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Contact us











Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Product Survey

| Versions | Recommended Key grid | Illumination | | | Overall height | Contacts | Page |
|---|----------------------|-------------------|---|-------------------|---|----------------|--------|
| | | Keyswitch | | Signal indicator | | | |
| RACON 8  | ≥ 12 mm | Non-illuminated | | | 5.0 mm (variable plunger) | Gold | 4 - 6 |
| RACON 12  | ≥ 15.24 mm | Non-illuminated | | | 5.0 mm (variable plunger) | Gold | 4 - 10 |
| RACON 12 V  | | Non-illuminated | | | 5.0 mm (variabler plunger) | Gold | 4 - 14 |
| RACON 12 i  | ≥ 15.24 mm | Fully illuminated | | | 9.7 mm | Gold | 4 - 16 |
| RF 15  | ≥ 19.05 mm | Non-illuminated | Fully/spot illuminated | Fully illuminated | 9.7 mm or 12.5 mm (with keycap) | Gold or Silver | 4 - 26 |
| RF 15 N (nieder)  | ≥ 19.05 mm | Non-illuminated | Illumination by separate/integrated LED (depending on overall height) | | 6.2 mm 9.7 mm 12.5 mm 22.5 mm (var. plunger) | Gold or Silver | 4 - 32 |
| RF 15 R (rund)  | ≥ 15.24 mm | Non-illuminated | Spot illuminated | | 9.7 mm or 12.5 mm | Gold or Silver | 4 - 36 |
| RF 15 H (hoch)  | ≥ 20 mm | Non-illuminated | Fully illuminated | | 12.5 mm | Gold or Silver | 4 - 42 |
| RF 19  | ≥ 23 mm | Non-illuminated | Fully/spot illuminated | Fully illuminated | 9.7 mm | Gold or Silver | 4 - 50 |
| RF 19, 1 Ö + 1 S  | ≥ 23 mm | Non-illuminated | | | 9.7 mm | Gold or Silver | 4 - 56 |

| Versions | Recommended Key grid | Illumination | | Overall height | Contacts | Page |
|--|----------------------|--|-----------------------------|------------------------------|---------------------------------------|---------|
| | | Keyswitch | Signal indicator | | | |
| RF 19 H (high profile)  | ≥ 24 mm | | Fully illuminated | 12.5 mm | Gold or Silver | 4 - 60 |
| Main switch KN19  | ≥ 19.05 x 38.1 mm | Non-illuminated | Spot illuminated with 1 LED | 9.7 mm | Silver | 4 - 75 |
| RK 90 System  | ≥ 12.50 mm | Depending on the type of keyswitch used: – RACON (without plunger) – RF 15/RF 15 N – RF 19 – KN 19 | | | | 4 - 79 |
| RG 85 III System  | ≥ 35/55 mm | Edge-illuminated and symbol illumination | Fully illuminated | 14 mm | Silver | 4 - 95 |
| Full-Travael Keyswitch RS 76  | ≥ 19.05 mm | Non-illuminated | Fully/spot illuminated | 15.5/15.9 mm (with key caps) | RS 76 M: Gold RS 76 C: contactless | 4 - 115 |
| Keyswitches for Conductor Board  | ≥ 19.05 mm | Non-illuminated | | 19.5 mm (without key) | Gold | 4 - 143 |

Examples for Applications Standards

RF 15



CE-Conformity

The products of the Chapter "PCB Keyswitches" can – relating to the CE-conformity according to the Low-Voltage Directive 73/23/EEG – be divided into the following groups:

All products with an operating voltage $U_B > 50 V$

F. ex. Short-Travel Main Switch KN 19, for this product the Low-Voltage Directive 73/23/EEG applies.

All products with an operating voltage $U_B < 50 V$

F. ex. RACON, RF 15, RS 76, for these components no directive applies.

RG 85 III System



Single parts, accessories and illumination

No directive applies for these products.

EMC-Law

The components of this catalogue are within the meaning of the law concerning the electromagnetic conformity (= EMC-Law) "basic components as, for ex., switches, signal lamps or like" and, therefore, do not fall within the scope of the EMC-Law.

Declarations of Conformity

Declarations of conformity for all concerned products are available and can be delivered upon request. Please always state the exact order reference of the respective product.

Marking

The marking will be corresponding to the Low-Voltage Directive 73/23/EEG resp. the Directive "CE-Marking 93/68/EEG" either on the packing or on the product itself or on the shipping documents.

RF 15 with RK 90 System

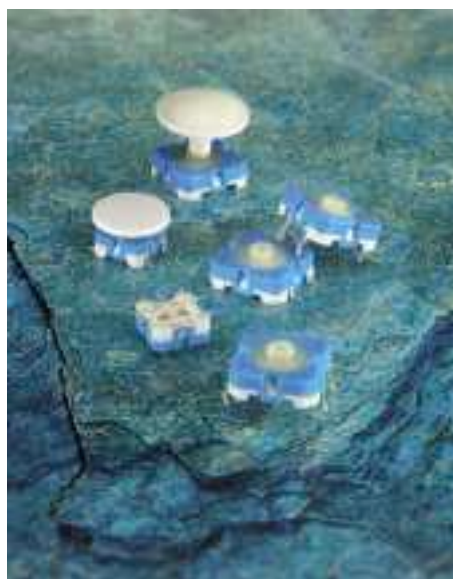


UL-approval

for **RACON 8/12, KN 19 and Short-Travel Keyswitches RF 15/19**

The Short-Travel Main Switch KN 19 and data entry systems which are built with Rafi short-travel switches according to our design proposals meet the requirements of the UL approvals for the American market.

UL file no. for KN 19: E 116362
 UL file no. for data entry systems: E 202520



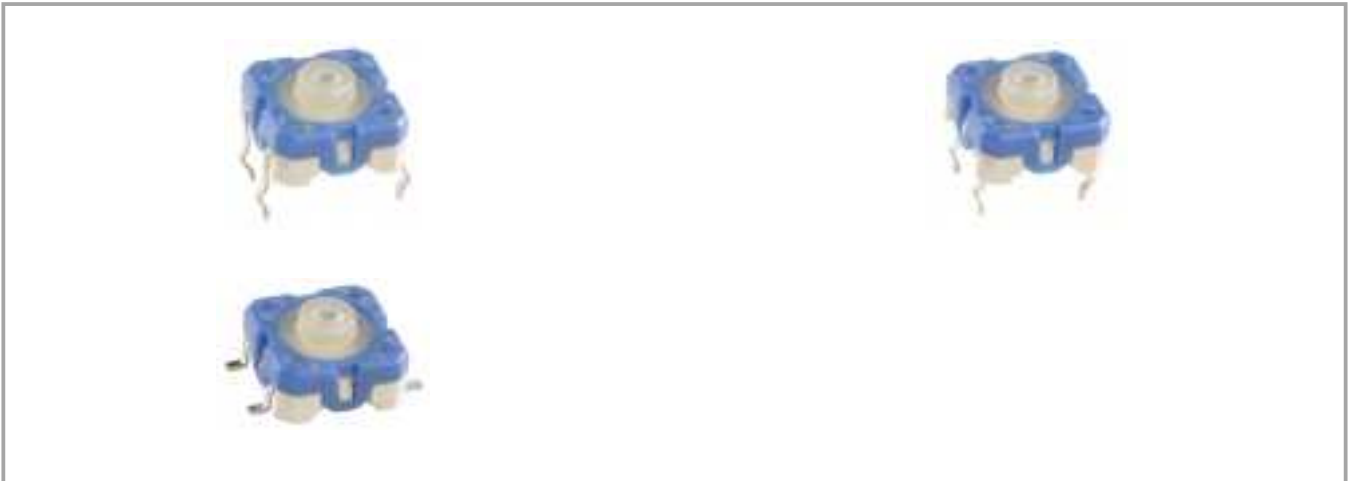
General data

RACON short-travel keyswitches with sealed contact system and distinct key click, excellent switching reliability. For use under an overlay or with RK 90 keycaps. Print and SMD versions available (suitable for automatic assembly).

