KRAUS & NAIMER

BLUE LINE SWITCHGEAR

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SINCE 1907

Catalog 100

CL Switches 10 A-20 A
C, CA, CAD Switches 10 A-315 A
L Switches 350 A-2400 A

KRAUS & NAIMER

The development of the Blue Line rotary switch, contactor and motor starter product ranges is based on more than seventy-five years experience by Kraus & Naimer in the design and manufacture of electrical switchgear. Kraus & Naimer pioneered the introduction of the cam operated rotary switch and continues to be recognized as the world leader in that product field.

BLUE LINE

Blue Line products are protected by numerous patents throughout the industrial world. They are built to national and international standards and designed to withstand adverse temperatures and climates.

Blue Line products are accepted and universally recognized for their quality and workmanship. They are supported by a worldwide sales and service organization.

The Kraus & Naimer Registered Trademark

WORLDWIDE SYMBOL
FOR QUALITY SWITCHGEAR

Disconnectors and Main Switches acc. to IEC 60947-3 see Catalog 500

Contents

Construction Data

The load switches of the C, CA, CAD and CL-series offer a solution for most cam switch applications. Different contact designs, contact materials and terminals allow for their use as control switches, instrumentation switches and motor control switches, as well as in electronic circuitry and in aggressive environments according to IEC 60947-3 and VDE 0660 part 107.

The stage is the basis for all switches and can be supplied with a maximum of 2 contacts. The terminals are accessible from the side. CA and CAD switches are supplied with open terminals to facilitate wiring and are protected against accidental finger contact according to EN 50274, VDE 0660 part 514 and BGV A2. Captive plus-minus terminal screws and integrated screwdriver guides also reduce wiring.

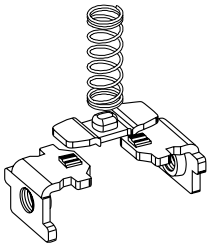
The switches of the new CL-series are supplied with IDC terminals (**I**nsulation **D**isplacement **C**onnection) instead of the conventional screw type terminals. The stripping or preparation of the insulation is no longer required. Eliminate errors due to i.e., stripped end of the conductor too long or too short, incorrect sleeves used, sleeves crimped incorrectly or wrong crimping tool is used, terminal screws not tightened properly etc. The CL switches reduce installation time by 60 %-70 % compared to the screw type terminals. This translates to significant cost savings. For connecting 2 conductors to a terminal an additional screw terminal with plus-minus screw is available.

If a positive manual operation or a higher DC rating is required, many of these switches can be fitted with a snap action latching mechanism - suffix „S“ - to the switch type.

The cam-operated switches L350-L2000 are continuous current rated for off-load switching. They may be used to switch resistive or low inductive loads.

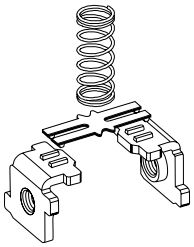
Special Contact Systems

CA4/CA4-1



High contact reliability by multiple cross-point contacts, electronic compatible, CA4 with 1 μ and CA4-1 with 35 μ gold plating.

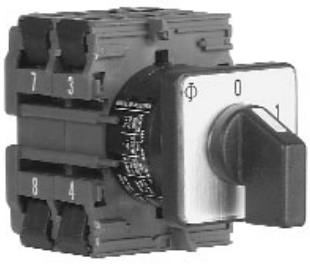
CAD11/CAD12



H-bridge with „cross-wire“ contact system, high contact reliability also at lower voltages. CAD11 with gold-plated contacts, CAD12 with silver contact.

Type	Size	Possible Switching Angles	Max. No. of Stages
CA4, CA4-1	S00	30°, 45°, 60°, 90°	9
CL4	S00	30°, 45°, 60°, 90°	8
CA10-CA25	S0	30°, 45°, 60°, 90°	12
CA10S-CA25S	S0	60°	on request
CAD11, CAD12	S0	30°, 45°, 60°, 90°	12
CL10	S0	30°, 45°, 60°, 90°	10
CA10B-CA25B	S1	30°, 45°, 60°, 90°	12
C26, C32, C42	S1	20°, 30°, 45°, 60°, 90°	12
C26S, C32S, C42S	S1	60°	on request
C43, C80, C125	S2	20°, 30°, 45°, 60°, 90°	12
C315	S3	20°, 30°, 45°, 60°, 90°	12
L350/51, L630/31, L1000/01, L1250/51	S2	30°, 45°, 60°, 90°	12
L400, L600, L800, L1200, L1600, L2000	S3	30°, 45°, 60°, 90°	12

