



PCB Keyswitches

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Examples for Applications Standards

MICON 5



RF 15



RG 85 III System



RF 15 with RK 90 System



CE-Conformity

The products of the Chapter "PCB Keyswitches" can – relating to the CE-conformity according to the Low-Voltage Directive 73/23/EWG – 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/EWG applies.

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

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

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/EWG resp. the Directive "CE-Marking 93/68/EWG" either on the packing or on the product itself or on the shipping documents.

UL-approval

for MICON 5, RACON 8/12, Short-Travel Keyswitches RF 15/19

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

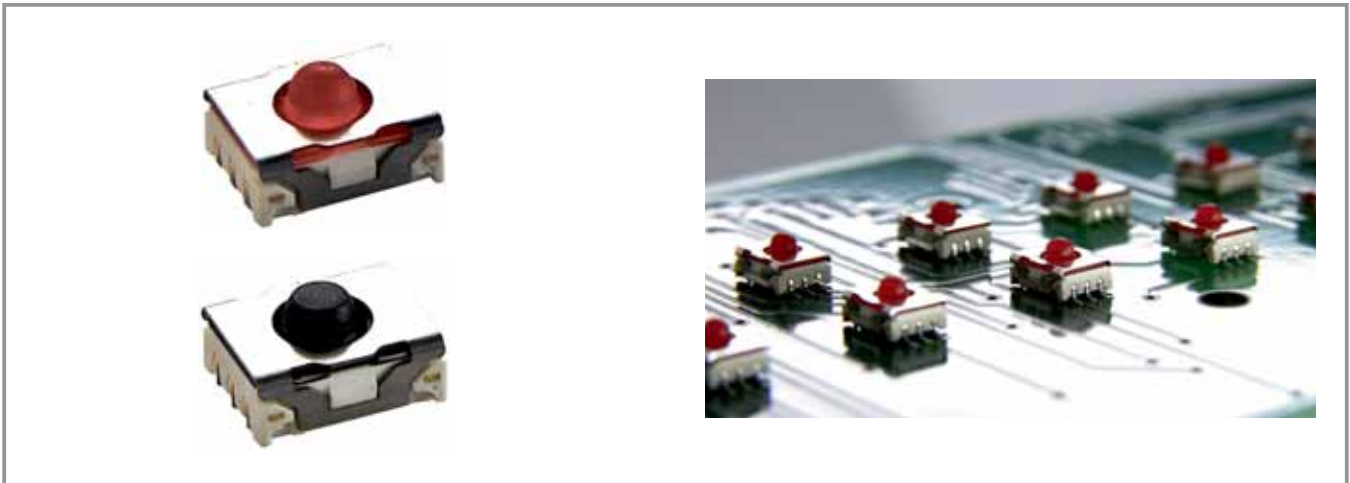
Short-travel switch range MICON 5, with sealed contact system, clear key click and extremely reliable switching. Use under overlay or under keycaps RK 90. THT and SMT versions which can be mounted automatically.

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NEW

MICON 5 - Short-travel keyswitches



General Data

MICON 5 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, MICON keyswitches should be combined with plungers.

The features at a glance:

- Suitable for the most common soldering methods
 - Wave soldering bath for THT versions
 - Reflow soldering for SMT version
 - Vapour phase soldering for SMT versions
 - Manual soldering
- SMT version suitable for processing with an automatic SMT assembly machines
- IMDS listed

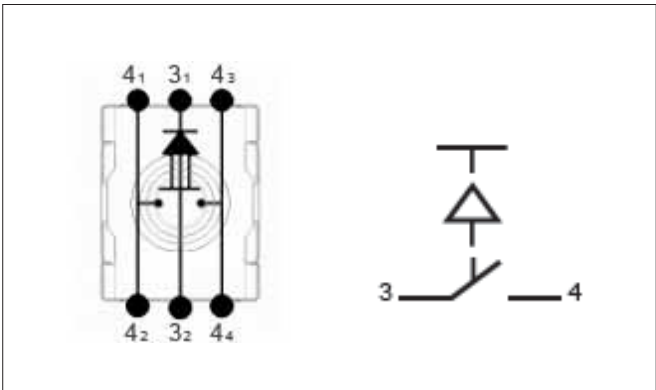
You can download actual product information from our internet site www.rafi.de / Catalogues and Downloads

Technical Data

MICON

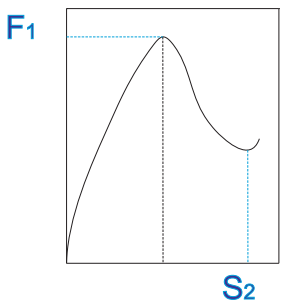
Dimensions		Rated current min.	0.01 mA
Length of housing	6.4 mm	Rated current max.	100 mA
Width of housing	5.1 mm	Rated power max.	1 W
Overall height	see order block	(ohmic load)	
Mechanical design		Contact resistance when new	100 mΩ
Mounting	soldering	Rated voltage resistance AC	250 V
Terminals	see order block	Insulation resistance	10 ⁹ Ω
Contact system	snap-action contact	Other specifications	
Contact arrangement	1 NO	Ambient temp. operating min.	-40 °C
Contact materials	Au	Ambient temp. operating max.	+90 °C
Illumination	no	Resistance to environment	IEC 60068-2 -14, -30,-33, -78
Mechanical characteristics		Operating life (test force)	see order block
Operating force F1 (±20%)	see order block	Solder heat resistance /	see order block
Switching travel S2 (±0.15 mm)	see order block	Solderability	
Electrical characteristics		Flammability of materials	UL 94 V1
Rated voltage min.	0.02 V	Packing	see order block
Rated voltage max.	35 V	Produkt code	see order block

MICON 5 Circuit Diagram

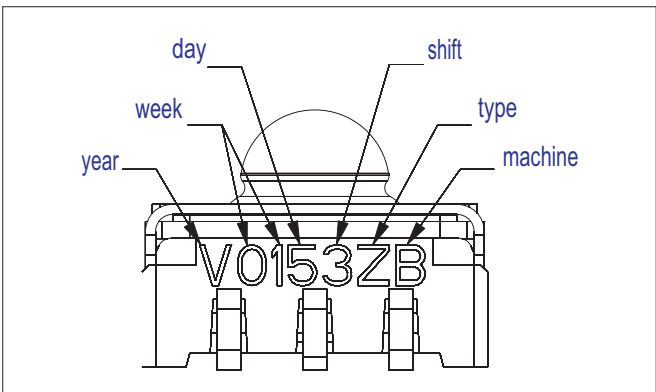


MICON 5 Force-Travel Diagram

Operating force F_1 : see order block
Switching travel S_2 : see order block

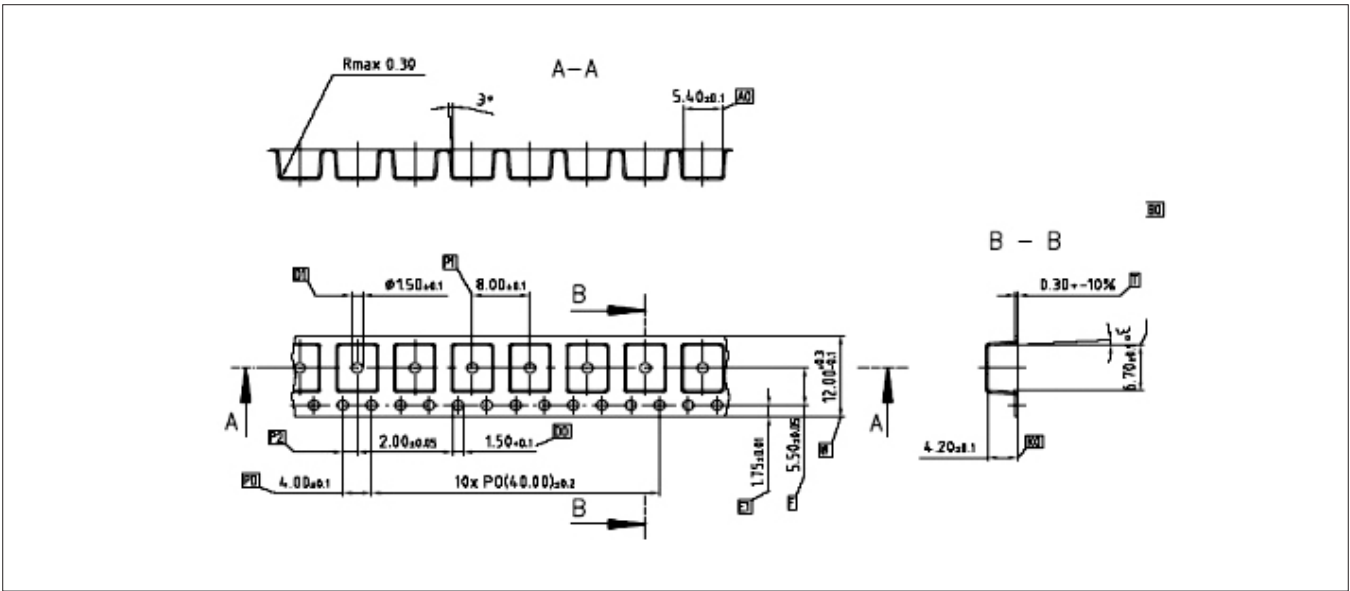


MICON 5 Product Code acc. to DIN EN ISO 9001 (EN ISO 8402)



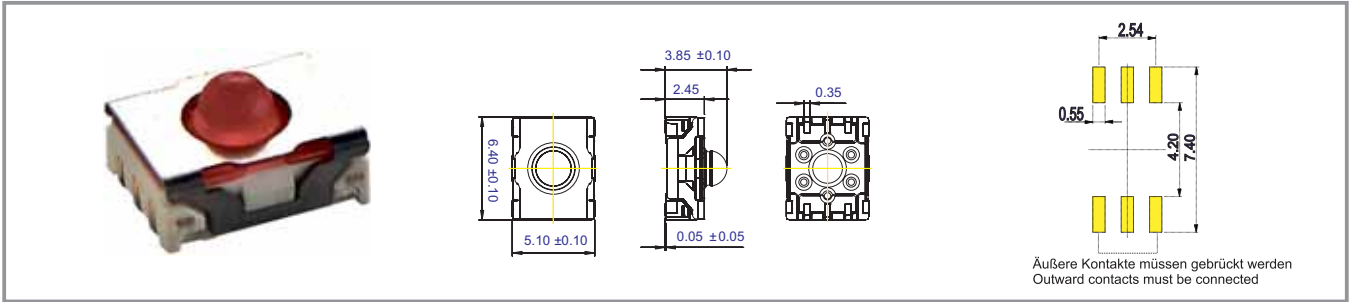
Traceability acc. to (EN ISO 8402) DIN EN ISO 9001, 2000, 7.5.3
A 7-digit code is printed on the housing of the keyswitch. This code informs about production date, production shift and type of product.

MICON 5 SMT Version, Tape and Reel Drawing



NEW

MICON 5 - Short-travel keyswitch, SMT Standard



Terminals	Solder heat resistance / Solderability	Operating force F1 (±20%)	Switching travel S2 (±0,15 mm)	Operating life (test force)	Produkt code	Order no.
SMT	E DIN IEC 600 68-2-58	3.0 N	0.7 mm	1,000,000 (4 N)	X	1.14.002.101/0000
SMT	E DIN IEC 600 68-2-58	4.5 N	0.8 mm	250,000 (6 N)	Z	1.14.002.001/0000
SMT	E DIN IEC 600 68-2-58	5.5 N	0.9 mm	1,000,000 (8 N)	W	1.14.002.111/0000
SMT	E DIN IEC 600 68-2-58	8.0 N	1.1 mm	250,000 (12 N)	Y	1.14.002.011/0000

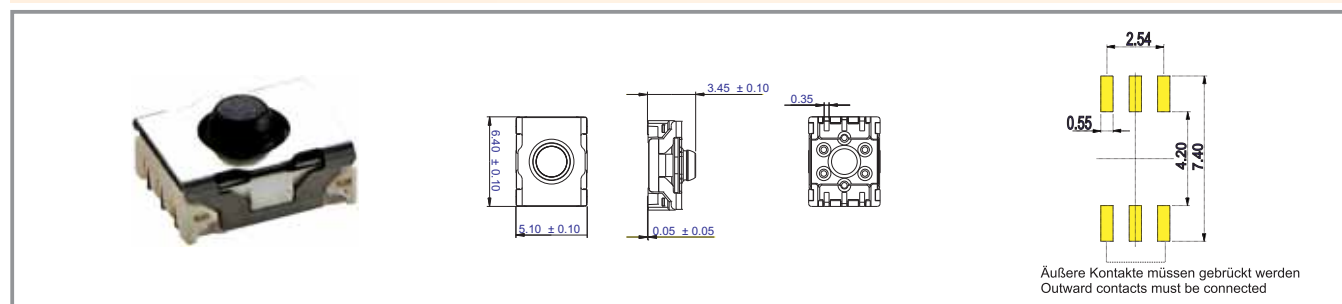
Technical data see page 4 - 4

Packing: in tape, reel with 2100 pieces
Keycaps see RK 90

Mounting hints:
Special pipette (Siemens Siplace order no.: 348514-02), mounting with collect and place head
Recommendation for screen printing: 150 µm stencil with 10% reduction of the pad size.

MICON 5 - Short-travel keyswitch, SMT low

NEW



Terminals	Solder heat resistance / Solderability	Operating force F1 (±20%)	Switching travel S2 (±0,15 mm)	Operating life (test force)	Produkt code	Order no.
SMT	E DIN IEC 600 68-2-58	3.0 N	0.6 mm	1,000,000 (4 N)	S	1.14.002.103/0000
SMT	E DIN IEC 600 68-2-58	4.5 N	0.7 mm	250,000 (6 N)	T	1.14.002.003/0000
SMT	E DIN IEC 600 68-2-58	5.5 N	0.7 mm	1,000,000 (8 N)	R	1.14.002.113/0000

Technical data see page 4 - 4

Packing: in tape, reel with 2100 pieces

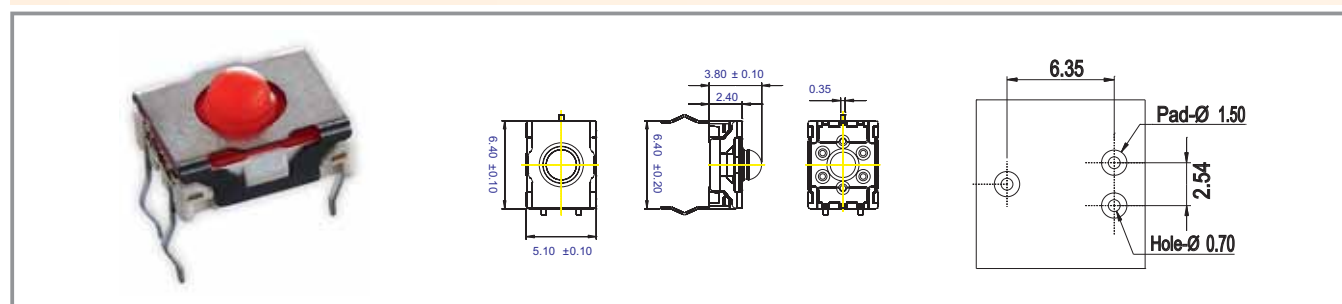
Keycaps see RK 90

Mounting hints:

Special pipette (Siemens Siplace order no.: 348514-02), mounting with collect and place head

Recommendation for screen printing: 150 µm stencil with 10% reduction of the pad size.

MICON 5 - Short-travel keyswitch, THT Standard



Terminals	Solder heat resistance / Solderability	Operating force F1 (±20%)	Switching travel S2 (±0,15 mm)	Operating life (test force)	Produkt code	Order no.
THT	E DIN IEC 600 68-2-20	3.0 N	0.7 mm	1,000,000 (4 N)	O	1.14.002.106/0000
THT	E DIN IEC 600 68-2-20	4.5 N	0.8 mm	250,000 (6 N)	Q	1.14.002.006/0000
THT	E DIN IEC 600 68-2-20	5.5 N	0.9 mm	1,000,000 (8 N)	N	1.14.002.116/0000
THT	E DIN IEC 600 68-2-20	8.0 N	1.1 mm	250,000 (12 N)	P	1.14.002.016/0000

Technical data see page 4 - 4

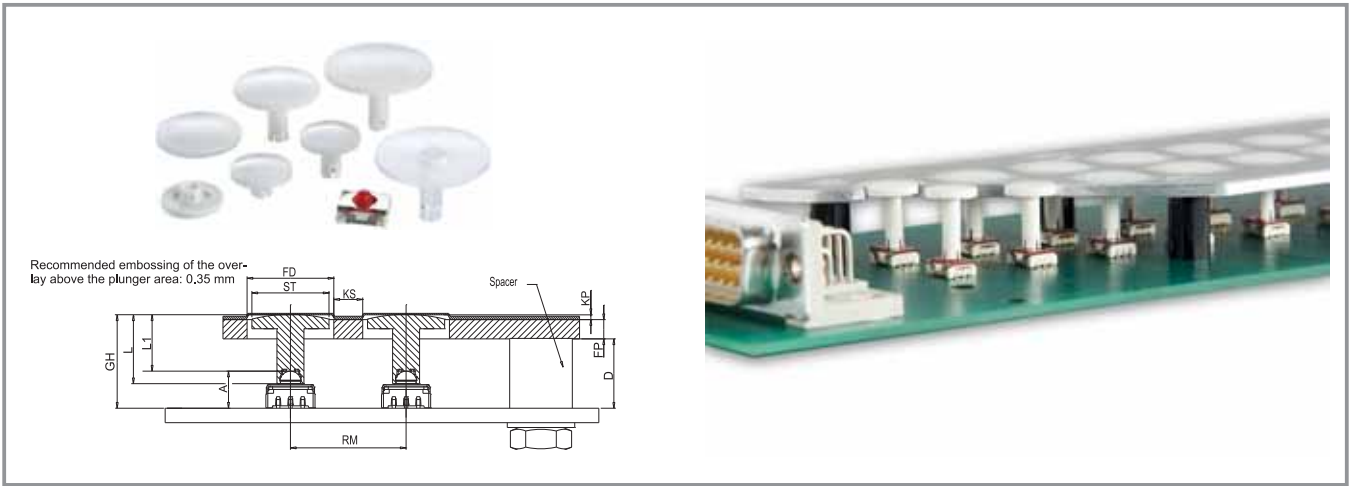
Packing: in tubes with 102 pieces

Keycaps see RK 90

NEW

NEW

MICON 5 - Plungers round, not illuminable



General Data

- A - Height of keyswitch: SMT type: 3.85 mm, THT type: 3.80 mm
 - D - Length of spacer $D = GH - KP - FP$
 - FD - Front panel cut-out $FD = ST + 1 \text{ mm}$
 - FP - Front panel thickness
 - GH - Overall height: $GH = A + L1 + 0.05$ (SMT type), $GH = A + L1$ (THT type)
 - KP - Thickness of overlay + embossing
 - KS - Glue webs for overlay, min. 3 mm
 - L1 - Length of plunger above keyswitch $L1 = GH - A$
 - L - Overall length of plunger $L = L1 + 1.3 \text{ mm}$ (min. 3 mm)
 - RM - Key grid $RM = FD + KS$
 - ST - Diameter of plunger
- The plungers can only be combined with MICON 5 version Standard (red bubble).

4

Technical Data

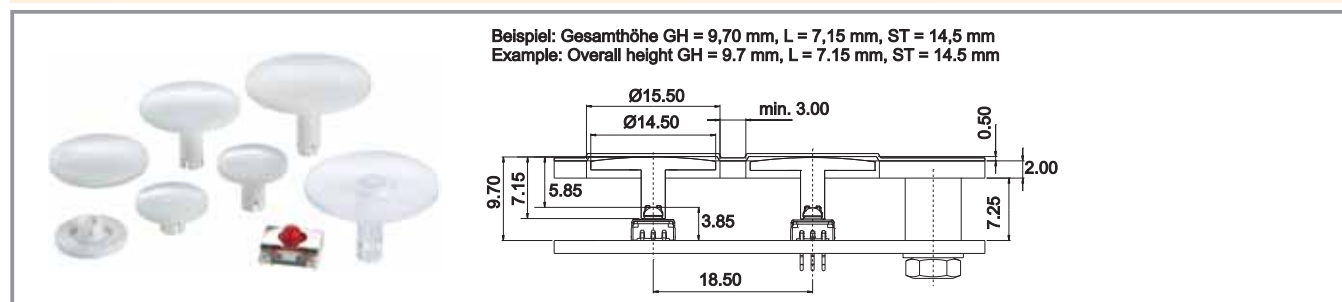
General information

Plunger diameter/size	see order block
Length of plunger L	see order block

MICON

MICON 5 - Plunger opaque, round, not illuminable

NEW



Plunger diameter ST/size	Length of plunger L	Order no.
6.0 mm	3.00 mm	5.46.001.103/0200
6.0 mm	3.45 mm	5.46.001.104/0200
6.0 mm	3.95 mm	5.46.001.105/0200
6.0 mm	4.45 mm	5.46.001.106/0200
6.0 mm	7.15 mm	5.46.001.107/0200
6.0 mm	9.95 mm	5.46.001.108/0200
8.0 mm	3.00 mm	5.46.001.123/0200
8.0 mm	3.45 mm	5.46.001.124/0200
8.0 mm	3.95 mm	5.46.001.125/0200
8.0 mm	4.45 mm	5.46.001.126/0200
8.0 mm	5.50 mm	5.46.001.121/0200
8.0 mm	7.15 mm	5.46.001.127/0200
8.0 mm	9.95 mm	5.46.001.128/0200
8.0 mm	10.30 mm	5.46.001.122/0200
11.5 mm	3.00 mm	5.46.001.143/0200
11.5 mm	3.45 mm	5.46.001.144/0200
11.5 mm	3.95 mm	5.46.001.145/0200
11.5 mm	4.45 mm	5.46.001.146/0200
11.5 mm	5.50 mm	5.46.001.141/0200
11.5 mm	7.15 mm	5.46.001.147/0200
11.5 mm	9.95 mm	5.46.001.148/0200
11.5 mm	10.30 mm	5.46.001.142/0200

4

MICON

Plunger diameter ST/size	Length of plunger L	Order no.
14.5 mm	3.00 mm	5.46.001.163/0200
14.5 mm	3.45 mm	5.46.001.164/0200
14.5 mm	3.95 mm	5.46.001.165/0200
14.5 mm	4.45 mm	5.46.001.166/0200
14.5 mm	7.15 mm	5.46.001.167/0200
14.5 mm	9.95 mm	5.46.001.168/0200
19.0 mm	3.00 mm	5.46.001.183/0200
19.0 mm	3.45 mm	5.46.001.184/0200
19.0 mm	3.95 mm	5.46.001.185/0200
19.0 mm	4.45 mm	5.46.001.186/0200
19.0 mm	7.15 mm	5.46.001.187/0200
19.0 mm	9.95 mm	5.46.001.188/0200

Technical data see page 4 - 8

Can only be combined with MICON 5 version Standard (red bubble)



MICON 5: Just feel it.



AUTOMOTIVE



INSTRUMENTATION-CONTROL-AUTOMATION



MEDICAL TECHNOLOGY

There is no miniature key-switch which has a better tactile and acoustic feedback than the new RAFI MICON 5 short-travel keyswitch.

The little one shows its excellence under keycaps, membrane overlays or elastic seals. Outstanding tactile feedback and absolutely

reliable switching behaviour in demanding applications, including hostile environments. MICON 5 – test it!

For samples and information, please contact: info@rafi.de

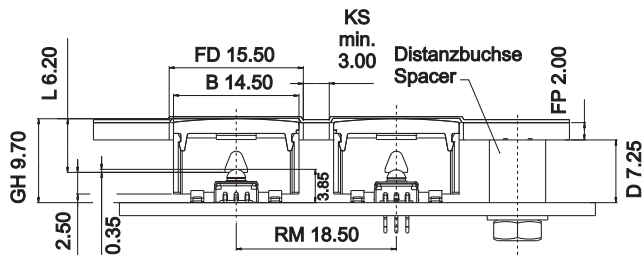
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RAFI
SOLUTIONS WITH PASSION

NEW

MICON 5 - Plungers square, illuminable

Musteraufbau, MICON 5 mit quadratischem Stößel, GH = 9.7 mm
Sample assembly, MICON 5 with square plunger, GH = 9.7 mm



General Data

Description

A - Height of keyswitch: SMT = 3.85 mm, THT = 3.80 mm
B - Width of plunger (11 x 11 mm, 14,5 x 14,5 mm or 18 x 18 mm)
D - GH - FP - 0.5 mm (= embossing height 0.35 mm + glue height 0.15 mm)
FD - Front panel cut-out: B + 1 mm
FP - Thickness of front plate
GH - Overall height: A + 5.75 mm
KS - Glue strip min. 3 mm
R - Grid size: FD + KS
The plungers can only be combined with MICON 5 version Standard (red bubble).

4

Technical Data

General information

Overall height GH	see order block
Colour of lens	see order block

MICON

MICON 5 - Plunger square, illuminable, 11 x 11 mm

NEW



Pic. with 2 LED OSRAM LO M676-Q1R1-24

Overall height GH	Colour of lens	Order no.
9.70 mm	red	5.05.511.470/2300
9.70 mm	green	5.05.511.470/2500
9.70 mm	yellow	5.05.511.470/2400
9.70 mm	white	5.05.511.470/2200
9.70 mm	blue	5.05.511.470/2600
12.50 mm	red	5.05.511.471/2300
12.50 mm	green	5.05.511.471/2500
12.50 mm	yellow	5.05.511.471/2400
12.50 mm	white	5.05.511.471/2200
12.50 mm	blue	5.05.511.471/2600
12.50 mm	opaque blue	5.05.511.476/0600

Technical data see page 4 - 12

Can only be combined with MICON 5 version Standard (red bubble)

4

MICON

NEW

MICON 5 - Plunger square, illuminable, 14.5 x 14.5 mm



Pic. with 4 LED OSRAM LO M676-Q1R1-24

Overall height GH	Colour of lens	Order no.
9.70 mm	red	5.05.511.475/2300
9.70 mm	green	5.05.511.475/2500
9.70 mm	yellow	5.05.511.475/2400
9.70 mm	white	5.05.511.475/2200
9.70 mm	blue	5.05.511.475/2600
12.50 mm	red	5.05.511.476/2300
12.50 mm	green	5.05.511.476/2500
12.50 mm	yellow	5.05.511.476/2400
12.50 mm	white	5.05.511.476/2200
12.50 mm	blue	5.05.511.476/2600

Technical data see page 4 - 12

Can only be combined with MICON 5 version Standard (red bubble)

MICON 5 - Plunger square, illuminable, 18 x 18 mm

NEW



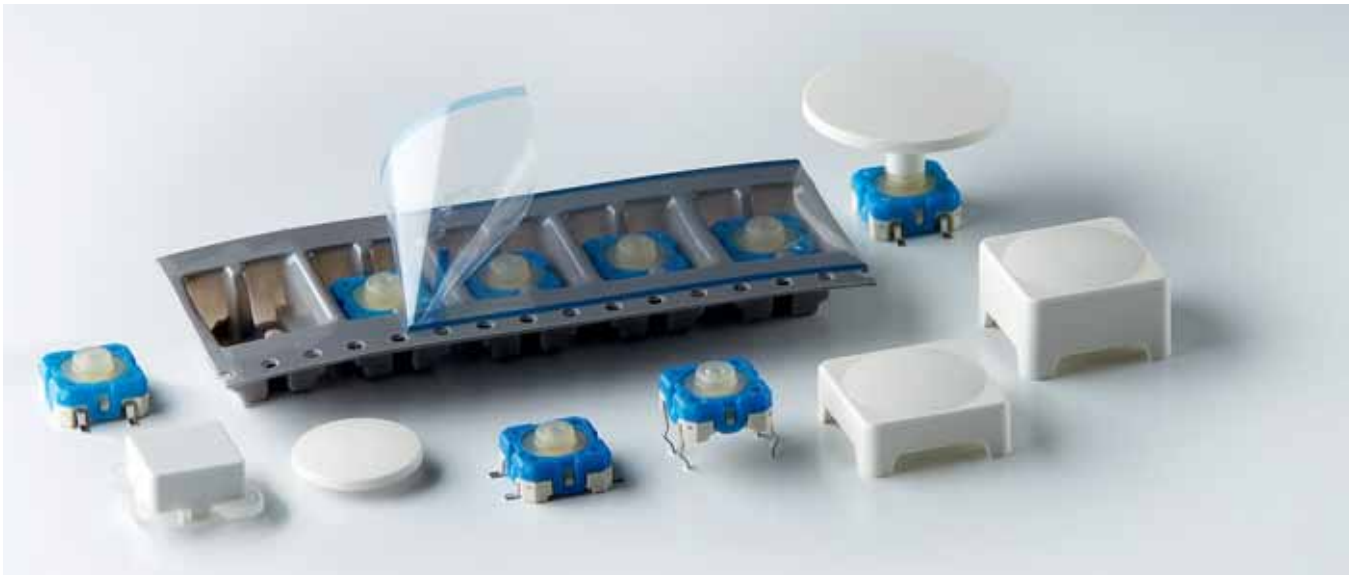
Overall height GH	Colour of lens	Order no.
9.70 mm	red	5.05.511.480/2300
9.70 mm	green	5.05.511.480/2500
9.70 mm	yellow	5.05.511.480/2400
9.70 mm	white	5.05.511.480/2200
9.70 mm	blue	5.05.511.480/2600
12.50 mm	red	5.05.511.481/2300
12.50 mm	green	5.05.511.481/2500
12.50 mm	yellow	5.05.511.481/2400
12.50 mm	white	5.05.511.481/2200
12.50 mm	blue	5.05.511.481/2600

Technical data see page 4 - 12

Can only be combined with MICON 5 version Standard (red bubble)

4

MICON



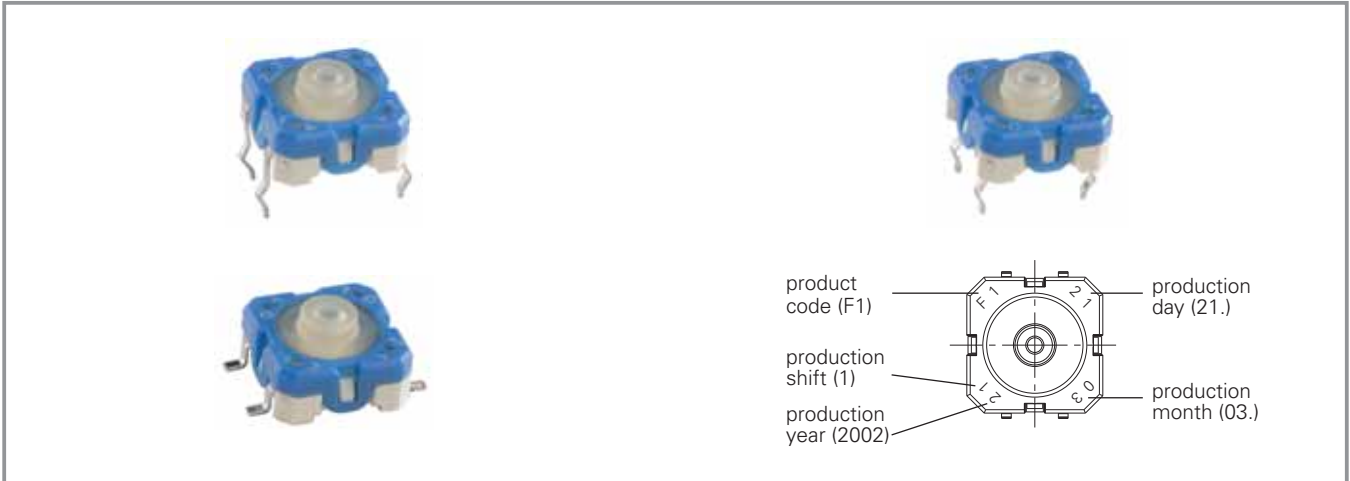
General Data

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).

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RACON 8 - Short-travel keyswitch



General Data

RACON 8 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 THT versions
 - Reflow soldering for SMT version
 - Vapour phase soldering for SMT versions
 - Manual soldering
- SMT version suitable for processing with an automatic SMT assembly machine
- IMDS listed

You can download actual product information from our internet site www.rafi.de / Catalogues and Downloads

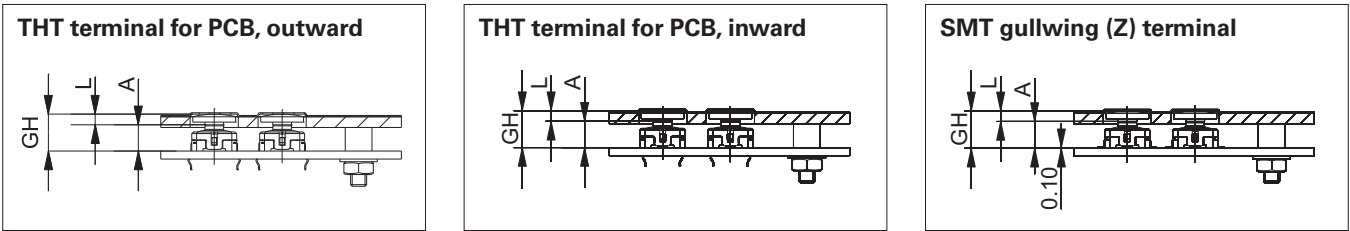
4

Technical Data

Dimensions		Rated current min.		0.01 mA
Length of housing	8.4 mm	Rated current max.		100 mA
Width of housing	8.4 mm	Rated power max.		1 W
Height of housing	see order block	(ohmic load)		
Mechanical design		Contact resistance when new max.		100 mΩ
Mounting	soldering	Insulation resistance		10 ⁹ Ω
Terminals	see order block	Other specifications		
Contact system	snap-action contact	Ambient temp. operating min.		-40 °C
Contact arrangement	1 NO	Ambient temp. operating max.		+90 °C
Contact materials	Au	Resistance to environment		DIN EN 60068-2 -14, -30,-33 and -78
Illumination	no	Operating life		1,000,000
Mechanical characteristics		Solderability / Solder heat resistance		see order block
Operating force	3.3±0.6 N	Flammability of materials		UL 94 HB
Switching travel	0.34±0.1 mm	Packing		see order block
Electrical characteristics		Produkt code		see order block
Rated voltage min.	0.02 V			
Rated voltage max.	35 V			

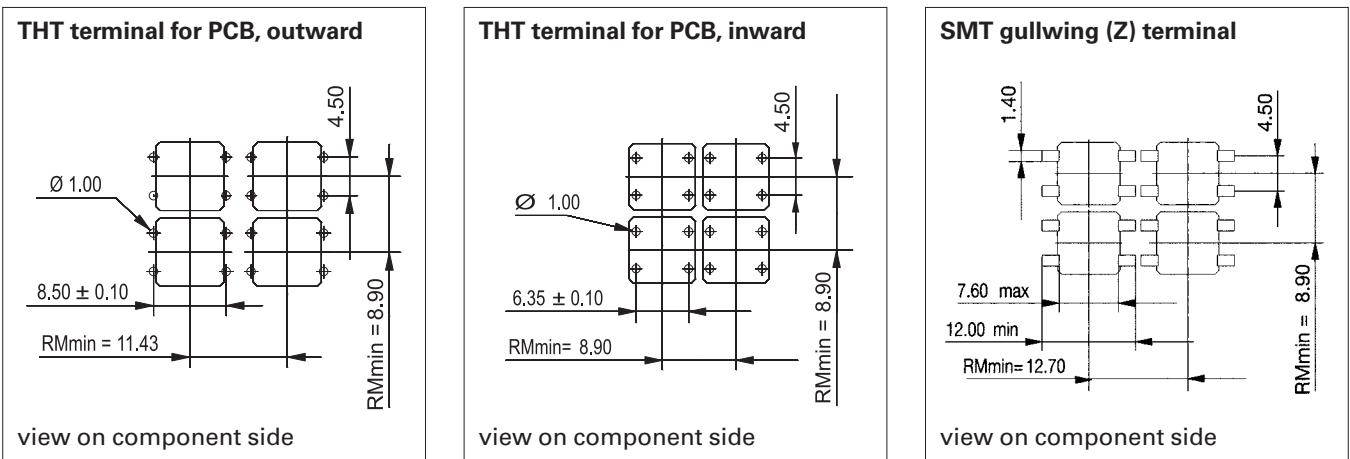
RACON

RACON 8, Typical System Assembly with Plunger under Overlay



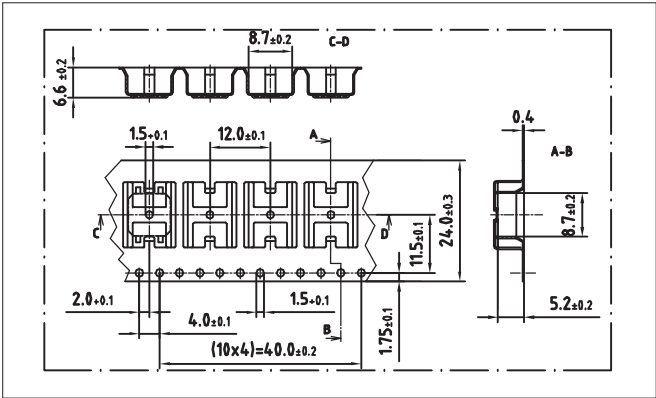
Variable	Declaration	THT terminal outward	THT terminal inward	SMT-terminal
A	Height of keyswitch		$A = 4.90 \pm 0.1 \text{ mm}$	
GH	Overall height		$GH = A + L$	$GH = A + L + 0.1 \text{ mm}$
L	Length of plunger		$L = GH - A$	$L = GH - A - 0.1 \text{ mm}$

