KRAUS & NAIMER

BLUE LINE SWITCHGEAR

www.krausnaimer.com

Catalog 120

CG, CH, CHR Switches
10 A-25 A

KRAUS & NAIMER

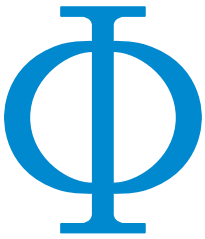
The development of the Blue Line rotary switch, contactor and motor starter product ranges is based on more than seventy-five years experience by Kraus & Naimer in the design and manufacture of electrical switchgear. Kraus & Naimer pioneered the introduction of the cam operated rotary switch and continues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

BLUE LINE

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

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

The Kraus & Naimer Registered Trademark



WORLDWIDE SYMBOL
FOR QUALITY SWITCHGEAR

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

Contents

Construction Data

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).

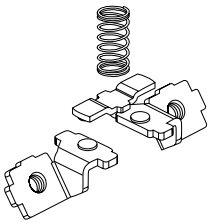
The stage is the basis for all switches and can be supplied with a maximum of 2 contacts. All switches of this series are supplied with open terminals which are accessible while the switch is installed. The terminals are protected against accidental finger contact according to EN 50274, VDE 0660 part 514 and BGV A2. 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.

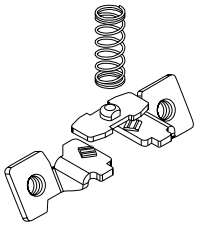
3 different Contact Systems are available

CG6 to CHR16B



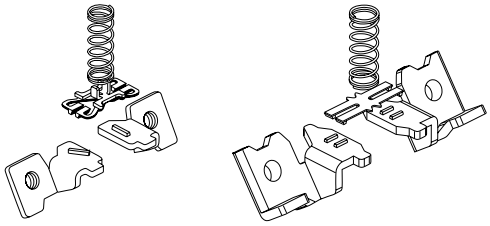
A rigid, double-break bridge with silver alloy contacts provides high making and breaking capabilities for regular control applications.

CG4 and CG4-1



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

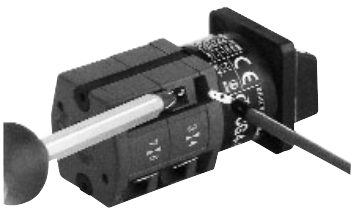
CGD4-1 CH11/CHR11 CH12/CHR12



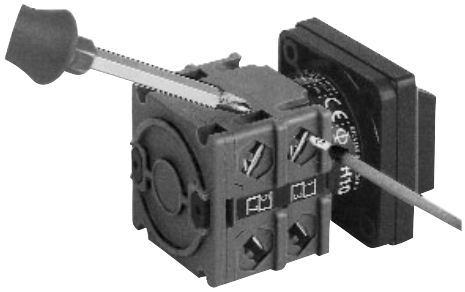
High contact reliability by H-bridge design with “cross-wire“ contacts. The contact system with gold-plated contacts (CH12/CHR12 with silver contact) allows for low voltages, electronic compatible.

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, CG9B	S1	30°, 45°, 60°, 90°	12
CH10B-CHR16B	S1	30°, 45°, 60°, 90°	12
CG8S, CG9S	S0	60°	on request

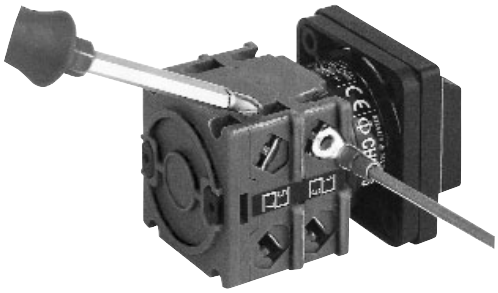
CG-series



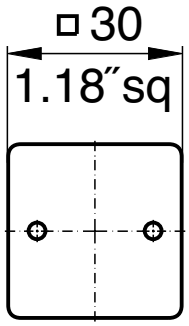
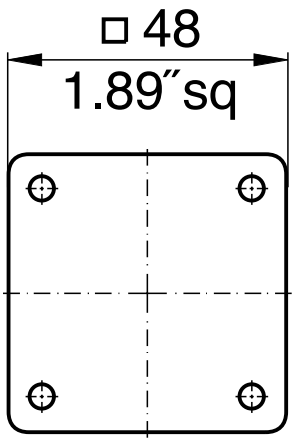
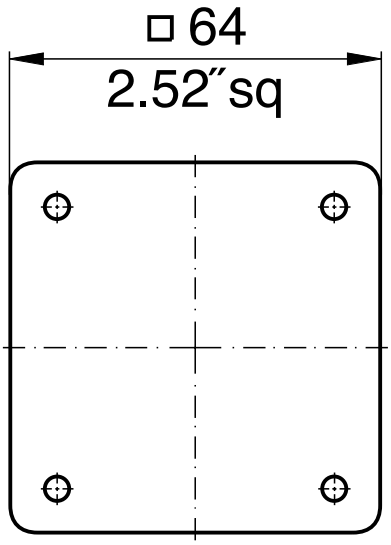
CH-series



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
	CG7	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
	CG9	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, CG9, CH10, CH16, CHR10, CHR16 for four hole panel mounting
L	with lockout-relay w/o manual release	CG8, CG9, CH10, CH16, CHR10, CHR16
M	with lockout-relay with manual release	CG8, CG9, CH10, CH16, CHR10, CHR16
X	with power failure release	CG8, CG9, CH10, CH16, CHR10, CHR16
R	with spring return latching mechanism	CG8, CH10, CH16
S	with snap action	CG8, CG9, CH10, CH16, CHR10, CHR16 with 60° 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 with frame and fixation ring only (if using switches with single hole mounting: **- .16**)
- .11 = without escutcheon plate, but with handle bearing plate
- .12 = with yellow escutcheon plate backing and red handle
- .14 = with B-handle
- .16 = escutcheon plate with frame and fixation ring only if using switches with single hole mounting
- .17 = standard escutcheon plate and rectangular add-on escutcheon plate if using switches with single hole mounting FT2

Example: The complete coding for switch type 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**.

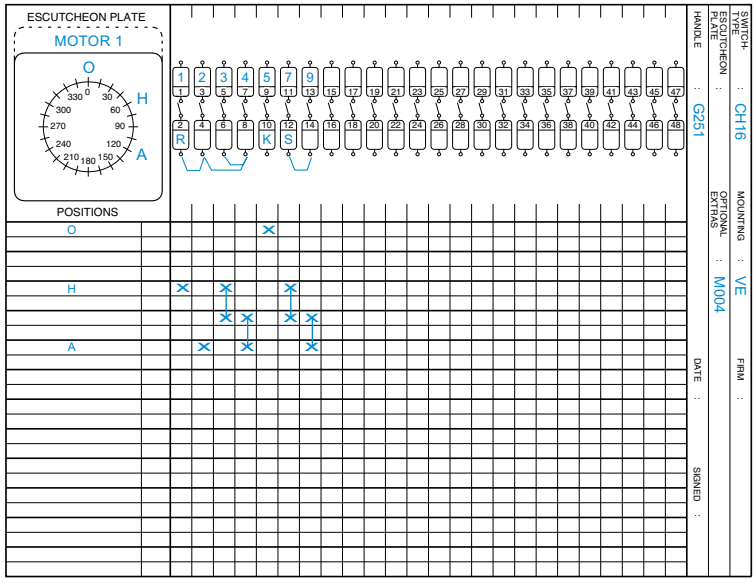
Switch Size

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.

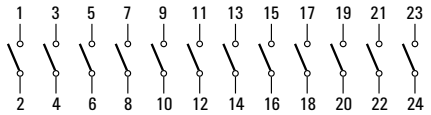
For technical reasons, it may not be possible to follow the sequence of contacts requested by the customer. The final contact development which is sent with every switch will show the customer's original terminal markings.



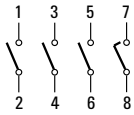
Order forms are available on request.

ON/OFF Switches with 60° Switching

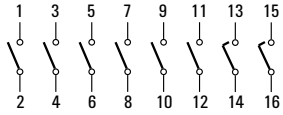
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram
1 pole						A200-600	1	
2 pole						A201-600	1	
3 pole						A202-600	2	
3 pole	with red handle					A202-626	2	
3 pole	with V850 padlock attachment					A202-627	2	
4 pole						A203-600	2	
4 pole	1 pole preclose 6°[1]					A653-600	2	
5 pole						A341-600	3	
6 pole						A342-600	3	
7 pole						A343-600	4	
8 pole						A344-600	4	
8 pole	2 pole preclose 6°[1]					A654-600	4	
9 pole						A345-600	5	
10 pole						A346-600	5	
11 pole						A347-600	6	
12 pole						A348-600	6	
1 pole						A200-620	1	
2 pole						A201-620	1	
3 pole						A202-620	2	
4 pole						A203-620	2	
4 pole	1 pole preclose 6°[1]					A653-620	2	
5 pole						A341-620	3	
6 pole						A342-620	3	
7 pole						A343-620	4	
8 pole						A344-620	4	
8 pole	2 pole preclose 6°[1]					A654-620	4	
9 pole						A345-620	5	
10 pole						A346-620	5	
11 pole						A347-620	6	
12 pole						A348-620	6	
1 pole						A200-621	1	
2 pole						A201-621	1	
3 pole						A202-621	2	
4 pole						A203-621	2	
4 pole	1 pole preclose 6°[1]					A653-621	2	
5 pole						A341-621	3	
6 pole						A342-621	3	
1 pole						A200-622	1	
2 pole						A201-622	1	
3 pole						A202-622	2	
4 pole						A203-622	2	
4 pole	1 pole preclose 6°[1]					A653-622	2	
5 pole						A341-622	3	
6 pole						A342-622	3	
1 pole						A200-623	1	
2 pole						A201-623	1	
3 pole						A202-623	2	
4 pole						A203-623	2	
4 pole	1 pole preclose 6°[1]					A653-623	2	
5 pole						A341-623	3	
6 pole						A342-623	3	
1 pole						A200-624	1	
2 pole						A201-624	1	
3 pole						A202-624	2	
4 pole						A203-624	2	
4 pole	1 pole preclose 6°[1]					A653-624	2	
5 pole						A341-624	3	
6 pole						A342-624	3	
1 pole						A200-625	1	
2 pole						A201-625	1	
3 pole						A202-625	2	
4 pole						A203-625	2	
4 pole	1 pole preclose 6°[1]					A653-625	2	
5 pole						A341-625	3	
6 pole						A342-625	3	



1-12 pole

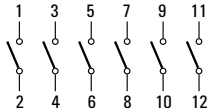
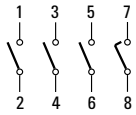
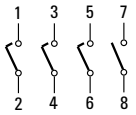
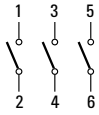
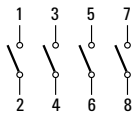
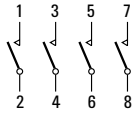


4 pole 1 pole preclose 6°



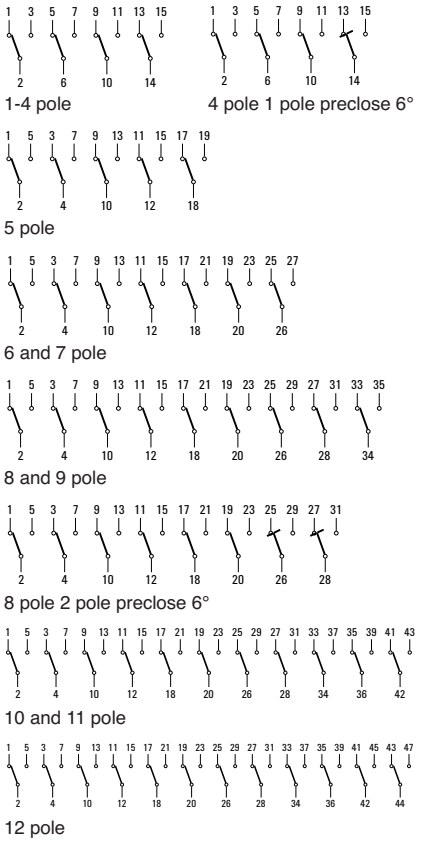
8 pole 2 pole preclose 6°

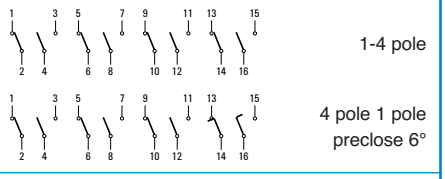
[1]For use in a three phase four-wire system with switched neutral.