CL Switches

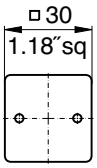
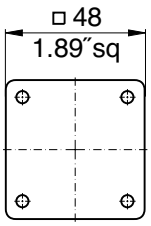
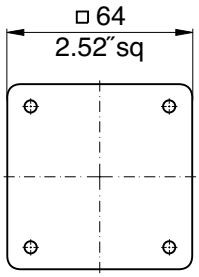
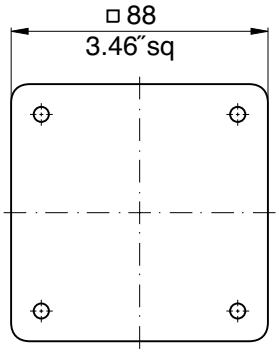
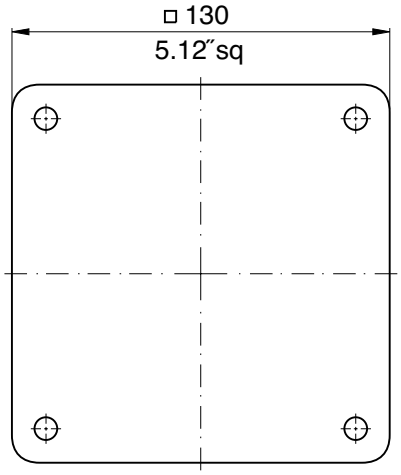


CA and CAD Switches

C Switches

L Switches

Above illustrates the standard terminal positions.

Switch Size		Type	According to IEC 60947-3/VDE 0660 part 107			
			Insulation Voltage[1]	Thermal Current	Motor Rating 3 x 380 V-440 V	
			U_i	I_u/I_{th}	AC-23	AC-3
			V	**A**	**kW**	**kW**
S00		**CA4**	440	10	3	2,2
		CA4-1	440	10	3	2,2
		CL4	440	10	3	2,2
S0		**CA10**	690	20	7,5	5,5
		CA11	690	20	7,5	5,5
		CA20	690	25	11	7,5
		CA25	690	32	15	11
		CAD11	600	6	-	-
		CAD12	600	6	-	-
		CL10	690	20	7,5	5,5
S1		**CA10B**	690	20	7,5	5,5
		CA11B	690	20	7,5	5,5
		CA20B	690	25	11	7,5
		CA25B	690	32	15	11
		C26	690	32	15	11
		C32	690	50	22	15
		C42	690	63	30	18,5
S2		**C43**	690	63	30	18,5
		C80	690	115	45	30
		C125	690	150	75	37
		L350	690	350	90	37
		L351	690	350	90	37
		L630	690	630[2]	90	37
		L631	690	630[2]	90	37
		L1000	690	1000[2]	90	37
		L1001	690	1000[2]	90	37
		L1250	690	1250[2]	90	37
		L1251	690	1250[2]	90	37
S3		**C315**	690	315	132	55
		C316[3]	1000	315	132	55
		L400	690	500	132	55
		L600	690	800[2]	132	55
		L800	690	1100[2]	132	55
		L1200	690	1450[2]	132	55
		L1600	690	1900[2]	132	55
		L2000	690	2400[2]	132	55

For further technical details, refer to pages 40-43.
To furnish with gold contacts and quick connects see page 4.

[1]Valid for lines with grounded common neutral termination, overvoltage category III, pollution degree 3. Values for other supply systems on request. [2]Ambient temperature 35 °C max. [3]Additional switch functions on request.

How to order

Disconnectors and Main Switches according to IEC 60947-3 see Catalog 500

Three types of data (shown below) are required for ordering Blue Line cam-operated switches. Code numbers for ordering are shown in this catalog.

1. Type of Switch

The type of switch required may be easily selected by referring to the table on page 3 which shows the thermal current, power rating and dimensions of each switch. For further technical details, refer to pages 40-43. Variations of contacts and terminals are shown below.

2. Switch Function

The code numbers for standard switches shown on pages 6-28 indicate the switch function, escutcheon plate, handle and any optional extras.

Additional coding to modify type and color of handle and escutcheon plate is explained below.

