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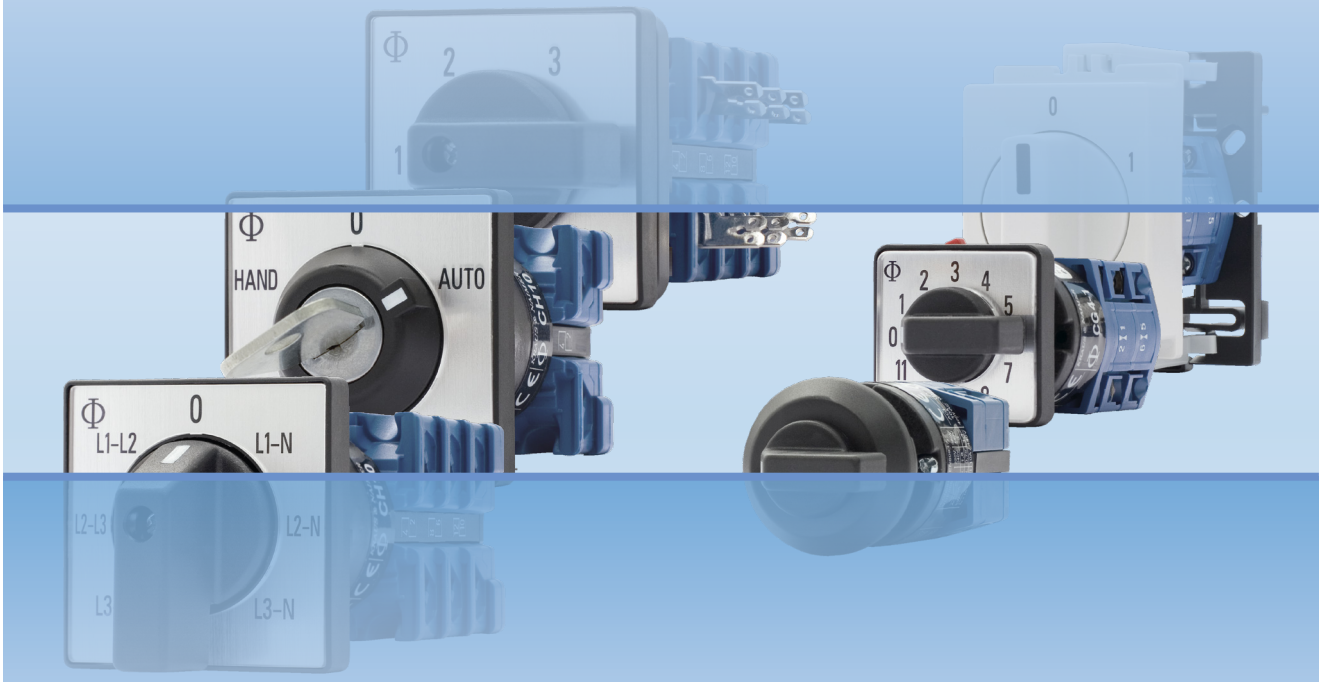
Find the *Kraus & Naimer CH10-A600* at our website: *Click HERE*

Kraus & Naimer

Catalog 120
05 / 2020

Control Switches

CG, CH and CHR type up to 25 A



Kraus & Naimer

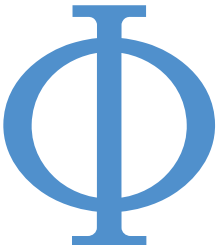
The development of the Blue Line rotary switch and motor starter product ranges is based on more than hundred years experience by Kraus & Naimer in the design and manufacture of electrical switchgear. Kraus & Naimer pioneered the introduction of the cam operated rotary switch and continues to be recognized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

BLUE LINE

Blue Line products are protected by numerous patents through-out 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

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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).

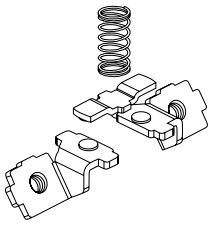
The stage is the basis for all switches and can be supplied with a maximum of 2 contacts. All switches of this series are supplied with open terminals which are accessible while the switch is installed. The terminals are protected against accidental finger contact according to EN 50274, VDE 0660 part 514 and DGUV V3. 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.

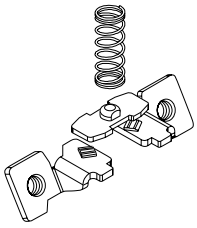
3 different Contact Systems are available

CG6 to CHR16B



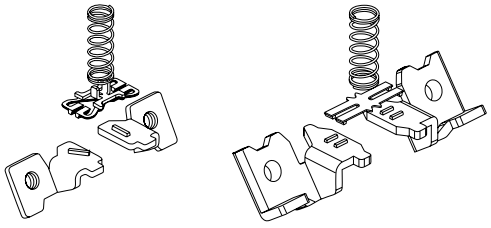
A rigid, double-break bridge with silver alloy contacts provides high making and breaking capabilities for regular control applications.

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



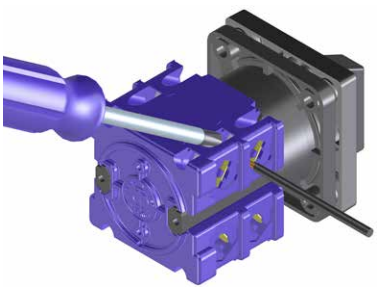
High contact reliability by H-bridge design with “cross-wire“ contacts. The contact system with gold-plated contacts (CH12/CHR12 with silver contact) allows for low voltages, electronic compatible.

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

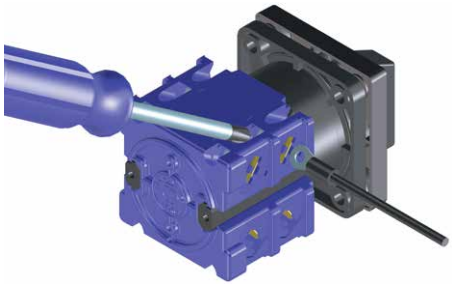
CG-series



CH-series



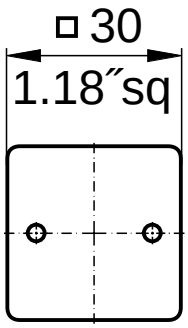
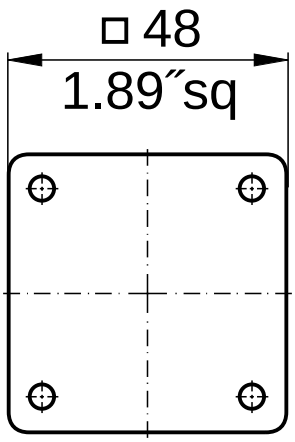
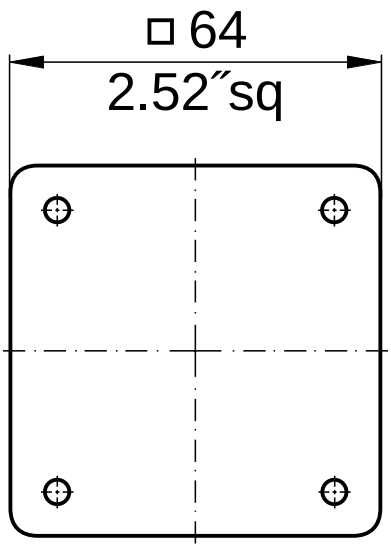
CHR-series



Above illustrates the standard terminal positions.

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Switch Size	Type	According to IEC 60947-3, EN 60947-3, VDE 0660 part 107			
		Insulation Voltage[1] U_i	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 36-38.

[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 5 which shows the thermal current, power rating and dimensions of each switch. For further technical details, refer to pages 36-38. Variations of contacts and terminals are shown below.

2. Switch Function

The code numbers for standard switches shown on pages 8-25 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 26-31. Catalog **101** describes enclosures and optional extras.

Specify the mounting code to indicate required mounting.

CH10	A202	VE

Type of Switch

Extending the switch type coding the following combinations will define:

Amendment	Definition	For switch types
-1	with gold contacts[1]	CG4-1, CGD4-1, CH10-1, CH10B-1, CH16B-1, CHR6-1, CHR10-1
-4[2]	with quick connects (nickel-plated)	CH10-4, CH10B-4, CH16-4, CH16B-4 CH10-6, CH10S-6, CH16-6
-6[2]	with angled quick connects (nickel-plated)	CH6-6, CH10-6, CH10S-6, CH16-6
B	S0 switches with latching mechanism size S1	CG8B, CH10B, CH11B, CH12B, CH16B, CH16B, CHR10B, CHR16B for four hole panel mounting
L	with lockout-relay w/o manual release	CH10L, CHR10L, CHR16L
M	with lockout-relay with manual release	CHR10M
X	with power failure release	CG8X
R	with spring return latching mechanism	CG8R, CH10R, CH11R, CHR10R, CHR11R
S	with snap action	CG8S, CH10S, CH16S, CHR10S, CHR16S with 60° or 90° switching
Y	with power failure release and trip-free release	CG8Y

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

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

Handles, Escutcheon Plates and Optional Extras

The handles for standard switches shown on pages 8-25 are suitable for mounting units with four hole mounting. Alternative types of handles available are illustrated on pages 26-31.
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 32-34. 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 5 lists these sizes and the various switch types they include.