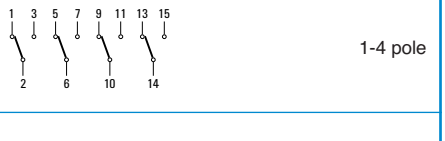
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CG8,CG9 CH10B-CHR16B	Code	Stages	Connection Diagram
ON/OFF Switches with 90° Switching								
1 pole contacts 2 pole preclose 30° 3 pole						A290-600 A291-600 A292-600	1 1 2	
4 pole 4 pole 1 pole preclose 60° 4 pole 3 pole preclose 30°						A324-600 A293-600 A327-600	2 2 2	 1, 2, 3, 4, 5 and 6 pole
5 pole contacts 6 pole preclose 30°						A325-600 A326-600	3 3	
1 pole contacts 2 pole preclose 30° 3 pole						A290-620 A291-620 A292-620	1 1 2	 4 pole 1 pole preclose 60°
4 pole 4 pole 1 pole preclose 60° 4 pole 3 pole preclose 30°						A324-620 A293-620 A327-620	2 2 2	
5 pole contacts 6 pole preclose 30°						A325-620 A326-620	3 3	 4 pole 3 pole preclose 30°
3 pole 360° rotation						A208-600	2	
						A208-620	2	
3 pole for foot operation					[1]	A386-600	2	
ON/OFF Switches with 30° Switching								
1 pole 2 pole 3 pole 4 pole						A100-600 A101-600 A102-600 A103-600	1 1 2 2	 1-4 pole
1 pole with spring return 2 pole with spring return 3 pole with spring return 4 pole with spring return						A204-600 A205-600 A206-600 A207-600	1 1 2 2	 1-4 pole
1 pole with spring return 2 pole with spring return 3 pole with spring return 4 pole with spring return						A204-620 A205-620 A206-620 A207-620	1 1 2 2	

[1] available as switch types CH16B and CHR16B

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Double-throw Switches without „OFF“ 60° Switching								
1 pole						A220-600	1	
2 pole						A221-600	2	
3 pole						A222-600	3	
4 pole						A223-600	4	
4 pole 1 pole preclose 6°[2]						A673-600	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°[2]						A972-600	8	
9 pole						A373-600	9	
10 pole						A374-600	10	
11 pole						A375-600	11	
12 pole						A376-600	12	
Double-throw Switches without „OFF“ with electrically isolated contacts								
1 pole						A720-600	1	
2 pole						A721-600	2	
3 pole						A722-600	3	
4 pole						A723-600	4	
4 pole 1 pole preclose 6°[2]						A973-600	4	
1 pole with spring return						A795-600	1	
Double-throw Switches without „OFF“ 30° Switching								
1 pole						A120-600	1	
2 pole						A121-600	2	
3 pole						A122-600	3	
4 pole						A123-600	4	
1 pole with spring return						A295-600	1	
2 pole with spring return						A296-600	2	
3 pole with spring return						A297-600	3	
1 pole with spring return						A295-620	1	
2 pole with spring return						A296-620	2	
3 pole with spring return						A297-620	3	





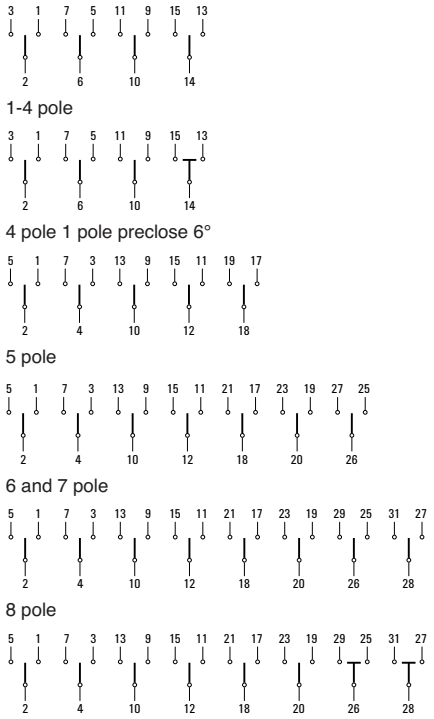


[1]Connection diagrams for CHR switches on request. [2]For use in a three phase four-wire system with switched neutral.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]

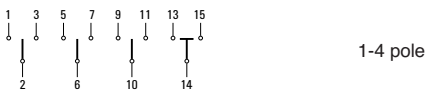
Double-throw Switches with Center „OFF“ 60° Switching

Function	Escutch. Plate	CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages
1 pole	Φ 0 1 2					A210-600	1
2 pole						A211-600	2
3 pole						A212-600	3
4 pole						A213-600	4
4 pole 1 pole preclose 6°[2]						A913-600	4
5 pole						A361-600	5
6 pole						A362-600	6
7 pole						A363-600	7
8 pole						A364-600	8
8 pole 2 pole preclose 6°[2]						A664-600	8
1 pole	Φ OFF 1 2					A210-620	1
2 pole						A211-620	2
3 pole						A212-620	3
4 pole						A213-620	4
4 pole 1 pole preclose 6°[2]						A913-620	4
5 pole						A361-620	5
6 pole						A362-620	6
7 pole						A363-620	7
8 pole						A364-620	8
8 pole 2 pole preclose 6°[2]						A664-620	8
1 pole	Φ 0 HAND AUTO					A210-621	1
2 pole						A211-621	2
3 pole						A212-621	3
1 pole	Φ 0 HAND AUTO					A210-622	1
2 pole						A211-622	2
3 pole						A212-622	3
1 pole	Φ OFF MAN AUTO					A210-623	1
2 pole						A211-623	2
3 pole						A212-623	3
1 pole	Φ OFF AUTO HAND					A210-624	1
2 pole						A211-624	2
3 pole						A212-624	3
4 pole						A213-624	4
4 pole 1 pole preclose 6°[2]						A913-624	4



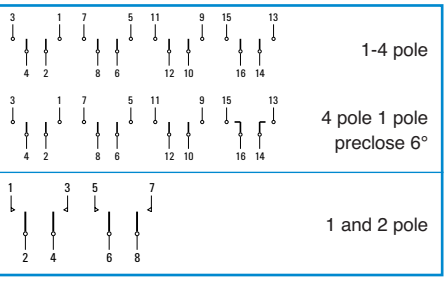
Double-throw Switches with Center „OFF“ 90° Switching

Function	Escutch. Plate	CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages
1 pole	Φ 0 1 2					A218-600	1
2 pole						A219-600	2
3 pole						A299-600	3
4 pole 1 pole preclose 6°						A294-600	4
1 pole	Φ OFF 1 2					A218-620	1
2 pole						A219-620	2
3 pole						A299-620	3
4 pole 1 pole preclose 6°						A294-620	4

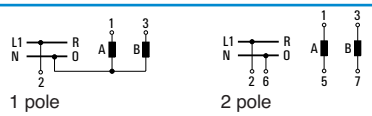
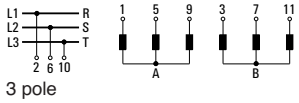
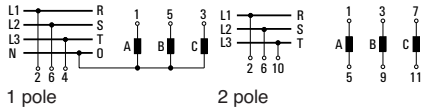
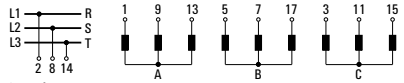
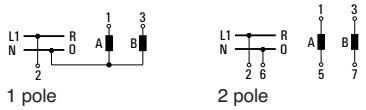
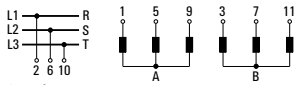
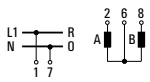


Double-throw Switches with Center „OFF“ and electrically isolated contacts

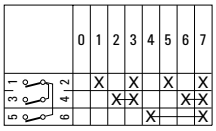
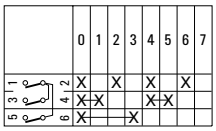
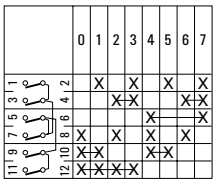
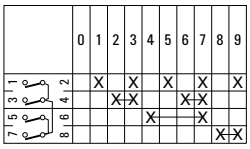
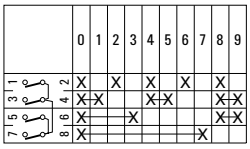
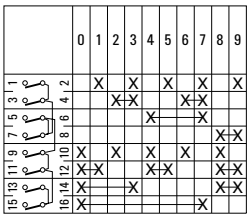
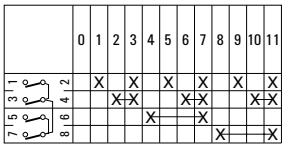
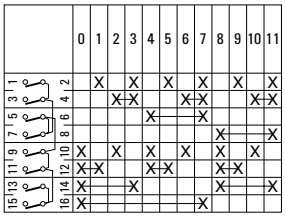
Function	Escutch. Plate	CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages
1 pole	Φ 0 1 2					A710-600	1
2 pole						A711-600	2
3 pole						A712-600	3
4 pole						A713-600	4
4 pole 1 pole preclose 6°[2]						A963-600	4
1 pole with spring return	Φ 1 0 2					A714-600	1
2 pole to center						A715-600	2

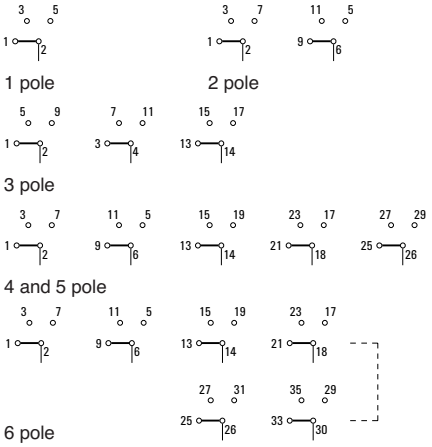
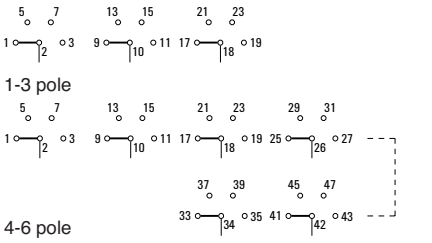
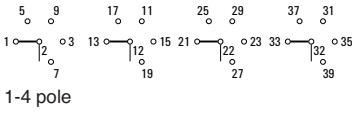
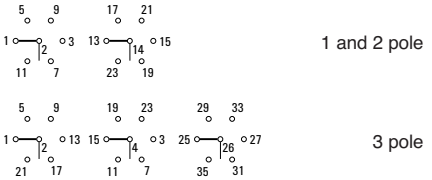
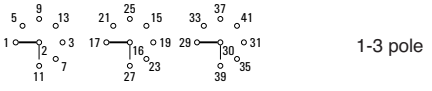
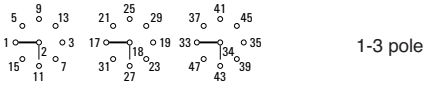
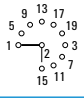
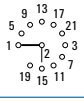
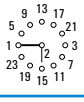


[1]Connection diagrams for CHR switches on request. [2]For use in a three phase four-wire system with switched neutral.