Content

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RACON 8



General data

RACON short-travel keyswitches offer an extremely high switching reliability while needing very little space. They can be arranged as single keys, in rows or key blocks.

When arranged under an overlay, RACON keyswitches should be combined with plungers.

The features at a glance:

- Suitable for the most common soldering methods
 - Wave soldering bath for print versions
 - Reflow soldering (SMD)
 - Manual soldering
- SMD version suitable for processing with an automatic SMD assembly machine

4

Technical data

Dimensions

| | |
|----------------------|-----------------|
| Recommended key grid | see order block |
| Key grid max. | see order block |
| Length of housing | 8.4 mm |
| Width of housing | 8.4 mm |
| Overall height | 5.00 mm |

Mechanical design

| | |
|---------------------|---------------------|
| Mounting | soldering |
| Terminals | see order block |
| Contact system | snap-action contact |
| Contact arrangement | 1 NO |
| Contact materials | Au |
| Illumination | no |

Mechanical characteristics

| | |
|------------------|---------------------------|
| Operating force | 3.3 ^{+/-0.6} N |
| Switching travel | 0.34 ^{+/-0.1} mm |
| Robustness min. | 100 N |

Electrical characteristics

| | |
|----------------------------------|---------|
| Rated voltage min. | 0.02 V |
| Rated voltage max. | 42 V |
| Rated current min. | 0.01 mA |
| Rated current max. | 100 mA |
| Rated power max. (ohmic load) | 1 W |

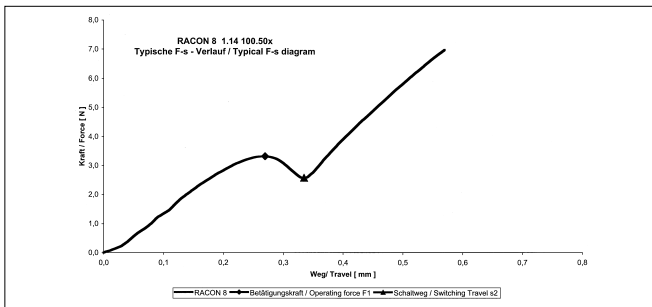
| | |
|----------------------------------|-------------------|
| Contact resistance when new max. | 100 mΩ |
| Insulation resistance | 10 ⁹ Ω |
| Bouncing time max. | 5 ms |

Other specifications

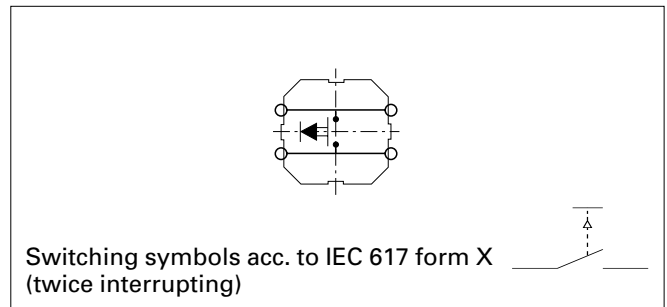
| | |
|---|---------------------------------------|
| Ambient temp. operating min. | -40 °C |
| Ambient temp. operating max. | +80 °C |
| Resistance to constant environment | according to IEC 600 68-2-3 and 2-30 |
| Resistance at variable environment | according to IEC 600 68-2-14 and 2-33 |
| Operating life at R _T = 23° C and test force = 1,5 x rated force | 1000000 |
| Solderability / solder heat resistance PCB version | DIN IEC 600 68-2-20 |
| Solderability / solder heat resistance SMD version | EN 61760-1 and DIN IEC 600-68-2-58 |
| Flammability of materials | UL 94 HB |
| Packing | see order block |
| Produkt code | see order block |

RACON short-travel keyswitches

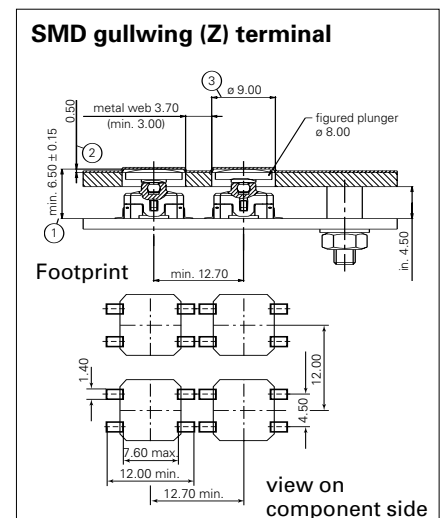
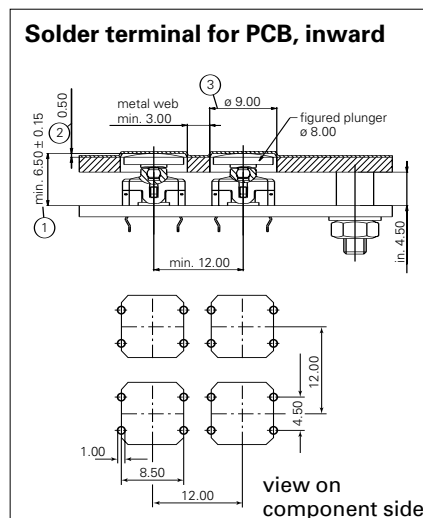
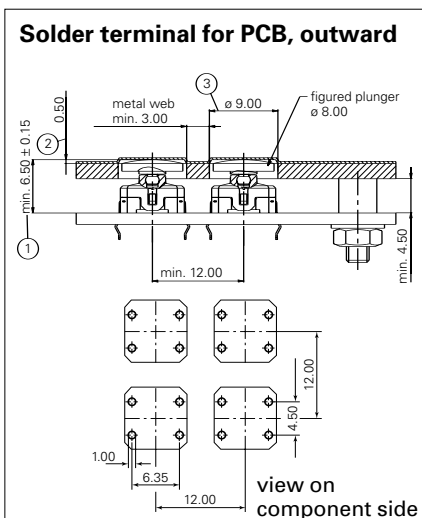
Typical force/travel diagram RACON 8



