

CÔNG TY CỔ PHẦN THIẾT BỊ ĐIỆN HOÀNG PHƯƠNG

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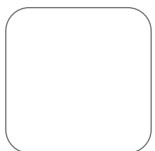
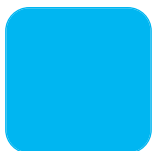
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h₃ MCCBs :

Low voltage protection devices



h3 MCCBs

from 16 to 1600 A

Allow the connection, protection, breaking and switching in the low voltage distribution boards.



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h3 MCCBs and trip-free switches 16 to 1600 A

Easy mounting and safety

The new h3 range of MCCBs provides safe and easy solutions for low voltage electrical circuits protection. The state of the art circuit breakers offers both designers and installers wide range of features and benefits.

Special attention has been given to ergonomics, especially with the integration of these devices in the TP&N and panelboard.



Your benefits:

- Easy to install
- Quick, easy and safety mounting of accessories
- Wide range of rated current ratings and breaking capacities
- Calibrated at 50 Deg centigrade
- Trip-free switches

Technical data :

- Comply with IEC 60947-2
- 6 frame sizes: x160, x250, h250, h630, h1000, h1600
- Breaking capacity: 18, 25, 40, 50, 65, 70 kA
- Thermal magnetic and electronic trip units
- 1 pole to 4 poles
- Current limiting type
- Complete range of accessories
- International certification and approvals

Expert tips

1



Design by Hager
In harmony with Hager enclosures and modular products.

5



Visibility of auxiliaries fitted
Indicates type of auxiliary mounted in breaker.

2



Electronic trip unit (LSI)
Is permitting total selectivity and generator protection.

6



Integrated padlocking facility
Nice solution for maintenance.

3



Breaking capacity
18 to 70kA, Icu 415V AC, covers all applications.

7



Complete range of accessories
Rotary handles, padlocks, motors, terminal covers.

4



Easy mounting of auxiliaries
Easy opening of secondary cover, clip-on type auxiliaries.

8



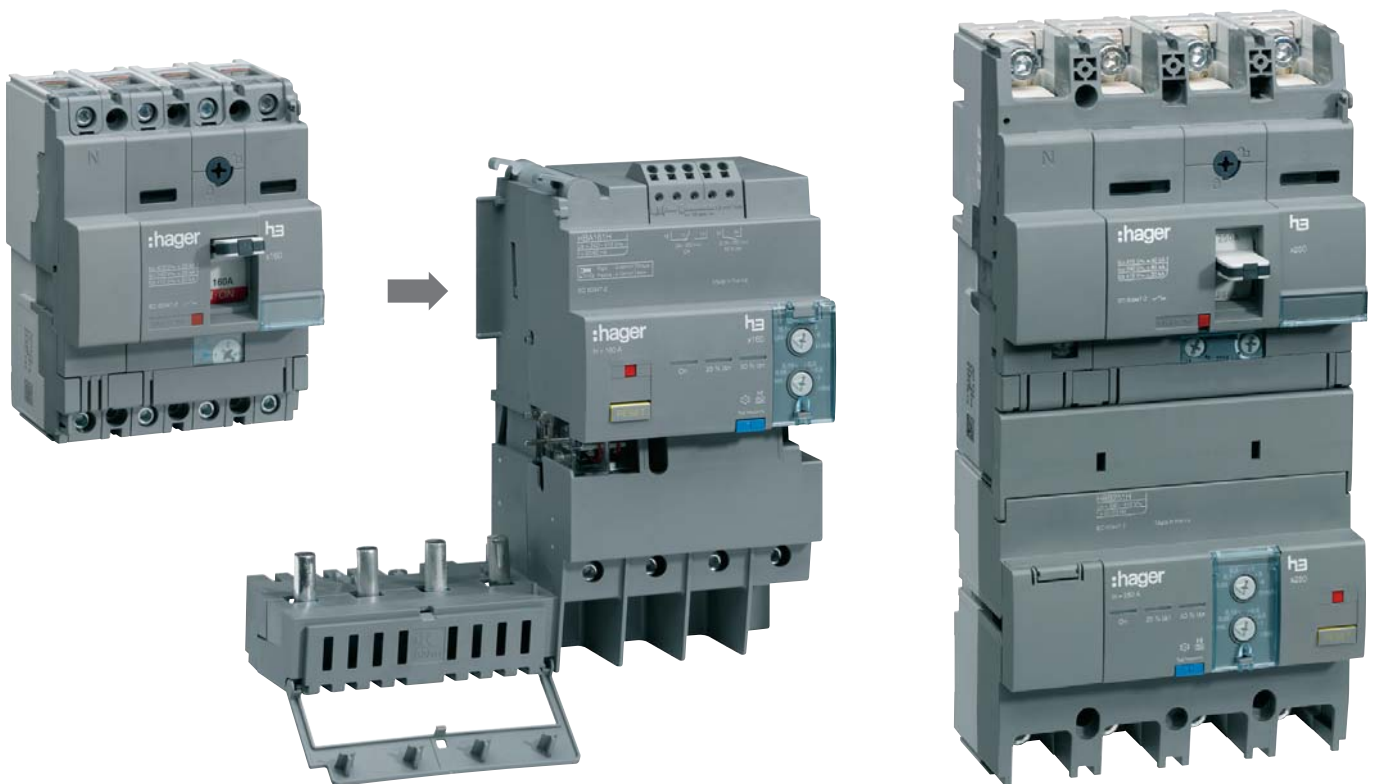
Flexible connection
Collar terminals, front and rear connections, straight connections, spreaders ...

h3 add-on blocks 16 to 1600 A

Easy mounting and safety

Designed to complete the MCCBs and trip-free switches range, the h3 residual current add-on blocks feature:

- performance: high immunity A type for standard versions, adjustable product...
- Safety: default current gradually displayed, class II...
- Ease of use: drawer system, system avoids the omission of terminal tightening, Quick Connect...



Your benefits:

- Easy to install
- Safety to use
- Time saving
- Design matches with modular protection devices

Technical data :

- 3 frame sizes: x160, x250, h630
- Double isolation class II
- Type A reinforced immunity
- Fixed 300mA version for x160
- Sensitivity and time delay settings

Expert tips

1



Drawer system for mounting on x160

Quick and safe to mount, thanks to the system avoiding the terminal tightening omission.

4



High performance

Gradual display of the default current allows preventive action before tripping.

2



Connections

for the information report via Quick Connect terminals: fast and long term quality connections.

5



Safe connection MCCB / add-on block

- Class II: terminal cover avoid direct contacts.

3



A and HI type are standard

High detection performance product:
- detects sinusoidal alternating currents and residual pulsating currents
- is protected against nuisance tripping caused by transient voltages

6



Pre-mounted connection screws

Simplified implementation of the add-on blocks:
- time saving
- avoid part loosening.

Frame	x160				x250			h250 TM			h250 TM+			
Product	Switch	MCCB			Switch	MCCB		MCCB			MCCB			
Reference	HCA	HDA	HHA	HNA	HCB	HHB	HNB	HHG	HNG	HEG	HNH	HEH		
Number of poles	[No.]	3-4	1-2-3-4	1-2-3-4	3-4			3-4			3-4			
Electrical characteristics														
Rated current	In [A]	160			250			250			250			
Current rated range	[A]	125-160	16-125 (1P), 16-160 (2,3,4P)		250	100-250		12,5-250			12,5-250			
Rated service voltage, (AC)	Ue [V]	220-440				220-440			220-690			220-690		
Frequency	f [Hz]	50/60				50/60			50/60			50/60		
Rated insulation voltage	Ui [V]	690				800			800			800		
Rated impulse withstand voltage	Uimp [kV]	8				8			8			8		
Rated ultimate short-circuit breaking capacity, (Icu)														
(AC) 50-60 Hz 220/230 V	Icu [kA]	-	25	35	85	-	35	85	35	85	85	85	100	
(AC) 50-60 Hz 380/415 V	Icu [kA]	-	18	25	40	-	25	40	25	50	65	50	70	
(AC) 50-60 Hz 480/500/525 V	Icu [kA]	-	6	7.5	12.5	-	-	10	10	25	25	30	45	
(AC) 50-60 Hz 660/690 V	Icu [kA]	-	-	-	6	-	-	4	-	7,5	7,5	20	20	
(DC) 250 V - 2 poles in series	Icu [kA]	-	12.5	20	25	-	25	25	25	40	40	40	40	
Rated service short-circuit breaking capacity, (Ics)														
(AC) 50-60 Hz 220/230 V	Ics [kA]	-	25	25	40	-	25	40	27	65	85	85	100	
(AC) 50-60 Hz 380/415 V	Ics [kA]	-	18	20	25	-	20	20	19	25	36	50	70	
(AC) 50-60 Hz 480/500/525 V	Ics [kA]	-	3	4	7.5	-	-	7.5	7.5	25	25	30	45	
(AC) 50-60 Hz 660/690 V	Ics [kA]	-	-	-	3	-	-	2	-	7.5	7.5	15	15	
(DC) 250 V - 2 poles in series	Ics [kA]	-	7	10	13	-	13	13	19	40	40	40	40	
Rated short-circuit making capacity	Icm [kA]	2,8	-	-	-	6	-	-	-	-	-	-	-	
Rated short-time withstand current for 1s	Icw [kA]	2	-	-	-	3	-	-	-	-	-	-	-	
Category of use (EN 60947-2)		-	A			-	A		A			A		
Calibration temperature		-	50°C			-	50°C		50°C			50°C		
Derating 40°C		-	100%			-	100%		100%			100%		
	50°C	-	100%			-	100%		100%			100%		
	55°C	-	95%			-	94%		94%			94%		
	60°C	-	93%			-	91%		91%			91%		
	65°C	-	90%			-	88%		88%			88%		
Suitability for isolation		ok				ok			ok			ok		
Electric endurance in number of cycles		10000				10000			10000			10000		
Mechanical endurance in number of operations		20000				20000			30000			30000		
Operating temperature		-25 to +70°C				-25 to +70°C			-25 to +70°C			-25 to +70°C		
Storage temperature		-35 to +70°C				-35 to +70°C			-35 to +70°C			-35 to +70°C		
Power loss (at In for 3P)	[W]	39				60			65			68		
Reference standard		IEC 60947-3 IEC 60947-2				IEC 60947-3		IEC 60947-2		IEC 60947-2			IEC 60947-2	
Releases: switch		ok				ok			-			-		
Releases: TM (thermomagnetic)		ok				ok			ok			ok		
T fixed, M fixed		ok				ok			-			-		
T adjustable, M fixed		ok				-			-			-		
T adjustable, M adjustable		-				ok			ok			ok		
Thermal adjustment value		0,63 to 1 x In				-			0,63 to 1 x In		0,63 to 1 x In			
Magnetic adjustment value		-				-			6-8-10-13 x In (200A) 5-7-9-11 In (250A)		6-8-10-13 x In			
Releases: LSI (electronic)		-				-			-			-		
Long delay		-				-			-			-		
Short delay		-				-			-			-		
Time delay		-				-			-			-		
Terminations														
Standard terminal type		lugs				lugs			lugs			lugs		
Maximum terminal capacity		95 mm ²				185 mm ² (cage)			120 mm ² (cage)			120 mm ² (cage)		
Terminal width	mm	17.2				25			25			25		
Terminal shields		ok				ok			ok			ok		
Cage terminal		Z version				ok			ok			ok		
Extended connections		ok				ok			ok			ok		
Rear connections		no				ok			ok			ok		
Dimensions														
Height	mm	130				165			165			165		
Width	1P mm	-	25	-	-									
	2P mm	-	50	-	-									
	3P mm	75				105			105			105		
	4P mm	100				140			140			140		
Depth	mm	68				68			68			97		
Weight	1P kg	-	0,29	-	-									
	2P kg	-	0,48	-	-									
	3P kg	0,715				1,3			1,5			2,4		
	4P kg	0,95				1,6			1,9			3,2		

h250 LSI		h400 TM			h630 LSI			h800 TM		h1000 LSI			h1600 LSI		
MCCB		MCCB			Switch	MCCB		MCCB		Switch	MCCB		Switch	MCCB	
HNC	HEC	HHD	HND	HKD	HCD	HND	HED	HNK	HEK	HCE	HNE	HEE	HCF	HNF	HEF
3-4		3-4			3-4			3-4		3-4			3-4		
250		400			630			800		1000			1600		
40-125-250		250-400			400-630	250-400-630		630-800		630-800-1000			1250-1600		
220-690		220-690			220-690			220-690		220-690			220-690		
50/60		50/60			50/60			50/60		50/60			50/60		
800		800			800			800		800			800		
8		8			8			8		8			8		
85	100	35	85	100	-	85	100	85	100	-	85 (800A) 75 (1000A)	100	-	100	100
50	70	25	50	70	-	50	70	50	70	-	50	70	-	50	70
25	45	10	30		-	30	30	30	30	-	30	30	-	45	65
7,5	20	7,5	20		-	20	20	20	20	-	20	20	-	25	45
-	-	25	40		-			50	50	-	-	-	-	-	-
85	100	35	85		-	85	85	85	75	-	85 (800A) 75 (1000A)	100 (800A) 75 (1000A)	-	75	75
25	70	25	50	50	-	50	50	50	50	-	50	50	-	50	50
25	45	10	30		-	30	30	30	30	-	30	30	-	45	50
7,5	15	7,5	15		-	15	15	20	20	-	20	20	-	25	34
-	-	25	40		-			50	50	-	-	-	-	-	-
-	-	-	-		9	-	-	-	-	20	-	-	45	-	-
-	-	-	-		5 (0,3s)	-	-	-	-	10 (0,3s)	-	-	20 (0,3s)	-	-
A		A			-	B(250-400A) - A(630A)		A		-	B(800A) - A(1000A)		-	B	
40/50°C		50°C			-	40/50°C		40°C		-	40/50°C		-	40/50°C	
100%		100%			-	100%		100%		-	100%		-	100%	
95%		100%			-	95%		100%		-	95%		-	95%	
90%		95%			-	90%		95%		-	90%		-	90%	
80%		92%			-	80%		92%		-	80%		-	80%	
80%		89%			-	80%		89%		-	80%		-	80%	
ok		ok			ok			ok		ok			ok		
10000		4500			4500			4500		4500			4500		
30000		15000			15000			15000		15000			15000		
-25 to +70°C		-25 to +70°C			-25 to +70°C			-25 to +70°C		-25 to +70°C			-25 to +70°C		
-35 to +70°C		-35 to +70°C			-35 to +70°C			-35 to +70°C		-35 to +70°C			-35 to +70°C		
75		75			150			150		150			170		
IEC 60947-2		IEC 60947-2			IEC 60947-3	IEC 60947-2		IEC 60947-2		IEC 60947-3	IEC 60947-2		IEC 60947-3	IEC 60947-2	
-		ok			ok	-		ok		ok	-		ok	-	
-		ok			-			ok		-			-		
-		-			-			-		-			-		
-		-			-			-		-			-		
-		ok			-			ok		-			-		
-		0,63 to 1 x In			-			0,63 to 1 x In		-			-		
-		6-8-10-12 x In			-			5 to 10 x In		-			-		
-		-			-	ok		-		-	ok		-	ok	
0,4 to 1 x Ir		-			-	0,4 to 1 x Ir		-		-	0,4 to 1 x Ir		-	0,4 to 1 x Ir	
2,5 to 10 x Ir		-			-	2,5 to 10 x Ir (250-400A) 2,5 to 8 x Ir (630A)		-		-	2,5 to 10 x Ir (800A) 2,5 to 8 x Ir (1000A)		-	2,5 to 10 x Ir	
0,1 - 0,2s		-			-	0,1 - 0,2s		-		-	0,1 - 0,2s		-	0,1 - 0,2s	
lugs		lugs			lugs			lugs		lugs			lugs		
120 mm ² (cage)		240 mm ² (cage)			-			-		-			-		
25		30			30			45		45			45		
ok		ok			ok			ok		ok			ok		
ok		ok			-			-		-			-		
ok		ok			integrated			integrated		integrated			integrated		
ok		ok			ok			ok		ok			ok		
165		260			260			273/433		273/433			370/570		
-		-			-			-		-			-		
-		-			-			-		-			-		
105		140			140			210		210			210		
140		185			185			280		280			280		
97		97			97			99,5		99,5			140		
-		-			-			-		-			-		
-		-			-			-		-			-		
2,5		4,2			4,3			8,5		11			27		
3,3		5,6			5,7			11,5		14,8			31		

Product Frame	Add-on blocks h3				
	x160	x160	x250	h630	
Number of poles	3, 4	3, 4	4	4	
Tripping access	mechanical	mechanical	mechanical	mechanical	
Standards CEI/EN 60947-2 appendix B	ok	ok	ok	ok	
Electrical characteristics					
Max rated current (40°) In A	In	125A	125 - 160A	160 - 250A	400A - 500A
Rated service voltage Ue V AC (50/60Hz)	Ue	240-415V	240-415V	240-415V	240-415V
Mechanical characteristics					
Top and bottom supply		ok	ok	ok	ok
For tripping, no additional external electrical sources		ok	ok	ok	ok
Possible operating with 2 active phases		ok	ok	ok	ok
Settings					
Sensitivity IΔn	IΔn (A)	300mA	0.03, 0.1, 0.3, 1, 3, 6A	0.03, 0.1, 0.3, 1, 3, 6A	0.03, 0.1, 0.3, 1, 3, 6A
Time delay Δt	Δt (s)	inst.	inst., 0.06, 0.15, 0.3, 0.5, 1	inst., 0.06, 0.15, 0.3, 0.5, 1	inst., 0.06, 0.15, 0.3, 0.5, 1
Max. opening time	ms	10	10	10	10
Delay add-on block is not possible if IΔn = 30mA		/	ok	ok	ok
Selective product		no	ok	ok	ok
Mechanical test button		ok	ok	ok	ok
Isolating test without cable removal		ok	ok	ok	ok
Electrical test button		ok	ok	ok	ok
Reset button		ok	ok	ok	ok
Sealable setting button		no	ok	ok	ok
Isolation level signaling by led 25 and 50%		no	ok	ok	ok
In running signalisation by led		no	ok	ok	ok
Residual default signaling contact		ok	ok	ok	ok
Signaling contact 50% IΔn		no	ok	ok	ok
Anti-transient	type AC	ok	ok	ok	ok
Pulsating current	type A	ok	ok	ok	ok
High immunity	type HI	yes	yes	yes	yes
-25°C		ok	ok	ok	ok
Accessories and connection					
Steel terminal cage (x3/x4)		ok (included)	ok (included)	accessories	accessories
Connection by lugs		no	no	ok	ok
Extended connections (x4)		ok	ok	ok	ok
Spreaders (x4)		ok	ok	ok	ok
Terminal covers (3P/4P)		no	no	ok	ok
Interphase barriers (x3)		ok	ok	ok	ok
Rigid cables connection capacity mm ²		4 - 95	4 - 95	35-185	35-240
Flexible cables connection capacity mm ² (with terminal)		4 - 70	4 - 70	35-150	35-185
Tightening torque Nm		6	6	12	22
Copper bar (width) in mm		no	no	25	30
Mounting					
Clips on DIN rail		ok	ok	no	no
Fixed on mounting plate		no	no	ok	ok
Fixation type		side	side	bottom	bottom
Mounting by customer		ok	ok	ok	ok
Dimensions and weight					
Dimensions (LxHxD) in mm	L	100	100	140	184
Side mounted 4P	H	165	165	107,5	133
	D	95	95	85	110
Weight	3P	1,4	1,4	/	/
	4P	1,55	1,55	1,2	2,4

	Pole	Trip unit	Serie In A	HDx 18kA	HHx 25kA	HNx 40kA	HNx 30kA - 50kA	HEx 65kA* - 70kA			
x160	1P	TM fix/fix	16	HDA014Z	HHA014Z						
			20	HDA018Z	HHA018Z						
			25	HDA023Z	HHA023Z						
			32	HDA030Z	HHA030Z						
			40	HDA038Z	HHA038Z						
			50	HDA048Z	HHA048Z						
			63	HDA061Z	HHA061Z						
			80	HDA078Z	HHA078Z						
			100	HDA098Z	HHA098Z						
			125	HDA123Z	HHA123Z						
			2P	TM fix/fix	16	HDA015Z	HHA015Z				
					20	HDA019Z	HHA019Z				
	25	HDA024Z			HHA024Z						
	32	HDA031Z			HHA031Z						
	40	HDA039Z			HHA039Z						
	50	HDA049Z			HHA049Z						
	63	HDA062Z			HHA062Z						
	80	HDA079Z			HHA079Z						
	100	HDA099Z			HHA099Z						
	125	HDA124Z			HHA124Z						
	160	HDA159Z			HHA159Z						
	3P	TM fix/fix			16	HDA016Z	HHA016Z	HNA016Z			
			20	HDA020Z	HHA020Z	HNA020Z					
			25	HDA025Z	HHA025Z	HNA025Z					
			32	HDA032Z	HHA032Z	HNA032Z					
			40	HDA040Z	HHA040Z	HNA040Z					
			50	HDA050Z	HHA050Z	HNA050Z					
			63	HDA063Z	HHA063Z	HNA063Z					
			80	HDA080Z	HHA080Z	HNA080Z					
			100	HDA100Z	HHA100Z	HNA100Z					
			125	HDA125Z	HHA125Z	HNA125Z					
			160	HDA160Z	HHA160Z	HNA160Z					
			TM adj/fix	16-20-25	HDA025Z	HHA025U	HNA025U				
		25-32-40		HDA040Z	HHA040U	HNA040U					
		40-50-63		HDA063Z	HHA063U	HNA063U					
		50-63-80		HDA080Z	HHA080U	HNA080U					
		63-80-100		HDA100Z	HHA100U	HNA100U					
		80-100-125		HDA125Z	HHA125U	HNA125U					
		100-125-160		HDA160Z	HHA160U	HNA160U					
		4P 100%		TM fix/fix	16	HDA017Z	HHA017Z	HNA017Z			
					20	HDA021Z	HHA021Z	HNA021Z			
					25	HDA026Z	HHA026Z	HNA026Z			
					32	HDA033Z	HHA033Z	HNA033Z			
					40	HDA041Z	HHA041Z	HNA041Z			
			50		HDA051Z	HHA051Z	HNA051Z				
	63		HDA064Z		HHA064Z	HNA064Z					
	80		HDA081Z		HHA081Z	HNA081Z					
	100		HDA101Z		HHA101P	HNA101Z					
	125		HDA126Z		HHA126P	HNA126Z					
	160		HDA161Z		HHA161P	HNA161Z					
	TM adj/fix		16-20-25		HDA026U	HHA026U	HNA026U				
		25-32-40	HDA041U	HHA041U	HNA041U						
		40-50-63	HDA064U	HHA064U	HNA064U						
		50-63-80	HDA081U	HHA081U	HNA081U						
		63-80-100	HDA101U	HHA101U	HNA101U						
		80-100-125	HDA126U	HHA126U	HNA126U						
		100-125-160	HDA161U	HHA161U	HNA161U						
		x250	3P	TM fix/fix	100		HHB100Z	HNB100Z			
					125		HHB125Z	HNB125Z			
					160		HHB160Z	HNB160Z			
					200		HHB200Z	HNB200Z			
					250		HHB250Z	HNB250Z			
	TM adj/adj			63-80-100			HNB100U				
				80-100-125			HNB125U				
				100-125-160			HNB160U				
				125-160-200			HNB200U				
				160-200-250			HNB250U				
				4P 0% - 4P 100%	TM fix/fix	100		HHB101Z	HNB101Z		
						125		HHB126Z	HNB126Z		
	160					HHB161Z	HNB161Z				
	200					HHB201Z	HNB201Z				
	250					HHB251Z	HNB251Z				
	TM adj/adj		63-80-100				HNB101U				
			80-100-125				HNB126U				
			100-125-160				HNB161U				
			125-160-200				HNB201U				
			160-200-250				HNB251U				

--	Pole	Trip unit	Serie	HDx	HHx	HNx	HNx	HEx	HKx		
			In A	18kA	25kA	40kA	30kA - 50kA	65kA* - 70kA	65kA* - 70kA		
h250	3P	TM adj/adj	12,5-16-20		HHG020U		HNG020U				
			20-25-32		HHG032U		HNG032U				
			32-40-50		HHG050U				HEG050U*		
			40-50-63		HHG063U		HNG063U		HEG063U*		
			63-80-100		HHG100U		HNG100U		HEG100U*		
			80-100-125		HHG125U		HNG125U		HEG125U*		
			100-125-160		HHG160U		HNG160U		HEG160U*		
			125-160-200		HHG200U		HNG200U		HEG200U*		
			160-200-250		HHG250U		HNG250U		HEG250U*		
		TM+ adj/adj	12,5-16-20					HNH020U		HEH020U	
			20-25-32					HNH032U		HEH032U	
			32-40-50					HNH050U		HEH050U	
			40-50-63					HNH063U		HEH063U	
			63-80-100					HNH100U		HEH100U	
			80-100-125					HNH125U		HEH125U	
			100-125-160					HNH160U		HEH160U	
			125-160-200								
			160-200-250					HNH250U		HEH250U	
	LSI	16-40					HNC040H		HEC040H		
		50-125					HNC125H		HEC125H		
		100-250					HNC250H		HEC250H		
	4P	TM adj/adj	12,5-16-20				HNG021U				
			20-25-32				HNG033U				
			32-40-50				HNG051U		HEG051U		
			40-50-63				HNG064U		HEG064U		
			63-80-100				HNG101U		HEG101U		
			80-100-125				HNG126U		HEG126U		
			100-125-160				HNG161U		HEG161U		
			125-160-200				HNG201U		HEG201U		
			160-200-250				HNG251U		HEG251U		
		TM+ adj/adj	12,5-16-20					HNH021U		HEH021U	
			20-25-32					HNH033U		HEH033U	
			32-40-50					HNH051U		HEH051U	
			40-50-63					HNH064U		HEH064U	
			63-80-100					HNH101U		HEH101U	
			80-100-125					HNH126U		HEH126U	
100-125-160							HNH161U		HEH161U		
125-160-200											
160-200-250							HNH251U		HEH251U		
4P 0 - 50 - 100%	LSI	16-40				HNC041H		HEC041U			
		50-125				HNC126H		HEC126H			
		100-250				HNC251H		HEC251H			
h400 - h630	3P	TM adj/adj	160-200-250		HHD250U		HND250U		HKD250U		
			250-320-400		HHD400U		HND400U		HKD400U		
			160-400								
		LSI	250-630					HND630U			
			100-250					HND250H		HED250H	
			160-400					HND400H			
	4P	TM adj/adj	400-630						HED400H		
			250-630					HND630H		HED630H	
			160-200-250					HND251U		HKD251U	
		LSI	250-320-400					HND401U		HKD401U	
			100-250					HND251H		HED251H	
			160-400					HND401H		HED401H	
h1000	3P	TM	630				HNK630U		HEK630U		
			800				HNK800U		HEK800U		
			630				HNE630U		HEE630H		
		LSI	800				HNE800H		HEE800H		
			1000				HNE970H		HEE970H		
			630				HNK631U		HEK631U		
	4P	TM	800				HNK801U		HEK801U		
			630				HNE631U				
			800				HNE801H		HEE801H		
		LSI	1000				HNE971H		HEE971H		
			1250				HNF980H		HEF980H		
			1600				HNF990H		HEF990H		
h1600	4P 0% - 50% - 100%	LSI	1250				HNF981H		HEF981H		
			1600				HNF991H		HEF991H		
			1250								

Serie				x160	x250	h630	h1000	h1600		
Product	Version	Poles	In A							
Trip-free switches	3 poles	125		HCA125Z						
		160		HCA160Z						
		4 poles	125		HCA126Z					
			160		HCA161Z					
		3 poles	250			HCB250Z				
			4 poles	250			HCB251Z			
	3 poles	400					HCD400H			
		630					HCD630H			
		4 poles	400					HCD401H		
			630					HCD631U		
	3 poles	800						HCE800H		
		1000						HCE970H		
	4 poles	800						HCE801U		
		1000						HCE971U		
	3 poles	1250							HCF980U	
		1600							HCF990H	
		4 poles	1250							HCF981U
			1600							HCF991U
Add-on blocks	Side mounted	3 poles	125 fixed		HBA127H					
			125 adjustable		HBA125H					
			160 adjustable		HBA160H					
		4 poles	125 fixed		HBA128H					
			125 adjustable		HBA126H					
			160 adjustable		HBA161H					
	Bottom mounted	4 poles	160 adjustable			HBB161H				
			250 adjustable			HBB251H				
			400 adjustable					HBD401H		
			500 adjustable					HBD631H		

Switches and accessories for h3 references guide

Products	Version	pole	In A / Ue V	Switches and accessories						
				x160	x250	h250	h400-h630	h1000	h1600	
Auxiliaries	Shunt trip release	3/4P	24V DC	HXA001H		HXC001H			HXF001H	
			48V DC	HXA002H		HXC002H			HXF002H	
			110V DC	-		HXC008H			HXF008H	
			100-120V AC	HXA003H		HXC003H			HXF003H	
			200-240V AC	HXA004H		HXC004H			HXF004H	
			380-450V AC	HXA005H		HXC005H			HXF005H	
	Undervoltage release	3/4P	24V DC	HXA011H			HXC011H		HXE011H	
			100-120V DC	-			HXC018H		HXE018H	
			200-240V DC	-			HXC019H		HXE019H	
			100-120V AC	HXA013H			HXC013H		HXE013H	
			200-240V AC	HXA014H			HXC014H		HXE014H	
			380-450V AC	HXA015H			HXC015H		HXE015H	
	Delayed undervoltage release	3/4P	24V DC	HXA051H			HXC051H	HXD051H	HXE051H	HXF051H
		3/4P	110-120V AC	HXA053H			HXC053H	HXD053H	HXE053H	HXF053H
		3/4P	220-240V AC	HXA054H			HXC054H	HXD054H	HXE054H	HXF054H
		3/4P	380-415V AC	HXA055H			HXC055H	HXD055H	HXE055H	HXF055H
	Auxiliary contact	3/4P	1NO+1NC	HXA021H			HXC021H			
	Alarm contact	3/4P	1NO+1NC	HXA024H			HXC024H			
	Auxiliary contact - low level	3/4P	1NO+1NC	HXA025H			HXC025H			
	Alarm contact - low level	3/4P	1NO+1NC	HXA026H			HXC026H			
	Direct rotary handle				HXA030H	HXB030H	HXC030H	HXD030H	HXE030H	HXF030H
	Extended rotary handle				HXA031H	HXB031H	HXC031H	HXD031H	HXE031H	HXF031H
	Padlock				HXA039H	HXA039H	HXC039H	HXD039H		HXF039H
					HXA037H*					
	Motor operator	3/4P	24-48V DC	-		HXB040H	HXC040H	HXD040H	HXE040H	HXF040H
			200-240V AC	-		HXB042H	HXC042H	HXD042H	HXE042H	HXF042H
	Interlocking wire type (kit)	3/4P				HXB065H	HXC065H	HXD065H	HXE065H	-
	Interlocking wire type (unit)					HXB066H	HXC066H	HXD066H	HXE066H	-
	Cable for interlock wire 1 m					HXB070H				-
Cable for interlock wire 1,5 m					HXB071H				-	
Electrical interlock for motor type A	3/4P				HXB068H		HXD068H		-	
Electrical interlock for motor type B	3/4P				HXB069H (between HXB04xH or HXC04xH and HXD04xH or HXE04xH.)				-	

* for HxAxxxP references - standard version handle

Products	Version	pole	In A / Ue V	Switches and accessories						
				x160	x250	h250	h400-h630	h1000	h1600	
Connections	Collar terminal - copper	3P	-	-	-	HYC003H	HYD003H (250-400A)	-	-	
		4P	-	-	-	HYC004H	HYD004H (250-400A)	-	-	
	Collar terminal - aluminium / copper 185 mm ²	3P	-	-	HYB001H	-	-	-	-	
		4P	-	-	HYB002H	-	-	-	-	
	Collar terminal - aluminium / copper 240 mm ²	3P	-	-	HYB005H	-	-	HYD005H	-	-
		4P	-	-	HYB006H	-	-	HYD006H	-	-
	Collar terminal multiple - aluminium / copper 240 mm ²	3P	-	-	-	-	-	HYD007H	HYE007H (to 800)	-
		4P	-	-	-	-	-	HYD008H	HYE008H (to 800)	-
	Extended straight connection	3/4P	-	-	HYA010H	HYB010H	HYC010H	HYD010H (250-400A) HYD013H (630A integrated)	included	included
	Extended spreader connection	3P	-	-	HYA011H	HYB011H	HYC011H	HYD011H (250-400A) HYD014H (630A)	-	-
		4P	-	-	HYA012H	HYB012H	-	HYD012H (250-400A) HYD015H (630A)	-	-
	Interphase barrier	3/4P	short	-	HYA019H	-	-	-	-	-
			long	-	HYB019H	-	included / HYC019 (LSI/TM+) HYB019 (TM)	included / HYD019H	-	-
	Terminal cover for extended straight connections	3P	-	-	HYA021H	HYB021H	HYC021H (LSI / TM+) HYG021H (TM)	HYD021H	HYE021H	-
		4P	-	-	HYA022H	HYB022H	HYC022H (LSI / TM+) HYG022H (TM)	HYD022H	HYE022H	-
	Terminal cover large for spreader connection	3P	-	-	HYA023H	HYB023H	-	HYD023H	-	-
		4P	-	-	HYA024H	HYB024H	-	HYD024H	-	-
	Terminal cover short for rear connections	3P	-	-	HYA025H	HYB025H	HYC025H (LSI / TM+)	HYD025H	HYE025H	-
		4P	-	-	HYA026H	HYB026H	HYC026H (LSI / TM+)	HYD026H	HYE026H	-
	Terminal cover for collar terminal	3P	-	-	HYA027H	HYB027H	HYC027H	HYD027H	-	-
		4P	-	-	HYA028H	HYB028H	HYC028H	HYD028H	-	-
	Rear connections	3P	-	-	HYA031H (16-50A) HYA131H (63-160A) for S version and P version	HYB031H	HYC031H (LSI / TM+) HYG031H (TM)	HYD031H (250-400A) HYD033H (630A)	HYE031H (630-800A) HYE033H (1000A)	-
		4P	-	-	HYA032H (16-50A) HYA132H (63-160A) for S version and P version	HYB032H	HYC032H (LSI / TM+) HYG032H (TM)	HYD032H (250-400A) HYD034H (630A)	HYE032H (630-800A) HYE034H (1000A)	-
	DIN rail adaptor	3/4P	-	-	HYA033H	-	-	-	-	-
	Connecting kit (0,75mm ²)	3/4P	-	-	HYA035H	-	-	-	-	-
	Rail Din raiser	3/4P	-	-	HYA036H	-	-	-	-	-
	OCR sealing cover	-	-	-	-	-	HYC041H (LSI) HYG041H (TM)	-	-	-
	Compact lugs 16mm ² D:8,5	3/4P	-	-	HYA086H	-	-	-	-	-
	Compact lugs 25mm ² D:8,5	3/4P	-	-	HYA087H	-	-	-	-	-
	Compact lugs 35mm ² D:8,5	3/4P	-	-	HYA088H	-	-	-	-	-
	Compact lugs 50mm ² D:8,5	3/4P	-	-	HYA089H	-	-	-	-	-
	Compact lugs 70mm ² D:8,5	3/4P	-	-	HYA090H	-	-	-	-	-
	Compact lugs 95mm ² D:8,5	3/4P	-	-	HYA091H	-	-	-	-	-
	Compact lugs 120mm ² D:8,5	3/4P	-	-	-	HYB092H	-	-	-	-
	Compact lugs 120mm ² D:10	3/4P	-	-	-	-	-	HYD093H	-	-
	Compact lugs 150mm ² D:8,5	3/4P	-	-	-	HYB094H	-	-	-	-
Compact lugs 150mm ² D:10,5	3/4P	-	-	-	-	-	HYD095H	-	-	
Compact lugs 185mm ² D:10,5	3/4P	-	-	-	-	-	HYD096H	-	-	
Compact lugs 185mm ² D:12,8	3/4P	-	-	-	-	-	HYD097H*	-	-	
Compact lugs 240mm ² D:12,8	3/4P	-	-	-	-	-	HYD098H*	-	-	

* with spreaders

Moulded case circuit breakers x160

Thermal magnetic trip unit, 2 versions:
 - Z version: fixed thermal and fixed magnetic, collar terminal
 - S version: adjustable thermal and fixed magnetic, cable lug terminal
 - P version: fixed thermal and fixed magnetic, cable lug terminal

1P, 2P, 3P and 4P
 Mechanical test button, lockable settings,
 integrated padlocking handle Ø 4mm (S version),
 needs accessory for DIN rail mounting.

Connection capacity
 95 mm² rigid cables
 70 mm² flexible cables

Comply with IEC 60 947-2.

Trip-free switches

Allows tripping at distance using a voltmeterical trip unit (optional)
 AC 22/23A.

Comply with IEC 60 947-3.



HDA125Z

Designation	In	Cat. ref.				
		1P	2P	3P	4P	
MCCBs x160 18kA breaking capacity Ics : 18 kA (400/415 V AC) fixed thermal 1x In fixed magnetic > 10 x In	16A	HDA014Z	HDA015Z	HDA016Z	HDA017Z	
	20A	HDA018Z	HDA019Z	HDA020Z	HDA021Z	
	25A	HDA023Z	HDA024Z	HDA025Z	HDA026Z	
	32A	HDA030Z	HDA031Z	HDA032Z	HDA033Z	
	40A	HDA038Z	HDA039Z	HDA040Z	HDA041Z	
	50A	HDA048Z	HDA049Z	HDA050Z	HDA051Z	
	63A	HDA061Z	HDA062Z	HDA063Z	HDA064Z	
	80A	HDA078Z	HDA079Z	HDA080Z	HDA081Z	
	100A	HDA098Z	HDA099Z	HDA100Z	HDA101Z	
	125A	HDA123Z	HDA124Z	HDA125Z	HDA126Z	
	160A	-	HDA159Z	HDA160Z	HDA161Z	
	adjustable thermal 0,63 - 0,8 - 1 x In fixed magnetic > 10 x In	25A	-	-	HDA025U	HDA026U
		40A	-	-	HDA040U	HDA041U
		63A	-	-	HDA063U	HDA064U
		80A	-	-	HDA080U	HDA081U
		100A	-	-	HDA100U	HDA101U
125A		-	-	HDA125U	HDA126U	



HDA161U

MCCBs x160 25kA breaking capacity Ics : 20 kA (400/415 V AC) fixed thermal 1x In fixed magnetic > 10 x In	16A	HHA014Z	HHA015Z	HHA016Z	HHA017Z	
	20A	HHA018Z	HHA019Z	HHA020Z	HHA021Z	
	25A	HHA023Z	HHA024Z	HHA025Z	HHA026Z	
	32A	HHA030Z	HHA031Z	HHA032Z	HHA033Z	
	40A	HHA038Z	HHA039Z	HHA040Z	HHA041Z	
	50A	HHA048Z	HHA049Z	HHA050Z	HHA051Z	
	63A	HHA061Z	HHA062Z	HHA063Z	HHA064Z	
	80A	HHA078Z	HHA079Z	HHA080Z	HHA081Z	
	100A	HHA098Z	HHA099Z	HHA100Z	HHA101Z	
	125A	HHA123Z	HHA124Z	HHA125Z	HHA126Z	
	160A	-	HHA159Z	HHA160Z	HHA161Z	
	adjustable thermal 0,63 - 0,8 - 1 x In fixed magnetic > 10 x In	25A	-	-	HHA025U	HHA026U
		40A	-	-	HHA040U	HHA041U
		63A	-	-	HHA063U	HHA064U
		80A	-	-	HHA080U	HHA081U
		100A	-	-	HHA100U	HHA101U
125A		-	-	HHA125U	HHA126U	



HNA125P

Designation	In	Cat. ref.				
		1P	2P	3P	4P	
MCCBs x160 40kA breaking capacity Ics : 25 kA (400/415 V AC)	16A	-	-	HNA016Z	HNA017Z	
	20A	-	-	HNA020Z	HNA021Z	
	25A	-	-	HNA025Z	HNA026Z	
	32A	-	-	HNA032Z	HNA033Z	
	40A	-	-	HNA040Z	HNA041Z	
	fixed thermal	50A	-	-	HNA050Z	HNA051Z
	1 x In	63A	-	-	HNA063Z	HNA064Z
	fixed magnetic	80A	-	-	HNA080Z	HNA081Z
	> 10 x In	100A	-	-	HNA100Z	HNA101Z
		125A	-	-	HNA125Z	HNA126Z
		160A	-	-	HNA160Z	HNA161Z
	adjustable thermal 0,63 - 0,8 - 1 x In fixed magnetic > 10 x In	25A	-	-	HNA025U	HNA026U
		40A	-	-	HNA040U	HNA041U
		63A	-	-	HNA063U	HNA064U
		80A	-	-	HNA080U	HNA081U
		100A	-	-	HNA100U	HNA101U
125A		-	-	HNA125U	HNA126U	
	160A	-	-	HNA160U	HNA161U	

Trip-free switches x160 suitable for AC22A / AC 23A	125A	-	-	HCA125U	HCA126U
	160A	-	-	HCA160U	HCA161U

Ue: 415 V AC
Icw (1s): 2 kA



HBA161H

Add-on blocks	I Δ n 300 mA fixed sensitivity instantaneous tripping	125A	HBA127H	HBA128H
	sensitivity I Δ n adjustable: 0,03 - 0,1 - 0,3 - 1 - 3 - 6A adjustable tripping: - instantaneous - time delay: 0,06 - 0,15 - 0,3 - 0,5 - 1s	125A 160A	HBA125H HBA160H	HBA126H HBA161H

Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB is "open" or "close".
- 1 changeover alarm contact: indicates MCCB tripping.

Coil connection

Connection capacity:
0,75 mm² flexible or rigid cables
Optional connection cables.
The cable capacity of the terminals is 0,5 to 1,25 mm².

Shunt trip

Remotes tripping of MCCBs or trip-free switches.
Operating voltage: 0,7 to 1,1 x Un

Under voltage release

Allows the tripping of MCCBs or trip-free switches when voltage level drop between 35 and 70% of Un. Pick up voltage 0,85 x Un

Direct rotary handle

- padlockable
- equipped with front cover and handle
- fixing without any additional screw.

Extended rotary handle

- IP 55
- supplied complete with shaft and handle.

Designation	Characteristics	Cat. ref.	
Auxiliary contacts AX AL	1 changeover contact (ON/OFF) 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXA021H	
	1 changeover alarm contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXA024H	
	Low level contact (ON/OFF) 125 V AC 1 NO + 1 NC	HXA025H	
	Low level alarm contact 125 V AC 1 NO + 1 NC	HXA026H	
	Shunt trips SH	24 V DC 48 V DC 100 - 120 V AC 200 - 240 V AC 380 - 450 V AC	HXA001H HXA002H HXA003H HXA004H HXA005H
Undervoltage releases UV	24 V DC 100 - 120 V AC 200 - 240 V AC 380 - 450 V AC	HXA011H HXA013H HXA014H HXA015H	
	Delayed undervoltage releases DUVR	24 V DC 110 - 120 V AC 220 - 240 V AC 380 - 415 V AC	HXA051H HXA053H HXA054H HXA055H



HXA021H

HXA024H



HXA014H



HXA030H



HXA031H



HYA013H



HYA 015H



HYA021H



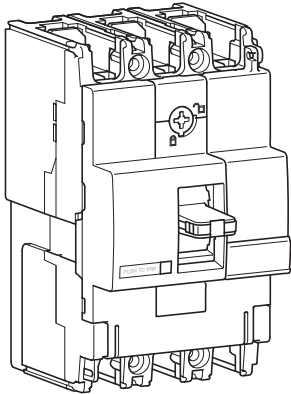
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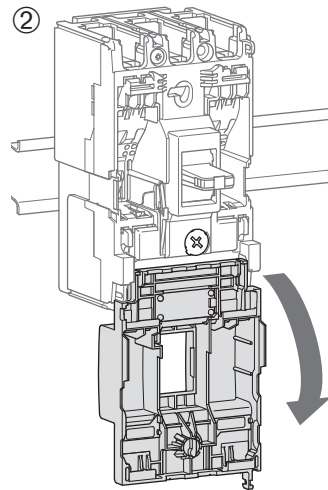
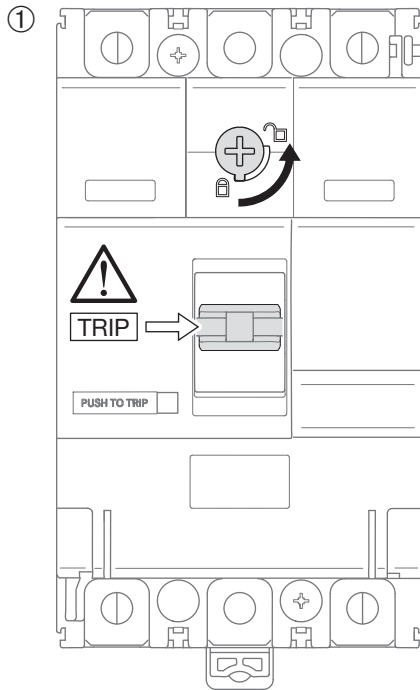
Designation	Characteristics	Cat. ref.	
		3P	4P
Direct rotary handle	padlockable handle max Ø 6 mm	HXA030H	HXA030H
Extended rotary handle	padlockable handle max Ø 8 mm	HXA031H	HXA031H
Padlock	for padlock integrated handle to mount on MCCB for handle locking for 3 padlock max Ø 8 mm	HXA039H	HXA039H
Extended connections	set of 4 straight connections	HYA013H	HYA013H
	set of 3 or 4 spreader connections	HYA014H	HYA015H
Interphase barriers	set of 3, height: 50 mm	HYA019H	HYA019H
	set of 3, height: 97 mm	HYB019H	HYB019H
Terminal covers	for extended straight connections	HYA021H	HYA022H
	for extended spreader connections	HYA023H	HYA024H
	for collar terminal	HYA027H	HYA028H
Din rail adaptor		HYA033H	HYA033H
Rear connections	16 to 50A	HYA031H	HYA032H
	63 to 160A	HYA131H	HYA132H
Connecting kit	0,75 mm ² set of 3 x 2 wires length: 1,30m	HYA035H	HYA035H
Rail Din raiser		HYA036H	HYA036H
Designation	Characteristics	Cat. ref.	
Ring lugs	compact lugs 16 mm ² Ø8,5	HYA086H	
	compact lugs 25 mm ² Ø8,5	HYA087H	
	compact lugs 35 mm ² Ø8,5	HYA088H	
	compact lugs 50 mm ² Ø8,5	HYA089H	
	compact lugs 70 mm ² Ø8,5	HYA090H	
	compact lugs 95 mm ² Ø8,5	HYA091H	

MCCBs

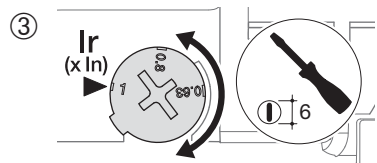


		220/240V AC IEC 60 947-2	380/415V AC IEC 60 947-2
HDA	l _{cu}	25 kA	18 kA
	l _{cs}	25 kA	18 kA
HHA	l _{cu}	35 kA	25 kA
	l _{cs}	25 kA	20 kA
HNA	l _{cu}	85 kA	40 kA
	l _{cs}	30 kA	25 kA
HCA	l _{cm}	-	2,8 kA
	l _{cw}	-	2 kA - 1s

Magnetic and thermal settings



For DIN rail mounting, use HYA033H.

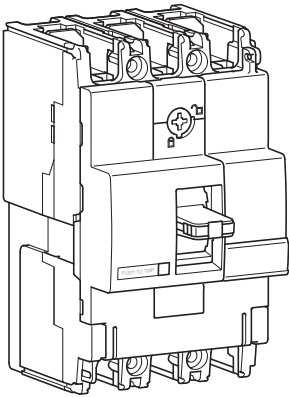


Thermal adjustment from 0,63 to 1 x I_n

Magnetic adjustment fixed > 10 x I_n

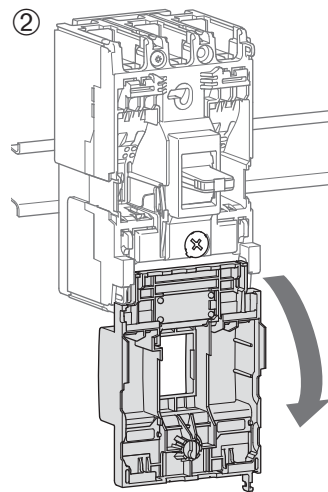
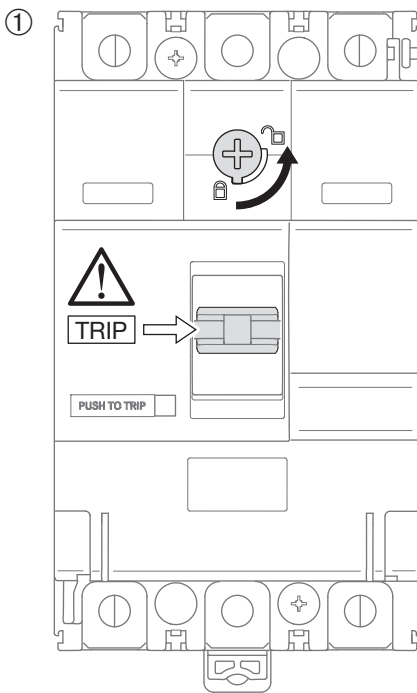
I_n	15 - 50 A	63 - 80 A	100 - 125 A	160 A
I_{mag}	600 A	1000 A	1500 A	1600 A

MCCBs

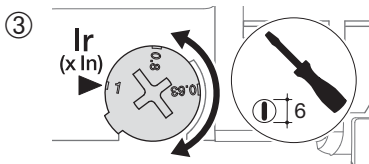


		220/240V AC IEC 60 947-2	380/415V AC IEC 60 947-2
HDA	Icu	25 kA	18 kA
	Ics	25 kA	18 kA
HHA	Icu	35 kA	25 kA
	Ics	25 kA	20 kA
HNA	Icu	85 kA	40 kA
	Ics	30 kA	25 kA
HCA	Icm	-	2,8 kA
	Icw	-	2 kA - 1s

Magnetic and thermal settings



For DIN rail mounting, use HYA033H.



