Kraus & Naimer

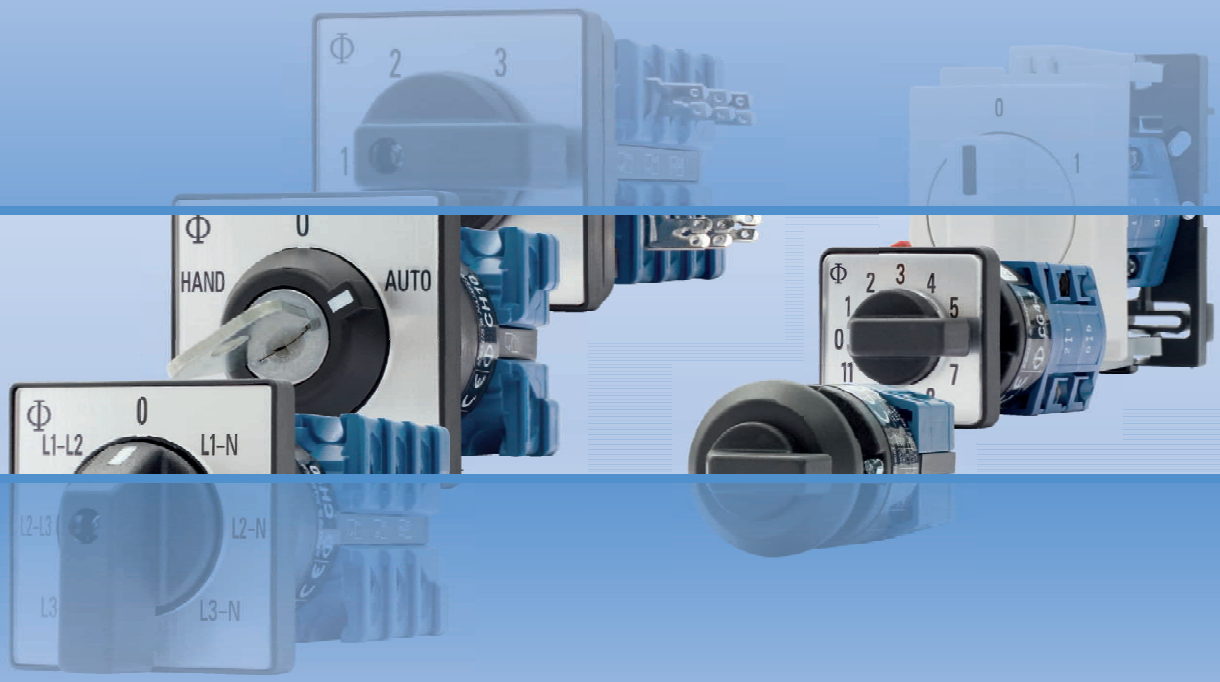
BLUE LINE switchgear

since 1907

Catalog 120
Control Switches

03/2011

CG, CH and CHR type up to 25 A



Kraus & Naimer

The development of the Blue Line rotary switch, contactor and motor starter product ranges is based on more than hundred 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

	Page
Construction Data	2
Dimensions and Nominal Ratings	3
How to order	4, 5
Switch Function and Configuration	
ON/OFF Switches	6, 7
Double-throw Switches	8-10
General Application Switches	10
Coding Switches	11
Multi-step Switches	12-14
Voltmeter Switches	15-17
Ammeter Switches	17-19
Volt-ammeter Switches	19
Control Switches	19, 20
Motor Switches	21-23
Types of Mounting	
Panel Mounting	24-27
Base Mounting	28, 29
Escutcheon Plates	30, 31
Handles	32
International Standards and Approvals	33
Technical Data	34-36
Dimensions	
Panel Mounting	37-40
Base Mounting	41, 42
Overall Switch Lengths	42, 43
Blue Line Switchgear: Summary	44

Construction Data

Cam switches of the CG, CH and CHR-series are designed for universal application and may ideally be used for control switches, instrumentation switches and motor control switches. Different contact designs, contact materials and terminals allow the use as well as in electronic circuitry and in aggressive environments in accordance with IEC 60947-3, EN 60947-3, VDE 0660 part 107, UL and cUL (cUR).

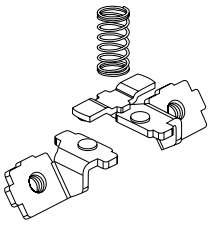
The stage is the basis for all switches and can be supplied with a maximum of 2 contacts. All switches of this series are supplied with open terminals which are accessible while the switch is installed. The terminals are protected against accidental finger contact according to EN 50274, VDE 0660 part 514 and BGV A3. Captive plus-minus terminal screws and integrated screwdriver guides facilitate wiring. Due to the particular arrangement of the terminals of the CG switches, it is possible to install the switches closely, side by side, or to mount them directly at the cable trays. The contact terminal numbers are easy to read, even if the switch is installed.

The captive plus-minus screws of the CH and CHR-series are located about 90° apart from the terminal direction. This allows for connecting wires without any interference with the terminal screws.

For connection with ring type terminals the CHR-series were designed. The switches are supplied with large open terminals. This allows for connection without removing the screws.

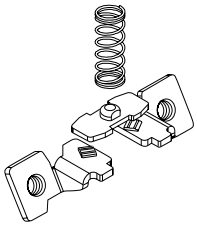
3 different Contact Systems are available

CG6 to CHR16B



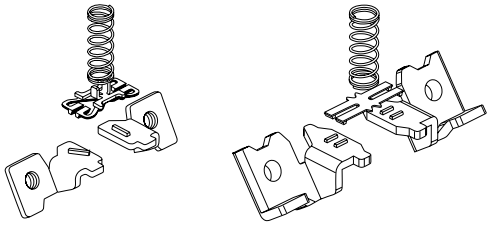
A rigid, double-break bridge with silver alloy contacts provides high making and breaking capabilities for regular control applications.

CG4 and CG4-1



High contact reliability by multiple cross-point contacts, CG4 with 1 µ and CG4-1 with 35 µ gold plating.

CGD4-1 CH11/CHR11 CH12/CHR12



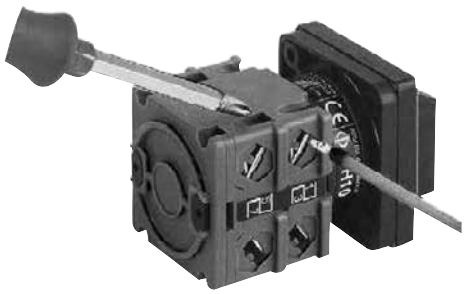
High contact reliability by H-bridge design with “cross-wire“ contacts. The contact system with gold-plated contacts (CH12/CHR12 with silver contact) allows for low voltages, electronic compatible.

Type	Size	Possible Switching Angles	Max. No. of Stages
CG4-CGD4-1	S00	30°, 45°, 60°, 90°	8
CG6-CHR6	S00	30°, 45°, 60°, 90°	4
CG8-CHR16	S0	30°, 45°, 60°, 90°	12
CG8B	S1	30°, 45°, 60°, 90°	12
CH10B-CHR16B	S1	30°, 45°, 60°, 90°	12
CG8S	S0	60°	on request

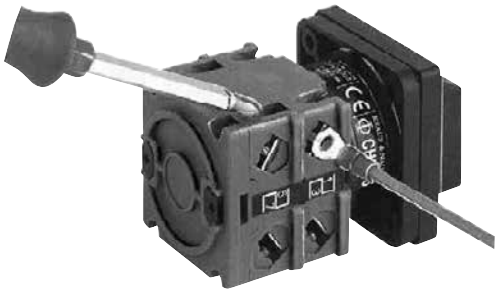
CG-series



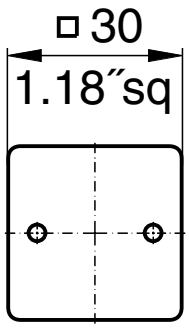
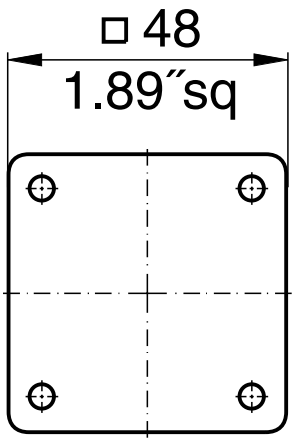
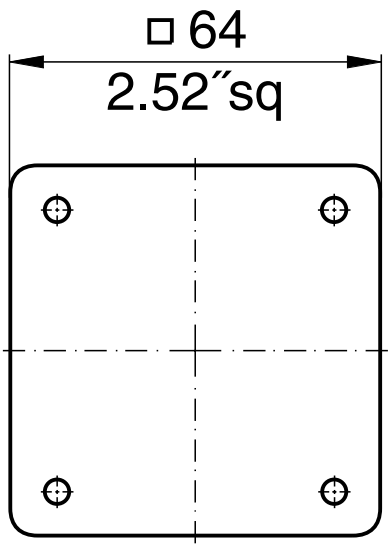
CH-series



CHR-series



Above illustrates the standard terminal positions.

Switch Size	Type	According to IEC 60947-3, EN 60947-3, VDE 0660 part 107			
		Operational Voltage[1] U_e	Thermal Current I_u/I_{th}	Motor Rating 3 x 380 V-440 V AC-23A	AC-3
		V	A	kW	kW
S00 	**CG4**	440	10	3	2,2
	CG4-1	440	10	3	2,2
	CGD4-1	440	5	-	-
	CG6	690	20	7,5	5,5
	CH6	690	20	7,5	5,5
	CHR6	690	20	7,5	5,5
S0 	**CG8**	690	20	7,5	5,5
	CH10	690	20	7,5	5,5
	CH11	600	6	-	-
	CH12	600	6	-	-
	CH16	690	25	11	7,5
	CHR10	690	20	7,5	5,5
	CHR11	600	6	-	-
	CHR12	600	6	-	-
	CHR16	690	25	11	7,5
S1 	**CH10B**	690	20	7,5	5,5
	CH16B	690	25	11	7,5
	CHR10B	690	20	7,5	5,5
	CHR16B	690	25	11	7,5

For further technical details, refer to pages 34-36.

[1]Valid for lines with grounded common neutral termination, overvoltage category III, pollution degree 3. Values for other supply systems 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 34-36. Variations of contacts and terminals are shown below.

2. Switch Function

The code numbers for standard switches shown on pages 6-23 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 24-29. Catalog **101** describes enclosures and optional extras.

Specify the mounting code to indicate required mounting.

CH10 **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]	CH6, CHR6, CH10, CHR10, CH10B, CHR10B
-4[2]	with quick connects (nickel-plated)	CH6, CH10, CH16, CH10B, CH16B
-6[2]	with angled quick connects (nickel-plated)	CH6, CH10, CH16, CH10B, CH16B
B	S0 switches with latching mechanism size S1	CG8, CH10, CH16, CHR10, CHR16 for four hole panel mounting
L	with lockout-relay w/o manual release	CG8, CH10, CH16, CHR10, CHR16
M	with lockout-relay with manual release	CG8, CH10, CH16, CHR10, CHR16
X	with power failure release	CG8, CH10, CH16, CHR10, CHR16
R	with spring return latching mechanism	CG8, CH10, CH16
S	with snap action	CG8, CH10, CH16, CHR10, CHR16 with 60° or 90° switching

Example: Coding for switch type **CH10** with latching mechanism size S1 is **CH10B**.

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	electro-gray	electro-gray	brushed alu	black	-100
S0, S1	electro-gray	electro-gray	black	mat silver	-500
S00, S0, S1	black	black	brushed alu	black	-600
S00, S0, S1	black	black	black	mat silver	-700

[1]Technical data on request. [2]Connection Diagrams on request.

How to order

Modification of Switches

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 CG8 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: **CH10 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 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 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 CG8 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: **CH10 A202-103 E**.

Handles, Escutcheon Plates and Optional Extras

The handles for standard switches shown on pages 6-23 are suitable for mounting units with four hole mounting. Alternative types of handles available are illustrated on pages 24-29.
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 30-32. 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**.