Circuit diagram RACON 8



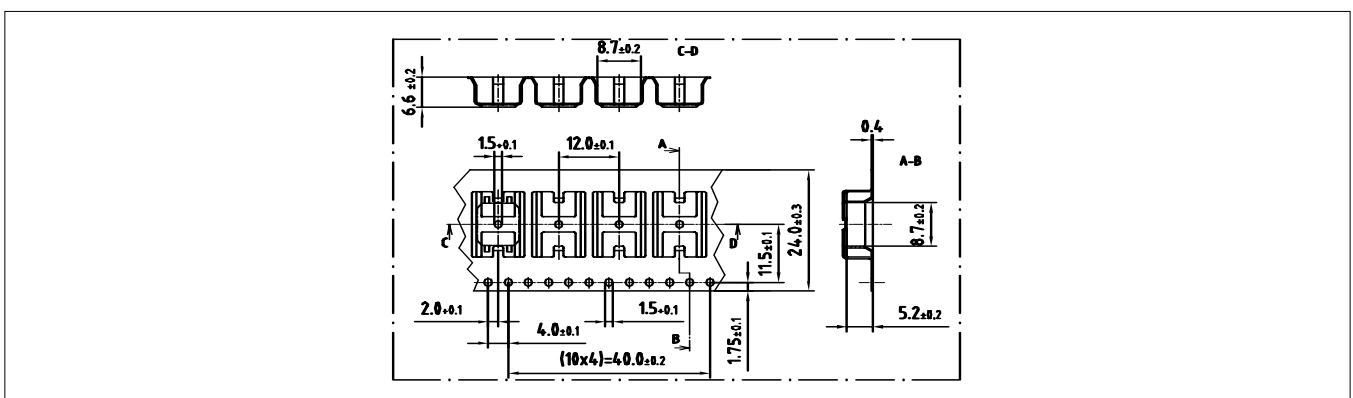
RACON 8, Typical system assembly with plunger under overlay



Explanation

- ① Overall height = RACON + plunger
- ② Recommended area embossing 0.35 mm at glue spacer thickness of 0.15 mm
- ③ Front panel cut out = plunger diameter + 1 mm

RACON 8, SDM-terminal, tape and reel drawing

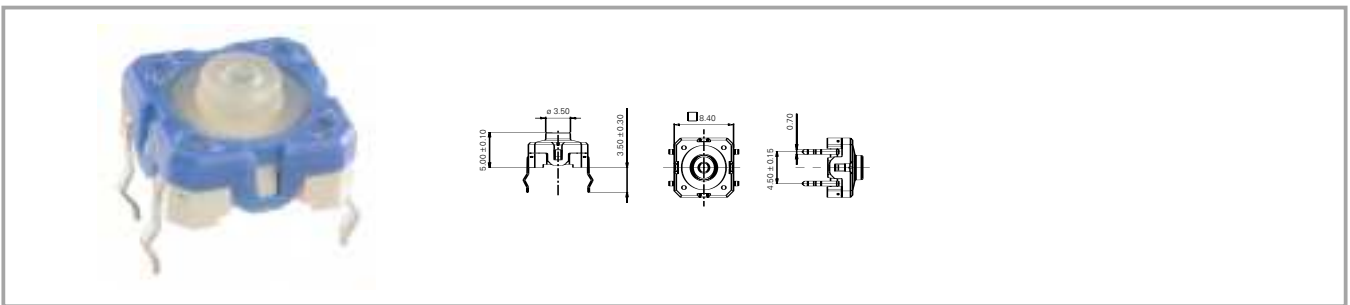


Accessories RACON 8

| Description | Photo | Order no. | Page |
|--|--|--------------------------|--------|
| Plunger for membrane data entry system |  | 5.46.167.042/0209 | 4 - 20 |
| Plunger for membrane data entry system |  | 5.46.167.090/0209 | 4 - 20 |
| Plunger for membrane data entry system |  | 5.46.168.042/0209 | 4 - 20 |
| Plunger for membrane data entry system |  | 5.46.169.042/0209 | 4 - 20 |

For other plungers, refer to the chapter „RACON special accessories“; for keycaps, refer to the chapter „RK 90“.

RACON 8, solder terminals for PCB, outward

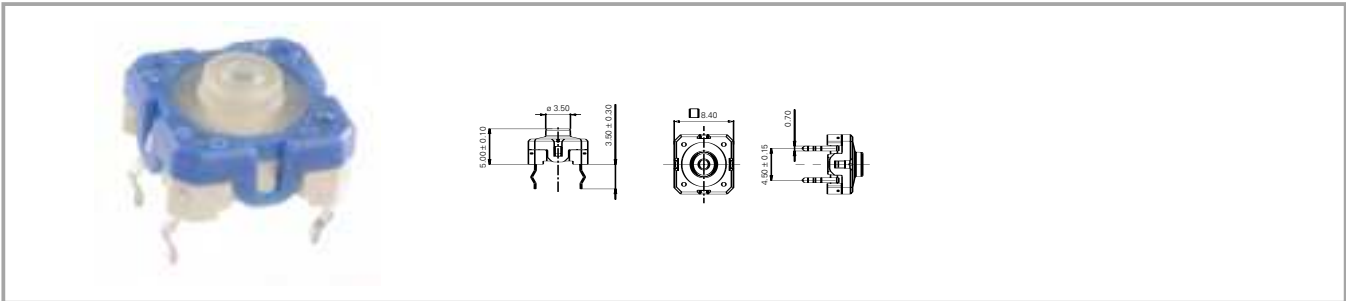


| Terminals | Contact arrangement | Product code | Packing | Recommended key grid | Order no. |
|----------------------------------|---------------------|--------------|--------------------|----------------------|--------------------------|
| solder terminal for PCB, outward | 1 NO | A1 | 60 pieces per tube | 12 x 12 mm | 1.14.100.501/0000 |

Technical data see page 4 - 6

RACON short-travel keyswitches

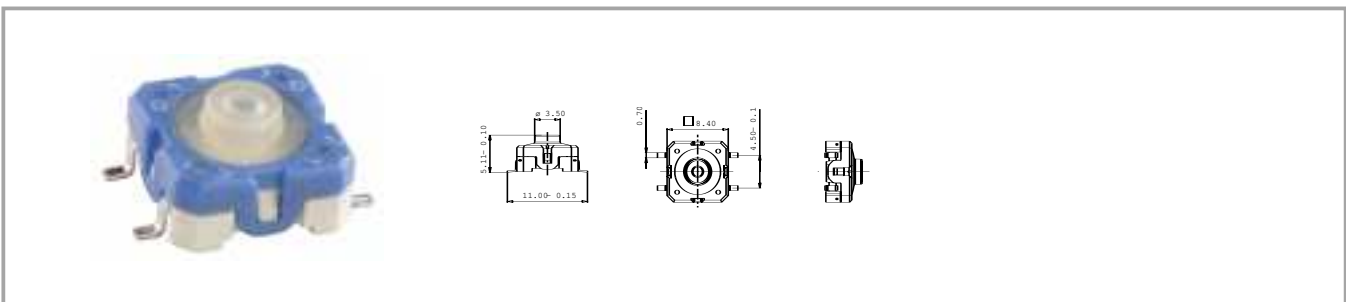
RACON 8, solder terminals for PCB, inward



| Terminals | Contact arrangement | Product code | Packing | Recommended key grid | Order no. |
|---------------------------------|---------------------|--------------|--------------------|----------------------|--------------------------|
| solder terminal for PCB, inward | 1 NO | B1 | 60 pieces per tube | 12 x 12 mm | 1.14.100.502/0000 |

Technical data see page 4 - 6

RACON 8, SMD gullwing (Z) terminals



| Terminals | Contact arrangement | Product code | Packing | Recommended key grid | Order no. |
|----------------------------|---------------------|--------------|---------------------------|----------------------|--------------------------|
| SMD Gullwing (Z) terminals | 1 NO | C1 | 1000 pieces tape and reel | 12 x 12.7 mm | 1.14.100.503/0000 |

Technical data see page 4 - 6

RACON 12



General data

RACON short-travel keyswitches offer an extremely high switching reliability while needing very little space. They can be arranged as single keys, in rows or key blocks. When arranged under an overlay, RACON keyswitches should be combined with plungers.