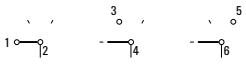
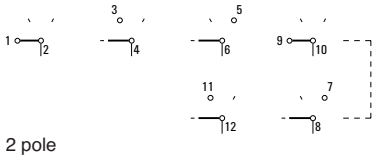
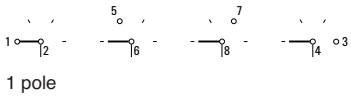
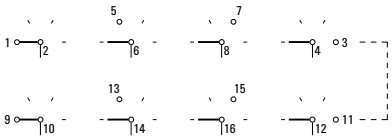
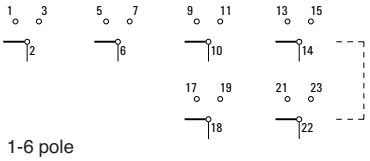
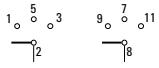
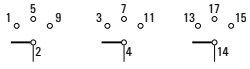
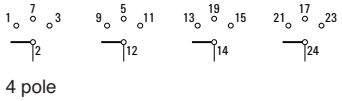
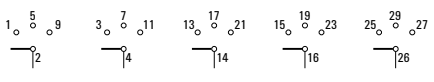
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Double-throw Switches with Spring Return to Center								
1 pole with spring return 2 pole to center 3 pole		☐ ☐ ☐	☐	☐ ☐ ☐	☐ ☐ ☐	A214-600 A215-600 A216-600	1 2 3	 1-3 pole
1 pole 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 A314-600	1 2 3	 1 pole 2 pole
1 pole 2 pole 3 pole		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A310-620 A312-620 A314-620	1 2 3	 3 pole
1 pole 3 Gang 2 pole Switching sequence: 3 pole 0, A, A+B, A+B+C		☐ ☐ ☐	☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A311-600 A313-600 A315-600	2 3 5	 1 pole 2 pole
1 pole 2 pole 3 pole		☐ ☐ ☐	☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A311-620 A313-620 A315-620	2 3 5	 3 pole
1 pole 2 Gang 2 pole Series switching 3 pole Switching sequence: 0, A, B, A+B		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A330-600 A331-600 A332-600	1 2 3	 1 pole 2 pole
1 pole 2 pole 3 pole		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	A330-620 A331-620 A332-620	1 2 3	 3 pole
2 pole 2 Gang Series-parallel Switching Switching sequence: 0, A+B series, A, A+B parallel	 	☐ ☐	☐ ☐	☐ ☐	☐ ☐	A339-600 A339-620	2 2	

[1]Connection diagrams for CHR switches on request.

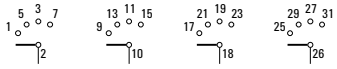
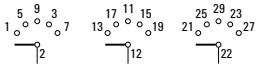
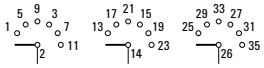
Function	Escutch. Plate	Type/Handle CG4-CGD4-1	Type/Handle CG6-CHR6	Type/Handle CH11 CH12	Type/Handle CH10B-CHR16B	Code	Stages	Connection Diagram
Coding Switches/Binary Code								
0 - 7 360° rotation						A540-600	2	
0 - 7 complement 360° rotation						A541-600	2	
0 - 7 + complement 360° rotation						A542-600	3	
0 - 9						A550-600	2	
0 - 9 complement						A551-600	2	
0 - 9 + complement						A552-600	4	
0 - 11 360° rotation						A543-600	2	
0 - 11 + complement 360° rotation						A545-600	4	

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CG8,CG9 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 A484-600 A489-600	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 A485-600 A490-600	2 4 6 8 10 12	
1 pole 5 Step 2 pole 3 pole 4 pole		▭ ▭ ▭	▭	▭ ▭ ▭ ▭	▭ ▭ ▭ ▭	A232-600 A252-600 A272-600 A478-600	3 5 8 10	
1 pole 6 Step 2 pole 3 pole		▭ ▭	▭	▭ ▭ ▭	▭ ▭ ▭	A233-600 A253-600 A273-600	3 6 9	
1 pole 7 Step 2 pole 3 pole		▭ ▭	▭	▭ ▭ ▭	▭ ▭ ▭	A234-600 A254-600 A274-600	4 7 11	
1 pole 8 Step 2 pole 3 pole				▭ ▭ ▭	▭ ▭ ▭	A235-600 A255-600 A275-600	4 8 12	
1 pole 9 Step		▭		▭	▭	A236-600	5	
1 pole 10 Step		▭		▭	▭	A237-600	5	
1 pole 11 Step		▭		▭	▭	A238-600	6	
1 pole 12 Step 1 pole 360° rotation		▭		▭	▭	A239-600 A639-600	6 6	

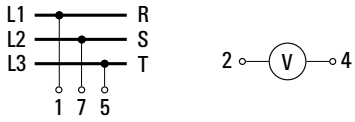
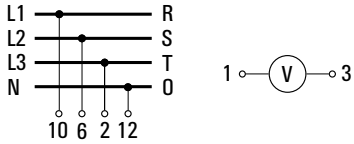
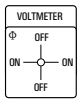
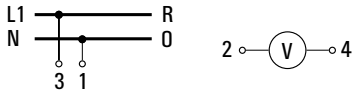
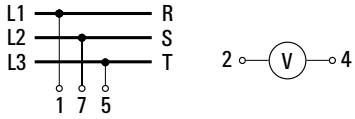
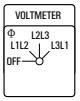
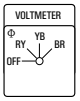
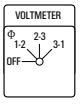
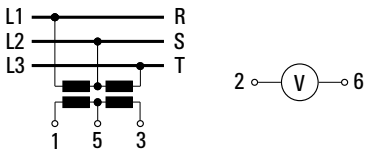
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CG8,CG9 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		▭	▭	▭	▭	A480-600	4	
5 pole		▭		▭	▭	A486-600	5	
6 pole		▭		▭	▭	A491-600	6	
1 pole		▭	▭	▭	▭	A240-620	1	
2 pole		▭	▭	▭	▭	A260-620	2	
3 pole		▭	▭	▭	▭	A280-620	3	
4 pole		▭	▭	▭	▭	A480-620	4	
5 pole		▭		▭	▭	A486-620	5	
6 pole		▭		▭	▭	A491-620	6	
1 pole 3 Step		▭	▭	▭	▭	A241-600	2	 1 and 2 pole
2 pole		▭	▭	▭	▭	A261-600	3	
3 pole		▭		▭	▭	A281-600	5	
4 pole		▭		▭	▭	A481-600	6	
5 pole		▭		▭	▭	A487-600	8	
1 pole		▭	▭	▭	▭	A241-620	2	 3 pole
2 pole		▭	▭	▭	▭	A261-620	3	
3 pole		▭		▭	▭	A281-620	5	
4 pole		▭		▭	▭	A481-620	6	
5 pole		▭		▭	▭	A487-620	8	
1 pole		▭	▭	▭	▭	A241-621	2	 4 pole
2 pole		▭	▭	▭	▭	A261-621	3	
								 5 pole

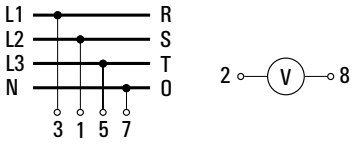
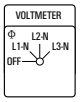
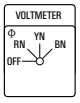
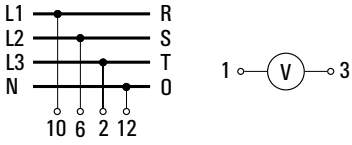
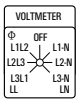
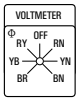
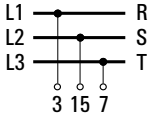
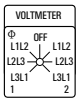
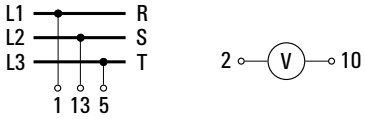
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CG8,CG9 CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Multi-step Switches with „OFF“								
1 pole 4 Step		▭	▭	▭	▭	A242-600	2	
2 pole		▭	▭	▭	▭	A262-600	4	
3 pole		▭		▭	▭	A282-600	6	
4 pole		▭		▭	▭	A482-600	8	
1 pole		▭	▭	▭	▭	A242-620	2	
2 pole		▭	▭	▭	▭	A262-620	4	1-4 pole
3 pole		▭		▭	▭	A282-620	6	
4 pole		▭		▭	▭	A482-620	8	
1 pole 5 Step		▭	▭	▭	▭	A243-600	3	
2 pole		▭		▭	▭	A263-600	5	
3 pole		▭		▭	▭	A283-600	8	
1 pole		▭	▭	▭	▭	A243-620	3	
2 pole		▭		▭	▭	A263-620	5	1-3 pole
3 pole		▭		▭	▭	A283-620	8	
1 pole 6 Step		▭	▭	▭	▭	A244-600	3	
2 pole		▭		▭	▭	A264-600	6	
3 pole				▭	▭	A284-600	9	
1 pole		▭	▭	▭	▭	A244-620	3	
2 pole		▭		▭	▭	A264-620	6	1-3 pole
3 pole				▭	▭	A284-620	9	
1 pole 7 Step		▭	▭	▭	▭	A245-600	4	
2 pole		▭		▭	▭	A265-600	7	
1 pole		▭	▭	▭	▭	A245-620	4	
2 pole		▭		▭	▭	A265-620	7	1 pole 2 pole
1 pole 8 Step		▭	▭	▭	▭	A246-600	4	
1 pole		▭	▭	▭	▭	A246-620	4	
1 pole 9 Step		▭		▭	▭	A247-600	5	
1 pole		▭		▭	▭	A247-620	5	
1 pole 10 Step		▭		▭	▭	A248-600	5	
1 pole		▭		▭	▭	A248-620	5	
1 pole 11 Step				▭	▭	A249-600	6	
1 pole 360° rotation		▭				A649-600	6	
1 pole				▭	▭	A249-620	6	
1 pole 360° rotation		▭				A649-620	6	

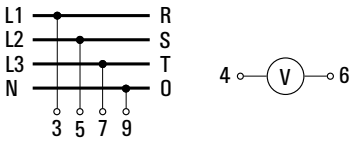
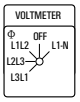
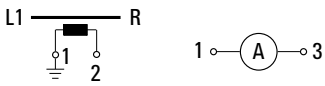
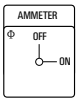
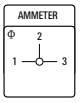
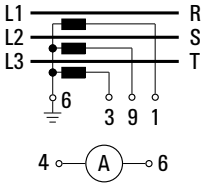
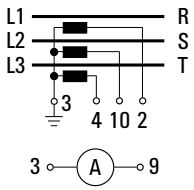
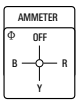
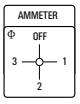
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 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						A002-600	1	
3 phase 3 wire						A004-600	2	
						A004-620	2	
						A004-621	2	
						A004-622	2	
						A004-623	2	
						A004-624	2	
						A011-600	2	