RACON 8, PCB Hole Pattern, Smallest Grid

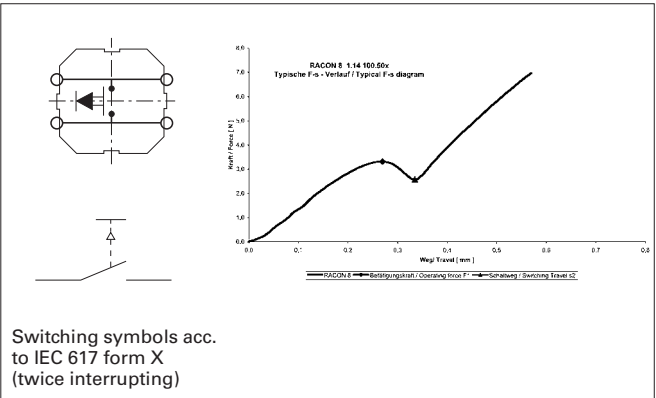


4

RACON 8, SMT Terminal, Tape and Reel Drawing



Circuit Diagram RACON 8 Typical Force-Travel Diagram



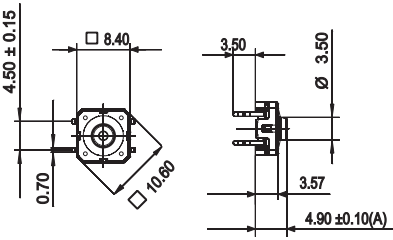
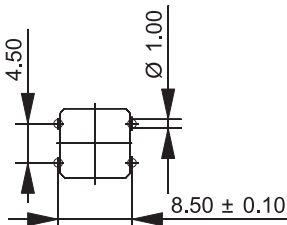
RACON

Typical accessories RACON 8 - Short-travel keyswitch

Description	Photo	Order no.	Additional accessories see page
Spacer, round, length 6.25 mm, red		5.30.759.034/0000	2 - 239, 4 - 82, 5 - 30
Plunger round		5.46.167.311/0209	4 - 32
RK 90 - Keycap body, for lenses 9 x 9 mm		5.55.103.265/1013	4 - 93

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

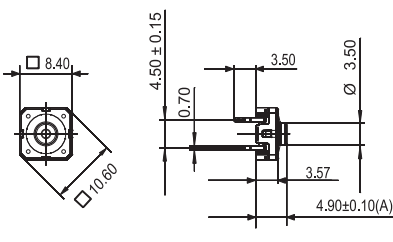
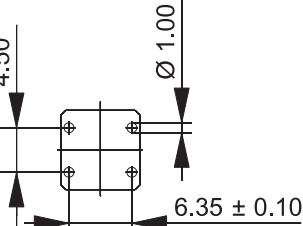
RACON 8 - Short-travel keyswitch, THT outward

   PCB footprint, view on component side					
Terminals	Operating force	Solderability / Solder heat resistance	Produkt code	Packing	Order no.
THT outward	3.3±0.6 N	E DIN IEC 600 68-2-20	A1	tubes à 60 piece	1.14.100.501/0000

Technical data see page 4 - 18

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

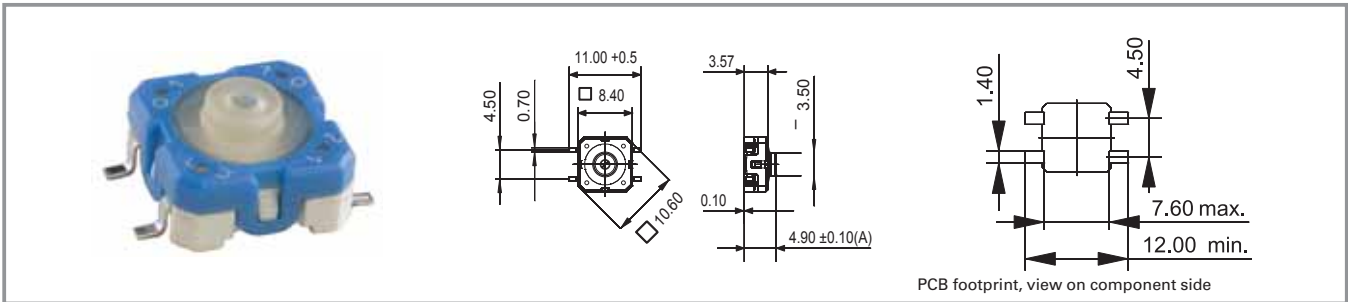
RACON 8 - Short-travel keyswitch, THT inward

   PCB footprint, view on component side					
Terminals	Operating force	Solderability / Solder heat resistance	Produkt code	Packing	Order no.
THT inward	3.3±0.6 N	E DIN IEC 600 68-2-20	B1	tubes à 60 piece	1.14.100.502/0000

Technical data see page 4 - 18

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

RACON 8 - Short-travel keyswitch, SMT gullwing (Z) terminals

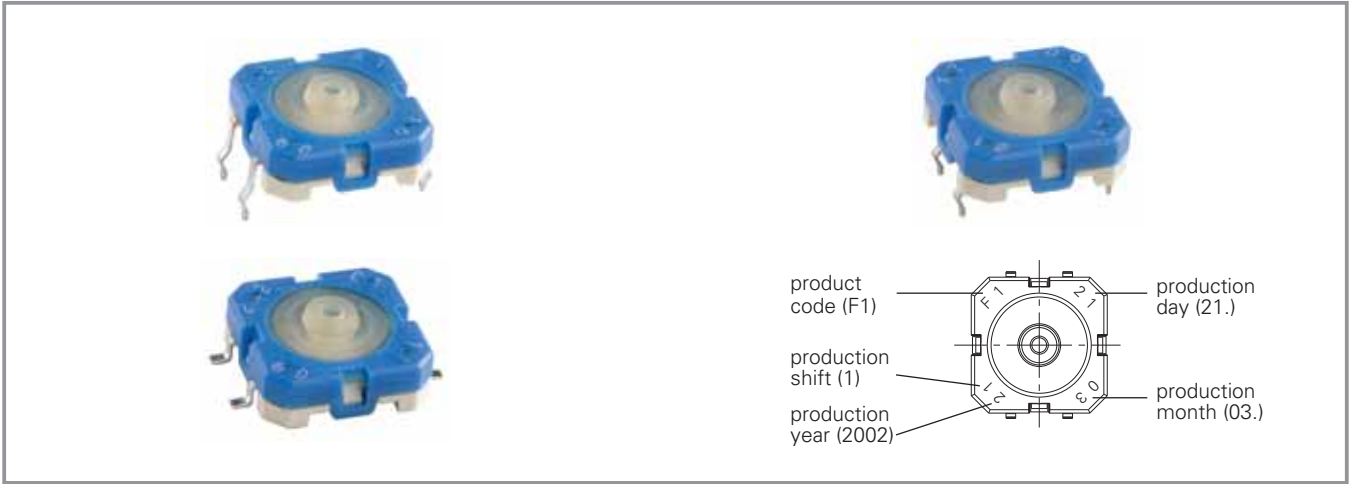


Terminals	Operating force	Solderability / Solder heat resistance	Produkt code	Packing	Order no.
SMT Gullwing (Z) terminals	3.3±0.6 N	E DIN IEC 600 68-2-58	C1	tape and reel à 1000 pieces	1.14.100.503/0000

Technical data see page 4 - 18

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

RACON 12 - Short-travel keyswitch



General Data

RACON 12 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.

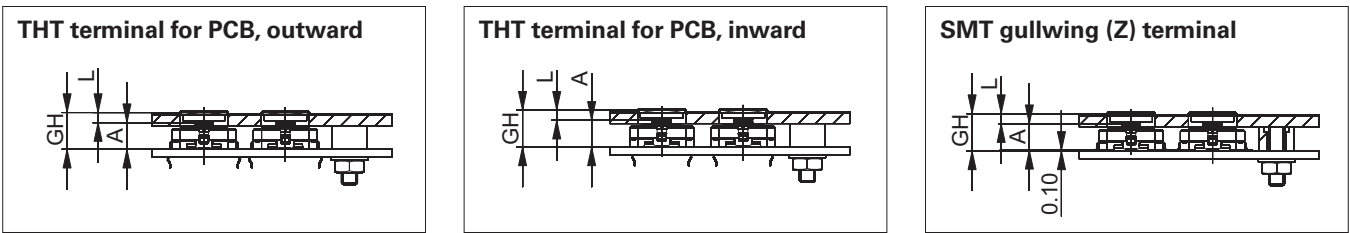
- The features at a glance:
- Suitable for the most common soldering methods
 - Wave soldering bath for THT versions
 - Reflow soldering for SMT versions
 - Vapour phase soldering for SMT versions
 - Manual soldering
 - SMT version suitable for processing with an automatic SMT assembly machine
 - IMDS listed

4

Technical Data

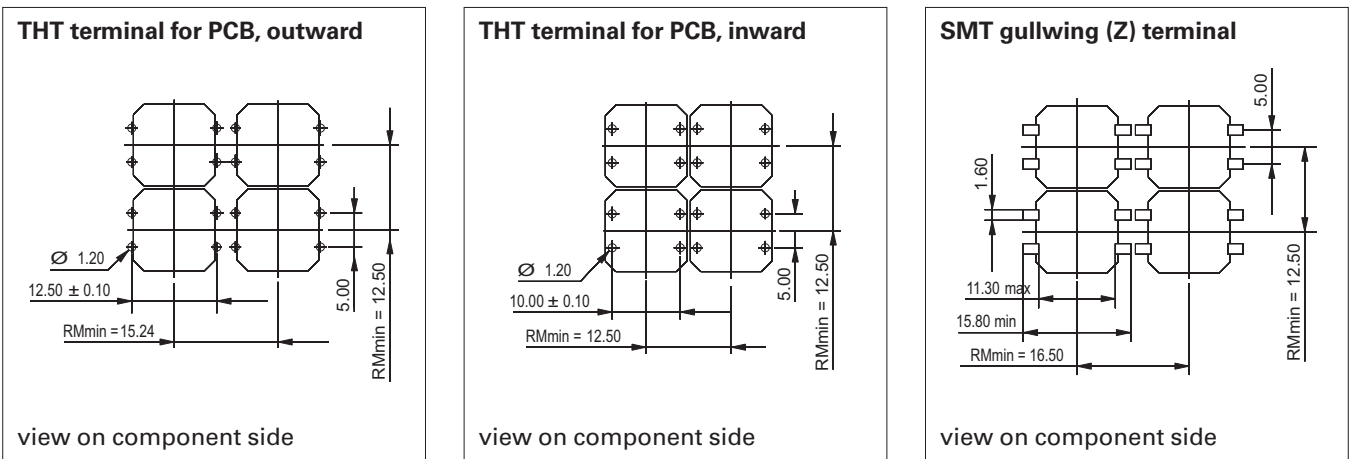
RACON	Dimensions			
	Length of housing	12 mm	Rated current min.	0.01 mA
	Width of housing	12 mm	Rated current max.	100 mA
	Overall height	see order block	Rated power max.	1 W
	Mechanical design		(ohmic load)	
	Mounting	soldering	Contact resistance when new	100 mΩ
	Terminals	see order block	max.	
	Contact system	snap-action contact	Insulation resistance	10 ⁹ Ω
	Contact arrangement	1 NO	Other specifications	
	Contact materials	Au	Ambient temp. operating min.	-40 °C
Mechanical characteristics			Ambient temp. operating max.	+90 °C
Operating force		see order block	Resistance to environment	DIN EN 60068-2 -14, -30, -33 and -78
Switching travel		see order block	Operating life	1,000,000
Electrical characteristics			Solderability / Solder heat	see order block
Rated voltage min.		0.02 V	resistance	
Rated voltage max.		35 V	Flammability of materials	UL 94 HB
			Packing	see order block
			Produkt code	see order block

RACON 12, Typical System Assembly with Plunger under Overlay

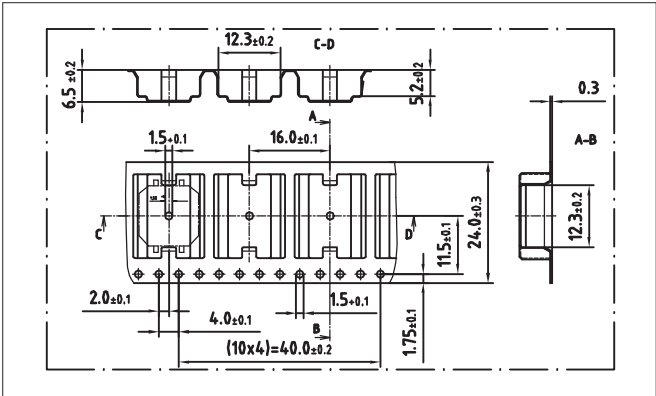


Variable	Declaration	THT terminal outward	THT terminal inward	SMT-terminal
A	Height of keyswitch		$A = 4.95 \pm 0.1 \text{ mm}$	
GH	Overall height		$GH = A + L$	$GH = A + L + 0.1 \text{ mm}$
L	Length of plunger		$L = GH - A$	$L = GH - A - 0.1 \text{ mm}$

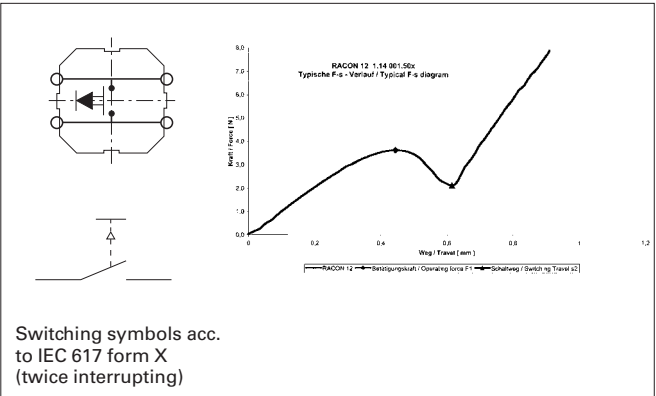
RACON 12, PCB Hole Pattern, Smallest Grid



RACON 12, SMT Terminal, Tape and Reel Drawing



Circuit Diagram Typical Force-Travel Diagram

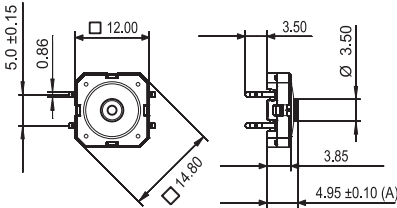
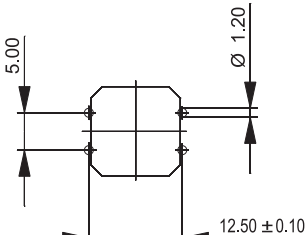


Typical accessories RACON 12 - Short-travel keyswitch

Description	Photo	Order no.	Additional accessories see page
Spacer, round, length 6.25 mm, red		5.30.759.034/0000	2 - 239, 4 - 82, 5 - 30
Square plunger for membrane data entry system		5.46.001.057/0209	4 - 34
Plunger round		5.46.168.050/0209	4 - 33
RK 90 - Keycap body, for lens 1 -module		5.55.103.030/1013	4 - 95

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

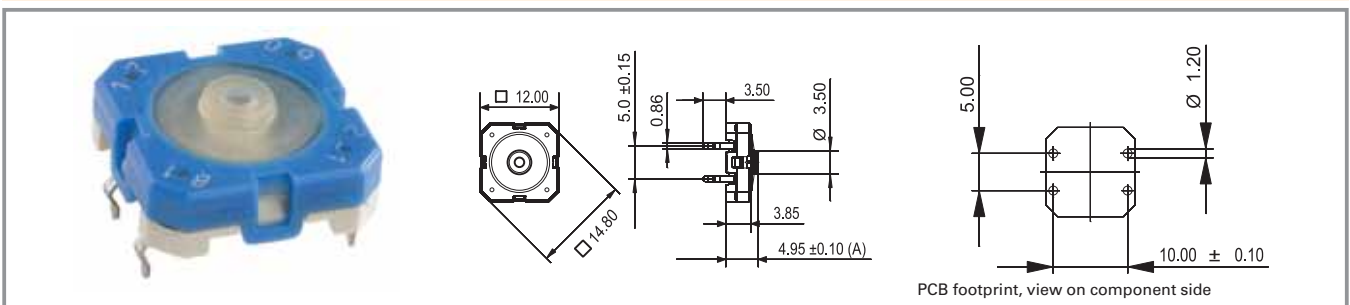
RACON 12 - Short-travel keyswitch solder terminals for PCB, outward

   PCB footprint, view on component side						
Terminals	Operating force	Switching travel	Solderability / Solder heat resistance	Produkt code	Packing	Order no.
THT outward	3.6±0.7 N	0.61±0.1 mm	E DIN IEC 600 68-2-20	A1	tubes à 45 pieces	1.14.001.501/0000

Technical data see page 4 - 22

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

RACON 12 - Short-travel keyswitch solder terminals for PCB, inward

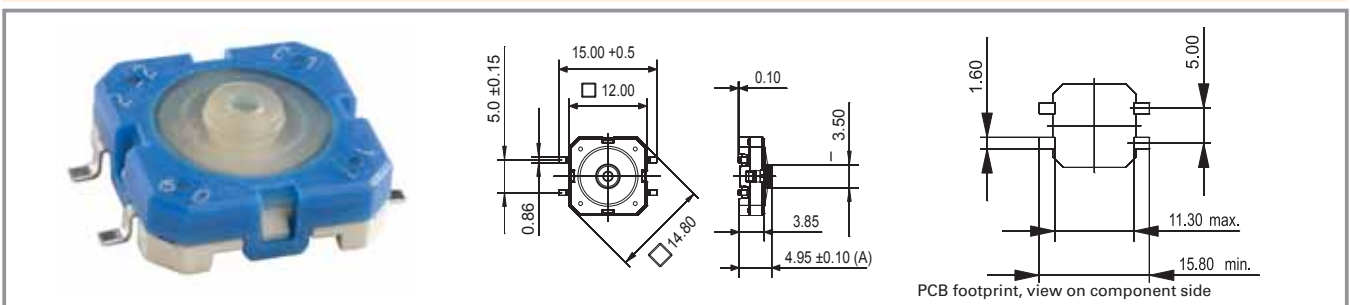


Terminals	Operating force	Switching travel	Solderability / Solder heat resistance	Produkt code	Packing	Order no.
THT outward	3.6±0.7 N	0.61±0.1 mm	E DIN IEC 600 68-2-20	B1	tubes à 45 pieces	1.14.001.502/0000

Technical data see page 4 - 22

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

RACON 12 - Short-travel keyswitch SMT gullwing (Z) terminals



Terminals	Operating force	Switching travel	Solderability / Solder heat resistance	Produkt code	Packing	Order no.
SMT Gullwing (Z)	3.6±0.7 N	0.61±0.1 mm	E DIN IEC 600 68-2-58	C1	tape and reel à 750 pieces	1.14.001.503/0000
SMT Gullwing (Z)	6.8±1.6 N	0.7±0.1 mm	E DIN IEC 600 68-2-58	ZD	tape and reel à 750 pieces	1.14.001.916/0000
SMT Gullwing (Z)	9.7±2.5 N	0.73±0.1 mm	E DIN IEC 600 68-2-58	ZE	tape and reel à 750 pieces	1.14.001.920/0000

Technical data see page 4 - 22

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

RACON 12V - Short-travel keyswitch with vertical adapter



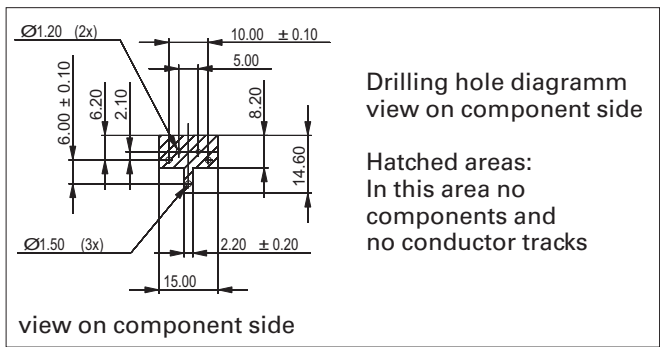
General Data

The RACON 12V 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.

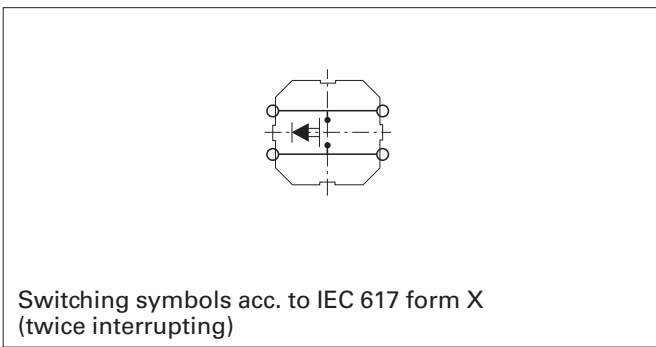
Technical Data

4	Dimensions		Contact resistance when new	100 mΩ
	Length	14.5 mm	max.	
	Width	13.6 mm	Insulation resistance	10 ⁹ Ω
	Overall height	4.95 mm		
	Mechanical design		Other specifications	
	Mounting	soldering	Ambient temp. operating min.	-40 °C
	Terminals	THT	Ambient temp. operating max.	+80 °C
	Contact system	snap-action contact	Storage temperature min.	-50 °C
	Contact arrangement	1 NO	Storage temperature max. (product)	+85 °C
	Contact materials	Au	Storage temperature max. (in tube)	+85 °C
RACON	Illumination	no	Environmental resistance	acc. to IEC 60068-2
	Mechanical characteristics			-14, -30, -33 and -78
	Operating force	3.6±0.7 N	Operating life	1,000,000
	Switching travel	0.61±0.1 mm	Solderability / solder heat resistance	E DIN IEC 600 68-2-20
	Electrical characteristics		Flammability of materials	UL 94 HB
	Rated voltage min.	0.02 V	Packing	in boxes à 100 pieces
	Rated voltage max.	35 V		F 1
	Rated current min.	0.01 mA	Produkt code	
	Rated current max.	100 mA		
	Rated power max. (ohmic load)	1 W		

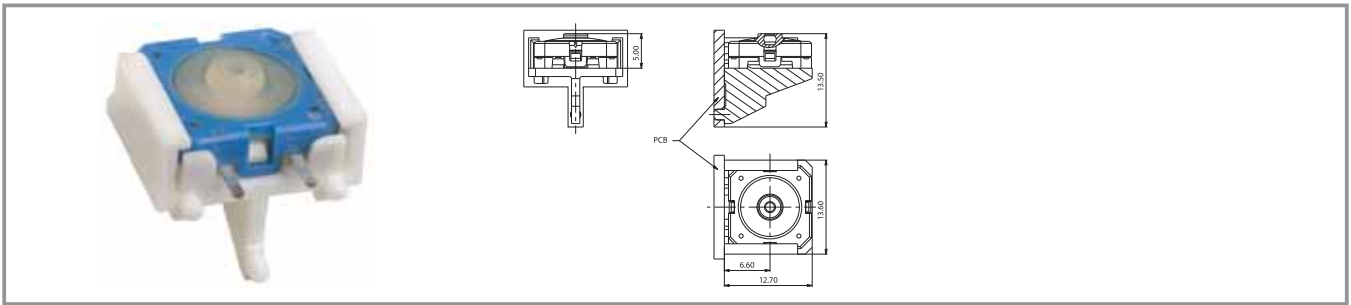
PCB footprint RACON 12V



Circuit Diagram RACON 12V



RACON 12V - Short-travel keyswitch with vertical adapter



Terminals	Contact arrangement	Produkt code	Packing	Order no.
THT	1 NO	F 1	in boxes à 100 pieces	1.14.001.505/0000

Technical data see page 4 - 26

Plungers for overall height of 6.5 mm may not be used.

RACON 12 i - Short-travel keyswitch



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 min.	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	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	Au
Illumination	fully illuminated

LED colour	see order block
LED type	standard 2 mm

Mechanical characteristics

Operating force	3.3 $\pm$ 0.6 N
Switching travel	0.34 $\pm$ 0.1 mm

Electrical characteristics

Rated voltage min.	0.02 V
Rated voltage max.	35 V
Rated current min.	0.01 mA
Rated current max.	100 mA
Rated power max.	1 W
(ohmic load)	
Contact resistance when new max.	100 m Ω

Dielectric strength AC min.	750 V
Insulation resistance	10 ⁹ Ω

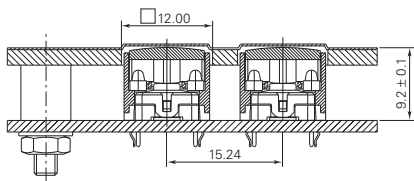
Electrical characteristics of LED

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/degree C, yellow 0.8 mA/degree 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

Other specifications

Ambient temp. operating min.	-40 °C
Ambient temp. operating max.	+80 °C
Storage temperature min.	see order block
Storage temperature max. (product)	see order block
Storage temperature max. (intube)	see order block
Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Operating life	1,000,000
Solderability / solder heat resistance	E DIN IEC 600 68-2-20
Flammability of materials	UL 94 HB
Packing	tubes à 45 pieces

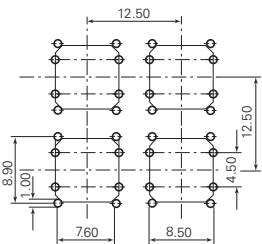
RACON 12i typical system assembly



view on component side

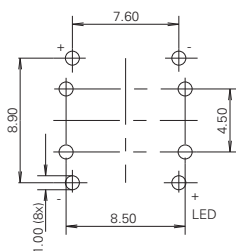
Explanation
Recommended area embossing 0.35 mm at glue spacer
thickness of 0.15 mm

RACON 12i smallest grid



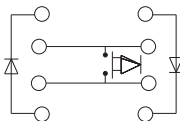
view on component side

LED hole patterns



view on component side

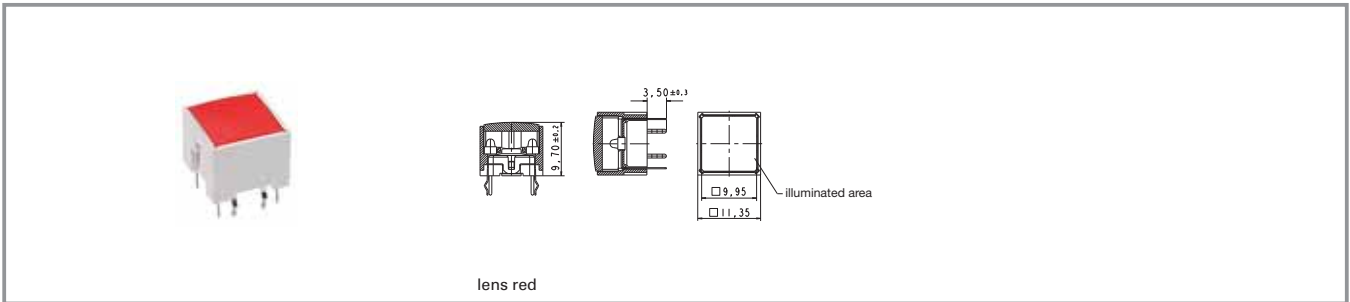
Circuit Diagram RACON 12i



Switching symbols acc. to IEC 60 617 form
(twice interrupting)



RACON 12 i - Short-travel keyswitch



Terminals	Contact arrangement	Illumination	Colour of lens	LED colour	Order no.
THT	1 NO	fully illuminated 2 LED	red	red	1.14.001.551/0000
THT	1 NO	fully illuminated 2 LED	green	green	1.14.001.552/0000
THT	1 NO	fully illuminated 2 LED	yellow	yellow	1.14.001.553/0000
THT	1 NO	fully illuminated 2 LED	orange	yellow	1.14.001.554/0000

Technical data see page 4 - 28

If keycaps are used we recommend RK 90 keycaps 9 x 9 mm.

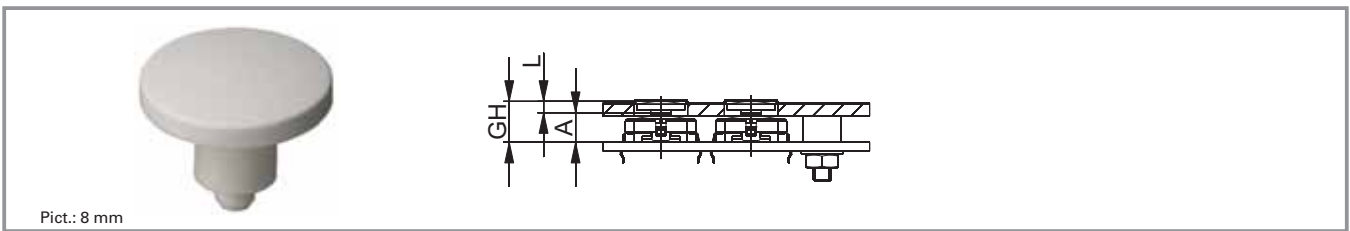
RACON - Special accessories



General Data

GH = „L“ lenth oh plunger + „A“ height of keyswitch (+ 0.1 mm for SMT versions)
Front panel cut-out = size of plunger + 1 mm

Plunger round



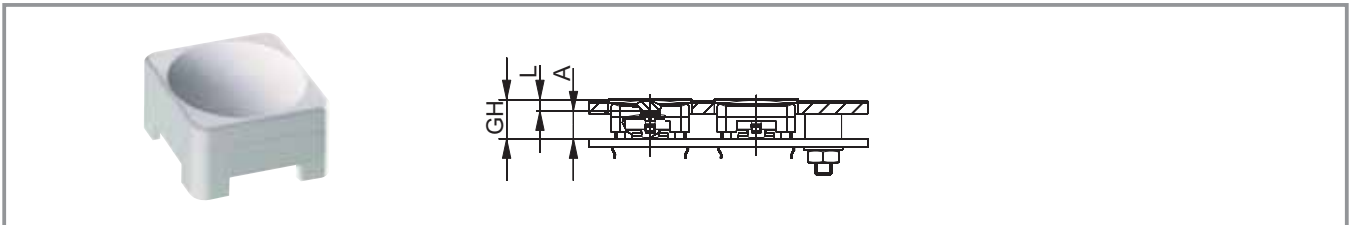
Plunger diameter/size	RACON version	Length of plunger L	Order no.
8 mm	RACON 8	1,4 mm	5.46.167.301/0209
8 mm	RACON 8	1.5 mm	5.46.167.102/0209
8 mm	RACON 8	1.6 mm	5.46.167.101/0209
8 mm	RACON 8/12	1,9 mm	5.46.167.090/0209
8 mm	RACON 8/12	2 mm	5.46.167.106/0209
8 mm	RACON 8/12	2.1 mm	5.46.167.107/0209
8 mm	RACON 8/12	4,6 mm	5.46.167.091/0209
8 mm	RACON 8/12	4.7 mm	5.46.167.311/0209
8 mm	RACON 8/12	4.8 mm	5.46.167.094/0209
8 mm	RACON 8/12	7,4 mm	5.46.167.092/0209
8 mm	RACON 8/12	7.5 mm	5.46.167.099/0209
8 mm	RACON 8/12	7.6 mm	5.46.167.096/0209

Plunger diameter/size	RACON version	Length of plunger L	Order no.
11.5 mm	RACON 8	1,4 mm	5.46.167.227/0209
11.5 mm	RACON 8	1.5 mm	5.46.167.061/0209
11.5 mm	RACON 8	1.6 mm	5.46.167.060/0209
11.5 mm	RACON 8/12	2 mm	5.46.167.067/0209
11.5 mm	RACON 8/12	2.1 mm	5.46.167.064/0209
11.5 mm	RACON 8/12	4,6 mm	5.46.167.043/0209
11.5 mm	RACON 8/12	4.7 mm	5.46.167.050/0209
11.5 mm	RACON 8/12	4.8 mm	5.46.167.047/0209
11.5 mm	RACON 8/12	7.5 mm	5.46.167.059/0209
11.5 mm	RACON 8/12	7.6 mm	5.46.167.058/0209
14.5 mm	RACON 8	1,4 mm	5.46.168.227/0209
14.5 mm	RACON 8	1.5 mm	5.46.168.061/0209
14.5 mm	RACON 8	1.6 mm	5.46.168.060/0209
14.5 mm	RACON 8/12	2 mm	5.46.168.067/0209
14.5 mm	RACON 8/12	2.1 mm	5.46.168.064/0209
14.5 mm	RACON 8/12	4,6 mm	5.46.168.043/0209
14.5 mm	RACON 8/12	4.7 mm	5.46.168.050/0209
14.5 mm	RACON 8/12	4.8 mm	5.46.168.047/0209
14.5 mm	RACON 8/12	7,4 mm	5.46.168.044/0209
14.5 mm	RACON 8/12	7.5 mm	5.46.168.059/0209
14.5 mm	RACON 8/12	7.6 mm	5.46.168.058/0209
19 mm	RACON 8	1.5 mm	5.46.169.061/0209
19 mm	RACON 8	1.6 mm	5.46.169.060/0209
19 mm	RACON 8/12	2 mm	5.46.169.067/0209
19 mm	RACON 8/12	2.1 mm	5.46.169.064/0209
19 mm	RACON 8/12	4.7 mm	5.46.169.050/0209
19 mm	RACON 8/12	4.8 mm	5.46.169.047/0209
19 mm	RACON 8/12	7.5 mm	5.46.169.059/0209

Plunger diameter/size	RACON version	Length of plunger L	Order no.
19 mm	RACON 8/12	7.6 mm	5.46.169.058/0209

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

Square plunger for membrane data entry system

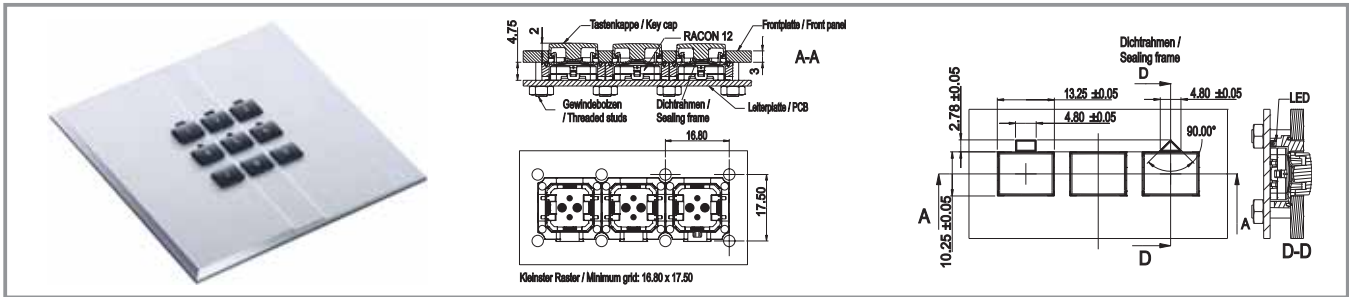


Plunger diameter/size	RACON version	Length of plunger L	Order no.
14 x 14 mm	RACON 12THT	2.1 mm	5.46.001.064/0209
14 x 14 mm	RACON 12THT	4.8 mm	5.46.001.060/0209
14 x 14 mm	RACON 12THT	7.6 mm	5.46.001.063/0209
14 x 14 mm	RACON 12 SMT	2 mm	5.46.001.057/0209
14 x 14 mm	RACON 12 SMT	4.7 mm	5.46.001.058/0209
14 x 14 mm	RACON 12 SMT	7.5 mm	5.46.001.059/0209

Front panel cut-out = 15 x 15 mm.

NEW

RK 90 II, Key cap system for RACON 12 with individual sealing



Technical Data

General information

Thickness of front panel	3.00 mm
Light conductor	see order block
Key grid	min. 16.8 x 17.5 mm
Degree of protection	IP 65

The key cap system RK 90 II has been developed especially for the short-travel keyswitch RACON 12. The lenses are snapped onto the sealing frame and then set onto the RACON 12 keyswitches. The PCB presses this unit against the front panel, so they are sealed.

Two versions of the sealing frames are provided with light conductors, either in square or triangle form.

The lenses can be legended directly with laser. For bright letters (see picture) first white lenses are painted in dark, then the letters are cut out of the dark colour with laser.

RK 90 II - Sealing frame



Thickness of front panel	Light conductor	Order no. without lens	Note
3.00 mm	square	5.05.004.901/0000	Please order lens separately.
3.00 mm	triangular	5.05.004.902/0000	Please order lens separately.
3.00 mm	-	5.05.004.903/0000	Please order lens separately.

Technical data see page 4 - 36

Lenses:

Lens RK 90 II, white: 5.46.654.192/0200
Lens RK 90 II, red: 5.46.654.192/0300
Lens RK 90 II, green: 5.46.654.192/0500
Lens RK 90 II, blue: 5.46.654.192/0600
Lens RK 90 II, yellow: 5.46.654.192/0400
Lens RK 90 II, grey: 5.46.654.192/0700
Lens RK 90 II, iron grey (varnished): 5.46.654.192/6033
Lens RK 90 II, grey (varnished): 5.46.654.192/6032

Legended lenses on request.