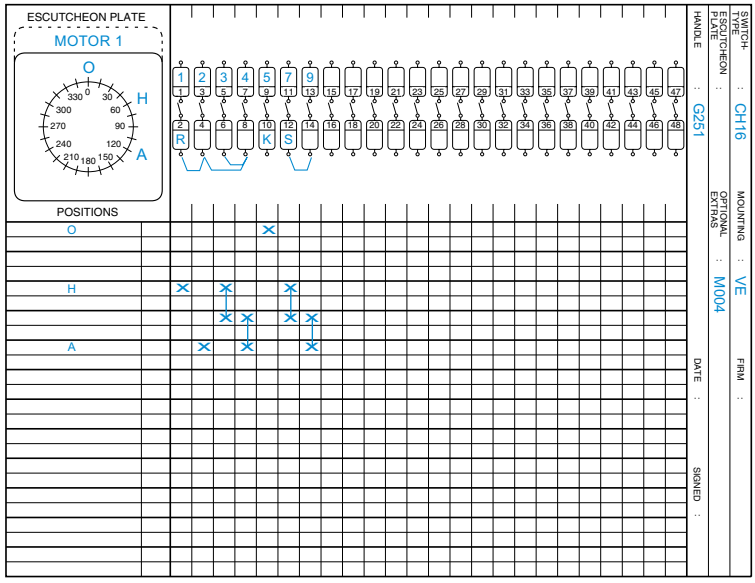
Switch Size

CG, CH and CHR switches are available in sizes S00, S0 and S1. These size codes indicate the dimension 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.

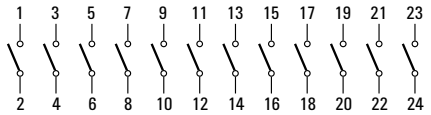
For technical reasons, it may not be possible to follow the sequence of contacts requested by the customer. The final contact development which is sent with every switch will show the customer's original terminal markings.



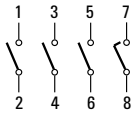
Order forms are available on request.

ON/OFF Switches with 60° Switching

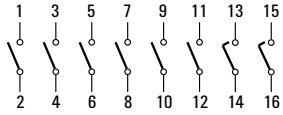
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram
1 pole						A200-600	1	
2 pole						A201-600	1	
3 pole						A202-600	2	
3 pole	with red handle					A202-626	2	
4 pole						A203-600	2	
4 pole	1 pole preclose 6°[1]					WAA653	2	
5 pole						WAA341	3	
6 pole						A342-600	3	
7 pole						A343-600	4	
8 pole						A344-600	4	
8 pole	2 pole preclose 6°[1]					WAA654	4	
9 pole						WAA345	5	
10 pole						A346-600	5	
11 pole						WAA347	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]					WAA653	2	
5 pole						WAA341	3	
6 pole						A342-620	3	
7 pole						A343-620	4	
8 pole						A344-620	4	
8 pole	2 pole preclose 6°[1]					WAA654	4	
9 pole						WAA345	5	
10 pole						A346-620	5	
11 pole						WAA347	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]					WAA653	2	
5 pole						WAA341	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]					WAA653	2	
5 pole						WAA341	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]					WAA653	2	
5 pole						WAA341	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]					WAA653	2	
5 pole						WAA341	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]					WAA653	2	
5 pole						WAA341	3	
6 pole						A342-625	3	



1-12 pole

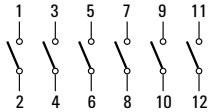
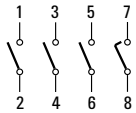
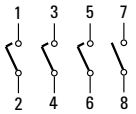
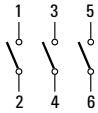
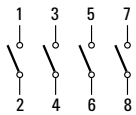
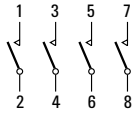


4 pole 1 pole preclose 6°



8 pole 2 pole preclose 6°

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

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram
ON/OFF Switches with 90° Switching								
1 pole contacts 2 pole preclose 30° 3 pole 4 pole 4 pole 1 pole preclose 60°[1] 4 pole 3 pole preclose 30° 5 pole contacts 6 pole preclose 30°						A290-600 A291-600 A292-600 A324-600 A293-600 WAA327 WAA325 A326-600	1 1 2 2 2 2 3 3	 1, 2, 3, 4, 5 and 6 pole
1 pole contacts 2 pole preclose 30° 3 pole 4 pole 4 pole 1 pole preclose 60°[1] 4 pole 3 pole preclose 30° 5 pole contacts 6 pole preclose 30°						A290-620 A291-620 A292-620 A324-620 A293-620 WAA327 WAA325 A326-620	1 1 2 2 2 2 3 3	 4 pole 1 pole preclose 60°  4 pole 3 pole preclose 30°
3 pole 360° rotation	 	 	 	 	 	WAA208 WAA208	2 2	
3 pole for foot operation					 [2]	WAA386	2	
ON/OFF Switches with 30° Switching								
1 pole 2 pole 3 pole 4 pole						WAA100 WAA101 WAA102 WAA103	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 WAA206 WAA207	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 WAA206 WAA207	1 1 2 2	

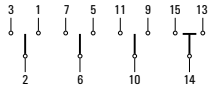
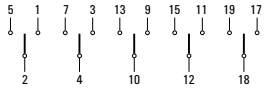
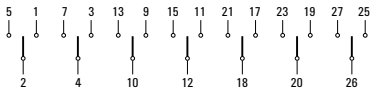
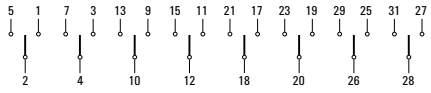
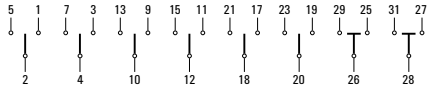
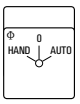
[1]For use in a three phase four-wire system with switched neutral. [2]available as switch types CH16B and CHR16B

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[2]
Double-throw Switches without „OFF“ 60° Switching								
1 pole						A220-600	1	 1-4 pole  4 pole 1 pole preclose 6°
2 pole						A221-600	2	
3 pole						A222-600	3	
4 pole						A223-600	4	
4 pole 1 pole preclose 6°[1]						WAA673	4	
5 pole						A369-600	5	
6 pole						A370-600	6	
7 pole						A371-600	7	
8 pole						A372-600	8	
8 pole 2 pole preclose 6°[1]						WAA972	8	
9 pole						WAA373	9	
10 pole						WAA374	10	
11 pole						WAA375	11	
12 pole						WAA376	12	
								5 pole 6 and 7 pole 8 and 9 pole 8 pole 2 pole preclose 6° 10 and 11 pole 12 pole
Double-throw Switches without „OFF“ with electrically isolated contacts								
1 pole						A720-600	1	1-4 pole 4 pole 1 pole preclose 6°
2 pole						A721-600	2	
3 pole						A722-600	3	
4 pole						A723-600	4	
4 pole 1 pole preclose 6°[1]						WAA973	4	
1 pole with spring return						A795-600	1	1 pole with spring return
Double-throw Switches without „OFF“ 30° Switching								
1 pole						WAA120	1	1-4 pole
2 pole						WAA121	2	
3 pole						WAA122	3	
4 pole						WAA123	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						WAA297	3	
1 pole with spring return						A295-620	1	
2 pole with spring return						A296-620	2	
3 pole with spring return						WAA297	3	

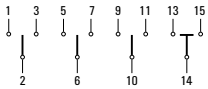
[1]For use in a three phase four-wire system with switched neutral. [2]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[2]

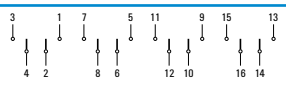
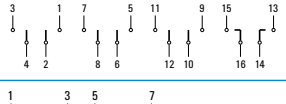
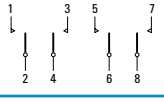
Double-throw Switches with Center „OFF“ 60° Switching

Function	Escutch. Plate	CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[2]
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°[1]						WAA913	4	
5 pole						A361-600	5	
6 pole						A362-600	6	
7 pole						WAA363	7	
8 pole						WAA364	8	
8 pole 2 pole preclose 6°[1]						WAA664	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°[1]						WAA913	4	
5 pole						A361-620	5	
6 pole						A362-620	6	
7 pole						WAA363	7	
8 pole						WAA364	8	
8 pole 2 pole preclose 6°[1]						WAA664	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	
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3 pole						A212-624	3	
4 pole						A213-624	4	
4 pole 1 pole preclose 6°[1]						WAA913	4	

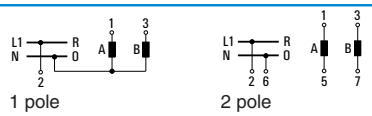
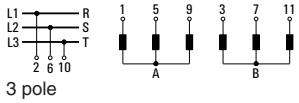
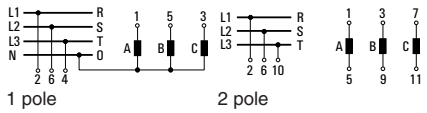
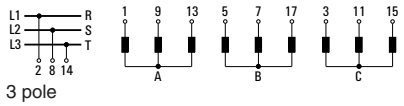
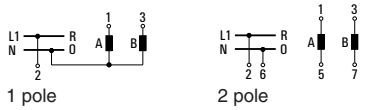
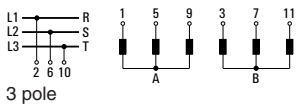
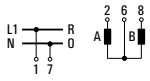
Double-throw Switches with Center „OFF“ 90° Switching

Function	Escutch. Plate	CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[2]
1 pole						A218-600	1	 1-4 pole
2 pole						A219-600	2	
3 pole						WAA299	3	
4 pole 1 pole preclose 6°[1]						WAA294	4	
1 pole						A218-620	1	
2 pole						A219-620	2	
3 pole						WAA299	3	
4 pole 1 pole preclose 6°[1]						WAA294	4	

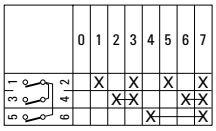
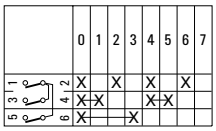
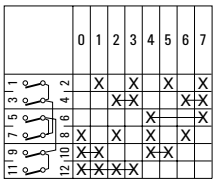
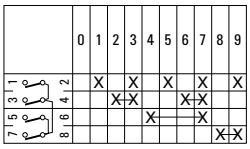
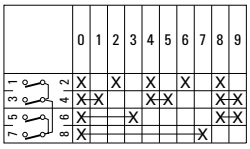
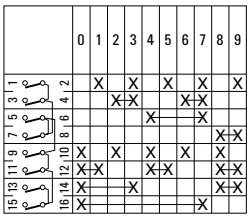
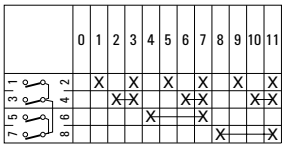
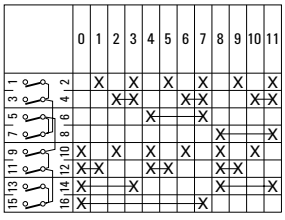
Double-throw Switches with Center „OFF“ and electrically isolated contacts

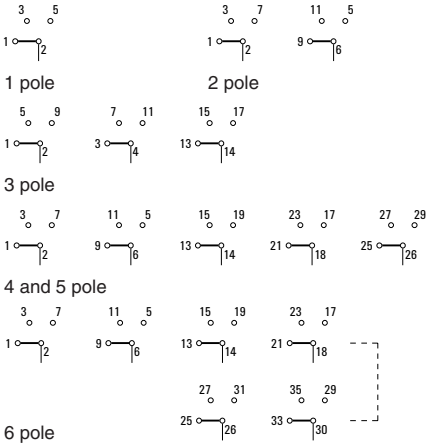
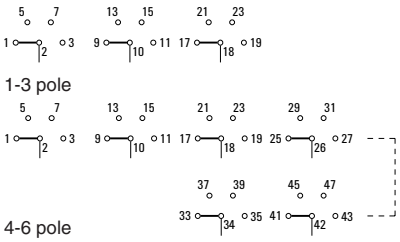
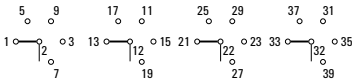
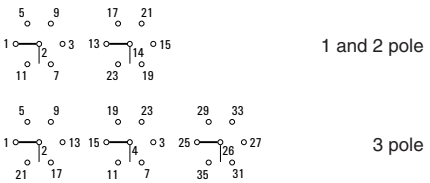
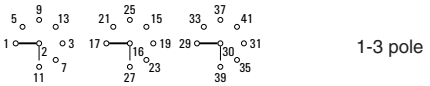
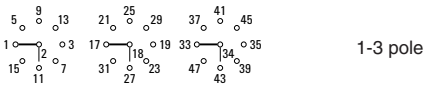
Function	Escutch. Plate	CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[2]
1 pole						A710-600	1	 1-4 pole
2 pole						A711-600	2	
3 pole						A712-600	3	
4 pole						A713-600	4	
4 pole 1 pole preclose 6°[1]						WAA963	4	 4 pole 1 pole preclose 6°
1 pole with spring return						A714-600	1	 1 and 2 pole
2 pole to center						A715-600	2	

[1]For use in a three phase four-wire system with switched neutral. [2]Connection diagrams for CHR switches on request.

