



Main switches

A manual operated main switch must be provided for every mains circuit. It must be a switch-disconnector corresponding to utilization category AC23 (IEC 947-3) fulfils the following requirements:

- Disconnecting the electrical equipment from the main.
- Visible contact indication or a disconnection function by construction (the handle is in the "OFF" position when all contacts are open).
- If the main switch does not serve simultaneously as an emergency-stop switch, its handle should not be red. Black or grey handles are recommended.
- It should be lockable in the off-position (e.g. by padlock).
- All active conductors are to be disconnected from the main.
- The breaking capacity should be sufficient. In order to break the current of the largest motor in a blocked state together with the sum of the operating currents of the remaining motors/loads.
- The handle of the main switch must be easily accessible and must lie between 0.6 and 1.9 m above the incomer level.

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Standards

- Complying with:
- IEC 60947-3
 - DIN VDE 0660
 - low voltage directive 73/73 EEC
 - low voltage directive EMC 89/336 EEC

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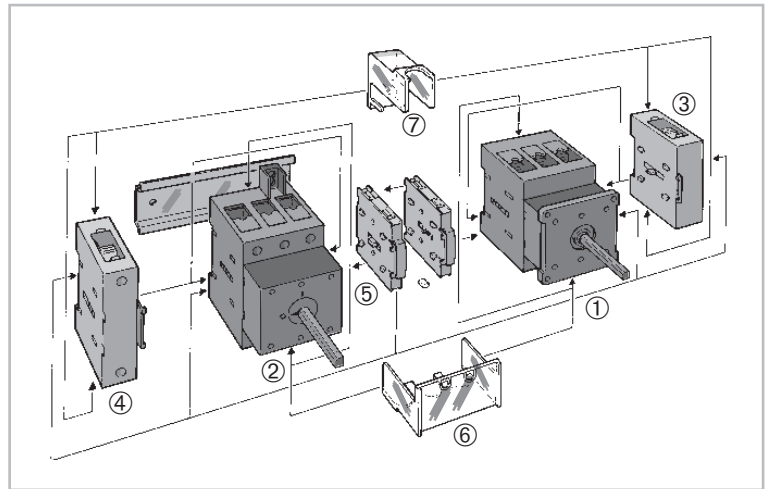
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Emergency-stop equipment

The main switch may fulfil the function of an emergency-stop switch on certain machines.

The handles must be red on a yellow background.

The contacts of manual operated emergency-stop switch has to be opened by force.

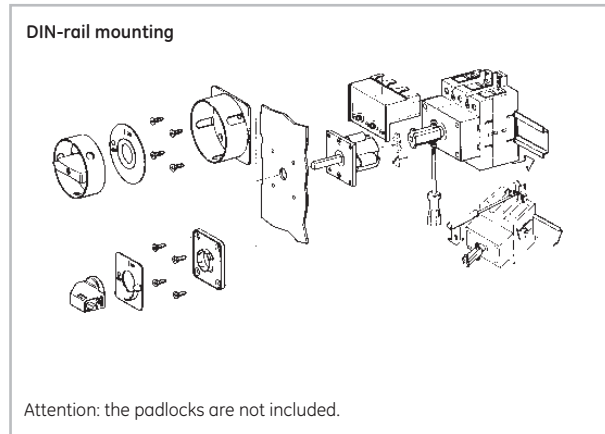
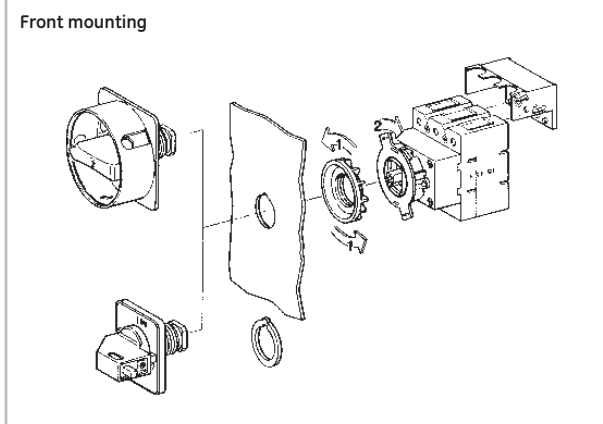


