

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)

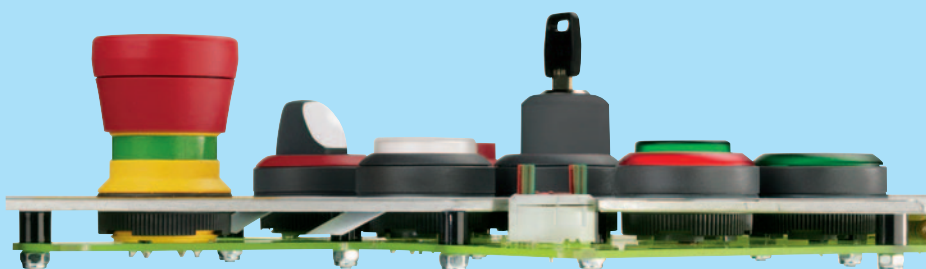
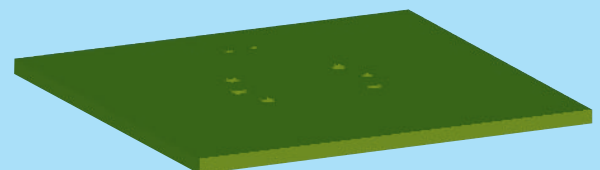
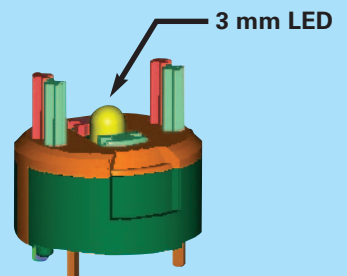
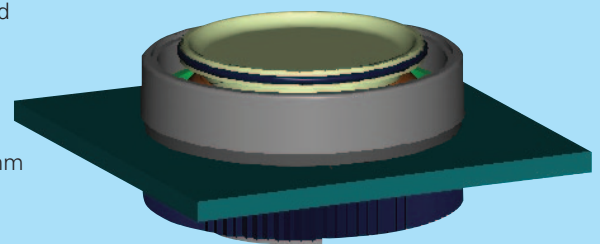
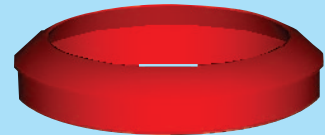
Actuator with O-ring seal and
special membrane,
housing with integrated
cast-on collar seal,
front panel thickness 1 - 3 mm

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.



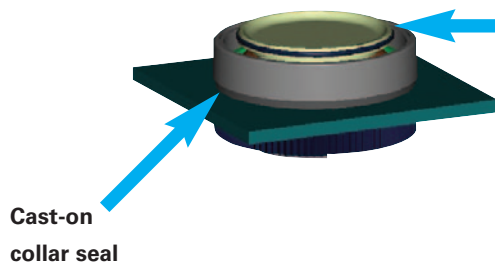
Illumination

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**



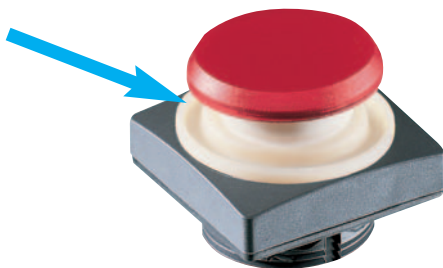
O-ring seal

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



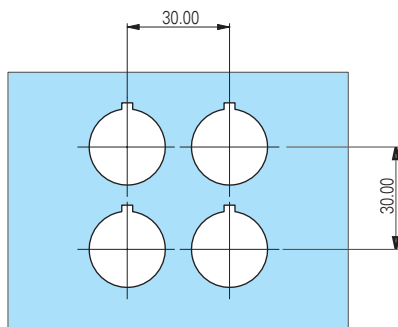
The special membrane seal safely prevents moisture, oil or dust from reaching the contact block.

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.