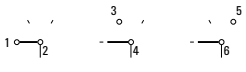
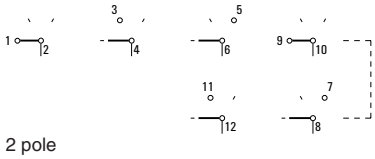
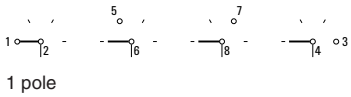
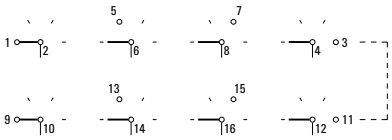
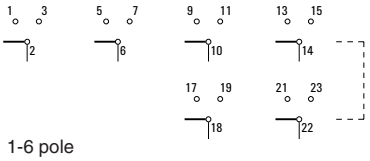
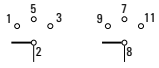
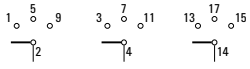
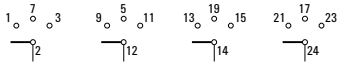
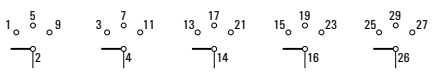
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Double-throw Switches with Spring Return to Center								
1 pole with spring return 2 pole to center 3 pole		☐ ☐ ☐	☐	☐ ☐ ☐	☐ ☐ ☐	A214-600 A215-600 A216-600	1 2 3	 1-3 pole
1 pole 2 pole 3 pole		☐ ☐ ☐	☐	☐ ☐ ☐	☐ ☐ ☐	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 WAA314	1 2 3	 1 pole 2 pole
1 pole 2 pole 3 pole		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A310-620 A312-620 WAA314	1 2 3	 3 pole
1 pole 3 Gang 2 pole Switching sequence: 3 pole 0, A, A+B, A+B+C		☐ ☐ ☐	☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A311-600 WAA313 WAA315	2 3 5	 1 pole 2 pole
1 pole 2 pole 3 pole		☐ ☐ ☐	☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A311-620 WAA313 WAA315	2 3 5	 3 pole
1 pole 2 Gang 2 pole Series switching 3 pole Switching sequence: 0, A, B, A+B		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	WAA330 WAA331 WAA332	1 2 3	 1 pole 2 pole
1 pole 2 pole 3 pole		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	WAA330 WAA331 WAA332	1 2 3	 3 pole
2 pole 2 Gang Series-parallel Switching Switching sequence: 0, A+B series, A, A+B parallel	 	☐ ☐	☐ ☐	☐ ☐	☐ ☐	WAA339 WAA339	2 2	

[1]Connection diagrams for CHR switches on request.

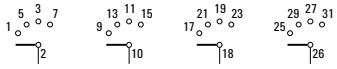
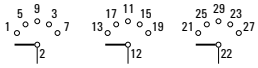
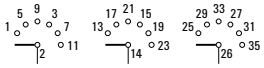
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	Type/Handle CG6-CHR6	Type/Handle CH11 CH12	Type/Handle CH10B-CHR16B	Code	Stages	Connection Diagram
Coding Switches/Binary Code								
0 - 7 360° rotation						A540-600	2	
0 - 7 complement 360° rotation						WAA541	2	
0 - 7 + complement 360° rotation						WAA542	3	
0 - 9						A550-600	2	
0 - 9 complement						WAA551	2	
0 - 9 + complement						WAA552	4	
0 - 11 360° rotation						WAA543	2	
0 - 11 + complement 360° rotation						WAA545	4	

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Multi-step Switches without „OFF“								
1 pole 3 Step 2 pole 3 pole 4 pole 5 pole 6 pole						A230-600 A250-600 A270-600 A476-600 WAA484 WAA489	2 3 5 6 8 9	
1 pole 4 Step 2 pole 3 pole 4 pole 5 pole 6 pole						A231-600 A251-600 A271-600 A477-600 WAA485 WAA490	2 4 6 8 10 12	
1 pole 5 Step 2 pole 3 pole 4 pole						A232-600 A252-600 WAA272 WAA478	3 5 8 10	
1 pole 6 Step 2 pole 3 pole						A233-600 WAA253 WAA273	3 6 9	
1 pole 7 Step 2 pole 3 pole						WAA234 WAA254 WAA274	4 7 11	
1 pole 8 Step 2 pole 3 pole						WAA235 WAA255 WAA275	4 8 12	
1 pole 9 Step						WAA236	5	
1 pole 10 Step						WAA237	5	
1 pole 11 Step						WAA238	6	
1 pole 12 Step 1 pole 360° rotation						WAA239 WAA639	6 6	

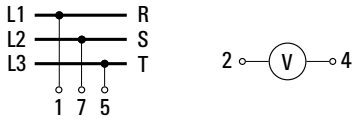
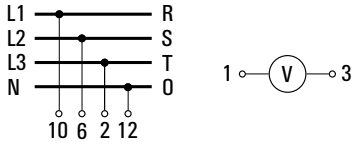
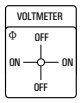
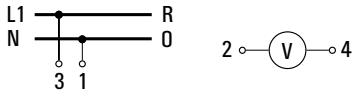
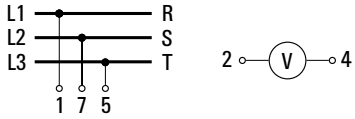
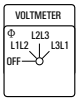
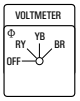
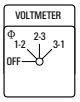
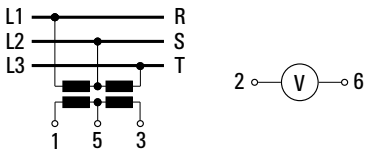
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Multi-step Switches without „OFF“ with electrically isolated contacts								
1 pole 3 Step						A730-600	2	 1 pole
2 pole						A750-600	3	 2 pole
1 pole 4 Step						A731-600	2	 1 pole
2 pole						A751-600	4	 2 pole
Multi-step Switches with „OFF“								
1 pole 2 Step						A240-600	1	 1-6 pole
2 pole						A260-600	2	
3 pole						A280-600	3	
4 pole						WAA480	4	
5 pole						WAA486	5	
6 pole						WAA491	6	
1 pole						A240-620	1	
2 pole						A260-620	2	
3 pole						A280-620	3	
4 pole						WAA480	4	
5 pole						WAA486	5	
6 pole						WAA491	6	
1 pole 3 Step						A241-600	2	 1 and 2 pole
2 pole						A261-600	3	
3 pole						A281-600	5	
4 pole						WAA481	6	
5 pole						WAA487	8	
1 pole						A241-620	2	 3 pole
2 pole						A261-620	3	
3 pole						A281-620	5	
4 pole						WAA481	6	
5 pole						WAA487	8	
1 pole						A241-621	2	 4 pole
2 pole						A261-621	3	 5 pole

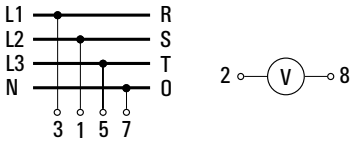
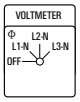
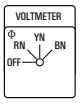
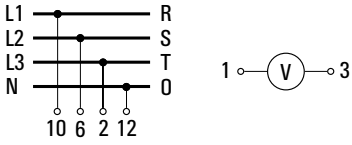
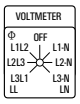
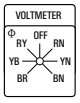
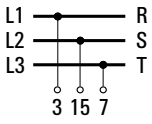
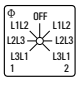
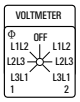
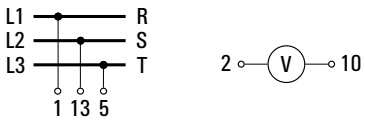
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Multi-step Switches with „OFF“								
1 pole 4 Step						A242-600	2	
2 pole						WAA262	4	
3 pole						WAA282	6	
4 pole						WAA482	8	
1 pole						A242-620	2	
2 pole						WAA262	4	1-4 pole
3 pole						WAA282	6	
4 pole						WAA482	8	
1 pole 5 Step						A243-600	3	
2 pole						WAA263	5	
3 pole						WAA283	8	
1 pole						A243-620	3	
2 pole						WAA263	5	1-3 pole
3 pole						WAA283	8	
1 pole 6 Step						A244-600	3	
2 pole						WAA264	6	
3 pole						WAA284	9	
1 pole						A244-620	3	
2 pole						WAA264	6	1-3 pole
3 pole						WAA284	9	
1 pole 7 Step						WAA245	4	
2 pole						WAA265	7	
1 pole						WAA245	4	
2 pole						WAA265	7	1 pole 2 pole
1 pole 8 Step						WAA246	4	
1 pole						WAA246	4	
1 pole 9 Step						WAA247	5	
1 pole						WAA247	5	
1 pole 10 Step						WAA248	5	
1 pole						WAA248	5	
1 pole 11 Step						WAA249	6	
1 pole 360° rotation						WAA649	6	
1 pole						WAA249	6	
1 pole 360° rotation						WAA649	6	

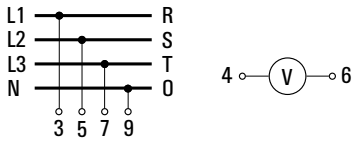
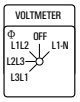
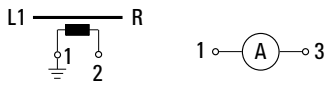
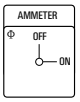
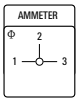
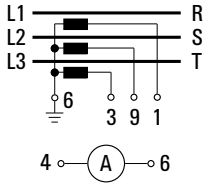
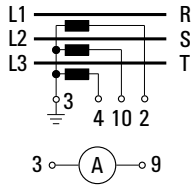
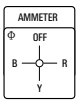
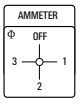
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Voltmeter Switches without „OFF“								
3 phase 3 wire						A023-600	2	
						A023-620	2	
3 phase 3 wire 3 phase to phase and phase to neutral						A025-600	3	
						A025-620	3	
Voltmeter Switches with „OFF“								
2 pole 360° rotation						WAA002	1	
3 phase 3 wire						A004-600	2	
						A004-620	2	
						A004-621	2	
						A004-622	2	
						A004-623	2	
						A004-624	2	
						WAA011	2	

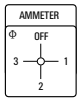
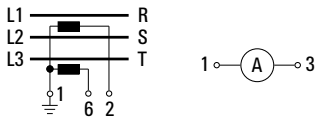
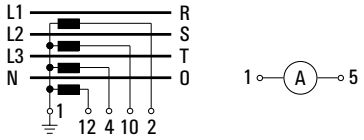
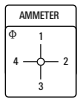
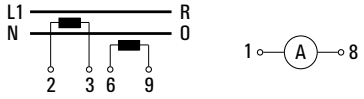
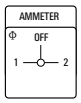
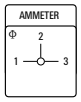
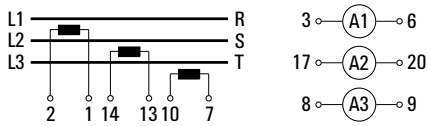
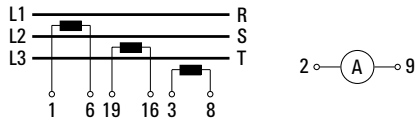
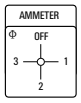
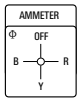
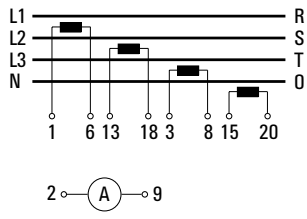
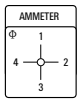
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Voltmeter Switches with „OFF“								
3 phase to neutral						WAA005	2	
						WAA005	2	
						WAA005	2	
						WAA005	2	
						WAA005	2	
3 phase to phase and 3 phase to neutral						A007-600	3	
						A007-620	3	
						A007-621	3	
						A007-622	3	
						A007-623	3	
						A007-624	3	
2 separate 3 phase with center „OFF“						WAA008	4	
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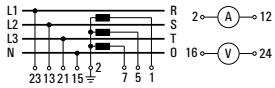
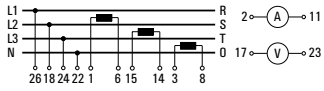
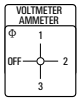
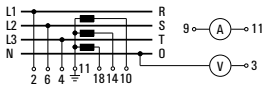
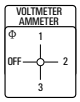
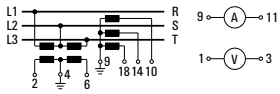
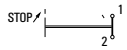
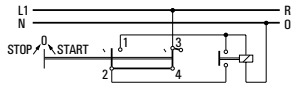
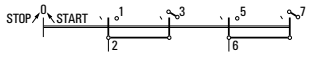
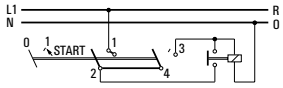
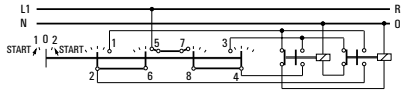
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Voltmeter Switches with „OFF“								
3 phase and 1 phase to neutral						WAA010	3	
						WAA010	3	
						WAA010	3	
						WAA010	3	
Ammeter Switches								
Single pole with one current transformer						WAA046	1	
						WAA046	1	
						WAA046	1	
Single pole with 3 current transformers without „OFF“						A017-600	3	
						A017-620	3	
Single pole with 3 current transformers with „OFF“ 360° rotation						A048-600	3	
						A048-620	3	
						A048-621	3	
						A048-622	3	
						A048-623	3	