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

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RF 15 - Short-travel keyswitch, non-illuminated	4 - 44
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RF 15 N - Short-travel keyswitch, non-illuminated	4 - 51
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RF 15 R - Low short-travel keyswitch, 1 LED spot-illumination	4 - 56
RF 15 R - High short-travel keyswitch, 1 LED spot-illumination	4 - 57
RF 15 H - Short-travel keyswitch	4 - 58
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RF 19 - Signal indicator, 1 x 1-module	4 - 79
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RF 15 N - Extension plunger, round head	4 - 80
RF 15 N - Extension plunger, round head, with recess for LED	4 - 81
RF 15 - Keycap, snap-on, for overall height 12.5 mm	4 - 81
Spacers, round	4 - 82
Spacers, triangular	4 - 83
RF 15 N - LED spacer	4 - 84

Specifications LED

3 mm LED

(valid for 25 °C)	Red LED	Green LED	Yellow LED
Max. forward current I_F :	30 mA	30 mA	20 mA
Current reduction from: $T_0 = 50\text{ °C}$:	approx 0.5 mA/°C	approx 0.5 mA/°C	approx 0.2 mA/°C
Wavelength typ:	635 nm	565 nm	586 nm
Forward voltage U_F/I_F typ:	2 V/10 mA	2 V/10 mA	2 V/10 mA
Reverse voltage U_R/I_F typ:	5 V/100 µA min.	5 V/100 µA min.	5 V/100 µA min.
Ambient temperature, operating:	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C
	Blue LED	White LED	Green LED superbright
Max. forward current I_F :	20 mA	25 mA	30 mA
Current reduction from: $T_0 = 50\text{ °C}$:	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: $T_0 = 50\text{ °C}$:	0.5 mA/°C	0.5 mA/°C	0.8 mA/°C
Light current f_v/I_F typ:	-	-	250 mIm/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-colour LED	
Max. forward current I_F :	30 mA	30 mA	
Current reduction from: $T_0 = 50\text{ °C}$:	-	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:	Rated power of series:	Example for 5 Volt:
$R_V = \frac{U_B - U_F}{I_F}$	$P_V = I_F^2 \times R_V$	$R_V = \frac{5V - 2,0V}{0,02 A} = 150\ \Omega (= \text{standard value})$

RF 15 - Short-travel keyswitch



General Data

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

Technical Data

General information

Colour of lens	see order block
Recommended key grid	19.05 mm

Dimensions

Length	15 mm
Width	15 mm
Overall height	9.7 mm

Mechanical design

Mounting	soldering in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	see order block
LED colour	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 min.	with through-plated PCB 100 N

Electrical characteristics

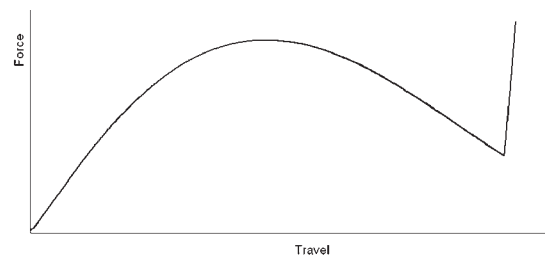
Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	Au: 35 V, Ag: 50 V
Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Rated current max.	Au: 100 mA, Ag: 250 mA
Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Contact resistance when new max.	100 mΩ
Insulation resistance	10 ⁹ Ω

Other specifications

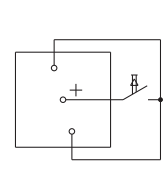
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.

Force/Travel Diagram – Keyswitch RF 15

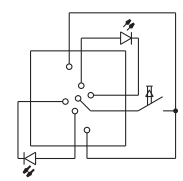
Operation characteristic limits RF



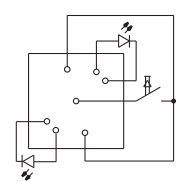
Circuit Diagram – Keyswitch RF 15



Keyswitch,
non-illuminated

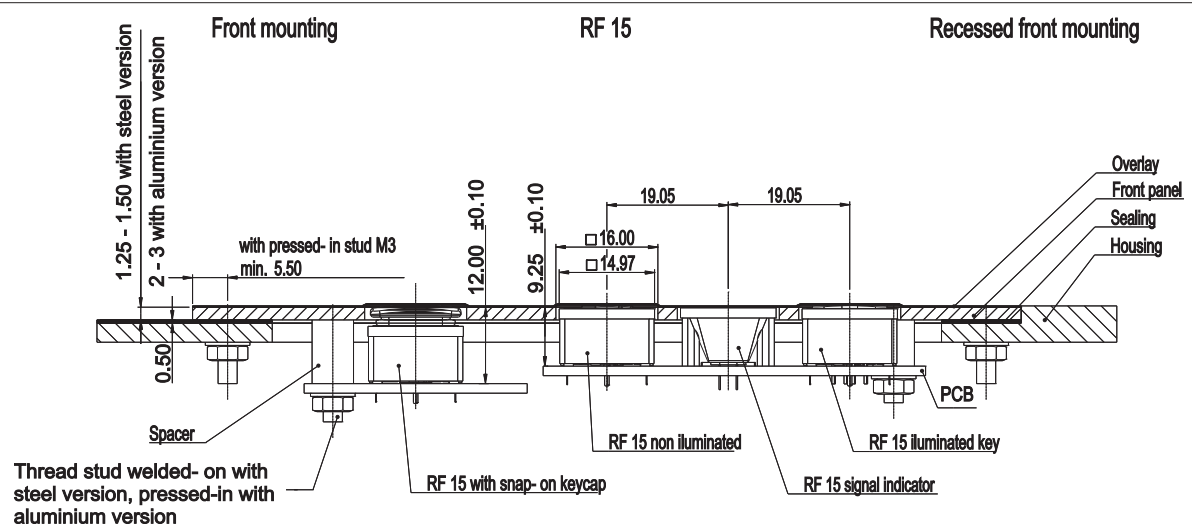


Keyswitch,
fully illuminated

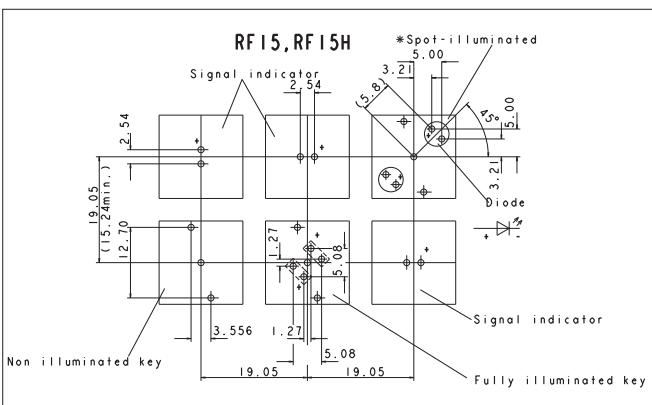


Keyswitch,
spot-illuminated

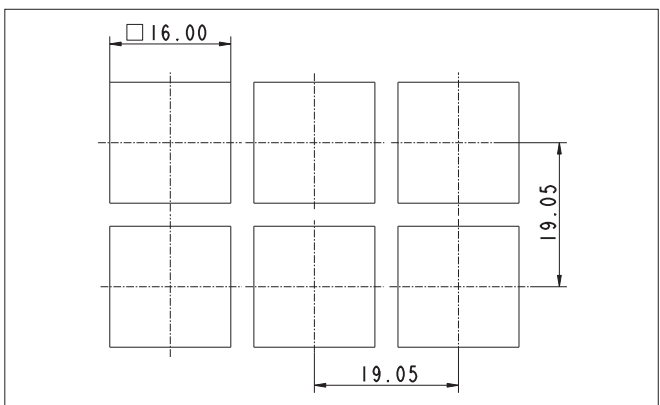
Dimensional Drawing RF 15



Hole Pattern RF 15

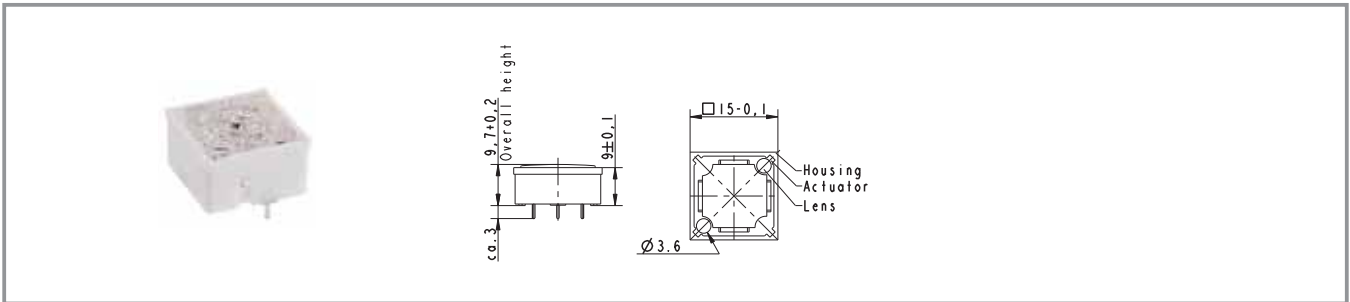


Hole Pattern – Front Panel



View on component side, all hole diameters 1,1 +/- 0,1 mm
PCB Keyswitches

RF 15 - Short-travel keyswitch, non-illuminated



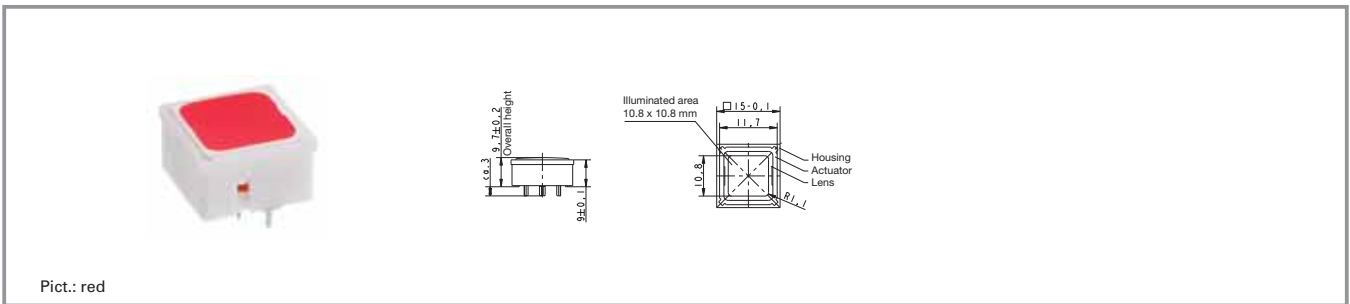
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	not illuminated	transparent	-	-	3.14.100.001/0000
Ag	not illuminated	transparent	-	-	3.14.100.006/0000

Technical data see page 4 - 42

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 - Short-travel keyswitch, fully illuminated with 2 LED



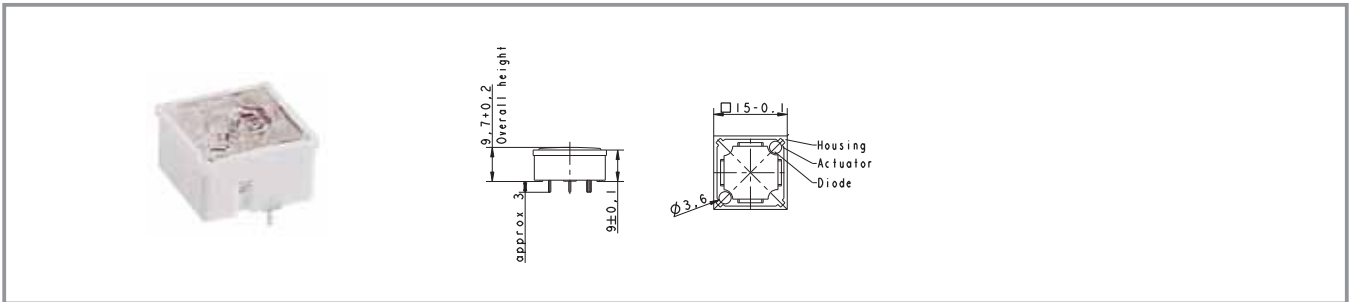
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.200.011/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.200.012/0000
Au	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.200.013/0000
Au	fully illuminated 2 LED	orange	yellow	2 mm	3.14.200.014/0000
Au	fully illuminated 2 LED	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	green	green	2 mm	3.14.200.022/0000
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
Ag	fully illuminated 2 LED	blue	blue	2 mm	3.14.200.025/0000

Technical data see page 4 - 42

For keycaps, refer to RK 90 system design.

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

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



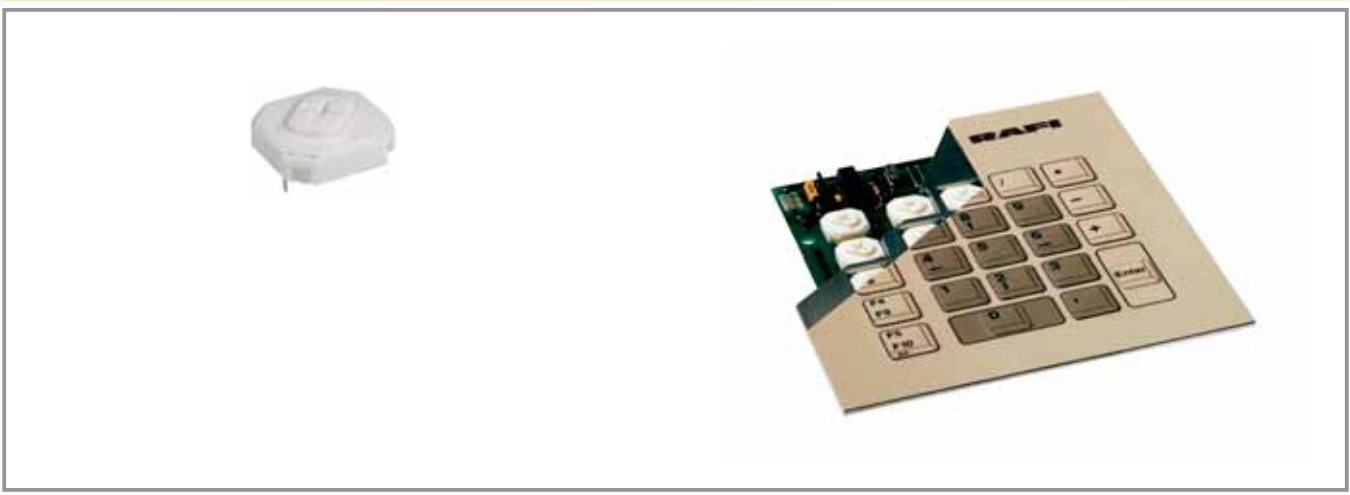
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	spot illumination 1 LED	opaque white	blue	3 mm	3.14.100.030/0000
Au	spot illumination 1 LED	opaque white	red	3 mm	3.14.100.031/0000
Au	spot illumination 1 LED	opaque white	green	3 mm	3.14.100.032/0000
Au	spot illumination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

Technical data see page 4 - 42

Double-spot LED illumination available on request

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

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

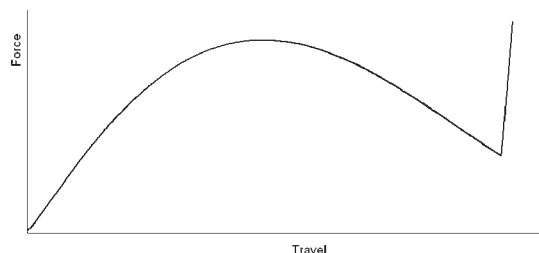
4

General information		Electrical characteristics	
Colour of lens	see order block	Rated voltage min.	Au: 0.02 V, Ag: 3 V
Recommended key grid	19.05 mm	Rated voltage max.	Au: 35 V, Ag: 50 V
Dimensions		Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Length	15 mm	Rated current max.	Au: 100 mA, Ag: 250 mA
Width	15 mm	Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Overall height	6.2 mm	Contact resistance when new max.	100 mΩ
Mechanical design		Insulation resistance	10 ⁹ Ω
Mounting	soldering in PCB	Other specifications	
Terminals	THT	Ambient temp. operating min.	-25 °C
Contact system	snap-action contact	Ambient temp. operating max.	+70 °C
Contact arrangement	1 NO	Storage temperature max. (in tube)	+50 °C
Contact materials	see order block	Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Illumination	external 3 mm LED possible if height more than 12 mm	Operating life min. (operations)	1,000,000
Mechanical characteristics		Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
Operating force max.	2.9±0.6 N	Wave soldering	260 °C max.
Switching travel	0.5±0.2 mm	Manual soldering	350 °C / 5 sec. max.
Robustness min.	100 with through-plated PCB N		

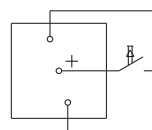
RF

Force/Travel Diagram – Keyswitch RF 15 N

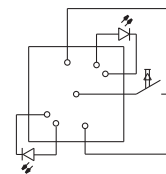
Operation characteristic limits RF



Circuit Diagram – Keyswitch RF 15 N

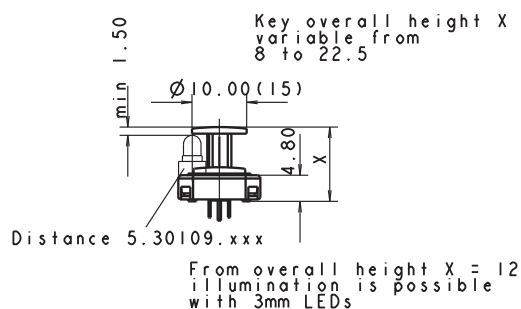
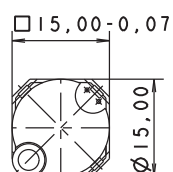
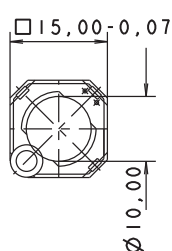


Keyswitch,
non illuminated

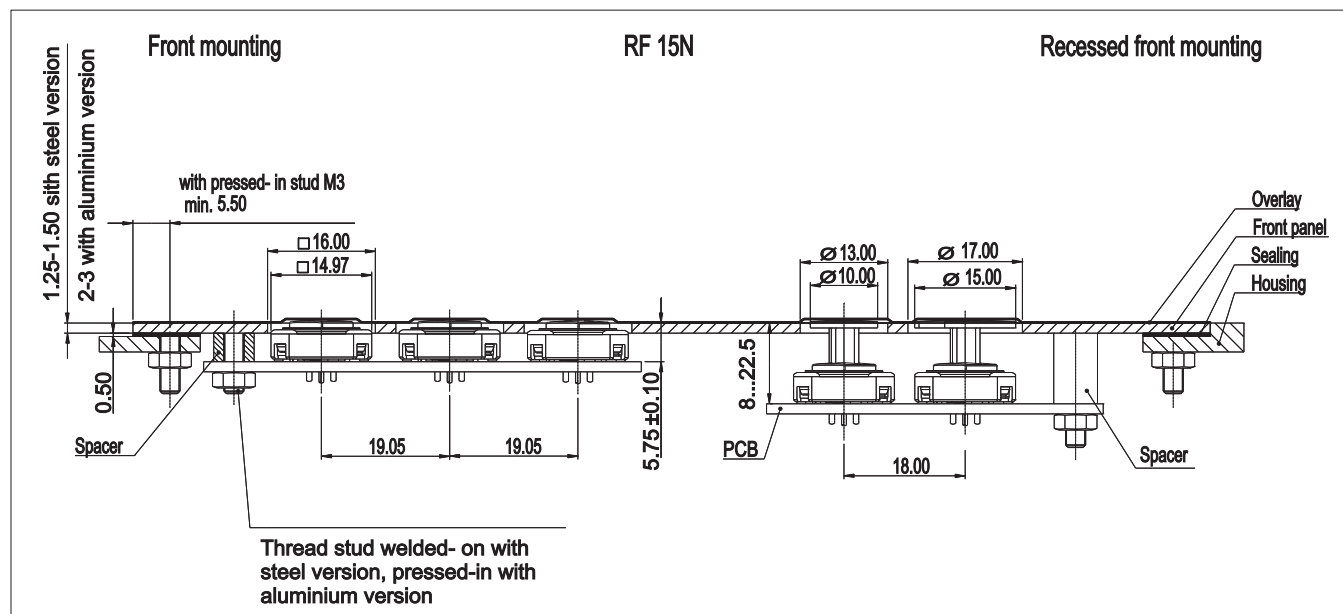


Keyswitch,
spot-illuminated

Dimensional Drawings RF 15 N



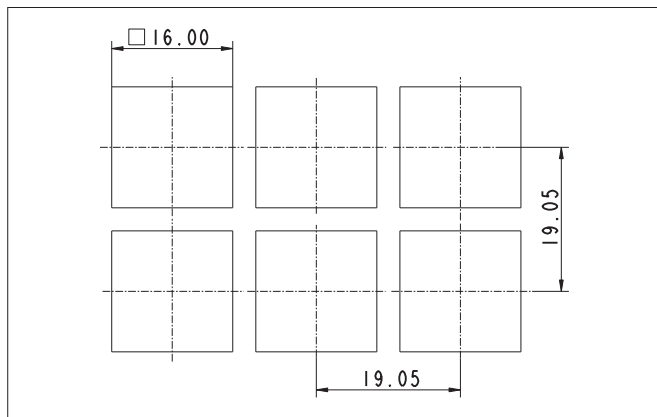
4



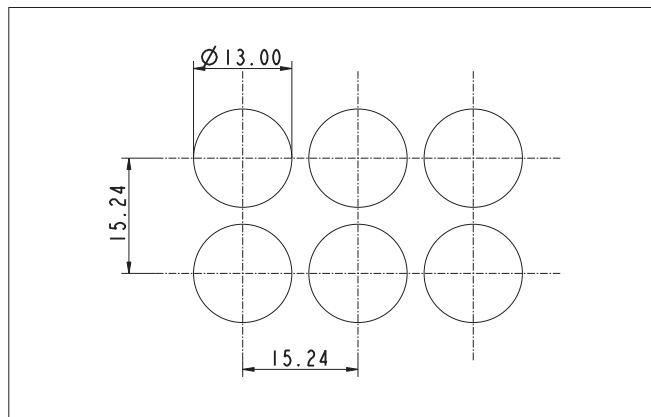
RF

Hole Patterns – Front Panel RF 15 N

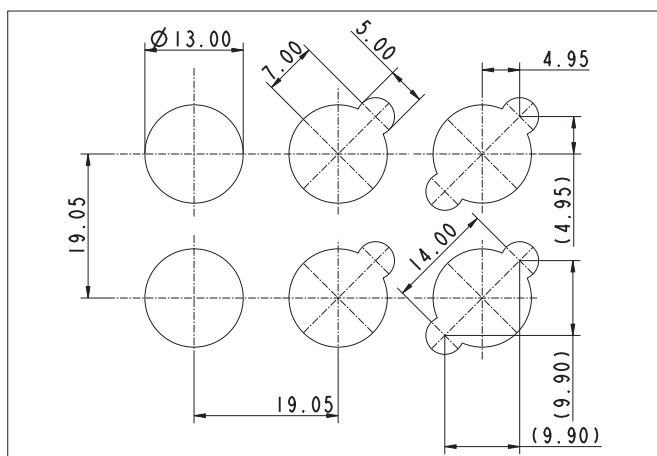
RF 15 N without plunger



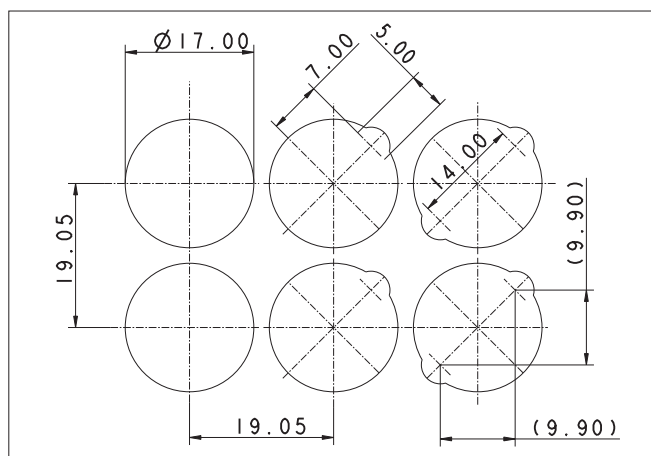
RF 15 N with plunger $\varnothing$ 10 mm, non-illuminated



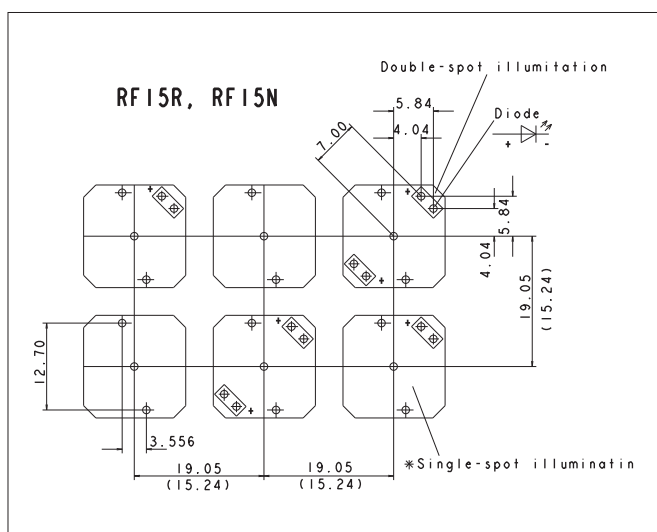
RF 15 N with plunger $\varnothing$ 10 mm, illuminated



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



Hole Pattern RF 15 N

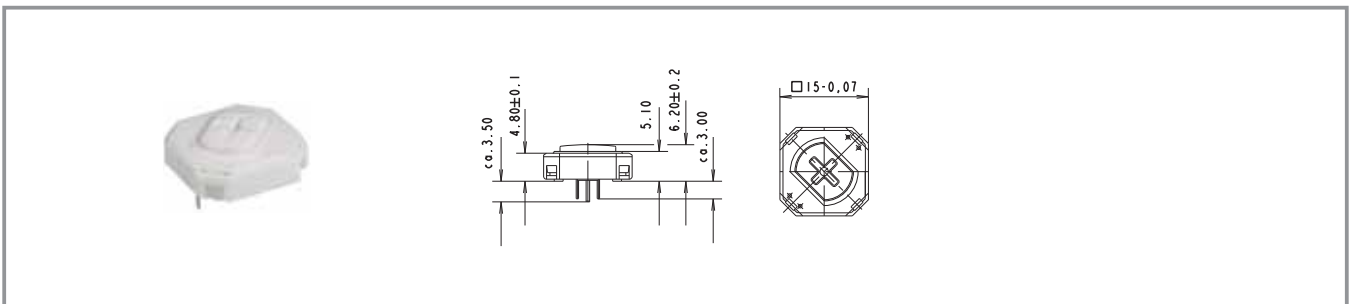


View on component side
All hole diameters $1.1^{+/-0.1}$ mm
PCB layout keyswitch 1/400" grid

Typical accessories RF 15 N - Short-travel keyswitch

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 - 84
RF 15 N - Extension plunger, Ø 10 mm, overall height 22.5 mm		5.46.011.028/0710	4 - 80
RF 15 N - Extension plunger, Ø 15 mm, overall height 22.5 mm		5.46.017.028/0710	4 - 81

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 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

Technical data see page 4 - 48

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

RF 15 R - Short-travel keyswitch



Pict.: with 2 mm LED, red

with 3 mm LED, green

General Data

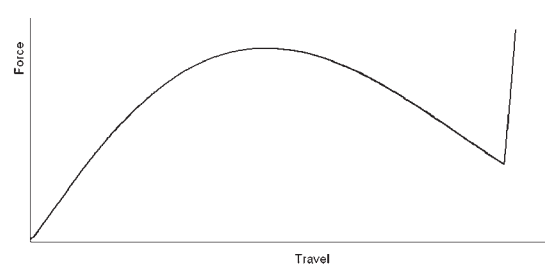
The round actuator of the RF 15 R keyswitch requires round front panel cut-outs. These make it possible to use a narrow keyboard grid of only 15.24 mm with sufficiently large frame webs between the individual keys. We recommend area embossing over the actuators for the overlay.

Technical Data

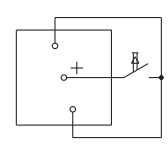
General information		Electrical characteristics	
Recommended key grid	15.24 mm	Rated voltage min.	Au: 0.02 V, Ag: 3 V
Dimensions		Rated voltage max.	Au: 35 V, Ag: 50 V
Length	15 mm	Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Width	15 mm	Rated current max.	Au: 100 mA, Ag: 250 mA
Overall height	see order block	Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Mechanical design		Contact resistance when new max.	100 mΩ
Mounting	soldering in PCB	Insulation resistance	10 ⁹ Ω
Terminals	THT	Other specifications	
Contact system	snap-action contact	Ambient temp. operating min.	-25 °C
Contact arrangement	1 NO	Ambient temp. operating max.	+70 °C
Contact materials	see order block	Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Illumination	see order block	Operating life min. (operations)	1,000,000
LED colour	see order block	Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
LED type	see order block	Wave soldering	260 °C max.
Mechanical characteristics		Manual soldering	350 °C / 5 sec. max.
Operating force max.	2.9±0.6 N		
Switching travel	0.5±0.2 mm		
Robustness min.	with through-plated PCB 100 N		

Force/Travel Diagram – Keyswitch RF 15 R

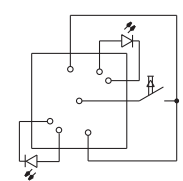
Operation characteristic limits RF



Circuit Diagram – Keyswitch RF 15 R

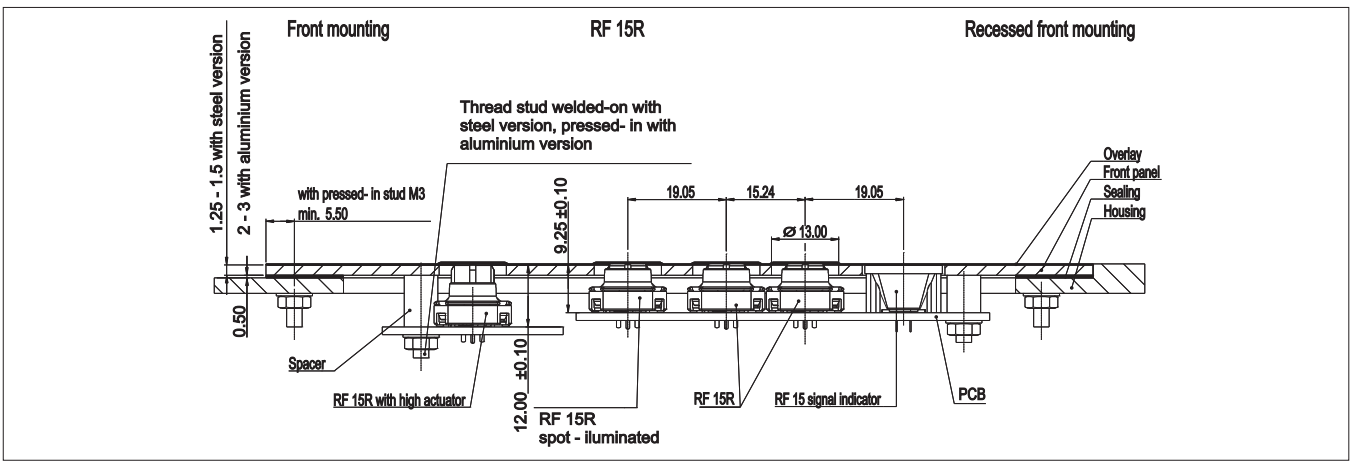


Keyswitch,
non-illuminated

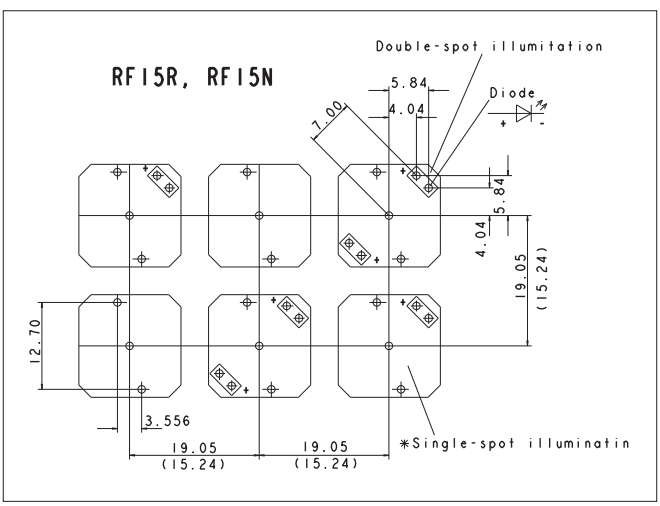


Keyswitch,
spot-illuminated

Dimensional Drawing RF 15 R



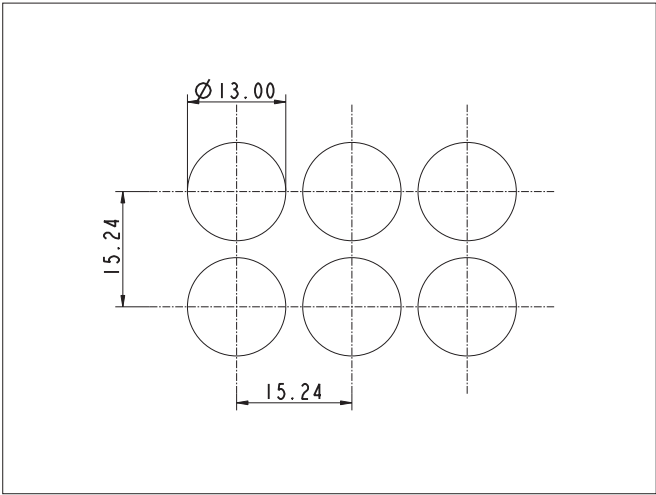
Hole Pattern RF 15 R



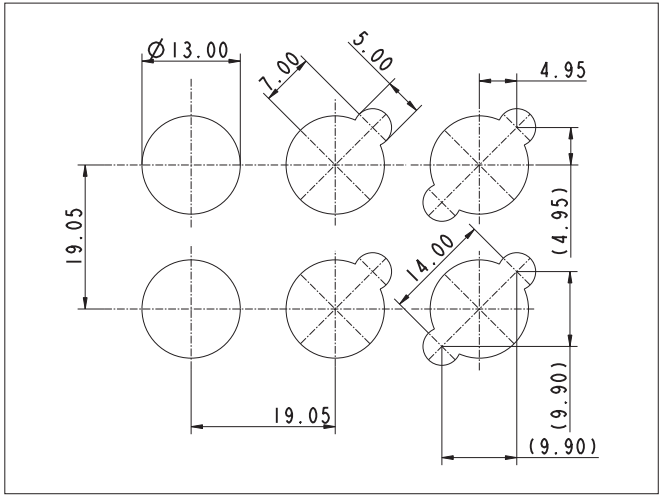
View on component side
All hole diameters 1.1 $\pm$ 0.1 mm
PCB layout keyswitch 1/400" grid

Hole Pattern – Front Panel RF 15 R

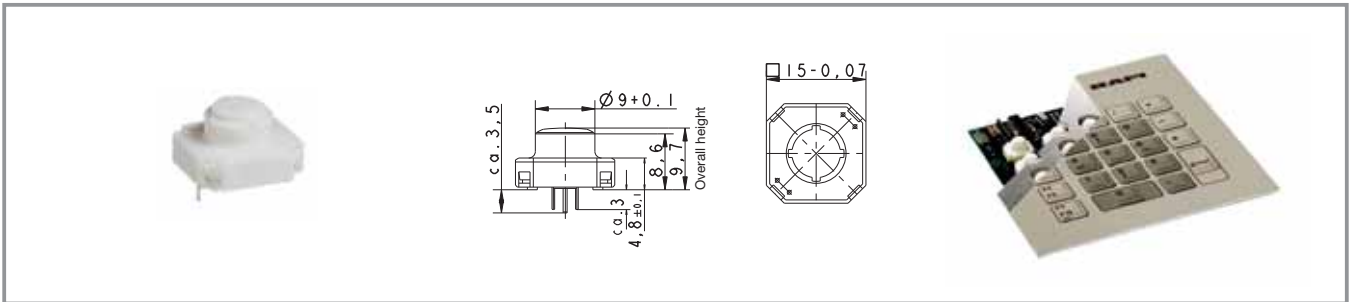
RF 15 R, non-illuminated



RF 15 R, illuminated



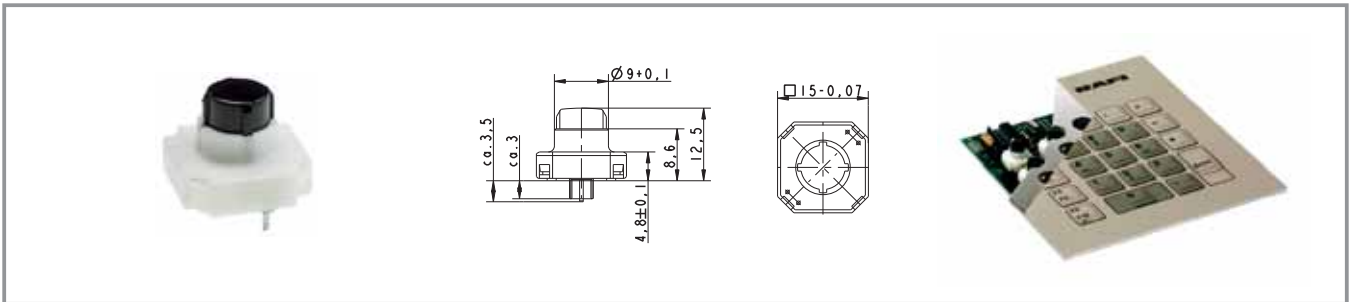
RF 15 R - Low short-travel keyswitch, non-illuminated



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 - 52

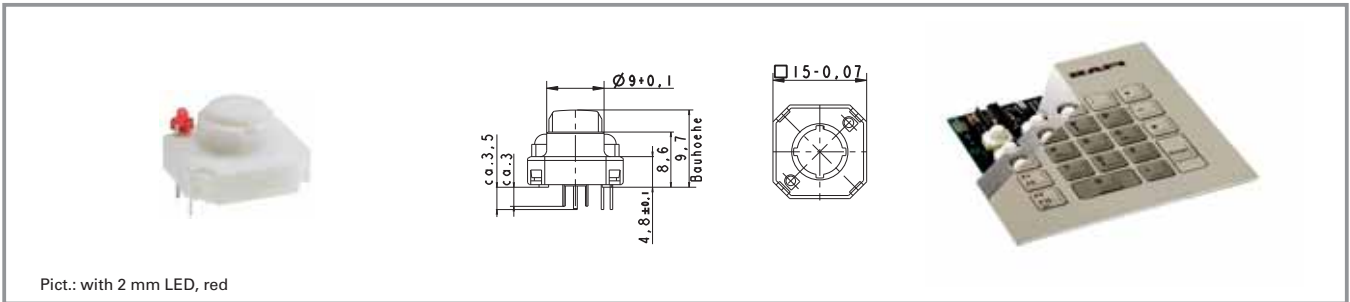
RF 15 R - High short-travel keyswitch, non-illuminated



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 - 52

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



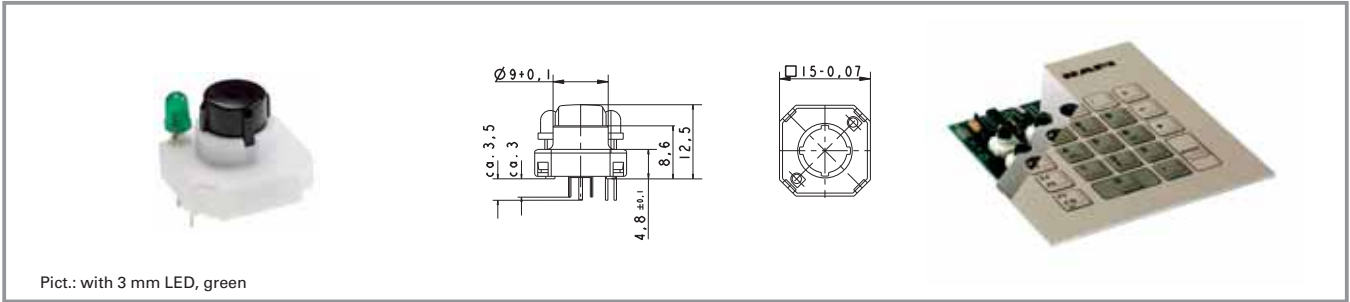
Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	9.7 mm	spot illumination 1 LED	2 mm	red	3.14.100.531/0000
Au	9.7 mm	spot illumination 1 LED	2 mm	green	3.14.100.532/0000
Au	9.7 mm	spot illumination 1 LED	2 mm	yellow	3.14.100.533/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	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 - 52

Versions with 2 LEDs available on request.