3. Type of Mounting

Types of mounting are shown on pages 29-35. Catalog **101** describes enclosures and optional extras.

Specify the mounting code to indicate required mounting.

CA10	A202-600	VE

Type of Switch

Extending the switch type coding the following combinations will define:

Amendment	Definition	For switch types
-1	with gold contacts[1]	CA10, CA11, CA10B, CA11B
-4	with quick connects	CA4
B	S0 switches with latching mechanism size S1	CA10, CA11, CA20, CA25, CAD12
C	S1 switches with latching mechanism size S2	C26, C32
L	with lockout-relay w/o manual release for std. sw.	CA10, C26, C32, C42
M	with lockout-relay with manual release for std. sw.	C26, C32, C42
X	with power failure release	CA10, CA11, CA20, CA25, CAD12, C26, C32, C42
Y	with power failure release and trip-free release	CA10, CA11, CA20
S	with snap action	CA10, CA11, CA20, CA25, C26, C32, C42 with 60° switching
R	with spring return latching mechanism	CA10

Example: Coding for switch type **CA10** with gold contacts is **CA10-1**.

Modification of Switches

The part number for switch function and options may be modified in cases where items are required other than standard. The modification may involve the escutcheon plate inscription, color combination of escutcheon plate and handle, type of escutcheon plate and handle or the optional extra.

Switch Size	Escutcheon Plate Frame	Handle	Escutcheon Plate Backing	Escutcheon Plate Lettering	Dash Number
S0, S1, S2, S3	electro-gray	electro-gray	brushed alu	black	-100
S0, S1, S2, S3	electro-gray	electro-gray	black	mat silver	-500
S00, S0, S1, S2, S3	black	black	brushed alu	black	-600
S00, S0, S1, S2, S3	black	black	black	mat silver	-700

[1]Technical data on request.

How to order

Modification of Switches

Color combinations of escutcheon plate and handle

The standard switch consists of a transparent escutcheon plate with brushed aluminum backing and black inscription. The escutcheon plate frame is black as well as the handle. Page 4 shows further color combinations of escutcheon plate and handle which are available. The appropriate dash number must be substituted in the switch function coding to specify other color combinations as required.

Example: The complete coding for switch type CA10 with a 3 pole ON/OFF switch function, electro-gray handle and electro-gray escutcheon plate frame with brushed aluminum backing and black inscription which reads 0-1 is as follows: **CA10 A202-100 E**.

The following is a list of special programs for escutcheon plate and handle combinations. They may be obtained by specifying any one of the following two (2) digit dash numbers as a part of the overall dash number. It is still necessary to prefix these two digit numbers with the first digit which represents the color combination desired.

Special programs for escutcheon plate and handle combinations

-000 = without escutcheon plate, without handle
- .01 = without escutcheon plate
- .02 = without handle
- .03 = with square escutcheon plate without lettering
- .04 = with rectangular escutcheon plate without lettering
- .05 = with square escutcheon plate without lettering and without handle
- .06 = with rectangular escutcheon plate without lettering and without handle
- .07 = standard escutcheon plate, without lettering on rectangular section
- .08 = with F-handle
- .09 = with P-handle
- .10 = escutcheon plate with frame and fixation ring only (if using switches with single hole mounting: **- .16**)
- .11 = without escutcheon plate, but with handle bearing plate
- .12 = with yellow escutcheon plate backing and red handle
- .14 = with B-handle
- .16 = escutcheon plate with frame and fixation ring only, if using switches with single hole mounting
- .17 = standard escutcheon plate and rectangular add-on escutcheon plate, if using switches with single hole mounting FT2

Example: The complete coding for switch type CA10 with a 3 pole ON/OFF switch function with electro-gray escutcheon plate frame, square escutcheon plate without lettering, brushed aluminum plate backing and electro-gray handle reads as follows: **CA10 A202-103 E**.

Handles, Escutcheon Plates and Optional Extras

The handles for standard switches shown on pages 6-28 are suitable for mounting units with four hole mounting. Alternative types of handles available are illustrated on pages 29-35.
When a handle, escutcheon plate or optional extra is required but not covered by the dash number, the code number for the selected component should be entered separately. A comprehensive range of available standard escutcheon plates is illustrated on pages 36 and 37. Non-standard or special escutcheon plate engravings are available at extra cost.
The large number of optional extras and enclosures is covered in Catalog **101**.