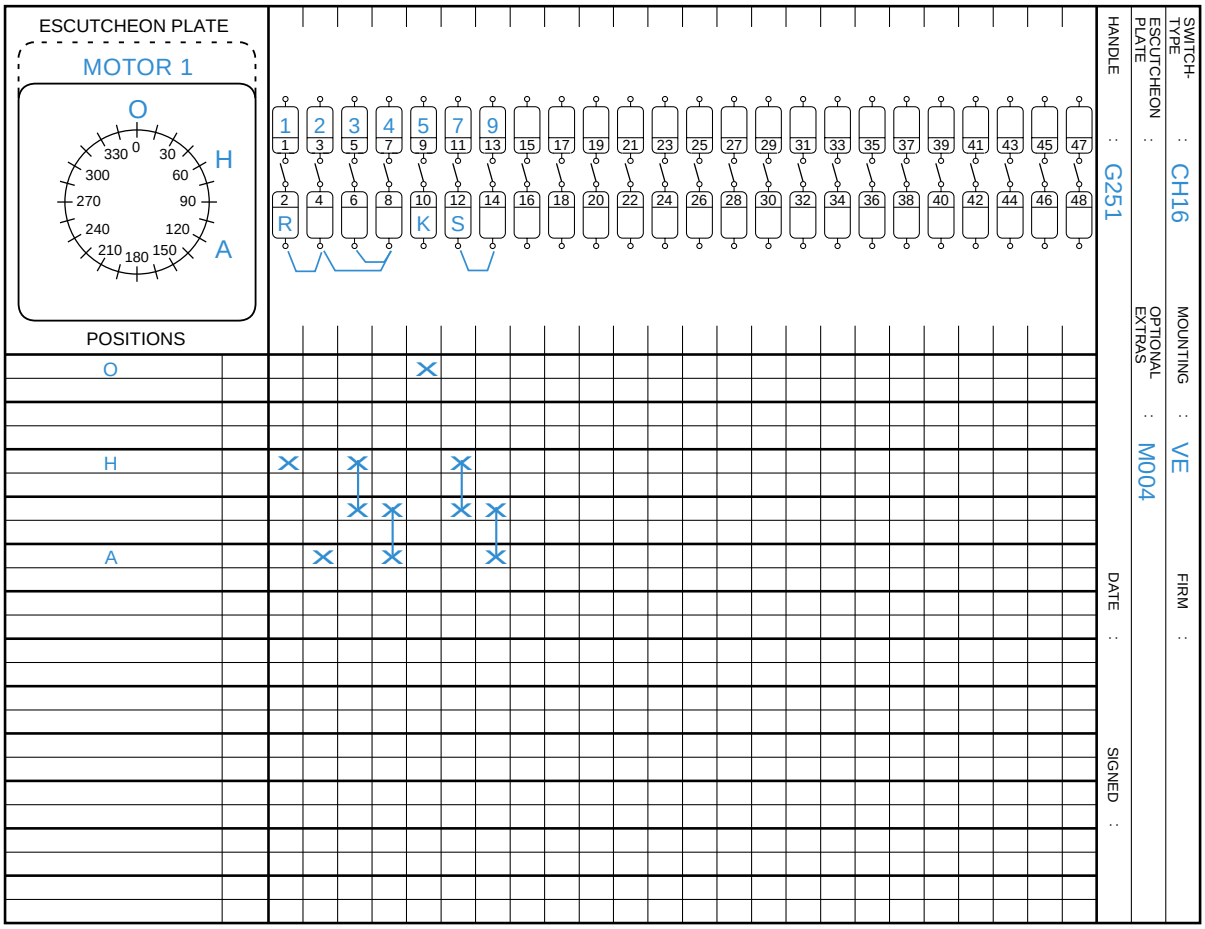
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How to order

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.

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Notes:

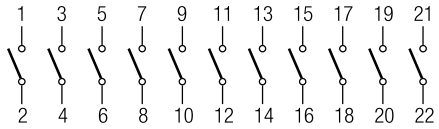
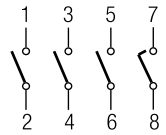
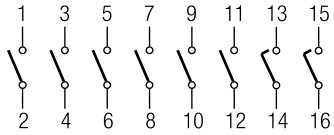
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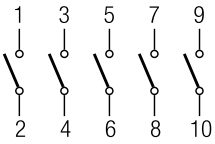
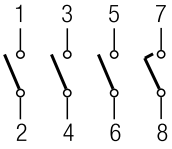
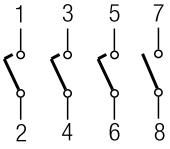
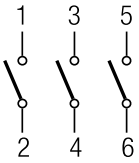
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram

ON/OFF Switches with 60° Switching

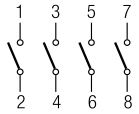
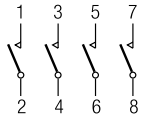
Dimensions p. 46

1 pole 2 pole 3 pole 4 pole 4 pole 1 pole preclose 6°[1] 5 pole 6 pole 7 pole 8 pole 8 pole 2 pole preclose 6°[1] 9 pole 10 pole 11 pole 12 pole	F070					A200 A201 A202 A203 WAA653 WAA341 A342 A343 A344 WAA654 WAA345 A346 WAA347 A348	1 1 2 2 2 3 3 4 4 4 5 5 6 6	 1-12 pole  4 pole 1 pole preclose 6°  8 pole 2 pole preclose 6°

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°	F056					A290 A291 A292 A324 A293 WAA327 WAA325 A326	1 1 2 2 2 2 3 3	 1, 2, 3, 4, 5 and 6 pole  4 pole 1 pole preclose 60°  4 pole 1 pole preclose 60°
3 pole 360° rotation 3 pole for foot operation	F062				[2]	WAA208 WAA386	2 2	

ON/OFF Switches with 30° Switching

1 pole 2 pole 3 pole 4 pole	F169					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	F153					A204 A205 WAA206 WAA207	1 1 2 2	 1-4 pole

Double-throw Switches without „OFF“ 60° Switching

Dimensions p. 46

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CG8 CH10B-CHR16B	Code	Stages	Connection Diagram[2]
1 pole	F072	☐	☐	☐	☐	A220	1	1-4 pole / 4 pole 1 pole preclose 6°
2 pole		☐	☐	☐	☐	A221	2	
3 pole		☐	☐	☐	☐	A222	3	
4 pole		☐	☐	☐	☐	A223	4	
4 pole 1 pole preclose 6°[1]		☐	☐	☐	☐	WAA673	4	
5 pole		☐		☐	☐	A369	5	5 pole
6 pole		☐		☐	☐	A370	6	
7 pole		☐		☐	☐	A371	7	6 and 7 pole
8 pole		☐		☐	☐	A372	8	
8 pole 2 pole preclose 6°[1]		☐		☐	☐	WAA972	8	8 pole 2 pole preclose 6°
9 pole				☐	☐	WAA373	9	8 and 9 pole
10 pole				☐	☐	WAA374	10	
11 pole				☐	☐	WAA375	11	10 and 11 pole
12 pole				☐	☐	WAA376	12	12 pole

Double-throw Switches without „OFF“ with electrically isolated contacts

1 pole	F072	☐	☐	☐	☐	A720	1	1-4 pole
2 pole		☐	☐	☐	☐	A721	2	
3 pole		☐	☐	☐	☐	A722	3	
4 pole		☐	☐	☐	☐	A723	4	
4 pole 1 pole preclose 6°[1]		☐	☐	☐	☐	WAA973	4	4 pole 1 pole preclose 6°
1 pole with spring return	F026	☐	☐	☐	☐	A795	1	1 pole with spring return

Double-throw Switches without „OFF“ 30° Switching

1 pole	F026			☐		WAA120	1	1-4 pole
2 pole				☐		WAA121	2	
3 pole				☐		WAA122	3	
4 pole				☐		WAA123	4	
1 pole with spring return	F026	☐	☐	☐	☐	A295	1	1-3 pole
2 pole with spring return		☐		☐	☐	A296	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.

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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	Type/Handle CG6-CHR6	Type/Handle CG8 CH10-CHR16	Type/Handle CH10B-CHR16B	Code	Stages	Connection Diagram[2]
Double-throw Switches with Center „OFF“ 60° Switching Dimensions p. 46								
1 pole	F071					A210	1	1-4 pole
2 pole						A211	2	
3 pole						A212	3	
4 pole						A213	4	
4 pole 1 pole preclose 6°[1]						WAA913	4	4 pole 1 pole preclose 6°
5 pole						A361	5	5 pole
6 pole						A362	6	6 and 7 pole
7 pole						WAA363	7	
8 pole						WAA364	8	8 pole
8 pole 2 pole preclose 6°[1]						WAA664	8	8 pole 2 pole preclose 6°
Double-throw Switches with Center „OFF“ 90° Switching								
1 pole	F057					A218	1	1-4 pole
2 pole						A219	2	
3 pole						WAA299	3	
4 pole 1 pole preclose 6°[1]						WAA294	4	
Double-throw Switches with Center „OFF“ and electrically isolated contacts								
1 pole	F071					A710	1	1-4 pole
2 pole						A711	2	
3 pole						A712	3	
4 pole						A713	4	
4 pole 1 pole preclose 6°[1]						WAA963	4	4 pole 1 pole preclose 6°
1 pole with spring return	F025					A714	1	1 and 2 pole
2 pole to center						A715	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	CH10B-CHR16B	Code	Stages	Connection Diagram[1]

Double-throw Switches with Spring Return to Center

Dimensions p. 46

1 pole 2 pole 3 pole	with spring return to center	F025					A214 A215 A216	1 2 3	1 3 5 7 9 11 2 6 10 1-3 pole
1 pole 2 pole 3 pole	with spring return from left to center	F361					A320 A321 A322	1 2 3	3 1 7 5 11 9 2 6 10 1-3 pole

