

**Previous products**

Our catalogue presents the current Rafi product range. Many articles from previous product ranges are still available. Please contact your usual Rafi partners.

**Legending**

Legending is possible using ready-made legend inserts, by engraving, printing or hot stamping. Grooved transparent lenses are not suitable for legending.

**CE conformity**

The CE conformity information for the individual products is specified in the general information section of each individual chapter. With regard to CE conformity, the products listed in this catalogue can be subdivided according to the following groups based on the Low-Voltage Directive 73/23/EEC:

**Emergency stop components with an operating voltage > 50 V**

For example, RAFIX 16, 22 QR. These products are subject to the Low-Voltage Directive 73/23/EEC and the Machinery Directive 89/392/EEC.

**Emergency stop components with an operating voltage < 50 V**

For example, LUMOTAST 25 and RAFIX 16 with gold contacts. These products are subject to the Machinery Directive 89/392/EEC.

**All other products with an operating voltage > 50 V**

For example, LUMOTAST 75 pushbuttons, signal lamps. These products are subject to the Low-Voltage Directive 73/23/EEC.

**All other products with an operating voltage < 50 V**

For example, RACON, LUMOTAST 25, signal lamps with LEDs. These products are not subject to any European directive.

**Single parts, accessories and luminous elements**

These products are not subject to any European directive.

**EMC legislation**

The components listed in this catalogue are "elementary components such as switches, signal lamps, etc." according to the electromagnetic compatibility (EMC) legislation and are therefore not within the scope of the EMC legislation.

**ENEC approval**

European approval mark for switches for appliances according to IEC 61058-1.

This new European approval mark replaces all national approval marks in Europe, such as VDE, SEV, ÖVE, DEMKO, SEMKO, NEMKO, FEMKO and KEMA.

Many Rafi products have already obtained approval according to the new standard, others are under preparation.

**Explanation of the ENEC ratings**

Example: 25 T 85 (70)  
 Lower temperature: - 25 °C  
 Upper temperature: + 85 °C (without lamp)  
 Upper temperature: + 70 °C (with lamp)

**Recommended colour coding acc. to EN 60 204-1**

**1. Colours**

Pushbutton actuators must be marked with 2 colours in accordance with table 2.

Colours for START/ON actuators should be WHITE, GREY or BLACK, preferably WHITE. GREEN is also permitted. RED must NOT be used.

RED must be used for actuators provided for stopping in an emergency situation and for switching off in an emergency situation.

Colours for STOP/OFF actuators should be BLACK, GREY or WHITE, preferably BLACK. GREEN must NOT be used. RED is also permitted, however, it is recommended to avoid RED in the vicinity of components provided for emergency actions.

WHITE, GREY or BLACK are the preferred colours for pushbutton actuators with alternating START/ON and STOP/OFF function. RED, YELLOW or GREEN must not be used.

WHITE, GREY or BLACK are the preferred colours for pushbutton actuators initiating a function while being pressed and stopping the function when released (e.g. inching operations). RED, YELLOW or GREEN must not be used.

Resetting pushbuttons must be BLUE, WHITE, GREY or BLACK. In those cases where they also perform a STOP/OFF function, the preferred colours are WHITE, GREY or BLACK, with BLACK being the first choice. GREEN must NOT be used.

**Recommended colour coding to EN 60 204-1**

**Table 2: Colours for pushbutton actuators and their meanings**

Colour	Meaning	Description	Examples of application
RED	Emergency situation	Actuate in a dangerous or emergency situation.	Emergency stop. Initiate emergency functions
YELLOW	Abnormal condition	Actuate if an abnormal condition occurs	Intervention to suppress an abnormal condition. Intervention to resume an interrupted automatic sequence.
GREEN	Normal condition	Actuate to initiate normal conditions	
BLUE	Mandatory action	Actuate in a situation which requires a mandatory action	Resetting function
WHITE	No special meaning defined	General initiation of functions except emergency stop (see note below)	START/ON (preferred) STOP/OFF
GREY			START/ON STOP/OFF
BLACK			START/ON STOP/OFF (preferred)

NOTE: If an additional coding feature (e.g. shape, position, surface finish) is used for marking pushbutton actuators, the same colours – WHITE, GREY or BLACK – may also be used to identify different functions (e.g. WHITE for START/ON and STOP/OFF actuators).