- ① Front mounting (flush mounting)
- ② Rear mounting
- ③ Main contact and PE- or N-terminals for ①
- ④ Main contact and PE- or N-terminals for ②
- ⑤ Auxiliary switch 1NO/1NG for ① and ②
- ⑥ Terminal cover triple for ① and ②
- ⑦ Terminal cover single for ③ and ④

- Mounting possibilities ● pg. I.3
- Accessories ● pg. I.6
- Technical data ● pg. I.8
- Dimensions ● pg. I.9

Mounting possibilities

	Ith	25A	40A	63A	80A	125A
	Series	ML 1	ML 1	ML 2	ML 2	ML 3
	Type	640	650	660	670	680
Front mounting (flush mounting)						
	Colour					
Central fixing						
Ø 22.5/30.5 mm for 3 padlocks	red/yellow	789178	789179			
Ø 22.5/30.5 mm for 3 padlocks	black	789180	789181			
Ø 22.5/30.5 mm for 1 or 2 padlocks	red/yellow	789174	789175			
Ø 22.5/30.5 mm for 1 or 2 padlocks	black	789176	789177			
4-hole fixing						
With standard handle	black	789239	789240	789241	789242	789243
For 3 padlocks	red/yellow	789186	789187	789188	789189	789190
For 3 padlocks	black	789191	789192	789193	789194	789195
For 1 or 2 padlocks	red/yellow	789182	789183			
For 1 or 2 padlocks	black	789184	789185			
Rear mounting						
With cover coupling						
For 3 padlocks	red/yellow	789200	789201	789202	789203	789204
For 3 padlocks	black	789205	789206	789207	789208	789209
For 1 or 2 padlocks	red/yellow	789196	789197			
For 1 or 2 padlocks	black	789198	789199			
With door coupling						
For 3 padlocks	red/yellow	789214	789215	789216	789217	789218
For 3 padlocks	black	789219	789220	789221	789122	789223
For 1 or 2 padlocks	red/yellow	789210	789211			
For 1 or 2 padlocks	black	789212	789213			
DIN-rail mounting						
With standard handle	black	789234	789235	789236	789237	789238
For 1 or 2 padlocks	red/yellow	789224	789225	789226	789227	789228
For 1 or 2 padlocks	black	789229	789230	789231	789232	789233



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Standard programme - Front mounting

Main switches

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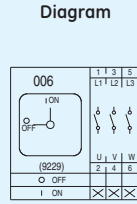
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Central fixing Ø 22.5/30.5 mm



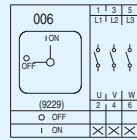
Locking handle by 1 or 2 padlocks



	Protection	Ithe	Type	Red/yellow Ref. no.	Black/gray Ref. no.	Pack
With terminal cover	IP65	25A	640	789174	789176	1
With terminal cover	IP65	40A	650	789175	789177	1



Locking handle by 3 padlocks

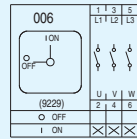


With terminal cover	IP65	25A	640	789178	789180	1
With terminal cover	IP65	40A	650	789179	789181	1

4-hole fixing



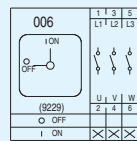
Locking handle by 1 or 2 padlocks



With terminal cover	IP55	25A	640	789182	789184	1
With terminal cover	IP55	40A	650	789183	789185	1



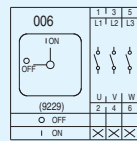
Locking handle by 3 padlocks



With terminal cover	IP55	25A	640	789186	789191	1
With terminal cover	IP55	40A	650	789187	789192	1
With terminal cover	IP55	63A	660	789188	789193	1
With terminal cover	IP55	80A	670	789189	789194	1
With terminal cover	IP55	125A	680	789190	789195	1



