EAO – Your Expert Partner for
Human Machine Interfaces

EAO Product Information

Series 82

eao


12V
24V

Contents 82

Product Information

General notes
The series 82 has a range of vandal-resistant pushbuttons that are designed to improve the durability and strength of control panels. The pushbuttons are protected to IK09 and IP65, which makes them ideal for use in exposed public aereas or aggressive industrial environments. They are mounted in 16mm or 19mm holes.
The 19 mm versions are available with LED illumination, either a ring or central dot. The ring creates a stylish, contemporary look that is also an effective way to focus user's attention on a primary function.
Please note: The 16mm versions are non-illuminated.

Mounting
The switches are mounted by pushing them through the mounting hole in the front panel. They are fixed with a fixing nut.

We reserve the right to modify technical data
All dimensions in mm

Pushbutton Ø16 mm and Ø19 mm



	Front protection	Lens	Mounting type	Typ-Nr.	Typ-Nr.	Technical drawing	Circuit drawing	kg
Pushbutton Ø16 mm and Ø19 mm	IP 65	Brass gold-coloured convex	level with bezel	**82-2372.1000**		6	2	0.018
		Brass nickel plated convex		**82-2272.1000**		6	2	0.018
		Stainless steel natural convex		**82-2172.1000**		6	2	0.018
		Brass gold-coloured flat		**82-2352.1000**		4	2	0.018
		Brass nickel plated flat		**82-2252.1000**		4	2	0.018
		Stainless steel natural flat		**82-2152.1000**		4	2	0.018
		Stainless steel brushed flat		**82-2452.1000**		4	2	0.018
		Brass gold-coloured flat	raised above bezel	**82-2362.1000**		5	2	0.018
		Brass nickel plated flat		**82-2262.1000**		5	2	0.018
		Stainless steel natural flat		**82-2162.1000**		5	2	0.018
		Brass gold-coloured convex	level with bezel		**82-1372.1000**	3	2	0.015
		Brass nickel plated convex			**82-1272.1000**	3	2	0.015
		Stainless steel natural convex			**82-1172.1000**	3	2	0.015
		Brass gold-coloured flat			**82-1352.1000**	1	2	0.015
		Brass nickel plated flat			**82-1252.1000**	1	2	0.015
		Stainless steel natural flat			**82-1152.1000**	1	2	0.015
		Stainless steel brushed flat			**82-1452.1000**	1	2	0.015
		Brass gold-coloured flat	raised above bezel		**82-1362.1000**	2	2	0.015
		Brass nickel plated flat			**82-1262.1000**	2	2	0.015
		Stainless steel natural flat			**82-1162.1000**	2	2	0.015

Contacts: 1 Normally open
Switching action: Momentary action
Terminals: Screw terminal
Technical drawing from page 9, Circuit drawing from page 12

Illuminated pushbutton Ø19 mm

	Front protection	Lens	Mounting type	Lighting	Operating voltage	Typ-Nr.	Technical drawing	Circuit drawing	kg
Illuminated pushbutton Ø19 mm	IP 65	Stainless steel natural flat	level with bezel	Dot with blue LED	3.5 V	**82-2151.1221**	7	1	0.024
					6 V	**82-2151.1222**	7	1	0.024
					12 V	**82-2151.1223**	7	1	0.024
					24 V	**82-2151.1224**	7	1	0.024
					110 V	**82-2151.1225**	7	1	0.024
					220 V	**82-2151.1226**	7	1	0.024
				Dot with green LED	3.5 V	**82-2151.1231**	7	1	0.024
					6 V	**82-2151.1232**	7	1	0.024
					12 V	**82-2151.1233**	7	1	0.024
					24 V	**82-2151.1234**	7	1	0.024
					110 V	**82-2151.1235**	7	1	0.024
					220 V	**82-2151.1236**	7	1	0.024
				Dot with red LED	3.5 V	**82-2151.1211**	7	1	0.024
					6 V	**82-2151.1212**	7	1	0.024
					12 V	**82-2151.1213**	7	1	0.024
					24 V	**82-2151.1214**	7	1	0.024
					110 V	**82-2151.1215**	7	1	0.024
					220 V	**82-2151.1216**	7	1	0.024
				Dot with white LED	3.5 V	**82-2151.1251**	7	1	0.024
					6 V	**82-2151.1252**	7	1	0.024
					12 V	**82-2151.1253**	7	1	0.024
					24 V	**82-2151.1254**	7	1	0.024
					110 V	**82-2151.1255**	7	1	0.024
					220 V	**82-2151.1256**	7	1	0.024
				Dot with yellow LED	3.5 V	**82-2151.1241**	7	1	0.024
					6 V	**82-2151.1242**	7	1	0.024
					12 V	**82-2151.1243**	7	1	0.024
					24 V	**82-2151.1244**	7	1	0.024
					110 V	**82-2151.1245**	7	1	0.024
					220 V	**82-2151.1246**	7	1	0.024
				Dot with orange LED	3.5 V	**82-2151.1271**	7	1	0.024
					6 V	**82-2151.1272**	7	1	0.024
					12 V	**82-2151.1273**	7	1	0.024
					24 V	**82-2151.1274**	7	1	0.024
					110 V	**82-2151.1275**	7	1	0.024
					220 V	**82-2151.1276**	7	1	0.024

