

P012...D P016...D P020...D

PHOENIX CAM SWITCHES WITH TYPE "D" BASE MOUNTING AND DIRECT COMMAND (12 A / 16 A / 20 A)

CODE READING 2
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Before use, read this booklet carefully to acquaint yourself with the features of the product. This booklet is an integral part of the product and therefore must be kept until the product is dismissed.



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P0 and PX series cam switches are designed and manufactured according to IEC international standard and EN European regulations.



Any improper installation or any tampering of the device may cause serious personnel injury or property damage, therefore, the installation and maintenance must be performed by specialized and authorized personnel.



The use of this device is not allowed in environment with a potentially explosive atmosphere or in presence of corrosive substances and in salt spray.

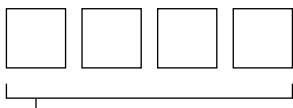
ATTENTION
 Before any installation or maintenance operation, disconnect the power supply to the system. Before restoring the power supply, make sure that all connections to the device have been made correctly. Giovenzana International B.V. disclaims any responsibility for any damage to things and people caused by non-compliance with the rules described here.

Cam switches involved in this instruction manual:

Series	Mounting	Terminal protection class	AC-21A (690 V)	AC-23A (400 V)
P012...D	Base with direct command	IP20	12 A	10 A
P016...D			16 A	14 A
P020...D			20 A	16 A

Read the page with the code reading for further useful information on the product in your possession. This instruction manual illustrates features and procedures relating to the products in the Giovenzana catalog. The specifications on p.3 and the mounting instructions on p.10 and following, are also valid for custom products derived from one of the series illustrated in this manual.

CODE READING



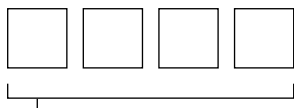
Series

Specifications: p.3

P012 12 A, IP20 contacts

P016 16 A, IP20 contacts

P020 20 A, IP20 contacts



Electrical scheme

Reference table: p.7

ON-OFF switches 0-1

0001 1 pole

0002 2 poles

0003 3 poles

0004 4 poles

0005 5 poles

0006 6 poles

Changeover switches 1-0-2

0008 1 pole

0009 2 poles

0010 3 poles

Ammeter and voltmeter switches

0019 Ammeter selector switch 1 pole for 3 current transformers

0020 Voltmeter selector switch phase-neutral

0021 Voltmeter selector switch phase-phase

0023 Voltmeter selector switch phase-phase and phase-neutral

0024 Voltmeter selector switch phase-phase and 1 phase-neutral



Cam switch mounting type

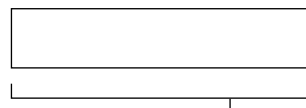
Overall dimensions: p.6

D DIN mounting 46 mm with actuator
(equipped with typical actuator p.n. 027/....)

S custom product (these products have their own
electrical scheme, not available in this document)

Actuator code

Each cam switch series can be fitted with one or more actuators with their own code. This document provides the installation instructions for each cam switch series and its matching actuators. Actuators reference table: p.9



SPECIFICATIONS

General characteristics

Protection class	control	EN 60529 UL50 / NEMA	IP65 Type 1 - 4 - 4X
	control with knob only		IP40
	terminals		IP20
Material group		EN 60947-1	II
Pollution grade		EN 60947-1	3
Flammability		UL94	V0 (live electrical parts)
Ambient temperature	operating		-40 ... +85°C
	storage		-40 ... +70°C
Climate withstand		IEC 68 part 2-3 IEC 68 part 2-30	damp heat, steady state damp heat, cyclic
Terminal screw identification	conforming to		EN50013
Connections	terminal block caliber	EN60947-1	A3
	terminal screw		M3.5
	tightening torque	EN60947-1 UL508	0.8 N·m (7.2 lb·in) 7.5 lb·in (0.85 N·m)
Connectable section	flexible conductors		1 × 0.75 ... 4 mm ² or 2 × 0.75 ... 2.5 mm ² AWG 18 ... 10
	solid conductors		1 × 0.75 ... 4 mm ² or 2 × 0.75 ... 2.5 mm ² AWG 18 ... 10
Contacts			double breaking
Opening angles			30° - 45° - 60° - 90°
Mechanical lifetime	@ 120 operations / hour		1 million cycles
Electrical lifetime	@ 120 operations / hour		P012... 1 million cycles P016... 0.75 million cycles P020... 0.75 million cycles