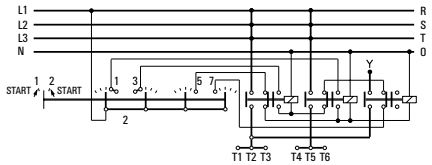
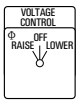
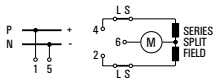
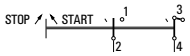
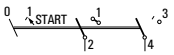
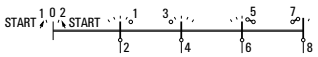
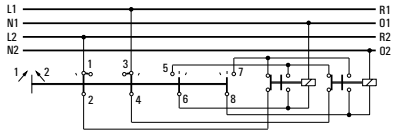
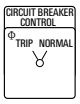
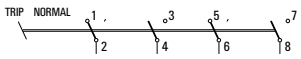
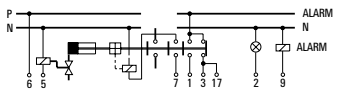
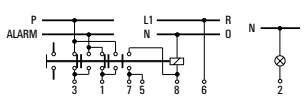
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Ammeter Switches								
Single pole with 2 current transformers (3 readings)						A021-600	2	
						A021-620	2	
Single pole with 4 current transformers						WAA036	4	
						WAA036	4	
2 pole 2 current transformers						WAA037	3	
						WAA037	3	
						WAA037	3	
2 pole 3 current transformers						WAA019	5	
						WAA019	5	
						A038-600	5	
						A038-620	5	
						A038-621	5	
2 pole 4 current transformers						WAA039	6	
						WAA039	6	

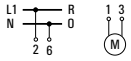
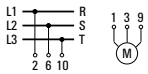
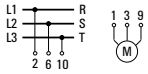
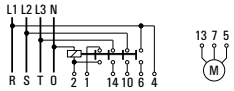
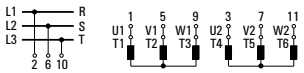
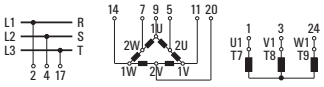
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Volt-ammeter Switches								
3 phase - phase to phase 3 current		●		●	●	WAA027	6	
		●		●	●	WAA028	7	
3 phase voltage 3 phase current 4 wire		●		●	●	WAA033	5	
3 phase voltage 3 phase current 3 wire		●		●	●	WAA035	5	
Control Switches								
Stop switch		●	●	●	●	WAA174	1	
Start switch		●	●	●	●	A175-600	1	
Stop start switch single pole		●	●	●	●	A176-600	1	
Stop start switch 2 pole		●	●	●	●	WAA183	2	
Stop start switch with spring return from start to run		●	●	●	●	A178-600	1	
		●	●	●	●	A178-620	1	
Stop start switch with spring return to run for 2 units		●	●	●	●	WAA177	2	
		●	●	●	●	WAA177	2	

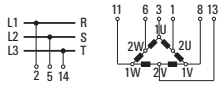
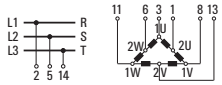
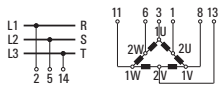
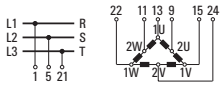
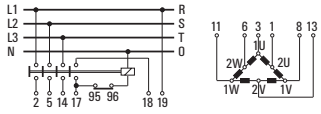
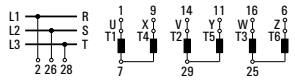
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram
Control Switches								
Stop start switch with spring return to run with contactor interlock contactors for 2 units						WAA182	2	
						WAA182	2	
Motor voltage control switch						WAA150	2	
Control Switches with electrically isolated contacts								
Stop start switch 1 pole						A789-600	1	
Stop start switch with spring return to 1						A791-600	1	
Stop start switch with spring return to run for 2 units						WAA790	2	
Contactor control with spring return to „OFF“						WAA179	2	
						WAA179	2	
Circuit breaker control						WAA537	2	
Control and Alarm Switches[1]								
With slip clutch and without indicator device						WAA190	5[2]	
Without indicator device						WAA192	2	

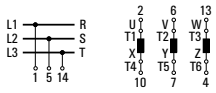
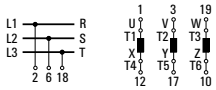
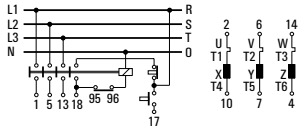
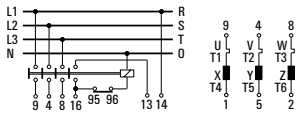
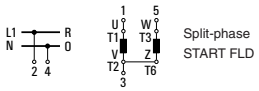
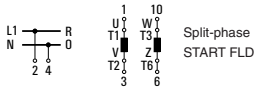
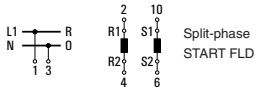
[1]Advise the indicator device, described in Catalog 101, page 7. [2]incl. slip clutch

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Motor Reversing Switches								
2 pole						A400-600	2	
						A400-620	2	
						A400-621	2	
3 pole						A401-600	3	
						A401-620	3	
						A401-621	3	
3 pole with spring return to „OFF“						A228-600	3	
						A228-620	3	
3 pole for use with reversing contactors						WAA402	4	
Motor Control Switches								
2 speed 2 winding 0-A-BY or Δ						WAA451	3	
						WAA451	3	
3 speed 2 winding 0-AΔ-BY-AYY						WAA457	6	
						WAA457	6	

[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Motor Control Switches								
2 speed single winding						A440-600	4	
						A440-620	4	
2 speed single winding without „OFF“						A466-600	4	
2 speed single winding with center „OFF“						A441-600	4	
						A441-620	4	
2 speed single winding reversing						A442-600	6	
						A442-620	6	
2 speed single winding for use with contactors						WAA444	5	
						WAA444	5	
2 speed reversing for 2 way operation with slip clutch for „OFF“ load use						WAA468	10[2]	
						WAA468	10[2]	

[1]Connection diagrams for CHR switches on request. [2]incl. slip clutch

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Star-delta Switches								
OFF-star-delta						A410-600	4	
						A410-620	4	
Reversing						WAA413	5	
With auxiliary contact closed in „OFF“ position						WAA416	5	
For use with reversing contactors						A419-600	4	
Start and Run Switches								
Split-phase start						A425-600	2	 Split-phase START FLD
						A425-620	2	
Split-phase start reversing						WAA426	3	 Split-phase START FLD
						WAA426	3	
Split-phase reversing auto cutout of start field winding						WAA622	3	 Split-phase START FLD

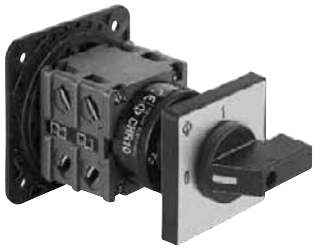
[1]Connection diagrams for CHR switches on request.

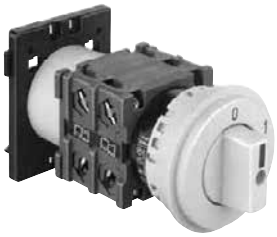
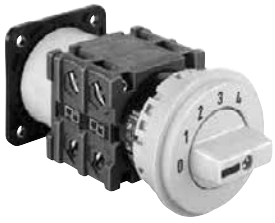
Two or Four Hole Panel Mounting	Terminals rotated 90°	Code	CG4-CHR6	CG8-CHR16	CH10B-CHR16B
Panel mounting					
 Two hole panel mounting		E	●		
	●	E-V	●		
Two hole panel mounting, protection IP 66		EF	●		
	●	EF-V	●		
 Four hole panel mounting		E		●	●
	●	E-V		●	●
Four hole panel mounting, protection IP 66		EF		●	●
	●	EF-V		●	●
Two hole panel mounting, protection IP 65		E22		●	
	●	E22-V		●	
Panel mounting using larger escutcheon plate and handle and with heavy duty latching					
 Four hole panel mounting		EG		●	
Four hole panel mounting, protection IP 66		EGF		●	

Two Hole Panel Mounting or Mosaic Mounting	Code	CG4-CHR6
Panel mounting with round shaft for combining with commercial radio knobs		
 Two hole panel mounting Shaft diam. 6 mm/.24 inch	E9	●
Two hole panel mounting Shaft diam. 6,35 mm/.25 inch	E91	●
Mosaic mounting		
 For Siemens-Mosaic 30 mm grid depth	E92	●
 For Subklew-, Kreutzenbeck-, Symo-Mosaic 28 mm 25 mm 25 mm grid depth	E93	●
For Mauell-Mosaic 30 mm grid depth	E94	●

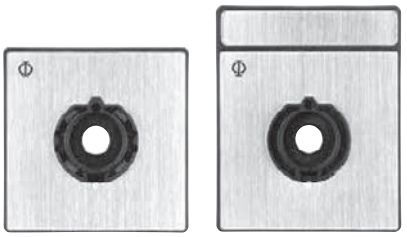
Two or Four Hole Panel Mounting		Code	CG8-CHR16	CH10B-CHR16B
	Panel mounting with heavy duty latching and metal shaft			
	Four hole panel mounting Mounting plate, escutcheon plate and handle of size S0	KN2	●	
	Four hole panel mounting Mounting plate, escutcheon plate and handle of size S1	KN1	●	●
	Four hole panel mounting Mounting plate, escutcheon plate and handle of size S1 and 6 mm square metal shaft	KD1	●	●
	Panel mounting with protective cover			
	Four hole panel mounting Protection front IP 40 rear IP 30	EC	CH CHR	●
	Four hole panel mounting with additional shaft seal Protection front IP 65 rear IP 30	ED	CH CHR	●
	Four hole panel mounting Protection front IP 40 rear IP 42	EC1		●
	Four hole panel mounting with additional shaft seal Protection front IP 65 rear IP 42	ED1		●
	Two hole panle mounting Protection front IP 65 rear IP 42	ED22	●	

Single Hole Mounting	Terminals rotated 90°	Code	CG4-CHR6	CG8-CHR16
			mm	mm
With locking nut and shaft seal, protection IP 66				
 Without escutcheon plate		FS1	16/22	
	●	FS1-V	16/22	
		FT1		22
	●	FT1-V		22
		FT3		22/30
	●	FT3-V		22/30
 With square escutcheon plate		FS2	16/22	
	●	FS2-V	16/22	
		FT2		22
	●	FT2-V		22
		FT4		22/30
	●	FT4-V		22/30
With size S1 square escutcheon plate and heavy duty latching		FH3		22
	●	FH3-V		22
 With rectangular escutcheon plate		FS4	16/22	
	●	FS4-V	16/22	
		FT6		22
	●	FT6-V		22
With size S1 rectangular escutcheon plate and heavy duty latching		FH4		22
	●	FH4-V		22
 Mounting key for locking nut		S00 T170 09		

Base Mounting	Terminals rotated 90°	Code	CG4-CGD4-1	CG8-CHR16
Base mounting				
 Base mounting - four hole		VE		●
	●	VE-V		●
For four hole base mounting and with integrated simplified door clutch, protection IP 65		VF		●
	●	VF-V		●
 For two hole base mounting		VE22		●
	●	VE22V		●
For two hole base mounting and with integrated simplified door clutch, protection IP 65		VF22		●
	●	VF22V		●
 Snap-on base mounting for track EN 60715.		VE1		●
Snap-on base mounting for track EN 60715. Escutcheon plate can be fastened by screws at the switch.		VE1E	●	●
Snap-on base mounting for track EN 60715. Escutcheon plate fastened by single hole mounting at the switch e.g. for combining with key-lock device.		VE1F	●	●

Base Mounting	Code	CG4-CGD4-1	CG8-CHR16
Base mounting			
 Snap-on base mounting for track EN 60715 with rectangular escutcheon plate for 45 mm standard knock-out.	VE2		●
 Snap-on base mounting for track EN 60715. Both the escutcheon plate for 45 mm standard knock-out and the handle are adjustable in height.	VE21	●	●
 Snap-on base mounting for track EN 60715 with circular escutcheon plate for 46 mm standard knock-out.	VE3		●
 Base mounting - four hole - for circular escutcheon plate with 46 mm knock-out.	VE4		●

