


























Connection devices



- B.2 Insulated busbars - prong
- B.3 Insulated busbars - fork
- B.4 Connection blocks
- B.5 Brass terminals $1 \leq 60A$



Insulated busbars - prong

	Designation	Section In		Width module	Pack qty.	Cat. ref.
 KB 063P	1 pole, 1 step brown insulation (phase)	10	63A	13 	50	KB 063P
	blue insulation (neutral)	10	63A	13 	50	KB 063N
 KB 063N	without insulation	10	63A	13 	50	KB 163I
	insulated	20	100A	57 	10	KB 190B
		20	100A	24 	10	KB 190C
2 pole, 1 step						
 KB 263C	insulated	10	63A	12 	10	KB 263A
		10	63A	24 	10	KB 263C
		16	80A	56 	10	KB 280B
3 pole, 1 step						
 KB 363C	insulated	10	63A	12 	10	KB 363A
		10	63A	57 	20	KB 363B
		10	63A	24 	10	KB 363C
		16	80A	57 	10	KB 380B
4 pole, 1 step						
 KB 463C	insulated	10	63A	12 	10	KB 463A
		10	63A	24 	10	KB 463C
		16	80A	56 	10	KB 480B
Cable connectors						
 KF 81A	connection from top In 63A	for cables : 25mm ²			10	KF 81A
 KF 82A		for cables : 2 x 16mm ²			10	KF 82A
 KF 83A	connection from side In 63A	for cables : 25mm ²			10	KF 83A
	connection from back In 63A	for cables : 50mm ²			10	KF 50S
End cap cover						
 KZ 021	for single pole busbars KB 063P and KB 063N				1 set	KZ 021
	for double pole busbars, 10mm ²				1 set	KZ 022
	for triple pole busbars, 10 or 16mm ² and double pole busbars 16mm ²				1 set	KZ 023A
	for four pole busbars, 10 or 16mm ²				1 set	KZ 024
 KZ 023A						

Insulated busbars - fork

	Designation	Section In		Width module	Pack qty.	Cat. ref.	
 KDN 180B	1 pole, 1 step	10	63A	12	100	KDN 163A	
		10	63A	57	50	KDN 163B	
		16	80A	12	100	KDN 180A	
		16	80A	57	50	KDN 180B	
		20	100A	56	10	KD 190B	
 KDN 380A	2 pole, 1 step	10	63A	12	50	KDN 263A	
		10	63A	56	20	KDN 263B	
		16	80A	12	50	KDN 280A	
		16	80A	56	10	KDN 280B	
	3 pole, 1 step	10	63A	12	50	KDN 363A	
		10	63A	57	20	KDN 363B	
		16	80A	12	50	KDN 380A	
		16	80A	57	10	KDN 380B	
	4 pole, 1 step	insulated	10	63A	12	25	KDN 463A
			10	63A	56	10	KDN 463B
			16	80A	12	25	KDN 480A
			16	80A	56	10	KDN 480B



KF 84A



KZ 023



Cable connectors

connection from side In 63A	for cables : 25mm ²	10	KF 84A
connection from top In 63A	for cables : 25mm ²	10	KF 81D

End cap cover

for one pole busbars, 10 or 16mm ²	1 set	KZN 021
for double or triple pole busbars, 10 or 16mm ²	1 set	KZN 023
for four pole busbars, 10 or 16mm ²	1 set	KZN 024

Connection blocks

Application :

connection blocks 16□ to 35□ to connect incoming cables and continue live feed.

Technical data :

connections :
incoming : 2x25□ or 2x35□
outgoing : 16□ or 25□
mounting : fixing on DIN rail

connection blocks include :
one insulated support, brass connection blocks with removable antishear plates to enable the incoming cables to be connected without cutting.



K 018F



K 023F

Designation
Characteristics

Width in ■
17.5mm

Pack
qty.

**Cat.
ref.**

Connection blocks

connection on each pole
incoming : 2x25□
4 separate outgoing ways : 16□

1 pole

l. 34 x h. 50 x w. 52mm

2 1/2

20

K 018F

2 pole

l. 64 x h. 50 x w. 52mm

4

10

K 023F

4 pole

l. 121 x h. 50 x w. 62mm

7

5

K 024F

5 pole

l. 150 x h. 50 x w. 62mm

8 1/2

5

K 025F

Connection blocks

connection :
incoming : 2x35□
4 separate outgoing ways : 25□

1 pole









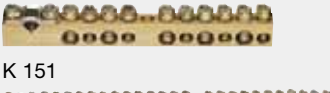

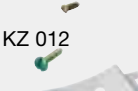
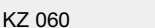

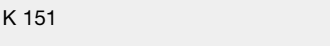

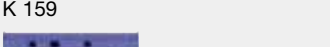
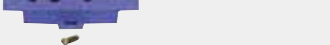
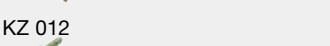


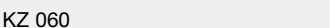
l. 37x h. 30 x w. 47mm

2 1/2

10

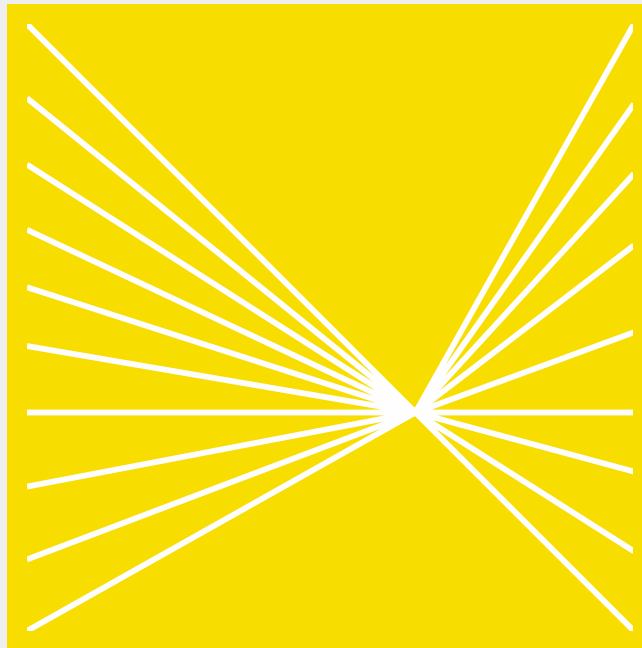
K 037F

Brass terminals 1 ≤ 60A

	Description :	Technical data :				Can be clipped directly on the DIN rail vertical position or with KZ 060 rail clip horizontal position.		
	insulated support can be fitted support for neutral/earth/phase connections	brass terminals with/without earth = green/yellow support phase = beige support neutral = blue support						
		Connections : number + section	Terminals with support Pack qty	Neutral cat. ref.	Earth cat.ref.	Phases cat. ref.	Without support Pack qty.	Cat. ref.
	KM 04L	2 x 16 + 2 x 10□ 4 connections length 30mm	50	-	-	KM 04L	10	K 140
	KM 08L	4 x 16 + 4 x 10□ 8 connections length 30mm	20	-	-	KM 08L	-	-
	KM 07N	3 x 16 + 4 x 10□ 7 connections length 49mm	20	KM 07N	KM 07E	KM 07L	10	K 142
	KM 10E	5 x 16 + 5 x 10□ 10 connections length 67mm	20	KM 10A	KM 10B	KM 10C	10	K 143
	KM 13N	5 x 16 + 6 x 10□ 11 connections length 73mm	20	KM 11N	KM 11E	KM 11L	10	K 144
	KM 11B	2 x 16 (double drive) + 8 x 10□ 10 connections length 69mm	20	KM 10N	KM 10E	KM 10L	10	K 145
	KM 25N	6 x 16 + 7 x 10□ 13 connections length 85mm	20	KM 13N	KM 13E	-	10	K 148
	K 151	1 x 25 + 5 x 16 + 5 x 10□ 11 connections length 85mm	20	-	KM 11B	-	10	K 151
	K 156	1 x 25 + 8 x 16 + 8 x 10□ 17 connections length 121mm	20	KM 17N 2supports	KM 17E	- 2 supports	10	K 156
	K 158	1 x 25 + 11 x 16 + 13 x 10□ 25 connections length 169mm	20	KM 25N 2supports	KM 25E	- 2 supports	10	K 158
	K 159	1 x 25 + 8 x 16 + 29 x 10□ long length terminals (without support) length 242mm					10	K 159
	K 160	1 x 25 + 16 x 16 + 61 x 10□ fixing on flat bar length 482mm 12 x 2 with supports (see below)					10	K 160
	K 162	1 x 25 + 33 x 16 + 129 x 10□ length 992mm					10	K 162
	K 151	Supports for K 140 to K 162 terminals		blue support for neutral			10	KZ 012
	K 151	insulating material M4 x 8 fixing screws		green/yellow supportfor earth			10	KZ 013
	K 151			beige supports (see below)			10	KZ 014
	K 159							
	K 159							
	K 159							
	K 159							
	K 159							
	K 159							
	KZ 012	Rail clip for fixing terminals on DIN rail not for : KM 04L, KM 08L, KM 10A, KM 10B, KM 10C, KM 10N, KM 10E, KM 10L		mounting on DIN rail			50	KZ 060

Circuit protection devices

- C.2 Miniature circuit breakers
- C.9 Miniature circuit breakers 80-125A
- C.13 Remote control auxiliary and auto reclosing remote control auxiliary
- C.14 Auxiliaries and accessories for MCBs & RCCBs
- C.15 RCD add-on blocks
- C.17 2 and 4 pole residual current devices (RCCBs/ELCBs)
- C.18 RCCBs selective product range
- C.19 Combined MCB/RCD (RCBO)
- C.20 RCBO electronic
- C.21 Earth leakage relays
- C.23 HRC fuse carriers and fuses
- C.24 L51-L58 HRC fuse carriers
- C.25 Motor starters
- C.26 Surge protection devices (SPD)
- C.29 Isolating switches
- C.31 Enclosed fuse combination switches and switch disconnectors
- C.34 Control relays



Miniature circuit breakers 4.5kA type C - MY

Description

protection and control of circuits against overloads and short circuits in domestic, commercial and industrial applications.

Technical data

C curve tripping
current rating : 1-63A
breaking capacity :
4.5kA IEC898
6kA IEC947-2
10KAIC NEMA AB-1
reference calibration
temperature : 30°C

voltage rating : 230/400V
mechanical endurance :
20 000 operations

Connection capacity :

25□ rigid conductor
16□ flexible conductor

Will accept accessories, shunt trips, auxiliary contact.
see page 12

Approval :

KEMA
ST
SNI
LMK

□ For technical information
see page T.15 - T.16



MY 120

Designation	In/A	Width in 17.5mm	Pack qty.	Cat. ref.
Single pole MCB	1	1	12	MY 101
	2	1	12	MY 102
	3	1	12	MY 103
	4	1	12	MY 104
	6	1	12	MY 106
	10	1	12	MY 110
	16	1	12	MY 116
	20	1	12	MY 120
	25	1	12	MY 125
	32	1	12	MY 132
	40	1	12	MY 140
	50	1	12	MY 150
	63	1	12	MY 163



MY 220

Double pole MCB	1	2	6	MY 201
	2	2	6	MY 202
	3	2	6	MY 203
	4	2	6	MY 204
	6	2	6	MY 206
	10	2	6	MY 210
	16	2	6	MY 216
	20	2	6	MY 220
	25	2	6	MY 225
	32	2	6	MY 232
	40	2	6	MY 240
	50	2	6	MY 250
	63	2	6	MY 263



MY 316

Triple pole MCB	1	3	4	MY 301
	2	3	4	MY 302
	3	3	4	MY 303
	4	3	4	MY 304
	6	3	4	MY 306
	10	3	4	MY 310
	16	3	4	MY 316
	20	3	4	MY 320
	25	3	4	MY 325
	32	3	4	MY 332
	40	3	4	MY 340
	50	3	4	MY 350
	63	3	4	MY 363

Miniature circuit breakers 6kA type B and C - MT MU

Description

protection and control of circuits against overloads and short circuits in domestic, commercial and industrial applications.

Technical data

MTxxxA = type B tripping
MUxxxA = type C tripping
according to IEC898 and
BSEN 60-898
reference calibration
temperature : 30°C
breaking capacity :
6kA IEC898

10kA IEC 947-2
22KAIC NEMA AB-1
voltage rating : 230/400V
current rating : 2-63A
mechanical endurance :
20 000 operations

Connection capacity :

25[□] rigid conductor
16[□] flexible conductor

Will accept accessories, shunt
trips, auxiliary contact.
see page 12

Approval :

KEMA
SNI
LMK

☐ For technical information
see page T.15 - T.16



MT 116A



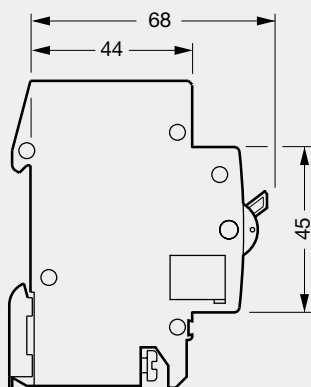
MT 220A



MT 320A

Designation	In/A	Width in 17.5mm	Pack qty.	B curve cat. ref.	C curve cat.ref.
Single pole MCB	2	1	12		MU 102A
	4	1	12		MU 104A
	6	1	12	MT 106A	MU 106A
	10	1	12	MT 110A	MU 110A
	16	1	12	MT 116A	MU 116A
	20	1	12	MT 120A	MU 120A
	25	1	12	MT 125A	MU 125A
	32	1	12	MT 132A	MU 132A
	40	1	12	MT 140A	MU 140A
	50	1	12	MT 150A	MU 150A
	63	1	12	MT 163A	MU 163A
Double pole MCB	2	2	6		MU 202A
	4	2	6		MU 204A
	6	2	6	MT 206A	MU 206A
	10	2	6	MT 210A	MU 210A
	16	2	6	MT 216A	MU 216A
	20	2	6	MT 220A	MU 220A
	25	2	6	MT 225A	MU 225A
	32	2	6	MT 232A	MU 232A
	40	2	6	MT 240A	MU 240A
	50	2	6	MT 250A	MU 250A
	63	2	6	MT 263A	MU 263A
Triple pole MCB	2	3	4		MU 302A
	4	3	4		MU 304A
	6	3	4	MT 306A	MU 306A
	10	3	4	MT 310A	MU 310A
	16	3	4	MT 316A	MU 316A
	20	3	4	MT 320A	MU 320A
	25	3	4	MT 325A	MU 325A
	32	3	4	MT 332A	MU 332A
	40	3	4	MT 340A	MU 340A
	50	3	4	MT 350A	MU 350A
	63	3	4	MT 363A	MU 363A

Miniature circuit breakers 10kA type B, C and D - NB NC ND ...



Description
protection and control of circuits against overloads and short circuits in domestic, commercial and industrial electrical distribution systems.

Technical data
NBxxxA = type B tripping
NCxxxA = type C tripping
NDxxxA = type D tripping
according to IEC898 and BSEN 60-898
breaking capacity :
10kA according to IEC898

15kA (up to 63A) according to IEC947-2
reference calibration
temperature : 30°C
voltage rating : 230/400V
current rating : 0.5 - 63A
mechanical endurance :
20 000 operations

Positive contact indication
red - contacts closed
green - contacts open
Will accept accessories, shunt trips, auxiliary contact.
see page 12

Connection capacity (up to 63A) :
25□ rigid conductor
16□ flexible conductor

Approval :
KEMA
SNI
LMK

□ For technical information
see page T.15 - T.16



NC 116A

Designation	In/A	Width in I 17.5mm	Pack qty.	B curve cat. ref.	C curve cat.ref.	D curve cat.ref.
Single pole MCB	0.5	1	12		NC 100A	ND 100A
	1	1	12		NC 101A	ND 101A
	2	1	12		NC 102A	ND 102A
	3	1	12		NC 103A	ND 103A
	4	1	12		NC 104A	ND 104A
	6	1	12	NB 106A	NC 106A	ND 106A
	10	1	12	NB 110A	NC 110A	ND 110A
	16	1	12	NB 116A	NC 116A	ND 116A
	20	1	12	NB 120A	NC 120A	ND 120A
	25	1	12	NB 125A	NC 125A	ND 125A
	32	1	12	NB 132A	NC 132A	ND 132A
	40	1	12	NB 140A	NC 140A	ND 140A
	50	1	12	NB 150A	NC 150A	ND 150A
	63	1	12	NB 163A	NC 163A	ND 163A



NC 220A

Double pole MCB	0.5	2	6		NC 200A	ND 200A
	1	2	6		NC 201A	ND 201A
	2	2	6		NC 202A	ND 202A
	3	2	6		NC 203A	ND 203A
	4	2	6		NC 204A	ND 204A
	6	2	6	NB 206A	NC 206A	ND 206A
	10	2	6	NB 210A	NC 210A	ND 210A
	16	2	6	NB 216A	NC 216A	ND 216A
	20	2	6	NB 220A	NC 220A	ND 220A
	25	2	6	NB 225A	NC 225A	ND 225A
	32	2	6	NB 232A	NC 232A	ND 232A
	40	2	6	NB 240A	NC 240A	ND 240A
	50	2	6	NB 250A	NC 250A	ND 250A
	63	2	6	NB 263A	NC 263A	ND 263A



NC 320A

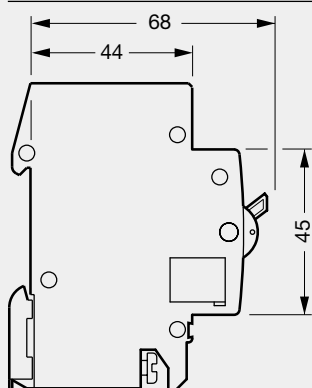
Designation	In/A	Width in 17.5mm	Pack qty.	B curve cat. ref.	C curve cat.ref.	D curve cat.ref.
Triple pole MCB	0.5	3	4		NC 300A	ND 300A
	1	3	4		NC 301A	ND 301A
	2	3	4		NC 302A	ND 302A
	3	3	4		NC 303A	ND 303A
	4	3	4		NC 304A	ND 304A
	6	3	4	NB 306A	NC 306A	ND 306A
	10	3	4	NB 310A	NC 310A	ND 310A
	16	3	4	NB 316A	NC 316A	ND 316A
	20	3	4	NB 320A	NC 320A	ND 320A
	25	3	4	NB 325A	NC 325A	ND 325A
	32	3	4	NB 332A	NC 332A	ND 332A
	40	3	4	NB 340A	NC 340A	ND 340A
	50	3	4	NB 350A	NC 350A	ND 350A
	63	3	4	NB 363A	NC 363A	ND 363A



NC 425A

Four pole MCB	0.5	4	3		NC 400A	ND 400A
	1	4	3		NC 401A	ND 401A
	2	4	3		NC 402A	ND 402A
	3	4	3		NC 403A	ND 403A
	4	4	3		NC 404A	ND 404A
	6	4	3	NB 406A	NC 406A	ND 406A
	10	4	3	NB 410A	NC 410A	ND 410A
	16	4	3	NB 416A	NC 416A	ND 416A
	20	4	3	NB 420A	NC 420A	ND 420A
	25	4	3	NB 425A	NC 425A	ND 425A
	32	4	3	NB 432A	NC 432A	ND 432A
	40	4	3	NB 440A	NC 440A	ND 440A
	50	4	3	NB 450A	NC 450A	ND 450A
	63	4	3	NB 463A	NC 463A	ND 463A

Miniature circuit breakers 15/25kA type C - NR



Description
protection and control of circuits against overloads and short circuits in commercial and industrial electrical distribution systems.

Technical data
type C tripping characteristics
reference calibration
temperature : 40°C
breaking capacity to IEC 947-2
- 25 000A (≤ 20A)
- 20 000A (25 to 40A)
- 15 000A (50 to 63A)

voltage rating - 230-400V
current rating - 6-63A
electrical endurance :
20 000 operations

Positive contact indication
red - contacts closed
green - contacts open

Will accept accessories, shunt trips, auxiliary contact.
see page 12

Connection capacity
25□ rigid conductor
16□ flexible conductor

□ For technical information
see page T.15 - T.16



NR 110A



NR 232A



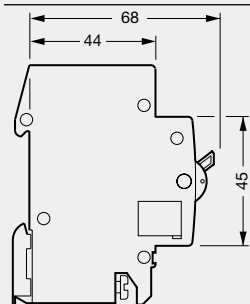
NR 340A



NR 440A

Designation	breaking capacity kA	In/A	Width in 17.5mm	Pack qty.	cat. ref.
Single pole MCB	25	6	1	12	NR 106A
	25	10	1	12	NR 110A
	25	16	1	12	NR 116A
	25	20	1	12	NR 120A
	20	25	1	12	NR 125A
	20	32	1	12	NR 132A
	20	40	1	12	NR 140A
	15	50	1	12	NR 150A
	15	63	1	12	NR 163A
Double pole MCB	25	6	2	6	NR 206A
	25	10	2	6	NR 210A
	25	16	2	6	NR 216A
	25	20	2	6	NR 220A
	20	25	2	6	NR 225A
	20	32	2	6	NR 232A
	20	40	2	6	NR 240A
	15	50	2	6	NR 250A
	15	63	2	6	NR 263A
Triple pole MCB	25	6	3	4	NR 306A
	25	10	3	4	NR 310A
	25	16	3	4	NR 316A
	25	20	3	4	NR 320A
	20	25	3	4	NR 325A
	20	32	3	4	NR 332A
	20	40	3	4	NR 340A
	15	50	3	4	NR 350A
	15	63	3	4	NR 363A
Four pole MCB	25	6	4	3	NR 406A
	25	10	4	3	NR 410A
	25	16	4	3	NR 416A
	25	20	4	3	NR 420A
	20	25	4	3	NR 425A
	20	32	4	3	NR 432A
	20	40	4	3	NR 440A
	15	50	4	3	NR 450A
	15	63	4	3	NR 463A

Miniature circuit breakers 25kA type C - NR



Description

protection and control of circuits against overloads and short circuits in commercial and industrial installations.

Technical data

type C tripping characteristics to IEC 947-2
magnetic setting : 5-10In
breaking capacity : 25 000A

reference calibration

temperature : 40°C
voltage rating : 230-400V
current rating : 25- 63A
mechanical endurance : 20 000
ambient temperature range :
-5°C to +40°C
tropicalisation T2

Positive contact indication

red - contacts closed
green - contacts open

Connection capacity :

rigid conductor 50[□]
flexible conductor 35[□]

Options

auxiliary contact, shunt trip,
locking kit - see page 12

☐ For technical information
see page T.15 - T.16



NR 240X

Designation	In/A	Width in 17.5mm	Pack. qty.	C curve cat. ref.
Single pole MCB	25	1.5	1	NR 125X
	32	1.5	1	NR 132X
	40	1.5	1	NR 140X
	50	1.5	1	NR 150X
	63	1.5	1	NR 163X
Double pole MCB	25	3	1	NR 225X
	32	3	1	NR 232X
	40	3	1	NR 240X
	50	3	1	NR 250X
	63	3	1	NR 263X
Triple pole MCB	25	4.5	1	NR 325X
	32	4.5	1	NR 332X
	40	4.5	1	NR 340X
	50	4.5	1	NR 350X
	63	4.5	1	NR 363X
Four pole MCB	25	6	1	NR 425X
	32	6	1	NR 432X
	40	6	1	NR 440X
	50	6	1	NR 450X
	63	6	1	NR 463X

Miniature circuit breakers Type C SP&N - ML

Description

Protection and control of circuits against overloads and short circuits.

Connection capacity


16□ rigid cables
10□ flexible cables
+ busbars

Technical data

Type C tripping characteristics
Breaking capacity :
6000A to IEC898
Voltage rating : 230V
Current rating : 6-32A



ML 516J

Designation	In/A	Width in 17.5mm	Pack qty.	Cat. ref.
SP&N MCB - 6kA	6	1	12	ML 506J
SP&N	10	1	12	ML 510J
	16	1	12	ML 516J
	20	1	12	ML 520J
	25	1	12	ML 525J
	32	1	12	ML 532J

Miniature circuit breakers 80-125A

Thermal magnetic circuit breakers

curves "B" - "C" - "D"

In 80 to 125 A

These circuit breakers are intended for the protection of the circuits against overloads and short circuits in professional premises (from residential to commercial and industrial premises).

The circuit breakers curve "B" are particularly recommended for the circuits with long cable length and for residential loads with low in-rush current. The circuit breakers curve "C" are adapted to the protection of the circuits in professional premises. The circuit breakers curve "D" are particularly adapted to the protection of the circuits where the installations are subject to high in-rush currents.

☐ **HMB curve "B"** 15000
15 kA of 80 - 100 - 125 A :
width 1,5 ■ / pole

☐ **HMC curve "C"** 15000
15 kA of 80 - 100 - 125 A :
width 1,5 ■ / pole

☐ **HMD curve "C"** 15000
15 kA of 80 - 100 - 125 A :
width 1,5 ■ / pole

☐ **HLE curve "B"** 10000
10 kA of 80 - 100 - 125 A :
width 1,5 ■ / pole

☐ **HLF curve "C"** 10000
10 kA of 80 - 100 - 125 A :
width 1,5 ■ / pole

☐ For technical information
see page T.17

Series HMB, HMC, HMD, HLE, HLF :

These circuit breakers are equipped with reinforced screw cages.

A label holder is integrated under the handle to ensure the location of the product.

The "OFF" position is clearly shown by a green indicator below the handle.

Suitable for isolation (according to IEC 60947-2) : the isolation of the circuit breakers is indicated by a green indicator on the handle.

These circuit breakers have quick closing : fast and simultaneous closing of the contacts, independent of the handling speed. That increases the life of the circuit breaker whatever the type of load.

Nominal voltage : 230/400 V ~
calibration setting :30 °C
(IEC 60898-1)
insulation voltage: 500 V

Options :

- ☐ auxiliary :
 - to visualise the state ON or OFF of the circuit breaker,
 - to ON/OFF remotely the circuit breaker
- ☐ locking mechanism
- ☐ terminal covers and phase separators
- ☐ RCD add-on blocks

Series HMB, HMC, HMD,

☐ disassembly capability :
bistable DIN-rail latches (2 positions) upstream and downstream facilitate the assembly or the disassembling of the circuit breakers on the DIN-rail.

☐ terminals with tightening compensation.

These circuit breakers are equipped with screw cages with tightening compensation, reinforcement cage, cable holding jaws. These elements contribute to an effective cable tightening over time.

☐ These circuit breakers are equipped with cable terminals of type "fast on" upstream and downstream to feed an auxiliary low voltage circuit (indicating lights, auxiliary control...) Max. circuit 6A
6 mm² maxi.

☐ lockable handle
MCB can be locked in "Off" position by the integrated locking facility on the handle. This lock allows to insert a 2,5-3,5mm plastic cable tie where you can fit a warning card if necessary and allows a safer working environment for all personnel.

☐ RCD Add-on blocks, simple, quick, adjustable and fixed

1. assembly
2. connection
3. locking

the assembly of the add-on block is carried out very quickly and easily. Simple and fast : it is a Hager innovation. add-on blocks 125A are available in fixed version and adjustable version.

Model	Icc/Curve	Accessories	Fast-on connection	Tightening comp. system	Lockable handle	Front product labelling
HLE / HLF	10kA / B, C	YES	NO	NO	NO	YES
HMB / HMC HMD	15kA / B, C, D	YES	YES	YES	YES	YES

Miniature circuit breakers 80-125A HLE, HLF : B"- C" 10000 - 10 kA

new

Curves "B" and "C" **10000**
(IEC 60898-1)
10 kA
IEC 60947-2

In 80 to 125 A

Tripping curves :
B"magnetic setting between
3 and 5 In,
C"magnetic setting between
5 and 10 In.

