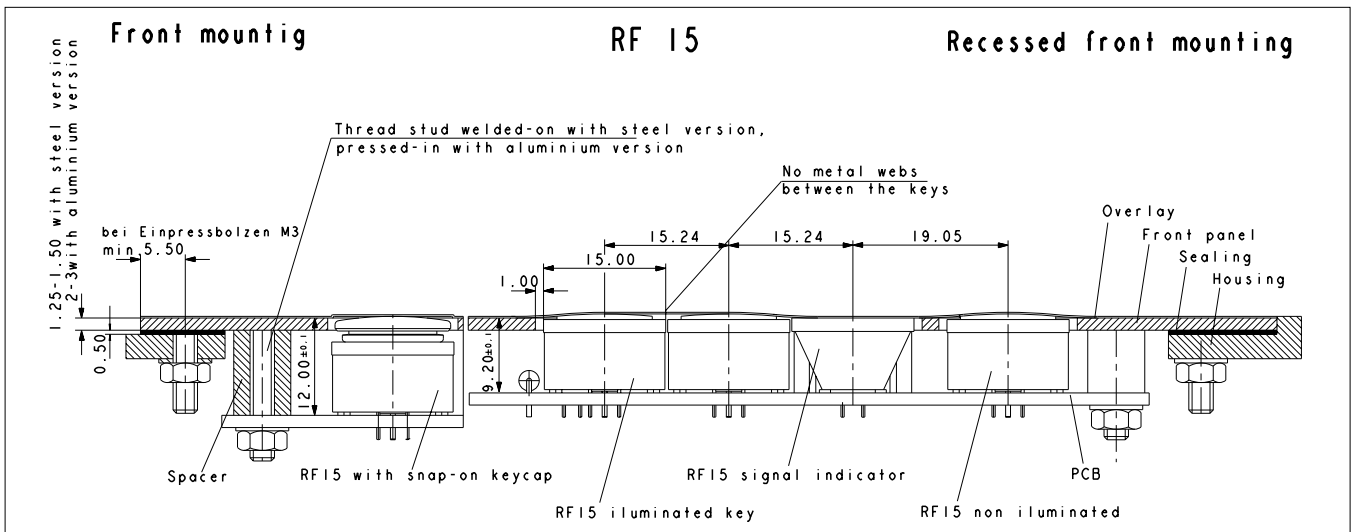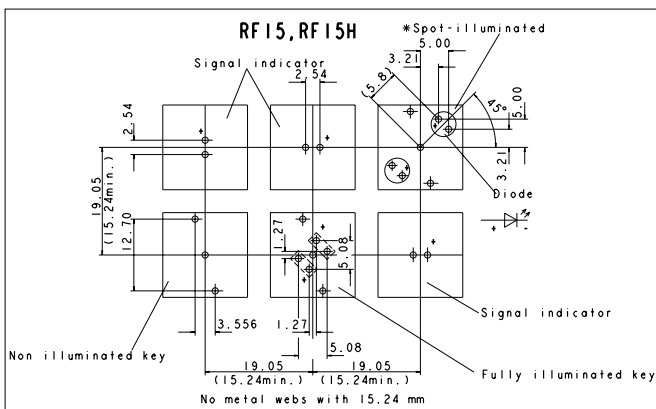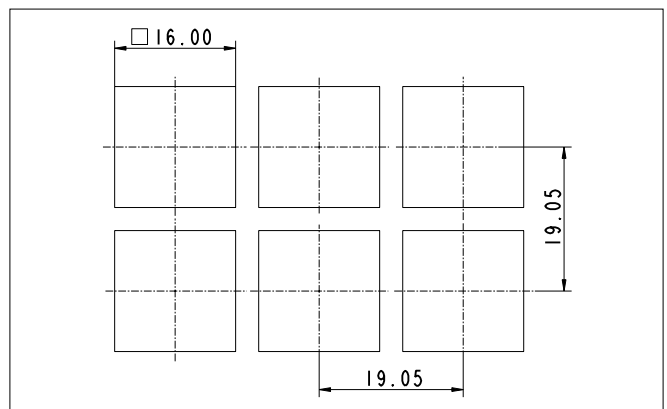
RF 15 short-travel keyswitch, non-illuminated
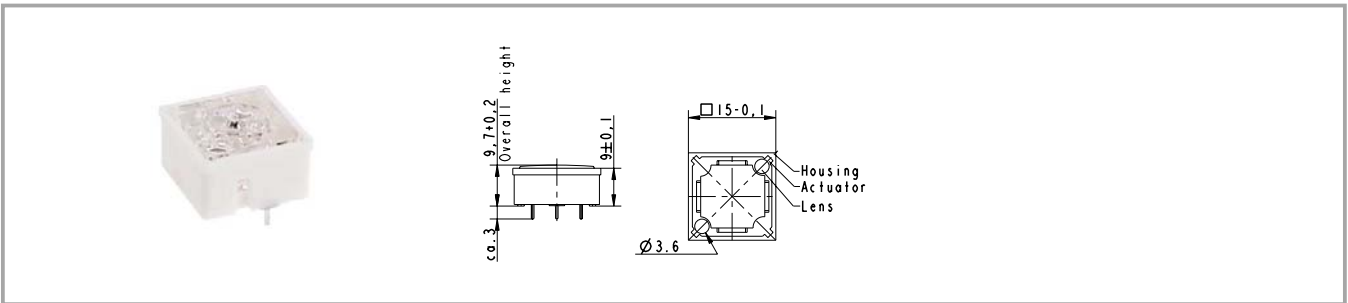
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Ag	not illuminated	transparent			**3.14.100.006/0000**
Au	not illuminated	transparent			**3.14.100.001/0000**

Technical data see page 4 - 26

Accessories:
Keycap for RF 15, snap-on, for overall height 12.5 mm: 5.46.654.059/0227

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.

4

RF

Stock items are marked
by **bold printed** order numbers.

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

Pict.: red
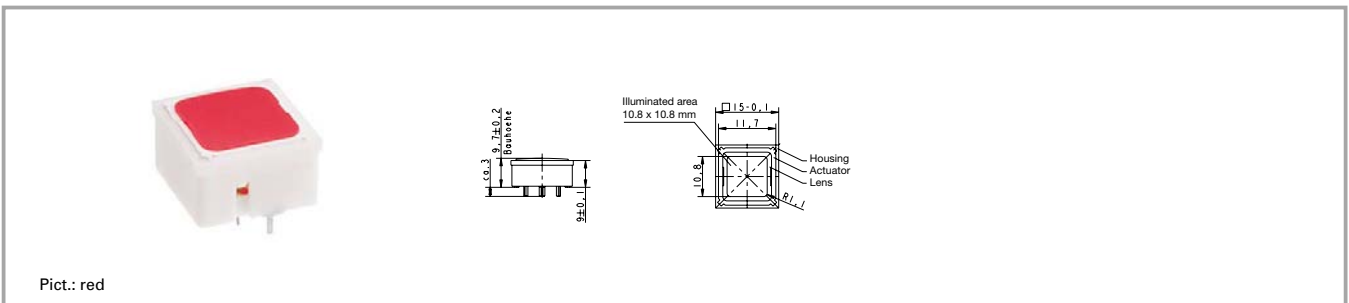
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Ag	fully illuminated 2 LEDs	red	red	2 mm	**3.14.200.021/0000**
Ag	fully illuminated 2 LEDs	green	green	2 mm	**3.14.200.022/0000**
Ag	fully illuminated 2 LEDs	yellow	yellow	2 mm	**3.14.200.023/0000**
Ag	fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.200.024/0000
Ag	fully illuminated 2 LEDs	blue	blue	2 mm	3.14.200.025/0000
Au	fully illuminated 2 LEDs	green	green	2 mm	**3.14.200.012/0000**
Au	fully illuminated 2 LEDs	yellow	yellow	2 mm	**3.14.200.013/0000**
Au	fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.200.014/0000
Au	fully illuminated 2 LEDs	blue	blue	2 mm	3.14.200.015/0000

Technical data see page 4 - 26

For keycaps, refer to RK 90 system design.
Technical data of LED see seperate page at the beginning of this chapter.

4

RF

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

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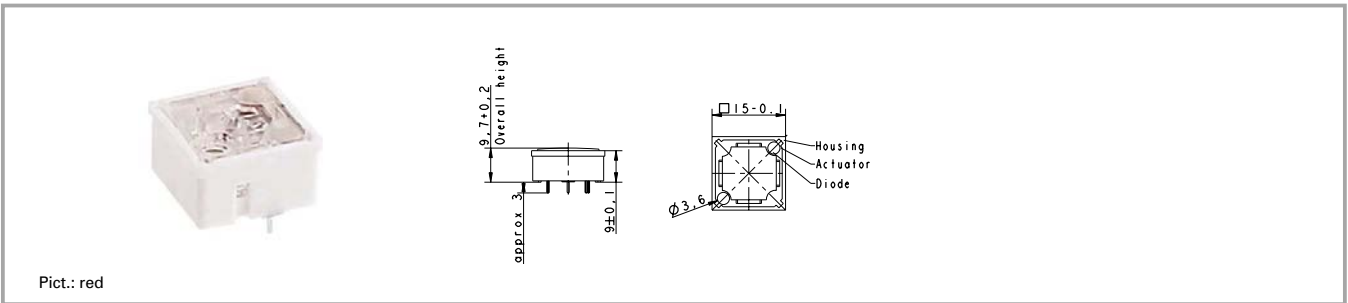
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Ag	spot illumination 1 LED	opaque white	blue	3 mm	3.14.100.040/0000
Ag	spot illumination 1 LED	transparent	red	3 mm	**3.14.100.041/0000**
Ag	spot illumination 1 LED	transparent	green	3 mm	**3.14.100.042/0000**
Ag	spot illumination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

Technical data see page 4 - 26

Double-spot LED illumination available on request
Technical data of LED see seperate page at the beginning of this chapter.

4

RF

Stock items are marked
by **bold printed** order numbers.