With standard black handle


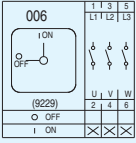

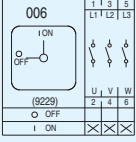
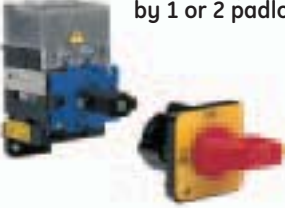
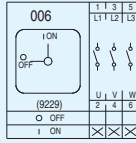

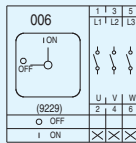

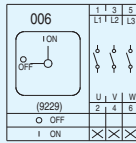

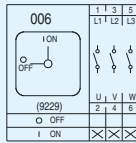


	IP55	25A	640		789239	1
	IP55	40A	650		789240	1
	IP55	63A	660		789241	1
	IP55	80A	670		789242	1
	IP55	125A	680		789243	1

Accessories see I.6



Standard programme - Rear mounting

DIN-rail mounting		Protection	Ithe	Type	Red/yellow	Black/gray	Pack			
					Ref. no.	Ref. no.				
 <p>Locking handle by 1 or 2 padlocks</p>		With terminal cover	IP30	25A	640	789224	789229	1		
		With terminal cover	IP30	40A	650	789225	789230	1		
		With terminal cover	IP30	63A	660	789226	789231	1		
		With terminal cover	IP30	80A	670	789227	789232	1		
		With terminal cover	IP30	125A	680	789228	789233	1		
 <p>With standard black handle</p>		With terminal cover	IP30	25A	640		789234	1		
		With terminal cover	IP30	40A	650		789235	1		
		With terminal cover	IP30	63A	660		789236	1		
		With terminal cover	IP30	80A	670		789237	1		
		With terminal cover	IP30	125A	680		789238	1		
With door coupling		 <p>Locking handle by 1 or 2 padlocks</p>		With terminal cover	IP55	25A	640	789210	789212	1
With terminal cover	IP55			40A	650	789211	789213	1		
 <p>Locking handle by 3 padlocks</p>		With terminal cover	IP55	25A	640	789214	789219	1		
		With terminal cover	IP55	40A	650	789215	789220	1		
		With terminal cover	IP55	63A	660	789216	789221	1		
		With terminal cover	IP55	80A	670	789217	789222	1		
		With terminal cover	IP55	125A	680	789218	789223	1		
With cover coupling		 <p>Locking handle by 1 or 2 padlocks</p>		With terminal cover	IP65	25A	640	789196	789198	1
With terminal cover	IP65			40A	650	789197	789199	1		
 <p>Locking handle by 3 padlocks</p>		With terminal cover	IP65	25A	640	789200	789205	1		
		With terminal cover	IP65	40A	650	789201	789206	1		
		With terminal cover	IP65	63A	660	789202	789207	1		
		With terminal cover	IP65	80A	670	789203	789208	1		
		With terminal cover	IP65	125A	680	789204	789209	1		

Accessories see 1.6

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Accessories - Fitable contactblocs⁽¹⁾

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Neutral switched		
Front	Rear	
789244	789245	1
Series ML1 - Type 640/650		
789246	789247	1
Series ML2 - Type 660/670		
789248	789249	1
Series ML3 - Type 680		

Fixed neutral module		
Front	Rear	
789262	789263	1
Series ML1 - Type 640/650		
789264	789265	1
Series ML2 - Type 660/670		
789266	789267	3
Series ML3 - Type 680		



Switching contact		
Front	Rear	
789250	789251	1
Series ML1 - Type 640/650		
789252	789253	1
Series ML2 - Type 660/670		
789254	789255	1
Series ML3 - Type 680		

Auxiliary contact NO+NC Ith = 16A		
Front	Rear	
789268	789269	1
Series ML1 - Type 640/650		
789268	789269	1
Series ML2 - Type 660/670		
789268	789269	1
Series ML3 - Type 680		