Use :
residential, commercial and
industrial premises


Connection capacity :
- 35² flexible wire (50² possible
with some cable end-caps),
- 70² rigid wire

KEMA In conformity with the
IEC 60898-1, 947-2 approved

☐ For technical information
see page T.17




HLF 199S

Designation	In / A	Width in ■ 17,5 mm	Ref. . curve B	curve C
Circuit breakers 1 pole 1 P.P.	80	1,5	HLE 180S	HLF 180S
	100	1,5	HLE 190S	HLF 190S
	125	1,5	HLE 199S	HLF 199S



HLF 299F

Circuit breakers 2 poles 2 P.P.	80	3	HLE 280S	HLF 280S
	100	3	HLE 290S	HLF 290S
	125	3	HLE 299S	HLF 299S




HLF 399S

Circuit breakers 3 poles 3 P.P.	80	4,5	HLE 380S	HLF 380S
	100	4,5	HLE 390S	HLF 390S
	125	4,5	HLE 399S	HLF 399S



HLF 499S

Circuit breakers 4 poles 4 P.P.	80	6	HLE 480S	HLF 480S
	100	6	HLE 490S	HLF 490S
	125	6	HLE 499S	HLF 499S

Miniature circuit breakers 80-125A HMB, HMC : B"- C" 15000 - 15 kA

new

Curves "B" and "C" **15000**
(IEC 60898-1)
15 kA
IEC 60947-2

Tripping curves :
B"magnetic setting between
3 and 5 In,
C"magnetic setting between
5 and 10 In.

Connection capacity :
- 35² flexible wire (50² possible
with some cable end-caps),
- 70² rigid wire

KEMA In conformity with the
IEC 60898-1, 947-2 approved

In 80 to 125 A

Use :
residential, commercial and
industrial premises

□ For technical information
see page T.17



HMC 199







HMC 299



HMC 399



HMC 499

Designation	In / A	Width in ■ 17,5 mm	Ref. . curve B curve C
Circuit breakers 1 pole 1 P.P.	80	1,5	HMB 180 HMC 180
	100	1,5	HMB 190 HMC 190
	125	1,5	HMB 199 HMC 199
Circuit breakers 2 poles 2 P.P.	80	3	HMB 280 HMC 280
	100	3	HMB 290 HMC 290
	125	3	HMB 299 HMC 299
Circuit breakers 3 poles 3 P.P.	80	4,5	HMB 380 HMC 380
	100	4,5	HMB 390 HMC 390
	125	4,5	HMB 399 HMC 399
Circuit breakers 4 poles 4 P.P.	80	6	HMB 480 HMC 480
	100	6	HMB 490 HMC 490
	125	6	HMB 499 HMC 499

Miniature circuit breakers 80-125A HMD : D" 15000 - 15 kA

new

Curve "D"

15000

IEC 60898-1

15 kA

IEC 60947-2

Tripping curve :

D"magnetic setting between 10 and 20 In.

Use :

professional premises

Connection capacity :

- 35² flexible wire (50² possible with some cable end-caps)
- 70² rigid wire.

KEMA In conformity with the standards IEC 60898-1, 947-2

☐ For technical information see page T.17

In 80 to 125 A

Désignation

In / A

Width in ■
17,5 mm

Ref.

Circuit breakers 1 poles 1 P.P.



80

1,5

HMD 180

100

1,5

HMD 190

125

1,5

HMD 199

Circuit breakers 2 poles 2 P.P.



80

3

HMD 280

100

3

HMD 290

125

3

HMD 299

Circuit breakers 3 poles 3 P.P.



80

4,5

HMD 380

100

4,5

HMD 390

125

4,5

HMD 399

Circuit breakers 4 poles 4 P.P.



80

4,5

HMD 480

100

4,5

HMD 490

125

4,5

HMD 499



HMD 299



HMD 399



HMD 499

Accessories for circuit breakers HMB, HMC, HMD

new

Désignation

Characteristics

Ref.

Terminal covers/ screw cap

Allows to cover connection terminals, screws of circuit breakers. The screw covers can be sealed.

MZN 130



MZN 130

Phase separator

1 set of 3 phase separators

MZN 131



MZN 131

Remote control auxiliary and auto reclosing remote control auxiliary

Remote control auxiliaries MZ900 and MZ910 allow :

- to operate by remote control the closing and opening contacts of the associated product (e.g. MCB)
- to indicate their states
- to stop all controls locally or remotely
- to make locally or remotely a reset.

The product MZ900 has a further function which allows a second automatic tripping when fault current.

These auxiliary devices are not designed for homes but for installation in isolated buildings, difficult to get to (e.g. transmission relays, pumping stations, etc...)

They are to be mounted on the following products :

- MCBs SPSN, 1P, 2P, 3P and 4P up to 63A (left or right mounting)
- RCBOs (left mounting for following devices also)
- RCCBs 2P and 4P.

MZ 900 :

- ☐ operation indicator light,
- ☐ 2 built-in Contacts (5 A) indicating
- 4 states :
 - closed or opened contacts of associated product
 - locking/initialization of auxiliary device
 - opened contacts of associated product after fault current.
- ☐ 3 positions front side selector :
 - activation of opening and closing controls

- locking/initialization of auxiliary device
- locking/initialization and reset of auxiliary device.
- ☐ 2 positions side selector :
 - the number of openings on fault is limited to 3,
 - the number of openings is unlimited.
- ☐ 4 control inputs:
 - opening,
 - closing,
 - locking/initialization of auxiliary device
 - locking/initialization and reset of auxiliary device.
- ☐ control inputs operate by a contact such as push button or closing switch (ie. : switch, relay, automation, etc....)
- ☐ built-in locking feature is provided on auxiliary device's lever (Ø 5mm lock not provided).

MZ 910 = MZ 900 + :

- ☐ front side selector with one additional position :
 - activation of opening and closing controls and of automatic resetting (3 min time delay before reset).

supply voltage : 230 V
frequency : 50/60 Hz
product consumption :
- in permanent operation : 7 VA
- in transition : 5 A max for 150 ms
control voltage : 230V
consumption of control : 1 mA

Operation number : 10 000

☐ For technical information see page T.18



MZ 900

Designation	Width in ■ 17,5 mm	Qty..	Ref.
Remote control auxiliary device	3	1	MZ 900
auto reclosing remote control auxiliary	3	1	MZ 910

Auxiliaries and accessories for MCBs & RCCBs

All auxiliaries are common to both single and multi-pole circuit breakers. These auxiliaries are fitted to the left hand side of devices.
Fault indication, auxiliaries, shunt trips, and under-voltage releases are fitted with a flag indicator that indicates the auto-matic/remote tripping of the device.

Test mode for CZ001, MZ201, MZ202 : possible to test cabling of auxiliary circuits operation by tripping-over contacts manually. Resetting of contact occurs simultaneously with MCB/RCCB resetting.

☐ For technical information see page T.19

CZ001 must be fitted on the RCCB before fitting maximum one additional auxiliary (MZ203 to MZ206).
Up to 4 auxiliaries can be fitted on MCB.



MZ 201





MZ 204



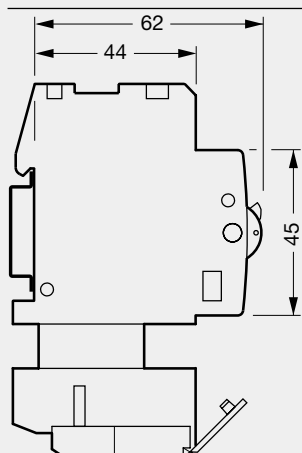
MZ 205



MZ 206

Designation	Description	Width in 17.5mm	Pack qty.	cat. ref.
Auxiliary + alarm switch	1 module wide for ON/OFF & trip indication	1	1	CZ 001
Auxiliary contacts 6A - 230V~ 3A - 440V~ allows remote indication of main contact status.	1NO + 1NC auxiliary contact	1/2	1	MZ 201
Signal contacts 6A - 230V~ 3A - 440V~ signal contact indicates a fault condition (e.g. MCB tripped on overload or short circuit). flag indicator red - MCB tripped	1NO + 1NC signal contact	1/2	1	MZ 202
Shunt trip allows remote tripping of the device	230 - 415 Vac 110 - 130 Vdc	1	1	MZ 203
	24 - 48 Vac 12 - 48 Vdc	1	1	MZ 204
Under voltage release allows MCB to be closed only when voltage is above 70% of Un. MCB will automatically trip when voltage falls by 35% of Un	48 Vdc 230 Vac	1 1	1 1	MZ 205 MZ 206
				
Locking kit for the dolly of the device supplied without padlock.	this allows locking of the device dolly in the on/off position. will accept two padlocks with hasps of 4.75mm diameter max.		2	MZ 207

RCD add-on blocks (63A)



Description

RCD add-on blocks for use with MCB ranges MY, MT, MU, NB, NC, ND, NR up to 63A.

Technical data :

High sensitivity :
10-30 mA instant tripping
Medium sensitivity :
100-500 mA instant tripping
300 - 500mA selective (time delay)

These devices are designed to be fitted on the right hand side of the 2, 3 and 4 poles MCBs.

The combination device then provides protection against overload, short circuits and earth leakage faults.

All devices have a test facility

All devices except 10mA and 100mA, are type AC.

10mA and 100mA are type A.

All devices are protected against nuisance tripping and transient

voltages

Nominal voltage :

2 poles 230V

3 and 4 poles : 230/400V

Comply with IEC1009

Connection capacities :

25 A : 6 flexible cable

10 rigid cable

40, 63 A : 16 flexible cable

25 rigid cable

For technical information see page T.20



BD 226N



BD 364N



BD 426N

Designation

Type

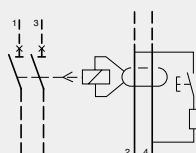
Sensitivity
 $I_{\Delta n}$

Width in I
17.5mm

Pack
qty.

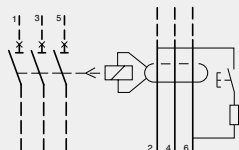
Cat.
ref.

2 poles add-on blocks



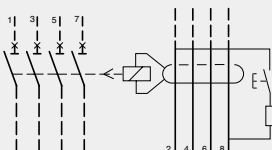
A	10 mA	25A	2	1	BC 225N
AC	30 mA	25A	2	1	BD 226N
AC		40A	2	1	BD 241N
AC		63A	2	1	BD 264N
A	100 mA	25A	2	1	BE 225N
A		63A	2	1	BE 263N
AC	300 mA	25A	2	1	BF 226N
AC		40A	2	1	BF 241N
AC		63A	2	1	BF 264N
AC	500 mA	63A	2	1	BG 264N
AC	300 mA	63A	2	1	BP 264N
AC	500mA	63A	2	1	BR 264N

3 poles add-on blocks



AC	30 mA	25A	2	1	BD 326N
AC		40A	3	1	BD 341N
AC		63A	3	1	BD 364N
A	100 mA	25A	3	1	BE 325N
A		63A	3	1	BE 363N
AC	300 mA	25A	2	1	BF 326N
AC		40A	3	1	BF 341N
AC		63A	3	1	BF 364N
AC	500 mA	63A	3	1	BG 364N
AC	300 mA	63A	3	1	BP 364N
AC	500 mA	63A	3	1	BR 364N

4 poles add-on blocks



AC	30 mA	25A	2	1	BD 426N
AC		40A	3	1	BD 441N
AC		63A	3	1	BD 464N
A	100mA	25A	3	1	BE 425N
A		63A	3	1	BE 463N
AC	300 mA	25A	2	1	BF 426N
AC		40A	3	1	BF 441N
AC		63A	3	1	BF 464N
AC	500 mA	63A	3	1	BG 464N
AC	300 mA	63A	3	1	BP 464N
AC	500 mA	63A	3	1	BR 464N


RCD add-on blocks type AC , type AC and HI new

RCD add-on blocks for circuit breakers HMB, HMC, HMD, HLE, HLF.

Fixed :

- **high sensitivity 30 mA** instantaneous
- **average sensitivity 300 mA** - instantaneous.

Settings :

- sensitivity Δn 0,3 - 0,5 - 1 A ...
- delay Δt 0  60 - 150 ms.

These devices are intended to be fixed on the right side of the circuit breakers to form differential circuit breakers from 80 to 125A, two, three or four-pole.

This "circuit breaker + block" ensures, in addition to the overload and short circuit protection, the protection of the installations against the insulation defects (300mA and 1A) and the protection of the people against the direct contacts (30mA) and indirect (300mA).

Adjustable blocks :

the setting is done by actuating the thumbwheel in front face. The setting thumbwheels are protected by a transparent sealable cover.

Disassembly :


the bistable latch (2 positions) facilitate the assembly or disassembly by the bottom of the "circuit breaker + block."

These RCD add-on blocks exist in version AC and in version A-HI.

Version AC :

the add-on blocks are protected against unexpected tripping caused by the transitory leakage currents : lightning, capacitive loading.

Version A et HI :

type A  : when the electrical load is likely to produce fault component dc pulsating current, the protection of the people must be carried out by differentials of type A.

HI (High Immunity) :




the products with "reinforced immunity" reduce the unexpected tripping when they protect equipment generating disturbances (micro-processing, electronic ballast,...)

The differential defect or earth fault is visualized by the rearmament handle of the block in low position (yellow colour). Test button for differential functioning check.

Tightening compensation cages

these circuits breakers blocs are equipped with screw cages with tightening compensation, reinforcement arch, cable holding jaws. These elements contribute to an effective tightening over time.

Connection capacity :

- 35  flexible connection (50  possible with some terminals),
- 70  rigid connection.

Assembly and disassembly facilitated by the drawer assembly system. The terminal cover is dependent of the add-on block. It is provided with jeying systems avoiding the omission of terminal tightening downstream of the circuit breaker. .

Nominal voltage : -15 +10 %
2 poles : 230 V
three and four-pole : 230/400 V
test button : 230/400 V.

In conformity with the requirements of the appendix G of the IEC 61009-1.
In conformity with the requirements of standard IEC 60947-2.




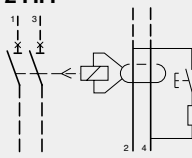

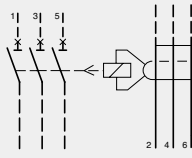

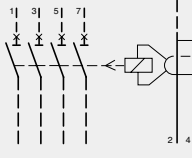

BDC 280E



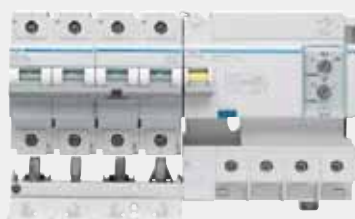
BTH 380E



BDC 480E

Designation	Sensitivity fixe / adjustable Δn	I_n / A	Width in  mm	Ref. add-on blocks AC	add-on blocks A-HI
Add-on blocks 2 poles 2 P.P.					
	fixe 30 mA	125	6	BDC 280E	BDH 280E
	adjustable 0,3 - 0,5 - 1 A 0 -  60 - 150 ms	125	6	BTC 280E	BTH 280E
Add-on blocks 3 poles 3 P.P.					
	fixe 30 mA	125	6	BDC 380E	BDH 380E
	adjustable 0,3 - 0,5 - 1 A 0 -  60 - 150 ms	125	6	BTC 380E	BTH 380E
Add-on blocks 4 poles 4 P.P.					
	fixe 30 mA	125	6	BDC 480E	BDH 480E
	fixe 300 mA	125	6	BFC 480E	BFH 480E
	adjustable 0,3 - 0,5 - 1 A 0 -  60 - 150 ms	125	6	BTC 480E	BTH 480E

association circuit breaker + add-on block 4 poles adjustable



2 and 4 pole residual current devices (RCCBs/ELCBs)

Description

to open a circuit automatically in the case of an earth leakage fault between phase and earth and / or neutral greater or equal to 10, 30, 100, 300 or 500mA; use in domestic, commercial and industrial installations.

Technical data

nominal voltage :
2 pole 110/230V - 50Hz
4 pole 230/400V - 50Hz
specifications : IEC 61008-1
SS97

Connection capacity :

16-63A rigid 25[□]
flexible 16[□]

80-100A rigid 50[□]
flexible 35[□]
ambient temperature range :
-5 to +40°C

Positive contact indication :

mechanical indicator, appearing on the front face of the RCCB, linked to the contacts shows the positive opening of all poles,
red = contacts closed
green = contacts open

Earth fault indicator

mechanical indicator appearing on the front face of the RCCB to differentiate between tripping and off position
yellow - tripped

Nuisance tripping

all the RCCBs are protected against transient voltages (lightning, line disturbances) and transient currents (from high capacitive circuits).

DC sensitive RCCBs or time delay devices are available, please consult us.

you also have the possibility to install the following accessories :
electrical auxiliaries
terminal cover kit
locking kit
* without SS97

☐ For technical information see page T.21 - T.22



CD 240B



CD 440B

	Sensitivity $I_{\Delta n}$	Current	Pack qty.	Cat.ref. 2 poles	Pack qty.	Cat.ref. 4 poles
High sensitivity	10mA	16A	6	CC 216B		
		25A	6	CC 225B		
	30mA	16A	6	CD 216B		
		25A	6	CD 225B	3	CD 425B
		40A	6	CD 240B	3	CD 440B
		63A	6	CD 263B	3	CD 463B
		80A	6	CD 280B	3	CD 480B*
		100A	3	CD 284B	3	CD 484B*
Medium sensitivity	100mA	25A	6	CE 225B	3	CE 425B
		40A	6	CE 240B	3	CE 440B
		63A	6	CE 263B	3	CE 436B
		80A	6	CE 280B	3	CE 480B
		100A	6	CE 284B	3	CE 484B
Low sensitivity	300mA	25A	6	CF 225B	3	CF 425B
		40A	6	CF 240B	3	CF 440B
		63A	6	CF 263B	3	CF 463B
		80A	6	CF 280B	3	CF 480B
		100A	6	CF 284B	3	CF 484B
Low sensitivity	500mA	25A	6	CG 225B	3	CG 425B
		40A	6	CG 240B	3	CG 440B
		63A	6	CG 263B	3	CG 463B
		80A	6	CG 280B	3	CG 480B
		100A	6	CG 284B	3	CG 484B
Terminal cover kit (1 set = 2 covers)	for RCCBs 2I	16 to 63A	10 sets			CZN 005
	for RCCBs 4I	16 to 63A	10 sets			CZN 006
	for RCCBs 2I	80 to 100A	10 sets			CZ 007
	for RCCBs 4I	80 to 100A	10 sets			CZ 008

Locking kit :

MZN 175

RCCBs - Selective product range

The selective Residual Current Circuit Breakers are available with 100, 300 mA sensitivity in 2 and 4 pole version.

A selective RCCBs is time delayed (min. 300ms at $I_{\Delta n}$). And it is commonly used as a main breaker to prevent nuisance tripping due to transient overvoltages and provide discrimination with the downstream standard RCCBs.

Technical data

nominal voltage :
2-pole 127-230V
4-pole 230-400V
Surge current withstand (8/20 μ s) :
standard : 250A
selective : 3kA
Type AC
Positive contact indication :
Red : contacts closed
Green : contacts open
Earth fault indicator :
breaker tripping due to earth fault shown by yellow window

Transient protected :
protected against nuisance tripping

Standard : IEC 61008-1,

Type	I_n (A)	Mod.	100mA	300mA
2-pole selective	40A	2	CN 240B	
4-pole selective	40A	4	CN 440B	CP 440B
	63A	4	CN 463B	CP 463B
Alarm and auxiliary contact	5A/230V	1	CZ 001	CZ 001

auxiliary contact for remote indication of breaker position, and alarm contact for remote fault indication.



CN 240B



CN 463B

Terminal cover kit (1 set = 2 covers)	for RCCBs 2 for RCCBs 4	16 to 63A 16 to 63A	10 sets 10 sets	CZN 005 CZN 006
---	------------------------------	------------------------	--------------------	----------------------------------


Combined MCB/RCD (RCBO)

Description

compact protection devices which provide MCB overcurrent protection and RCCB earth leakage protection in a single unit.

Specification

IEC 61009-1

Protected against transient voltages (lightning, line disturbances,...) and transient currents (from high capacitive circuits) 

Technical data :

the units are available with current ratings of 6A, 10A, 16A, 20A, 25A, 32A and 40A. The device switches both the phase and neutral conductors. All ratings have 10mA, 30mA, 100mA or 300mA earth leakage protection. The units feature indicators which show whether tripping is due to an overcurrent or earth leakage fault. voltage rating - 127-230V current rating - 6-40A.

mechanical life :
2 000 operations
6kA for 6-40A
10kA IEC947-2

Type AC

Connection capacity
rigid conductor 25[□]
flexible conductor 16[□]



AD 916B

Designation	Sensitivity Δ_n	In/A	breaking capacity	Width in 17.5mm	Pack qty.	Cat. ref. type B	Cat. ref. type C
RCBO 1P+N	10mA	16	6kA	2	1	AC 916B	AC 966B
		30mA	6	2	1	AD 906B	AD 956B
			10	2	1	AD 910B	AD 960B
			16	2	1	AD 916B	AD 966B
			20	2	1	AD 920B	AD 970B
			25	2	1	AD 925B	AD 975B
			32	2	1	AD 932B	AD 982B
			40	2	1	AD 940B	AD 990B
	100mA	6		2	1		AE 956B
		10		2	1		AE 960B
		16		2	1		AE 966B
		20		2	1		AE 970B
		25		2	1		AE 975B
		32		2	1		AE 982B
		40		2	1		AE 990B
	300mA	6		2	1		AF 956B
		10		2	1		AF 960B
		16		2	1		AF 966B
		20		2	1		AF 970B
		25		2	1		AF 975B
		32		2	1		AF 982B
		40		2	1		AF 990B

Grey terminal cover

AZ 002

Description

compact one module protection devices which combine the overcurrent functions of an MCB with the earth fault functions of an RCD. A range of sensitivity and current ratings are available for use in commercial and industrial applications

Technical data

specification complies with BSEN61009, IEC1009

Sensitivity (fixed)

10 - 30 - 100 - 300 mA

Terminal capacities :

1 module type - 16[□] rigid
10[□] flexible

operation temperature :
-25°C to +55°C

Features

1 module devices provide a compact solution for installation in consumer units, Invicta TP+N distribution boards, and din rail enclosures. These devices are 1P & solid neutral.

Operating voltage
110 - 230 V AC

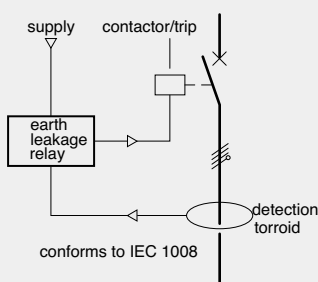
Flying neutral lead length
700mm



AD 110

Sensitivity $I\Delta n$ mA	Breaking capacity	In/A	Width in 17.5mm	Pack qty.	Cat.ref. type B	Cat. ref. type C
10mA	6kA	16A	1	1	AC 107	AC 122
30mA	6kA	6A	1	1	AD 104	AD 119
		10A	1	1	AD 105	AD 120
		16A	1	1	AD 107	AD 122
		20A	1	1	AD 108	AD 123
		25A	1	1	AD 109	AD 124
		32A	1	1	AD 110	AD 125
		40A	1	1	AD 111	AD 126
		45A	1	1	AD 112	AD 127
		50A	1	1	AD 113	AD 128
100mA	6kA	6A	1	1		AE 106Z
		10A	1	1		AE 110Z
		16A	1	1		AE 116Z
		20A	1	1		AE 120Z
		25A	1	1		AE 125Z
		32A	1	1		AE 132Z
		40A	1	1		AE 140Z
		45A	1	1		AE 145Z
		50A	1	1		AE 150Z
300mA	6kA	20A	1	1		AF 120Z
		25A	1	1		AF 125Z
		32A	1	1		AF 132Z
		40A	1	1		AF 140Z
30mA	10kA	6A	1	1		AD 184
		10A	1	1		AD 185
		16A	1	1		AD 187
		20A	1	1		AD 188
		25A	1	1		AD 189
		32A	1	1		AD 190
		40A	1	1		AD 191

Earth leakage relays



Earth leakage relays with separate detection torroids

these units ensure the protection of electrical installations and the protection of persons against direct and indirect contacts.

this range of products contain a set of earth leakage relays, designed on an electronic basis, which ensure the monitoring of earth fault currents. When the fault current rises above the selected level, the outputs of the product operate depending on the relay selected, it can have either fixed or selectivity purposes. the relays are linked with detection torroids. 14 separate types are available, circular and rectangular in section.

Common characteristics

- positive safety : the relay trips in the event of a break in the

connection between relay and torroid.

- positive reset required after a fault is detected.
- test button for simulation of a fault.

- protected against nuisance tripping

- class A

- EMC 30V/m immunity
- output : 1 C/O contact 250V~ 6A AC1.

- visual display of fault by red LED.

- supply voltage 230V~ ± 20% 50/60Hz

- supply voltage indication

Features according to the selected model

- adjustment of sensitivity and time delay (sealable).

- extra positive safety contact (1C/O 250V AC~ 6A AC1).

- display of fault current before it triggers the relay (5% to 75%).

- extra output contact (250V - AC1/6A) to enable remote

indication of fault currents over 50% of $I_{\Delta n}$
- remote test and reset by 3-wire link.

Torroids

circular dia. 30, 35, 70, 105, 140, 210mm
rectangular 70x175, 115x305, 150x350mm

Connection capacity

relay :
flexible 1 to 2.5[□]
rigid 1.5 to 4[□]

relay - torroid link
2 wires, 25m max. + 50m
twisted wire
test and remote reset link
3 wires, 200m max.

☐ For technical information
see page T.12



HR 404



HR 410



HR 422



HR 440

Designation	Characteristics	Width in I 17.5mm	Pack qty.	Cat. ref.
Earth leakage relay C/O contact 6A~ AC1 250V~	instant trip adjustable sensitivity 0.03A/0.1A/0.3A/0.5A/1A/2A/3A	2	1	HR 404
Earth leakage relays C/O contact 6A AC1 250V~	standard version 1 OF adjustable time delay 0/0.1s./0.3s/0.4s./0.5s/1s/3s adjustable sensitivity 0.03A/0.1A/0.3A/0.5A/1A/3A/5A/ 10A	3	1	HR 410
Earth leakage relay with led optical scale C/O contact 6A~ AC1 250V~	adjustable time delay 0/0.1s./0.2s./0.25s/0.3s/0.4s./0.5s adjustable sensitivity 0.03A/0.1A/0.3A/0.5A/1A/2A/3A	3	1	HR 421
HR421 : - output contact for remote indication of fault current 50% $I_{\Delta n}$ - standard or positive safety output - external test and reset	adjustable time delay 0/0.1s./0.2s./0.25s/0.3s/0.4s./0.5s adjustable sensitivity 0.03A/0.1A/0.3A/0.5A/1A/3A/10A	3	1	HR 422
	adjustable time delay 0/0.1s./0.2s./0.25s/0.3s/0.4s./0.5s adjustable sensitivity 0.5A/1A/3A/5A/10A/20A/30A	3	1	HR 423
Earth leakage relay with integrated torroid 25mm	instant trip or time delay 0.1s/0.3s/0.5s/0.75s/1s adjustable sensitivity 0.03A/0.1A/0.3A/0.5A/1A/3A	4	1	HR 440
with integrated torroid 35mm	instant trip or time delay 0.1s/0.3s/0.5s/0.75s/1s adjustable sensitivity 0.03A/0.1A/0.3A/0.5A/1A/3A	6	1	HR 441

detection torroids

Torroids can be associated with HR4xx range ELRs. They meet all requirements of electrical distribution.

- ☐ 4 circular section torroids of Ø 35 to Ø 140 mm
- ☐ 3 closed rectangular section torroids
- ☐ 5 rectangular section torroids opening for renovation (can be

installed without disconnecting cables).

Mounting :

- either directly on cable or strip iron
- on perforated plate kits in Orion enclosures.