RF short-travel keyswitches

RAFI
SOLUTIONS WITH PASSION

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, fix contact Ag plated
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	Au/Ag
Illumination	external 3 mm LED 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 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	10^9 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.	1,000,000
Soldering time max.	2,5 sec.
Soldering temperature max.	250 °C
Flammability of materials	UL 94 HB

RF short-travel keyswitches
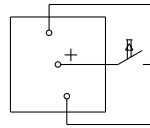
RAFI
SOLUTIONS WITH PASSION

Force/Travel Diagram – Keyswitch RF 15 N
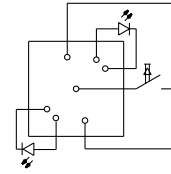
Operation characteristic limits RF
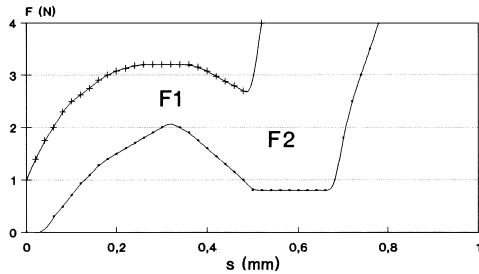
F 1 = Max. operating force
F 2 = Force at contact
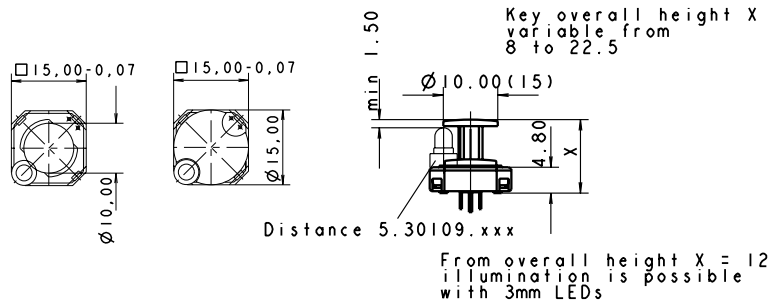F 2 is max. 55% of F 1

Circuit Diagram – Keyswitch RF 15 N

Keyswitch, non illuminated

Keyswitch, spot-illuminated

Dimensional Drawings RF 15 N

RAFI
SOLUTIONS WITH PASSION
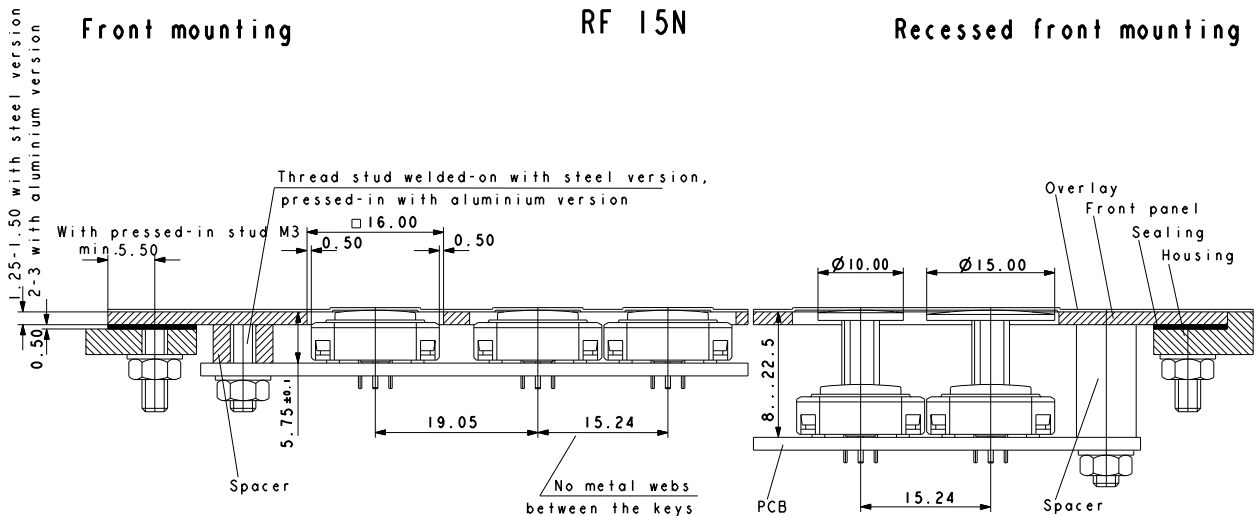
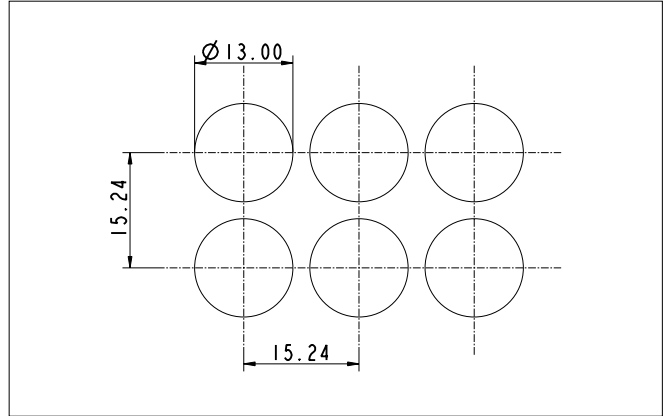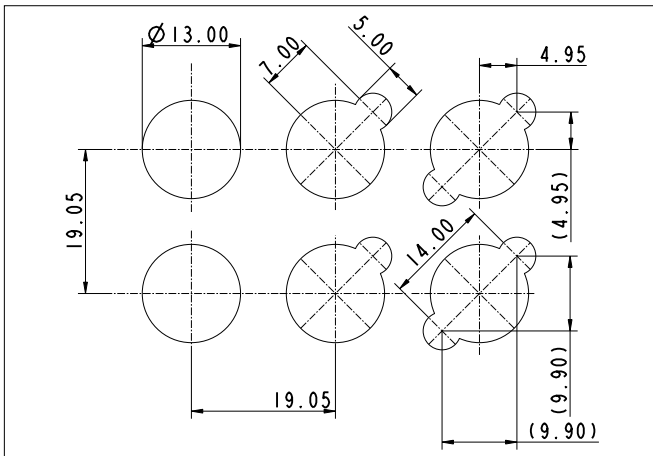## Hole Patterns – Front Panel RF 15 N

RF 15 N without plunger
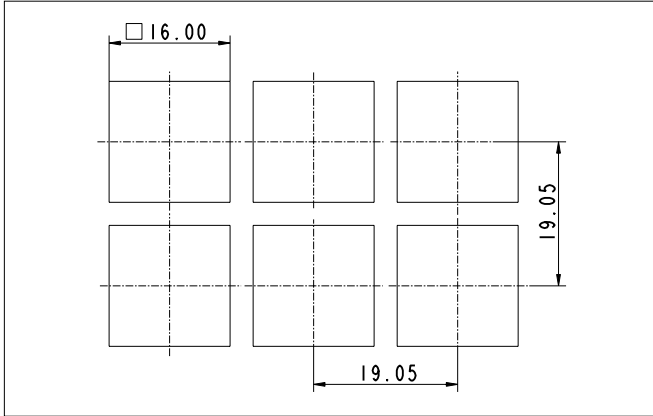
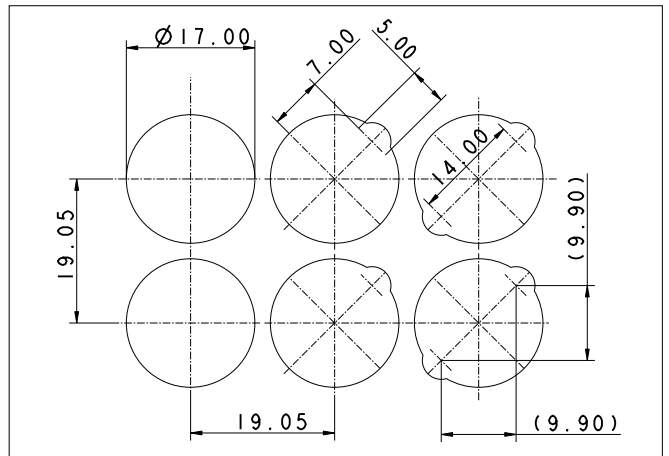

RF 15 N with plunger ø 10 mm, non-illuminated

RF 15 N with plunger ø 10 mm, illuminated

RF 15 N with plunger ø 15 mm, illuminated

4

RF

Hole Pattern RF 15 N
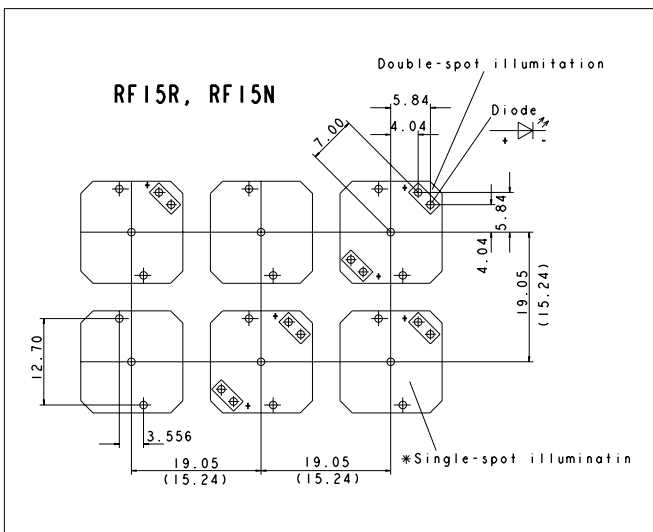
View on component side
All hole diameters 1,1 $^{+/- 0,1}$ mm
PCB layout Keyswitch 1/400" grid

Accessories RF 15 N short-travel keyswitch

Description	Photo	Order no.	Page
LED yellow, 3mm		1.90.690.103/0000	5 - 20
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		**5.46.011.028/0710**	
Extension plunger for RF 15 N, Ø 15 mm, overall height 22.5 mm		**5.46.017.028/0710**	

RF 15 N short-travel keyswitch, non-illuminated
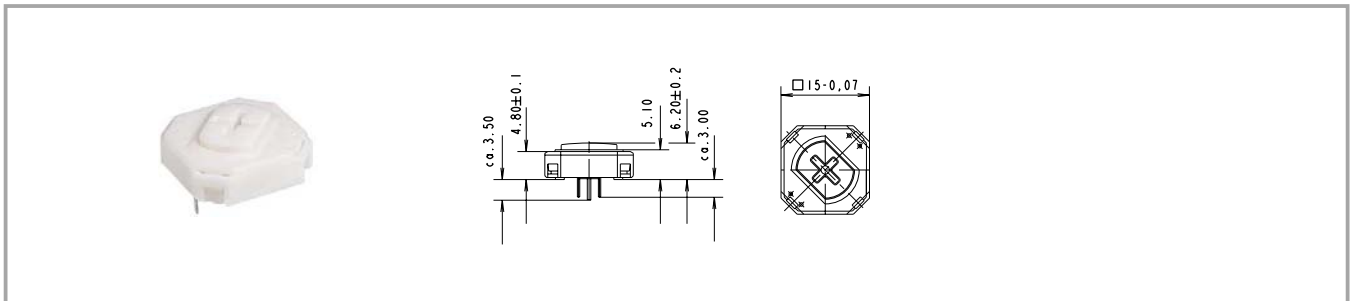
Contact materials	Illumination	Recommended key grid	Overall height	Order no.
Au	external 3 mm LED possible if height < 12 mm	19.05 mm	6.2 mm	**3.14.100.601/0000**
Ag	external 3 mm LED possible if height < 12 mm	19.05 mm	6.2 mm	**3.14.100.606/0000**

Technical data see page 4 - 32

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

4

RF

Stock items are marked
by **bold printed** order numbers.