General Application Switches

1 pole 2 pole 3 pole	2 Gang Switching sequence: 0, A, A+B	F075					A310 A312 WAA314	1 2 3	L1 N R 0 1 A 3 B 2 1 pole L1 N R 0 1 A 3 B 2 6 5 7 2 pole L1 L2 L3 R S T 2 6 10 1 5 9 A 3 7 11 B 3 pole
1 pole 2 pole 3 pole	3 Gang Switching sequence: 0, A, A+B, A+B+C	F001					A311 WAA313 WAA315	2 3 5	L1 L2 L3 N R S T 0 2 6 4 1 5 3 A B C 1 pole L1 L2 L3 R S T 2 6 10 1 3 7 A B C 5 9 11 2 pole L1 L2 L3 R S T 2 8 14 1 9 13 A 5 7 17 B 3 11 15 C 3 pole
1 pole 2 pole 3 pole	2 Gang Series switching Switching sequence: 0, A, B, A+B	F001					WAA330 WAA331 WAA332	1 2 3	L1 N R 0 1 A 3 B 2 1 pole L1 N R 0 1 A 3 B 2 6 5 7 2 pole L1 L2 L3 R S T 2 6 10 1 5 9 A 3 7 11 B 3 pole
2 pole	2 Gang Series-parallel Switching Switching sequence: 0, A+B series, A, A+B parallel	F001					WAA339	2	L1 N R 0 1 7 2 6 8 A B

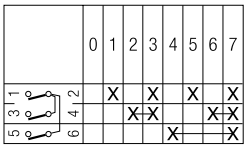
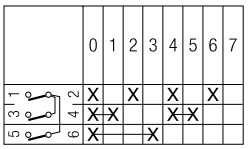
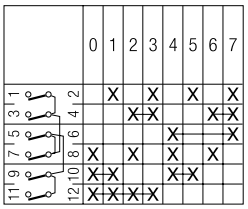
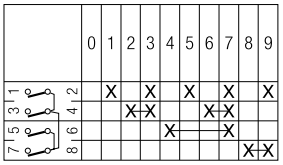
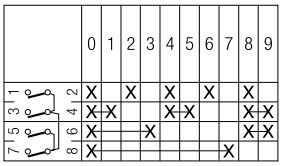
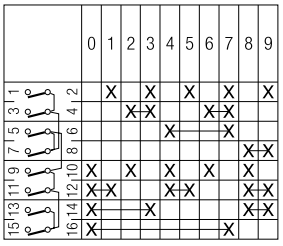
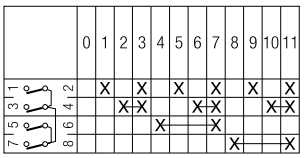
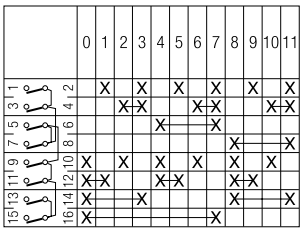
[1]Connection diagrams for CHR switches on request.

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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CH11 CH12	CH10B-CHR16B	Code	Stages	Connection Diagram

Coding Switches/Binary Code

Dimensions p. 46

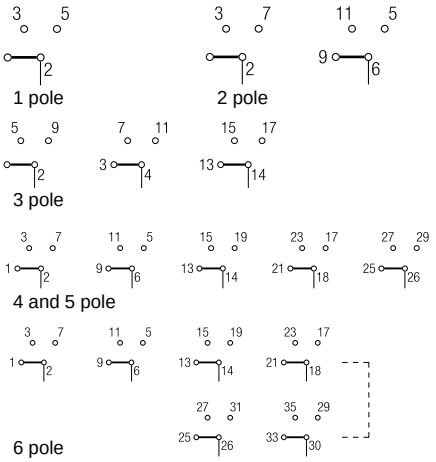
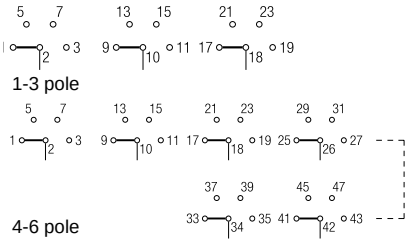
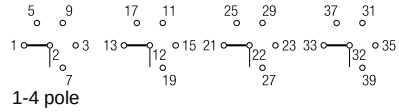
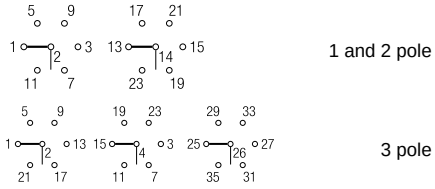
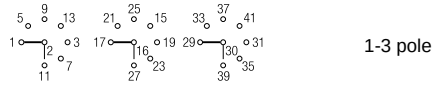
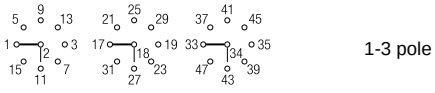
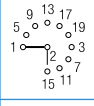
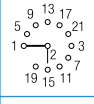
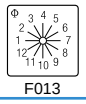
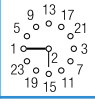
0 - 7 360° rotation	 F322	▭		▭		A540	2	
0 - 7 complement 360° rotation	 F322	▭		▭		WAA541	2	
0 - 7 + complement 360° rotation	 F322	▭		▭		WAA542	3	
0 - 9	 F007	▭		▭		A550	2	
0 - 9 complement	 F007	▭		▭		WAA551	2	
0 - 9 + complement	 F007	▭		▭		WAA552	4	
0 - 11 360° rotation	 F009	▭		▭		WAA543	2	
0 - 11 + complement 360° rotation	 F009	▭		▭		WAA545	4	

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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“

Dimensions p. 46

1 pole 3 Step 2 pole 3 pole 4 pole 5 pole 6 pole	 F076					A230 A250 A270 A476 WAA484 WAA489	2 3 5 6 8 9	 1 pole 2 pole 3 pole 4 and 5 pole 6 pole
1 pole 4 Step 2 pole 3 pole 4 pole 5 pole 6 pole	 F077					A231 A251 A271 A477 WAA485 WAA490	2 4 6 8 10 12	 1-3 pole 4-6 pole
1 pole 5 Step 2 pole 3 pole 4 pole	 F078					A232 A252 WAA272 WAA478	3 5 8 10	 1-4 pole
1 pole 6 Step 2 pole 3 pole	 F079					A233 WAA253 WAA273	3 6 9	 1 and 2 pole 3 pole
1 pole 7 Step 2 pole 3 pole	 F110					WAA234 WAA254 WAA274	4 7 11	 1-3 pole
1 pole 8 Step 2 pole 3 pole	 F111					WAA235 WAA255 WAA275	4 8 12	 1-3 pole
1 pole 9 Step	 F010					WAA236	5	
1 pole 10 Step	 F011					WAA237	5	
1 pole 11 Step	 F012					WAA238	6	
1 pole 12 Step 1 pole 360° rotation	 F013					WAA239 WAA639	6 6	

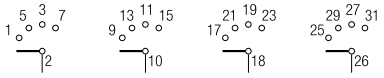
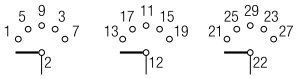
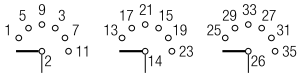
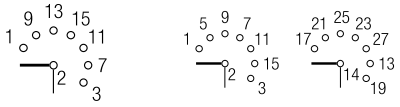
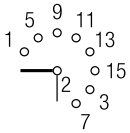
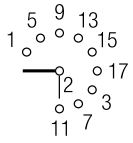
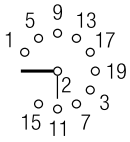
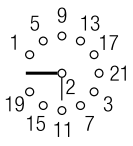
[1]Connection diagrams for CHR switches on request.

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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 Dimensions p. 46								
1 pole 3 Step	F076					A730	2	1 pole
2 pole						A750	3	2 pole
1 pole 4 Step	F077					A731	2	1 pole
2 pole						A751	4	2 pole
Multi-step Switches with „OFF“								
1 pole 2 Step 2 pole 3 pole 4 pole 5 pole 6 pole	F075					A240 A260 A280 WAA480 WAA486 WAA491	1 2 3 4 5 6	1-6 pole
1 pole 3 Step 2 pole 3 pole 4 pole 5 pole	F109					A241 A261 A281 WAA481 WAA487	2 3 5 6 8	1 and 2 pole 3 pole 4 pole 5 pole

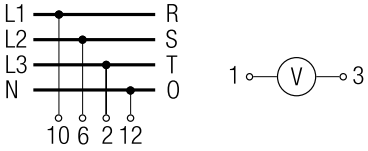
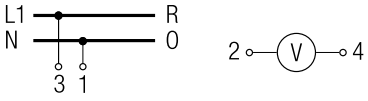
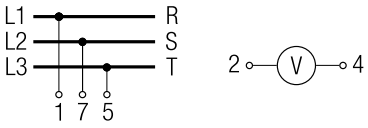
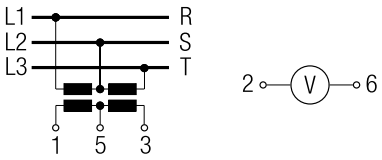
[1]Connection diagrams for CHR switches on request.

