

The ultra-flat **Control Components**



# RAFIX 22FS

**RAFI**

# RAFIX 22FS

## The ultra-flat Control Components

The new RAFIX 22FS control component range **can be combined on a common printed circuit board together with short-travel keys and other components thanks to its extremely small mounting depth of 9.2 mm.**

In contrast with conventional control component arrangements, the overall mounting depth of the complete system is drastically reduced by using RAFIX 22FS components.

The actuators (pushbuttons, keylock switches, selector switches, signal indicators, emergency stop buttons) are fastened to the front panel with a threaded ring in a 22.3 mm panel cut-out to IEC 947. The cast-on collar seal made of thermoflex and an integrated special membrane provide a water-jet proof degree of protection IP 65 to DIN.

The contact blocks are soldered onto the PCB. Illumination of the actuator is provided by a 3 mm LED inserted into the base of the contact block and soldered to the PCB together with the contact block.

The printed circuit board is fastened to the front panel with bolts, with the contact blocks sliding almost completely into the actuators. In this way an extremely low profile is achieved. Additional advantages: Individual wiring is made unnecessary and there is no more need for a cut-out in the PCB in the control component areas.

Screw-on front ring,  
made of plastic or metal

Lens  
transparent (illuminated) or opaque

Legend insert  
(for transparent lenses only)

Diffuser  
(for transparent lenses only)

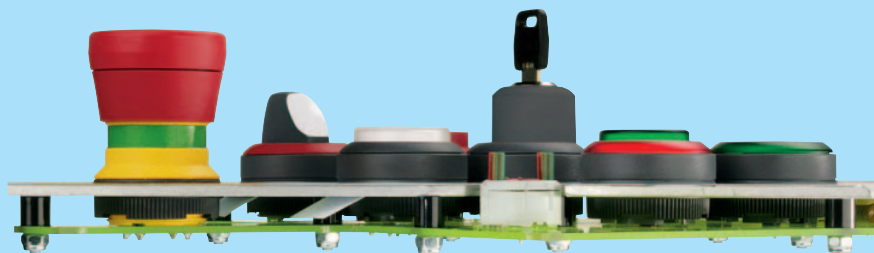
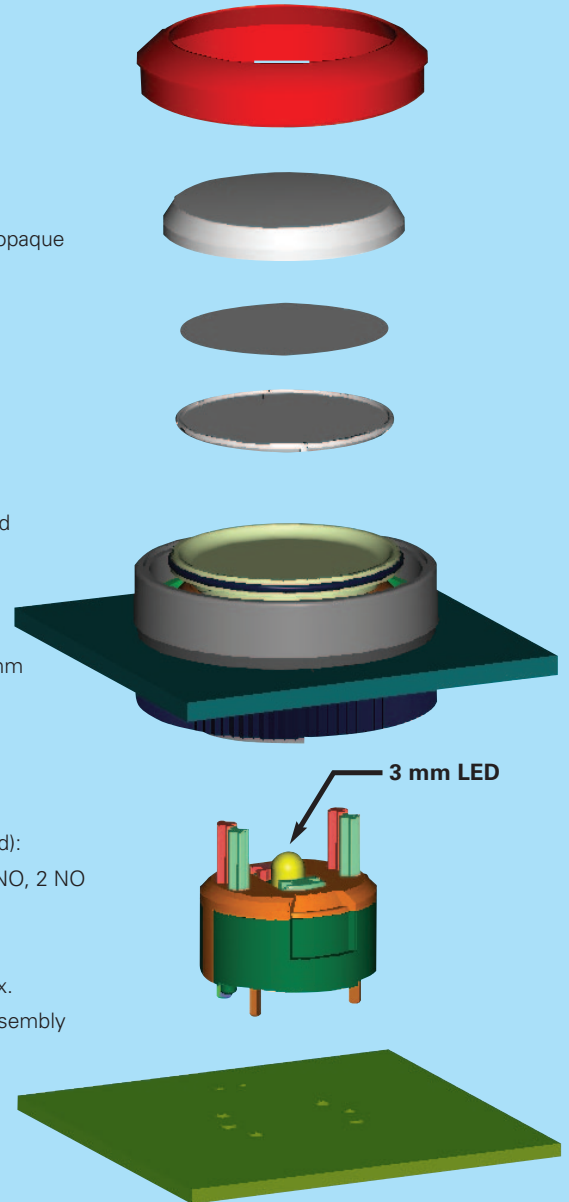
Actuator with O-ring seal and  
special membrane,  
housing with integrated  
cast-on collar seal,  
front panel thickness 1 - 3 mm