RF short-travel keyswitches

RAFI
SOLUTIONS WITH PASSION

RF 15 R short-travel keyswitch

Pict.: with 2 mm LED, red

with 3 mm LED, green
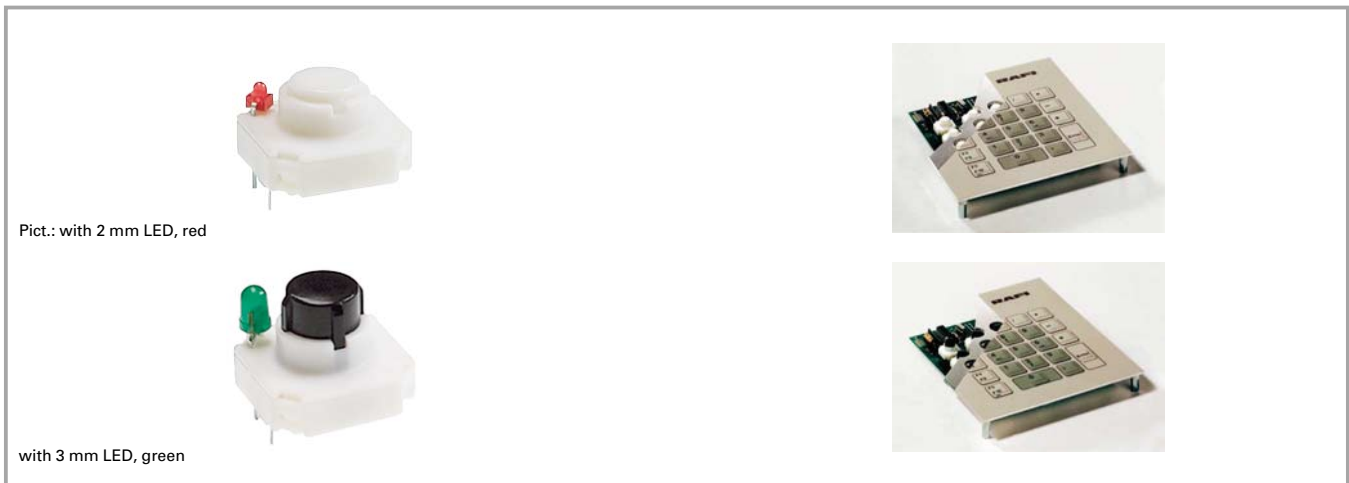
General data

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

4

RF

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	contacts tin-plated, 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	10^9 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.	1,000,000
Soldering time max.	2,5 sec.
Soldering temperature max.	250 °C
Flammability of materials	UL 94 HB

PCB Keyswitches

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
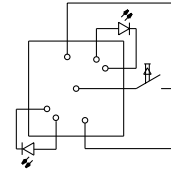
Keyswitch,
spot-illuminated

Dimensional Drawing RF 15 R
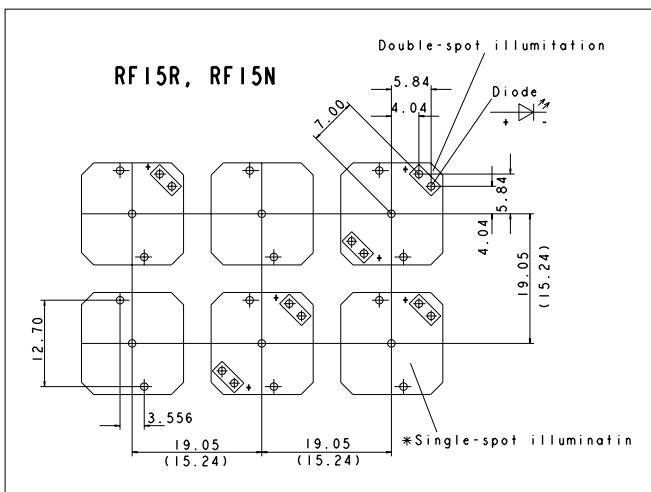
4

RF

Hole Pattern RF 15 R

View on component side
All hole diameters 1,1 $^{+/- 0,1}$ mm
PCB layout Keyswitch 1/400″ grid

RAFI
SOLUTIONS WITH PASSION

Hole Pattern – Front Panel RF 15 R

RF 15 R, non-illuminated
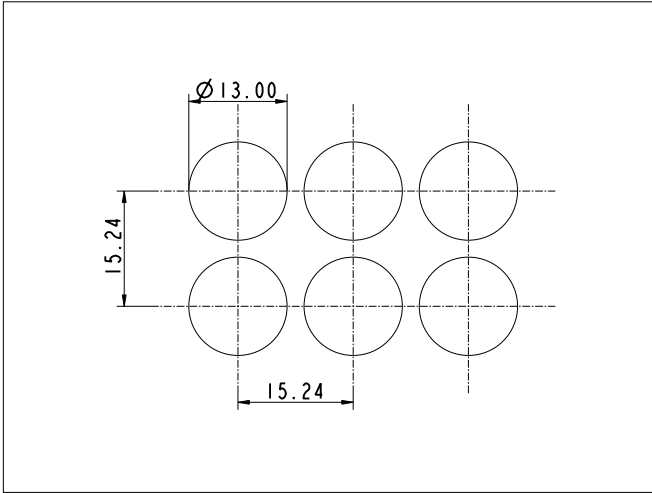
RF 15 R, illuminated
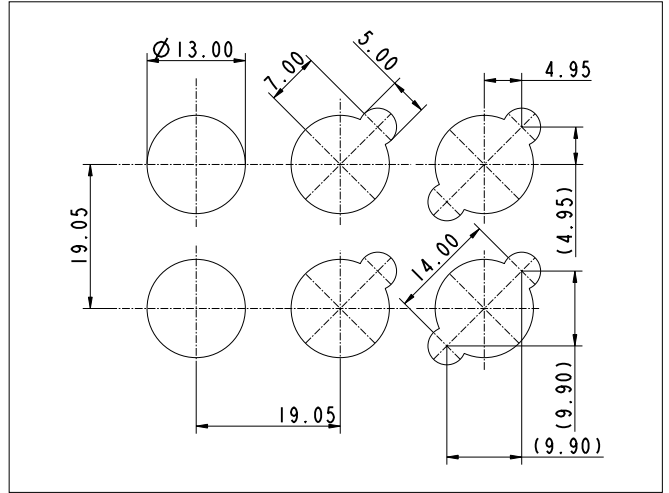
RF 15 R low short-travel keyswitch, non-illuminated
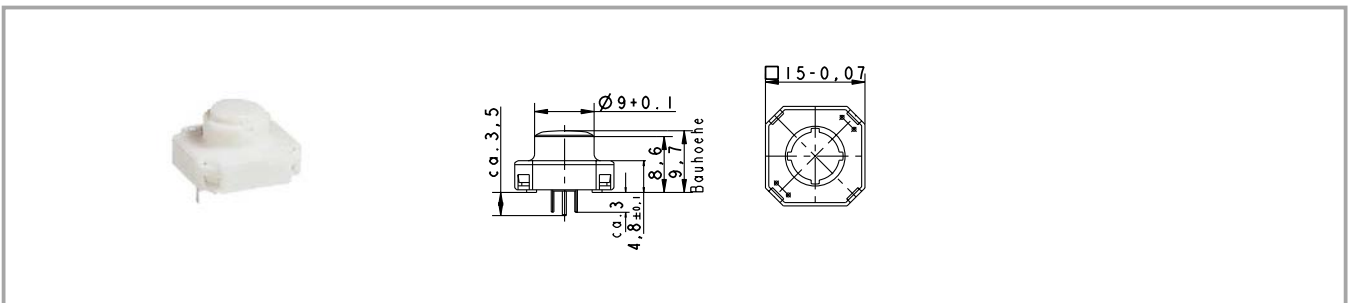
Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	9.7 mm	not illuminated			**3.14.100.501/0000**
Ag	9.7 mm	not illuminated			**3.14.100.506/0000**

Technical data see page 4 - 36

RF 15 R high short-travel keyswitch, non-illuminated
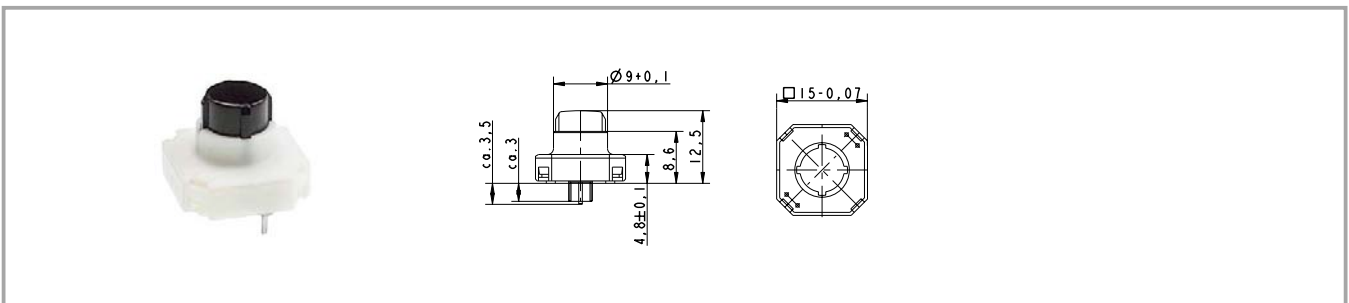
Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	12.5 mm	not illuminated			**3.14.100.801/0000**
Ag	12.5 mm	not illuminated			**3.14.100.806/0000**

Technical data see page 4 - 36

4

RF

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

Pict.: with 2 mm LED, red
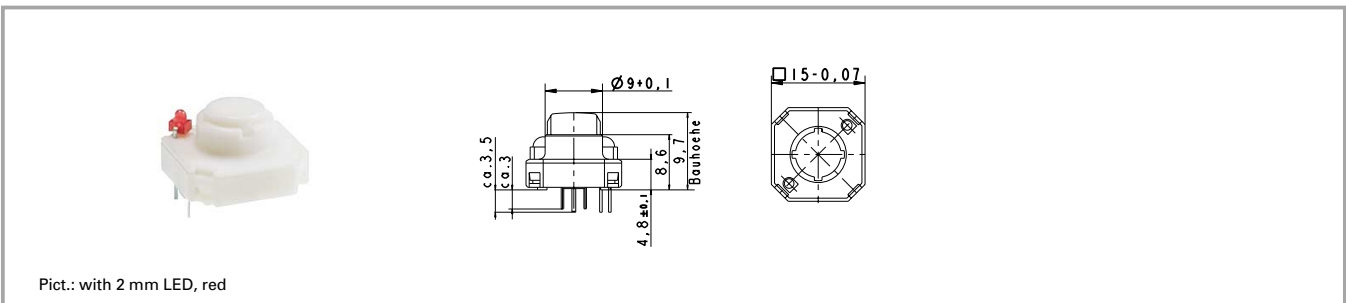
Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	9.7 mm	spot illumination 1 LED	2 mm	red	**3.14.100.531/0000**
Au	9.7 mm	spot illumination 1 LED	2 mm	green	**3.14.100.532/0000**
Au	9.7 mm	spot illumination 1 LED	2 mm	yellow	**3.14.100.533/0000**
Ag	9.7 mm	spot illumination 1 LED	2 mm	red	3.14.100.541/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	green	3.14.100.542/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	yellow	3.14.100.543/0000

Technical data see page 4 - 36

Versions with 2 LEDs available on request.
Technical data of LED see seperate page at the beginning of this chapter.

4

RF

Stock items are marked
by **bold printed** order numbers.

RF 15 R high short-travel keyswitch, 1 LED spot-illumination
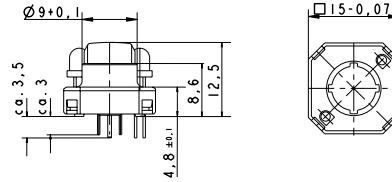
Pict.: with 3 mm LED, green

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

Technical data see page 4 - 36

Versions with 2 LEDs available on request.
Technical data of LED see seperate page at the beginning of the chapter.