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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Multi-step Switches with „OFF“ Dimensions p. 46								
1 pole 4 Step 2 pole 3 pole 4 pole	F002					A242 WAA262 WAA282 WAA482	2 4 6 8	 1-4 pole
1 pole 5 Step 2 pole 3 pole	F003					A243 WAA263 WAA283	3 5 8	 1-3 pole
1 pole 6 Step 2 pole 3 pole	F004					A244 WAA264 WAA284	3 6 9	 1-3 pole
1 pole 7 Step 2 pole	F005					WAA245 WAA265	4 7	 1 pole 2 pole
1 pole 8 Step	F006					WAA246	4	
1 pole 9 Step	F007					WAA247	5	
1 pole 10 Step	F008					WAA248	5	
1 pole 11 Step 1 pole 360° rotation	F009					WAA249 WAA649	6 6	

[1]Connection diagrams for CHR switches on request.

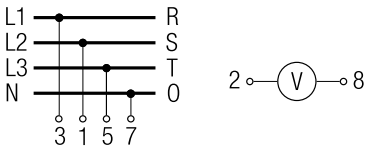
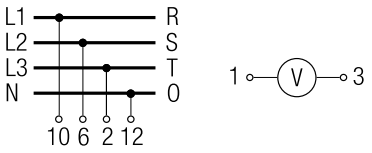
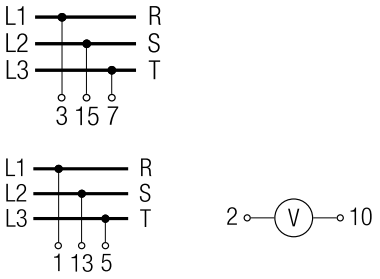
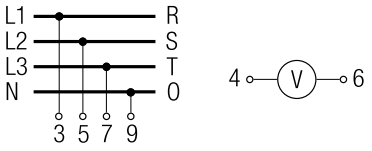
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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Voltmeter Switches without „OFF“								
3 phase 3 wire	F792					A023	2	
3 phase 3 wire 3 phase to phase and phase to neutral	F794					A025	3 3	
Voltmeter Switches with „OFF“								
2 pole 360° rotation	F170-PRL					WAA002	1	
3 phase 3 wire	F775					A004	2	
	F212-PRL					WAA011	2	

[1]Connection diagrams for CHR switches on request.

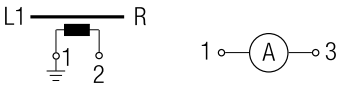
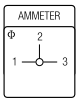
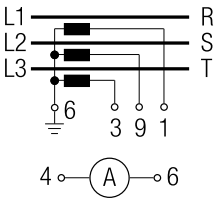
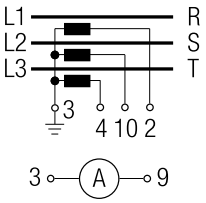
Dimensions p. 46

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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Voltmeter Switches with „OFF“ Dimensions p. 46								
3 phase to neutral	 F779					WAA005	2	
3 phase to phase and 3 phase to neutral	 F782					A007	3	
2 separate 3 phase with center „OFF“	 F786					WAA008	4	
3 phase and 1 phase to neutral	 F789					WAA010		

[1]Connection diagrams for CHR switches on request.

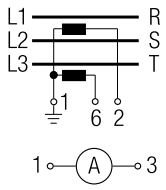
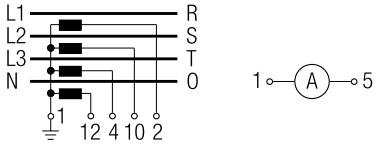
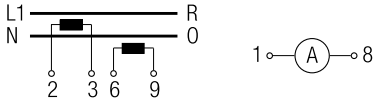
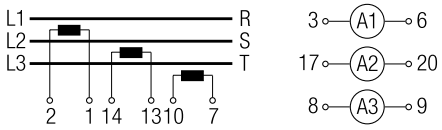
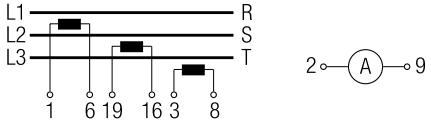
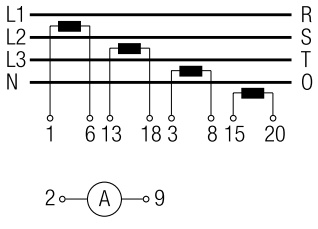
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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Ammeter Switches								
Single pole with one current transformer	 F058					WAA046	1	
Single pole with 3 current transformers without „OFF“	 F181-PRL					WAA017		
Single pole with 3 current transformers with „OFF“ 360° rotation	 F059					A048	3	

Dimensions p. 46

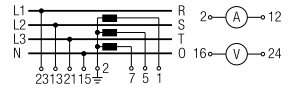
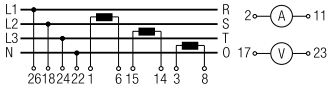
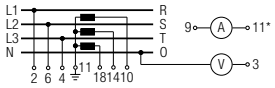
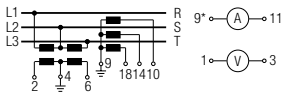
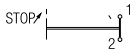
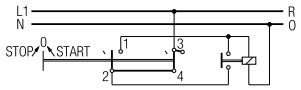
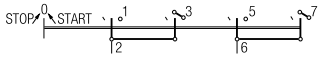
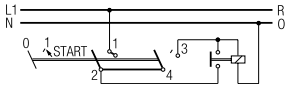
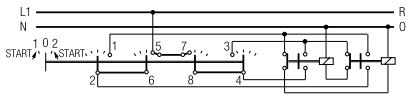
[1]Connection diagrams for CHR switches on request.

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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Ammeter Switches								Dimensions p. 46
Single pole with 2 current transformers (3 readings)	AMMETER F172-PRL	●	●	●	●	WAA021	2	
Single pole with 4 current transformers	F060	●	●	●	●	WAA036	4	
2 pole 2 current transformers	F057	●	●	●	●	WAA037	3	
2 pole 3 current transformers	AMMETER F181-PRL	●		●	●	WAA019	5	
	F059	●		●	●	A038	5	
2 pole 4 current transformers	F060	●		●	●	WAA039	6	

[1]Connection diagrams for CHR switches on request.

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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Volt-ammeter Switches								
3 phase - phase to phase 3 current	F101	●		●	●	WAA027	6	
	F077	●		●	●	WAA028	7	
3 phase voltage 3 phase current 4 wire	F174-PRL	●		●	●	WAA033	5	
3 phase voltage 3 phase current 3 wire	F174-PRL	●		●	●	WAA035	5	
Control Switches								
Stop switch	F022	●	●	●	●	WAA174	1	
Start switch	F023	●	●	●	●	A175	1	
Stop start switch single pole	F024	●	●	●	●	A176	1	
Stop start switch 2 pole	F024	●	●	●	●	WAA183	2	
Stop start switch with spring return from start to run	F119	●	●	●	●	A178	1	
Stop start switch with spring return to run for 2 units	F121	●	●	●	●	WAA177	2	

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[1]Connection diagrams for CHR switches on request.

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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	F121					WAA182	2	
Motor voltage control switch	F144-PRL					WAA150	2	
Control Switches with electrically isolated contacts								
Stop start switch 1 pole	F024					A789	1	
Stop start switch with spring return to 1	F119					A791	1	
Stop start switch with spring return to run for 2 units	F121					WAA790	2	
Contactor control with spring return to „OFF“	F025					WAA179	2	
Circuit breaker control	F143-PRL					WAA537	2	
Control and Alarm Switches[1]								
With slip clutch and without indicator device						WAA190	5[2]	
Without indicator device						WAA192	2	

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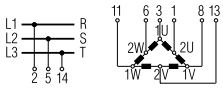
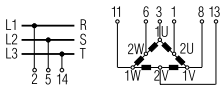
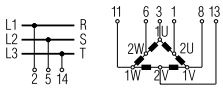
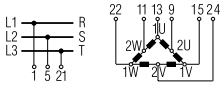
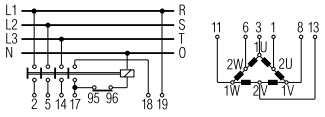
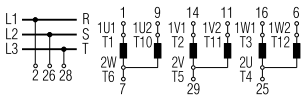
[1]Advise the indicator device, described in Catalog 101, page 9. [2]incl. slip clutch

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	F071					A400	2	
3 pole	F071					A401	3	
3 pole with spring return to „OFF“	F025					A228	3	
3 pole for use with reversing contactors	F121					WAA402	4	
Motor Control Switches								
2 speed 2 winding 0-A-BY or Δ	F073					WAA451	3	
3 speed 2 winding 0-AΔ-BY-AYY	F109					WAA457	6	

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[1]Connection diagrams for CHR switches on request.