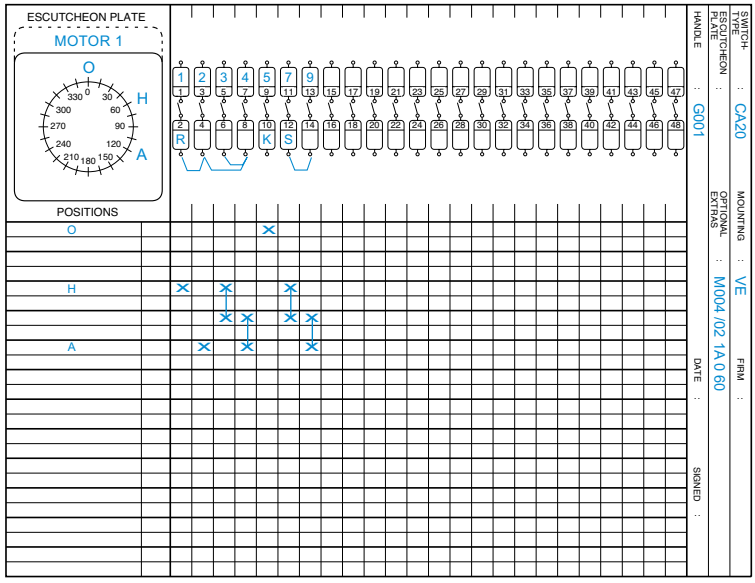
Switch Size

Blue Line switches are available in sizes S00, S0, S1, S2 and S3. These size codes indicate the dimensions of the mounting, the escutcheon plate and the handle, as well as the size of optional devices and enclosures.
Page 3 lists these sizes and the various switch types they include.

Ordering of Special Switches and Escutcheon Plates

When ordering special switches and escutcheon plates it is advisable to use our order form, as illustrated. The customer's requirements are shown in blue as an example.

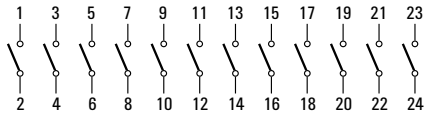
For technical reasons, it may not be possible to follow the sequence of contacts requested by the customer. The final contact development which is sent with every switch will show the customer's original terminal markings.



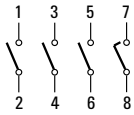
Order forms are available on request.

ON/OFF Switches with 60° Switching

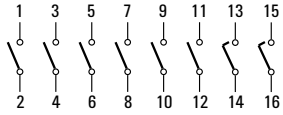
Function	Escutch. Plate	Type/Handle CA4 CA4-1 CL4	Type/Handle CAD.. CA10- CA25 CL10	Type/Handle CA10B- CA25B	Type/Handle C26- C315	Code	Stages	Connection Diagram
1 pole						A200-600	1	
2 pole						A201-600	1	
3 pole						A202-600	2	
3 pole	with red handle					A202-626	2	
3 pole	with V850 padlock attachment					A202-627	2	
4 pole						A203-600	2	
4 pole	1 pole preclose 6°[1]					A653-600	2	
5 pole						A341-600	3	
6 pole						A342-600	3	
7 pole						A343-600	4	
8 pole						A344-600	4	
8 pole	2 pole preclose 6°[1]					A654-600	4	
9 pole						A345-600	5	
10 pole						A346-600	5	
11 pole						A347-600	6	
12 pole						A348-600	6	
1 pole						A200-620	1	
2 pole						A201-620	1	
3 pole						A202-620	2	
4 pole						A203-620	2	
4 pole	1 pole preclose 6°[1]					A653-620	2	
5 pole						A341-620	3	
6 pole						A342-620	3	
7 pole						A343-620	4	
8 pole						A344-620	4	
8 pole	2 pole preclose 6°[1]					A654-620	4	
9 pole						A345-620	5	
10 pole						A346-620	5	
11 pole						A347-620	6	
12 pole						A348-620	6	
1 pole						A200-621	1	
2 pole						A201-621	1	
3 pole						A202-621	2	
4 pole						A203-621	2	
4 pole	1 pole preclose 6°[1]					A653-621	2	
5 pole						A341-621	3	
6 pole						A342-621	3	
1 pole						A200-622	1	
2 pole						A201-622	1	
3 pole						A202-622	2	
4 pole						A203-622	2	
4 pole	1 pole preclose 6°[1]					A653-622	2	
5 pole						A341-622	3	
6 pole						A342-622	3	
1 pole						A200-623	1	
2 pole						A201-623	1	
3 pole						A202-623	2	
4 pole						A203-623	2	
4 pole	1 pole preclose 6°[1]					A653-623	2	
5 pole						A341-623	3	
6 pole						A342-623	3	
1 pole						A200-624	1	
2 pole						A201-624	1	
3 pole						A202-624	2	
4 pole						A203-624	2	
4 pole	1 pole preclose 6°[1]					A653-624	2	
5 pole						A341-624	3	
6 pole						A342-624	3	
1 pole						A200-625	1	
2 pole						A201-625	1	
3 pole						A202-625	2	
4 pole						A203-625	2	
4 pole	1 pole preclose 6°[1]					A653-625	2	
5 pole						A341-625	3	
6 pole						A342-625	3	