4

RF

RF short-travel keyswitches

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 / 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	10^9 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.	1,000,000
Soldering time max.	2,5 sec.
Soldering temperature max.	250 °C
Flammability of materials	UL 94 HB

4

RF

RAFI
SOLUTIONS WITH PASSION

Force/Travel Diagram – Keyswitch RF 15 H

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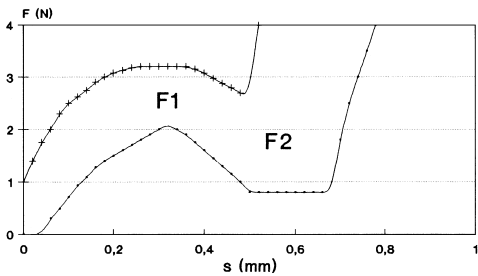
F 1 = Max. operating force
F 2 = Force at contact
F 2 is max. 55% of F 1

Circuit Diagram – Keyswitch RF 15 H
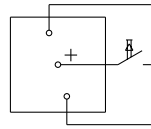
Keyswitch,
non-illuminated
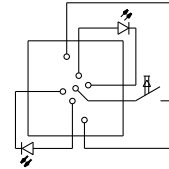
Keyswitch,
fully illuminated

Dimensional Drawing

Hole Pattern

No metal webs with 15.24 mm. View on component side.
All hole diameters 1,1 $^{+/- 0,1}$ mm. PCB layout Keyswitch 1/400″ grid.

Hole Pattern – Front Panel

4

RF
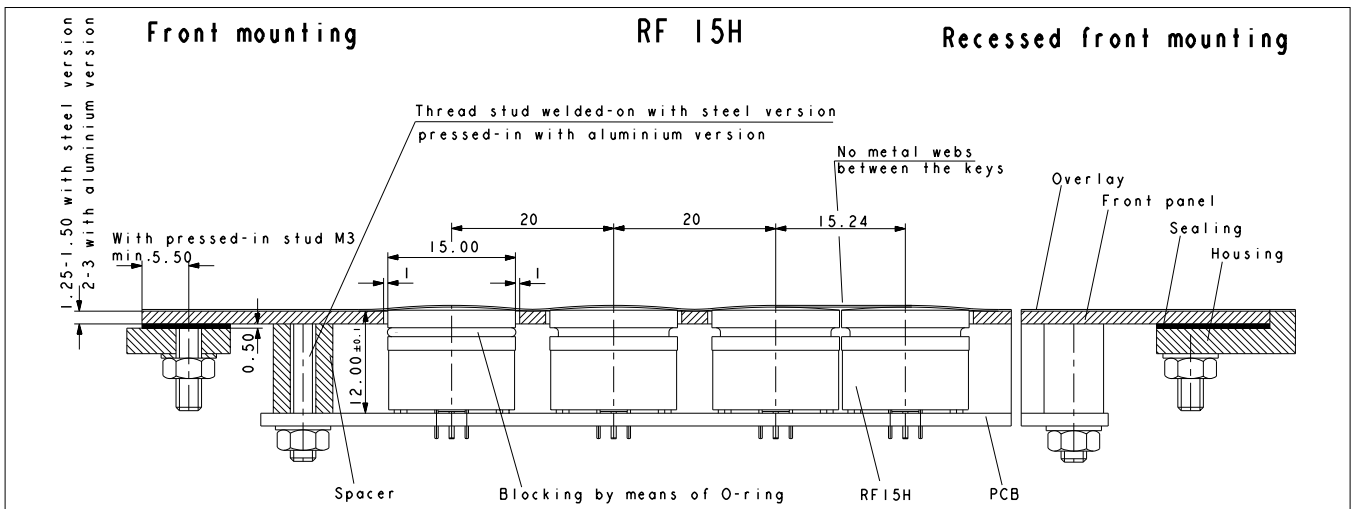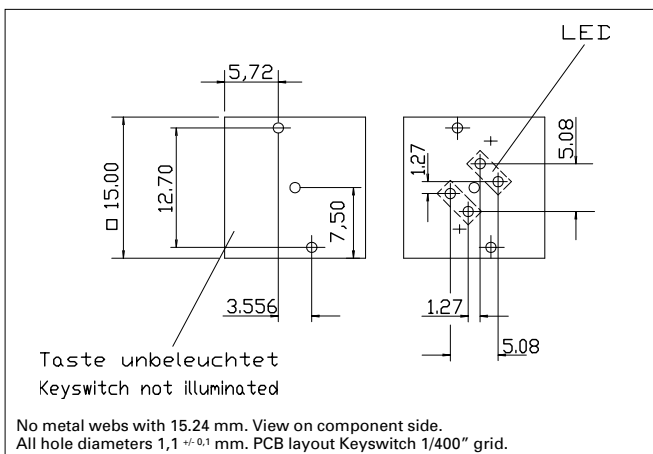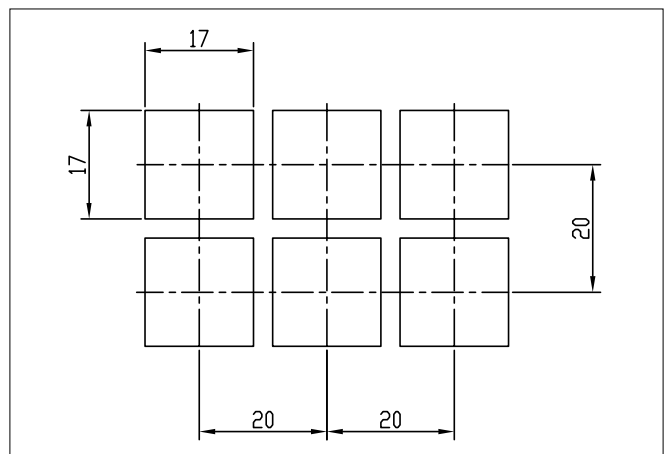
Accessories RF 15 H short-travel keyswitch

Description	Photo	Order no.	Page
O-ring, black, for blocking the operating stroke		**5.30.120.009/0100**	5 - 27

RF 15 H short-travel keyswitch, non-illuminated
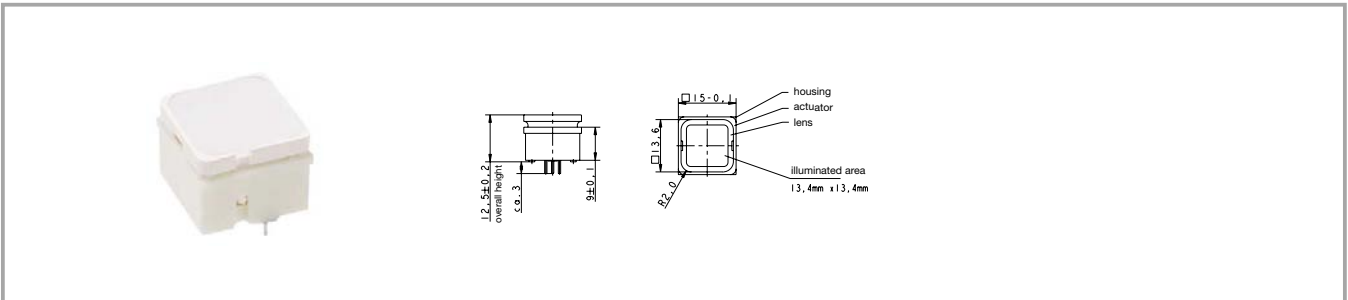
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	not illuminated	white			**3.14.100.702/0000**
Ag	not illuminated	white			**3.14.100.707/0000**

Technical data see page 4 - 42

RF 15 H short-travel keyswitch, fully illuminated
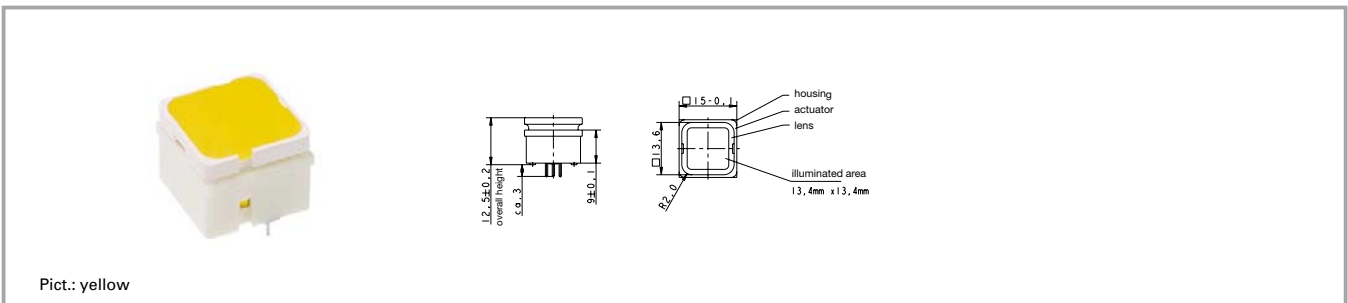
Pict.: yellow

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

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.
Technical data of LED see seperate page of the beginning of this chapter.

Stock items are marked
by **bold printed** order numbers.

RAFI

SOLUTIONS WITH PASSION

RF 15 signal indicator

Pict.: green

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
Illumination	fully illuminated 1 LED
LED colour	see order block
LED type	2 mm

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

4

RF

PCB Keyswitches

Dimensional Drawing Signal Indicator RF 15

4 - 47

Front mountig   RF 15   Recessed front mounting

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

No metal webs
between the keys

Overlay
Front panel
Sealing
Housing

bei Einpressbolzen M3
min 5.50

15.24   15.24   19.05

15.00

1.00

1.25-1.50 with steel version
2-3 with aluminium version

0.50

12.00±0.1

9.20±0.1

Spacer   RF15 with snap-on keycap

RF15 signal indicator   PCB

RF15 iluminated key   RF15 non iluminated

Hole Pattern

Hole Pattern – Front Panel

RF15, RF15H

*Spot-illuminated
5.00

Signal indicator
2.54   3.21

45°   5.00

2.54

19.05
(15.24min.)
12.70

Diode

1.27

5.08

3.556   1.27
5.08

19.05   19.05
(15.24min.)   (15.24min.)

Signal indicator

Non illuminated key

Fully illuminated key

No metal webs with 15.24 mm. View on component side.
All hole diameters 1,1 +/-0,1 mm.