Escutcheon Plates

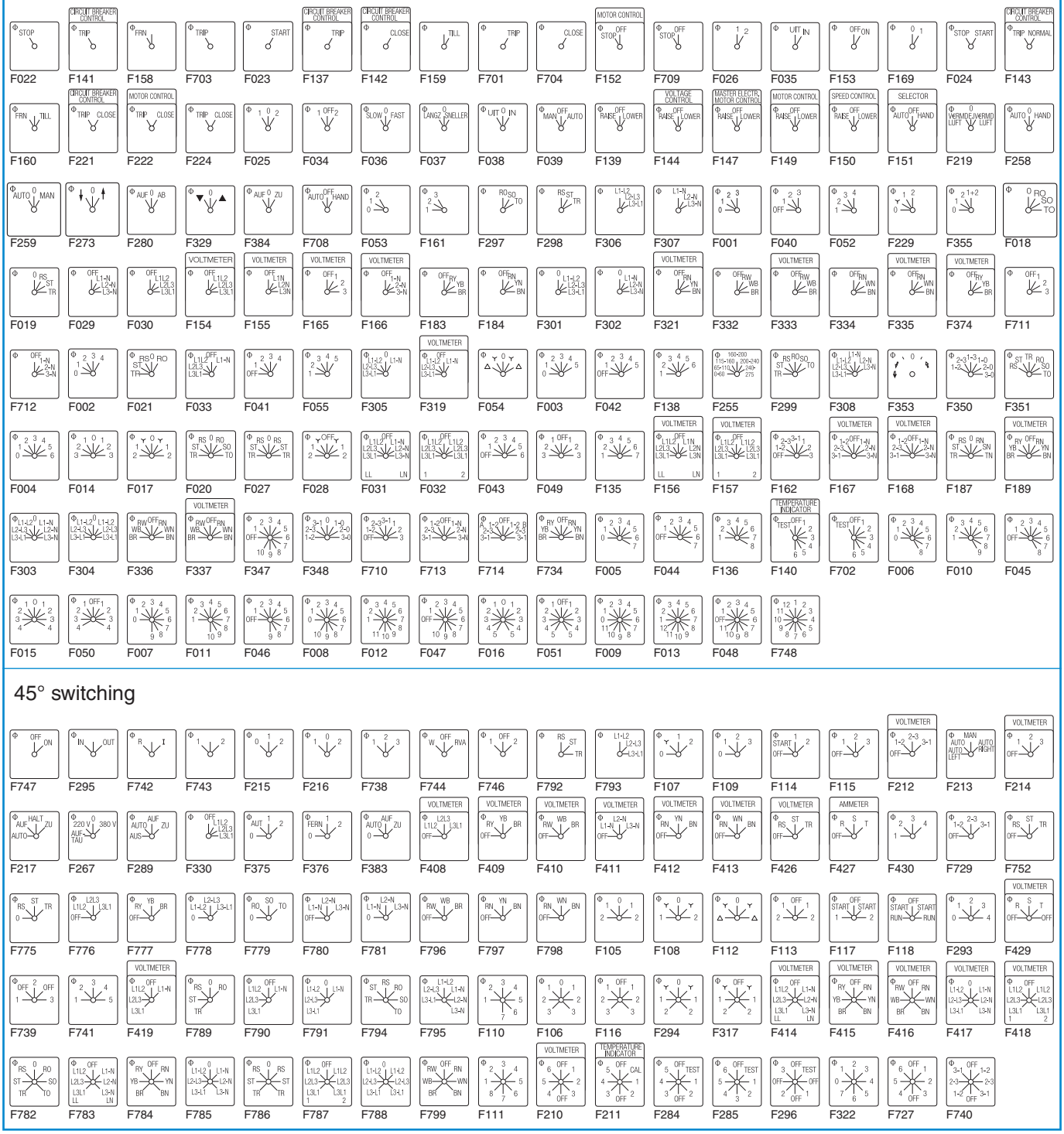


Square and rectangular escutcheon plates are available for each size of switch. The escutcheon plate consists of a frame and a faceplate having the switch positions which is than embossed with hot-foil backing. The escutcheon plate frame is an essential part of the switch and serves as a bearing surface for the handle. If the switch is to be mounted without an escutcheon plate we would recommend for size S1, S2 and S3 the handle bearing plate T100-04.

Standard Letterings Available

(Over 500 standard letterings, special letterings upon request.)

30° switching



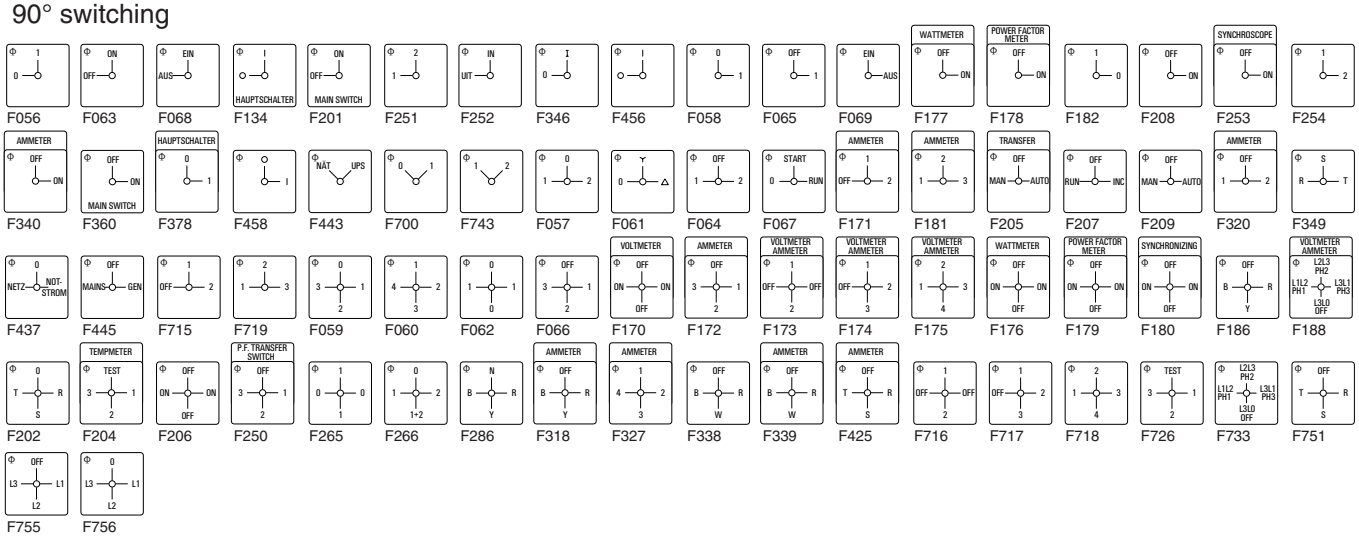
45° switching

Escutcheon Plates

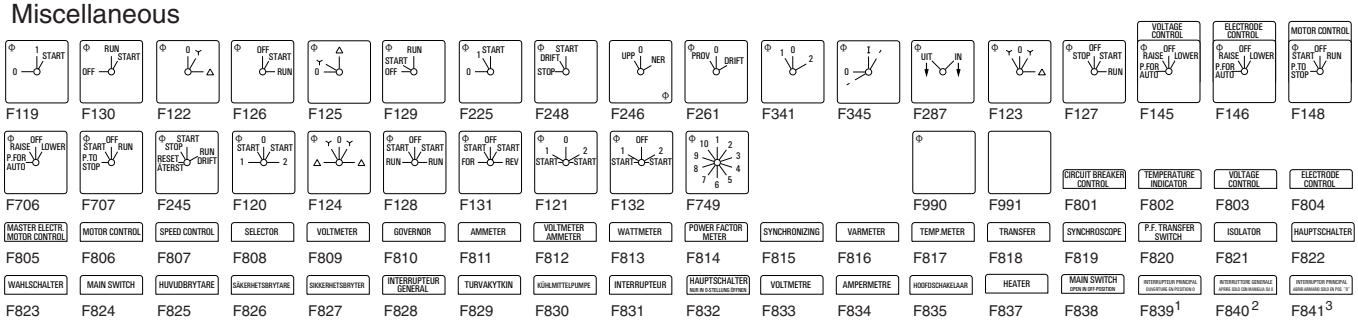
60° switching



90° switching



Miscellaneous



[1]INTERRUPTEUR PRINCIPAL, OUVERTURE EN POSITION 0 [2]INTERRUTTORE GENERALE, APRIRE SOLO CON MANIGLIA SU 0
[3]INTERRUPTOR PRINCIPAL, ABRIR ARMARIO SOLO EN POS. "0"

Handles

Type	Color	Code	Size S00	Size S0	Size S1
R-Handle 	black	G001	—	●	●
	red	G002	—	●	●
	white	G003	—	●	●
	electro-gray	G007	—	●	●
F-Handle 	black	G221	●	●	●
	red	G222	●	●	●
	white	G223	●	●	●
	electro-gray	G227	●	●	●
S-Handle  S0 S1	black	G301	—	●	●
	red	G302	—	●	●
	white	G303	—	●	●
	electro-gray	G307	—	●	●
P-Handle  S0 S1	black	G211	—	●	●
	red	G212	—	●	●
	white	G213	—	●	●
	electro-gray	G217	—	●	●
O-Handle 	black	G321	—	—	●
	red	G322	—	—	●
	white	G323	—	—	●
	electro-gray	G327	—	—	●

Type	Color	Code	Size S00	Size S0	Size S1
I-Handle  S00 S0, S1	black	G251	●	●	●
	red	G252	●	●	●
	white	G253	●	●	●
	electro-gray	G257	●	●	●
B-Handle 	black	G521	—	●	●
	red	G522	—	●	●
	white	G523	—	●	●
	electro-gray	G527	—	●	●
L-Handle 	black	G501	—	—	●
	red	G502	—	—	●
	white	G503	—	—	●
	electro-gray	G507	—	—	●
K-Handle 	black	G411	—	—	●
	red	G412	—	—	●
	white	G413	—	—	●
	electro-gray	G417	—	—	●

International Standards and Approvals

Country	Authority	Mark or Standard	CG4	CG4-1 CGD4-1	CG6	CG8	CH6 CH10 CH11 CH12 CH10B	CH16 CH16B	CHR6 CHR10 CHR11 CHR12 CHR10B	CHR16 CHR16B
USA	Underwriters Laboratories	[1]							●	●
		[2] [3]	●	●	●	●	●	●		
Canada	Canadian Standards Association	[6]	●	CG4-1	●	●	●	●	●	●
		[1]							●	●
		[2] [3]	●	●			●	●		
Switzerland	Schweizerischer Elektrotechnischer Verein		●	+	+	+	+	+	+	+
Denmark	Danmarks Elektriske Materiellkontrol		+	+	+	+	+	+	+	+
Norway	Norges Elektriske Materiellkontroll		+	+	+	+	+	+	+	+
Sweden	Svenska Elektriska Materielkontroll-anstalten		+	+	+	+	+	+	+	+
Finland	Sähkötar-kastuskeskus		+	+	+	+	+	+	+	+
Austria	Österreichischer Verband für Elektrotechnik		+	+	+	+	+	+	+	+
Federal Republic of Germany	Verband Deutscher Elektrotechniker	VDE 0660[4]	+	+	+	+	+	+	+	+
Great Britain	British Standards Institution	BS EN 60947[4]	+	+	+	+	+	+	+	+
International Electrical Commission (IEC) Recommendation		IEC 60947[5]	+	+	+	+	+	+	+	+
China	China Quality Certification Centre	[7]	●	CG4-1			CH10 CH10B	●	CHR10 CHR10B	●
Russian Federation	GOST	[7] CH01	●	● +	●	●	●	●	●	●
Germanischer Lloyd			+	+	+	+	+	+	+	+
Lloyds Register EMEA			+	+	+	+	CH10 CH10B	●	+	+

● Switch approved + Switch conforms to requirements

[1] Approved under the "Component Program" (UL-Recognized Industrial Component). File No. E35541, Category Control No. NLRV2 (U.S.) resp. NLRV8 (Canada).
[2] Approved under the "Listing Program". File No. E35541, Category Control No. NLRV (U.S.) resp. NLRV7 (Canada).
[3] Switch types CGD4-1, CH11, CH12, CHR11, CHR12 approved under the "Listing Program". File No. E60262, Category Control No. NRNT (U.S.) resp. NRNT7 (Canada).
[4] It is not required for Industrial Switchgear to bear a symbol but must conform to requirements. By stating the specific standard no. on the product the manufacturer declares that all requirements of the product standard are met.
[5] IEC does not operate an approval scheme.
[6] File No. 13002, Class No. 3211-05 resp. 4652-04.
[7] If this approval is required, please request when ordering.