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

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



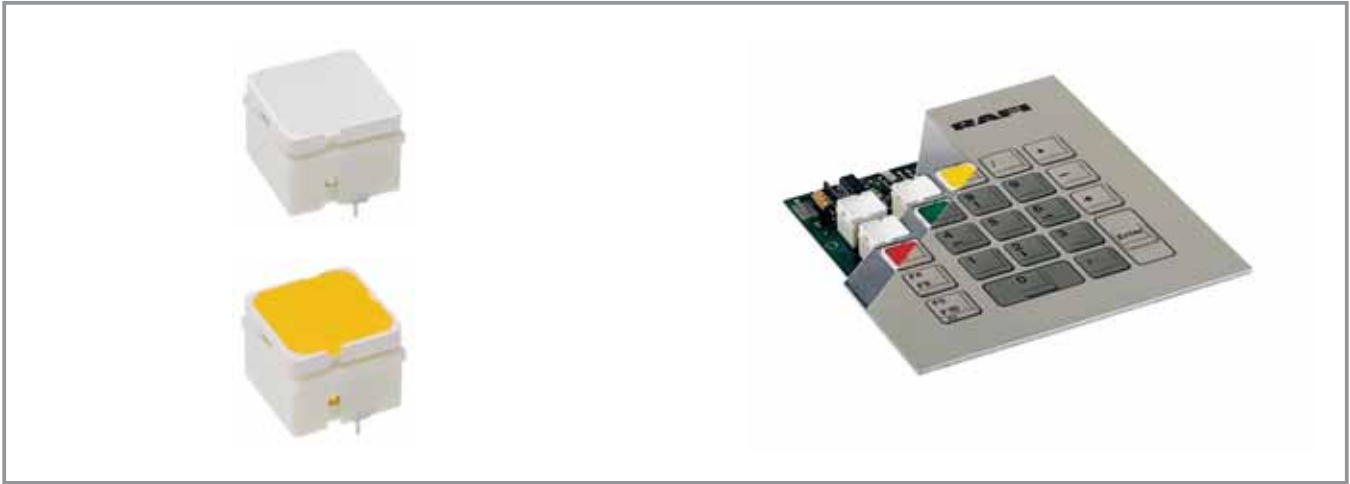
Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	12.5 mm	spot illumination 1 LED	3 mm	blue	3.14.100.830/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	red	3.14.100.831/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	green	3.14.100.832/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	yellow	3.14.100.833/0000

Technical data see page 4 - 52

Versions with 2 LEDs available on request.

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

RF 15 H - Short-travel keyswitch



General Data

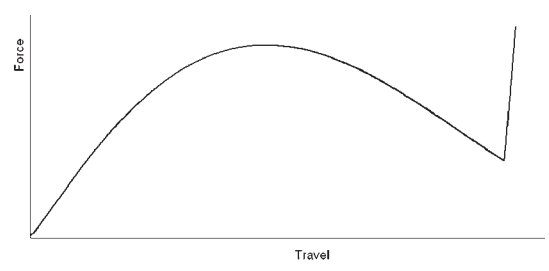
Application notes:
The RF 15 H key has an overall height of 12.5 mm and can be fully illuminated. When designing membrane keyboards, we recommend using a key grid of at least 20 mm and a 0.13 mm overlay with area embossing over the keys. You can use the O-ring (accessory) to block the key and use it as an indicator field or blank spaceholder.

Technical Data

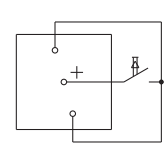
General information		Electrical characteristics	
Colour of lens	see order block	Rated voltage min.	Au: 0.02 V, Ag: 3 V
Recommended key grid	20 mm	Rated voltage max.	Au: 35 V, Ag: 50 V
Dimensions		Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Length	15 mm	Rated current max.	Au: 100 mA, Ag: 250 mA
Width	15 mm	Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Overall height	12.5 mm	Contact resistance when new max.	100 mΩ
Mechanical design		Insulation resistance	10 ⁹ Ω
Mounting	soldering in PCB	Other specifications	
Terminals	THT	Ambient temp. operating min.	-25 °C
Contact system	snap-action contact	Ambient temp. operating max.	+70 °C
Contact arrangement	1 NO	Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Contact materials	see order block	Operating life min. (operations)	1,000,000
Illumination	see order block	Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
LED colour	see order block	Wave soldering	260 °C max.
LED type	see order block	Manual soldering	350 °C / 5 sec. max.
Mechanical characteristics			
Operating force max.	2.9±0.6 N		
Switching travel	0.5±0.2 mm		
Robustness min.	with through-plated PCB 100 N		

Force/Travel Diagram – Keyswitch RF 15 H

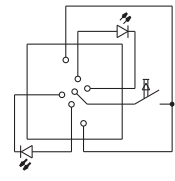
Operation characteristic limits RF



Circuit Diagram – Keyswitch RF 15 H

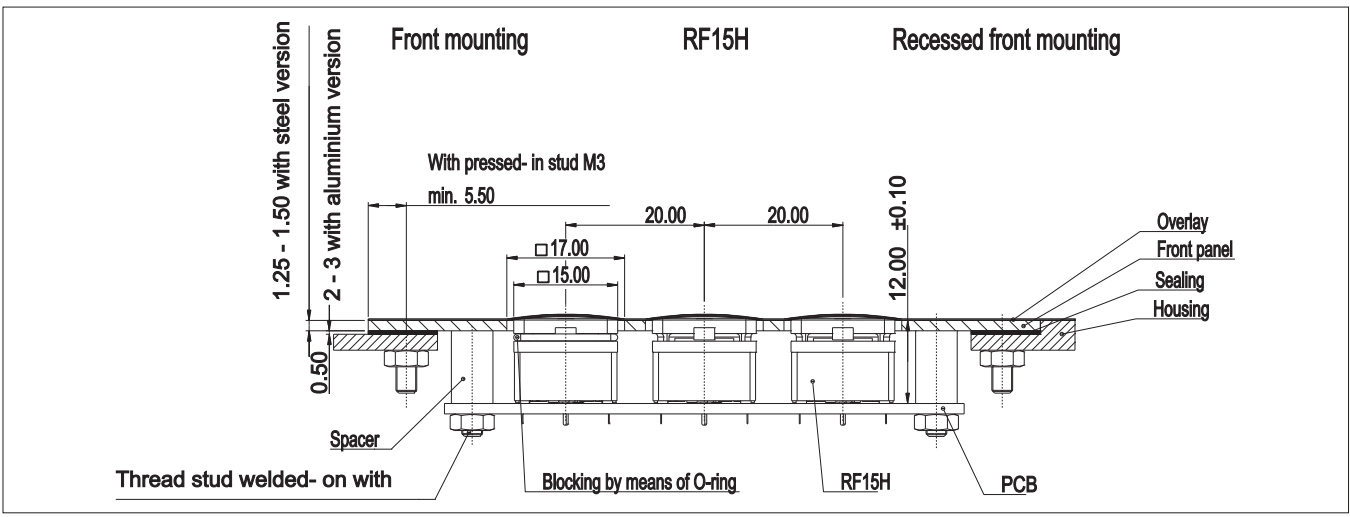


Keyswitch, non-illuminated

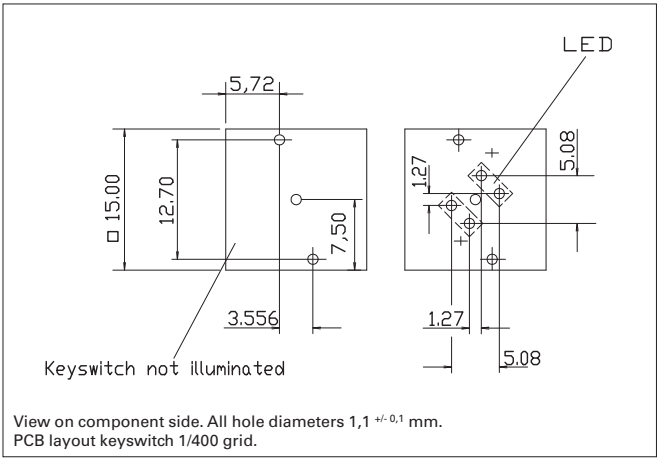


Keyswitch, fully illuminated

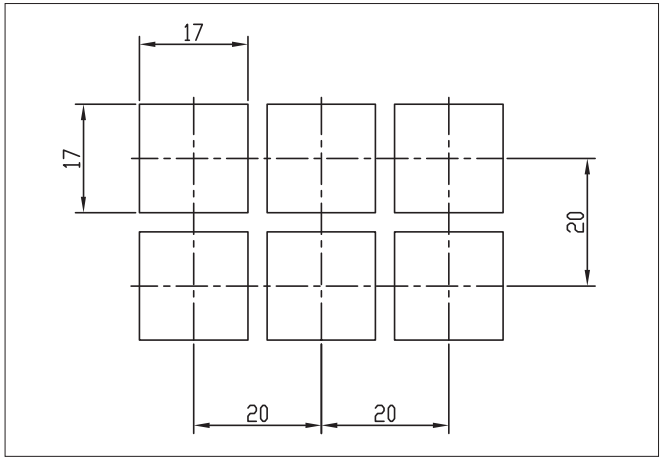
Dimensional Drawing



Hole Pattern



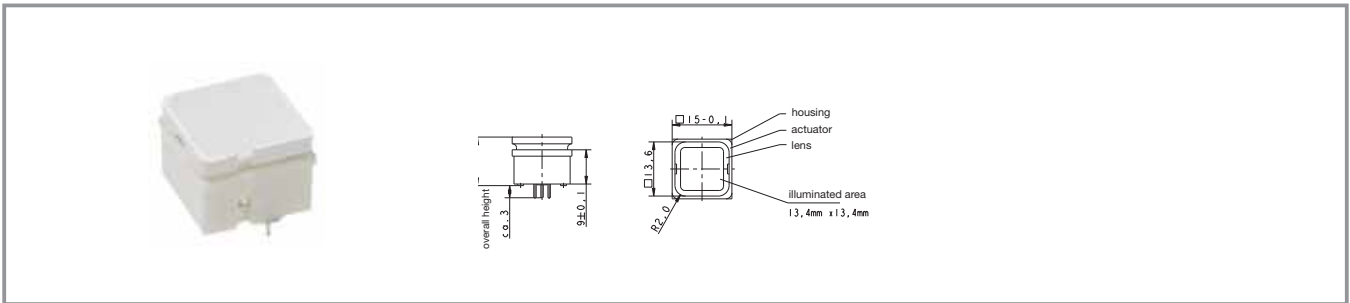
Hole Pattern – Front Panel



Typical accessories RF 15 H - Short-travel keyswitch

Description	Photo	Order no.	Additional accessories see page
O-ring, black, for blocking the operating stroke		5.30.120.009/0100	5 - 25

RF 15 H - Short-travel keyswitch, non-illuminated



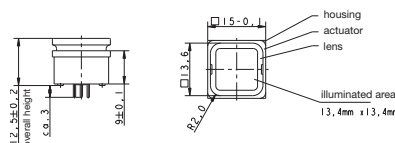
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	not illuminated	white	-	-	3.14.100.702/0000
Ag	not illuminated	white	-	-	3.14.100.707/0000

Technical data see page 4 - 58

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 LED	red	red	2 mm	3.14.200.731/0000
Au	fully illuminated 2 LED	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 LED	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 LED	orange	yellow	2 mm	3.14.200.738/0000
Au	fully illuminated 1 LED	blue	blue	3 mm	3.14.200.739/0000
Au/Ag	fully illuminated 2 LED	yellow	multi colour	3 mm	3.14.101.903/0000
Ag	fully illuminated 2 LED	red	red	2 mm	3.14.200.741/0000
Ag	fully illuminated 2 LED	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 LED	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 LED	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 LED	white	multi colour	3 mm	3.14.100.744/0000

Technical data see page 4 - 58

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 separate page at the beginning of this chapter.

RF 15 - Signal indicator



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

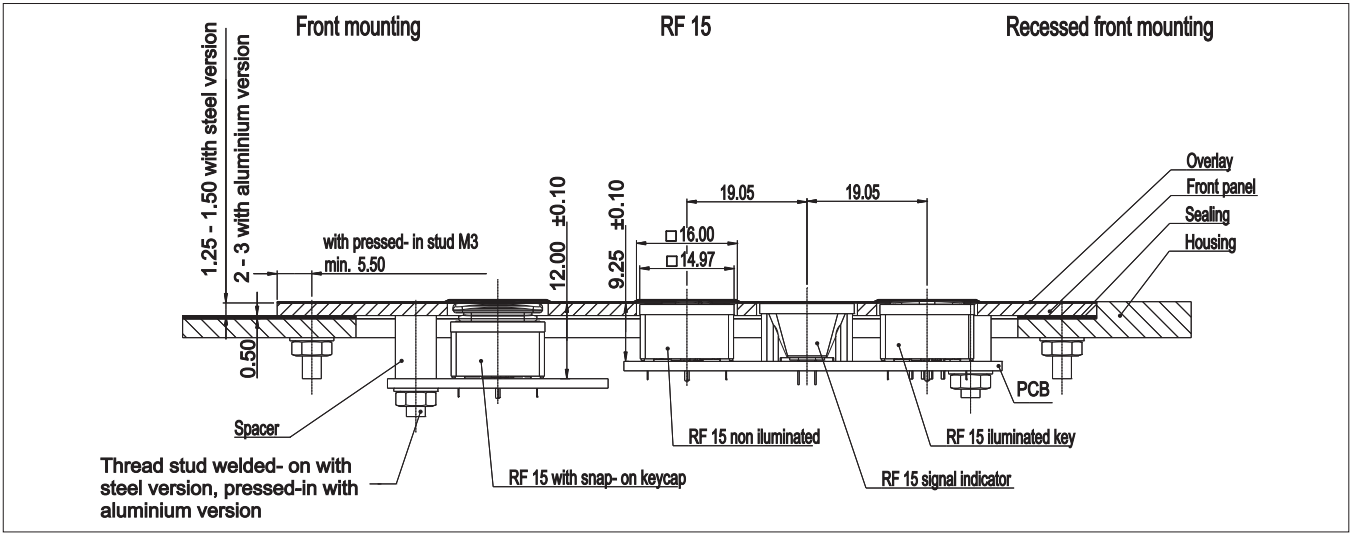
Mechanical design

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

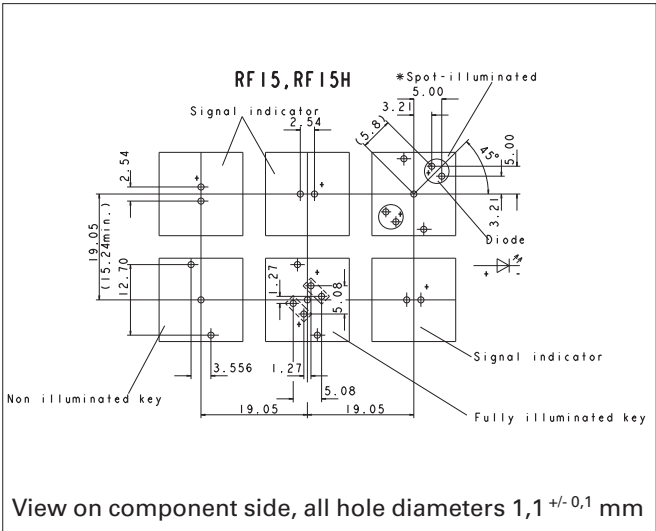
Other specifications

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.

Dimensional Drawing Signal Indicator RF 15

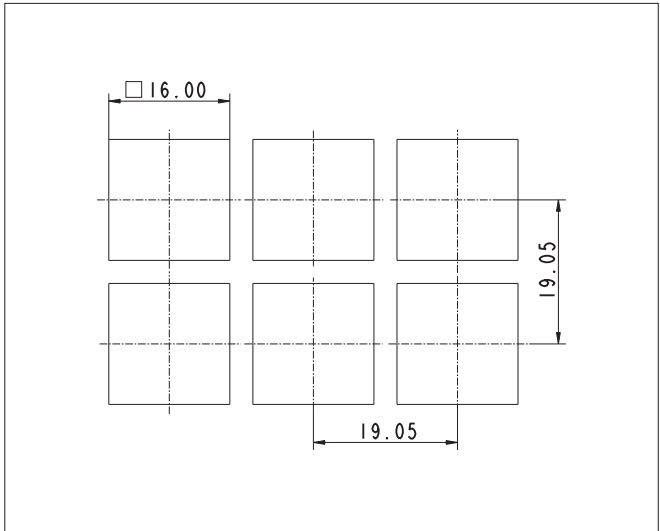


Hole Pattern

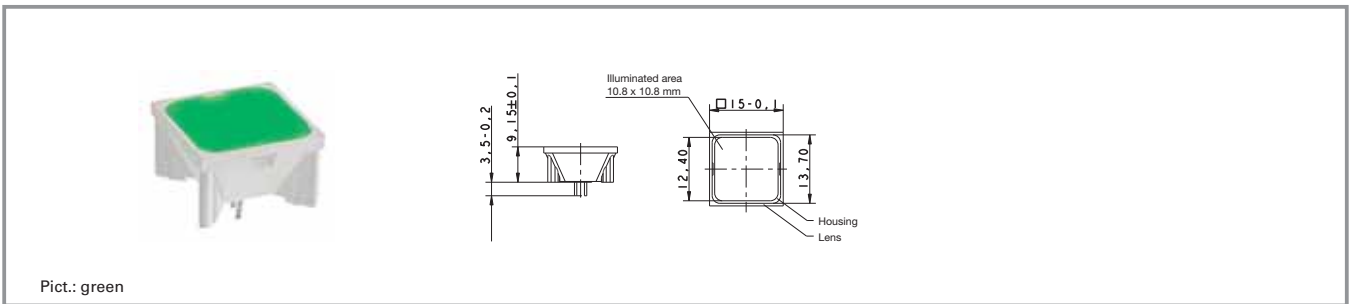


View on component side, all hole diameters 1,1 ±0,1 mm

Hole Pattern – Front Panel



RF 15 - Signal indicator, fully illuminated, 1 LED



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 - 62

Technical data of LED see separate page at the beginning of chapter 4 PCB 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 in PCB
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	see order block
Illumination	see order block
LED colour	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 min.	with through-plated PCB 100 N

Electrical characteristics

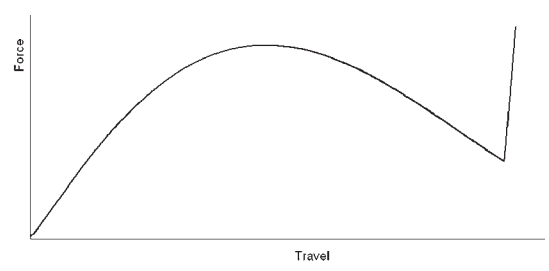
Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	Au: 35 V, Ag: 50 V
Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Rated current max.	Au: 100 mA, Ag: 250 mA
Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Contact resistance when new max.	100 m Ω
Insulation resistance	$10^9 \Omega$

Other specifications

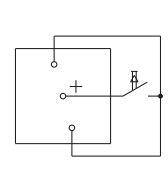
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Operating life min. (operations)	1,000,000
Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.

Force/Travel Diagram – Keyswitch RF 19

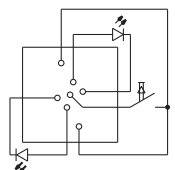
Operation characteristic limits RF



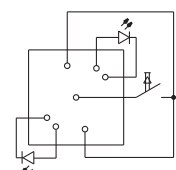
Circuit Diagram – Keyswitch RF 19



Keyswitch,
non-illuminated

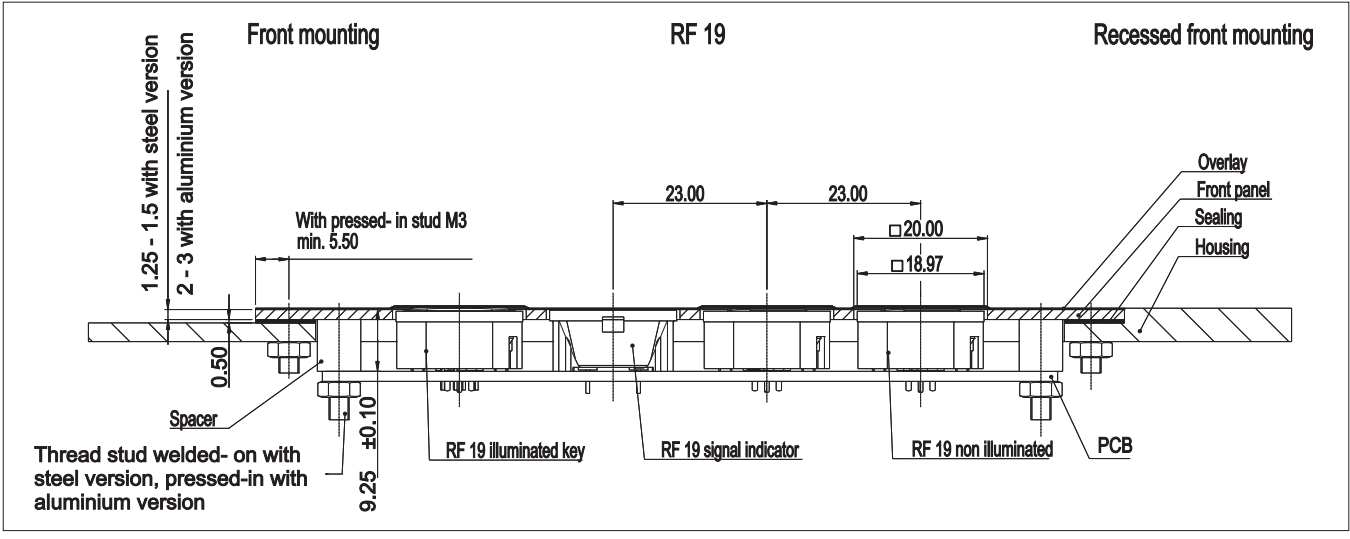


Keyswitch,
fully illuminated

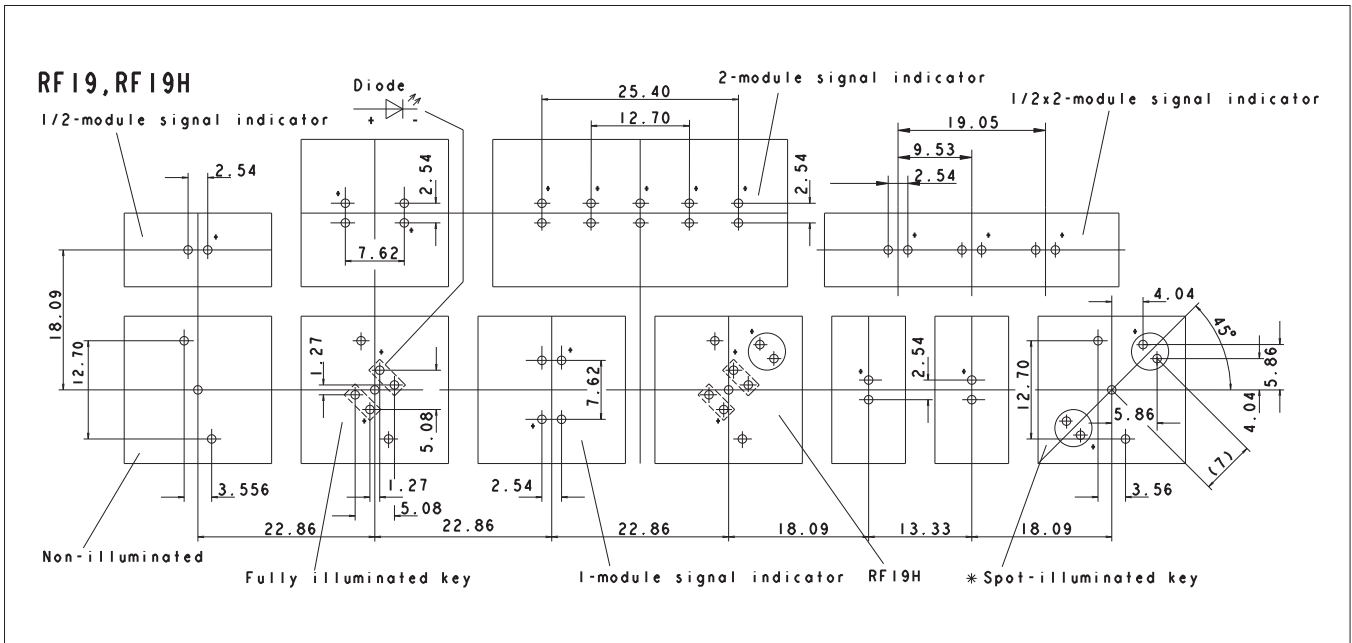


Keyswitch,
spot-illuminated

Dimensional Drawing

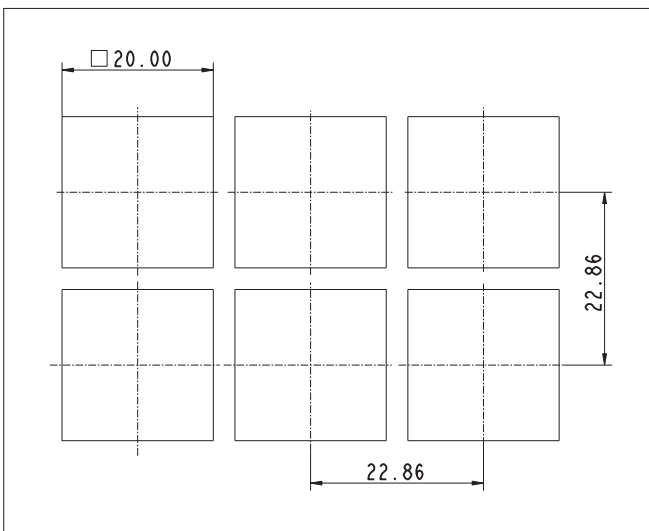


Hole Patterns RF 19

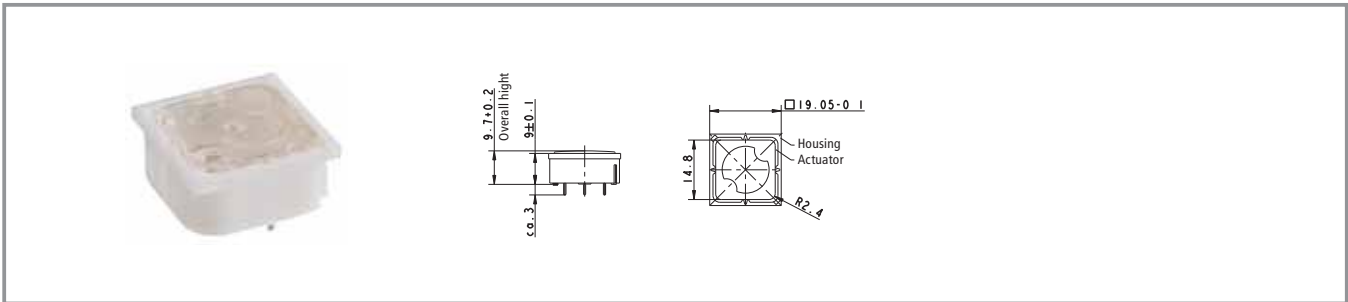


*The LED may be positioned either on the left-hand or right-hand side.
Standard version: LED on left-hand side
View on component side, all hole diameters 1.1 +/- 0.1 mm

Hole Patterns – Front Panel RF 19



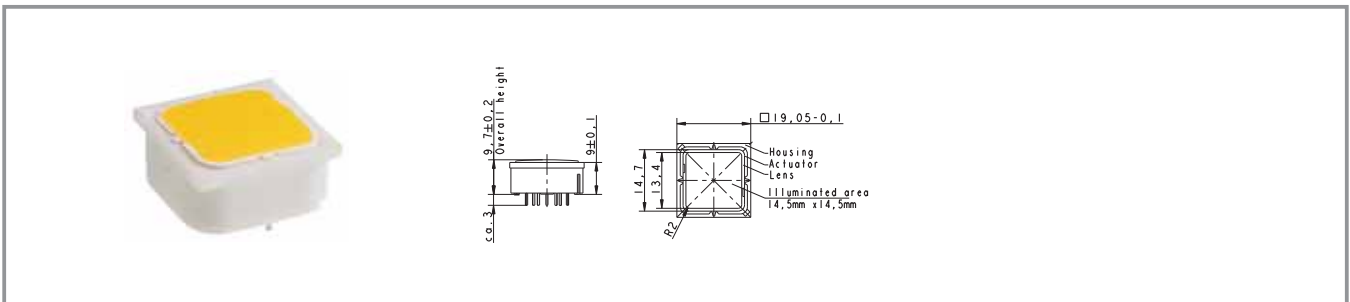
RF 19 - Short-travel keyswitch, non-illuminated



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 - 66

RF 19 - Short-travel keyswitch, fully illuminated with 2 LED

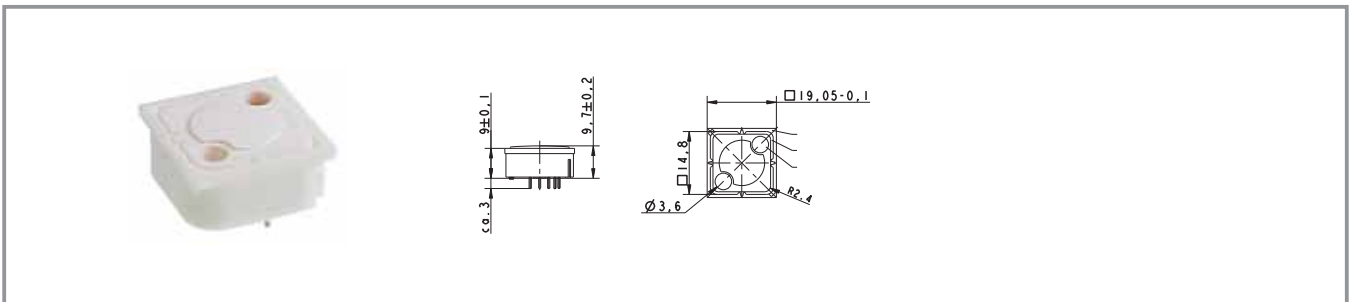


Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.002.011/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.002.012/0000
Au	fully illuminated 2 LED	opaque white	green	2 mm	3.14.002.901/0000
Au	fully illuminated 2 LED	yellow	yellow	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	blue	blue	2 mm	3.14.002.015/0000
Ag	fully illuminated 2 LED	red	red	2 mm	3.14.002.021/0000
Ag	fully illuminated 2 LED	green	green	2 mm	3.14.002.022/0000
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	blue	blue	2 mm	3.14.002.025/0000
Ag	fully illuminated 2 LED	opaque white	green	2 mm	3.14.002.944/0000
Ag	fully illuminated 2 LED	white	green	2 mm	3.14.002.026/0000
Ag	fully illuminated 2 LED	white	yellow	2 mm	3.14.002.027/0000

Technical data see page 4 - 66

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

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



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	opaque white	red	3 mm	3.14.001.031/0000
Au	spot illumination 1 LED	opaque white	green	3 mm	3.14.001.032/0000
Au	spot illumination 1 LED	opaque white	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	opaque white	red	3 mm	3.14.001.041/0000
Ag	spot illumination 1 LED	opaque white	green	3 mm	3.14.001.042/0000
Ag	spot illumination 1 LED	opaque white	yellow	3 mm	3.14.001.043/0000

Technical data see page 4 - 66

Versions with 2 LEDs available on request.

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

RF 19 H - Short-travel keyswitch



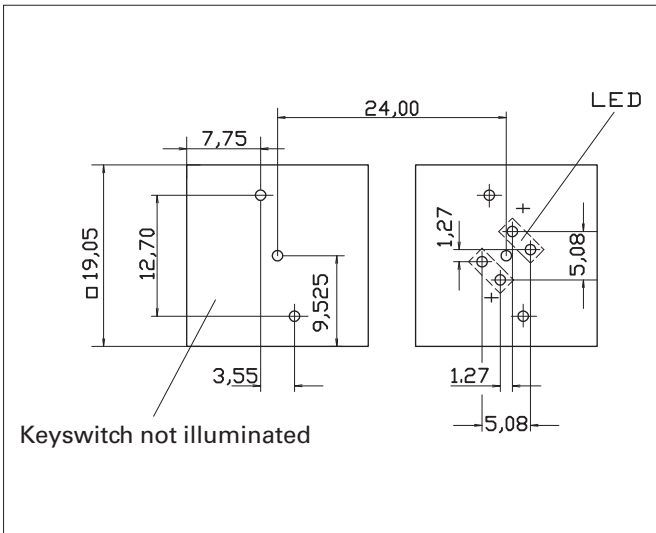
General Data

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 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.