□ 16.00

19.05

19.05

4

RF

RAFI
SOLUTIONS WITH PASSION

RF 15 signal indicator, fully illuminated, 1 LED

Pict.: green
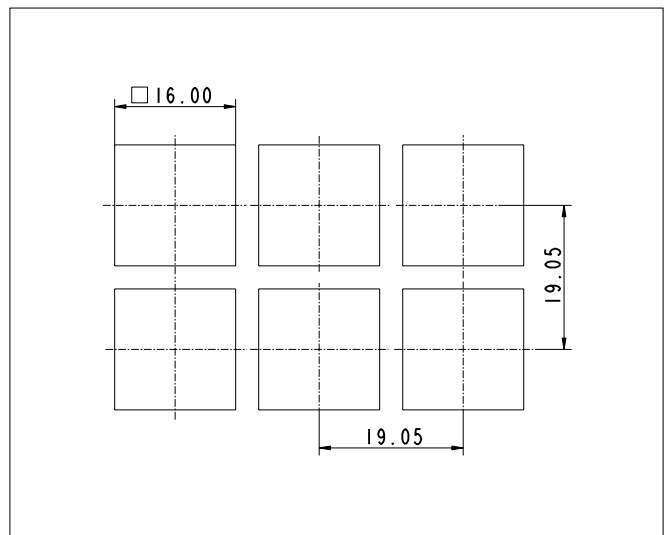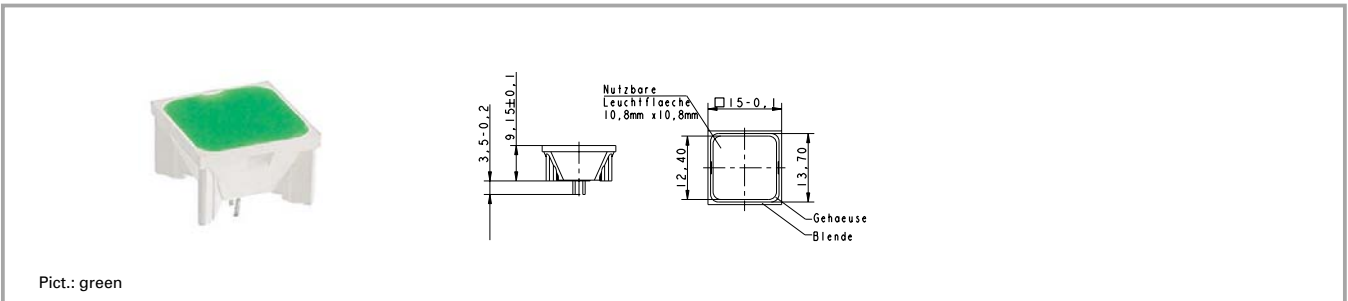
Overall height	Illumination	Colour of lens	LED colour	LED type	Order no.
9.7 mm	fully illuminated 1 LED	red	red	2 mm	**3.14.200.051/0000**
9.7 mm	fully illuminated 1 LED	green	green	2 mm	**3.14.200.052/0000**
9.7 mm	fully illuminated 1 LED	yellow	yellow	2 mm	**3.14.200.053/0000**
9.7 mm	fully illuminated 1 LED	orange	yellow	2 mm	3.14.200.054/0000
9.7 mm	fully illuminated 1 LED	blue	blue	2 mm	3.14.200.055/0000

Technical data see page 4 - 46

For more information, see LEDs.
Technical data of LED see seperate page of the beginning of this chapter.

4

RF

Stock items are marked
by **bold printed** order numbers.

RF short-travel keyswitches

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 >= 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 mΩ
Contact resistance acc. to life max.	3 Ω
Insulation resistance	10^9 Ω
ESD strength (underneath overlay)	15 kV
Bouncing time max.	5 ms

Other specifications

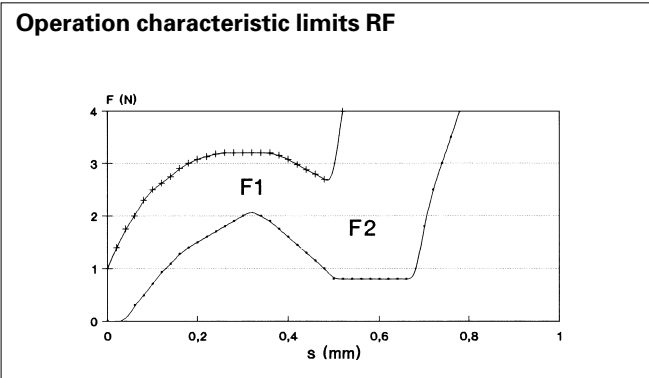|	
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Storage temperature min.	-40 °C
Storage temperature max. (product)	+80 °C
Storage temperature max. (in tube)	+50 °C
Resistance to constant environment	according to IEC 600 68-2-3 and 2-30
Resistance at variable environment	according to IEC 600 68-2-14 and 2-33
Operating life min.	1,000,000
Soldering time max.	2,5 sec.
Soldering temperature max.	250 °C
Flammability of materials	UL 94 HB

RAFI
SOLUTIONS WITH PASSION

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

Front mounting RF 19 Recessed front mounting

Thread stud weided-on with steel version
pressed-in with aluminium version

No metal webs between the keys

Overlay
Front panel
Sealing
Housing

With pressed-in stud M3 min. 5.5

19.05
19
19
22.86

1.25 with steel version
2-3 with aluminium version

0.5
9.2
1
1

Spacer
Illuminated key
Signal Indicator
PCB

RF short-travel keyswitches

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

Hole Patterns – Front Panel RF 19

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

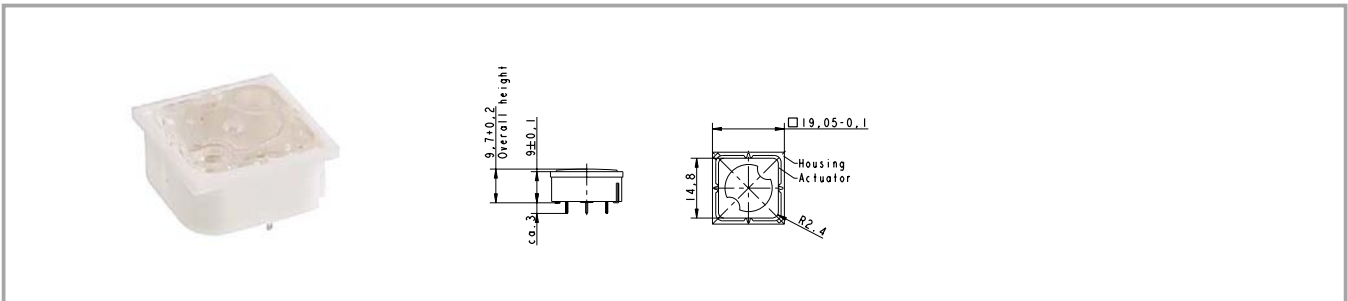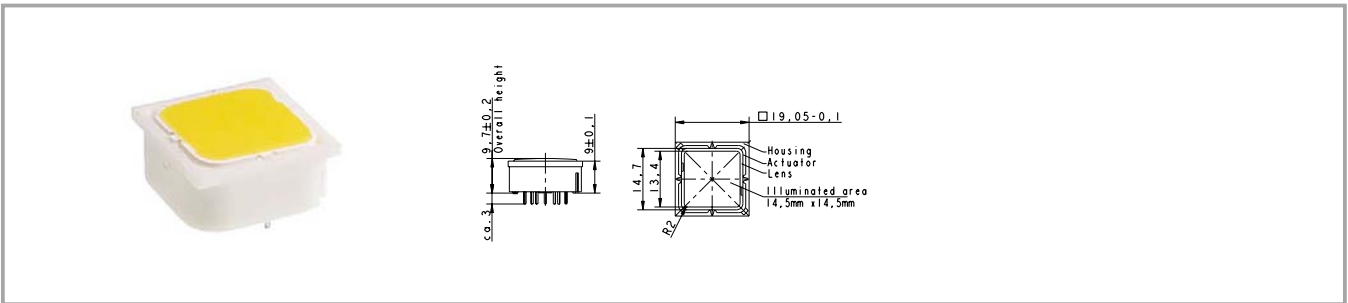| Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	fully illuminated 2 LEDs	red	red	2 mm	**3.14.002.011/0000**
Au	fully illuminated 2 LEDs	green	green	2 mm	**3.14.002.012/0000**
Au	fully illuminated 2 LEDs	yellow	yellow	2 mm	**3.14.002.013/0000**
Au	fully illuminated 2 LEDs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

Technical data see page 4 - 50

Technical data of LED see seperate page of the beginning of this chapter.

4

RF

Stock items are marked
by **bold printed** order numbers.

PCB Keyswitches

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

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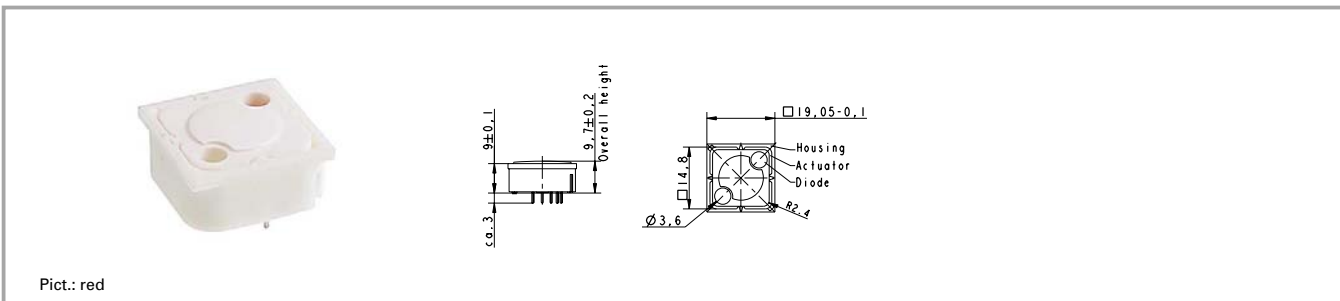
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	spot illumination 1 LED	opaque white	blue	3 mm	3.14.001.030/0000
Au	spot illumination 1 LED	transparent	red	3 mm	**3.14.001.031/0000**
Au	spot illumination 1 LED	transparent	green	3 mm	**3.14.001.032/0000**
Au	spot illumination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

Technical data see page 4 - 50

Versions with 2 LEDs available on request.
Technical data of LED see seperate page of the beginning of this chapter.

4

RF

RAFI
SOLUTIONS WITH PASSION

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
Contact system | bridge contact
Contact arrangement | 1 NC + 1 NO
Contact materials | Au/Ag
Illumination | none

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
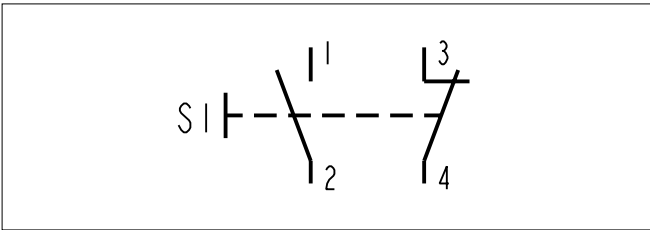Rated power max. (ohmic load) | Au: 2 W, Ag: 12.5 W

For keycaps, refer to RK 90.