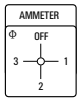
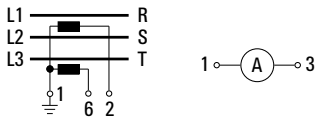
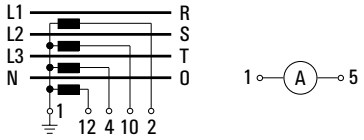
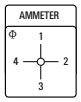
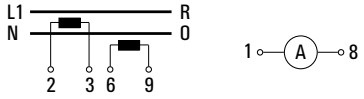
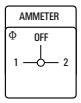
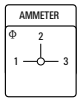
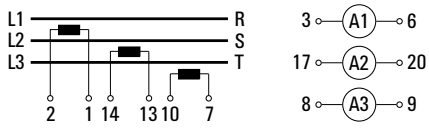
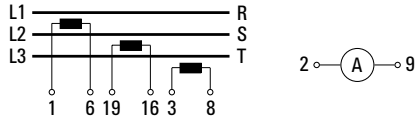
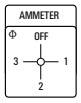
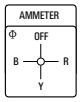
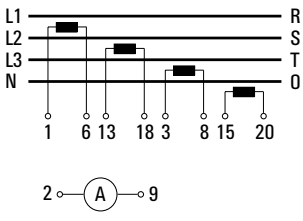
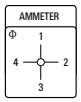
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Voltmeter Switches with „OFF“								
3 phase to neutral						A005-600	2	
						A005-620	2	
						A005-621	2	
						A005-622	2	
						A005-623	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“						A008-600	4	
						A008-620	4	
						A008-621	4	
						A008-622	4	

[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Voltmeter Switches with „OFF“								
3 phase and 1 phase to neutral						A010-600	3	
						A010-620	3	
						A010-621	3	
						A010-622	3	
Ammeter Switches								
Single pole with one current transformer						A046-600	1	
						A046-620	1	
						A046-621	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	

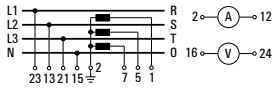
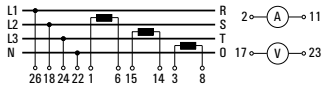
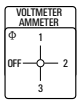
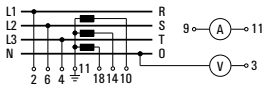
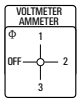
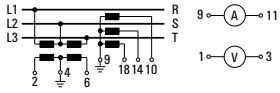
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	Type/Handle CG6-CHR6	Type/Handle CG8,CG9 CH10-CHR16	Type/Handle 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						A036-600	4	
						A036-620	4	
2 pole 2 current transformers						A037-600	3	
						A037-620	3	
						A037-621	3	
2 pole 3 current transformers						A019-600	5	
						A019-620	5	
						A038-600	5	
						A038-620	5	
						A038-621	5	
2 pole 4 current transformers						A039-600	6	
						A039-620	6	

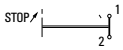
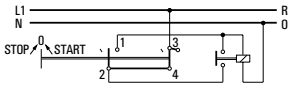
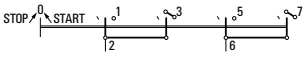
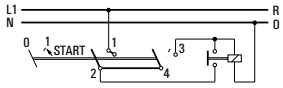
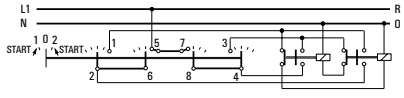
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]

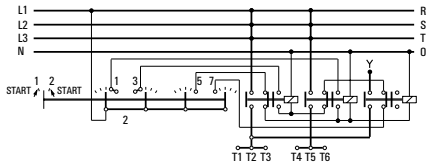
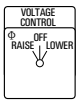
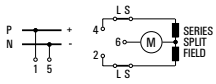
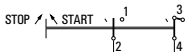
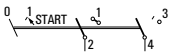
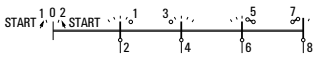
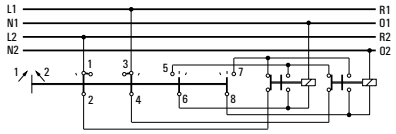
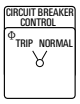
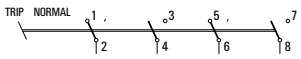
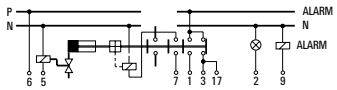
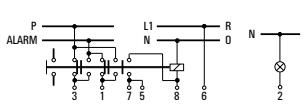
Volt-ammeter Switches

3 phase - phase to phase 3 current		▭		▭	▭	A027-600	6	
		▭		▭	▭	A028-600	7	
3 phase voltage 3 phase current 4 wire		▭		▭	▭	A033-600	5	
3 phase voltage 3 phase current 3 wire		▭		▭	▭	A035-600	5	

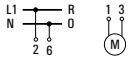
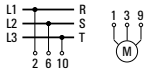
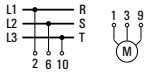
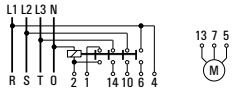
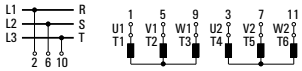
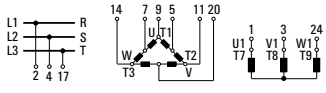
Control Switches

Stop switch		▭	▭	▭	▭	A174-600	1	
Start switch		▭	▭	▭	▭	A175-600	1	
Stop start switch single pole		▭	▭	▭	▭	A176-600	1	
Stop start switch 2 pole		▭	▭	▭	▭	A183-600	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		▭	▭	▭	▭	A177-600	2	
		▭	▭	▭	▭	A177-620	2	

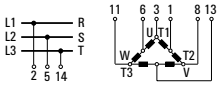
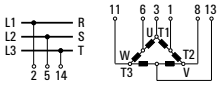
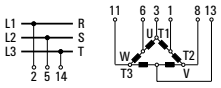
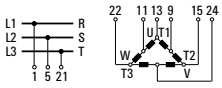
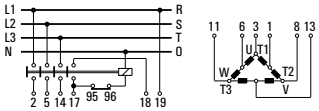
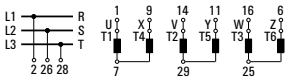
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 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						A182-600	2	
						A182-620	2	
Motor voltage control switch						A150-600	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						A790-600	2	
Contactor control with spring return to „OFF“						A179-600	2	
						A179-620	2	
Circuit breaker control						A537-600	2	
Control and Alarm Switches[1]								
With slip clutch and without indicator device						A190-600	5[2]	
Without indicator device						A192-600	2	

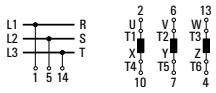
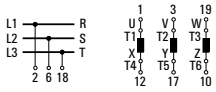
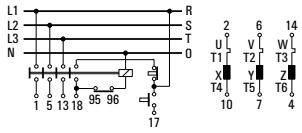
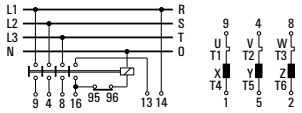
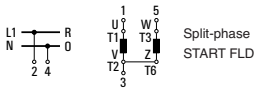
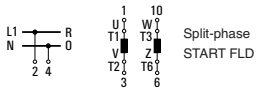
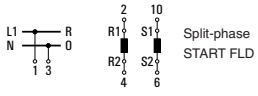
[1]Advise the indicator device, described in Catalog 101, page 7. [2]incl. slip clutch

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 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						A402-600	4	
Motor Control Switches								
2 speed 2 winding 0-A-BY or Δ						A451-600	3	
						A451-620	3	
3 speed 2 winding 0-AΔ-BY-AYY						A457-600	6	
						A457-620	6	

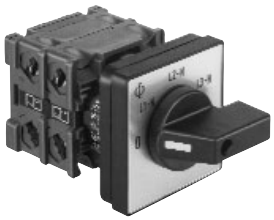
[1]Connection diagrams for CHR switches on request.

Function	Escutch. Plate	Type/Handle CG4-CGD4-1	CG6-CHR6	CG8,CG9 CH10-CHR16	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		▭		▭	▭	A444-600	5	
		▭		▭	▭	A444-620	5	
2 speed reversing for 2 way operation with slip clutch for „OFF“ load use				▭	▭	A468-600	10[2]	
				▭	▭	A468-620	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,CG9 CH10-CHR16	CH10B-CHR16B	Code	Stages	Connection Diagram[1]
Star-delta Switches								
OFF-star-delta		▭	▭	▭	▭	A410-600	4	
		▭	▭	▭	▭	A410-620	4	
Reversing		▭		▭	▭	A413-600	5	
With auxiliary contact closed in „OFF“ position		▭		▭	▭	A416-600	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		▭		▭	▭	A426-600	3	 Split-phase START FLD
		▭		▭	▭	A426-620	3	
Split-phase reversing auto cutout of start field winding		▭	▭	▭	▭	A622-600	3	 Split-phase START FLD

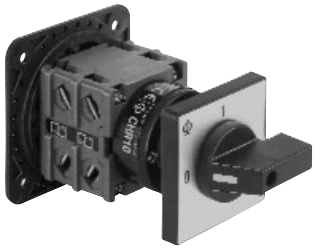
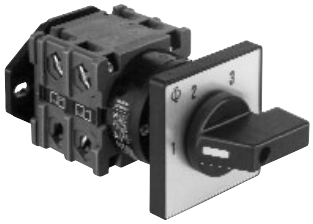
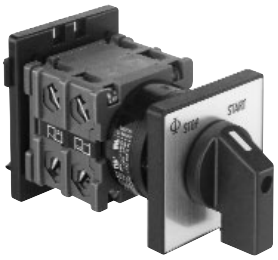
[1]Connection diagrams for CHR switches on request.

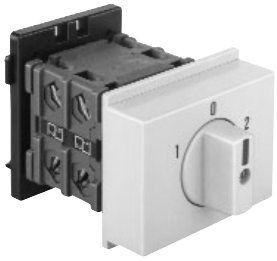
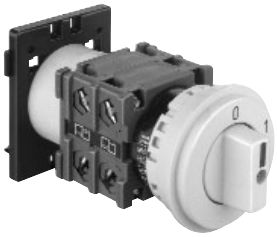
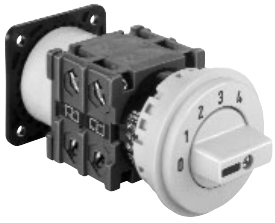
Two or Four Hole Panel Mounting	Terminals rotated 90°	Code	CG4-CHR6	CG8-CHR16	CH10B-CHR16B
Panel mounting					
 Two hole panel mounting		E	●		
	●	E-V	●		
Two hole panel mounting, protection IP 65		EF	●		
	●	EF-V	●		
 Four hole panel mounting		E		●	●
	●	E-V		●	●
Four hole panel mounting, protection IP 65		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 65		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	●

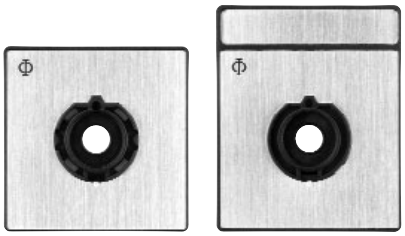
Two or Four Hole Panel Mounting	Code	CG8-CHR16	CH10B-CHR16B
 Panel mounting with heavy duty latching and metal shaft			
Four hole panel mounting Mounting plate, escutcheon plate and handle of size S0	KN2	●	
 Four hole panel mounting Mounting plate, escutcheon plate and handle of size S1	KN1	●	●
Four 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 65				
 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 rectangular escutcheon plate		FS4	16/22	
	●	FS4-V	16/22	
 With size S1 escutcheon plate and heavy duty latching		FH3		22
	●	FH3-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 50022.		VE1		●
Snap-on base mounting for track EN 50022. Escutcheon plate fastened by screws.		VE1E	●	●
Snap-on base mounting for track EN 50022. Escutcheon plate fastened by single hole mounting e.g. for combining with a key-lock device.		VE1F	●	●