1-12 pole

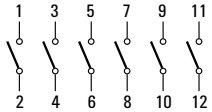
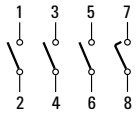
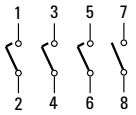
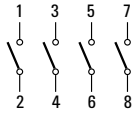
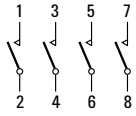


4 pole 1 pole preclose 6°

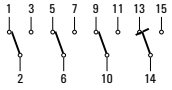
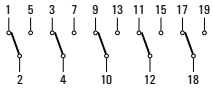
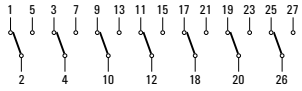
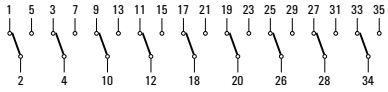
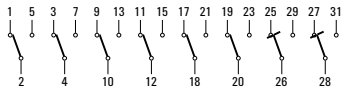
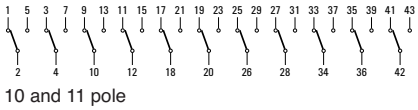
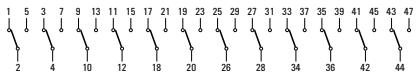
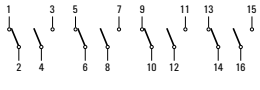
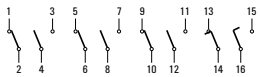
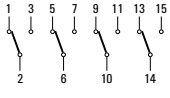
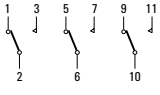


8 pole 2 pole preclose 6°

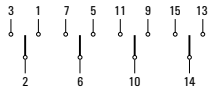
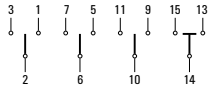
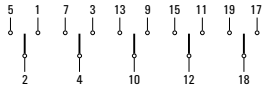
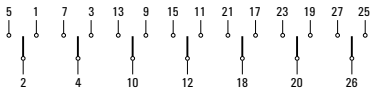
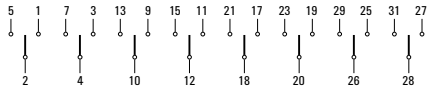
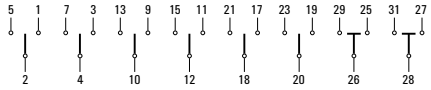
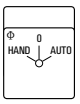
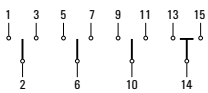
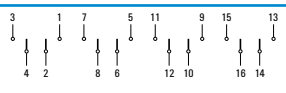
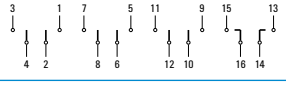
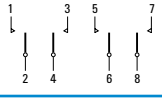
[1]for use in a three phase four-wire system with switched neutral