**2. Symbolic marking**

It is recommended to mark pushbuttons with the following symbols near the actuator or – preferably –

directly on the actuator in addition to the functional identification described:

START or ON	STOP or OFF	Pushbuttons with alternating START/STOP and ON/OFF function.	Pushbuttons with START or ON function while being pressed and with STOP or OFF function when being released (i.e. inching).
60417-IEC-5007	60417-IEC-5008	60417-IEC-5010	60417-IEC-5011

**Recommended colour coding to EN 60 204-1**

**3. Indicator lights and indicators**

**Applications**

Indicator lights and indicators are used to provide the following information:

- Indication: To draw the operator's attention to a specific circumstance or to indicate that a specific action should be performed. The usual colours used for this type of application are RED, YELLOW, GREEN or BLUE.
- Confirmation: To confirm a command or condition, or to confirm the end of a change operation or transition time. Usually, BLUE and WHITE are used for this type of application; GREEN is permitted in some cases.

**Colours**

Indicator lights must have the colour coding according to table 3 unless otherwise agreed between the supplier and the purchaser. Other meanings deviating therefrom (refer to IEC 60073) may be assigned based on one of the following criteria:

- Safety of persons and environment
- Condition of the electrical equipment

**Table 3: Colours of indicator lights and their meanings relating to the machine status**

Colour	Meaning	Description	Operator action
RED	Emergency situation	Dangerous condition	Immediate action to respond to a dangerous condition (e.g. by pressing emergency stop)
YELLOW	Abnormal condition	Abnormal condition; anticipated critical condition	Monitoring and/or intervention (e.g. by restoring the intended function)
GREEN	Normal condition	Normal condition	Optional
BLUE	Mandatory action	Indication of a condition requiring operator intervention	Mandatory action
WHITE	Neutral	Other conditions; may be used if there is uncertainty about the appropriateness of RED, YELLOW, GREEN or BLUE	Monitor

**Flammability rating to UL 94**

identical with IEC 60707/VDE 0304, Part 3

**Flammability**

The flammability class specifications refer only to insulating materials which are in direct contact with

electrically conductive parts. The flammability of the material with the lowest rating is specified.

Flammability class acc. to		Self-extinguishing after . . . seconds in vertical burning test	Possibly dripping material ignites objects	No more smouldering after . . . seconds
UL	IEC/VDE			
V 0	FV 0	Less than 5 seconds	No	30 seconds
V 1	FV 1	Less than 25 seconds	No	30 seconds
V 2	FV 2	Less than 25 seconds	Possible	60 seconds
HB	FH	Burn rate (horizontal burning test with the following values): Wall thickness up to 3 mm = 3 inches/minute, max.; wall thickness over 3 mm = 1.5 inches/minute, max.		

**Glow wire test**

The test temperature of 850 °C means that these products can be used in devices designed for unattended continuous operation.

**IEC concepts/standards**

**IEC 60947-5-1**

Low-voltage switchgear and controlgear  
Part 5-1: Control circuit devices and switching elements, electromechanical control circuit devices

- ↳ DIN EN 60947-5-1
- ↳ VDE 0660, Part 200

**IEC 60947-5-5**

Low-voltage switchgear and controlgear  
Part 5-5: Control circuit devices and switching elements, electrical emergency stop device with mechanical latching function

- ↳ DIN EN 60947-5-5
- ↳ VDE 0660, Part 210

**IEC 60204/-1**

Electrical equipment of machines  
Part1: General requirements

- ↳ DIN EN 60204-1
- ↳ VDE 0113, Part 1

**IEC 60529**

Degrees of protection by housings

- ↳ DIN EN 60529
- ↳ VDE 0470, Part 1

**IEC 61058/-1**

Device switches  
Part 1: General requirements

- ↳ DIN EN 61058-1
- ↳ VDE 0630, Part 1

**CURus**

Approval label for the U.S.A. and Canada – tested by UL – acc. to UL 508 and CSA C22.2 14-M91

**CSA "NRTL/C"**

Approval label for Canada and U.S.A., tested by CSA – acc. to CSA C 22.2 14-M91 and UL 508

**Marking**

Marking is made in accordance with the Low-Voltage Directive 73/23/EEC or the CE Marking Directive 93/68/EEC in the delivery papers on the packaging or on the product itself.

**Declarations of conformity**

Declarations of conformity for all products concerned are available on request. Please specify the accurate order numbers of the specific products.

**Plastic materials**

Housings, keycaps and lenses are exclusively made of thermoplastic or thermosetting plastic materials with excellent electrical characteristics, high impact resistance and high temperature resistance.

