

Miniature circuit breakers

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Notes

A large grid area for taking notes, consisting of a 20x20 grid of small squares. The grid is empty and occupies the majority of the page.

Selection table RCCB's Series FI

Page No.	Series	Sensitivity (mA)	Poles	Type	Nominal current (A)						Isolator appl.	Add-on devices	Rated voltage		
					16	25	40	63	80	100					
B.8	FI														
	EH/E	10	2P	AC/A									x	x	240
	EH/E	30	2P	AC/A									x	x	240
	EH			Ai									x	x	240
	EH/E		4P	AC/A									x	x	240/415
	EH			Ai									x	x	240/415
	EH/E	100	2P	AC/A/S									x	x	240
			4P	AC/A/S									x	x	240/415
	EH/E	300	2P	AC/A/S/Si									x	x	240
			4P	AC/A/S/Si									x	x	240/415
	EH/E	500	2P	AC/A/S									x	x	240
			4P	AC/A/S									x	x	240/415

Selection table RCBO's - 6 kA

Page No.	Series	Sensitivity (mA)	Pole	Type	Tripping charact.	Nominal current (A)								Isolator appl.	Add-on devices	Rated voltage			
						4	6	10	13	16	20	25	32				40		
B.14	D/HD																		
	D/HD90	10	1+N	AC/A	B												x	x	240
					C												x	x	240
	D/HD90	30	1+N	AC/A	B												x	x	240
					C												x	x	240
	D/HD90	300	1+N	AC/A	B												x	x	240
					C												x	x	240
B.16	DE																		
	DE90	30	1+N	AC	C												x	x	240
	DE90S	30	1+N	AC	C												x	x	240
B.18	HD																		
	HD62	30	2P		B/C														
	HD63N	30	3P+N		C														

Selection table RCBO's - 10 kA

Page No.	Series	Sensitivity (mA)	Pole	Type	Tripping charact.	Nominal current (A)								Isolator appl.	Add-on devices	Rated voltage			
						4	6	10	13	16	20	25	32				40		
B.14	D/HD																		
	D/HD90S	10	1+N	AC/A	B												x	x	240
					C												x	x	240
	D/HD90S	30	1+N	AC/A	B												x	x	240
					C												x	x	240
	D/HD90S	300	1+N	AC/A	B												x	x	240
					C												x	x	240

Selection table for Add-on RCCB's

Page No.	Series	Sensitivity (mA)	Pole	Type	Nominal current (A)		Rated voltage
					32	63	
B.20							
	HD/D92-94	30	2-3-4	AC/A			240/415
	HD/DS	300	2-3-4	AC/A/S			240/415

Overview technical data RCD's

Series			E/EHFI [DFI]	D/HD90
Standards			IEC 61008-1	IEC 61009-1
Magnetic tripping characteristics			-	B-C
Residual tripping characteristic			AC, A, S, Ai, Si	A, AC
Tripping time at $I_{\Delta n}$	Instantaneous	ms	<40	<40
	Selective	ms	>150	-
Rated current		A	16,25,40,63, 80, 100	4,6,10,13,16,20,25,32,40
Rated residual current $I_{\Delta n}$		mA	10,30,100,300,500	10,30,300
Calibration temperature		°C	30	30
Number of poles versus modules			1	1
Rated voltage U_n	2PAC	V	240	240 (1P+N)
	3P AC	V	-	-
	4P AC	V	415	-
Frequency		Hz	50/60	50/60
Maximum service voltage U_{bmax}		V	2P=265 / 4P=455	255
Minimum service voltage U_{bmin}		V	2P=117 / 4P=205	117
Power supply			Top/Bottom	Top/Bottom
Selectivity class			-	3
Rated making and breaking capacity (Im)		A	500 (or 10xIn)	500
Residual making and breaking capacity ($I_{\Delta m}$)		A	500 (or 10xIn)	6000
Conditional short-circuit capacity (Inc)		A	10000 fuse 100A	-
Conditional residual short-circuit capacity ($I_{\Delta c}$)		A	10000	-
Short-circuit capacity (Icn)		A	-	6000
Grid distance (safety distance between two devices)		mm	35	35
Isolator application			yes	yes
Insulation degree	Insulation voltage	V (DC)	500	500
	Shock voltage (1.2/50ms)	kV	8	6
	Insulation resistance	(mOhm)	1000	1000
	Dielectric strength	V	2500	2500
Shock resistance (in x, y, z direction)(IEC 60077/16.3)			40g, 18 shocks 5 ms	40g, 18 shocks 5 ms
Vibration resistance (in x, y, z direction; IEC 60068-2-6)			1.5g, 30 min, 0...80Hz	1.5g, 30 min, 0...80Hz
Endurance	electrical at U_n , I_n		10000	10000
	mechanical at U_n , I_n		20000	20000
Protection degree (outside/inside electrical enclosure)			IP 20 / IP 40	IP 20 / IP 40
Self extinguish degree (according to UL94)			V2	V2
Tropicalisation (according to IEC 60068-2, DIN 40046)		°C/RH	+55/95%	+55/95%
Pollution degree (acc. IEC 60947-1)			3	3
Operating temperature			AC (-5.. +60); A -25.. +60)	-5..+60
Storage temperature		°C	-25..+70	-25..+70
Terminals capacity	Rigid cable min/max (top)	mm ²	1.5/50 [1.5/35]	1/25
	Flexible cable min*/max (top)	mm ²	1.5/35 [1.5/25]	1/16
	Rigid cable min/max (bottom)	mm ²	1.5/50 [1.5/35]	1/35
	Flexible cable min*/max (bottom)	mm ²	1.5/35 [1.5/25]	1/25
	(*Flexible cable 0.75/1/1.5 mm ² with cable lug)			
Torque	Top/Bottom	Nm	5/5	3/4
Add-on devices (side add-on)	Auxiliary contacts		yes	yes
	Remote release		yes	yes
	Undervoltage trip NUVR		yes	yes
	Remote drive NFA		yes	yes
	Panel board switch NLVS		yes	yes
Busbars systems	Pin		yes	Bottom
	Fork		yes	Bottom
Accessories			yes	yes
Dimensions, weights, packaging	# Poles		2-4	1+N
	(HxDxW) 86x68xW	mm	36/72	36
	Weight/unit	g	2P=250 / 4P=368	250
	Package/unit		2P=1/6 / 4P=1/3	1/6
Approvals			VDE / KEMA	VDE / KEMA
CE-marking			yes	yes
Page			B.8	B.12