Function	Escutch. Plate	Type/Handle CA4 CA4-1 CL4	CAD.. CA10- CA25 CL10	CA10B- CA25B	C26- C315	Code	Stages	Connection Diagram
ON/OFF Switches with 90° Switching								
1 pole contacts 2 pole preclose 30° 3 pole						A290-600 A291-600 A292-600	1 1 2	
4 pole 4 pole 1 pole preclose 60° 4 pole 3 pole preclose 30°						A324-600 A293-600 A327-600	2 2 2	 1, 2, 3, 4, 5 and 6 pole
5 pole contacts 6 pole preclose 30°						A325-600 A326-600	3 3	
1 pole contacts 2 pole preclose 30° 3 pole						A290-620 A291-620 A292-620	1 1 2	 4 pole 1 pole preclose 60°
4 pole 4 pole 1 pole preclose 60° 4 pole 3 pole preclose 30°						A324-620 A293-620 A327-620	2 2 2	
5 pole contacts 6 pole preclose 30°						A325-620 A326-620	3 3	 4 pole 3 pole preclose 30°
3 pole 360° rotation	 					A208-600 A208-620	2 2	
3 pole for foot operation					C26- C42	A386-600	2	
ON/OFF Switches with 30° Switching								
1 pole 2 pole 3 pole 4 pole						A100-600 A101-600 A102-600 A103-600	1 1 2 2	 1-4 pole
1 pole with spring return 2 pole with spring return 3 pole with spring return 4 pole with spring return						A204-600 A205-600 A206-600 A207-600	1 1 2 2	 1-4 pole
1 pole with spring return 2 pole with spring return 3 pole with spring return 4 pole with spring return						A204-620 A205-620 A206-620 A207-620	1 1 2 2	

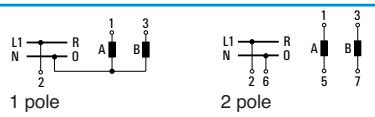
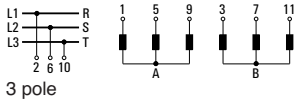
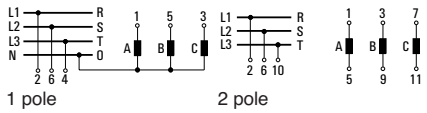
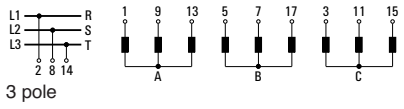
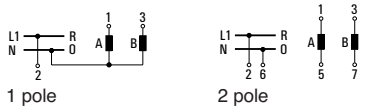
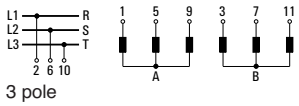
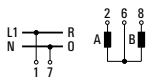
[1]not available for switch type CA25

Function	Escutch. Plate	Type/Handle CA4 CA4-1 CL4	CAD.. CA10- CA25 CL10	CA10B- CA25B	C26- C315	Code	Stages	Connection Diagram
Double-throw Switches without „OFF“ 60° Switching								
1 pole						A220-600	1	 1-4 pole
2 pole						A221-600	2	
3 pole						A222-600	3	
4 pole						A223-600	4	
4 pole 1 pole preclose 6°[3]						A673-600	4	 4 pole 1 pole preclose 6°
5 pole						A369-600	5	 5 pole
6 pole						A370-600	6	
7 pole						A371-600	7	 6 and 7 pole
8 pole						A372-600	8	
8 pole 2 pole preclose 6°[3]		[2]				A972-600	8	 8 and 9 pole
9 pole						A373-600	9	
10 pole						A374-600	10	 8 pole 2 pole preclose 6°
11 pole			[4]			A375-600	11	 10 and 11 pole
12 pole			[4]			A376-600	12	 12 pole
Double-throw Switches without „OFF“ with electrically isolated contacts								
1 pole						A720-600	1	 1-4 pole
2 pole						A721-600	2	
3 pole						A722-600	3	
4 pole						A723-600	4	
4 pole 1 pole preclose 6°[3]						A973-600	4	 4 pole 1 pole preclose 6°
1 pole with spring return						A795-600	1	 1 pole with spring return
Double-throw Switches without „OFF“ 30° Switching								
1 pole						A120-600	1	 1-4 pole
2 pole						A121-600	2	
3 pole						A122-600	3	
4 pole						A123-600	4	
1 pole with spring return						A295-600	1	 1-3 pole
2 pole with spring return						A296-600	2	
3 pole with spring return			[1]			A297-600	3	
1 pole with spring return						A295-620	1	
2 pole with spring return						A296-620	2	
3 pole with spring return			[1]			A297-620	3	

[1]not available for switch type CA25 [2]not available for switch type CL4 [3]for use in a three phase four-wire system with switched neutral
[4]not available for switch type CL10

