The Component Ranges RS 74 and RS 76

The Rafi full-travel keyswitches RS 74/76 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).

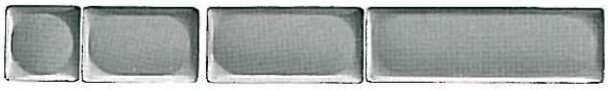
Latching keyswitches
Latching keyswitches lock when actuated and are returned to their initial position when pressed again (push-push action).

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.

1-module 1½-module 2-module 3-module



Contact principle
There are two contact principles:
- **Mechanical (M):** Cross contact (RS 74 / RS 76 M)
  Bridge contact (RS 76 M, illuminated)
- **Contactless (C):** Based on Hall IC (RS 76 C)

Soldering
The soldering temperature should not exceed 250 °C, the soldering time not be longer than 3 seconds.

Following momentary/latching keyswitches can be flow-soldered:
- Momentary/latching keyswitches with **sealed** bottom and sealed terminals:
  - Momentary keyswitches RS 74 M with increased ESD-strength
  - Keylock, code and rotary switches
- All momentary/latching keyswitches RS 76 C (Hall-IC)

The assembled PCB should be cleaned only by using brushing machines from the soldering side of the PCB. The cleaning agent should not exceed the component side of the PCB. **Unsealed** momentary/latching keyswitches (= rest of programme) can be flow-soldered, provided that an acid fluxer is used and that the whole unit is cleaned afterwards in de-ionised water.
Keylock, code and rotary switches should not be cleaned in this way.

Cleaning
Keyswitches should not be washed in freon or similar substances as a lubricant is used, otherwise the operating life of the keyswitches will be reduced.
If complete keyboards are to be cleaned by dipping, it must be remembered that the keyboard may only be dipped in the dipping solution as far as the component side of the PCB.

Features RS 74 and RS 76

	RS 74	RS 76
Degrees of protection acc. to DIN 40 050	IP 40 / IP 54	IP 40 / IP 65
Overall height	10.8 / 11.6 mm	15.5 / 15.9 mm
Full travel	2.5 mm	4 mm

Examples for Application

Example: Key block RS 74 M

Example: Keyboard RS 76

Application example: Rafi keyboard with German keycap set

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 an integrated part of the keycap, thus eliminating abrasion.
All Rafi keycap sets with standard legending are manufactured by this method.
Customer-specific keycaps which are two-shot moulded have a minimum order quantity for each symbol.

Printing
Keycaps can be printed with a two-component ink on request. The abrasion of this kind of legending is very high. No abrasion will occur if in case of keycaps with replaceable legend insert, the legending is printed on a legend insert and protected by a transparent lens.
This method of legending is suitable for average volumes.

Engraving
In this highly 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 inserts are protected by the lens, there can be no abrasion here either.

Contents

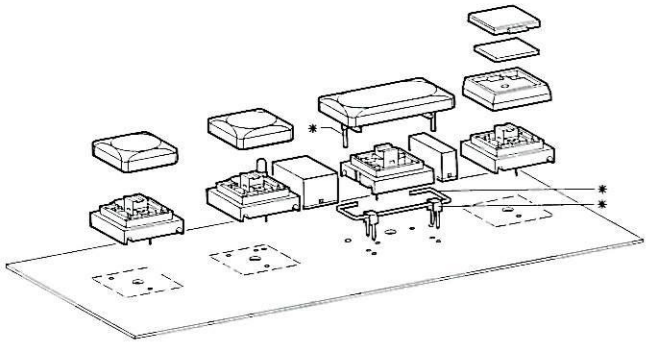
- IP 40: Momentary/latching keyswitches and keycaps 5 – 68
- IP 54: Momentary/latching keyswitches and keycaps 5 – 70
- Legended keycap sets 5 – 72
- Circuit diagrams 5 – 73
- Cut-out – support plate 5 – 74

General Information

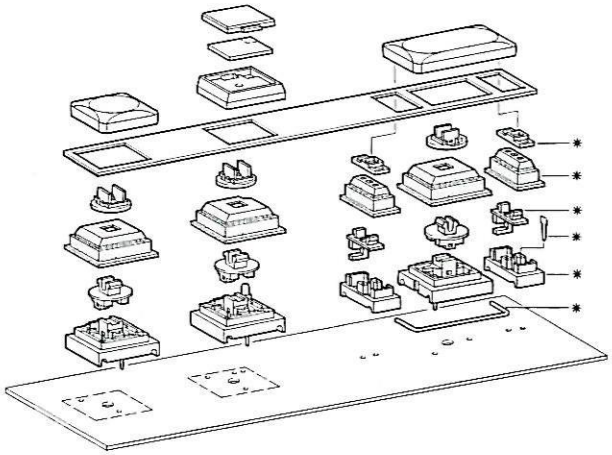
The full-travel keyswitches RS 74 M have a particularly low overall height of only 10.8/11.6 mm with a full travel of 2.5 mm. Any keyboard arrangements are possible due to the modular system in the 3/4" = 19.05 mm grid.

The cross contact (gold)/1 NO-contact used in the momentary/latching keyswitches ensures a high contact reliability and short bouncing times.
The **latching keyswitch** is illuminable.

Design IP 40



Design IP 54

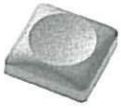


When ordering keycaps ≧ 2-module, the accessories marked with *) are included in the delivery.

Note for IP 54 version: The degree of protection IP 54 is guaranteed by the use of sealing caps (spotted in the drawing). They seal up the contact system between momentary/latching keyswitch and keycap.

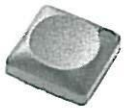
By means of a **support plate** (see "Cut-out – Support Plate") the individual sealing caps are pressed to the keyswitch housing.
The support plate is fixed to the PCB by means of thread studs and spacers (see "Accessories").
For the protection of the sealing caps we recommend the use of covers (see "Accessories") or a covering plate.

Mom./Latching Keyswitches/Keycaps

Momentary keyswitch, non-illuminated	Order no.	Keycap, non-illuminated			Colour no. Keycap (A)
		Order no.			
(1) with increased ESD-strength	3.12961.001	(A) (Legended keycap sets see page 5 – 54) 	1-module	5.82200.000 /colour no.	/0754 light grey /0801 dark grey /0103 black /0305 red (only 1-module) /0406 yellow (only 1-mod.) /0505 green (only 1-mod.) /0602 blue (only 1-mod.)
			1½-module	5.82210.000 /colour no.	
			2-module	5.82570.000 /colour no.	
			3-module	5.82580.000 /colour no.	
			8-module	5.82590.000 /colour no.	

Latching keyswitch, non-illuminated	Order no.				Colour no. Keycap (B)
			Key-cap body	Order no.	
(2)	3.12960.101	(B) Keycap delivered in single parts: Mat lens, legend insert, keycap body	1-module	light grey	5.04665.407 /colour no.
				dark grey	5.04665.408 /colour no.
				black	5.04665.402 /colour no.
			2-module*	light grey	5.04665.447 /colour no.
				dark grey	5.04665.448 /colour no.
				black	5.04665.442 /colour no.

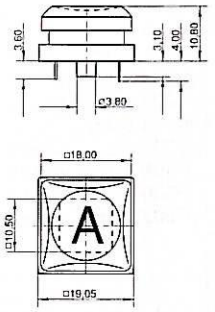
	Lens	Legend insert
/5520	colourless	white
/5570	colourless	light grey
/5580	colourless	dark grey
/5511	colourless	black
/5523	red	white
/5524	yellow	white
/5525	green	white

Latching keyswitch, illuminated	Order no.	Keycap, illuminated			Colour no. Keycap (C)
		Order no.			
(3) with integrated LED, red	3.17960.101	(C) 	1-module	5.82400.000 /colour no.	/0754 light grey /0801 dark grey /0103 black /0305 red /0406 yellow /0505 green /0602 blue

* 2 momentary/latching keyswitches for each keycap

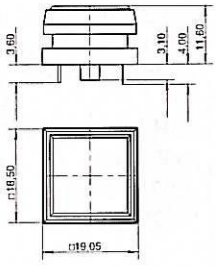
5

(1), (2)



Operating life (1): $\geqq 10^7$ operations
ESD-protection: Cover: PC
ESD-strength: $\leqq$ 12 kV

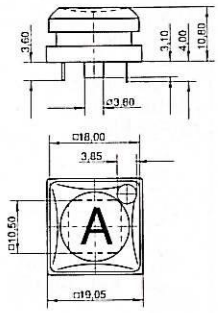
Switching symbol



Operating life (2): $\geqq 10^5$ operations
ESD-strength: $\leqq$ 7 kV

Switching symbol

(3)



Operating life (3): $\geqq 10^5$ operations
ESD-strength: $\leqq$ 4 kV

Illumination with red LED
(other LED colours on request)

Switching symbol

Mechanical construction

Contact system and arrangement:	Cross contact, 1 normally-open contact
Fixing:	By soldering into the PCB
Flammability of plastic materials:	UL 94 HB
Contact material:	Gold-alloy
Terminals:	Soldering terminals, copper-alloy, tin-plated

Mechanical characteristics

Operating force:	0.8 N
Full travel:	2.5 mm
Switching travel:	1.5 ± 0.5 mm
Robustness:	$\geqq$ 100 N

Electrical characteristics

Rated voltage:	2 ... 42 V AC/DC
Rated current:	0.01 ... 100 mA AC/DC
Rated power:	$\leqq$ 1 W
Contact resistance:	$\leqq$ 100 mΩ, when new $\leqq$ 3 Ω after operating life
Insulation resistance:	$\geqq 10^9$ Ω
Bouncing time:	$\leqq$ 5 ms

Further details

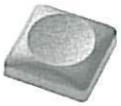
Ambient temp., operating:	– 25 °C ... + 70 °C
Ambient temp., storage:	– 40 °C ... + 80 °C (without packing) – 40 °C ... + 50 °C (with standard packing)

Environment conditions:
- Constant environment: acc. to IEC 68-2-3 and 2-30
- Variable environment: acc. to IEC 68-2-14 and 2-33

Illumination: (3):

LED (characteristics at T = 25 °C)	
Light intensity (I_F = 10 mA):	> 5 mcd
Forward voltage (I_F = 10 mA):	typ. 2.1 V
Forward current:	25 mA max.
Power dissipation:	135 mW max.
Series resistor for 5 V:	180 Ω (approx. 15 mA)

Mom./Latching Keyswitches/Keycaps

Momentary keyswitch non-illuminated	Order no.	Keycap, non-illuminated Order no.			Colour no. Keycap (A)
(1)	3.12961.211	(A) (Legended keycap sets see page 5-54) 	1-module	5.82200.000 /colour no.	/0754 light grey /0801 dark grey /0103 black /0305 red (not for 3- and 8-mod.) /0406 yellow (not for 3- and 8-mod.) /0505 green (not for 3- and 8-mod.) /0602 blue (not for 3- and 8-mod.)
			1½-module	5.82210.000 /colour no.	
			2-module	5.82470.000 /colour no.	
			3-module	5.82480.000 /colour no.	
			8-module	5.82490.000 /colour no.	