Continuation see next page

Continued from previous page

	Front protection	Lens	Mounting type	Lighting	Operating voltage	Typ-Nr.	Technical drawing	Circuit drawing	kg
Illuminated pushbutton Ø19 mm	IP 65	Stainless steel natural flat	level with bezel	Ring with blue LED	3.5 V	**82-2151.1121**	8	1	0.021
					6 V	**82-2151.1122**	8	1	0.021
					12 V	**82-2151.1123**	8	1	0.021
					24 V	**82-2151.1124**	8	1	0.021
					110 V	**82-2151.1125**	8	1	0.021
					220 V	**82-2151.1126**	8	1	0.021
				Ring with green LED	3.5 V	**82-2151.1131**	8	1	0.021
					6 V	**82-2151.1132**	8	1	0.021
					12 V	**82-2151.1133**	8	1	0.021
					24 V	**82-2151.1134**	8	1	0.021
					110 V	**82-2151.1135**	8	1	0.021
					220 V	**82-2151.1136**	8	1	0.021
				Ring with red LED	3.5 V	**82-2151.1111**	8	1	0.021
					6 V	**82-2151.1112**	8	1	0.021
					12 V	**82-2151.1113**	8	1	0.021
					24 V	**82-2151.1114**	8	1	0.021
					110 V	**82-2151.1115**	8	1	0.021
					220 V	**82-2151.1116**	8	1	0.021
				Ring with white LED	3.5 V	**82-2151.1151**	8	1	0.021
					6 V	**82-2151.1152**	8	1	0.021
					12 V	**82-2151.1153**	8	1	0.021
					24 V	**82-2151.1154**	8	1	0.021
					110 V	**82-2151.1155**	8	1	0.021
					220 V	**82-2151.1156**	8	1	0.021
				Ring with orange LED	3.5 V	**82-2151.1171**	8	1	0.021
					6 V	**82-2151.1172**	8	1	0.021
					12 V	**82-2151.1173**	8	1	0.021
					24 V	**82-2151.1174**	8	1	0.021
					110 V	**82-2151.1175**	8	1	0.021
					220 V	**82-2151.1176**	8	1	0.021
				Ring with yellow LED	3.5 V	**82-2151.1141**	8	1	0.021
					6 V	**82-2151.1142**	8	1	0.021
					12 V	**82-2151.1143**	8	1	0.021
					24 V	**82-2151.1144**	8	1	0.021
					110 V	**82-2151.1145**	8	1	0.021
					220 V	**82-2151.1146**	8	1	0.021

Contacts: 1 Normally open + 1 Normally closed
Switching action: Momentary action
Terminals: Soldering terminal (also pluggable 2.8 x 0.8 mm)
Technical drawing from page 9, Circuit drawing from page 12

Pushbutton

Switching system

Contact arrangement
Non-illuminated: 1 NO
Illuminated: 1 NO + 1 NC

Switching action
Momentary

Material

Pushbutton

Non-illuminated:	Stainless steel
	Gold brass
	Brass nickel plated
Illuminated:	Stainless steel

Material of contact
Silver alloy

Mechanical characteristics

Mounting hole
Non-illuminated: Ø 16.2mm | Ø 19.2mm
Illuminated Ø 19.2mm

Terminals
Non-illuminated: Screw terminal
Illuminated: Solder terminal (also pluggable 2.8 x 0.5 mm)

Actuating force
5.5N

Mechanical lifetime
1 million cycles

Electrical characteristics

Illumination
LED light colours in red, green, yellow, orange, blue and white
LED and serie resistor are built in.