Selection Data	CG4 CG4-1	CG6 CG8	CH6 CH10 CH10B	CHR6 CHR10 CHR10B	CH16 CH16B	CHR16 CHR16B

Rated Insulation Voltage U_e	IEC 60947-3, EN 60947-3[1]							
	VDE 0660 part 107[1]		V	440	690	690	690	690	690
	SEV	max.	V	400	690	–	–	–	–
	UL/Canada[2]		V	300	300	600	600	600	600
	CEE 24		V	380	380	–	–	–	–
	min. voltage		V			on request			
Rated Impulse Withstand Voltage U_{imp}[1]			kV	4	6	6	6	6	6
Rated Thermal Current I_u/I_{th}	IEC 60947-3, EN 60947-3								
	VDE 0660 part 107		A	10	20	20	20	25	25
	SEV	max.	A	10	20	–	–	–	–
	UL/Canada		A	10	16	20	20	25	25
Rated Operational Current I_e									
AC-21A Switching of resistive loads, including moderate overloads	IEC 60947-3, EN 60947-3 VDE 0660 part 107		A	10	20	20	20	25	25
AC-1 Resistive or low inductive loads	SEV	400 V	A	10	–	–	–	–	–
		500 V	A	–	–	–	–	–	–
		600 V	A	–	–	–	–	–	–
AC-22A Switching of combined resistive or low inductive loads including moderate overloads	IEC 60947-3	220 V-440 V	A	10	20	20	20	25	25
	VDE 0660,	500 V	A	–	20	20	20	25	25
	part 107	660 V-690 V	A	–	16	16	16	25	25
AC-15 Switching of control devices, contactors, valves etc.	IEC 60947-5-1	110 V	A	2,5	6	5	5	8	8
	VDE 0660,	220 V-240 V	A	2,5	5	5	5	8	8
	part 200	380 V-440 V	A	1,5	4	4	4	5	5
Pilot Duty	UL/Canada[2]	Heavy		A300	A300	A600	A600	A600	A600
Ampere Rating Resistive or low inductive loads	UL/Canada[2]		A	10	16 (150 V) 10 (300 V)	20	20	25	25
Resistive load/Motor load	CEE 24[2]		A	4/2	10/6	–	–	–	–
	NEMKO/FI[2]		A	6/4[4]	10/6	–	–	–	–
Breaking capacity		220 V-240 V	A	50	150	150	150	200	200
		380 V-440 V	A	50	150	150	150	200	200
		660 V-690 V	A	–	80	80	80	125	125
Power loss per contact at I_u			W	0,4/0,7	0,8	1,4	1,4	2,3	2,3
Resistance to vibration						on request			
Resistance to shock						min. 5 g, 30 ms			
Short Circuit Protection									
Max. fuse size		(gL-characteristic)	A	10	25	25	25	35	35
Rated short-time withstand current		(1s-current)	A	90	140	200	200	250	250

DC Switching Capacity[6]

No. of series contacts	1	2	3	4	5	6	8		**Rated Operational Current I_e**						
	Voltage V								CG4 CG4-1	CG6 CG8	CG8S[3]	CH6 CH10 CH10B	CHR6 CHR10 CHR10B	CH16 CH16B	CHR16 CHR16B
Resistive loads	24	48	70	95	120	145	190	A	10	20	20	20	20	25	25
T ≤ 1 ms	48	95	140	190	240	290	350		6	12	16	12	12	20	20
	60	120	180	240	300	360	450		2,5	4,5	8	4,5	4,5	7,5	7,5
	110	220	330	440	550	660	–		0,7	1	2	1	1	1,5	1,5
	220	440	660	–	–	–	–		0,3	0,4	0,6	0,4	0,4	0,5	0,5
	440	660	–	–	–	–	–		0,2	0,27	0,35	0,27	0,27	0,3	0,3
Inductive loads	24	48	70	95	120	145	190	A	6	12	20	12	12	20	20
T = 50 ms	30	60	90	120	150	180	240		3	5	13	5	5	9	9
	48	95	140	190	240	290	350		1	2	6	2	2	3	3
	60	120	180	240	300	360	450		0,7	1	3	1	1	1,5	1,5
	110	220	330	440	550	660	–		0,3	0,4	1	0,4	0,4	0,5	0,5

Ambient Temperature of Stages[5, 7]	open at 100 % I_u/I_{th}	55 °C during 24 hours with peaks up to 60 °C	
	enclosed at 100 % I_{the}	35 °C during 24 hours with peaks up to 40 °C	

[1]Valid for lines with grounded common neutral termination, overvoltage category III, pollution degree 3. Values for other supply systems on request. [2]International Standards and Approvals, refer to page 33. [3]Valid only for max. 4 simultaneously opening contacts. [4]Valid for CG4 only. [5]For electromagnetic optional extras see additional data in Catalog 101. [6]Values for switches with spring return on request. [7]Storage temperature: -40 °C to 85 °C (in case of temperature below -5 °C no shock load permissible).

Selection Data					CG4 CG4-1	CG6 CG8	CH6 CH10 CH10B	CHR6 CHR10 CHR10B	CH16 CH16B	CHR16 CHR16B
Rated Utilization Category		IEC 60947-3, EN 60947-3 VDE 0660 part 107								
AC-2	Slip ring motor starting, reversing and plugging, star-delta starting (CG4-CHR10B)	3 phase 3 pole	220 V-240 V 380 V-440 V 500 V 660 V-690 V	kW	2,5 4,5 – –	4 7,5 10 10	4 7,5 10 10	4 7,5 10 10	5,5 11 15 13	5,5 11 15 13
AC-3	Direct-on-line starting, star-delta starting (CH16-CHR16B)	3 phase 3 pole	220 V-240 V 380 V-440 V 500 V 660 V-690 V	kW	1,5 2,2 – –	3 5,5 5,5 5,5	3 5,5 5,5 5,5	3 5,5 5,5 5,5	4 7,5 7,5 7,5	4 7,5 7,5 7,5
		1 phase 2 pole	110 V-120 V 220 V-240 V 380 V-440 V 500 V 660 V-690 V	kW	0,3 0,55 0,75 – –	0,6 2,2 3 – –	0,6 2,2 3 3 3	0,6 2,2 3 3 3	1,5 3 3,7 4 3,7	1,5 3 3,7 4 3,7
AC-4	Direct-on-line starting, reversing, plugging and inching	3 phase 3 pole	220 V-240 V 380 V-440 V 500 V 660 V-690 V	kW	0,37 0,55 – –	0,55 1,5 1,5 1,5	0,55 1,5 1,5 1,5	0,55 1,5 1,5 1,5	1,5 3 3 3	1,5 3 3 3
		1 phase 2 pole	110 V-120 V 220 V-240 V 380 V-440 V	kW	0,15 0,25 0,5	0,3 0,75 1,5	0,3 0,75 1,5	0,3 0,75 1,5	0,45 1,1 2,2	0,45 1,1 2,2
AC-23A	Frequent switching of motors or other high inductive loads	3 phase 3 pole	220 V-240 V 380 V-440 V 500 V 660 V-690 V	kW	1,8 3 – –	3,7 7,5 7,5 7,5	3,7 7,5 7,5 7,5	3,7 7,5 7,5 7,5	5,5 11 11 11	5,5 11 11 11
		1 phase 2 pole	110 V-120 V 220 V-240 V 380 V-440 V 500 V 660 V-690 V	kW	0,37 0,75 1,1 – –	0,75 2,5 3,7 – –	0,75 2,5 3,7 4 4	0,75 2,5 3,7 4 4	1,5 3 5,5 5,5 5,5	1,5 3 5,5 5,5 5,5
Ratings		UL/Canada								
	Standard motor load DOL-Rating (similar AC-3)	3 phase 3 pole	110 V-120 V 220 V-240 V 440 V-600 V	HP	0,75 1 –	1,5 1 –	1,5 3 5	1,5 3 5	2 5 10	2 5 10
		1 phase 2 pole	110 V-120 V 220 V-240 V 277 V 440 V-600 V	HP	0,33 0,75 0,75 –	0,5 1 1 –	0,5 1 2 2	0,5 1 2 2	1 2 3 5	1 2 3 5
	Heavy motor load Reversing-Rating (similar AC-4)	3 phase 3 pole	110 V-120 V 220 V-240 V 440 V-600 V	HP	– – –	0,5 1 –	0,5 1 3	0,5 1 3	1 2 5	1 2 5
		1 phase 2 pole	110 V-120 V 220 V-240 V 277 V 440 V-600 V	HP	– – – –	0,17 0,5 0,5 –	0,17 0,5 0,6 1,5	0,17 0,5 0,6 1,5	0,33 0,75 1 2	0,33 0,75 1 2
Max. Permissible Wire Gage - Use copper wire only										
	Single-core or stranded wire			mm^2 AWG	2x1,5 2x14	2x2,5 2x12	2x4 2x10		2x4 2x10	
	Flexible wire (sleeving in accordance with DIN 46228) Flexible AWG wires (without sleeve)			mm^2 AWG	2x1,5(1) 2x16	2x2,5(2,5) 2x14	2x2,5(2,5) 2x12		2x2,5(2,5) 2x12	
	Connection with insulated ring and fork type terminals									
	Internal diameter			mm				≥3,6		≥3,6
	External diameter			mm				≤8,6		≤8,6
	Connection with quick connect terminations			mm				6,3		6,3

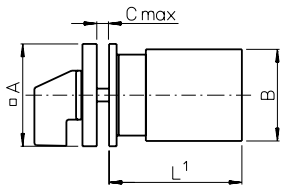
Selection Data				CGD4-1	CH11	CHR11	CH12	CHR12
Rated Insulation Voltage U_e	IEC 60947-3, EN 60947-3[1] VDE 0660 part 107[1]		V	440	600	600	600	600
	North America		V	300	300	300	300	300
	min. voltage		V	1[4]	1[4]	1[4]	6	6
Rated Impulse Withstand Voltage U_{imp}				on request				
Rated Thermal Current I_u/I_{th}	IEC 60947-3, EN 60947-3 VDE 0660 part 107		A	5	6	6	6	6
	North America		A	5	6	6	6	6
Rated Operational Current I_e	IEC 60947-3, EN 60947-3 VDE 0660 part 107							
AC-21A Switching of resistive loads, including moderate overloads	North America[2]	1 V/6 V	A	5/2	6/3	6/3	–/6	–/6
		12 V/24 V	A	1,2/0,7	2/1	2/1	6/5	6/5
		48 V/60 V	A	0,45/–	0,8/0,7	0,8/0,7	4/3,5	4/3,5
		110 V	A	0,25	0,4	0,4	3	3
		240 V	A	0,15	0,2	0,2	1,8	1,8
		300 V	A	0,13	0,13	0,13	1,3	1,3
		440 V	A	0,1	0,1	0,1	1	1
		500 V	A	–	0,08	0,08	0,8	0,8
		600 V	A	–	0,05	0,05	0,5	0,5
Power loss per contact at I_u			W	0,4	0,4	0,4	0,2	0,2
Short Circuit Protection								
Max. fuse size		(glass-tube, quick)	A	5	6	6	6	6
Rated short-time withstand current		(1s-current)	A	30	35	35	50	50
DC Switching Capacity[5]	IEC 60947-3, EN 60947-3 VDE 0660 part 107							
DC-21B Resistive load T ≤ 1 ms	North America[2]	1 V/6 V	A	3/1,2	4/2,5	4/2,5	–/4	–/4
		12 V/24 V	A	0,7/0,4	1,5/0,8	1,5/0,8	3/2,2	3/2,2
		48 V/60 V	A	0,25/0,2	0,3/0,27	0,3/0,27	1,2/1	1,2/1
		110 V/240 V	A	0,13/0,08	0,2/0,1	0,2/0,1	0,6/0,3	0,6/0,3
		300 V/440 V	A	0,07/0,05	0,07/0,05	0,07/0,05	0,2/0,15	0,2/0,15
		500 V/600 V	A	–	0,03/0,02	0,03/0,02	0,1/0,1	0,1/0,1
Max. Permissible Wire Gage - Use copper wire only								
Single-core or stranded wire			mm^2	2x1,5	2x4		2x4	
			AWG	2x14	2x10		2x10	
Flexible wire (sleeving in accordance with DIN 46228)			mm^2	2x1,5(1)	2x2,5(2,5)		2x2,5(2,5)	
Flexible AWG wires (without sleeve)			AWG	2x16	2x12		2x12	
Connection with insulated ring and fork type terminals								
Internal diameter			mm			≥3,6		≥3,6
External diameter			mm			≤8,6		≤8,6
Connection with quick connect terminations			mm			6,3		6,3
Ambient Temperature of Stages[3, 6]		open at 100 % I_u/I_{th}		55 °C during 24 hours with peaks up to 60 °C				
		enclosed at 100 % I_{the}		35 °C during 24 hours with peaks up to 40 °C				

[1]Valid for lines with grounded common neutral termination, overvoltage category III, pollution degree 3. Values for other supply systems on request. [2]max. 300 V. [3]For electromagnetic optional extras see additional data in Catalog 101. [4]Values for lower voltages on request. [5]Values for switches with spring return on request. [6]Storage temperature: -40 °C to 85 °C (in case of temperature below -5 °C no shock load permissible).