The features at a glance:

- Suitable for the most common soldering methods
 - Wave soldering bath for print versions
 - Reflow soldering (SMD)
 - Manual soldering
- SMD version suitable for processing with an automatic SMD assembly machine

4

Technical data

Dimensions

| | |
|----------------------|-----------------|
| Recommended key grid | see order block |
| Key grid max. | see order block |
| Length of housing | 12 mm |
| Width of housing | 12 mm |
| Overall height | see order block |

Mechanical design

| | |
|---------------------|---------------------|
| Mounting | soldering |
| Terminals | see order block |
| Contact system | snap-action contact |
| Contact arrangement | 1 NO |
| Contact materials | Au |
| Illumination | no |

Mechanical characteristics

| | |
|------------------|---------------------------|
| Operating force | 3.6 ^{+/-0.7} N |
| Switching travel | 0.61 ^{+/-0.1} mm |
| Robustness min. | 100 N |

Electrical characteristics

| | |
|-------------------------------|---------|
| Rated voltage min. | 0.02 V |
| Rated voltage max. | 42 V |
| Rated current min. | 0.01 mA |
| Rated current max. | 100 mA |
| Rated power max. (ohmic load) | 1 W |

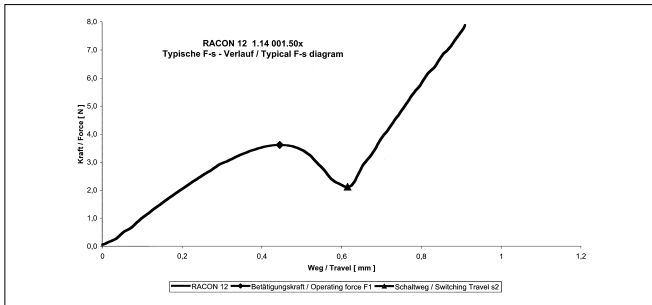
| | |
|----------------------------------|-------------------|
| Contact resistance when new max. | 100 mΩ |
| Insulation resistance | 10 ⁹ Ω |
| Bouncing time max. | 5 ms |

Other specifications

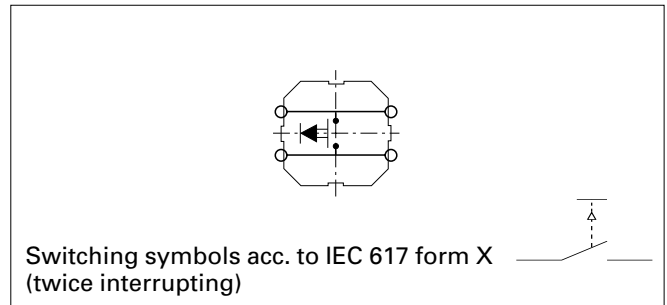
| | |
|---|---------------------------------------|
| Ambient temp. operating min. | -40 °C |
| Ambient temp. operating max. | +80 °C |
| Resistance to constant environment | according to IEC 600 68-2-3 and 2-30 |
| Resistance at variable environment | according to IEC 600 68-2-14 and 2-33 |
| Operating life at R _T = 23° C and test force = 1,5 x rated force | 1000000 |
| Solderability / solder heat resistance PCB version | DIN IEC 600 68-2-20 |
| Solderability / solder heat resistance SMD version | EN 61760-1 and DIN IEC 600-68-2-58 |
| Flammability of materials | UL 94 HB |
| Packing | see order block |
| Produkt code | see order block |

RACON short-travel keyswitches

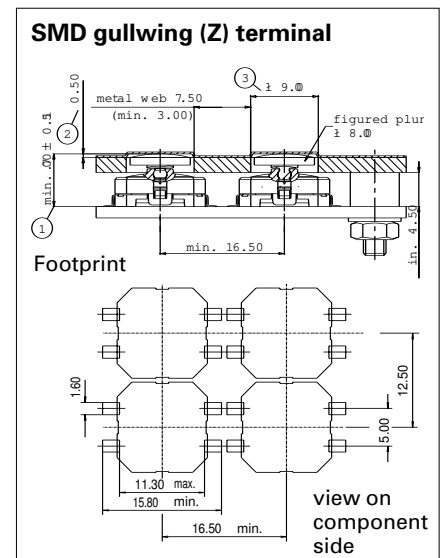
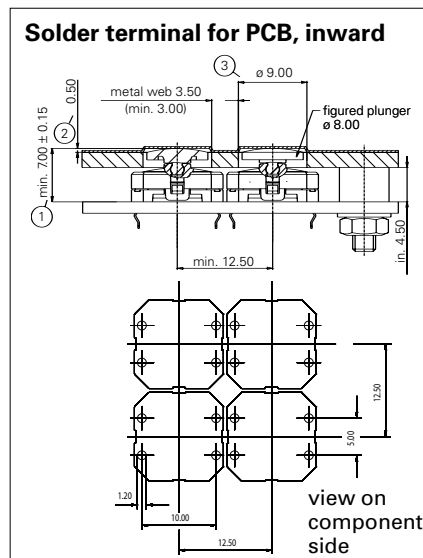
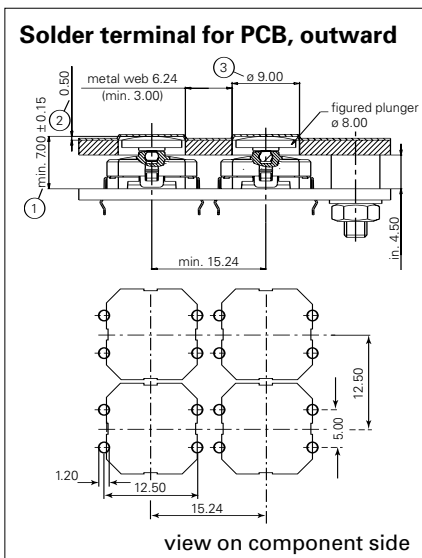
Typical force/travel diagram RACON 12



Circuit Diagram RACON 12



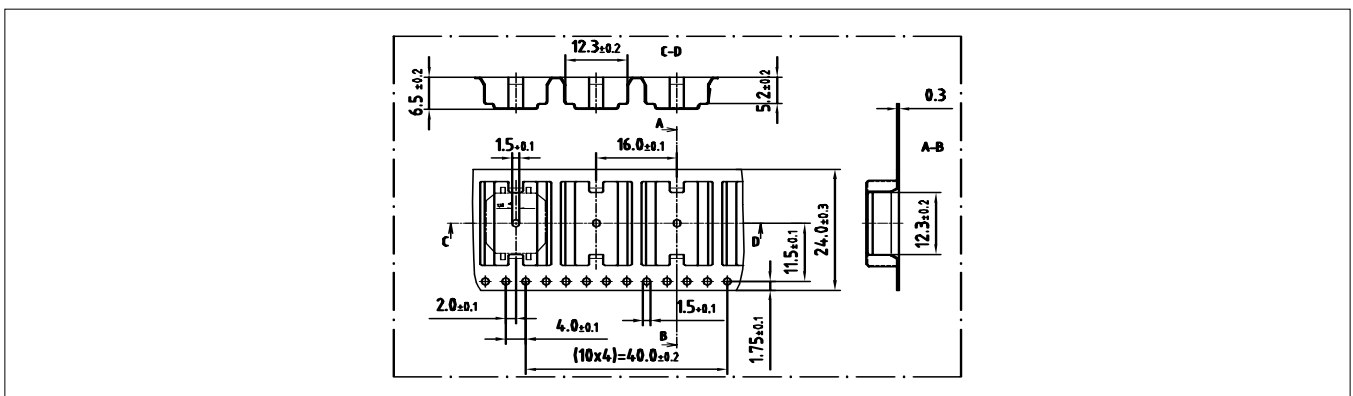
RACON 12, Typical system assembly with plunger under overlay