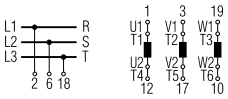
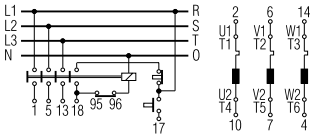
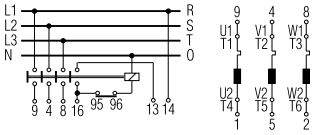
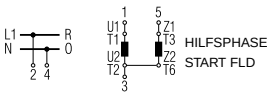
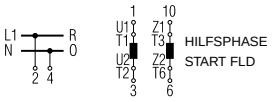
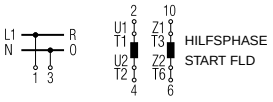
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Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Motor Control Switches								
2 speed single winding	F073	☐	☐	☐	☐	A440	4	
2 speed single winding without „OFF“	F072	☐	☐	☐	☐	A466	4	
2 speed single winding with center „OFF“	F071	☐	☐	☐	☐	A441	4	
2 speed single winding reversing	F105	☐		☐	☐	A442	6	
2 speed single winding for use with contactors	F073	☐		☐	☐	WAA444	5	
2 speed reversing for 2 way operation with slip clutch for „OFF“ load use	F294			☐	☐	WAA468	10[2]	

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

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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	F080	✓	✓	✓	✓	A410	4	
Reversing	F112	✓		✓	✓	WAA413	5	
With auxiliary contact closed in „OFF“ position	F080	✓		✓	✓	WAA416	5	
For use with reversing contactors	F061	✓	✓	✓	✓	A419	4	
Start and Run Switches								
Split-phase start	F119	✓	✓	✓	✓	A425	2	
Split-phase start reversing	F120			✓	✓	WAA426	3	
Split-phase reversing auto cutout of start field winding	F104	✓	✓	✓	✓	WAA622	3	

Dimensions p. 46

[1]Connection diagrams for CHR switches on request.

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Two or Four Hole Panel Mounting	Terminals rotated 90°	Code	CG4-CHR6	CG8-CHR16	CH10B-CHR16B
Panel mounting					
 Two hole panel mounting, Protection IP 40		E	●		
	●	E-V	●		
Two hole panel mounting, Protection IP 66/67/69k		EF	●		
	●	EF-V	●		
 Four hole panel mounting, Protection IP 40		E		●	●
	●	E-V		●	●
Four hole panel mounting, Protection IP 66/67/69k		EF		●	●
	●	EF-V		●	●
Two hole panel mounting, Protection IP 66/67/69k		E22		●	
	●	E22-V		●	
Panel mounting using larger escutcheon plate and handle and with heavy duty latching					
 Four hole panel mounting, Protection IP 40		EG		●	
Four hole panel mounting, Protection IP 66/67/69k		EGF		●	

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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, Protection IP 40 Shaft diam. 6 mm/.24 inch	E9	●
Two hole panel mounting, Protection IP 40 Shaft diam. 6,35 mm/.25 inch	E91	●
Mosaic mounting		
 For Siemens-Mosaic 30 mm grid depth, Protection IP 40	E92	●
 For Subklew-, Kreutzenbeck-, Symo-Mosaic, Protection IP 40 28 mm 25 mm 25 mm grid depth	E93	●
For Mauell-Mosaic 30 mm grid depth, Protection IP 40	E94	●

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Two or Four Hole Panel Mounting	Code	CG8-CHR16	CH10B-CHR16B
 **Panel mounting with heavy duty latching and metal shaft**			
Four hole panel mounting, Protection IP 40 Mounting plate, escutcheon plate and handle of size S0	KN2	●	
 Four hole panel mounting, Protection IP 40 Mounting plate, escutcheon plate and handle of size S1	KN1	●	●
Four hole panel mounting, Protection IP 40 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 66/67/69k rear IP 42	ED1		●
Two hole panle mounting Protection front IP 66/69k rear IP 42	ED22	●	

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Single Hole Mounting		Terminals rotated 90°	Code	CG4-CHR6	CG8-CHR16
	**With locking nut and shaft seal**			mm	mm
	Without escutcheon plate, Protection IP 66/67/69k		FS1	16/22	
		●	FS1-V	16/22	
			FT1		22
		●	FT1-V		22
			FT3		22/30
		●	FT3-V		22/30
			FS2	16/22	
	With square escutcheon plate, Protection IP 66/67/69k	●	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, Protection IP 66/67/69k		FH3		22
		●	FH3-V		22
			FS4	16/22	
	With rectangular escutcheon plate, Protection IP 66/67/69k	●	FS4-V	16/22	
			FT6		22
		●	FT6-V		22
	With size S1 rectangular escutcheon plate and heavy duty latching, Protection IP 66/67/69k		FH4		22
		●	FH4-V		22
	Mounting key for locking nut		S00 T170 09		

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Base Mounting	Terminals rotated 90°	Code	CG4-CGD4-1	CG8-CHR16
Base mounting				
 Base mounting - four hole, Protection IP 40		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, Protection IP 40		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, Protection IP 40		VE1		●
Snap-on base mounting for track EN 60715, Escutcheon plate can be fastened by screws at the switch, Protection IP 40		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, Protection IP 66/67/69k		VE1F	●	●

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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, Protection IP 40	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, Protection IP 40	VE21	●	●

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Escutcheon Plates

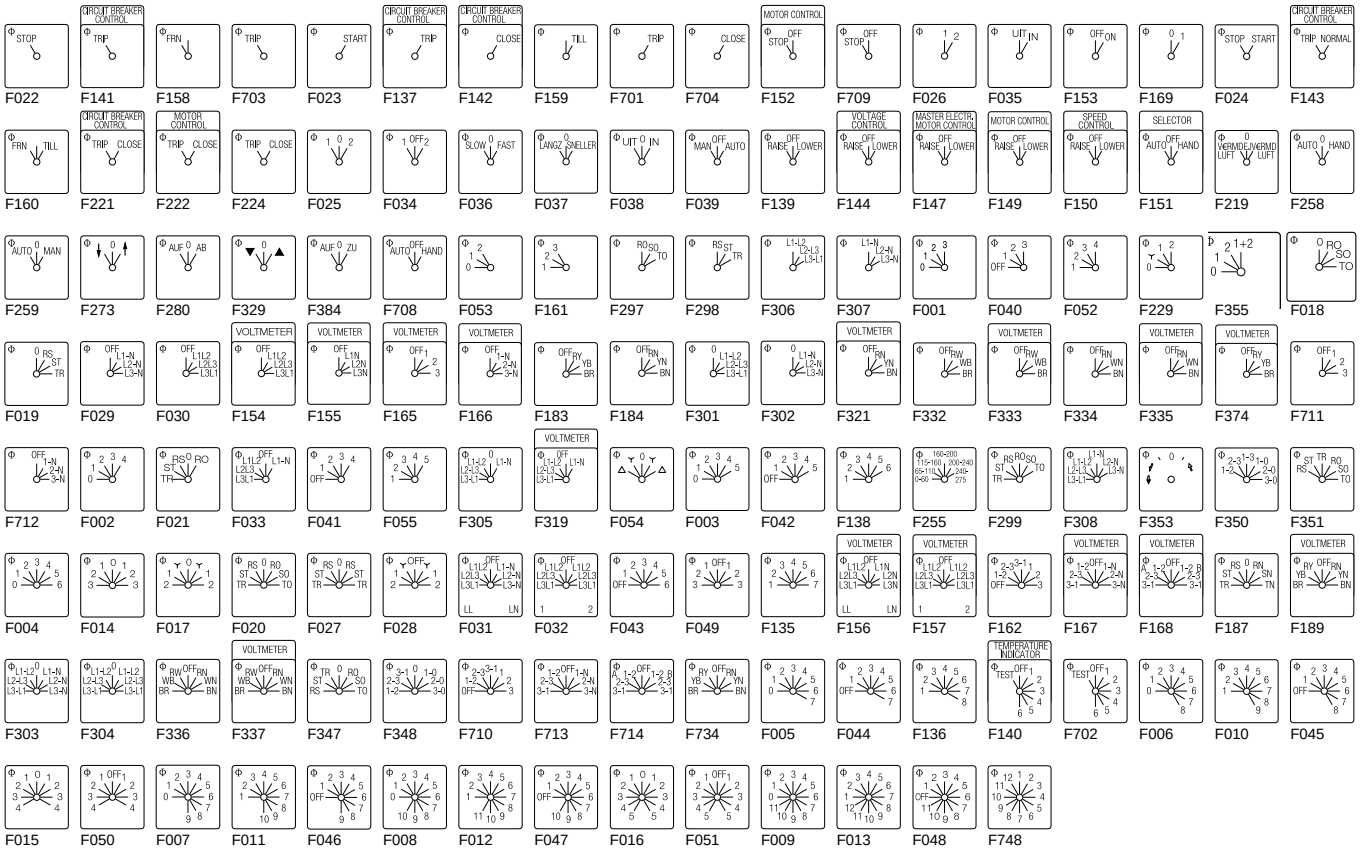


Square and rectangular escutcheon plates are available for each size of switch. The escutcheon plate consists of a frame and a faceplate having the switch positions which is than embossed with hot-foil backing. The escutcheon plate frame is an essential part of the switch and serves as a bearing surface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