Latching keyswitch, non-illuminated	Order no.				Colour no. Keycap (B)	
			Keycap body	Order no.	Lens	Legend insert
(2)	3.12960.311	(B) Keycap delivered in single parts: Mat lens, legend insert, keycap body	1-module light grey	5.04665.407 /colour no.	/5520 colourless	white
			1-module dark grey	5.04665.408 /colour no.	/5570 colourless	light grey
			1-module black	5.04665.402 /colour no.	/5580 colourless	dark grey
			2-module light grey	5.04665.417 /colour no.	/5511 colourless	black
			2-module dark grey	5.04665.418 /colour no.	/5523 red	white
			2-module black	5.04665.412 /colour no.	/5524 yellow	white
					/5525 green	white

Latching keyswitch, illuminated	Order no.	Keycap, illuminated Order no.			Colour no. Keycap (C)
(3)	3.17960.351	(C)	1-module	5.82400.000 /colour no.	/0754 light grey /0801 dark grey /0103 black /0305 red /0406 yellow /0505 green /0602 blue
		or			
		(D) Delivered in single parts		Keycap body / Order no.	Colour no. Keycap (D)
			1-module light grey	5.04665.467 /colour no.	see (2)
			1-module dark grey	5.04665.468 /colour no.	
			1-module black	5.04665.462 /colour no.	

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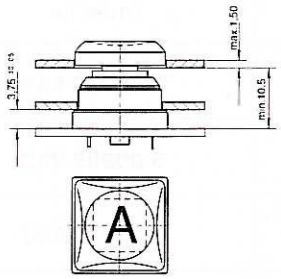
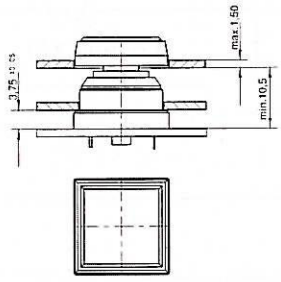
(1), (2), (3)





Operating life (1): ≧ 10^6 operations
ESD-strength: ≦ 10 kV

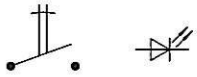
Switching symbol

Operating life (2): ≧ 10^5 operations
ESD-strength: ≦ 10 kV

Switching symbol

Operating life (3): ≧ 10^5 operations
ESD-strength: ≦ 4 kV
Illumination with red LED
(other LED colours on request)

Switching symbol



Mechanical construction

Contact system and arrangement:	Cross contact, 1 normally-open contact
Fixing:	By soldering into the PCB
Flammability of plastic materials:	UL 94 HB
Contact material:	Gold-alloy
Terminals:	Soldering terminals, copper-alloy, tin-plated

Mechanical characteristics

Operating force:	1 N
Full travel:	2.5 mm
Switching travel:	1.5 ± 0.5 mm
Robustness:	≧ 100 N

Electrical characteristics

Rated voltage:	2 ... 42 V AC/DC
Rated current:	0.01 ... 100 mA AC/DC
Rated power:	≦ 1 W
Contact resistance:	≦ 100 mΩ, when new ≦ 3 Ω after operating life
Insulation resistance:	≧ 10^9 Ω
Bouncing time:	≦ 5 ms

Further details

Ambient temp., operating:	– 25 °C ... + 70 °C
Ambient temp., storage:	– 40 °C ... + 80 °C (without packing) – 40 °C ... + 50 °C (with standard packing)

Environment conditions:
- Constant environment: acc. to IEC 68-2-3 and 2-30
- Variable environment: acc. to IEC 68-2-14 and 2-33

Illumination (3):
LED (characteristics at T = 25 °C)

Light intensity (I_F = 10 mA):	> 20 mcd
Forward voltage (I_F = 10 mA):	typ. 2.1 V
Forward current:	25 mA max.
Power dissipation:	135 mW max.
Series resistor for 5 V:	180 Ω (approx. 15 mA)

Keycap Sets

Keycap, non illuminated	Legended keycap sets, two-shot moulded

(1)

A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Keycap	Symbol	Order no.
light grey	black	5.00999.836
dark grey	white	5.00999.837
black	white	5.00999.838

(2)

1	2	3	4	5	6	7	8	9	0

Keycap	Symbol	Order no.
light grey	black	5.00999.839
dark grey	white	5.00999.840
black	white	5.00999.841

Supplement: Keycap, 1-module with dimple
Legending "5" on request

(3)

◊	+	*	–	=	'	←	→	%	×	⅞	·

Keycap	Symbol	Order no.
light grey	black	5.00999.842
dark grey	white	5.00999.843
black	white	5.00999.844

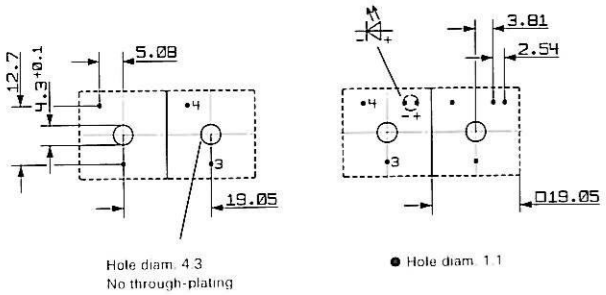
Further keycap sets and single keycaps on request.

5

Circuit Diagrams IP 40 / 54

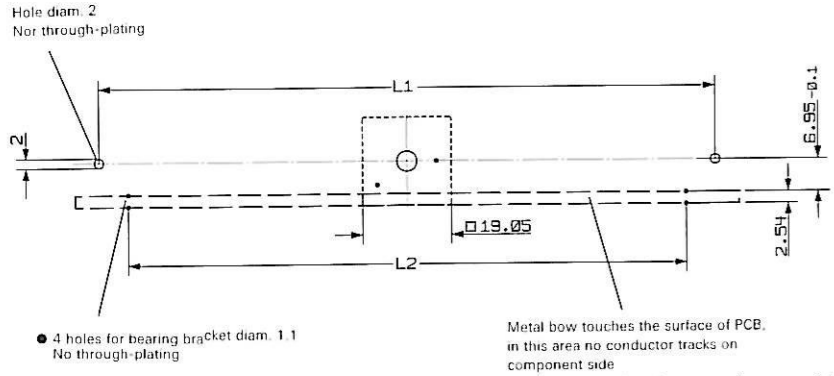
For 1- and 1½-module keycaps and keycap (B) 2-module, IP 40 with 2 momentary/latching keyswitches:

non-illuminated | with LED | View on component side



For 1- and 1½-module keycaps no boreholes are necessary

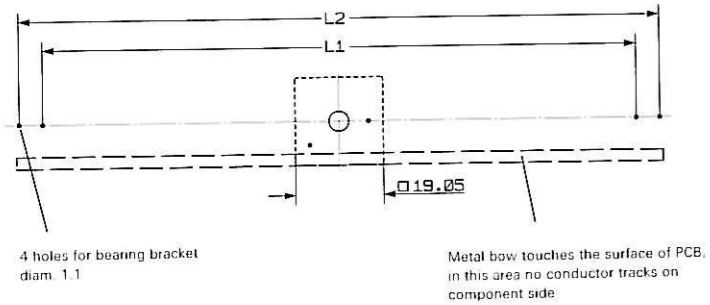
For 2-, 3- and 8-module keycaps IP 40 (keycap (B) 2-module, IP 40 see above):



Keycap	L 1 mm	L 2 mm
2-module	30.48	22.86
3-module	38.10	30.48
8-module	133.35	120.65

In the case of 2-, 3- and 8-module keycaps additional boreholes have to be provided for the accessories

For 2-, 3- and 8-module keycaps IP 54:



Keycap	L 1 mm	L 2 mm
2-module	23.495	33.655
3-module	33.02	43.18
8-module	128.27	138.43

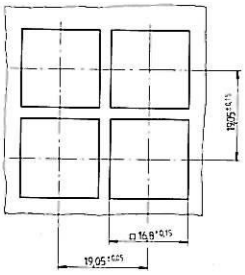
In the case of 2-, 3- and 8-module keycaps additional boreholes have to be provided for the accessories

Important note:

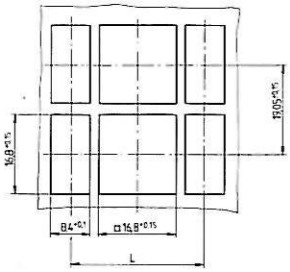
All the circuit diagrams apply to the horizontal position of the keycap symbols. If the symbols are to be rotated by 90 degrees, the keyswitch must be mounted accordingly i. e. rotated by 90 degrees.
For keycaps ≧ 2-module the momentary/latching keyswitch has to be soldered into rotated by 90 degrees, too.