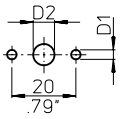
Dimensions

mm
inch

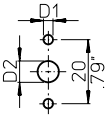
Two or Four Hole Panel Mounting



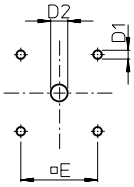
E
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CG4-CGD4-1
CH6/CHR6
E-V
for
CG6



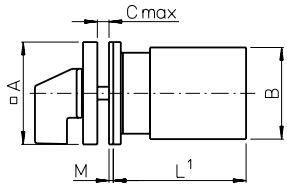
E-V
for
CG4-CGD4-1
CH6/CHR6
E
for
CG6



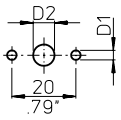
E
E-V



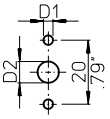
	CG4 CG4-1 CGD4-1	CG6	CG8	CH6 CHR6	CH10- CHR16	CH10B- CHR16B
A	30 1.18	30 1.18	48 1.89	30 1.18	48 1.89	64 2.52
B	28 1.10	38 1.50	38 1.50	46 1.81	46 1.81	56 2.20
C	4 .16	4 .16	4 .16	4 .16	4 .16	4 .16
D1	3,2 .13	3,2 .13	5 .20	3,2 .13	5 .20	5 .20
D2	8-11 .31-.43	8-11 .31-.43	8-15 .31-.59	8-11 .31-.43	8-15 .31-.59	10-15 .39-.59
E	- -	- -	36 1.42	- -	36 1.42	48 1.89



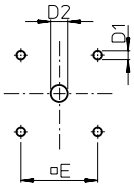
EF
for
CG4-CGD4-1
CH6/CHR6
EF-V
for
CG6



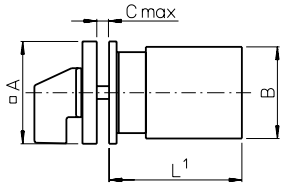
EF-V
for
CG4-CGD4-1
CH6/CHR6
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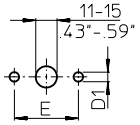
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EF-V



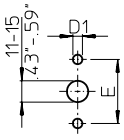
	CG4 CG4-1 CGD4-1	CG6	CG8	CH6 CHR6	CH10- CHR16	CH10B- CHR16B
A	30 1.18	30 1.18	48 1.89	30 1.18	48 1.89	64 2.52
B	28 1.10	38 1.50	38 1.50	46 1.81	46 1.81	56 2.20
C	4 .16	4 .16	4 .16	4 .16	4 .16	4 .16
D1	3,2 .13	3,2 .13	5 .20	3,2 .13	5 .20	5 .20
D2	8-11 .31-.43	8-11 .31-.43	15-19 .59-.75	8-11 .31-.43	15-19 .59-.75	19-22 .75-.87
E	- -	- -	36 1.42	- -	36 1.42	48 1.89
M	1 .04	1 .04	- -	1 .04	- -	- -



E22
for
CG
E22-V
for
CH/CHR



E22-V
for
CG
E22
for
CH/CHR



	CG8	CH10- CHR16
A	48 1.89	48 1.89
B	38 1.50	46 1.81
C	4 .16	4 .16
D1	5 .20	5 .20
E	30 1.17	30 1.17

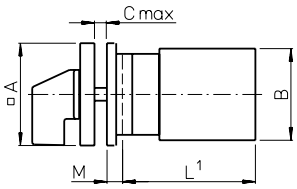
[1]see page 43

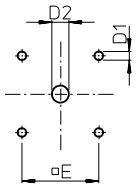
Dimensions

mm
inch

Four Hole Panel Mounting or Mosaic Mounting

EG
EGF

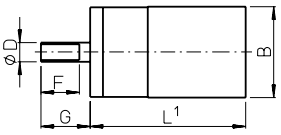


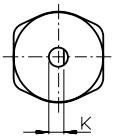


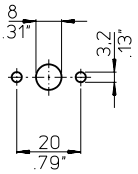
		CG8	CH10-CHR16
	A	64 2.52	64 2.52
	B	38 1.50	46 1.81
	C	4 .16	4 .16
	D1	5 .20	5 .20
EG	**D2**	10-15 .39-.59	10-15 .39-.59
EGF	**D2**	19-22 .75-.87	19-22 .75-.87
	E	48 1.89	48 1.89
	M	6,7 .26	6,7 .26

E9
E91

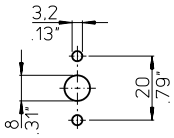
for
CG4-CGD4-1
CH6/CHR6



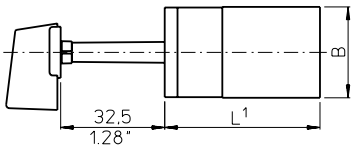


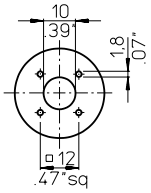


for
CG6

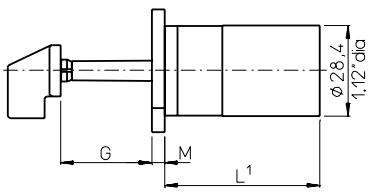


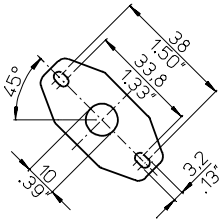
E92





E93
E94





		CG4 CG4-1 CGD4-1	CG6	CH6 CHR6
	B	28 1.10	38 1.50	46 1.81

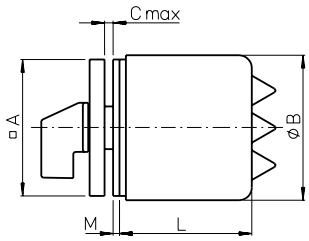
CG4 CG4-1 CGD4-1 CG6 CH6 CHR6	**E9**	**E91**	**E92**	**E93**	**E94**
D	6 .24	6,35 .25	- -	- -	- -
F	12 .47	12,8 .50	- -	- -	- -
G	15,4 .61	17,4 .69	32,5 1.28	28,5 1.12	32,5 1.28
K	4,7 .19	5,5 .22	- -	- -	- -
M	- -	- -	- -	4 .16	- -

[1]see page 43

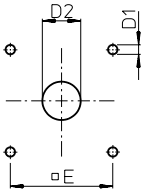
Dimensions

mm
inch

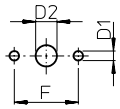
Two or Four Hole Panel Mounting



EC
ED
EC1
ED1



ED22



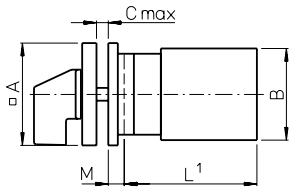
		CG8	CH10-CHR16		CH10B-CHR16B	
		ED22	**EC ED**	**ED22**	**EC ED**	**EC1 ED1**
	A	48 1.89	64 2.52	48 1.89	64 2.52	64 2.52
	B	74 2.91	68 2.68	74 2.91	68 2.68	74 2.91
EC/EC1	**C**	- -	4 .16	- -	4 .16	4 .16
ED/ED1/ED22	**C**	4 .16	2 .08	4 .16	4 .16	4 .16
	D1	5 .20	5 .20	5 .20	5 .20	5 .20
EC/EC1	**D2**	- -	8-15 .31-.59	- -	10-15 .39-.59	10-15 .39-.59
ED/ED1/ED22	**D2**	11-15 .43-.59	18-22 .71-.87	11-15 .43-.59	22-25 .87-.98	19-22 .75-.87
	E	- -	48 1.89	- -	48 1.89	48 1.89
	F	30 1.17	- -	30 1.17	- -	- -
ED/ED1/ED22	**M**	1,5 .06	2 .08	1,5 .06	2 .08	- -
Stages L	**1**	74,3 2.93	- -	74,3 2.93	- -	72,7 2.86
	2	74,3 2.93	- -	74,3 2.93	- -	72,7 2.86
	3	94,3 3.71	- -	94,3 3.71	- -	92,7 3.65
	4	94,3 3.71	103 4.06	94,3 3.71	114,5 4.51	- -
	5	94,3 3.71	- -	- -	127 5.00	- -
	6	- -	- -	- -	139,5 5.49	- -
	7	- -	- -	- -	164,5 6.48	- -
	8	- -	- -	- -	177 6.97	- -
	9	- -	- -	- -	- -	- -
	10	- -	- -	- -	- -	- -

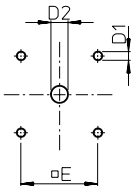
Dimensions

mm
inch

Four Hole Panel Mounting or Single Hole Mounting

KN1
KD1
KN2





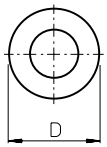
KN2	CG8	CH10-CHR16
A	48 1.89	48 1.89
B	38 1.50	46 1.81
C	4 .16	4 .16
D1	5 .20	5 .20
D2	8-15 .31-.59	8-15 .31-.59
E	36 1.42	36 1.42
M	5,2 .20	5,2 .20

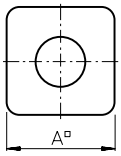
KN1 KD1	CG8	CH10-CHR16	CH10B-CHR16B
A	64 2.52	64 2.52	64 2.52
B	38 1.50	46 1.81	56 2.20
C	4 .16	4 .16	4 .16
D1	5 .20	5 .20	5 .20
D2	10-15 .39-.59	10-15 .39-.59	10-15 .39-.59
E	48 1.89	48 1.89	48 1.89
M	4,7 .19	4,7 .19	7 .28

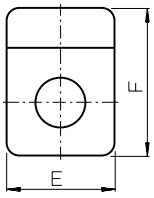
FS1...
FT1...
FT3...

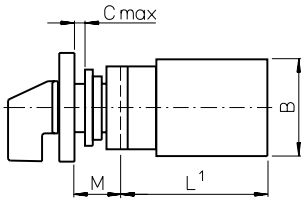
FH3...
FS2...
FT2...
FT4...

FH4...
FS4...
FT6...





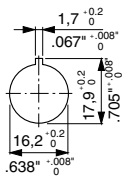


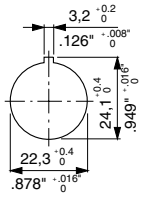


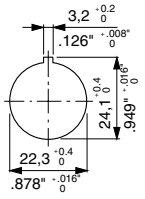
FS1...
FS2...
FS4...

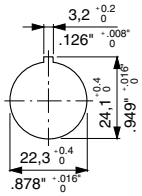
FH3...
FH4...
FT1...
FT2...
FT6...

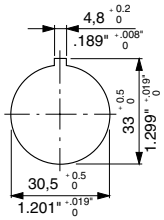
FT3...
FT4...