Explanation

- ① Overall height = RACON + plunger
- ② Recommended area embossing 0.35 mm at glue spacer thickness of 0.15 mm
- ③ Front panel cut out = plunger diameter + 1 mm

RACON 12, SMD-terminal, tape and reel drawing

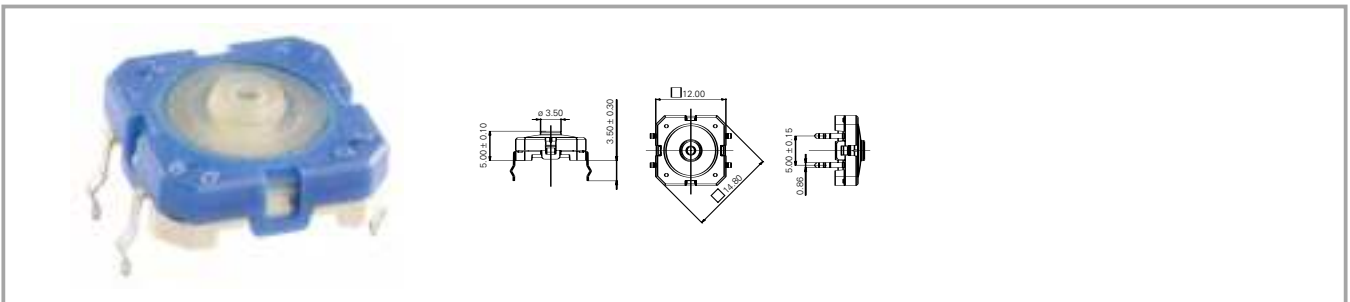


Accessories RACON 12

| Description | Photo | Order no. | Page |
|---|--|--------------------------|--------|
| Square plunger for membrane data entry system |  | 5.46.001.057/0209 | 4 - 21 |
| Plunger for membrane data entry system |  | 5.46.167.042/0209 | 4 - 20 |
| Plunger for membrane data entry system |  | 5.46.167.090/0209 | 4 - 20 |
| Plunger for membrane data entry system |  | 5.46.169.042/0209 | 4 - 20 |

For other plungers, refer to the chapter „RACON special accessories“; for keycaps, refer to the chapter „RK 90“.

RACON 12, solder terminals for PCB, outward

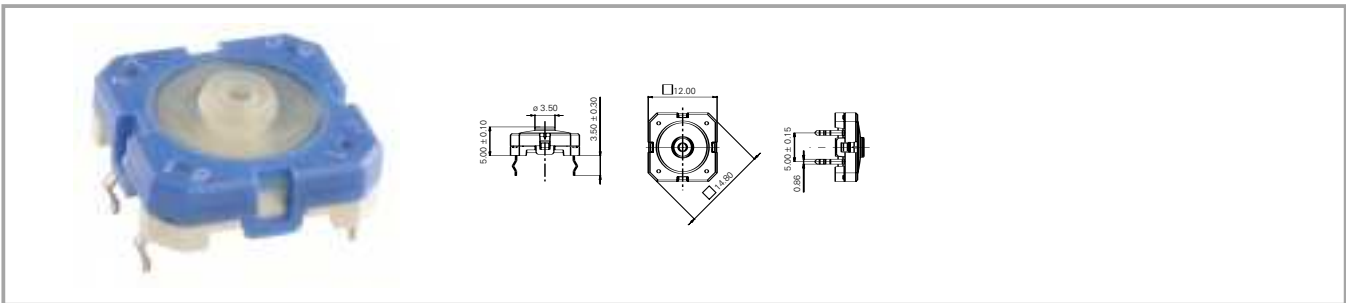


| Terminals | Contact arrangement | Product code | Packing | Recommended key grid | Key grid max. | Order no. |
|----------------------------------|---------------------|--------------|--------------------|----------------------|-----------------|--------------------------|
| solder terminal for PCB, outward | 1 NO | A1 | 45 pieces per tube | 15.24 x 15.24 mm | 12.5 x 15.24 mm | 1.14.001.501/0000 |

Technical data see page 4 - 10

RACON short-travel keyswitches

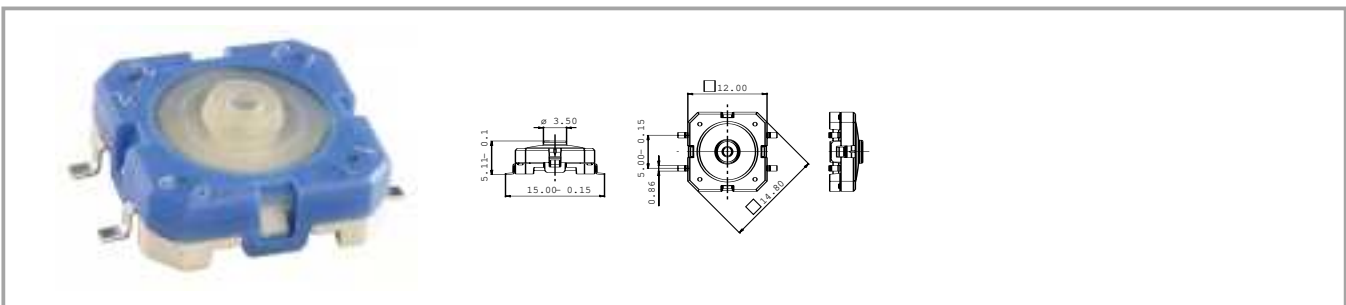
RACON 12, solder terminals for PCB, inward



| Terminals | Contact arrangement | Product code | Packing | Recommended key grid | Key grid max. | Order no. |
|---------------------------------|---------------------|--------------|--------------------|----------------------|----------------|--------------------------|
| solder terminal for PCB, inward | 1 NO | B1 | 45 pieces per tube | 15.24 x 15.24 mm | 12.5 x 12.5 mm | 1.14.001.502/0000 |

Technical data see page 4 - 10

RACON 12, SMD gullwing (Z) terminals



| Terminals | Contact arrangement | Product code | Packing | Recommended key grid | Key grid max. | Order no. |
|----------------------------|---------------------|--------------|--------------------------|----------------------|----------------|--------------------------|
| SMD Gullwing (Z) terminals | 1 NO | C1 | 750 pieces tape and reel | 15.24 x 16.5 mm | 12.5 x 16.5 mm | 1.14.001.503/0000 |

Technical data see page 4 - 10

RACON 12 V with vertical adapter



General data

The RACON 12 V version can be used, for example, for PC plug-in boards and for measurement and control engineering applications. The vertical mounting adapter (support element) absorbs the operating force so that the pressure on the soldered terminals is reduced. For this mounting arrangement, the keyswitch is provided with two horizontal terminals on one side.