Cut-out – Support Plate IP 54

For 1-module keyswitches



For multi-module keyswitches



Keycap	L ± 0.05
2-module	28.30
3-module	38.10
8-module	133.35

Contents

RS 76 M/C

- RS 76 M: Momentary/latching keyswitches IP 40/65 5 – 78
- RS 76 C: Momentary/latching keyswitches IP 40/65 5 – 80
  - Specific technical data 5 – 82
  - Examples for application 5 – 83
- RS 76 M/C: Dimensional drawings/hole patterns 5 – 84
- Blank keycaps 5 – 86
  - **Non-illuminated** 5 – 86
    - Without legend insert
    - With replaceable legend insert
  - **Illuminated** 5 – 87
    - Without legend insert
    - With replaceable legend insert
  - **With protective collar IP 65,** Illuminated/non-illuminated 5 – 88
- Legended keycaps 5 – 89
- Legended keycap sets 5 – 90
- Accessories 5 – 94

General Information

The full-travel keyswitches RS 76 with an overall height of 15.5/15.9 mm and a full-travel of 4 mm excel by their high degree of operating comfort.
Any key blocks are possible due to the modular system in the 3/4" = 19.05 mm grid.
The momentary/latching keyswitches are available with the degrees of protection IP 40 and IP 65 as well as with two different contact principles:

Mechanical RS 76 M

Momentary keyswitch, non-illuminated: Cross contact
Momentary/latching keyswitch, illuminated: Bridge contact

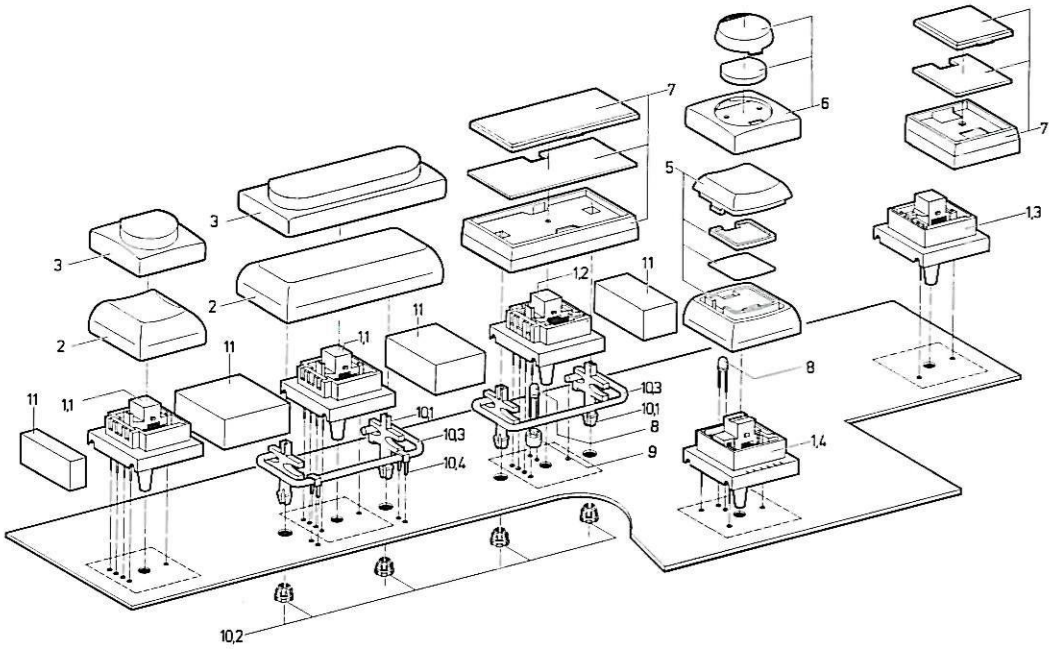
A gold-alloy as contact material together with the construction of the systems provide for a high contact reliability, low contact resistances and short bouncing times.

Contactless RS 76 C

Momentary keyswitch, non-illuminated:
Latching keyswitch, illuminated: Contactless Hall IC

Due to the use of a solid state switch in Hall-IC technology a bounce- and wearfree switching as well as a long operating life are achieved.
Operation: When the keyswitches are actuated, the position of a permanent magnet is altered in relation to the Hall IC, thereby generating an output signal.
The use of these keyswitches is therefore particularly recommended under severe environmental influences and high stress conditions.

Design IP 40



No. Description

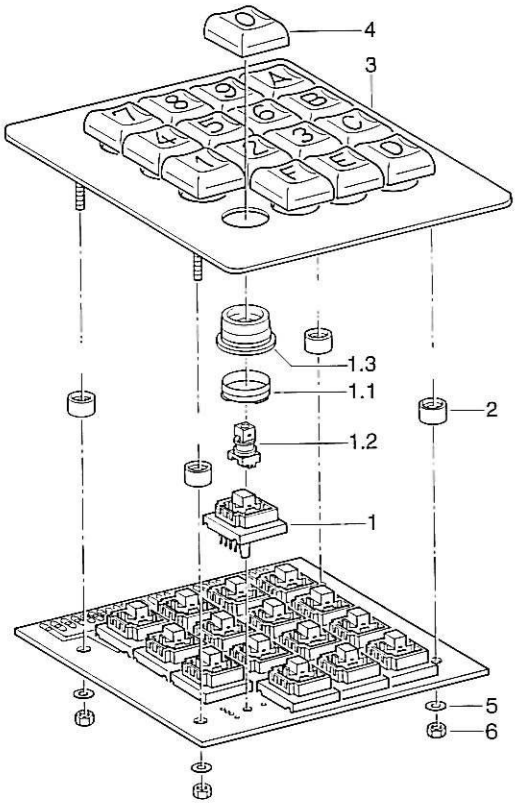
1.1 Momentary keyswitch RS 76 C
1.2 Momentary/latching keyswitch RS 76 C with LED
1.3 Momentary keyswitch RS 76 M
1.4 Momentary/latching keyswitch RS 76 M with LED
2 Keycap, 1- resp. multi-module
3 Keycap with nail protection, 1- resp. multi-module
5 Keycap, illuminated
6 Keycap, illuminated
7 Keycap, illuminated
8 LED
9 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.

Design IP 65

The individual keyswitches are sealed with a sealing cap and a support plate. The support plate can be manufactured either by Rafi or by the customer. For the protection of the sealing caps we recommend the use of covers (see "Accessories") or a covering plate (not shown in the drawing).

The accessories delivered with orders of IP 65 momentary/latching keyswitches as well as the assembly sequence can be seen from the below drawing.



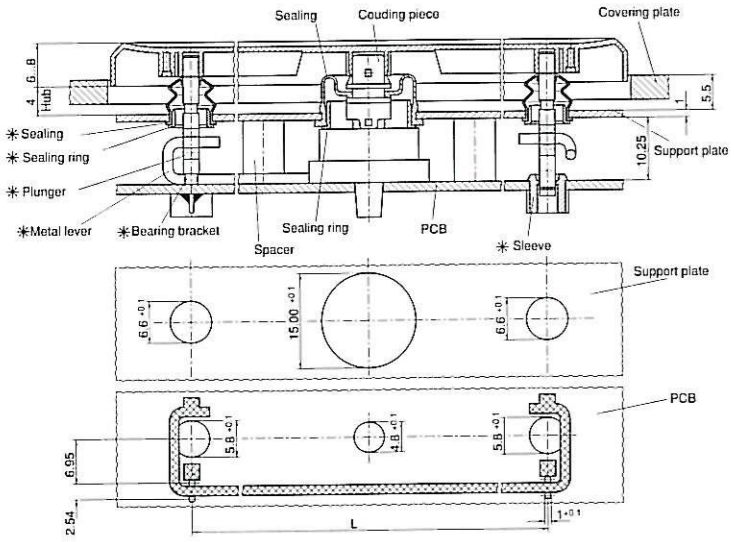
No.	Description
1	Momentary/latching keyswitch RS 76 C
1.1	Sealing ring
1.2	Coupling piece
1.3	Sealing cap
2	Spacer
3	Support plate
4	Keycap
5	Use spring washer
6	Torque for fixing 0.4 . . . 0.6 Nm

The parts 1.1 – 1.3 are included with no. 1 in deliveries of momentary/latching keyswitches IP 65.

Assembly sequence:

- Pre-assemble coupling piece (no. 1.2) and sealing cap (no. 1.3).
- Insert this in support plate (no. 3).
- Insert sealing ring (no. 1.1) from below in the pre-assembled sealing cap.
- Assemble pre-assembled sealing cap with spacers (no. 2) and with PCB completely (coupling piece shall be snapped in).

Multi-module keycap (Example: 8-module)



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

Momentary/Latching Keyswitches

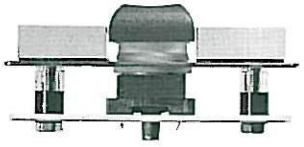
Momentary keyswitch, non-illuminated	Illumination	Order no. IP 40		Order no. IP 65	
		Operating force		Operating force	
		0.9 N	1.4 N*	1.1 N	1.6 N*
(1)	–	3.13002.502	3.13002.512	3.13012.502	3.13012.512
(2) with diode		3.13005.001	3.13005.011	3.13012.001	3.13012.011

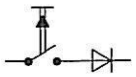
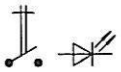
Momentary keyswitch, illuminated	Illumination		Order no. IP 40	
			Operating force	
			1 N	1.4 N*
(3)	LED	–	3.13002.102/0000	3.13002.107/0000
		red**	3.13002.102/1350	3.13002.107/1350
		green**	3.13002.102/1550	3.13002.107/1550
		yellow**	3.13002.102/1450	3.13002.107/1450
Latching key-switch, illumin. (4)	LED	–	3.13002.022/0000	–
		red**	3.13002.022/1350	
		green**	3.13002.022/1550	
		yellow**	3.13002.022/1450	

* Recommended for multi-module keycaps.
** LED included in delivery contents.

(1) – (4): IP 40

Example for keyswitches (1, 2) IP 65:



	Non-illuminated		Illuminated		
	(1) Momentary keyswitch	(2) Mom. keys. with diode	(3) Momentary keyswitch	(4) Latching keyswitch	
					
Mechanical construction					
Contact system and arrangement	Cross contact, 1 NO-contact		Bridge contact, 1 NO-contact		
Fixing	By soldering into the PCB				
Materials	Keycap: ABS, housing: PBTP, actuator: POM				
Flammability of plastic materials	UL 94 HB				
Contact material	Gold alloy				
Terminals	Solder terminals, tin-plated				
Illumination	–		By LED		
Mechanical characteristics					
Max. operating force IP 40 (65) in N	0.9/1.4 (1.1/1.6)		1/1.4		1
Full travel	4 mm				
Switching travel	1.5 – 2.8 mm				
Robustness	≧ 100 N				
Electrical characteristics					
Rated voltage	2 . . . 42 V	3 . . . 42 V	2 . . . 42 V		
Rated current	0.01 . . . 100 mA	0.01 . . . 100 mA	0.01 . . . 100 mA		
Rated power	≦ 1 W				
Contact resistance, when new	≦ 100 mΩ	*	≦ 200 mΩ		
after operating life	≦ 3 Ω	*	≦ 3 Ω		
Insulation resistance	≧ 10^9 Ω				
ESD-strength	≦ 8 kV				
Bouncing time	≦ 5 ms		≦ 10 ms		
LED (characteristics at T = 25 °C)	–		red	green	yellow
– Wavelength	–		635 nm	560 nm	585 nm
– Light intensity (I_F = 10 mA)	–		≧ 15 mcd	≧ 10 mcd	≧ 15 mcd
– Forward voltage (I_F = 10 mA)	–		typ 2.1 V		
– Forward current	–		30 mA max.		
– Power dissipation	–		120 mW max.		
– Series resistor for 5 V**	–		270 Ω (approx. 11 mA)		
Operating life (operations)	≧ 10^7				≧ 10^5
Further details					
Ambient temperature, operating	– 25 °C . . . + 70 °C				
Ambient temperature, storage					
– Without packing	– 40 °C . . . + 80 °C				
– With standard packing	– 40 °C . . . + 50 °C				
Environment conditions	Constant env.: acc. to IEC 68-2-3 and 2-30; Variable env.: acc. to IEC 68-2-14 and 2-33				