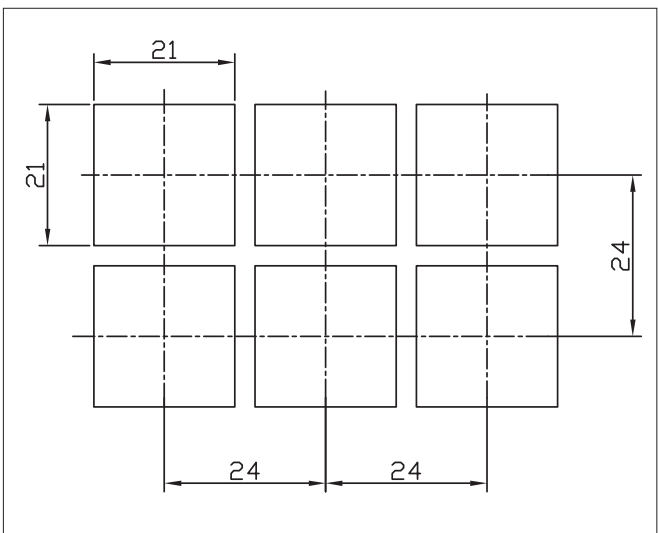
Technical Data

General information		Electrical characteristics	
Colour of lens	see order block	Rated voltage min.	Au: 0.02 V, Ag: 3 V
Recommended key grid	24 mm	Rated voltage max.	Au: 35 V, Ag: 50 V
Dimensions		Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Length	19.05 mm	Rated current max.	Au: 100 mA, Ag: 250 mA
Width	19.05 mm	Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Overall height	12.5 mm	Contact resistance when new max.	100 mΩ
Mechanical design		Insulation resistance	10 ⁹ Ω
Mounting	soldering in PCB	Other specifications	
Terminals	THT	Ambient temp. operating min.	-25 °C
Contact system	snap-action contact	Ambient temp. operating max.	+70 °C
Contact arrangement	1 NO	Environmental restistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Contact materials	see order block	Operating life min. (operations)	1,000,000
Illumination	see order block	Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
LED colour	see order block	Wave soldering	260 °C max.
LED type	see order block	Manual soldering	350 °C / 5 sec. max.
Mechanical characteristics			
Operating force max.	2.9±0.6 N		
Switching travel	0.5+0.2 mm		
Robustness min.	with through-plated PCB 100 N		

Hole Pattern RF 19 H



Hole Pattern – Front Panel RF 19 H



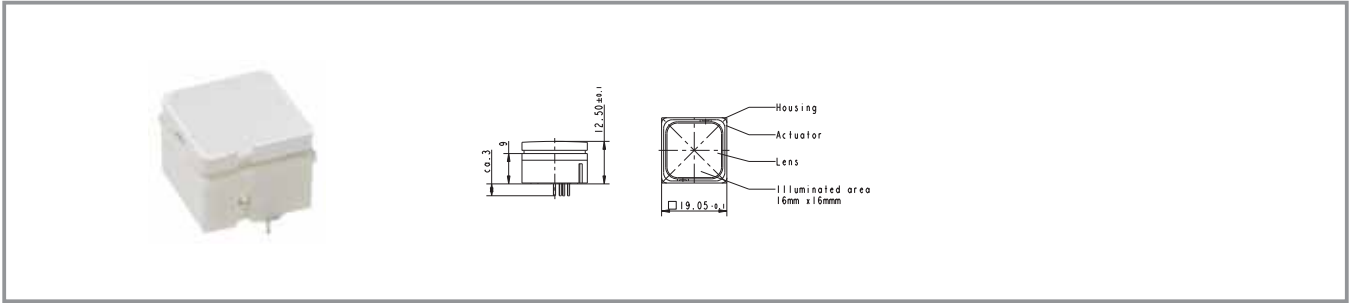
The LED may be positioned either on the left-hand or right-hand side.
Standard version: LED on left-hand side
View on component side, all hole diameters
1.1 +/- 0.1 mm

4

Typical accessories RF 19 H - Short-travel keyswitch

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 - 25

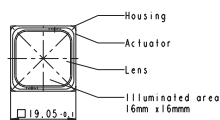
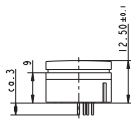
RF 19 H - Keyswitch, non-illuminated



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 - 72

RF 19 H - Short-travel keyswitch, fully illuminated



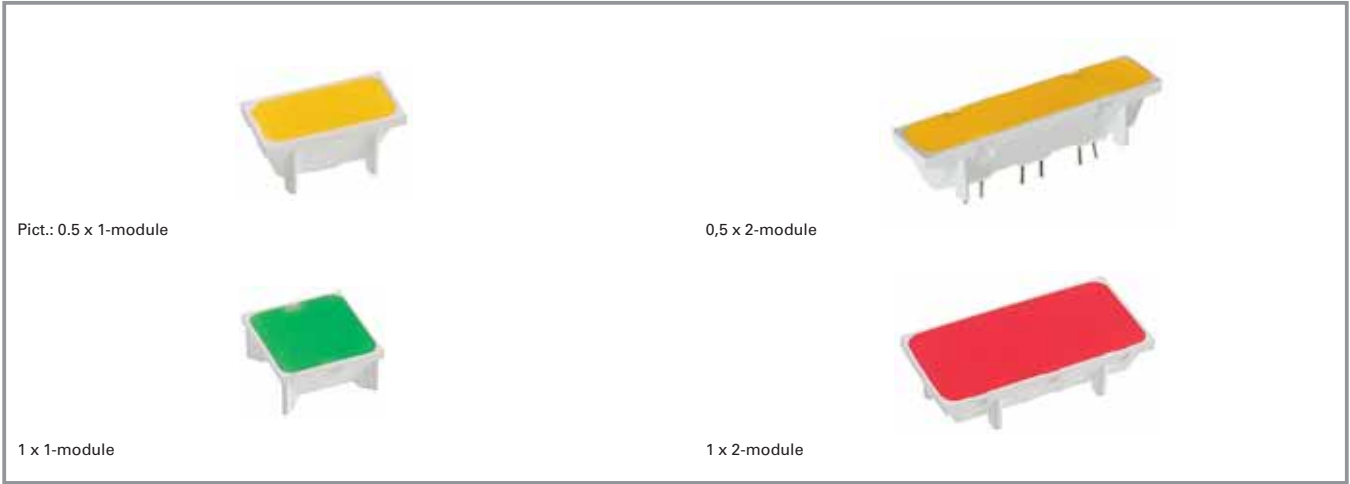
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.002.613/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.002.632/0000
Au	fully illuminated 1 LED	green	green super bright	3 mm	3.14.002.633/0000
Au	fully illuminated 2 LED	yellow	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 LED	orange	yellow	2 mm	3.14.002.673/0000
Au	fully illuminated 2 LED	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 LED	red	red	2 mm	3.14.002.623/0000
Ag	fully illuminated 2 LED	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	3 mm	3.14.002.688/0000
Ag	fully illuminated 2 LED	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 LED	orange	yellow	2 mm	3.14.002.678/0000
Ag	fully illuminated 2 LED	white	multi colour	3 mm	3.14.001.682/0000

Technical data see page 4 - 72

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 separate page at the beginning of this chapter.

RF 19 - Signal indicator



Technical Data

General information

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

Dimensions

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

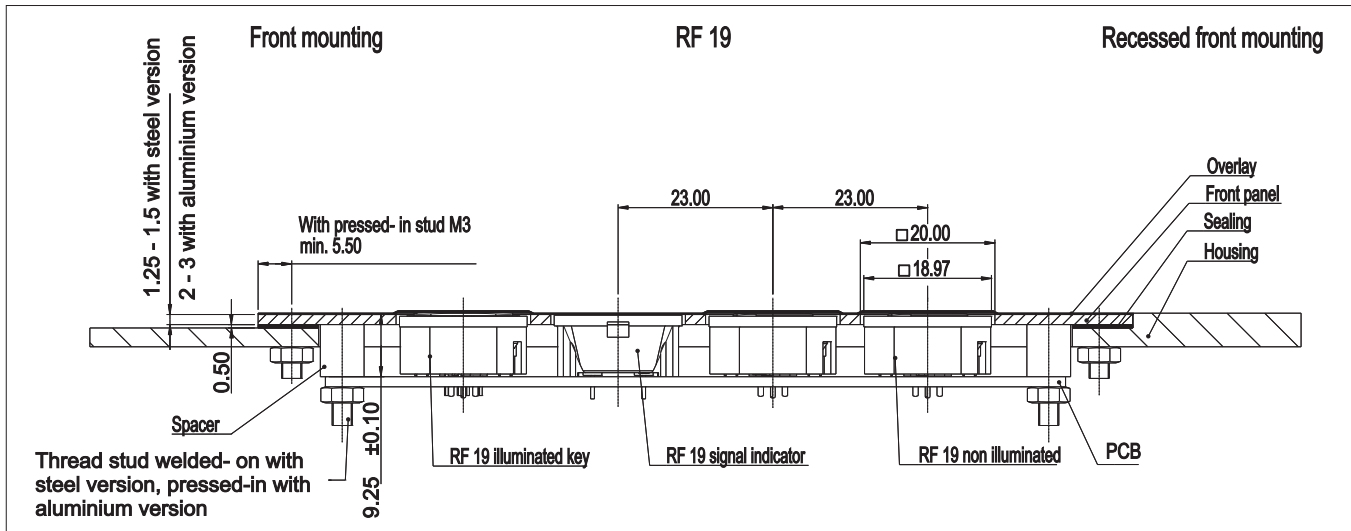
Mechanical design

Mounting	THT soldering in PCB
Illumination	see order block
LED colour	see order block
LED type	see order block

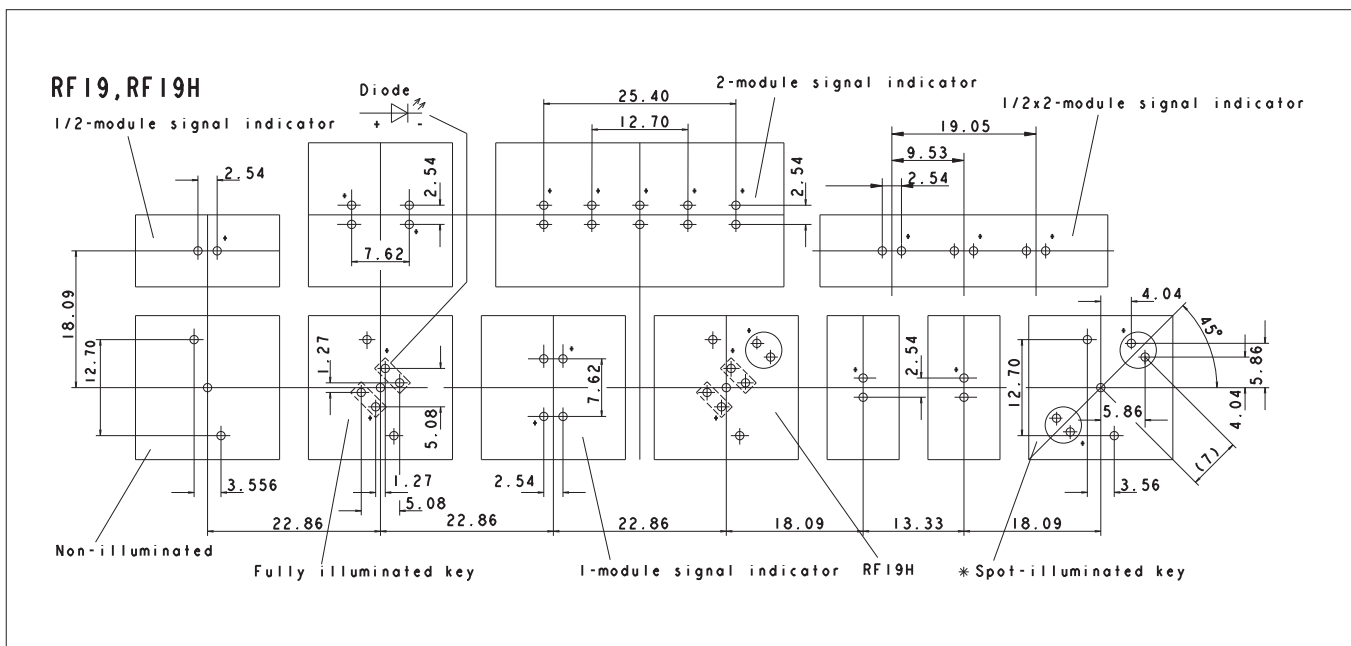
Other specifications

Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Solderability / solder heat resistance	according to E DIN IEC 600 28-2-20
Wave soldering	260 °C max.
Manual soldering	350 °C / 5 sec. max.

Dimensional Drawing Signal Indicator RF 19



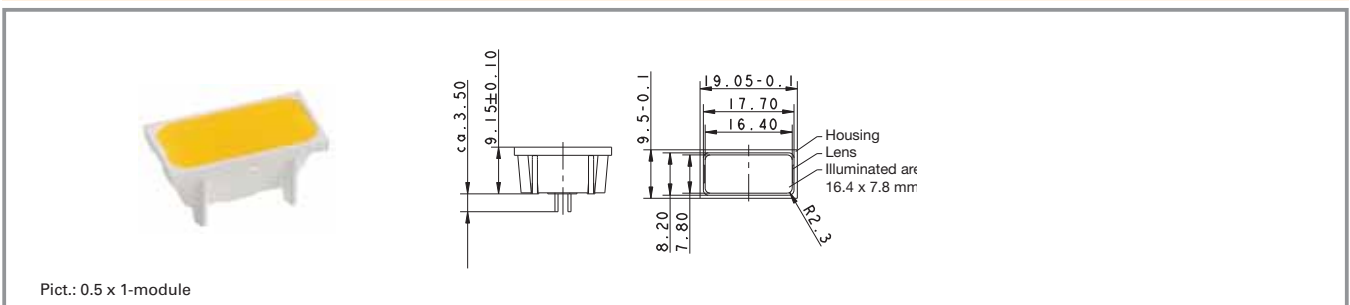
Hole Pattern RF 19



*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

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

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

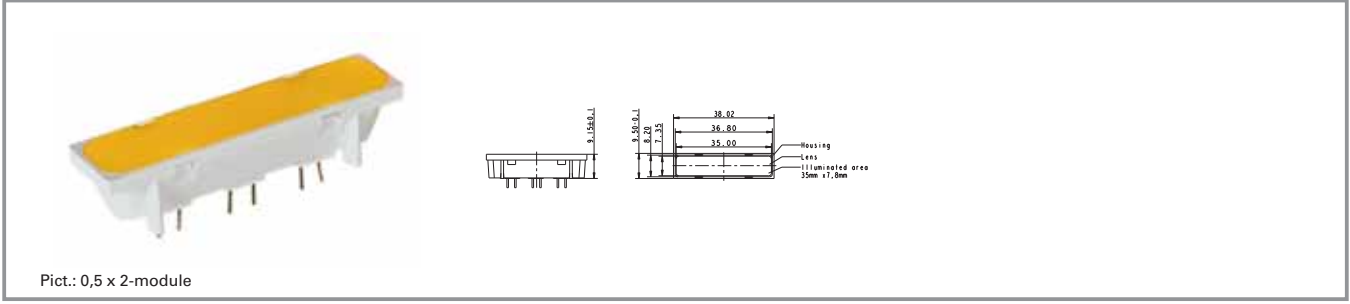


Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 1 LED	red	red	2 mm	3.14.002.061/0000
fully illuminated 1 LED	green	green	2 mm	3.14.002.062/0000
fully illuminated 1 LED	yellow	yellow	2 mm	3.14.002.063/0000
fully illuminated 1 LED	orange	yellow	2 mm	3.14.002.064/0000

Technical data see page 4 - 76

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

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

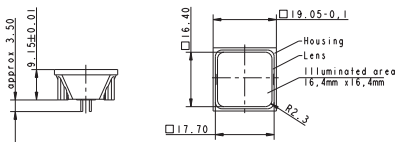


Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 3 LED	red	red	2 mm	3.14.002.908/0000
fully illuminated 3 LED	green	green	2 mm	3.14.002.909/0000
fully illuminated 3 LED	yellow	yellow	2 mm	3.14.002.910/0000
fully illuminated 3 LED	orange	yellow	2 mm	3.14.002.911/0000

Technical data see page 4 - 76

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

RF 19 - Signal indicator, 1 x 1-module



Pict.: 1 x 1-module

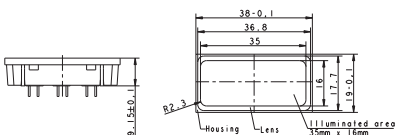
Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 2 LED	red	red	2 mm	3.14.002.051/0000
fully illuminated 2 LED	green	green	2 mm	3.14.002.052/0000
fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.053/0000
fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.054/0000
fully illuminated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

Technical data see page 4 - 76

For technical data of the LED see separate page at the beginning of chapter „RF short-travel keyswitches“

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

RF 19 - Signal indicator, 1 x 2-module



Pict.: 1 x 2-module

Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 5 LED	red	red	2 mm	3.14.002.071/0000
fully illuminated 5 LED	green	green	2 mm	3.14.002.072/0000
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

Technical data see page 4 - 76

For technical data of the LED see separate page at the beginning of chapter „RF short-travel keyswitches“

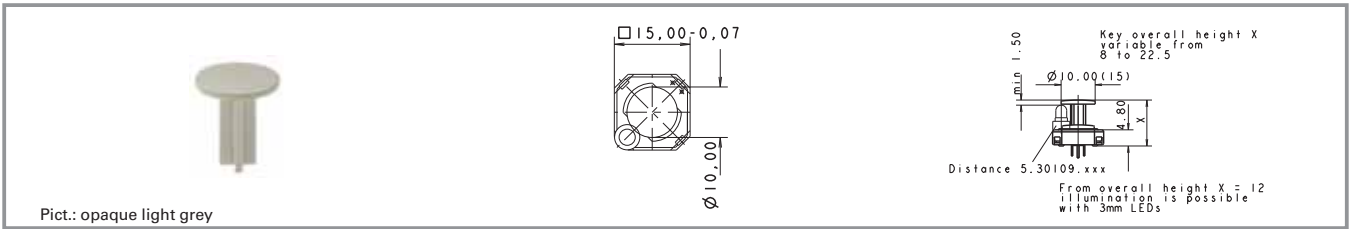
RF 15/19 - Special accessories



Technical Data

Dimensions			
Length	see order block	Overall height	see order block
Width	see order block	Diameter	see order block
		Colour	see order block

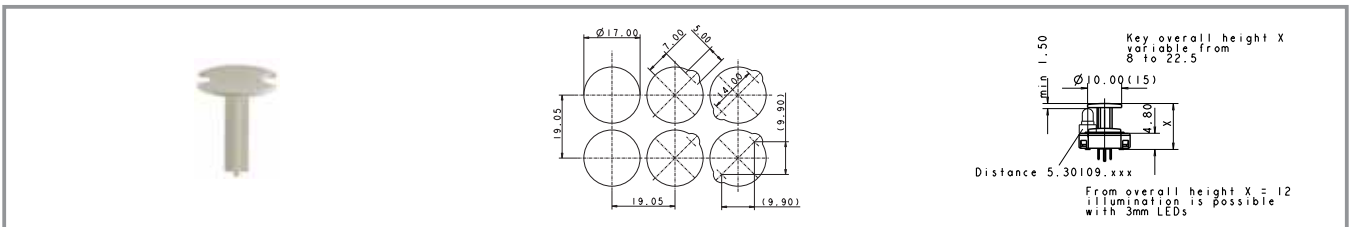
RF 15 N - Extension plunger, round head



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.

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

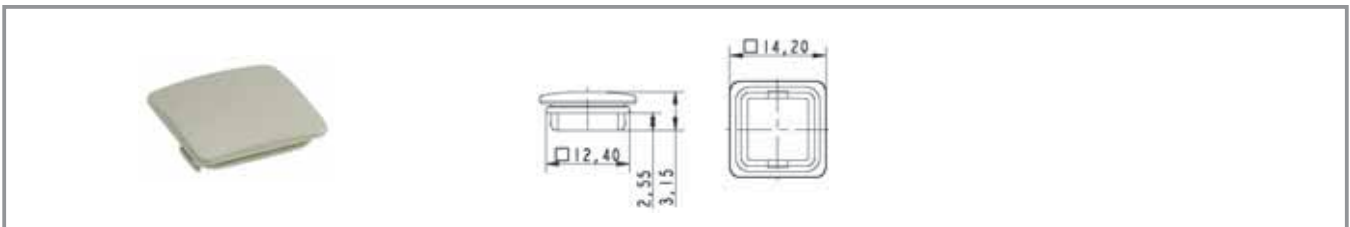


Length	Width	Overall height	Diameter	Colour	Order no.
-	-	9 mm	15 mm	-	5.46.017.036/0710
-	-	9.7 mm	15 mm	-	5.46.017.030/0710
-	-	12.5 mm	15 mm	-	5.46.017.037/0710
-	-	22.5 mm	15 mm	-	5.46.017.028/0710
-	-	13 mm	15 mm	-	5.46.017.038/0710

Technical data see page 4 - 80

Length of plunger = Overall height - 4.25 mm.

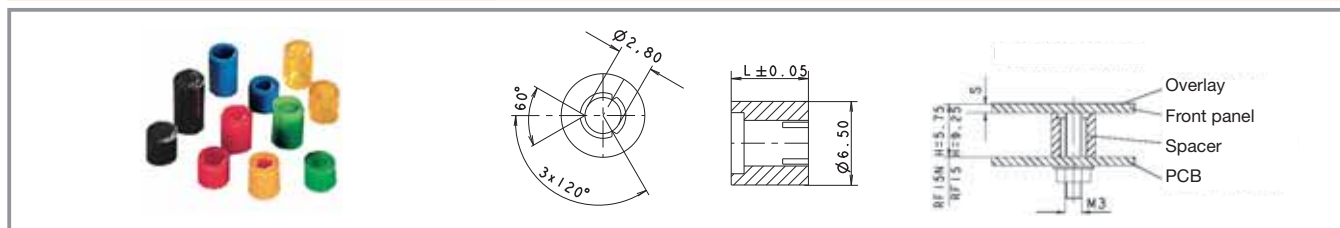
RF 15 - Keycap, snap-on, for overall height 12.5 mm



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

Technical data see page 4 - 80

Spacers, round

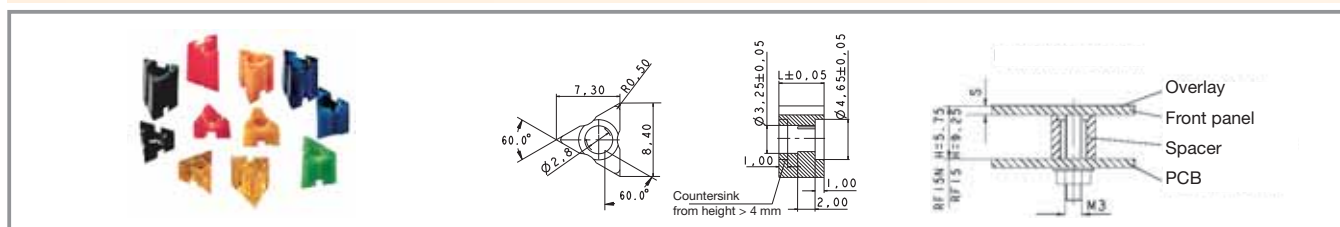


Length	Width	Overall height	Diameter	Colour	Order no.
3.50 mm	-	-	-	blue transparent	5.30.759.023/0000
4 mm	-	-	-	green	5.30.759.025/0000
4.25 mm	-	-	-	blue	5.30.759.026/0000
4.50 mm	-	-	-	red	5.30.759.027/0000
4.75 mm	-	-	-	blue transparent	5.30.759.028/0000
5 mm	-	-	-	black	5.30.759.029/0000
5.25 mm	-	-	-	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
10.00 mm	-	-	-	black	5.30.759.043/0104

Technical data see page 4 - 80

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

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

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

Technical data see page 4 - 80

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	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

Technical data see page 4 - 80

4

RF



General Data

Short-travel main switch for use in membrane keyboards under the overlay or with RK 90 keycaps, 250V, 4A max.
A cut-out in the overlay is not required!

Content

KN 19 - Short-travel main switch
KN 19 - Short-travel main switch

4 - 86
4 - 88

KN 19 - Short-travel main switch



Pict.: 1 NC + 1 NO



2 NC / 2 NO

General Data

The KN 19 makes it possible to implement a power switch directly in a low-profile data entry system. This eliminates the need for extra switches on the device and additional openings in the overlay. In this way, you can achieve an optimum of safety and a consistent design. The contact opening widths comply with the VDE standards. The KN 19 can also be employed underneath RK 90 keycaps. Other actuation functions (momentary, latching/momentary) available on request.

Technical Data

General information

Recommended key grid 19.05 x 38.1 mm

Dimensions

Length 37.8 mm
Width 18.8 mm
Overall height 9.7 mm

Mechanical design

Mounting on PCB
Terminals THT solder terminals
Contact system snap-action bridge contact
Contact arrangement see order block
Contact materials Ag
Illumination 1 LED (max. 3 mm) possible

Degree of protection IP40
Hot wire ignition acc. to IEC 60695-2-1 850 °C

Mechanical characteristics

Operating force max. 9±3 N
Operating travel 0.55±0.15 mm
Robustness max. 100 N

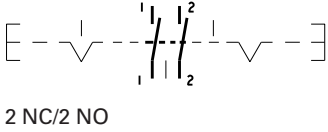
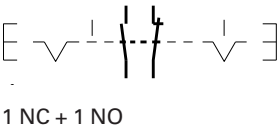
Electrical characteristics

Rated voltage AC min. 12 V
Rated voltage DC min. 12 V
Rated voltage AC max. 250 V
Rated voltage DC max. 50 V
Ohmic load AC 6 A
Ohmic load DC min. 0.1 A
Ohmic load DC max. 10 A
Contact resistance when new max. 50 mΩ
Capacity input current AC max. 100 A
Rated motor current AC 4 A
Rated filament lamp current AC 2.4 A
Bouncing time max. 10 ms

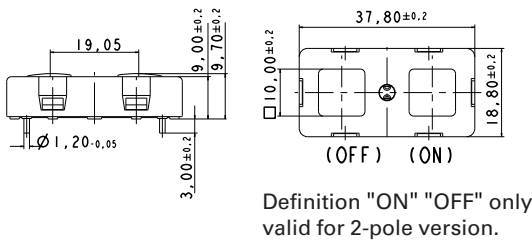
Other specifications

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 AC AC 250 V: 200.000/2A; 100.000 /6A
Operating life DC 50,000(10 A / 50 V=)
Soldering time max. 3 s
Soldering temperature max. 350 °C
Flame class acc. to UL 94 UL 94 VO

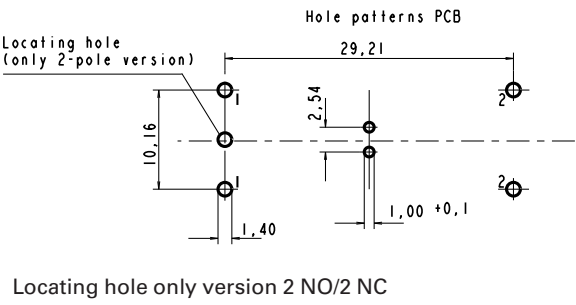
Circuit Diagram



Dimensional Drawing



Hole Pattern



View on component side.

Approvals



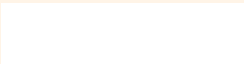
Approvals



IEC 61058

UL 508, C22.2 No. 14-M91

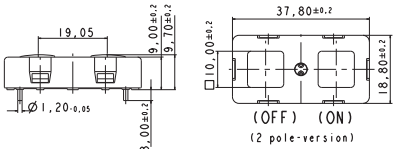
Typical accessories KN 19 - Short-travel main switch

Description	Photo	Order no.	Additional accessories see page
KN19 - Absorption rubber		5.30.729.009/0000	

KN 19 - Short-travel main switch



Pict.: 1 NC + 1 NO



Contact arrangement	Rated voltage AC max.	Order no.
1 NC + 1 NO	250 V	1.12.000.001/0000
2 NC / 2 NO	250 V	1.12.000.501/0000

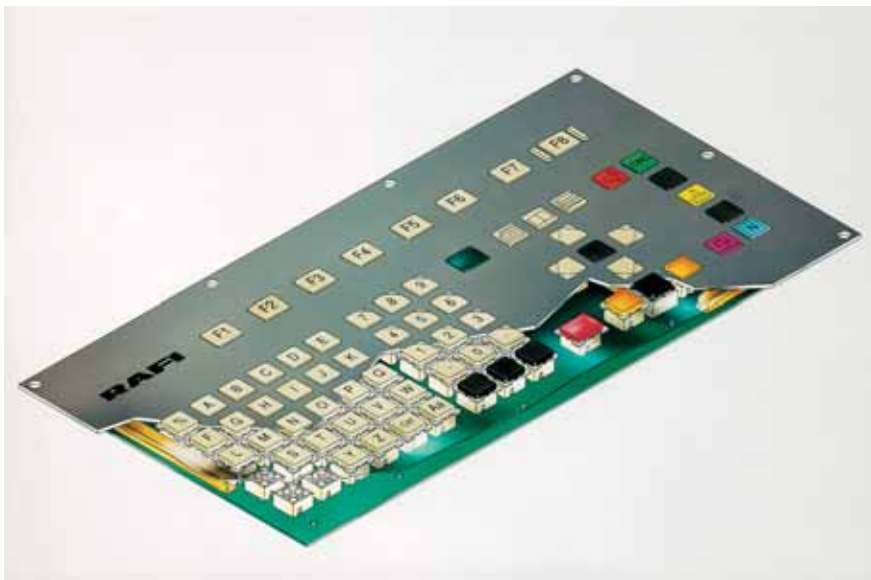
Technical data see page 4 - 86

Accessoires:

KN19 - Absorption rubber: 5.30.729.009/0000

For keycaps, refer to RK 90 system design.
Positive opening NC contacts to IEC 60 947-5-1.
1-LED spot-illumination (max. 3 mm) possible.

KN
19



General Data

Keycaps for RACON, RF 15 / RF 19 and KN 19 short-travel keyswitches

- You can insert a legend insert between lens and pressure pool of the transparent keycaps.

Content

RK 90 - Keycaps, plastic, 9 x 9 mm	4 - 92
RK 90 - Keycap body plastic, for lenses 9 x 9 mm	4 - 93
RK 90 - Keycaps, plastic, 14 mm	4 - 94
RK 90 - Keycap body plastic, for lenses 14 mm, 1-module	4 - 95
RK 90 - Keycap body plastic, for lenses 1¼-module	4 - 95
RK 90 - Keycap body plastic, for lenses 14 mm, 1½-module	4 - 96
RK 90 - Keycap body plastic, for lenses 2-module	4 - 96
RK 90 - Keycaps, aluminum, 14 x 14 mm	4 - 98
RK 90 - Keycaps, aluminum, 14 mm, 1-module	4 - 98
RK 90 - Keycaps, aluminum, 14 mm, 1½-module	4 - 99
RK 90 - Keycaps, aluminum, 14 mm, 2-module	4 - 99
RK 90 - Special accessories	4 - 100
RK 90 - Fin, to avoid inadvertent operation	4 - 100
RK 90 - Spacer M 4	4 - 101
RK 90 - Silicone foil 600 x 590 x 0.45 mm	4 - 101

Keycap system RK 90

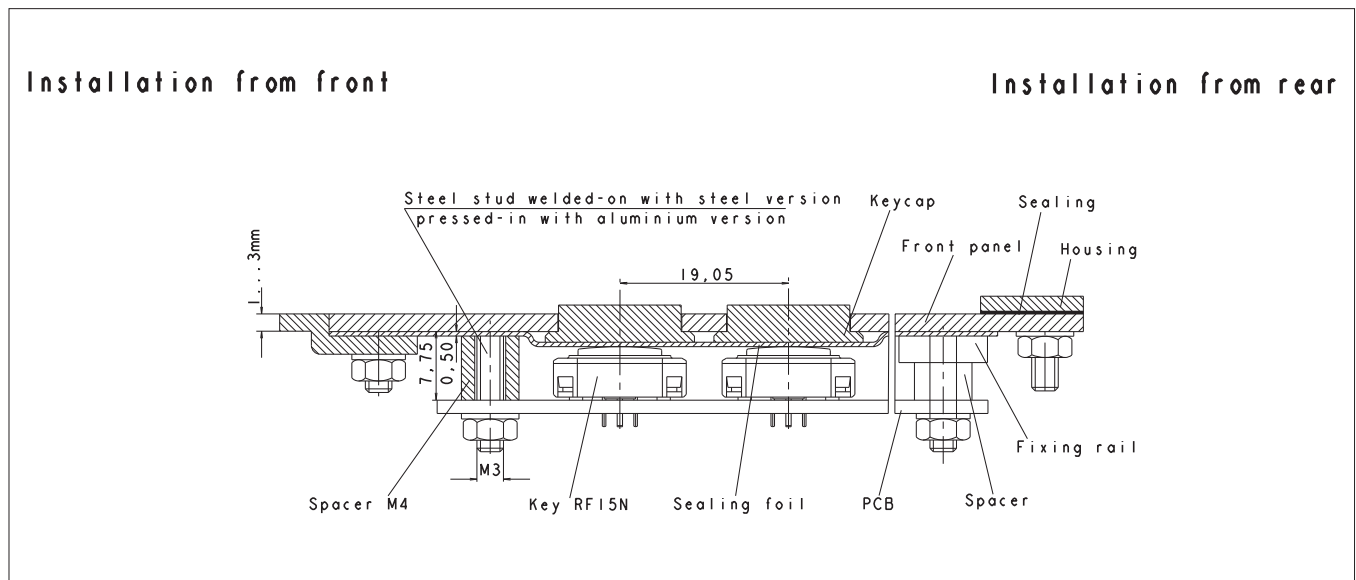
Example with RF 15 keyswitches. Instead of RF 15 following keyswitches can be used:

- MICON 5
- RACON 8/12
- RF 15 keyswitches and signal indicators
- RF 19 keyswitches and signal indicators
- Short-travel main switch KN 19

The RK 90 system was granted the prize of the Design Forum of the Hannover Fair.

Degree of protection: IP65 according to DIN in front of the panel, with silicone sealing.

Installation methods



4

Mounting from front

Sealing foil between RK 90 keyboard and customer's front panel.

Mounting from rear

Sealing foil is screwed to RK 90 panel with fixing rails; sealing between keyboard and customer's front panel has to be provided.

Legending

- **Laser printing:** This labelling method is possible for opaque keycaps. The symbols are engraved in the keycaps with laser.
- When using transparent lenses, the pressure pad can be legended by printing.

As the legending is protected by the lens, it is friction-proof.

- **Engraving:** With this method the keycaps are engraved with the required symbol and then inlaid with ink.

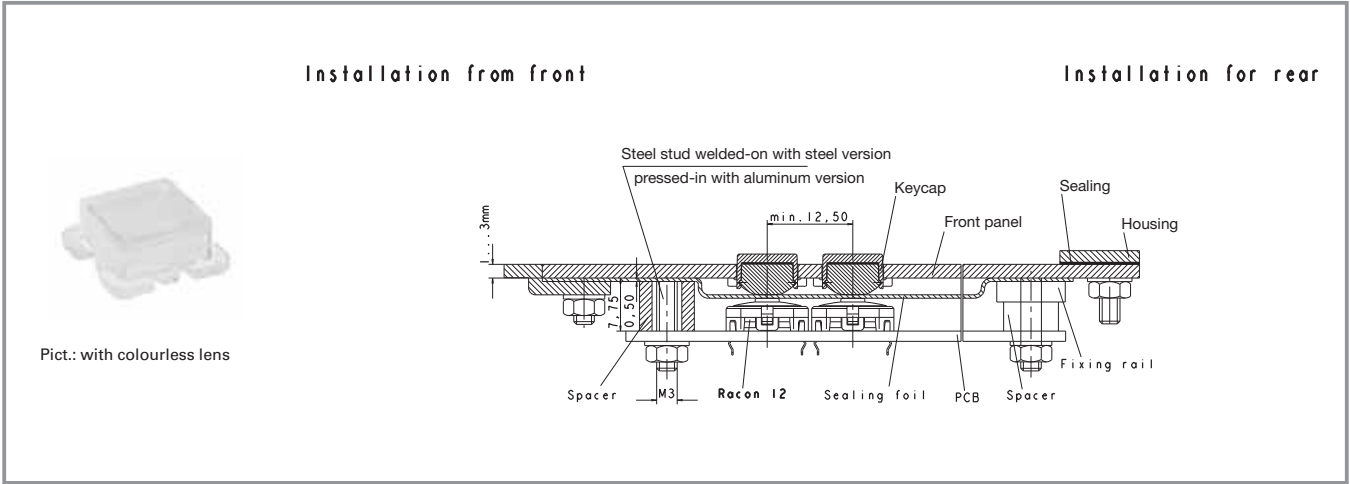
Recommendations

- **Front panel thickness:**
 - **Aluminum:** 2 mm (1.5 mm min, 3 mm max.)
(Fixing with M 3 pressed-in studs)
 - **Steel:** 2 mm (3 mm max.): V2A: 1.25 mm
(Fixing with M 3 welded-on studs)The keytop surface is flush with the keyboard at a panel thickness of 3.5 mm.
- **Silicone sealing:**
 - Material: Silicone transparent
 - Type: A-SY 40-79
 - Hardness: 30° shore +/- 5°
 - Thickness: 0.45 +/- 0.05 mm
- **Installation:** Ensure that the keyboard slopes slightly so that any liquid can drain away between front panel and silicone sealing; if necessary, provide additional drain holes in the front panel.

Cleaning liquids

For the cleaning of the plastic keycaps please do not use cleaning liquids based on alcohol or acid.

RK 90 - Keycaps, plastic, 9 x 9 mm



General Data

You can design especially small input fields with the small keycap 9 x 9 mm. For example, controls for measurement and laboratory equipment which do not offer much space for input fields because of their small size. RK 90 keycaps 9 x 9 mm and RACON short-travel keyswitches can be used to implement key grids of only 12.5 mm. The keycaps can be legended by laser-printing, engraving or standard printing. This keycap is our first choice in a combination with the illuminated RACON 12 i short-travel keyswitch.

Please note: For the cleaning of the plastic keycaps please do not use cleaning liquids based on alcohol or acid.

Technical Data

General information

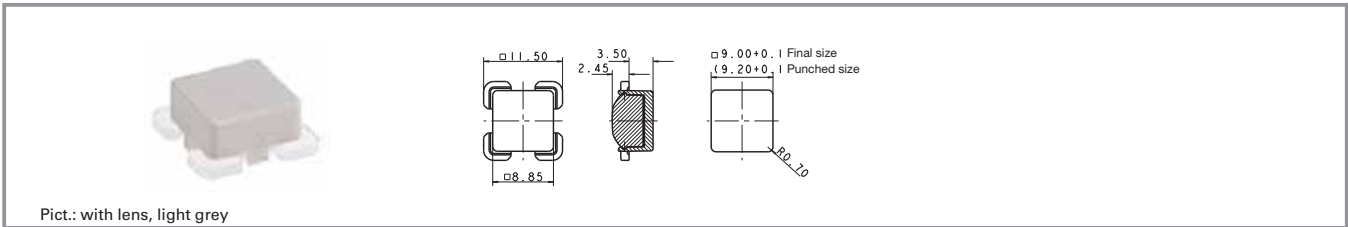
Colour of lens	see order block
Size	1-module
Degree of protection (with silicon seal)	IP65
Illuminability	see order block

Dimensions

Dimension keycap in front of front panel	8.85 x 8.85 mm
Dimension keycap behind front panel	11.5 x 11.5 mm
Dimension (c) hole patterns final size	9.00 x 9.00 mm
Dimension hole patterns punched size	9.20 x 9.20 mm

Please order lens separately.