Base Mounting	Code	CG4-CGD4-1	CG8-CHR16
Base mounting			
 Snap-on base mounting for track EN 50022 with rectangular escutcheon plate for 45 mm standard knock-out.	VE2		●
 Snap-on base mounting for track EN 50022. 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 50022 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

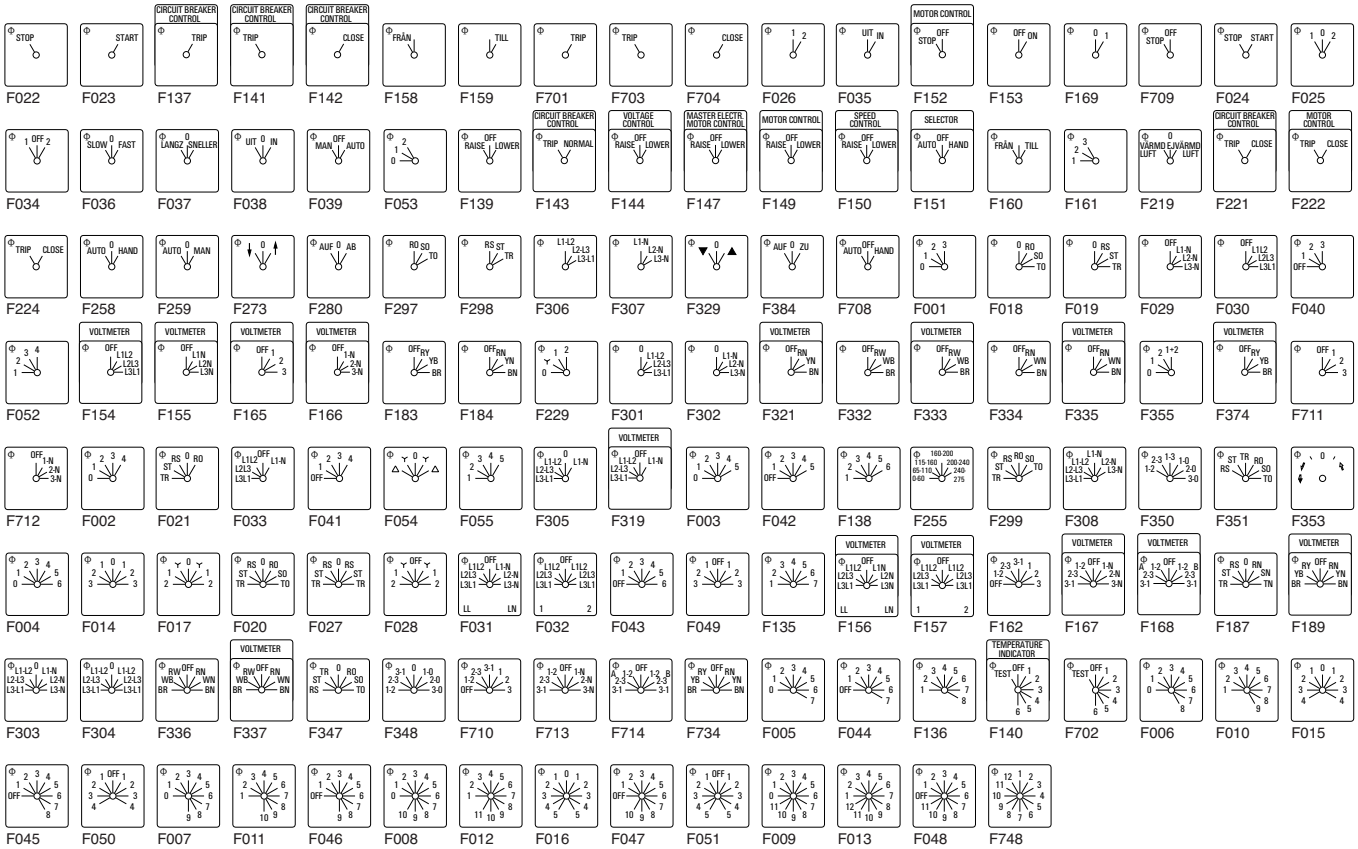


Square and rectangular escutcheon plates are available for each size of switch. The escutcheon plate consists of a frame and a faceplate having the switch positions which is than embossed with hot-foil backing. The escutcheon plate frame is an essential part of the switch and serves as a bearing surface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