* Contact resistance cannot be measured due to integrated LED
** Recommendation

Momentary/Latching Keyswitches

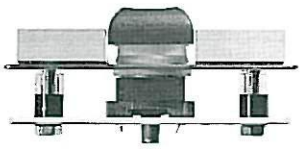
Momentary keyswitch, non-illuminated	Illumination	Order no. IP 40		Order no. IP 65	
		Operating force		Operating force	
		0.7 N	1 N*	1 N	1.3 N*
(1)	–	3.13001.010	3.13001.210	3.13011.010	3.13011.210

Momentary keyswitch, illuminated	Illumination		Order no. IP 40	Order no. IP 65
			Operating force	Operating force
			0.7 N	1.1 N
(2)	LED	–	3.13001.110/0000	3.13011.110/0000
		red**	3.13001.110/1350	3.13011.110/1350
		green**	3.13001.110/1550	3.13011.110/1550
		yellow**	3.13001.110/1450	3.13011.110/1450
Latching keys., illuminated (3)	LED	–	3.13001.130/0000	3.13011.130/0000
		red**	3.13001.130/1350	3.13011.130/1350
		green**	3.13001.130/1550	3.13011.130/1550
		yellow**	3.13001.130/1450	3.13011.130/1450

* Recommended for multi-module keycaps.
** LED and spacer included in delivery contents.

(1) – (3): IP 40

Example for momentary/latching keyswitches IP 65:



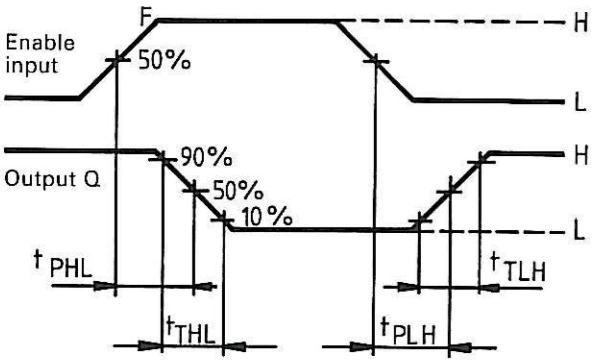
5

	Non-illuminated	Illuminated	
Mechanical construction	(1) Momentary keyswitch	(2) Mom. keyswitch	(3) Latching keysw.
Contactless switching system	Hall IC, 1 enable input, 1 transistor output NPN		
Fixing	By soldering into the PCB		
Materials	Keycap: ABS, housing: PBTP, actuator: POM		
Flammability of plastic materials	UL 94 HB		
Terminals	Solder terminals, tin-plated		
Illumination	–	By LED	
Mechanical characteristics			
Max. operating force IP 40 (65) in N	0.7/1.0 (1.0/1.3)	0.7 (1.0)	
Full travel	4 mm		
Switching travel – on	1.5 . . . 2.8 mm		
– off	0.8 . . . 2.4 mm		
Robustness	≧ 100 N		
Electrical characteristics			
Supply voltage	4.75 . . . 5.25 V = *		
Supply current	≦ 0.5 mA at U_{IL} = 0 V	≦ 5 mA at U_{IH} = + 5 V	
Input voltage (F)	U_{IL} = 0 ≦ 0.4 V	U_{IH} = 2.4 V ≦ 5.25 V	
Output load current (Q)	≦ 16 mA		
Output residual current (Q)	≦ 10 µA		
Output saturation voltage (Q)	≦ 0.4 V (at 16 mA)		
Output switching times (Q)	at T_U = 25 °C	at T_U = 50 °C	at T_U = 70 °C
t_{PHL}	3 µs	7 µs	10 µs
(see pulse diagram) t_{PLH}	4 µs	5 µs	6 µs
t_{THL}	1 µs	1,5 µs	2,5 µs
t_{TLH}	2 µs	2,5 µs	3 µs
ESD-strength	≦ 9 kV	≦ 7 kV	
LED (characteristics at T = 25 °C)	–	red	green	yellow
– Wavelength (approx.)	–	635 nm	560 nm	585 nm
– Light intensity (I_F = 10 mA)	–	≧ 15 mcd	≧ 10 mcd	≧ 15 mcd
– Forward voltage (I_F = 10 mA)	–	typ. 2.1 V		
– Forward current	–	30 mA max.		
– Power dissipation	–	120 mW max.		
– Series resistor for 5 V**	–	270 Ω (approx. 11 mA)		
Operating life (mechanical)	≧ 10^8	≧ 10^8	≧ 10^5	
Reliability of Hall IC	$\lambda = 2.5 \times 10^{-7}\ h^{-1}$ (at T_U = 25 °C)			
Further details				
Ambient temp., operating	0 °C . . . 70 °C			
Ambient temp., storage	Without packing: – 40 °C . . . + 80 °C, with standard packing: – 40 °C . . . + 50 °C			
Environment conditions	Constant env.: acc. to IEC 68-2-3 and 2-30; Variable env.: acc. to IEC 68-2-14 and 2-33			

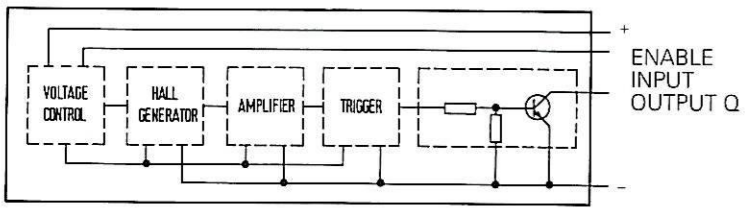
* Other supply voltages on request
** Recommendation

Specific Technical Data

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_{PLH}	4 µs	5 µs	6 µs
Fall/rise time	t_{TLH}	2 µs	2.5 µs	3 µs
	t_{THL}	1 µs	1.5 µs	2.5 µs



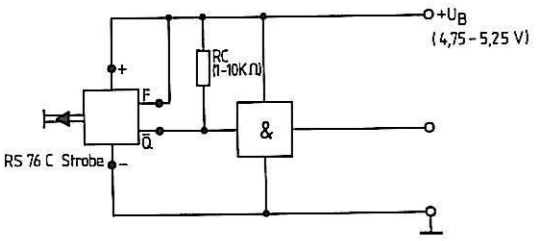
Block diagram
Hall IC



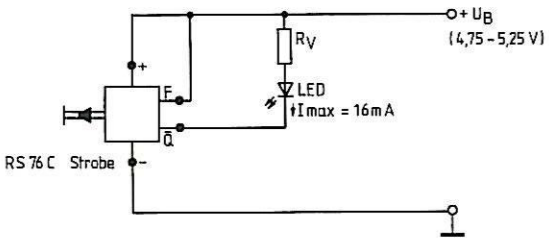
STATIC with ENABLE INPUT

Examples for Application

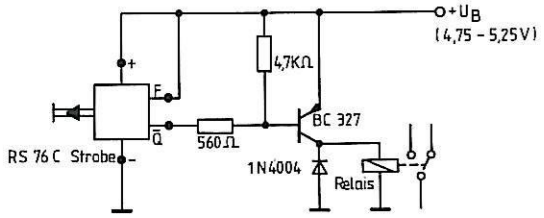
Driving of logic components



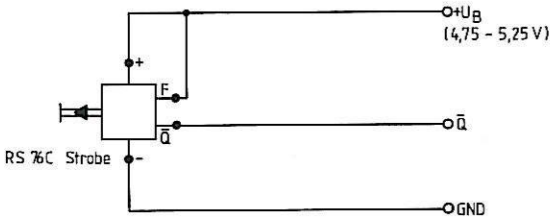
Indication of logical states



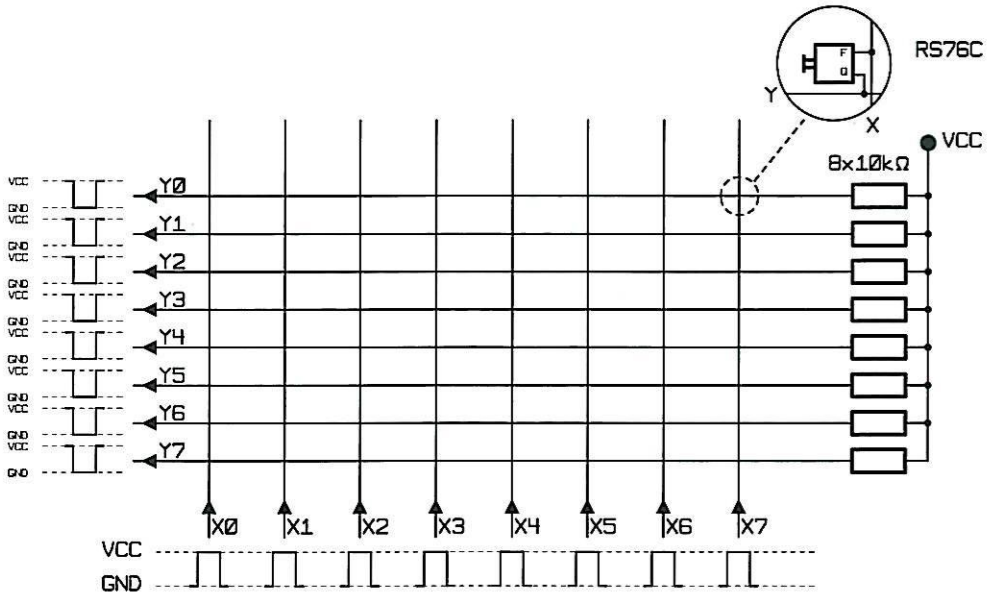
Driving of a PNP transistor



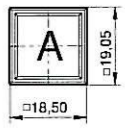
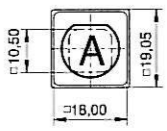
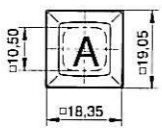
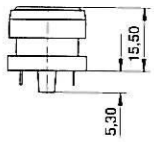
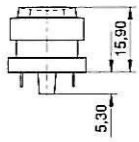
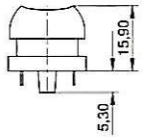
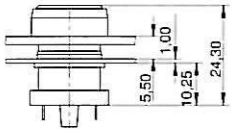
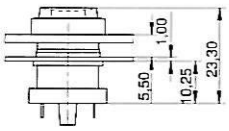
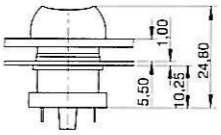
Use as static key with open collector output.
Output transistor (NPN) is conductive when actuated.