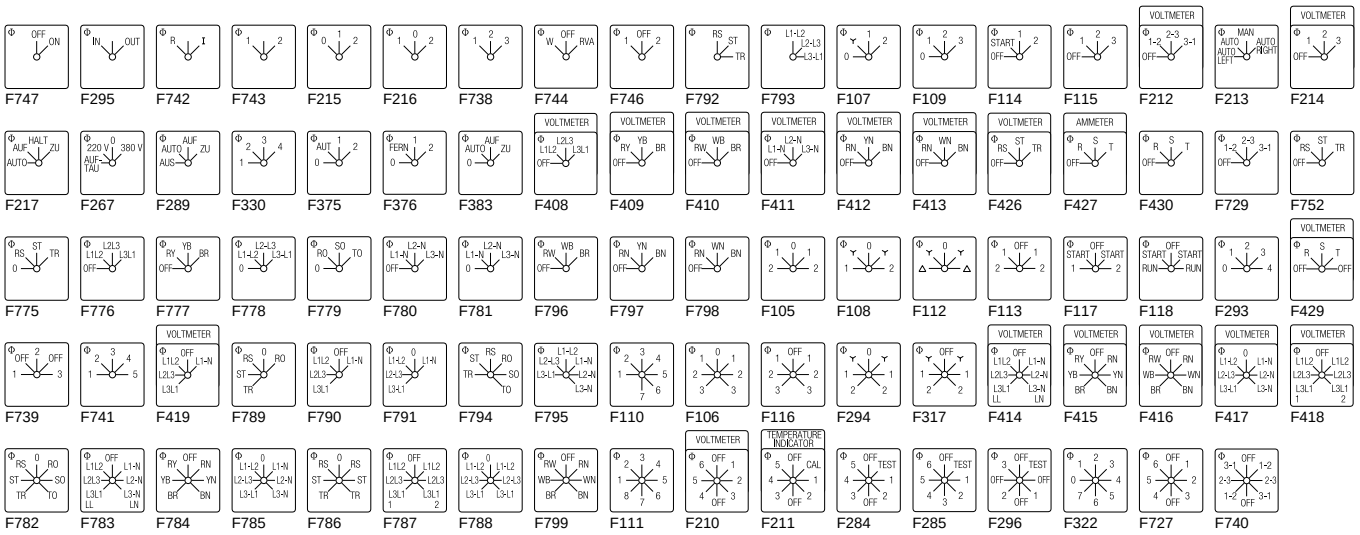
Standard Letterings Available

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

30° switching



45° switching

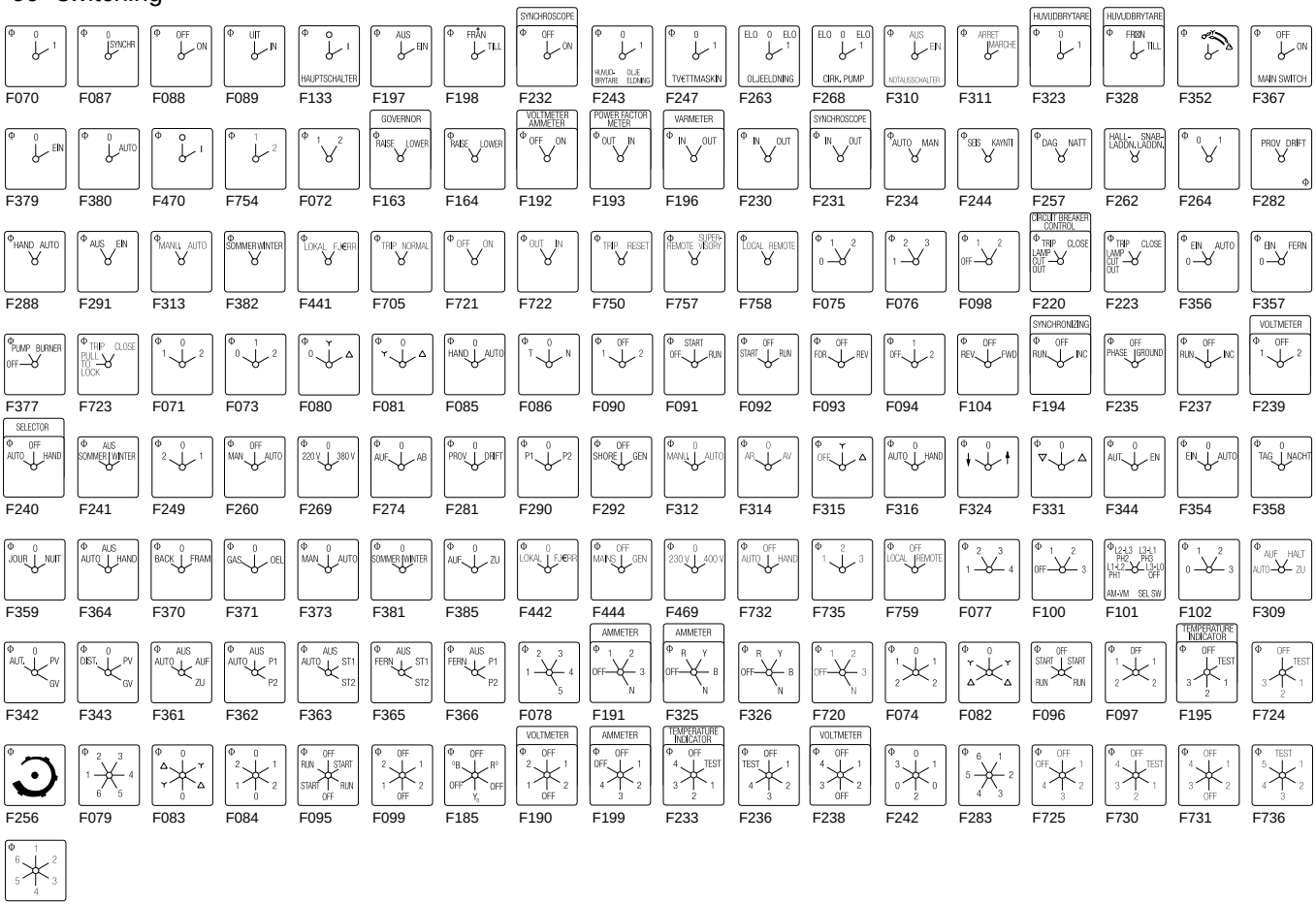


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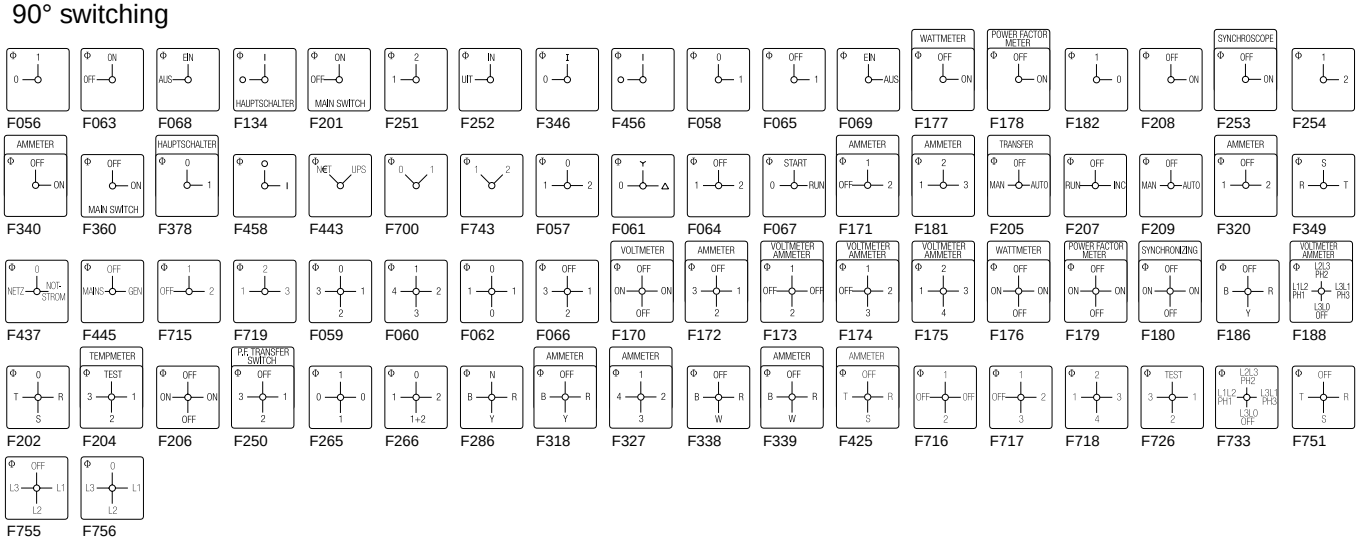
Face plates

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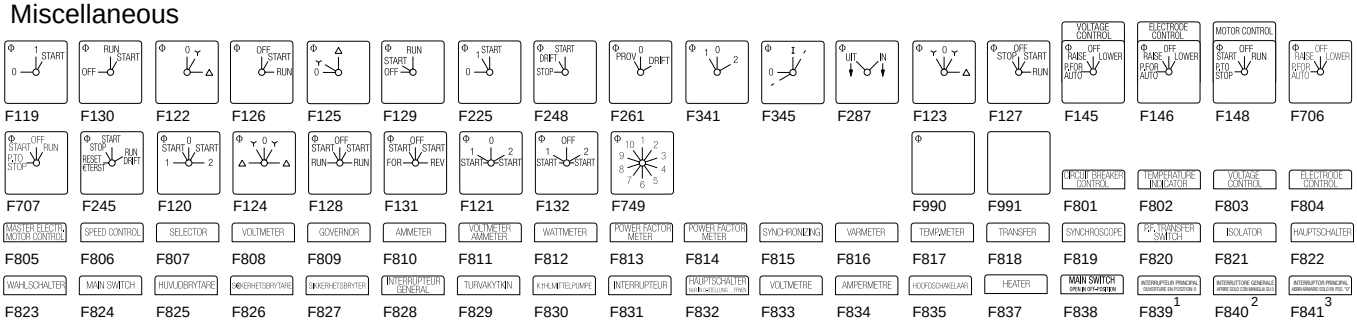
60° switching



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	S0	S1
R-Handle 	black red	G001 G002	— —	● ●	● ●
F-Handle 	black red	G221 G222	● ●	● ●	● ●
S-Handle  S0 S1	black red	G301 G302	— —	● ●	● ●
P-Handle  S0 S1	black red	G211 G212	— —	● ●	● ●
O-Handle 	black red	G321 G322	— —	— —	● ●

Type	Color	Code	Size S00	S0	S1
I-Handle  S00 S0, S1	black red	G251 G252	● ●	● ●	● ●
B-Handle 	black red	G521 G522	— —	● ●	● ●
L-Handle 	black red	G501 G502	— —	— —	● ●
K-Handle 	black red	G411 G412	— —	— —	● ●

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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	GB/T14048.3	●	CG4-1			CH10 CH10B	●	CHR10 CHR10B	●
Russia Belarus Kazakhstan	Eurasian Conformity		●	● +	●	●	●	●	●	●
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.) and NLRV8 (Canada) resp. File No. E60262, Category Control Number NRNT2 (U.S.) and NRNT8 (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.