Voltage	Resistance	Current	Consumption
3.5 V	70 Ω	24 mA	0.084 W
6 V	270 Ω	15 mA	0.1 W
12 V	750 Ω	14 mA	0.17 W
24 V	2.1 kΩ	10 mA	0.24 W
110 V	56 kΩ	2 mA	0.22 W
220 V	180 kΩ	1.3 mA	0.29 W

Isolation resistance
>1000 mΩ

Contact resistance
≤50 mΩ

Electrical life
at full load

Non-illuminated:	16 mm	40,000 cycles	24 VDC, 2 A
	19 mm	40,000 cycles	48 VDC, 2 A
Illuminated:	19 mm	50,000 cycles	250 VAC, 5 A

Switch rating
Non-illuminated: 2 A, 48 VDC
Illuminated: 5 A, 250 VAC

Attention:
No EN/VDE or UL approbations available for 110/250 V operating voltages.

Electric strength
2000VAC

Environmental conditions

Operating temperature
Non-illuminated: -20 °C ... +55 °C
Illuminated: -20 °C ... +70 °C

Protection degree
sealed to IP 65

Operating humidity
45 ... 85% RH (no condensation)

Suppressor circuits

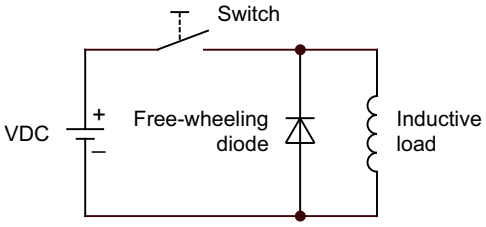
When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

Fig. 1 shows an inductive load with a free-wheeling diode connected in parallel. This free-wheeling diode provides a path for the inductor current to flow when the current is interrupted by the switch. Without this free-wheeling diode, the voltage across the coil will be limited only by dielectric break-down voltages of the circuit or parasitic elements of the coil. This voltage can be kilovolts in amplitude even when nominal circuit voltages are low (e.g. 12 VDC) see Fig. 2.

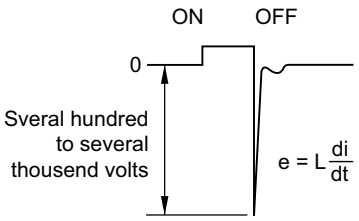
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (VR) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current flowing through the load.

To get an efficient protection, the free-wheeling diode must be connected as close as possible to the inductive load!