Installation instruction :

- put cables or bars in the centre of the torroid
- the PE conductor must not pass through the torroid

Connection of cables :

- rigid 1,5 to 4²
- flexible 1 to 6²

maximum torroids/relay length :
- 50 m max with twisted cable of 1,5 mm²

☐ For technical information see page T.13



HR 841



HR 841



HR 830



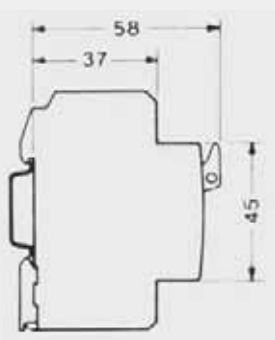
HR 820



HR 822

Designation	Characteristics	Pack qty.	Cat. ref.
Circular section torroid	Ø 35mm section 7cm ²	1	HR 841
	Ø 70mm section 38cm ²	1	HR 842
	Ø 105mm section 87cm ²	1	HR 843
	Ø 140mm section 154cm ²	1	HR 844
Rectangular section torroid	70 x 175mm section 123cm ²	1	HR 830
	115 x 305mm section 351cm ²	1	HR 831
	150 x 350mm section 525cm ²	1	HR 832
Open rectangular torroid	20 x 30mm section 6cm ²	1	HR 820
	50 x 80mm section 40cm ²	1	HR 821
	80 x 80mm section 64cm ²	1	HR 822
	90 x 120mm section 96cm ²	1	HR 823
	90 x 160mm section 128cm ²	1	HR 824

BS 1361 HRC fuse carriers and fuses



Description

protection and control of circuits against overloads and short circuits :

- in domestic installations
- in commercial and light industrial electrical distribution systems

Technical data :

- fuse carriers suitable for fuses which fully comply with the dimensional, power loss, fusing factor, discrimination and time current characteristics of BS 136. Complies with BS1361:1971:
- short-circuit rating : 16.5kA (i.e. no further consideration of fault levels is necessary)
- colour coded ratings
- connection capacities :

top : cable + busbar
rigid conductor 16□
flexible conductor 10□



L113 L115 L116 L118

Designation	Current rating (Amps)	Colour	Width in 17.5mm	Pack. qty.	Cat. ref.
Fuse carriers	5A - 240V	white	1	12	L 113
	15A - 240V	blue	1	12	L 115
	20A - 240V	yellow	1	12	L 116
	30A - 240V	red	1	12	L 118
BS 1361 HRC spare cartridge fuses (suitable only for L11x carriers)	5A (23 x 6.35 x 4.8mm)	white		50	L 153
	15A (26 x 10.32 x 6.4mm)	blue		50	L 155
	20A (26 x 10.32 x 6.4mm)	yellow		50	L 156
	30A (29 x 12.7 x 8mm)	red		50	L 158

protection

HRC fuse carriers

Fuse carrier 32 Amps max.

protection and control of circuits against overloads and short-circuit :

- in single or three phase subcircuits
- suitable for fuses which comply with IEC 269
- rating voltage : 415 V a.c. 250 V d.c.
- fusing factor : class Q1

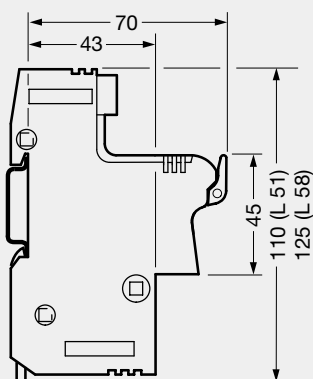
- rated breaking capacities; 80kA at 415 V a.c. 40kA at 250 V d.c.
- complies with IEC269-2, 2-1
- for spare cartridge fuses 10.3 x 38mm



L 501

Designation	description	Width in 17.5mm	Pack. qty.	Cat. ref.
Fuse carriers for cylindrical cartridge fuses 10.3 x 38mm (supplied without fuse)	1 phase	1	12	L 501
	1 phase + neutral	2	6	L 502
	3 phase	3	4	L 503
	3 phase + neutral	4	3	L 504

L51 - L58 HRC fuse carriers



Fuse carriers L 51
for spare cartridge fuses
14 x 51mm
50A 690V
complies with IEC 947-3

Connection capacity :
35[□] rigid cable
25[□] flexible cable

Fuse carriers L 58
for cylindrical cartridge fuses
22 x 58mm
125A 690V
complies with IEC 947-3

Connection capacity :
50[□] rigid cable
35[□] flexible cable

can be padlocked in the off position



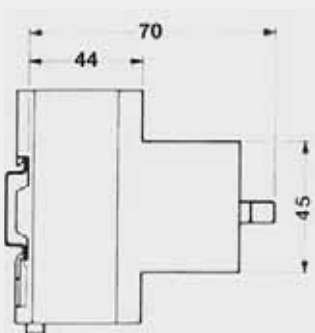
LR 601



LR 703

Designation	description	Width in 17.5mm	Pack qty.	Cat. ref.
L51 fuse carrier	1 phase	1 1/2	10	LR 601
	2 phases	3	5	LR 602
	3 phases	4 1/2	3	LR 603
	3 phases + neutral	6	2	LR 604
L58 fuse carrier	1 phase	2	6	LR 701
	2 phases	4	3	LR 702
	3 phases	6	2	LR 703
	3 phases + neutral	8	1	LR 704

Motor starters



Description

to ensure localised control and protection of single and three phase motors. All motor starters have thermal and adjustable magnetic trip.

Technical data :

- adjustable thermal relay
- AC3 utilisation category

Connection capacity

2 conductors
max size 1 to 4 flexible
1.5 to 6 rigid

Conform to :

IEC 947-1, IEC947-2

Note :

please consult us for enclosure selection

Options :

undervoltage release :
MZ 528N, MZ 529N,
auxiliary contacts :
MZ 520N, MZ 527N
alarm contact :
MZ 527N

For technical information
see page T.23



MM 501N



MZ 520N



MZ 527N



MZ 521N

Designation	current setting	standard power motor 50/60Hz 230V (kW)	rating of 3 phase (AC3 category) 400V (kW)	Width in 17.5mm	Pack qty.	Cat. ref. type B
Motor starters	0.1 - 0.16A				1	MM 501N
	0.16 - 0.24A	-	0.06	2 1/2	1	MM 502N
	0.24 - 0.4A	0.06	0.09	2 1/2	1	MM 503N
	0.4 - 0.6A	0.09	0.12	2 1/2	1	MM 504N
	0.6 - 1.0A	0.12	0.25	2 1/2	1	MM 505N
	1.0 - 1.6A	0.25	0.55	2 1/2	1	MM 506N
	1.6 - 2.4A	0.55	0.8	2 1/2	1	MM 507N
	2.4 - 4A	0.8	1.5	2 1/2	1	MM 508N
	4 - 6A	1.5	2.5	2 1/2	1	MM 509N
	6 - 10A	2.5	4	2 1/2	1	MM 510N
	10 - 16A	4	7.5	2 1/2	1	MM 511N
	16 - 20A	5.5	9	2 1/2	1	MM 512N
	20 - 25A	5.5	12.5	2 1/2	1	MM 513N

Auxiliary contacts
(act as an indicating control device to monitor the ON or OFF position)

1C + 1O

2A - 400V~
3.5A - 230V~

1/2

1

MZ 520N

Alarm contacts
(mounted inside the motor starter)

1C

2A - 400V~
3.5A - 230V~

1

MZ 527N

Under voltage release
(to prevent automatic restarting of the controlled device)

230V~ 50Hz

1

MZ 528N

400V~ 50Hz

1

MZ 529N

Surface mounting enclosure

weatherproof IP55
removable window

1

MZ 521N

w78 x h150 x d95mm

Emergency stop button
IP65

1

MZ 530N

Surge protective devices for general protection

SPDs with plug in cartridge with very high, high and medium discharge current capacity (65 kA, 40 kA and 15 kA).

SPDs with plug in cartridge ensure :

- general protection of electrical or electronic equipment,
- protection in common and differential mode for domestic, industrial and commercial buildings.

Common characteristics :
SPDs with base and cartridges.

Available in 2 versions :

- ☐ SPDs with base and plug in cartridges with an end of life indication LED
- ☐ SPDs with base and auxiliary contact for remote signalling and plug in cartridges with reserve protection indicator .

This version, with reserve indicator, shows the intermediary state, with indication of the need to change the cartridge before disconnection, but keeps the maximal protection capacity till the end.

For remote signalling, an auxiliary contact (R version) is used to report the information of condition indication until the end of life of the product.

The cartridge allows simple replacement without the need to cut-off the power supply

- ☐ SPDs are equipped with integrated thermic and dynamic disconnection

- ☐ connection capacity of terminal blocks, (L, N/E) :
 - 25^{sq} flexible conductor,
 - 35^{sq} rigid conductor for auxiliary contact :
 - 0,5^{sq} mini
 - 1,5^{sq} maxi
- ☐ degree of protection : IP 203 (in enclosure).

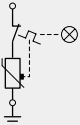
☐ For technical information see page T.24





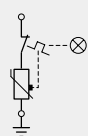

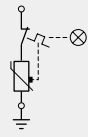
SPN 265R



SPN 465R

Designation	Characteristics	Width in ■ 17,5 mm	Ref.
SPDs with plug in cartridge I max. 65 kA Un : 230/400 V ~ 50/60 Hz 	2 poles 1 Ph + N with reserve indicator and remote signalling Up : 1,3 kV at In 4 poles 3 Ph + N with reserve indicator and remote signalling Up : 1,5 kV at In	2 4	SPN 265R SPN 465R

Surge protective devices for general protection

	Designation	Characteristics	Width in  17,5 mm	Ref.
 SPN 240R	SPDs with plug in cartridge I max. 40 kA Un : 230/400 V ~ 50/60 Hz 	- single pole 1 Ph Up : 2 kV at In	1	SPN 140C
		- single pole 1 Ph Up : 1,2 kV at In	1	SPD 140D
		- 2 poles 1 Ph + N with reserve indicator and remote signalling Up : 1,2 kV at In	2	SPN 240R
		- 2 poles 1 Ph + N Up : 1,2 kV at In	2	SPD 240D
		- 4 poles 3 Ph + N with reserve indicator and remote signalling Up : 1,2 kV at In	4	SPN 440R
		- 4 poles 3 Ph + N Up : 1,2 kV at In	4	SPD 440D
 SPD 415D	SPDs with plug in cartridge I max. 15 kA Un : 230/400 V ~ 50/60 Hz 	- 2 poles 1 Ph + N with reserve indicator and remote signalling Up : 1,0 kV at In	2	SPN 215R
		- 2 poles 1 Ph + N Up : 1,0 kV at In	2	SPD 215D
		- 4 poles 3 Ph + N with reserve indicator and remote signalling Up : 1,0 kV at In	4	SPN 415R
		- 4 poles 3 Ph + N Up : 1,0 kV at In	4	SPD 415D

Replacement cartridges for SPDs with plug in cartridge



Replacement cartridges

The cartridge allows simple replacement without the need to cut-off the power supply.

Cartridges are available for all discharge currents (65 kA, 40kA, 15kA) with or without reserve protection indication.

A keying system exists to prevent a line cartridge being interchanged by mistake with a neutral and vice versa

☐ For technical information
see page T.24

	Designation	Characteristics	Ref.
 SPN 065R	Replacement cartridges	Phase for : SPN 265R, SPN 465R	SPN 065R
		SPN 140C	SPN 040C
		SPN 240R, SPN 440R	SPN 040R
		SPD 140D, SPD 240D, SPD 440D	SPD 040D
		SPN 215R, SPN 415R	SPN 015R
		SPD 215D, SPD 415D	SPD 015D
 SPN 065N	Remark : for a replacement of cartridges, choose only the same reference as the previous cartridge.	Neutral for: SPN 265R, SPN 465R,	SPN 065N
		SPN 240R, SPN 440R, SPN 215R, SPN 415R	SPN 040N
		SPDxxxD	SPD 040N

Surge protective devices for fine protection

SPDs with low valotage protection level

To protect very sensitive electronic equipment.
The fine protection completes the main protection and can protect 1 or several electronic devices.
Optimal coordination is obtained when cascaded with a main protection device (lower Up see table below)

Protection is assured in both common and differnetial modes.

Discharge current :
I max. 8 kA (8/20 wave).

A green LED on the front face indicates the status of the SPD connected in series with the equipment that needs to be protected.
Connected in series with the equipment that needs to be protected.



Suitable for every earthing system.

Connection capacity :
- 6[□] flexible conductor
- 10[□] rigid conductor .

Degree of protection : IP 20 (in enclosure).

complies with
NF EN 61-643-11
september 2002

☐ For technical information
see page T.24

	Designation	Characteristics	Width in  17,5 mm	Ref.
	SPD with low voltage protection level	2 poles 1 Ph + N	2	SPN 208
	Un : 230/400 V ~ 50/60 Hz	4 poles 3 Ph + N	3	SPN 408S
	Up (Ph/ N/ \neq) : 1,2 kV at In Up (Ph/N) : 1 kV at In	Voltage protection level with a main + fine protection : Up ≤ 800 V		

SPN 408S

SPDs for telephone lines

SPDs for telephone lines.

For the protection of receiver against transient current surge vehicled by telephone lines (fax, modem, etc...)
Protection is assured in both common and differential modes

In-line connection on telephone line with receiver to be protected.



Discharge current :
I max 10 kA (8/20 wave).

Connection capacity
- 0,5 à 2,5[□] flexible conductor
- 0,5 à 2,5[□] rigid conductor

Degree of protection : IP 10 (in enclosure).

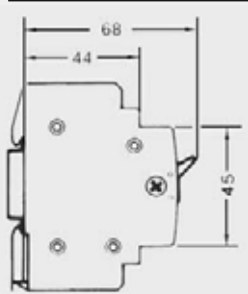
Complies with
IEC 61643-21

☐ For technical information
see page T.24

	Designation	Characteristics	Width in  17,5 mm	Ref.
	Voltage surge protection for analog telephone lines	Un : 130 V Up : 600 V	1	SPN 505
	Voltage surge protection for digital telephone lines	Un : 40 V Up : 600 V	1	SPN 504

SPN 505

Isolating switches



Description

for use as an isolating switch in all types of circuit as defined in the IEE wiring regulations

Technical data :

AC 22 duty specification : IEC 947-3

In : 25, 32A

shrouded cable clamps

Connection capacity :
16□ rigid conductor
10□ flexible conductor

In : 40, 63, 80A

“Q” version for 32A.

cable clamps
Connection capacity :
25□ rigid conductor
16□ flexible conductor


In : 100A

cable clamps,
Connection capacity :
50□ rigid conductor
35□ flexible conductor

All switches have a green/red toggle indication giving an obvious contact indication.




SB 125S

Designation	characteristics	Width in 17.5mm	Pack qty.	Cat. ref.
Single pole				
	1 x 25A 250V~	1	12	SB 125S
	1 x 32A 250V~	1	12	SB 132S
	1 x 40A 250V~	1	12	SB 140S
	1 x 63A 250V~	1	12	SB 163S
	1 x 80A 250V~	1	12	SB 180S
	1 x 100A 250V~	1	12	SB 199S




SB 232S SB 240S


Double pole				
	2 x 25A 400V~	1	12	SB 225S
	2 x 32A 400V~	1	12	SB 232S
	2 x 32A 400V~	2	6	SB 232Q
	2 x 40A 400V~	2	6	SB 240S
	2 x 63A 400V~	2	6	SB 263S
	2 x 80A 400V~	2	6	SB 280S
	2 x 100A 400V~	2	6	SB 299S






SB 399S

Triple pole				
	3 x 25A 400V~	2	6	SB 325S
	3 x 32A 400V~	2	6	SB 332S
	3 x 32A 400V~	3	4	SB 332Q
	3 x 40A 400V~	3	4	SB 340S
	3 x 63A 400V~	3	4	SB 363S
	3 x 80A 400V~	3	4	SB 380S
	3 x 100A 400V~	3	4	SB 399S

Isolating switches

Designation	characteristics	Width in 17.5mm	Pack qty.	Cat. ref.
Four pole 	4 x 25A 400V~	2	6	SB 425S
	4 x 32A 400V~	2	6	SB 432S
	4 x 32A 400V~	4	3	SB 432Q
	4 x 40A 400V~	4	3	SB 440S
	4 x 63A 400V~	4	3	SB 463S
	4 x 80A 400V~	4	3	SB 480S
	4 x 100A 400V~	4	3	SB 499S

2 way / centre off changeover modular switches

	Designation	characteristics		Width in 17.5mm	Pack qty.	Cat. ref.
	Switches, 2 ways single pole	1 x 25A	250V~	1	12	SF 118F
	1NO + 1NC	2 x 25A	250V~	1	12	SF 115
	Double pole	2 x 25A	250V~	2	6	SF 218F
	Switches, centre - off changeover					
	Single pole	1 x 25A	250V~	1	12	SF 119F
		1 x 40A	250V~	1	12	SF 119G
	Double pole	2 x 25A	250V~	2	6	SF 219F
		2 x 40A	250V~	2	6	SF 219G
	Triple pole	3 x 40A	400V~	3	4	SF 319G
	Four pole	4 x 40A	400V~	4	3	SF 419G
	Padlocking kit for isolating and changeover switch	allows locking the device toggle in the on / off position			2	MZN 175

enclosed fuse combination switches and switch disconnectors

The range of enclosed Fuse Combination Switches (FCS) and Switch Disconnectors (LBS) have been designed for easy installation. The robust enclosure is made from 1.2mm CR steel and the switching device offers the latest technology to ensure safe long lasting and

maintenance free operation. The switches have 4 break points to ensure that a high AC rating can be obtained. The FCS has contacts either side of the fuses which ensures that the fuse connections are totally isolated when the product is switched off. Operation of

the product is through a rotary handle that ensures that the enclosures cannot be opened when the device is in the switched on position. The 3 pole devices are delivered complete with Neutral Bar & earth point and the 4 pole with earth point only. The products have

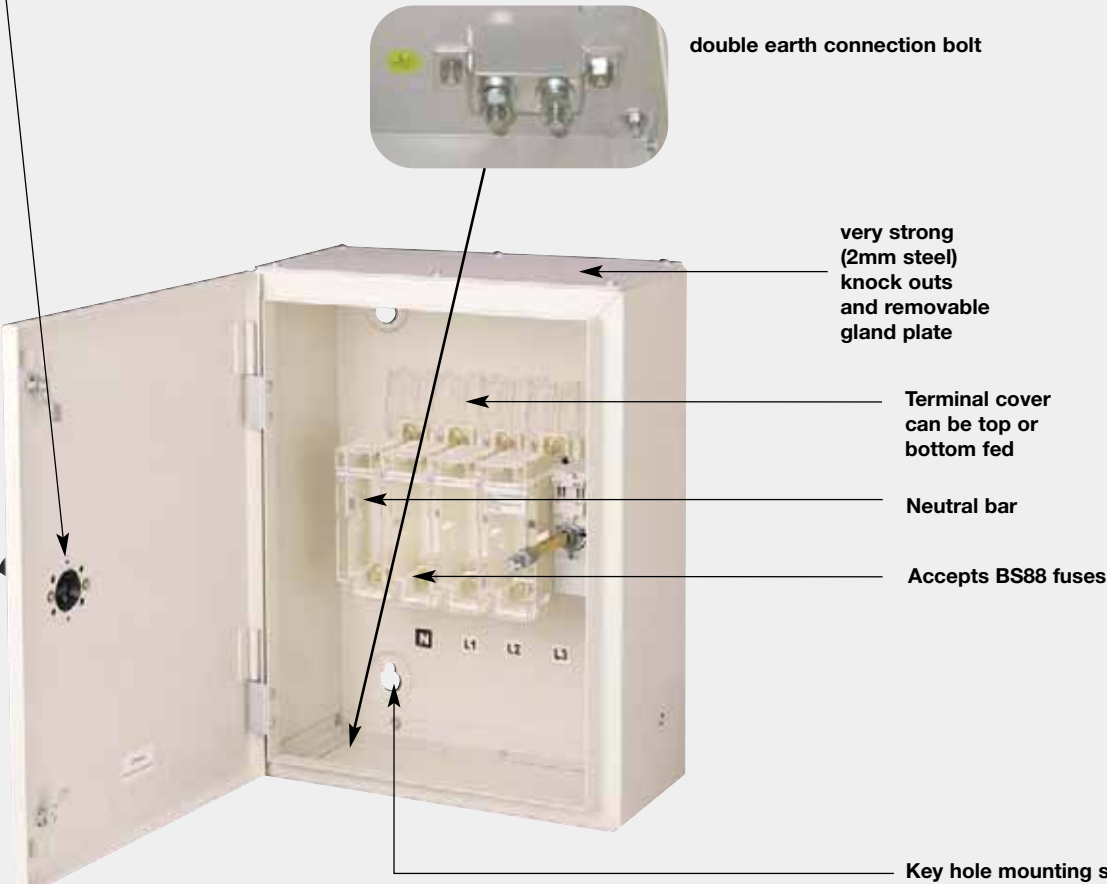
been independently tested by Lovag Laboratory and have a certificate according to IEC60947-3.

The colour of the enclosure is RAL

LBS



FCS



protection

Enclosed Fuse Combination switches 32-630A

description

The Hager range of fuse combination switches has been designed to provide individual protection and control of individual circuits.

The enclosures up to 200A have been designed to provide adequate cabling space without the need for additional cable spreader boxes.

Operation of the device is through a door mounted rotary handle which is mechanically interlocked to prevent access to

live conductors when the switch is in the on position. The handle is also padlockable in the off position.

All versions will accept standard BS88 fuse links and can be converted to switch disconnector by fitting copper links.

utilisation category

AC23 A/B
Icc : 50kA

Complies with:

BS EN 60-439 part 1 (enclosure)
BS EN 60-947 part 3 (device)
range: SPSN 20-200A (4 ratings)
TPN 20-630A (12 ratings)
TPSN 20-630A
(12 ratings)

IP41

Note: maximum rated fuse links are fitted in all fuse combination switches

cable capacity

20A = 16mm²
32A = 16mm²
63A = 25mm²
100A = 95mm²
125A = 95mm²
160A = 95mm²
200A = 240mm²
250A = 240mm²
315A = 240mm²
400A = 240mm²
630A = 2x300mm²
800A = 2x300mm²

□ For technical information see page T.28



JFG416S



JFG425S

Designation	In A	Pack Qty.	Cat. Ref.
enclosed FCS	20A	1	JFB202S
single pole switched neutral	32A	1	JFB203S
	63A	1	JFD206S
	100A	1	JFE210S
triple pole & neutral	20A	1	JFB302S
	32A	1	JFB303S
	63A	1	JFD306S
	100A	1	JFE310S
	125A	1	JFG312S
	160A	1	JFG316S
	200A	1	JFG320S
	250A	1	JFG325S
	315A	1	JFH331S
	400A	1	JFH340S
	630A	1	JFI363S
	800A	1	JFI380S
triple pole switched neutral	20A	1	JFB402S
	32A	1	JFB403S
	63A	1	JFD406S
	100A	1	JFE410S
	125A	1	JFG412S
	160A	1	JFG416S
	200A	1	JFG420S
	250A	1	JFG425S
	315A	1	JFH431S
	400A	1	JFH440S
	630A	1	JFI463S
	800A	1	JFI480S
cable extension boxes	for 125A/160A /200A	1	JZA701
triple pole & triple pole +	for 315A /400A FCS	1	JZA702
switched neutral	for 630A / 800A FCS	1	JZA703
Auxiliary contact			
1AC type NO			HZF301
1AC type NC			HZF302
Terminal cover		2P	3P
100A		HZF201	HZF202
125A, 160A			HZF202
200A to 400A			HZF204
630A to 800A			HZF206
			HZF205
			HZF207

description

The Hager range of switch disconnecter has been designed to provide individual protection and control of individual circuits up to 800A.

The enclosures have been designed to provide adequate cabling space without the need for additional cable spreader boxes.

Operation of the device is through a door mounted rotary handle which is mechanically interlocked to prevent access to live conductors when the switch is in the "On" position. The handle is also padlockable in the "Off" position.

utilisation category

AC23A
AC22A/B

Complies with:

BS EN 60-439 part 1 (enclosure)
BS EN 60-947 part 3 (device).
IP41

cable capacity

20A = 16mm²
32A = 16mm²
63A = 50mm²
100A = 50mm²
125A = 95mm²
160A = 95mm²
200A = 95mm²
250A = 185mm²

315A = 185mm²
400A = 240mm²
630A = 300mm²
800A = 2x185mm²

☐ For technical information
see page T.28



JAB302S



JAG440S

Designation	In A	Pack Qty.	Cat. Ref
enclosed LBS triple pole & neutral	20A	1	JAB302S
	32A	1	JAB303S
	63A	1	JAB306S
	100A	1	JAB310S
	125A	1	JAC312S
	160A	1	JAC316S
	200A	1	JAE320S
	250A	1	JAE325S
	315A	1	JAG331S
	400A	1	JAG340S
	630A	1	JAG363S
	800A	1	JAH380S
triple pole & switch neutral	20A	1	JAB402S
	32A	1	JAB403S
	63A	1	JAB406S
	100A	1	JAB410S
	125A	1	JAC412S
	160A	1	JAC416S
	200A	1	JAE420S
	250A	1	JAE425S
	315A	1	JAG431S
	400A	1	JAG440S
	630A	1	JAG463S
	800A	1	JAH480S
cable extension boxes	for 125/160A LBS	1	JZA700
triple pole & triple pole + switched neutral	for 200/250/315/400A LBS	1	JZA701
	for 630/800A LBS	1	JZA702
Auxiliary contact			
20A to 100A			HZ021
125A to 800A			HZ023
Terminal cover			
125A to 200A		3P HZC201	4P HZC202
250A to 400A		HZC203	HZC204
630A		HZC205	HZC206
800A		HZ036	HZ046

Control relays ...

Control relays are used in installations where the current or the voltage fluctuation may damage equipments.

The range is composed of modular devices :

Voltage control relays dedicated to protect air conditioning equipments :

EU 100, EU 101 single phase
EU 301 three phase

Voltage control relay used to survey DC or AC voltage :
EU 102 single phase product to monitor DC or AC
EU 302 three phase control relay

used to check AC voltage

Current control relay used to survey DC or AC current :
EU 103 single phase product to monitor DC or AC current direct via current transformer

Phase control relay
EU 300 to verify phase parameters (asymmetry, loss of phase, undervoltage)

The two digital control relays EU 102 and EU 103 are equipped with an LCD indicator. During normal operation, the LCD displays the measured voltage (EU 102) or current (EU 103). The

LCD and the local push buttons are also used to enter the parameter settings (type of signal, monitored levels,...)