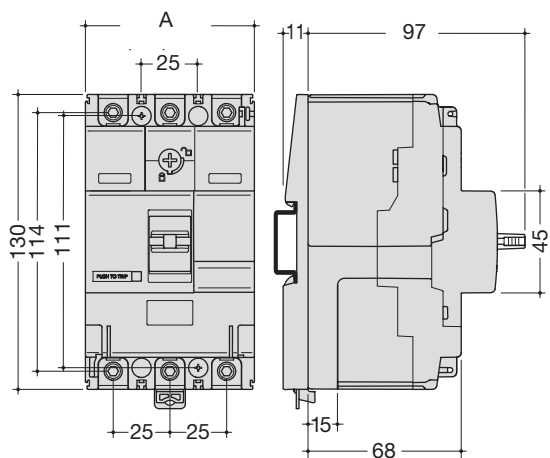
Thermal adjustment from 0,63 to 1 x In

Magnetic adjustment fixed > 10 x In

In	15 - 50 A	63 - 80 A	100 - 125 A	160 A
Imag	600 A	1000 A	1500 A	1600 A

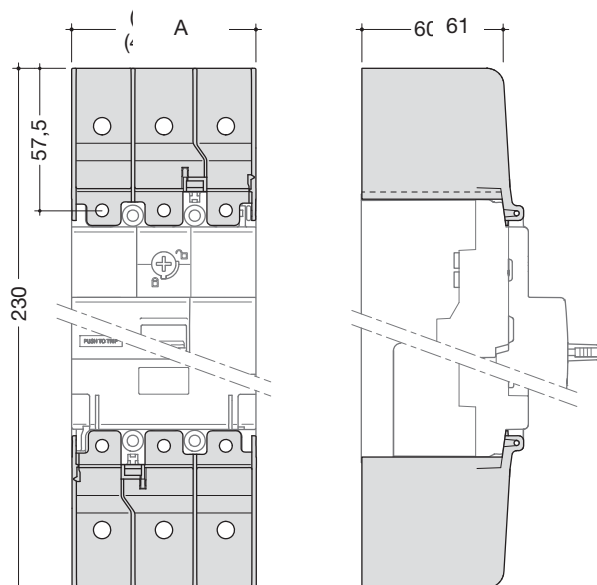
Dimensions

MCCB x160



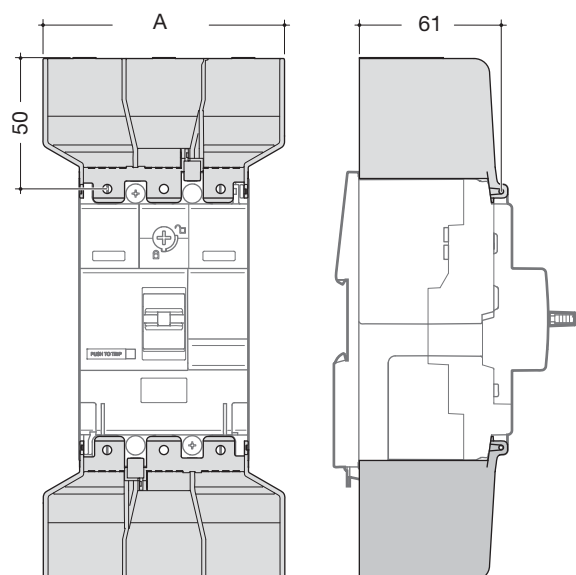
	A (mm)
1P	24,8
2P	49,5
3P	74,5
4P	99,5

Terminal covers for extended straight connections



	A (mm)
1P	24,4
2P	49,5
3P	74,5
4P	99,5

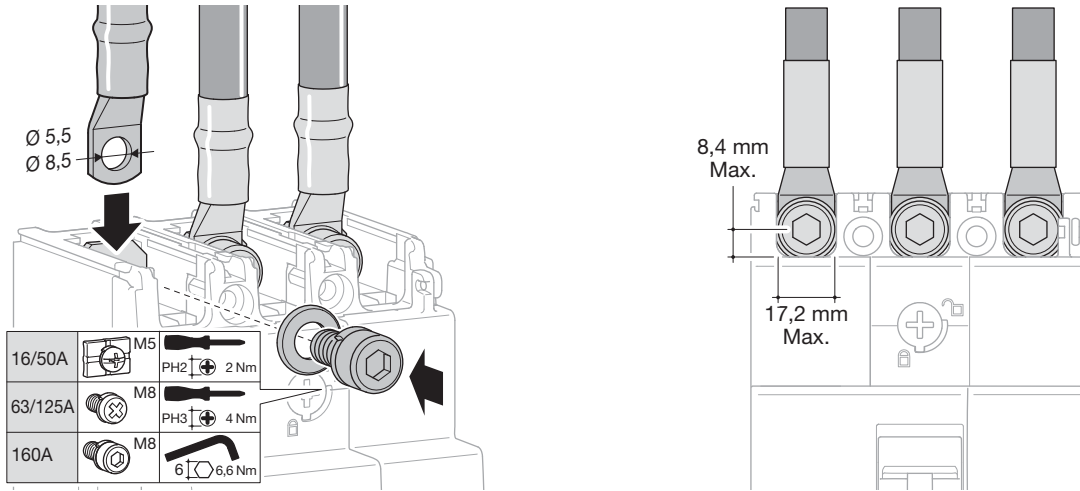
Terminal cover for extended spreader connections



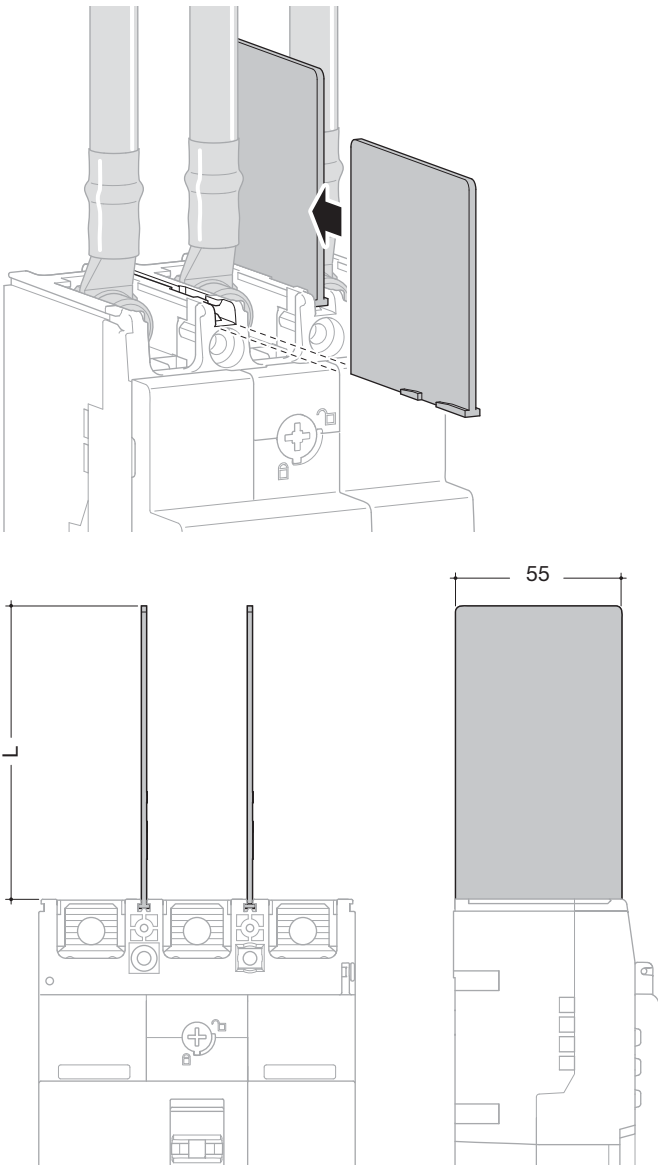
	A (mm)
3P	106,5
4P	141,5

Connection

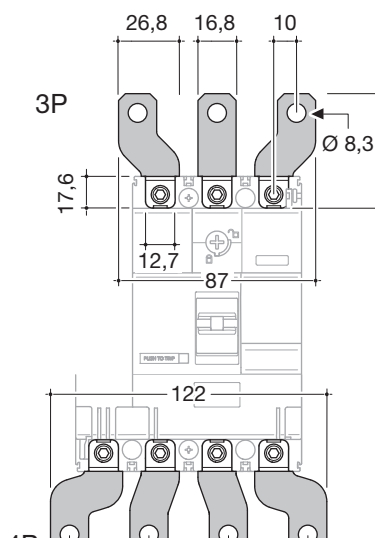
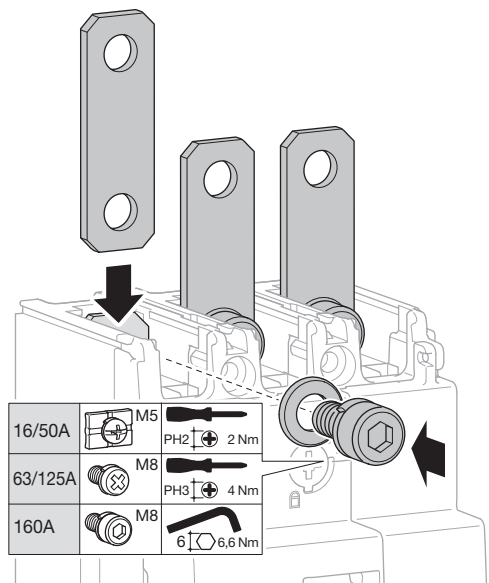
Connection with cable lugs



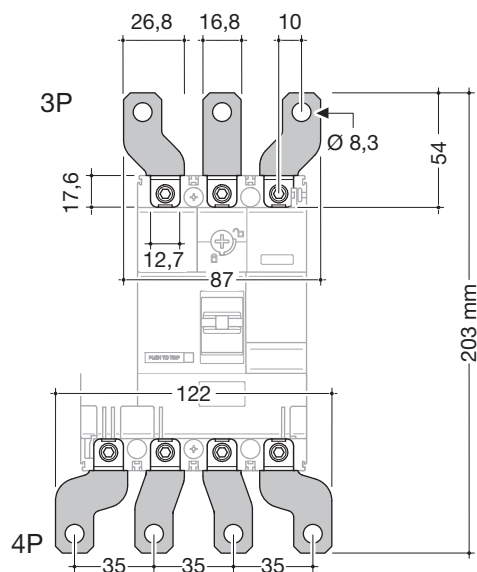
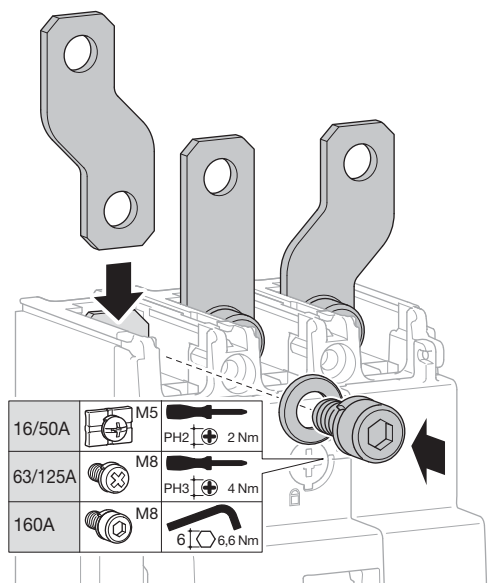
Interphase barriers



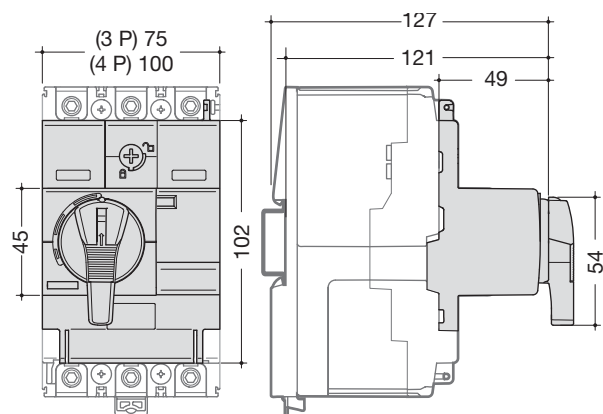
Extended straight connections



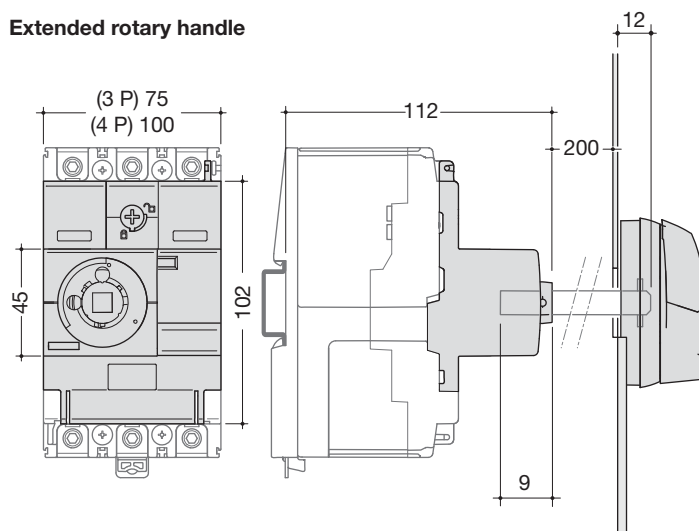
Extended spreader connections



Direct rotary handle

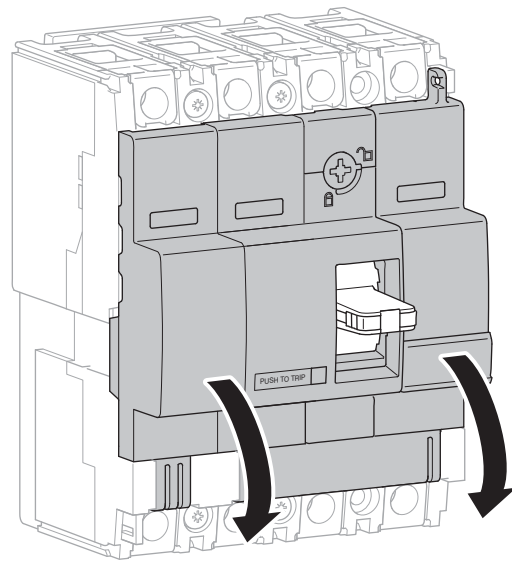
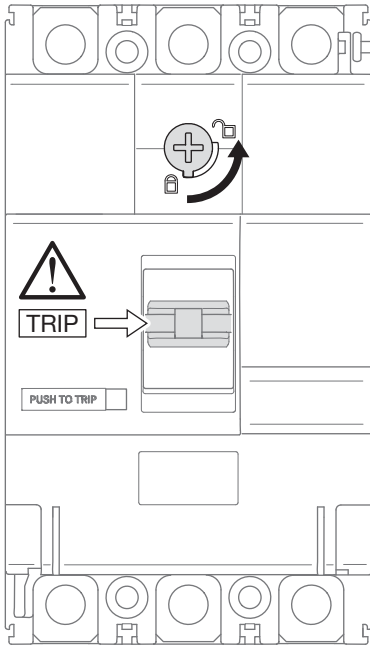


Extended rotary handle



Auxiliaries

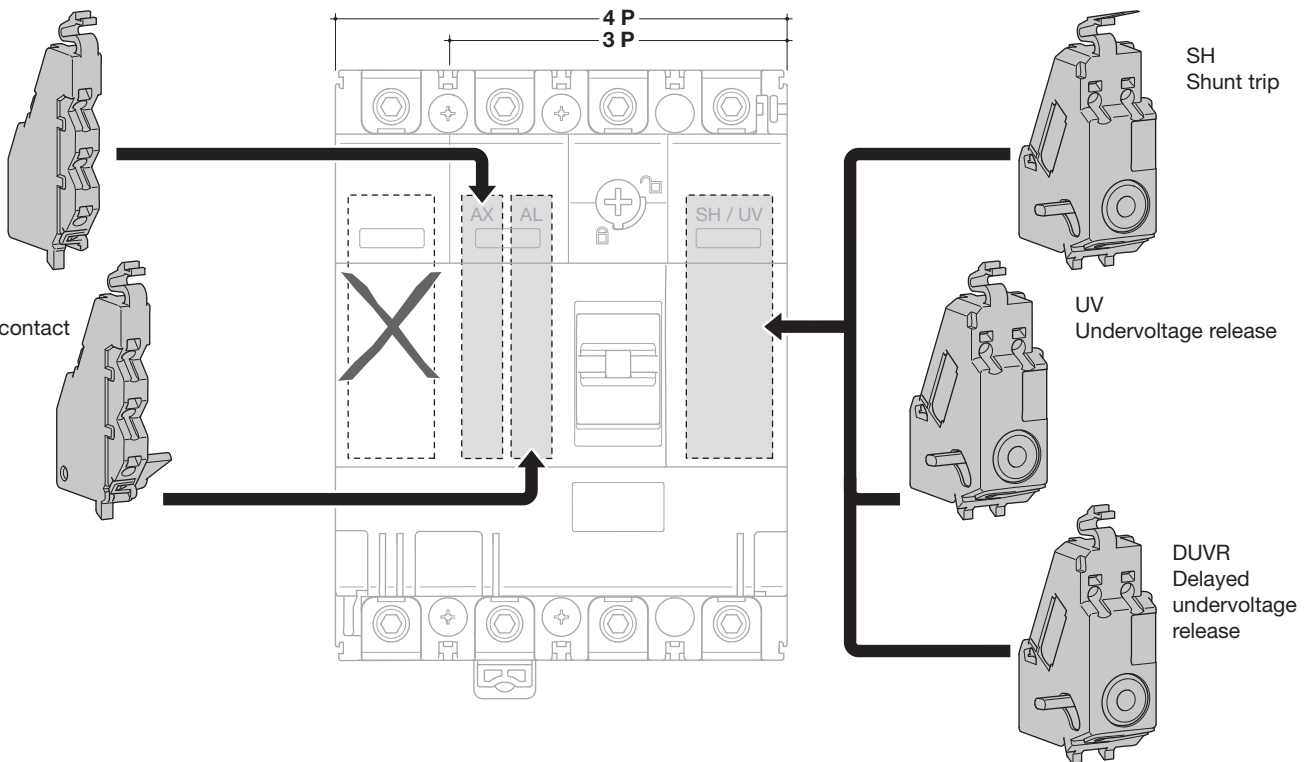
Auxiliaries for MCCBs and trip-free switches

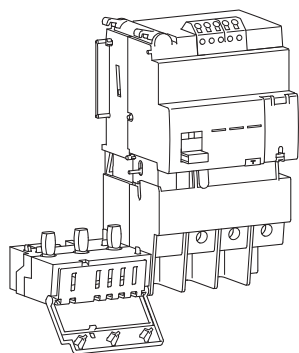


Mounting combination for auxiliaries and releases

AX
Auxiliary contact

AL
Alarm contact





When associated with MCCB, the add-on block provides an earth fault protection and protects against electrical shocks by direct or indirect contacts.

The add-on blocks are protected against nuisance tripping caused by transient voltages. It's able to detect sinusoidal alternating currents and residual pulsating direct currents (A type). It also avoids miss tripping (HI type - High Immunity).

Characteristics

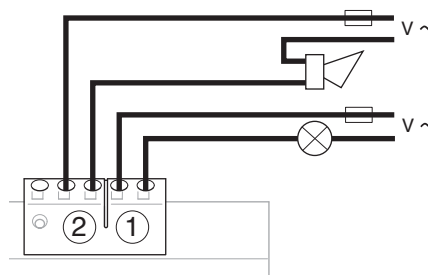
Reset button :
Signals add-on block tripping and must be acknowledged before switching on the installation.

Test button for differential functioning :
Allows to check the electrical operating of the MCCB / Add-on block association.

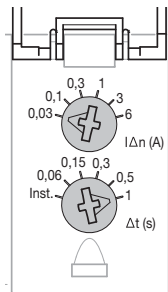
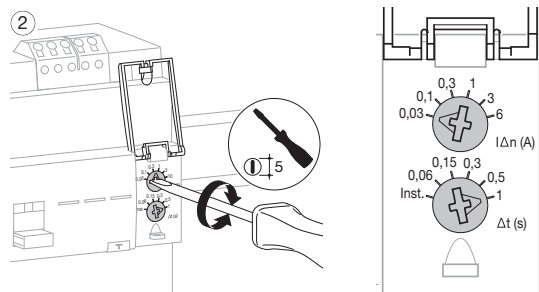
Mechanical test button :
Allows to check the mechanical operating of the MCCB / Add-on block association.

LED signaling default current level in the installation:
25% (orange) and 50% (red) I_n ; green light to signal correct operating.

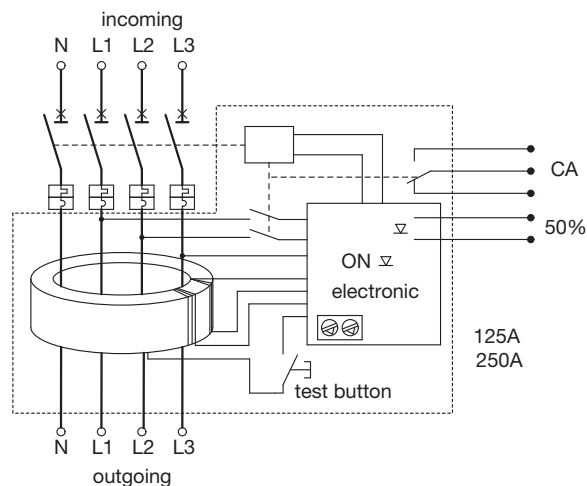
Remote tripping and advanced warning (50% I_n) signaling thanks to these contacts:



Earth leakage current ($I_{\Delta n}$) and delay (Δt) setting

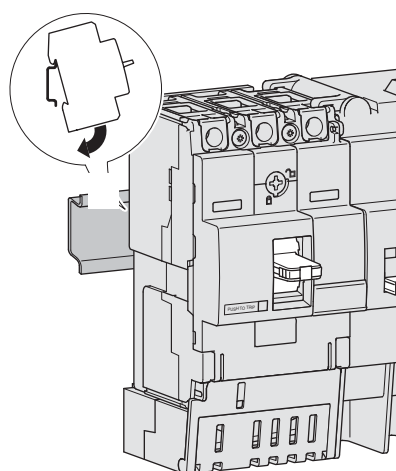
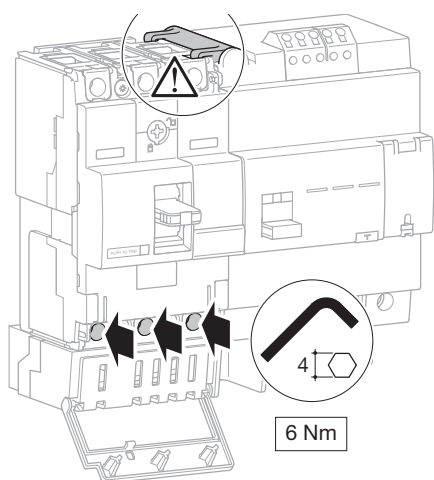
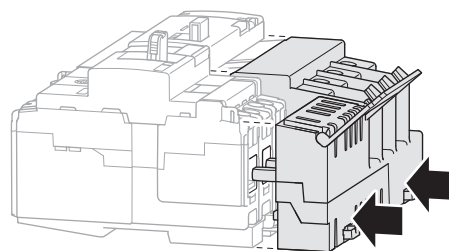
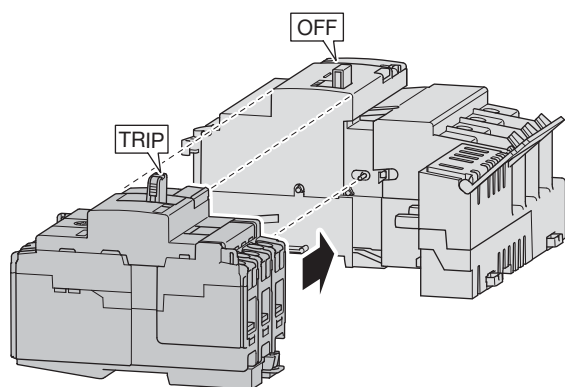


Add-on block operating



S (t)	A (I n)						
	0,03	0,1	0,3	1	3	6	
Inst.	OK	OK	OK	OK	OK	OK	
0,06	no	OK	OK	OK	OK	OK	
0,15	no	OK	OK	OK	OK	OK	
0,3	no	OK	OK	OK	OK	OK	
0,5	no	OK	OK	OK	OK	OK	
1	no	OK	OK	OK	OK	OK	

Add-on block mounting

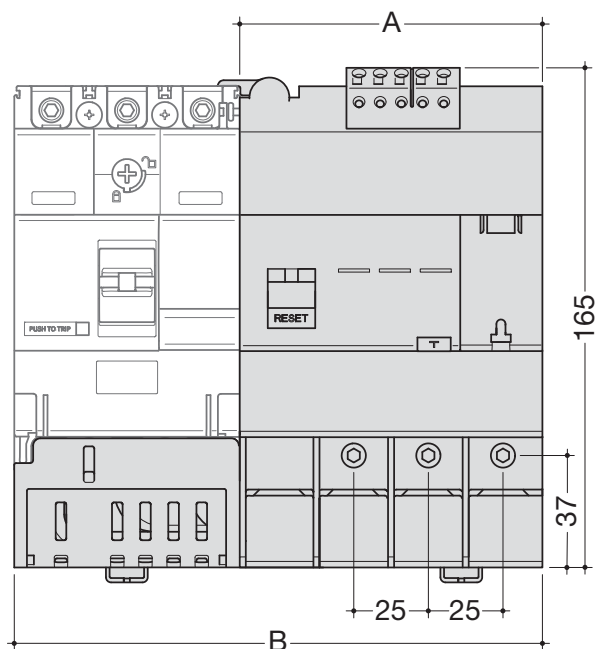


Exclusive drawer assembly system allows quick mounting and makes MCCB and add-on block association a complete monoblock unit.

Reinforced insulation connexion (class II)

System avoids the omission of terminal tightening

Dimensions



	3P	4P
A (mm)	100	100
B (mm)	174,5	199,5

Moulded case circuit breakers x250,

2 versions of trip unit:
 - Z version: fixed thermal and magnetic
 - U version: adjustable thermal and magnetic

3P and 4P
 Mechanical test button, lockable settings, integrated padlocking handle Ø 4mm.
 Comply with IEC 60 947-2.

Connection:
 Directly on copper cable terminal,

with end lug max. width: 25 mm
 Connection capacity: 185 mm² rigid cables

Comply with IEC 60 947-2.
 Collar terminals

Trip-free switches

Allows tripping at distance using a voltmeterical trip unit (optional)
 Complies with IEC 60 947-3
 AC 22/23A

Add-on blocks for x250 devices

These devices are intended to be fixed at the bottom of the devices.

Type A and HI for fault component dc pulsating current and the products with "reinforced immunity".
 Adjustable sensitivity and tripping.
 Test button for differential functioning check.
 Mechanical test button LED or at distance signal for tripping or advance warning (25 - 50% IΔn).

Comply with IEC 60 947-2 annexe B

Designation	Designation	In	Cat. ref.	
			3P	4P

MCCBs x250 25kA

breaking capacity Icu : 25 kA (400/415 V AC) Ics: 20kA	100A	HHB100Z	HHB101Z
	125A	HHB125Z	HHB126Z
	160A	HHB160Z	HHB161Z
	200A	HHB200Z	HHB201Z
	250A	HHB250Z	HHB251Z
fixed thermal 1 x In fixed magnetic ≥10 x In			



HNB250Z

MCCBs x250 40kA

breaking capacity Icu : 40 kA (400/415 V AC) Ics: 20 kA	100A	HNB100Z	HNB101Z
	125A	HNB125Z	HNB126Z
	160A	HNB160Z	HNB161Z
	200A	HNB200Z	HNB201Z
	250A	HNB250Z	HNB251Z
fixed thermal 1 x In fixed magnetic ≥10 x In			
adjustable thermal 0,63 - 0,8 - 1 x In adjustable magnetic 6 - 8 - 10 - 13 x In (100 - 200A) 5 - 7 - 9 - 11 x In (250A)	100A	HNB100U	HNB101U
	125A	HNB125U	HNB126U
	160A	HNB160U	HNB161U
3P, 3 trip units 4P, neutral setting: 0 or 100%	200A	HNB200U	HNB201U
	250A	HNB250U	HNB251U



HNB100U

Trip-free switches x250

capacity suitable for AC 22/23A	250A	HCB250Z	HCB251Z
Icw (1s): 3 kA			

Add-on blocks

adjustable sensitivity IΔn: 0,03 - 0,1 - 0,3 - 1 - 3 - 6A	160A	-	HBB161H
	250A	-	HBB251H
adjustable tripping: - instantaneous - time delay: 0,06 - 0,15 - 0,3 - 0,5 - 1 sec			



HBB251H

Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB is "open" or "closed".
- 1 changeover alarm contact: indicates MCCB tripping.

Coil connection

Connection capacity:
0,75 mm² flexible or rigid cables
Optional connection cables.
The cable capacity of the terminals is 0,5 to 1,25 mm².

Shunt trip

Remotes tripping of MCCBs or trip-free switches.
Operating voltage: 0,7 to 1,1 x Un

Under voltage release

Allows the tripping of MCCBs or trip-free switches when voltage level drop between 35 and 70% of Un. Pick up voltage 0,85 x Un

Direct rotary handle

- padlockable
- equipped with front cover and handle
- fixing without any additional screw.

Extended rotary handle

- IP 55
- supplied complete with shaft and handle.



HXA021H

HXA024H



HXA014H



HXB042H

	Characteristics	Cat. ref.
Auxiliary contacts AX AL	1 changeover contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXA021H
	1 changeover alarm contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXA024H
	low level contact (ON/OFF) 125 V AC 1 NO + 1 NC	HXA025H
	low level alarm contact 125 V AC 1 NO + 1 NC	HXA026H
Shunt trips SH	24 V DC	HXA001H
	48 V DC	HXA002H
	100 - 120 V AC	HXA003H
	200 - 240 V AC	HXA004H
	380 - 450 V AC	HXA005H
Undervoltage releases UV	24 V DC	HXA011H
	100 - 120 V AC	HXA013H
	200 - 240 V AC	HXA014H
	380 - 450 V AC	HXA015H
Delayed undervoltage releases DUVR	24 V DC	HXA051H
	110 - 120 V AC	HXA053H
	200 - 240 V AC	HXA054H
	380 - 415 V AC	HXA055H
Direct rotary handles	padlockable handle max Ø 6 mm	HXB030H
Extended rotary handles	padlockable handle max Ø 8 mm	HXB031H
Padlocks	to mount on MCCBs for handle locking for 3 padlocks max Ø 8 mm	HXA039H
Motor operators	24 V DC	HXB040H
	230 - 240V AC	HXB042H
Electrical interlock	for motor type A (between 2 250A)	HXB068H
	for motor type B (between 250A and other sizes)	HXB069H



HYB010H



HYB002H



HYB012H



HYB022H



HYB024H

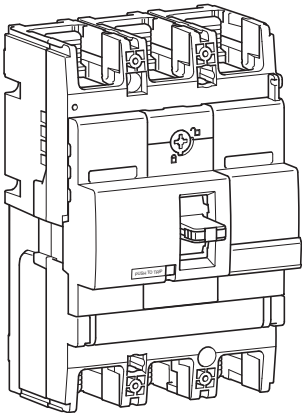


HYB031H

Designation	Characteristics	Cat. ref.	
		3P	4P
Interlocking kit	wire type set of 2 pieces and cable	HXB065H	HXB065H
Interlocking unit	wire type	HXB066H	HXB066H
Interlocking mechanical cable	1 m	HXB070H	HXB070H
	1,5 m	HXB071H	HXB071H
Collar terminals	aluminium / copper conductors 150 mm ² rigid cables 120 mm ² flexible cables	HYB001H	HYB002H
Collar terminals 240 mm²	aluminium / copper conductors	HYB005H	HYB006H
Extended connections	set of 4 pieces for straight connections	HYB010H	HYB010H
	spreader connections	HYB011H	HYB012H
Interphase barriers	set of 3, height: 97 mm	HYB019H	HYB019H
Terminal covers	for extended straight connections	HYB021H	HYB022H
	for extended spreader connections	HYB023H	HYB024H
	for rear connections	HYB025H	HYB026H
	for collar terminals	HYB027H	HYB028H
Rear connections	set of 3 or 4 pieces	HYB031H	HYB032H
Connecting kit	0,75 mm ² set of 3 x 2 wires length: 1,30m	HYA035H	HYA035H

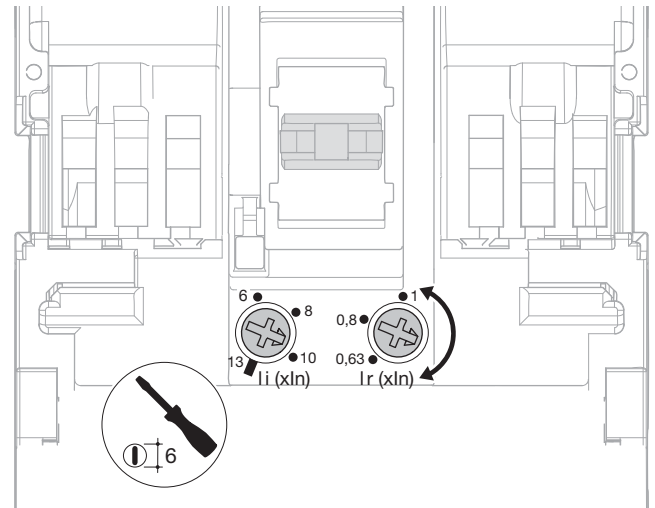
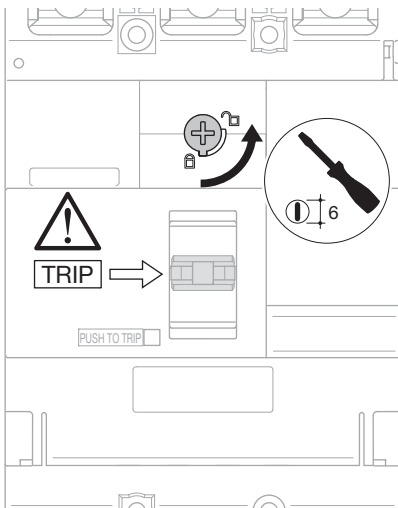
Designation	Characteristics	Cat. ref.
Ring lugs	compact lugs 35 mm ² Ø8,5	HYA088H
	compact lugs 50 mm ² Ø8,5	HYA089H
	compact lugs 70 mm ² Ø8,5	HYA090H
	compact lugs 95 mm ² Ø8,5	HYA091H
	compact lugs 120 mm ² Ø8,5	HYB092H
	compact lugs 150 mm ² Ø8,5	HYB094H

MCCBs



		220/240V AC IEC 60 947-2	380/415V AC IEC 60 947-2
HHB	Icu	35 kA	25 kA
	Ics	25 kA	20 kA
HNB	Icu	85 kA	40 kA
	Ics	40 kA	20 kA
HCB	Icm	-	9 kA
	Icw	-	3 kA - 1s

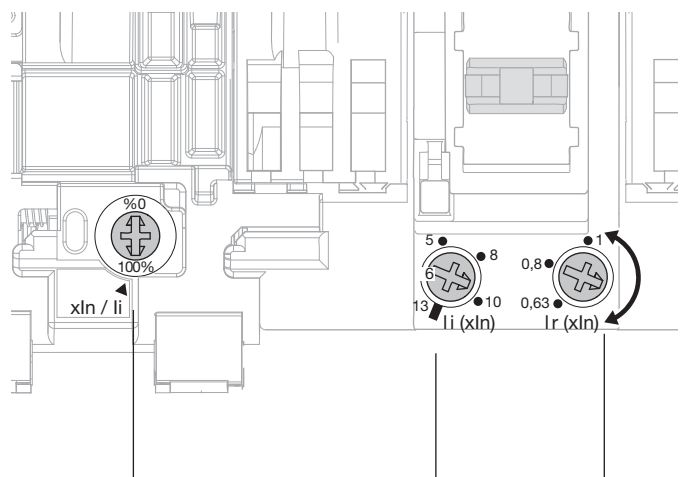
Magnetic and thermal settings



Thermal adjustment from 0,63 to 1 x In

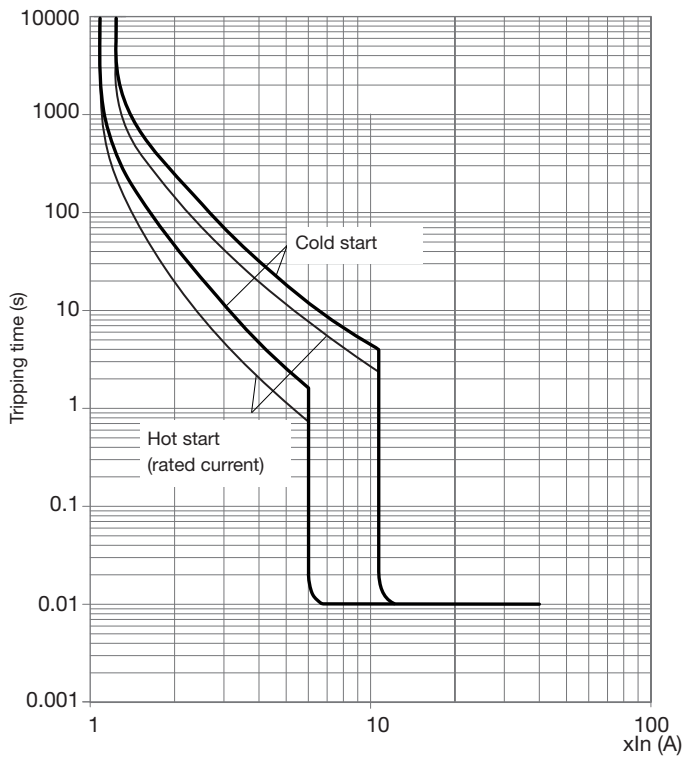
Magnetic adjustment from 6 to 13 x In (100 - 200A)
from 5 to 11 x In (250A)

	100 - 200A	250A
I _r (x I _n)	0,63 - 0,8 - 1 x I _n	
I _i (x I _n)	6 - 8 - 10 - 13 x I _n	5 - 7 - 9 - 11 x I _n
x I _n /I _i	0 - 100%	
	0 - 60%	



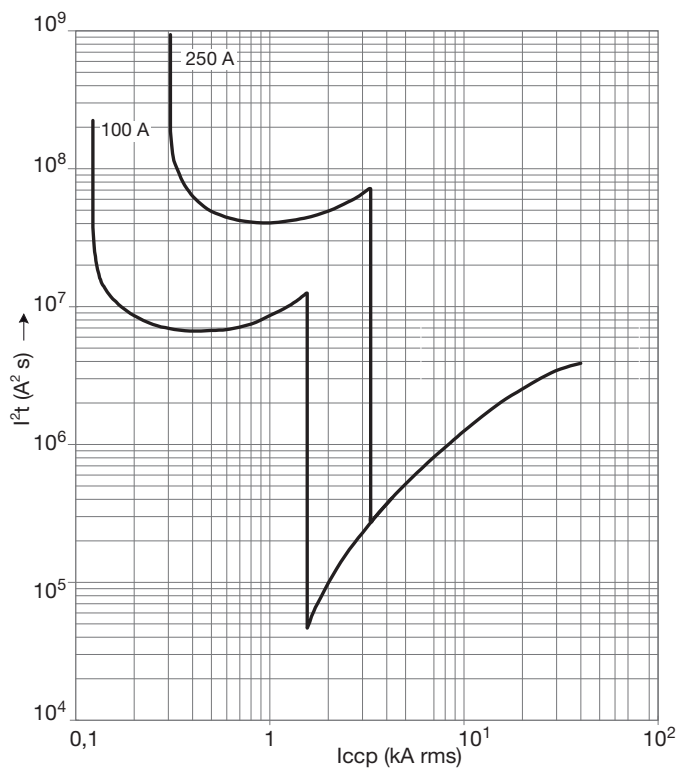
Tripping curve

MCCB x250



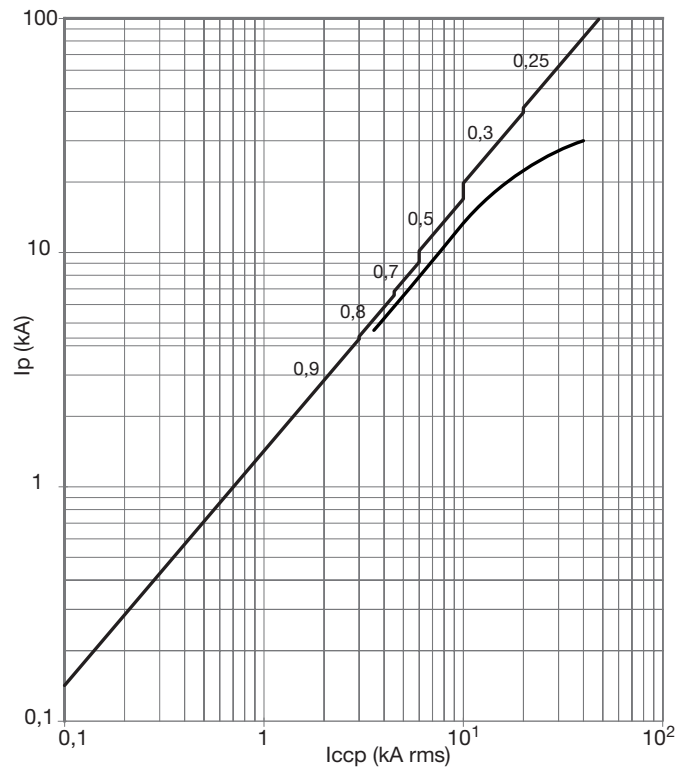
Thermal constraint curve at 400V (Let-through energy)

MCCB x250



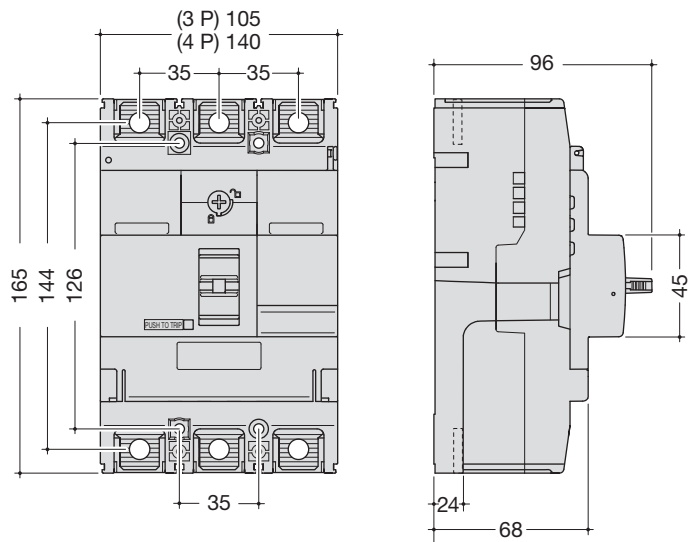
Current limiting curve at 400V (Let-through peak current)

MCCB x250

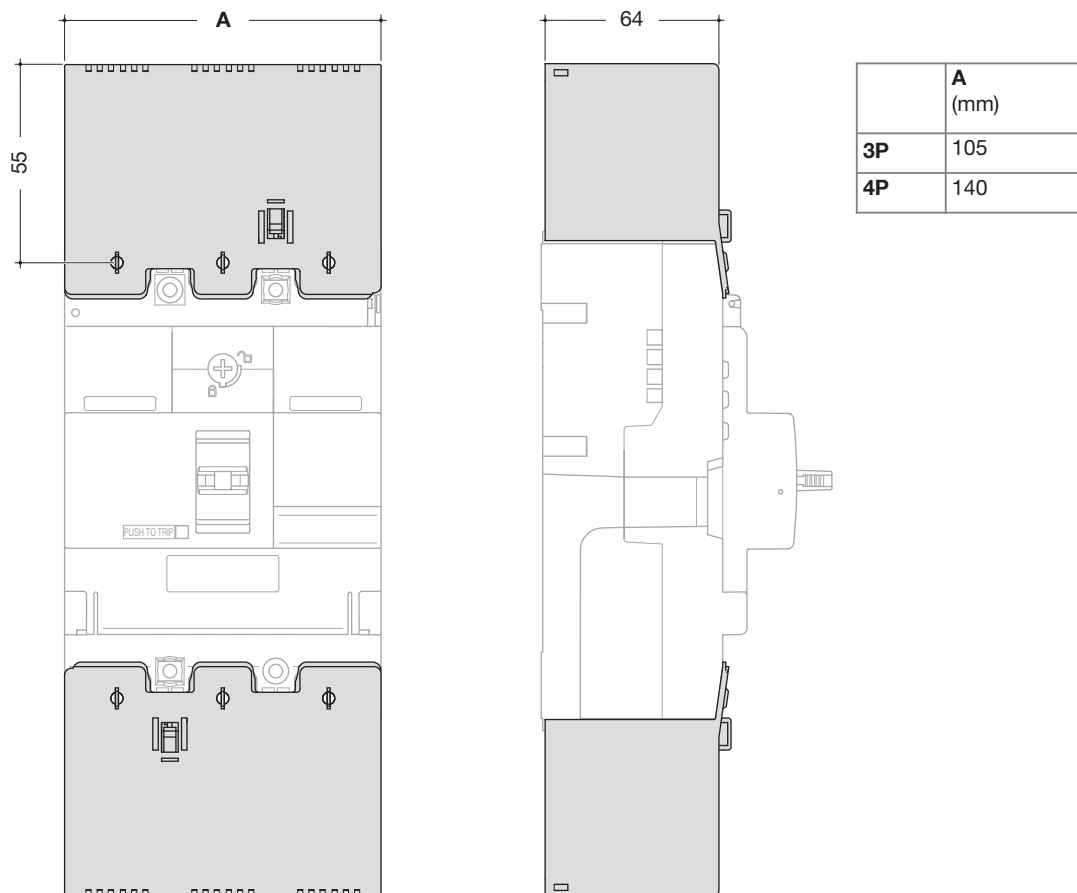


Dimensions

MCCB x250

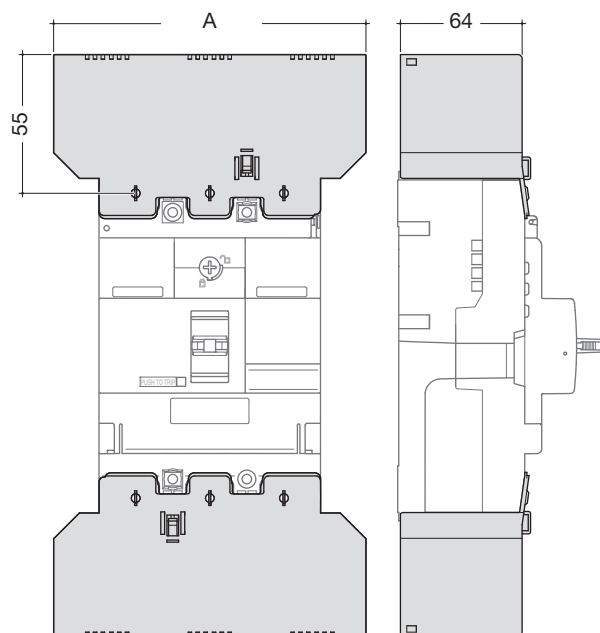


Terminal covers for extended straight connections



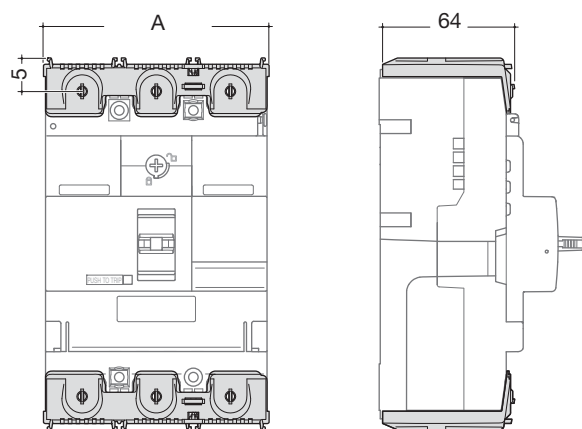
Accessories

Terminal cover for extended spreader connections



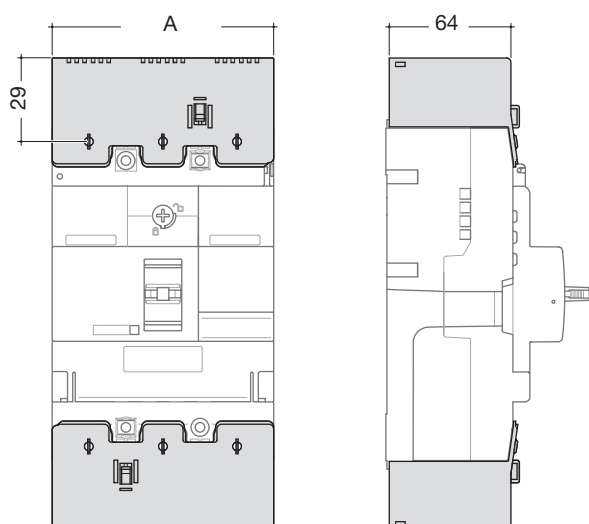
	A (mm)	B (mm)	C (mm)
3P	147,5	54,5	64
4P	196	54,5	64