PE-terminal (Fixed)		
Front	Rear	
789256	789257	1
Series ML1 - Type 640/650		
789258	789259	1
Series ML2 - Type 660/670		
789260	789261	1
Series ML3 - Type 680		

Accessories - Terminal cover



Single terminal cover (HS1)		
	789270	1
Series ML1 - Type 640/650		
	789271	1
Series ML2 - Type 660/670		
	789271	1
Series ML3 - Type 680		

Triple terminal cover (HS3)		
	789272	1
Series ML1 - Type 640/650		
	789273	1
Series ML2 - Type 660/670		
	789274	1
Series ML3 - Type 680		
Same cover for front- or base mounting		



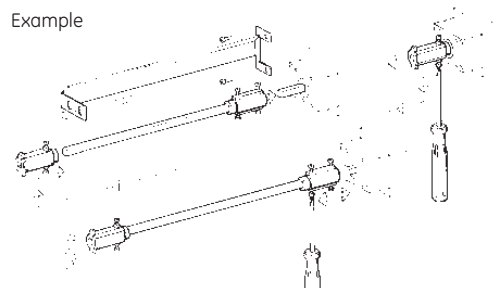
Extension shafts for door coupling



Shaft length	Depth range between door and base (mm)		
	ML1	ML2, ML3	Cat. no.
AL-65	170-215 mm	185-320 mm	789275
AL-165	265-335 mm	280-350 mm	789276
AL-265 ⁽²⁾	365-435 mm	380-450 mm	789277
AL-365 ⁽²⁾	465-535 mm	480-550 mm	789278
Shaft support for 265 and 365 mm			789279

An extension shaft is necessary when the depth is higher than the length of the standard shaft.
ML1: 105-135 mm
ML2 and ML3: 120-150 mm

- (1) ML1: max. 2 units
ML2 and ML3: max 3 units
- (2) Shaft support included.



Enclosed switches



The maintenance switch is an enclosed main switch with locking handle by 3 padlocks. With red handle and yellow front plate, if it should be used as an emergency-stop switch, otherwise black/grey.

There are six sizes of standard enclosures for the series ML. Each is equipped with a cover coupling and a double PE-terminal. Switches type 640 (3 and 4-pole) are provided with an additional N-terminal.

All enclosures have a degree of protection IP65 and are of solid impact and flame resistant polyester.

Enclosed switches

	Diagram	Type	Ithe	Type of enclosure	Red/yellow 3 padlocks	Black/grey 3 padlocks	Pack
					Ref. no.	Ref. no.	
Three poles		640	25A	E2	789280	789285	1
		650	32A	E3	789281	789286	1
		660	50A	E4	789282	789287	1
		670	63A	E5	789283	789288	1
		680	100A	E7	789284	789289	1
Four poles		640	25A	E2	789290	789295	1
		650	32A	E3	789291	789296	1
		660	50A	E4	789292	789297	1
		670	63A	E5	789293	789298	1
		680	100A	E7	789294	789299	1
Three poles + (1 NO + 1 NC)		640	25A	E2	789300	789305	1
		650	32A	E3	789301	789306	1
		660	50A	E4	789302	789307	1
		670	63A	E5	789303	789308	1
		680	100A	E7	789304	789309	1
Four poles + (1 NO + 1 NC)		640	25A	E2	789310	789315	1
		650	32A	E3	789311	789316	1
		660	50A	E4	789312	789317	1
		670	63A	E5	789313	789318	1
		680	100A	E7	789314	789319	1
Six poles		640	25A	E2	789320	789325	1
		650	32A	E3	789321	789326	1
		660	50A	E4	789322	789327	1
		670	63A	E5	789323	789328	1
		680	100A	E7	789324	789329	1
Six poles + (1 NO + 1 NC)		640	25A	E2	789330	789335	1
		650	32A	E3	789331	789336	1
		660	50A	E4	789332	789337	1
		670	63A	E5	789333	789338	1
		680	100A	E7	789334	789339	1

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Technical data

Main switches - According to IEC 60947-3, EN 60947-3, DIN VDE 0660 part 107, UL and CSA