Contact resistance when new max. | 100 mΩ
Contact resistance acc. to life max. | 3 Ω
Insulation resistance | 2×10^6 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. | 100000
Soldering time max. | 5 sec.
Soldering temperature max. | 265 °C
Flammability of materials | UL 94 HB

4

RF

Circuit Diagram

Dimensional Drawing
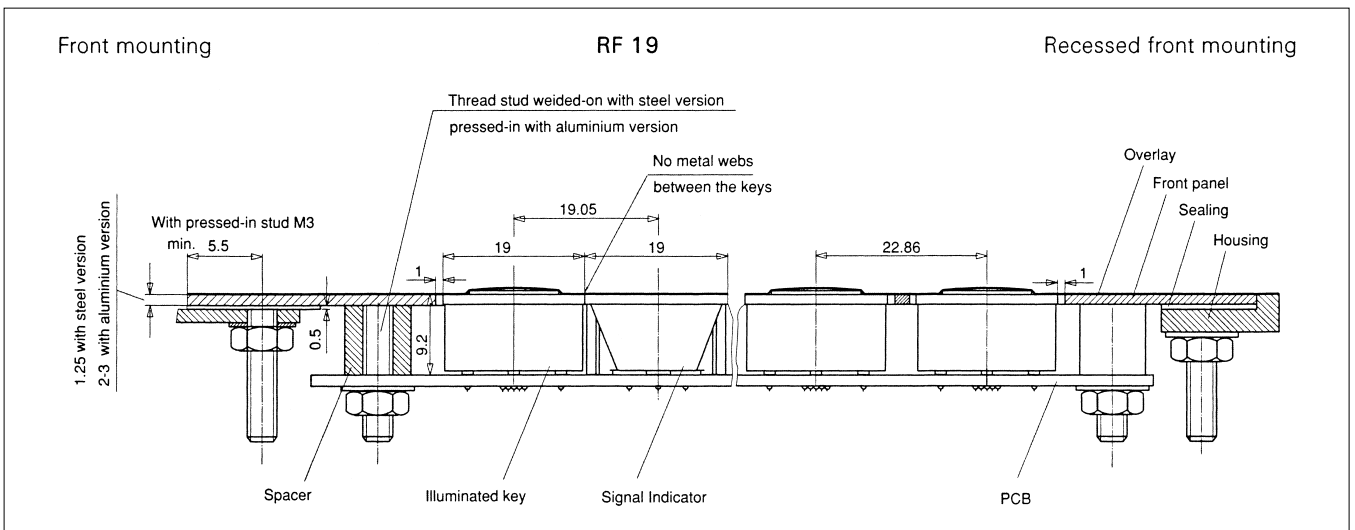
Front mounting   RF 19   Recessed front mounting

Hole Pattern

view on component side

Hole Pattern – Front Panel

4

RF
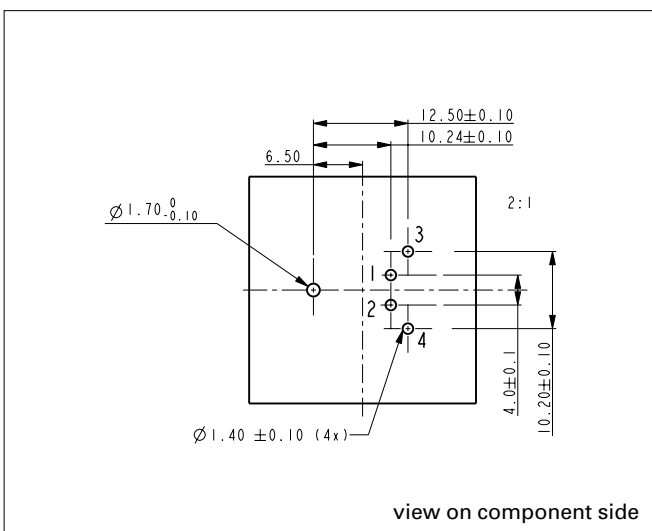
RF 19 short-travel keyswitch, non-illuminated

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 short-travel keyswitches

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, 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	10^9 Ω
ESD strength (underneath overlay)	15 kV
Bouncing time max.	5 ms

Other specifications

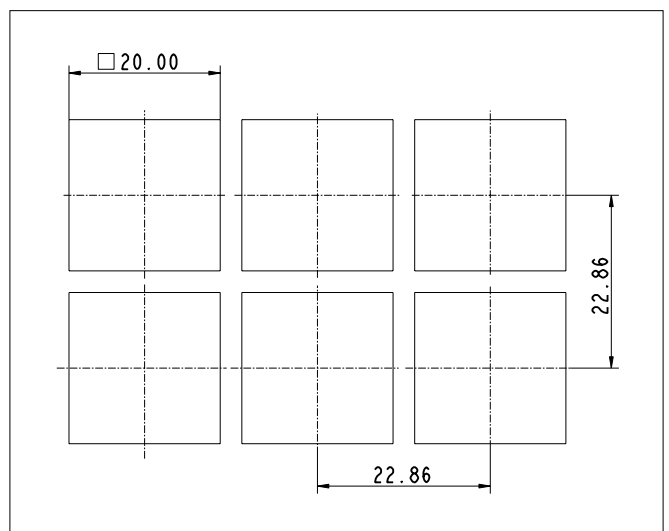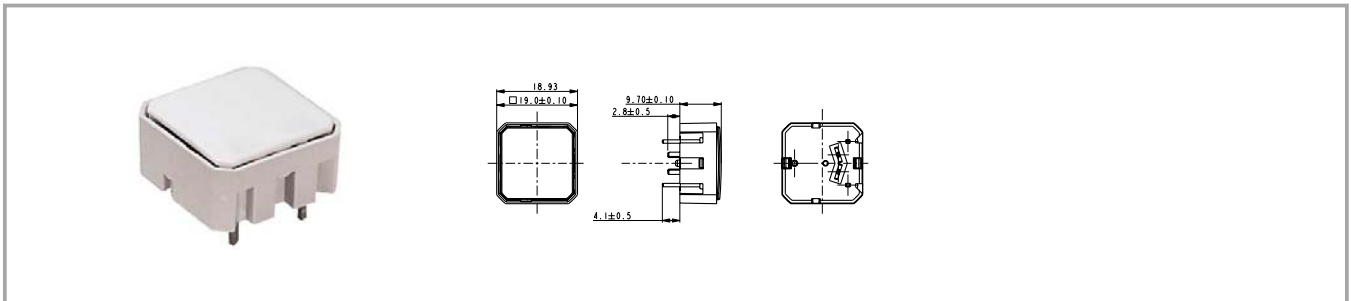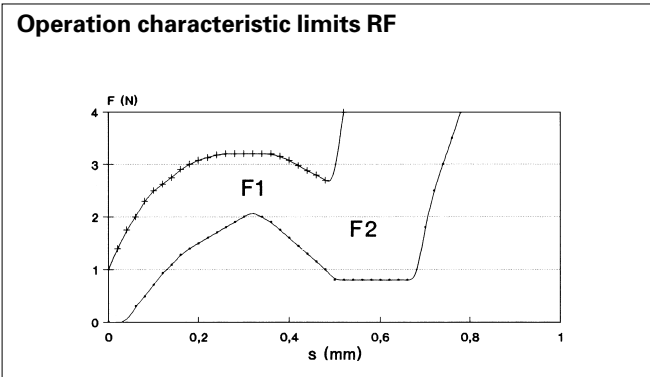|	
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Storage temperature min.	-40 °C
Storage temperature max. (product)	+80 °C
Storage temperature max. (in tube)	+50 °C
Resistance to constant environment	according to IEC 600 68-2-3 and 2-30
Resistance at variable environment	according to IEC 600 68-2-14 and 2-33
Operating life min.	1,000,000
Soldering time max.	2,5 sec.
Soldering temperature max.	250 °C
Flammability of materials	UL 94 HB

RAFI
SOLUTIONS WITH PASSION

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

Front mounting

RF 19H

Recessed front mounting

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

1.25-1.50 with steel version
2-3 with aluminium version

With pressed-in stud M3
min. 5.50

19.05   24   24

19.00

0.50   12.00±0.1

Overlay
Front panel
Sealing
Housing

Spacer

No metal webs
between the keys

RF19H   PCB

4

RF

RAFI
SOLUTIONS WITH PASSION

Hole Pattern RF 19 H

Hole Pattern – Front Panel RF 19 H
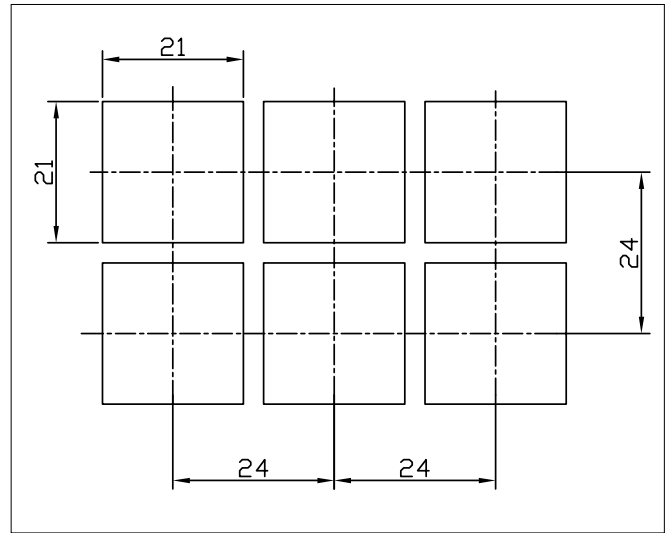
Keyswitch not illuminated

* 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

Accessories RF 19 H short-travel keyswitch

Description	Photo	Order no.	Page
O-ring, black, 17.0 x 1.5, for blocking RF 19H keys		5.30.125.003/0100	5 - 27

RF 19 H keyswitch, non-illuminated
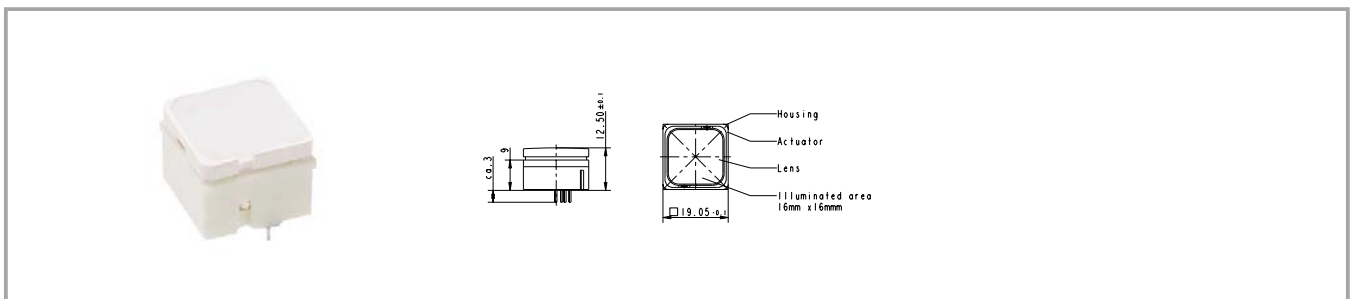
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	not illuminated	white			3.14.001.501/0000
Ag	not illuminated	white			3.14.001.506/0000

Technical data see page 4 - 60
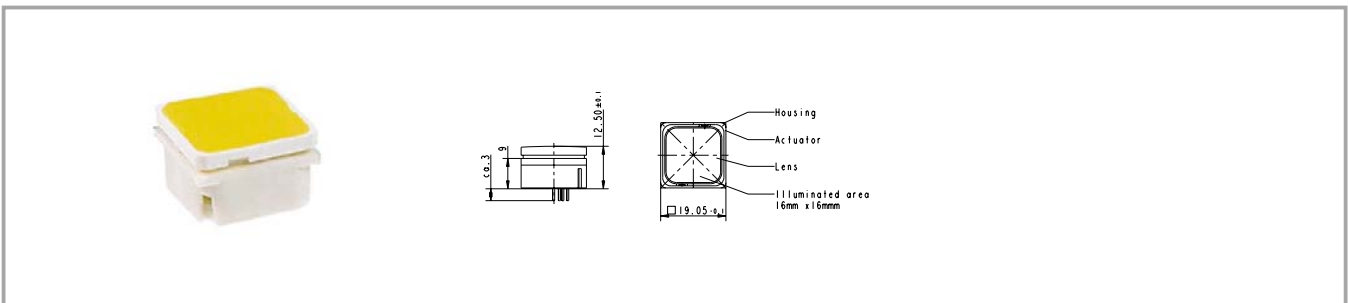
Stock items are marked
by **bold printed** order numbers.