EN 60947-3 characteristics

		P012...	P016...	P020...
Rated operating voltage	U _e	690 V	690 V	690 V
Rated insulation voltage	U _i	690 V	690 V	690 V
Rated impulse withstand voltage (sectionable)	U _{imp}	4 kV	4 kV	4 kV
Rated thermal current	I _{th}	16 A	20 A	25 A
Rated enclosed thermal current	I _{the}	12 A	16 A	20 A
Frequency		50/60 Hz	50/60 Hz	50/60 Hz

Alternate current

Rated operating current		le		P012...		P016...		P020...	
AC-21A	Switching of resistive loads, including moderate overloads		690 V	12 A		16 A		20 A	
AC-22A	Switching of mixed resistive and inductive loads, including moderate overloads		690 V	12 A		16 A		20 A	
AC-23A	Switching of motor loads or other highly inductive loads	1 phase - 1 pole	110 V	12 A	1.1 kW	14 A	1.5 kW	18 A	2 kW
			230 V	12 A	2.2 kW	14 A	3 kW	18 A	4 kW
		3 phases - 3 poles	230 V	10 A	3 kW	14 A	3 kW	16 A	5 kW
			400 V	10 A	5.5 kW	14 A	7.5 kW	16 A	9 kW
			500 V	10 A	7.5 kW	14 A	10 kW	16 A	11 kW
690 V	10 A	7.5 kW	14 A	10 kW	16 A	12.5 kW			
AC-3	Squirrel-cage motors: starting, switches off motors during running time	1 phase - 1 pole	110 V	10 A	0.75 kW	12 A	1.1 kW	16 A	1.5 kW
			230 V	10 A	2 kW	12 A	2.2 kW	16 A	3.5 kW
		3 phases - 3 poles	230 V	8 A	2.2 kW	10 A	3 kW	12 A	4 kW
			400 V	8 A	4 kW	10 A	5 kW	12 A	6 kW
			500 V	8 A	5.5 kW	10 A	7.5 kW	12 A	8 kW
690 V	6 A	5.5 kW	8 A	7.5 kW	10 A	9 kW			
AC-23A	Nominal breaking capacity (cosφ 0.45)		230 V	80 A		104 A		128 A	
			400 V	80 A		104 A		128 A	
			500 V	80 A		112 A		128 A	
			690 V	80 A		112 A		128 A	
Power dissipation for each pole				0.3 W		0.35 W		0.4 W	

Direct current

Rated operating current		le		P012...		P016...		P020...	
DC-21A	Switching resistive loads with light overloads	1 phase	50 V	10 A		12 A		16 A	
DC-22A	Switching resistive loads with light overloads	1 phase	30 V	8 A		10 A		12 A	

Short circuit characteristics

		P012...	P016...	P020...
Rated short-time short circuit withstand current (1 s) I_{cw}		300 A	300 A	300 A
Rated short circuit making capacity	I_{cm}	1200 A	1200 A	1200 A
Conditional rated short circuit withstand current		5 kA	5 kA	5 kA
Fuse rating (type gG)	690 V	20 A	20 A	20 A

UL 508 characteristics

		P012...		P016...		P020...	
General use	600 V AC	12 A		16 A		20 A	
Standard motor load	1 phase - 2 poles	120 V AC	0.5 HP 9.8 FLA	1 HP 16 FLA	1.5 HP 20 FLA	1.5 HP 20 FLA	2 HP 12 FLA
		240 V AC	1 HP 8 FLA	1.5 HP 10 FLA	2 HP 12 FLA		
	3 phases - 3 poles	200 V AC	1.5 HP 6.9 FLA	3 HP 11.04 FLA	5 HP 17.5 FLA	5 HP 17.5 FLA	5 HP 15.2 FLA
		240 V AC	3 HP 9.6 FLA	5 HP 15.2 FLA	5 HP 15.2 FLA		
		480 V AC	5 HP 7.6 FLA	7.5 HP 11 FLA	10 HP 14 FLA	10 HP 14 FLA	
		600 V AC	5 HP 6.1 FLA	7.5 HP 9 FLA	10 HP 11 FLA		