Series			ML 1	ML 1	ML 2	ML 2	ML 3
Types			640	650	660	670	680
Rated uninterrupted current	I_u open = I_{th}	(A)	25	40	63	80	125
	I_{the} enclosed	(A)	25	32	50	63	100
Rated insulation voltage U_i (III/3)		(V)	690	690	690	690	690
Rated impulse withstand voltage U_{imp} (III/3)		(kV)	6	6	6	6	6
Rated operational current I_e AC21 A ⁽³⁾		(A)	25	40	63	80	125
Rated operational voltage U_e		(V)	690	690	690	690	690
Frequency		(Hz)	50/60	50/60	50/60	50/60	50/60
Making/breaking capacity							
Utilization category AC3:	3 × 230V	(kW)	5.5	7.5	15	18.5	22
Motor switches for operational switching	3 × 400V	(kW)	7.5	11	22	30	37
Utilization category AC23A ⁽³⁾	3 × 690V	(kW)	7.5	11	22	30	45
Motor switches	3 × 230V	(kW)	7.5	11	18.5	22	25
(Main switches for machinery)	3 × 400V	(kW)	11	15	30 ⁽¹⁾	37 ⁽²⁾	45
Rated breaking category AC23 A ⁽³⁾	3 × 230V	(A)	260	390	630	750	870
	3 × 400V	(A)	220	300	570	700	850
	3 × 690V	(A)	130	170	330	400	490
Short-circuit capacity							
Max. fuse rating gG		(A)	50	50	80	80	125
Rated conditional short-circuit current		(kA _{eff})	10	10	-	-	-
Rated short-circuit making capacity I_{cm}		(kA)	-	-	2.1	2.1	3.4
Rated short-time withstand I_{cw} (1s-current)		(A _{eff})	300	480	765	960	1500
Disconnect function up to		(V)	690	690	690	690	690
Terminal screws (Pozidriv)			M4	M4	M5	M5	M6
Torque terminal screws		(Nm)	2.5	2.5	4	4	6
Cable cross section							
Solid or multi-stranded (Cu)		min. - max. (mm ²)	1.5-10	1.5-10	2.5-35	2.5-35	6-70
Flexible with ferrule (DIN 46228)		min. - max. (mm ²)	1.5-6	1.5-6	1.5-25	1.5-25	6-50
General purpose 3-phase		(A)	25	40	63	80	125
		(V)	600	600	600	600	600
Motor 3-phase	240V	(HP)	7.5	10	15	20	25
	480V	(HP)	10	20	30	40	50
	600V	(HP)	10	20	30	40	50
Motor 1-phase (2 pole)	120V	(HP)	1	1.5	3	4	6
	240V	(HP)	2	3	7.5	10	15
Cable cross section		AWG-No	14-7	14-3	14-2	14-2	8-1/0

(1) 22 kW in enclosure

(2) 30 kW in enclosure

(3) ML2/ML3 according to EN 60947-3 category B

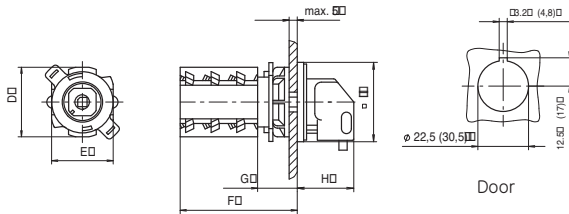
Auxiliary contact for ML 1/2/3 - According to IEC 60947-5-1

Series			ML 1/2/3		
Rated uninterrupted current	I_u open = I_{th}	(A)	16		
	I_{the} enclosed	(A)	16		
Rated insulation voltage U_i (III/3)		(V)	690		
Rated impulse withstand voltage U_{imp}		(kV)	6		
Rated operational current I_e (AC15)	230V	(A)	6		
	400V	(A)	4		
	600V	(A)	2		
	690V	(A)	2		
Max. fuse rating gG		(A)	16		
Rated conditional short-circuit current		(kA _{eff})	3		
Cable cross section, solid or multi-stranded		min. - max. (mm ²)	1-4		
Flexible with ferrule (DIN 46228)		min. - max. (mm ²)	1-2.5		
Terminal screws (Pozidriv)			M3		
Torque terminal screws		(Nm)	0.6		