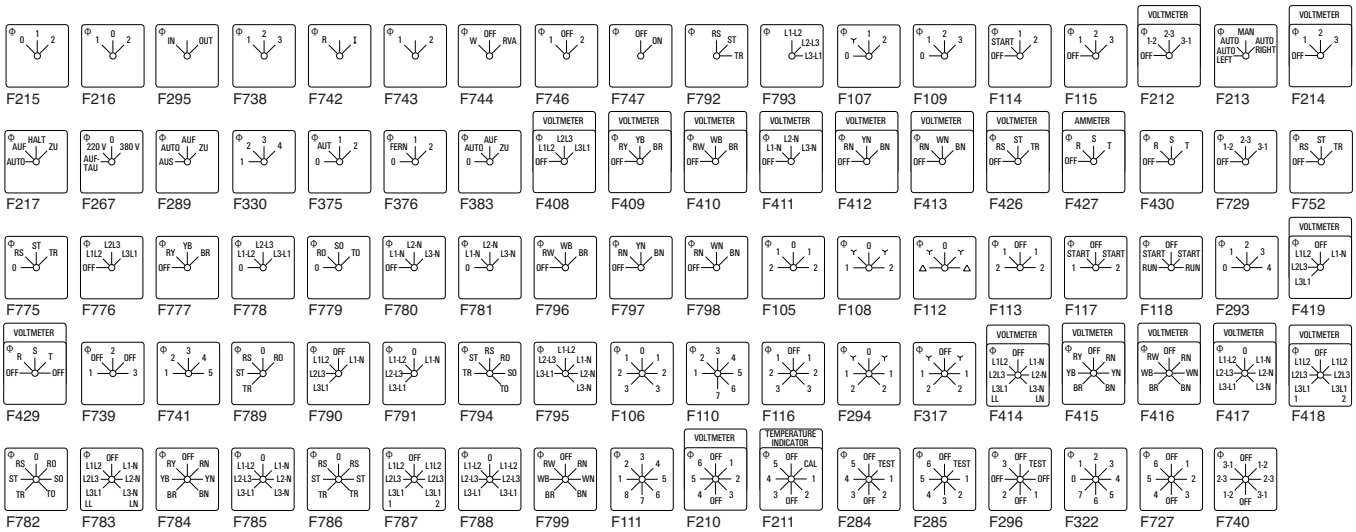
Standard Letterings Available

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

30° switching

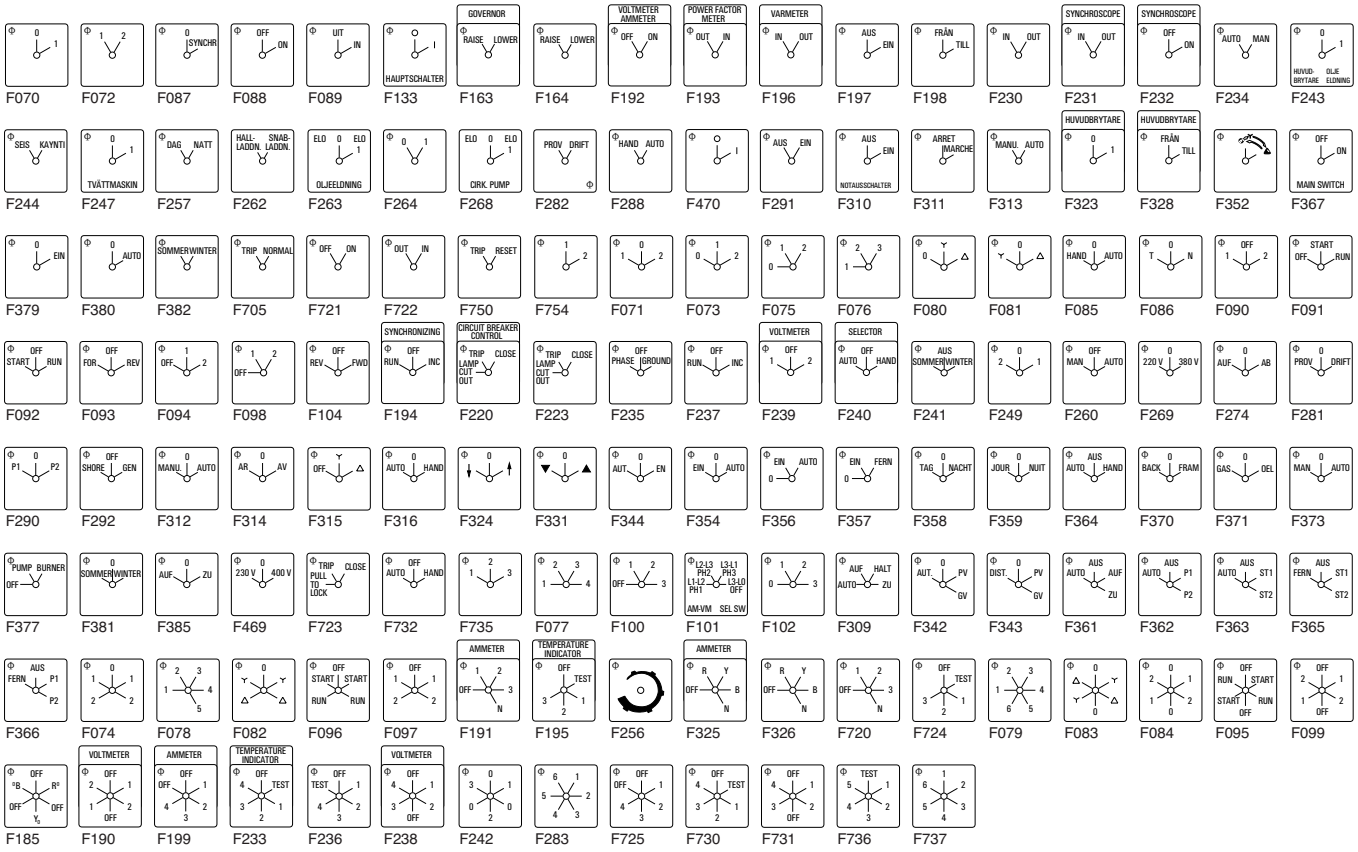


45° switching

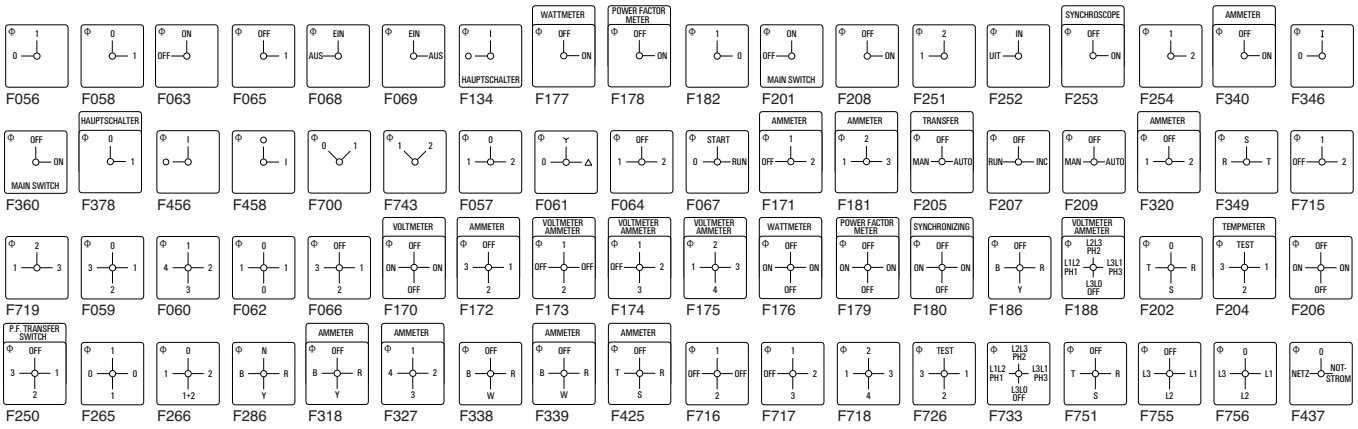


Escutcheon Plates

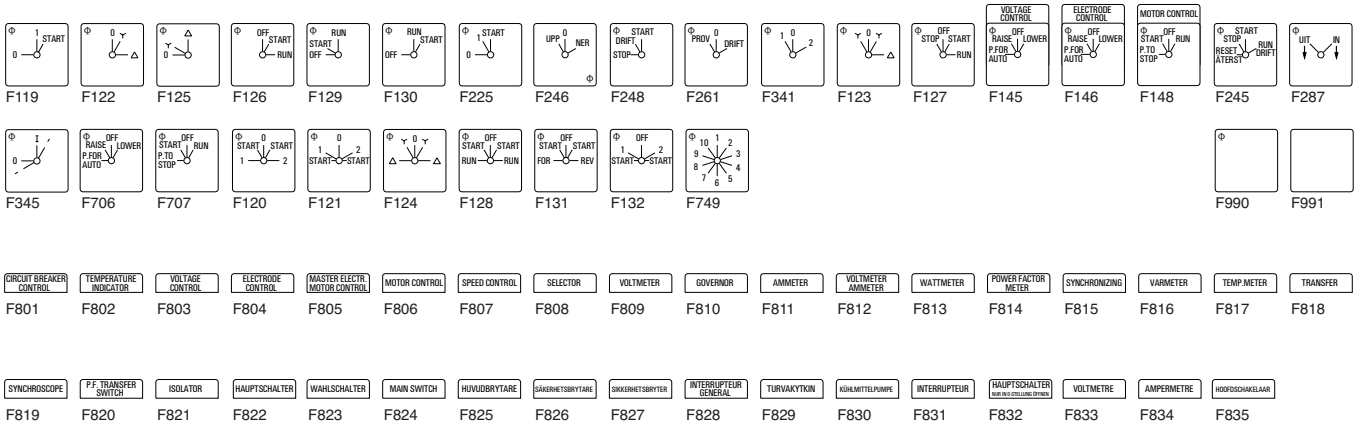
60° switching



90° switching



Miscellaneous



Handles

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

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

International Standards and Approvals

Country	Authority	Mark or Standard	CG4	CG4-1 CGD4-1	CG6	CG7	CG8	CG9	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] GB14048.3	●	CG4-1					CH10 CH10B		CHR10 CHR10B	
Russian Federation	GOST	[7] CH01	●	● +	●	●	●	●	●	●	+	+
Germanischer Lloyd			+	+	+	+	+	+	+	+	+	+
Lloyds Register of Shipping			+	+	+	+	+	+	+	+	+	+

● 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	CG7 CG9	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	690
	SEV max.	V	400	690	690	–	–	–	–
	UL/Canada[2]	V	300	300	600	600	600	600	600
	CEE 24	V	380	380	380	–	–	–	–
Rated Impulse Withstand Voltage U_{imp}[1]		kV	4	6	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	20	25	25
	SEV max.	A	10	20	20	–	–	–	–
	UL/Canada	A	10	16	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	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	20	25	25
	VDE 0660, 500 V	A	–	20	20	20	20	25	25
	part 107 660 V-690 V	A	–	16	16	16	16	25	25
AC-15 Switching of control devices, contactors, valves etc.	IEC 60947-3 110 V	A	2,5	6	6	5	5	8	8
	VDE 0660, 220 V-240 V	A	2,5	5	5	5	5	8	8
	part 107 380 V-440 V	A	1,5	4	4	4	4	5	5
Pilot Duty	UL/Canada[2] Heavy	VAC	300	300	600	600	600	600	600
Ampere Rating Resistive or low inductive loads	UL/Canada[2]	A	10	16 (150 V) 10 (300 V)	16	20	20	25	25
Resistive load/Motor load	CEE 24[2]	A	4/2	10/6	10/6	–	–	–	–
	NEMKO/FI[2]	A	6/4[4]	10/6	–	–	–	–	–
Short Circuit Protection									
Max. fuse size	(gL-characteristic)	A	10	25	25	25	25	35	35
Rated short-time withstand current	(1s-current)	A	90	140	140	200	200	250	250

DC Switching Capacity

No. of series contacts	1	2	3	4	5	6	8	
	Voltage V							
Resistive loads	24	48	70	95	120	145	190	A
T ≤ 1 ms	48	95	140	190	240	290	350	
	60	120	180	240	300	360	450	
	110	220	330	440	550	660	–	
	220	440	660	–	–	–	–	
	440	660	–	–	–	–	–	
Inductive loads	24	48	70	95	120	145	190	A
T = 50 ms	30	60	90	120	150	180	240	
	48	95	140	190	240	290	350	
	60	120	180	240	300	360	450	
	110	220	330	440	550	660	–	

Rated Operational Current I_e

CG4 CG4-1	CG6 CG7 CG8 CG9	CG8S[3] CG9S[3]	CH6 CH10 CH10B	CHR6 CHR10 CHR10B	CH16 CH16B	CHR16 CHR16B
10	20	20	20	20	25	25
6	12	16	12	12	20	20
2,5	4,5	8	4,5	4,5	7,5	7,5
0,7	1	2	1	1	1,5	1,5
0,3	0,4	0,6	0,4	0,4	0,5	0,5
0,2	0,27	0,35	0,27	0,27	0,3	0,3
6	12	20	12	12	20	20
3	5	13	5	5	9	9
1	2	6	2	2	3	3
0,7	1	3	1	1	1,5	1,5
0,3	0,4	1	0,4	0,4	0,5	0,5

Ambient Temperature of Stages[5]	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.

Selection Data					CG4 CG4-1	CG6 CG8	CG7 CG9	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	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	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 – –	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	0,55 1,5 1,5 1,5	1,5 3 3 3	1,5 3 3 3
		1 phase 2 pole	110 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	0,3 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	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 – –	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	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	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	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 0,5 –	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	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(–) 2x16	2x2,5(2,5) 2x14	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

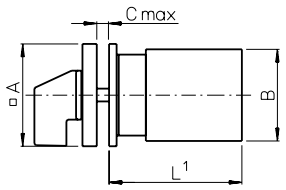
Selection Data				CGD4-1	CH11	CHR11	CH12	CHR12
Rated Insulation Voltage U_e	IEC 60947-3, EN 60947-3[1] VDE 0660 part 107[1]		V	440	600	600	600	600
	North America		V	300	300	300	300	300
	min. voltage		V	1[4]	1[4]	1[4]	6	6
Rated Impulse Withstand Voltage U_{imp}				on request				
Rated Thermal Current 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
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	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								
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(–)	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]		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.

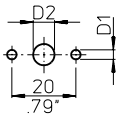
Dimensions

mm
inch

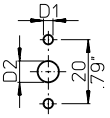
Two or Four Hole Panel Mounting



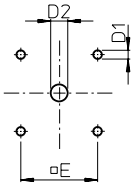
E
for
CG4-CGD4-1
CH6/CHR6
E-V
for
CG6/CG7



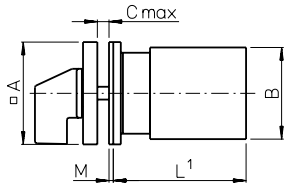
E-V
for
CG4-CGD4-1
CH6/CHR6
E
for
CG6/CG7



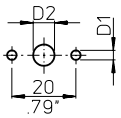
E
E-V



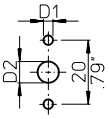
	CG4 CG4-1 CGD4-1	CG6 CG7	CG8 CG9	CH6 CHR6	CH10- CHR16	CH10B- CHR16B
A	30 1.18	30 1.18	48 1.89	30 1.18	48 1.89	64 2.52
B	28 1.10	38 1.50	38 1.50	46 1.81	46 1.81	56 2.20
C	4 .16	4 .16	4 .16	4 .16	4 .16	4 .16
D1	3,2 .13	3,2 .13	5 .20	3,2 .13	5 .20	5 .20
D2	8-11 .31-.43	8-11 .31-.43	8-15 .31-.59	8-11 .31-.43	8-15 .31-.59	10-15 .39-.59
E	- -	- -	36 1.42	- -	36 1.42	48 1.89



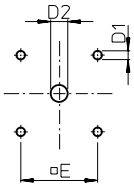
EF
for
CG4-CGD4-1
CH6/CHR6
EF-V
for
CG6/CG7



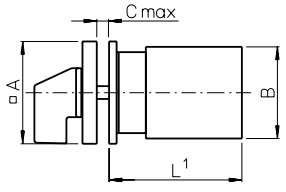
EF-V
for
CG4-CGD4-1
CH6/CHR6
EF
for
CG6/CG7



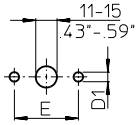
EF
EF-V



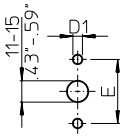
	CG4 CG4-1 CGD4-1	CG6 CG7	CG8 CG9	CH6 CHR6	CH10- CHR16	CH10B- CHR16B
A	30 1.18	30 1.18	48 1.89	30 1.18	48 1.89	64 2.52
B	28 1.10	38 1.50	38 1.50	46 1.81	46 1.81	56 2.20
C	4 .16	4 .16	4 .16	4 .16	4 .16	4 .16
D1	3,2 .13	3,2 .13	5 .20	3,2 .13	5 .20	5 .20
D2	8-11 .31-.43	8-11 .31-.43	15-19 .59-.75	8-11 .31-.43	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 CG9	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

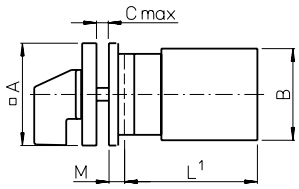
[1]see page 43

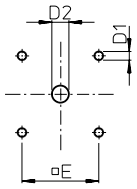
Dimensions

mm
inch

Four Hole Panel Mounting or Mosaic Mounting

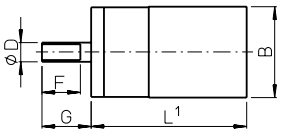
EG
EGF

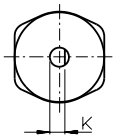




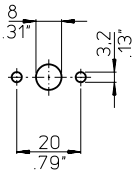
		CG8 CG9	CH10- CHR16
	A	64 2.52	64 2.52
	B	38 1.50	46 1.81
	C	4 .16	4 .16
	D1	5 .20	5 .20
EG	**D2**	10-15 .39-.59	10-15 .39-.59
EGF	**D2**	19-22 .75-.87	19-22 .75-.87
	E	48 1.89	48 1.89
	M	6,7 .26	6,7 .26