RK 90 - Keycap body plastic, for lenses 9 x 9 mm



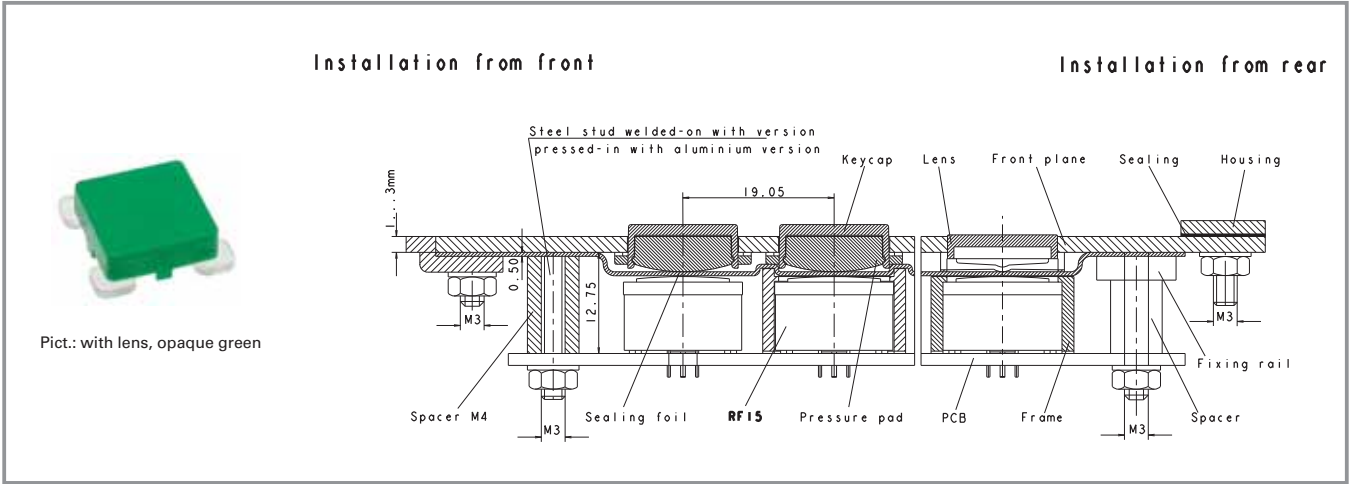
Size	Illuminability	Dimension keycap behind front panel	Dimension keycap in front of front panel	Dimension (c) hole patterns final size	Order no. without lens	Note
1-module	yes	11.5 x 11.5 mm	8.85 x 8.85 mm	9.00 x 9.00 mm	5.55.103.265/1013	Please order lenses separately.

Technical data see page 4 - 92

Lenses:

- RK 90 - Lens, 9 x 9 mm, opaque red: 5.46.651.015/0309
- RK 90 - Lens, 9 x 9 mm, opaque yellow: 5.46.651.015/0409
- RK 90 - Lens, 9 x 9 mm, opaque green: 5.46.651.015/0514
- RK 90 - Lens, 9 x 9 mm, opaque blue: 5.46.651.015/0611
- RK 90 - Lens, 9 x 9 mm, opaque light grey: 5.46.651.015/0700
- RK 90 - Lens, 9 x 9 mm, transparent colourless: 5.46.651.019/1002
- RK 90 - Lens, 9 x 9 mm, transparent red: 5.46.651.019/1307
- RK 90 - Lens, 9 x 9 mm, transparent yellow: 5.46.651.019/1403
- RK 90 - Lens, 9 x 9 mm, transparent green: 5.46.651.019/1510

RK 90 - Keycaps, plastic, 14 mm



General Data

Keycap system for 19.05 mm grid. The keycaps can be legended by laser-printing, engraving or standard printing. Keycaps / sets with legends and other keycap shapes / colours available on request.

Please note: For the cleaning of the plastic keycaps please do not use cleaning liquids based on alcohol or acid.

Technical Data

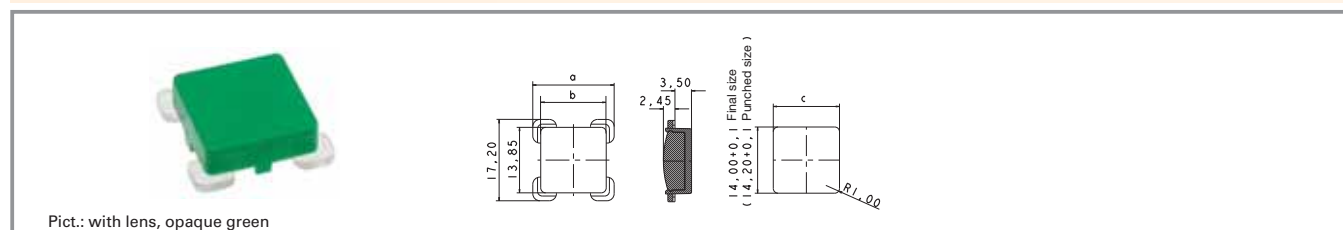
General information

Colour of lens	see order block
Size	see order block
Degree of protection (with silicon seal)	IP65
Illuminability	yes

Dimensions

Dimension (b) in front of front panel	see order block
Dimension (a) behind front panel	see order block
Dimension (c) hole patterns final size	see order block
Dimension hole patterns punched size	see order block

RK 90 - Keycap body plastic, for lenses 14 mm, 1-module



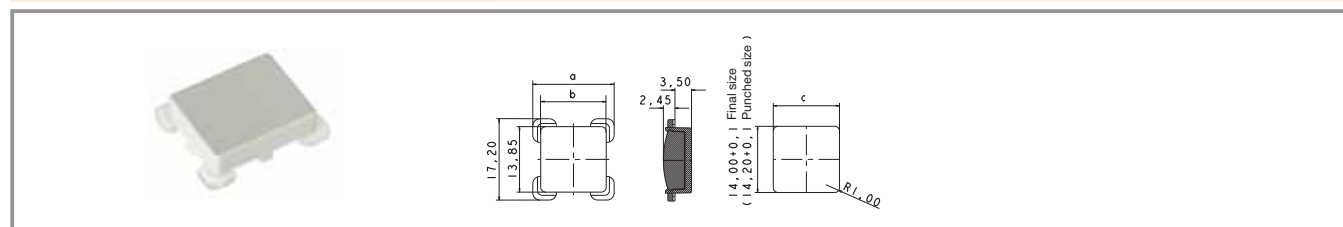
Size	Illuminability	Dimension (a) behind front panel	Dimension (b) in front of front panel	Dimension (c) hole patterns final size	Order no. without lens	Note
1-module	yes	17.20 x 17.20 mm	13.85 x 13.85 mm	14.00 x 14.00 mm	5.55.103.030/1013	Please order lenses separately.

Technical data see page 4 - 94

Lenses:

RK 90 - Lens, 14 mm, 1-module, opaque red: 5.46.681.001/0309
 RK 90 - Lens, 14 mm, 1-module, opaque yellow: 5.46.681.001/0409
 RK 90 - Lens, 14 mm, 1-module, opaque green: 5.46.681.001/0514
 RK 90 - Lens, 14 mm, 1-module, opaque blue: 5.46.681.001/0611
 RK 90 - Lens, 14 mm, 1-module, opaque light grey: 5.46.681.001/0700
 RK 90 - Lens, 14 mm, 1-module, transparent colourless: 5.46.681.021/1002
 RK 90 - Lens, 14 mm, 1-module, transparent red: 5.46.681.021/1307
 RK 90 - Lens, 14 mm, 1.5-module, transparent yellow: 5.46.681.021/1403
 RK 90 - Lens, 14 mm, 1-module, transparent green: 5.46.681.021/1510

RK 90 - Keycap body plastic, for lenses 1¼-module



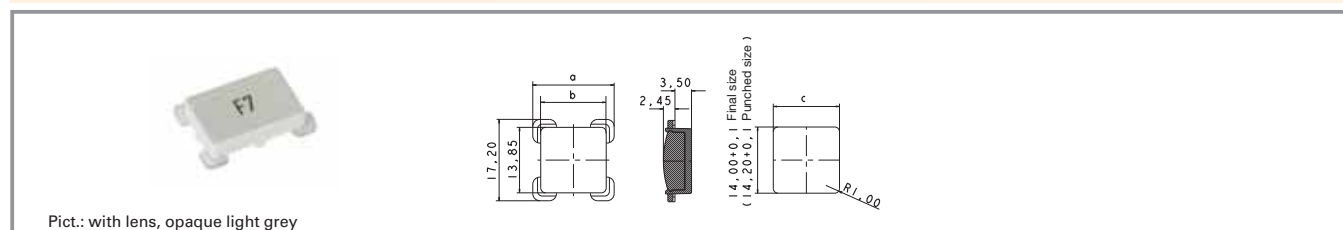
Size	Illuminability	Dimension (a) behind front panel	Dimension (b) in front of front panel	Dimension (c) hole patterns final size	Order no. without lens	Note
1 1¼-module	yes	17.20 x 20.7 mm	13.85 x 17.35 mm	14,00 x 17,5 mm	5.55.103.031/1013	Please order lenses separately.

Technical data see page 4 - 94

Lenses:

RK 90 - Lens, 14 mm, 1.25-module, opaque red: 5.46.681.002/0309
 RK 90 - Lens, 14 mm, 1.25-module, opaque light grey: 5.46.681.002/0700
 RK 90 - Lens, 14 mm, 1.25-module, transparent colourless: 5.46.681.022/1002
 RK 90 - Lens, 14 mm, 1.25-module, transparent red: 5.46.681.022/1307
 RK 90 - Lens, 14 mm, 1.25-module, transparent yellow: 5.46.681.022/1403
 RK 90 - Lens, 14 mm, 1.25-module, transparent green: 5.46.681.022/1510

RK 90 - Keycap body plastic, for lenses 14 mm, 1½-module



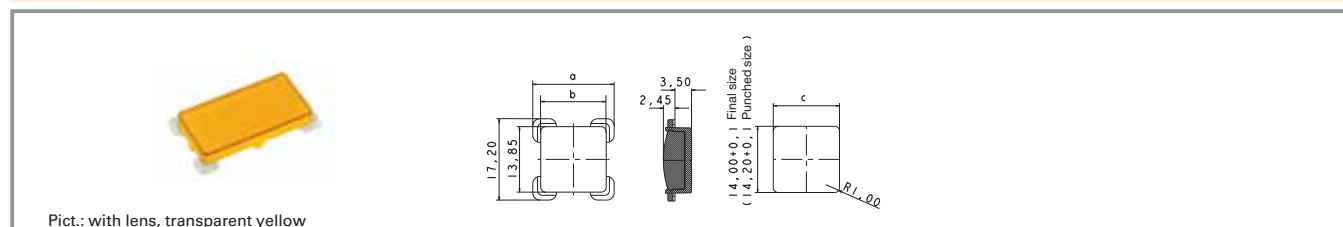
Size	Illuminability	Dimension (a) behind front panel	Dimension (b) in front of front panel	Dimension (c) hole patterns final size	Order no. without lens	Note
1½-module	yes	17.20 x 24.20 mm	13.85 x 20.85 mm	14.00 x 21.00 mm	5.55.103.032/1013	Please order lenses separately.

Technical data see page 4 - 94

Lenses:

- RK 90 - Lens, 14 mm, 1.5-module, opaque red: 5.46.681.003/0309
- RK 90 - Lens, 14 mm, 1.5-module, opaque yellow: 5.46.681.003/0409
- RK 90 - Lens, 14 mm, 1.5-module, opaque green: 5.46.681.003/0514
- RK 90 - Lens, 14 mm, 1.5-module, opaque blue: 5.46.681.003/0611
- RK 90 - Lens, 14 mm, 1.5-module, opaque light grey: 5.46.681.003/0700
- RK 90 - Lens, 14 mm, 1.5-module, transparent colourless: 5.46.681.023/1002
- RK 90 - Lens, 14 mm, 1.5-module, transparent red: 5.46.681.023/1307
- RK 90 - Lens, 14 mm, 1.5-module, transparent yellow: 5.46.681.023/1403
- RK 90 - Lens, 14 mm, 1.5-module, transparent green: 5.46.681.023/1510

RK 90 - Keycap body plastic, for lenses 2-module



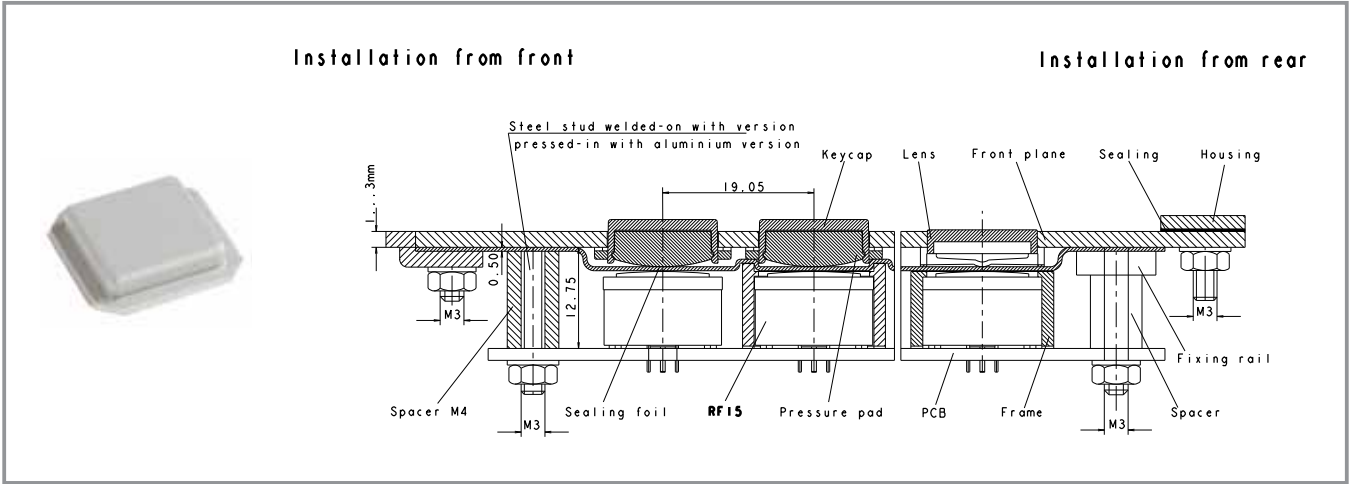
Size	Illuminability	Dimension (a) behind front panel	Dimension (b) in front of front panel	Dimension (c) hole patterns final size	Order no. without lens	Note
2-module	yes	17.20 x 31.20 mm	13.85 x 27.85 mm	14.00 x 28.00 mm	5.55.103.077/1013	Please order lenses separately.

Technical data see page 4 - 94

Lenses:

- RK 90 - Lens, 14 mm, 2-module, opaque red: 5.46.681.004/0309
- RK 90 - Lens, 14 mm, 2-module, opaque yellow: 5.46.681.004/0409
- RK 90 - Lens, 14 mm, 2-module, opaque green: 5.46.681.004/0514
- RK 90 - Lens, 14 mm, 2-module, opaque blue: 5.46.681.004/0611
- RK 90 - Lens, 14 mm, 2-module, opaque light grey: 5.46.681.004/0700
- RK 90 - Lens, 14 mm, 2-module, transparent colourless: 5.46.681.024/1002
- RK 90 - Lens, 14 mm, 2-module, transparent red: 5.46.681.024/1307
- RK 90 - Lens, 14 mm, 2-module, transparent yellow: 5.46.681.024/1403
- RK 90 - Lens, 14 mm, 2-module, transparent green: 5.46.681.024/1510

RK 90 - Keycaps, aluminum, 14 x 14 mm



General Data

The RK 90 system design with metal keycaps is fairly safe against mechanical, thermal or chemical effects. Combined with a metal front panel, this data entry system offers maximum protection against vandalism. Tried and tested MICON 5, RACON 8/12 or RF 15/19 PCB keyswitches are used underneath the metal keycaps. The keycaps can be provided with engraved, coloured anodized or laser-printed legends. This means that the legend is durable and cannot be removed by mechanical or chemical means.

4

Technical Data

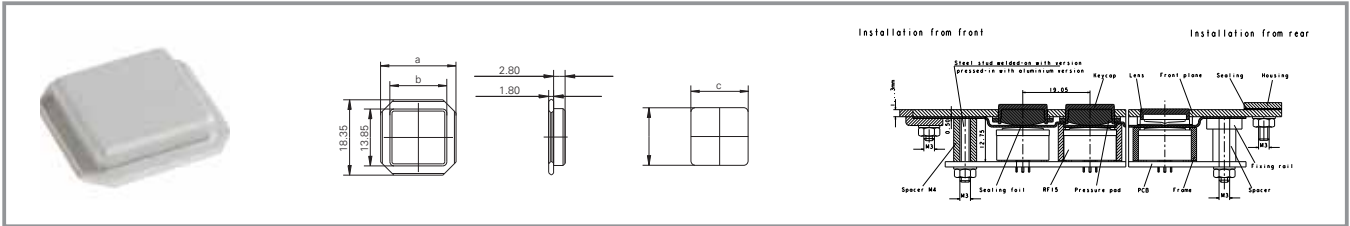
General information

Colour of lens	aluminum colourless anodized
Size	see order block
Degree of protection (with silicon seal)	IP65

Dimensions

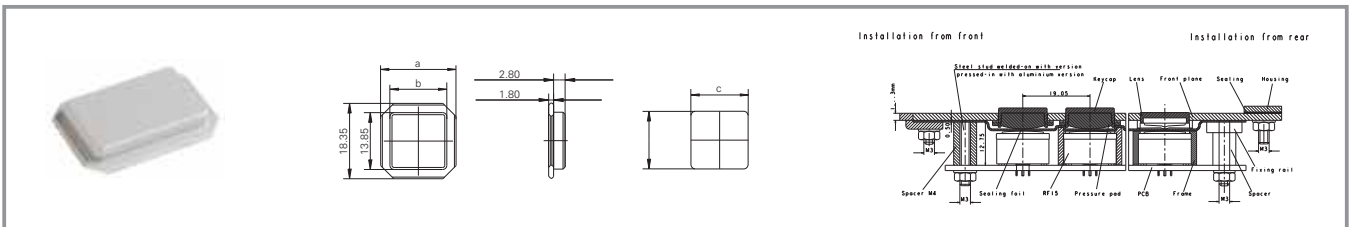
Dimension (b) in front of front panel	see order block
Dimension (a) behind front panel	see order block
Dimension (c) hole patterns final size	see order block
Dimension hole patterns punched size	see order block

RK 90 - Keycaps, aluminum, 14 mm, 1-module



Size	Colour of lens	Dimension (a) behind front panel	Dimension (b) in front of front panel	Dimension (c) hole patterns final size	Order no.
1-module	aluminum co- lourless anodized	18.35 x 18.35 mm	13.85 x 13.85 mm	14.00 x 14.00 mm	5.46.500.001/4010

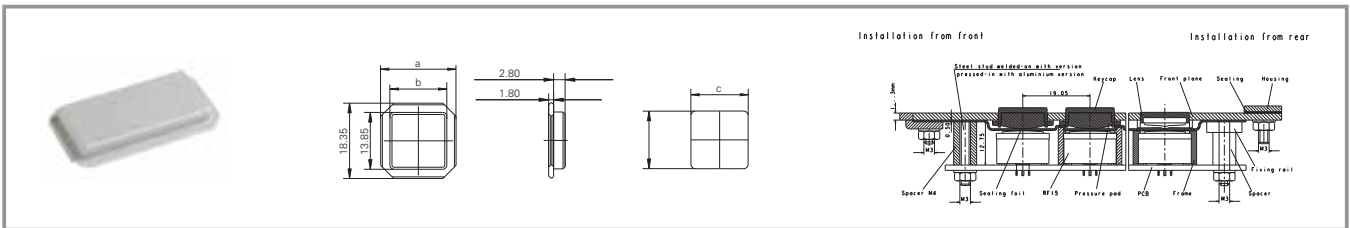
RK 90 - Keycaps, aluminum, 14 mm, 1½-module



Size	Colour of lens	Dimension (a) behind front panel	Dimension (b) in front of front panel	Dimension (c) hole patterns final size	Order no.
1½-module	aluminum colourless anodized	18.35 x 25.35 mm	13.85 x 20.85 mm	14.00 x 21.00 mm	5.46.500.003/4010

Technical data see page 4 - 98

RK 90 - Keycaps, aluminum, 14 mm, 2-module



Size	Colour of lens	Dimension (a) behind front panel	Dimension (b) in front of front panel	Dimension (c) hole patterns final size	Order no.
2-module	aluminum colourless anodized	18.35 x 32.35 mm	13.85 x 27.85 mm	14.00 x 28.00 mm	5.46.500.004/4010

Technical data see page 4 - 98

RK 90 - Special accessories



Pict.: charcoal grey

Technical Data

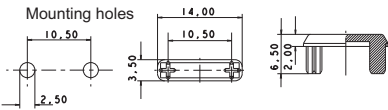
General information
Colour

see order block

Dimensions
Dimensions

see order block

RK 90 - Fin, to avoid inadvertent operation



Pict.: charcoal grey

Short text	Feature 1	Feature 2	Order no.
RK 90 - Fin, to avoid inadvertent operation, light grey	-	-	5.55.103.079/0700
RK 90 - Fin, to avoid inadvertent operation, charcoal grey	-	-	5.55.103.079/0152

RK 90 - Spacer M 4



Short text	Feature 1	Feature 2	Order no.
RK 90 - Spacer M 4 with RF 15 keys, height 12.50 mm, mounting from front (1 pc. per stud)	-	12.5 mm overall height for RF 15	5.30.764.040/0000
RK 90 - Spacer M 4 with RF 15 keys, height 9.25 mm, mounting from rear (1 pc. per stud)	-	9.25 mm overall height, for RF 15	5.30.764.027/0000
RK 90 - Spacer M 4 with RF 15 N keys, height 5.50 mm, mounting from rear (1 pc. per stud)	-	5.5 mm overall height, for RF15 N	5.30.764.010/0000
RK 90 - Spacer M 4 with RACON 8/12 keys, height 7.50 mm, mounting from front (1 pc. per stud)	-	7.5 mm overall height for RACON 8/12	5.30.764.018/0000
RK 90 - Spacer M 4 with RACON 8/12 keys, height 4.25 mm, mounting from rear (1 pc. per stud)	-	4.25 mm overall height, for RACON 8/12	5.30.764.005/0000

Technical data see page 4 - 100

RK 90 - Silicone foil 600 x 590 x 0.45 mm



Short text	Feature 1	Feature 2	Order no.
RK 90 - Silicone foil 600 x 590 x 0.45 mm	transparent	600 x 590 x 0.45 mm	7.16.102.006/0000

Technical data see page 4 - 100



General Data

Vandal-proof input system, ideally suited for elevator controls, info terminals, vending machines, etc.

- Edge illumination and symbol illumination possible
- Connection: Each module individually with an 8-pin Micro-Match socket connector
- Modular fixing system with quick fasteners or single fixing
- Contact arrangement: 1 NO contact or 1 NC + 1 NO contact
- 50 V/250 mA max.
- Degree of protection IP65 (keylock switch IP40).

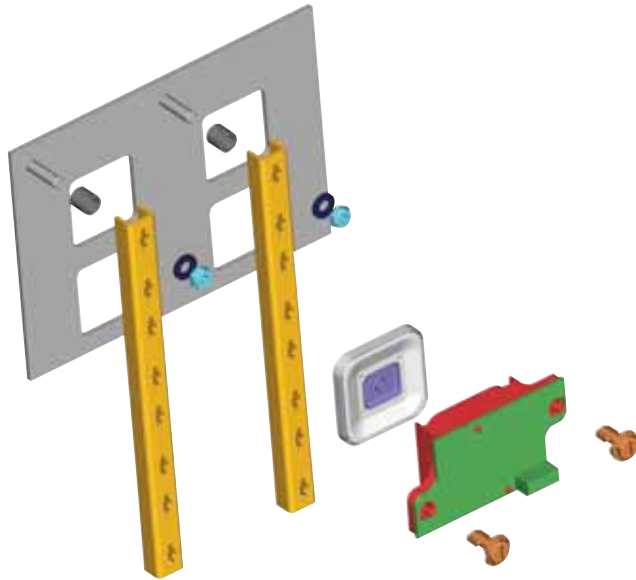
Content

RG 85 III - Keyswitch	4 - 106
RG 85 III - Keyswitch, round design, without lens	4 - 107
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RG 85 III - Keylock switch	4 - 110
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RG 85 III - Lens, round, for signal indicators	4 - 121
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Cable, 8 wires, with socket connectors on both ends	4 - 122
Fixing rail, length 490 mm	4 - 123
Spacer	4 - 123
Fixing piece for mounting the elements with the rail fixing method	4 - 123

System Features

Perfectly suited for: elevator controls, info terminals, vending machines, etc.

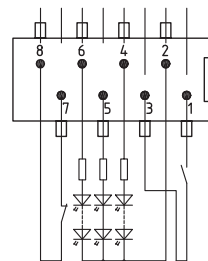
- Vandal proof construction
- Modular fixing system with quick fasteners or single fixing method using thread studs
- Connection with keyed 8-pin micro-match connector
- Degree of protection: IP40/65



Keylock Switch Features

- Round or square design and lens shape
- Edge illumination in one or two colours with 4 LED for each colour
- Lens material: Aluminum or stainless steel with plastic inlays
- Contact arrangement: 1 NO
- Cylinder lock with pin tumblers
- Two switching positions: 0 and 90 degrees, key can be removed in any position
- Lock type 5201 – other lock types on request
- Included: 2 keys

Micro-Match Connector Pin Assignment



- 1/3 NO contact
- 2 OV – LED
- 4 Edge illuminat./signal indicator
1st colour + 24 V DC +/- 20%
- 5 Symbol illumination
+ 24 V DC +/- 20%
- 6 Edge illuminat./signal indicator
2nd colour + 24 V DC +/- 20%
- 7/8 NC contact

4

Pushbutton Features

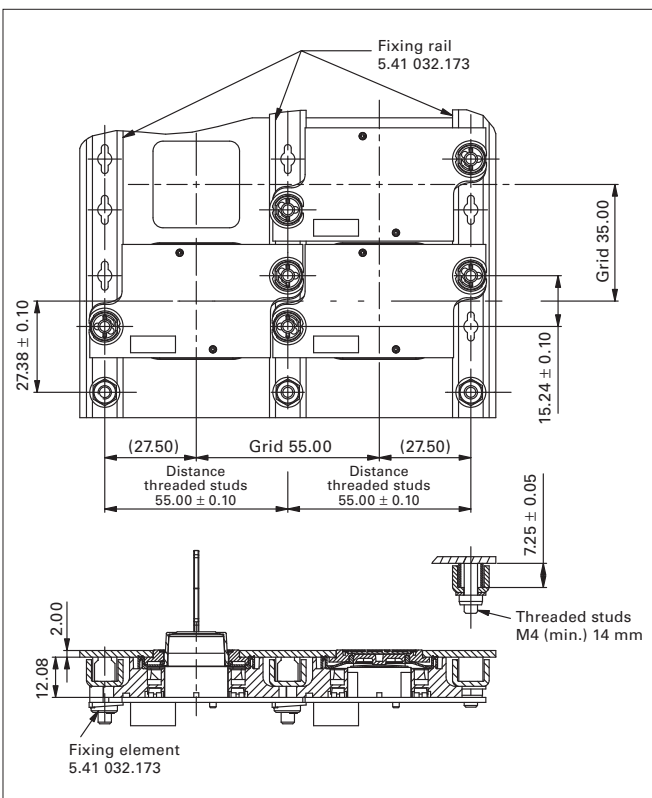
- Round or square design and lens shape
- Edge illumination in one or two colours with 4 LED for each colour
- Pushbutton with 1 NO contact: Additional illumination of the symbol with 2 LED possible
- Lens material: Aluminum or stainless steel with plastic inlays
- Switching element: short-travel keyswitch RF 19
 - 1 NO contact, non-illuminated
 - 1 NO contact, fully illuminated
 - 1 NC contact and 1 NO contact, non-illuminated

Signal Indicator Features

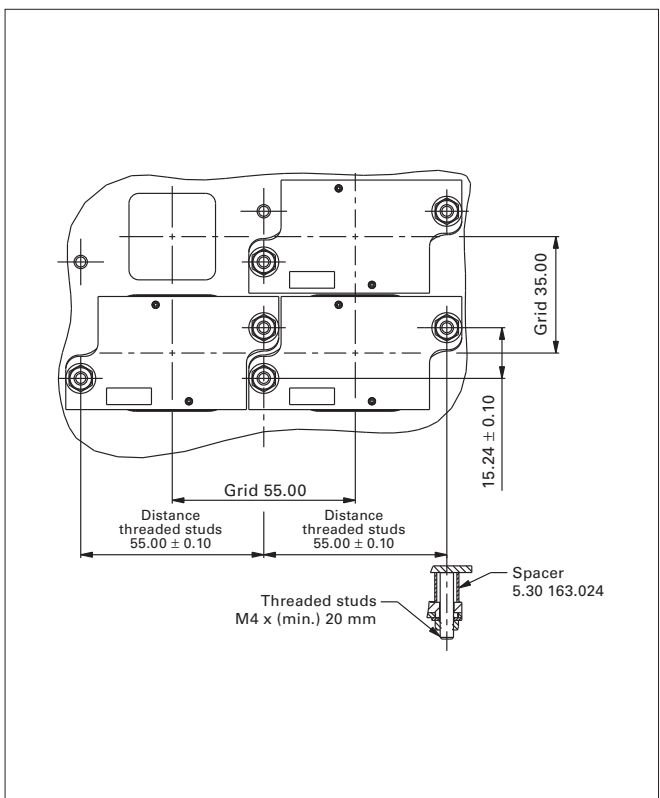
- Lens shape round, square or triangular (arrow shape)
- Lens material: Translucent plastic material
- Fully illuminated with 5 LED

Installation plan

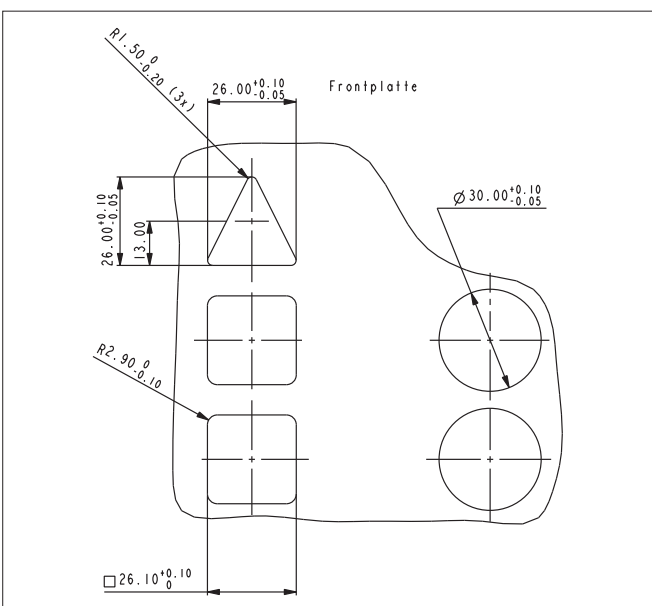
Rail fixing method



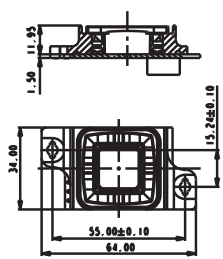
Single fixing method



Front panel



RG 85 III - Keyswitch



Technical Data

Dimensions		Electrical characteristics	
Mounting grid min.	55 x 35 mm	Rated voltage min.	3 V
Length	64 mm	Rated voltage max.	50 V
Width	34 mm	Rated current min.	0.1 mA
Mechanical design		Rated current max.	250 mA
Version	see order block	Rated power max.	12.5 W
Mounting	on U-rails or single mounting	Contact resistance when new	100 mΩ
Terminals	8-pin Micro-Match® female connector	Contact resistance acc. to life max.	3 Ω
Contact system	snap-action (1 NO) or bridge contact (1 NC + 1 NO)	Bouncing time max.	10 ms
Contact arrangement	see order block	Operating voltage for LED	24±20% V
Contact materials	Ag	Input current LED	per colour/LED row 9 - 16 mA
Symbol illumination	see order block	Other specifications	
Edge illumination	see order block	Ambient temp. operating min.	-25 °C
Mechanical characteristics		Ambient temp. operating max.	+70 °C
Operating force	3.5 N	Storage temperature min.	-40 °C
Operating travel	1 mm	Storage temperature max.	+80 °C
Switching travel NO	1 mm	Environmental resistance	acc. to IEC 60068-2
Switching travel NC	0.6 mm		-14, -30, -33 and -78
		Operating life min. (operations)	1,000,000
		Degree of protection rail mounting	IP40
		Degree of protection single mounting	IP65
		Flammability of materials	according to UL 94 HB

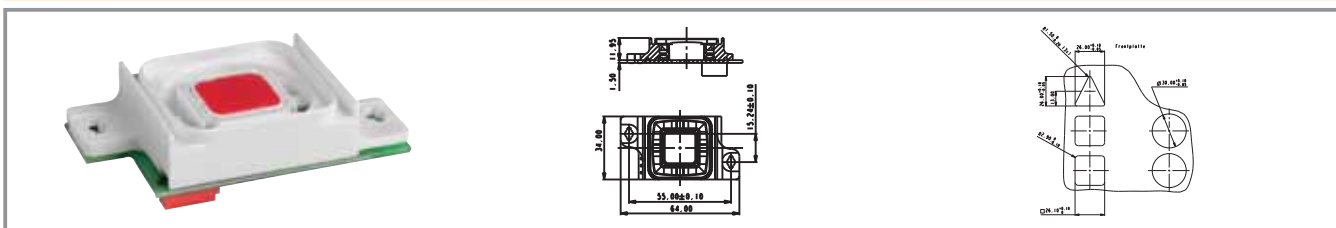
Typical accessories RG 85 III - Keyswitch

Description	Photo	Order no.	Additional accessories see page
Cable, 8 wires, with socket connectors on both ends, length 1 m		5.03.772.261/0000	4 - 122
RG 85 III - Lenses for keyswitches, round, stainless steel		5.04.914.000/2000	4 - 117
RG 85 III - Lenses for keyswitches, square, aluminum		5.04.915.100/2000	4 - 118

4

RG 85 III

RG 85 III - Keyswitch, round design, without lens

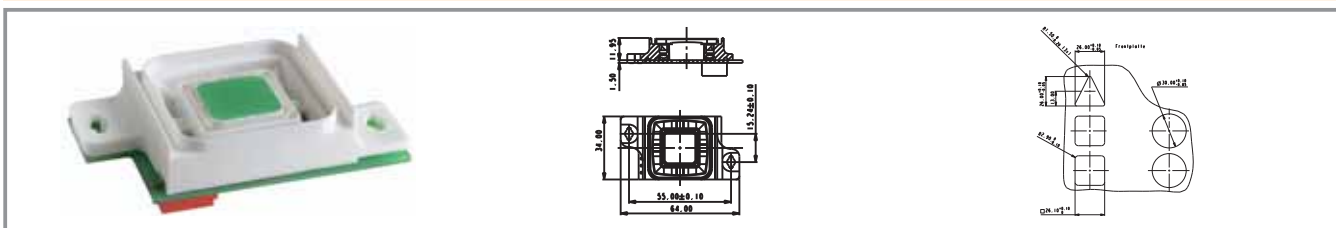


Contact arrangement	Edge illumination	Symbol illumination	Version	Order no.
1 NO	4 LED white	-	round	3.99.400.111/2000
1 NO	4 LED red	-	round	3.99.400.111/3000
1 NO	4 LED yellow	-	round	3.99.400.111/4000
1 NO	4 LED green	-	round	3.99.400.111/5000
1 NO	4 LED blue	-	round	3.99.400.111/6000
1 NO	4 LED white, 4 LED blue	-	round	3.99.400.111/7000
1 NO	4 LED green, 4 LED red	-	round	3.99.400.111/8000
1 NO	4 LED white	2 LED yellow	round	3.99.400.111/2400
1 NO	4 LED red	2 LED red	round	3.99.400.111/3300
1 NO	4 LED yellow	2 LED green	round	3.99.400.111/4500
1 NO	4 LED green	2 LED green	round	3.99.400.111/5500
1 NO	4 LED blue	2 LED blue	round	3.99.400.111/6600
1 NO	4 LED white, 4 LED blue	2 LED blue	round	3.99.400.111/7600
1 NO	4 LED green, 4 LED red	2 LED red	round	3.99.400.111/8300
1 NC + 1 NO	4 LED white	-	round	3.99.400.131/2000
1 NC + 1 NO	4 LED red	-	round	3.99.400.131/3000
1 NC + 1 NO	4 LED yellow	-	round	3.99.400.131/4000
1 NC + 1 NO	4 LED green	-	round	3.99.400.131/5000
1 NC + 1 NO	4 LED blue	-	round	3.99.400.131/6000
1 NC + 1 NO	4 LED white, 4 LED blue	-	round	3.99.400.131/7000
1 NC + 1 NO	4 LED green, 4 LED red	-	round	3.99.400.131/8000

Technical data see page 4 - 106

Please order lenses (round shape) separately.

RG 85 III - Keyswitch, square design, without lens



Contact arrangement	Edge illumination	Symbol illumination	Version	Order no.
1 NO	4 LED white	-	square	3.99.400.112/2000
1 NO	4 LED red	-	square	3.99.400.112/3000
1 NO	4 LED yellow	-	square	3.99.400.112/4000
1 NO	4 LED green	-	square	3.99.400.112/5000
1 NO	4 LED blue	-	square	3.99.400.112/6000
1 NO	4 LED white, 4 LED blue	-	square	3.99.400.112/7000
1 NO	4 LED green, 4 LED red	-	square	3.99.400.112/8000
1 NO	4 LED white	2 LED yellow	square	3.99.400.112/2400
1 NO	4 LED red	2 LED red	square	3.99.400.112/3300
1 NO	4 LED yellow	2 LED green	square	3.99.400.112/4500
1 NO	4 LED green	2 LED green	square	3.99.400.112/5500
1 NO	4 LED blue	2 LED blue	square	3.99.400.112/6600
1 NO	4 LED white, 4 LED blue	2 LED blue	square	3.99.400.112/7600
1 NO	4 LED green, 4 LED red	2 LED red	square	3.99.400.112/8300
1 NC + 1 NO	4 LED white	-	square	3.99.400.132/2000
1 NC + 1 NO	4 LED red	-	square	3.99.400.132/3000
1 NC + 1 NO	4 LED yellow	-	square	3.99.400.132/4000
1 NC + 1 NO	4 LED green	-	square	3.99.400.132/5000
1 NC + 1 NO	4 LED blue	-	square	3.99.400.132/6000
1 NC + 1 NO	4 LED white, 4 LED blue	-	square	3.99.400.132/7000
1 NC + 1 NO	4 LED green, 4 LED red	-	square	3.99.400.132/8000

4

RG
85 III

Technical data see page 4 - 106

Please order lenses (square shape) separately.