Dimensional drawings

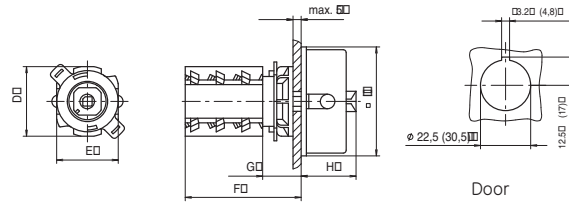
Front mounting - Central fixing \varnothing 22.5/30.5 mm

For 1 or 2 padlocks, \varnothing max. 5 mm



Series	D	E	F	G	H	I
ML1	55	45	75	25	35	48

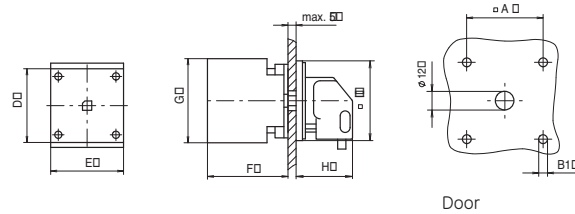
For 3 padlocks, \varnothing max. 9 mm



Series	D	E	F	G	H	I
ML1	55	45	75	25	35	66

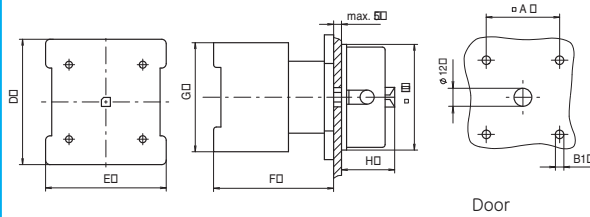
Front mounting - 4-hole fixing

For 1 or 2 padlocks, \varnothing max. 5 mm



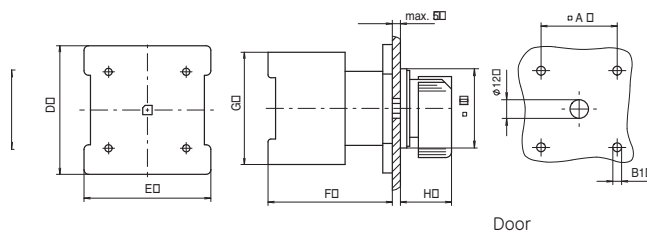
Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	35	48

For 3 padlocks, \varnothing max. 5 mm



Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	32	66
ML2	48	5.5	58	58	72	75	37	86
ML3	48	5.5	78	78	72	80	37	86

Front mounting - 4-hole fixing, with standard black handle



Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	29	48
ML2	48	5.5	58	58	72	75	33	64
ML3	69	5.5	78	78	72	80	35	88

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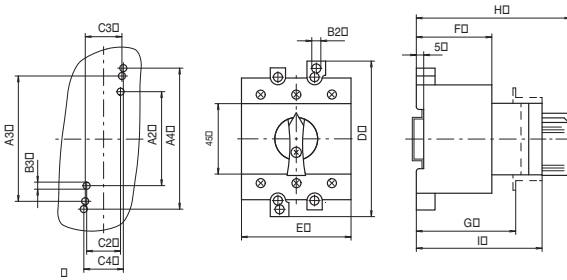
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Dimensional drawings

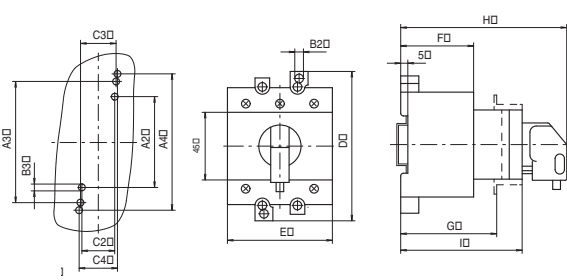
Rear mounting - DIN-rail mounting

With standard black handle



Series	A2	A3	A4	B2	B3	C2	C3
ML1	60	65	70	4.2	3.8	22	30
ML2	-	80	90	5.5	5.2	-	23.5
ML3	-	80	90	5.5	5.2	-	23.5
Series	C4	D	E	F	G	H	I
ML1	25	78	52.5	42	48.5	87.5	67.5
ML2	25	100	53.5	49	-	100	79
ML3	25	100	70	49	-	100	79