E9
E91

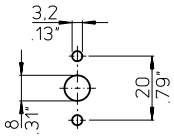




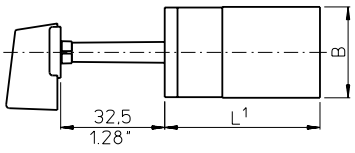
for
CG4-CGD4-1
CH6/CHR6

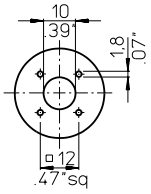


for
CG6/CG7

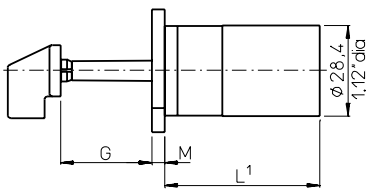


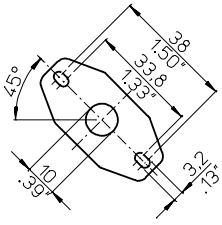
E92





E93
E94





		CG4 CG4-1 CGD4-1	CG6 CG7	CH6 CHR6
	B	28 1.10	38 1.50	46 1.81

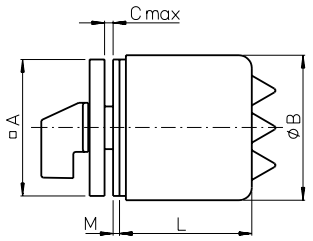
CG4 CG4-1 CGD4-1 CG6 CG7 CH6 CHR6	**E9**	**E91**	**E92**	**E93**	**E94**
D	6 .24	6,35 .25	- -	- -	- -
F	12 .47	12,8 .50	- -	- -	- -
G	15,4 .61	17,4 .69	32,5 1.28	28,5 1.12	32,5 1.28
K	4,7 .19	5,5 .22	- -	- -	- -
M	- -	- -	- -	4 .16	- -

[1]see page 43

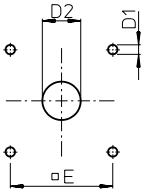
Dimensions

mm
inch

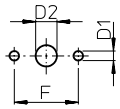
Two or Four Hole Panel Mounting



EC
ED
EC1
ED1



ED22



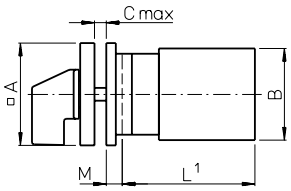
		CG8	CG9	CH10-CHR16		CH10B-CHR16B	
		ED22	**ED22**	**EC ED**	**ED22**	**EC ED**	**EC1 ED1**
	A	48 1.89	48 1.89	64 2.52	48 1.89	64 2.52	64 2.52
	B	74 2.91	74 2.91	68 2.68	74 2.91	68 2.68	74 2.91
EC/EC1	**C**	- -	- -	4 .16	- -	4 .16	4 .16
ED/ED1/ED22	**C**	4 .16	4 .16	2 .08	4 .16	4 .16	4 .16
	D1	5 .20	5 .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	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	- -	30 1.17	- -	- -
ED/ED1/ED22	**M**	1,5 .06	1,5 .06	2 .08	1,5 .06	2 .08	- -
Stages L	**1**	74,3 2.93	74,3 2.93	- -	74,3 2.93	- -	72,7 2.86
	2	74,3 2.93	74,3 2.93	- -	74,3 2.93	- -	72,7 2.86
	3	94,3 3.71	94,3 3.71	- -	94,3 3.71	- -	92,7 3.65
	4	94,3 3.71	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	- -	- -	- -	- -	- -	- -

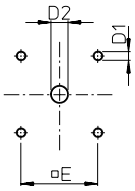
Dimensions

mm
inch

Four Hole Panel Mounting or Single Hole Mounting

KN1
KD1
KN2

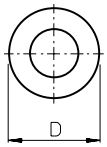




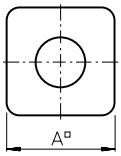
KN2	CG8 CG9	CH10- CHR16
A	48 1.89	48 1.89
B	38 1.50	46 1.81
C	4 .16	4 .16
D1	5 .20	5 .20
D2	8-15 .31-.59	8-15 .31-.59
E	36 1.42	36 1.42
M	5,2 .20	5,2 .20

KN1 KD1	CG8 CG9	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

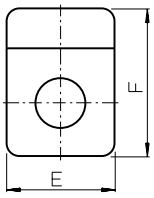
FS1...
FT1...
FT3...

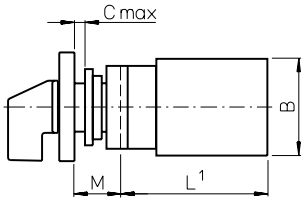


FH3...
FS2...
FT2...
FT4...

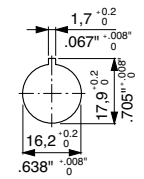


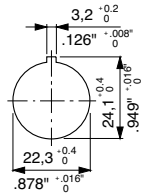
FS4...



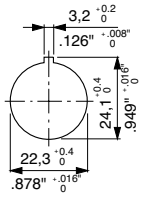


FS1...
FS2...
FS4...

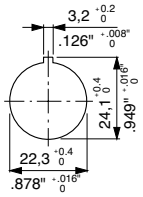


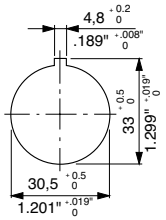


FH3...
FT1...
FT2...



FT3...
FT4...





		CG4 CG4-1 CGD4-1	CG6 CG7	CG8 CG9	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
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	- -	39 1.54	- -
M		12,5 .49	12,5 .49	20 .79	12,5 .49	20 .79
	FH3...	- -	- -	27 1.07	- -	27 1.07

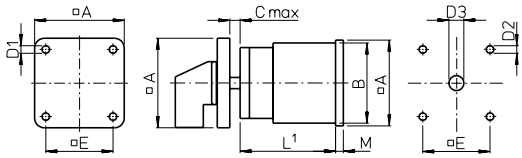
[1]see page 43

Dimensions

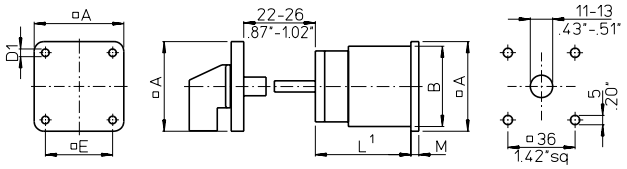
mm
inch

Base Mounting

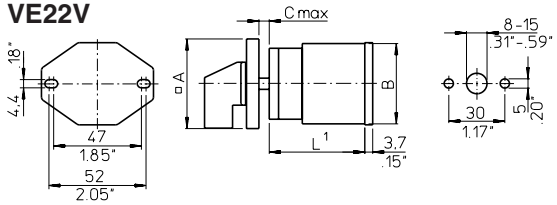
VE
VE-V



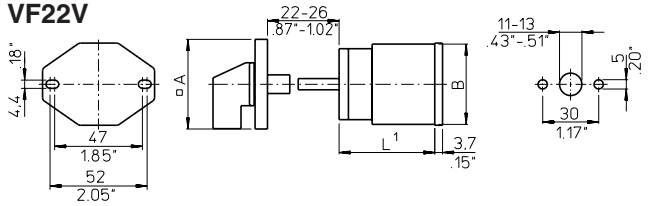
VF
VF-V



VE22
VE22V



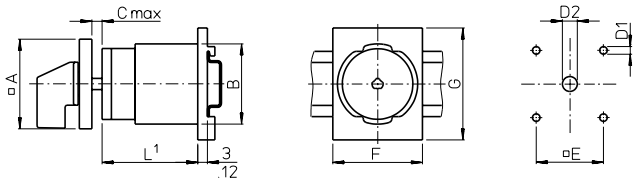
VF22
VF22V



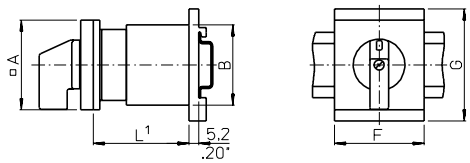
	CG8 CG9	CH10- CHR16
A[2]	48 1.89	48 (64) 1.89 (2.52)
B	38 1.50	46 1.81
C	10,5 .41	10,5 .41
D1	4,1 .16	4,1 .16
D2	5 .20	5 .20
D3	8-15 .31-.59	8-15 .31-.59
E[2]	36 1.42	36 (48) 1.42 (1.89)
M	2,2 .09	5,2 .20

[2]Dimensions in ( ) for revertive mounting plate

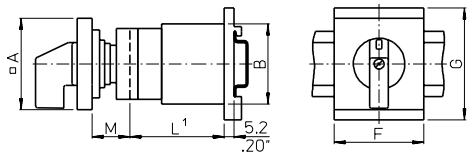
VE1



VE1E



VE1F



	CG4 CG4-1 CGD4-1	CG8 CG9	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

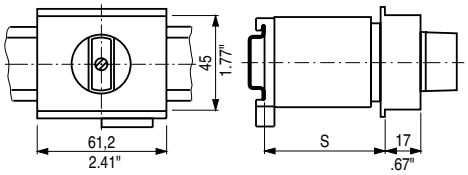
[1]see page 43

Dimensions

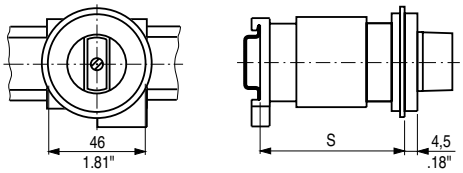
mm
inch

Base Mounting and Escutcheon Plates

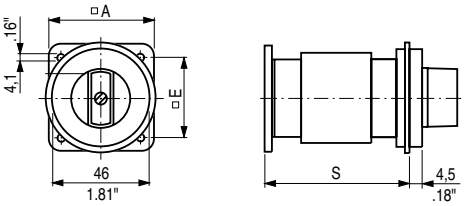
VE2



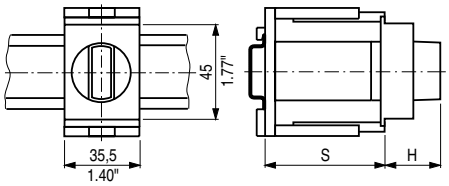
VE3



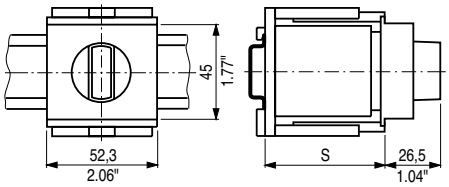
VE4



VE21
for CG4-CGD4-1

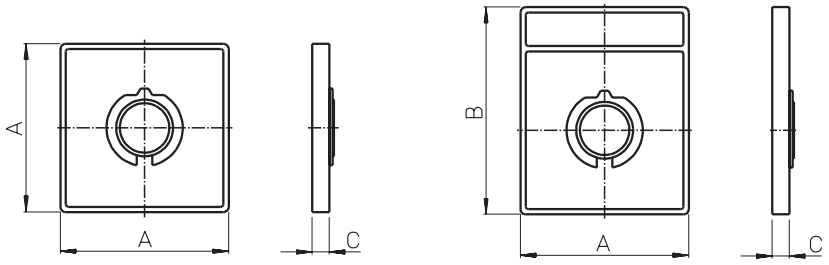


VE21
for CG8-CHR16



	VE2			VE3			VE4					VE21			
	CG8	CG9	CH10-CHR16	CG8	CG9	CH10-CHR16	CG8	CG9	CH10-CHR16	$S_{min.}$	H	CG4-CGD4-1	CG8	CG9	CH10-CHR16
	Max. no. of stages			Max. no. of stages			Max. no. of stages					No. of stages			
S = 46 1.81	1	1	1	-	-	-	1	-	-	44 1.73	21 .83	1	1	1	1
S = 50 1.97	2	1	2	1	-	1	1	1	-	46 1.81	26,5 1.04	2	2	-	-
S = 61 2.40	3	2	2	2	1	1	2	1	1	50 1.97	- -	-	-	-	2
S = 67 2.64	3	2	3	2	2	2	2	2	2	54 2.13	- -	-	-	2	-
S = 69 2.70	3	2	3	2	2	2	2	2	2	60 2.36	- -	-	3	-	-
A							48 1.89	48 1.89	64 2.52	62 2.44	26,5 1.04	3	-	-	-
E							36 1.42	36 1.42	48 1.89	64 2.52	- -	-	-	-	3
										72 2.83	- -	-	4	3/4	-