Switching with inductive load
Fig. 1

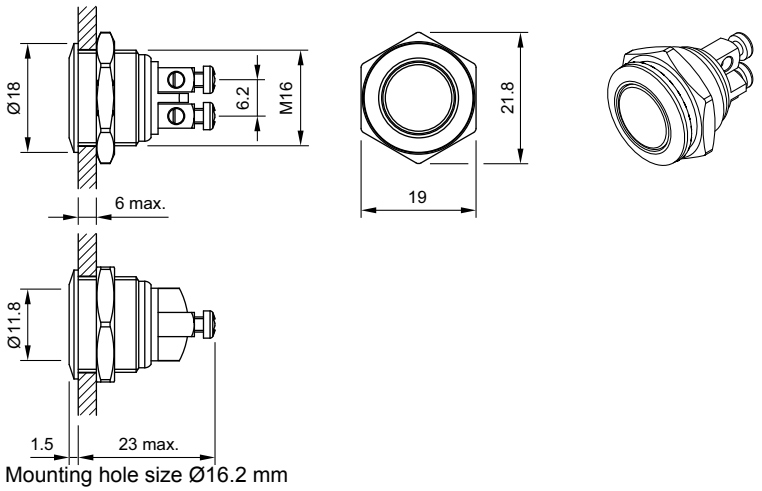


Counter emf
over load without free-wheeling diode
Fig. 2



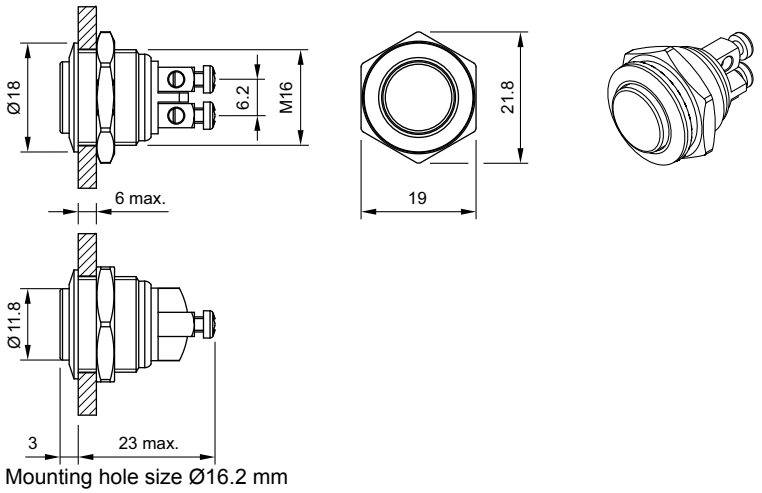
Technical drawing

1 Pushbutton Ø16 mm and Ø19 mm page 4



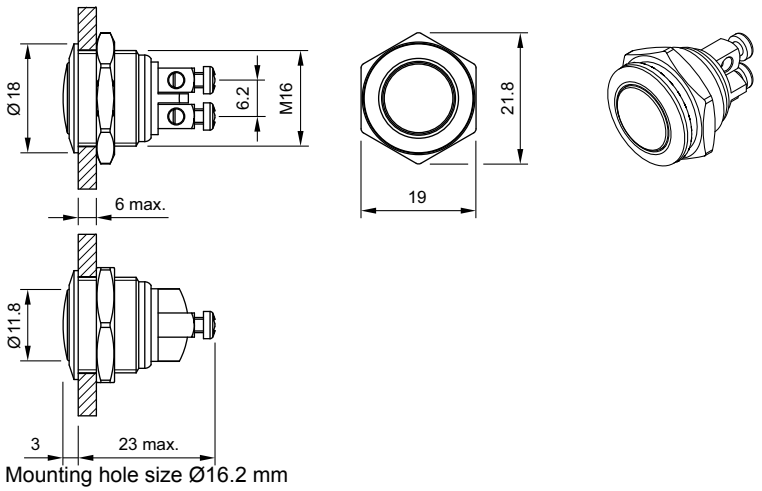
Mounting hole size Ø16.2 mm

2 Pushbutton Ø16 mm and Ø19 mm page 4



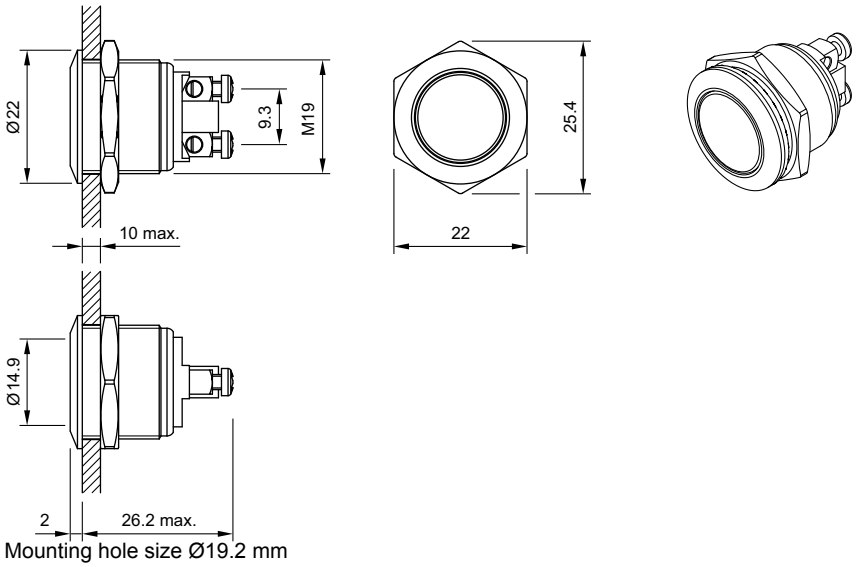
Mounting hole size Ø16.2 mm