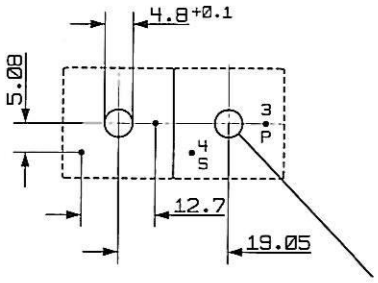
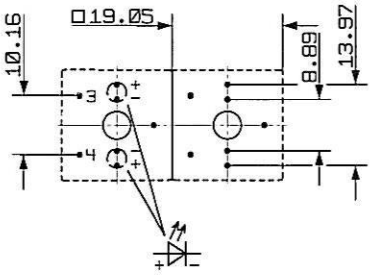
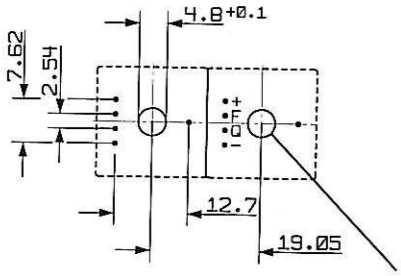
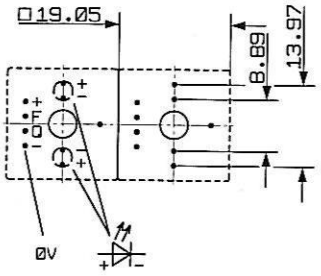
Use in keyboards



Dimensional Drawing

Momentary/ latching keyswitches with keycap			
IP 40			
IP 65			

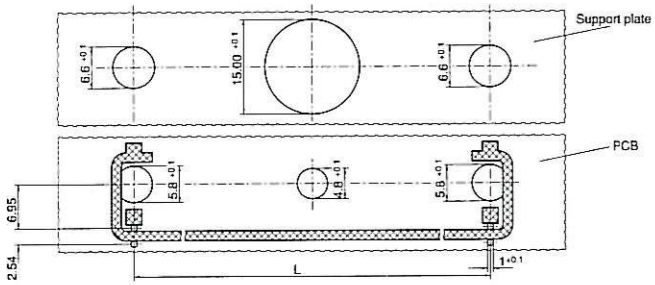
Hole Patterns

	For 1 – 1¾-module keycaps (view on component side)	
	Momentary keyswitch, non-illuminated	Momentary/latching keyswitch, illuminated
RS 76 M	 ● Boreholes ø 1.1 Borehole ø 4.8 no through-plating	 ● Boreholes ø 1.1
RS 76 C	 ● Boreholes ø 1.1 Borehole ø 4.8 no through-plating	 ● Boreholes ø 1.1

The hole patterns apply to the horizontal position of the keycaps only. Should they be in a vertical position, the momentary/latching keyswitches must be mounted accordingly, i. e. rotated by 90°.

Hole Patterns

The hole patterns apply to the horizontal position of the keycaps only. Should they be in a vertical position, the momentary/latching keyswitches must be mounted accordingly, i. e. rotated by 90°.

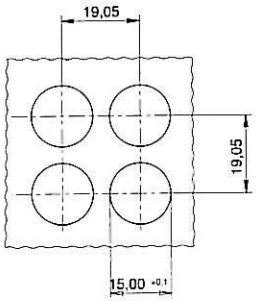
	For 2-, 3- and 8-module keycaps (view on component side)
RS 76 M/C	 Borehole for sleeve ø 5.8, in the area of ø 7 no conductor track and through-plating PCB ● 4 boreholes for bearing bracket ø 1.1, no through-plating Metal bow touches the surface of PCB, in this area no conductor track on component side

Keycap	L mm
2-module	25.40
3-module	30.48
8-module	125.73

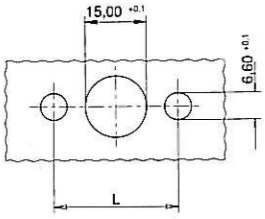
Important note: In the case of 2-, 3- and 8-module keycaps, additional holes must be provided for the accessories.
In the case of keycaps < 2-module, neither accessories nor holes are required.

Support Plates IP 65

1 – 1¾-module



2-, 3- and 8-module



Keycap	L mm
2-module	25.40
3-module	30.48
8-module	125.73

Keycaps, non-illuminated

Keycap, without legend insert	Degree of protection	Order no. 5.82––0.000/colour no.									Colour no. Keycap
		1-module	1¼-module	1½-module	1¾-module	2-module	3-module	L-shape key*	8-module	2-module vertical	
(1) (1-module)	IP 40	–00	–07	–01	–08	–70	–71	–72	–73	–74	/0710 light beige /0242 light grey /0801 dark grey /0152 charcoal grey **only 1-module** /0406 yellow /0505 green /0602 blue /0305 red
	IP 65					–75	–76	–77	–78	–79	
(2) (1-module)	Degree of protection	Order no. 5.80––0.000/colour no.									
		1-module	1¼-module	1½-module	1¾-module	2-module	3-module	L-shape key*	8-module	2-module vertical	
	IP 40	–00	–07	–01	–08	–70	–71	–72	–73	–74	
	IP 65					–75	–76	–77	–78	–79	

From keycaps (1) and (2) keycap sets, two-shot moulded are available (see RS 76 M/C "Keycap Sets").
Ordering example for (1): Keycap without legend insert IP 65, 1-module, light grey, order no. 5.82000.000/0242
In the case of keycaps ≥ 2-module, the necessary accessories are included in the delivery.

* Size of L-shape key, see "Keycap Sets" – Keycap Set "International"

Keycap, with replaceable legend insert	Degree of protection	Colour keycap body	Order no. 5.04665.––– /colour no.				Colour no. Keycap		
			1-module	1½-module	2-module	3-module		Lens	Legend insert
(3) (1-module)	IP 40	light beige	.222	.242	.262	.272	/5520	colourless	white
		dark grey	.228	.248	.268	.278	/5572	colourless	light beige
		charcoal grey	.221	.241	.261	.271	/5580	colourless	dark grey
		light grey	.230	.250	.270	.280	/5510	colourless	charcoal grey
	IP 65	light beige	.222	.242	.662	.682	/5522	colourless	light grey
		dark grey	.228	.248	.668	.688	/5523	red	white
		charcoal grey	.221	.241	.661	.681	/5524	yellow	white
		light grey	.230	.250	.669	.689	/5525	green	white

With order no. following **single parts** are delivered: lens mat, legend insert, keycap body as well as with keycaps ≥ 2-module the necessary accessories.

Keycaps, illuminated

Keycap, without legend insert	Order no. 1-module	Colour no.	
(1)	5.82110.000/colour no.	/0801 dark grey /0152 charcoal grey /0710 light beige /0242 light grey	LED light bar is colourless transparent.

Keycap, with replaceable legend insert	Degree of protection	Colour Keycap body	Order no. 5.04665.--- /colour no. 1-module	1½-module	1¾-module	Colour no. Keycap
(2) (1½-module)	IP 40/65	light beige	.522	.542	.552	
		dark grey	.528	.548	.558	
		charcoal grey	.521	.541	.551	
		light grey	.530	.550	.560	

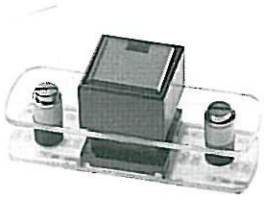
(3)	Degree of protection	Colour Keycap body	Order no. 5.04665.--- /colour no. 1-module	1½-module	Colour no. Keycap
(1-module)	IP 40/65	light beige	.912	.932	
		dark grey	.918	.938	
		charcoal grey	.911	.931	
		light grey	.920	.940	

(4)	Degree or protection	Colour Keycap body	Order no. 5.04665.--- /colour no. 1-module	1½-module	2-module	3-module	Colour no. Keycap
(1½-module)	IP 40	light beige	.162	.182	.202	.212	
		dark grey	.168	.188	.208	.218	
		charcoal grey	.161	.181	.201	.211	
		light grey	.170	.190	.210	.220	
	IP 65	light beige	.162	.182	.672	.692	
		dark grey	.168	.188	.678	.698	
		charcoal grey	.161	.181	.671	.691	
		light grey	.170	.190	.679	.699	

(2) – (4)	Lens	Legend insert
/5520	colourless	white
/5572	colourless	light beige
/5580	colourless	dark grey
/5510	colourless	charcoal grey
/5522	colourless	light grey
/5523	red	white
/5524	yellow	white
/5525	green	white

With order no. following **single parts** are delivered:
(2) and (4):
Mat lens, legend insert, diffuser foil, keycap body. When assembling, ensure that the shiny side of the diffuser foil lies on the keycap body.
(4): Keycaps ≧ 2-module, necessary accessories are included.
(3): Mat lens, legend insert, keycap body.

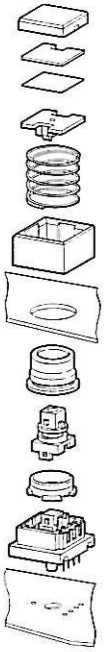
Keycaps with Protective Collar IP 65

Keycap, complete	Version	Order no.	Colour no. Protective collar
	illuminated	5.04665.991 /colour no.	/0710 light beige /0801 dark grey /0152 charcoal grey /0242 light grey
consisting of: - colourless lens - white legend insert - diffuser foil (only with illuminated version)* - keycap body - actuator spring - protective collar (delivered in single parts)	non-illuminated	5.04665.992 /colour no.	

The Rafi keycaps with protective collars provide protection against accidental actuation according to the requirements of the trading associations. These keycaps may be mounted anywhere on the keyboard (3/4" grid = 19.05 mm).

* When assembling, ensure that the shiny side of the diffuser foil lies on the keycap body.