In case of an error, the relay will close a contact (changeover contact 8A)

□ For technical information see page T.29 - T.30

Designation	characteristics	Width in 17.5mm	Pack qty.	Cat. ref.
Air conditioning control relay single phase	Power supply 230V AC Under/over voltage control Umin : 0,75 Un - Umax : 1,2 Un Restart duration (5 or 10 minute) selected via bridge Output : changeover contact 8A AC1 250V~	2	1	EU 100
Air conditioning control relay single phase	Power supply 230V AC Under/over voltage control Umin/Umax : +/-5% to +/-20% Un defined via potentiometer Restart duration (5 or 10 minute) selected via switch Output : changeover contact 8A AC1 250V~	2	1	EU 101
Air conditioning control relay three phase	Power supply Un 400V AC Under/over voltage control Umin/Umax : +/-5% to +/-20% Un defined via potentiometer Restart duration (5 or 10 minute) selected via switch Output : changeover contact 8A AC1 250V~	2	1	EU 301
Phase control relay	Power supply Un 400V AC Under voltage control Loss of phase, phase order control Asymetry control : +/-5% to +/-20% defined via potentiometer Output : changeover contact 8A AC1 250V~	2	1	EU 300

... Control relays



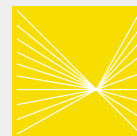
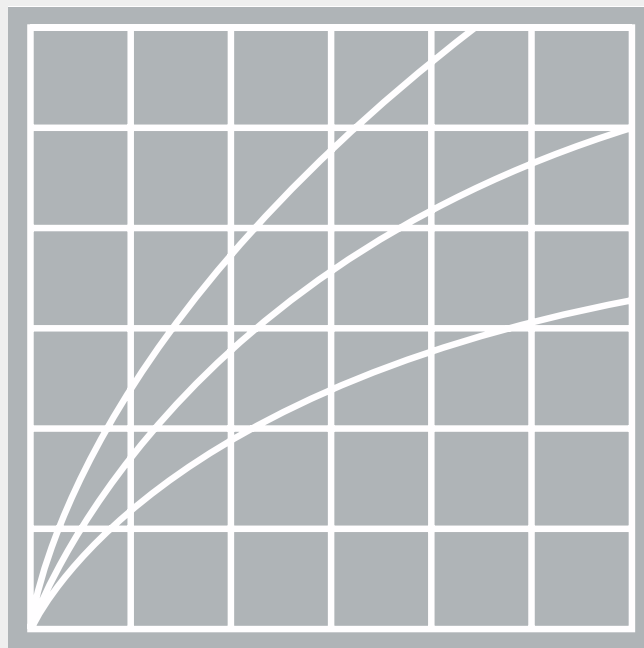
EU 102

<i>Designation</i>	<i>characteristics</i>	<i>Width in 17.5mm</i>	<i>Pack qty.</i>	<i>Cat. ref.</i>
Voltage control relay single	Power supply 230V~ Voltage monitored DC 15 to 700V or AC 15 to 480V~ Under or over voltage or both control Parameter setting via push button and LCD indicator Output : changeover contact 8A AC 250V~	2	1	EU 102
Voltage control relay three phase	Power supply Un 400V~ Under/over voltage control Umin/Umax : +/-5% to +/-20% Un defined via potentiometer Output : changeover contact 8A AC1 250V~	2	1	EU 302
Current control relay single phase	Power supply Un 230V~ Current control DC or AC, direct 0,1A to 10A or via current transformer Under or over current or both control Parameter setting via push button and LCD indicator Output : changeover contact 8A AC1 250V~	2	1	EU 103

Technical information

Protection devices

T.12	Earth leakage relays
T.13	Torroids for Earth Leakage Relays
T.15	MCB
T.17	MCB 125A
T.18	Remote control and automatic reset auxiliary device
T.19	Auxiliaries
T.20	RCD add-on blocks
T.21	RCCB (ELCB)
T.23	Technical information motor starters
T.24	Surge protection devices
T.28	Enclosed fuse combination switch
T.29	Control relays



Technical specifications	nonadjustable ELR	adjustable ELR				
	HR 404	HR 410	HR 421	HR 422	HR423	HR440 / HR441
Relays power supply voltage ~50/60 Hz	230 V \pm 20%					
Controlled mains voltage ~ 50/60 Hz	50 to 700 V					
power consumption	3 VA	5 VA	5 VA			10VA
output contact	one change-over volt free contact					
contact rating (standard output, positive security, pre-alarm 50%)	6 A / 250 V AC1					
sensitivity $I_{\Delta n}$	0.03A/0.1A/0.3A/ 0.5A/1A/2A/3A	0.03A/0.1A/0.3A/ 0.5A/1A/3A/5A/10A	0.03A/0.1A/0.3A/ 0.5A/1A/2A/3A	0.03A/0.1A/0.5A/1A/3A/ 0.3A/0.5A 5A/10A/ 1A/3A/10A 20A/30A		0.03A/0.1A/0.3A/ 0.5A/1A/3A
time delay (\pm 20%)	instantaneous	0/0.1s./0.3s/0.4s./ 0.5s/1s/3s	0/0.1s./0.2s./0.25s/ 0.3s/0.4s./0.5s			0.1s/0.3s/0.5s/0.75s/ 1s
acceptable overload at torroid level	30 kA / 100 ms					
voltage of test and reset BP	100 à 250 V					
maximum lentgh of test/reset cconnection	200 m					
maxi. lentgh of torroid/relay connection	50 m maxi with twisted cable 1,5 mm ² - 25m with nontwisted cable					
relay connection : cage terminals rigid	1,5 ² to 4 ²					
flexible	1 ² to 2,5 ²					
torroïd connection rigid	1,5 ² to 4 ²					
flexible	1 ² to 6 ²					
operating temperature	-10 to +55 °C					
storage temperature	-25 to +70 °C					
diameter integrated torroïd	-					
EMC immunity according to EN61000	30V/m at 1890 MHz					
						25 - 35 mm

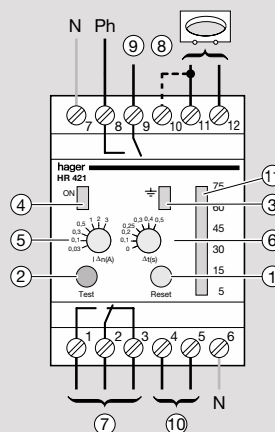
Main characteristics

- ① **"reset" push button** : in case of tripping, the output remains commutated and the return to "normal" position is made by :
 - pushing the "reset" push button
 - a power cut.
- ② **"test" push button** : it allows to verify, by a simulation, the good functioning of the relay in case of fault.
- ③ **Fault indicator** : it is switched on when fault of the supervised installation. Intermittent when there is a breaking of the relay/torroid connection.
- ④ **Supply indicator** : good functioning of the product.
- ⑤ **$I_{\Delta n}$ ratings**
- ⑥ **Time delay Δt**
 - **sealing adjustments** : all modifications of adjustment can be done by a sealing cover.
- ⑦ **Standard output (1 OF)** : tripping at 85% of $I_{\Delta n} \pm 15$ %.
 - Goes from 0 to 1 when :
 - fault when torroid/relay connection
 - fault current when supervised installation.
 - or positive safety output :**
 - Goes to 1 when supply, goes from 1 to 0 when :
 - fault of torroid/relay connection,
 - fault current when supervised installation,
 - supply fault or internal relay fault.
- ⑧ **Input for changing the output contact :**
 - from standard output contact to positive safety output contact : 0 V = standard contact
 - 220 V = positive safety contact

- ⑨ **Pre-alarm output** : the contact closes itself at 50% of $I_{\Delta n}$ (± 15 %)

- ⑩ **Remote test and reset**
Bargraph (HR 420) : indicates continuously the value of the leakage current, 5 to 15 %, 15 to 30 %, 30 to 45 %, 45 to 60 % and 60 to 75 % of $I_{\Delta n}$.

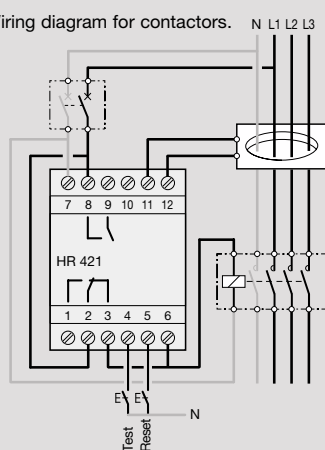
Product presentation



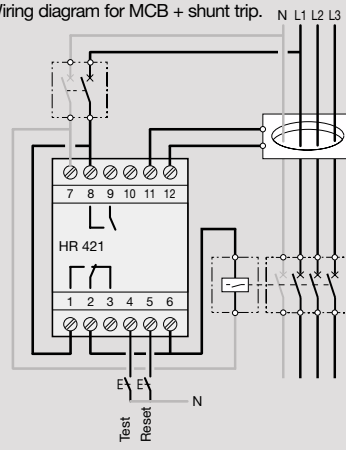
Load controlled settings : any setting change can be prevented by using a lead controlled cover.

Electrical connection

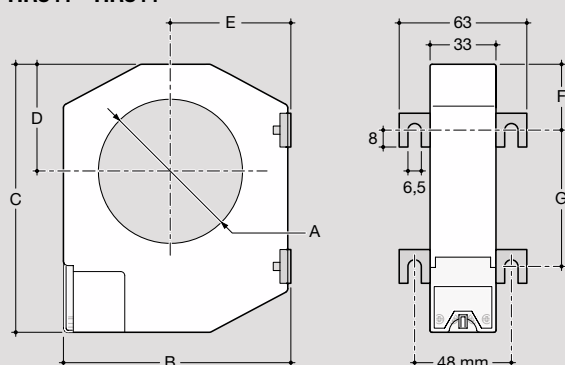
Wiring diagram for contactors.



Wiring diagram for MCB + shunt trip.

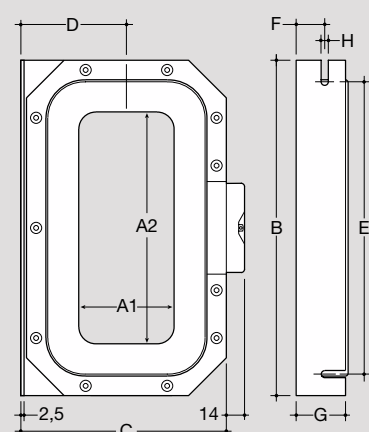


Circular section torroids : HR841 - HR844



	HR 841	HR 842	HR 843	HR 844
A (mm)	Ø 35	Ø 70	Ø 105	Ø 140
B (mm)	79	110	146	196
C (mm)	100	130	170	220
D (mm)	35	52	72	97
E (mm)	43	57	73	98
F (mm)	26	32	38	48,5
G (mm)	48,5	66	94	123

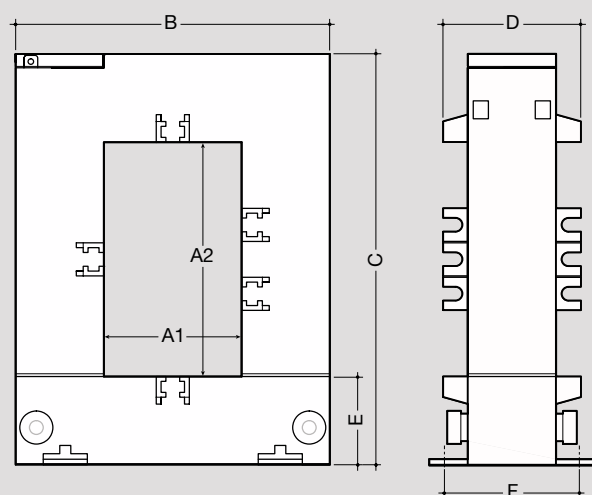
rectangular section torroids : HR 830, HR 831, HR 832



Dimensions for circular and rectangular section torroids

reference	overall dimensions (in mm)									
	A	A1	A2	B	C	D	E	F	G	H
HR 801	ø 35	-	-	92	86	43,5	74	17	32,5	5,5
HR 802	ø 70	-	-	115	118	60,5	97	17	32,5	5,5
HR 803	ø 105	-	-	158	162,5	84,5	140	15	32,5	5,5
HR 804	ø 140	-	-	202	203	103,5	178	21	32,5	7,5
HR 805	ø 210	-	-	290	295	150	265	23	32,5	7,5
HR 830	-	70	175	260	162	85	225	22	40	7,5
HR 831	-	115	305	400	225	116	360	25	48	8,5
HR 832	-	150	350	460	270	140	415	28	48	8,5

Opening rectangular section torroids :



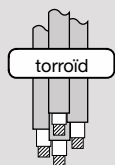
Dimensions of opening rectangular section torroids

	A1	A2	B	C	D	E	F
HR 820	20	30	89	110	41	32	46
HR 821	50	80	114	145	50	32	46
HR 822	80	80	145	145	50	32	46
HR 823	80	121	145	185	50	32	46
HR 824	80	161	184	244	70	37	46

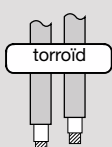
Torroid capacity

on copper ►
cables

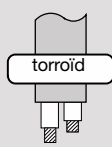
U 1000 R2V
one conductor
cable



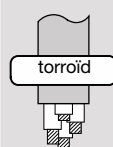
U 1000 R2V
one conductor cable



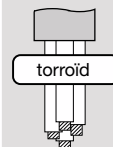
U 1000 R2V
two conductor
cable



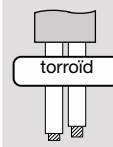
U 1000 R2V
four conductor
cable



U 1000 R2V
partially stripped
four-conductor
cable



U 1000 R2V
partially stripped
two-conductor
cable

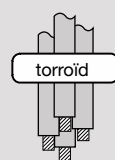


Ø torroid inside ▼

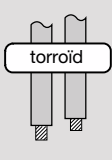
30	4 x 16 [□]	2 x 50 [□]	35 [□]	35 [□]	35 [□]	50 [□]
35	4 x 25 [□]	2 x 70 [□]	35 [□]	50 [□]	35 [□]	70 [□]
70	4 x 185 [□]	2 x 400 [□] ou 4 x 150 [□]	35 [□]	240 [□]	35 [□]	300 [□]
105	4 x 500 [□]	2 x 630 [□] ou 4 x 185 [□]	35 [□]	300 [□]	35 [□]	300 [□]
140	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
210	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
70 x 175	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
115 x 305	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
150 x 350	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
20 x 30	4 x 16 [□]	2 x 70 [□]	35 [□]	10 [□]	35 [□]	16 [□]
50 x 80	4 x 240 [□]	2 x 630 [□] ou 4 x 185 [□]	35 [□]	120 [□]	35 [□]	150 [□]
80 x 80	4 x 500 [□]	2 x 630 [□] ou 4 x 185 [□]	35 [□]	300 [□]	35 [□]	300 [□]
80 x 120	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
80 x 160	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]

on copper ►
cables

H07 V - U
1 conductor

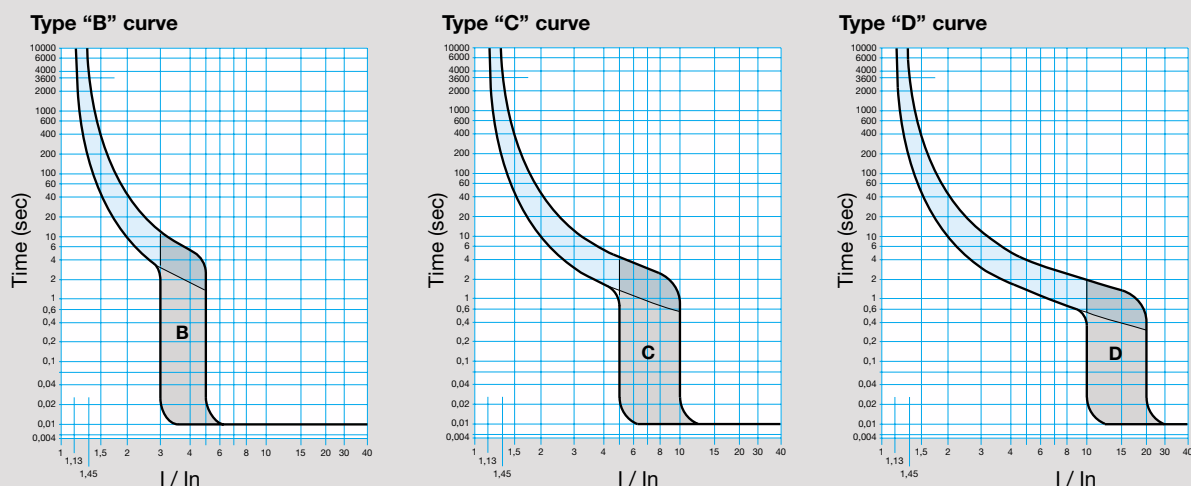


H07 V - U
1 conductor



Ø torroid inside ▼

30	4 x 35 [□]	2 x 70 [□]
35	4 x 50 [□]	2 x 95 [□]
70	4 x 240 [□]	2 x 400 [□] ou 4 x 185 [□]
105	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
140	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
210	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
70 x 175	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
115 x 305	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
150 x 350	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
20 x 30	4 x 10 [□]	2 x 35 [□]
50 x 80	4 x 185 [□]	2 x 240 [□]
80 x 80	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
80 x 120	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
80 x 160	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]



Electrical characteristics

MCB type	MY _ _ _	MT _ _ A	MU _ _ A	NB _ _ A	NC _ _ A	ND _ _ A	NR _ _ A	NR _ _ X	HLxxx	HMxxx
current rating	1 - 63A	6 - 63A	2 - 63A	6 - 63A	0.5 - 63A	0.5 - 63A	6 - 63A	25 - 63A	80-125A	80-125A
tripping curve										
B: 3 - 5In										
C: 5 - 10In	C	B	C B	C	D	C	C		B / C	B / C / D
D: 10 - 20In										
breaking capacity										
EN 60 898 & IEC 898	4.5kA	6kA	6kA	10kA	10kA	10kA		-	10kA	15kA
IEC 947 - 2	6kA	10kA	10KA	15kA	15kA	15KA	15/25kA	25kA	10kA	15kA
NEMA AB - 1	10KAIC	22KAIC	22KAIC	30KAIC	30KAIC	30KAIC	30KAIC	30KAIC		
rated voltage - 50/60Hz	230/400Vac (max. 440Vac)								240 / 415Vac	
isolating voltage	500V									
electrical endurance	0.5 to 32A 20 000 operations 40 to 125A 10 000 operations									
working temperature	-5°C to +60°C									
tropicalisation	treatment 2 with relative humidity 95% at 55°C									

Correction factor

Depending on the model selected some of the breaker is calibrated at a temperature of 30°C in accordance to IEC 898.
Temperature correction

grouping factor (rated current reduce by factor K)

In (A)	30°C	35°C	40°C	45°C	50°C	55°C	60°C
0.5	0.5	0.47	0.45	0.4	0.38	-	-
1	1	0.95	0.9	0.8	0.7	0.6	0.5
2	2	1.	1.7	1.6	1.5	1.4	1.3
3	3	2.8	2.	2.	2.	2.1	1.9
4	4	3.7	3.	3.3	3	2.8	2.5
6	6	5.6	5.3	5	4.6	4.2	3.8
10	10	9.4	8.8	8	7.5	7	6.4
16	16	15	14	13	12	11	10
20	20	18.5	17.5	16.5	15	14	13
25	25	23.5	22	20.5	19	17.5	16
32	32	30	28	26	24	22	20
40	40	37.5	35	33	30	28	25
50	50	47	44	41	38	35	32
63	63	59	55	51	48	44	40
80	80	77.6	75.1	72.6	70	67.2	64.4
100	100	96.6	93.1	89.4	85.6	81.6	77.5
125	125	121.9	118.9	115.7	112.4	109.1	105.6

no. of units n	K
n = 1	1
2 ≤ n < 4	0.95
4 ≤ n < 6	0.9
6 ≤ n	0.85

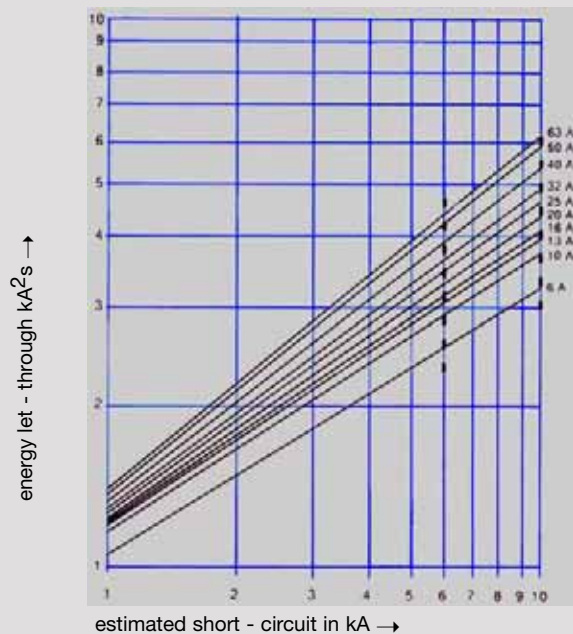
frequency

thermal - unchanged
magnetic - value multiplied by coefficient K

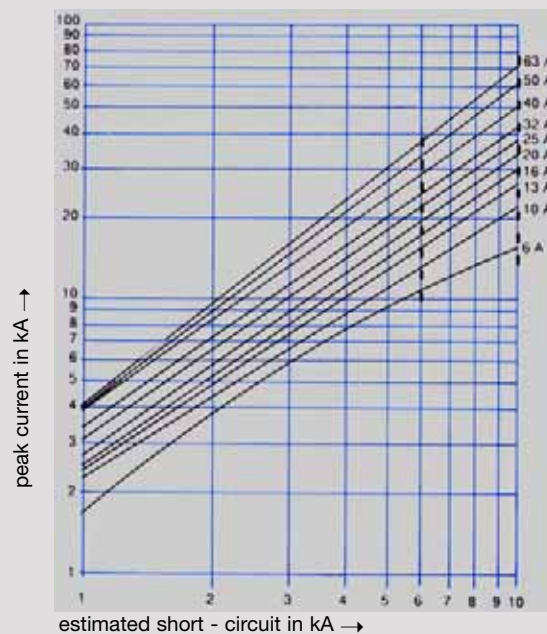
F (Hz)	17Hz - 60Hz	100Hz	200Hz	400Hz
K	1	1.1	1.2	1.5

Installation

working position : vertically, horizontally or flat.
supply : feed from either top or bottom terminals.

*i*²T characteristics curve


Current limitation curve



Power loss

The power loss of MCB's is closely controlled by the standards and is calculated on the basis of the voltage drop across the main terminals measured at rated current. The power loss of Hager circuit breakers is very much lower than that required by the IEC Standard, so in consequences run cooler and are less affected when mounted together.

The table below gives the watts loss per pole at rated current.

MCB rated current (A)	0.5	1	2	3	4	6	10	16	20	25	32	40	50	63	80	100	125
watt loss per pole (W)	1.3	1.5	1.7	2.1	2.4	2.7	1.8	2.6	2.8	3.3	3.9	4.3	4.8	5.2	5	5.5	8

DC applications

Because of their quick make and break design and excellent arc quenching capabilities Hager circuit breakers are suitable for use on DC. When selecting a circuit breaker for any DC application it is necessary to consider two main points.

1. rated current

The thermal time/current characteristics is unaffected so that the circuit breaker will carry its rated current and operate within its designated thermal time/current zone at 40°C Derating for higher ambient temperatures and grouping apply exactly the same as AC applications. The instantaneous magnetic trip is affected however, becoming less sensitive, requiring 2 times the AC operating current. The table below shows the upper and lower limits of both B and C instantaneous characteristic curves for 50Hz C and DC applications. Thermal unchanged. Magnetic trip increased as table below.

Characteristics curve	B		C	
magnetic trip	50Hz	DC	50Hz	DC
I _{rm} 1	3I _n	3I _n	5I _n	5I _n
I _{rm} 2	5I _n	7.5I _n	10I _n	15I _n

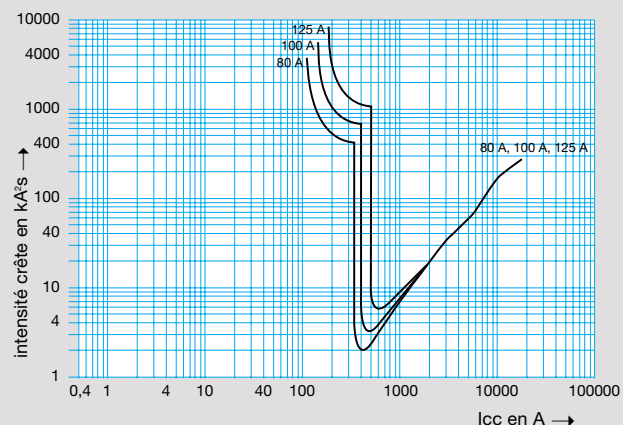
2. system voltage

The system voltage and the type of system determines the number of poles required to provide the necessary breaking capacity and arc control. The table below gives the maximum DC voltage and breaking capacity for one pole or two poles connected in the series; The positioning of these breaking poles in the system depends on whether the system is earthed or insulated and if it is earthed whether one polarity is earthed or the centre point is earthed.

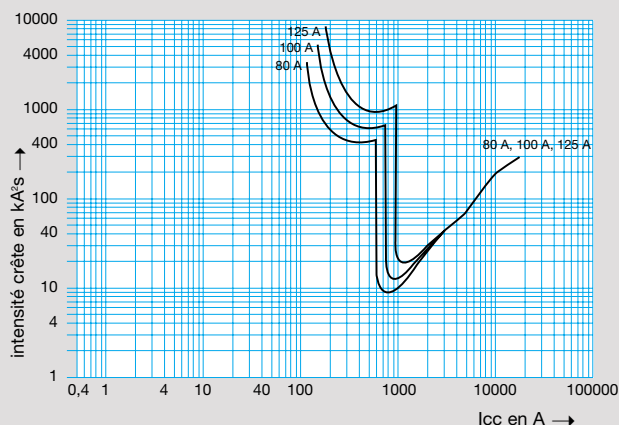
MCB	Breaking capacity			Magnetic tripping
	1 pole/60V	2 poles in series/125V	4 poles in series/250V	
MY	10kA	10kA	-	5 - 15I _n
MT	15kA	15kA	-	3 - 7.5I _n
MU	15kA	15kA	-	5 - 15I _n
NB	20kA	20kA	20kA	3 - 7.5I _n
NC	20kA	20kA	20kA	5 - 15I _n
ND	15kA	15kA	15kA	13 - 28I _n
NM	10kA	10kA	10kA	5 - 15I _n
NR	20kA	20kA	20kA	5 - 15I _n
HLE	10kA	10kA	10kA	3 - 7.5I _n
HLF	10kA	10kA	10kA	5 - 15I _n
HMB	15kA	15kA	15kA	3 - 7.5I _n
HMC	15kA	15kA	15kA	5 - 15I _n
HMD	15kA	15kA	15kA	13 - 28I _n

Current limiting at 400 V

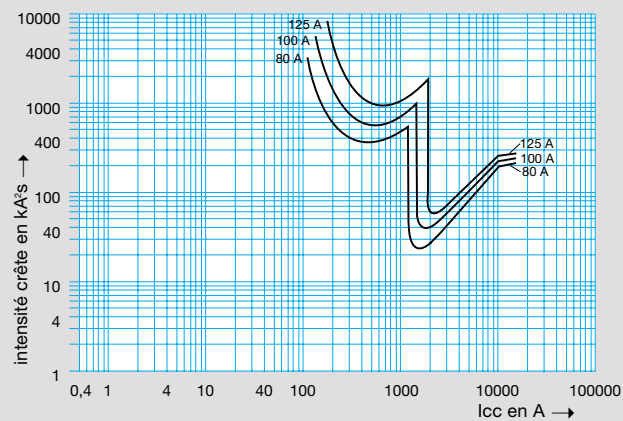
MCB's : HMB



MCB's : HMC

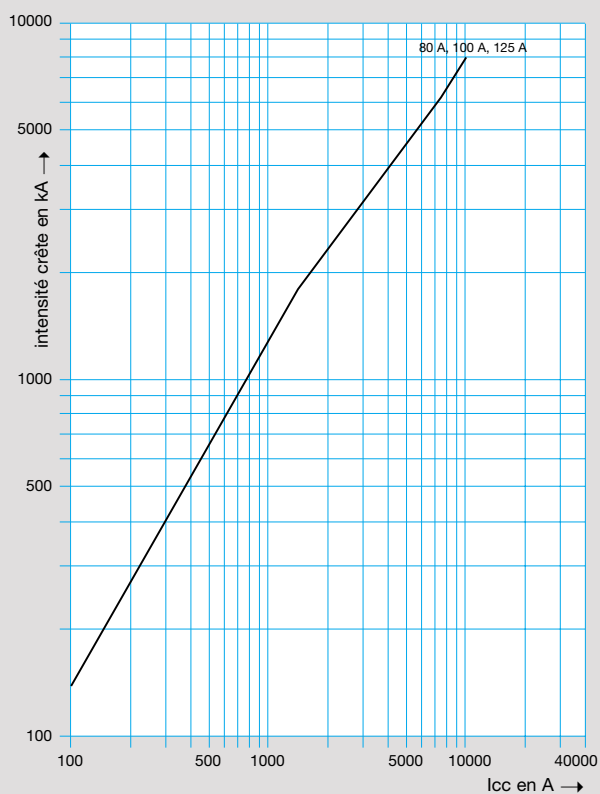


MCBs : HMC

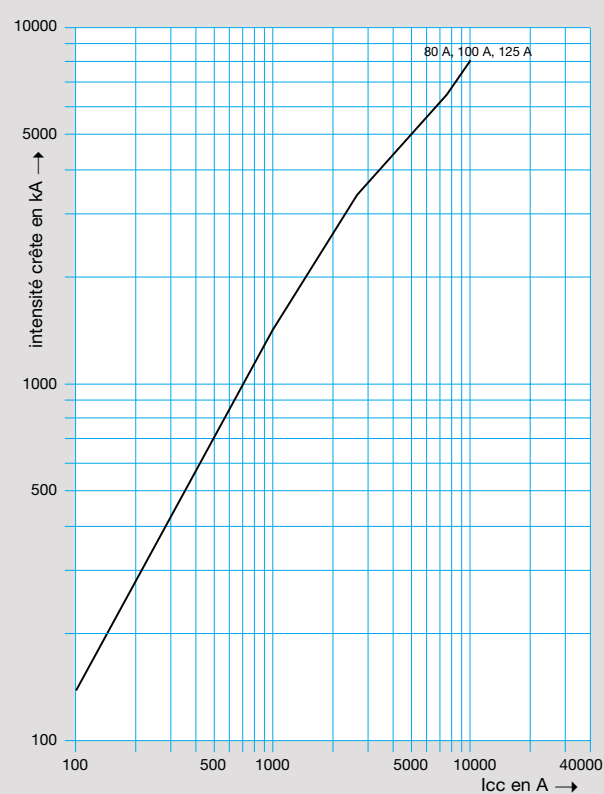


Short circuit limiting at 400 V

MCB's : HMB, HMC



MCB's : HMD



Remote control and automatic resetting auxiliary device

Front side selector ① in position “ + reset”

This position locks all controls and automatic resetting, and initializes the product if the position is maintained for more than 5 sec. The initialization consists in resetting all time delays and the number of faults.