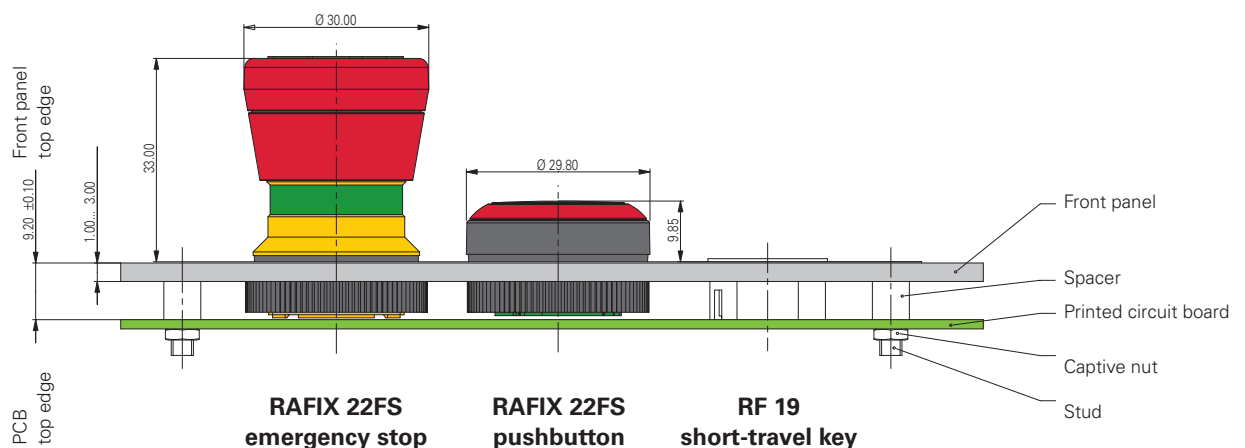
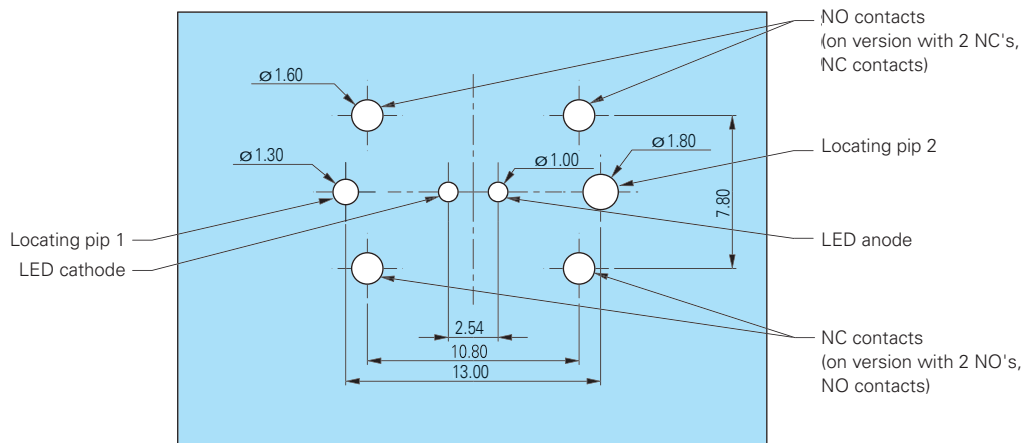
RAFIX 22FS is available both with a round or a square collar. The square version can be arranged one collar to the next just as an integral keypad.



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.

General information

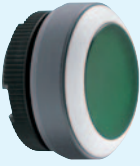
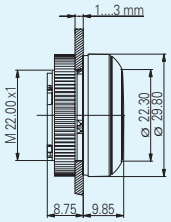
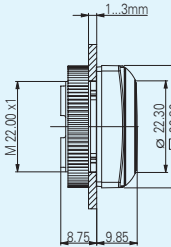
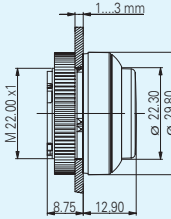
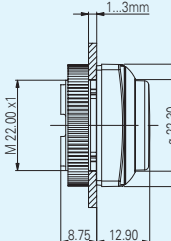
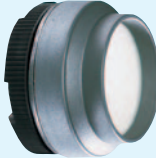
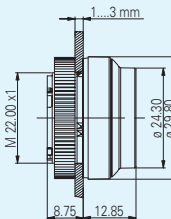
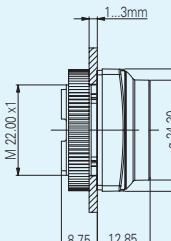
Panel cut-out:	22.3 mm acc. to IEC 947
Ambient conditions:	IEC 68-2-1, IEC 68-2-2, IEC 68-2-30
Saline fog:	IEC 68-2-11
Resistance to vibration, constant acceleration:	5 g, frequency range 10-500 Hz logarithmic to IEC 68-2-6
Approvals:	IEC 947, IEC 1058, UL 508, CSA 22.2; equivalent to EC Directive NSR 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