Terminal cover for rear connections



	A (mm)
3P	105
4P	140

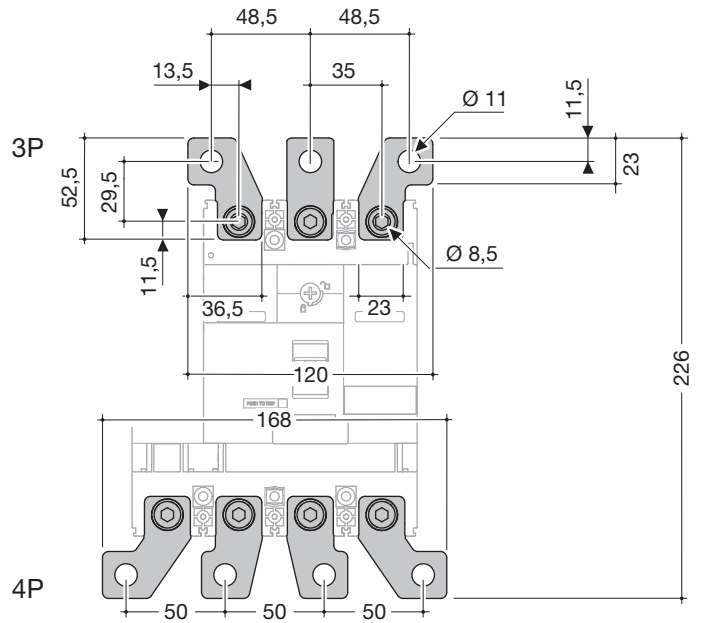
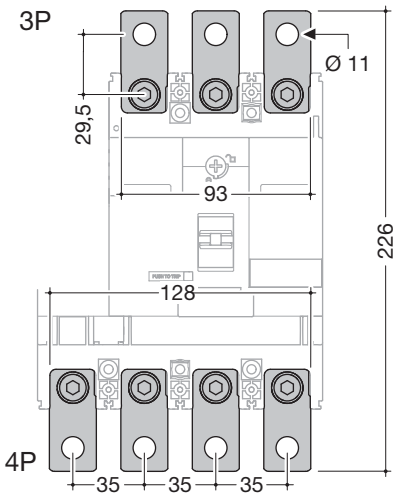
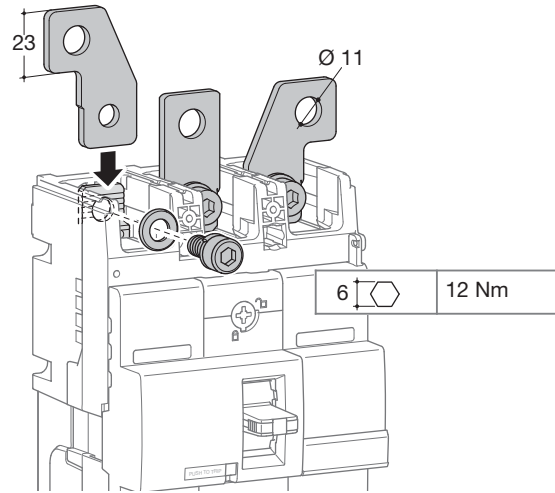
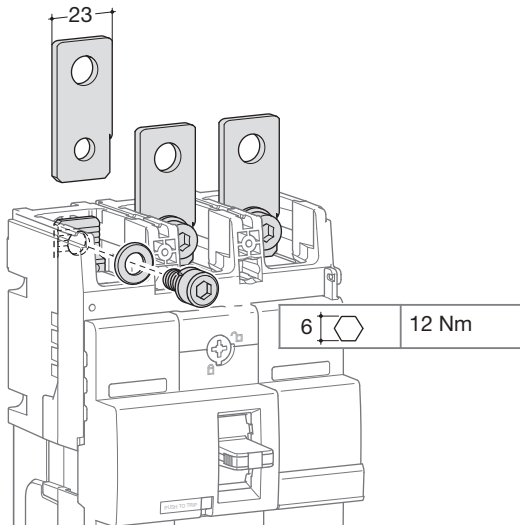
Terminal covers for collar terminals



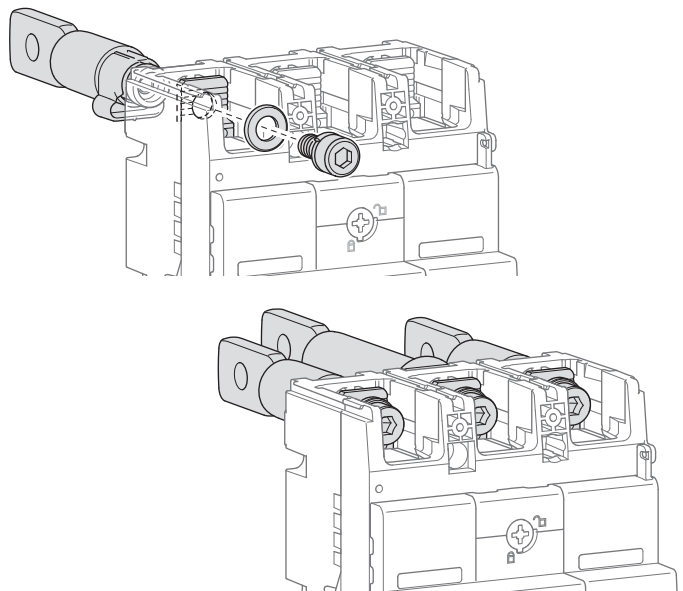
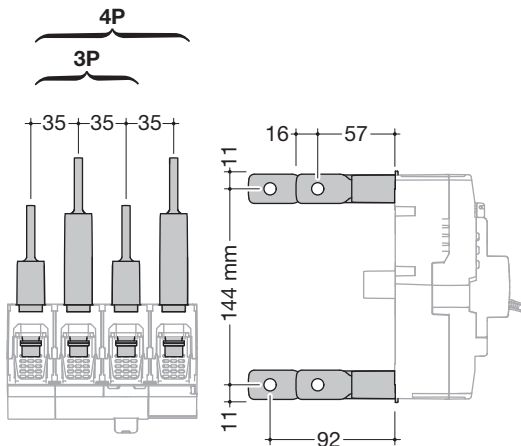
	A (mm)
3P	105
4P	140

Connection

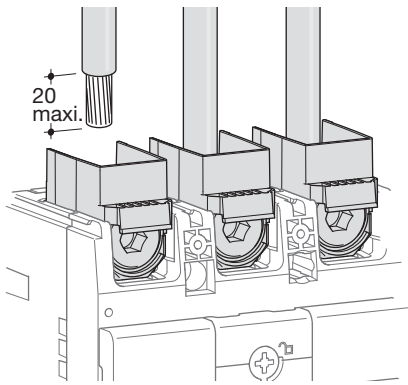
Extended straight and spreader connections



Rear connections

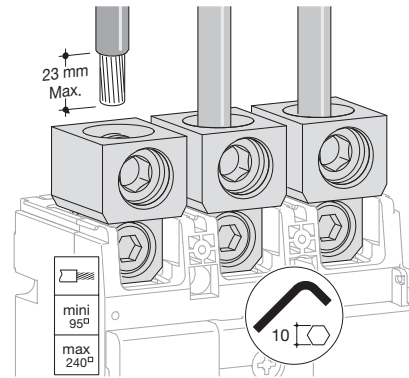


Connection by collar



Terminals for aluminium / copper conductors (accessory)
HYB001H, HYB002H

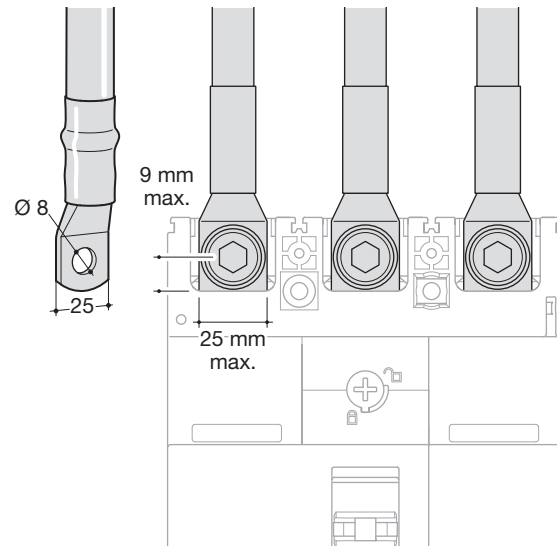
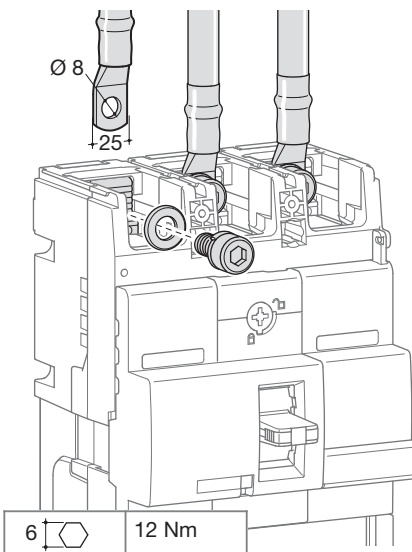
	min. 35 mm ²	max. 150 mm ²
	min. 35 mm ²	max. 185 mm ²
	35 mm ² to 50 mm ² = 25 Nm 60 mm ² to 185 mm ² = 25 Nm	



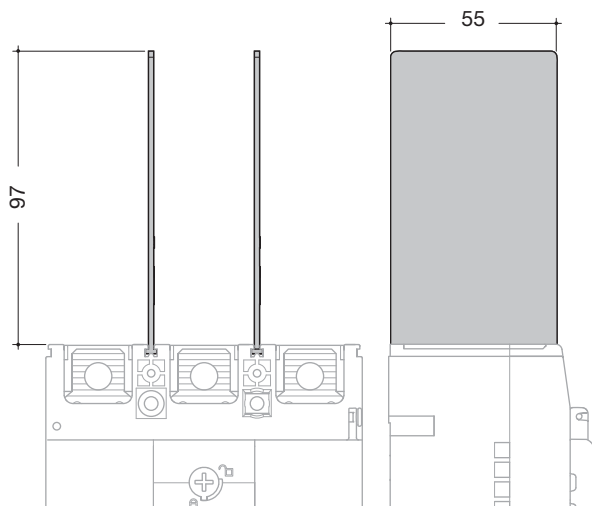
Terminals for aluminium / copper conductors (accessory)
HYB005H, HYB006H

	min. 95 mm ²	max. 240 mm ²
	95 mm ² to 240 mm ² = 25 Nm	

Connection with end lugs

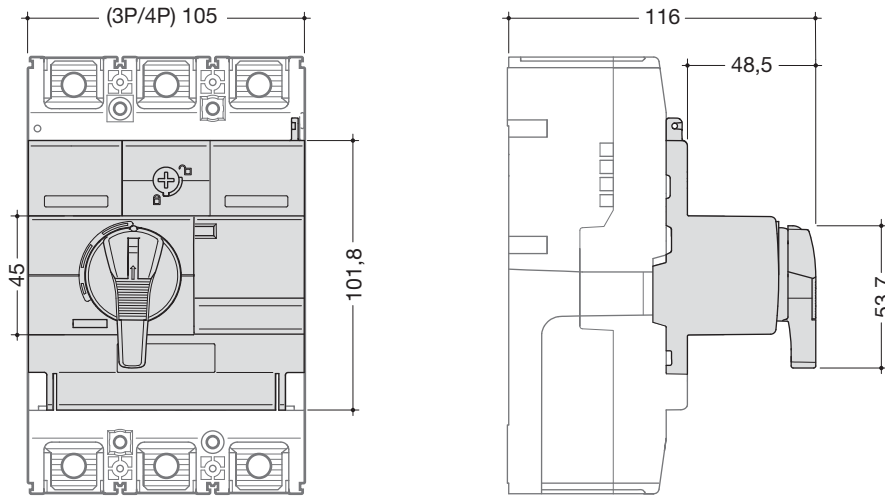


Interphase barriers

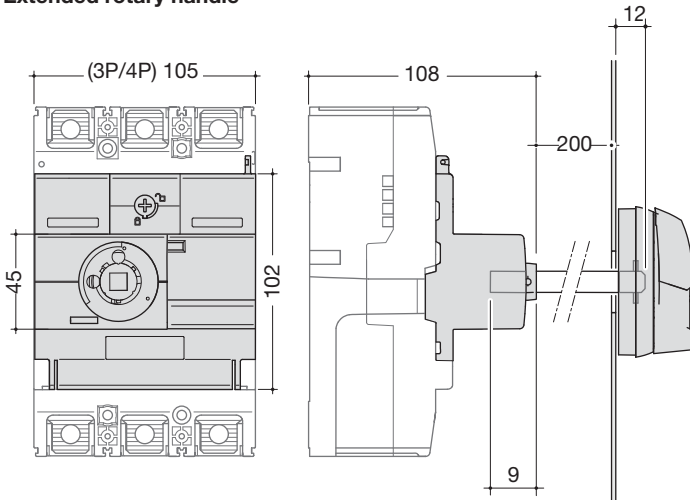


Accessories

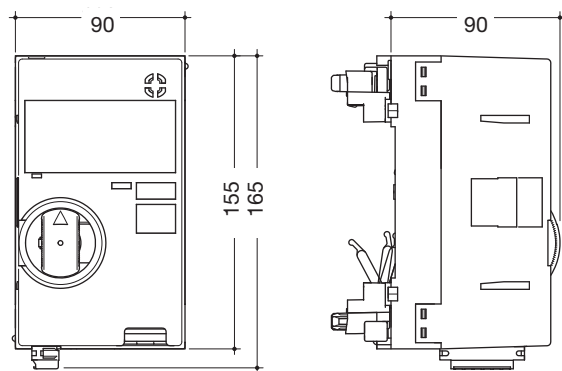
Rotary handle



Extended rotary handle

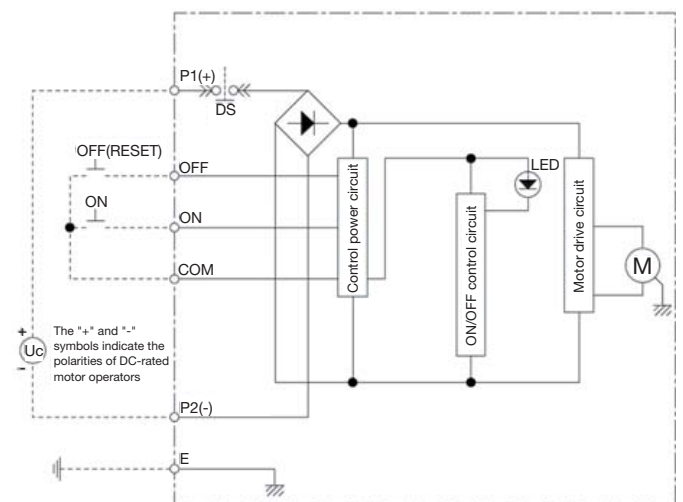


Motor operator



		HXB040H	HXB042H
Operating voltage		24V DC	230-240V AC
Operating current / starting current peak value (A)	24V DC	18/26	-
	230-240V AC	-	3,5/7
Operating time (s)	(ON)	0,1s	
	(OFF)	0,1s	
	(RESET)	0,1s	
Power supply required		300VA min.	
Dielectric properties (1 min)		1000V AC	1500V AC

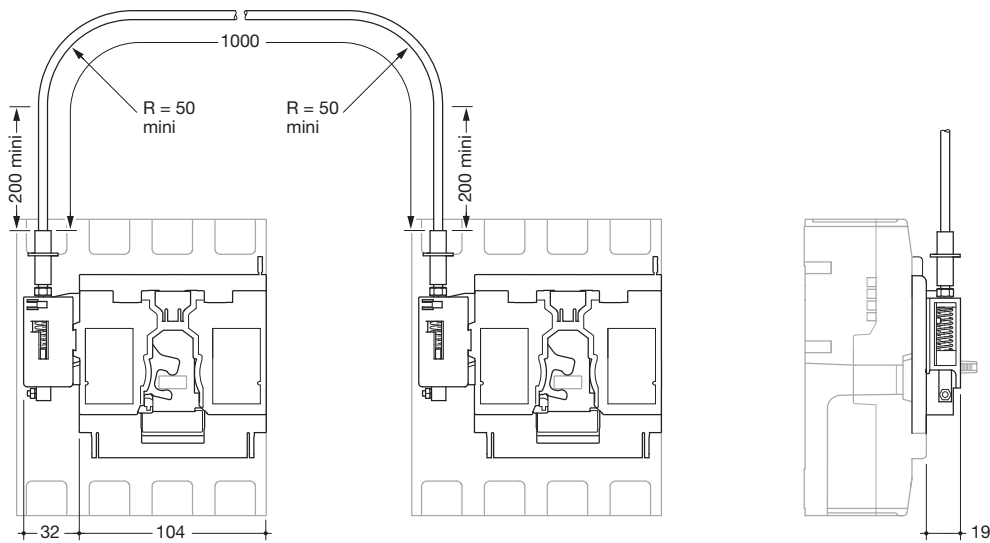
Wiring diagram



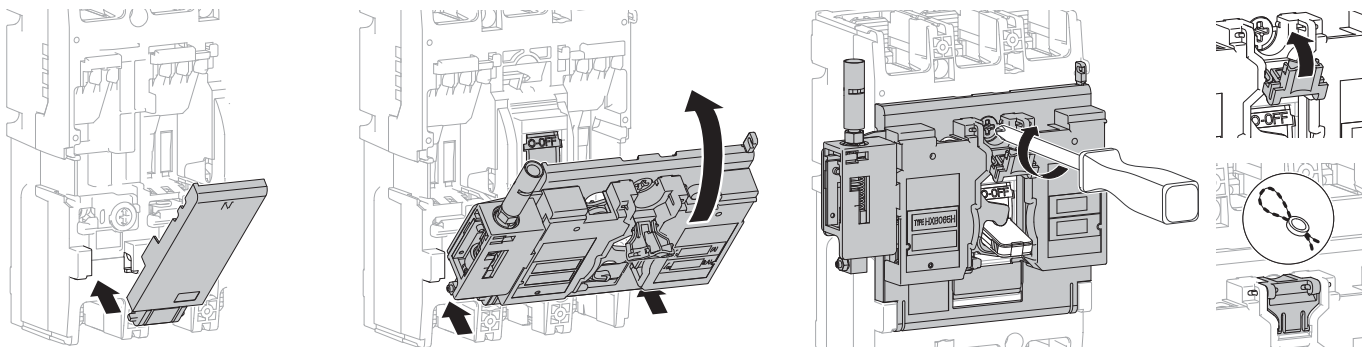
Interlocking system

Suitable with motor operator HXB04xH.
With electrical interlock for motor operator HXB068H (for 250A) or HXB069H (for 630/1000A).

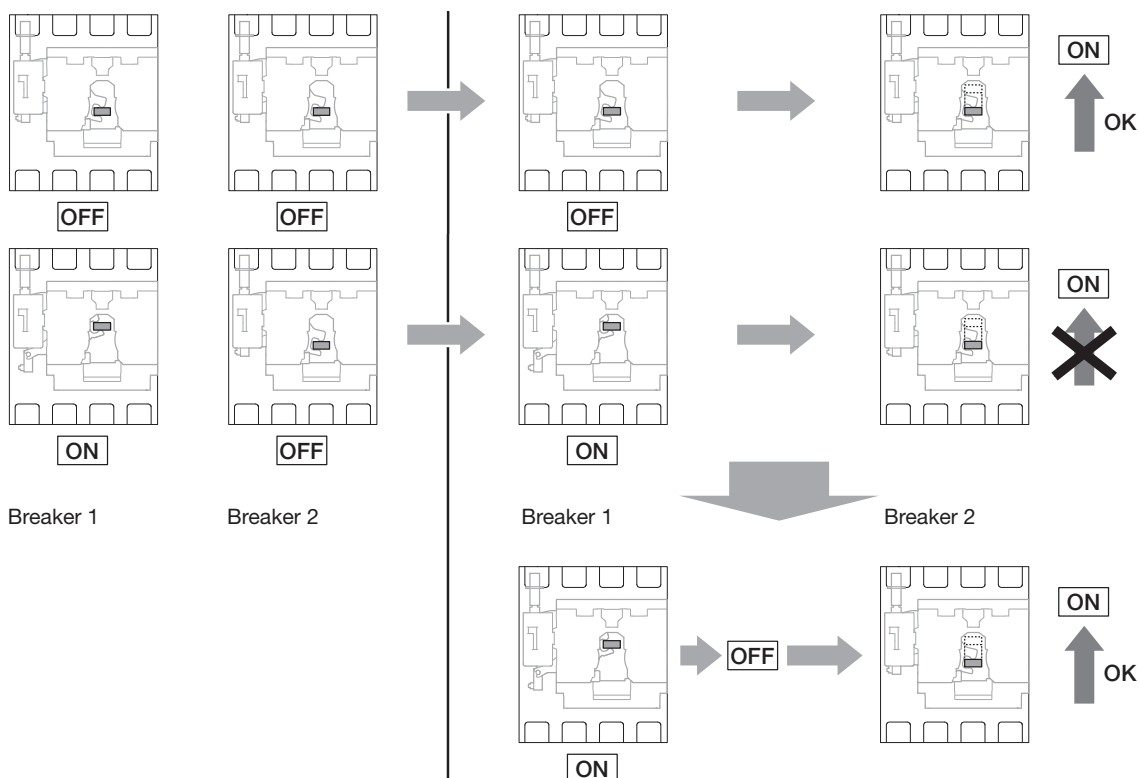
- Length HXB068H: 1500 mm
- Length HXB069H: 2100 mm



Mounting

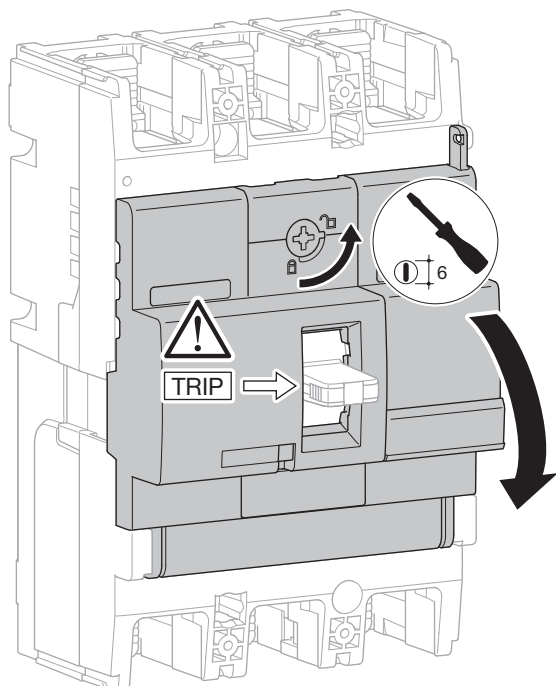


Checking the correct assembly



Auxiliaries

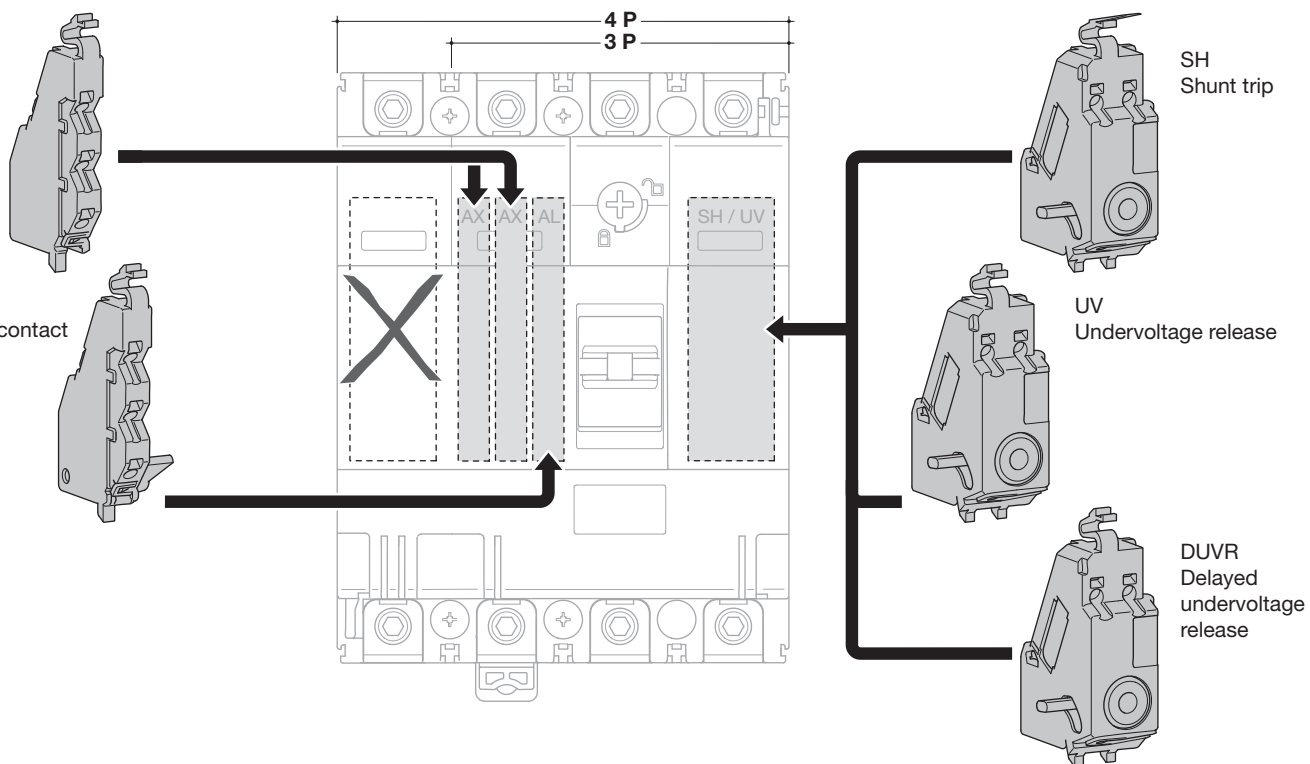
Auxiliaries for MCCBs and trip-free switches

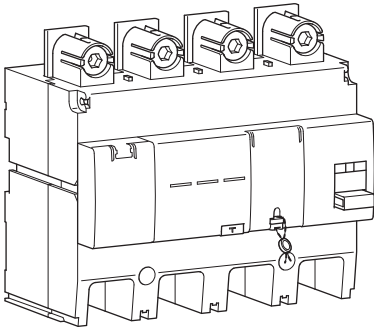


Mounting combination for auxiliaries and releases


AX
Auxiliary contact

AL
Alarm contact





When associated with MCCB, the add-on block provides an earth fault protection and protects against electrical shocks by direct or indirect contacts.

The add-on blocks are protected against nuisance tripping caused by transient voltages. It's able to detect sinusoidal alternating currents and residual pulsating direct currents (A type ). It also avoids miss tripping (HI type - High Immunity).

Characteristics

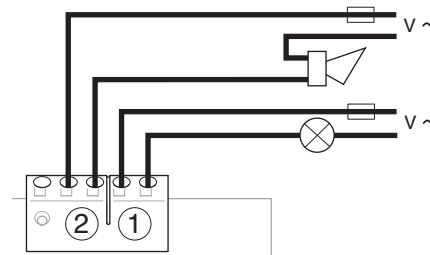
Reset button :
Signals add-on block tripping and must be acknowledged before switching on the installation.

Test button for differential operating :
Allows to check the electrical operating of the MCCB / Add-on block association.

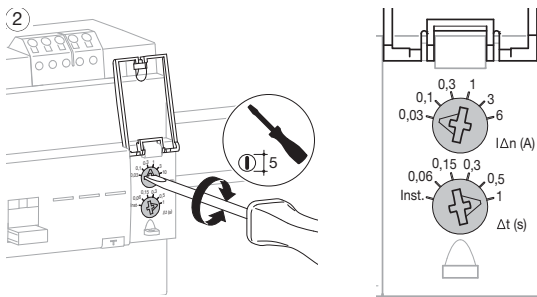
Mechanical test button :
Allows to check the mechanical operating of the MCCB / Add-on block association.

LED signaling default current level in the installation:
25% (orange) and 50% (red) I_n ; green light to signal correct operating.

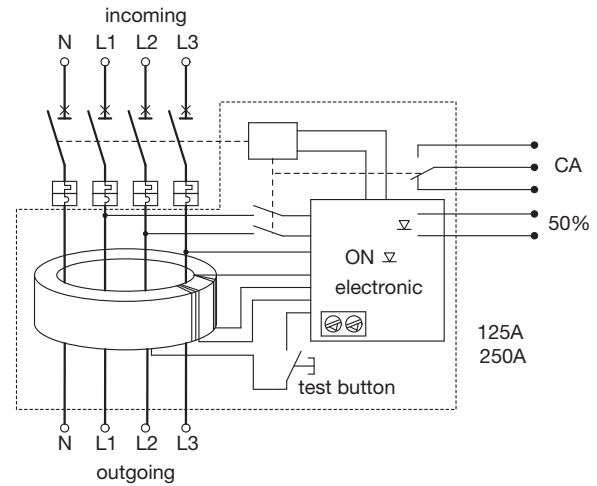
Remote tripping and advanced warning (50% I_n) signaling thanks to these contacts:



Earth leakage current ($I_{\Delta n}$) and delay (Δt) setting

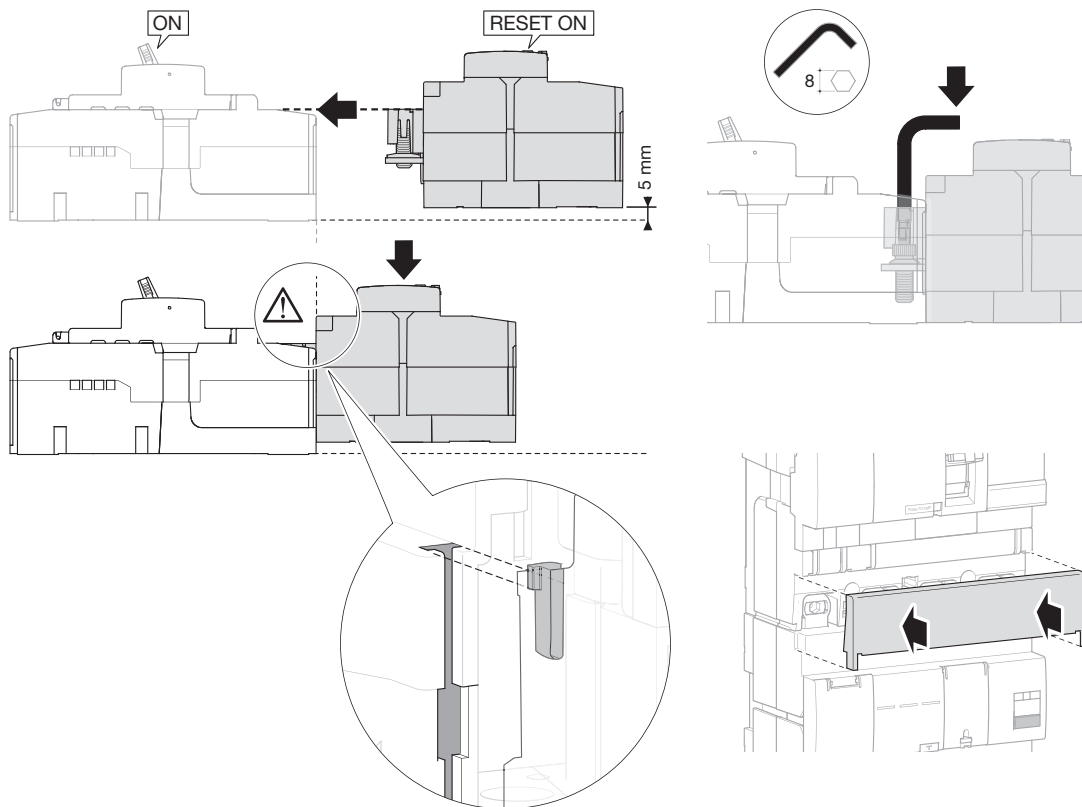


Add-on block operating

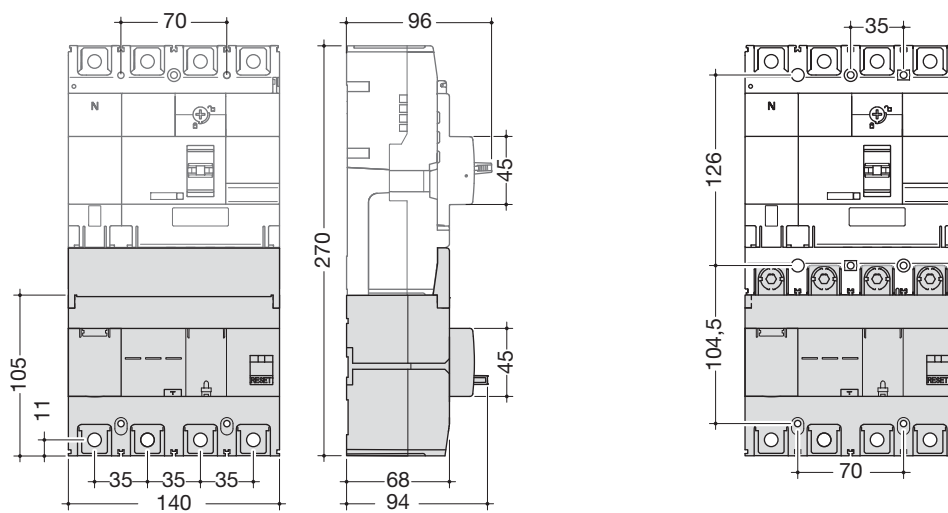


S (t)	A (I n)						
	0,03	0,1	0,3	1	3	6	
Inst.	OK	OK	OK	OK	OK	OK	
0,06	no	OK	OK	OK	OK	OK	
0,15	no	OK	OK	OK	OK	OK	
0,3	no	OK	OK	OK	OK	OK	
0,5	no	OK	OK	OK	OK	OK	
1	no	OK	OK	OK	OK	OK	

Add-on block mounting



Dimensions



Moulded case circuit breakers h250
Thermal magnetic trip unit:
 thermal adjustment: 0.63 to 1 I_n
 magnetic adjustment:
 6-8-10-13 x I_n
 3P & 4P (3P only for 25kA)
 Mechanical test button,
 lockable settings,

Connection:
 Directly on copper cable
 terminal,
 with end lug max. width: 25 mm
 Comply with IEC 60 947-2.



HHG250U

Designation	Characteristics	In	Cat. ref.	
			3P	4P
MCCBs h250 25kA TM	breaking capacity I _{cu} : 25 kA (400/415 V AC) I _{cs} : 19 kA	20A	HHG020U	-
		32A	HHG032U	-
		50A	HHG050U	-
		63A	HHG063U	-
	adjustable thermal 0.63 to 1 x I _n adjustable magnetic 6 - 8 - 10 - 13 x I _n	100A	HHG100U	-
		125A	HHG125U	-
		160A	HHG160U	-
		200A	HHG200U	-
		250A	HHG250U	-

MCCBs h250 50kA TM	breaking capacity I _{cu} : 30 kA (20-32A) I _{cu} : 50 kA (400/415 V AC) I _{cs} : 25 kA	20A	HNG020U	HNG021U
		32A	HNG032U	HNG033U
		63A	HNG063U	HNG064U
		100A	HNG100U	HNG101U
		125A	HNG125U	HNG126U
	adjustable thermal 0.63 to 1 x I _n adjustable magnetic 6 - 8 - 10 - 13 x I _n	160A	HNG160U	HNG161U
		200A	HNG200U	HNG201U
		250A	HNG250U	HNG251U

MCCBs h250 65kA TM	breaking capacity I _{cu} : 65 kA (400/415 V AC) I _{cs} : 36 kA	50A	HEG050U	HEG051U
		63A	HEG063U	HEG064U
		100A	HEG100U	HEG101U
		125A	HEG125U	HEG126U
		160A	HEG160U	HEG161U
	adjustable thermal 0.63 to 1 x I _n adjustable magnetic 6 - 8 - 10 - 13 x I _n	200A	HEG200U	HEG201U
		250A	HEG250U	HEG251U



HNH250U

MCCBs h250 50kA TM+	breaking capacity I _{cu} : 50 kA (400/415 V AC) I _{cs} : 50 kA	20A	HNH020U	HNH021U
		32A	HNH032U	HNH033U
		50A	HNH050U	HNH051U
		63A	HNH063U	HNH064U
	adjustable thermal 0.63 to 1 x I _n adjustable magnetic 6 - 8 - 10 - 13 x I _n	100A	HNH100U	HNH101U
		125A	HNH125U	HNH126U
		160A	HNH160U	HNH161U
		200A	HNH200U	HNH201U
		250A	HNH250U	HNH251U

MCCBs h250 70kA TM+	breaking capacity I _{cu} : 70 kA (400/415 V AC) I _{cs} : 70 kA	20A	HEH020U	HEH021U
		32A	HEH032U	HEH033U
		50A	HEH050U	HEH051U
		63A	HEH063U	HEH064U
	adjustable thermal 0.63 to 1 x I _n adjustable magnetic 6 - 8 - 10 - 13 x I _n	100A	HEH100U	HEH101U
		125A	HEH125U	HEH126U
		160A	HEH160U	HEH161U
		200A	HEH200U	HEH201U
		250A	HEH250U	HEH251U

Moulded case circuit breakers h250

Electronic trip unit LSI:

Long delay (thermal equivalent)
adjustable: $I_r = 0.4$ to $1 \times I_n$
short delay (magnetic equivalent)
adjustable: 2.5 to $10 \times I_r$
time delay: $0,1 - 0,2$ s
3P & 4P
Mechanical test button,
sealable settings,

Not for use in TPN and panel boards.

Connection:
Directly on copper cable terminal,
with end lug max. width: 25 mm

Comply with IEC 60 947-2.



HEC250U

Designation	Characteristics	In	Cat. ref.	
			3P	4P
MCCBs h250 50kA LSI	breaking capacity	40A	HNC040H	HNC041H
	$I_{cu} : 50$ kA (400/415 V AC)	125A	HNC125H	HNC126H
	$I_{cs} : 25$ kA	250A	HNC250H	HNC251U
	adjustable thermal $I_r = 0.4$ to $1 \times I_n$ adjustable magnetic 2.5 to $10 \times I_r$			
	3P, 3 trip units & 4P, 3 trip units			
MCCBs h250 70kA LSI	breaking capacity	40A	HEC040H	HEC041U
	$I_{cu} : 70$ kA (400/415 V AC)	125A	HEC125H	HEC126H
	$I_{cs} : 70$ kA	250A	HEC250H	HEC251H
	adjustable thermal $I_r = 0.4$ to $1 \times I_n$ adjustable magnetic 2.5 to $10 \times I_r$			
	3P, 3 trip units & 4P, 3 trip units			

Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB is "open" or "close".
 - 1 changeover alarm contact: indicates MCCB tripping.

Coil connection

Connection capacity:
 0,75 mm² flexible or rigid cables
 Optional connection cables.
 The cable capacity of the terminals is 0,5 to 1,25 mm².

Shunt trip

Remotes tripping of MCCBs or trip-free switches.
 Operating voltage: 0,7 to 1,1 x Un

Under voltage release

Allows the tripping of MCCBs or trip-free switches when voltage level drop between 35 and 70% of Un. Pick up voltage 0,85 x Un

Direct rotary handle

- padlockable
 - equipped with front cover and handle
 - fixing without any additional screw.

Extended rotary handle

- IP 55
 - supplied complete with shaft and handle.

Designation	Characteristics	Cat. ref.
Auxiliary contacts		
AX	1 changeover contact 250 V AC / 3A	HXC021H
AL	1 changeover alarm contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXC024H
	low level contact (ON/OFF) 125 V AC 1 NO + 1 NC	HXA025H
	low level alarm contact 125 V AC 1 NO + 1 NC	HXA026H
Shunt trips		
SH	24 V DC 48 V DC 110 V DC 100 - 120 V AC 200 - 240 V AC 380 - 450 V AC	HXC001H HXC002H HXC008H HXC003H HXC004H HXC005H
Undervoltage releases		
UV	24 V DC 100 - 120 V DC 200 - 240 V DC 100 - 120 V AC 200 - 240 V AC 380 - 450 V AC	HXC011H HXC018H HXC019H HXC013H HXC014H HXC015H
Delayed undervoltage releases		
DUVR	24 V DC 110 - 120 V AC 200 - 240 V AC 380 - 415 V AC	HXC051H HXC053H HXC054H HXC055H
Direct rotary handles	padlockable handle Ø 5 - 8 mm ² max	HXC030H
Extended rotary handles	padlockable handle Ø 5 - 8 mm ² max	HXC031H



HXC030H



HXC039H

Designation	Characteristics	Cat. ref.	
		3P	4P
Padlocks	to mount on MCCBs for handle locking for 3 padlocks max Ø 5 mm	HXC039H	
Motor operators	24 V DC 230-240 V AC	HXC040H	HXC042H
Interlocking kit	wire type set of 2 pieces and cable	HXC065H	
Interlocking unit	wire type	HXC066H	
Interlocking mechanical cable	1 m 1,5 m	HXB070H	HXB071H
Electrical interlocks	for motor type A (between 2 250A) for motor type B (between 250A and other size)	HXB068H	HXB069H



HYC011H

Designation	Characteristics	Cat. ref.	
		3P	4P
Collar terminals	set of 3 or 4 pieces for copper conductors 120 mm ²	HYC003H	HYC004H

Extended connections	spreader connections	HYC011H	HYB012H
	straight connections	HYC010H	HYC010H



HYC022H

Interphase barriers	for LSI and TM+	HYC019H	HYC019H
	for TM only	HYB019H	HYB019H

Terminal covers	for extended straight connections (LSI and TM+)	HYC021H	HYC022H
	for extended straight connections (TM only)	HYG021H	HYG022H
	for rear connections (LSI only)	HYC025H	HYC026H
	for collar terminals	HYC027H	HYC028H

Rear connections	for LSI only	HYC031H	HYC032H
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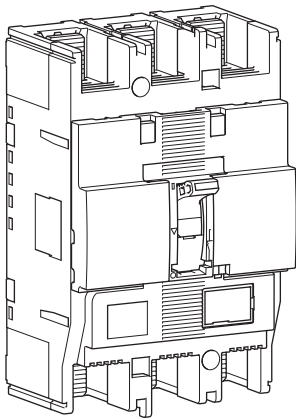


HYC031H

Connecting kit	0,75 mm ² set of 3 x 2 wires length: 1,30m	HYA035H	HYA035H
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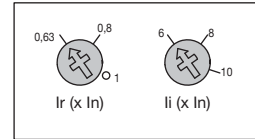
OCR sealing covers	for LSI only	HYC041H	HYC041H
	for TM only	HYG041H	HYG041H

MCCBs



		220/240 V AC	380/415 V AC	660/690 V AC
TM HHG	Icu (kA)	35	25	-
	Ics (kA)	27	19	-
TM HNG	Icu (kA)	35	50	7,5
	Ics (kA)	65	25	7,5
TM HEG	Icu (kA)	85	65	7,5
	Ics (kA)	85	36	7,5
LSI HNC	Icu (kA)	85	50	7,5
	Ics (kA)	85	25	7,5
LSI HEC	Icu (kA)	100	70	20
	Ics (kA)	100	70	15
TM+ HNG	Icu (kA)	85	50	20
	Ics (kA)	85	50	15
TM+ HEH	Icu (kA)	100	70	20
	Ics (kA)	100	70	15

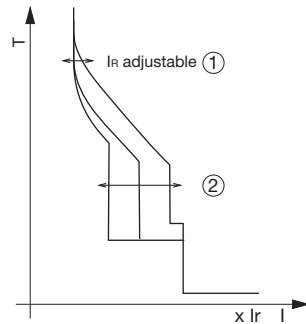
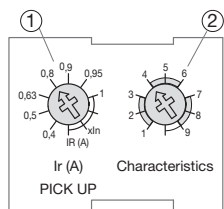
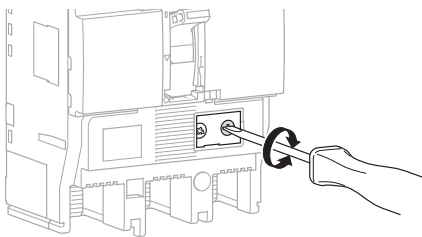
Magnetic and thermal settings (TM/TM+)



Thermal adjustment from 0,63 to 1 x In

Magnetic adjustment from 6 to 10 x In (250A)
from 6 to 13 x In (160 and 200A)
from 6 to 12 x In (32, 63, 100 and 125A)

Electronic trip unit setting (LSI)



L - Long delay - protection against overloads: Ir and tr settings

S - Short delay - protection against short circuits: Isd and tsd settings

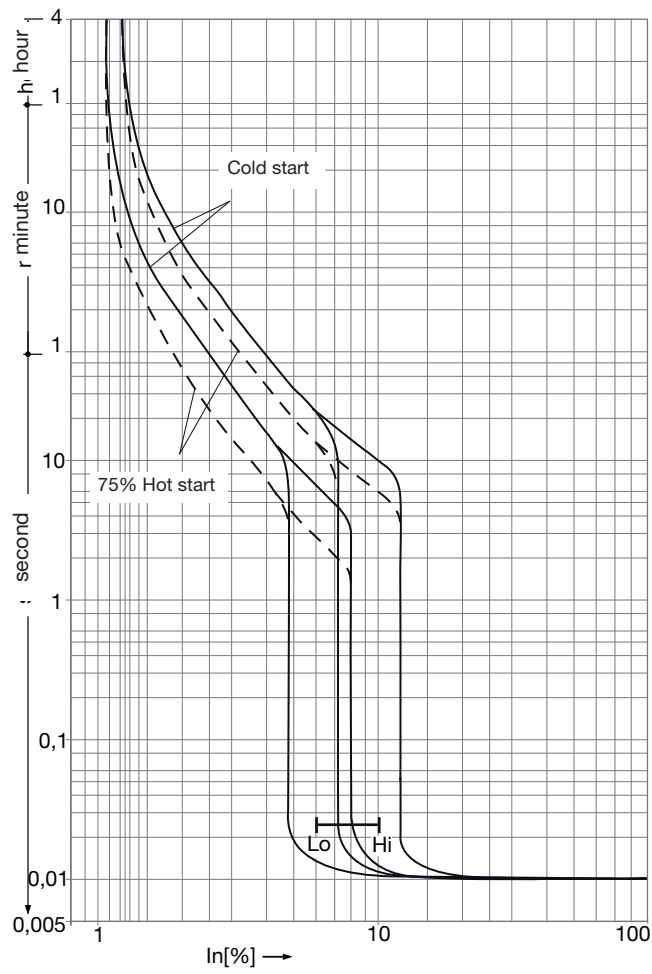
I - Instantaneous - max. instantaneous threshold (< 10 ms) in case of short circuit: 2,5 to 10 x Ir.