Function	Escutch. Plate	Type/Handle CA4 CA4-1 CL4	CAD.. CA10- CA25 CL10	CA10B- C43	C80- C315	Code	Stages	Connection Diagram
Double-throw Switches with Center „OFF“ 60° Switching								
1 pole						A210-600	1	 1-4 pole  4 pole 1 pole preclose 6°  5 pole  6 and 7 pole  8 pole  8 pole 2 pole preclose 6°
2 pole						A211-600	2	
3 pole						A212-600	3	
4 pole						A213-600	4	
4 pole 1 pole preclose 6°[3]						A913-600	4	
5 pole						A361-600	5	
6 pole						A362-600	6	
7 pole						A363-600	7	
8 pole						A364-600	8	
8 pole 2 pole preclose 6°[3]						A664-600	8	
1 pole						A210-620	1	
2 pole						A211-620	2	
3 pole						A212-620	3	
4 pole						A213-620	4	
4 pole 1 pole preclose 6°[3]						A913-620	4	
5 pole						A361-620	5	
6 pole						A362-620	6	
7 pole						A363-620	7	
8 pole						A364-620	8	
8 pole 2 pole preclose 6°[3]						A664-620	8	
1 pole						A210-621	1	
2 pole						A211-621	2	
3 pole						A212-621	3	
1 pole						A210-622	1	
2 pole						A211-622	2	
3 pole						A212-622	3	
1 pole						A210-623	1	
2 pole						A211-623	2	
3 pole						A212-623	3	
1 pole						A210-624	1	
2 pole						A211-624	2	
3 pole						A212-624	3	
4 pole						A213-624	4	
4 pole 1 pole preclose 6°[3]						A913-624	4	
Double-throw Switches with Center „OFF“ 90° Switching								
1 pole						A218-600	1	 1-4 pole
2 pole						A219-600	2	
3 pole						A299-600	3	
4 pole 1 pole preclose 60°					[1]	A294-600	4	
1 pole						A218-620	1	
2 pole						A219-620	2	
3 pole						A299-620	3	
4 pole 1 pole preclose 60°					[1]	A294-620	4	
Double-throw Switches with Center „OFF“ and electrically isolated contacts								
1 pole						A710-600	1	 1-4 pole  4 pole 1 pole preclose 6°
2 pole						A711-600	2	
3 pole						A712-600	3	
4 pole						A713-600	4	
4 pole 1 pole preclose 6°[3]						A963-600	4	
1 pole with spring return					[2]	A714-600	1	 1 and 2 pole
2 pole to center						A715-600	2	

[1]switch type C315 with handle [2]not available for switch type C315 [3]for use in a three phase four-wire system with switched neutral

Function	Escutch. Plate	Type/Handle CA4 CA4-1 CL4	CAD.. CA10- CA25 CL10	CA10B- CA25B	C26- C315	Code	Stages	Connection Diagram
Double-throw Switches with Spring Return to Center								
1 pole with spring return 2 pole to center 3 pole					[2] [3] [4]	A214-600 A215-600 A216-600	1 2 3	 1-3 pole
1 pole 2 pole 3 pole					[2] [3] [4]	A214-620 A215-620 A216-620	1 2 3	
1 pole with spring return 2 pole from left to center 3 pole						A320-600 A321-600 A322-600	1 2 3	 1-3 pole
1 pole 2 pole 3 pole						A320-621 A321-621 A322-621	1 2 3	
General Application Switches								
1 pole 2 Gang 2 pole Switching sequence: 3 pole 0, A, A+B						A310-600 A312-600 A314-600	1 2 3	 1 pole 2 pole
1 pole 2 pole 3 pole						A310-620 A312-620 A314-620	1 2 3	 3 pole
1 pole 3 Gang 2 pole Switching sequence: 3 pole 0, A, A+B, A+B+C						A311-600 A313-600 A315-600	2 3 5	 1 pole 2 pole
1 pole 2 pole 3 pole						A311-620 A313-620 A315-620	2 3 5	 3 pole
1 pole 2 Gang 2 pole Series switching 3 pole Switching sequence: 0, A, B, A+B						A330-600 A331-600 A332-600	1 2 3	 1 pole 2 pole
1 pole 2 pole 3 pole						A330-620 A331-620 A332-620	1 2 3	 3 pole
2 pole 2 Gang Series-parallel Switching Switching sequence: 0, A+B series, A, A+B parallel	 					A339-600 A339-620	2 2	

[1]not available for switch type CA25 [2]not available for switch type C315 [3]available only up to switch type C43 [4]available only for switch type C43