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

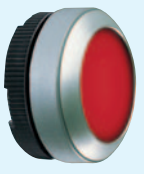
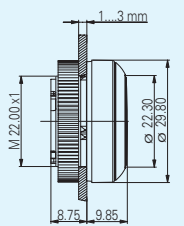
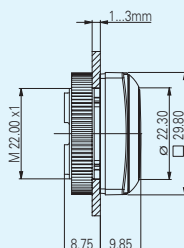
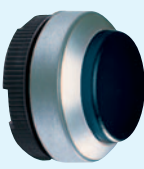
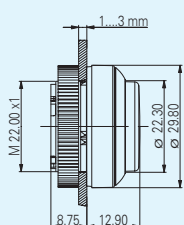
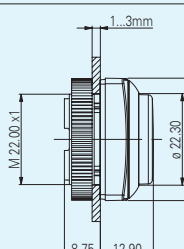
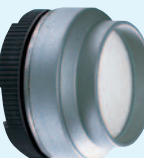
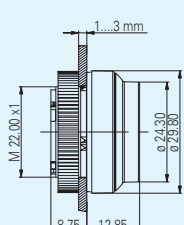
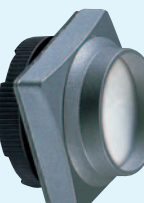
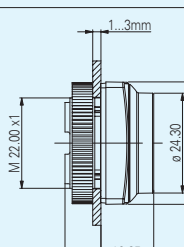
Contact block

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:	10×10^{-6} operations

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

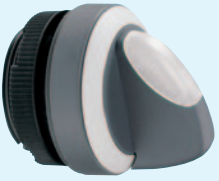
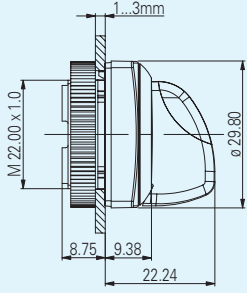
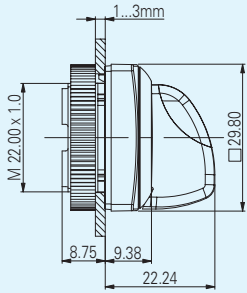
Colour no. for front ring and transparent lens

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

	Function	Metal front ring	plastic front ring	
(1) ○, flush pushbutton 	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.	
(2) □, flush pushbutton 	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.	
(3) ○, protruding lens 	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.	
(4) □, protruding lens 	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.	
(5) ○, protruding front ring 	momentary	1.30 250.521/colour no.	1.30 250.501/colour no.	
(6) □, protruding front ring 	momentary	1.30 250.571/colour no.	1.30 250.551/colour no.	

Colour no. for front ring and opaque lens

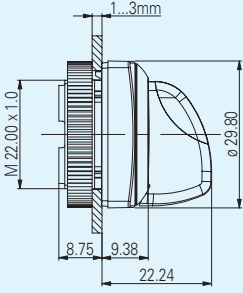
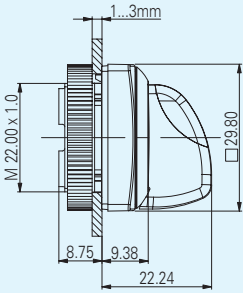
Lens	Ring	Metal front ring	Plastic front ring					
			black	red	yellow	green	blue	slate grey
black		/0100	/0101	/0103	/0104	/0105	/0106	/0107
white		/0200	/0201	/0203	/0204	/0205	/0206	/0207
red		/0300	/0301	/0303	/0304	/0305	/0306	/0307
yellow		/0400	/0401	/0403	/0404	/0405	/0406	/0407
green		/0500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

	Function	Collar shape	Metallized front ring	Plastic front ring	
○ collar 	1 x 40°, momentary 	○ □	1.30 252.002 1.30 252.052	1.30 252.001 1.30 252.051	
	2 x 40°, momentary 	○ □	1.30 252.027 1.30 252.077	1.30 252.026 1.30 252.076	
□ collar 	1 x 90°, latching 	○ □	1.30 252.102 1.30 252.152	1.30 252.101 1.30 252.151	
	2 x 90°, latching 	○ □	1.30 252.127 1.30 252.177	1.30 252.126 1.30 252.176	
	1 x 90°, latching 	○ □	1.30 252.202 1.30 252.252	1.30 252.201 1.30 252.251	
	2 x 60°, latching 	○ □	1.30 252.302 1.30 252.352	1.30 252.301 1.30 252.351	
	1 x 90°, latching 1 x 40°, 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