D/HD90S	DE90	DE90S	HD62/HD63N	D/HD92-94
IEC 61009-1	IEC 61009-1	IEC 61009-1	IEC EN 61009-1	IEC 61009-1
B-C	C	C	2P=B/C - 4P=C	-
A, AC	AC	AC	A	AC-A-S
<40	<40	<40	< 40	<40
-	-	-	-	>150
4,6,10,13,16,20,25,32,40	6 ...40	6 ...40	2P=6...32 - 4P=10...25	32, 63
10,30,300	30	30, 100	30	30, 300
30	30	30	30	30
1	1	1	2P=1,5 - 4P=1	1
240 (1P+N)	240 (1P+N)	240 (1P+N)	230	240/415
-	-	-	-	400
-	-	-	400	400
50/60	50/60	50/60	50/60	50/60
255	265	265	2P=255 - 4P=440	2P=265 / 4P=455
117	195	195	2P=127 - 4P=180	2P=205 / 4P=205
Top/Bottom	Bottom	Bottom	Top/Bottom	Top
3	3	3	3	3
500	500	10xIn	-	-
7.500	6000	10.000	3000	see MCB
-	-	-	-	-
-	-	-	-	-
10.000	6000	10.000	6000	see MCB
35	-	-	35	35
yes	yes	yes	yes	no
500	500 ⁽¹⁾	500 ⁽¹⁾	500	500
6	6 ⁽¹⁾	6 ⁽¹⁾	6	8
1000	1000 ⁽¹⁾	1000 ⁽¹⁾	1.000	1000
2500	2500 ⁽¹⁾	2500 ⁽¹⁾	2000	2500
40g, 18 shocks 5 ms 1.5g, 30 min, 0...80Hz	40g, 18 shocks 5 ms 2g, 30 min, 0...80Hz	40g, 18 shocks 5 ms 2g, 30 min, 0...80Hz	40g, 18 shocks, 5ms 1,5g, 30min, 0....80Hz	40g, 18 shocks 5 ms 5g, 30 min, 0...80Hz
10000	10000	10000	10000	10000
20000	20000	20000	20000	20000
IP 20 / IP 40	IP20 / IP40	IP20 / IP40	IP20 / IP40	IP 20 / IP 40
V2	V2	V2	V0	V2
+55/95%	+55/95%	+55/95%	+55/95%	+55/95%
3	3	3	2	3
-5...+60	-5...+60	-5...+60	- 25° / + 40°	AC (-5...+60); A(-25...+60)
-25...+70	-25...+70	-25...+70	-25° / + 55°	-25...+70
1/25	1/25	1/25	1/35	1/25
1/16	1/16	1/16	1/25	1/16
1/35	1/35	1/35	1/35	1/35
1/25	1/25	1/25	1/25	1/25
3/4	3	3	3	-/4.5
yes	-	-	-	yes (coupled to MCB)
yes	-	-	-	yes (coupled to MCB)
yes	-	-	-	yes (coupled to MCB)
yes	-	-	-	yes (coupled to MCB)
yes	-	-	-	yes (coupled to MCB)
Bottom	Bottom	Bottom	Bottom	-
Bottom	Bottom	Bottom	Bottom	-
yes	yes	yes	no	yes
-	-	-	-	-
1+N	1+N	1+N	2/3+N	2-3-4
36	18	18	2P= 92 x 54 x 52.5 - 4P= 92 x 68 x 70	72/90/108/125/144
250	350	350	2P=350 - 4P= 480	2P=250 / 3P=320 / 4P=340
1/6	1	1	1	1
VDE / KEMA	KEMA	KEMA	IMQ	KEMA
yes	yes	yes	yes	yes
B.14	B.16	B.16	B.18	B.20