3 Pushbutton Ø16 mm and Ø19 mm page 4



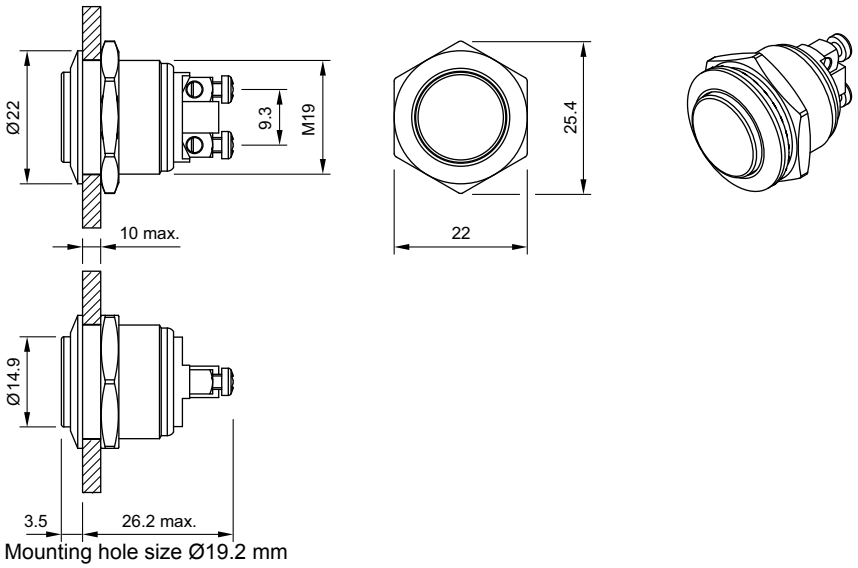
Mounting hole size Ø16.2 mm

4 Pushbutton Ø16 mm and Ø19 mm page 4



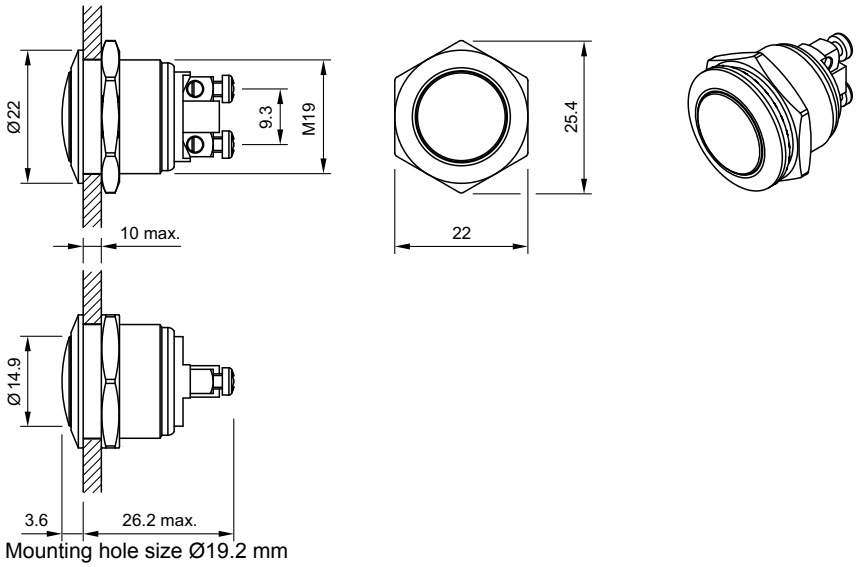
Mounting hole size Ø19.2 mm

5 Pushbutton Ø16 mm and Ø19 mm page 4



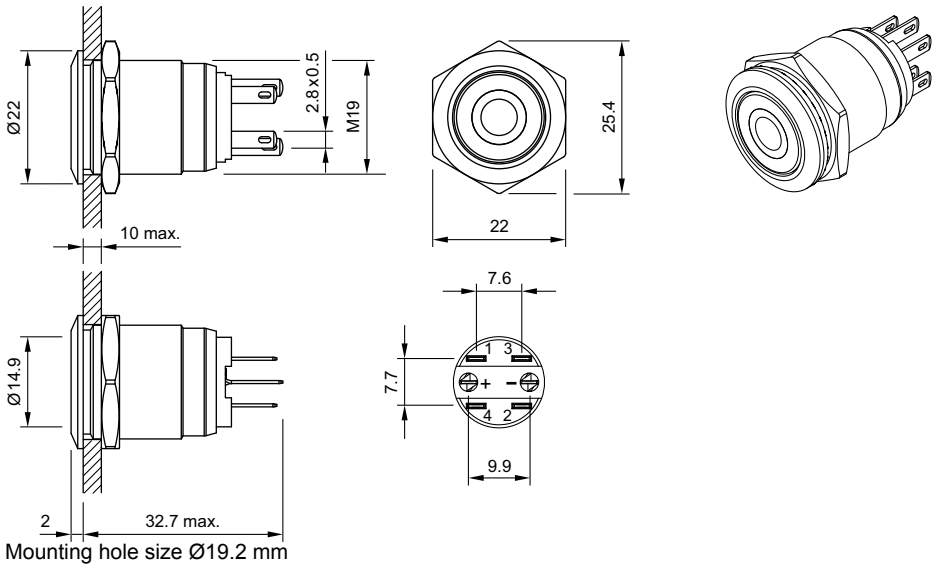
Mounting hole size Ø19.2 mm

6 Pushbutton Ø16 mm and Ø19 mm page 4



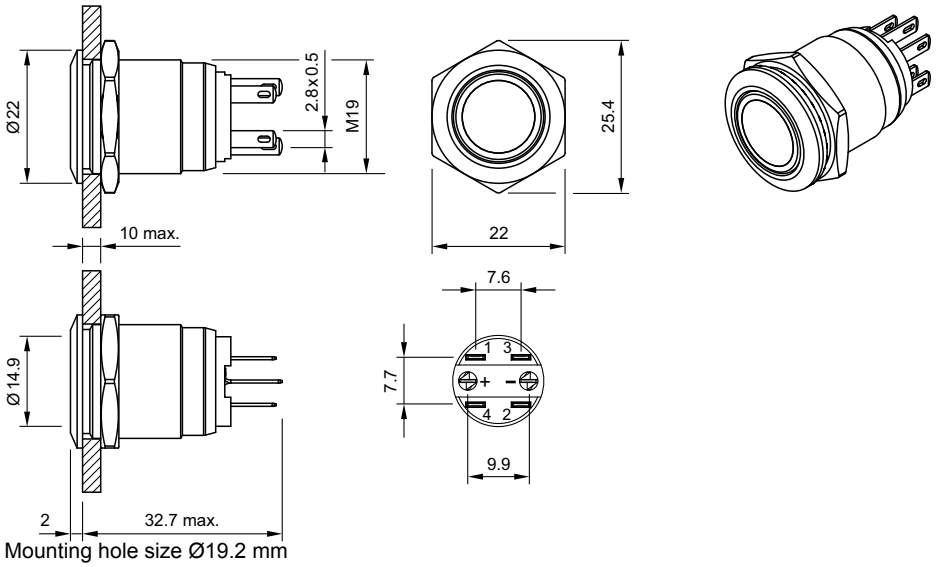
Mounting hole size Ø19.2 mm

7 Illuminated pushbutton Ø19 mm page 5



Mounting hole size Ø19.2 mm

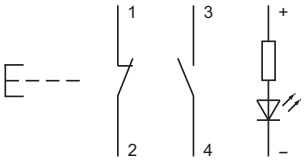
8 Illuminated pushbutton Ø19 mm page 6



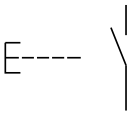
Mounting hole size Ø19.2 mm

Circuit drawing

1 Illuminated pushbutton Ø19 mm from page 5



2 Pushbutton Ø16 mm and Ø19 mm page 4



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