RF 19 H short-travel keyswitch, fully illuminated

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

4

RF

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.
Technical data of LED see seperate page of the beginning of this chapter.

RF 19 signal indicator
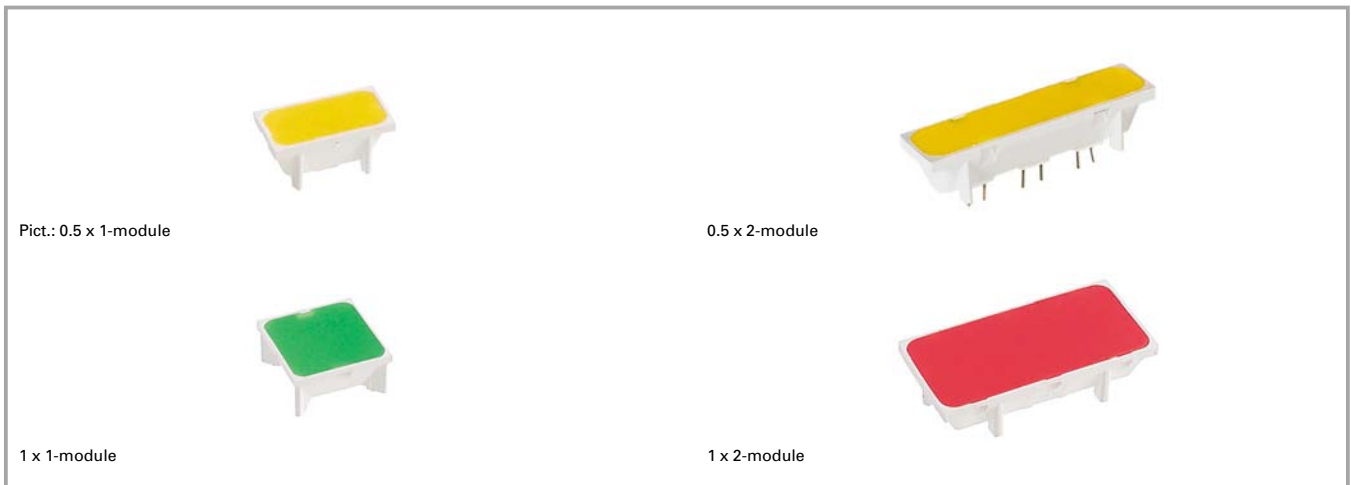
Pict.: 0.5 x 1-module

0.5 x 2-module

1 x 1-module

1 x 2-module

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

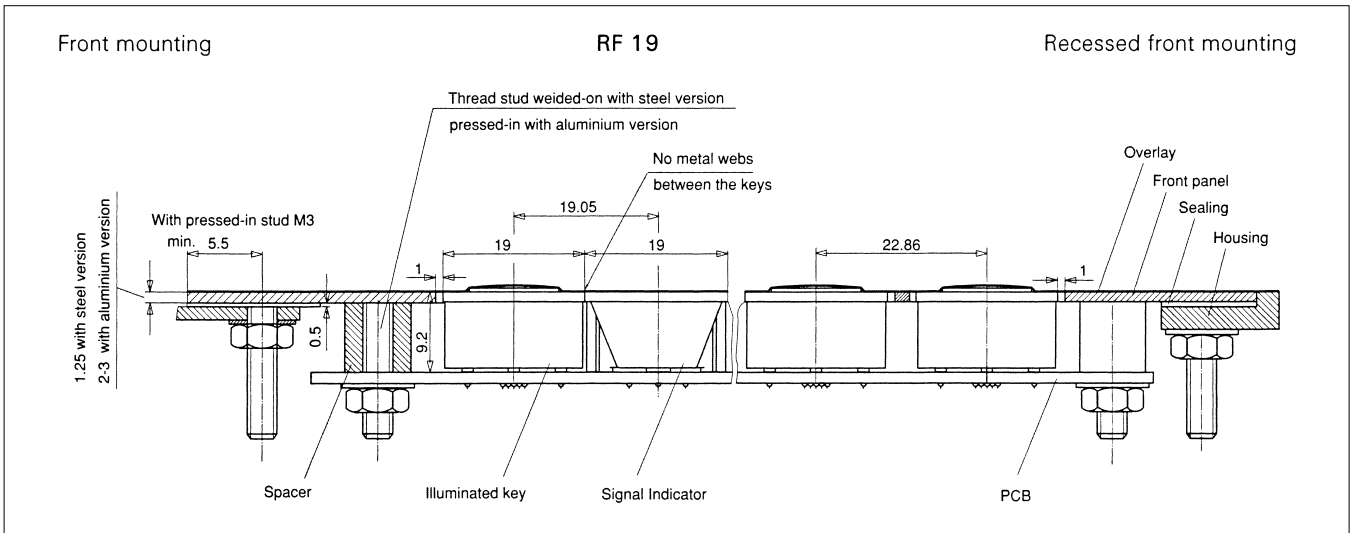|	
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Storage temperature min.	-40 °C
Storage temperature max. (product)	+80 °C
Storage temperature max. (in tube)	+50 °C
Resistance to constant environment	according to IEC 600 68-2-3 and 2-30
Resistance at variable environment	according 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

4

RF

RF short-travel keyswitches
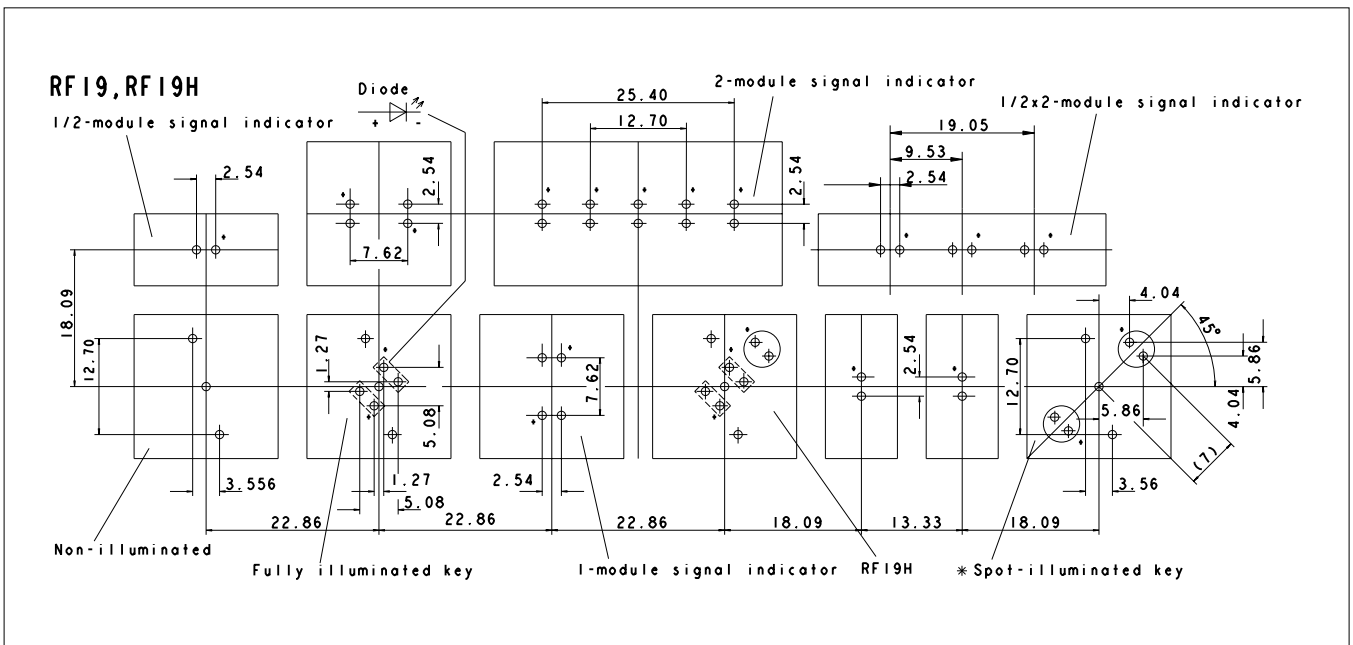
Dimensional Drawing Signal Indicator RF 19
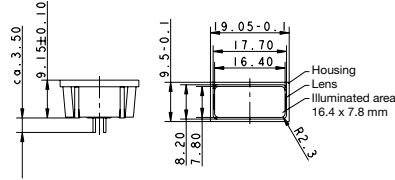

Hole Patterns RF 19

* The LED may be positioned either on the left-hand or right-hand side.
  Standard verstion: 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
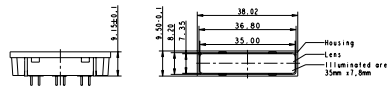
RF 19 signal indicator, $^1/_2$ x 1-module

Pict.: 0,5 x 1-module, yellow

Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 1 LED	red	red	2 mm	**3.14.002.061/0000**
fully illuminated 1 LED	green	green	2 mm	**3.14.002.062/0000**
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

Technical data see page 4 - 64

For more information, see LEDs.

RF 19 signal indicator, $^1/_2$ x 2-module

Pict.: 0,5 x 2-module, yellow

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

Technical data see page 4 - 64

For more information, see LEDs.

Stock items are marked
by **bold printed** order numbers.

PCB Keyswitches

RF 19 signal indicator, 1 x 1-module
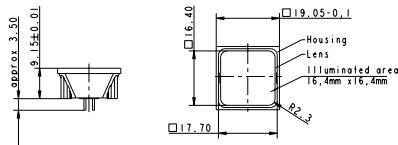
Pict.: 1 x 1-module, green

Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 2 LEDs	red	red	2 mm	**3.14.002.051/0000**
fully illuminated 2 LEDs	green	green	2 mm	**3.14.002.052/0000**
fully illuminated 2 LEDs	yellow	yellow	2 mm	**3.14.002.053/0000**
fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.002.054/0000
fully illuminated 2 LEDs	blue	blue	2 mm	3.14.001.659/0000

Technical data see page 4 - 64

For more information, see LEDs.
Suitable for RK 90 system design, illuminated for 2-module keycap.