Threaded ring

Contact block  
(optionally with LED installed):

- 1NC, 1NO, 2NC, 1NC + 1NO, 2 NO  
(colour-coded plungers:  
NC=red, NO=green)
- Gold contacts for 42 V max.
- Locating pip for correct assembly

Printed circuit board



9.2 mm

## Combined with **short-travel keys**

The actuators of the RAFIX 22FS system are ideally suited for integration into low-profile data entry systems. The small mounting depth and the PCB solder terminals make it possible to combine the contact blocks with Rafi short-travel keys RACON 8 and 12, RF 15 and RF 19 as well as KN 19 on one and the same printed circuit board.

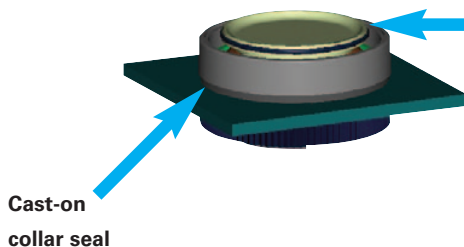


## **Illumination**

RAFIX 22FS pushbuttons, selector switches and emergency stop buttons are also available as illuminated versions. For illumination, we recommend to use the superbright 3 mm LEDs in the colour matching the lens. The LEDs are fitted into the contact block and soldered together with it.

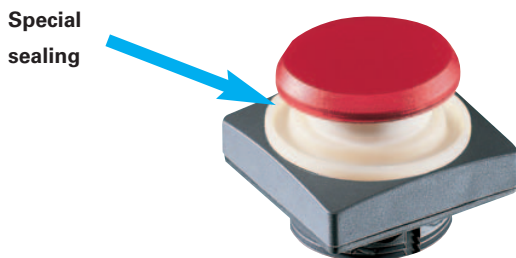
The signal indicators are also illuminated with superbright LEDs soldered directly onto the printed circuit board. In order to ensure full illumination, the LED must be mounted on a base. Bases are available as accessories.

## **Sealed** for life against **moisture and dirt**



### **O-ring seal**

The O-ring seals the space between the lens and the actuator. The cast-on collar seal cannot be lost or distorted during assembly. During assembly, the actuator is held in the mounting hole by the cast-on seal and can then be fixed by screwing from the rear.



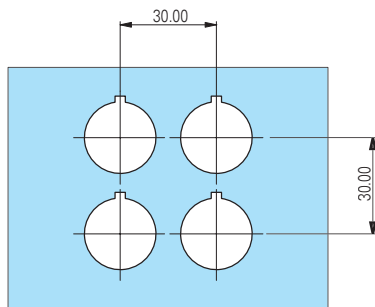
### **Special sealing**

The special membrane seal safely prevents moisture, oil or dust from reaching the contact block. In contrast with seals sliding up and down along the shaft, the special membrane seal is arranged in a fixed position on the housing. In this way, RAFIX 22FS guarantees switching reliability for the full service life (degree of protection IP 65 to DIN).

## Numerous design options for individual panels

RAFIX 22FS is available with many options. The interchangeable front rings and lenses offer you nearly unlimited design options for your panels.