We do not use any cadmium for surface protection of contact and connection elements and we only use cadmium-free plastic materials and asbestos-free filling materials.

Cadmium-containing and cadmium-free plastics have the same technical characteristics. Equal quality is confirmed by the manufacturers. A limitation is the consistence of hue. In some cases it can be noticed by visual inspection. However, in general the difference can only be detected by measuring equipment.

**Units of measurement**

All the dimensions in the dimensional drawings in this catalogue are given in mm. All temperature values are given in degrees Celsius. A conversion table for the most common units of measurement is provided below for your convenience:

**Conversion table:**

mm	x 0.0394	= inches
grams	x 0.0353	= ounces
Newton	x 0.224	= pounds
Newton	x 3.59	= ounces
°Celsius	x 1.8 + 32	= °Fahrenheit

**Contact block identification data**

**Example: RAFIX 22 QR 1.20.124.xxx/5.00.100.1xx**

**Rated values to IEC 61058-1**

10/100(6)[3,6] 250 ~ 7.5 (4) 400 ~ 5E4 25T70

Explanation of data from left to right, current-related data first

**10 or 7.5**

10A ohmic load at 250V, 7.5 A ohmic load at 400 V

**/100**

100A capacitive peak input current (tested at 250V) (descending E-function to rated current)

**(6) or (4)**

6A motor rated current at 250V, 4A motor rated current. The test specimen makes 6 times the motor rated current, 36A or 24A, cos phi = 0.6,  $\Delta$  9000 or 9600 VA at 400 V throughout the full durability test.

**[3,6]**

3.6A filament lamp rated current = 36A peak input current (tested at 250V)

**250 AC or 400 AC**

Rated voltages and mains type, ~ = AC

**5E4**

50,000 operations (no. of test cycles) = 5 x 10<sup>4</sup>

**25T70**

-25°C lower operating temperature and + 70°C upper operating temperature  
The first 25,000 operations were tested at +70°C, the remaining 25,000 operations at -25°C in all of the tests.

**CURus ratings**

A 600, 10A/250Vac

**A 600**

Thermal continuous test current 10A  
Max. permitted load in VA:  
Max. 7,200VA make, 720VA break  
Max. make values:                      Max. break values:  
60A/120V                                      6A/120V  
30A/240V                                      3A/240V  
15A/480V                                      1.5A/480V  
12A/600V                                      1.2A/600V

**10A/250Vac**

Ohmic AC load

**Rated values to IEC 60947-5-1**

U 400 V AC12 10A, AC 15 6A/250V  
DC13 Q 300

**U 400V**

Rated insulation voltage for use in devices designed for continuous duty and degree of contamination 3

**AC12 10A**

10A ohmic load and semiconductor load

**AC15 6A/250V**

Controlling electromagnetic loads  
Max. 60A cos phi = 0.3 at 250V AC make, 6A cos phi = 0.3 at 250V AC break

**DC13 Q 300**

Controlling solenoids (DC)  
Maximum thermal continuous current 2.5A  
Max. 0.55A at 120V – make and break  
Max. 0.27A at 250V – make and break

**Degrees of protection to IEC 60529**

The degree of protection specified for the individual components refers to those parts of the components located on the front side of the panel. The electrical terminals are not protected unless they are provided

with special protection means such as cable sleeves, insulating sleeves or similar elements during assembly. The degrees of protection are standardised according to IEC 60 529 as follows:

IP X		X	
1st numeral	Protection against electric shock and ingress of foreign bodies:	2nd numeral	Protection against ingress or harmful effects of water:
0	No protection	0	No protection
1	> 50 mm diameter; protection against accidental touching with a hand	1	Dripping water, vertical
2	> 12 mm diameter; protection against touching with fingers	2	Dripping water, up to 15° angle
3	> 2.5 mm diameter; protection against touching with tools	3	Spraying water, up to 60° angle
4	> 1 mm diameter; protection against touching with wires	4	Splashing water from all directions
5	and effects of dust deposits. Full-scale protection against voltage	5	Water jets from all directions
6	and penetration of dust (dust-proof). Full-scale protection against voltage	6	Strong water jets from all directions
		7	Temporary submersion
		8	Continuous submersion

**UL standard**

**for Rafi short-travel keyswitches**

The KN 19 short-travel main switch and those operating panels fitted with Rafi RACON and RF short-travel keyswitches in accordance with our design recommendations comply with the UL standards for the North American market.

File no. for KN 19:                      E 116 362  
File no. for systems:                      E 202 520