Front side selector ① in position “ ”

This position locks all controls and automatic resetting.

“On” (input n°2) and “off” (input n°4) remote controls

These controls can be made by contact such as push-button or closing switch (e.g. automation, supervisor, clock, etc...) “Off” has priority with regard to the “on” and the automatic resetting.

Remote control (input n° 6) “ + reset”

This control can be made by contact such as push-button or closing switch (e.g. automation, supervisor, clock, etc...) This control padlocks “on” and automatic resetting, and initializes the product.

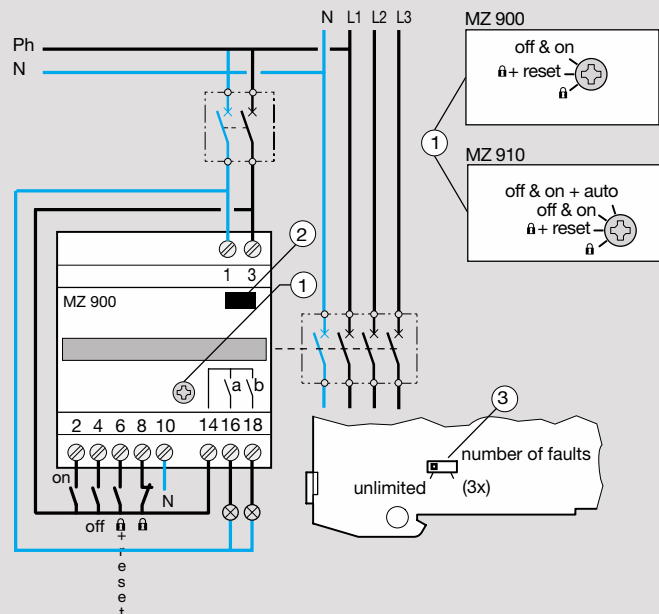
Remote control (input n° 8) “ ”

This control can be made by contact such as push-button or opening switch (e.g. locking emergency stop button etc.). This control locks “on” and automatic resetting. The “off” is available.

“a” and “b” signal outputs

These outputs indicate the position of the handle of the associated product or the states of the remote control auxiliary.

Connection diagram



The indicator light ② indicates the state of the product and allows a diagnosis to be established.

We can distinguish 3 general cases :










- fixed indicator light : the product is operational
- indicator light off : the product is not supplied
- indicator light flashing : controls or automatic resetting are temporarily or permanently clamped.

The red intermittent indicator light also means that contacts of the associated product are soldered or that the handle of the remote control is padlocked.

a	b	
		on
		off
		
		no power supply

Technical characteristics

Position of front side selector position of “number of faults” side selector

	“3x”	“unlimited
“off & on”	<ul style="list-style-type: none"> - The “on”, “off”, “ + reset” and “ ” are operational - $1 \leq \text{number of faults} < 3$: “on” is operational after 3 min time delay - number of faults = 3 : “on” locked. Unlocking possible with local or remote control “ + reset” 	<ul style="list-style-type: none"> - The “on”, “off”, “ + reset” and “ ” are operational - faults are not counted
“off & on + auto” (only on MZ 910)	<ul style="list-style-type: none"> - The “on”, “off”, “ + reset”, “ ” and the automatic resetting are operational - $1 \leq \text{fault} \leq 2\text{s. after closing} < 3$: “on” or automatic resetting are operational after 3 min time delay. - 2s. fault after closing = 3 : “on” and automatic resetting are locked. - fault > 2s. after closing : fault counter = 0, “on” and automatic resetting are operational after 3 min time delay. 	<ul style="list-style-type: none"> - The “on”, “off”, “ + reset”, “ ” and the automatic resetting are operational - 3 min time delay on automatic resetting - no time delay on “on” control

Functions

Tripping and indication auxiliary contacts are common to the range of Hager MCBs and RCCBs. They should be mounted on the left hand side of the device.

Auxiliary contact MZ 201

Allows remote indication of the status of the device contacts to which it is associated.

Alarm contact MZ 202

The alarm or signal contact will provide indication if the breaker trips under fault conditions

Note

Default indication auxiliaries and shunt trips or under voltage releases are fitted with tripping indications and reset facility.

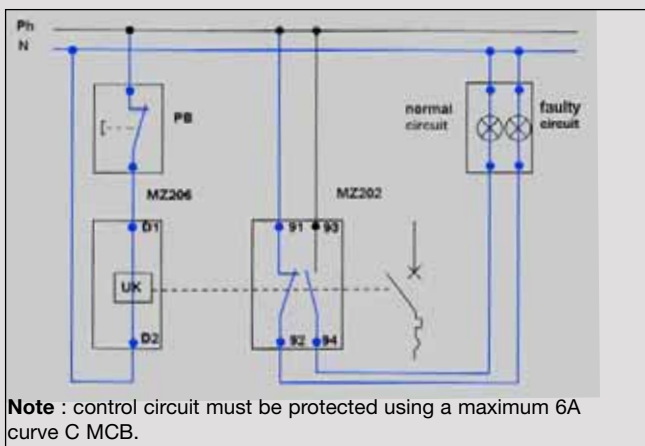
MZ 203 / MZ 204 shunt trip

Allows tripping of the device by feeding the coil. It is fitted with internal contacts which allow it to be fed by an impulse or latched feed. The contacts also allow for remote indication of operation.

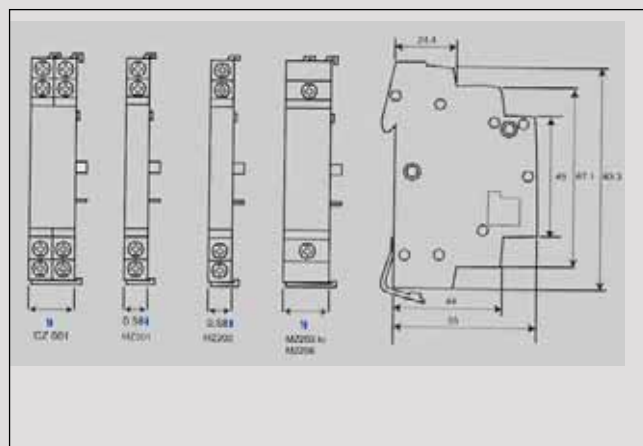
MZ 205 / MZ 206 under voltage release

Allows the MCB to trip when the voltage drops or by pressing a remote off switch (ie emergency stop).

Emergency switch - off with under voltage release



Sizes



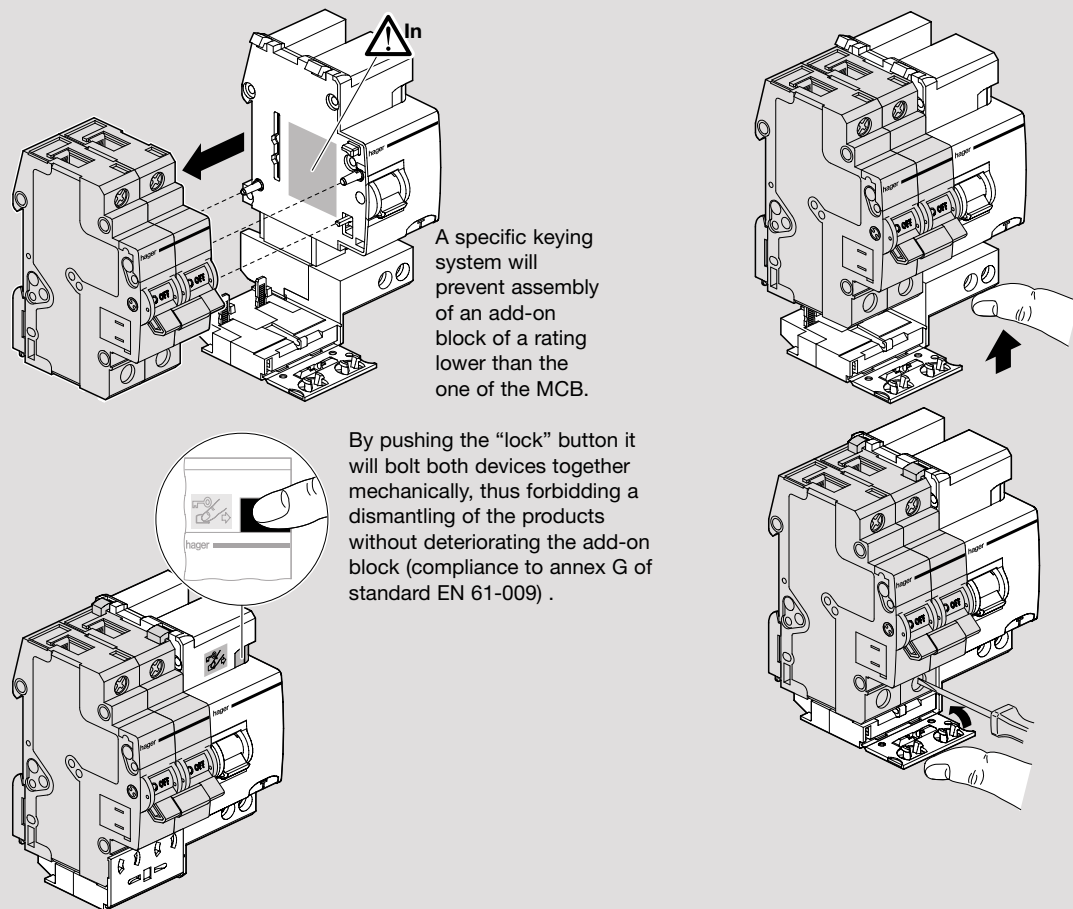
Recapitulative table

	MZ 201	MZ 202	CZ 001	MZ 203	MZ 204	MZ 205	MZ 206
	1O + 1C 230V~ 6A 440V~ 3A	1O + 1C 230V~ 6A 440V~ 3A	2X 1O + 1C 230V~ 6A 400V~ 3A				
				230 to 415V~ 110 to 130V= 50Hz	24 to 48V~ 12 to 48V= 50Hz	48V 50Hz	230V~ 50Hz

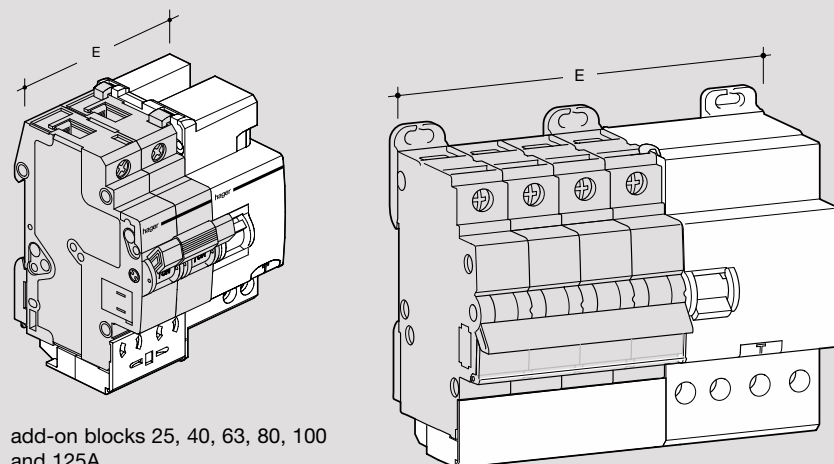
Grouping / combination of several auxiliaries

On 2,3 and 4 pole MCBs it is possible to associate 3 auxiliaries - 2 indication auxiliaries and 1 release auxiliary. In this case, it is important to first fix the indication auxiliary (MZ 201 and MZ 202) and then the release auxiliary (MZ 203/204 and MZ 205/206)

Assembly of the add-on blocks ≤ 63 A and 80-125A



Dimensions of associated MCB / add-on block

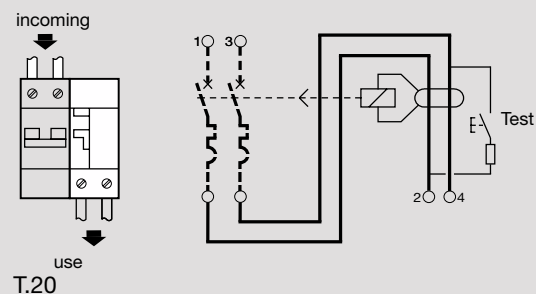


add-on blocks 25, 40, 63, 80, 100 and 125A

	E
2 P.P. 6 to 63 A	4
2 P.P. HM 80 to 125 A	9
3 P.P. 6 to 25 A	5
3 P.P. 32 to 63 A	6
3 P.P. HM 80 to 125 A	10,5
4 P.P. 6 to 25 A	6
4 P.P. 32 to 63 A	7
4 P.P. 6 to 63 A *	7
4 P.P. HM 80 to 125 A	12

* 4 pole add-on blocks two output

Wiring diagram for MCB+Add-on block from 25 to 125A



Connection capacities :

for assembled products from 6 to 25A : 6[□] / 10[□]
 for assembled products from 32 to 63 A : 10[□] / 25[□]
 for assembled products from 80 to 125A : 35[□] / 70[□]

If the supply of the add-on block is done from the bottom it should be clearly indicated.

Residual current devices

A residual current device (RCD) is the generic term for a device which monitors the current in the line conductor and the neutral conductor of a circuit in an earthed system.

The drawing opposite shows how a toroid is located around the line and neutral conductors to measure the magnetic fields created by the current flowing in these conductors. The sum of the magnetic fields set up by these currents (which takes into consideration both the magnetic and phase relationship of the currents) is detected by the toroid.

In a normal healthy circuit the vector sum of the current values added together will be zero. Current flowing to earth, due to a line earth fault, will return via the earth conductor, and regardless of load conditions will register as a fault. This current flow will give rise to a residual current (I_{res}) which will be detected by the device.

It is most important that the line and neutral conductors are passed through the toroid. A common cause of nuisance operation is the failure to connect the neutral through the device.

RCCBs work just as well on three phase or three phase and neutral circuits, but when the neutral is distributed it must pass through the toroid.

RCCB are not suitable for use on DC systems and unearthed networks.

RCCBs - domestic installation

RCCBs can be installed in two ways :

1. whole house protection
2. selective protection

Whole house protection is provided typically by a consumer unit where the RCCB device serves as the main switch. Although very popular this suffers from a disadvantage : all circuits are disconnected in the event of fault. Selective protection can be provided by associating the RCCB with identified high risk circuits by adopting one or more of the following :

Split busbar consumer unit


All circuits are fed via an overall isolator and selected circuits fed additionally via the RCCB. Typical circuits fed direct are lighting, freezer, storage heating : and circuits fed via the RCCB are socket outlets, garage circuits. This concept minimises inconvenience in the event of fault.

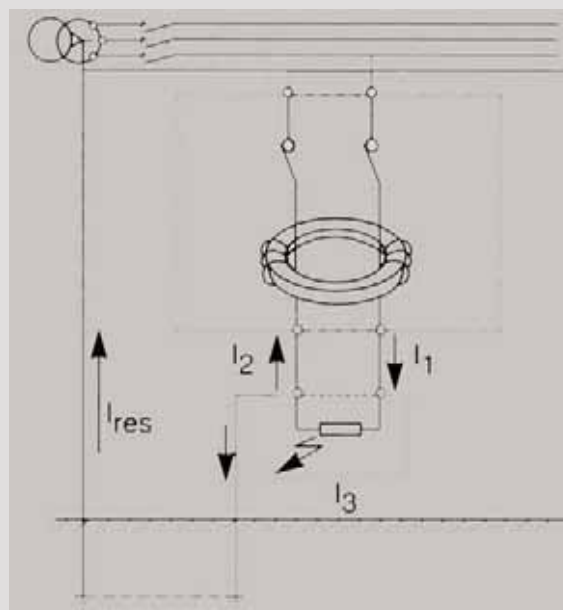
Whole ring circuit

A 30mA device adjacent to the consumer unit, which provides protection for the downstairs ring circuit, provides an easy installation with protection for all associated socket outlets. This represents the best solution for upgrading existing installations.

Nuisance tripping

All Hager RCCBs incorporate a filtering device preventing the risk of nuisance tripping due to transient voltages (lightning, line disturbances on other equipment...) and transient currents (from high capacitive circuit).

Check for the symbol : 




Pulsating DC fault current sensitive

Increasingly, semi-conductors are also extensively used in computers, VDUs, printers, plotters,... all of which may be fed from the main electrical supply. The presence of semi-conductors may result in the normal sinusoidal AC waveform being modified. For example, the waveform may be rectified or, as in asymmetric phase control devices, the waveform may be chopped. The resulting waveforms are said to have a pulsating DC component.

In the event of an earth fault occurring in equipment containing semiconductor devices, there is a probability that the earth fault current will contain a pulsating DC component.

Standard types of RCCB may not respond to this type of earth fault current and the intended degree of protection will not be provided.

Check for symbol : 

Hager provide a range of pulsating d.c. sensitive devices for this type of application.

Tripping characteristics

Type	$I_n(A)$	$I\Delta n(A)$	Standard values of break time(s) and non-actuating time(s) at a residual current (I) equal to :					
			$0.5I\Delta n$	$I\Delta n$	$2I\Delta n$	$5I\Delta n$	500A	
general	any value	≤ 0.03	no trip	0.1s	0.1s	0.04s	0.04s	max. break times
		> 0.03	no trip	0.3s	0.15s	0.04s	0.04s	max. break times

Protection against shock outside the equipotential bonding zone

Bonding conductors are used in an installation to maintain metallic parts, as near as possible, to the same potential as earth. Working with portable equipment outside this equipotential bonding zone, e.g. in the car park of a factory, introduces additional shock hazards. Socket outlets rated 32A or less (which may be reasonably expected to supply portable equipment for use outdoors) should have at least one socket nominated for outdoor use. This socket should be equipped with RCC protection unless fed from an isolating transformer or similar device, or fed from a reduced voltage.

Protection in special situations (IEE wiring regulation)

The use of RCCBs is obligatory or recommended in the following situations :

- caravans : 30mA RCCBs should be used
- TT systems
- swimming pools : 30mA RCCB for socket outlets in zone B obligatory; recommended in zone C.
- Agricultural and horticultural : 30mA RCCB for socket outlets and for the purpose of protection against fire, $RCCB \leq 0.5A$ sensitivity.
- construction sites : 30mA RCCB recommended

Portable equipment

With the exception mentioned above, where a socket is specifically designated for work outside the equipotential bonding zone, the Wiring Regulations demand the use of RCCBs to protect the users of portable equipment. It is widely recognised that their use has made a significant contribution to safety in the workplace and the home.

Protection against fire hazards

The provisions in the Wiring Regulations for protection against shock by indirect contact ensure rapid disconnection under earth fault assuming the fault has negligible impedance. Under such conditions the fault current, as we have seen, is sufficiently great to cause the overcurrent protection device to quickly disconnect the fault. However high impedance faults can arise where the fault current is sufficient to cause considerable local heat without being high enough to cause tripping of the overcurrent protective device. The heat generated at the point of the fault may initiate a fire long before the fault has deteriorated into a low impedance connection to earth.

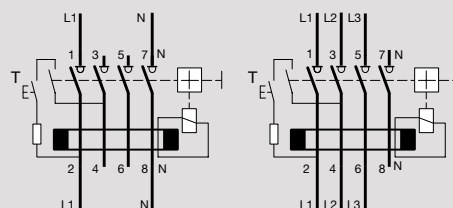
The provision of residual current protection throughout a system or in vulnerable parts of a system will greatly reduce the hazard of fire caused by such faults.

PEN conductors

The use of RCCBs is prohibited. A PEN conductor is a single conductor combining the functions of neutral conductor and protective conductor. This being so, when the PEN conductor is taken through the torroid of an RCCB, earth faults will go undetected because the return path for the earth fault current is included in the residual sum.

Use of Hager RCCBs on 3 phase 3 wire systems

The Hager range of 4 pole RCCBs can be used to provide residual current protection of 3 phase, 3 wire circuits (no neutral).



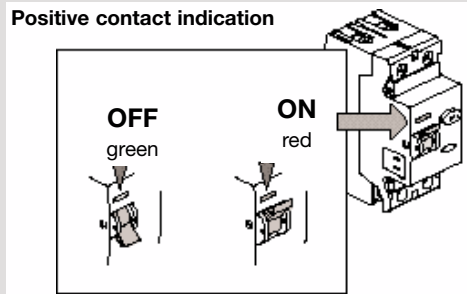
Supply entry

Top or bottom feed.

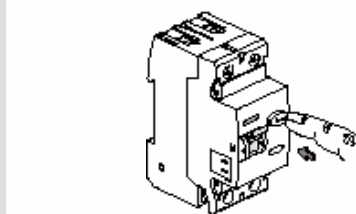
RCCBs /MCBs co-ordination

RCCBs	with MCBs				
	MY	MT/MU	NB	NC	ND
	1-63A C	2-63A B/C	6-100A B	0.5-100A C	6-63A D
2 poles					
16A	4.5kA	6kA	10kA	10kA	6kA
25A	4.5kA	6kA	10kA	10kA	6kA
40A	4.5kA	6kA	10kA	10kA	6kA
63A	4.5kA	6kA	10kA	10kA	6kA
80A	4.5kA	6kA	10kA	10kA	6kA
100A	4.5kA	6kA	10kA	10kA	6kA
4 poles					
16A	4.5kA	6kA	10kA	10kA	6kA
25A	4.5kA	6kA	10kA	10kA	6kA
40A	4.5kA	6kA	10kA	10kA	6kA
63A	4.5kA	6kA	10kA	10kA	6kA
80A	4.5kA	6kA	10kA	10kA	6kA
100A	4.5kA	6kA	10kA	10kA	6kA

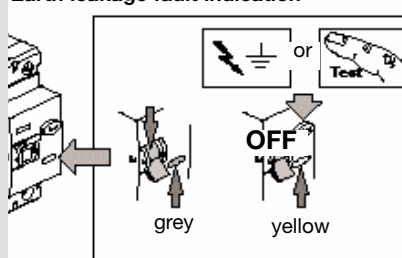
Positive contact indication



TEST : test regularly : RCCB must trip.



Earth leakage fault indication

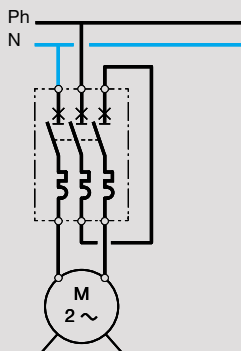


Technical specifications

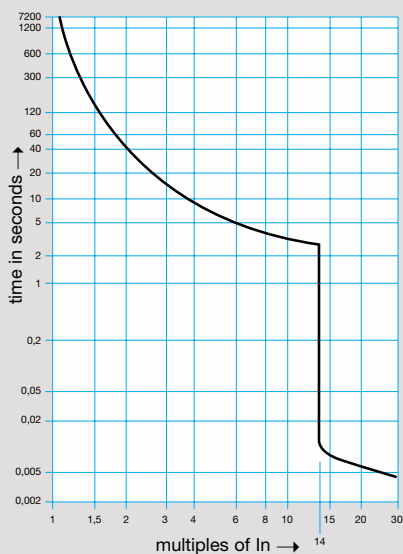
Electrical characteristics

- electrical supply : 230/400V
- ambient temperature range : 25°C to +55°C
- working life : 100 000 operations AC-3
- maximum of 40 operations/hour
- tropicalized for all climates
- connection with clamp type, terminals connection capacity :
flexible : 1□ to 4□
rigid : 1.5□ to 3□

Electrical connection single phase



Time/current characteristics



	230V	400V	230/400V + spare cartridge fuses aM/gI
MM 501N	150kA	150kA	150kA
MM 502N			
MM 503N			
MM 504N			
MM 505N			
MM 506N			
MM 507N			
MM 508N			
MM 509N			
MM 510N			
MM 511N	50kA	50kA	50kA
MM 512N			
MM 513N			

Nominal breaking capacity \geq short circuit current : fuses are not necessary, if nominal breaking capacity $<$ short circuit current : fuses must be used, breaking capacity of association is 80kA (with BS 88 fuses)

Under voltage release (no volt coil)

MZ 528N
230V~

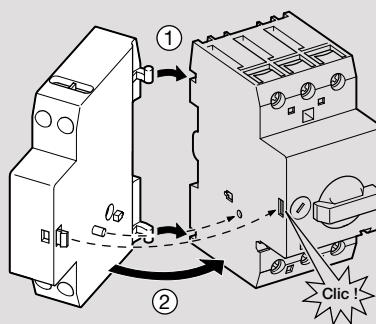
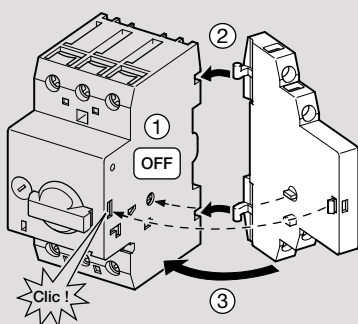
MZ 529N
400V~

Auxiliary contact (mounted inside starter)

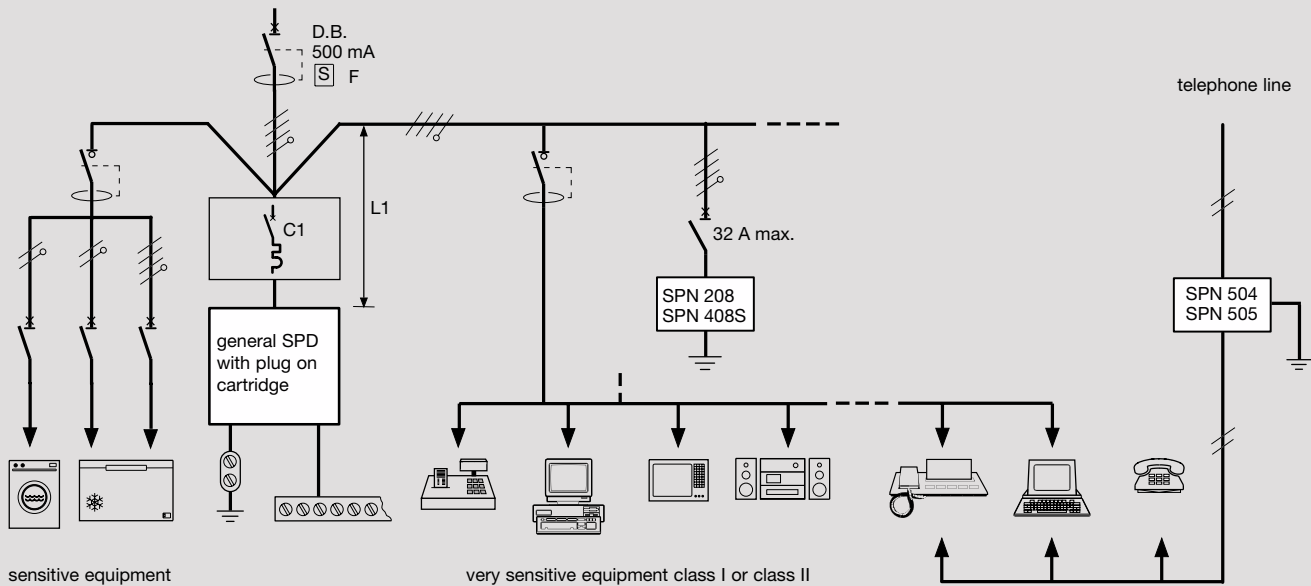
MZ 520N
2A - 400V~
3.5A - 230V~

Alarm contact (mounted inside starter)

MZ 527N
2A - 400V~
3,5A - 230V~



Installation example



Some installation rules for SPDs

- General SPD protects the whole installation by diverting the lightning current to the earth. Fitted in directly downstream the type S differential function or delayed for system TT and TN-S.
- The cable length L1 must be reduced to less than 0,5m
- The resistance of the earth connection must be weakest possible (approx. 10 Ω) and only one is requested by installation,
- SPDs SPN 208 and SPN 408S protect very sensitive devices of class I and class II.
- a cable length of at least 1m is requested between general and secondary SPD to ensure a minimum impedance in order to avoid the simultaneous bringing into conduction of both SPDs,
- SPDs SPN 504 and SPN 505 protect analog or digital telephone lines from very sensitive receivers.