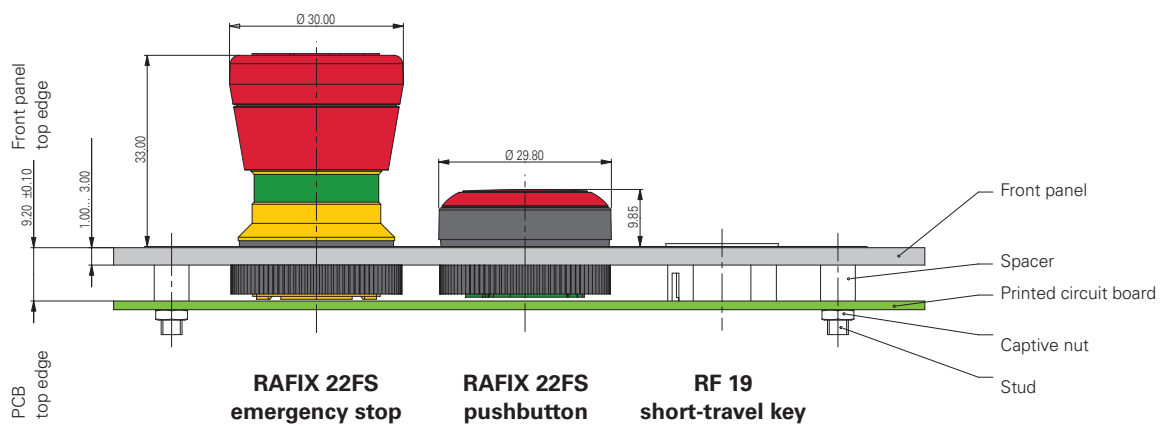
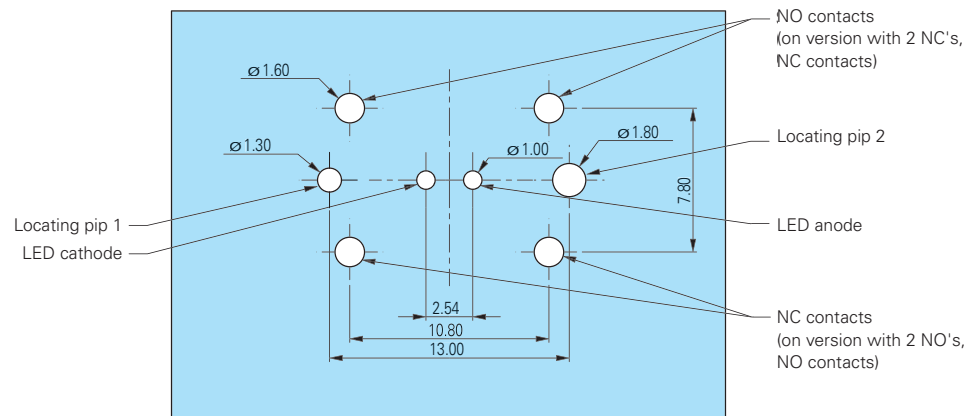
RAFIX 22FS is available both with a round or a square collar. The square version can be arranged one collar to the next just as an integral keypad.



### Panel cut-out to IEC 947

All actuators are provided with a locating pip.

With a grid spacing of 30 mm, the collars of the square actuators are arranged next to each other without a space in between. We recommend to use this grid spacing also for the round collar shapes (IEC 947).





# RAFIX 22FS preliminary data

Subject to technical modification.

All dimensions in this catalogue are given in mm.

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## General information

Panel cut-out:	22.3 mm acc. to IEC 947
Ambient conditions:	IEC 68-2-1, IEC 68-2-2, IEC 68-2-30
Saline fog:	IEC 68-2-11
Resistance to vibration, constant acceleration:	5 g, frequency range 10-500 Hz logarithmic to IEC 68-2-6
Approvals:	IEC 947, IEC 1058, UL 508, CSA 22.2; equivalent to EC Directive NSR 73/23, ULc, BG/TÜV under preparation
Operating temperature:	-25 ... +70°C
Storage temperature:	-40 ... +80°C
Shock resistance to IEC 68-2-27:	> 50g at 11 ms amplitude, half sinusoidal
Pushbutton actuating travel:	4 mm
Robustness of actuator:	> 100N
Mounting position:	Any
Degree of protection, front side of panel:	IP 65 over the full operating life