Construction:



Keycap, complete
illuminated
non-illuminated

Actuator spring

Protective collar

Support plate

Sealing cap

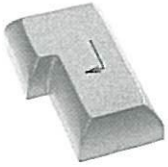
Coupling piece

Sealing ring

Momentary/latching keyswitch IP 65
(Order no. see "Momentary/Latching keyswitches RS 76 M/C")

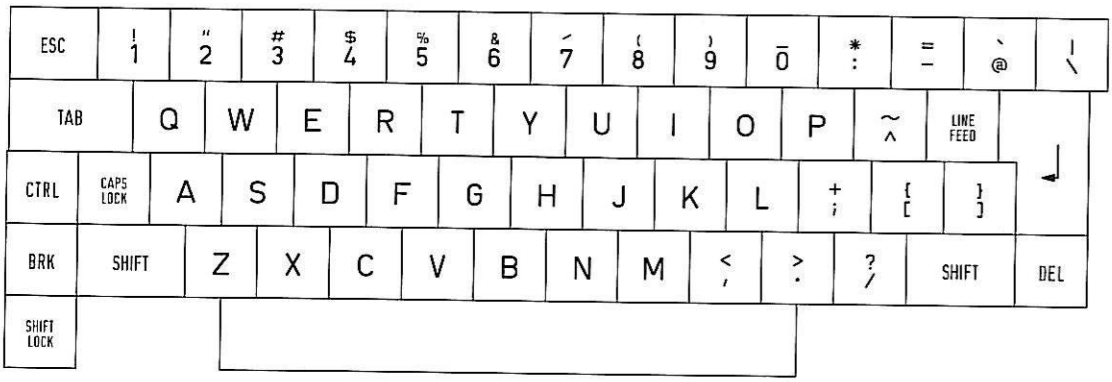
PCB

Legended Keycaps, two-shot moulded

Keycaps, opaque, with nail protection	Order no. IP 40/IP 65	Keycaps, opaque	Order no. IP 40/IP 65
1 ¼-module	5.80071.184/colour no.	1 ¼-module	5.82071.184/colour no.
1 ½-module	5.80010.801/colour no.	1 ½-module	5.82010.801/colour no.
1 ¾-module	5.80080.502/colour no.	1 ¾-module	5.82080.502/colour no.
1 ¾-module	5.80083.703/colour no.	1 ¾-module	5.82083.703/colour no.
2-module	IP 40: 5.80700.036/colour no. IP 65: 5.80750.036/colour no.	2-module	IP 40: 5.82700.036/colour no. IP 65: 5.82750.036/colour no.
2-module	IP 40: 5.80747.290/colour no. IP 65: 5.80797.290/colour no.	2-module	IP 40: 5.82747.290/colour no. IP 65: 5.82797.290/colour no.
L-shape key	IP 40: 5.80721.578/colour no. IP 65: 5.80771.578/colour no.	 L-shape key	IP 40: 5.82721.578/colour no. IP 65: 5.82771.578/colour no.

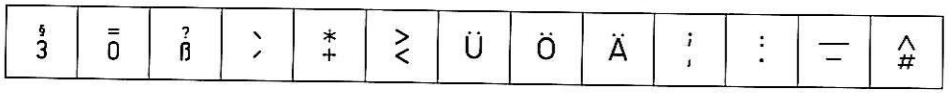
Colour no.					
	Keycap	light beige	dark grey	charcoal grey	light grey
	Symbol	brown	white	white	black
	Reference code	/9740	/9820	/9121	/9216

Legended Keycap Sets, two-shot moulded



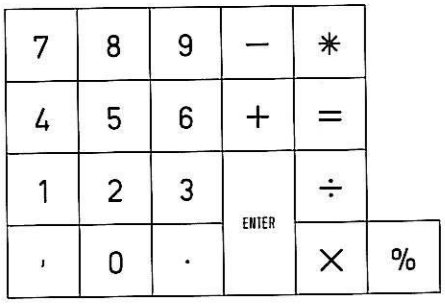
Keycap set, International	Degree of protection*	Colour	Order no.			
		Keycap	light beige	dark grey	charcoal grey	light grey
		Symbol	brown	white	white	black
(1)	IP 40		5.00999.382	5.00999.396	5.00999.408	5.00999.800
	IP 65		5.00999.802	5.00999.803	5.00999.804	5.00999.805
(2)	IP 40		5.00999.372	5.00999.390	5.00999.402	5.00999.801
	IP 65		5.00999.806	5.00999.807	5.00999.808	5.00999.809

For keycaps ≧ 2-module the necessary accessories are included.
* The keys "CAPS LOCK" and "SHIFT LOCK" are illuminated with RS 76 M IP 40 version and not illuminated with RS 76 M IP 65 version.



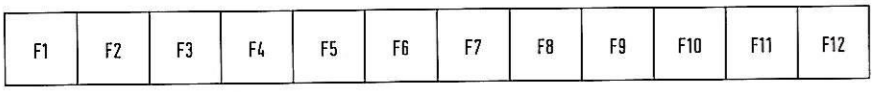
Keycap set, German	Degree of protection	Colour	Order no.			
		Keycap	light beige	dark grey	charcoal grey	light grey
		Symbol	brown	white	white	black
(1)	IP 40/65		5.00999.384	5.00999.398	5.00999.410	5.00999.845
(2)			5.00999.374	5.00999.392	5.00999.404	5.00999.846

Legended Keycap Sets, two-shot moulded



Keycap set Numerical key block	Degree of protection	Colour	Order no.			
		Keycap	light beige	dark grey	charcoal grey	light grey
		Symbol	brown	white	white	black
(1)	IP 40		5.00999.387	5.00999.401	5.00999.413	5.00999.812
	IP 65		5.00999.814	5.00999.815	5.00999.816	5.00999.817
(2)	IP 40		5.00999.377	5.00999.395	5.00999.407	5.00999.813
	IP 65		5.00999.818	5.00999.819	5.00999.820	5.00999.821

For keycaps ≥ 2-module the necessary accessories are included.



Keycap set Function key block	Degree of protection	Colour	Order no.			
		Keycap	light beige	dark grey	charcoal grey	light grey
		Symbol	brown	white	white	black
(1)	IP 40/65		5.00999.522	5.00999.523	5.00999.521	5.00999.822
(2)			5.00999.547	5.00999.548	5.00999.546	5.00999.823

Legended Keycap Sets, two-shot moulded

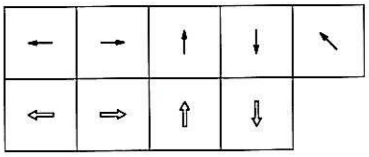
A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Keycap set A – Z	Degree of protection	Colour	Order no.			
		Keycap	light beige	dark grey	charcoal grey	light grey
		Symbol	brown	white	white	black
(1)	IP 40/65		5.00999.501	5.00999.502	5.00999.500	5.00999.824
(2)			5.00999.526	5.00999.527	5.00999.525	5.00999.825

1	2	3	4	5	6	7	8	9	0

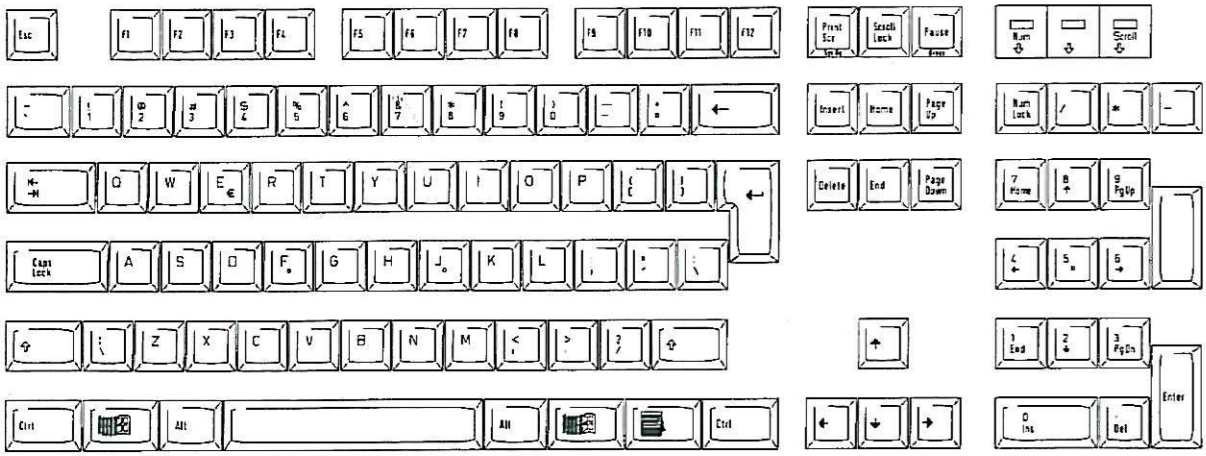
Keycap set 0 – 9	Degree of protection	Colour	Order no.			
		Keycap	light beige	dark grey	charcoal grey	light grey
		Symbol	brown	white	white	black
(1)	IP 40/65		5.00999.505	5.00999.506	5.00999.504	5.00999.826
(2)			5.00999.530	5.00999.531	5.00999.529	5.00999.827

Legended Keycap Sets, two-shot moulded



Keycap set Cursor	Degree of protection	Colour	Order no.			
		Keycap	light beige	dark grey	charcoal grey	light grey
		Symbol	brown	white	white	black
(1)	IP 40/65		5.00999.828	5.00999.829	5.00999.830	5.00999.831
(2)			5.00999.832	5.00999.833	5.00999.834	5.00999.835

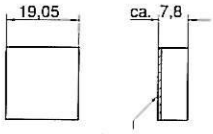
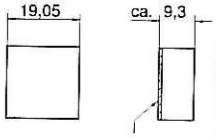
MF 2 Keycap set with Windows keys and Euro-Symbol	Degree of protection	Keycap set	Order no.	
(3)	IP 40	International	5.00999.890	The colour of the keycaps for the alphabetic and numeric key blocks is lighter than the colour of the function keys. The necessary accessories for keycaps bigger than 1¾ units are included. The keycap set also includes three LED indicator fields with green LEDs (Num, ⇳, Scroll). Photo of German layout see page 5 – 65.
		German	5.00999.891	

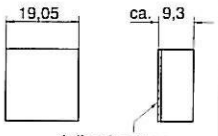


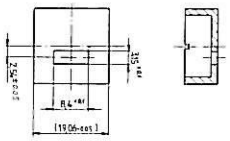
International Layout

Other keycap sets as well as individual keycaps on request.

Covers for Keyboard Systems

RS 74 M (IP 40)	Dimensional drawing	Order no. 5.04520.---				Colour no.
		¼-module	½-module	¾-module	1-module	
(1) (¼-module)	1-module 	.181 /colour no.	.182 /colour no.	.183 /colour no.	.184 /colour no.	/0754 light grey /0801 dark grey /0103 black
RS 74 M (IP 54)	1-module					
(2) (½-module)		.171 /colour no.	.172 /colour no.	.173 /colour no.	.174 /colour no.	