Technical data

Dimensions

| | |
|----------------|---------|
| Length | 14.5 mm |
| Width | 13.6 mm |
| Overall height | 5 mm |

Mechanical design

| | |
|---------------------|----------------------------|
| Mounting | soldering |
| Terminals | solder terminal tin-plated |
| Contact system | snap-action contact |
| Contact arrangement | 1 NO |
| Contact materials | Au |
| Illumination | no |

Mechanical characteristics

| | |
|------------------|---------------------------|
| Operating force | 3.6 ^{+/-0.7} N |
| Switching travel | 0.61 ^{+/-0.1} mm |
| Robustness min. | 100 N |

Electrical characteristics

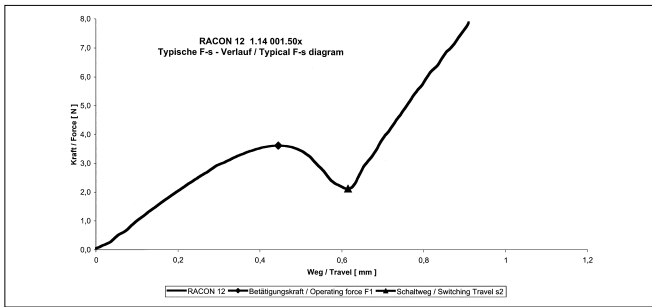
| | |
|----------------------------------|-------------------|
| Rated voltage min. | 0.02 V |
| Rated voltage max. | 42 V |
| Rated current min. | 0.01 mA |
| Rated current max. | 100 mA |
| Rated power max. (ohmic load) | 1 W |
| Contact resistance when new max. | 100 mΩ |
| Insulation resistance | 10 ⁹ Ω |
| Bouncing time max. | 5 ms |

Other specifications

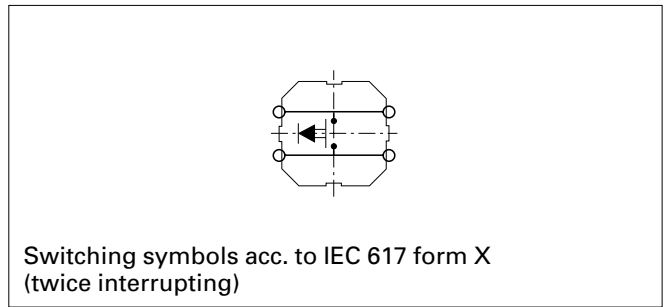
| | |
|---|---------------------------------------|
| Ambient temp. operating min. | -40 °C |
| Ambient temp. operating max. | +80 °C |
| Storage temperature min. (product) | -50 °C |
| Storage temperature max. (product) | +85 °C |
| Storage temperature max. (rail) | +85 °C |
| Resistance to constant 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 at R _T = 23° C and test force = 1,5 x rated force | 1000000 |
| Solderability / solder heat resistance | according to DIN IEC 600 68-2-20 |
| Flammability of materials | UL 94 HB |
| Packing | in boxes à 100 piece |
| Produkt code | F 1 |

RACON short-travel keyswitches

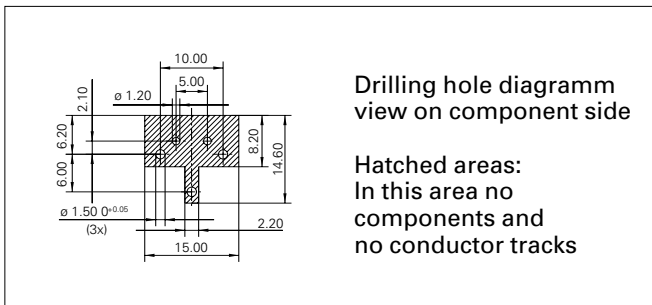
Typical force/travel diagram RACON 12V



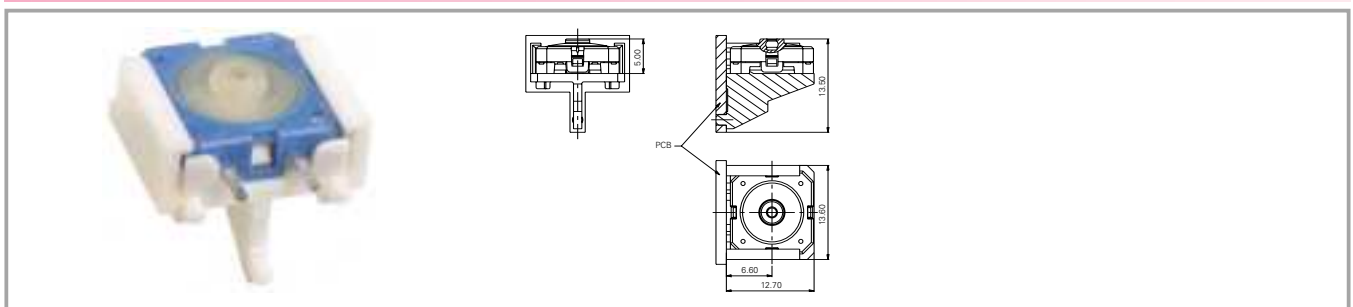
Circuit Diagram RACON 12V



PCB footprint RACON 12V



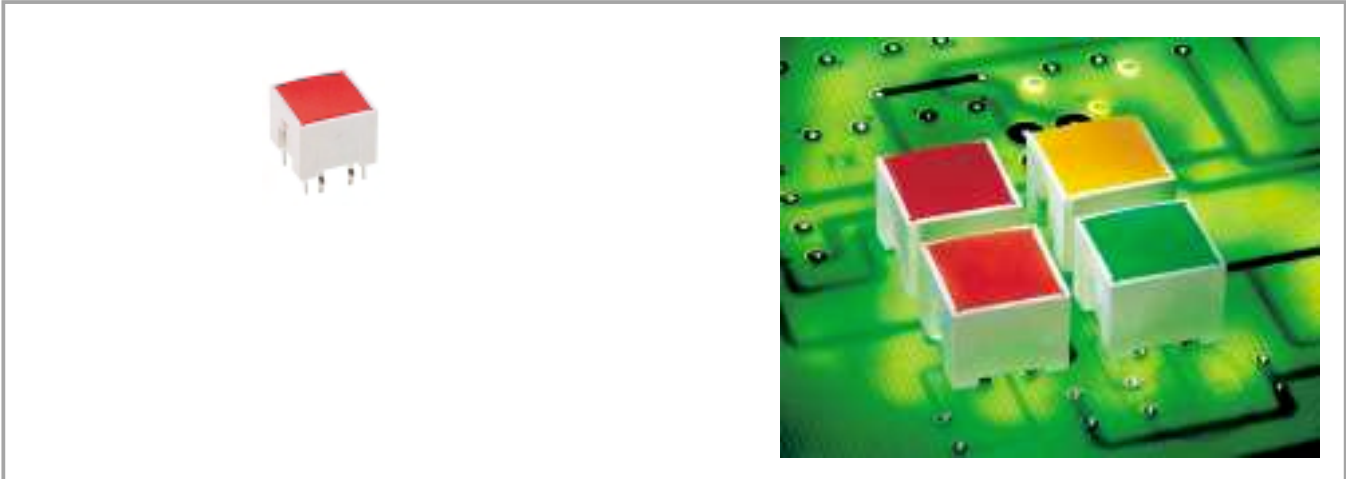
RACON 12 V with vertical adapter



| Terminals | Contact arrangement | Product code | Packing | Order no. |
|----------------------------|---------------------|--------------|--------------------|-------------------|
| solder terminal tin-plated | 1 NO | F 1 | 100 pieces per box | 1.14.001.505/0000 |

Technical data see page 4 - 14

RACON 12 i



General data

Application note

Low-profile keyboards with RACON 12 i components should be designed with a grid spacing of 15.24 mm. 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. If our RK 90 system design is used, we recommend the 9 x 9 mm keycaps.