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## Actuators, operating life specified in cycles

Pushbutton:	momentary: > 1 million, latching: > 0.5 million
Selector switch:	momentary: > 0.5 million, latching: > 0.5 million
Keylock switch:	momentary: > 0.3 million, latching: > 50,000
Emergency stop button:	> 50,000

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## Contact block

Terminals:	PCB solder terminals, with locating pip
Contact system:	Self-cleaning bridge contact
Contact arrangement:	1 NC, 1 NO, 2 NC, 2 NO, 1 NC+1 NO
Normally-closed contacts (NC):	Positive opening to IEC 947-5-1 (EN 60947-5-1) Section K
Operating voltage, max.:	42 V AC/DC
Current rating, max.:	100 mA AC/DC
Power, max.:	250 mW
Operating life:	> 1 million operations at 10 mA/24V DC
Switching reliability at 24V/ 5mA DC:	$10 \times 10^{-6}$ operations

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	Legending (black letters)	Function	Metal front ring	Plastic front ring	
<b>(1) ○, flush pushbutton</b> 	none	momentary	1.30 250.021 / colour no.	1.30 250.001 / colour no.	
	I	momentary	1.30 250.023 / colour no.	1.30 250.003 / colour no.	
	none	latching	1.30 250.031 / colour no.	1.30 250.011 / colour no.	
<b>(2) □, flush pushbutton</b> 	none	momentary	1.30 250.071 / colour no.	1.30 250.051 / colour no.	
	I	momentary	1.30 250.073 / colour no.	1.30 250.053 / colour no.	
	none	latching	1.30 250.081 / colour no.	1.30 250.061 / colour no.	
<b>(3) ○, protruding lens</b> 	none	momentary	1.30 250.221 / colour no.	1.30 250.201 / colour no.	
	0	momentary	1.30 250.222 / colour no.	1.30 250.202 / colour no.	
	none	latching	1.30 250.231 / colour no.	1.30 250.211 / colour no.	
<b>(4) □, protruding lens</b> 	none	momentary	1.30 250.271 / colour no.	1.30 250.251 / colour no.	
	0	momentary	1.30 250.272 / colour no.	1.30 250.252 / colour no.	
	none	latching	1.30 250.281 / colour no.	1.30 250.261 / colour no.	
<b>(5) ○, protruding front ring</b> 	none	momentary	1.30 250.421 / colour no.	1.30 250.401 / colour no.	
<b>(6) □, protruding front ring</b> 	none	momentary	1.30 250.471 / colour no.	1.30 250.451 / colour no.	

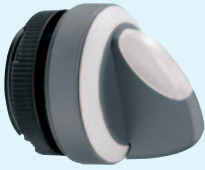

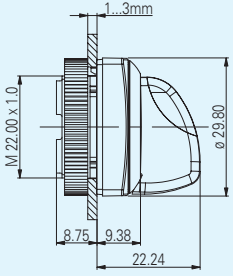




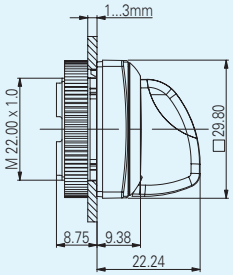



Colour no. for front ring and transparent lens

Lens	Ring	Plastic front ring						
	Metal front ring	black	red	yellow	green	blue	slate grey	silver
white	/1000	/1001	/1003	/1004	/1005	/1006	/1007	/1008
red	/1300	/1301	/1303	/1304	/1305	/1306	/1307	/1308
yellow	/1400	/1401	/1403	/1404	/1405	/1406	/1407	/1408
green	/1500	/1501	/1503	/1504	/1505	/1506	/1507	/1508
blue	/1600	/1601	/1603	/1604	/1605	/1606	/1607	/1608