Marking

Compliance by passed test

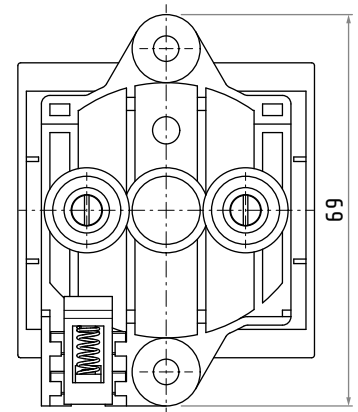
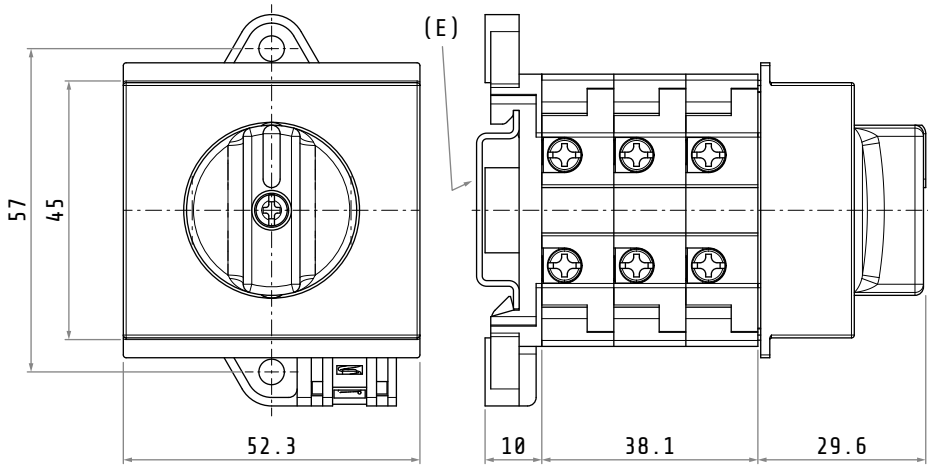


Approved

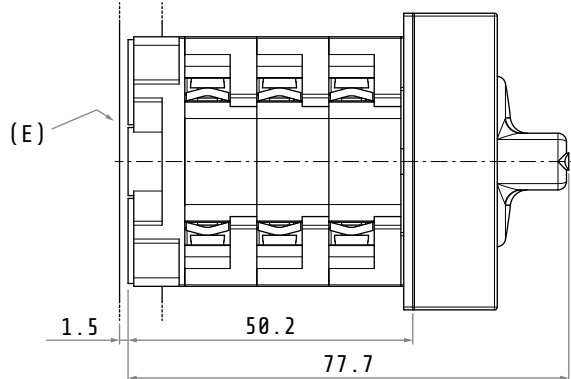


OVERALL DIMENSIONS

P012...D / P016...D / P020...D



Terminal protection class IP20



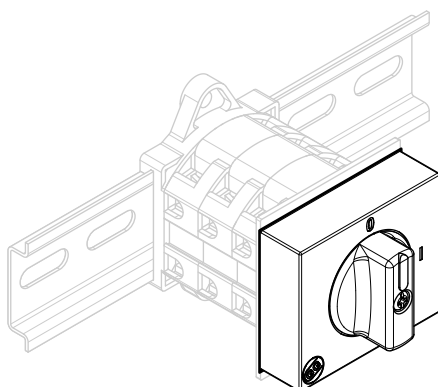
Dimensions in mm
Illustrations NOT in scale

(E) DIN rail 35 mm (EN 46277/3)

Please note

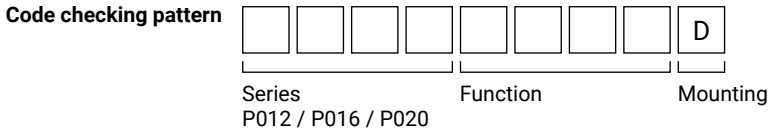
The standard cam switches for DIN mounting with actuator are built with 3 wafers.

The standard cam switches for DIN mounting with actuator are typically equipped with actuator p.n. 027/.... (separated and to be assembled).



This installation implies DIN rails in 46 mm standard boxes like in the picture on the left.