Technical data

General information

| | |
|----------------------|------------------|
| Colour of lens | see order block |
| Recommended key grid | 15.24 x 15.24 mm |
| Key grid max. | 12.5 x 12.5 mm |

Dimensions

| | |
|----------------|----------|
| Length | 11.35 mm |
| Width | 11.35 mm |
| Overall height | 9.7 mm |

Mechanical design

| | |
|---------------------|--------------------------|
| Mounting | soldering |
| Terminals | PCB terminals |
| Contact system | snap-action contact |
| Contact arrangement | 1 NO |
| Contact materials | Au |
| Illumination | fully illuminated 2 LEDs |
| LED colour | see order block |
| LED type | standard 2 mm |

Mechanical characteristics

| | |
|------------------|---------------------------|
| Operating force | 3.3 ^{+/-0.6} N |
| Switching travel | 0.34 ^{+/-0.1} mm |
| Robustness min. | 100 N |

Electrical characteristics

| | |
|----------------------------------|-------------------|
| Rated voltage min. | 0.02 V |
| Rated voltage max. | 42 V |
| Rated current min. | 0.01 mA |
| Rated current max. | 100 mA |
| Rated power max. (ohmic load) | 1 W |
| Contact resistance when new max. | 100 mΩ |
| Dielectric strength AC min. | 750 V |
| Insulation resistance | 10 ⁹ Ω |
| Bouncing time max. | 5 ms |

Other specifications

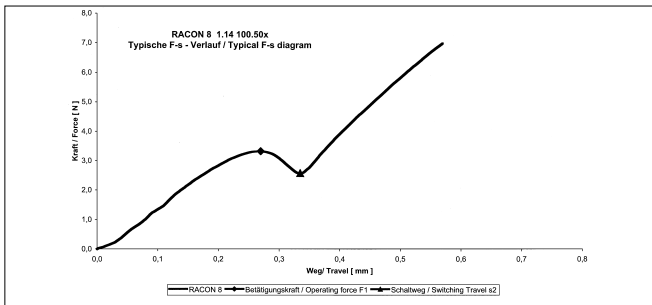
| | |
|---|---------------------------------------|
| Ambient temp. operating min. | -40 °C |
| Ambient temp. operating max. | +80 °C |
| Resistance to constant environment | according to IEC 600 68-2-3 and 2-30 |
| Resistance at variable environment | according to IEC 600 68-2-14 and 2-33 |
| Operating life at R _T = 23° C and test force = 1,5 x rated force | 1000000 |
| Solderability / solder heat resistance | according to IEC 600 68-2-20 |
| Flammability of materials | UL 94 HB |
| Packing | in tubes à 45 piece |

Electrical characteristics of LED

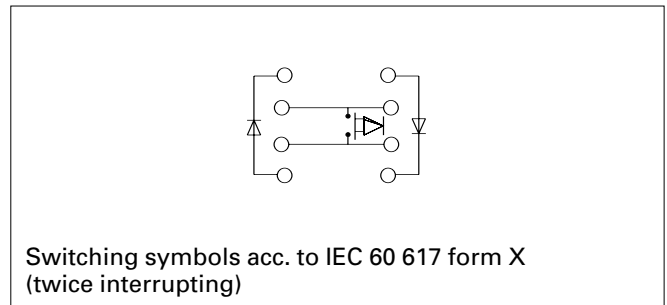
| | |
|--|--|
| LED rated current max. I _F at 25°C | red/green: 30, yellow: 50 mA |
| LED current reduction beginning with 50 degree C | red: 0.5 mA/Grad C, yellow 0.8 mA/Grad C |
| LED wavelength typ. | red 639, green 510-535, yellow 590 |
| LED forward voltage U _F at 20 mA | red: 1.8 V/20 mA, yellow: 1.9 V/20 mA |
| LED breakdown voltage U _R at 25°C | min. 5 V/0.1 mA |