	Function	Metal front ring	plastic front ring	
<b>(1) ○, flush pushbutton</b> 	momentary	1.30 250.121/colour no.	1.30 250.101/colour no.	
	latching	1.30 250.131/colour no.	1.30 250.111/colour no.	
<b>(2) □, flush pushbutton</b> 	momentary	1.30 250.171/colour no.	1.30 250.151/colour no.	
	latching	1.30 250.181/colour no.	1.30 250.161/colour no.	
<b>(3) ○, protruding lens</b> 	momentary	1.30 250.321/colour no.	1.30 250.301/colour no.	
	latching	1.30 250.331/colour no.	1.30 250.311/colour no.	
<b>(4) □, protruding lens</b> 	momentary	1.30 250.371/colour no.	1.30 250.351/colour no.	
	latching	1.30 250.381/colour no.	1.30 250.361/colour no.	
<b>(5) ○, protruding front ring</b> 	momentary	1.30 250.521/colour no.	1.30 250.501/colour no.	
	latching	1.30 250.571/colour no.	1.30 250.551/colour no.	
<b>(6) □, protruding front ring</b> 	momentary	1.30 250.571/colour no.	1.30 250.551/colour no.	
	latching	1.30 250.571/colour no.	1.30 250.551/colour no.	

Colour no. for front ring and opaque lens

Lens \ Ring	Metal	Plastic front ring						
	front ring	black	red	yellow	green	blue	slate grey	silver
black	/0100	/0101	/0103	/0104	/0105	/0106	/0107	/0108
white	/0200	/0201	/0203	/0204	/0205	/0206	/0207	/0208
red	/0300	/0301	/0303	/0304	/0305	/0306	/0307	/0308
yellow	/0400	/0401	/0403	/0404	/0405	/0406	/0407	/0408
green	/0500	/0501	/0503	/0504	/0505	/0506	/0507	/0508
blue	/0600	/0601	/0603	/0604	/0605	/0606	/0607	/0608
slate grey	/0700	/0701	/0703	/0704	/0705	/0706	/0707	/0708

	Function	Collar shape	Metallized front ring	Plastic front ring		
○ collar 	1x40°, momentary 	○ □	1.30 252.002 1.30 252.052	1.30 252.001 1.30 252.051		
	2x40°, momentary 	○ □	1.30 252.027 1.30 252.077	1.30 252.026 1.30 252.076		
	1x90°, latching 	○ □	1.30 252.102 1.30 252.152	1.30 252.101 1.30 252.151		
□ collar 	2x90°, latching 	○ □	1.30 252.127 1.30 252.177	1.30 252.126 1.30 252.176		
	1x90°, latching 	○ □	1.30 252.202 1.30 252.252	1.30 252.201 1.30 252.251		
	2x60°, latching 	○ □	1.30 252.302 1.30 252.352	1.30 252.301 1.30 252.351		
1x90°, latching 1x40°, momentary 	○ □	1.30 252.427 1.30 252.477	1.30 252.426 1.30 252.476			

Colour no. for front ring and translucent white\* handle marking

Front ring	Metallized front ring	Plastic front ring						
		black	red	yellow	green	blue	slate grey	silver
Colour no.	/2200	/2201	/2203	/2204	/2205	/2206	/2207	/2208

\* Other colours on request

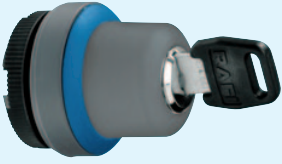
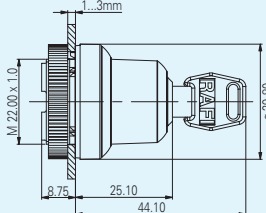



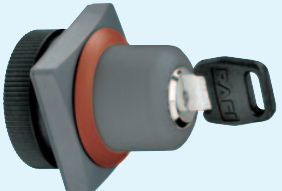
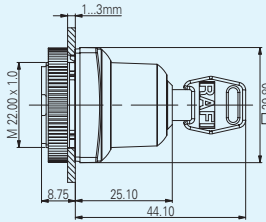