N.b. : when SPD is fitted downstream of RCD, the system should preferably be selectif (with time delay) to avoid nuisance tripping.

Choice of disconnection device

The choosen device is an MCB

Selection chart for disconnection device according to the SPD type

general SPD

	 C1 (1)
SPN 165P	32 A curve C
SPN 265R	
SPN 465R	
SPN 140C - SPD 140D	32 A curve C
SPN 240R - SPD 240D	
SPN 440R - SPD 440D	
SPN 215R - SPD 215D	32 A curve C
SPN 415R - SPD 415D	

(1) The breaking capacity of MCB must be choosen according to the short circuit intensity at the head of the installation and according to the number of poles (1,2 or 4)

Distressing of SPD

Successive discharging of current due to lightning reduces progressively the performance of SPDs, with the consequence of a possible short circuit for the installation.

For this reason, all our SPDs are fitted with an automatic thermic and dynamic disconnection device

LED on front indicates the good working of the device :

- for normal version :
green = OK red = replacement
- for version with reserve indicator :
green = OK yellow = caution red = replacement
- for version with electric LED for SPDs for fine protection
green = OK LED off = replacement

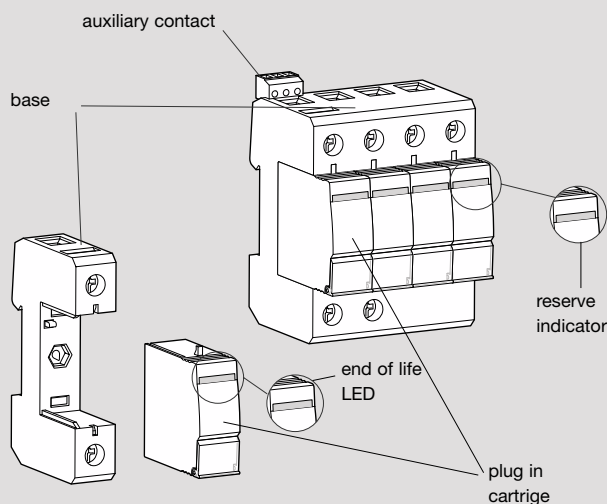
Warranty

Warranty can not be applied for SPDs as their life expectancy depends on the perturbation level absorbed to protect the electric installation.

SPDs with plug in cartridge

Presentation of 1 pole and multi pole SPDs :
available in two versions :

- base with an auxiliary contact and cartridges with reserve indicator
- base without auxiliary contact and cartridges with end of life LED



Keying system for fitting of neutral and phase cartridge

Neutral plug in cartridges can not be fitted in slots for phase cartridges and visa versa

On the front of the cartridge, a mechanical LED indicates the state of SPD

with reserve indicator



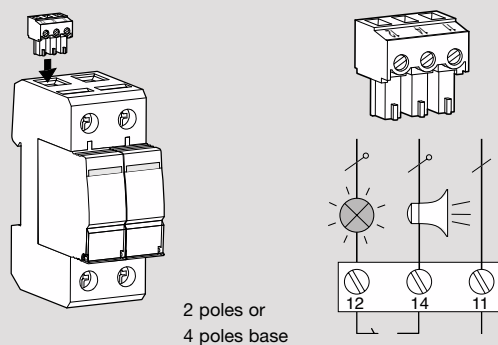
end of live LED



OK



Auxiliary contact for signalling and remote monitoring



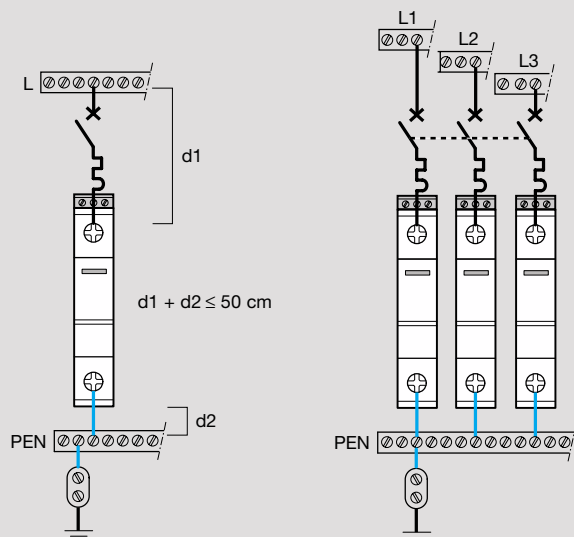
2 poles or
4 poles base

auxiliary contact	mini	0,5 mm ²	
connection capacity	maxi	1,5 mm ²	
remote signalling	voltage	230 V ~	250 V ~
	nominal current	1 A	0,1 A

Connection diagrams

Single pole SPDs : SPN1xx - SPD1xx
protection only in common mode

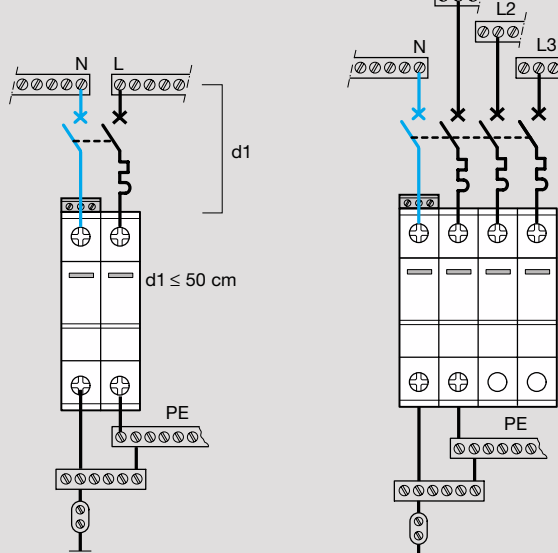
IT / TN-C



Multi pole SPDs : SPN2xx - SPN4xx - SPD2xx - SPD4xx

protection is assured in both common and differential modes without adding devices

TT / TN-S



Technical characteristics of single pole SPDs

references		SPN 140C	SPD 140D
installation exposure level (risk)		medium	medium
installation of SPDs		in parallel	in parallel
nominal voltage Un frequency		230 V~ 50/60 Hz	230 V~ 50/60 Hz
Max. continuous operating voltage Uc		440 V	275 V
voltage protection level Up		2 kV	1,2 kV
discharge current capacity 8/20 µs wave	nominal current In	15 kA	15 kA
	max. current Imax	40 kA	40 kA
degree of protection		IP 20	IP 20
short circuit resistance Icc (MCB - curve C)		20 kA - 32 A	20 kA - 32 A
temperature	working	-20 à + 60°C	-20 à + 60°C
	storage	-40 à +70°C	-40 à +70°C
end of live LED		yes	yes
reserve indicator + auxiliary contact		-	-
domestic building	collective/individual	yes	yes
	industrial/commercial	yes	yes
earthing systems		IT, TN-C	IT, TN-C
max. connection capacity (Ph, N, E)	flexible	25 mm ²	25 mm ²
	rigid	35 mm ²	35 mm ²
screw head		PZ2	PZ2

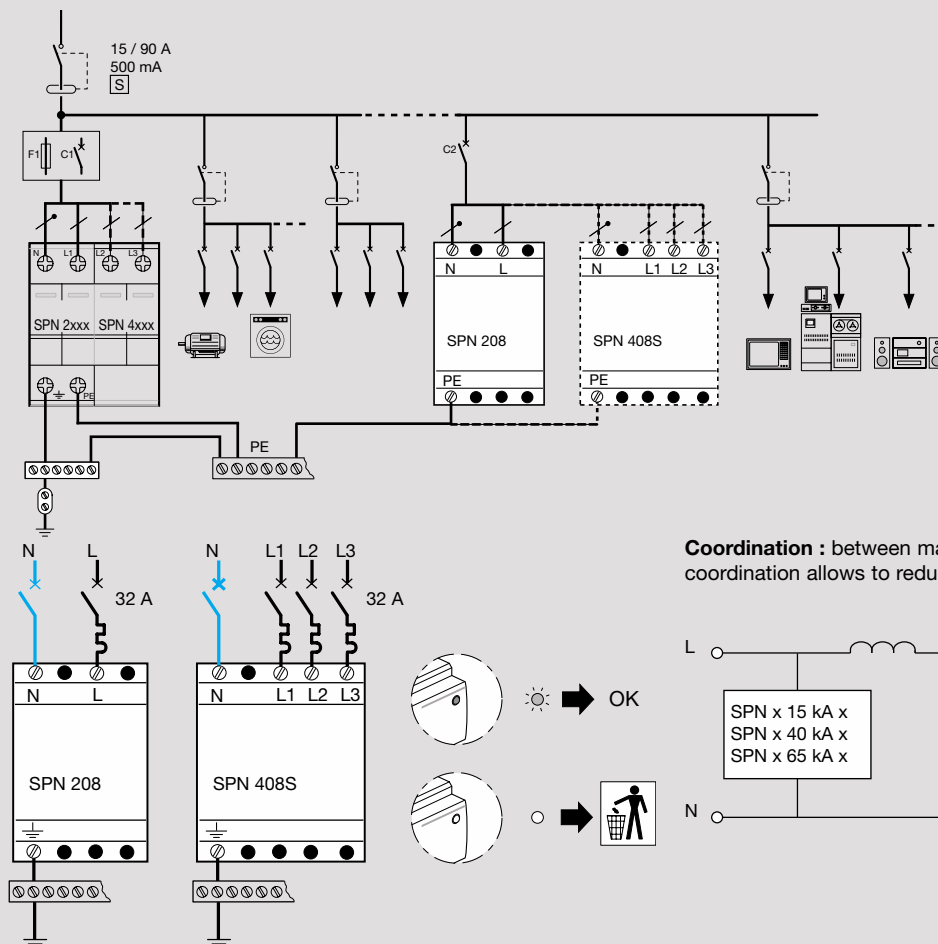
technical characteristics of multipole SPDs

references		SPN 265R-SPN 465R	SPN 240R, SPN 440R SPD 240D, SPD 440D	SPN 215R, SPN 415R SPD 215D, SPD 415D
installation exposure level (risk)		very high	medium	low
installation of SPDs		in parallel	in parallel	in parallel
nominal voltage Un frequency		230/400 V~ 50/60 Hz	230/400 V~ 50/60 Hz	230/400 V~ 50/60 Hz
Max. continuous operating voltage Uc		between Phase / Neutral between Neutre / PE	255 V 275 V	255 V 275 V
protection mode	common	yes	yes	yes
	differential	yes	yes	yes
voltage protection level Up		1,5 kV	1,2 kV	1,0 kV
discharge current capacity 8/20 µs wave	nominal current In	20 kA	15 kA	5 kA
	maxial current Imax	65 kA	40 kA	15 kA
degree of protection		IP 20		
short circuit resistance Icc (MCB - curve C)		20 kA - 32 A	20 kA - 32 A	10 kA - 32 A
working temperature		-40°C à +60°C		
end of life LED		-	SPN 240D - SPN 440D	SPN 215D - SPN 415D
reserve indicator + auxiliary contact		SPN 265R - SPN 465R	SPN 240R - SPN 440R	SPN 215R - SPN 415R
domestic buildings	collective / individual	yes		
	industrial / commercial	yes		
earthing systems		TT TN - S	TT TN - S	TT TN - S
connection capacity (Ph, N, E)	flexible	25 mm ²		
	rigid	35 mm ²		
screw head		PZ2		

Technical characteristics of secondary SPDs (fine protection)

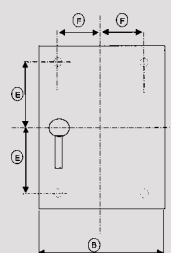
references		SPN 208	SPN 408S
installation exposure level (risk)		low	low
installation of SPDs		in parallel	in parallel
nominal voltage U_n		230 V~	230/400 V~
frequency		50/60 Hz	50/60 Hz
Max. continuous operating voltage U_c	between N / PE between Phase and Neutral	255 V 255 V	255 V 255 V
protection mode	common differential	yes yes	yes yes
voltage protection level U_p		1,5 kV	1,0 kV
discharge current capacity 8/20 μ s wave	nominal current I_n maximal current I_{max}	2 kA 8 kA	2 kA 8 kA
degree of protection		IP 20	IP 20
short circuit resistance I_{cc} (with fuse or associated MCB)		6 kA - 16 A	6 kA - 32 A
temperature	working storage	-25°C à +40°C -25°C à +60°C	-25°C à +40°C -25°C à +40°C
well functioning indicator		green LED	green LED
domestic buildings	collective / individual industrial / commercial	yes yes	yes yes
earthing systems		TT, IT, TN - S	TT, IT, TN - S
connection capacity (Ph, N, E)	flexible min./max. rigid min./max.	2,5/6 mm ² 6/10 mm ²	2,5/6 mm ² 6/10 mm ²
screw head		PZ1	

SPDs SPN 208S and SPN 408S



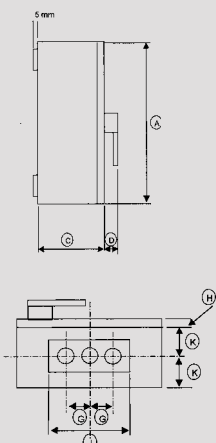
Coordination : between main SPD and secondary level SPDs, this coordination allows to reduce the protection level U_p to ≤ 800 V

Enclosed fuse combination switch



Dimensions:

1P + Switched Neutral	A	B	C	D	E	F	G	H	J	K	BS88 Fuse Size
JG02FC	350	300	130	60	135	110	65	15	292	107	A1
JG04FC	350	300	130	60	135	110	65	15	292	107	A2 - A3
JG06FC	350	300	130	60	135	110	65	15	292	107	A4

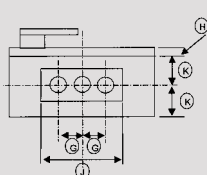
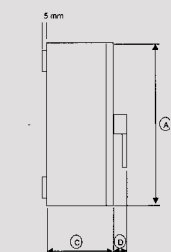
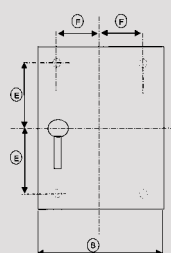


3P + N	4P	A	B	C	D	E	F	G	H	J	K	BS88 Fuse Size
JG09FC	JG10FC	350	300	130	60	135	110	65	15	292	107	A1
JG11FC	JG12FC	350	300	130	60	135	110	65	15	292	107	A2 - A3
JG17FC	JG18FC	350	300	130	60	135	110	65	15	292	107	A4
JG23FC	JG24FC	450	380	200	60	165	130	70	15	372	177	B1 - B2
JG26FC	JG27FC	450	380	200	60	165	130	70	15	372	177	B1 - B2
JG30FC	JG31FC	500	450	250	60	190	165	-	15	442	227	B1 - B3
JG32FC	JG33FC	500	450	250	60	190	165	-	15	442	227	B1 - B4
JG36FC	JG37FC	700	600	350	91	250	200	-	15	592	327	C1 - C2

Enclosed Load Break

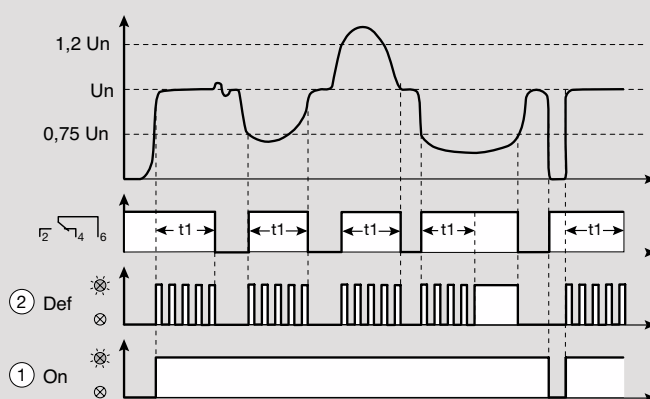
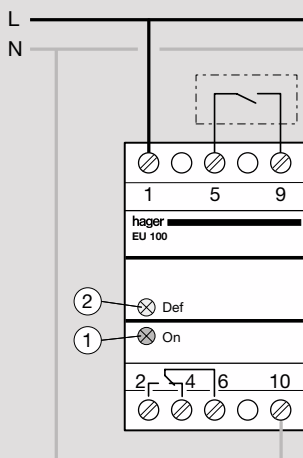
Dimensions:

3P + N	4P	A	B	C	D	E	F	G	H	J	K
JG07SC	JG08SC	200	150	100	60	55	35	36	15	142	78
JG09SC	JG10SC	200	150	100	60	55	35	36	15	142	78
JG11SC	JG12SC	200	150	100	60	55	35	36	15	142	78
JG17SC	JG18SC	300	250	130	60	95	85	70	15	242	108
JG23SC	JG24SC	300	250	130	60	95	85	70	15	242	108
JG26SC	JG27SC	400	300	200	60	140	110	-	15	292	118
JG28SC	JG29SC	400	300	200	60	140	110	-	15	292	118
JG30SC	JG31SC	600	400	250	60	250	160	-	15	392	228
JG32SC	JG33SC	600	400	250	60	250	160	-	15	392	228
JG36SC	JG37SC	600	450	250	70	225	165	-	15	442	228

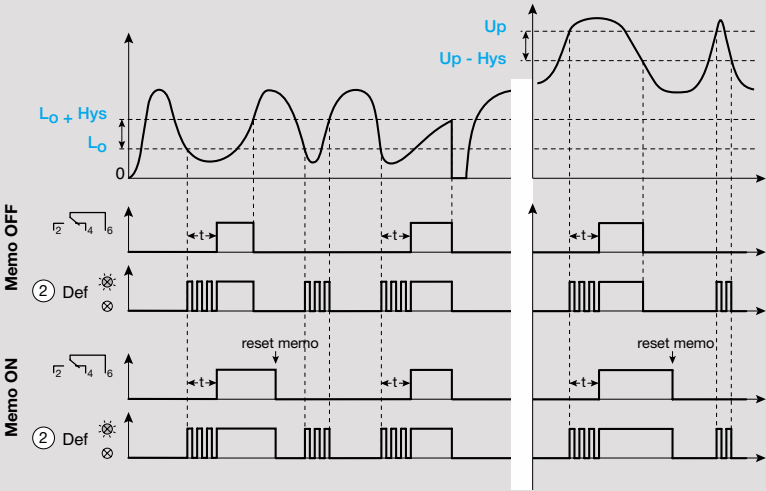
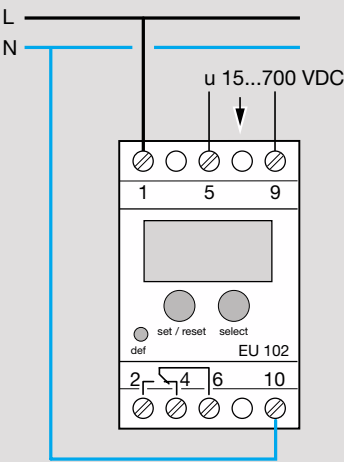


References	EU 100	EU 101	EU 301	EU 302	EU 300	EU 102	EU 103
Function	single phase compressor control relay	single phase compressor control relay	three phase compressor control relay	three phase voltage control relay	phase control relay	voltage control relay with LCD	current control relay with LCD
LCD indicator	No					measured voltage	measured current
Power supply	230 V AC +10% -15% 50/60Hz +/-2%		230 V AC +10% -15% 50/60Hz +/-2%			230 V AC +10% -15% 50/60Hz +/-2%	
Power consumption	< 5 VA						
Output contact	8A - AC1 - 250V closed : normal status opened : default status						
Disconnection time	5min / 10min			-			
Response time	200 ms			0,1..12s set via potentiometer	200 ms	200 ms	
Monitoring function	Monitoring function over/under voltage				Monitor. funct. under voltage loss of phase	over voltage under voltage band	over current under current band
Monitoring levels	Umin : 0.75Un Umax : 1.2Un	Umin/Umax : +/-5% to +/-20%Un set via potentiometer		Umin : +/-5 to +/-20% Un Umax : 1.15Un	Asymmetry +/-5% to +/-20% Umin : 0.70Un	DC : 15V to 700V AC : 15V rms to 480V rms	DC : 0.1 to 10A AC : direct : 0.1to10A or via current transformer : X/5
Hysteresis						5 to 50%	
Latching function	No			Yes	No	Yes	
Supervised voltage	the power supply						
Width	2 modules					2 modules	
LED power supply : green	lights when powered						
LED default information : red	lights in case of fault, flashing during time elapses, off during normal status						
LED asymmetry information : yellow					asymmetry fault		
Ik	3						
IP rating	IP 20						
Working temperature	-20 to +55°C						
Storage temperature	-40 to +70°C						
Connexion flexible rigid	0.75 to 4mm ² 1 to 6 mm ²						

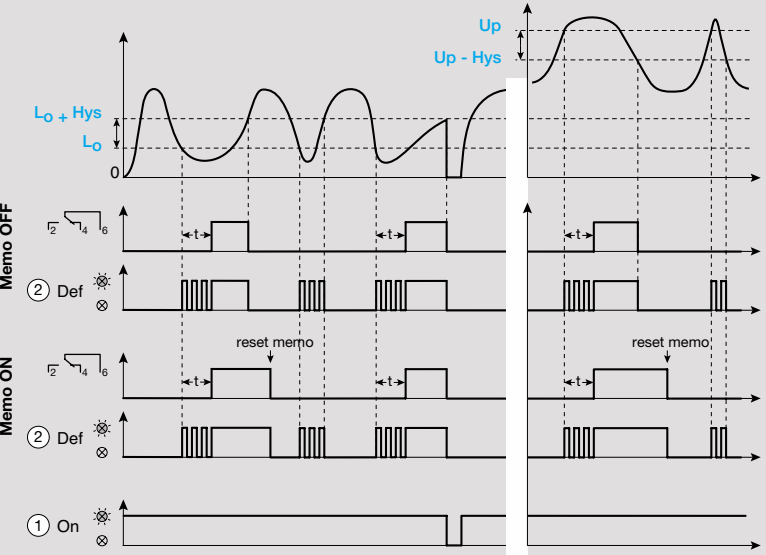
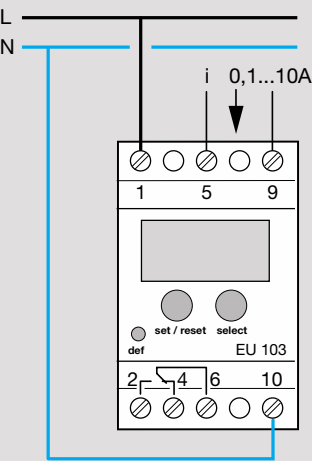
Air conditioning control relay single phase EU 100



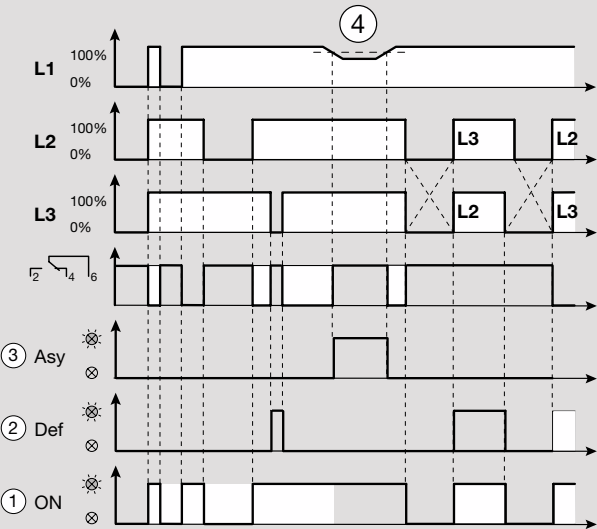
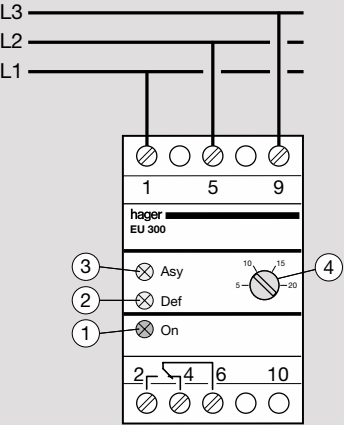
Voltage control relay single phase EU 102



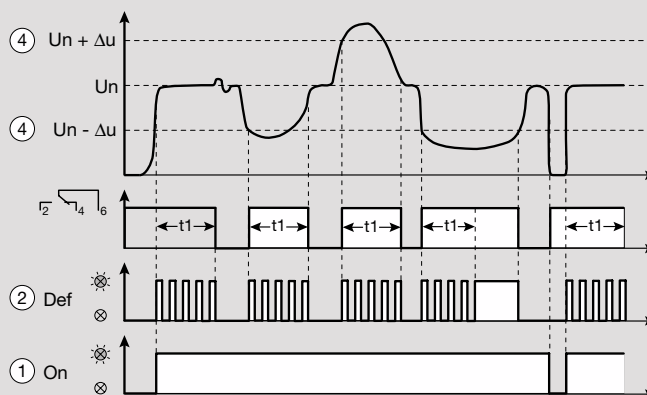
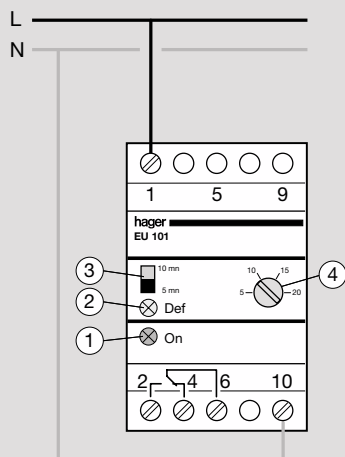
Current control relay single phase EU 103