Use	Characteristics (*)	
	3 P	4 P
Generator protection	pos. 1	pos. 1, 4 and 7
Standard protection	pos. 2 and 3	pos. 2, 5 and 8
Motor protection	pos. 4 and 5	pos. 3, 6 and 9

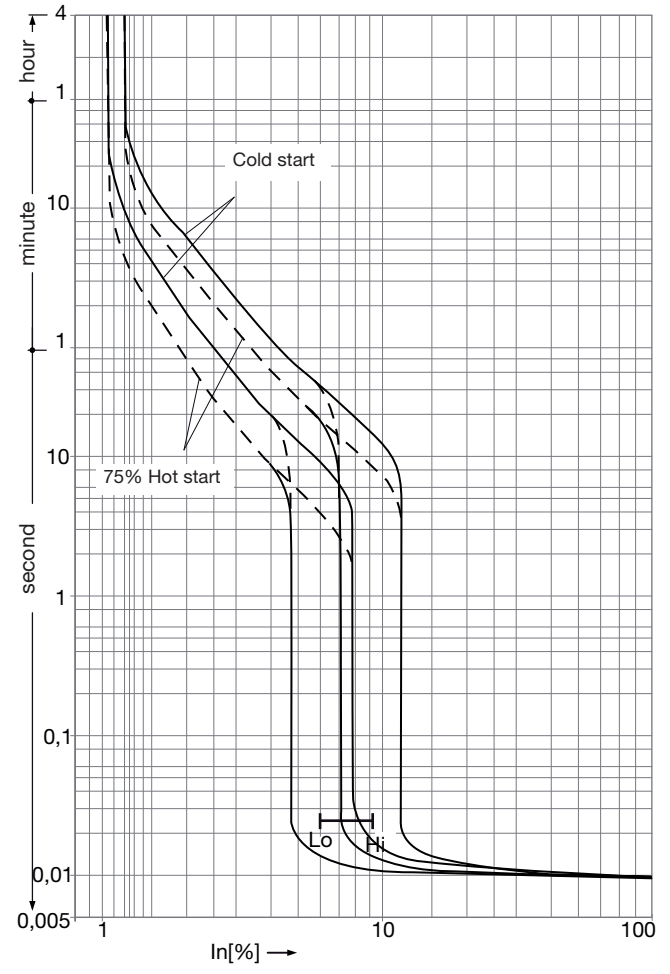
LSI	In A										
	3P						4P				
	Long Time Delay		Short Time Delay		Inst	Long Time Delay		Short Time Delay		Inst	Protection
Ir (x In)	tr (s)	isd (xlr)	tsd (s)	li (xlr)	Ir (x In)	tr (s)	isd (xlr)	tsd (s)	li (xlr)	Neutral	
Ir (x In)	0,4	OK				OK					
	0,5	OK				OK					
	0,63	OK				OK					
	0,8	OK				OK					
	0,9	OK				OK					
	0,95	OK				OK					
	1	OK				OK					
Characteristics	1	11s at 2 xlr	2,5	0,1	14 (max 13 x In)		11 s at 2 xlr	2,5	0,1	14	no
	2	21s at 2 xlr					21 s at 2 xlr				
	3		7,5 s at 6 xlr	10			0,2				
	4	5 s at 6 xlr	10	0,2	11 s at 2 xlr		2,5	0,1	50%		
	5	7,5 s at 6 xlr			21 s at 2 xlr		5				
	6				7,5 s at 6 xlr		10	0,2			
	7				11 s at 6 xlr		2,5	0,1	100%		
	8				21 s at 2 xlr		5				
	9				7,5 s at 6 xlr		10	0,2			

Tripping curve

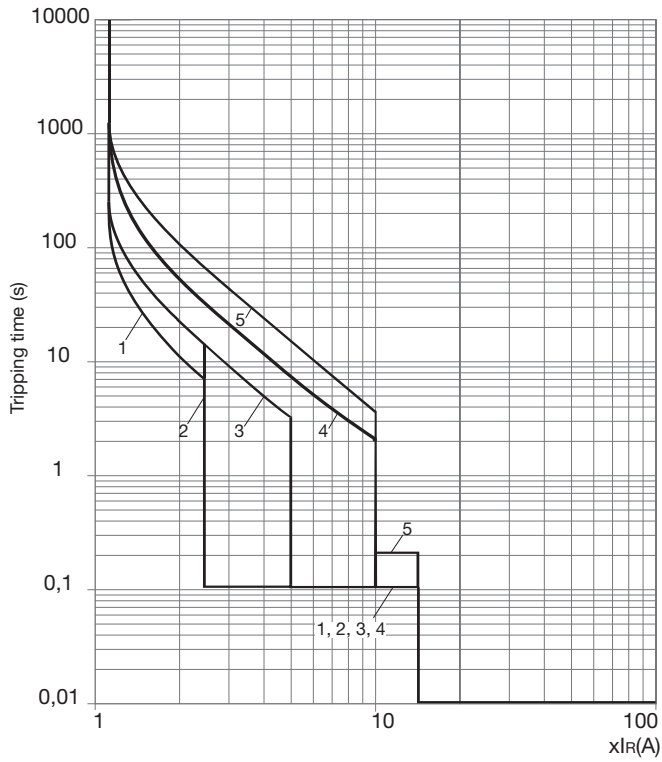
MCCB h250 TM



MCCB h250 TM+

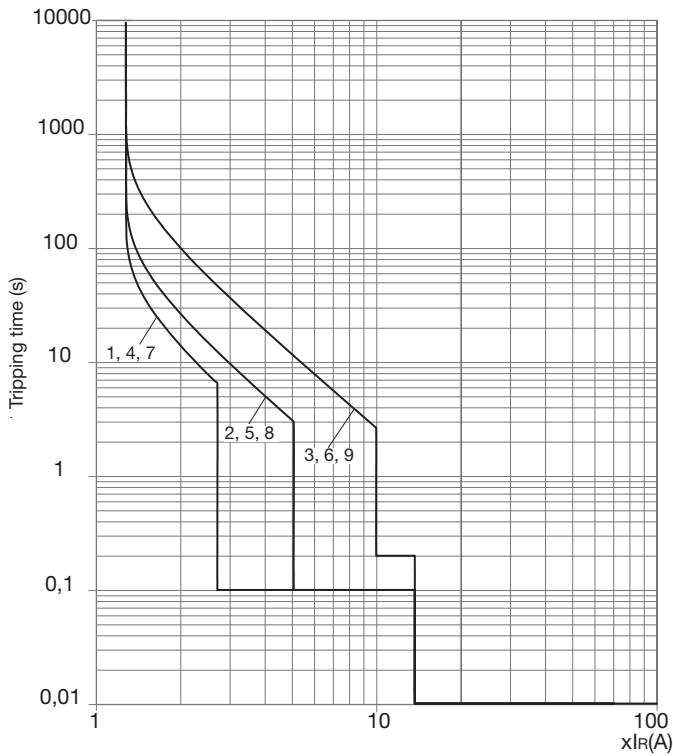


MCCB h250 3P LSI



LTD pick-up current		I_R	$x I_n$	0,4	0,5	0,63	0,8	0,9	0,95	1
Characteristics			No.	1	2	3	4	5		
Standard	LTD	t_R	(s)	11	21	21	5	7,5		
				200 % $x I_R$				600 % $x I_R$		
	STD	I_{sd}	$x I_R$	2,5	2,5	5	10	10		
		t_{sd}	(s)	0,1	0,1	0,1	0,1	0,2		
INST	I_i	$x I_R$	14 (max 13 $x I_n$)							

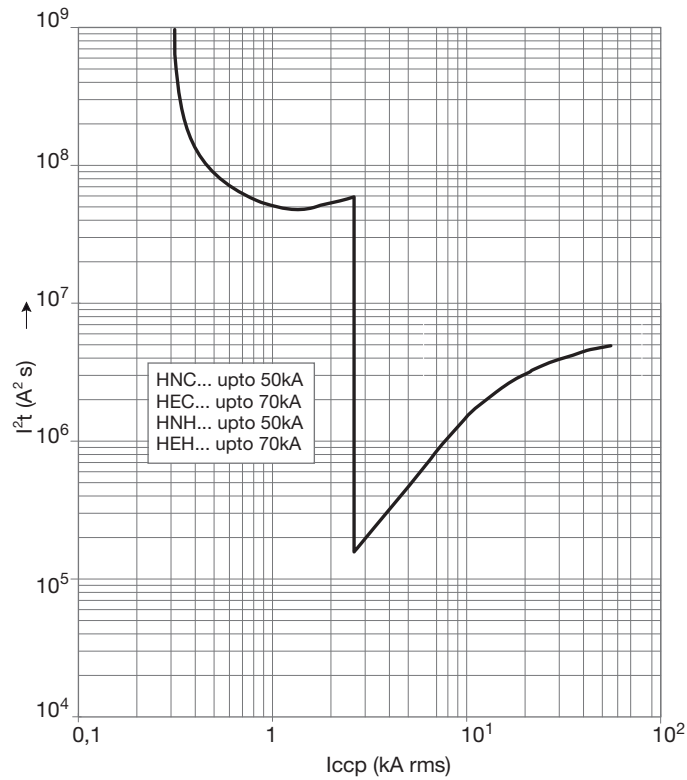
MCCB h250 4P LSI



LTD pick-up current		I_R	$x I_n$	0,4	0,5	0,63	0,8	0,9	0,95		
Characteristics			No.	1	2	3	4	5	6	7	8
Standard	LTD	t_R	(s)	11 s	21 s	7,5 s	11 s	21 s	7,5 s	11 s	21 s
				200 % x I_R		600% x I_R	200 % x I_R		600% x I_R	200 % x I_R	
	STD	I_{sd}	x I_R	2,5	5	10	2,5	5	10	2,5	5
		t_{sd}	(s)	0,1		0,2	0,1		0,2	0,1	
	INST	I_i	x I_R	14							
Neutral protection		$x I_n$	no			0,5			1		

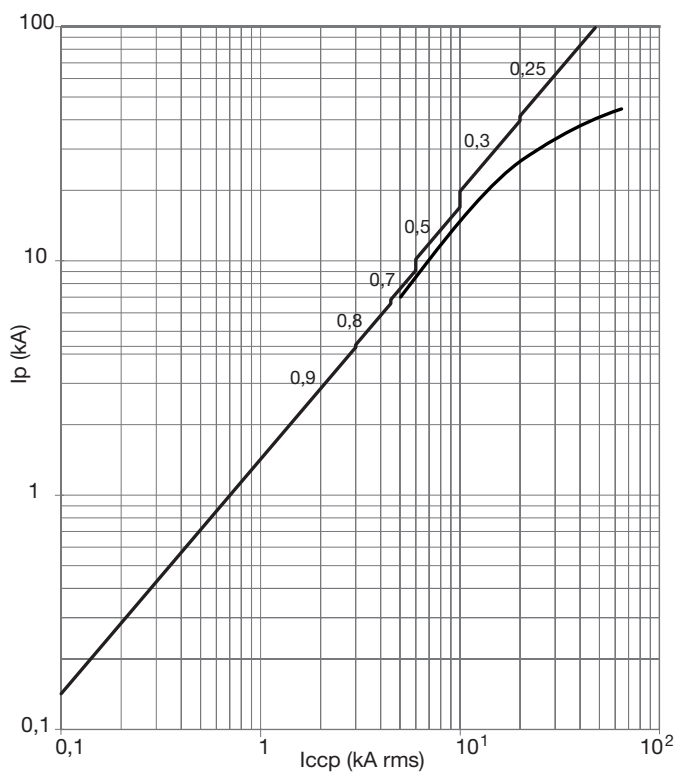
Thermal constraint curve at 400V (Let-through energy)

MCCB h250



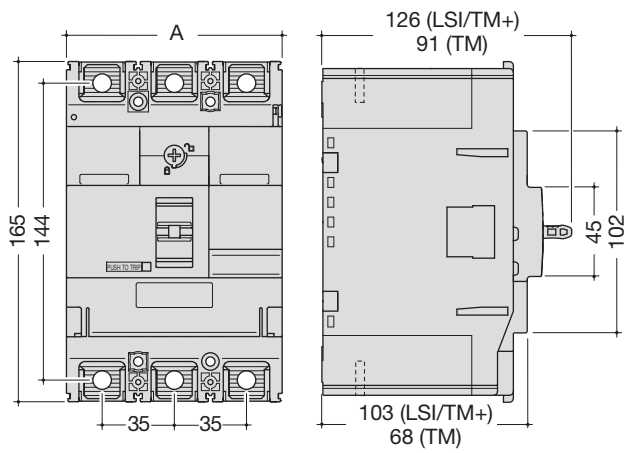
Current limiting curve at 400V (Let-through peak current)

MCCB h250



Dimensions

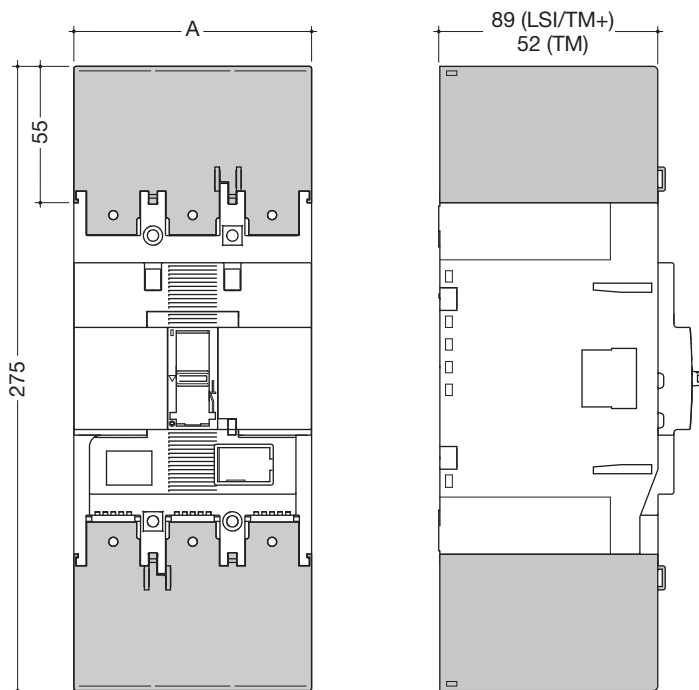
MCCBs



	A (mm)
3P	105
4P	140

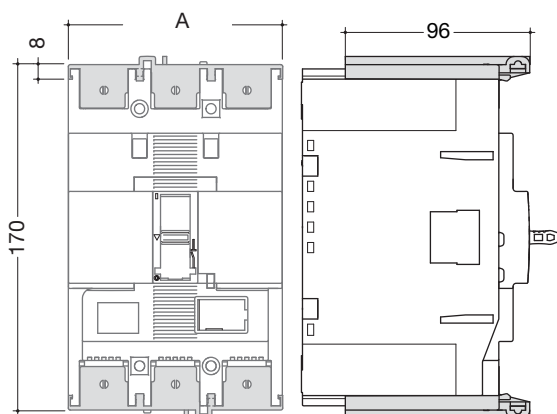
Accessories

Terminal covers for extended straight connections



	A (mm)
3P	105
4P	140

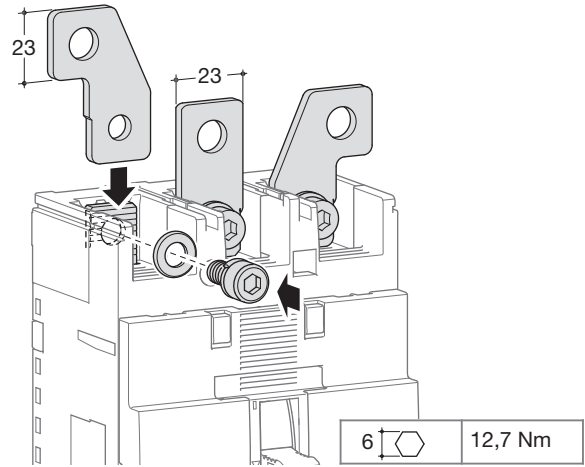
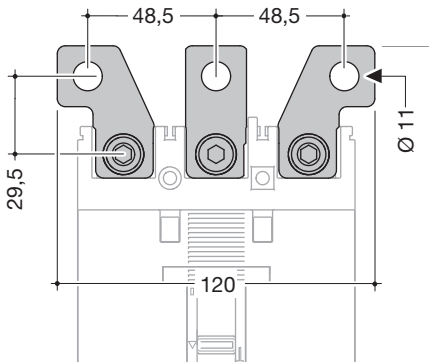
Terminal cover for rear connections (LSI/TM+ only)



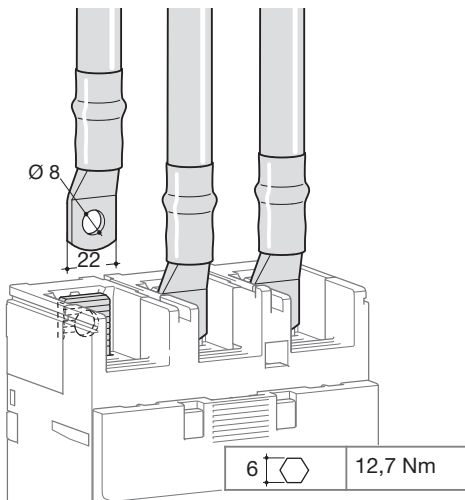
	A (mm)
3P	105
4P	140

Connection

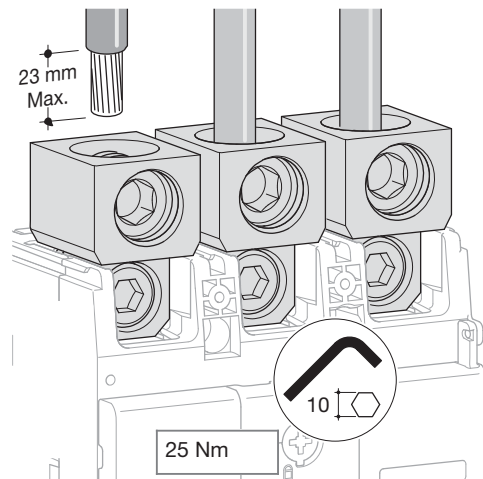
Extended straight and spreader connections



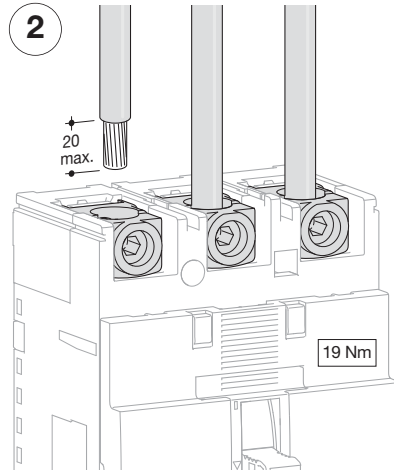
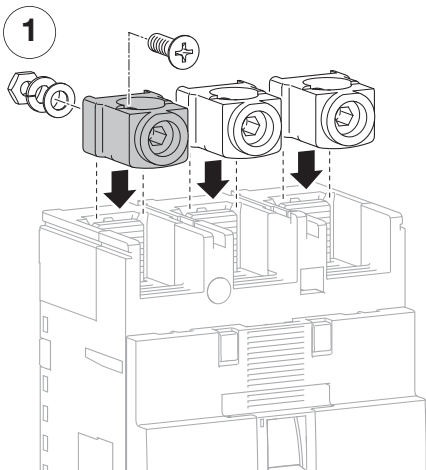
Connection with end lugs



Connection by collar 240mm² - HYB005H and HYB006H



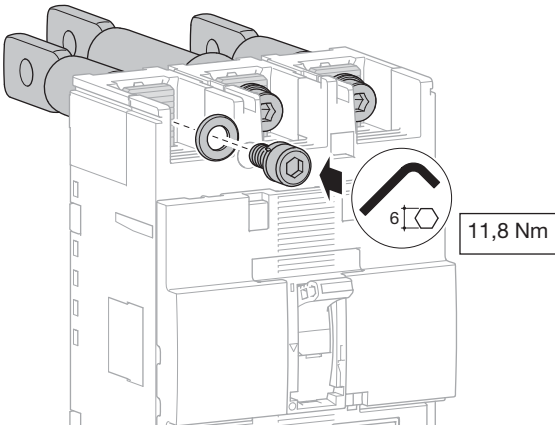
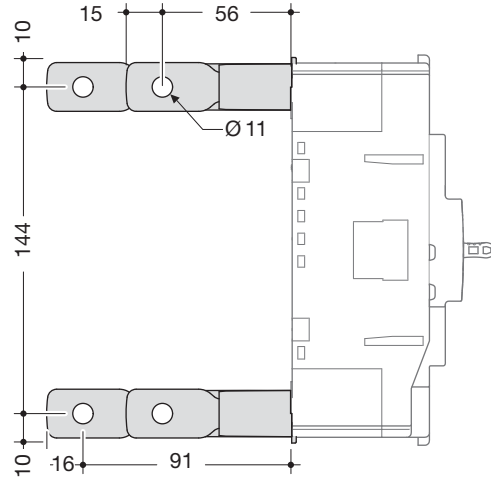
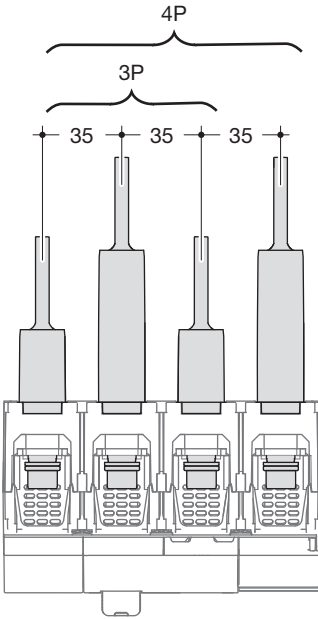
Connection by collar



Terminals for copper conductors
HYC003H, HYC004H

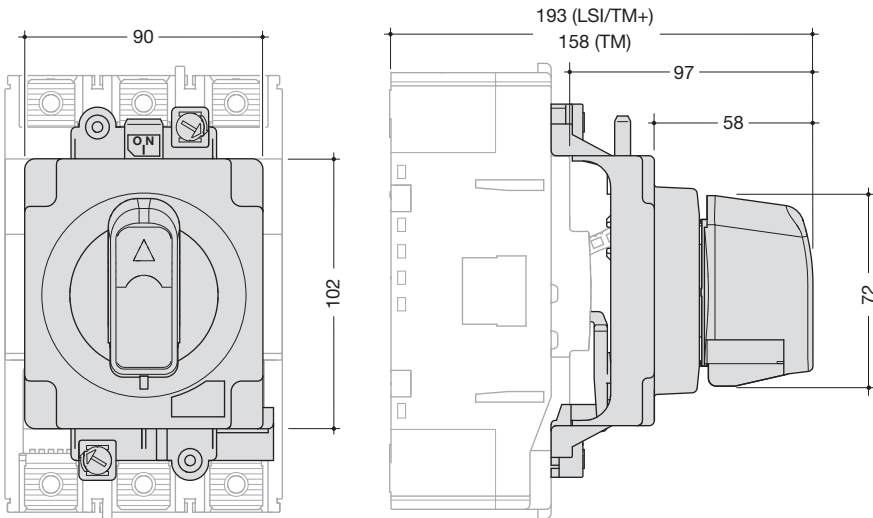
	min. 35 mm ²	max. 120 mm ²
	min. 35 mm ²	max. 120 mm ²
6 mm hex key	19 Nm	

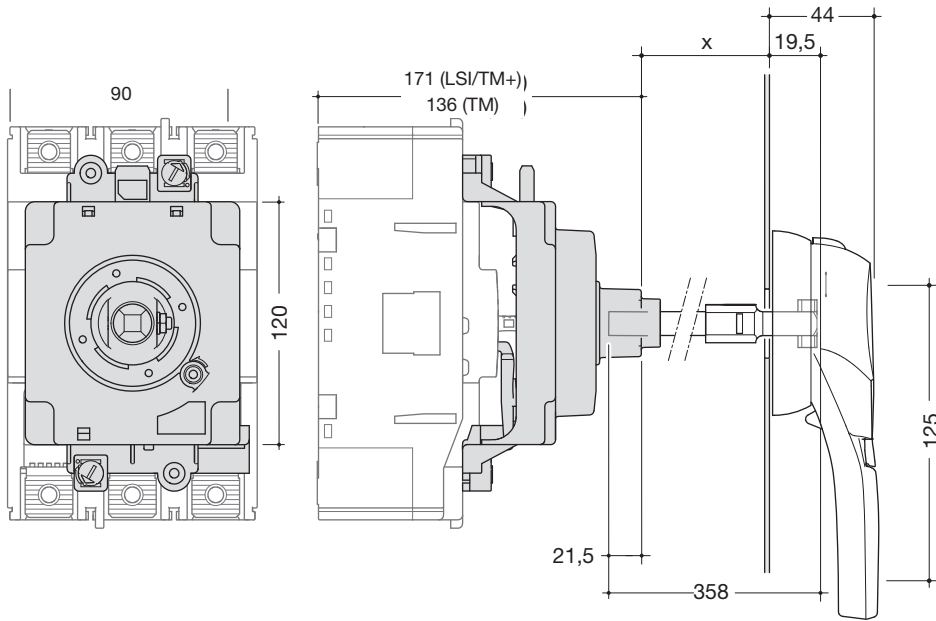
Rear connections (LSI/TM+ only)



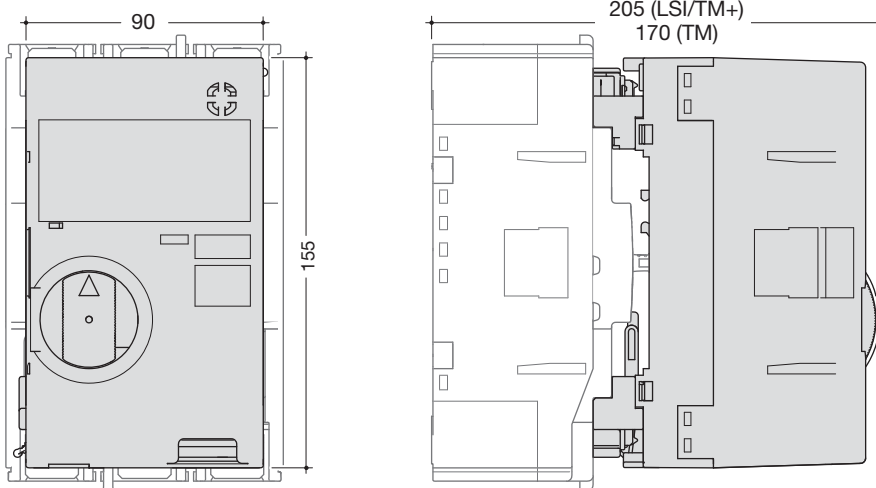
Accessories

Direct rotary handle



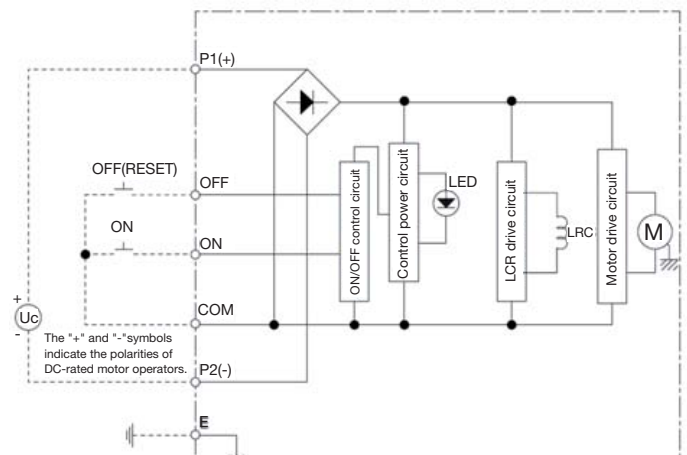


Motor operator



		HXC040H	HXC042H
Operating voltage		24V DC	230-240V AC
Operating current / starting current peak value (A)	24V DC	18/26	-
	230-240V AC	-	3,5/7
Operating time (s)	(ON)	0,1s	
	(OFF)	0,1s	
	(RESET)	0,1s	
Power supply required		300VA min.	
Dielectric properties (1 min)		1000V AC	1500V AC

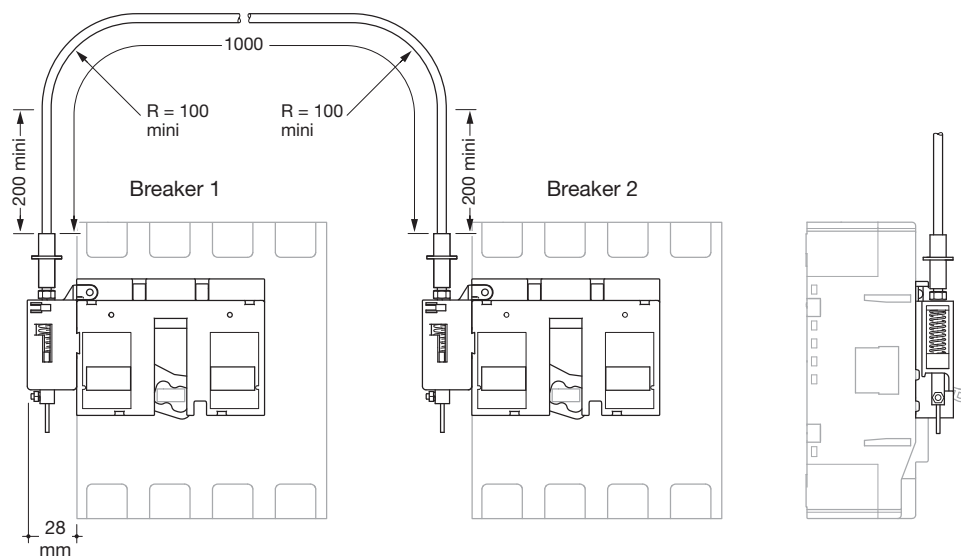
Wiring diagram



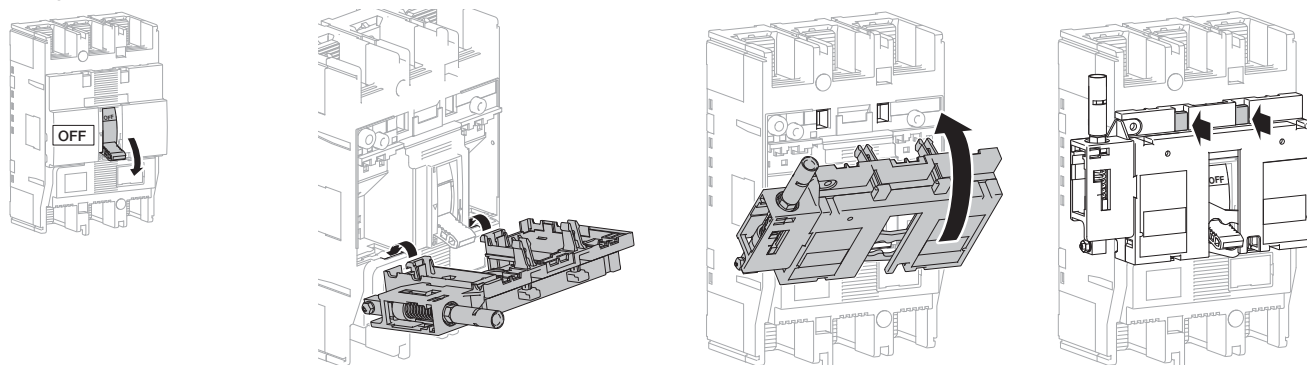
Interlocking system

Suitable with motor operator HXC04xH.
 With electrical interlock for motor operator HXB068H (for 250A) or
 HXB069H (for 630/1000A).

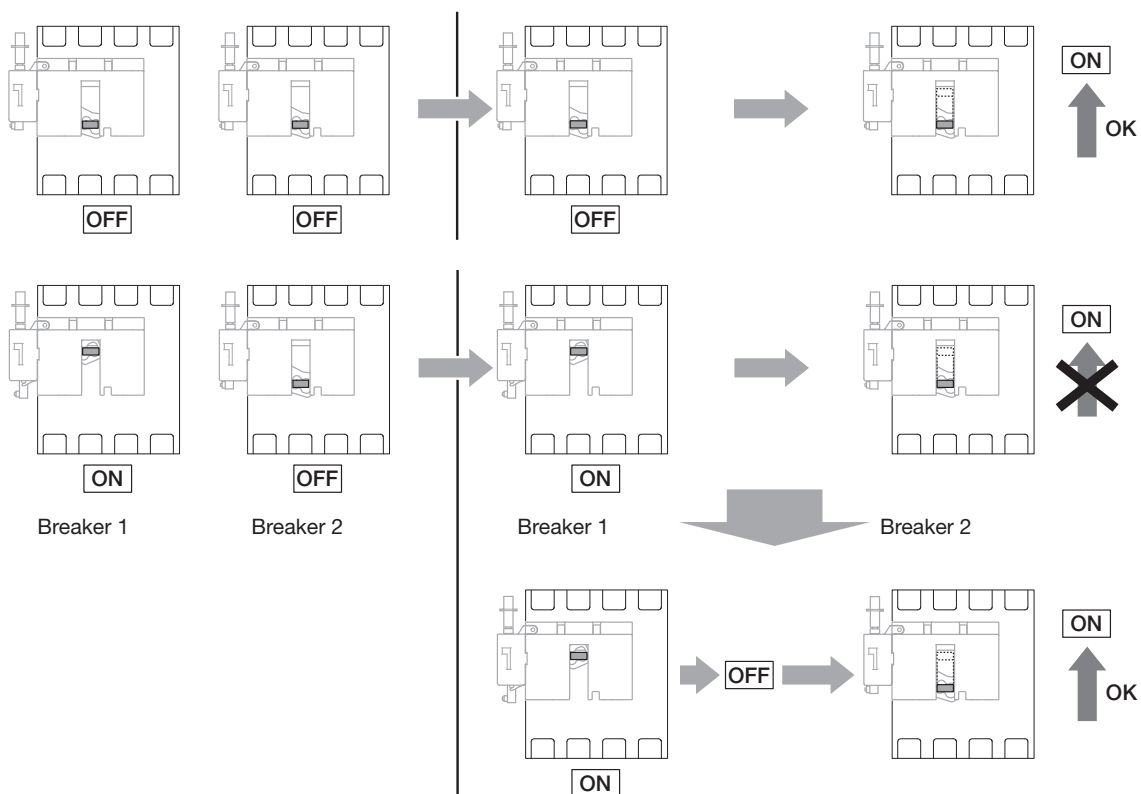
- Length HXB068H: 1500 mm
 - Length HXB069H: 2100 mm



Mounting

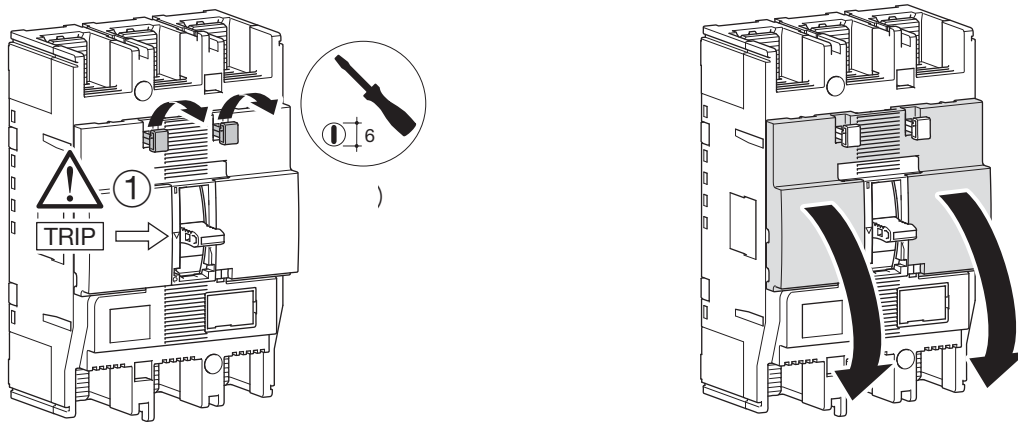


Checking the correct assembly

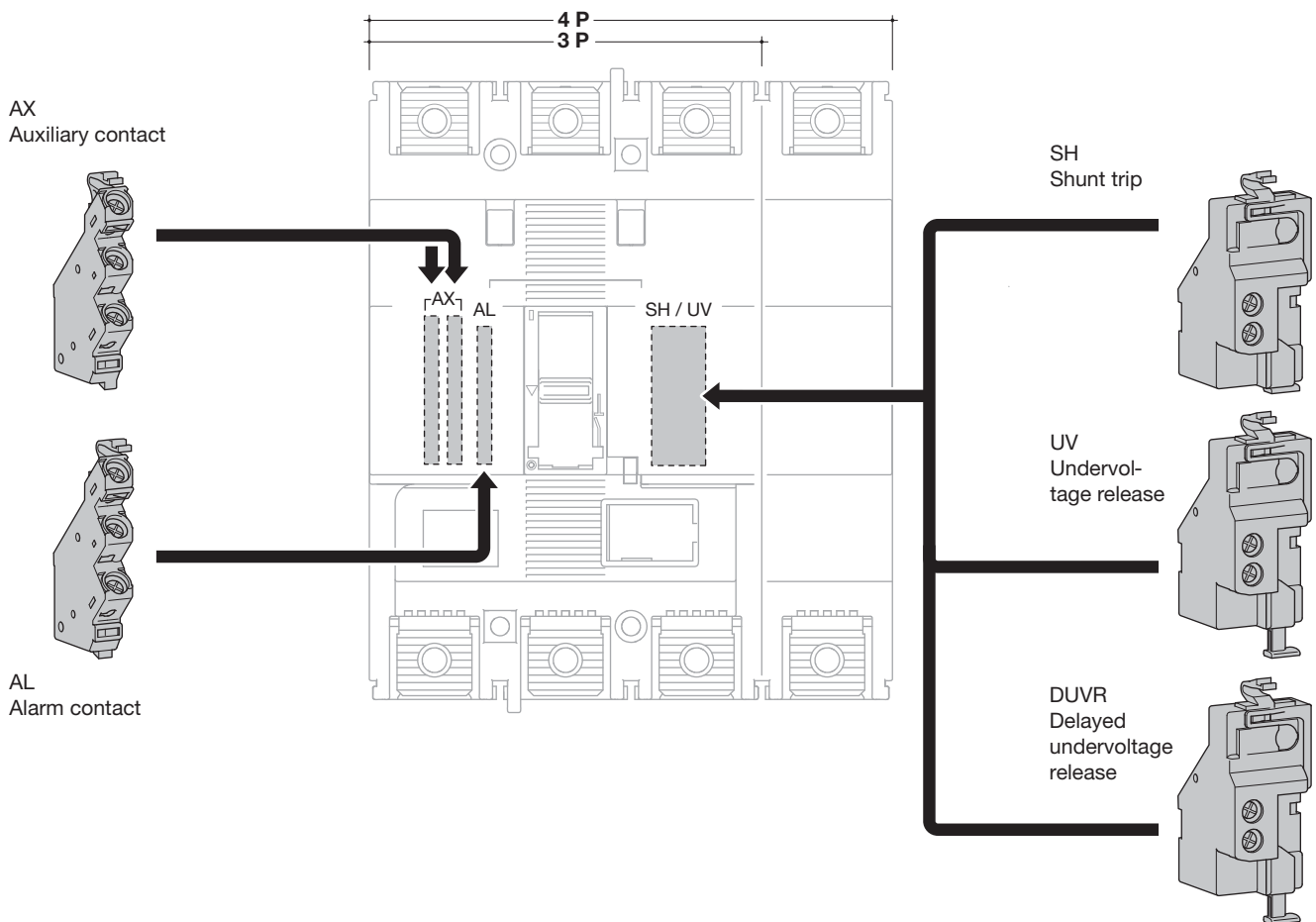


Auxiliaries

Auxiliaries for MCCBs and trip-free switches



Mounting combination for auxiliaries and releases



**Moulded case circuit breakers
h400, h630**

Thermal magnetic trip unit TM:

- thermal adjustment:
from 0.63 to 1 x I_n
- magnetic adjustment:
from 6 to 12 x I_n

Connection:

Directly on copper cable
terminal,
with end lug max. width: 30 mm

Comply with IEC 60 947-2.



HHD400U

Designation	Characteristics	I _n	Cat. ref.	
			3P	4P
MCCBs h400 25kA TM	breaking capacity I _{cu} : 25 kA (400/415 V AC) I _{cs} : 25 kA	250A	HHD250U	-
		400A	HHD400U	-
	adjustable thermal: 0.63 to 1 x I _n adjustable magnetic: 6 to 12 x I _n			
MCCBs h400 50kA TM	breaking capacity I _{cu} : 50 kA (400/415 V AC) I _{cs} : 50 kA	250A	HND250U	HND251U
		400A	HND400U	HND401U
	adjustable thermal: 0.63 to 1 x I _n adjustable magnetic: 6 to 12 x I _n			
MCCBs h400 70kA TM	breaking capacity I _{cu} : 70 kA (400/415 V AC) I _{cs} : 50 kA	250A	HKD250U	HKD251U
		400A	HKD400U	HKD401U
	adjustable thermal: 0.63 to 1 x I _n adjustable magnetic: 6 to 12 x I _n			

Moulded case circuit breakers h400, h630

Electronic trip unit LSI:

- long delay (thermal equivalent) adjustable:
 $I_r = 0.4$ to $1 \times I_n$
 - short delay (magnetic equivalent) adjustable:
 2.5 to $10 \times I_r$ (400A)
 2.5 to $8 \times I_r$ (630A)
 - time delay: $0,1 - 0,2$ s
 3P & 4P (adjustable neutral $0 - 50\% - 100\%$).
 Mechanical test button, lockable settings

Connection:

Directly on copper cable terminal,

with end lug max. width: 30 mm

Comply with IEC 60 947-2.

Trip-free switches

Allows tripping at distance using a voltmeterical trip unit (optional)

Comply with IEC 60 947-3.
 AC 23A / DC 22A

Add-on blocks

For h630 (LSI) devices
 These devices are intended to be fixed at the bottom of the devices.

Fixed version: 300mA sensitivity and instantaneous tripping

Adjustable version: sensitivity from 30mA to 6A, tripping from instantaneous to 1s delay.
 Test button for differential functioning check.
 Mechanical test button.
 LED or remote signal for tripping or advance warning (25-50% $I_{\Delta n}$).
 Type A (for fault component DC pulsating current) and HI (reinforced immunity against unexpected tripping).

Comply with IEC 60 947-2.



HND630H

Designation	Characteristics	In	Cat. ref.	
			3P	4P
MCCBs h630 50kA LSI * delivered with spreader bars	breaking capacity I _{cu} : 50 kA (400/415 V AC) I _{cs} : 50 kA	400A 630A	HND400H HND630H*	HND401H HND631H*
	adjustable thermal: $I_r = 0.4$ to $1 \times I_n$ adjustable magnetic: 2.5 to $10 \times I_r$ (250-400A) 2.5 to $8 \times I_r$ (630A) time delay: $0,1 - 0,2$ s			
MCCBs h630 70kA LSI * delivered with spreader bars	breaking capacity I _{cu} : 70 kA (400/415 V AC) I _{cs} : 50 kA	400A 630A	HED400H HED630H*	HED401H HED631U*
	adjustable thermal: $I_r = 0.4$ to $1 \times I_n$ adjustable magnetic: 2.5 to $10 \times I_r$ (250-400A) 2.5 to $8 \times I_r$ (630A) time delay: $0,1 - 0,2$ s			
Trip-free switches * delivered with spreader bars	suitable for AC 22A / AC 23A U _e : 415 V AC I _{cw} (0,3s) = 5kA	400A 630A	HCD400H HCD630H*	HCD401H HCD631U*
Add-on blocks (only for h630)	adjustable sensitivity $I_{\Delta n}$: 0,03 - 0,1 - 0,3 - 1 - 3 - 6A	400A	-	HBD401H
	adjustable tripping instantaneous time delay: 0,06s - 0,15s - 0,3s - 0,5 - 1s	500A	-	HBD631H



HBD401H

Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB is "open" or "close".
- 1 changeover alarm contact: indicates MCCB tripping.

Coil connection

Connection capacity:
0,75 mm² flexible or rigid cables
Optional connection cables.
The cable capacity of the terminals is 0,5 to 1,25 mm².

Shunt trip

Remotes tripping of MCCBs or trip-free switches.
Operating voltage: 0,7 to 1,1 x Un

Under voltage release

Allows the tripping of MCCBs or trip-free switches when voltage level drop between 35 and 70% of Un. Pick up voltage 0,85 x Un

Direct rotary handle

- padlockable
- equipped with front cover and handle
- fixing without any additional screw.

Extended rotary handle

- IP 55
- supplied complete with shaft and handle.

Designation	Characteristics	Cat. ref.
Auxiliary contacts	1 changeover contact	HXC021H
AX	250 V AC / 3A	
AL	125 V DC / 0,4A	
	1 NO + 1 NC	
	1 changeover alarm contact	HXC024H
	250 V AC / 3A	
	125 V DC / 0,4A	
	1 NO + 1 NC	
	low level contact (ON/OFF)	HXC025H
	125 V AC	
	1 NO + 1 NC	
	low level alarm contact	HXC026H
	125 V AC	
	1 NO + 1 NC	
Shunt trips	24 V DC	HXC001H
SH	48 V DC	HXC002H
	110 V DC	HXC008H
	100 - 120 V AC	HXC003H
	200 - 240 V AC	HXC004H
	380 - 450 V AC	HXC005H
Undervoltage releases	24 V DC	HXC011H
UV	100 - 120 V DC	HXC018H
	200 - 240 V DC	HXC019H
	100 - 120 V AC	HXC013H
	200 - 240 V AC	HXC014H
	380 - 450 V AC	HXC015H
Delayed undervoltage releases	24 V DC	HXD051H
DUVR	100 - 120 V AC	HXD053H
	200 - 240 V AC	HXD054H
	380 - 450 V AC	HXD055H
Designation	Characteristics	Cat. ref.
Direct rotary handle	padlockable handle max Ø 6 mm	HXD030H
Extended rotary handle	padlockable handle max Ø 8 mm	HXD031H
Padlock	to mount on MCCBs for handle locking for 3 padlock Ø 5 - 8 mm ² max	HXD039H



HXC021H

HXC024H



HXC004H



HXC014H



HXD030H



HXD039H



HXD042H



HYD003H



HYD015H



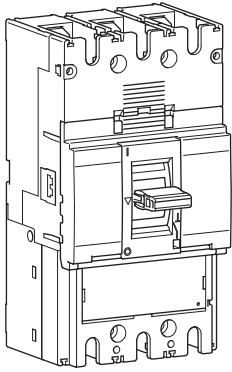
HYD022H



HYD033H

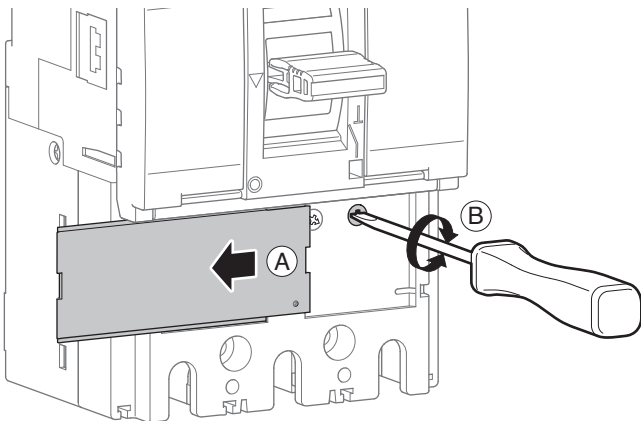
Motor operators	24-48 V DC		HXD040H	HXD040H
	100-240 V AC		HXD042H	HXD042H
Interlocking kit	wire type		HXD065H	HXD065H
	set of 2 pieces and cable			
Interlocking unit	wire type		HYD066H	HYD066H
Interlocking mechanical cable	1 m		HXB070H	HXB070H
	1,5 m		HXB071H	HXB071H
Electrical interlocks	for motor type A (between 2 630/1000A)		HXD068H	HXD068H
	for motor type B (between 630 and 250A)		HXB069H	HXB069H
Collar terminals	set of 3 or 4 terminals for copper conductors 1 x 35 - 240 mm ²	250 - 400A	HYD003H	HYD004H
	set of 3 or 4 terminals for aluminium / copper conductors 1 x 35 - 240 mm ²	250 - 400 - 630A	HYD005H	HYD006H
	set of 3 or 4 terminals for multiple aluminium / copper conductors 2 x 35 - 240 mm ²	250 - 400 - 630A	HYD007H	HYD008H
Extended connections	set of 4 pieces for straight connections	250 - 400A 630A	HYD010H HYD013H	HYD010H HYD013H
	spreader connections	250 - 400A 630A	HYD011H HYD014H	HYD012H HYD015H
Interphase barrier	set of 4 pieces		HYD019H	HYD019H
Terminal covers	for extended straight connections		HYD021H	HYD022H
	for extended spreader connections		HYD023H	HYD024H
	for rear connections		HYD025H	HYD026H
	for collar terminals		HYD027H	HYD028H
Rear connections		250 - 400A 630A	HYD031H HYD033H	HYD032H HYD034H
Connecting kit	0,75 mm ² set of 3 x 2 wires length: 1,30m		HYA035H	HYA035H
Designation	Characteristics			Cat. ref.
Ring lugs	compact lugs 120 mm ² Ø10			HYD093H
	compact lugs 150 mm ² Ø10,5			HYD095H
	compact lugs 185 mm ² Ø10,5			HYD096H
	compact lugs 185 mm ² Ø12,8 suitable with spreader			HYD097H
	compact lugs 240 mm ² Ø12,8 suitable with spreader			HYD098H

MCCBs

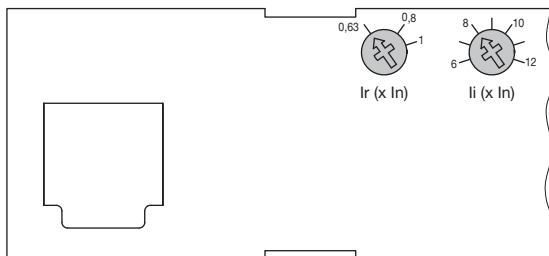


		220/240 V AC	380/415 V AC	660/690 V AC
h400 TM/h630 LSI HND	I _{cu} (kA)	85	50	20
	I _{cs} (kA)	85	50	15
h400 TM HKD	I _{cu} (kA)	100	70	20
	I _{cs} (kA)	85	50	15
h400 TM HHD	I _{cu} (kA)	35	25	-
	I _{cs} (kA)	35	25	-
h630 LSI HED	I _{cu} (kA)	100	70	20
	I _{cs} (kA)	85	50	15
h630 HCD	I _{cm} (kA)	-	9	-
	I _{cw} (kA)	-	5 kA-0,3 s	-

Settings



Magnetic and thermal settings (TM)



Thermal adjustment from 0,63 to 1 x I_n

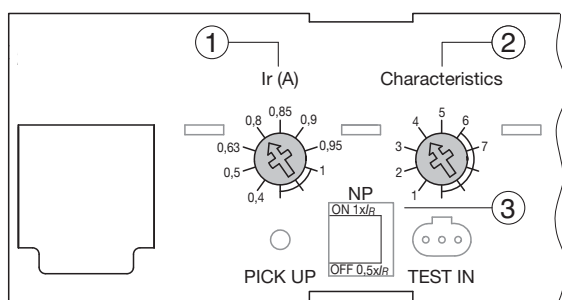
Magnetic adjustment from 6 to 12 x I_n

Electronic trip unit setting (LSI)

L - Long delay - protection against overloads: I_r and t_r settings

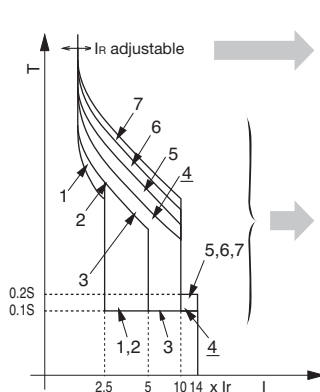
S - Short delay - protection against short circuits: I_{sd} and t_{sd} settings

I - Instantaneous - max. instantaneous threshold (< 10 ms) in case of short circuit: $2,5$ to $10 \times I_r$ (250 - 400A) and $2,5$ to $8 \times I_r$ (630A).