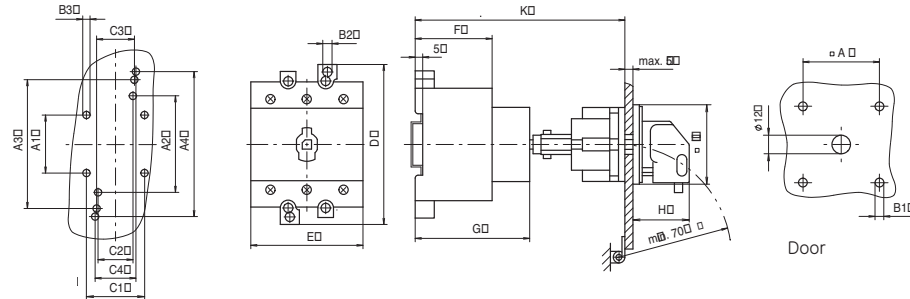
For 1 or 2 padlocks, Ø max. 5 mm



Series	A2	A3	A4	B2	B3	C2	C3
ML1	60	65	70	4.2	3.8	22	30
ML2	-	80	90	5.5	5.2	-	23.5
ML3	-	80	90	5.5	5.2	-	23.5
Series	C4	D	E	F	G	H	I
ML1	25	78	52.5	42	48.5	91.5	67.5
ML2	25	100	53.5	49	-	104	79
ML3	25	100	70	49	-	104	79

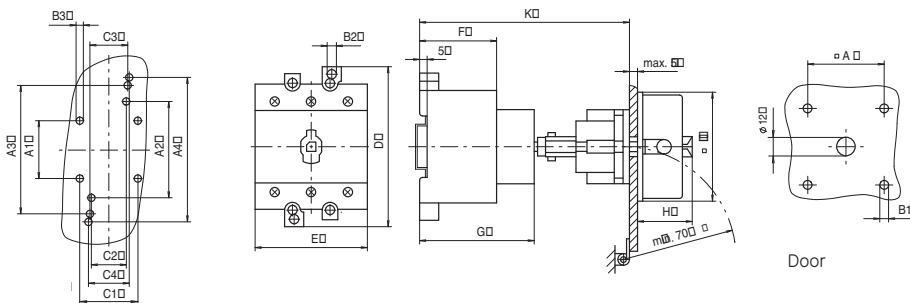
Rear mounting - With door coupling

For 1 or 2 padlocks, Ø max. 5 mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	35	48	105-135

For 3 padlocks, Ø max. 5 mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	32	66	105-135
ML2	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	53.5	49	72	37	86	120-150
ML3	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	70	49	72	37	86	120-150