RACON short-travel keyswitches

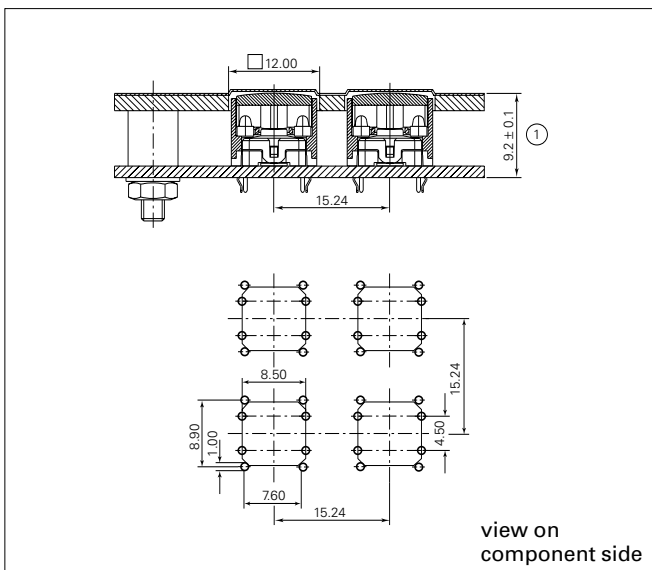
Typical force/travel diagramm RACON 12i



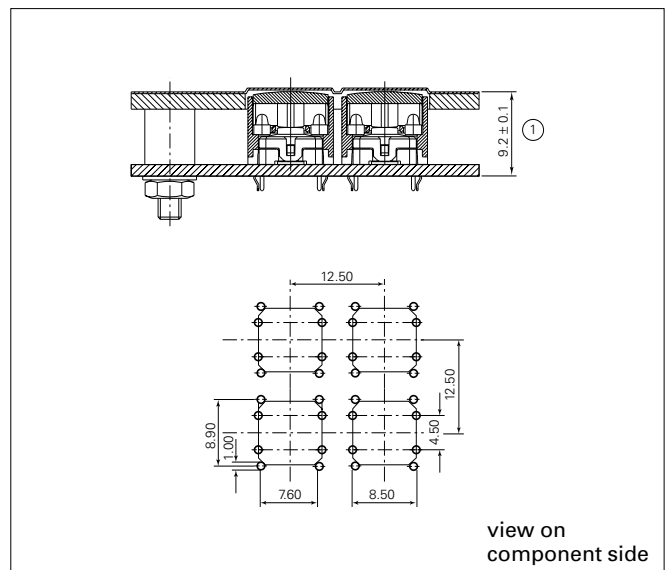
Circuit Diagram RACON 12i



RACON 12i flat data entry system with metal webs



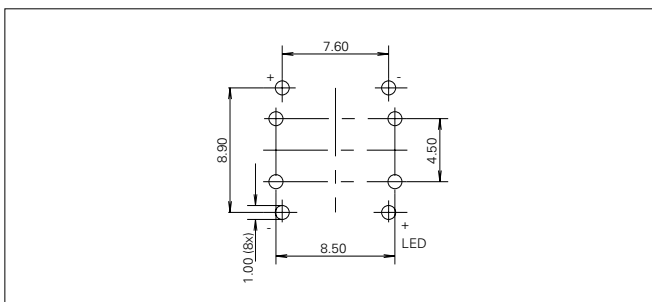
RACON 12i smallest grid



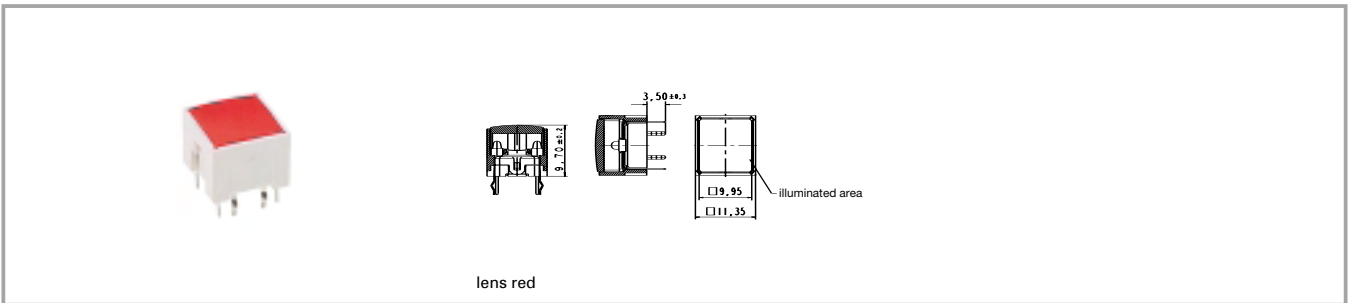
Explanation

- ① Recommended area embossing 0.35 mm at glue spacer thickness of 0.15 mm

LED hole patterns



RACON 12 i, solder terminals for PCB



lens red

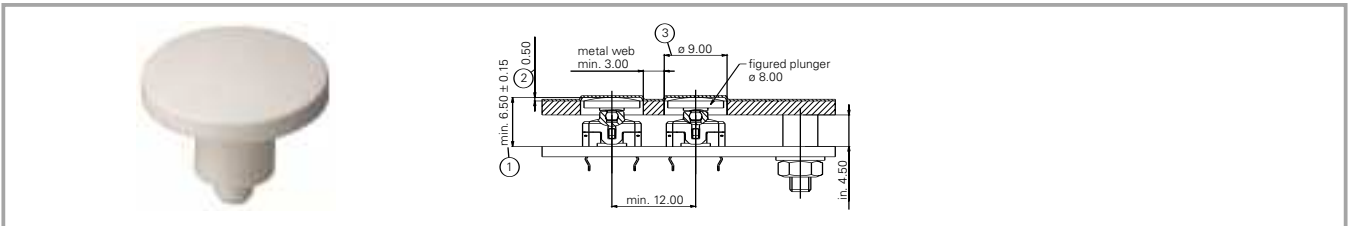
| Terminals | Contact arrangement | Recommended key grid | Illumination | Colour of lens | LED colour | Order no. |
|---------------|---------------------|----------------------|---------------------|----------------|------------|--------------------------|
| PCB terminals | 1 NO | 15.24 x 15.24 mm | fully illuminated 2 | red | red | 1.14.001.551/0000 |
| PCB terminals | 1 NO | 15.24 x 15.24 mm | fully illuminated 2 | green | green | 1.14.001.552/0000 |
| PCB terminals | 1 NO | 15.24 x 15.24 mm | fully illuminated 2 | yellow | yellow | 1.14.001.553/0000 |
| PCB terminals | 1 NO | 15.24 x 15.24 mm | fully illuminated 2 | orange | yellow | 1.14.001.554/0000 |

Technical data see page 4 - 16

RACON special accessories



Plunger for membrane data entry system



| Length | Width | Overall height | Diameter | Order no. complete |
|--------|-------|----------------|----------|--------------------------|
| | | 6.5 mm | 8 mm | 5.46.167.301/0209 |
| | | 7 mm | 8 mm | 5.46.167.090/0209 |
| | | 9.7 mm | 8 mm | 5.46.167.091/0209 |
| | | 12.5 mm | 8 mm | 5.46.167.092/0209 |
| | | 6.5 mm | 11.5 mm | 5.46.167.227/0209 |
| | | 7 mm | 11.5 mm | 5.46.167.042/0209 |
| | | 9.7 mm | 11.5 mm | 5.46.167.043/0209 |
| | | 12.5 mm | 11.5 mm | 5.46.167.044/0209 |
| | | 6.5 mm | 14.5 mm | 5.46.168.227/0209 |
| | | 7 mm | 14.5 mm | 5.46.168.042/0209 |
| | | 9.7 mm | 14.5 mm | 5.46.168.043/0209 |
| | | 12.5 mm | 14.5 mm | 5.46.168.044/0209 |
| | | 6.5 mm | 19 mm | 5.46.169.227/0209 |
| | | 7 mm | 19 mm | 5.46.169.042/0209 |
| | | 9.7 mm | 19 mm | 5.46.169.043/0209 |

4

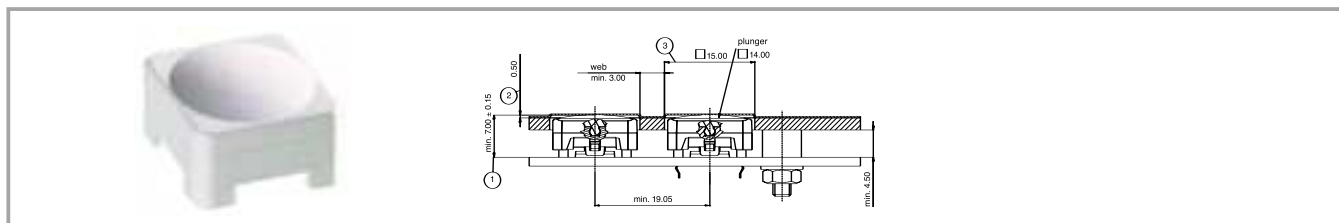
RACON

RACON short-travel keyswitches

| Length | Width | Overall height | Diameter | Order no. complete |
|--------|-------|----------------|----------|--------------------------|
| | | 12.5 mm | 19 mm | 5.46.169.044/0209 |

Front panel cut-out = Plunger diameter + 1 mm.

Square plunger for membrane data entry system



| Length | Width | Overall height | Diameter | Order no. complete |
|--------|-------|----------------|----------|--------------------------|
| 14 mm | 14 mm | 7 mm | | 5.46.001.057/0209 |
| 14 mm | 14 mm | 9.7 mm | | 5.46.001.058/0209 |
| 14 mm | 14 mm | 12.5 mm | | 5.46.001.059/0209 |

Front panel cut-out = 15 mm.

Legend:

1. Overall height RACON + plunger
2. Recommended area embossing 0.35 mm at an adhesive layer thickness of 0.15 mm
3. Front panel cut-out = Plunger diameter + 1 mm circumferential clearance