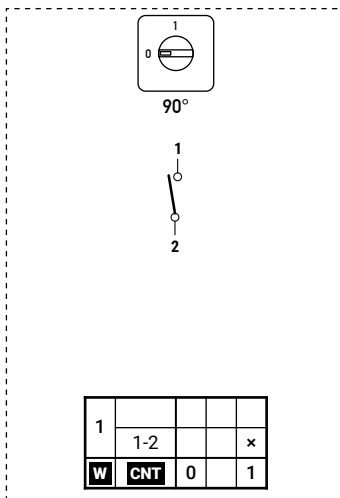
ELECTRICAL SCHEMES



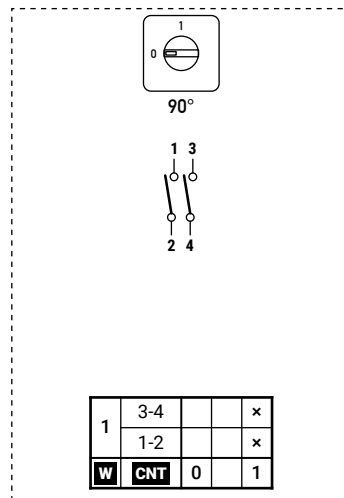
Function	N. of wafers	Electrical scheme
ON-OFF switches 0-1		
0001 ON-OFF switch 1 pole	1	p.7
0002 ON-OFF switch 2 poles	1	
0003 ON-OFF switch 3 poles	2	
0004 ON-OFF switch 4 poles	2	
0005 ON-OFF switch 5 poles	3	
0006 ON-OFF switch 6 poles	3	
Changeover switches 1-0-2		
0008 Changeover switch 1 pole	1	p.8
0009 Changeover switch 2 poles	2	
0010 Changeover switch 3 poles	3	
Ammeter and voltmeter switches		
0019 Ammeter selector switch 1 pole for 3 current transformers	3	p.8
0020 Voltmeter selector switch phase-neutral	2	
0021 Voltmeter selector switch phase-phase	2	
0023 Voltmeter selector switch phase-phase and phase-neutral	3	
0024 Voltmeter selector switch phase-phase and 1 phase-neutral	3	