	Function	Collar shape	Metallized front ring	Plastic front ring	
○ collar	1x40°, momentary	○ □	1.30 252.502 1.30 252.552	1.30 252.501 1.30 252.551	
	2x40°, momentary	○ □	1.30 252.527 1.30 252.577	1.30 252.526 1.30 252.576	
□ collar	1x90°, latching	○ □	1.30 252.602 1.30 252.652	1.30 252.601 1.30 252.651	
	2x90°, latching	○ □	1.30 252.627 1.30 252.677	1.30 252.626 1.30 252.676	
○ collar	1x90°, latching	○ □	1.30 252.702 1.30 252.752	1.30 252.701 1.30 252.751	
	2x60°, latching	○ □	1.30 252.802 1.30 252.852	1.30 252.801 1.30 252.851	
○ collar	1x90°, latching 1x40°, momentary	○ □	1.30 252.927 1.30 252.977	1.30 252.926 1.30 252.976	

Colour no. for front ring and opaque white\* handle marking

Front ring	Metallized front ring	Plastic front ring						
		black	red	yellow	green	blue	slate grey	silver
Colour no.	/0200	/0201	/0203	/0204	/0205	/0206	/0207	/0208

\* Other colours on request

	Function	Key removal position	Collar shape	Metal front ring	Plastic front ring	
 <p>○ collar</p> 	1 x 40°, momentary 	0 0	○ □	1.30 255.002 1.30 255.052	1.30 255.001/colour no. 1.30 255.051/colour no.	
	2 x 40°, momentary 	0 0	○ □	1.30 255.102 1.30 255.152	1.30 255.101/colour no. 1.30 255.151/colour no.	
	1 x 90°, latching 	0 0	○ □	1.30 255.202 1.30 255.252	1.30 255.201/colour no. 1.30 255.251/colour no.	
		0 + 1 0 + 1	○ □	1.30 255.212 1.30 255.262	1.30 255.211/colour no. 1.30 255.261/colour no.	
	 <p>□ collar</p> 	1 x 90°, latching 	0 0	○ □	1.30 255.302 1.30 255.352	1.30 255.301/colour no. 1.30 255.351/colour no.
			1 1	○ □	1.30 255.312 1.30 255.362	1.30 255.311/colour no. 1.30 255.361/colour no.
		2 x 90°, latching 	0 + 1 0 + 1	○ □	1.30 255.402 1.30 255.452	1.30 255.401/colour no. 1.30 255.451/colour no.
			0 + 2 0 + 2	○ □	1.30 255.412 1.30 255.462	1.30 255.411/colour no. 1.30 255.461/colour no.
	1 x 90°, latching 1 x 40°, momentary 	0 + 2 0 + 2	○ □	1.30 255.422 1.30 255.472	1.30 255.421/colour no. 1.30 255.471/colour no.	
		0 + 1 + 2 0 + 1 + 2	○ □	1.30 255.432 1.30 255.482	1.30 255.431/colour no. 1.30 255.481/colour no.	
		0 0	○ □	1.30 255.502 1.30 255.552	1.30 255.501/colour no. 1.30 255.551/colour no.	
		2 2	○ □	1.30 255.512 1.30 255.562	1.30 255.511/colour no. 1.30 255.561/colour no.	
0 + 2 0 + 2		○ □	1.30 255.522 1.30 255.572	1.30 255.521/colour no. 1.30 255.571/colour no.		

Colour no. for plastic front ring

Front ring	black	red	yellow	green	blue	slate grey	silver
Colour no.	/0100	/0300	/0400	/0500	/0600	/0700	/0800


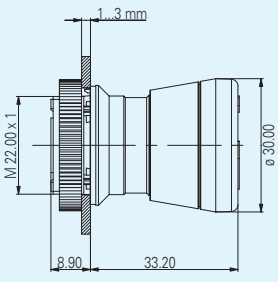

Lock no. 001.

Other lock types available on request.