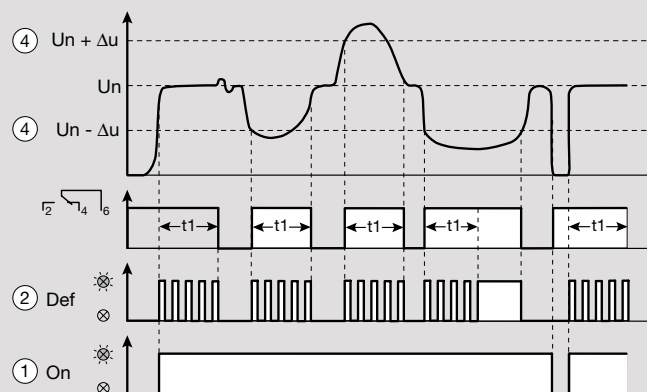
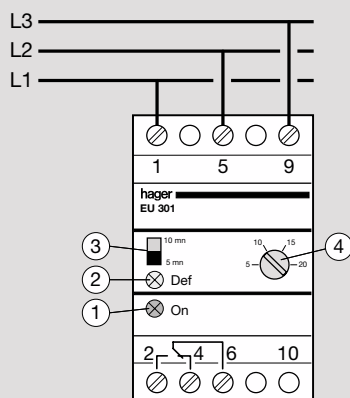
Phase control relay EU 300



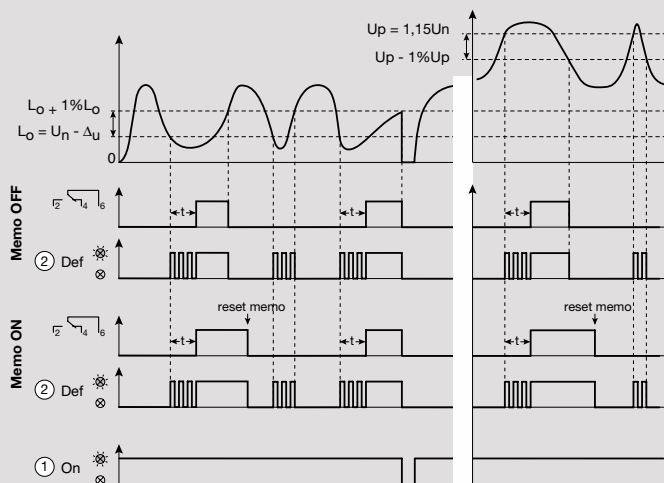
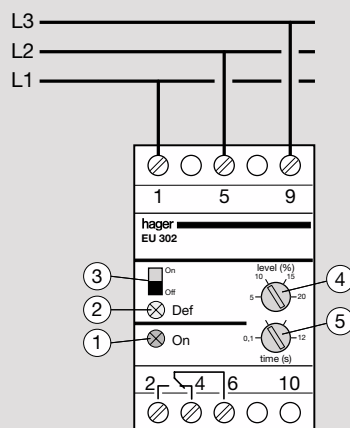
Air conditioning control relay single phase EU 101



Air conditioning control relay three phase EU 301

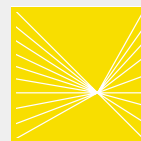
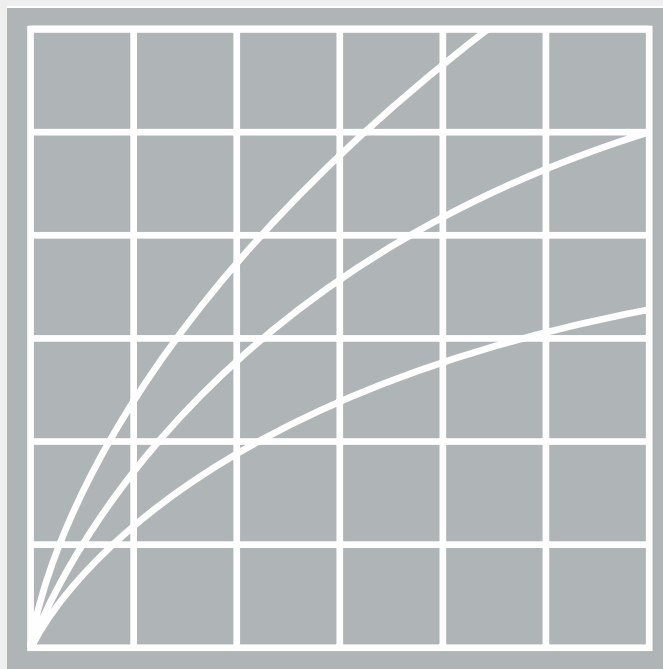


Voltage control relay three phase EU 302



Technical information Protection devices

T.12	Earth leakage relays
T.13	Torroïds for Earth Leakage Relays
T.15	MCB
T.17	MCB 125A
T.18	Remote control and automatic reset auxiliary device
T.19	Auxiliaries
T.20	RCD add-on blocks
T.21	RCCB (ELCB)
T.23	Technical information motor starters
T.24	Surge protection devices
T.28	Enclosed fuse combination switch
T.29	Control relays



Technical specifications

	nonadjustable ELR	adjustable ELR				
	HR 404	HR 410	HR 421	HR 422	HR423	HR440 / HR441
Relays power supply voltage ~50/60 Hz	230 V ± 20%					
Controlled mains voltage ~ 50/60 Hz	50 to 700 V					
power consumption	3 VA	5 VA	5 VA			10VA
output contact	one change-over volt free contact					
contact rating (standard output, positive security, pre-alarm 50%)	6 A / 250 V AC1					
sensitivity $I_{\Delta n}$	0.03A/0.1A/0.3A/ 0.5A/1A/2A/3A	0.03A/0.1A/0.3A/ 0.5A/1A/3A/5A/10A	0.03A/0.1A/0.3A/ 0.5A/1A/2A/3A	0.03A/0.1A/0.5A/1A/3A/ 0.3A/0.5A 5A/10A/ 1A/3A/10A 20A/30A		0.03A/0.1A/0.3A 0.5A/1A/3A
time delay (± 20%)	instantaneous	0/0.1s/0.3s/0.4s/ 0.5s/1s/3s	0/0.1s/0.2s/0.25s/ 0.3s/0.4s/0.5s			0.1s/0.3s/0.5s/0.75s/ 1s
acceptable overload at torroïd level	30 kA / 100 ms					
voltage of test and reset BP	100 à 250 V					
maximum lentgh of test/reset conection	200 m					
maxi. lentgh of torroïd/relay connection	50 m maxi with twisted cable 1,5 mm ² - 25m with nontwisted cable					
relay connection : cage terminals rigid	1,5 ² to 4 ²					
flexible	1 ² to 2,5 ²					
torroïd connection rigid	1,5 ² to 4 ²					
flexible	1 ² to 6 ²					
operating temperature	-10 to +55 °C					
storage temperature	-25 to +70 °C					
diameter integrated torroïd	-					
EMC immunity according to EN61000	30V/m at 1890 MHz					
						25 - 35 mm

Main characteristics

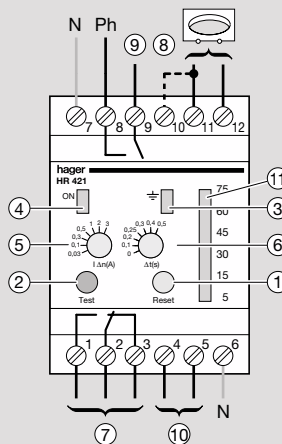
- ① **"reset" push button** : in case of tripping, the output remains commutated and the return to "normal" position is made by :
 - pushing the "reset" push button
 - a power cut.
- ② **"test" push button** : it allows to verify, by a simulation, the good functioning of the relay in case of fault.
- ③ **Fault indicator** : it is switched on when fault of the supervised installation. Intermittent when there is a breaking of the relay/torroïd connection.
- ④ **Supply indicator** : good functioning of the product.
- ⑤ **$I_{\Delta n}$ ratings**
- ⑥ **Time delay Δt**
 - **sealing adjustments** : all modifications of adjustment can be done by a sealing cover.
- ⑦ **Standard output (1 OF)** : tripping at 85% of $I_{\Delta n} \pm 15\%$.
Goes from 0 to 1 when :
 - fault when torroïd/relay connection
 - fault current when supervised installation.**or positive safety output :**
Goes to 1 when supply, goes from 1 to 0 when :
 - fault of torroïd/relay connection,
 - fault current when supervised installation,
 - supply fault or internal relay fault.
- ⑧ **Input for changing the output contact :**
from standard output contact to positive safety output contact : 0 V = standard contact
----- 220 V = positive safety contact

- ⑨ **Pre-alarm output** : the contact closes itself at 50% of $I_{\Delta n}$ (±15%)

Remote test and reset

Bargraph (HR 420) : indicates continuously the value of the leakage current, 5 to 15 %, 15 to 30 %, 30 to 45 %, 45 to 60 % and 60 to 75 % of $I_{\Delta n}$.

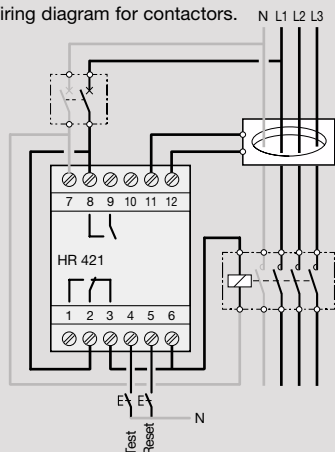
Product presentation



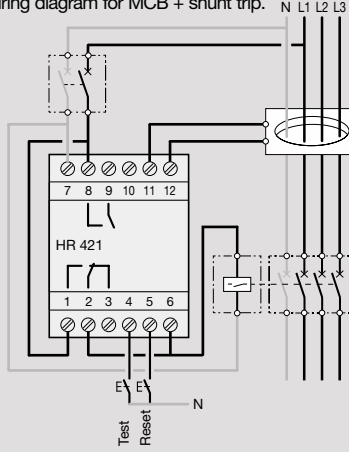
Load controlled settings : any setting change can be prevented by using a lead controlled cover.

Electrical connection

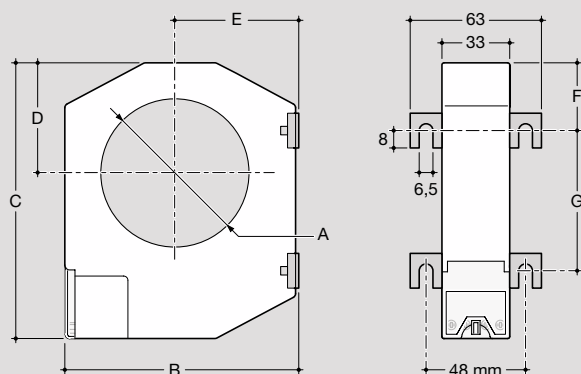
Wiring diagram for contactors.



Wiring diagram for MCB + shunt trip.

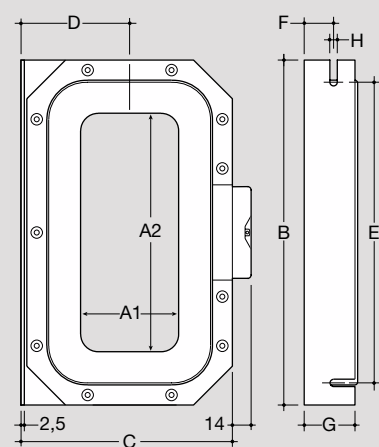


Circular section torroids : HR841 - HR844



	HR 841	HR 842	HR 843	HR 844
A (mm)	Ø 35	Ø 70	Ø 105	Ø 140
B (mm)	79	110	146	196
C (mm)	100	130	170	220
D (mm)	35	52	72	97
E (mm)	43	57	73	98
F (mm)	26	32	38	48,5
G (mm)	48,5	66	94	123

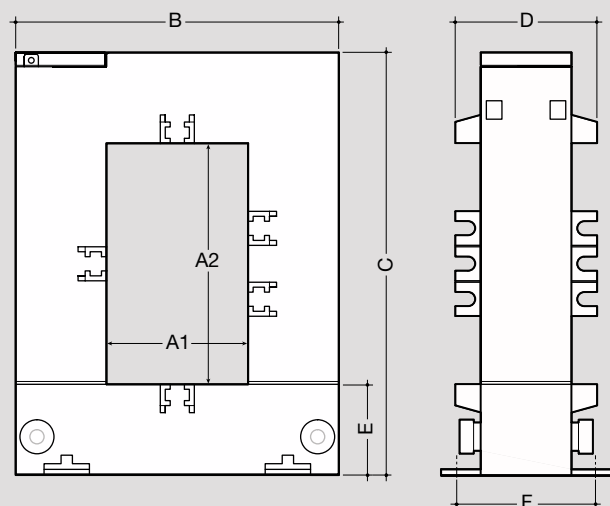
rectangular section torroids : HR 830, HR 831, HR 832



Dimensions for circular and rectangular section torroids

references	overall dimensions (in mm)									
	A	A1	A2	B	C	D	E	F	G	H
HR 801	Ø 35	-	-	92	86	43,5	74	17	32,5	5,5
HR 802	Ø 70	-	-	115	118	60,5	97	17	32,5	5,5
HR 803	Ø 105	-	-	158	162,5	84,5	140	15	32,5	5,5
HR 804	Ø 140	-	-	202	203	103,5	178	21	32,5	7,5
HR 805	Ø 210	-	-	290	295	150	265	23	32,5	7,5
HR 830	-	70	175	260	162	85	225	22	40	7,5
HR 831	-	115	305	400	225	116	360	25	48	8,5
HR 832	-	150	350	460	270	140	415	28	48	8,5

Opening rectangular section torroids :



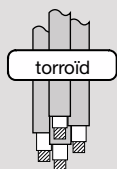
Dimensions of opening rectangular section torroids

	A1	A2	B	C	D	E	F
HR 820	20	30	89	110	41	32	46
HR 821	50	80	114	145	50	32	46
HR 822	80	80	145	145	50	32	46
HR 823	80	121	145	185	50	32	46
HR 824	80	161	184	244	70	37	46

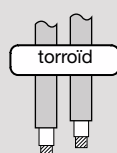
Torroïd capacity

on copper ►
cables

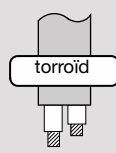
U 1000 R2V
one conductor
cable



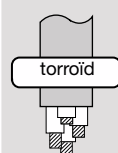
U 1000 R2V
one conductor cable



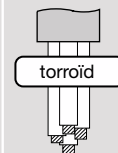
U 1000 R2V
two conductor
cable



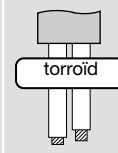
U 1000 R2V
four conductor
cable



U 1000 R2V
partially stripped
four-conductor
cable



U 1000 R2V
partially stripped
two-conductor
cable

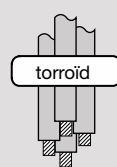


Ø torroïd inside ▼

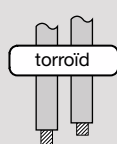
30	4 x 16 [□]	2 x 50 [□]	35 [□]	35 [□]	35 [□]	50 [□]
35	4 x 25 [□]	2 x 70 [□]	35 [□]	50 [□]	35 [□]	70 [□]
70	4 x 185 [□]	2 x 400 [□] ou 4 x 150 [□]	35 [□]	240 [□]	35 [□]	300 [□]
105	4 x 500 [□]	2 x 630 [□] ou 4 x 185 [□]	35 [□]	300 [□]	35 [□]	300 [□]
140	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
210	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
70 x 175	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
115 x 305	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
150 x 350	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
20 x 30	4 x 16 [□]	2 x 70 [□]	35 [□]	10 [□]	35 [□]	16 [□]
50 x 80	4 x 240 [□]	2 x 630 [□] ou 4 x 185 [□]	35 [□]	120 [□]	35 [□]	150 [□]
80 x 80	4 x 500 [□]	2 x 630 [□] ou 4 x 185 [□]	35 [□]	300 [□]	35 [□]	300 [□]
80 x 120	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]
80 x 160	4 x 630 [□]	2 x 630 [□] ou 4 x 240 [□]	35 [□]	300 [□]	35 [□]	300 [□]

on copper ►
cables

H07 V - U
1 conductor

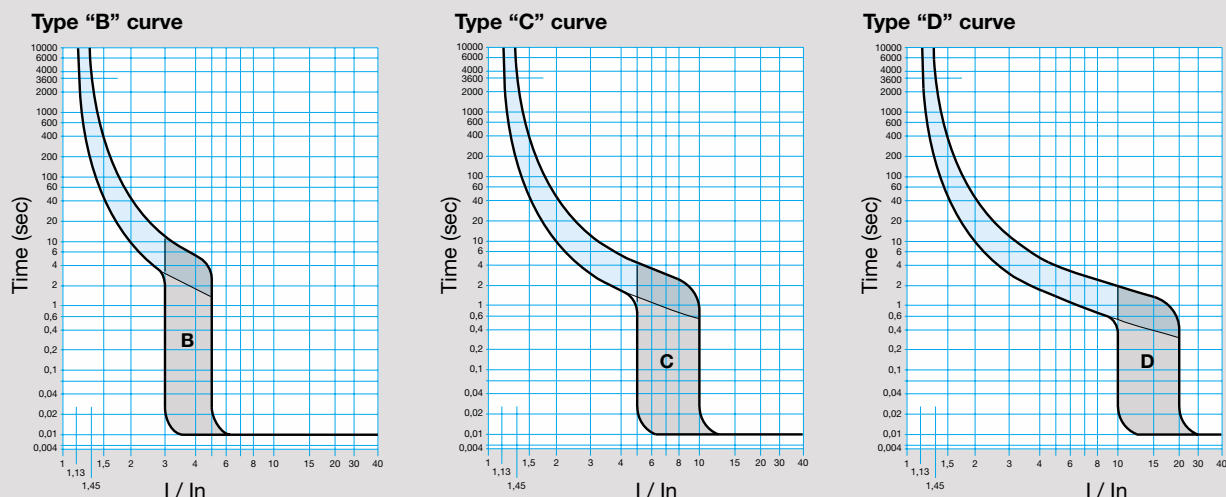


H07 V - U
1 conductor



Ø torroïd inside ▼

30	4 x 35 [□]	2 x 70 [□]
35	4 x 50 [□]	2 x 95 [□]
70	4 x 240 [□]	2 x 400 [□] ou 4 x 185 [□]
105	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
140	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
210	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
70 x 175	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
115 x 305	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
150 x 350	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
20 x 30	4 x 10 [□]	2 x 35 [□]
50 x 80	4 x 185 [□]	2 x 240 [□]
80 x 80	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
80 x 120	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]
80 x 160	4 x 400 [□]	2 x 400 [□] ou 4 x 240 [□]



Electrical characteristics

MCB type	MY _ _ _ _	MT _ _ A	MU _ _ A	NB _ _ A	NC _ _ A	ND _ _ A	NR _ _ A	NR _ _ X	HLxxx	HMxxx
current rating	1 - 63A	6 - 63A	2 - 63A	6 - 63A	0.5 - 63A	0.5 - 63A	6 - 63A	25 - 63A	80-125A	80-125A
tripping curve										
B: 3 - 5In										
C: 5 - 10In	C	B	C B	C	D	C	C		B / C	B / C / D
D: 10 - 20In										
breaking capacity										
EN 60 898 & IEC 898	4.5kA	6kA	6kA	10kA	10kA	10kA		-	10kA	15kA
IEC 947 - 2	6kA	10kA	10kA	15kA	15kA	15kA	15/25kA	25kA	10kA	15kA
NEMA AB - 1	10KAIC	22KAIC	22KAIC	30KAIC	30KAIC	30KAIC	30KAIC	30KAIC		
rated voltage - 50/60Hz	230/400Vac (max. 440Vac)								240 / 415Vac	
isolating voltage	500V									
electrical endurance	0.5 to 32A 20 000 operations 40 to 125A 10 000 operations									
working temperature	-5°C to +60°C									
tropicalisation	treatment 2 with relative humidity 95% at 55°C									

Correction factor

Depending on the model selected some of the breaker is calibrated at a temperature of 30°C in accordance to IEC 898.
Temperature correction

grouping factor (rated current reduce by factor K)

In (A)	30°C	35°C	40°C	45°C	50°C	55°C	60°C
0.5	0.5	0.47	0.45	0.4	0.38	-	-
1	1	0.95	0.9	0.8	0.7	0.6	0.5
2	2	1.	1.7	1.6	1.5	1.4	1.3
3	3	2.8	2.	2.	2.	2.1	1.9
4	4	3.7	3.	3.3	3	2.8	2.5
6	6	5.6	5.3	5	4.6	4.2	3.8
10	10	9.4	8.8	8	7.5	7	6.4
16	16	15	14	13	12	11	10
20	20	18.5	17.5	16.5	15	14	13
25	25	23.5	22	20.5	19	17.5	16
32	32	30	28	26	24	22	20
40	40	37.5	35	33	30	28	25
50	50	47	44	41	38	35	32
63	63	59	55	51	48	44	40
80	80	77.6	75.1	72.6	70	67.2	64.4
100	100	96.6	93.1	89.4	85.6	81.6	77.5
125	125	121.9	118.9	115.7	112.4	109.1	105.6

no. of units n	K
n = 1	1
2 ≤ n < 4	0.95
4 ≤ n < 6	0.9
6 ≤ n	0.85

frequency

thermal - unchanged

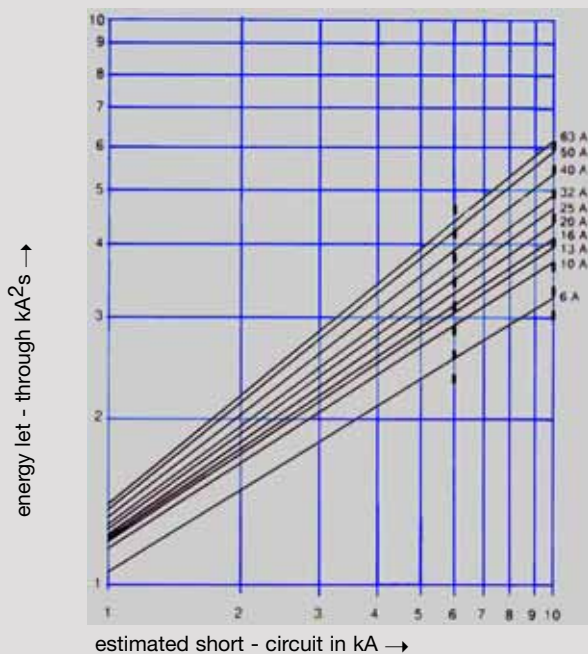
magnetic - value multiplied by coefficient K

F (Hz)	17Hz - 60Hz	100Hz	200Hz	400Hz
K	1	1.1	1.2	1.5

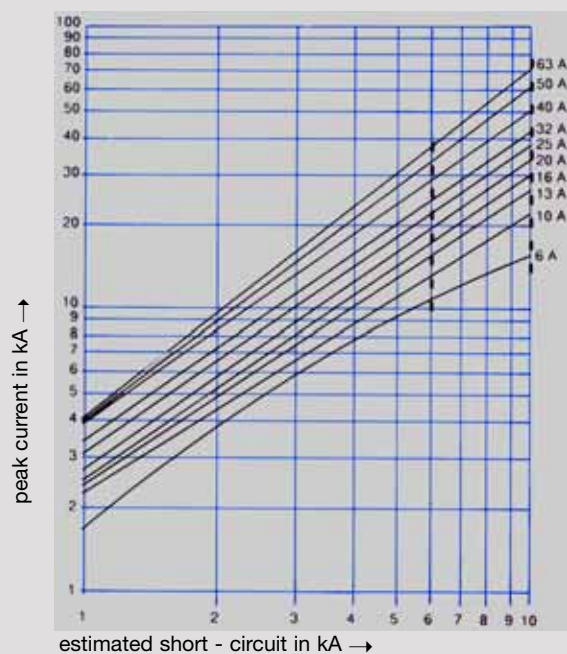
Installation

working position : vertically, horizontally or flat.
supply : feed from either top or bottom terminals.

I²T characteristics curve



Current limitation curve



Power loss

The power loss of MCB's is closely controlled by the standards and is calculated on the basis of the voltage drop across the main terminals measured at rated current. The power loss of Hager circuit breakers is very much lower than that required by the IEC Standard, so in consequences run cooler and are less affected when mounted together.

The table below gives the watts loss per pole at rated current.

MCB rated current (A)	0.5	1	2	3	4	6	10	16	20	25	32	40	50	63	80	100	125
watt loss per pole (W)	1.3	1.5	1.7	2.1	2.4	2.7	1.8	2.6	2.8	3.3	3.9	4.3	4.8	5.2	5	5.5	8

DC applications

Because of their quick make and break design and excellent arc quenching capabilities Hager circuit breakers are suitable for use on DC. When selecting a circuit breaker for any DC application it is necessary to consider two main points.

1. rated current

The thermal time/current characteristics is unaffected so that the circuit breaker will carry its rated current and operate within its designated thermal time/current zone at 40°C Derating for higher ambient temperatures and grouping apply exactly the same as AC applications. The instantaneous magnetic trip is affected however, becoming less sensitive, requiring 2 times the AC operating current. The table below shows the upper and lower limits of both B and C instantaneous characteristic curves for 50Hz C and DC applications. Thermal unchanged. Magnetic trip increased as table below.

Characteristics curve	B		C	
magnetic trip	50Hz	DC	50Hz	DC
I _{rm} 1	3I _n	3I _n	5I _n	5I _n
I _{rm} 2	5I _n	7.5I _n	10I _n	15I _n

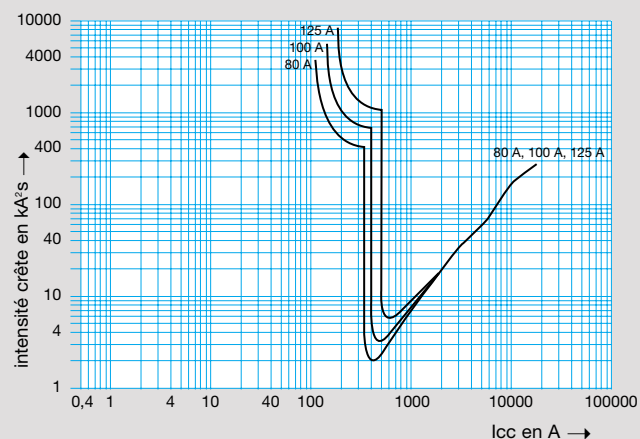
2. system voltage

The system voltage and the type of system determines the number of poles required to provide the necessary breaking capacity and arc control. The table below gives the maximum DC voltage and breaking capacity for one pole or two poles connected in the series; The positioning of these breaking poles in the system depends on whether the system is earthed or insulated and if it is earthed whether one polarity is earthed or the centre point is earthed.