A

B

C

D

E

F

G

H

I

X



A

B

C

D

E

F

G

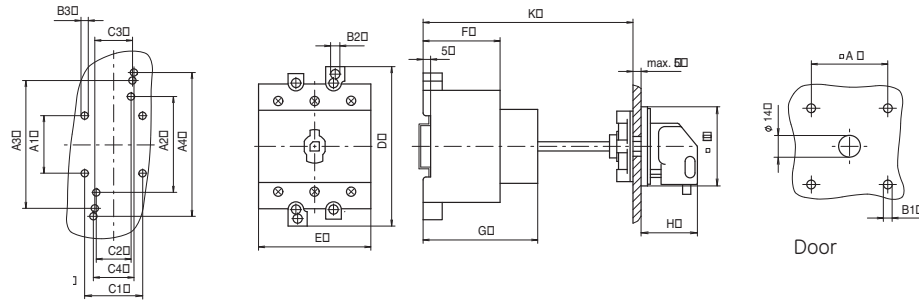
H

I

X

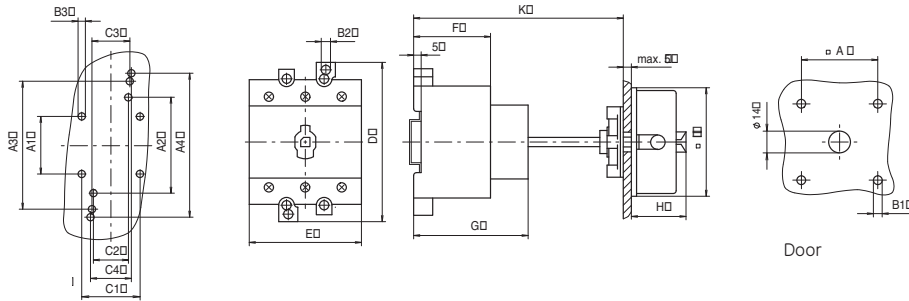
Rear mounting - With cover coupling

For 1 or 2 padlocks, \varnothing max. 9 mm



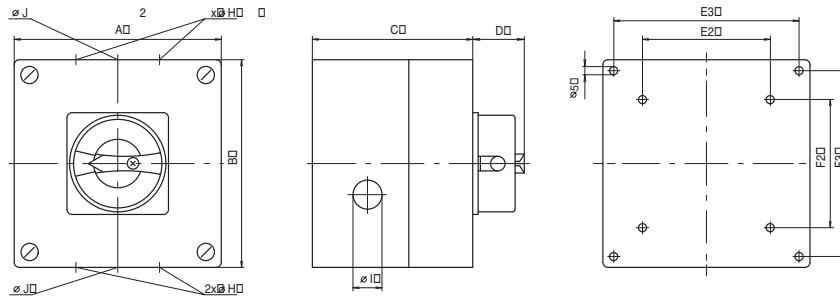
Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	35	48	105-135

For 3 padlocks, \varnothing max. 9 mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	32	66	88-98
ML2	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	53.5	49	72	37	86	103-113
ML3	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	70	49	72	37	86	103-113

Enclosed switches



Enclosure Type	A	B	C	D	E2	E3	F2	F3
E2	94	130	81	32	-	79	-	115
E3	130	130	99	32	-	115	-	115
E4	110	180	11	32	50	95	120	165
E5	180	182	111	37	120	165	120	167
E6	180	254	111	37	120	165	190	239
E7	265	265	140	37	194	-	230	-

Cable entry Type	H (1)	I (1)	H (2)	I (2)	J (2)
E2	PG 16/11	PG 11	-	-	-
E3	PG 21/16	PG 16	-	-	-
E4	-	-	PG 21	PG 11	-
E5	-	-	PG 29	-	PG 11
E6	-	-	PG 29	PG 11	-
E7	PG 36/29	PG 29	-	-	-

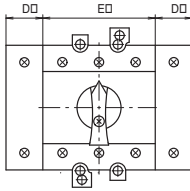
(1) Knock-out entry
(2) Cable entry



Dimensional drawings

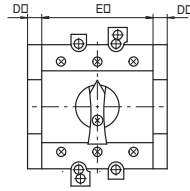
Accessories

N-module and PE-terminal



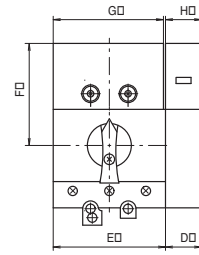
Series	D	E
ML1	14.5	45
ML2	23	53.5
ML3	23	70

Auxiliary contacts (NO + NC)



Series	D	E
ML1	9.5	45
ML2	9.5	53.5
ML3	9.5	70

Terminal covers



Series	D	E	F	G	H
ML1	14.5	45	53	41	14
ML2	23	53.5	61	52	22.5
ML3	23	70	65	68	22.5

Main switches

A

B

C

D

E

F

G

H

I

X