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	60 2.36	6,3 .25
S1	64 2.52	78,8 3.10	7,4 .29

Dimensions

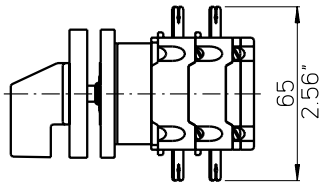
mm
inch

Additional Lengths

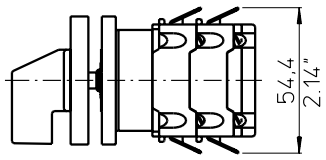
Additional lengths for amendment (page 4)

	CG8 CG9	CH10 CH16	CHR10 CHR16
B	6,2 .24	6,2 .24	6,2 .24
S	14,3 .56	14,3 .56	14,3 .56
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	CG7	CG8	CG9	CH6 CHR6	CH10 CH11 CH12 CH16	CHR10 CHR11 CHR12 CHR16	CH10B CH16B	CHR10B CHR16B
1	38,5 1.52	43,2 1.70	47 1.85	40,7 1.60	44,5 1.75	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	63,5 2.50	53,4 2.10	61 2.40	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	80 3.15	66,1 2.60	77,5 3.05	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	96,5 3.80	78,8 3.10	94 3.70	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	110,5 4.35	- -	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	127 5.00	- -	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	143,5 5.65	- -	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	160 6.30	- -	141,5 5.57	141,5 5.57	146,9 5.78	146,9 5.78
9	- -	- -	- -	142,3 5.60	176,5 6.95	- -	155,5 6.12	155,5 6.12	160,9 6.34	160,9 6.34
10	- -	- -	- -	155 6.10	193 7.60	- -	169,5 6.67	169,5 6.67	174,9 6.89	174,9 6.89
11	- -	- -	- -	167,7 6.60	209,5 8.25	- -	183,5 7.22	183,5 7.22	188,9 7.44	188,9 7.44
12	- -	- -	- -	180,4 7.10	226 8.90	- -	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 36 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. Terminals are 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 80 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**
Contactors 16 A-115 A and Motor Starters 1,1 kW-55 kW These include control relays, motor contactors, two and four pole output contactors, heating contactors, thermal overload relays.	**200**
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**

SALES AND SERVICE ORGANIZATION

Australia

australian solenoid Φ co. pty. ltd.

379 Liverpool Road, ASHFIELD, N.S.W. 2131
P. O. Box 1093, ASHFIELD, N.S.W. 1800
Tel: +61 2 9797-7333, Fax: 0092
e-mail: sales@austrasol.com.au

Austria

austro solenoid Φ ges.m.b.h.

Schumanngasse 35, Postfach 431
A-1181 WIEN
Tel: +43 1 404 06, Fax: 404 06-190
e-mail: aso@krausnaimer.com

Belgium, Luxembourg

solenoid benelux Φ b. v.

Stationstraat 34
B-3070 KORTENBERG
Tel: +32 2 757-0141, Fax: 1640
e-mail: info@solenoid.be

Brazil

solenoid do brasil Φ ltda.

Avenida Berna 230
04774-020 SAO PAULO
Tel: +55 11 5524-1288, Fax: 5521-4659/9633
e-mail: knbrasil@krausnaimer.com.br

Canada

canadian solenoid Φ inc.

219 Connie Crescent, Unit 13A
CONCORD, Ontario, L4K 1L4
Tel: +1 905 738-1666, Fax: 9327
e-mail: cdnsolenoid@cansol.on.ca

Chile

ASEA BROWN BOVERI S. A.
Vicuña Mackenna 1602, Casilla 3555
SANTIAGO DE CHILE
Tel: +56 2 544-7411, Fax: 7418

Cyprus

ELECTROMATIC CONSTRUCTIONS LTD.
72, Evagoras Pallikarides Str., CY-2235 LATSIA-Nicosia
P. O. Box 12630, CY-2251 LATSIA-Nicosia
Tel: +357 2 48 41 41, Fax: 48 57 47

Czech Republic

OBZOR, výrobní družstvo Zlín
Louky-Slanica 378
CZ-76413 ZLÍN
Tel: +420 57 7195-111/-153 (Techn. Supp.)
Fax: +420 57 7195-152/-138
e-mail: ots@obzor.cz

Denmark

C. THIIM A/S Ingeniørfirma
Transformervej 31
DK-2730 HERLEV
Tel: +45 44 85 80 00, Fax: 80 05
e-mail: thiim@thiim.com

Finland

suomen solenoid Φ oy

Karitie 7
FIN-01530 VANTAA
Tel: +358 9 825-4240, Fax: 42410
e-mail: etunimi.sukunimi@finsol.fi

France

solenoid france Φ s. a.

33, rue Bobillot
F-75013 PARIS
Tél: +33 1 58 40 80 80, Fax: 45 80 91 19
e-mail: sales@solfrance.fr

Germany

deutsche solenoid Φ vertriebs-gmbh

Wikingerstraße 20-28, D-76189 KARLSRUHE
Postfach 10 01 24, D-76231 KARLSRUHE
Tel: +49 721 59 88-0, Fax: 59 28 28
e-mail: desol@krausnaimer.com

Great Britain

u. k. solenoid Φ ltd.

115 London Road
NEWBURY/BERKSHIRE RG14 2AH
Tel: +44 1635 45991, Fax: 37807
e-mail: sales@uksol.co.uk

Greece

KALAMARAKIS-SAPOUNAS S. A.
Ionias & Neromilou Str., P. O. Box 46566
GR-13671 ACHARNES/ATHENS
Tel: +30 2 10 240-6000-6, Fax: 240-6007
e-mail: ksa@ksa.gr

Hungary

GANZ, Schalter- u. Gerätefabrik
X. Kőbányal út 41/c, Postfach 87
H-1475 BUDAPEST
Tel: +36 1 261-5479, Fax: 4685
e-mail: ganzkk@ganzkk.hu

Iceland

BRAEDURNIR ORMSSON EHF
Lágmúli 6-9, P. O. Box 8670
REYKJAVIK
Tel: +354 530-28 00, Fax: 28 10
e-mail: skuli@ormsson.is

Iran

RBS technische und kommerzielle
Beratungsgesellschaft mbH
Kohlriege 14
D-33758 SCHLOSS HOLTE
Tel: +49 5207 9111-0, Fax: 9111-19
e-mail: kontakt@rbs-gmbh.de

Republic of Ireland

irish solenoid Φ ltd.

Bay 145, Shannon Free Zone
SHANNON, Co. Clare
Tel: +353 61 704700, Fax: 471084
e-mail: salesirs@krausnaimer.ie

Italy

solenoid italia Φ s.r.l.

Via Terracini, 9
I-24047 TREVIGLIO (BG)
Tel: +39 0363-30 11 12, Fax: 30 21 13

Japan

solenoid japan Φ co. ltd.

Yoshiwada Building 2F
1-11-6 Hamamatsucho
Minato-Ku, TOKYO 105-0013
Tel: +81 3 3436-6151, Fax: 6325

Kuwait

AMMAR & PARTNERS ELECTRICAL CO.
P. O. Box 1871
13019 SAFAT
Tel: +965 483-0122/483-0133
Fax: +965 484-1818

Malaysia

INDUSTRIAL AUTOMATION (M) Sdn Bhd
30-3 & 30-4 Loke New Road
55200 KUALA LUMPUR
Tel: +60 3-9-2210511, Fax: 2222299
e-mail: inquiry@iasb.com.my

Mexico

ING. JAVIER CABALLERO B.
A. Gaviño 30, Satélite,
53100, Edo. de Mexico, MEXICO
Tel: +52 5555 62-7577, Fax: 0434
e-mail: j_caballero_b@infosel.net.mx

Netherlands

solenoid benelux Φ b. v.

Wegtersweg 38, Postbus 199
NL-7556 BR HENGELO (Ov.)
Tel: +31 74 291-9441, Fax: 8380
e-mail: info@solenoid.nl

New Zealand

new zealand solenoid Φ co. ltd.

42 Miramar Avenue, P. O. Box 15-009
WELLINGTON
Tel: +64 4 380-9888, Fax: 9877
e-mail: sales@nzsolenoid.co.nz

Norway

norsk solenoid Φ a/s

Hjalmar Brantings vei 8, P. O. Box 21, Økern
N-0508 OSLO
Tel: +47 22 64 44 20, Fax: 65 39 49
e-mail: nos@norsksol.no

Poland

ASTAT sp. z o.o
ul. Dąbrowskiego 461
PL-60451 POZNAŃ
Tel: +48 61 848-8871/72, Fax: 8276
e-mail: info@astat.com.pl

Portugal

ELECTRICOL-DAMAS, FERREIRA & DAMASCENO, S. A.
Apartado 1083
P-2671-852 SANTO ANTÓNIO DOS CAVALEIROS
Tel: +351 21 989-8939, Fax: 988-6464

Kingdom of Saudi-Arabia

HAWA ELECTRIC PANEL BOARD FACTORY
Industrial Area, P. O. Box 1684
DAMMAM 31441
Tel: +966 3 847-2061, Fax: 2056

Singapore

solenoid singapore Φ pte. ltd.

115A, Commonwealth Drive
03-17/23
SINGAPORE 149 596
Tel: +65 6473-8166, Fax: 8643
e-mail: krausnaimer@singsol.com.sg

Slovenia

SCHRACK Energietechnik d.o.o.
Glavni trg 47
SI-2380 SLOVENJ GRADEC
Tel: +386 2 88 392 00, Fax: 434 71
e-mail: schrack.sg@schrack-energietechnik.si

Republic of South Africa

south african solenoid Φ co. pty. ltd.

7 Village Crescent, Linbro Village
Linbro Business Park, SANDTON 2065
P. O. Box 511, KELVIN 2054
Tel: +27 11 608-6060, Fax: 608-2874
e-mail: sales@sasolenoid.co.za

Spain

HAZEMEYER ESPAÑOLA S. A.
Crta. de Tiana s/n, Esq. N-2
BADALONA-BARCELONA
Tel: +34 93 389-4262, Fax: 384-3586
e-mail: heshaze@catworld.net

Sweden

skandinaviska solenoid Φ ab

Dr. Widerströms Gata 11, FRUÄNGEN
Box 42097, S-126 14 STOCKHOLM
Tel: +46 8 97 00 80, Fax: 97 87 33
e-mail: order@skansol.se

Switzerland

AWAG Elektrotechnik AG
Sandbüelstraße 2, Postfach
CH-8604 VOLKETSWIL
Tel: +41 1 908-1919, Fax: 1999
e-mail: info@awag.ch

Taiwan

NUWTEC ENTERPRISE Co Ltd
No. 301, Sec. 1, Nan Kang Road
TAIPEI 115, Taiwan, R. o. C.
Tel: +886 2 265-13279, Fax: 13264
e-mail: nathan.nuwtec@msa.hinet.net

Turkey

ÜNAL KARDEŞ ELEKTRIK GEREÇLERI A. Ş.
Beşyol, Eski Londra Asfaltı-6
TR-34630 SEFAKÖY-Istanbul
Tel: +90 212 624-9204, Fax: 592-4810
e-mail: info@unalkardes.com.tr

USA

american solenoid Φ co. inc.

760 New Brunswick Road, P. O. Box 430
SOMERSET, NJ 08873
Tel: +1 732 560-1240, Fax: 8823
e-mail: amsol@krausnaimer-us.com