ON-OFF switches 0-1

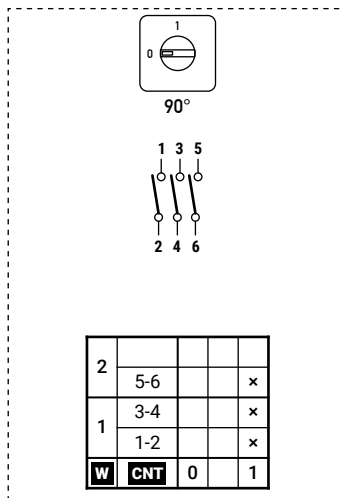
0001 • 1 pole



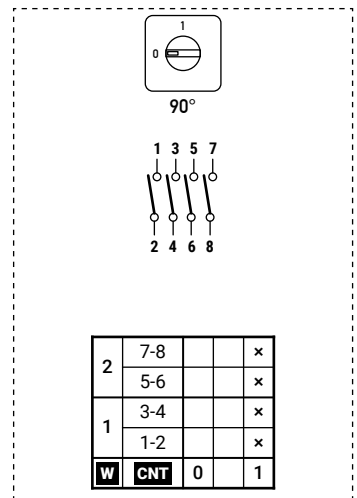
0002 • 2 poles



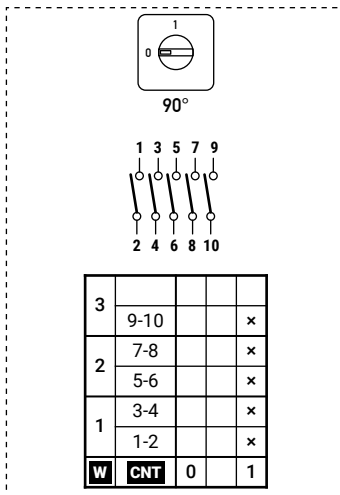
0003 • 3 poles



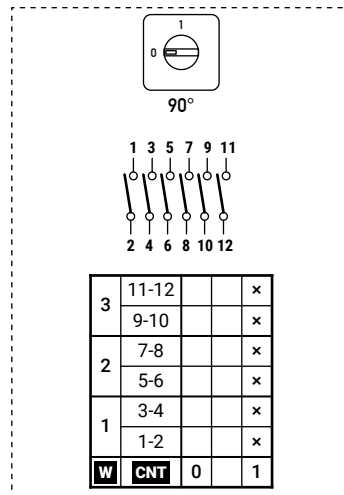
0004 • 4 poles



0005 • 5 poles



0006 • 6 poles



W Wafers
CNT Contacts

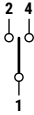
Changeover switches

Ammeter and voltmeter switches

0008 • 1 pole



45°

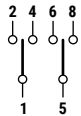


1	3-4			x
	1-2	x		
W	CNT	1	0	2

0009 • 2 poles



45°

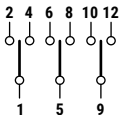


2	7-8			x
	5-6	x		
1	3-4			x
	1-2	x		
W	CNT	1	0	2

0010 • 3 poles



45°

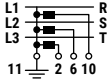


3	11-12			x
	9-10	x		
2	7-8			x
	5-6	x		
1	3-4			x
	1-2	x		
W	CNT	1	0	2

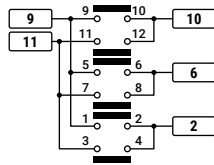
0019 • Ammeter selector switch
1 pole for 3 current transformers



90°



11 (A) 9

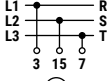
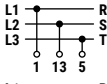


3	11-12	x-x		x-x-x-x-x
	9-10	x-x-x		
2	7-8	x-x-x-x-x		x-x-x
	5-6			x-x-x-x
1	3-4	x-x-x-x-x-x-x		x-x
	1-2			x-x-x-x
W	CNT	0	1	2

0022 • Voltmeter selector switch
phase-phase for two circuits



45°



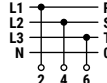
2 (V) 10

4	15-16	x-x		
	13-14			x-x
3	11-12	x		
	9-10			x
2	7-8	x		
	5-6			x
1	3-4	x	x	
	1-2			x-x
W	CNT	L3-L1 L2-L3 L1-L2	1	0

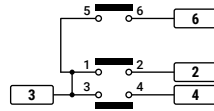
0020 • Voltmeter selector switch
phase-neutral



45°



3 (V) N

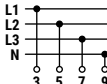


2	5-6			x
1	3-4			x
	1-2	x		
W	CNT	1	L1-N L2-N L3-N	

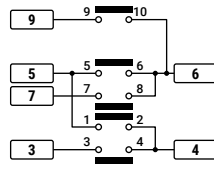
0024 • Voltmeter selector switch
phase-phase and 1 phase-neutral



45°



4 (V) 6




3	9-10				x
2	7-8	x-x			
	5-6				x
1	3-4	x	x		x
	1-2	x			
W	CNT	L3-L1 L2-L3 L1-L2	0	L1-N	

ACTUATORS





Cam switches / actuators matrix






Check the "Operation schemes matrix" (p.9) to identify the available operation scheme for each operator. Each actuator is referenced to the relevant page of the mounting instructions.

Series and size	P012 / P016 / P020	
Terminal protection class	IP20	
Mounting type	D	
45x52	Grey/Black	
screw	IP65	027/... (p.10)