		CG4 CG4-1 CGD4-1	CG6	CG8	CH6 CHR6	CH10-CHR16
A/E		30 1.18	30 1.18	48 1.89	30 1.18	48 1.89
	FH3...	- -	- -	64 2.52	- -	64 2.52
	FH4...	- -	- -	64 2.52	- -	64 2.52
B		28 1.10	38 1.50	38 1.50	46 1.81	46 1.81
C		5 .20	5 .20	6 .24	5 .20	6 .24
D		29,5 1.16	29,5 1.16	39 1.54	29,5 1.16	39 1.54
F		39 1.54	39 1.54	59 2.32	39 1.54	59 2.32
	FH4...	- -	- -	78,5 3.09	- -	78,5 3.09
M		12,5 .49	12,5 .49	18,2 .72	12,5 .49	18,2 .72
	FH3...	- -	- -	25,2 .99	- -	25,2 .99
	FH4...	- -	- -	25,2 .99	- -	25,2 .99

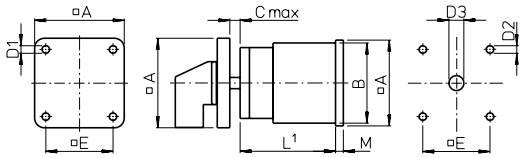
[1] see page 43

Dimensions

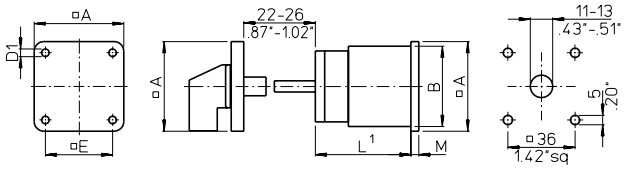
mm
inch

Base Mounting

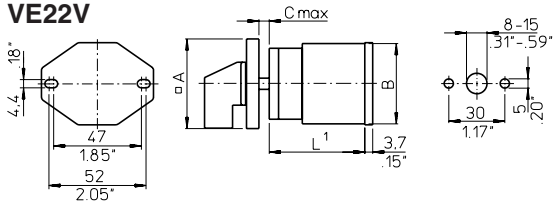
VE
VE-V



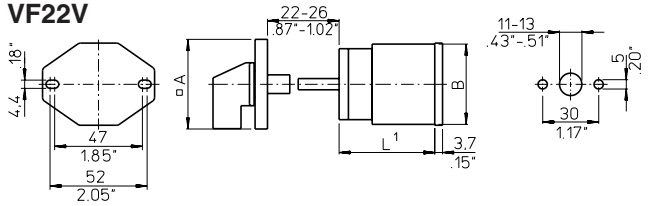
VF
VF-V



VE22
VE22V



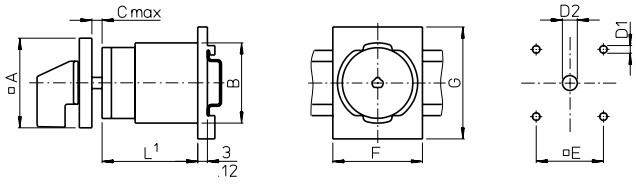
VF22
VF22V



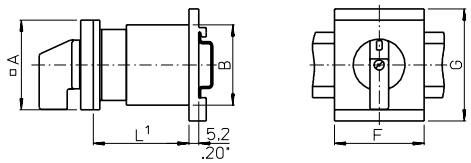
	CG8	CH10-CHR16
A[2]	48 1.89	48 (64) 1.89 (2.52)
B	38 1.50	46 1.81
C	10,5 .41	10,5 .41
D1	4,1 .16	4,1 .16
D2	5 .20	5 .20
D3	8-15 .31-.59	8-15 .31-.59
E[2]	36 1.42	36 (48) 1.42 (1.89)
M	2,2 .09	5,2 .20

[2]Dimensions in ( ) for revertive mounting plate

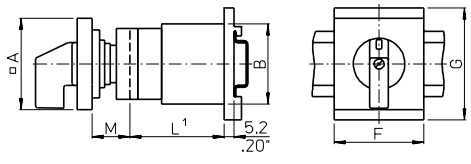
VE1



VE1E



VE1F



	CG4 CG4-1 CGD4-1	CG8	CH10-CHR16
A	30 1.18	48 1.89	48 1.89
B	28 1.10	38 1.50	46 1.81
C	- -	10,5 .41	10,5 .41
D1	- -	5 .20	5 .20
D2	- -	8-15 .31-.59	8-15 .31-.59
E	- -	36 1.42	36 1.42
F	35,5 1.40	48 1.89	48 1.89
G	60 2.36	60 2.36	60 2.36
M	12,5 .49	20 .79	20 .79

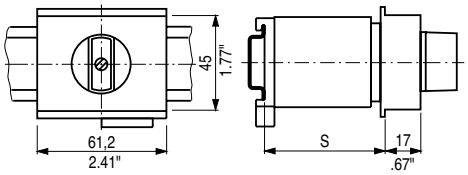
[1]see page 43

Dimensions

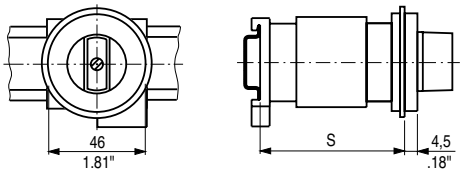
mm
inch

Base Mounting and Escutcheon Plates

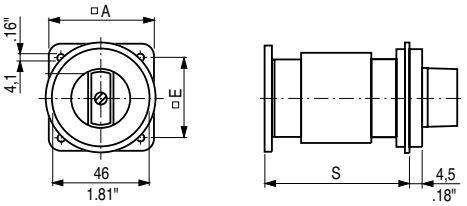
VE2



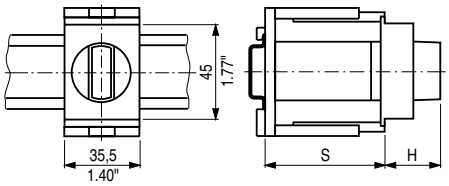
VE3



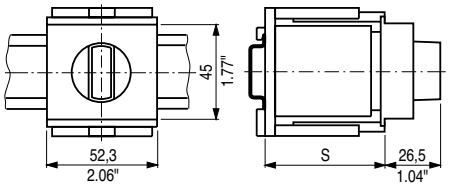
VE4



VE21
for CG4-CGD4-1



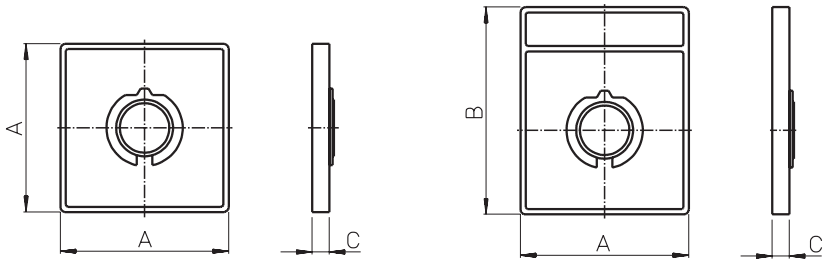
VE21
for CG8-CHR16



	VE2		VE3		VE4	
	CG8	CH10-CHR16	CG8	CH10-CHR16	CG8	CH10-CHR16
	Max. no. of stages		Max. no. of stages		Max. no. of stages	
S = 46 1.81	1	1	-	-	1	-
S = 50 1.97	2	2	1	1	1	-
S = 61 2.40	3	2	2	1	2	1
S = 67 2.64	3	3	2	2	2	2
S = 69 2.70	3	3	2	2	2	2
A					48 1.89	64 2.52
E					36 1.42	48 1.89

VE21				
		CG4-CGD4-1	CG8	CH10-CHR16
$S_{min.}$	**H**	No. of stages		
44 1.73	21 .83	1	1	1
46 1.81	26,5 1.04	2	2	-
50 1.97	- -	-	-	2
54 2.13	- -	-	-	-
60 2.36	- -	-	3	-
62 2.44	26,5 1.04	3	-	-
64 2.52	- -	-	-	3
72 2.83	- -	-	4	-

Escutcheon plates for mounting E, EF, EG, EGF, KN1, KD1, KN2, EC, EC1, ED, ED1, VE, VE1, VF



Size	A	B	C
S00	30 1.18	39 1.54	5,5 .22
S0	48 1.89	59 2.32	6,7 .26
S1	64 2.52	78 3.07	7,4 .29

Dimensions

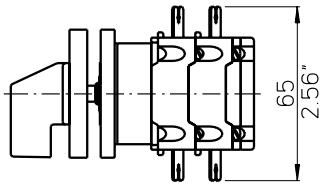
mm
inch

Additional Lengths

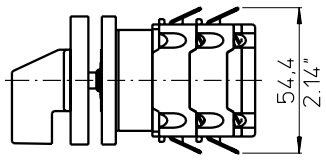
Additional lengths for amendment (page 4)

	CG8	CH10 CH16	CHR10 CHR16
B	6,2 .24	6,2 .24	6,2 .24
S	17,3 .68	17,3 .68	17,3 .68
L, M	24,8 .98	24,8 .98	24,8 .98
X	23,3 .92	23,3 .92	23,3 .92

Quick connect terminations (plug 2,8 mm or 6,35 mm) for CH switches (page 4)



with quick connects



with angled quick connects

Length L

Stages	CG4 CG4-1 CGD4-1	CG6	CG8	CH6 CHR6	CH10 CH11 CH12 CH16	CHR10 CHR11 CHR12 CHR16	CH10B CH16B	CHR10B CHR16B
1	38,5 1.52	43,2 1.70	40,7 1.60	46 1.81	43,5 1.71	43,5 1.71	48,9 1.93	48,9 1.93
2	50,5 1.99	55,9 2.20	53,4 2.10	60 2.36	57,5 2.26	57,5 2.26	62,9 2.48	62,9 2.48
3	62,5 2.46	68,6 2.70	66,1 2.60	74 2.91	71,5 2.81	71,5 2.81	76,9 3.03	76,9 3.03
4	74,5 2.93	81,3 3.20	78,8 3.10	88 3.46	85,5 3.37	85,5 3.37	90,9 3.58	90,9 3.58
5	86,5 3.41	- -	91,5 3.60	- -	99,5 3.92	99,5 3.92	104,9 4.13	104,9 4.13
6	98,5 3.88	- -	104,2 4.10	- -	113,5 4.47	113,5 4.47	118,9 4.68	118,9 4.68
7	110,5 4.35	- -	116,9 4.60	- -	127,5 5.02	127,5 5.02	132,9 5.23	132,9 5.23
8	122,5 4.82	- -	129,6 5.10	- -	141,5 5.57	141,5 5.57	146,9 5.78	146,9 5.78
9	- -	- -	142,3 5.60	- -	155,5 6.12	155,5 6.12	160,9 6.34	160,9 6.34
10	- -	- -	155 6.10	- -	169,5 6.67	169,5 6.67	174,9 6.89	174,9 6.89
11	- -	- -	167,7 6.60	- -	183,5 7.22	183,5 7.22	188,9 7.44	188,9 7.44
12	- -	- -	180,4 7.10	- -	197,5 7.77	197,5 7.77	202,9 7.99	202,9 7.99

The Range of “Blue Line” Switchgear

Technical literature covering the following products is available on request.

	Catalog Number
Main Switches and Main Switches with Emergency Function 16 A-315 A **Maintenance Switches 20 A-315 A** **Switch Disconnectors 20 A-315 A** According to IEC 60947-3, EN 60947-3, VDE 0660 part 107, IEC 60204, EN 60204 and VDE 0113	**500**
CL Switches 10 A-20 A **C, CA and CAD Switches 10 A-315 A and L Switches 350 A-2400 A** C, CA and CAD switches are designed for universal application. They are recommended for instrument, isolator, double-throw and motor control. L switches are designed for load and off-load applications. They are used to switch resistive or low inductive loads.	**100**
Optional Extras and Enclosures The complete product line, a large number of optional extras is available, including door interlocks, push-pull devices, cylinder and padlock attachments, control and indicator devices, AC motor drives, as well as enclosures, both insulated and metal.	**101**
A and AD Switches 6 A-25 A A and AD switches have 4 contacts in each switching stage. These switches provide an extensive range of switch functions and require a minimum mounting depth. Up to 24 switching positions are possible, with availability of 48 contacts per 12 stage switch column.	**110**
CG, CH and CHR Switches 10 A-25 A Ultra compact CG, CH and CHR switches are ideally suited for control and instrumentation applications. Switch terminals are “finger-proof” and conveniently accessible for wiring and are delivered open. All CG4 switches offer specially designed gold plated contacts or H-bridges with “cross-wire” contact systems, which facilitates their use in electronic circuitry and chemically aggressive environments.	**120**
DH, DHR, DK and DKR Switches 6 A-16 A DH, DHR, DK and DKR switches incorporate unique corrosion resistant contacts that permit operation on system voltage as low as 1 V. They have fully enclosed and protected contacts which can be operated either by rotary and/or lateral handle movement. D switches are used in calibration and semiconductor circuits. They are also used for relay and contactor control.	**130**
X Switches 200 A-630 A X switches can be applied for load, tap and gang switching duties. They incorporate 6 contacts in each switching stage. Their compact design provides a minimum length dimension for mounting purposes.	**140**
KG Switches 20 A-315 A and KH and KHR Switches 16 A-80 A KG, KH and KHR switches are excellent circuit interruptors. They have high through fault and fault making capacities and are especially designed for use as isolators and safety switches for machine tools, distribution panels and switchboards. KG ON/OFF switches offer unusually high dimensioned air and creepage distances between terminals which are designed for time saving “straight-line” wiring. ON/OFF switches are available with up to 8 poles and double-throw switches are available with up to 4 poles.	**150**
Push Buttons and Pilot Lights, 22,5 mm Ø A complete range of state-of-the-art push buttons and pilot lights represent an ideal combination of functional security and economical efficiency in a modular design.	**302**

We reserve the right to make technical and dimensional changes without prior notice.

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