RG 85 III - Keylock switch, round design, without lens



Contact arrangement	Edge illumination	Rotating angle	Version	Order no.
1 NO	4 LED white	1 x 90°	round	3.99.400.141/2000
1 NO	4 LED red	1 x 90°	round	3.99.400.141/3000
1 NO	4 LED yellow	1 x 90°	round	3.99.400.141/4000
1 NO	4 LED green	1 x 90°	round	3.99.400.141/5000
1 NO	4 LED blue	1 x 90°	round	3.99.400.141/6000
1 NO	4 LED white, 4 LED blue	1 x 90°	round	3.99.400.141/7000
1 NO	4 LED green, 4 LED red	1 x 90°	round	3.99.400.141/8000

Technical data see page 4 - 110

Accessoires:
RG 85 III - Lenses for keylock switches, round, stainless steel: 5.04.914.200/2000
Please order lenses (round shape) separately.

RG 85 III - Signal indicator, without lens



Technical Data

Dimensions		Other specifications	
Mounting grid min.	55 x 35 mm	Ambient temp. operating min.	-25 °C
Length	64 mm	Ambient temp. operating max.	+70 °C
Width	34 mm	Storage temperature min.	-40 °C
Mechanical design		Storage temperature max.	+80 °C
Version	according to lens	Environmental resistance	acc. to IEC 60068-2
Mounting	on U-rails or single mounting	Degree of protection rail mounting	-14, -30, -33 and -78
Terminals	8-pin Micro-Match® female connector	Degree of protection single mounting	IP40
Illumination	see order block	Flammability of materials	IP65
Electrical characteristics		according to UL 94 HB	
Operating voltage for LED	24±20% V		
Input current LED	depending on LED colour 20 - 30 mA		

4

Typical accessories RG 85 III - Signal indicator, without lens

Description	Photo	Order no.	Additional accessories see page
Cable, 8 wires, with socket connectors on both ends, length 2 m		5.03.772.262/0000	4 - 122
RG 85 III - Lens, square, for signal indicators		5.04.903.009/0000	4 - 122
RG 85 III - Lens, round, for signal indicators		5.04.903.010/0000	4 - 121
RG 85 III - Lens, triangular, for signal indicators		5.04.903.011/0000	4 - 122

RG 85 III - Accessories



RG 85 III - Lenses for keyswitches, round



Version	Form of lens	Legending colour	Legending	Order no.
aluminum	round	-	-	5.04.915.000/2000
aluminum	round	opaque black	1	5.04.915.001/0100
aluminum	round	translucent white	1	5.04.915.001/2000
aluminum	round	opaque black	2	5.04.915.002/0100
aluminum	round	translucent white	2	5.04.915.002/2000
aluminum	round	opaque black	3	5.04.915.003/0100
aluminum	round	translucent white	3	5.04.915.003/2000
aluminum	round	opaque black	4	5.04.915.004/0100
aluminum	round	translucent white	4	5.04.915.004/2000
aluminum	round	opaque black	5	5.04.915.005/0100
aluminum	round	translucent white	5	5.04.915.005/2000
aluminum	round	opaque black	6	5.04.915.006/0100
aluminum	round	translucent white	6	5.04.915.006/2000
aluminum	round	opaque black	U	5.04.915.021/0100
aluminum	round	translucent white	U	5.04.915.021/2000

Version	Form of lens	Legending colour	Legending	Order no.
aluminum	round	opaque black	K	5.04.915.022/0100
aluminum	round	translucent white	K	5.04.915.022/2000
aluminum	round	opaque black	E	5.04.915.023/0100
aluminum	round	translucent white	E	5.04.915.023/2000
aluminum	round	opaque yellow	symbol „bell“	5.04.915.024/0400
aluminum	round	opaque black	symbol „open door“	5.04.915.025/0100
aluminum	round	translucent white	symbol „open door“	5.04.915.025/2000
aluminum	round	opaque black	symbol „close door“	5.04.915.026/0100
aluminum	round	translucent white	symbol „close door“	5.04.915.026/2000
aluminum	round	opaque black	symbol „ventilator“	5.04.915.027/0100
aluminum	round	translucent white	symbol „ventilator“	5.04.915.027/2000
aluminum	round	opaque black	symbol „arrow“	5.04.915.028/0100
aluminum	round	translucent white	symbol „arrow“	5.04.915.028/2000
stainless steel	round	-	-	5.04.914.000/2000
stainless steel	round	opaque black	1	5.04.914.001/0100
stainless steel	round	translucent white	1	5.04.914.001/2000
stainless steel	round	opaque black	2	5.04.914.002/0100
stainless steel	round	translucent white	2	5.04.914.002/2000
stainless steel	round	opaque black	3	5.04.914.003/0100
stainless steel	round	translucent white	3	5.04.914.003/2000
stainless steel	round	opaque black	4	5.04.914.004/0100
stainless steel	round	translucent white	4	5.04.914.004/2000
stainless steel	round	opaque black	5	5.04.914.005/0100
stainless steel	round	translucent white	5	5.04.914.005/2000
stainless steel	round	opaque black	6	5.04.914.006/0100
stainless steel	round	translucent white	6	5.04.914.006/2000
stainless steel	round	opaque black	U	5.04.914.021/0100
stainless steel	round	translucent white	U	5.04.914.021/2000

Version	Form of lens	Legending colour	Legending	Order no.
stainless steel	round	opaque black	K	5.04.914.022/0100
stainless steel	round	translucent white	K	5.04.914.022/2000
stainless steel	round	opaque black	E	5.04.914.023/0100
stainless steel	round	translucent white	E	5.04.914.023/2000
stainless steel	round	opaque yellow	symbol „bell“	5.04.914.024/0400
stainless steel	round	opaque black	symbol „open door“	5.04.914.025/0100
stainless steel	round	translucent white	symbol „open door“	5.04.914.025/2000
stainless steel	round	opaque black	symbol „close door“	5.04.914.026/0100
stainless steel	round	translucent white	symbol „close door“	5.04.914.026/2000
stainless steel	round	opaque black	symbol „ventilator“	5.04.914.027/0100
stainless steel	round	translucent white	symbol „ventilator“	5.04.914.027/2000
stainless steel	round	opaque black	symbol „arrow“	5.04.914.028/0100
stainless steel	round	translucent white	symbol „arrow“	5.04.914.028/2000

Technical data see page 4 - 114

The lenses without legending can not be engraved - other than the mentioned legends on request.

RG 85 III - Lenses for keyswitches, square



Version	Form of lens	Legending colour	Legending	Order no.
aluminum	square	-	-	5.04.915.100/2000
aluminum	square	opaque black	1	5.04.915.101/0100
aluminum	square	translucent white	1	5.04.915.101/2000
aluminum	square	opaque black	2	5.04.915.102/0100
aluminum	square	translucent white	2	5.04.915.102/2000
aluminum	square	opaque black	3	5.04.915.103/0100

Version	Form of lens	Legending colour	Legending	Order no.
aluminum	square	translucent white	3	5.04.915.103/2000
aluminum	square	opaque black	4	5.04.915.104/0100
aluminum	square	translucent white	4	5.04.915.104/2000
aluminum	square	opaque black	5	5.04.915.105/0100
aluminum	square	translucent white	5	5.04.915.105/2000
aluminum	square	opaque black	6	5.04.915.106/0100
aluminum	square	translucent white	6	5.04.915.106/2000
aluminum	square	opaque black	U	5.04.915.121/0100
aluminum	square	translucent white	U	5.04.915.121/2000
aluminum	square	opaque black	K	5.04.915.122/0100
aluminum	square	translucent white	K	5.04.915.122/2000
aluminum	square	opaque black	E	5.04.915.123/0100
aluminum	square	translucent white	E	5.04.915.123/2000
aluminum	square	opaque yellow	symbol „bell“	5.04.915.124/0400
aluminum	square	opaque black	symbol „open door“	5.04.915.125/0100
aluminum	square	translucent white	symbol „open door“	5.04.915.125/2000
aluminum	square	opaque black	symbol „close door“	5.04.915.126/0100
aluminum	square	translucent white	symbol „close door“	5.04.915.126/2000
aluminum	square	opaque black	symbol „ventilator“	5.04.915.127/0100
aluminum	square	translucent white	symbol „ventilator“	5.04.915.127/2000
aluminum	square	opaque black	symbol „arrow“	5.04.915.128/0100
aluminum	square	translucent white	symbol „arrow“	5.04.915.128/2000
stainless steel	square	-	-	5.04.914.100/2000
stainless steel	square	opaque black	1	5.04.914.101/0100
stainless steel	square	translucent white	1	5.04.914.101/2000
stainless steel	square	opaque black	2	5.04.914.102/0100
stainless steel	square	translucent white	2	5.04.914.102/2000
stainless steel	square	opaque black	3	5.04.914.103/0100

Version	Form of lens	Legending colour	Legending	Order no.
stainless steel	square	translucent white	3	5.04.914.103/2000
stainless steel	square	opaque black	4	5.04.914.104/0100
stainless steel	square	translucent white	4	5.04.914.104/2000
stainless steel	square	opaque black	5	5.04.914.105/0100
stainless steel	square	translucent white	5	5.04.914.105/2000
stainless steel	square	opaque black	6	5.04.914.106/0100
stainless steel	square	translucent white	6	5.04.914.106/2000
stainless steel	square	opaque black	U	5.04.914.121/0100
stainless steel	square	translucent white	U	5.04.914.121/2000
stainless steel	square	opaque black	K	5.04.914.122/0100
stainless steel	square	translucent white	K	5.04.914.122/2000
stainless steel	square	opaque black	E	5.04.914.123/0100
stainless steel	square	translucent white	E	5.04.914.123/2000
stainless steel	square	opaque yellow	symbol „bell“	5.04.914.124/0400
stainless steel	square	opaque black	symbol „open door“	5.04.914.125/0100
stainless steel	square	translucent white	symbol „open door“	5.04.914.125/2000
stainless steel	square	opaque black	symbol „close door“	5.04.914.126/0100
stainless steel	square	translucent white	symbol „close door“	5.04.914.126/2000
stainless steel	square	opaque black	symbol „ventilator“	5.04.914.127/0100
stainless steel	square	translucent white	symbol „ventilator“	5.04.914.127/2000
stainless steel	square	opaque black	symbol „arrow“	5.04.914.128/0100
stainless steel	square	translucent white	symbol „arrow“	5.04.914.128/2000

The lenses without legending can not be engraved - other than the mentioned legends on request.

RG 85 III - Lenses for keylock switches, round



Version	Form of lens	Legending colour	Legending	Order no.
aluminum	round	-	-	5.04.915.200/2000
stainless steel	round	-	-	5.04.914.200/2000

RG 85 III - Lenses for keylock switches, square



Version	Form of lens	Legending colour	Legending	Order no.
aluminum	square	-	-	5.04.915.201/2000
stainless steel	square	-	-	5.04.914.201/2000

4

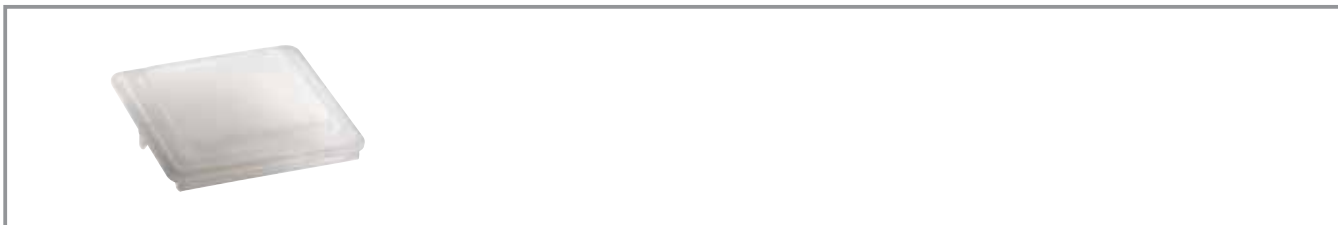
RG 85 III - Lens, round, for signal indicators



Version	Form of lens	Legending colour	Legending	Order no.
plastic translucent	round	-	-	5.04.903.010/0000

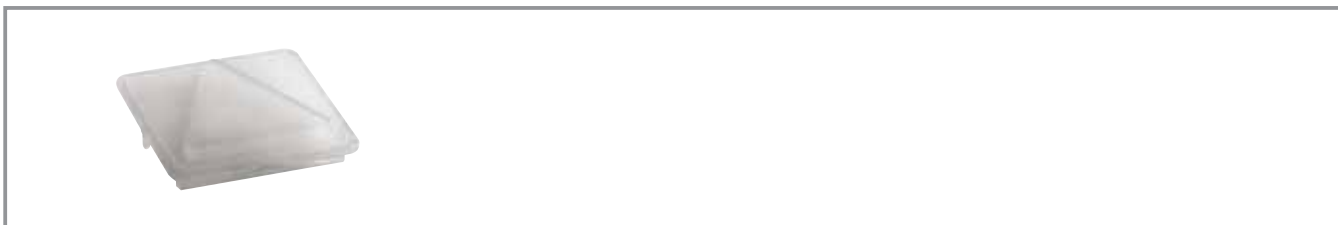
RG
85 III

RG 85 III - Lens, square, for signal indicators



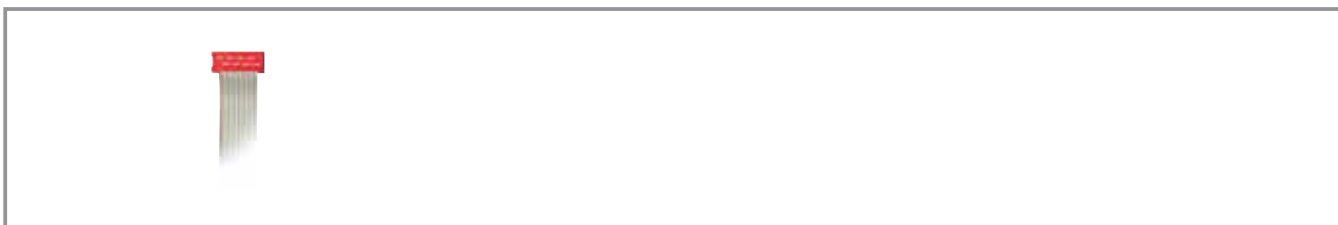
Version	Form of lens	Legending colour	Legending	Order no.
plastic translucent	square	-	-	5.04.903.009/0000

RG 85 III - Lens, triangular, for signal indicators



Version	Form of lens	Legending colour	Legending	Order no.
plastic translucent	triangular	-	-	5.04.903.011/0000

Cable, 8 wires, with socket connectors on both ends

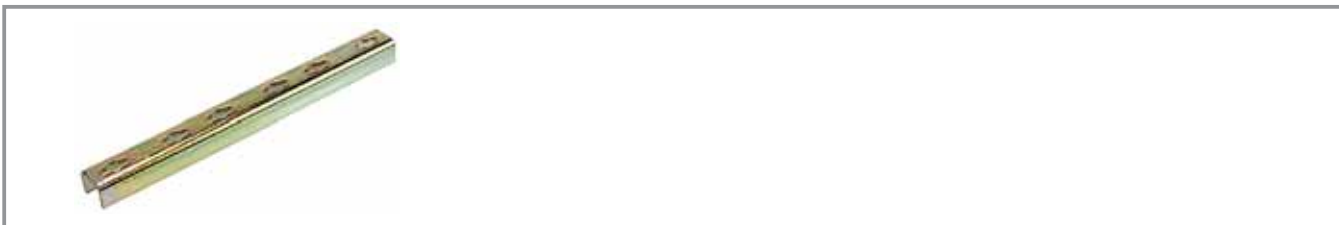


Version	Form of lens	Legending colour	Legending	Order no.
length: 1 m	-	-	-	5.03.772.261/0000
length: 2 m	-	-	-	5.03.772.262/0000

4

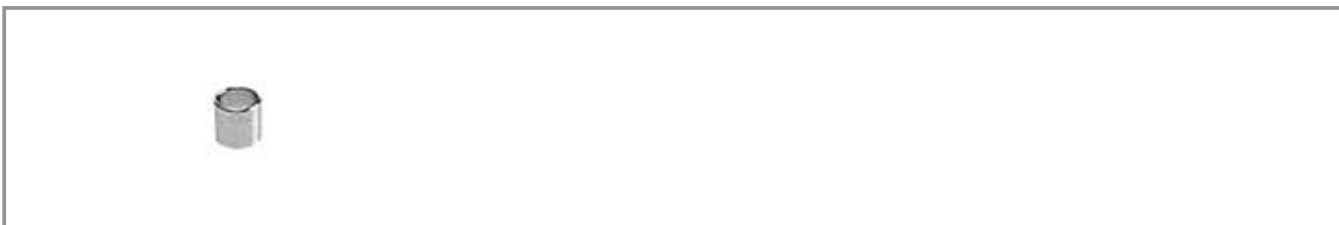
RG
85 III

Fixing rail, length 490 mm



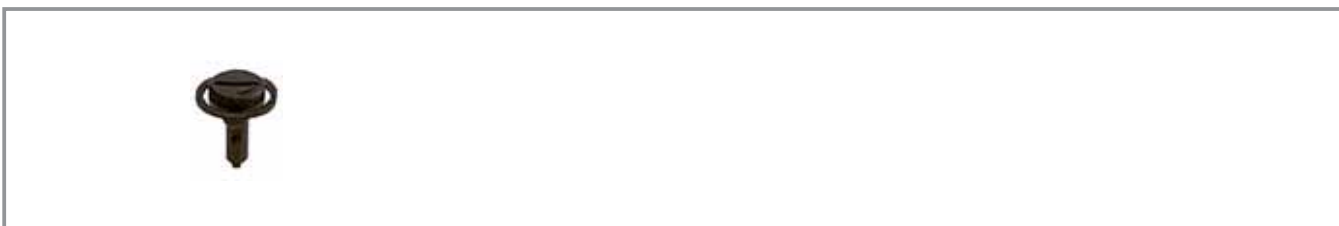
Version	Form of lens	Legending colour	Legending	Order no.
length: 490 mm	-	-	-	5.41.032.173/7500

Spacer



Version	Form of lens	Legending colour	Legending	Order no.
mounting on rails	-	-	-	5.30.163.021/6000
single mounting	-	-	-	5.30.163.024/6000

Fixing piece for mounting the elements with the rail fixing method



Version	Form of lens	Legending colour	Legending	Order no.
-	-	-	-	5.55.104.208/0459



General Data

The RS 76 full-travel keyswitches are designed for configuring keyboards. They offer very comfortable operation with an overall height of 15.5 / 15.9 mm and a key travel of 4 mm. The modular system with a grid of 3/4" = 19.05 mm enables you to design any key block you may want.

Mechanical contact system RS 76 M

A gold alloy is used as the contact material and provides high contact reliability, low contact resistance and short bouncing time.

Solid-state contact system RS 76 C

The solid-state switch in Hall-IC technology ensures bounce-free and wear-free switching and a long operating life. Function: When pressing the keys, a permanent magnet changes its position relative to the Hall-IC and thereby generates an output signal. Their use is especially recommended in hostile environments and for heavy duty applications.

Content

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RS 76 M - Full-travel keyswitch, illuminable	4 - 134
RS 76 M - Full-travel keyswitch, illuminable, momentary	4 - 135
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RS 76 C - Full-travel keyswitch, illuminable, momentary	4 - 141
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RS 76 - Keycaps, not illuminable	4 - 142
RS 76 - Keycap, opaque	4 - 142
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The RAFI full-travel keyswitches RS 76 are modular systems for designing individual key blocks and keyboards in the 3/4 inch (= 19.05 mm) grid.

Definitions

Momentary keyswitches

Momentary keyswitches return to their initial position after being pressed (momentary action).

Latching keyswitches

Latching keyswitches lock when actuated and are returned to their initial position when pressed again (push-push action).

Keycap materials

Keycap without legend insert: ABS

Keycap with legend insert:

– Keycap body: ABS

– Lens: PC

Keycap, n-module

A 2-module keycap f. ex. has the twofold length of a 1-module keycap.

Contact principle

There are two contact principles:

- **Mechanical (M):** Cross contact (RS 76 M)
Bridge contact
(RS 76 M, illuminated)
- **Contactless (C):** Based on Hall-IC (RS 76 C)

Manual Soldering

The soldering temperature should not exceed 300 °C and the soldering time should be less than 5 seconds.

Soldering process wave soldering

Wave soldering is permitted.

Legending of keycaps

Keycaps can be legended by different methods:

Two-shot moulding

Using this method the symbol is separately manufactured from a plastic and then the appropriate keycap form is moulded round it. Advantage: The character becomes a integrated part of the keycap, thus eliminating abrasion. All RAFI keycap sets with standard legending are manufactured by this method.

Customer specific two-shot moulded keycaps on request.

Printing

Keycaps can be printed with a two-component ink on request. The abrasion of this kind of legending is high. This method of legending is suitable for average volumes.

Engraving

In this labour intensive process the keycaps are engraved with the required symbol, then inlaid with ink. Only used for small volumes.

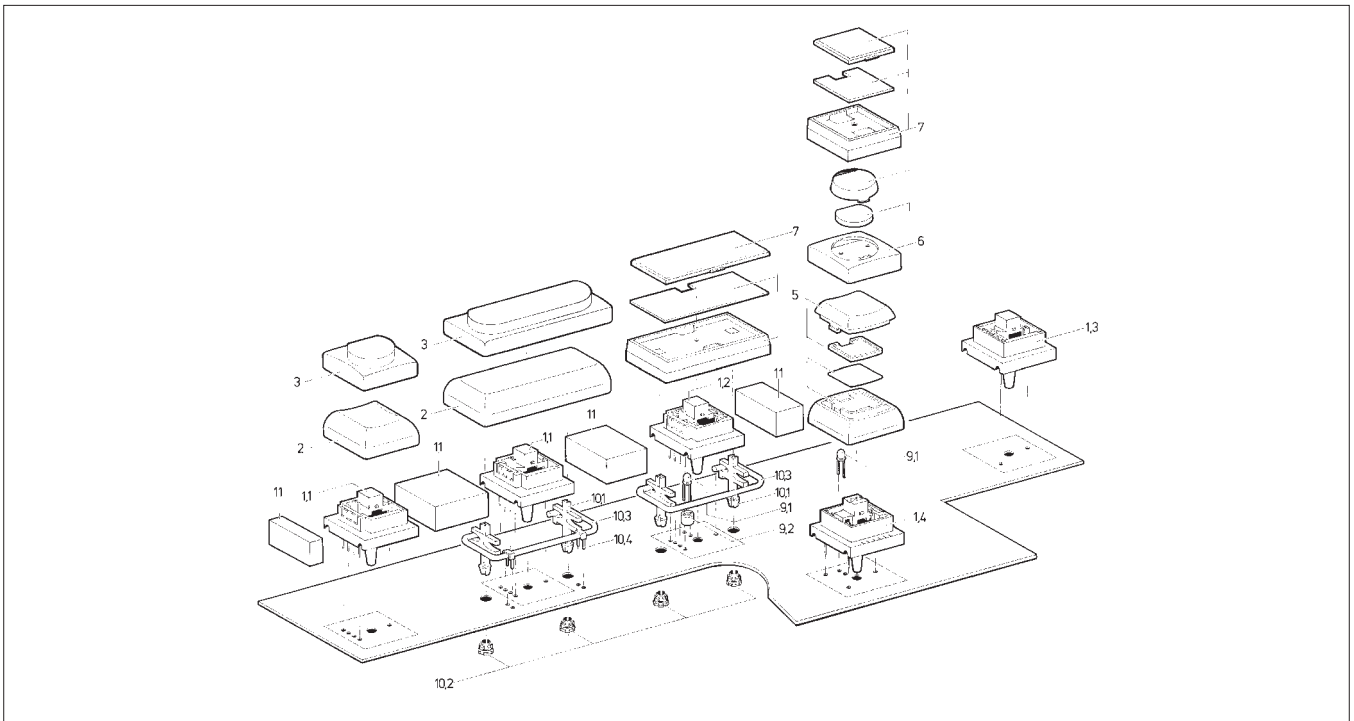
Laser-printing

This method of legending can be recommended when complete keyboards are required in different keyboard layouts for which RAFI will develop the respective software. The keyboards can then be legended within a short time. This method of legending is particularly recommended for average to large volumes.

Legend inserts

In the case of keycaps with replaceable legend inserts it is possible to print or engrave the legend inserts. As these insets are protected by the lens, there can be no abrasion here either.

Design



No. Description

- 1.1 Keyswitch RS 76 C
- 1.2 Keyswitch RS 76 C with LED
- 1.3 Keyswitch RS 76 M
- 1.4 Keyswitch R 76 M with LED
- 2 Keycap, 1- resp. multi-module
- 3 Keycap with nail protection, 1- resp. multi-module
- 5 Keycap, illuminated
- 6 Keycap, illuminated
- 7 Keycap, illuminated
- 9.1 LED

- 9.2 Spacer for LED (for RS 76 C only)
- 10.1 Plunger for multi-module keycaps*
- 10.2 Sleeve for multi-module keycaps*
- 10.3 Metal lever for multi-module keycaps*
- 10.4 Bearing bracket for multi-module keycaps*
- 11 Covers

*These parts are included as a complete packet in the delivery of keycaps ≥ 2 -module.

Hole Pattern PCB RS 76 M/RS 76 C

The hole patterns apply to the horizontal position of the keycaps only. Should they be in a vertical position,

the momentary keyswitch must be mounted accordingly, i. e. rotated by 90°.

For 1 – 1¾-module keycaps (view on component side)

	Momentary keyswitch, non-illuminated	Momentary keyswitch, illuminated
RS 76 M		
RS 76 C		

4

For 2-, 3- and 8-module keycaps (view on component side)

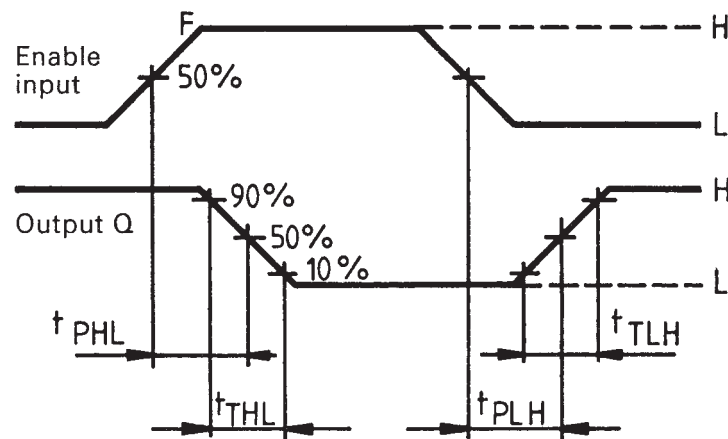
RS 76 M/C	
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Keycap	L 1 mm	L 2 mm
2-module	25,40	22,86
3-module	30,48	24,13
5-module	68,58	68,58

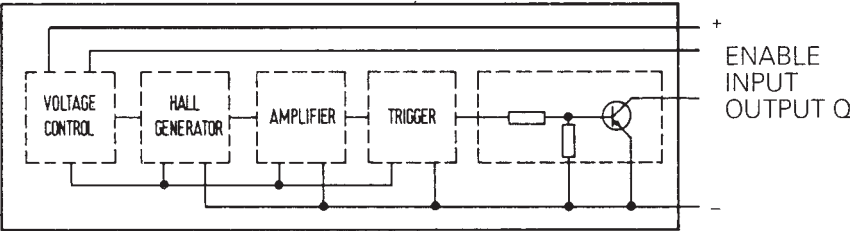
Important note: In the case of 2-, 3- and 8-module keycaps, additional holes must be provided for the accessories. In the case of keycaps < 2-module, neither accessories nor holes are required.

Specific Technical Data RS 76 C

Output pulse diagram Dynamic characteristics (max.)		Tw = 25 °C	Tw = 50 °C	Tw = 70 °C
Turn-on delay time	t _{PHL}	3 µs	7 µs	10 µs
Turn-off delay time	t _{PHL}	4 µs	5 µs	6 µs
Fall/rise time	t _{PHL}	2 µs	2,5 µs	3 µs
	t _{PHL}	1 µs	1,5 µs	2,5 µs

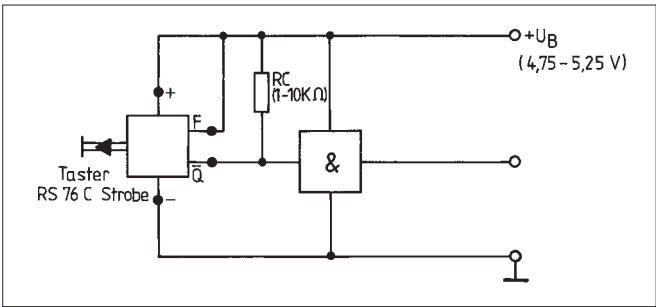


Block diagram
Hall IC

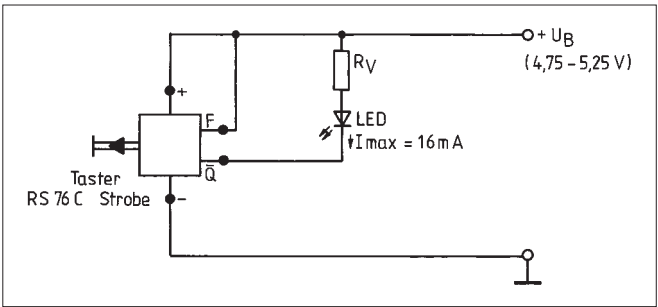


Static with Enable Input

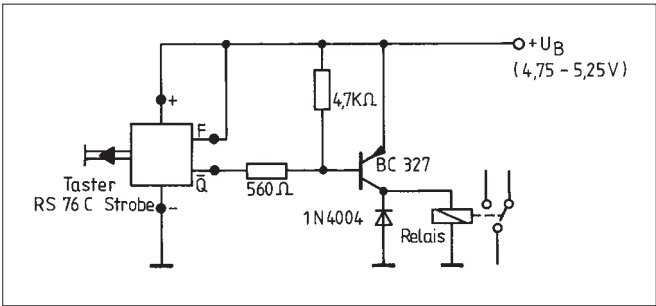
Examples for Application RS 76 C



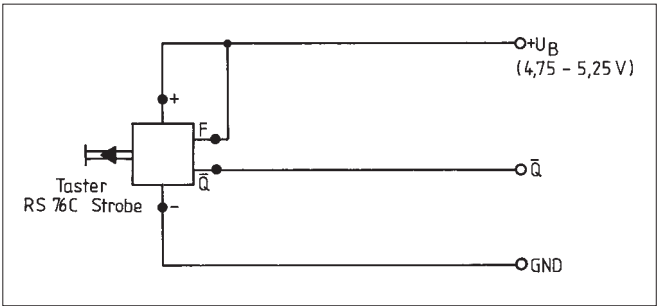
Driving of logic components



Indication of logical states

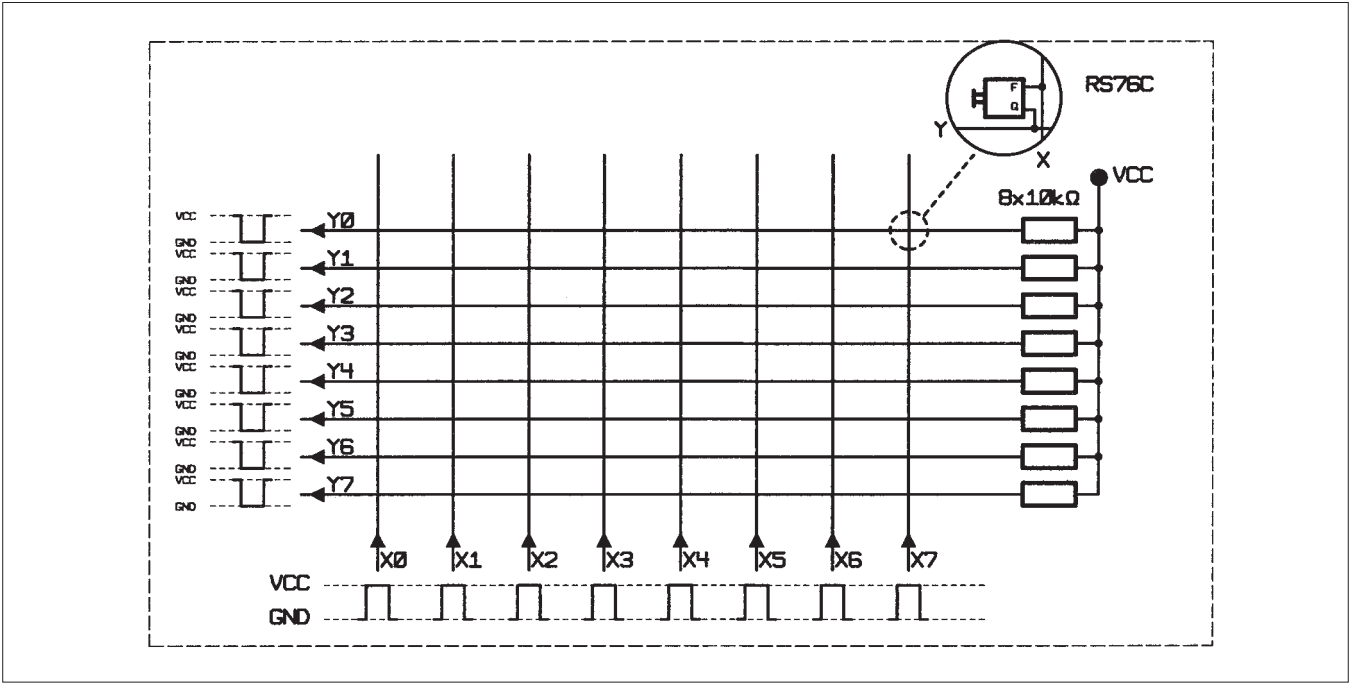


Driving of a PNP transistor



Use as static key with open collector output.
Output transistor (NPN) is conductive when actuated.

4



Use in keyboards

RS 76 M - Full-travel keyswitch, not illuminable



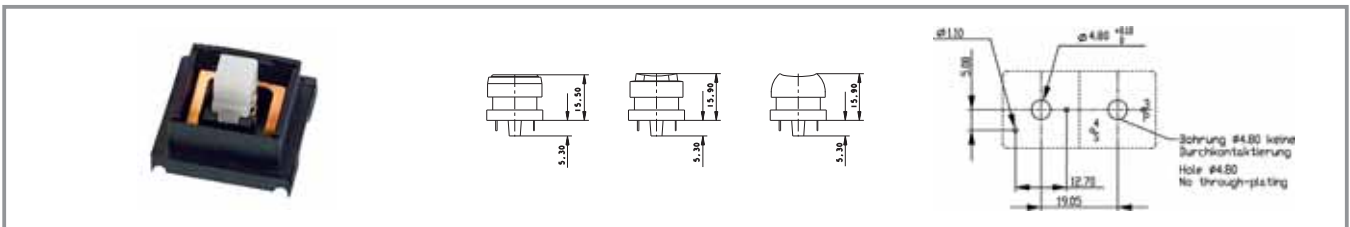
Technical Data

General information			
Recommended key grid	19.05 mm	Rated power max.	1 W
Mechanical design		Contact resistance when new max.	100 mΩ (without diode)
Contact function	momentary	Contact resistance acc. to life max.	3 Ω (without diode)
Mounting	soldering	Insulation resistance	10 ⁹ Ω
Terminals	solder terminals, tin-plated	ESD strength max.	8 kV
Contact system	cross contact	Bouncing time max.	5 ms
Contact arrangement	1 NO	Other specifications	
Contact materials	Au alloy	Ambient temp. operating min.	-25 °C
Illumination	no	Ambient temp. operating max.	+70 °C
Mechanical characteristics		Storage temperature min.	-40 °C
Operating force max.	see order block	Storage temperature max. (product)	+80 °C
Operating travel	4 mm	Storage temperature max. (rail)	+50 °C
Switching travel	1.5 - 2.8 mm	Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Robustness min.	100 N	Operating life min. (operations)	10 ⁷
Electrical characteristics		Degree of protection	IP40
Rated voltage min.	2 V (with Diode 3 V)	Flammability of materials	UL 94 HB
Rated voltage max.	35 V		
Rated current min.	0.01 mA		
Rated current max.	100 mA		

Typical accessories RS 76 M - Full-travel keyswitch, not illuminable

Description	Photo	Order no.	Additional accessories see page
RS 76 C - Keycap with legend insert		5.04.665.221/5520	4 - 143
RS 76 C - Keycap, opaque, with nail protection		5.80.000.000/0152	4 - 142
RS 76 C - Keycap, opaque		5.82.000.000/0152	4 - 142

RS 76 M - Full-travel keyswitch, not illuminable

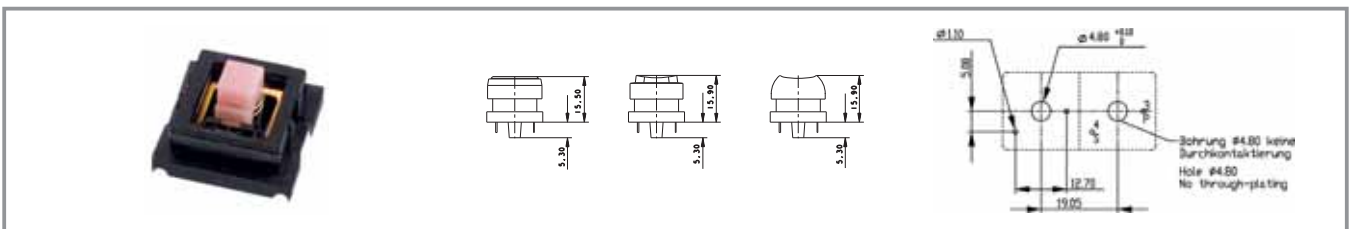


Contact function	Illumination	Contact arrangement	Contact materials	Operating travel	Operating force max.	Bestell-Nr.
momentary	no	1 NO	Au alloy	4 mm	0.9 N	3.13.002.502/0000
momentary	no	1 NO	Au alloy	4 mm	1.4 N	3.13.002.512/0000

Technical data see page 4 - 132

For accessories, refer to RS 76 special accessories.
For keycaps, see keycaps for RS 76.