Lock characteristics

Wafers: 5  
No. of lock types: 500

Included: 2 keys


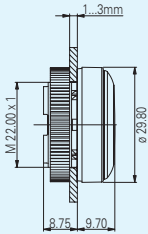

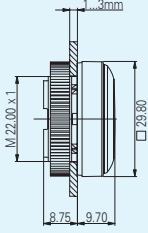
<p>(1) Non-illuminated</p> 	Order no.	
	1.30 253.101/0300	
<p>(2) Illuminated</p> 	1.30 253.001/0300	

The emergency stop pushbuttons comply with DIN EN 60 204, IEC 73, IEC 204, IEC 947, DIN EN 60 947, VDE 0660 Part 200 and VDE 0113 Part 1. They are designed dupe-proof according to EN 418 with a positive mechanical movement sequence. A certain operating force must be exerted at the action point in order to prevent inadvertent operation. The pushbutton latches when pressed and is reset by turning it in a clockwise direction.

The special shape of the actuator prevents the emergency stop pushbutton from being blocked. This means that the emergency stop process – once initiated – cannot be impeded by any jamming objects.

Do not use contact blocks other than 1.20 126.4xx. For emergency stop label plates, see accessories.

RAFIX 22FS signal indicators

<p>(3) <input type="radio"/> collar</p> 	Order no. Legending by legend insert	
	1.74 506.501 / colour no.	
<p>(4) <input type="checkbox"/> collar</p> 	1.74 506.551 / colour no.	

Colour no. for signal indicators





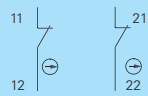

Version \ Lens	colourless	red	yellow	green	blue
Suitable for legending	/1000	/1300	/1400	/1500	/1600
Not suitable for legending	/2200	/2300	/2400	/2500	/2600

Please order accessories separately:

- LED base, order no. 5.55 101.557, see page 13
- Legend inserts, see accessories on page 14





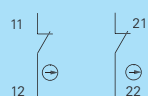
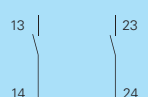
## RAFIX 22FS universal contact blocks

**Caution: Not suitable for emergency stop functions!**

1)	Version	Switching symbol	Order no. Gold 42V
 <p>Fig. 1 NO + 1 NC</p>	1 NC		1.20 126.001
	1 NO		1.20 126.002
	1 NO, 1 NC		1.20 126.003
	2 NC		1.20 126.004
	2 NO		1.20 126.005

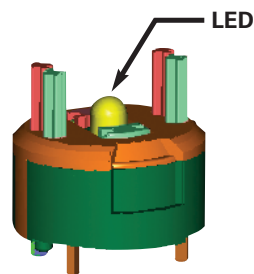
## RAFIX 22FS emergency stop contact blocks

**Caution: Only for emergency stop functions!**

2)	Version	Switching symbol	Order no. Gold 42V
 <p>Fig. 2 NC contact</p>	1 NC		1.20 126.401
	1 NO		1.20 126.402
	1 NO, 1 NC		1.20 126.403
	2 NC		1.20 126.404
	2 NO		1.20 126.405

### Notes on illumination:


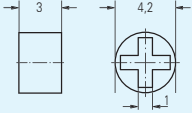
- The contact blocks are suitable for use with illuminated actuators: Insert the desired LED into the integrated LED base and subsequently solder it together with the contact block.
- We strongly recommend using the Rafi superbright LED (see accessories on page 13) since this ensures homogeneous illumination.



## RAFIX 22FS accessories

	Designation	Order no.	Colour no.
(1)  collar	<b>Blanking cap</b> Fixing: Threaded ring Degree of protection: IP 65	5.05 800.067	–
(2)  collar	<b>Blanking cap</b> Fixing: Threaded ring Degree of protection: IP 65	5.05 800.068	–
(3) 	<b>Fixing spanner</b> for threaded ring and front ring	5.05 800.062	–
(4) 	Threaded ring	5.24 279.014	–
(5) 	<b>Plastic front ring with thermoflex protective cap</b> for modifying illuminated/non-illuminated pushbuttons for increased protection against dust/hostile environments	5.24 279.014/ colour no.	/01 black /03 red /04 yellow /05 green /06 blue /07 slate grey /08 silver