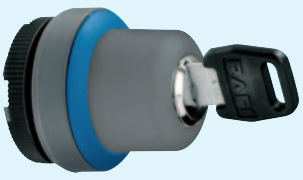
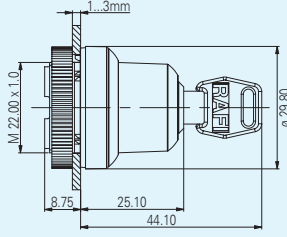
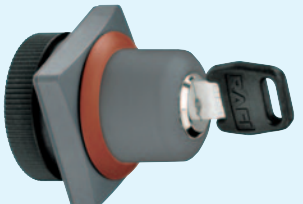
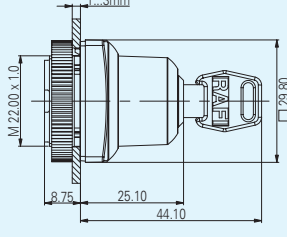
* Other colours on request

	Function	Collar shape	Metallized front ring	Plastic front ring	
○ collar	1 x 40°, momentary 	○ □	1.30 252.502 1.30 252.552	1.30 252.501 1.30 252.551	
	2 x 40°, momentary 	○ □	1.30 252.527 1.30 252.577	1.30 252.526 1.30 252.576	
□ collar	1 x 90°, latching 	○ □	1.30 252.602 1.30 252.652	1.30 252.601 1.30 252.651	
	2 x 90°, latching 	○ □	1.30 252.627 1.30 252.677	1.30 252.626 1.30 252.676	
	1 x 90°, latching 	○ □	1.30 252.702 1.30 252.752	1.30 252.701 1.30 252.751	
	2 x 60°, latching 	○ □	1.30 252.802 1.30 252.852	1.30 252.801 1.30 252.851	
	1 x 90°, latching 1 x 40°, 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
	1x40°, momentary 	0 0	○ □	1.30 255.002 1.30 255.052	1.30 255.001/colour no. 1.30 255.051/colour no.
○ collar  	2x40°, momentary 	0 0	○ □	1.30 255.102 1.30 255.152	1.30 255.101/colour no. 1.30 255.151/colour no.
	1x90°, latching 	0 0 I I 0 + I 0 + I	○ □ ○ □ ○ □	1.30 255.202 1.30 255.252 1.30 255.212 1.30 255.262 1.30 255.222 1.30 255.272	1.30 255.201/colour no. 1.30 255.251/colour no. 1.30 255.211/colour no. 1.30 255.261/colour no. 1.30 255.221/colour no. 1.30 255.271/colour no.
□ collar  	1x90°, latching 	0 0 I I 0 + I 0 + I	○ □ ○ □ ○ □	1.30 255.302 1.30 255.352 1.30 255.312 1.30 255.362 1.30 255.322 1.30 255.372	1.30 255.301/colour no. 1.30 255.351/colour no. 1.30 255.311/colour no. 1.30 255.361/colour no. 1.30 255.321/colour no. 1.30 255.371/colour no.
	2x90°, latching 	0 0 0 + I 0 + I 0 + 2 0 + 2 0 + I + 2 0 + I + 2	○ □ ○ □ ○ □ ○ □	1.30 255.402 1.30 255.452 1.30 255.412 1.30 255.462 1.30 255.422 1.30 255.472 1.30 255.432 1.30 255.482	1.30 255.401/colour no. 1.30 255.451/colour no. 1.30 255.411/colour no. 1.30 255.461/colour no. 1.30 255.421/colour no. 1.30 255.471/colour no. 1.30 255.431/colour no. 1.30 255.481/colour no.
	1x90°, latching 1x40°, momentary 	0 0 2 2 0 + 2 0 + 2	○ □ ○ □ ○ □	1.30 255.502 1.30 255.552 1.30 255.512 1.30 255.562 1.30 255.522 1.30 255.572	1.30 255.501/colour no. 1.30 255.551/colour no. 1.30 255.511/colour no. 1.30 255.561/colour no. 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

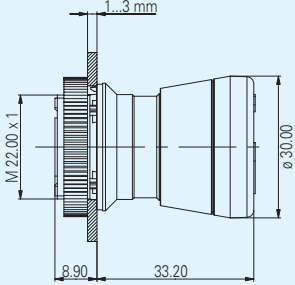
Lock no. 001.

Other lock types available on request.