RF 19 signal indicator, 1 x 2-module
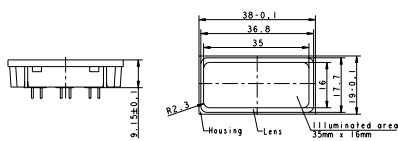
Pict.: 1 x 2-module, red

Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 5 LEDs	red	red	2 mm	**3.14.002.071/0000**
fully illuminated 5 LEDs	green	green	2 mm	**3.14.002.072/0000**
fully illuminated 5 LEDs	yellow	yellow	2 mm	**3.14.002.073/0000**
fully illuminated 5 LEDs	orange	yellow	2 mm	3.14.002.074/0000

Technical data see page 4 - 64

For more information, see LEDs.

RF special accessories

Pict.: light grey

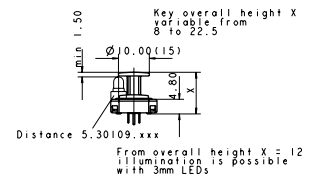round and triangular versions

Extension plunger for RF 15 N, round head

□15,00-0,07

Ø10,00

Key overall height X
variable from
8 to 22.5

min 1.50

Ø10.00(15)

4.80
X

Distance 5.30109.xxx

From overall height X = 12
illumination is possible
with 3mm LEDs

Pict.: light grey
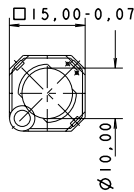
Length	Width	Overall height	Diameter	Colour	Order no.
		9 mm	10 mm		**5.46.011.036/0710**
		9.7 mm	10 mm		**5.46.011.030/0710**
		12.5 mm	10 mm		**5.46.011.037/0710**
		13 mm	10 mm		**5.46.011.038/0710**
		22.5 mm	10 mm		**5.46.011.028/0710**

Length of plunger = Overall height - 4.25 mm.

4

RF

Stock items are marked
by **bold printed** order numbers.

Extension plunger for RF 15 N, round head, with recess for LED
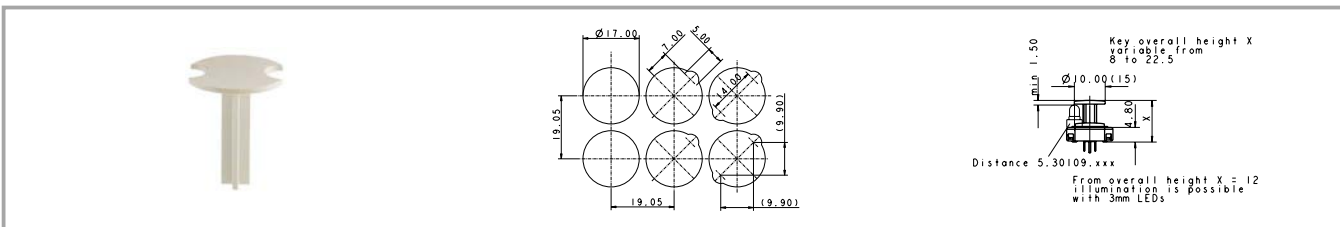
Length	Width	Overall height	Diameter	Colour	Order no.
		9 mm	15 mm		**5.46.017.036/0710**
		9.7 mm	15 mm		**5.46.017.030/0710**
		12.5 mm	15 mm		**5.46.017.037/0710**
		13 mm	15 mm		**5.46.017.038/0710**
		22.5 mm	15 mm		**5.46.017.028/0710**

Keycap for RF 15, snap-on, for overall height 12.5 mm
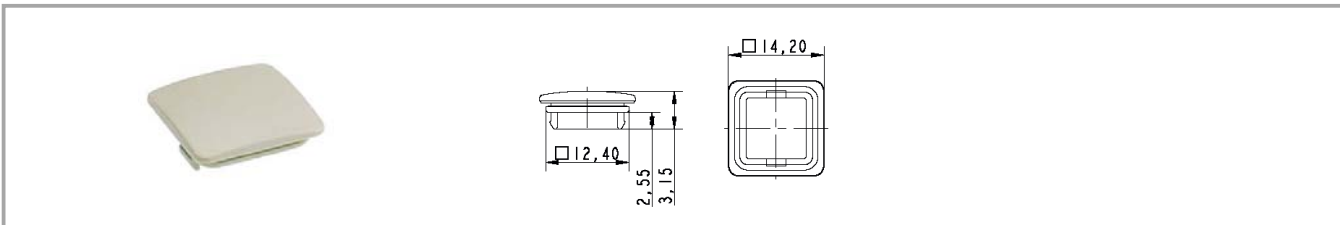
Length	Width	Overall height	Diameter	Colour	Order no.
14.2 mm	14.2 mm	12.5 mm		beige	5.46.654.059/0227

4

RF

RAFI
SOLUTIONS WITH PASSION

Spacers, round
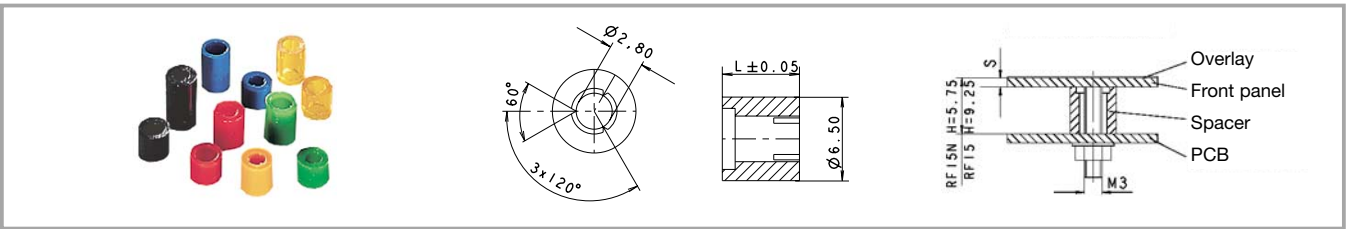
Length	Width	Overall height	Diameter	Colour	Order no.
3.50 mm				blue transparent	**5.30.759.023/0000**
4 mm				green	**5.30.759.025/0000**
4.25 mm				blue	**5.30.759.026/0000**
4.50 mm				red	**5.30.759.027/0000**
4.75 mm				blue transparent	**5.30.759.028/0000**
5 mm				black	**5.30.759.029/0000**
5.25 mm				yellow orange transparent	**5.30.759.030/0000**
5.50 mm				yellow	**5.30.759.031/0000**
5.75 mm				green	**5.30.759.032/0000**
6 mm				blue	**5.30.759.033/0000**
6.2 mm				blue	**5.30.759.251/0000**
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**
9.00 mm				green	**5.30.759.046/0000**
10.00 mm				black	**5.30.759.043/0104**

4

RF

Stock items are marked
by **bold printed** order numbers.

Spacers, triangular
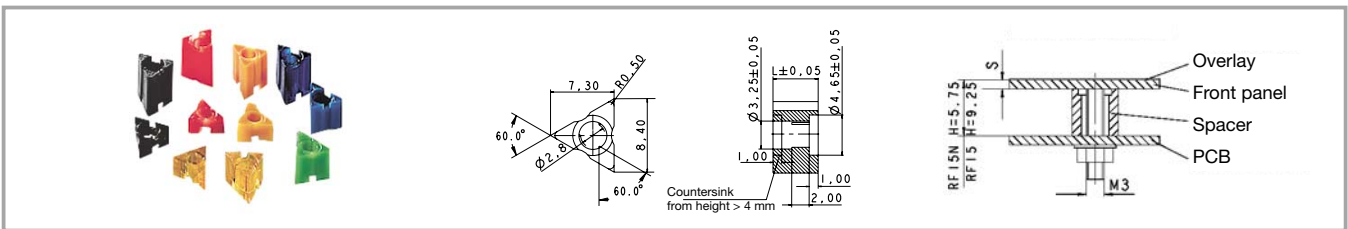
Length	Width	Overall height	Diameter	Colour	Order no.
2.50 mm				blue	**5.30.759.094/0000**
2.75 mm				red	**5.30.759.095/0000**
3 mm				blue transparent	**5.30.759.096/0000**
3.25 mm				black	**5.30.759.097/0000**
3.50 mm				yellow orange transparent	**5.30.759.098/0000**
3.75 mm				yellow	**5.30.759.099/0000**
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**
6.2 mm				blue	**5.30.759.253/0000**
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**

4

RF

Stock items are marked
by **bold printed** order numbers.

RF short-travel keyswitches

Length	Width	Overall height	Diameter	Colour	Order no.
8 mm				red	**5.30.759.116/0000**
8.25 mm				blue transparent	5.30.759.117/0000
9 mm				blue	**5.30.759.254/0000**
10.00 mm				black	5.30.759.124/0000
10.25 mm				yellow orange transparent	5.30.759.125/0000

LED spacer for RF 15 N
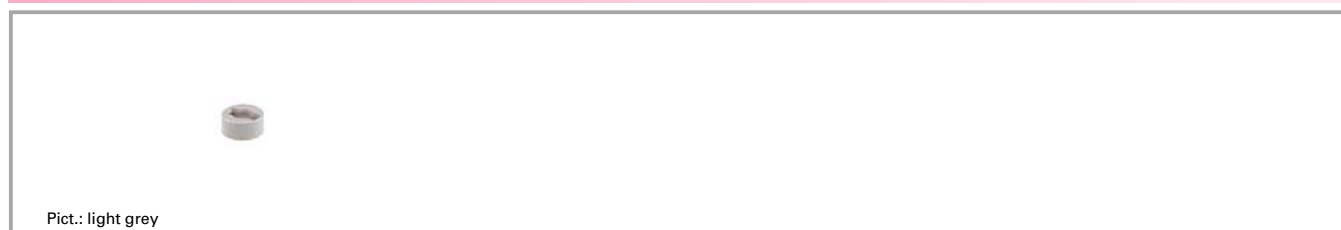
Pict.: light grey

Length Characteristic 1	Width Characteristic 2	Overall height	Diameter	Colour	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

4

RF

Stock items are marked by **bold printed** order numbers.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for rafi *manufacturer:*

Other Similar products are found below :

5.05.510.935/0000　5.00.070.074/0000　1.15.114.936/0000　1.15.108.152/0000　1.30.279.021/0700　5.46.001.127/0200　1.74.510.011/2500

1.10.119.967/0000　1.69.508.113/1002　1.30.270.021/2400　1.20.126.604/0000　1.30.276.601/0000　1.10.011.001/0551　5.00.888.506/1500

1.02.157.201/1300　3.13.026.001/0000　1.30.285.221/0100　1.30.270.021/2300　1.20.124.018/0000　1.66.003.081/1400　1.30.241.001/2207

5.76.204.114/0400　5.73.110.000/0000　1.90.690.351/0000　1.30.295.222/0000　1.30.285.101/0100　1.30.280.001/2201　1.30.275.221/0800

1.30.273.602/0300　1.30.242.026/2207　1.30.073.601/2000　1.20.123.035/0000　1.10.010.001/0221　1.10.099.201/0011　5.70.090.016/1001

5.70.090.011/1001　5.70.090.015/1001　1.20.126.303/9000　5.05.511.747/1500　1.90.692.001/0000　1.01.102.001/0104　3.14.002.052/0000

1.30.275.321/0100　5.05.511.476/2200　1.30.299.021/0700　1.15.108.632/0100　1.15.156.011/0000　1.65.111.051/0000　5.00.100.105/0000

5.00.070.078/0000