Neutral settings:

- ① Long delay current I_r setting
- ② Other curve characteristics setting (t_r , I_{sd} , t_{sd})
- ③ Neutral protection against overloads setting

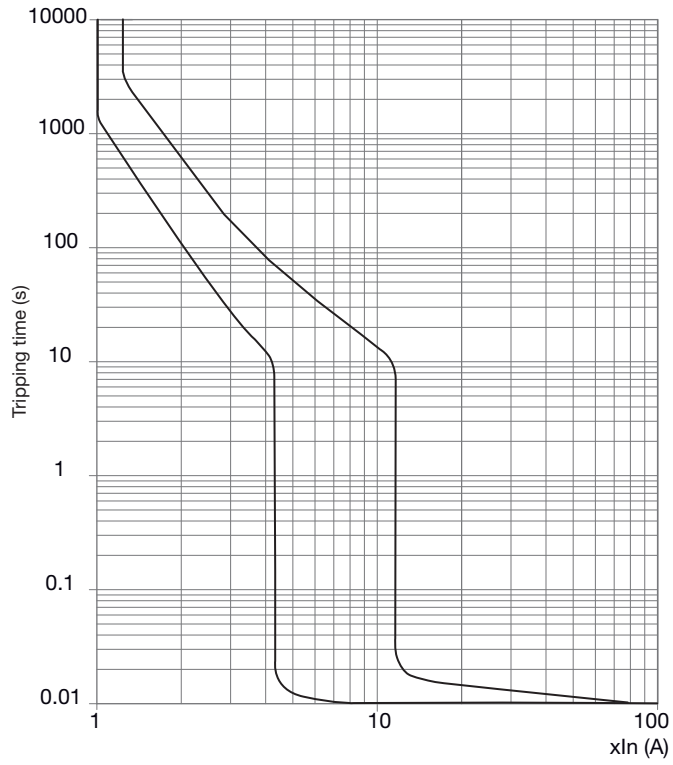


LSI	In A										
	Long Time Delay	250 A / 400 A				630 A					
		I_r (x I_n)	t_r (s)	I_{sd} (xlr)	t_{sd} (s)	li (xlr)	I_r (x I_n)	t_r (s)	I_{sd} (xlr)	t_{sd} (s)	li (xlr)
①	0,4	OK				OK					
I_r (x I_n)	0,5	OK				OK					
	0,63	OK				OK					
	0,8	OK				OK					
	0,85	-				OK					
	0,9	OK				OK					
	0,95	OK				OK					
	1	OK				OK					
	②	1	11s at 2 xlr	2,5	0,1	14 (max 13 x I_n)	11s at 2 xlr	2,5	0,1	14 (max 10 x I_n)	
Characteristics	2	21s at 2 xlr				21s at 2 xlr					
	3		5				5				
	4	5 s at 6 xlr	10			5 s at 6 xlr	8				
	5	10 s at 6 xlr		0,2		10 s at 6 xlr		0,2			
	6	19 s at 6 xlr				16 s at 6 xlr					
	7	29 s at 6 xlr				-					
	③	0% 50% 100%									

(*) Characteristic 1 : use for generators protection.
 Characteristic 2 to 4 - standard protection : options allow coordination optimisation with other products.
 Characteristic 5 to 7 - motor protection: use positions according to motor starting characteristics.

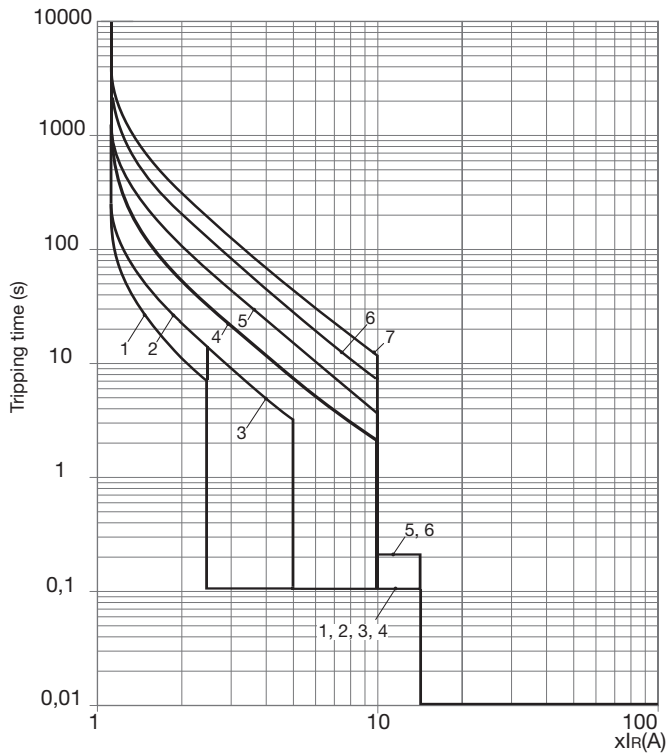
Tripping curve

MCCB h400 TM (250 and 400A)



Tripping curve

MCCB h630 LSI (250A and 400A)



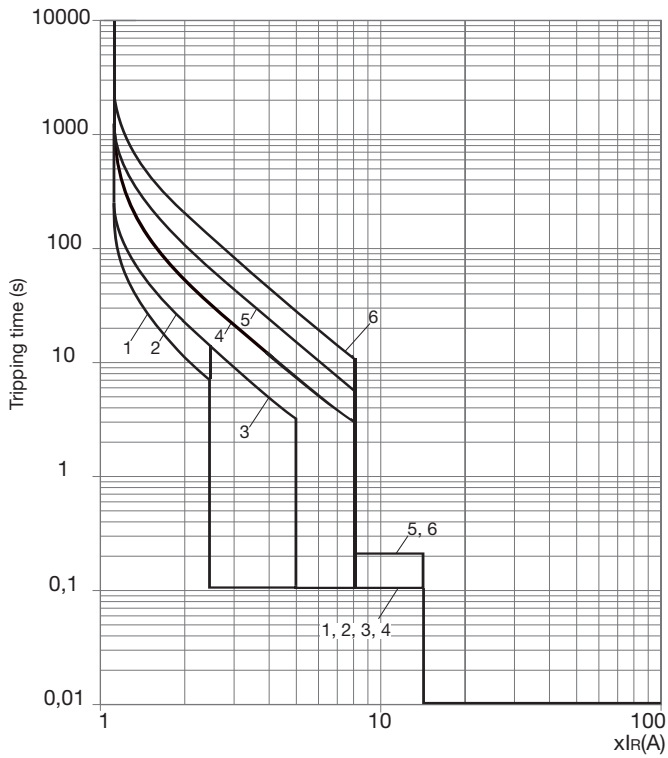
Electronic trip unit setting (LSI)

MCCB h630 LSI (250A and 400A)

		I_R (A)								
LTD Pick-up current		I_R	$\times I_n$	0,4	0,5	0,63	0,8	0,9	0,95	1
Characteristics			No.	1	2	3	4	5	6	7
Standard	LTD	t_R	(s)	11	21	21	5	10	19	29
				200% $\times I_R$			600% $\times I_R$			
	STD	I_{sd}	$\times I_R$	2,5		5	10			
		t_{sd}	(s)	0,1					0,2	
	INST	I_i	$\times I_R$	14 (max : 13 $\times I_n$)						
Optional	N	I_N	$\times I_n$	0 - 0,5 - 1						
		t_N	(s)	$t_N = t_R$						

Tripping curve

MCCB h630 LSI (630A electronic)



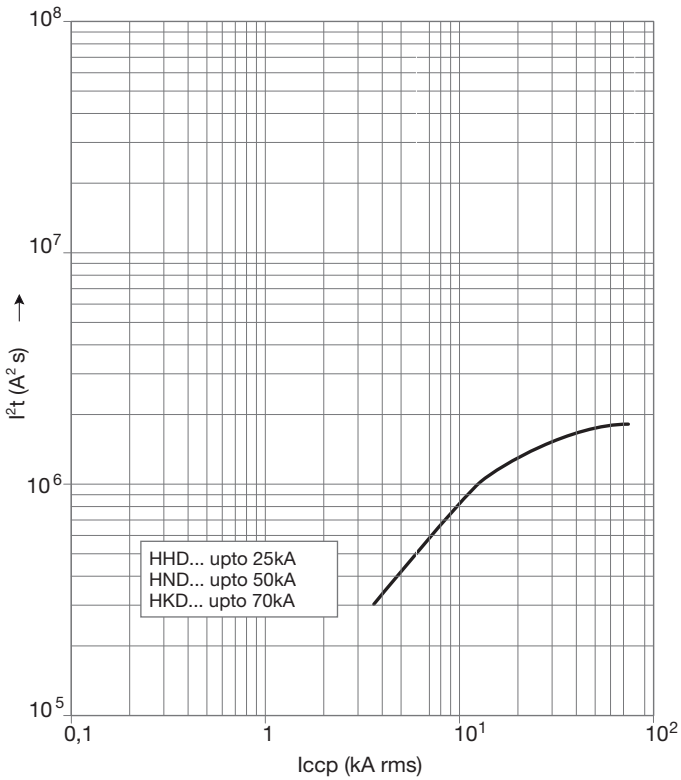
Electronic trip unit setting (LSI)

MCCB h630 LSI (630A electronic)

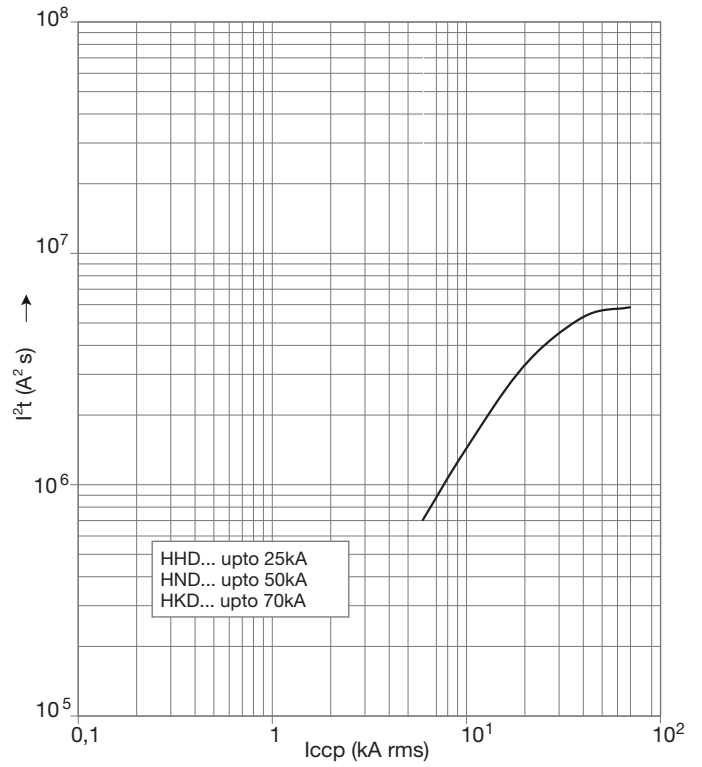
		I_R (A)									
LTD Pick-up current		I_R	$x I_n$	0,4	0,5	0,63	0,8	0,85	0,9	0,95	1
Characteristics		No.		1	2	3	4	5	6		
Standard	LTD	t_R	(s)	11	21	21	5	10	16		
				200% $x I_R$				600% $x I_R$			
	STD	I_{sd}	$x I_R$	2,5		5	8				
			t_{sd}	(s)	0,1				0,1		
Optional	N	I_N	$x I_n$	0 - 0,5 - 1							
			t_N	(s)	$t_N = t_R$						

Thermal constraint curve at 400V (Let-through energy)

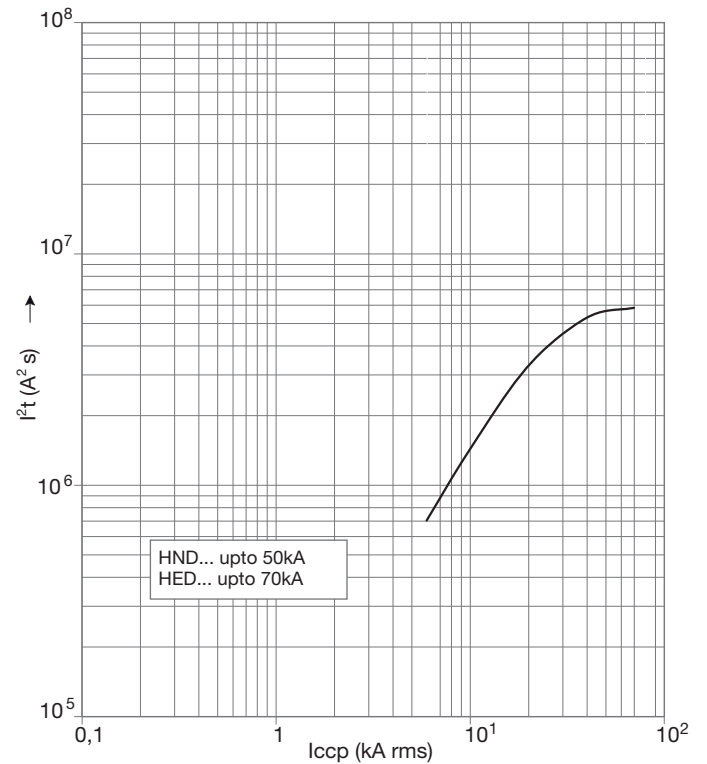
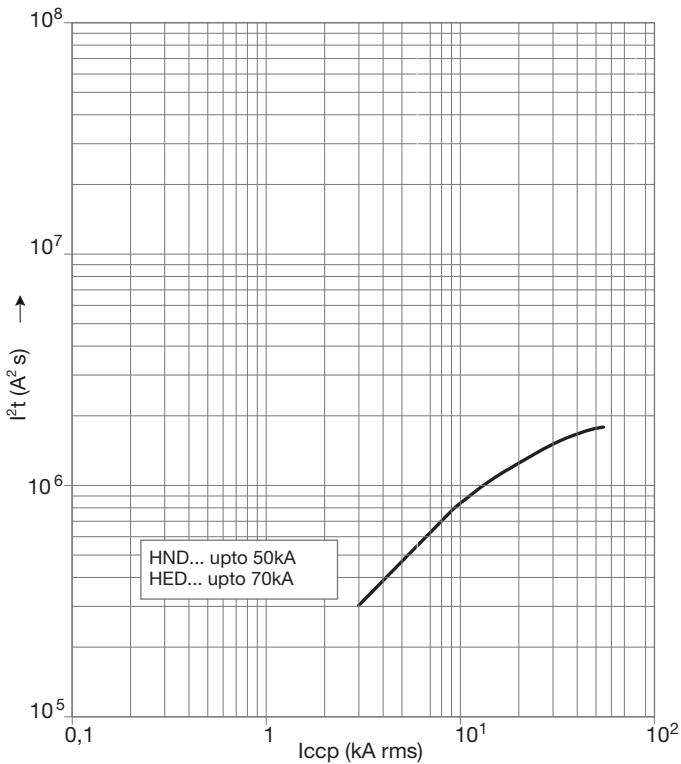
MCCB h400 TM (250A)



MCCB h400 TM (400A)

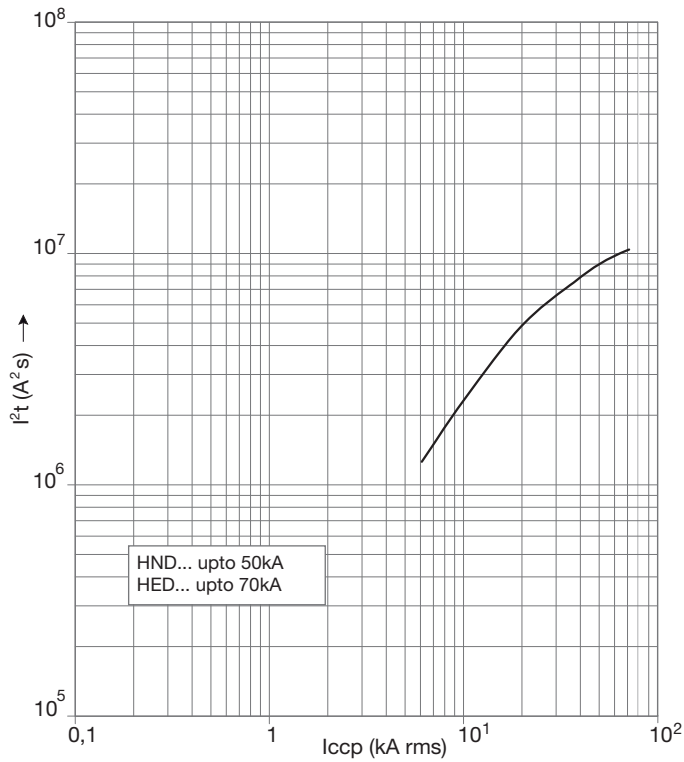


MCCB h630 LSI (250A)



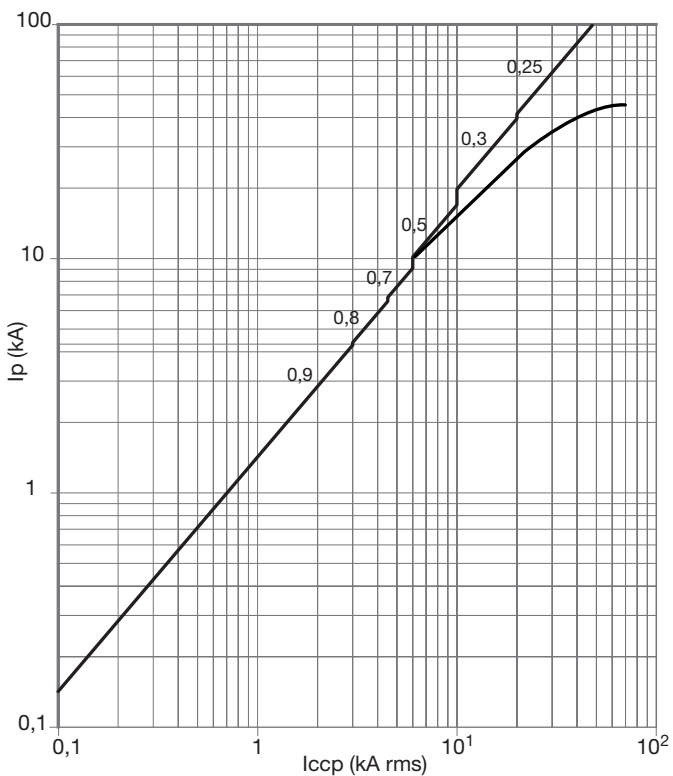
Thermal constraint curve at 400V (Let-through energy)

MCCB h630 LSI (630A)

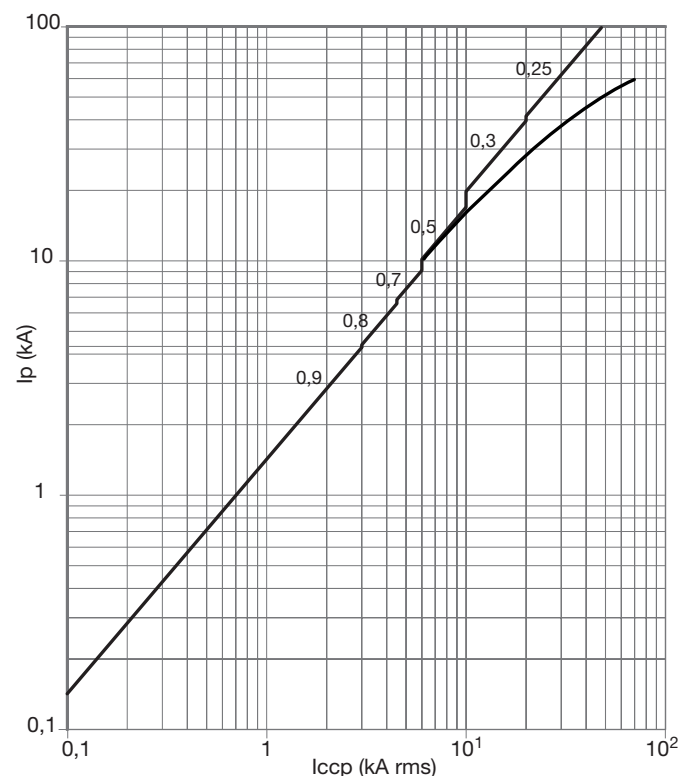


Current limiting curve at 400V (Let-through peak current)

**MCCB h630 LSI (250A and 400A)
MCCB h400 TM**

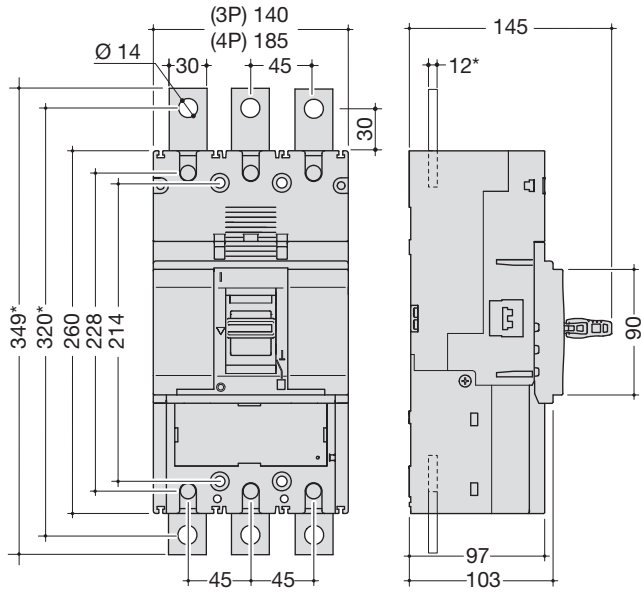


MCCB h630 LSI (630A)

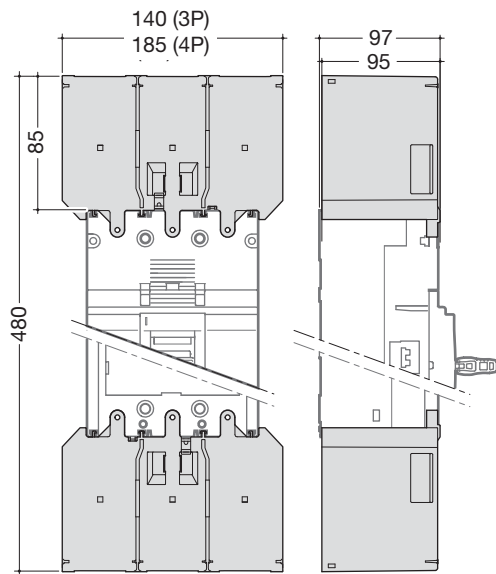


Dimensions

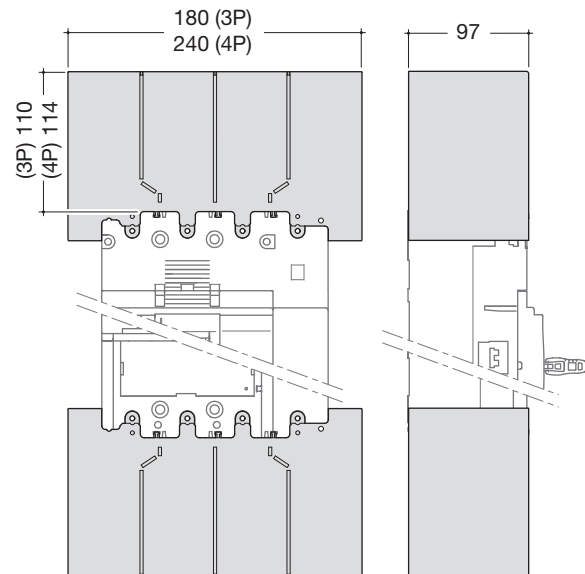
MCCBs



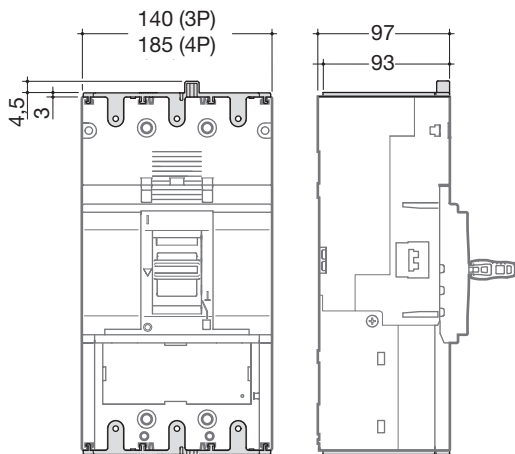
Terminal covers for extended straight connections



Terminal covers for extended spreader connections



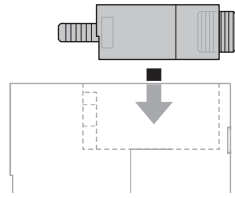
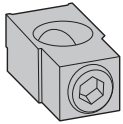
Terminal covers for rear connections and collar terminal





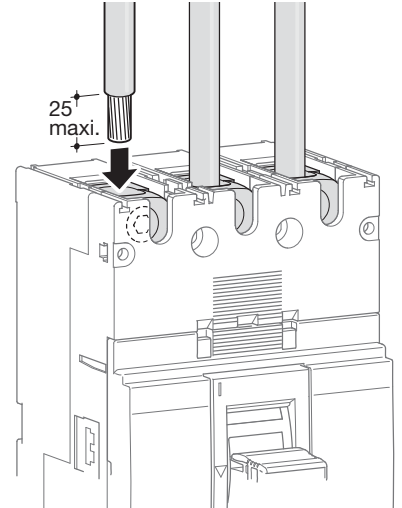
Connection

**Connection for aluminium / copper conductors
(h400 TM, h630 LSI)**

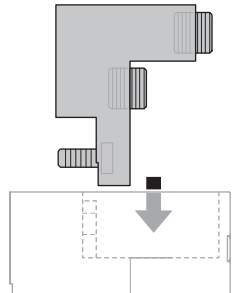
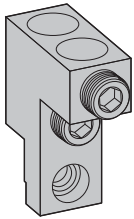
HYD005 (3P) - HYD006H (4P)





	max. 1x240 mm ²
	25 Nm

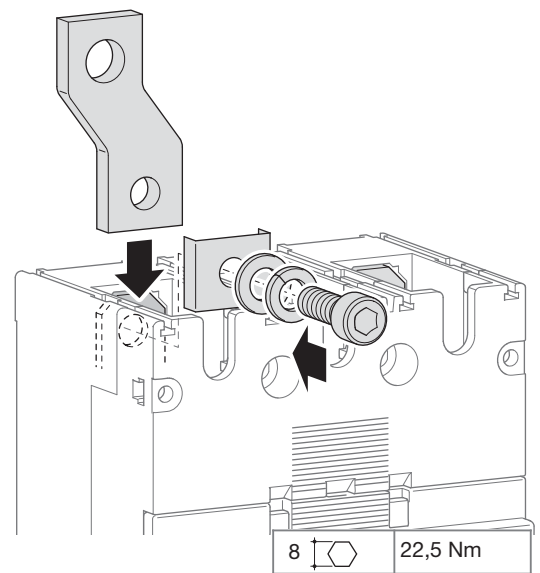
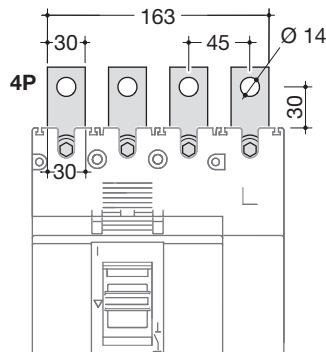
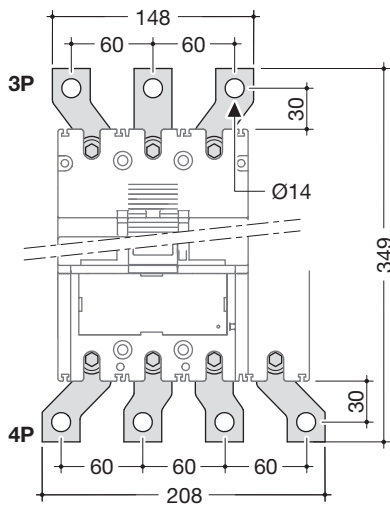


HYD007 (3P) - HYD008H (4P)

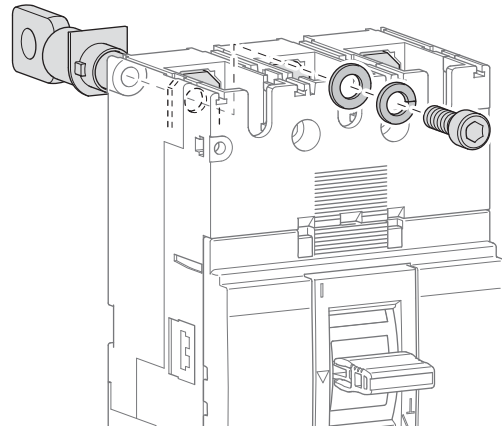
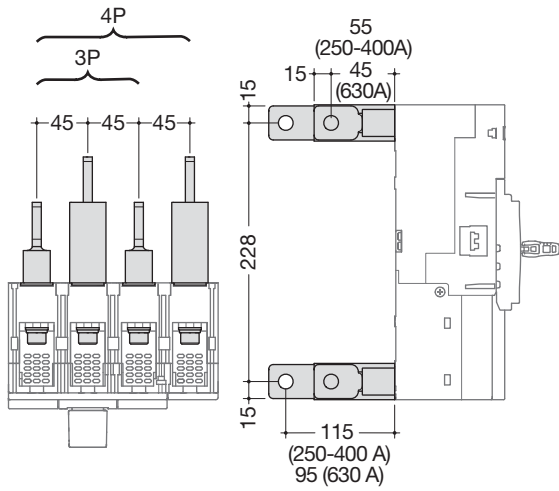


	max. 2x240 mm ²
	25 Nm

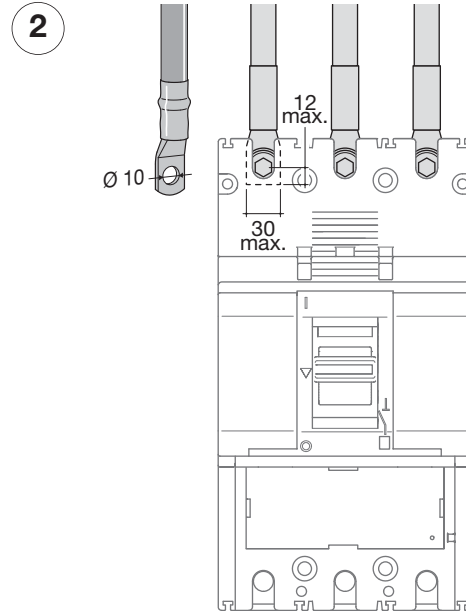
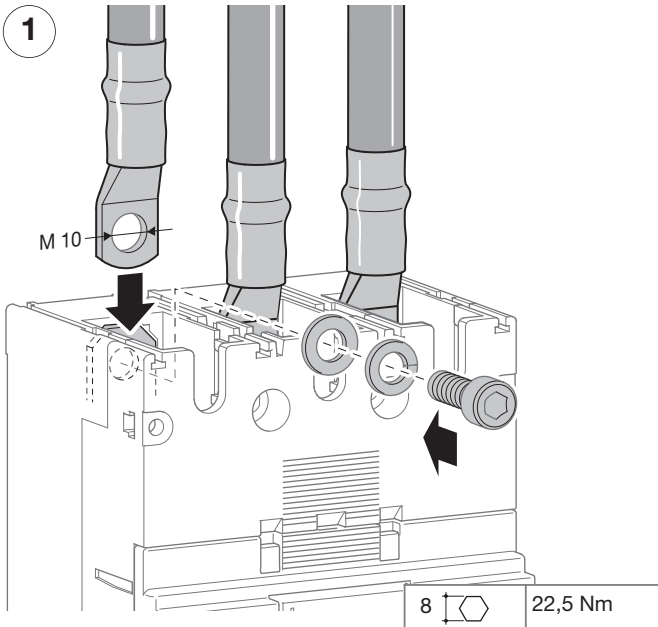
Extended straight and spreader connections



Rear connections

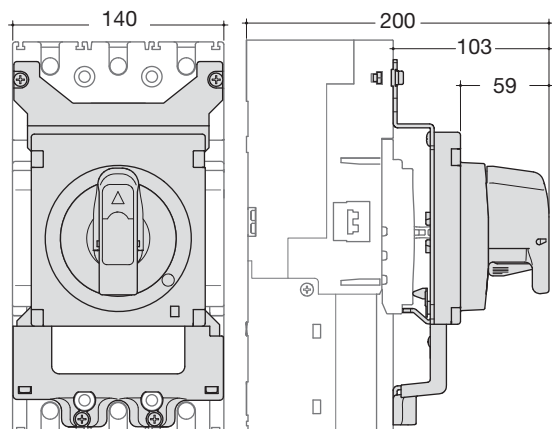


Connection with end lugs

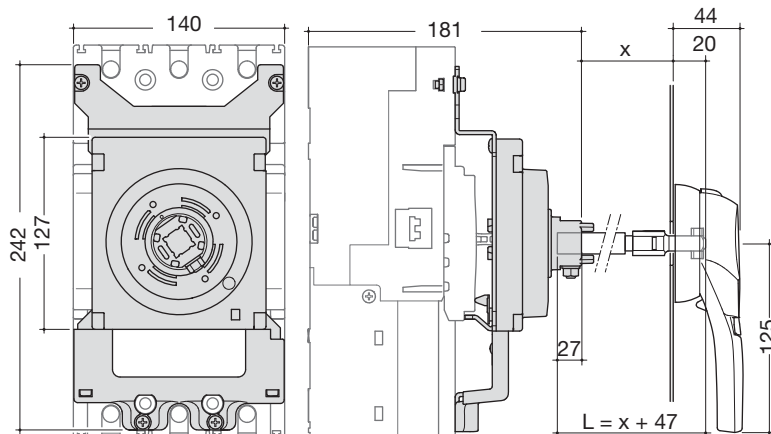


Accessories

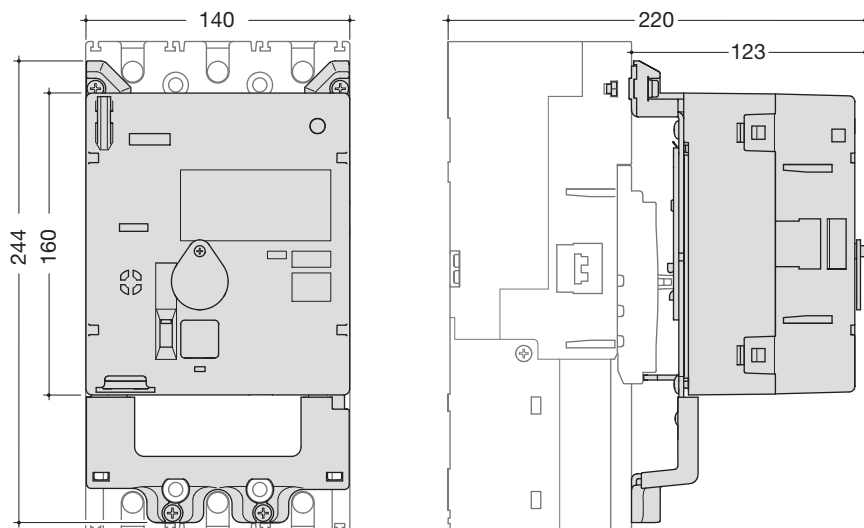
Direct rotary handle



Extended rotary handle

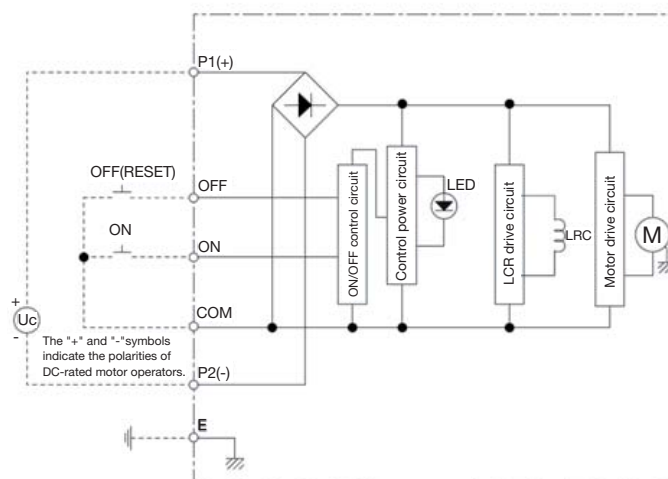


Motor operator



		HXD040H	HXD042H
Operating voltage		24-48V DC	100-240V AC
Operating current/starting current peak value (A)	24V DC	-/9,2 (ON) 4,3/9,8 (OFF, RESET)	-
	48V DC	-/3,8 (ON) 2,0/5,2 (OFF, RESET)	-
	100-110V AC	-	-/1,9 (ON) 1,3/3,8 (OFF, RESET)
	200-240V AC	-	-/3,3 (ON) 0,9/3,8 (OFF, RESET)
Operating time (s)	(ON)	0,1s	
	(OFF)	1,5 s	
	(RESET)	1,5 s	
Power supply required		300VA min.	
Dielectric properties (1 min)		1000V AC	1500V AC

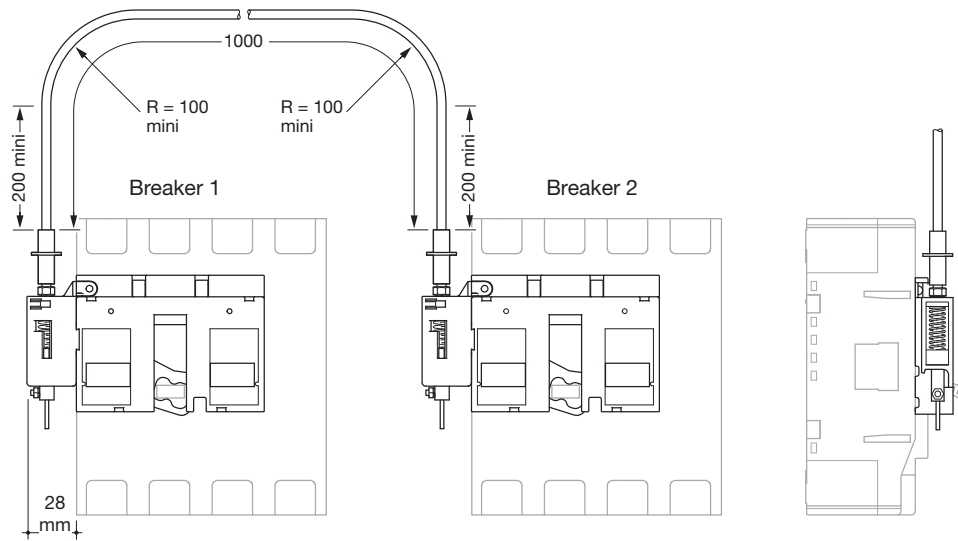
Wiring diagram



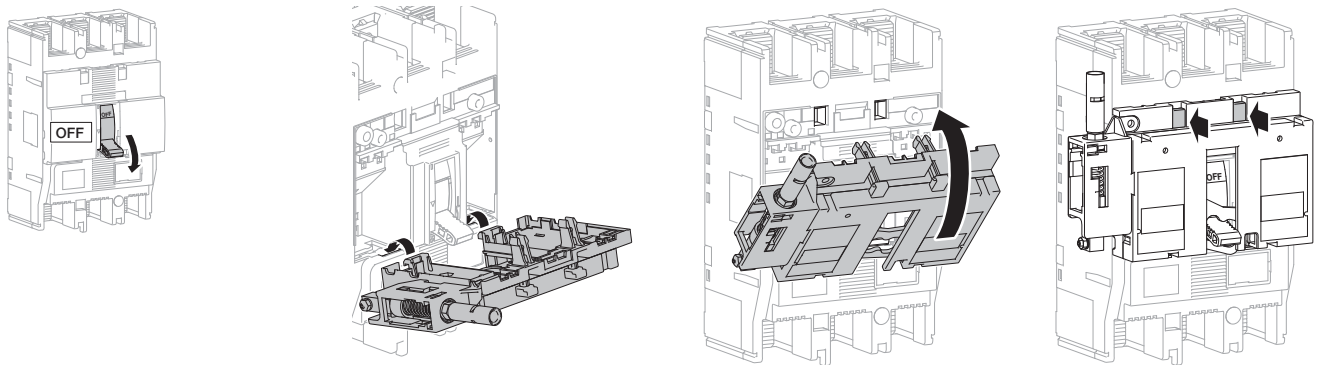
Interlocking system

Suitable with motor operator HXD04xH.
With electrical interlock for motor operator HXD068H (for 630/1000A) or HXB069H (for 250A).

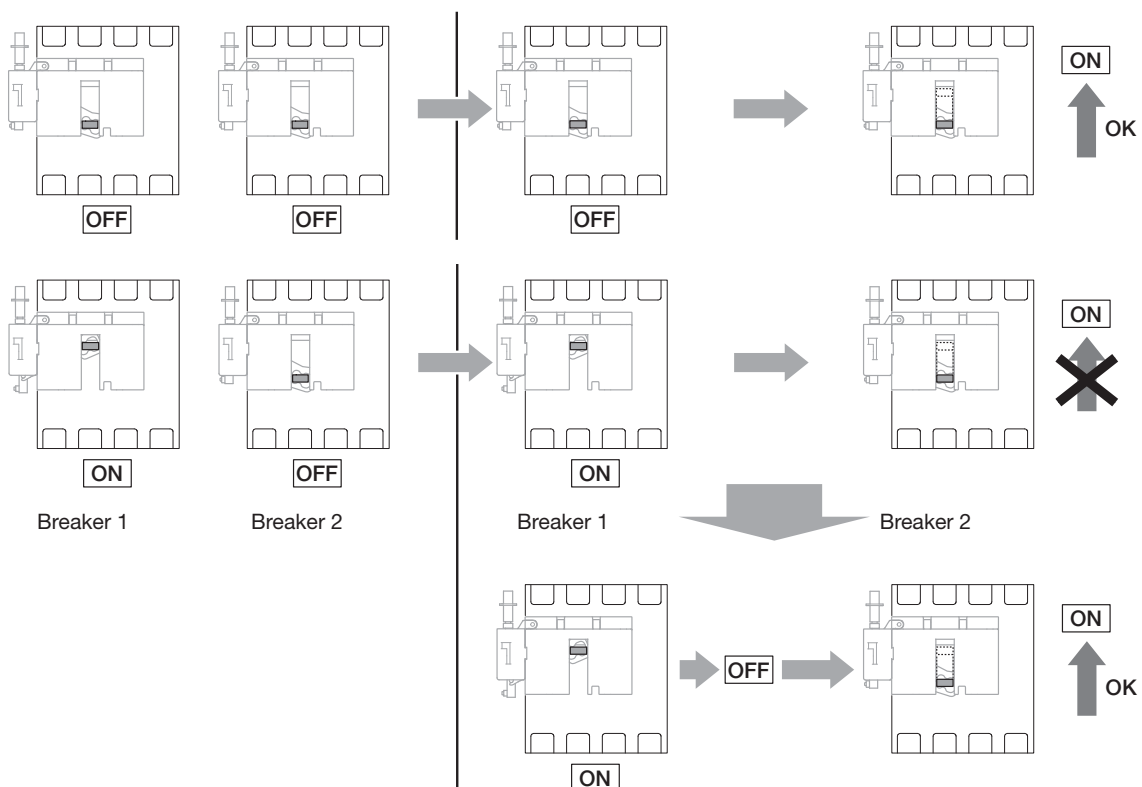
- Length HXD068H: 2100 mm
- Length HXB069H: 2100 mm



Mounting

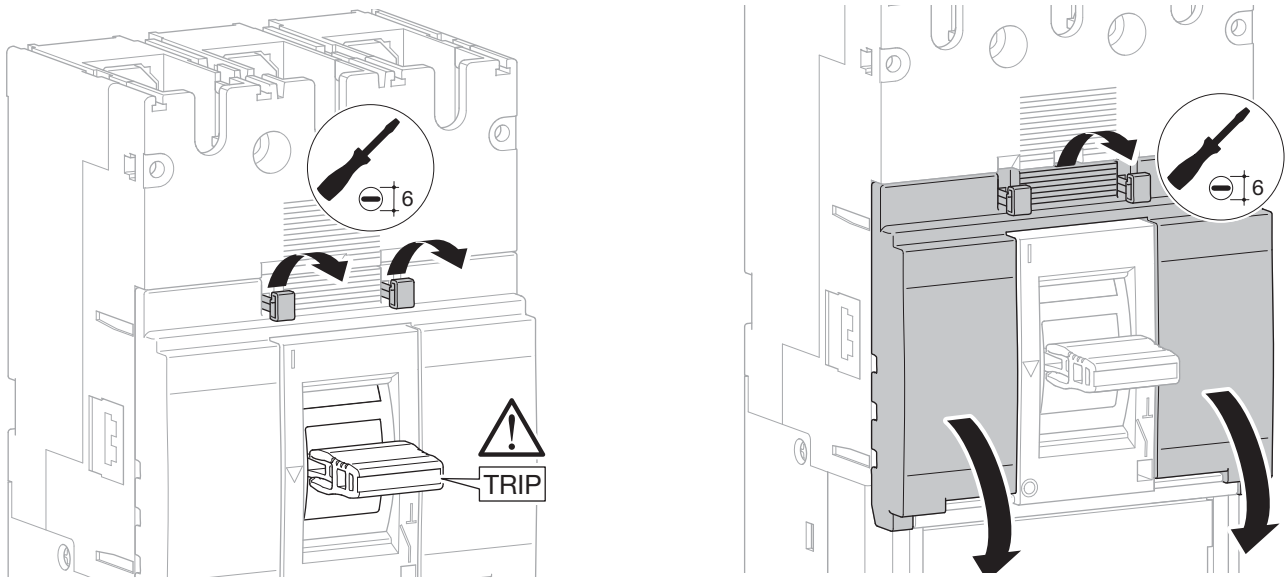


Checking the correct assembly

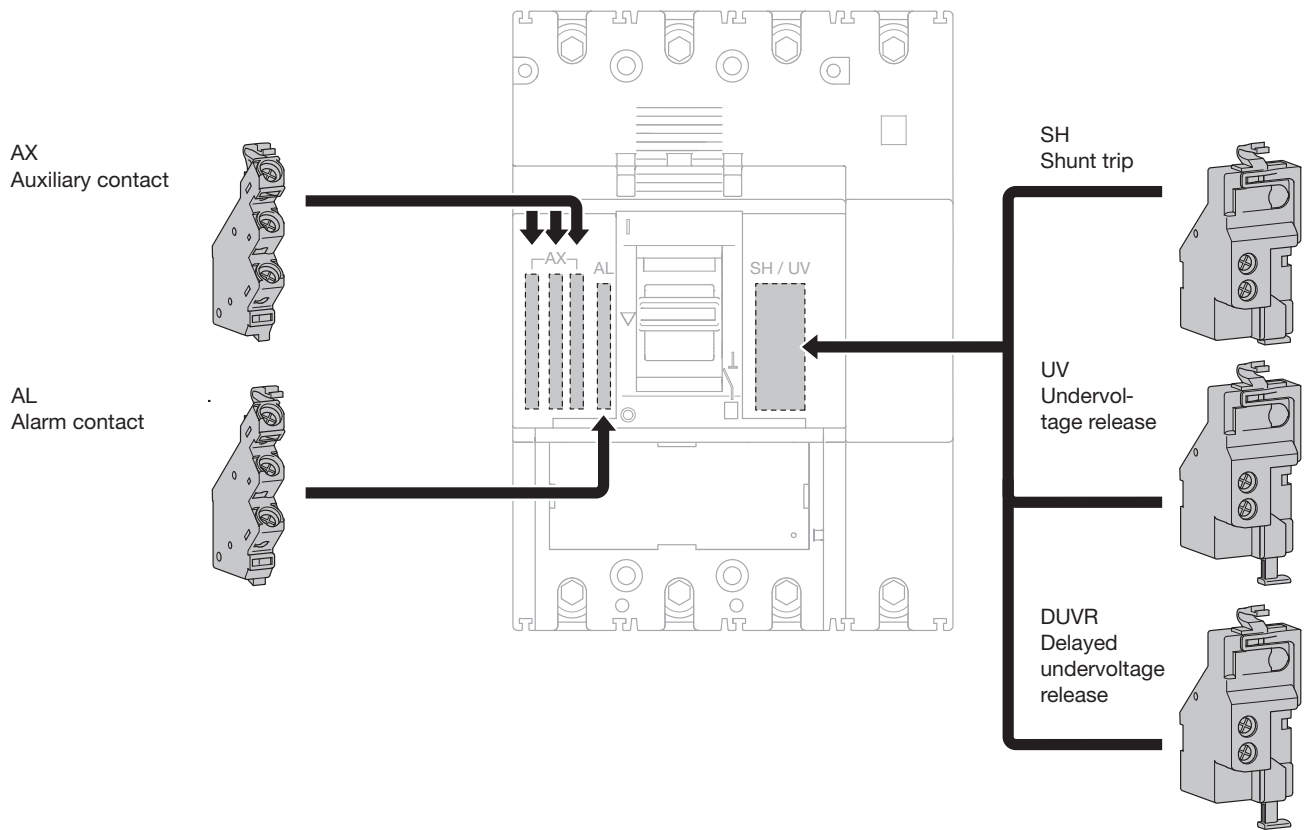


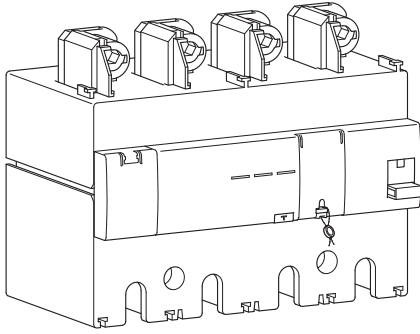
Auxiliaries

Auxiliaries for MCCBs and free tripping switches




Mounting combination for auxiliaries and releases





When associated with MCCB, the add-on block provides an earth fault protection and protects against electrical shocks by direct or indirect contacts.

The add-on blocks are protected against nuisance tripping caused by transient voltages. It's able to detect sinusoidal alternating currents and residual pulsating direct currents (A type ). It also avoids miss tripping (HI type - High Immunity).

Characteristics

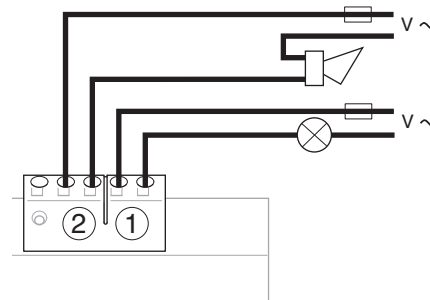
Reset button :
Signals add-on block tripping and must be acknowledged before switching on the installation.

Test button for differential functioning :
Allows to check the electrical operating of the MCCB / Add-on block association.