(1) Making sure that N-L and both flying leads are disconnected.

Association of RCCB's**With MCB's - Back-up protection**

		E90N	E90E	E90	E90S	E90X	E880	S90
Series EFI/EHFI 2P 230V	16A	3 kA	4.5 kA	10 kA	20 kA	20 kA	10 kA	25 kA
	25A	3 kA	4.5 kA	10 kA	20 kA	20 kA	10 kA	25 kA
	40A	3 kA	4.5 kA	10 kA	20 kA	20 kA	10 kA	25 kA
	63A	-	-	-	20 kA	20 kA	10 kA	25 kA
	80A	-	-	-	-	-	10 kA	25 kA
	100A	-	-	-	-	-	10 kA	25 kA
Series EFI/EHFI 4P 400V	25A	3 kA	4.5 kA	6 kA	10 kA	10 kA	10 kA	25 kA
	40A	3 kA	4.5 kA	6 kA	10 kA	10 kA	10 kA	25 kA
	63A	-	-	-	10 kA	10 kA	10 kA	25 kA
	80A	-	-	-	-	-	10 kA	25 kA
	100A	-	-	-	-	-	10 kA	25 kA

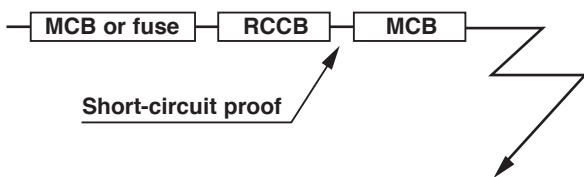
With fuses gL-gG - Back-up protection

		16A	25A	32A	40A	50A	63A	80A	100A
Series EFI/EHFI 2P 230V	16A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	25A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	40A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	63A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	80A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	100A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
Series EFI/EHFI 4P 400V	25A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	40A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	63A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	80A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA
	100A	100 kA	100 kA	80 kA	50 kA	40 kA	25 kA	16 kA	10 kA

The values indicated in the table are the maximum short-circuit current in kA rms
SCPD: Short-Circuit Protective Device (MCB or fuse)

Coordination of RCCB's

		UPSTREAM PROTECTION										
		MCB'S						FUSES				
		E90 ≤ 40A	E90S ≤ 40A	E90S > 40A	E90X ≤ 40A	E90X > 40A	E880 80...125A	S90	Fuse 160A	Fuse 250A	Fuse 400A	Fuse 630A
DOWNSTREAM	E90 ≤ 25A	6 kA	10 kA	10 kA	10 kA	10 kA	-	25 kA	-	-	-	-
	E90S ≤ 25A	-	25 kA	25 kA	25 kA	25 kA	10 kA	25 kA	16 kA	10 kA	10 kA	10 kA
	E90 > 25A	-	25 kA	25 kA	25 kA	25 kA	10 kA	25 kA	10 kA	10 kA	10 kA	10 kA
	Fuse 25A	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA



Power losses

	D90/HD90		EFI/EHFI		Add on D/HD92			
	Z mOhm	W/pole	Z mOhm	W/pole	Z mOhm	W/pole		
4A	125.00	2.00	16A	9.94	2.55	32/30	1.56	1.59
6A	53.00	1.91	25A	3.75	2.33	32/30	1.73	1.77
10A	16.30	1.63	40A	2.15	3.43	32/300	1.54	1.57
16A	9.80	2.51	63A	1.30	5.15	32/300	1.70	1.74
20A	7.10	2.84	80A	1.30	8.30	63/30	0.63	2.52
25A	5.60	3.50	100A	0.87	8.70	63/30	0.71	2.82
32A	4.70	4.81				63/300	0.62	2.46
40A	3.60	5.76				63/300	0.70	2.78