RS 76 M/C (IP 40)	Dimensional drawing	Order no. 5.04520.---				Colour no.
		¼-module	½-module	¾-module	1-module	
(3) (¾-module)	1-module 	.171 /colour no.	.172 /colour no.	.173 /colour no.	.174 /colour no.	/0801 dark grey /0152 charcoal grey /0710 light beige /0242 light grey

RS 76 M/C (IP 40) with LED	Hole pattern PCB	Order no. (1-module, colour: light beige)
(4) 		5.04520.268 (LED red) 5.04520.269 (LED green)

5

Keycap Extractor

Keycap extractor	Order no.
(1)	5.05800.014

Spacers

For support plate RS 74 M – IP 54	Order no.	Length	For support plate RS 76 – IP 65	Order no.	Length
(2)	5.30109.006	3.8 mm	(3)	5.30759.044	10.25 mm

Snap-in Lenses – RS 76 IP 40

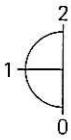
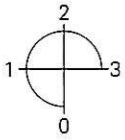
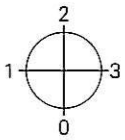
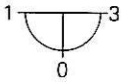
Snap-in lens, 1-module, non-illuminated	Frame colour	Order no. 5.04665.---	Colour no.
(4)	light beige	.302 /colour no.	
	dark grey	.308 /colour no.	
	charcoal grey	.301 /colour no.	
	light grey	.310 /colour no.	
Snap-in lens, 1-module, illuminated	**Frame colour**	**Order no. 5.04665.---**	
(5)	light beige	.312 /colour no.	
	dark grey	.318 /colour no.	
	charcoal grey	.311 /colour no.	
	light grey	.320 /colour no.	

	Lens	Legend insert
/5520	colourless	white
/5572	colourless	light beige
/5580	colourless	dark grey
/5510	colourless	charcoal grey
/5522	colourless	light grey
/5523	red	white
/5524	yellow	white
/5525	green	white

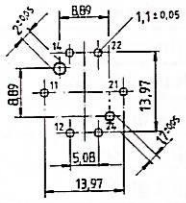
The snap-in lenses have the same external dimensions as a 1-module cover.
The circuit diagram of an illuminated RS 76 M or an illuminated RS 76 C keyswitch must be provided on the PCB. The snap-in lens is engaged in the 4.8 mm hole.

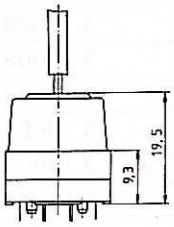
Following single parts are delivered:
(4): Mat lens, legend insert, frame
(5): Mat lens, legend insert, diffuser foil, frame

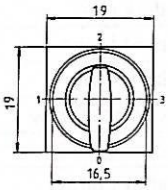
Keylock Switches IP 54

Keylock switch	Rotating angle	Key removal position	Colour	Order no.	Accessory key
	1 x 90° latching with stop	0	charcoal grey	3.13026.001	5.58007.001
			dark grey	3.13026.201	
			light beige	3.13026.401	
			light grey	3.13026.501	
		0 + 1	charcoal grey	3.13026.006	
			dark grey	3.13026.206	
			light beige	3.13026.406	
			light grey	3.13026.506	
	 2 x 90° latching with stop	0	charcoal grey	3.13026.011	5.58008.001
			dark grey	3.13026.211	
			light beige	3.13026.411	
			light grey	3.13026.511	
		0 + 1 + 2	charcoal grey	3.13026.016	
			dark grey	3.13026.216	
			light beige	3.13026.416	
			light grey	3.13026.516	
	 3 x 90° latching with stop	0	charcoal grey	3.13026.021	5.58009.001
			dark grey	3.13026.221	
			light beige	3.13026.421	
			light grey	3.13026.521	
		0 + 1 + 2 + 3	charcoal grey	3.13026.026	
			dark grey	3.13026.226	
			light beige	3.13026.426	
			light grey	3.13026.526	
	 4 x 90° latching without stop	0	charcoal grey	3.13026.031	5.58010.001
			dark grey	3.13026.231	
			light beige	3.13026.431	
			light grey	3.13026.531	
		0 + 1 + 2 + 3	charcoal grey	3.13026.036	
			dark grey	3.13026.236	
			light beige	3.13026.436	
			light grey	3.13026.536	
	 2 x 90° latching with stop	0	charcoal grey	3.13026.601	5.58008.001
			dark grey	3.13026.701	
			light beige	3.13026.801	
			light grey	3.13026.851	
		0 + 1 + 3	charcoal grey	3.13026.606	
			dark grey	3.13026.706	
			light beige	3.13026.806	
			light grey	3.13026.856	
	1 x 40° momentary	0	charcoal grey	3.13026.041	5.58007.001
			dark grey	3.13026.241	
			light beige	3.13026.441	
			light grey	3.13026.541	
Accessories: Round ring 5.30120.015; Adapter for 90° assembly 5.00642.008	2 x 40° momentary	a	charcoal grey	3.13026.611	
			dark grey	3.13026.711	
			light beige	3.13026.811	
			light grey	3.13026.861	

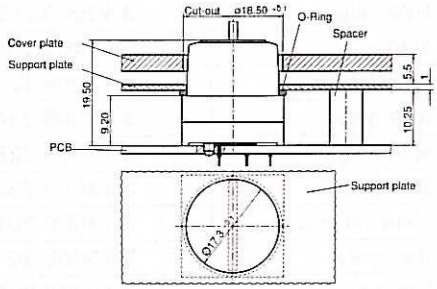
Hole pattern PCB
Component side







Front-panel mounting



Position	Contact function
0	11 – 12, 14 / 21 – 22, 24
1	11 – 12, 14 / 21 – 22, 24
2	11 – 12, 14 / 21 – 22, 24
3	11 – 12, 14 / 21 – 22, 24
a	11 – 12, 14 / 21 – 22, 24
b	11 – 12, 14 / 21 – 22, 24
c	11 – 12, 14 / 21 – 22, 24

Standard locking position of the keylock switch is 001.
Other locking positions on request.
Two keys are included in the delivery contents.

Mechanical construction

Contact system and arrangement:	Cross contact, self-cleaning
Fixing:	By soldering into the PCB
Flammability of plastic materials:	UL 94 HB
Contact material:	Gold alloy
Terminals:	0.5 x 0.7 and 0.15 x 0.7, tin-plated

Lock characteristics

Wafers:	5
Number of locking positions:	500
Main key:	Yes
Group key:	Yes
General key:	Yes
Symmetric key:	No

Mechanical characteristics

Switching positions:	4 max. (90° latching)
Key removal positions:	4 max.
Actuating torque:	0.04 ... 0.10 Nm
Robustness:	≧ 2 Nm

Electrical characteristics

Rated voltage:	42 V max.
Rated current:	100 mA max.
Rated power:	≦ 1 W
Contact resistance:	≦ 100 mΩ, when new ≦ 200 mΩ, after operating life
Insulation resistance:	$> 10^9$ Ω
ESD-strength:	≦ 8 KV
Dielectric strength:	> 500 V AC

Operating life: ≧ 5×10^4 operations

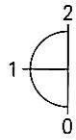
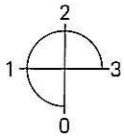
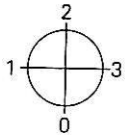
Further details

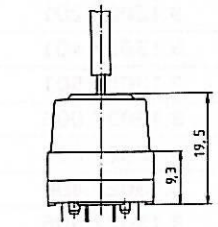
Ambient temp., operating:	– 25 °C ... + 70 °C
Ambient temp., storage:	– 40 °C ... + 80 °C

Environment conditions:
- Constant environment: acc. to IEC 68-2-3 and 2-30
- Variable environment: acc. to IEC 68-2-14 and 2-33

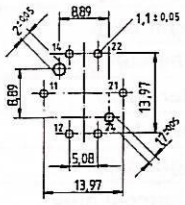
Degree of protection: IP 54 according to DIN

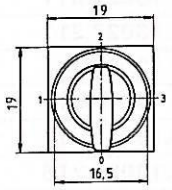
Keylock Switches IP 54

Keylock switch	Rotating angle	Key removal position	Colour	Order no.
	1 x 90° latching with stop	0	charcoal grey	3.13009.001
			dark grey	3.13009.004
			light beige	3.13009.005
			light grey	3.13009.006
		0 + 1	charcoal grey	3.13009.031
			dark grey	3.13009.034
			light beige	3.13009.035
			light grey	3.13009.036
	 2 x 90° latching with stop	0 + 2	charcoal grey	3.13009.101
			dark grey	3.13009.104
			light beige	3.13009.105
			light grey	3.13009.106
		0 + 1 + 2	charcoal grey	3.13009.131
			dark grey	3.13009.134
			light beige	3.13009.135
			light grey	3.13009.136
	 3 x 90° latching with stop	0 + 2	charcoal grey	3.13009.201
			dark grey	3.13009.204
			light beige	3.13009.205
			light grey	3.13009.206
		0 + 1 + 2 + 3	charcoal grey	3.13009.231
			dark grey	3.13009.234
			light beige	3.13009.235
			light grey	3.13009.236
Accessories: Round ring 5.30120.015 Adapter for 90° assembly 5.00642.008 Key 5.58006.801	 4 x 90° latching without stop	0 + 2	charcoal grey	3.13009.301
			dark grey	3.13009.304
			light beige	3.13009.305
			light grey	3.13009.306
		0 + 1 + 2 + 3	charcoal grey	3.13009.331
			dark grey	3.13009.334
			light beige	3.13009.335
			light grey	3.13009.336

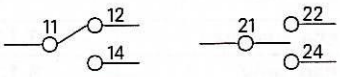
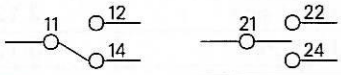
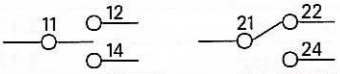
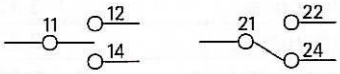


Hole pattern PCB
Component side





Front-panel mounting see page 5 – 97

Position	Contact function
0	
1	
2	
3	

Standard locking position of this extremely low-cost keylock switch is 801, other locking positions on request.
Two keys are included in the delivery contents.