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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, part 107	500 V	A	–	20	20	20	25	25
		660 V-690 V	A	–	16	16	16	25	25
AC-15 Switching of control devices, contactors, valves etc.	IEC 60947-5, EN 60947-5-1	110 V	A	2,5	6	5	5	8	8
	VDE 0660, part 200	220 V-240 V	A	2,5	5	5	5	8	8
		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		(gG-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		10	20	20	20	20	25	25
T ≤ 1 ms	48	95	140	190	240	290	350	A	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		6	12	20	12	12	20	20
T = 50 ms	30	60	90	120	150	180	240	A	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

Min. Ambient Temperature of Stages		-25 °C (valid only without optional extra)
Max. 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 35. [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).

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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 2	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

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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
Max. Ambient Temperature of Stages				-25 °C (valid only without optional extra)				
Max. 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).

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Tightening torque of screws

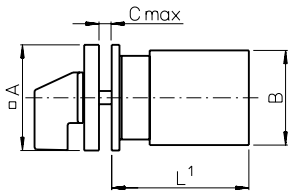
Type	Tightening torque	
CG4	0,4 Nm	3,5 lb-in
CG4-1	0,4 Nm	3,5 lb-in
CGD4-1	0,4 Nm	3,5 lb-in
CG6	0,8 Nm	7 lb-in
CG8	0,8 Nm	7 lb-in
CG8B	0,8 Nm	7 lb-in
CG8R	0,8 Nm	7 lb-in
CG8S	0,8 Nm	7 lb-in
CG8Y	0,8 Nm	7 lb-in
CH6	1,2 Nm	10 lb-in
CH10	1,2 Nm	10 lb-in
CH10-1	1,2 Nm	10 lb-in
CH10B	1,2 Nm	10 lb-in
CH10B-1	1,2 Nm	10 lb-in
CH10L	1,2 Nm	10 lb-in
CH10R	1,2 Nm	10 lb-in
CH10S	1,2 Nm	10 lb-in
CH11	1,2 Nm	10 lb-in
CH11B	1,2 Nm	10 lb-in
CH11R	1,2 Nm	10 lb-in
CH12	1,2 Nm	10 lb-in
CH12B	1,2 Nm	10 lb-in
CH16	1,2 Nm	10 lb-in
CH16B	1,2 Nm	10 lb-in
CH16B-1	1,2 Nm	10 lb-in
CH16S	1,2 Nm	10 lb-in
CHR6	1,4 Nm	12 lb-in
CHR6-1	1,4 Nm	12 lb-in
CHR10	1,4 Nm	12 lb-in
CHR10-1	1,4 Nm	12 lb-in
CHR10B	1,4 Nm	12 lb-in
CHR10L	1,4 Nm	12 lb-in
CHR10M	1,4 Nm	12 lb-in
CHR10R	1,4 Nm	12 lb-in
CHR10S	1,4 Nm	12 lb-in
CHR11	1,4 Nm	12 lb-in
CHR11R	1,4 Nm	12 lb-in
CHR12	1,4 Nm	12 lb-in
CHR16	1,4 Nm	12 lb-in
CHR16B	1,4 Nm	12 lb-in
CHR16L	1,4 Nm	12 lb-in
CHR16S	1,4 Nm	12 lb-in

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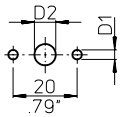
Dimensions

mm
inch

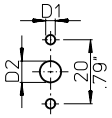
Two or Four Hole Panel Mounting



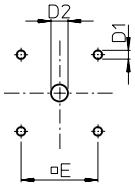
E
for
CG4-CGD4-1
CH6/CHR6
E-V
for
CG6



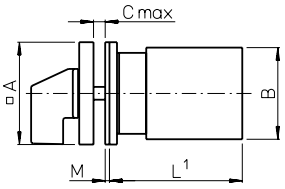
E-V
for
CG4-CGD4-1
CH6/CHR6
E
for
CG6



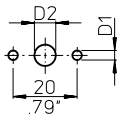
E
E-V



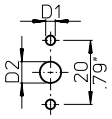
	CG4 CG4-1 CGD4-1	CG6	CG8	CH6 CHR6	CH10- CHR16	CH10B- CHR16B
A	30 1.18	30 1.18	48 1.89	30 1.18	48 1.89	64 2.52
B	28 1.10	38 1.50	38 1.50	46 1.81	46 1.81	56 2.20
C	4 .16	4 .16	4 .16	4 .16	4 .16	4 .16
D1	3,2 .13	3,2 .13	5 .20	3,2 .13	5 .20	5 .20
D2	8-11 .31-.43	8-11 .31-.43	8-19 .31-.75	8-19 .31-.75	8-19 .31-.75	10-22 .39-.87
E	- -	- -	36 1.42	- -	36 1.42	48 1.89



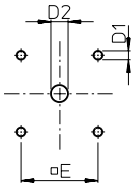
EF
for
CG4-CGD4-1
CH6/CHR6
EF-V
for
CG6



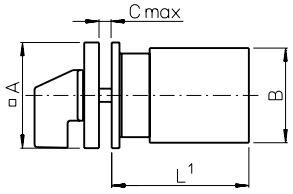
EF-V
for
CG4-CGD4-1
CH6/CHR6
EF
for
CG6



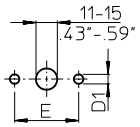
EF
EF-V



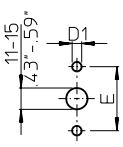
	CG4 CG4-1 CGD4-1	CG6	CG8	CH6 CHR6	CH10- CHR16	CH10B- CHR16B
A	30 1.18	30 1.18	48 1.89	30 1.18	48 1.89	64 2.52
B	28 1.10	38 1.50	38 1.50	46 1.81	46 1.81	56 2.20
C	4 .16	4 .16	4 .16	4 .16	4 .16	4 .16
D1	3,2 .13	3,2 .13	5 .20	3,2 .13	5 .20	5 .20
D2	8-11 .31-.43	8-11 .31-.43	15-19 .59-.75	8-11 .31-.43	15-19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

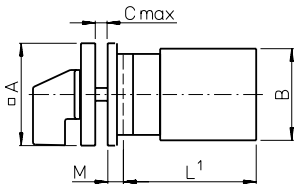
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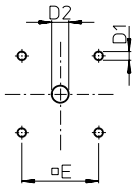
Dimensions

mm
inch

Four Hole Panel Mounting or Mosaic Mounting

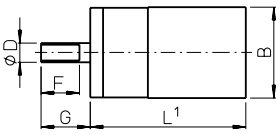
EG
EGF

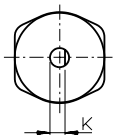




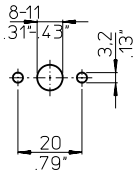
		CG8	CH10-CHR16
	A	64 2.52	64 2.52
	B	38 1.50	46 1.81
	C	4 .16	4 .16
	D1	5 .20	5 .20
EG	**D2**	10-22 .39-.87	10-22 .39-.87
EGF	**D2**	19-22 .75-.87	19-22 .75-.87
	E	48 1.89	48 1.89
	M	6,7 .26	6,7 .26

E9
E91

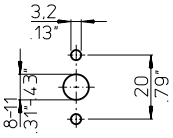




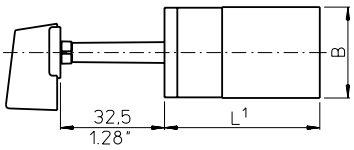
for
CG4-CGD4-1
CH6/CHR6

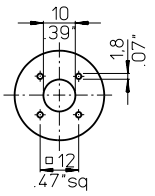


for
CG6

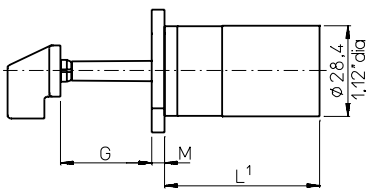


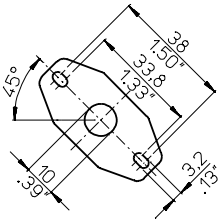
E92





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	- -

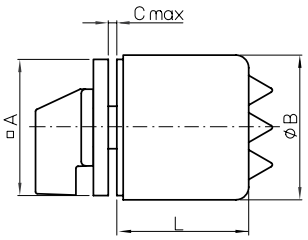
[1]see page 46

< back to table of contents >

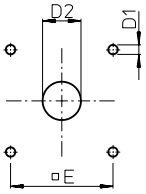
Dimensions

mm
inch

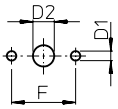
Two or Four Hole Panel Mounting



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	4 .16	4 .16	4 .16	4 .16
	D1	5 .20	5 .20	5 .20	5 .20	5 .20
EC/EC1	**D2**	- -	10-19 .39-.75	- -	10-22 .39-.87	10-22 .39-.87
ED/ED1/ED22	**D2**	11-15 .43-.59	19-22 .75-.87	11-15 .43-.59	19-22 .75-.87	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	- -	1,5 .06	- -	- -
Fluchten 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	104 4.10	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	- -	- -	- -	- -	- -