RS 76 M - Full-travel keyswitch, with diode, not illuminable



Contact function	Illumination	Contact arrangement	Contact materials	Operating travel	Operating force max.	Bestell-Nr.
momentary	no	1 NO	Au alloy	4 mm	0.9 N	3.13.005.001/0000
momentary	no	1 NO	Au alloy	4 mm	1.4 N	3.13.005.011/0000

Technical data see page 4 - 132

For accessories, refer to RS 76 special accessories.
For keycaps, see keycaps for RS 76.

RS 76 M - Full-travel keyswitch, illuminable



Pict.: RS 76M, for spot illumination



RS 76MX, for full illumination



RS 76MX, keyboard fully illuminated

Technical Data

General information

Recommended key grid 19.05 mm

Mechanical design

Contact function see order block
Mounting soldering
Terminals tin-plated
Contact system bridge contact
Contact arrangement 1 NO
Contact materials Au alloy
Illumination see order block

Mechanical characteristics

Operating force max. 1 N
Operating travel 4 mm
Switching travel 1.5 - 2.8 mm
Robustness min. 100 N

Electrical characteristics

Rated voltage min. 2 V
Rated voltage max. 35 V
Rated current min. 0.01 mA
Rated current max. 100 mA

Rated power max. 1 W
Contact resistance when new 200 mΩ
Contact resistance acc. to life max. 3 Ω
Insulation resistance 10⁹ Ω
ESD strength max. 8 kV
Bouncing time max. 10 ms

Other specifications

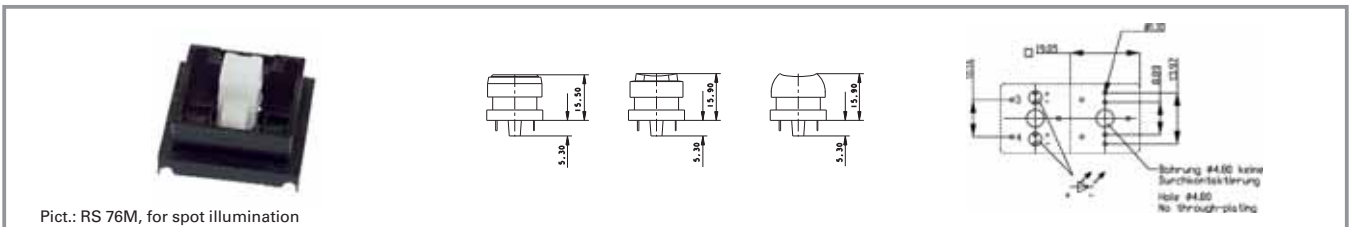
Ambient temp. operating min. -25 °C
Ambient temp. operating max. +70 °C
Storage temperature min. -40 °C
Storage temperature max. (product) +80 °C
Storage temperature max. (rail) +50 °C
Environmental resistance acc. to IEC 60068-2 -14, -30, -33 and -78
Operating life min. (operations) 10⁷ momentary, 10⁵ latching
Degree of protection IP40
Flammability of materials UL 94 HB

4

Typical accessories RS 76 M - Full-travel keyswitch, illuminable

Description	Photo	Order no.	Additional accessories see page
RS 76 - Cover IP40, 1-module, charcoal grey		5.04.520.174/0152	4 - 151
RS 76 C - Keycap, illuminated, with legend insert		5.04.665.521/5520	4 - 144
RS 76 C - Keycap, illuminated, with nail protection and legend insert		5.04.665.911/5520	4 - 145
RS 76 C - Keycap with light bar		5.82.110.000/0242	4 - 144

RS 76 M - Full-travel keyswitch, illuminable, momentary



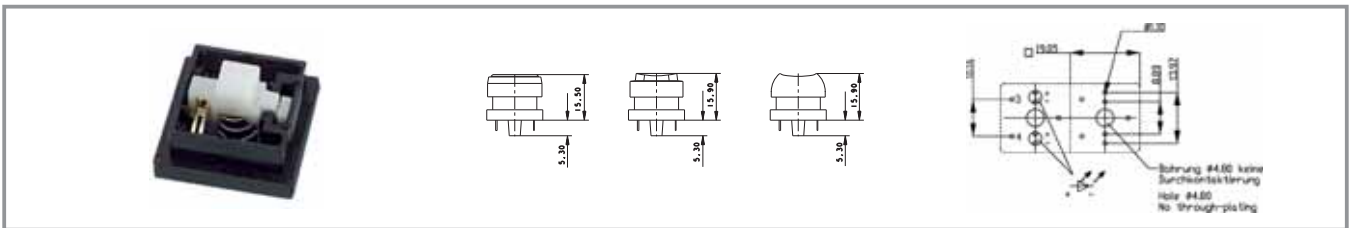
Pict.: RS 76M, for spot illumination

Contact function	Contact system	Illumination	Recommended key grid	Order no.
momentary	bridge contact	spot illumination possible with 3 LED	19.05 mm	3.13.002.102/0000

Technical data see page 4 - 134

For accessories, refer to RS 76 special accessories.
For keycaps, see keycaps for RS 76.

RS 76 M - Full-travel keyswitch, illuminable, latching

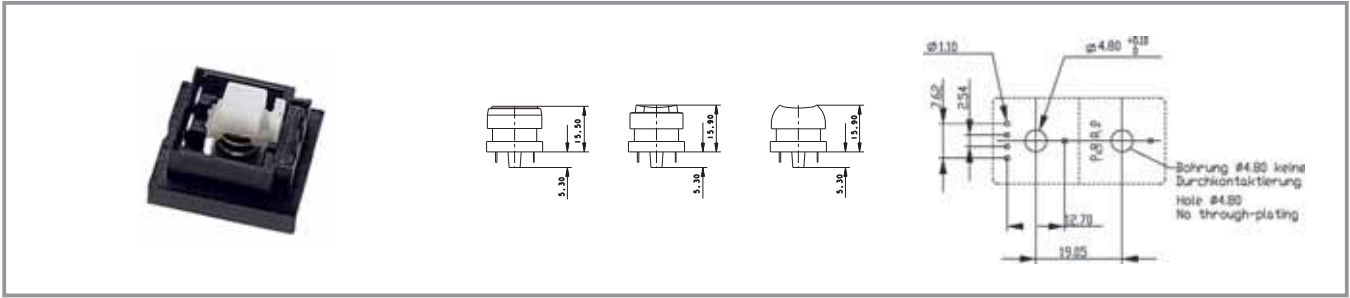


Contact function	Contact system	Illumination	Recommended key grid	Order no.
latching	bridge contact	spot illumination possible with 3 LED	19.05 mm	3.13.002.022/0000

Technical data see page 4 - 134

For accessories, refer to RS 76 special accessories.
For keycaps, see keycaps for RS 76.

RS 76 C - Full-travel keyswitch, not illuminable



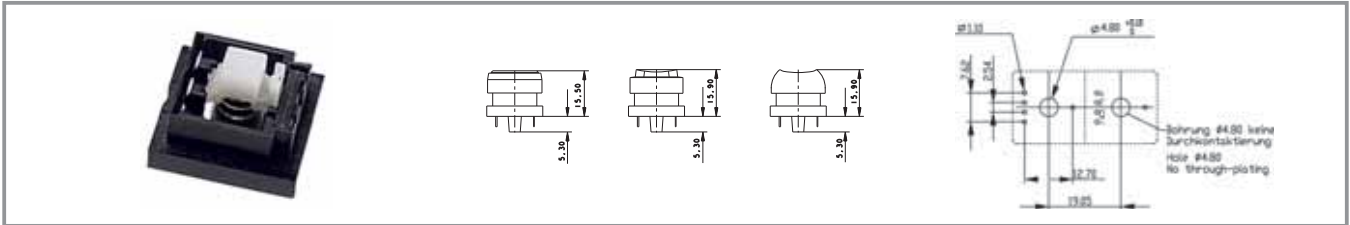
Technical Data

General information		Output saturation voltage (Q) max. bei 16 mA		0.4 V
Recommended key grid	19.05 mm	ESD strength max.		8 kV
Mechanical design		Output switching times (Q) at 25 °C, t _{PHL}		3 µs
Contact function	momentary	Output switching times (Q) at 25 °C, t _{PLH}		4 µs
Mounting	soldering	Output switching times (Q) at 25 °C, t _{THL}		1 µs
Terminals	solder terminals, tin-plated	Output switching times (Q) at 25 °C, t _{TLH}		2 µs
Contact system	contactless with Hall-IC	Other specifications		
Illumination	no	Reliability of Hall-IC at 25 °C	$\lambda = 2.5 \times 10^{-7} \text{ h}^{-1}$	
Mechanical characteristics		Ambient temp. operating min.	0 °C	
Switching travel off	0.8 ... 2.4 mm	Ambient temp. operating max.	+70 °C	
Operating force max.	see order block	Storage temperature min.	-40 °C	
Operating travel	4 mm	Storage temperature max. (product)	+80 °C	
Switching travel on	1.5 - 2.8 mm	Storage temperature max. (rail)	+50 °C	
Robustness min.	100 N	Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78	
Electrical characteristics		Operating life min. (operations)	see order block	
Operating voltage DC	4.75 ... 5.25 V	Degree of protection	IP40	
Supply current max. at U _{IL} = 0 V	0.5 mA	Flammability of materials	UL 94 HB	
Supply current max. at U _{IH} = 5 V	5 mA			
Input voltage (F) at U _{IL} = 0 V	0.4 V			
Input voltage (F) at U _{IH} = 2.4 V	5.25 V			
Output load current (Q) max.	16 mA			
Output residual current (Q) max.	10 µA			

Typical accessories RS 76 C - Full-travel keyswitch, not illuminable

Description	Photo	Order no.	Additional accessories see page
RS 76 C - Keycap with legend insert		5.04.665.221/5520	4 - 143
RS 76 C - Keycap, opaque, with nail protection		5.80.000.000/0152	4 - 142
RS 76 C - Keycap, opaque		5.82.000.000/0152	4 - 142

RS 76 C - Full-travel keyswitch, not illuminable

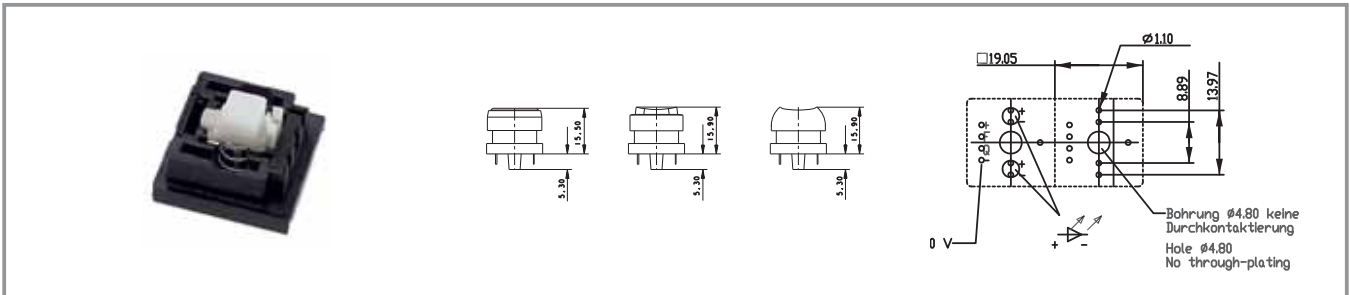


Contact function	Operating life min. (operations)	Illumination	Operating force max.	Operating travel	Order no.
momentary	10 ⁸	no	0.7 N	4 mm	3.13.001.010/0000
momentary	10 ⁸	no	1 N	4 mm	3.13.001.210/0000

Technical data see page 4 - 138

For accessories and keycaps, refer to RS 76. For applications, refer to the general description of RS 76.

RS 76 C - Full-travel keyswitch, illuminable



Technical Data

General information			
Recommended key grid	19.05 mm	Output residual current (Q) max.	10 µA
Mechanical design		Output saturation voltage (Q) max. bei 16 mA	0.4 V
Contact function	see order block	ESD strength max.	8 kV
Mounting	soldering	Output switching times (Q) at 25 °C, t _{PHL}	3 µs
Terminals	solder terminals, tin-plated	Output switching times (Q) at 25 °C, t _{PLH}	4 µs
Contact system	contactless with Hall-IC	Output switching times (Q) at 25 °C, t _{THL}	1 µs
Illumination	with LED	Output switching times (Q) at 25 °C, t _{TLH}	2 µs
LED colour	see order block	Other specifications	
Mechanical characteristics		Reliability of Hall-IC at 25 °C	$\lambda = 2.5 \times 10^{-7} \text{ h}^{-1}$
Switching travel on	1.5 - 2.8 mm	Ambient temp. operating min.	0 °C
Switching travel off	0.8 ... 2.4 mm	Ambient temp. operating max.	+70 °C
Operating force max.	0.7 N	Storage temperature min.	-40 °C
Operating travel	4 mm	Storage temperature max. (product)	+80 °C
Robustness min.	100 N	Storage temperature max. (rail)	+50 °C
Electrical characteristics		Environmental resistance	acc. to IEC 60068-2 -14, -30, -33 and -78
Number of LED	see order block	Operating life min. (operations)	see order block
Operating voltage DC	4.75 ... 5.25 V	Degree of protection	IP40
Supply current max. at U _{IL} = 0 V	0.5 mA	Flammability of materials	UL 94 HB
Supply current max. at U _{IH} = 5 V	5 mA		
Input voltage (F) at U _{IL} = 0 V	0.4 V		
Input voltage (F) at U _{IH} = 2.4 V	5.25 V		
Output load current (Q) max.	16 mA		

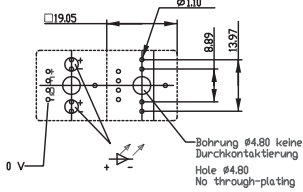
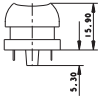
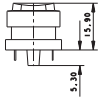
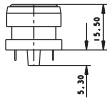
Typical accessories RS 76 C - Full-travel keyswitch, illuminable

Description	Photo	Order no.	Additional accessories see page
RS 76 - Cover IP40, 1-module, light grey		5.04.520.174/0242	4 - 151
RS 76 C - Keycap, illuminated, with legend insert		5.04.665.521/5520	4 - 144
RS 76 C - Keycap, illuminated, with nail protection and legend insert		5.04.665.911/5520	4 - 145

Typical accessories RS 76 C - Full-travel keyswitch, illuminable

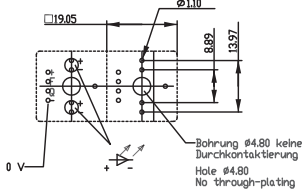
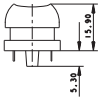
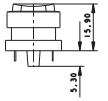
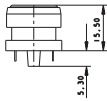
Description	Photo	Order no.	Additional accessories see page
RS 76 C - Keycap with light bar		5.82.110.000/0242	4 - 144

RS 76 C - Full-travel keyswitch, illuminable, momentary

					
Contact function	Operating life min. (operations)	Illumination	Operating force max.	Operating travel	Order no.
momentary	10 ⁸	with LED	0.7 N	4 mm	3.13.001.110/0000

Technical data see page 4 - 140

RS 76 C - Full-travel keyswitch, illuminable, latching

					
Contact function	Operating life min. (operations)	Illumination	Operating force max.	Operating travel	Order no.
latching	10 ⁵	with LED	0.7 N	4 mm	3.13.001.130/0000

Technical data see page 4 - 140



Pict.: light grey

opaque with nail protection charcoal grey / white

transparent colourless



Pict.: charcoal grey

light grey

Other keycap sizes, e.g. 1.25-, 1.5-, 1.75-, 2-, 3-, 5- and 8-module versions available on request.



Pict.: light grey

opaque with nail protection charcoal grey / white

Other keycap sizes, e.g. 1.25-, 1.5-, 1.75-, 2-, 3- and 8-module versions available on request.

RS 76 - Keycap with legend insert



Pict.: transparent colourless

Size of keycap	Illumination	Colour of keycap / legending	Colour of lens / legend insert	Order no.
1-module	no	charcoal grey/-	colourless/white	5.04.665.221/5520
1-module	no	light grey/-	colourless/white	5.04.665.230/5520

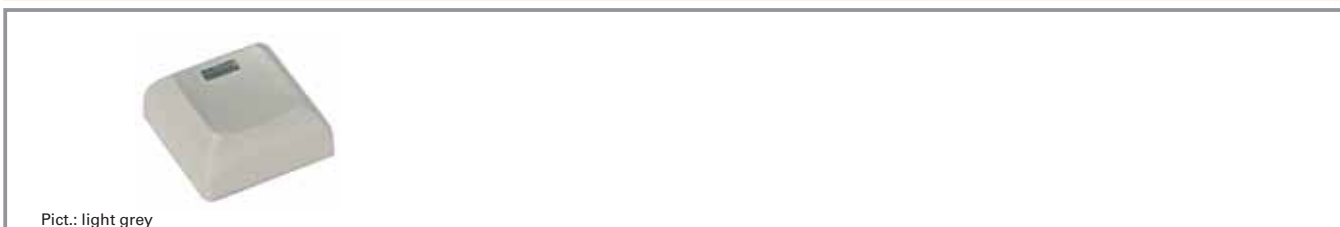
Supplied as single parts: Mat lens, legend insert, keycap body.

Other colours on request.

RS 76 - Keycaps, illuminable



RS 76 - Keycap with light bar



Size of keycap	Illumination	Colour of keycap / legending	Colour of lens / legend insert	Order no.
1-module	yes	light grey/-	-	5.82.110.000/0242
1-module	yes	charcoal grey/-	-	5.82.110.000/0152

Other colours on request.

RS 76 - Keycap, illuminable, with legend insert



Size of keycap	Illumination	Colour of keycap / legending	Colour of lens / legend insert	Order no.
1-module	yes	charcoal grey/-	colourless/white	5.04.665.521/5520
1-module	yes	light grey/-	colourless/white	5.04.665.530/5520

Supplied as single parts: Mat lens, legend insert, diffuser foil, keycap body.
Other colours on request.

RS 76 - Keycap, illuminable, with nail protection and legend insert



Pict.: light grey, yellow lens

Size of keycap	Illumination	Colour of keycap / legending	Colour of lens / legend insert	Order no.
1-module	yes	charcoal grey/-	colourless/white	5.04.665.911/5520
1-module	yes	light grey/-	colourless/white	5.04.665.920/5520

Supplied as single parts: Mat lens, legend insert, keycap body.
Other colours on request.

RS 76 - Keycap, illuminable, with legend insert



Pict.: light grey, red lens

Size of keycap	Illumination	Colour of keycap / legending	Colour of lens / legend insert	Order no.
1-module	yes	charcoal grey/-	colourless/white	5.04.665.161/5520
1-module	yes	light grey/-	colourless/white	5.04.665.170/5520

Supplied as single parts: Mat lens, legend insert, diffuser foil, keycap body.
Other colours on request.

RS 76 MX - Keycap, fully illuminable



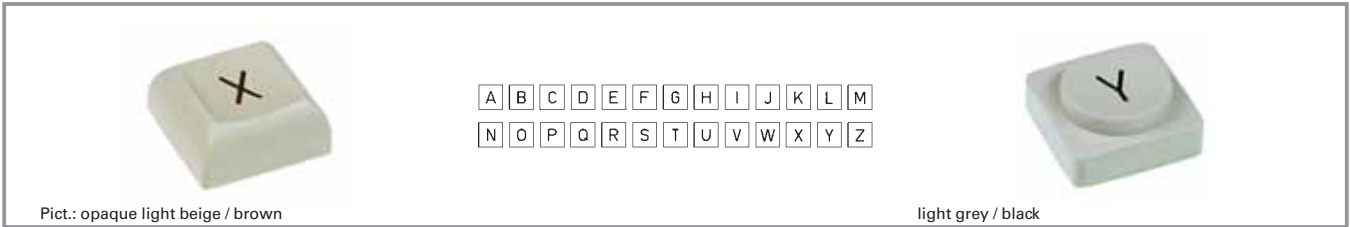
Size of keycap	Illumination	Colour of keycap / legending	Colour of lens / legend insert	Order no.
1-module	yes	white/-	white translucent/-	5.05.511.168/0209
1-module	yes	light grey/-	white translucent/-	5.05.511.168/0754
1¼-module	yes	white/-	white translucent/-	5.05.511.169/0209
1½-module	yes	white/-	white translucent/-	5.05.511.170/0209
1¾-module	yes	white/-	white translucent/-	5.05.511.171/0209
1¾-module with light conductor	yes	white/-	white translucent/-	5.05.511.173/0209

Laser-printed versions available on request.

RS 76 - Keycaps, with legend, two-shot moulded/keycap sets



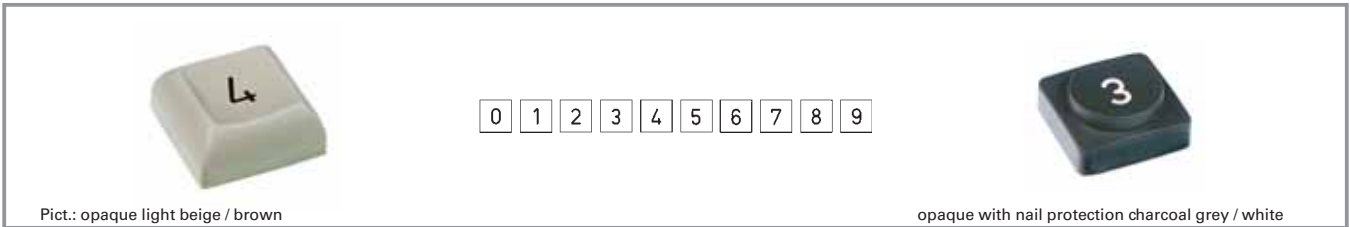
RS 76 - Keycap set, symbols A-Z



Size of keycap	Form of lens	Colour of keycap / legending	Symbol	Order no.
1-module	keycap opaque with nail protection	charcoal grey/white	A-Z	5.00.999.500/0000
1-module	keycap opaque with nail protection	light grey/black	A-Z	5.00.999.824/0000
1-module	keycap opaque	charcoal grey/white	A-Z	5.00.999.525/0000
1-module	keycap opaque	light grey/black	A-Z	5.00.999.825/0000

Other symbols and colours on request.

RS 76 - Keycap set, symbols 0-9



Size of keycap	Form of lens	Colour of keycap / legending	Symbol	Order no.
1-module	keycap opaque with nail protection	charcoal grey/white	0-9	5.00.999.504/0000
1-module	keycap opaque with nail protection	light grey/black	0-9	5.00.999.826/0000
1-module	keycap opaque	charcoal grey/white	0-9	5.00.999.529/0000
1-module	keycap opaque	light grey/black	0-9	5.00.999.827/0000

Other symbols and colours on request.

RS 76 - Accessories

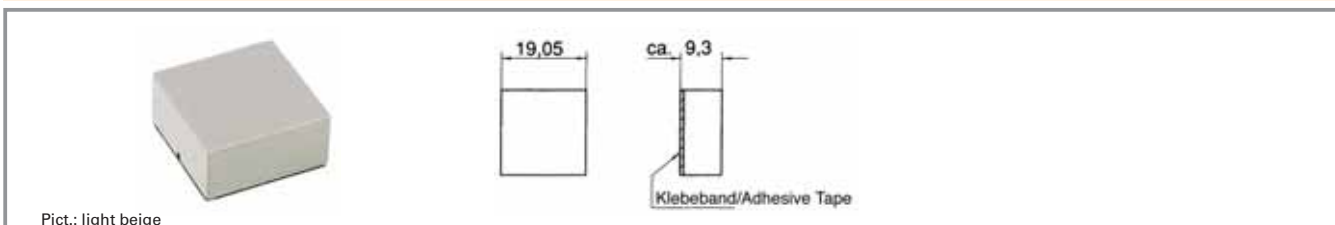


Pict.: light beige



dark grey

RS 76 - Cover IP40



Short text	Feature 1	Feature 2	Order no.
RS 76 - Cover IP40, 1/4-module, charcoal grey	charcoal grey	1/4-module	5.04.520.171/0152
RS 76 - Cover IP40, 1/4-module, light grey	light grey	1/4-module	5.04.520.171/0242
RS 76 - Cover IP40, 1/4-module, light beige	light beige	1/4-module	5.04.520.171/0710
RS 76 - Cover IP40, 1/4-module, dark grey	dark grey	1/4-module	5.04.520.171/0801
RS 76 - Cover IP40, 1/2-module, charcoal grey	charcoal grey	1/2-module	5.04.520.172/0152
RS 76 - Cover IP40, 1/2-module, light grey	light grey	1/2-module	5.04.520.172/0242
RS 76 - Cover IP40, 1/2-module, light beige	light beige	1/2-module	5.04.520.172/0710
RS 76 - Cover IP40, 1/2-module, dark grey	dark grey	1/2-module	5.04.520.172/0801
RS 76 - Cover IP40, 3/4-module, charcoal grey	charcoal grey	3/4-module	5.04.520.173/0152
RS 76 - Cover IP40, 3/4-module, light grey	light grey	3/4-module	5.04.520.173/0242
RS 76 - Cover IP40, 3/4-module, light beige	light beige	3/4-module	5.04.520.173/0710
RS 76 - Cover IP40, 3/4-module, dark grey	dark grey	3/4-module	5.04.520.173/0801
RS 76 - Cover IP40, 1-module, charcoal grey	charcoal grey	1-module	5.04.520.174/0152
RS 76 - Cover IP40, 1-module, light grey	light grey	1-module	5.04.520.174/0242
RS 76 - Cover IP40, 1-module, light beige	light beige	1-module	5.04.520.174/0710
RS 76 - Cover IP40, 1-module, dark grey	dark grey	1-module	5.04.520.174/0801

Other colours on request.



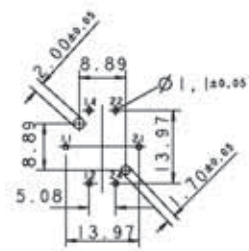
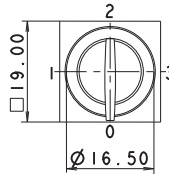
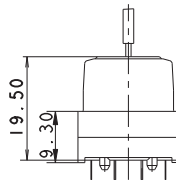
General Data

Keylock switches for PCB mounting. Matching with the RS 76 full-travel keyswitches and the RF 15 and RF 19 short-travel keyswitches.

Content

MICROMECH - Keylock switch IP54	4 - 154
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EUROLOCKS - Keylock switch IP54	4 - 159
Priority keylock switch IP54	4 - 160
Priority keylock switch IP54	4 - 161
Rotary switch IP40	4 - 162
Rotary switch IP40	4 - 163

Pict.: light grey

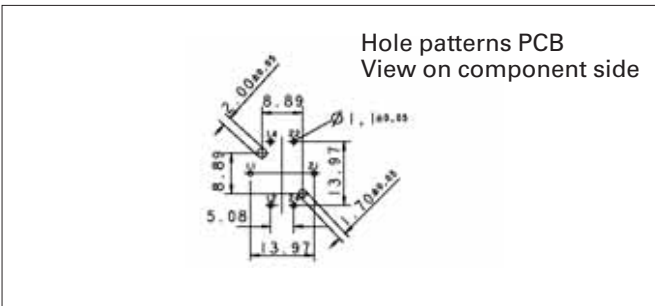


PCB hole pattern, component side

Switching torque	0.04 ... 0.10 Nm
Robustness max.	2 Nm
Dielectric strength AC min.	500 V
Rated power max.	1 W

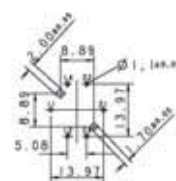
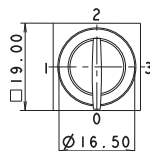
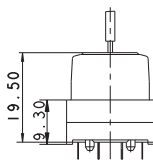
Description	Photo	Order no.	Additional accessories see page
O-ring for keylock switch		5.30.120.015/0100	5 - 25
Spare key, for single action, e.g. 1 x 90° (delivery content 1 key)		5.58.007.001/0000	
Spare key, for double action, e.g. 2 x 90° (delivery content 1 key)		5.58.008.001/0000	
Spare key for 3 angles, f.ex. 3 x 90° degree (content 1 key)		5.58.009.001/0100	

Description	Photo	Order no.	Additional accessories see page
Spare key for 4 angles, f.ex. 4 x 90 degrees, (content 1 key)		5.58.010.001/0100	



Switching position	Contact function
0	
1	
2	
3	

Pict.: charcoal grey

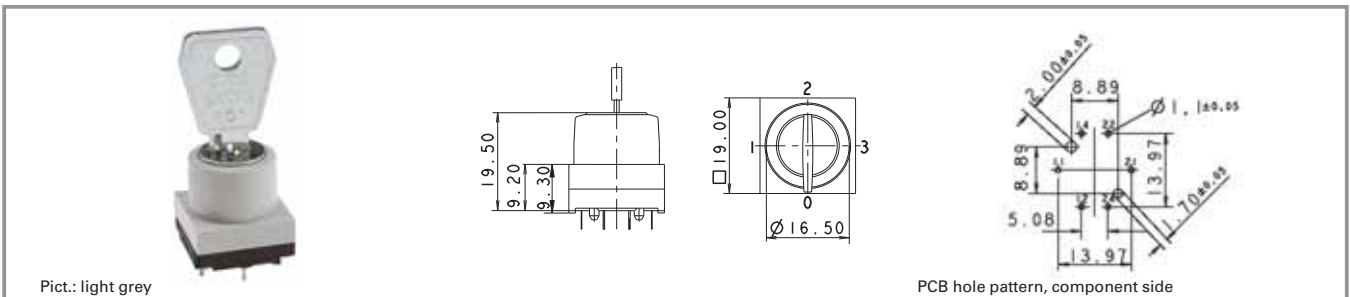


PCB hole pattern, component side

Contact function	Colour	Rotating angle		Key removal position	Order no.
momentary	charcoal grey	1 x 40°		0	3.13.026.041/0000
momentary	light grey	1 x 40°		0	3.13.026.541/0000
latching	charcoal grey	1 x 90°		0	3.13.026.001/0000
latching	light grey	1 x 90°		0	3.13.026.501/0000
latching	charcoal grey	1 x 90°		0+1	3.13.026.006/0000
latching	light grey	1 x 90°		0+1	3.13.026.506/0000
latching	charcoal grey	2 x 90°		0	3.13.026.011/0000
latching	light grey	2 x 90°		0	3.13.026.511/0000
latching	charcoal grey	2 x 90°		0+1+2	3.13.026.016/0000
latching	light grey	2 x 90°		0+1+2	3.13.026.516/0000
latching	charcoal grey	2 x 90°		0	3.13.026.601/0000
latching	light grey	2 x 90°		0	3.13.026.851/0000
latching	charcoal grey	2 x 90°		0+1+3	3.13.026.606/0000
latching	light grey	2 x 90°		0+1+3	3.13.026.856/0000
latching	charcoal grey	3 x 90°		0	3.13.026.021/0000
latching	light grey	3 x 90°		0	3.13.026.521/0000
latching	charcoal grey	3 x 90°		0+1+2+3	3.13.026.026/0000
latching	light grey	3 x 90°		0+1+2+3	3.13.026.526/0000
latching	charcoal grey	4 x 90° without stop		0	3.13.026.031/0000
latching	light grey	4 x 90° without stop		0	3.13.026.531/0000
latching	charcoal grey	4 x 90° without stop		0+1+2+3	3.13.026.036/0000
latching	light grey	4 x 90° without stop		0+1+2+3	3.13.026.536/0000

Other lock variants available on request.

EUROLOCKS - Keylock switch IP54



Pict.: light grey

PCB hole pattern, component side

Technical Data

General information

Colour	see order block
Form of collar	square

Dimensions

Length of collar	19 mm
Width of collar	19 mm
Overall height	19.5 mm

Mechanical design

Mounting	soldering
Terminals	tin-plated
Contact system	cross contact self cleaning latching
Contact function	Au alloy
Contact materials	no
Illuminability	Eurolocks
Lock	5
Wafers	801
Lock type	50
Number of locking positions	no
Main key	yes
Symmetric key	yes
Key removal position	see order block

Mechanical characteristics

Switching torque	0.04 ... 0.10 Nm
Robustness max.	2 Nm
Dielectric strength AC min.	500 V
Rated power max.	1 W

Electrical characteristics

Rated voltage	2 ... 35 V
Rated current max.	100 mA
Contact resistance when new	100 mΩ
max.	
Contact resistance acc. to	200 mΩ
life max.	
Insulation resistance	10 ⁹ Ω
ESD strength max.	8 kV

Other specifications

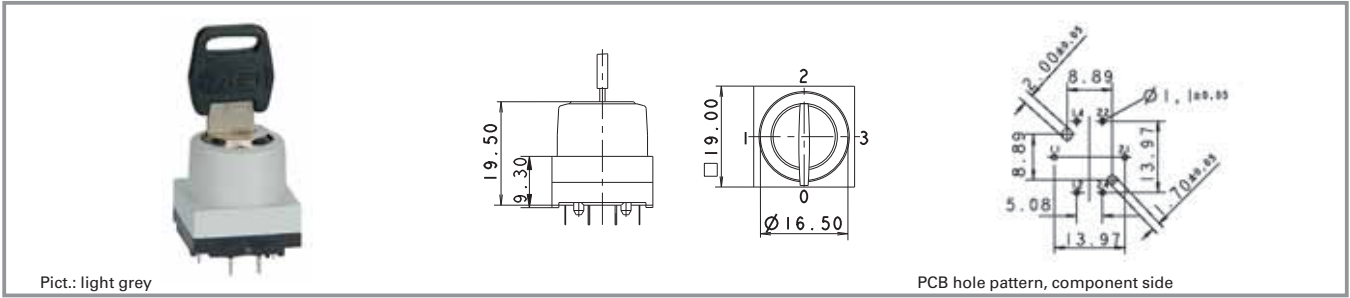
Rotating angle	see order block
Operating life	10,000
Degree of protection from	IP54
front side	
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Storage temperature min.	-40 °C
Storage temperature max.	+80 °C
Environmental resistance	acc. to IEC 60068-2
	-14, -30, -33 and -78
Flammability of materials	UL 94 HB

4

Typical accessories EUROLOCKS - Keylock switch IP54

Description	Photo	Order no.	Additional accessories see page
O-ring for keylock switch		5.30.120.015/0100	5 - 25
Spare key (delivery content 1 key)		5.58.006.801/0000	

Priority keylock switch IP54



General Data

Either 2 or 3 different keys are required, depending on the angle between positions. Key 1 can switch to position 1, key 2 can switch to position 1 and 2, etc.

Technical Data

General information		Electrical characteristics	
Colour	see order block	Rated voltage	2 ... 35 V
Form of collar	square	Rated current max.	100 mA
Dimensions		Contact resistance when new max.	100 mΩ
Length of collar	19 mm	Contact resistance acc. to life max.	200 mΩ
Width of collar	19 mm	Insulation resistance	10 ⁹ Ω
Overall height	19.5 mm	ESD strength max.	8 kV
Mechanical design		Other specifications	
Mounting	soldering	Rotating angle	see order block
Terminals	tin-plated	Operating life	10,000
Contact system	cross contact self cleaning	Degree of protection from front side	IP54
Contact function	see order block	Ambient temp. operating min.	-25 °C
Contact materials	Au alloy	Ambient temp. operating max.	+70 °C
Illuminability	no	Storage temperature min.	-40 °C
Lock	Micromec	Storage temperature max.	+80 °C
Wafers	5	Environmental resistance	acc. to IEC 60068-2
Lock type	001		-14, -30, -33 and -78
Number of locking positions	500	Flammability of materials	UL 94 HB
Main key	on request		
Key removal position	see order block		
Mechanical characteristics			
Switching torque	0.04 ... 0.10 Nm		
Robustness max.	2 Nm		
Dielectric strength AC min.	500 V		
Rated power max.	1 W		

Typical accessories Priority keylock switch IP54

Description	Photo	Order no.	Additional accessories see page
O-ring for keylock switch		5.30.120.015/0100	5 - 25

Description	Photo	Order no.	Additional accessories see page
Set of keys for 2 x 90° type (2 keys)		5.58.099.012/0000	
Set of keys for 3 x 90° type (3 keys)		5.58.099.013/0000	

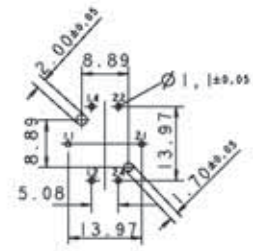
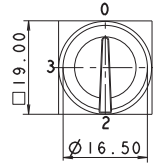
Pict.: charcoal grey

PCB hole pattern, component side

4

Either 2 or 3 different keys are required, depending on the angle between positions. Key 1 can switch to position 1, key 2 can switch to position 1 and 2, etc.

Technical drawing of a mechanical part showing dimensions: 24.00, 19.50, and 9.20.



Pict.: charcoal grey

PCB hole pattern, component side

Contact function	Colour	Rotating angle	Order no.
latching	charcoal grey	1 x 90° 	3.13.007.001/0152
latching	charcoal grey	2 x 90° 	3.13.007.011/0152
latching	charcoal grey	3 x 90° 	3.13.007.021/0152
latching	charcoal grey	4 x 90° 	3.13.007.031/0152

Other colour variants available on request