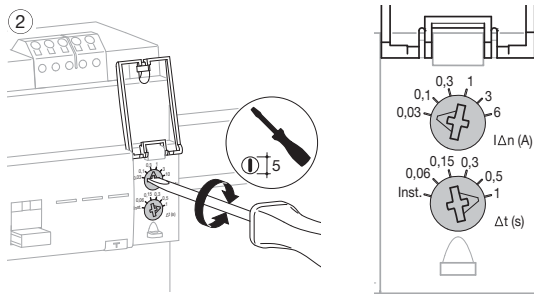
Mechanical test button :
Allows to check the mechanical operating of the MCCB / Add-on block association.

LED signaling default current level in the installation:
25% (orange) and 50% (red) I n; green light to signal correct operating.

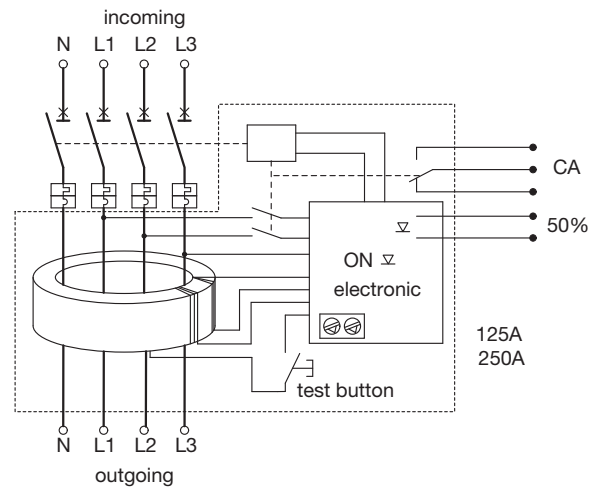
Remote tripping and advanced warning (50% I n) signaling thanks to these contacts:



Earth leakage current (IΔn) and delay (Δt) setting

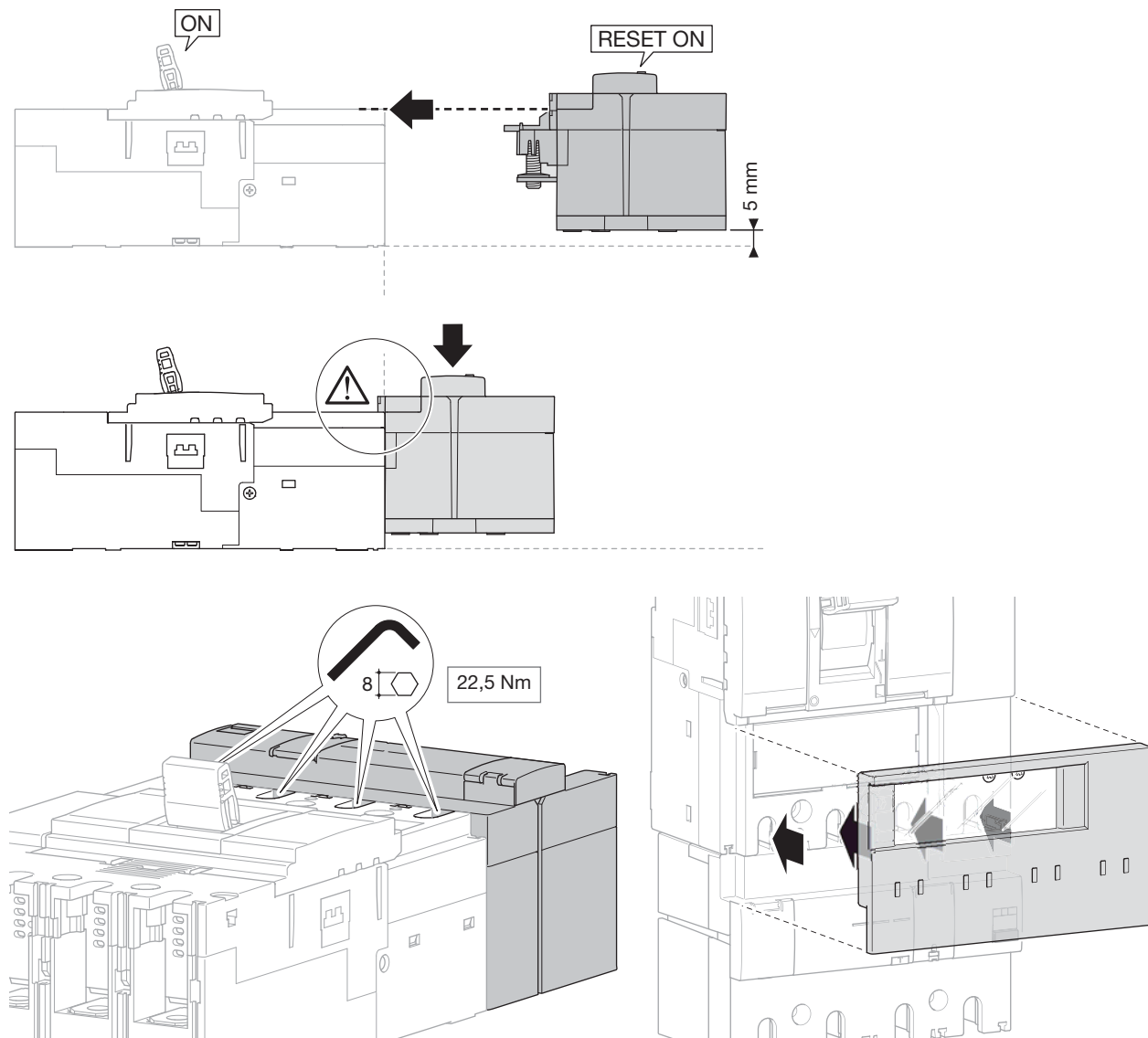


Add-on block operating

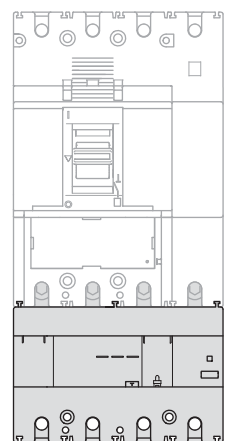


S (t)	A (I n)						
	0,03	0,1	0,3	1	3	6	
Inst.	OK	OK	OK	OK	OK	OK	
0,06	no	OK	OK	OK	OK	OK	
0,15	no	OK	OK	OK	OK	OK	
0,3	no	OK	OK	OK	OK	OK	
0,5	no	OK	OK	OK	OK	OK	
1	no	OK	OK	OK	OK	OK	

Add-on block mounting

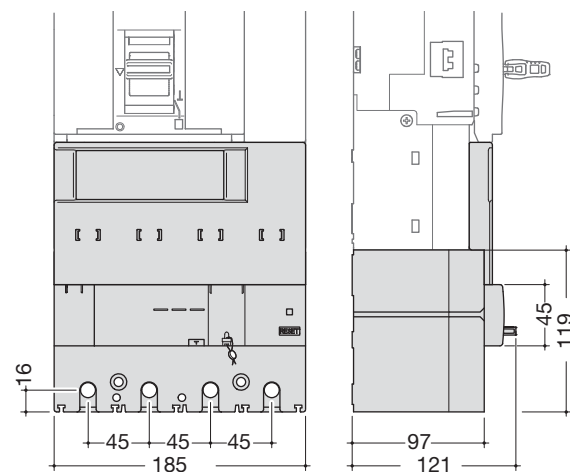


Association / Compatibility



250 - 400A	630A x 0,8
HBD401H 400A	HBD631H 500A (le: 630A x 0,8)

Dimensions



Moulded case circuit breakers h800

Thermal magnetic trip unit TM:

- thermal adjustment: from 0.63 to 1 x I_n
- magnetic adjustment: from 5 to 10 x I_n

Connection:

Directly on copper cable terminal, with end lug max. width: 30 mm

Comply with IEC 60 947-2.

Moulded case circuit breakers h1000

Electronic trip unit LSI:

- long delay (thermal equivalent) adjustable: I_r = 0,4 to 1 x I_n
- short delay (magnetic equivalent) adjustable: 2,5 to 10 x I_r (630-800A) and 2,5 to 8 x I_r (1000A)
- time delay: 0,1-0,2 s

3P & 4P (adjustable neutral 0 - 50% - 100%). Mechanical test button,

lockable settings.

Connection:

Directly on copper cable terminal, with end lug max. width: 50 mm

Comply with IEC 60 947-2.

Trip-free switches

Allows tripping at distance using a voltmetrical trip unit (optional)

Comply with IEC 60 947-3. AC 23A / DC 22A



HNE970U

Designation	Characteristics	I _n	Cat. ref.	
			3P	4P
MCCBs h800 50kA TM	breaking capacity I _{cu} : 50 kA (400/415 V AC) I _{cs} : 50 kA	630A	HNK630U	HNK631U
	adjustable thermal 0.63 to 1 x I _n adjustable magnetic 5 to 10 x I _n	800A	HNK800U	HNK801U
MCCBs h800 70kA TM	breaking capacity I _{cu} : 70 kA (400/415 V AC) I _{cs} : 50 kA	630A	HEK630U	HEK631U
	adjustable thermal 0.63 to 1 x I _n adjustable magnetic 5 to 10 x I _n	800A	HEK800U	HEK801U
MCCBs h1000 50kA LSI	breaking capacity I _{cu} : 50 kA (400/415 V AC) I _{cs} : 50 kA	630A	HNE630U	HNE631U
	adjustable thermal I _r = 0,4 to 1 x I _n adjustable magnetic 2,5 to 10 x I _r (630 - 800A) 2,5 to 8 x I _r (1000A) time delay: 0,1-0,2 s	800A	HNE800H	HNE801H
	neutral setting from 0-50 to 100%	1000A	HNE970H	HNE971H
MCCBs h1000 70kA LSI	breaking capacity I _{cu} : 70 kA (400/415 V AC) I _{cs} : 50 kA	800A	HEE800H	HEE801H
	adjustable thermal I _r = 0,4 to 1 x I _n adjustable magnetic 2,5 to 10 x I _r (800A) 2,5 to 8 x I _r (1000A) time delay: 0,1-0,2 s	1000A	HEE970H	HEE971H
Trip-free switches	suitable for AC 22A / AC 23A U _e : 415 V AC I _{cw} (0,3 s) = 10 kA	800A	HCE800H	HCE801U
		1000A	HCE970H	HCE971U

Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB is "open" or "close".
- 1 changeover alarm contact: indicates MCCB tripping.

Coil connection

Connection capacity:
0,75 mm² flexible or rigid cables
Optional connection cables.

The cable capacity of the terminals is 0,5 to 1,25 mm².




Shunt trip

Remotes tripping of MCCBs or trip-free switches.
Operating voltage:
0,7 to 1,1 x Un

Under voltage release

Allows the tripping of MCCBs or

trip-free switches when voltage level drop between 35 and 70% of Un. Pick up voltage 0,85 x Un

Designation	Characteristics	Cat. ref.	
 HXC021H HXC024H	Auxiliary contacts AX AL	1 changeover contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXC021H
		1 changeover alarm contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXC024H
		low level contact (ON/OFF) 125 V AC 1 NO + 1 NC	HXC025H
		low level alarm contact 125 V AC 1 NO + 1 NC	HXC026H
 HXC004H	Shunt trips SH	24 V DC	HXC001H
		48 V DC	HXC002H
		110 V DC	HXC008H
		100 - 120 V AC	HXC003H
		200 - 240 V AC	HXC004H
 HXE014H	Undervoltage releases UV	380 - 450 V AC	HXC005H
		24 V DC	HXE011H
		100 - 120 V DC	HXE018H
		200 - 240 V DC	HXE019H
		110 - 120 V AC	HXE013H
		220 - 240 V AC	HXE014H
Delayed undervoltage releases DUVR	24 V DC	HXE051H	
	110 - 120 V AC	HXE053H	
	220 - 240 V AC	HXE054H	
	380 - 415 V AC	HXE055H	

Direct rotary handle
- padlockable
- equipped with front cover and handle
- fixing without any additional screw.

Extended rotary handle
- IP 55
- supplied complete with shaft and handle.

Designation	Characteristics	In	Cat. ref.	
			3P	4P
Electrical interlock	for motor type A (between 2 630/1000A)		HXD068H	HXD068H
	for motor type B (between 1000A and 250A)		HXB069H	HXB069H
Collar terminals	Terminals for aluminium / copper conductors 4 x 35 - 240 mm ²	630-800A	HYE007H	HYE008H
Connecting kits	0,75 mm ² set of 3 x 2 wires length: 1,30m		HYA035H	HYA035H
Interphase barrier	set of 4 pieces		HYD019H	HYD019H
Terminal covers	for extended connections		HYE021H	HYE022H
	for rear connections		HYE025H	HYE026H
Rear connections		630-800A	HYE031H	HYE032H
		1000A	HYE033H	HYE034H



HYE031H

Designation	Characteristics	Cat. ref.
Direct rotary handles	padlockable handle	HXE030H
Extended rotary handles	padlockable handle	HXE031H
Padlocks	to mount on MCCB for handle locking for 3 padlocks max Ø 8 mm	HXD039H
Motor operators	24 - 48V DC	HXE040H
	100 - 240V AC	HXE042H
Interlocking kit	wire type set of 2 pieces and cable	HXE065H
Interlocking unit	wire type	HXE066H
Interlocking mechanical cable	1 m	HXB070H
	1,5 m	HXB071H

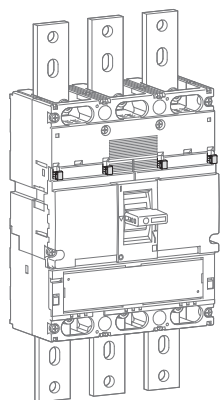


HXE030H

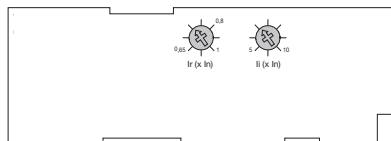


HXD039H

MCCBs

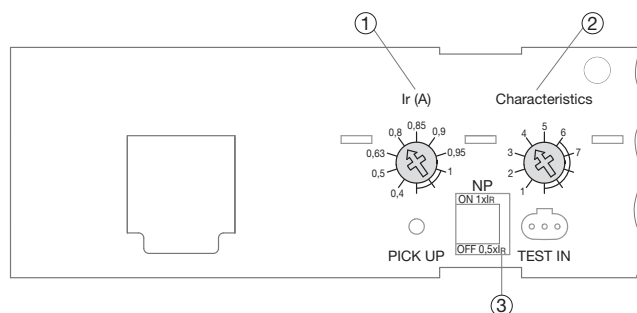
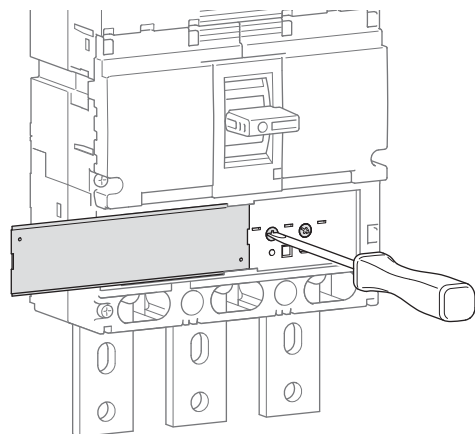


Magnetic and thermal settings



		220/240 V AC		380/415 V AC	660/690 V AC
		630 / 800A	1000A	630 / 800 / 1000A	630 / 800 / 1000A
LSI HNE	Icu (kA)	85	75	50	20
	Ics (kA)	85	75	50	20
LSI HEE	Icu (kA)	100	100	70	20
	Ics (kA)	100	75	50	20
TM HNK	Icu (kA)	85	-	50	20
	Ics (kA)	85	-	50	20
TM HEK	Icu (kA)	100	-	70	20
	Ics (kA)	75	-	50	20
HCE	Icm (kA)	-	-	17	-
	Icw (kA)	-	-	10kA - 0,3s	-

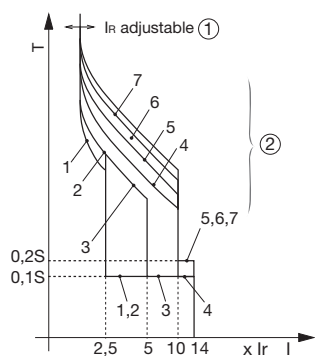
Electronic trip unit settings (LSI)



L - Long delay - protection against overloads: Ir and tr settings

S - Short delay - protection against short circuits: Isd and tsd settings

I - Instantaneous - max. instantaneous threshold (< 10 ms) in case of short circuit: 2,5 to 10 x Ir (630-800A) and 2,5 to 8 x Ir (1000A).



LSI	In A									
	630-800 A					1000 A				
	Long Time Delay		Short Time Delay		Inst	Long Time Delay		Short Time Delay		Inst
Ir (x In)	tr (s)	isd (xlr)	tsd (s)	li (xlr)	Ir (x In)	tr (s)	isd (xlr)	tsd (s)	li (xlr)	
①	0,4	OK				OK				
	0,5	OK				OK				
	0,63	OK				OK				
	0,8	OK				OK				
	0,9	OK				OK				
	0,95	OK				OK				
	1	OK				OK				
②	1	11s at 2 xlr	2,5	0,1	14	11s at 2 xlr	2,5	0,1	14	(max 12 x In)
	2	21s at 2 xlr				21s at 2 xlr				
	3		5				5			
	4	5 s at 6 xlr	10			5 s at 6 xlr	8			
	5	10 s at 6 xlr		0,2		10 s at 6 xlr		0,2		
	6	19 s at 6 xlr				16 s at 6 xlr				
	7	29 s at 6 xlr				-		-	-	
③	0%									
	50%									
	100%									

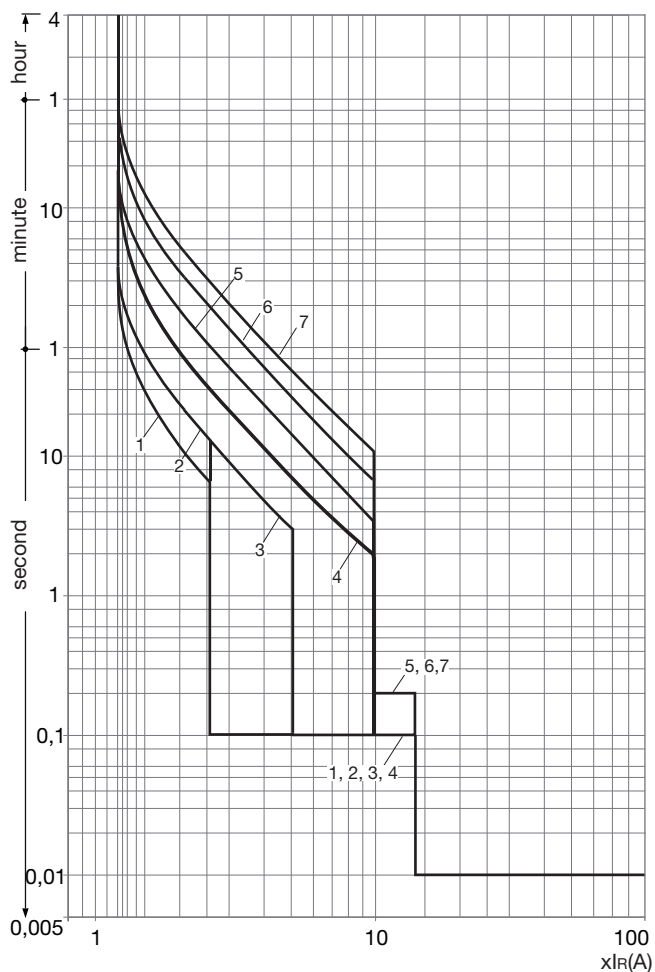
(*) Characteristic 1 : use for generators protection.

Characteristic 2 to 4 - standard protection : options allow coordination optimisation with other products.

Characteristic 5 to 7 - motor protection: use positions according to motor starting characteristics.

Tripping curve

MCCB h1000 LSI (630-800A)



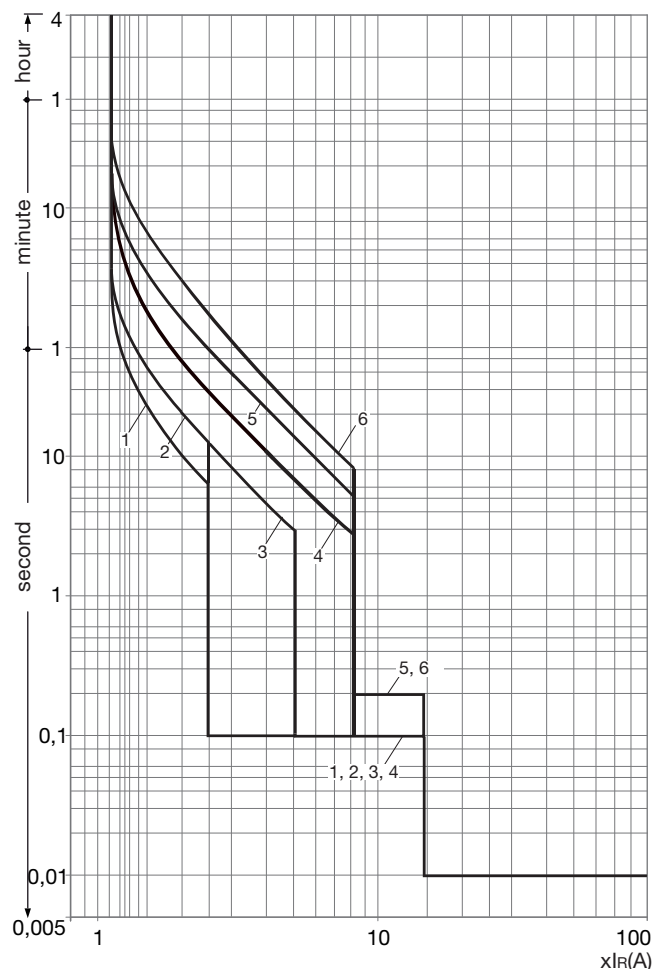
Electronic trip unit setting (LSI)

MCCBs 630-800A electronic

		I_R (A)								
LTD Pick-up current		I_R	$x I_n$	0,4	0,5	0,63	0,8	0,9	0,95	1
Characteristics			No.	1	2	3	4	5	6	7
Standard	LTD	t_R	(s)	11	21	21	5	10	19	29
				200% x I_R			600% x I_R			
	STD	I_{sd}	$x I_R$	2,5		5	10			
			t_{sd}	(s)	0,1					0,2
	INST	I_i	$x I_R$	14 (max : 12 x I_n)						
Optional	NP	I_N	$x I_n$	0 - 0,5 - 1						
			t_N	(s)	$I_N=t_R$					

Tripping curve

MCCB h1000 LSI (1000A)



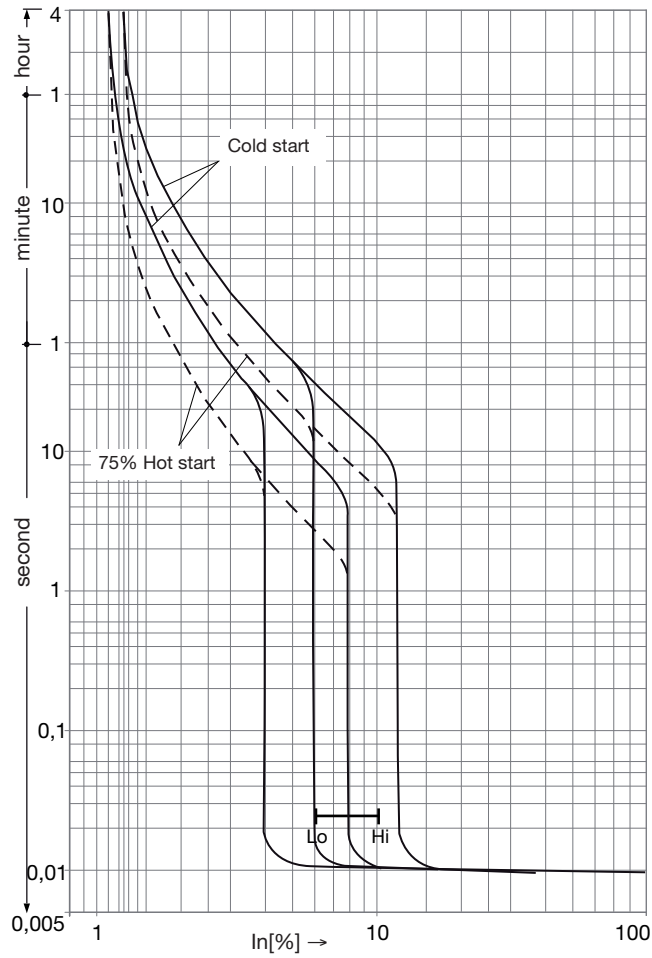
Electronic trip unit setting (LSI)

MCCBs 1000A electronic

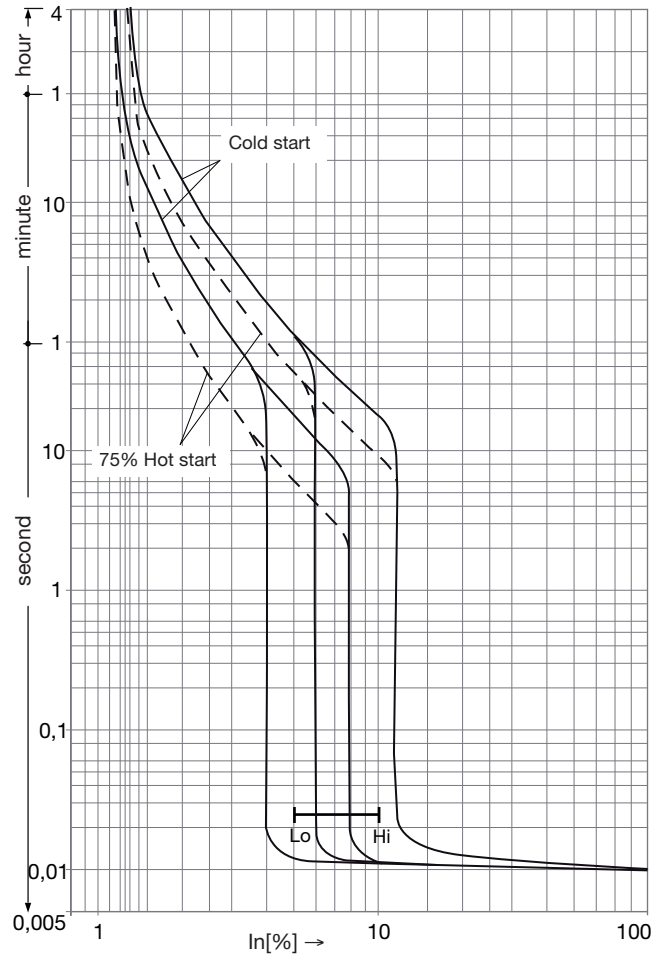
		I_R (A)								
LTD Pick-up current		I_R	x In	0,4	0,5	0,63	0,8	0,9	0,95	1
Characteristics			No.	1	2	3	4	5	6	
Standard	LTD	t_R	(s)	11	21	21	5	10	16	
				200% x I_R			600% x I_R			
	STD	I_{sd}	x I_R	2,5		5	8			
			t_{sd}	(s)	0,1					0,2
	INST	I_i	x I_R	14 (max : 10 x In)						
Optional	NP	I_N	x In	0 - 0,5 - 1						
			t_N	(s)	$I_N = t_R$					

Tripping curve

MCCB h800 TM (630A)

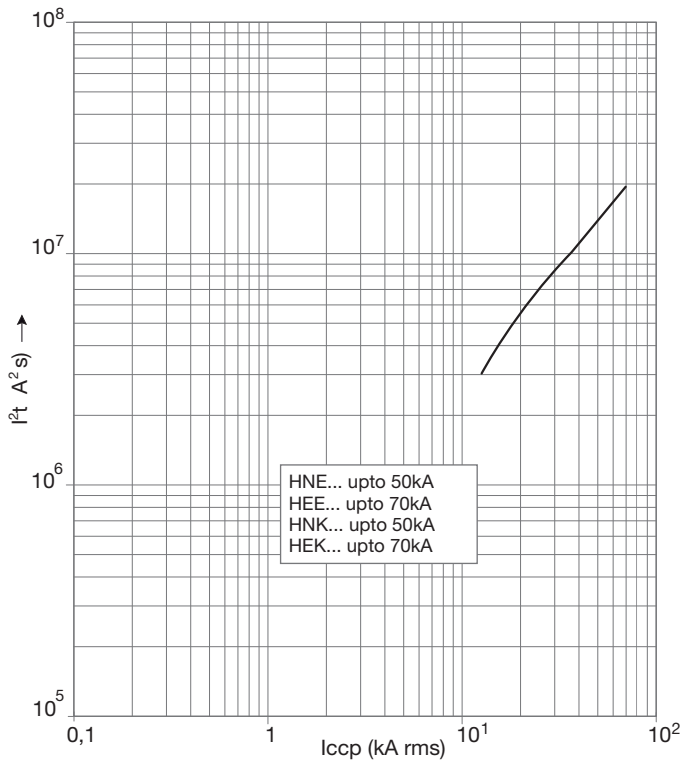


MCCB h800 TM (800A)



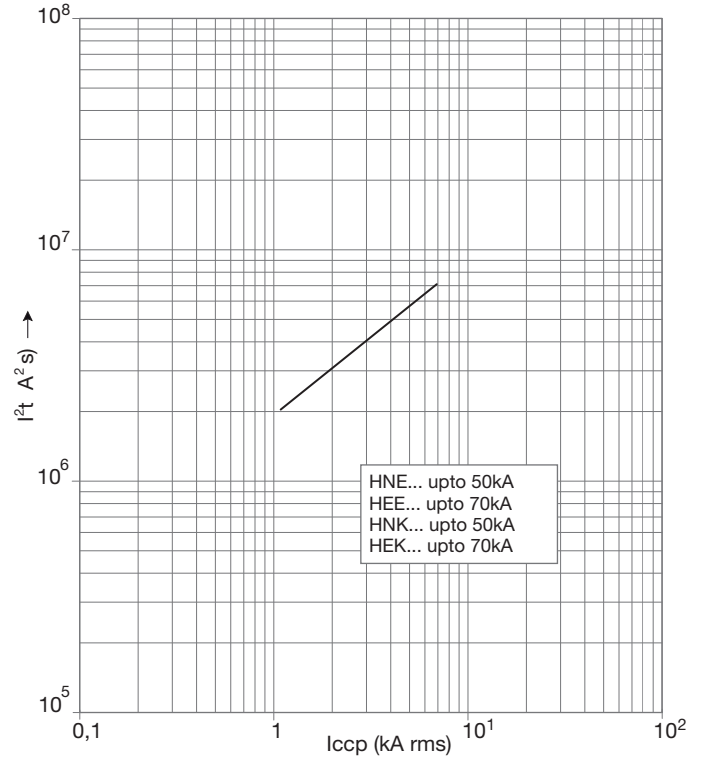
Thermal constraint curve at 400V (Let-through energy)

MCCB h1000



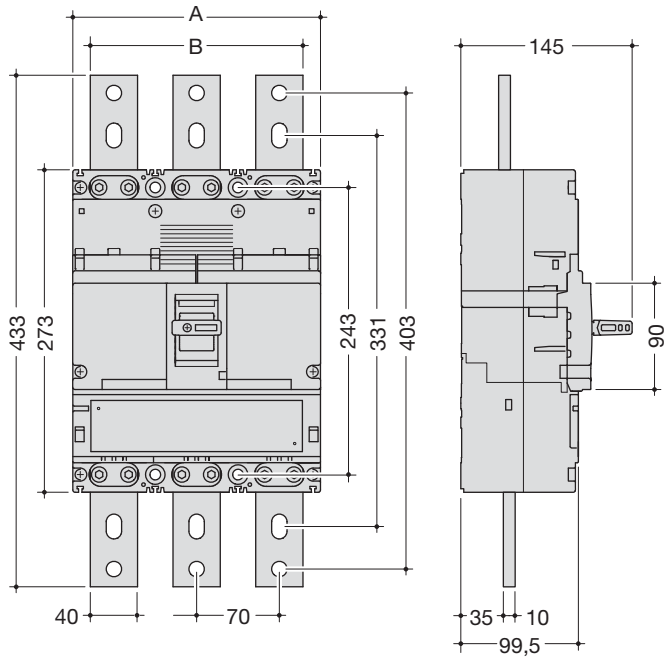
Current limiting curve at 400V (Let-through peak current)

MCCB h1000



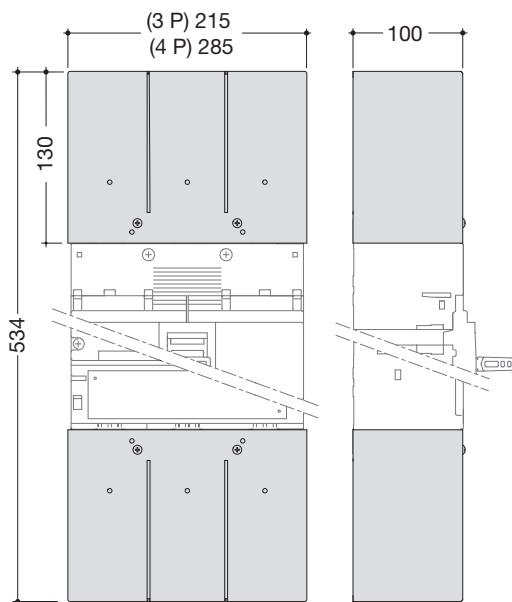
Dimensions

MCCBs

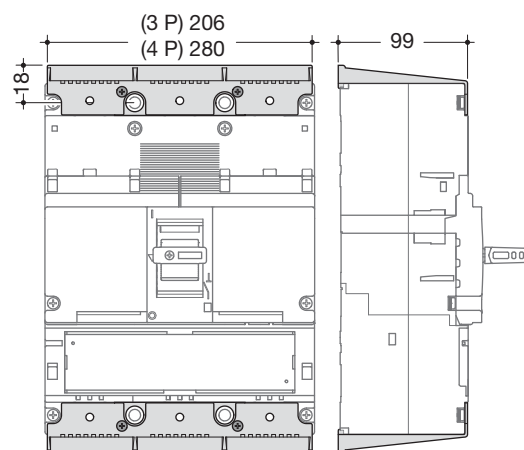


	A (mm)	B (mm)
3P	210	180
4P	280	250

Terminal covers for extended straight connections

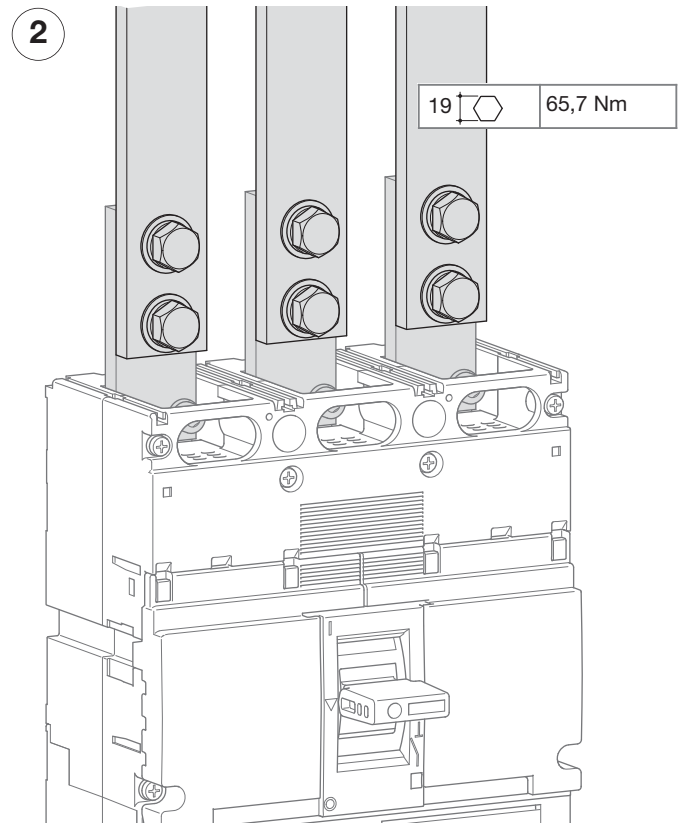
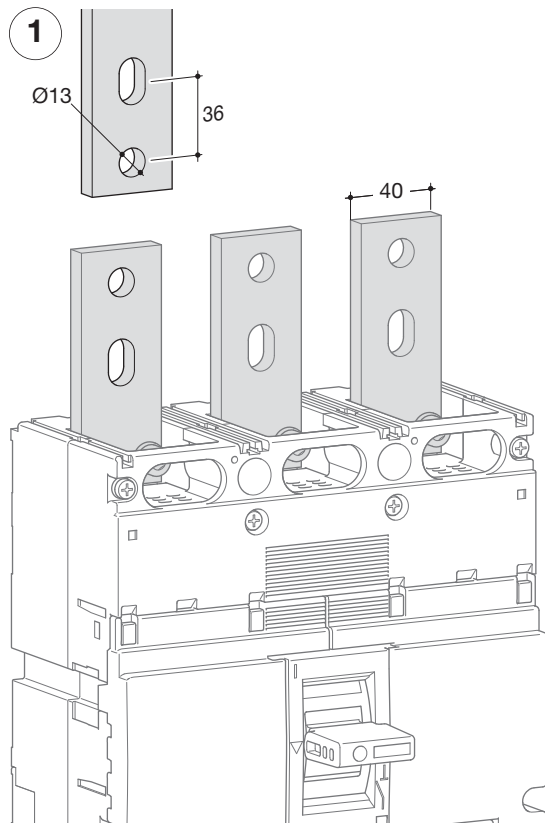


Terminal covers for rear connections



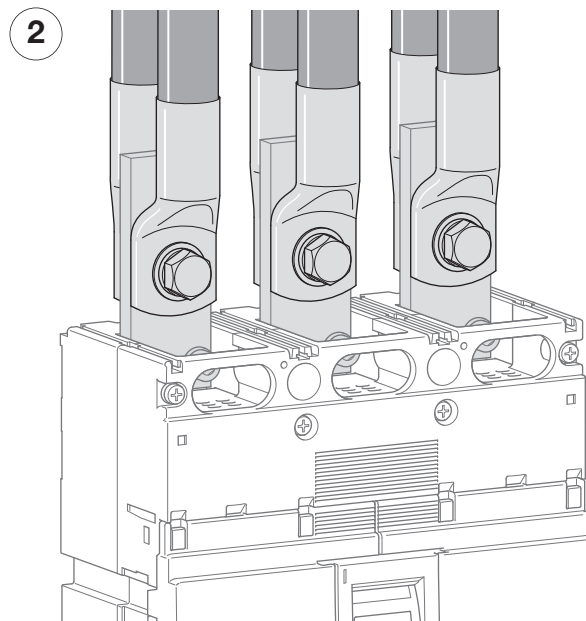
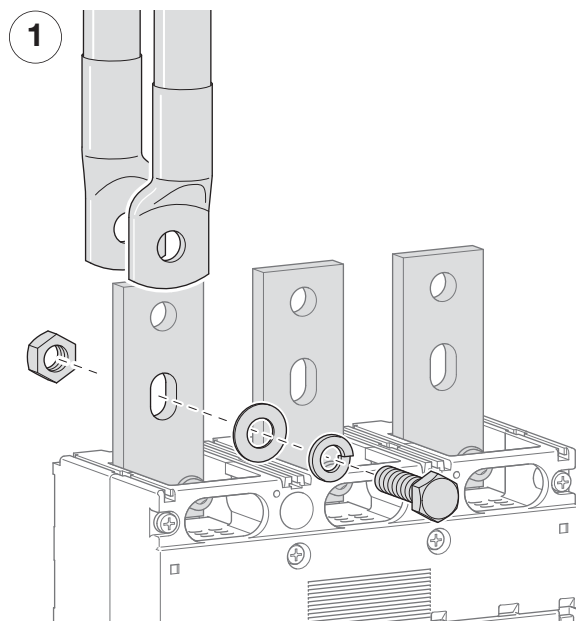
Connection

Extended straight connections

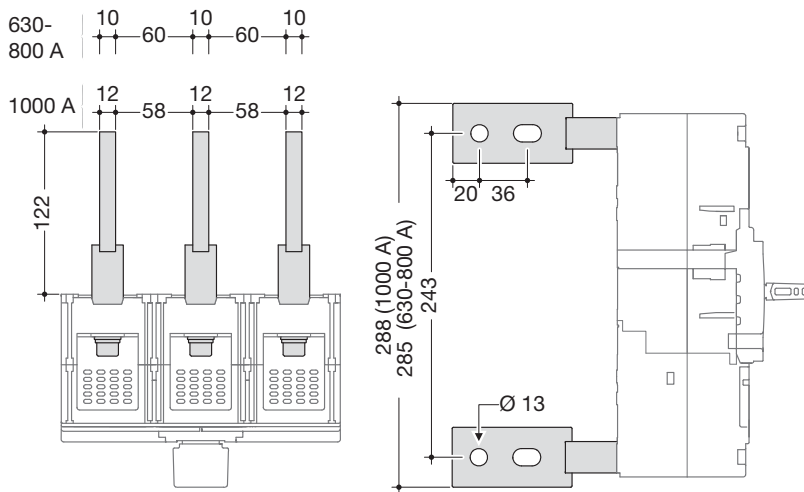
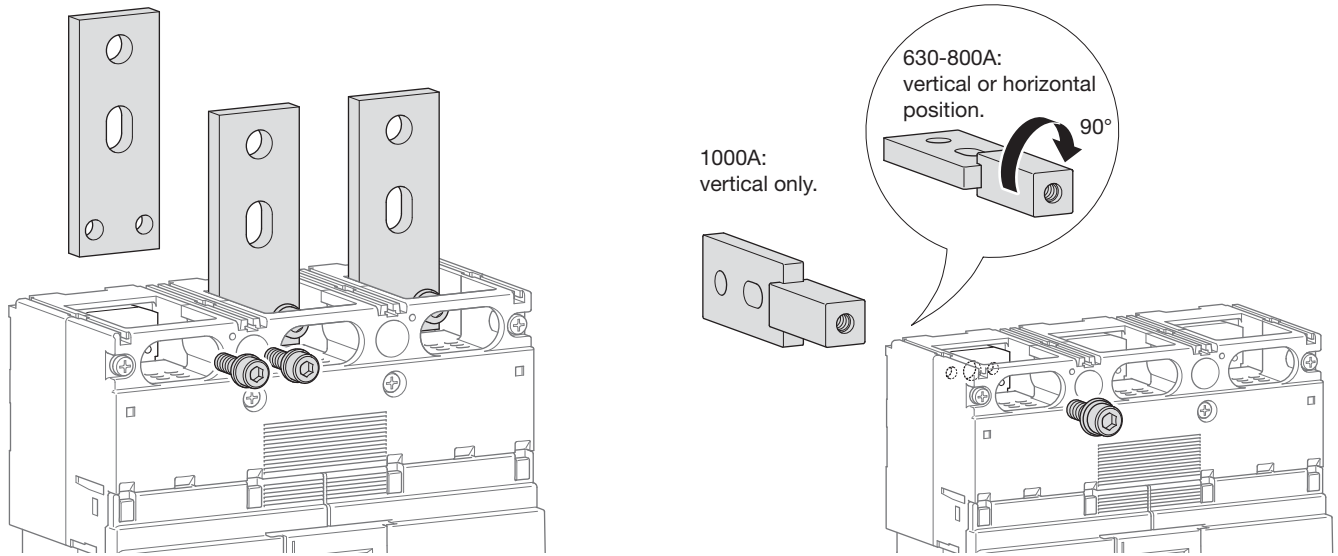


Direct cable connection on terminal
Copper with conductor max. width: 50 mm

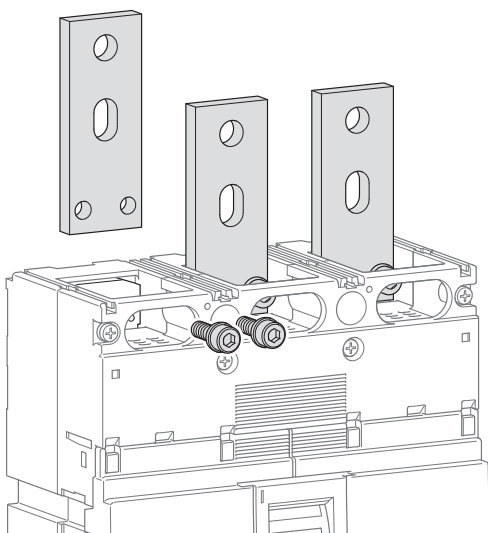
Connection with end lugs



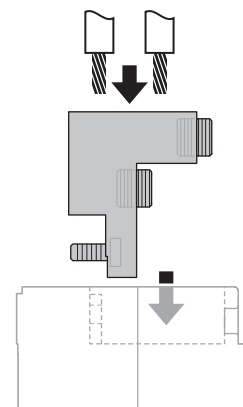
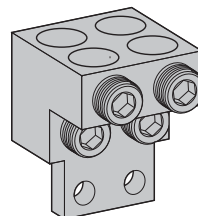
Rear connections



Connection for aluminium / copper conductors (h1000)



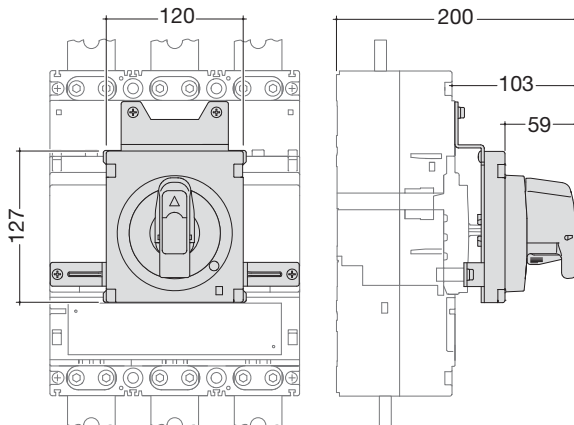
HYE007 (3P) - HYE008H (4P)



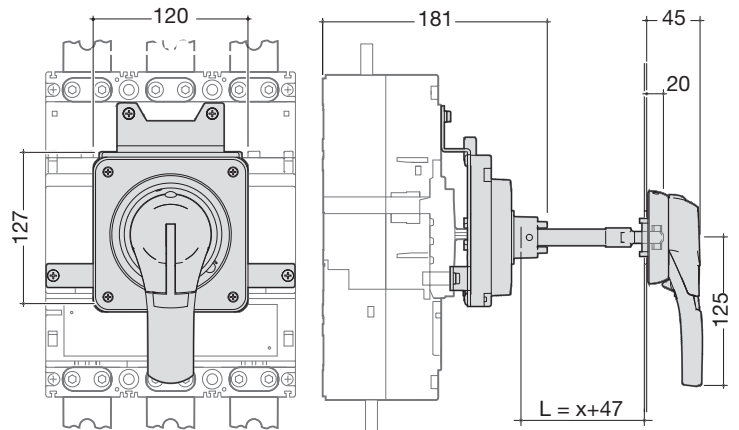
	max. 4x240 mm ²
10	25 Nm

Accessories

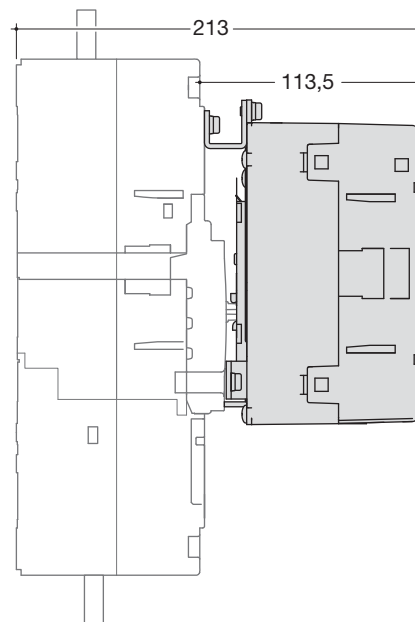
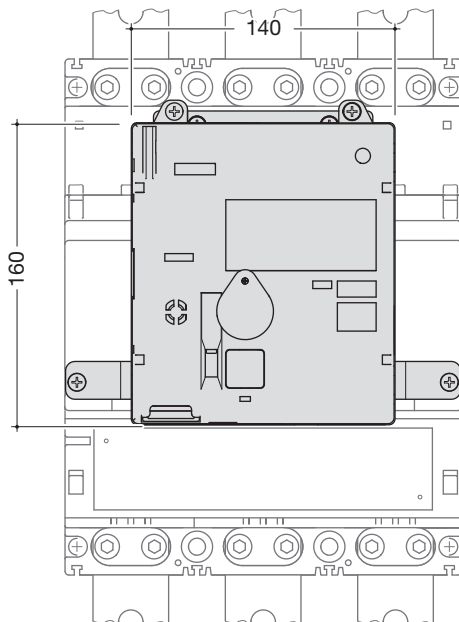
Direct rotary handle



Extended rotary handle

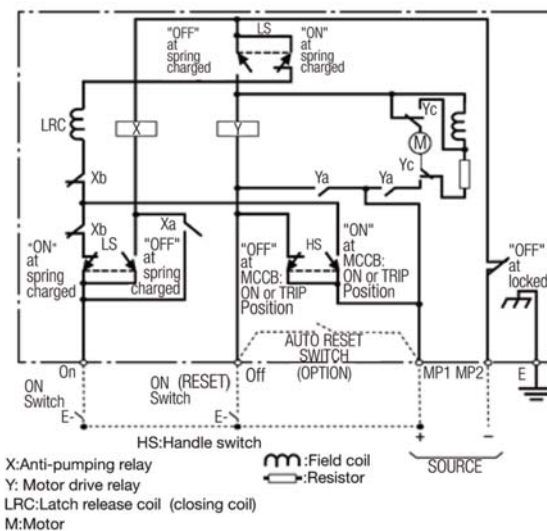


Motor operator



	HXE040H	HXE042H
Operating voltage	24-48V DC	100-240V AC
Operating current/starting current peak value (A)	24V DC	-/12 (ON) 6/11,5 (OFF, RESET)
	48V DC	-/7 (ON) 3,2/6,5 (OFF, RESET)
	100-110V AC	-/2,2 (ON) 1,7/3,5 (OFF, RESET)
	200-240V AC	-/2,2 (ON) 1,3/3,5 (OFF, RESET)
Operating time (s)	(ON)	0,1s
	(OFF)	1,5 s
	(RESET)	1,5 s
Power supply required	300VA min.	
Dielectric properties (1 min)	1000V AC	1500V AC

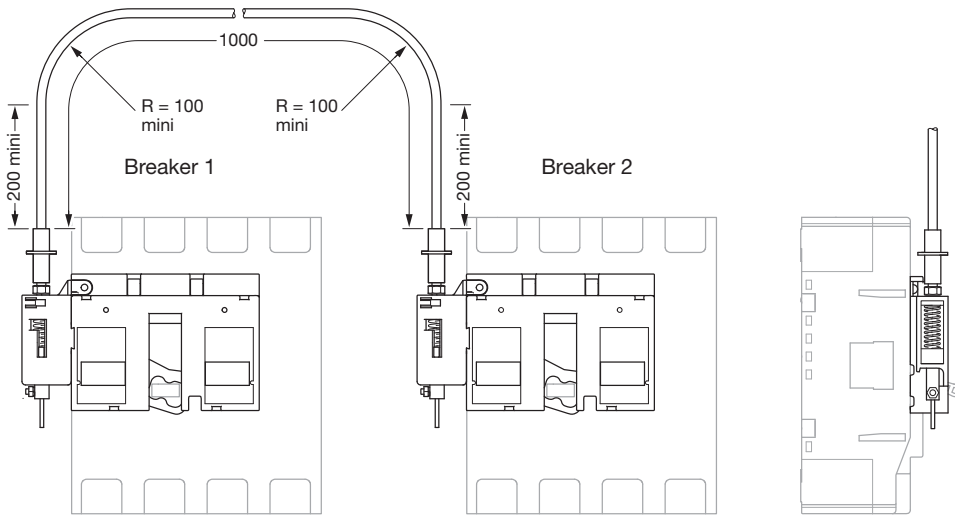
Wiring diagram



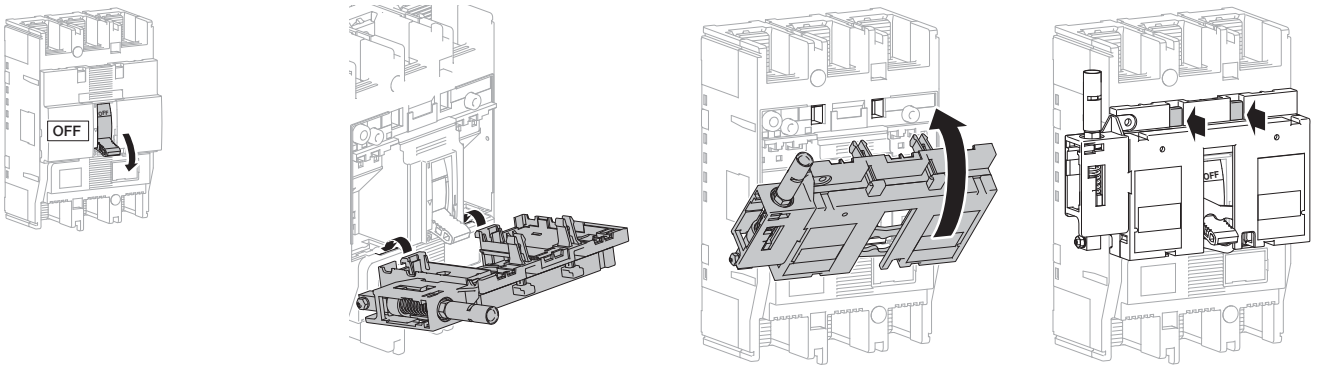
Interlocking system

Suitable with motor operator HXE04xH.
With electrical interlock for motor operator HXD068H (for 630/1000A) or HXB069H (for 250A).