Mechanical construction

Contact system and arrangement:	Cross contact, self-cleaning
Fixing:	By soldering into the PCB
Flammability of plastic materials:	UL 94 HB
Contact material:	Gold alloy
Terminals:	0.5 x 0.7 and 0.15 x 0.7, tin-plated

Lock characteristics

Wafers:	5
Number of locking positions:	50
Main key:	No
Group key:	No
General key:	No
Symmetric key:	Yes

Mechanical characteristics

Switching positions:	4 max. (90° latching)
Key removal positions:	4 max.
Actuating torque:	0.04 . . . 0.10 Nm
Robustness:	≧ 2 Nm

Electrical characteristics

Rated voltage:	42 V max.
Rated current:	100 mA max.
Rated power:	≦ 1 W
Contact resistance:	≦ 100 mΩ, when new ≦ 200 mΩ, after operating life
Insulation resistance:	> 10^9 Ω
ESD-strength:	8 KV
Dielectric strength:	> 500 V AC
Operating life:	≧ 5 x 10^4 operations

Further details

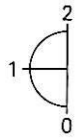
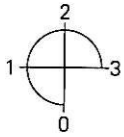
Ambient temp., operating:	– 25 °C . . . + 70 °C
Ambient temp., storage:	– 40 °C . . . + 80 °C

Environment conditions:
- Constant environment: acc. to IEC 68-2-3 and 2-30
- Variable environment: acc. to IEC 68-2-14 and 2-33

Degree of protection:	IP 54 according to DIN

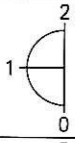
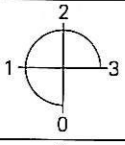
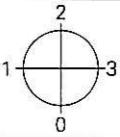
PCB Keyswitches – Supplements

Priority Keylock Switches IP 54

Priority keylock switch	Rotating angle	Key removal position	Colour	Order no.
(1)	 2 x 90° latching with stop	* 0	charcoal grey	3.13027.001
			dark grey	3.13027.201
			light beige	3.13027.401
			light grey	3.13027.501
		* 0 + 1 + 2	charcoal grey	3.13027.006
			dark grey	3.13027.206
			light beige	3.13027.406
			light grey	3.13027.506
	 3 x 90° latching with stop	** 0	charcoal grey	3.13027.011
			dark grey	3.13027.211
			light beige	3.13027.411
			light grey	3.13027.511
		** 0 + 1 + 2 + 3	charcoal grey	3.13027.016
			dark grey	3.13027.216
			light beige	3.13027.416
			light grey	3.13027.516

Accessories:
Round ring 5.30120.015
Adapter for 90° assembly 5.00642.008
Key set *5.58099.012
**5.58099.013

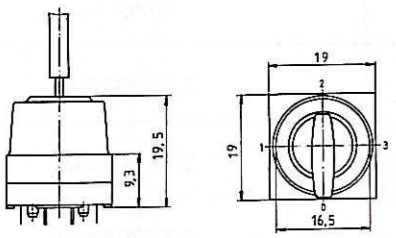
Rotary Switches IP 40

Rotary switch	Rotating angle	Colour	Order no.
(2)	1 x 90° with stop	charcoal grey	3.13007.001
		dark grey	3.13007.201
		light beige	3.13007.401
		light grey	3.13007.501
	 2 x 90° with stop	charcoal grey	3.13007.011
		dark grey	3.13007.211
		light beige	3.13007.411
		light grey	3.13007.511
	 3 x 90° with stop	charcoal grey	3.13007.021
		dark grey	3.13007.221
		light beige	3.13007.421
		light grey	3.13007.521
	 4 x 90° without stop	charcoal grey	3.13007.031
		dark grey	3.13007.231
		light beige	3.13007.431
		light grey	3.13007.531

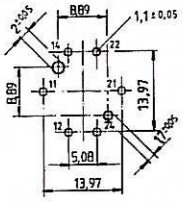
Accessories:
Adapter for 90° assembly 5.00642.008

5

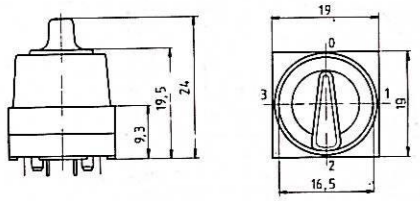
(1)



Hole pattern PCB (1), (2)
Component side



(2)



Position	Contact function
0	11 – 12, 14 / 21 – 22, 24
1	11 – 12, 14 / 21 – 22, 24
2	11 – 12, 14 / 21 – 22, 24
3	11 – 12, 14 / 21 – 22, 24

Standard locking position of the priority keylock switch (1) is 001, other locking positions on request.
Depending on the rotating angle 2 or 3 different keys are required. Two sets of keys are included in the delivery contents.
Functioning: Key 1 can be switched till position 1, key 2 till position 1 and 2, etc.

Mechanical construction

Contact system and arrangement:	Cross contact, self-cleaning
Fixing:	By soldering into the PCB
Flammability of plastic materials:	UL 94 HB
Contact material:	Gold alloy
Terminals:	0.5 x 0.7 and 0.15 x 0.7, tin-plated

Lock characteristics (1):

Wafers:	5
Number of locking positions:	500
Main key:	Yes
Group key:	Yes
General key:	Yes
Symmetric key:	No

Mechanical characteristics

Switching positions:	4 max.
Key removal positions (1):	4 max. (90° latching)
Actuating torque:	0.04 . . . 0.10 Nm
Robustness (1):	≧ 2 Nm
Torque till stop (2):	> 0.45 Nm

Electrical characteristics

Rated voltage:	42 V max.
Rated current:	100 mA max.
Rated power:	≦ 1 W
Contact resistance:	≦ 100 mΩ, when new ≦ 200 mΩ, after operating life
Insulation resistance:	> 10^9 Ω
ESD-strength:	≦ 8 KV
Dielectric strength (1):	> 500 V AC

Operating life: (1): 5 x 10^4 operations
(2): 1 x 10^4 operations

Further details

Ambient temp., operating:	– 25 °C . . . + 70 °C
Ambient temp., storage:	– 40 °C . . . + 80 °C

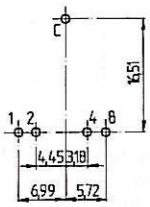
Environment conditions:
- Constant environment: acc. to IEC 68-2-3 and 2-30
- Variable environment: acc. to IEC 68-2-14 and 2-33

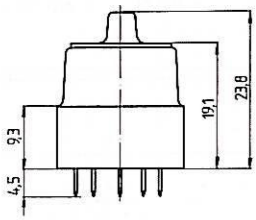
Degree of protection: (1) IP 54 according to DIN
(2) IP 40 according to DIN

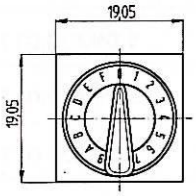
Code Switches IP 40

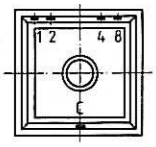
Code switch	Colour	Order no.
	charcoal grey	3.13008.001
	dark grey	3.13008.201
	light beige	3.13008.401
	light grey	3.13008.501

Hole pattern for terminals in PCB – component side









Mechanical construction

Contact system:	Self-cleaning sliding contacts on PCB
Fixing:	By soldering into the PCB
Flammability of plastic materials:	UL 94 HB
Contact material:	Gold alloy
Terminals:	Tin-plated

Mechanical characteristics

Torque for actuation:	< 0.03 Nm
Latching positions:	16 x 22.5°

Electrical characteristics

Rated voltage:	2 ... 42 V
Rated current:	0.01 ... 100 mA
Rated power:	1 W max.
Contact resistance:	≦ 100 mΩ, when new ≦ 200 mΩ, after operating life
Insulation resistance:	> 10^{11} Ω
ESD-strength:	≦ 10 KV
Coding of the outputs:	Hexadecimal

Operating life: ≧ 1 x 10^4 operations

Further details

Ambient temp., operating:	– 25 °C ... + 70 °C
Ambient temp., storage:	– 40 °C ... + 80 °C

Environment conditions:
- Constant environment: acc. to IEC 68-2-3 and 2-30
- Variable environment: acc. to IEC 68-2-14 and 2-33

Degree of protection: IP 40

Locking diagram

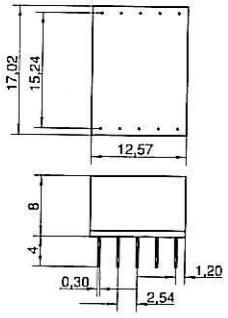
C connected to

Switching position	1	2	4	8
0				
1	●			
2		●		
3	●	●		
4			●	
5	●		●	
6		●	●	
7	●	●	●	
8				●
9	●			●
A		●		●
B	●	●		●
C			●	●
D	●		●	●
E		●	●	●
F	●	●	●	●

● Contact closed

7-Segment LED Displays

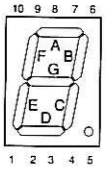
7-Segment LED display	Version	Order no.
(1)	Common cathode	5.93005.060
	Common anode	5.93005.048



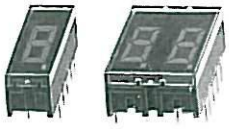
Pin assignment

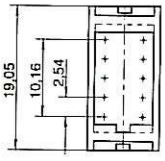
Pin

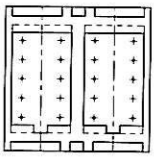
1 Segment E
2 Segment D
3 Anode
4 Segment C
5 Decimal point
6 Segment B
7 Segment A
8 Anode
9 Segment F
10 Segment G

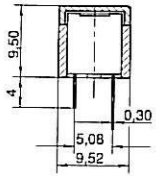


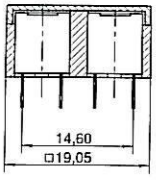
Character height:	14 mm
Colour:	red, 635 nm
Light intensity:	typ. 1700 µcd at I_F = 10 mA / segment
Forward voltage at I_F = 20 mA:	typ. 2.1 V
Forward current max.:	25 mA / segment
Current reduction:	approx. 0.5 mA / °C from 50 °C on
Ambient temp., operating:	– 40 °C ... + 85 °C

7-Segment LED display	Version		Order no.
(2) 	Common cathode	1-digit	5.09300.011
		2-digit	5.09300.012
	Common anode	1-digit	5.09300.021
		2-digit	5.09300.022





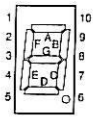




Pin assignment

Pin

1 Cathode/Anode
2 Segment F
3 Segment G
4 Segment E
5 Segment D
6 Cathode/Anode
7 Decimal point
8 Segment C
9 Segment B
10 Segment A



Character height:	9.20 mm
Colour:	red, typ. 635 nm at I_F = 20 mA
Light intensity:	typ. 2000 µcd at I_F = 10 mA / segment
Forward voltage:	typ. 2.1 V at I_F = 20 mA / segment
Reverse voltage:	5 V / segment
Forward current:	25 mA / segment
Reverse current:	100 µA max. / segment
Current reduction:	0.33 mA approx. / °C from 25 °C on
Ambient temperature, operating:	– 35 °C ... + 85 °C

Solder temperature 1/16 inch below seating plane for 3 seconds at 260 °C

5