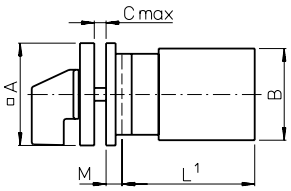
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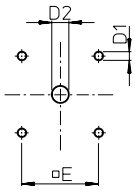
Dimensions

mm
inch

Four Hole Panel Mounting or Single Hole Mounting

KN1
KD1
KN2





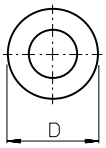
KN2	CG8	CH10-CHR16
A	48 1.89	48 1.89
B	38 1.50	46 1.81
C	4 .16	4 .16
D1	5 .20	5 .20
D2	8-19 .31-.75	8-19 .31-.75
E	36 1.42	36 1.42
M	5,2 .20	5,2 .20

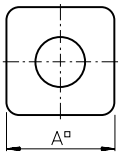
KN1 KD1	CG8	CH10-CHR16	CH10B-CHR16B
A	64 2.52	64 2.52	64 2.52
B	38 1.50	46 1.81	56 2.20
C	4 .16	4 .16	4 .16
D1	5 .20	5 .20	5 .20
D2	10-22 .39-.87	10-22 .39-.87	10-22 .39-.87
E	48 1.89	48 1.89	48 1.89
M	4,7 .19	4,7 .19	7 .28

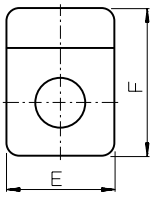
FS1...
FT1...
FT3...

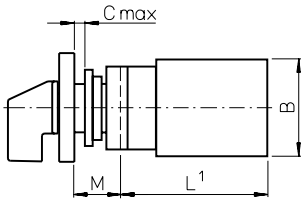
FH3...
FS2...
FT2...
FT4...

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





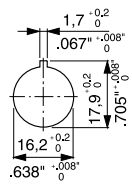


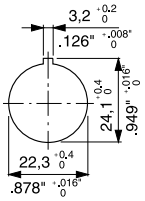


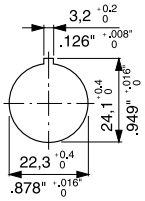
FS1...
FS2...
FS4...

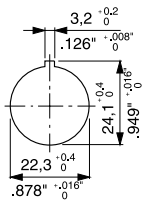
FH3...
FH4...
FT1...
FT2...
FT6...

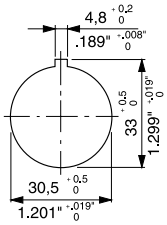
FT3...
FT4...











		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	39,4 1.55	29,5 1.16	39,4 1.55
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 46

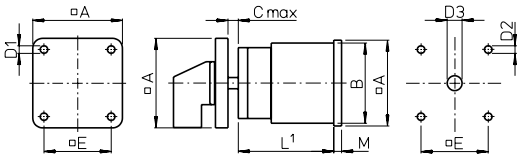
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Dimensions

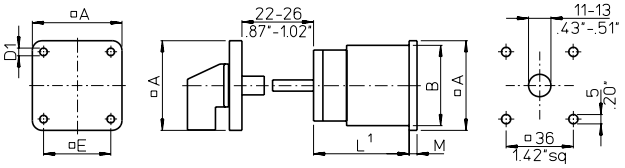
mm
inch

Base Mounting

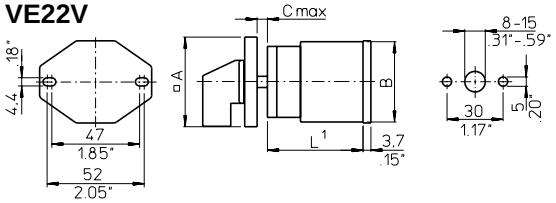
VE
VE-V



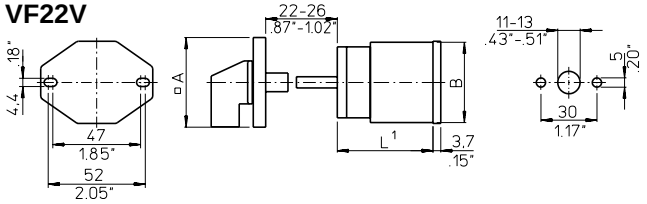
VF
VF-V



VE22
VE22V



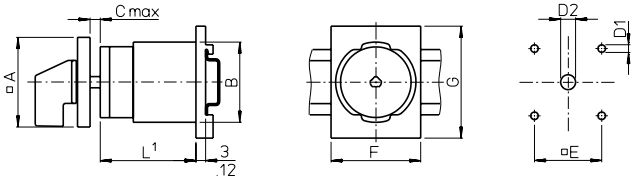
VF22
VF22V



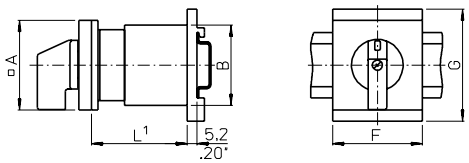
	CG8	CH10-CHR16
A[2]	48 1.89	48 (64) 1.89 (2.52)
B	38 1.50	46 1.81
C	10,5 .41	10,5 .41
D1	4,1 .16	4,1 .16
D2	5 .20	5 .20
D3	8-15 .31-.59	8-15 .31-.59
E[2]	36 1.42	36 (48) 1.42 (1.89)
M	2,2 .09	5,2 .20

[2]Dimensions in ( ) for revertive mounting plate

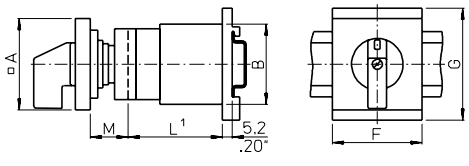
VE1



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 46

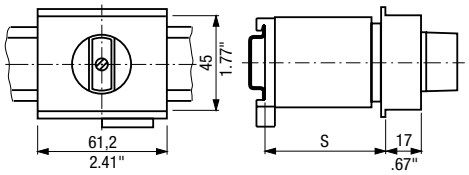
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Dimensions

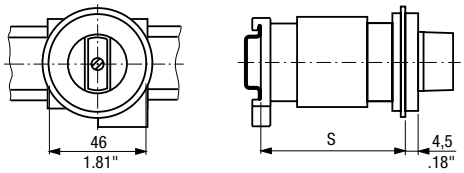
mm
inch

Base Mounting and Escutcheon Plates

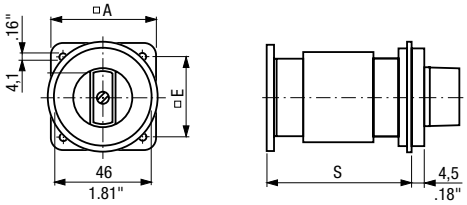
VE2



VE3

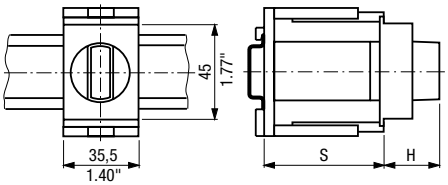


VE4



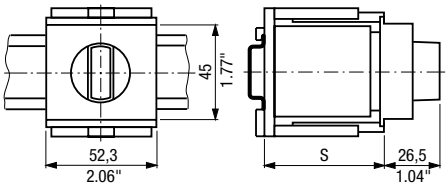
VE21

for CG4-CGD4-1



VE21

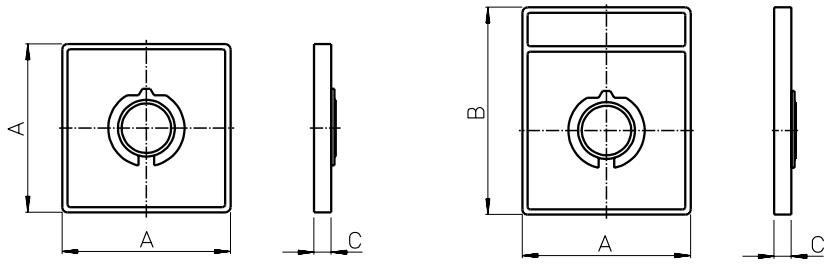
for CG8-CHR16



	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	1	2	1
S = 67 2.64	-	3	2	2	2	2
S = 69 2.70	-	-	2	2	2	2
A					48 1.89	64 2.52
E					36 1.42	48 1.89

VE21				
$S_{min.}$	H	CG4-CGD4-1	CG8	CH10-CHR16
		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

< back to table of contents >

Dimensions

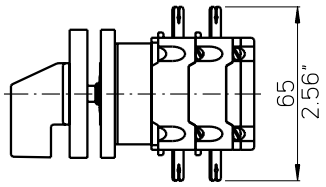
mm
inch

Additional Lengths

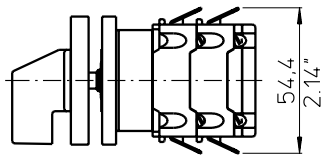
Additional lengths for amendment (page 6)

	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 6)

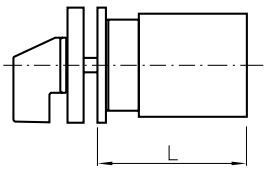


with quick connects



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

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Notes:

< back to table of contents >

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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