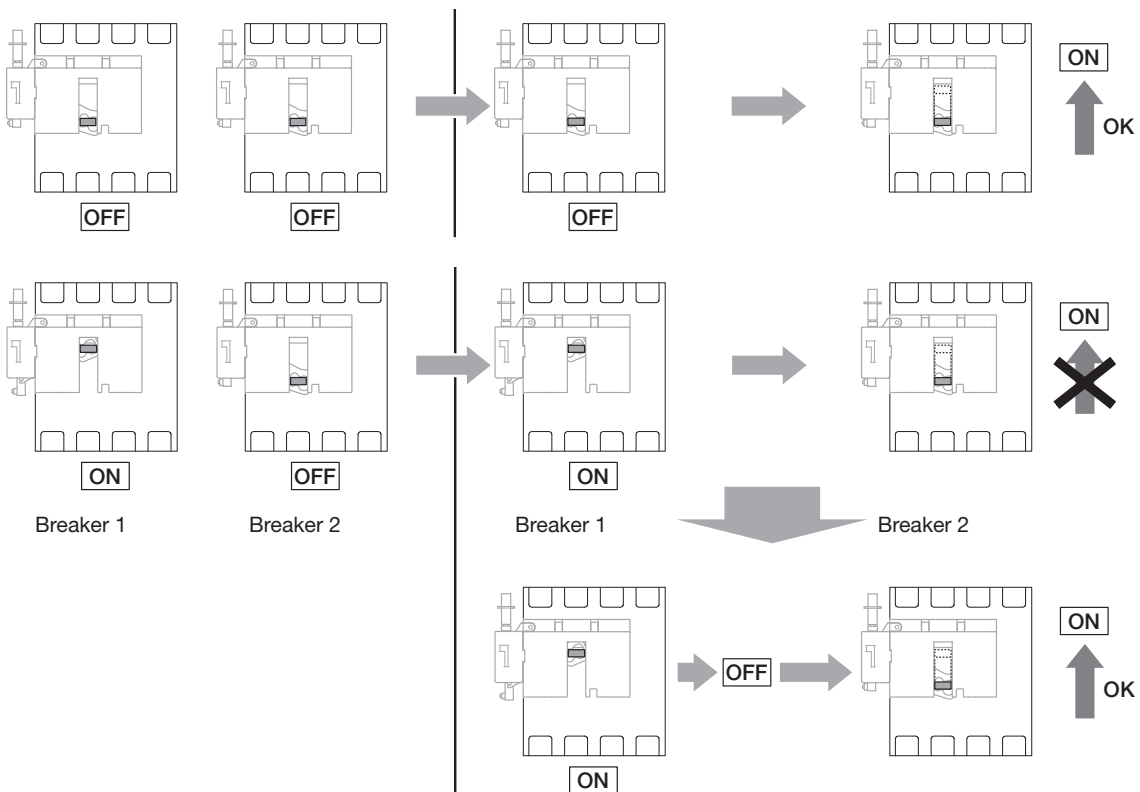
- Length HXD068H: 2100 mm
- Length HXB069H: 2100 mm



Mounting

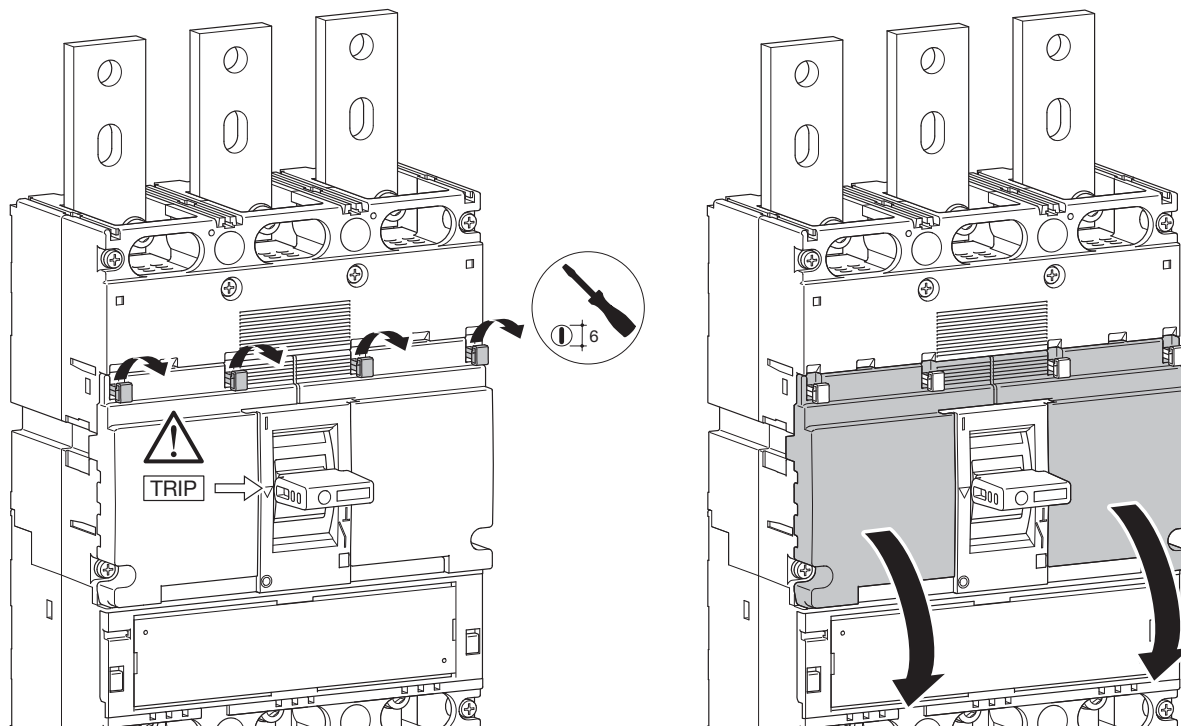


Checking the correct assembly

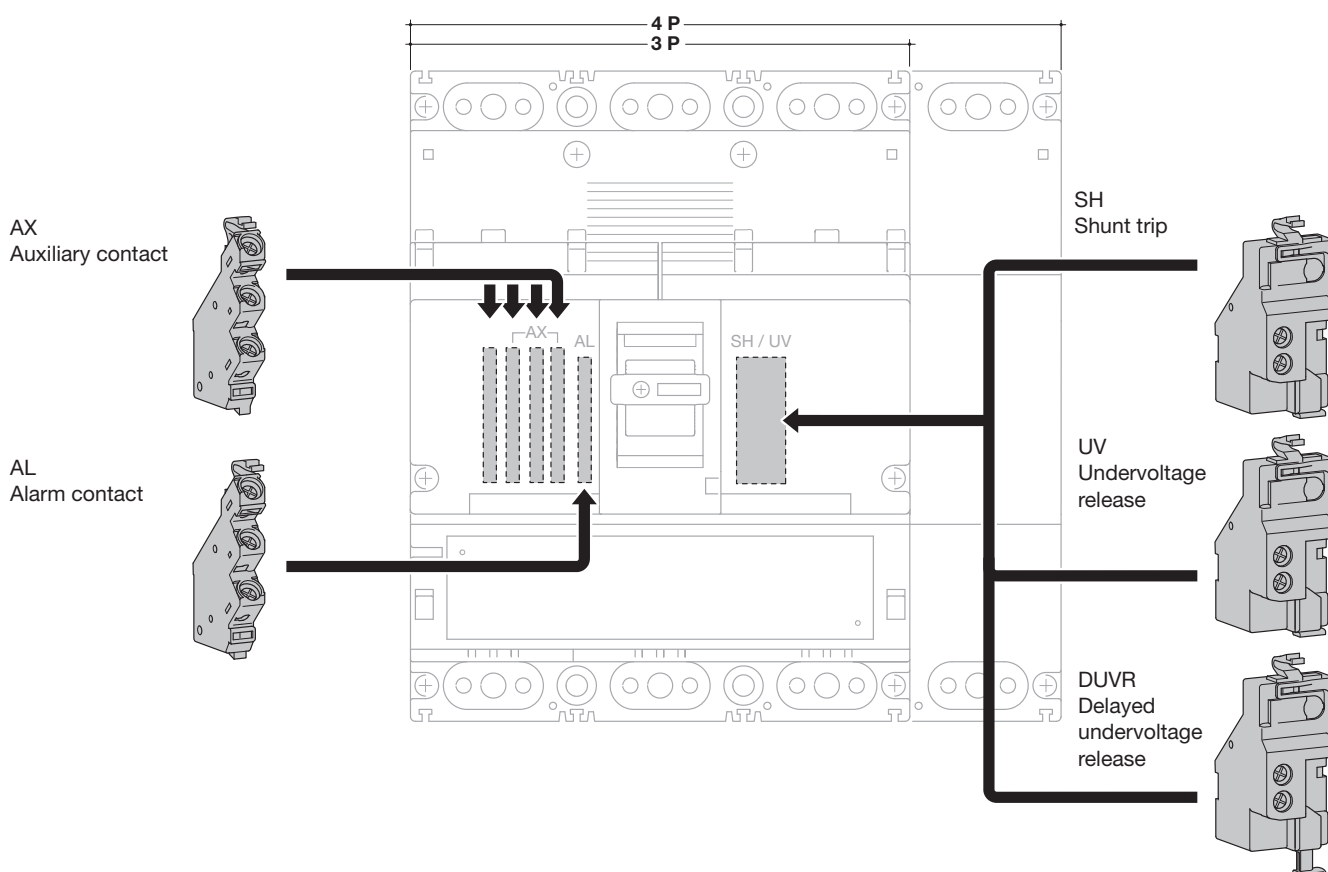


Auxiliaries

Auxiliaries for MCCBs and free tripping switches



Mounting combination for auxiliaries and releases



Moulded case circuit breakers h1600, selection and protection

Electronic trip unit LSI
 - Long delay (thermal equivalent) adjustable:
 $I_r = 0,4$ to $1 \times I_n$
 - short delay (magnetic equivalent) adjustable:
 $2,5$ to $10 \times I_r$
 - time delay: $0,1-0,2$ s

3 pole, 3 trip units,
 4 pole, 4 trip units,
 adjustable neutral 0 - 50% - 100%

Mechanical test button,
 lockable settings.

Connection:

Directly on copper cable terminal,
 with end lug max. width: 60 mm

Comply with IEC 60 947-2.

Trip-free switches

Allows tripping at distance using a voltmeterical trip unit (optional)

Comply with IEC 60 947-3.
 AC 23A / DC 22A



HNF990H

Designation	Characteristics	In	Cat. ref.	
			3P	4P
MCCBs h1600 50kA LSI	breaking capacity Icu : 50 kA (400/415 V AC) Ics: 50 kA	1250A	HNF980H	HNF981H
	adjustable thermal $I_r = 0,4$ to $1 \times I_n$ adjustable magnetic $2,5$ to $10 \times I_r$ time delay: $0,1-0,2$ s neutral setting 0, 50, 100%	1600A	HNF990H	HNF991H
MCCBs h1600 70kA LSI	breaking capacity Icu : 70 kA (400/415 V AC) Ics: 50 kA	1250A	HEF980H	HEF981H
	adjustable thermal $I_r = 0,4$ to $1 \times I_n$ adjustable magnetic $2,5$ to $10 \times I_r$ time delay: $0,1-0,2$ s neutral setting from 0, 50, 100%	1600A	HEF990H	HEF991H
Trip-free switches	suitable for AC 22A / AC 23A Ue : 415 V AC Icw (0,3 s) = 20 kA	1250A	HCF980U	HCF981U
		1600A	HCF990H	HCF991U

Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB is "open" or "close".
- 1 changeover alarm contact: indicates MCCB tripping.

Coil connection

Connection capacity:
0,75 mm² flexible or rigid cables
Optional connection cables.
The cable capacity of the terminals is 0,5 to 1,25 mm².

Shunt trip

Remotes tripping of MCCBs or trip-free switches.
Operating voltage:
0,7 to 1,1 x Un

Under voltage release

Allows the tripping of MCCBs or trip-free switches when voltage level drop between 35 and 70% of Un. Pick up voltage 0,85 x Un




Direct rotary handle

- padlockable
- equipped with front cover and handle
- fixing without any additional screw.

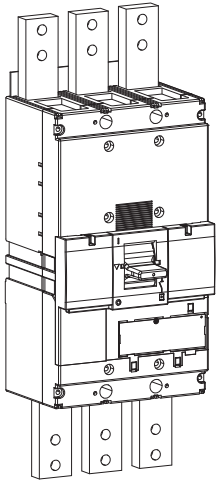
Extended rotary handle

- IP 55
- supplied complete with shaft and handle.

Rear connection: included

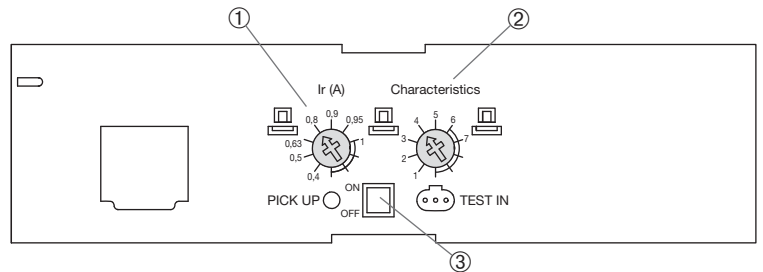
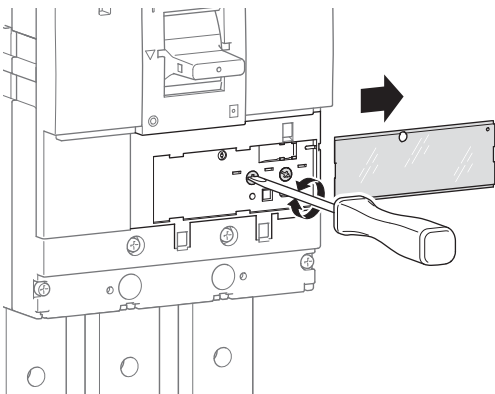
Designation	Characteristics	Cat. ref.	
 HXC021H HXC024H	Auxiliary contacts AX AL	1 changeover contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	
		1 changeover alarm contact 250 V AC / 3A 125 V DC / 0,4A 1 NO + 1 NC	HXC024H
		low level contact (ON/OFF) 125 V AC 1 NO + 1 NC	HXC025H
		low level alarm contact 125 V AC 1 NO + 1 NC	HXC026H
		Shunt trips SH	24 V DC 48 V DC 110 V DC 100 - 120 V AC 200 - 240 V AC 380 - 450 V AC
 HXC004H	Undervoltage releases UV	24 V DC 100 - 120 V DC 200 - 240 V DC 110 - 120 V AC 220 - 240 V AC 380 - 415 V AC	
			HXE011H
			HXE018H
			HXE019H
			HXE013H
			HXE014H HXE015H
 HXC014H	Delayed undervoltage releases DUVR	24 V DC 110 - 120 V AC 220 - 240 V AC 380 - 415 V AC	
			HXF051H HXF053H HXF054H HXF055H
	Direct rotary handle	padlockable handle, max Ø 8 mm	HXF030H
	Extended rotary handle	padlockable handle, max Ø 8 mm	HXF031H
Padlock	to mount on MCCB for handle locking for 3 padlocks max Ø 8 mm	HXF039H	
Motor operators	24 V DC 200 - 230 V AC	HXF040H HXF042H	
Interphase barriers	set of 4 pieces	HYD019H	
Connection kit	0,75 mm ² set of 3 x 2 wires length: 1,30m	HYA035H	

MCCBs



		220/240 V AC	380/415 V AC	660/690 V AC
HNF	I _{cu} (kA)	100	50	25
	I _{cs} (kA)	75	50	25
HEF	I _{cu} (kA)	100	70	45
	I _{cs} (kA)	75	50	34
HCF	I _{cm} (kA)	-	45	-
	I _{cw} (kA)	-	20 kA-0,3 s	-

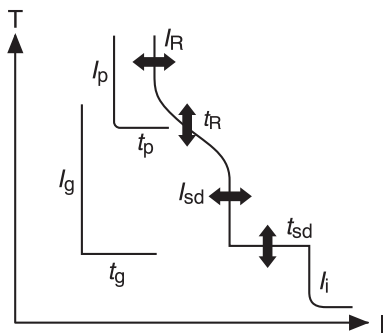
Electronic trip unit settings (LSI)



L - Long delay - protection against overloads: I_r and t_r settings

S - Short delay - protection against short circuits: I_{sd} and t_{sd} settings

I - Instantaneous - max. instantaneous threshold (< 10 ms) in case of short circuit: 2,5 to 10 x I_r.



	① I _r (A)	② I _m	③ N
LSI	0,4 - 1 I _n	2,5 - 10 I _r	0% 50% 100 %

LSI	I _n A				
	1250 - 1600 A				
	Long Time Delay		Short Time Delay		Inst
	I _r (x I _n)	t _r (s)	isd (xI _r)	t _{sd} (s)	I _i (xI _r)
① I _r (x I _n)	0,4	OK			
	0,5	OK			
	0,63	OK			
	0,8	OK			
	0,9	OK			
	0,95	OK			
	1	OK			
② Characteristics*	1	11s at 2 xI _r	2,5	0,1	14 (max 12 x I _n)
	2	21s at 2 xI _r			
	3		5	0,2	
	4	5 s at 6 xI _r	10		
	5	10 s at 6 xI _r			
	6	19 s at 6 xI _r			
	7	29 s at 6 xI _r			
③ Neutral protection	0%				
	50%				
	100%				

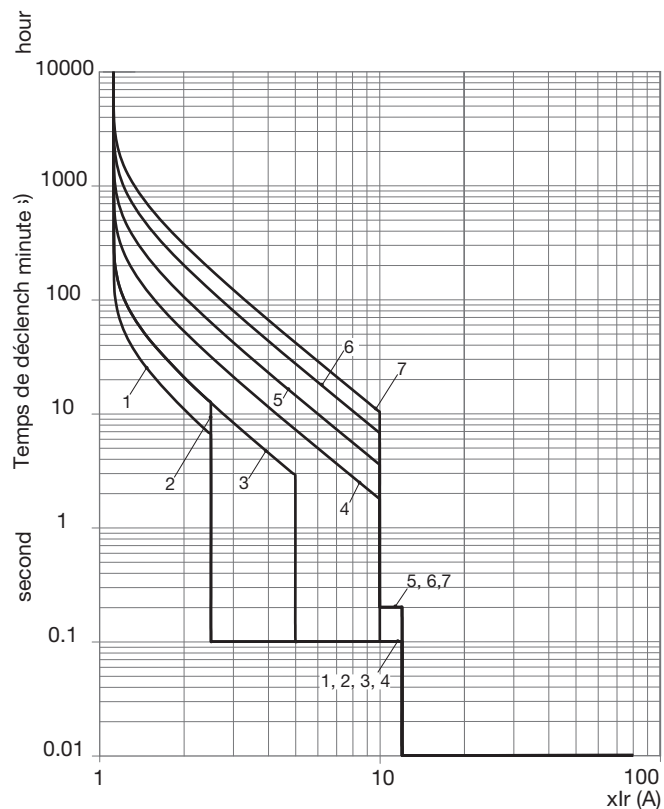
(*) Characteristic 1 : use for generators protection.

Characteristic 2 to 4 - standard protection : options allow coordination optimisation with other products.

Characteristic 5 to 7 - motor protection: use positions according to motor starting characteristics.

Tripping curve

MCCB h1600 LSI



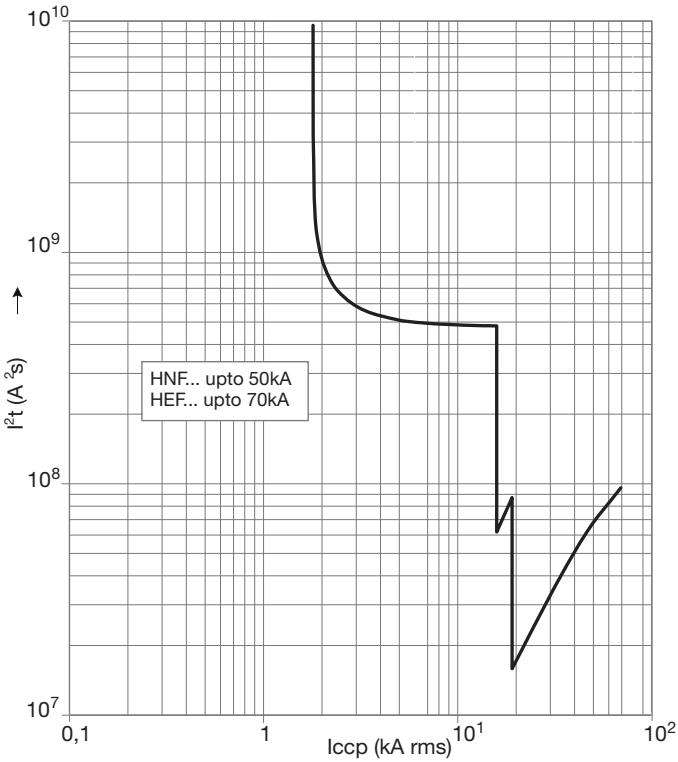
Electronic trip unit setting (LSI)

MCCBs 1250A and 1600A electronic

		I_R (A)								
LTD Pick-up current		I_R	$x I_n$	0,4	0,5	0,63	0,8	0,9	0,95	1
Characteristics		No.		1	2	3	4	5	6	7
Standard	LTD	t_R	(s)	11	21	21	5	10	19	29
				200% x I_R			600% x I_R			
	STD	I_{sd}	$x I_R$	2,5		5	10			
		t_{sd}	(s)	0,1					0,2	
	INST	I_i	$x I_R$	14 (max : 12 x I_n)						
Optional	NP	I_N	$x I_n$	0 - 0,5 - 1						
		t_N	(s)	$I_N = t_R$						

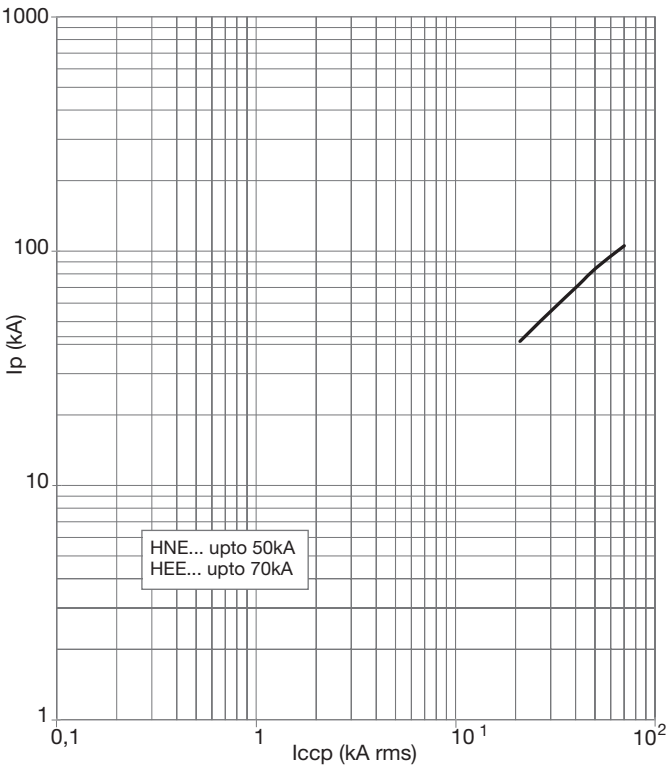
Thermal constraint curve at 400V (Let-through energy)

MCCB h1600



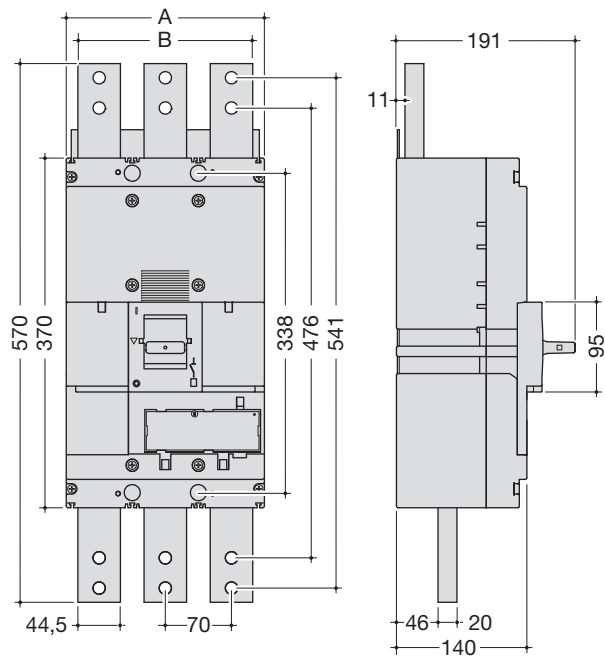
Current limiting curve at 400V (Let-through peak current)

MCCB h1600



Dimensions

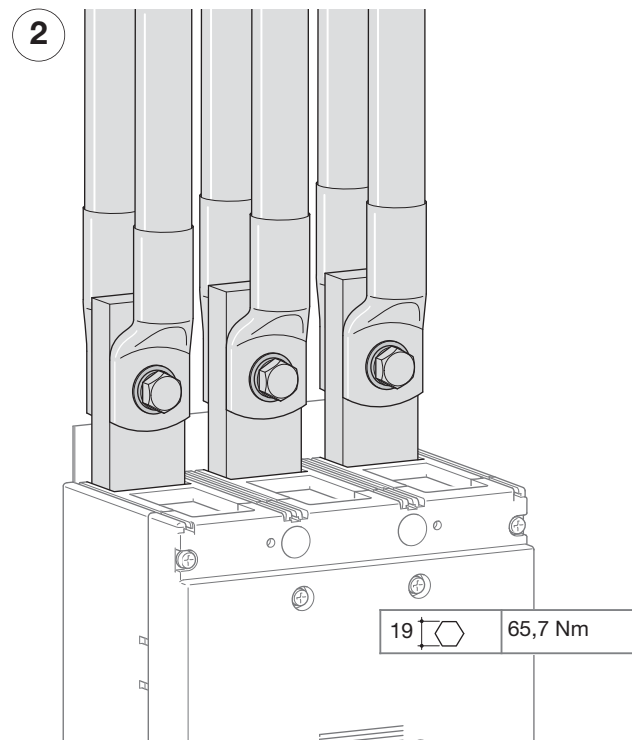
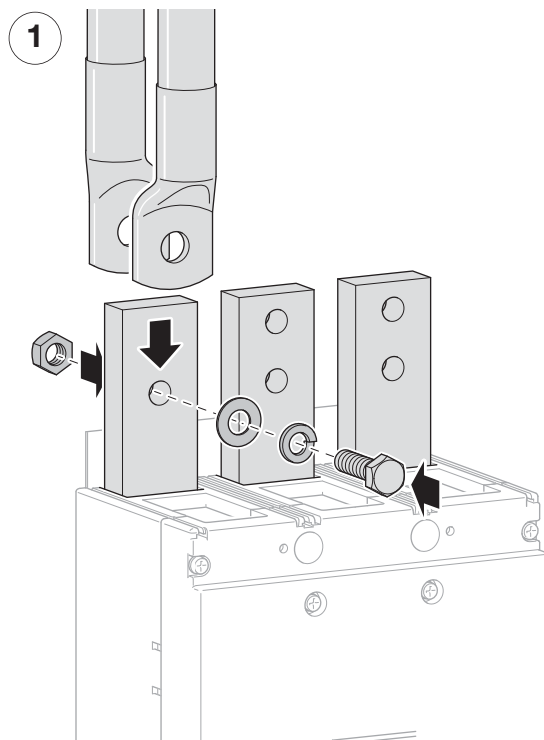
MCCBs



	A (mm)	B (mm)
3P	210	185
4P	280	255

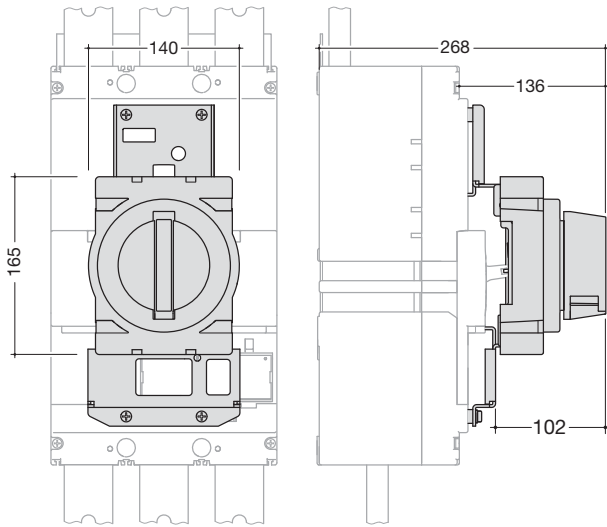
Connection

Connection with end lugs

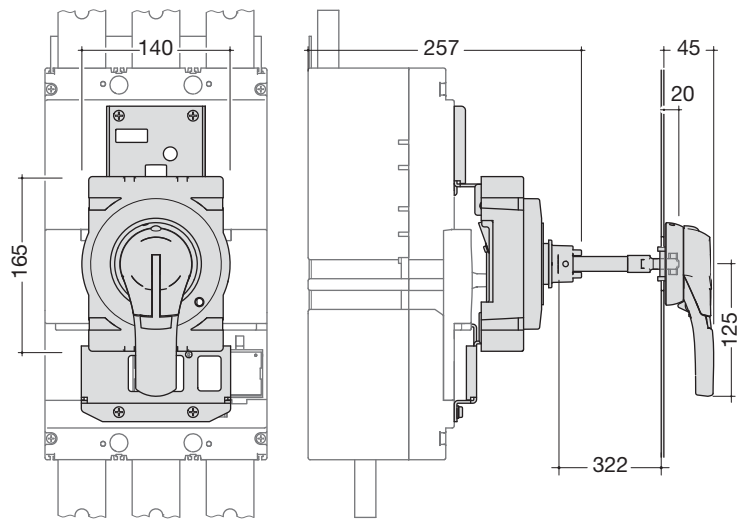


Accessories

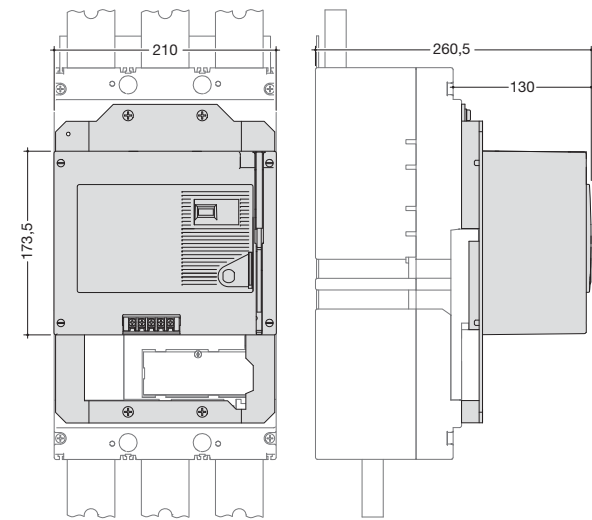
Direct rotary handle



Extended rotary handle

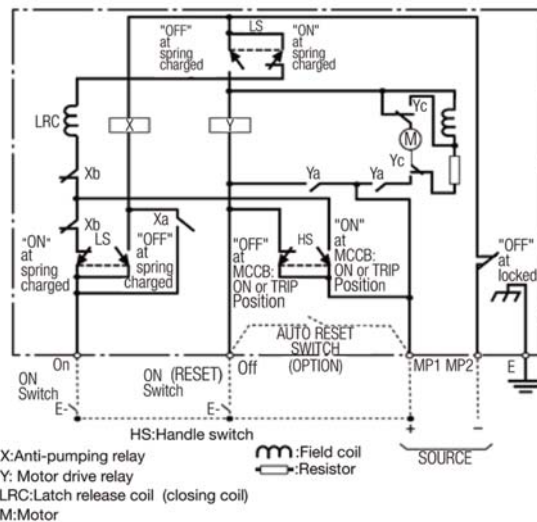


Motor operator



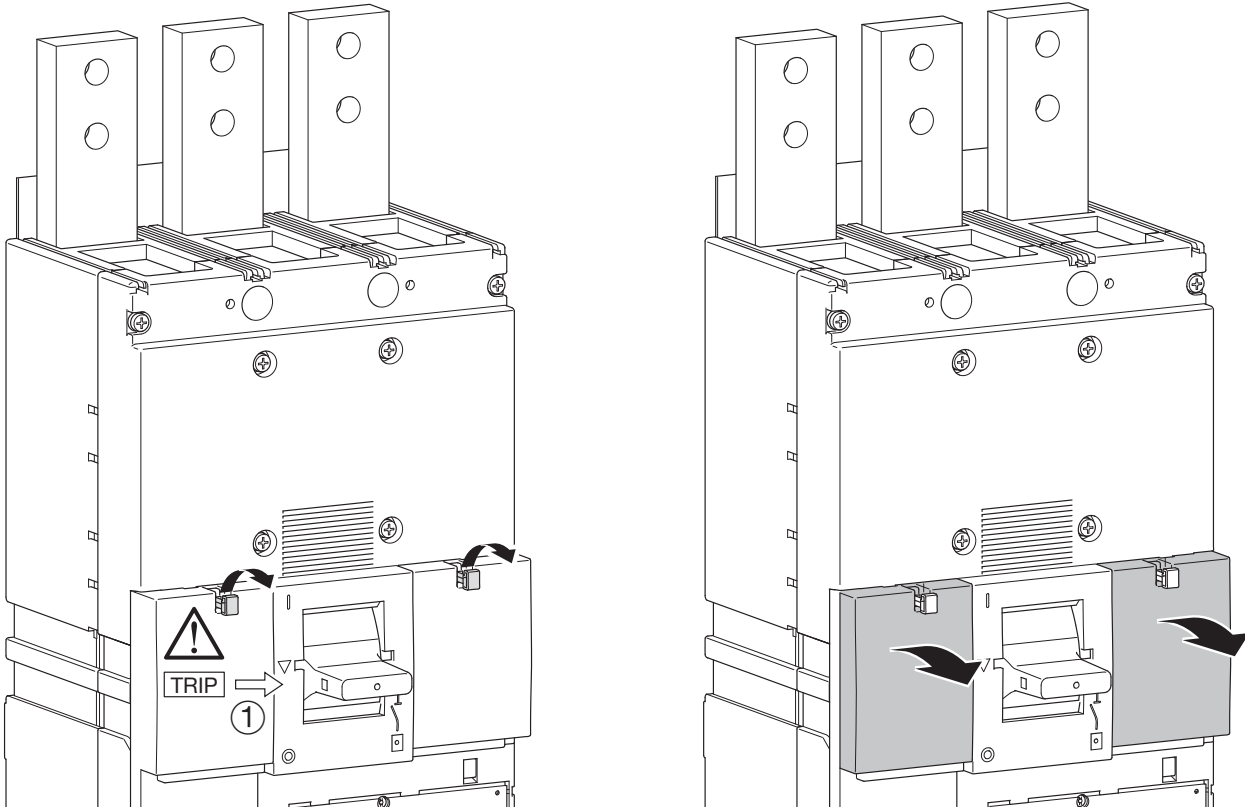
	HXF040H	HXF042H
Operating voltage	24V DC	200-230V AC
Operating current / starting current peak value (A)	24V DC	-/4,5 (ON) 4,0/12,0 (OFF, RESET)
	200-230V AC	-
Operating time (s)	(ON)	0,06s
	(OFF)	3s
	(RESET)	3s
Power supply required	300VA min.	
Dielectric properties (1 min)	500V AC	1500V AC

Wiring diagram

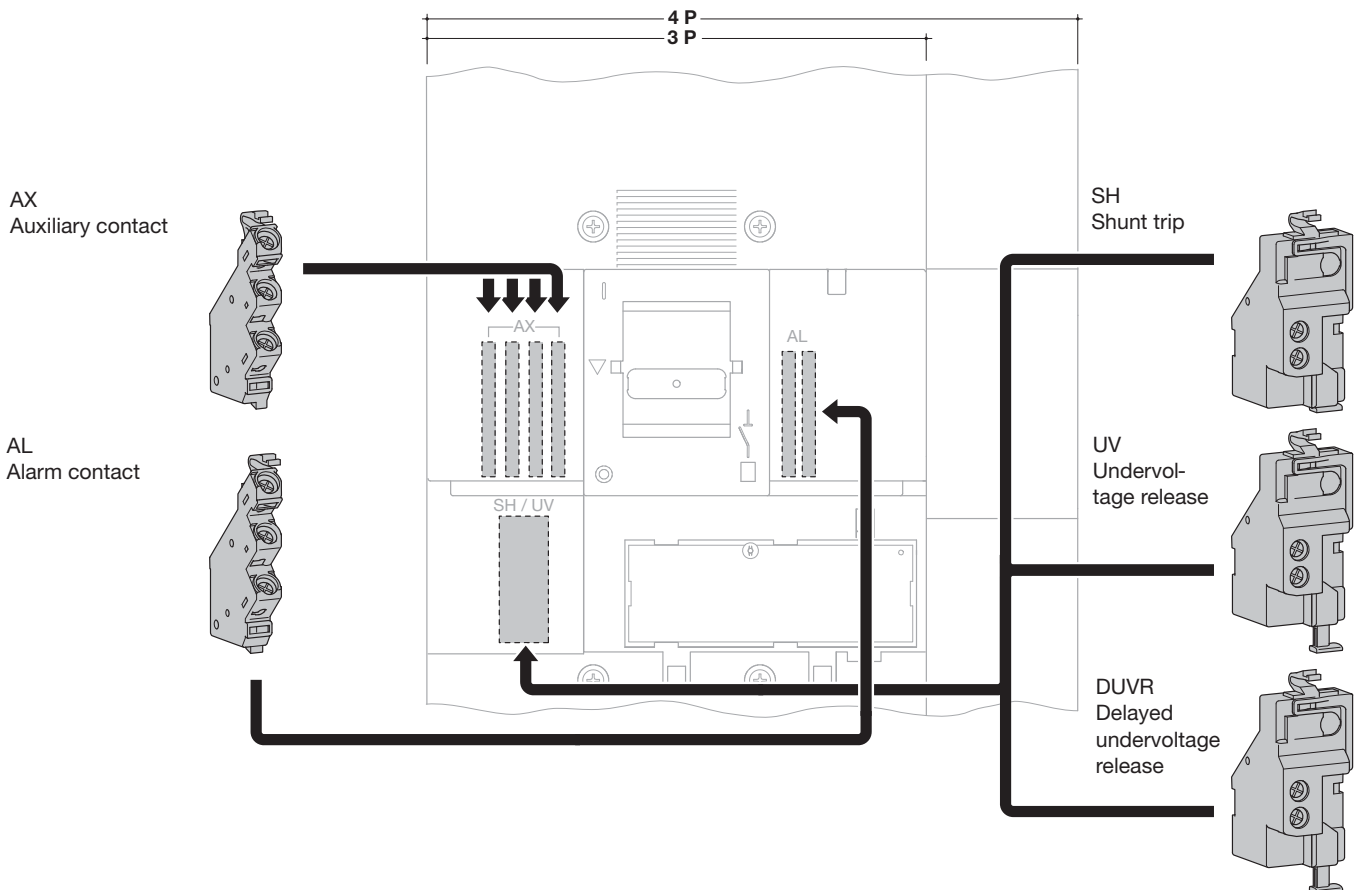


Auxiliaries

Auxiliaries for MCCBs and free tripping switches



Mounting combination for auxiliaries and releases



Cascading according to IEC 60947-2

MCCBs x160, x250, h250, h400, h630, h800, h1000, h1600

Max. cascading value in kA rms according to IEC 947-2 Network: 3 phases + neutral 220/380 - 240/415 VAC

				Upstream									
				x160 TM			x250 TM		h250 TM			h250 TM+	
				HDA	HHA	HNA	HHB	HNB	HHG	HNG	HEG	HNH	HEH
		IEC 60947-2	18 kA	25 kA	40 kA	25 kA	40 kA	25 kA	50 kA	65 kA	50 kA	70 kA	
Downstream	x160 TM	HDA	18 kA	18	25	40	25	40	25	40	40	50	70
		HHA	25 kA	-	25	40	25	40	25	50	65	50	70
		HNA	40 kA	-	-	40	25	40	25	50	65	50	70
	x250 TM	HHB	25 kA	-	-	-	25	40	25	50	65	50	70
		HNB	40 kA	-	-	-	-	40	-	50	65	50	70
	h250 TM	HHG	25 kA	-	-	-	25	40	25	50	65	50	70
		HNG	50 kA	-	-	-	-	-	-	50	65	50	70
		HEG	65 kA	-	-	-	25	40	25	50	65	50	70
	h250 TM+	HNH	50 kA	-	-	-	-	-	-	50	65	50	70
		HEH	70 kA	-	-	-	-	-	-	-	65	-	70
	h250 LSI	HNC	50 kA	-	-	-	-	-	-	50	65	50	70
		HEC	70 kA	-	-	-	-	-	-	-	-	-	70
	h400 TM	HHD	25 kA	-	-	-	-	-	-	-	-	-	-
		HND	50 kA	-	-	-	-	-	-	-	-	-	-
		HKD	70 kA	-	-	-	-	-	-	-	-	-	-
	h630 LSI	HND	50 kA	-	-	-	-	-	-	-	-	-	-
		HED	70 kA	-	-	-	-	-	-	-	-	-	-
	h800 TM	HNK	50 kA	-	-	-	-	-	-	-	-	-	-
HEK		70 kA	-	-	-	-	-	-	-	-	-	-	
h1000 LSI	HNE	50 kA	-	-	-	-	-	-	-	-	-	-	
	HEE	70 kA	-	-	-	-	-	-	-	-	-	-	
h1600 LSI	HNF	50 kA	-	-	-	-	-	-	-	-	-	-	
	HEF	70 kA	-	-	-	-	-	-	-	-	-	-	

Max. cascading value in kA rms according to IEC 947-2 Network: 3 phases + neutral 127/220 - 138/240 VAC
or downstream devices in single-phase network: 3 phases + neutral 220/380 - 240/415 VAC

				Upstream									
				x160 TM			x250 TM		h250 TM			h250 TM+	
				HDA	HHA	HNA	HHB	HNB	HHG	HNG	HEG	HNH	HEH
		IEC 60947-2	25 kA	35 kA	85 kA	35 kA	85 kA	35 kA	85 kA	85 kA	85 kA	100 kA	
Downstream	x160 TM	HDA	25 kA	25	35	85	35	85	35	85	85	85	100
		HHA	35 kA	-	35	85	35	85	35	85	85	85	100
		HNA	85 kA	-	-	85	35	85	35	85	85	85	100
	x250 TM	HHB	35 kA	-	-	-	35	85	35	85	85	85	100
		HNB	85 kA	-	-	-	-	85	-	85	85	85	100
	h250 TM	HHG	35 kA	-	-	-	35	85	35	85	85	85	100
		HNG	85 kA	-	-	-	-	85	-	85	85	85	100
		HEG	85 kA	-	-	-	-	85	-	85	85	85	100
	h250 TM+	HNH	85 kA	-	-	-	-	-	-	85	85	85	100
		HEH	100 kA	-	-	-	-	-	-	-	85	85	100
	h250 LSI	HNC	85 kA	-	-	-	-	85	-	85	85	85	100
		HEC	100 kA	-	-	-	-	-	-	-	-	-	100
	h400 TM	HHD	35 kA	-	-	-	-	-	-	-	-	-	-
		HND	85 kA	-	-	-	-	-	-	-	-	-	-
		HKD	100 kA	-	-	-	-	-	-	-	-	-	-
	h630 LSI	HND	85 kA	-	-	-	-	-	-	-	-	-	-
		HED	100 kA	-	-	-	-	-	-	-	-	-	-
	h800 TM	HNK	85 kA	-	-	-	-	-	-	-	-	-	-
HEK		100 kA	-	-	-	-	-	-	-	-	-	-	
h1000 LSI	HNE	85 kA	-	-	-	-	-	-	-	-	-	-	
	HEE	100 kA	-	-	-	-	-	-	-	-	-	-	
h1600 LSI	HNF	100 kA	-	-	-	-	-	-	-	-	-	-	
	HEF	100 kA	-	-	-	-	-	-	-	-	-	-	

h250 LSI		h400 TM			h630 LSI		h800 TM		h1000 LSI		h1600 LSI	
HNC	HEC	HHD	HND	HKD	HND	HED	HNK	HEK	HNE	HEE	HNF	HEF
50 kA	70 kA	25 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA
50	70	25	34	24	24	24	25	25	25	25	18	18
50	70	25	50	55	50	55	45	45	45	45	28	28
50	70	25	50	70	50	70	50	70	50	70	50	50
50	70	25	50	55	50	55	45	45	45	45	28	28
50	70	25	50	70	50	70	50	70	50	70	50	50
50	70	25	50	55	50	55	45	45	45	45	28	28
50	70	25	50	70	50	70	50	70	50	70	50	50
50	70	25	50	55	50	55	45	45	50	70	28	28
50	70	25	50	70	50	70	50	70	50	70	50	70
50	70	25	50	70	50	70	50	70	50	70	50	70
50	70	25	50	70	50	70	50	70	50	70	50	70
-	70	25	50	70	50	70	50	70	50	70	50	70
-	-	25	50	55	50	55	45	45	45	45	28	28
-	-	-	50	70	50	70	50	70	50	70	50	70
-	-	-	-	70	50	70	50	70	50	70	50	70
-	-	-	-	-	50	70	50	70	50	70	50	70
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-	-	-	-	-	-	-	50	70	50	70	50	70
-	-	-	-	-	-	-	-	70	-	70	50	70
-	-	-	-	-	-	-	-	-	50	70	50	70
-	-	-	-	-	-	-	-	-	-	70	50	70
-	-	-	-	-	-	-	-	-	-	-	50	70
-	-	-	-	-	-	-	-	-	-	-	-	70

h250 LSI		h400 TM			h630 LSI		h800 TM		h1000 LSI		h1600 LSI	
HNC	HEC	HHD	HND	HKD	HND	HED	HNK	HEK	HNE	HEE	HNF	HEF
85 kA	100 kA	35 kA	85 kA	100 kA	85 kA	100 kA	85 kA	100 kA	85 kA	100 kA	100 kA	100 kA
85	100	35	85	100	85	100	57	57	57	57	30	30
85	100	35	85	100	85	100	85	100	85	100	45	45
85	100	35	85	100	85	100	85	100	85	100	100	100
85	100	35	85	100	85	100	85	100	85	100	45	45
85	100	35	85	100	85	100	85	100	85	100	100	100
85	100	35	85	100	85	100	85	100	85	100	45	45
85	100	35	85	100	85	100	85	100	85	100	100	100
85	100	35	85	100	85	100	85	100	85	100	100	100
85	100	35	85	100	85	100	85	100	85	100	100	100
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85	100	35	85	100	85	100	85	100	85	100	100	100
-	100	35	85	100	85	100	85	100	85	100	100	100
-	-	35	85	100	85	100	85	100	85	100	45	45
-	-	-	85	100	85	100	85	100	85	100	100	100
-	-	-	-	70	85	100	85	100	85	100	100	100
-	-	-	-	-	85	100	85	100	85	100	100	100
-	-	-	-	-	-	100	85	100	85	100	100	100
-	-	-	-	-	-	-	85	100	85	100	100	100
-	-	-	-	-	-	-	-	100	-	100	100	100
-	-	-	-	-	-	-	-	-	85	100	100	100
-	-	-	-	-	-	-	-	-	-	100	100	100
-	-	-	-	-	-	-	-	-	-	-	100	100
-	-	-	-	-	-	-	-	-	-	-	-	100
-	-	-	-	-	-	-	-	-	-	-	100	100