Operation schemes matrix

Actuator code example: 027/0001

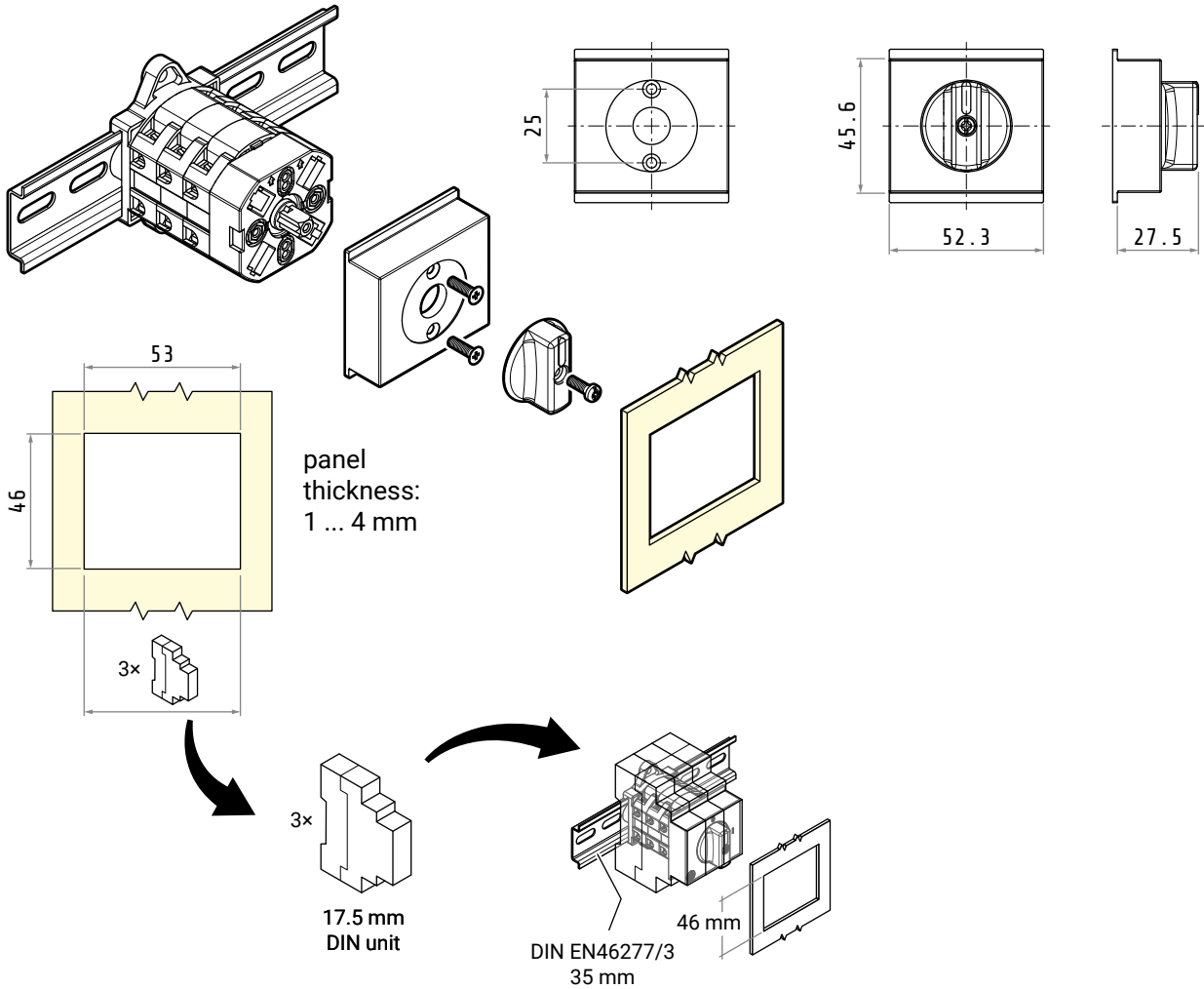
	ON-OFF switches 0-1  90°	Changeover switches 1-0-2 / Motor switches  45°	Ammeter switches  90°
 027/...	0001	0008	0019

	Voltmeter switches			
	 45°	 45°	 45°	 45°
 027/...	0020	0021	0023	0024

MOUNTING INSTRUCTIONS

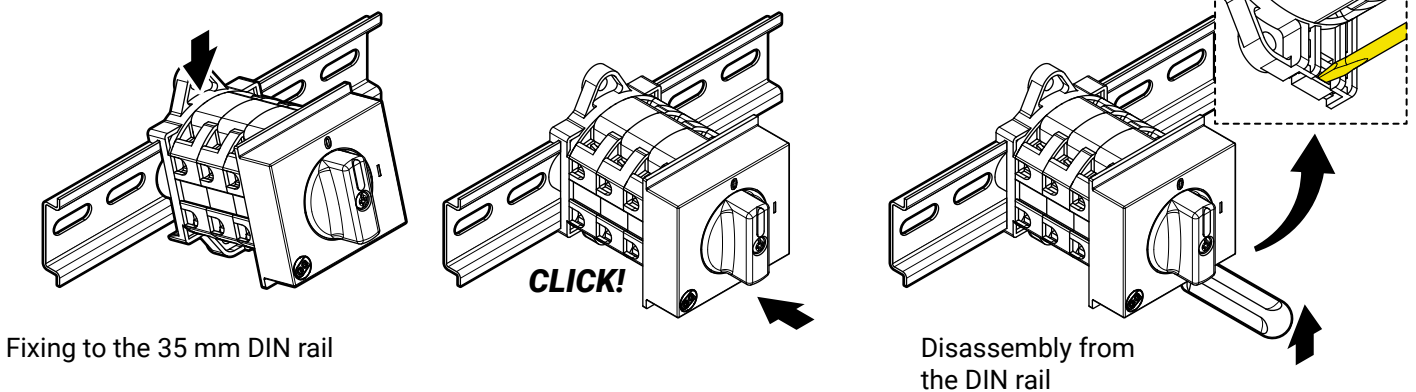
027/...

screw fixing



The overall dimensions of the cam switch equipped with the 027/... actuator match the dimensions of three 17.5 mm standard DIN units

Mounting





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