## RAFIX 22FS superbright LED

	Colours	Order no.
(6) LED Superbright LED 	yellow red blue green white	1.90 690.267 1.90 690.269 1.90 690.282 1.90 690.285 1.90 690.295
(7) LED base 	LED base for signal indicators	5.55 101.557


### Technical data of superbright LED

	LED yellow	LED red	LED blue*	LED green*	LED white*
Max. permitted current $I_F$	50 mA	50 mA	30 mA	30 mA	30 mA
Typical colour coordinates	–	–	$x = 0.13, y = 0.075$	$x = 0.17, y = 0.7$	$x = 0.31, y = 0.32$
Typical wavelength	590 nm	615 nm	–	–	–
Typical forward voltage $U_F$ at $I_F$	1.9 V/20 mA	1.9 V/20 mA	3.6 V/20 mA	3.5 V/20 mA	3.6 V/20 mA
Breakdown voltage $U_R$ at $I_F$	5 V/100 mA	5 V/100 mA	5 V	5 V	5 V
Operating temperature	-40°C...+100°C	-40°C...+100°C	-20°C...+80°C	-20°C...+80°C	-30°C...+80°C

\***Caution:** Antistatic precautions required!



## RAFIX 22FS legend inserts for illuminated pushbuttons and signal indicators

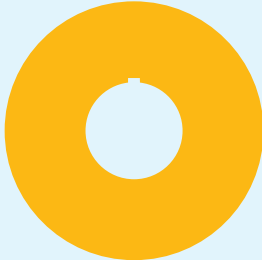
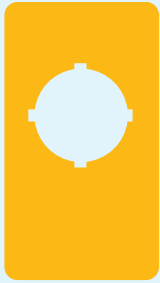
Sample legend	Legending black letters, white background	Order no. for flush pushbuttons	Order no. for protruding lenses	Order no. for signal indicators
		blank	5.70 800.000/2000	5.70 802.000/2000
	DOWN	5.70 800.001/0200	5.70 802.001/0200	5.70 803.001/0200
	UP	5.70 800.002/0200	5.70 802.002/0200	5.70 803.002/0200
	ON	5.70 800.003/0200	5.70 802.003/0200	5.70 803.003/0200
	OFF	5.70 800.004/0200	5.70 802.004/0200	5.70 803.004/0200
	START	5.70 800.006/0200	5.70 802.006/0200	5.70 803.006/0200
	STOP	5.70 800.007/0200	5.70 802.007/0200	5.70 803.007/0200
	I	5.70 800.010/0200	5.70 802.010/0200	5.70 803.010/0200
	+	5.70 800.017/0200	5.70 802.017/0200	5.70 803.017/0200
	-	5.70 800.018/0200	5.70 802.018/0200	5.70 803.018/0200
	→	5.70 800.019/0200	5.70 802.019/0200	5.70 803.019/0200
	RUN	5.70 800.020/0200	5.70 802.020/0200	5.70 803.020/0200
	FAULT	5.70 800.033/0200	5.70 802.033/0200	5.70 803.033/0200
	O	5.70 800.034/0200	5.70 802.034/0200	5.70 803.034/0200

Customized legends: Legends according to your specifications can be manufactured by engraving or printing.

When ordering, please specify:

1. Legend (text or symbol)
2. Type size
3. Line thickness
4. Legend colour/background colour
5. Orientation
6. Sketch/drawing or sample

## RAFIX 22FS emergency stop label plate

	Designation	Shape	Order no.	Front legend
	Ø 60 mm, RAL 1004 yellow made of PVC foil (self-adhesive)	round	5.76 204.100 5.76 204.101 5.76 204.103 5.76 204.102	- NOT-AUS EMERGENCY-STOP ARRÊT-D'URGENCE
	RAL 1004 yellow made of PVC foil (self-adhesive) blank	rectangular, 36 x 64 mm	5.76 205.011	-

# RAFIX 22QR



## Design compatible with RAFIX 22QR

The design of the RAFIX 22FS actuators matches the design of the RAFIX 22QR components. This makes it possible to use this range as a supplement, for example, if high currents are involved.

Your Rafi Sales Partner

06/2002 Eb

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