Cascading according to IEC 60947-2

MCCBs x160, x250, h250, h400, h630, h800, h1000, h1600

Max. cascading value in kA rms according to IEC 947-2 Network: 3 phases + neutral 220/380 - 240/415 VAC

				Upstream									
				x160 TM			x250 TM		h250 TM			h250 TM+	
				HDA	HHA	HNA	HHB	HNB	HHG	HNG	HEG	HNH	HEH
IEC 60947-2				18 kA	25 kA	40 kA	25 kA	40 kA	25 kA	50 kA	65 kA	50 kA	70 kA
Downstream	x160	HCA		18	25	40	25	40	25	50	65	50	70
	x250	HCB		-	-	-	25	40	25	50	65	50	70
	h630	HCD		-	-	-	-	-	-	-	-	-	-
	h1000	HCE		-	-	-	-	-	-	-	-	-	-
	h1600	HCF		-	-	-	-	-	-	-	-	-	-

Max. cascading value in kA rms according to IEC 947-2 Network: 3 phases + neutral 127/220 - 138/240 VAC
or downstream devices in single-phase network: 3 phases + neutral 220/380 - 240/415 VAC

				Upstream									
				x160 TM			x250 TM		h250 TM			h250 TM+	
				HDA	HHA	HNA	HHB	HNB	HHG	HNG	HEG	HNH	HEH
IEC 60947-2				25 kA	35 kA	85 kA	35 kA	85 kA	35 kA	85 kA	85 kA	85 kA	100 kA
Downstream	x160	HCA		25	35	85	35	85	35	85	85	85	100
	x250	HCB		-	-	-	35	85	35	85	85	85	100
	h250	HCD		-	-	-	-	-	-	-	-	-	-
	h250	HCE		-	-	-	-	-	-	-	-	-	-
	h250	HCF		-	-	-	-	-	-	-	-	-	-

h250 LSI		h400 TM			h630 LSI		h800 TM		h1000 LSI		h1600 LSI	
HNC	HEC	HHD	HND	HKD	HND	HED	HNK	HEK	HNE	HEE	HNF	HEF
50 kA	70 kA	25 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA
25	70	25	50	70	50	70	50	70	50	70	50	70
25	70	25	50	70	50	70	50	70	50	70	50	70
-	-	-	-	70	50	70	50	70	50	70	50	70
-	-	-	-	-	-	-	50	70	50	70	50	70
-	-	-	-	-	-	-	-	-	-	-	50	70

h250 LSI		h400 TM			h630 LSI		h800 TM		h1000 LSI		h1600 LSI	
HNC	HEC	HHD	HND	HKD	HND	HED	HNK	HEK	HNE	HEE	HNF	HEF
85 kA	100 kA	35 kA	85 kA	100 kA	85 kA	100 kA	85 kA	100 kA	85 kA	100 kA	100 kA	100 kA
35	100	35	85	100	85	100	85	100	100	100	100	100
35	100	35	85	100	85	100	85	100	100	100	100	100
-	-	-	-	100	85	100	85	100	100	100	100	100
-	-	-	-	-	-	-	85	100	100	100	100	100
-	-	-	-	-	-	-	-	-	-	-	100	100

Cascading according to IEC 60947-2 MCCBs / Switches, RCDs, RCBOs, MCBs

Max. cascading value in kA rms according to IEC 947-2 Network: 3 phases + neutral 220/380 - 240/415 VAC

						Upstream								
						x160 TM			x250 TM			h250 TM		
						HDA	HHA	HNA	HHB	HNB	HHG	HNG	HEG	
				IEC 60898 IEC 61008 IEC 61009	IEC 60947-2	18 kA	25 kA	40 kA	25 kA	40 kA	25 kA	50 kA	65 kA	
Downstream	Switches	SB1xx, SB3xx, SB4xx	32A	1P, 3P, 4P		2.2	2.2	2.2	-	-	-	-	-	
		SB1xx, SB3xx, SB4xx	63A	1P, 3P, 4P		3.1	3.1	3.1	-	-	-	-	-	
		SB1xx, SB3xx, SB4xx	100A	1P, 3P, 4P		4.8	4.8	4.8	4.6	4.6	-	-	-	
	Switches	SB2xx	32A	2P		2.3	2.3	2.3	-	-	-	-	-	
		SB2xx	63A	2P		3.4	3.4	3.4	-	-	-	-	-	
		SB2xx	100A	2P		5.5	5.5	5.5	4.6	4.6	-	-	-	
	IDL 2P/4P	SA2xx	80A	2P		6.7	6.7	6.7	5.1	5.1	5	5	5	
		SA4xx	80A	4P		5.7	5.7	5.7	5.1	5.1	5	5	5	
	RCD 2P/4P	CCxxx, CDxxx, CExxx, CFxxx, CGxxx	63A	2P		4.25	4.25	4.25	3.7	3.7	-	-	-	
			63A	4P		3.8	3.8	3.8	3.7	3.7	-	-	-	
			100A	2P		5.5	5.5	5.5	4.6	4.6	-	-	-	
			100A	4P		4.8	4.8	4.8	4.6	4.6	-	-	-	
	MCB Ph+N under 240V	MFS, MFN	32A	C	3 kA	-	3.3	3.3	3.3	-	-	-	-	
		MJN, MHN	40A	B, C	4.5 kA	6 kA	8	8	8	6.5	6.5	6	6	
		MLN, MLU	40A	C	6 kA	7.5 kA	12.5	12.4	12.5	9.7	9.7	7.5	7.5	
	MCB Spinx Ph+N under 240V	3PP: NFT3xx, NGT3xx 3PP+N: NFT8xx, NGT8xx	40A	C, D	6 kA	10 kA	18	20	20	14.1	20	10.1	10.1	
			Ph+N: NFT7xx, NGT7xx	40A	C, D	6 kA	10 kA	18	18	18	14.1	14.1	10.1	10.1
			Ph+N: MHT7xx, MJT7xx	40A	B, C	4.5 kA	6 kA	8	8	8	6.5	6.5	6	6
	RCBO 2 mod 1PP+N under 240V	ADC, ADH	32A	C	3 kA	-	3.3	3.3	3.3	-	-	-	-	
			Ax8xx	40A	C	4.5 kA	6 kA	8	8	8	6.5	6.5	6	6
			Ax9xx	40A	C	6 kA	10 kA	18	18	18	14	14	10	10
	RCBO 1 mod 1PP+N under 240V	AC1xx, AD1xx, AE1xx, AF1xx, ACx1xx, ADx1xx, AEx1xx	40A	B, C	10 kA	15 kA	18	25	40	25	40	25	25	
			50A	B, C	6 kA	10 kA	18	20	20	14.1	14.1	10.1	10.1	
	MCB Ocean 2 & v1 1 mod	MV, MW	63A	B, C	3 kA	4.5 kA	5.4	5.4	5.4	5.2	5.2	-	-	
		MX, MY	63A	B, C	4.5 kA	6 kA	8	8	8	6.5	6.5	6	6	
		MU, MT	63A	B, C	6 kA	10 kA	18	20	20	14.1	14.1	10.1	10.1	
		NB, NC, ND	63A	B, C, D	10 kA	15 kA	18	25	40	25	40	25	25	
	MCB GDE 1 mod	MVN, MWN	63A	B, C	3 kA	-	3.3	3.3	3.3	-	-	-	-	
		MXN, MYN	63A	B, C	4.5 kA	-	5.4	5.4	5.4	5.2	5.2	-	-	
		MBN, MCN, MTN, MUN, MP	63A	B, C	6 kA	-	8	8	8	6.5	6.5	6	6	
MCB GTE 1 mod	MBA, MCA, NEN, NFN, NGN	63A	B, C, D	6 kA	10 kA	18	25	30	20	25	15	18		
	NBN, NCN, NDN, NKN	63A	B, C, D	10 kA	15 kA	18	25	40	25	40	25	25		
	NQN, NRN, NSN	20A	B, C, D	-	25 kA	18	25	40	25	40	25	50	65	
		40A	B, C, D	-	20 kA	18	25	40	25	40	25	50	55	
		63A	B, C, D	-	15 kA	18	25	40	25	40	25	50	25	
	MMN2xx, MMN3xx	12A	magn.	-	25 kA	18	25	40	25	40	25	50	65	
	MMN2xx, MMN3xx	25A	magn.	-	20 kA	18	25	40	25	40	25	50	53.4	
MCB DEFI 125 1,5 mod	HLE, HLF, HLG, HME, HMF, HMG	125A	B, C	10 kA	15 kA	18	25	40	25	40	25	50		
	HMB, HMC, HMD	125A	B, C, D	15 kA	15 kA	18	25	40	25	40	25	50		
	HMJ, HMK	125A	C	-	30 kA	18	25	40	25	40	25	50		
	HMX	63A	C	-	50 kA	18	25	40	25	40	25	50		

h250 TM+		h250 LSI		h400 TM			h630 LSI		h800 TM		h1000 LSI		h1600 LSI	
HNH	HEH	HNC	HEC	HHD	HND	HKD	HND	HED	HNK	HEK	HNE	HEE	HNF	HEF
50 kA	70 kA	50 kA	70 kA	25 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA	50 kA	70 kA
3.5	3.5	3.5	3.5	-	-	-	-	-	-	-	-	-	-	-
3.9	3.9	3.9	3.9	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.5	3.5	3.5	3.5	-	-	-	-	-	-	-	-	-	-	-
3.9	3.10	3.11	3.12	-	-	-	-	-	-	-	-	-	-	-
4.7	4.7	4.7	4.7	-	-	-	-	-	-	-	-	-	-	-
5.3	5.3	5.3	5.3	-	-	-	-	-	-	-	-	-	-	-
5.3	5.3	5.3	5.3	-	-	-	-	-	-	-	-	-	-	-
5.3	5.3	5.3	5.3	-	-	-	-	-	-	-	-	-	-	-
5.3	5.3	5.3	5.3	-	-	-	-	-	-	-	-	-	-	-
4.7	4.7	4.7	4.7	-	-	-	-	-	-	-	-	-	-	-
4.7	4.7	4.7	4.7	-	-	-	-	-	-	-	-	-	-	-
4.1	4.1	4.1	4.1	-	-	-	-	-	-	-	-	-	-	-
6.5	6.5	6.5	6.5	-	-	-	-	-	-	-	-	-	-	-
9	9	9	9	9	9	7.7	7.7	7.7	-	-	-	-	-	-
20	20	20	20	13.6	13.6	20	20	20	10	10	10	10	10	10
14	14	14	14	13.6	13.6	10.1	10.1	10.1	10	10	10	10	10	10
6.5	6.5	6.5	6.5	6	6	6	6	6	6	6	6	6	6	6
4.1	4.1	4.1	4.1	-	-	-	-	-	-	-	-	-	-	-
6.5	6.5	6.5	6.5	-	-	-	-	-	-	-	-	-	-	-
14	14	14	14	14	14	10	10	10	-	-	-	-	-	-
46	46	46	46	23	23	18.6	18.6	18.6	18	18	18	18	-	-
14	14	14	14	13.6	13.6	10.1	10.1	10.1	-	-	-	-	-	-
5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-	-
6.5	6.5	6.5	6.5	-	-	-	-	-	-	-	-	-	-	-
14	14	14	14	13.6	13.6	10.1	10.1	10.1	-	-	-	-	-	-
47	47	47	47	23	23	18.6	18.6	18.6	18	18	18	18	-	-
4.1	4.1	4.1	4.1	-	-	-	-	-	-	-	-	-	-	-
5.1	5.1	5.1	5.1	-	-	-	-	-	-	-	-	-	-	-
6.5	6.5	6.5	6.5	-	-	-	-	-	-	-	-	-	-	-
25	35	25	35	15	20	20	20	20	18	18	18	18	-	-
47	47	47	47	23	23	20	20	20	18	18	18	18	-	-
50	70	50	70	25	50	58	50	58	44	44	44	44	28	28
50	70	50	70	25	44	29	29	29	30	30	30	30	20	20
47	47	47	47	25	33	19	19	19	18	18	18	18	-	-
50	70	50	70	25	50	58	50	58	44	44	44	44	28	28
50	70	50	70	25	44	29	29	29	30	30	30	30	20	20
47	47	47	47	23	23	18.6	18.6	18.6	18	18	18	18	-	-
47	47	47	47	23	23	19	19	19	18	18	18	18	-	-
50	70	50	70	25	50	70	50	70	50	65	50	65	34	34
50	70	50	70	25	50	70	50	70	50	70	50	70	50	70

Cascading according to IEC 60947-2 MCCBs / Switches, RCDs, RCBOs, MCBs

Max. cascading value in kA rms according to IEC 947-2 Network: 3 phases + neutral 127/220 - 138/240 VAC
or downstream devices in single-phase network: 3 phases + neutral 220/380 - 240/415 VAC

						Upstream								
						x160 TM			x250 TM		h250 TM			
						HDA	HHA	HNA	HHB	HNB	HHG	HNG	HEG	
				IEC 69898 IEC 61008 IEC 61009	IEC 60947-2	25 kA	35 kA	85 kA	35 kA	85 kA	35 kA	85 kA	85 kA	
Downstream	Switches	SB1xx, SB3xx, SB4xx	32A	1P, 3P, 4P		2.5	2.5	2.5	-	-	-	-	-	
		SB1xx, SB3xx, SB4xx	63A	1P, 3P, 4P		4	4	4	-	-	-	-	-	
		SB1xx, SB3xx, SB4xx	100A	1P, 3P, 4P		7.7	7.7	7.7	4.6	4.6	-	-	-	
	Switches	SB2xx	32A	2P		2.7	2.7	2.7	-	-	-	-	-	
		SB2xx	63A	2P		4.4	4.4	4.4	-	-	-	-	-	
		SB2xx	100A	2P		9	9	9	4.6	4.6	-	-	-	
	IDL 2P/4P	SA2xx	80A	2P		11.5	11.5	11.5	5.1	5.1	-	-	-	
		SA4xx	80A	4P		9.9	9.9	9.9	5.1	5.1	-	-	-	
	RCD 2P/4P	CCxxx, CDxxx, CExxx, CFxxx, CGxxx	63A	2P		6.2	6.2	6.2	3.7	3.7	-	-	-	
			63A	4P		5.5	5.5	5.5	3.7	3.7	-	-	-	
			100A	2P		9	9	9	4.6	4.6	-	-	-	
			100A	4P		7.7	7.7	7.7	4.6	4.6	-	-	-	
	MCB Ph+N under 240V	MFS, MFN	32A	C	3 kA	-	4.5	4.5	4.5	3.5	3.5	-	-	-
		MJN, MHN	40A	B, C	4.5 kA	6 kA	15	15	15	6.5	6.5	6	6	6
		MLN, MLU	40A	C	6 kA	7.5 kA	24	24	24	9	9	9	9	9
	MCB Spinx Ph+N under 240V	NFT7xx, NGT7xx	40A	C, D	6 kA	10 kA	25	35	45	15	20	18	18	18
		MHT7xx, MJT7xx	40A	B, C	4.5 kA	6 kA	15	15	15	6.5	6.5	6	6	6
	RCBO 2 mod 1PP+N under 240V	ADC, ADH	32A	C	3 kA	-	4.5	4.5	4.5	3.5	3.5	-	-	-
		Ax8xx	40A	C	4.5 kA	6 kA	15	15	15	6.5	6.5	6	6	6
		Ax9xx	40A	C	6 kA	10 kA	25	35	45	15	15	18	18	18
	RCBO 1 mod 1PP+N under 240V	AC1xx, AD1xx, AE1xx, AF1xx, ACx1xx, ADx1xx, AEx1xx	40A	B, C	10 kA	15 kA	25	35	45	35	85	35	85	85
			50A	B, C	6 kA	10 kA	25	35	45	15	15	18	18	18
	RCBO 2PP	ADA2xxN	32A	B, C	10 kA	10 kA	25	35	45	15	15	18	18	18
	MCB Ocean 2 & V1	MV, MW	63A	B, C	4,5 kA	6 kA	15	15	15	6.5	6.5	6	-	6
		MX, MY	63A	B, C	6 kA	10kA	25	35	45	15	15	18	18	18
		MU, MT	63A	B, C	10 kA	10 kA	25	35	45	15	15	18	18	18
		NB, NC, ND	63A	B, C, D	15 kA	20 kA	25	35	85	35	85	35	85	85
	MCB GDE 1 mod	MVN, MWN	63A	B, C	4.5 kA	-	-	-	-	-	-	-	-	-
		MXN, MYN	63A	B, C	6 kA	-	15	15	15	6.5	6.5	6	6	6
		MP 5xx under 240V	63A	ICP-M	6 kA	-	8	8	8	6.5	6.5	6	6	6
MUN 5xx under 240V		40A	C	6 kA	-	8	8	8	6.5	6.5	6	6	6	
MBN, MCN, MTN, MUN, MP		63A	B, C	10 kA	-	25	35	45	15	15	18	18	18	
MCB GTE 1 mod	NFN 7xx under 240V	63A	C	6 kA	10 kA	18	18	18	14.1	15.1	10.1	10.1	10.1	
	MBA, MCA, NEN, NFN, NGN	63A	B, C, D	10 kA	20 kA	25	35	85	35	85	35	85	85	
	NBN, NCN, NDN, NKN	63A	B, C, D	10 kA	30 kA	25	35	85	35	85	35	85	85	
	NQN, NRN, NSN	20A	B, C, D	-	50 kA	25	35	85	35	85	35	85	85	
		40A	B, C, D	-	40 kA	25	35	85	35	85	35	85	85	
		63A	B, C, D	-	30 kA	25	35	85	35	85	35	85	85	
	MMN2xx, MMN3xx	12A	magn.	-	50 kA	25	35	85	35	85	35	85	85	
MMN2xx, MMN3xx	25A	magn.	-	40 kA	25	35	85	35	85	35	85	85		
MCB DEFI 125 1,5 mod	HLE, HLF, HLG, HME, HMF, HMG	125A	B, C	15 kA	30 kA	25	35	85	35	85	35	85	85	
	HMB, HMC, HMD	125A	B, C, D	15 kA	30 kA	25	35	85	35	85	35	85	85	
	HMJ, HMK	125A	C	-	60 kA	25	35	85	35	85	35	85	85	
	HMX	63A	C	-	100 kA	25	35	85	35	85	35	85	85	

h250 TM+		h250 LSI		h400 TM			h630 LSI		h800 TM		h1000 LSI		h1600 LSI	
HNH	HEH	HNC	HEC	HHD	HND	HKD	HND	HED	HNK	HEK	HNE	HEE	HNF	HEF
85 kA	100 kA	85 kA	100 kA	35 kA	85 kA	100 kA	85 kA	100 kA	85 kA	100 kA	85 kA	100 kA	100 kA	100 kA
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	6	6	-	-	-	-	-	-	-	-	-
-	-	-	-	6	6	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	7	6	7	8.2	8.2	7.2	7.2	7.2	-	-	-	-	-	-
9	12	9	12	13.5	13.5	10	10	10	-	-	-	-	-	-
20	40	20	40	19	19	15	15	15	10	10	10	10	10	10
6	7	6	7	8.2	8.2	7.2	7.2	7.2	6	6	6	6	6	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	7	6	7	8.2	8.2	7.2	7.2	7.2	-	-	-	-	-	-
18	40	18	40	19	19	15	15	15	14	14	14	14	-	-
85	100	85	100	35	42	37	37	37	27	27	27	27	16	16
18	40	18	40	19	19	15	15	15	14	14	14	14	-	-
18	40	18	40	19	19	15	15	15	14	14	14	14	-	-
6	7	6	7	8.2	8.2	7.2	7.2	7.2	-	-	-	-	-	-
18	40	18	40	19	19	15	15	15	14	14	14	14	-	-
18	40	18	40	19	19	15	15	15	14	14	14	14	-	-
85	100	85	100	35	64	63	63	63	40	40	40	40	21	21
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	7	6	7	8.2	8.2	7.2	7.2	7.2	-	-	-	-	-	-
6.5	6.5	6.5	6.5	-	-	-	-	-	-	-	-	-	-	-
6.5	6.5	6.5	6.5	-	-	-	-	-	-	-	-	-	-	-
18	40	18	40	19	19	15	15	15	14	14	14	14	-	-
14	14	14	14	13.6	13.6	10.1	10.1	10.1	-	-	-	-	-	-
85	100	85	100	35	64	63	63	63	40	40	40	40	27	27
85	100	85	100	35	85	100	85	100	85	85	85	85	37	37
85	100	85	100	35	85	100	85	100	85	100	85	100	85	85
85	100	85	100	35	85	100	85	100	85	100	85	100	55	55
85	100	85	100	35	85	100	85	100	85	100	85	100	37	37
85	100	85	100	35	85	100	85	100	85	100	85	100	85	85
85	100	85	100	35	85	100	85	100	85	100	85	100	55	55
85	100	85	100	35	85	100	85	100	85	100	85	100	37	37
85	100	85	100	35	85	100	85	100	85	100	85	100	37	37
85	100	85	100	35	85	100	85	100	85	100	85	100	100	100
85	100	85	100	35	85	100	85	100	85	100	85	100	100	100

Discrimination chart according to IEC 60947-2 MCCBs / RCBOs and MCBs

Icc (kA)	Upstream (A)	x160 TM 18/25/40 kA											x250 TM 25/40 kA						h250 TM 25/50/65 kA								
		HDA, HHA, HNA											HHB, HNB						HHG, HNG, HEG								
		16	20	25	32	40	50	63	80	100	125	160	100	125	160	200	225	250	20	32	50	63	100	125	160	200	250
MCB 1 module / pole, GTE range MBA, MCA, NEN, NFN, NGN, NBN, NCN, NDN, NKN (15 kA max IEC 60947-2)	B curve	6	1.3	1.3	1.3	1.3	1.3	2.7	2.7	5.8	5.8	6.7	3.8	5.8	9.6	T	T	T	0.35	0.65	1.2	1.7	3.8	5.8	9.6	T	T
	10	1.2	1.2	1.2	1.2	1.2	1.2	2.2	2.2	4.8	4.8	5.4	3.1	4.8	8	13	T	T	0.33	0.58	1	1.5	3.1	4.8	8	13	12
	13	0.97	0.97	0.97	0.97	0.97	0.97	2	2	4.3	4.3	4.8	2.8	4.3	6.9	11	13	12	0.32	0.55	0.92	1.4	2.8	4.3	6.9	11	9.7
	16	0.97	0.97	0.97	0.97	0.97	0.97	2	2	4.3	4.3	4.8	2.8	4.3	6.9	11	13	12	0.32	0.55	0.92	1.4	2.8	4.3	6.9	11	9.7
	20	-	0.92	0.92	0.92	0.92	0.92	1.8	1.8	3.6	3.6	4	2.4	3.6	5.5	8.3	10	9.3	0.31	0.53	0.85	1.3	2.4	3.6	5.5	8.3	7.7
	25	-	-	0.92	0.92	0.92	0.92	1.8	1.8	3.6	3.6	4	2.4	3.6	5.5	8.3	10	9.3	-	0.53	0.85	1.3	2.4	3.6	5.5	8.3	7.7
	32	-	-	-	0.84	0.84	0.84	1.5	1.5	3	3	3.4	2.1	3	4.7	6.9	8	7.7	-	0.5	0.8	1.2	2.1	3	4.7	6.9	6.4
	40	-	-	-	-	0.84	0.84	1.5	1.5	3	3	3.4	2.1	3	4.7	6.9	8	7.7	-	-	0.8	1.2	2.1	3	4.7	6.9	6.4
	50	-	-	-	-	-	0.81	1.4	1.4	2.5	2.5	2.8	1.8	2.5	3.7	5.4	6.2	6	-	-	0.78	1.1	1.8	2.5	3.7	5.4	5
	63	-	-	-	-	-	-	1.4	1.4	2.5	2.5	2.8	1.8	2.5	3.7	5.4	6.2	6	-	-	-	1.1	1.8	2.5	3.7	5.4	5
C curve	0.5	5	5	5	5	5	5	T	T	T	T	T	T	T	T	T	T	0.8	1.8	4.5	8.5	T	T	T	T	T	
	1	1.6	1.6	1.6	1.6	1.6	1.6	4.8	4.8	12	12	14	7.1	12	T	T	T	T	0.42	0.85	1.5	2.6	7.1	12	T	T	T
	2	1.6	1.6	1.6	1.6	1.6	1.6	4.8	4.8	12	12	14	7.1	12	T	T	T	T	0.42	0.85	1.5	2.6	7.1	12	T	T	T
	3	1.4	1.4	1.4	1.4	1.4	1.4	3.5	3.5	8	8	9.2	5.1	8	14	T	T	T	0.37	0.7	1.3	2	5.1	8	14	T	T
	4	1.4	1.4	1.4	1.4	1.4	1.4	3.5	3.5	8	8	9.2	5.1	8	14	T	T	T	0.37	0.7	1.3	2	5.1	8	14	T	T
	6	1.3	1.3	1.3	1.3	1.3	1.3	2.7	2.7	5.8	5.8	6.7	3.8	5.8	9.6	T	T	T	0.35	0.65	1.2	1.7	3.8	5.8	9.6	T	T
	10	1.2	1.2	1.2	1.2	1.2	1.2	2.2	2.2	4.8	4.8	5.4	3.1	4.8	8	13	T	T	0.33	0.58	1	1.5	3.1	4.8	8	13	12
	13	0.97	0.97	0.97	0.97	0.97	0.97	2	2	4.3	4.3	4.8	2.8	4.3	6.9	11	13	12	0.32	0.55	0.92	1.4	2.8	4.3	6.9	11	9.7
	16	0.97	0.97	0.97	0.97	0.97	0.97	2	2	4.3	4.3	4.8	2.8	4.3	6.9	11	13	12	0.32	0.55	0.92	1.4	2.8	4.3	6.9	11	9.7
	20	-	0.92	0.92	0.92	0.92	0.92	1.8	1.8	3.6	3.6	4	2.4	3.6	5.5	8.3	10	9.3	0.31	0.53	0.85	1.3	2.4	3.6	5.5	8.3	7.7
D curve	0.5	4.3	4.3	4.3	4.3	4.3	14	14	T	T	T	T	T	T	T	T	T	0.8	1.8	4	7	T	T	T	T	T	
	1	1.6	1.6	1.6	1.6	1.6	4.6	4.6	11	11	13	6.8	11	T	T	T	T	T	0.42	0.84	1.5	7	6.8	11	T	T	T
	2	1.6	1.6	1.6	1.6	1.6	1.6	4.6	4.6	11	11	13	6.8	11	T	T	T	T	0.42	0.84	1.5	7	6.8	11	T	T	T
	3	1.4	1.4	1.4	1.4	1.4	1.4	3.2	3.2	7.4	7.4	8.5	4.6	7.4	13	T	T	T	0.36	0.7	1.3	2.6	4.6	7.4	13	T	T
	4	1.4	1.4	1.4	1.4	1.4	1.4	3.2	3.2	7.4	7.4	8.5	4.6	7.4	13	T	T	T	0.36	0.7	1.3	1.9	4.6	7.4	13	T	T
	6	1.2	1.2	1.2	1.2	1.2	1.2	2.4	2.4	5.4	5.4	6.2	3.4	5.4	9	T	T	T	0.34	0.62	1.05	1.5	3.4	5.4	9	T	14
	10	0.98	0.98	0.98	0.98	0.98	0.98	2	2	4.3	4.3	4.9	2.8	4.3	7.2	12	14	13	0.33	0.56	0.93	1.4	2.8	4.3	7.2	12	10.5
	13	0.92	0.92	0.92	0.92	0.92	0.92	1.8	1.8	3.7	3.7	4.2	2.5	3.7	6	9.2	11	11	0.32	0.54	0.88	1.3	2.5	3.7	6	9.2	8.4
	16	0.92	0.92	0.92	0.92	0.92	0.92	1.8	1.8	3.7	3.7	4.2	2.5	3.7	6	9.2	11	11	0.32	0.54	0.88	1.3	2.5	3.7	6	9.2	8.4
	20	-	0.86	0.86	0.86	0.86	0.86	1.6	1.6	3.2	3.2	3.4	2.2	3.2	4.8	7.1	8.5	7.9	0.31	0.52	0.82	1.2	2.2	3.2	4.8	7.1	6.7
25	-	-	0.86	0.86	0.86	0.86	1.6	1.6	3.2	3.2	3.4	2.2	3.2	4.8	7.1	8.5	7.9	-	0.52	0.82	1.2	2.2	3.2	4.8	7.1	6.7	
32	-	-	-	0.81	0.81	0.81	1.5	1.5	2.5	2.5	2.7	1.8	2.5	3.7	5.4	7.2	5.9	-	0.5	0.78	1.1	1.8	2.5	3.7	5.4	5.1	
40	-	-	-	-	0.81	0.81	1.5	1.5	2.5	2.5	2.7	1.8	2.5	3.7	5.4	7.2	5.9	-	-	0.78	1.1	1.8	2.5	3.7	5.4	5.1	
50	-	-	-	-	-	0.78	1.4	1.4	2.4	2.4	2.5	1.7	2.4	3.3	4.6	6.2	5	-	-	0.76	1	1.7	2.4	3.3	4.6	4.3	
63	-	-	-	-	-	-	1.4	1.4	2.4	2.4	2.5	1.7	2.4	3.3	4.6	6.2	5	-	-	-	1	1.7	2.4	3.3	4.6	4.3	

Breaking capacity according to IEC 947-2. Network : 3 phasis + neutral 220/380 ~ 240/415 V AC

notes : "T" = total discrimination (up to the breaking capacity of the downstream device)

"-" = no discrimination

h250 TM+ 50/70 kA								h250 LSI 50/70 kA			h400 TM 25/50/70 kA				h630 LSI 50/70 kA					h800 TM 50/70 kA		h1000 LSI 50/70 kA				h1600 LSI 50/70 kA		
HNN, HEH								HNG, HEG			HHD, HND, HKD				HND, HED					HNK, HEK		HNE, HEE				HNF, HEF		
20	32	50	63	100	125	160	250	40	125	250	250	300	350	400	250	400	500	600	630	630	800	630	700	800	1000	800	1250	1600
0.35	0.59	1.2	1.5	3.3	5	9.6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.33	0.52	1	1.4	2.8	4.2	8	12	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.32	0.5	0.92	1.3	2.5	3.7	6.9	9.7	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.32	0.5	0.92	1.3	2.5	3.7	6.9	9.7	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.31	0.48	0.85	1.1	2.2	3.1	5.5	7.7	T	T	T	11	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	0.48	0.85	1.1	2.2	3.1	5.5	7.7	T	T	T	11	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	0.46	0.8	1	1.9	2.6	4.7	6.4	T	T	T	9	14	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	0.8	1	1.9	2.6	4.7	6.4	T	T	T	9	14	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	0.78	0.95	1.6	2.3	3.7	5	-	T	T	7	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	-	0.95	1.6	2.3	3.7	5	-	T	T	7	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.8	1.6	4.5	7	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.42	0.74	1.5	2.2	6.2	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.42	0.74	1.5	2.2	6.2	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.37	0.61	1.3	1.7	4.5	7	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.37	0.61	1.3	1.7	4.5	7	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.35	0.59	1.2	1.5	3.3	5	9.6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.33	0.52	1	1.4	2.8	4.2	8	12	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.32	0.5	0.92	1.3	2.5	3.7	6.9	9.7	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.32	0.5	0.92	1.3	2.5	3.7	6.9	9.7	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.31	0.48	0.85	1.1	2.2	3.1	5.5	7.7	T	T	T	11	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	0.48	0.85	1.1	2.2	3.1	5.5	7.7	T	T	T	11	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	0.46	0.8	1	1.9	2.6	4.7	6.4	T	T	T	9	14	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	0.8	1	1.9	2.6	4.7	6.4	T	T	T	9	14	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	0.78	0.95	1.6	2.3	3.7	5	-	T	T	7	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	-	0.95	1.6	2.3	3.7	5	-	T	T	7	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.8	1.6	4	5.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.42	0.72	1.5	2	5.8	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.42	0.72	1.5	2	5.8	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.36	0.6	1.3	1.6	4	6.6	13	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.36	0.6	1.3	1.6	4	6.6	13	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.34	0.53	1.05	1.4	3	5	9	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.33	0.5	0.93	1.2	2.5	4	7.2	10.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.32	0.48	0.88	1.1	2.2	3.4	6	8.4	T	T	T	12	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.32	0.48	0.88	1.1	2.2	3.4	6	8.4	T	T	T	12	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
0.31	0.46	0.82	1	1.9	2.8	4.8	6.7	T	T	T	9.5	8	8	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	0.46	0.82	1	1.9	2.8	4.8	6.7	T	T	T	9.5	8	8	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	0.44	0.78	0.95	1.7	2.4	3.7	5.1	T	T	T	7	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	0.78	0.95	1.7	2.4	3.7	5.1	T	T	T	7	10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	0.76	0.9	1.6	2.2	3.3	4.3	T	T	T	5.8	14	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
-	-	-	0.9	1.6	2.2	3.3	4.3	T	T	T	5.8	14	14	T	T	T	T	T	T	T	T	T	T	T	T	T	T	

Discrimination chart according to IEC 60947-2

ACBs / MCCBs

	Icc (kA)	Upstream	frame I, HWG				frame I, HWN						
			Downstream	Icu = Ics = 50 kA @ 415V				Icu = Ics = 65 kA @ 415V					
				OCR: LSI or LSIG with OCR with Ir=1xIn, Tr>24s at 6lr, Is=10In, Ts>20ms, Ip=Max									
(A)			630	800	1000	1250	630	800	1000	1250	1600	2000	
HDA HHA HNA	x160 TM 18/25/40 kA	16	T	T	T	T	T	T	T	T	T	T	
		20	T	T	T	T	T	T	T	T	T	T	
		25	T	T	T	T	T	T	T	T	T	T	
		32	T	T	T	T	T	T	T	T	T	T	
		40	T	T	T	T	T	T	T	T	T	T	
		50	T	T	T	T	T	T	T	T	T	T	
		63	T	T	T	T	T	T	T	T	T	T	
		80	T	T	T	T	T	T	T	T	T	T	
		100	T	T	T	T	T	T	T	T	T	T	
		125	T	T	T	T	T	T	T	T	T	T	
160	T	T	T	T	T	T	T	T	T	T			
HHB HNB	x250 TM 25/40 kA	100	T	T	T	T	T	T	T	T	T	T	
		125	T	T	T	T	T	T	T	T	T	T	
		160	T	T	T	T	T	T	T	T	T	T	
		200	T	T	T	T	T	T	T	T	T	T	
		225	T	T	T	T	T	T	T	T	T	T	
HHG HNG HEG	h250 TM 25/50/65 kA	20	T	T	T	T	T	T	T	T	T	T	
		32	T	T	T	T	T	T	T	T	T	T	
		50	T	T	T	T	T	T	T	T	T	T	
		63	T	T	T	T	T	T	T	T	T	T	
		100	T	T	T	T	T	T	T	T	T	T	
		125	T	T	T	T	T	T	T	T	T	T	
		160	T	T	T	T	T	T	T	T	T	T	
		200	T	T	T	T	T	T	T	T	T	T	
HNH HEH	h250 TM+ 50/70 kA	20	T	T	T	T	T	T	T	T	T	T	
		32	T	T	T	T	T	T	T	T	T	T	
		50	T	T	T	T	T	T	T	T	T	T	
		63	T	T	T	T	T	T	T	T	T	T	
		100	T	T	T	T	T	T	T	T	T	T	
		125	T	T	T	T	T	T	T	T	T	T	
		160	T	T	T	T	T	T	T	T	T	T	
HNC HEC	h250 LSI 50/70 kA	40	T	T	T	T	T	T	T	T	T	T	
		125	T	T	T	T	T	T	T	T	T	T	
		250	T	T	T	T	T	T	T	T	T	T	
HHD HND HKD	h400 TM 25/50/70 kA	250	T	T	T	T	T	T	T	T	T	T	
		300	T	T	T	T	T	T	T	T	T	T	
		350	T	T	T	T	T	T	T	T	T	T	
		400	T	T	T	T	T	T	T	T	T	T	
HND HED	h630 LSI 50/70kA	250	T	T	T	T	T	T	T	T	T	T	
		400	T	T	T	T	T	T	T	T	T	T	
		500	T	T	T	T	T	T	T	T	T	T	
		600	T	T	T	T	T	T	T	T	T	T	
		630	-	T	T	T	-	T	T	T	T	T	
HNK HEK	h800 TM 50/70 kA	630	-	-	T	T	-	-	T	T	T		
		800	-	-	T	T	-	-	T	T	T		
HNE HEE	h1000 LSI 50/70 kA	630	-	-	T	T	-	-	T	T	T		
		700	-	-	T	T	-	-	T	T	T		
		800	-	-	T	T	-	-	T	T	T		
		7000	-	-	-	T	-	-	-	T	T		
HNF HEF	h1600 LSI 50/70 kA	800	-	-	T	T	-	-	T	T	T		
		1250	-	-	-	-	-	-	-	T	T		
		1600	-	-	-	-	-	-	-	-	T		

Breaking capacity according to IEC 60947-2. Network : 3 phasis + neutral 220/380 ~ 240/415 V AC
 notes : "T" = total discrimination (up to the breaking capacity of the downstream device)
 "-" = no discrimination

Cascading according to IEC 60947-2 and IEC 60439-1 ACBs / MCCBs

Max. cascading value in kA rms according to IEC 947-2 and IEC 60439-1

Network: 3 phases + neutral 220/380 - 240/415 VAC

			frame I, HWG	frame I HWN			
			rated current 630-800- 1000-1250A	rated current 630-800- 1000-1250A	rated current 1600A	rated current 2000A	
			IEC 60947-2	50 kA	65 kA	65 kA	65 kA
Downstream	x160 TM	HDA	18 kA	18	18	18	18
		HHA	25 kA	25	25	25	25
		HNA	40 kA	40	40	40	40
	x250 TM	HHB	25 kA	25	25	25	25
		HNB	40 kA	40	40	40	40
	h250 TM	HHG	25 kA	25	25	25	25
		HNG	50 kA	50	50	50	50
		HEG	65 kA	50	65	65	65
	h250 TM+	HNH	50 kA	50	50	50	50
		HEH	70 kA	50	65	65	65
	h250 LSI	HNC	50 kA	50	50	50	50
		HEC	70 kA	50	65	65	65
	h400 TM	HHD	25 kA	25	25	25	25
		HND	50 kA	50	50	50	50
		HKD	70 kA	50	65	65	65
	h630 LSI	HND	50 kA	50	50	50	50
		HED	70 kA	50	65	65	65
	h800 TM	HNK	50 kA	50	50	50	50
		HEK	70 kA	50	65	65	65
	h1000 LSI	HNE	50 kA	50	50	50	50
HEE		70 kA	50	65	65	65	
h1600 LSI	HNF	50 kA	-	-	50	50	
	HEF	70 kA	-	-	65	65	

frame II, HWS	frame II, HWS	frame II, HWS	frame III, HWP
rated current 800A	rated current 1000A	rated current 1600- 2000-2500-3200A	rated current 3200- 4000A
80 kA	80 kA	80 kA	100 kA
18	18	18	18
25	25	25	25
40	40	40	40
25	25	25	25
40	40	40	40
25	25	25	25
50	50	50	50
65	65	65	65
50	50	50	50
70	70	70	70
50	50	50	50
70	70	70	70
25	25	25	25
50	50	50	50
70	70	70	70
50	50	50	50
70	70	70	70
50	50	50	50
70	70	70	70
-	50	50	50
-	70	70	70
-	-	50	50
-	-	70	70

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HBA125H	16	HDA017Z	15	HDA126U	15	HEG250U	41	HHA039Z	15
HBA126H	16	HDA018Z	15	HDA126Z	15	HEG251U	41	HHA040U	15
HBA127H	16	HDA019Z	15	HDA159Z	15			HHA040Z	15
HBA128H	16	HDA020Z	15	HDA160U	15	HEH		HHA041U	15
HBA160H	16	HDA021Z	15	HDA160Z	15	HEH020U	41	HHA041Z	15
HBA161H	16	HDA023Z	15	HDA161U	15	HEH021U	41	HHA048Z	15
		HDA024Z	15	HDA161Z	15	HEH032U	41	HHA049Z	15
HBB		HDA025U	15			HEH033U	41	HHA050Z	15
HBB161H	27	HDA025Z	15	HEC		HEH050U	41	HHA051Z	15
HBB251H	27	HDA026U	15	HEC040H	42	HEH051U	41	HHA061Z	15
		HDA026Z	15	HEC041U	42	HEH063U	41	HHA062Z	15
HBD		HDA030Z	15	HEC125H	42	HEH064U	41	HHA063U	15
HBD401H	57	HDA031Z	15	HEC126H	42	HEH100U	41	HHA063Z	15
HBD631H	57	HDA032Z	15	HEC250H	42	HEH101U	41	HHA064U	15
		HDA033Z	15	HEC251H	42	HEH125U	41	HHA064Z	15
HCA		HDA038Z	15			HEH126U	41	HHA078Z	15
HCA125U	16	HDA039Z	15	HED		HEH160U	41	HHA079Z	15
HCA126U	16	HDA040U	15	HED400H	57	HEH161U	41	HHA080U	15
HCA160U	16	HDA040Z	15	HED401H	57	HEH250U	41	HHA080Z	15
HCA161U	16	HDA041U	15	HED630H	57	HEH251U	41	HHA081U	15
		HDA041Z	15	HED631U	57			HHA081Z	15
HCB		HDA048Z	15			HEK		HHA098Z	15
HCB250Z	27	HDA049Z	15	HEE		HEK630U	75	HHA099Z	15
HCB251Z	27	HDA050Z	15	HEE800H	75	HEK631U	75	HHA100U	15
		HDA051Z	15	HEE801H	75	HEK800U	75	HHA100Z	15
HCD		HDA061Z	15	HEE970H	75	HEK801U	75	HHA101U	15
HCD400H	57	HDA062Z	15	HEE971H	75			HHA101Z	15
HCD401H	57	HDA063U	15			HHA		HHA123Z	15
HCD630H	57	HDA063Z	15	HEF		HHA014Z	15	HHA124Z	15
HCD631U	57	HDA064U	15	HEF980H	88	HHA015Z	15	HHA125U	15
		HDA064Z	15	HEF981H	88	HHA016Z	15	HHA125Z	15
HCE		HDA078Z	15	HEF990H	88	HHA017Z	15	HHA126U	15
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HCE801U	75	HDA080U	15			HHA019Z	15	HHA159Z	15
HCE970H	75	HDA080Z	15	HEG		HHA020Z	15	HHA160U	15
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HCF		HDA098Z	15	HEG063U	41	HHA024Z	15	HHA161Z	15
HCF980U	88	HDA099Z	15	HEG064U	41	HHA025U	15		
HCF981U	88	HDA100U	15	HEG100U	41	HHA025Z	15	HHB	
HCF990H	88	HDA100Z	15	HEG101U	41	HHA026U	15	HHB100Z	27
HCF991U	88	HDA101U	15	HEG125U	41	HHA026Z	15	HHB101Z	27
		HDA101Z	15	HEG126U	41	HHA030Z	15	HHB125Z	27
HDA		HDA123Z	15	HEG160U	41	HHA031Z	15	HHB126Z	27
HDA014Z	15	HDA124Z	15	HEG161U	41	HHA032Z	15	HHB160Z	27
HDA015Z	15	HDA125U	15	HEG200U	41	HHA033Z	15	HHB161Z	27

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HHB201Z	27	HNA080Z	16	HND250U	56	HNH063U	41	HXA035H	29
HHB250Z	27	HNA081U	16	HND251U	56	HNH064U	41	HXA039H	18
HHB251Z	27	HNA081Z	16	HND400H	57	HNH100U	41	HXA051H	17
		HNA100U	16	HND400U	56	HNH101U	41	HXA051H	28
HHD		HNA100Z	16	HND401H	57	HNH125U	41	HXA053H	17
HHD250U	56	HNA101U	16	HND401U	56	HNH126U	41	HXA053H	28
HHD400U	56	HNA101Z	16	HND630H	57	HNH160U	41	HXA054H	17
		HNA125U	16	HND631H	57	HNH161U	41	HXA054H	28
HCG		HNA125Z	16			HNH250U	41	HXA055H	17
HHG020U	41	HNA126U	16	HNE		HNH251U	41	HXA055H	28
HHG032U	41	HNA126Z	16	HNE630U	75				
HHG050U	41	HNA160U	16	HNE631U	75	HNK		HXB	
HHG063U	41	HNA160Z	16	HNE800H	75	HNK630U	75	HXB001H	29
HHG100U	41	HNA161U	16	HNE801H	75	HNK631U	75	HXB002H	29
HHG125U	41	HNA161Z	16	HNE970H	75	HNK800U	75	HXB005H	29
HHG160U	41			HNE971H	75	HNK801U	75	HXB006H	29
HHG200U	41	HNB				HXA		HXB010H	29
HHG250U	41	HNB100U	27	HNF		HXA001H	17	HXB011H	29
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HKD250U	56	HNB101Z	27	HNF990H	88	HXA002H	28	HXB019H	29
HKD251U	56	HNB125U	27	HNF991H	88	HXA003H	17	HXB021H	29
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HKD401U	56	HNB126U	27	HNG		HXA004H	17	HXB023H	29
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HNA		HNB160U	27	HNG021U	41	HXA005H	28	HXB025H	29
HNA016Z	16	HNB160Z	27	HNG032U	41	HXA011H	17	HXB026H	29
HNA017Z	16	HNB161U	27	HNG033U	41	HXA011H	28	HXB027H	29
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HNA063U	16	HNC126H	42	HNH021U	41	HXA026H	17	HXB069H	59
HNA063Z	16	HNC250H	42	HNH032U	41	HXA026H	28	HXB069H	77
HNA064U	16	HNC251U	42	HNH033U	41	HXA026H	43	HXB070H	29
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HXB071H	29	HXC024H	58	HXE019H	89	HYA035H	89	HYD021H	59
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HXB071H	59	HXC024H	89	HXE031H	77	HYA086H	18	HYD023H	59
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HXB089H	29	HXC025H	76	HXE042H	77	HYA088H	18	HYD025H	59
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		HXC030H	43	HXE065H	77			HYD032H	59
HXC		HXC031H	43	HXE066H	77	HYB		HYD033H	59
HXC001H	43	HXC039H	44			HYB012H	44	HYD034H	59
HXC001H	58	HXC040H	44	HXF		HYB019H	18	HYD066H	59
HXC001H	58	HXC042H	44	HXF001H	89	HYB019H	44	HYD093H	59
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HXC003H	43	HXC065H	44	HXF008H	89	HYC010H	44		
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HXC003H	76			HXF031H	89	HYC019H	44	HYE007H	77
HXC004H	43	HXD		HXF039H	89	HYC021H	44	HYE008H	77
HXC004H	58	HXD030H	58	HXF040H	89	HYC022H	44	HYE021H	77
HXC004H	76	HXD031H	58	HXF042H	89	HYC025H	44	HYE022H	77
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HXC005H	58	HXD039H	77	HXF053H	89	HYC027H	44	HYE026H	77
HXC005H	76	HXD040H	59	HXF054H	89	HYC028H	44	HYE031H	77
HXC008H	43	HXD042H	59	HXF055H	89	HYC031H	44	HYE032H	77
HXC008H	58	HXD051H	58			HYC032H	44	HYE033H	77
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HXC011H	43	HXD054H	58	HYA013H	18				
HXC011H	58	HXD055H	58	HYA014H	18	HYD		HYG	
HXC013H	43	HXD068H	59	HYA015H	18	HYD003H	59	HYG021H	44
HXC013H	58	HXD068H	77	HYA019H	18	HYD004H	59	HYG022H	44
HXC014H	43			HYA021H	18	HYD005H	59	HYG041H	44
HXC014H	58	HXE		HYA022H	18	HYD006H	59		
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HXC015H	58	HXE011H	89	HYA024H	18	HYD008H	59		
HXC018H	43	HXE013H	76	HYA027H	18	HYD010H	59		
HXC018H	58	HXE013H	89	HYA028H	18	HYD011H	59		
HXC019H	43	HXE014H	76	HYA031H	18	HYD012H	59		
HXC019H	58	HXE014H	89	HYA032H	18	HYD013H	59		
HXC021H	43	HXE015H	76	HYA033H	18	HYD014H	59		
HXC021H	58	HXE015H	89	HYA035H	18	HYD015H	59		
HXC021H	76	HXE018H	76	HYA035H	44	HYD019H	59		

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