Lock characteristics

 Wafers: 5
 No. of lock types: 500

Included: 2 keys

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

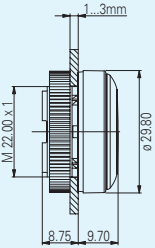
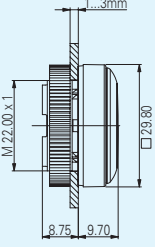
The emergency stop pushbuttons comply with DIN EN 60 204, IEC 73, IEC 204, IEC 947, DIN EN 60 947, VDE 0660 Part 200 and VDE 0113 Part 1. They are designed dupe-proof according to EN 418 with a positive mechanical movement sequence. A certain operating force must be exerted at the action point in order 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

1.74 506.---

	Order no. Legending by legend insert	
(3) ○ collar	1.74 506.501 / colour no.	 
(4) □ collar	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 42 V
	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



Fig. 1 NO + 1 NC

RAFIX 22FS emergency stop contact blocks

Caution: Only for emergency stop functions!

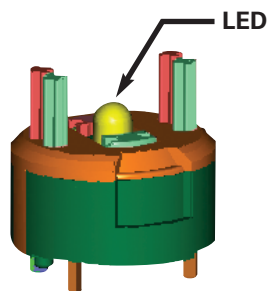
2)	Version	Switching symbol	Order no. Gold 42 V
	1 NC		1.20 126.401
	1 NO		1.20 126.402
	1 NO, 1 NC		1.20 126.403
	2 NC		1.20 126.404
	2 NO		1.20 126.405



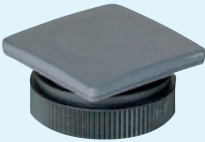
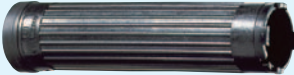
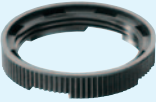
Fig. 2 NC contact

Notes on illumination:

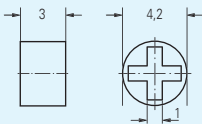
- The contact blocks are suitable for use with illuminated actuators: Insert the desired LED into the integrated LED base and subsequently solder it together with the contact block.
- We strongly recommend using the Rafi superbright LED (see accessories on page 13) since this ensures homogeneous illumination.



RAFIX 22FS accessories

	Designation	Order no.	Colour no.
(1) ○ collar 	Blanking cap Fixing: Threaded ring Degree of protection: IP 65	5.05 800.067	–
(2) □ collar 	Blanking cap Fixing: Threaded ring Degree of protection: IP 65	5.05 800.068	–
(3) 	Fixing spanner for threaded ring and front ring	5.05 800.062	–
(4) 	Threaded ring	5.24 279.014	–
(5) 	Plastic front ring with thermoflex protective cap 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

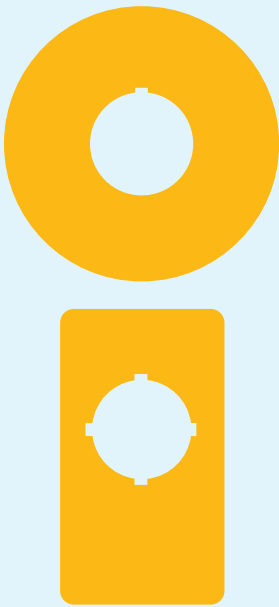
Sample legend	Legending black letters, white background	Order no. for flush pushbuttons	Order no. for protruding lenses	Order no. for signal indicators
		blank 5.70 800.000/2000 DOWN 5.70 800.001/0200 UP 5.70 800.002/0200 ON 5.70 800.003/0200 OFF 5.70 800.004/0200 START 5.70 800.006/0200 STOP 5.70 800.007/0200 I 5.70 800.010/0200 + 5.70 800.017/0200 – 5.70 800.018/0200 → 5.70 800.019/0200 RUN 5.70 800.020/0200 FAULT 5.70 800.033/0200 O 5.70 800.034/0200	5.70 802.000/2000 5.70 802.001/0200 5.70 802.002/0200 5.70 802.003/0200 5.70 802.004/0200 5.70 802.006/0200 5.70 802.007/0200 5.70 802.010/0200 5.70 802.017/0200 5.70 802.018/0200 5.70 802.019/0200 5.70 802.020/0200 5.70 802.033/0200 5.70 802.034/0200	5.70 803.000/2000 5.70 803.001/0200 5.70 803.002/0200 5.70 803.003/0200 5.70 803.004/0200 5.70 803.006/0200 5.70 803.007/0200 5.70 803.010/0200 5.70 803.017/0200 5.70 803.018/0200 5.70 803.019/0200 5.70 803.020/0200 5.70 803.033/0200 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

Rafi GmbH & Co. KG
Elektrotechnische Spezialfabrik
P.O. Box 2060, D-88190 Ravensburg
Phone: +49-751-89-0, Fax +49-751-89-1300
www.rafi.de, e-mail: info@rafi.de

RAFI