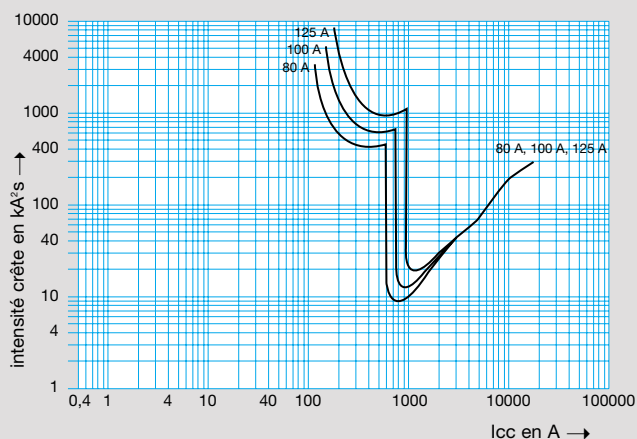
MCB	Breaking capacity			Magnetic tripping
	1 pole/60V	2 poles in series/125V	4 poles in series/250V	
MY	10kA	10kA	-	5 - 15In
MT	15kA	15kA	-	3 - 7.5In
MU	15kA	15kA	-	5 - 15In
NB	20kA	20kA	20kA	3 - 7.5In
NC	20kA	20kA	20kA	5 - 15In
ND	15kA	15kA	15kA	13 - 28In
NM	10kA	10kA	10kA	5 - 15In
NR	20kA	20kA	20kA	5 - 15In
HLE	10kA	10kA	10kA	3 - 7.5In
HLF	10kA	10kA	10kA	5 - 15In
HMB	15kA	15kA	15kA	3 - 7.5In
HMC	15kA	15kA	15kA	5 - 15In
HMD	15kA	15kA	15kA	13 - 28In

Current limiting at 400 V

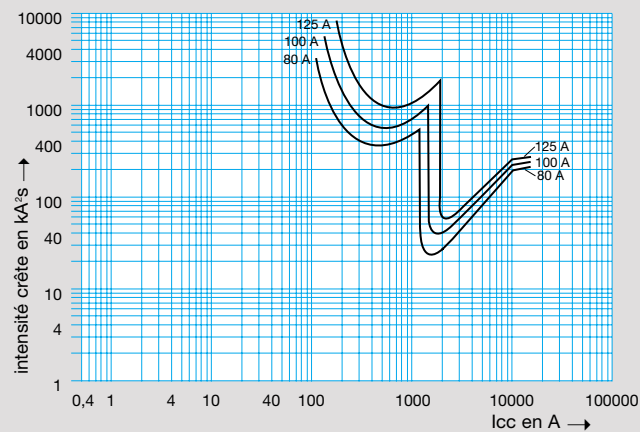
MCBs : **HMB**



MCBs : **HMC**

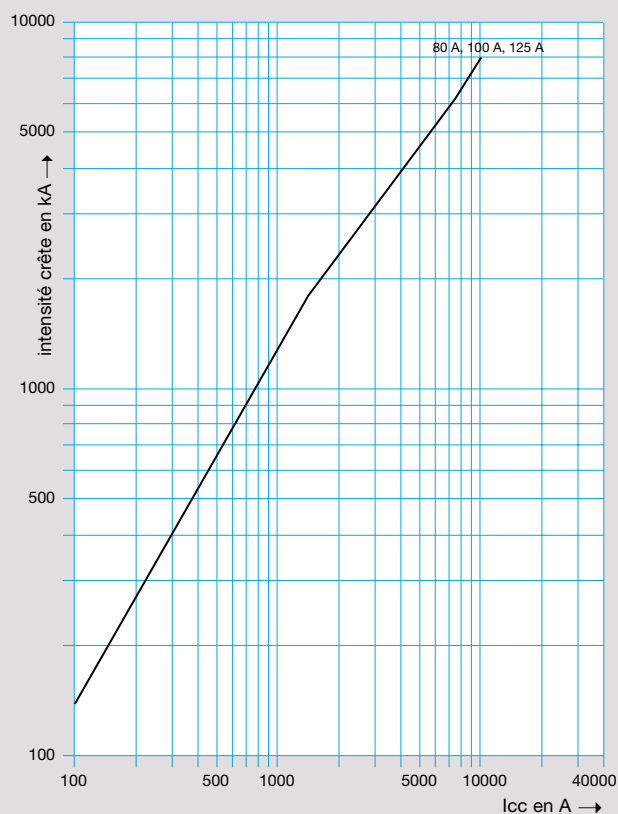


MCBs : **HMC**

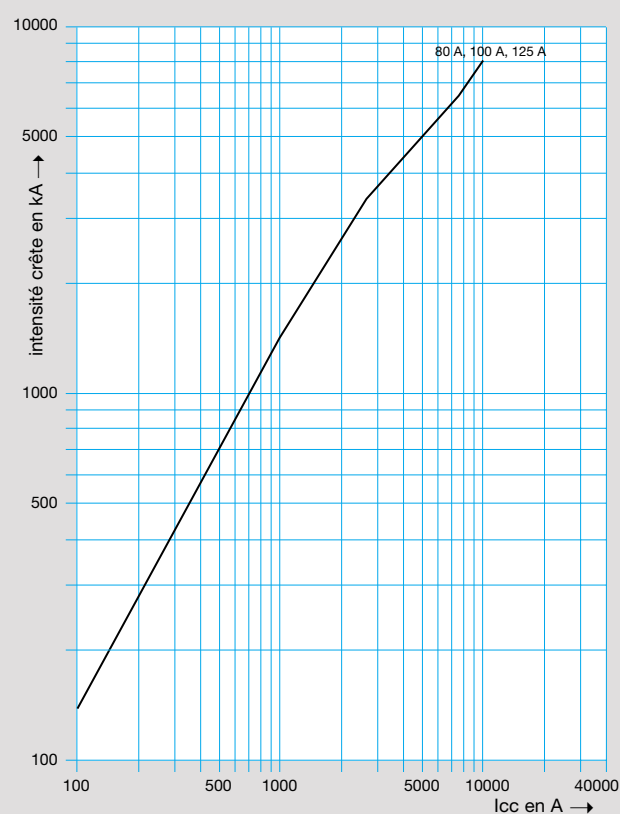


Short circuit limiting at 400 V

MCB's : **HMB, HMC**



MCB's : **HMD**



Remote control and automatic resetting auxiliary device

Front side selector ① in position “🔒 + reset”

This position locks all controls and automatic resetting, and initializes the product if the position is maintained for more than 5 sec. The initialization consists in resetting all time delays and the number of faults.

Front side selector ① in position “🔒”

This position locks all controls and automatic resetting.

“On” (input n°2) and “off” (input n°4) remote controls

These controls can be made by contact such as push-button or closing switch (e.g. automation, supervisor, clock, etc...). Off has priority with regard to the on and the automatic resetting.

Remote control (input n° 6) “🔒 + reset”

This control can be made by contact such as push-button or closing switch (e.g. automation, supervisor, clock, etc...). This control padlocks on and automatic resetting, and initializes the product.

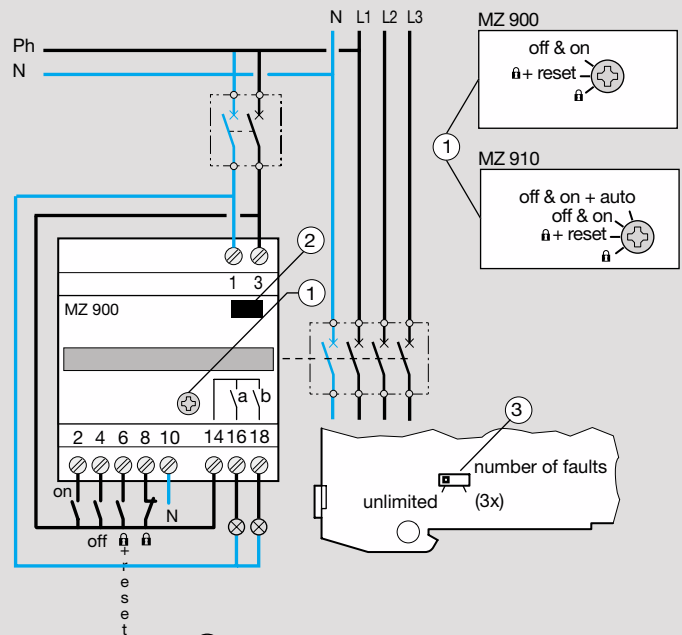
Remote control (input n° 8) “🔒”

This control can be made by contact such as push-button or opening switch (e.g. locking emergency stop button etc.). This control locks on and automatic resetting. The off is available.

“a” and “b” signal outputs

These outputs indicate the position of the handle of the associated product or the states of the remote control auxiliary.

Connection diagram



The indicator light ② indicates the state of the product and allows a diagnosis to be established.

We can distinguish 3 general cases :

- fixed indicator light : the product is operational
- indicator light off : the product is not supplied
- indicator light flashing : controls or automatic resetting are temporarily or permanently clamped.

The red intermittent indicator light also means that contacts of the associated product are soldered or that the handle of the remote control is padlocked.

a	b	
		on
	⏏	off
		🔒
	⏏	no power supply

Technical characteristics

Position of front side selector position of “number of faults” side selector

	3x	unlimited
off & on	<ul style="list-style-type: none"> - The on, off, “ + reset” and “ ” are operational - 1 ≤ number of faults < 3 : on is operational after 3 min time delay - number of faults = 3 : on locked. Unlocking possible with local or remote control “🔒 reset” 	<ul style="list-style-type: none"> - The on, off, “ + reset” and “ ” are operational - faults are not counted
off & on + auto (only on MZ 910)	<ul style="list-style-type: none"> - The on, off, “ + reset”, “ ” and the automatic resetting are operational - 1 ≤ fault 2s. after closing < 3 : on or automatic resetting are operational after 3 min time delay. - 2s. fault after closing = 3 : on and automatic resetting are locked. - fault > 2s. after closing : fault counter = 0, on and automatic resetting are operational after 3 min time delay. 	<ul style="list-style-type: none"> - The on, off, “ + reset”, “ ” and the automatic resetting are operational - 3 min time delay on automatic resetting - no time delay on on control

Functions

Tripping and indication auxiliary contacts are common to the range of Hager MCBs and RCCBs. They should be mounted on the left hand side of the device.

Auxiliary contact MZ 201

Allows remote indication of the status of the device contacts to which it is associated.

Alarm contact MZ 202

The alarm or signal contact will provide indication if the breaker trips under fault conditions

Note

Default indication auxiliaries and shunt trips or under voltage releases are fitted with tripping indications and reset facility.

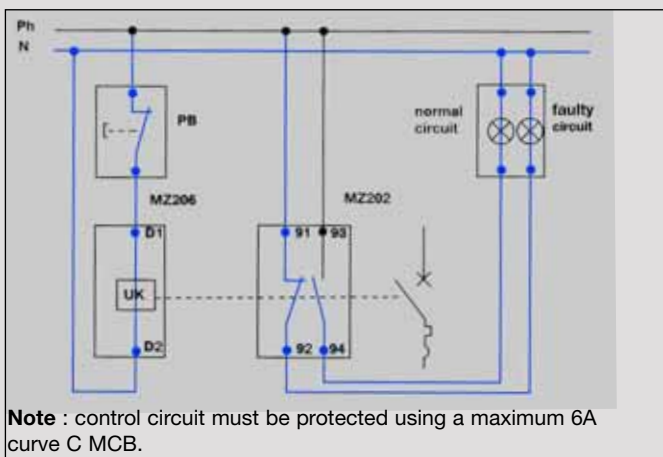
MZ 203 / MZ 204 shunt trip

Allows tripping of the device by feeding the coil. It is fitted with internal contacts which allow it to be fed by an impulse or latched feed. The contacts also allow for remote indication of operation.

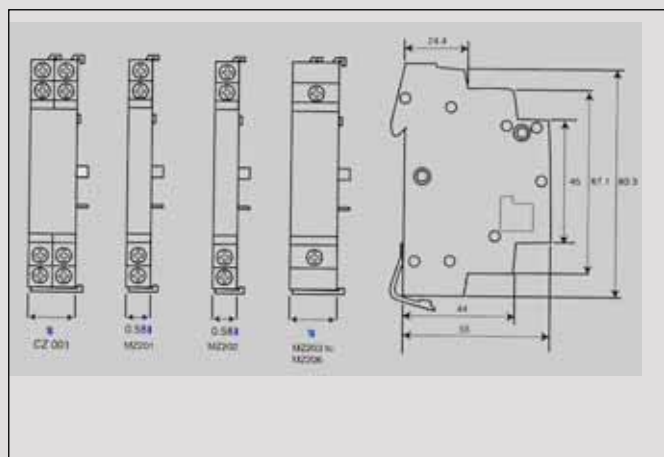
MZ 205 / MZ 206 under voltage release

Allows the MCB to trip when the voltage drops or by pressing a remote off switch (ie emergency stop).

Emergency switch - off with under voltage release



Sizes



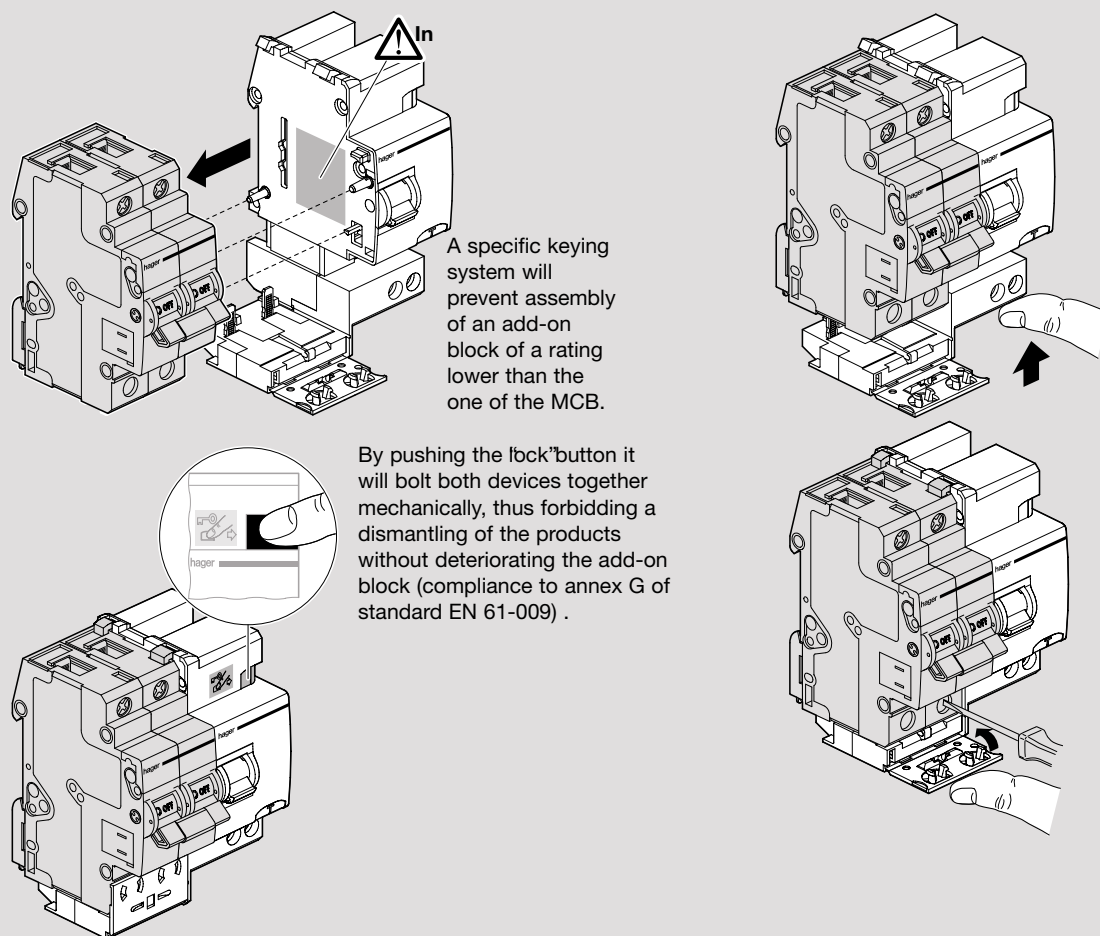
Recapitulative table

	MZ 201	MZ 202	CZ 001	MZ 203	MZ 204	MZ 205	MZ 206
	1O + 1C 230V~ 6A 440V~ 3A	1O + 1C 230V~ 6A 440V~ 3A	2X 1O + 1C 230V~ 6A 400V~ 3A				
				230 to 415V~ 110 to 130V= 50Hz	24 to 48V~ 12 to 48V= 50Hz	48V 50Hz	230V~ 50Hz

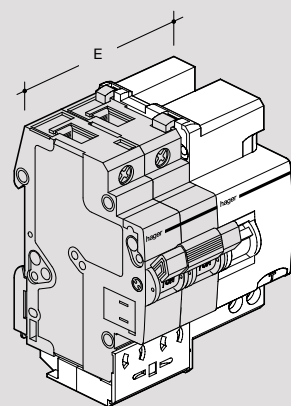
Grouping / combination of several auxiliaries

On 2,3 and 4 pole MCBs it is possible to associate 3 auxiliaries - 2 indication auxiliaries and 1 release auxiliary. In this case, it is important to first fix the indication auxiliary (MZ 201 and MZ 202) and then the release auxiliary (MZ 203/204 and MZ 205/206)

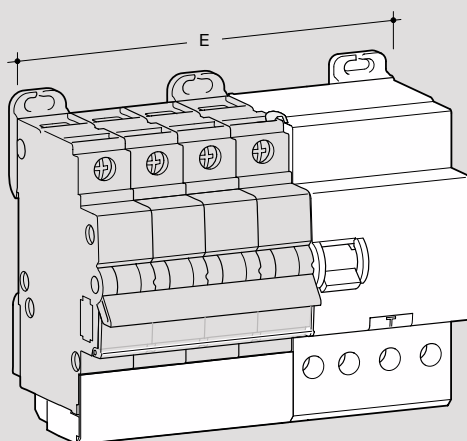
Assembly of the add-on blocks ≤ 63 A and 80-125A



Dimensions of associated MCB / add-on block



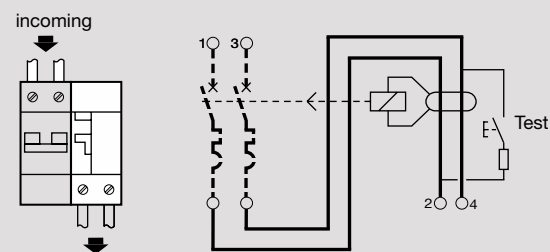
add-on blocks 25, 40, 63, 80, 100 and 125A



	E
2 P.P. 6 to 63 A	4
2 P.P. HM 80 to 125 A	9
3 P.P. 6 to 25 A	5
3 P.P. 32 to 63 A	6
3 P.P. HM 80 to 125 A	10,5
4 P.P. 6 to 25 A	6
4 P.P. 32 to 63 A	7
4 P.P. 6 to 63 A *	7
4 P.P. HM 80 to 125 A	12

* 4 pole add-on blocks two output

Wiring diagram for MCB+Add-on block from 25 to 125A



Connection capacities :

for assembled products from 6 to 25A : 6² / 10²
 for assembled products from 32 to 63 A : 10² / 25²
 for assembled products from 80 to 125A : 35² / 70²

If the supply of the add-on block is done from the bottom it should be clearly indicated.

Residual current devices

A residual current device (RCD) is the generic term for a device which monitors the current in the line conductor and the neutral conductor of a circuit in an earthed system.

The drawing opposite shows how a toroid is located around the line and neutral conductors to measure the magnetic fields created by the current flowing in these conductors. The sum of the magnetic fields set up by these currents (which takes into consideration both the magnetic and phase relationship of the currents) is detected by the toroid.

In a normal healthy circuit the vector sum of the current values added together will be zero. Current flowing to earth, due to a line earth fault, will return via the earth conductor, and regardless of load conditions will register as a fault. This current flow will give rise to a residual current (I_{res}) which will be detected by the device.

It is most important that the line and neutral conductors are passed through the toroid. A common cause of nuisance operation is the failure to connect the neutral through the device.

RCCBs work just as well on three phase or three phase and neutral circuits, but when the neutral is distributed it must pass through the toroid.

RCCB are not suitable for use on DC systems and unearthed networks.

RCCBs - domestic installation

RCCBs can be installed in two ways :

1. whole house protection
2. selective protection

Whole house protection is provided typically by a consumer unit where the RCCB device serves as the main switch. Although very popular this suffers from a disadvantage : all circuits are disconnected in the event of fault. Selective protection can be provided by associating the RCCB with identified high risk circuits by adopting one or more of the following :

Split busbar consumer unit


All circuits are fed via an overall isolator and selected circuits fed additionally via the RCCB. Typical circuits fed direct are lighting, freezer, storage heating : and circuits fed via the RCCB are socket outlets, garage circuits. This concept minimises inconvenience in the event of fault.

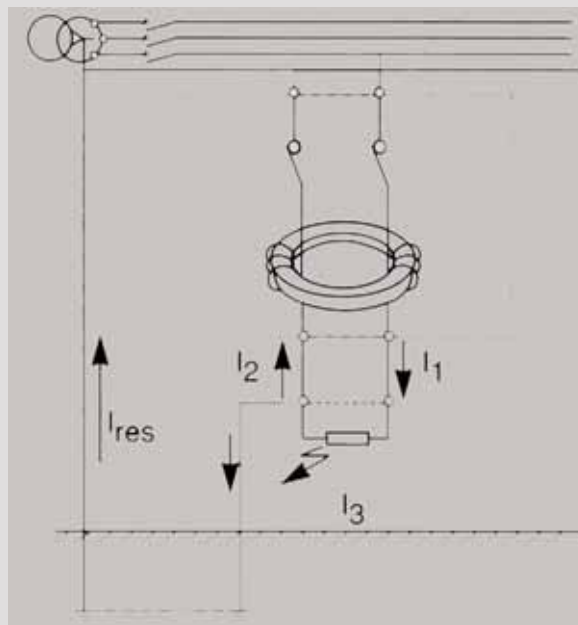
Whole ring circuit

A 30mA device adjacent to the consumer unit, which provides protection for the downstairs ring circuit, provides an easy installation with protection for all associated socket outlets. This represents the best solution for upgrading existing installations.

Nuisance tripping

All Hager RCCBs incorporate a filtering device preventing the risk of nuisance tripping due to transient voltages (lightning, line disturbances on other equipment...) and transient currents (from high capacitive circuit).

Check for the symbol : 




Pulsating DC fault current sensitive

Increasingly, semi-conductors are also extensively used in computers, VDUs, printers, plotters,... all of which may be fed from the main electrical supply. The presence of semi-conductors may result in the normal sinusoidal AC waveform being modified. For example, the waveform may be rectified or, as in asymmetric phase control devices, the waveform may be chopped. The resulting waveforms are said to have a pulsating DC component.

In the event of an earth fault occurring in equipment containing semiconductor devices, there is a probability that the earth fault current will contain a pulsating DC component.

Standard types of RCCB may not respond to this type of earth fault current and the intended degree of protection will not be provided.

Check for symbol : 

Hager provide a range of pulsating d.c. sensitive devices for this type of application.

Tripping characteristics

Type	$I_n(A)$	$I_{\Delta n}(A)$	Standard values of break time(s) and non-actuating time(s) at a residual current (I) equal to :					
			$0.5I_{\Delta n}$	$I_{\Delta n}$	$2I_{\Delta n}$	$5I_{\Delta n}$	500A	
general	any value	≤ 0.03	no trip	0.1s	0.1s	0.04s	0.04s	max. break times
		> 0.03	no trip	0.3s	0.15s	0.04s	0.04s	max. break times

Protection against shock outside the equipotential bonding zone

Bonding conductors are used in an installation to maintain metallic parts, as near as possible, to the same potential as earth. Working with portable equipment outside this equipotential bonding zone, e.g. in the car park of a factory, introduces additional shock hazards. Socket outlets rated 32A or less which may be reasonably expected to supply portable equipment for use outdoors should have at least one socket nominated for outdoor use. This socket should be equipped with RCC protection unless fed from an isolating transformer or similar device, or fed from a reduced voltage.

Protection in special situations (IEE wiring regulation)

The use of RCCBs is obligatory or recommended in the following situations :

- caravans : 30mA RCCBs should be used
- TT systems
- swimming pools : 30mA RCCB for socket outlets in zone B obligatory; recommended in zone C.
- Agricultural and horticultural : 30mA RCCB for socket outlets and for the purpose of protection against fire, RCCB $\leq 0.5A$ sensitivity.
- construction sites : 30mA RCCB recommended

Portable equipment

With the exception mentioned above, where a socket is specifically designated for work outside the equipotential bonding zone, the Wiring Regulations demand the use of RCCBs to protect the users of portable equipment. It is widely recognised that their use has made a significant contribution to safety in the workplace and the home.

Protection against fire hazards

The provisions in the Wiring Regulations for protection against shock by indirect contact ensure rapid disconnection under earth fault assuming the fault has negligible impedance. Under such conditions the fault current, as we have seen, is sufficiently great to cause the overcurrent protection device to quickly disconnect the fault. However high impedance faults can arise where the fault current is sufficient to cause considerable local heat without being high enough to cause tripping of the overcurrent protective device. The heat generated at the point of the fault may initiate a fire long before the fault has deteriorated into a low impedance connection to earth.

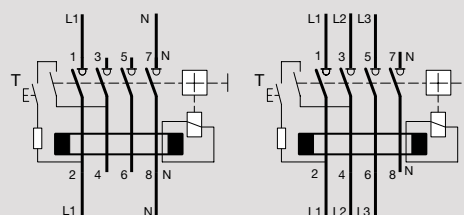
The provision of residual current protection throughout a system or in vulnerable parts of a system will greatly reduce the hazard of fire caused by such faults.

PEN conductors

The use of RCCBs on PEN conductors is prohibited. A PEN conductor is a single conductor combining the functions of neutral conductor and protective conductor. This being so, when the PEN conductor is taken through the toroid of an RCCB, earth faults will go undetected because the return path for the earth fault current is included in the residual sum.

Use of Hager RCCBs on 3 phase 3 wire systems

The Hager range of 4 pole RCCBs can be used to provide residual current protection of 3 phase, 3 wire circuits (no neutral).



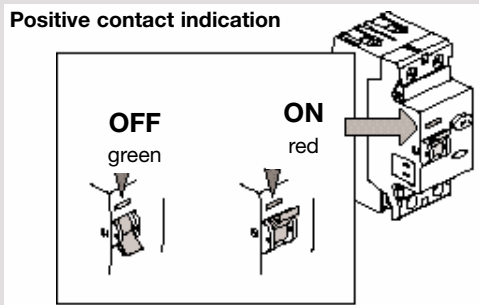
Supply entry

Top or bottom feed.

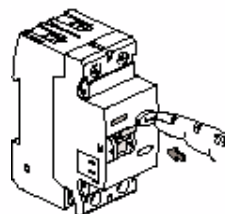
RCCBs /MCBs co-ordination

RCCBs	with MCBs				
	MY	MT/MU	NB	NC	ND
	1-63A C	2-63A B/C	6-100A B	0.5-100A C	6-63A D
2 poles					
16A	4.5kA	6kA	10kA	10kA	6kA
25A	4.5kA	6kA	10kA	10kA	6kA
40A	4.5kA	6kA	10kA	10kA	6kA
63A	4.5kA	6kA	10kA	10kA	6kA
80A	4.5kA	6kA	10kA	10kA	6kA
100A	4.5kA	6kA	10kA	10kA	6kA
4 poles					
16A	4.5kA	6kA	10kA	10kA	6kA
25A	4.5kA	6kA	10kA	10kA	6kA
40A	4.5kA	6kA	10kA	10kA	6kA
63A	4.5kA	6kA	10kA	10kA	6kA
80A	4.5kA	6kA	10kA	10kA	6kA
100A	4.5kA	6kA	10kA	10kA	6kA

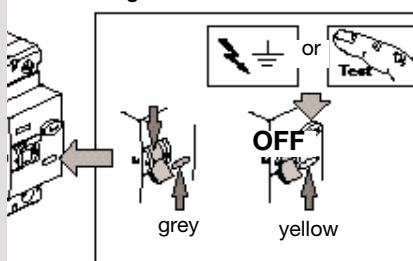
Positive contact indication



TEST : test regularly : RCCB must trip.



Earth leakage fault indication

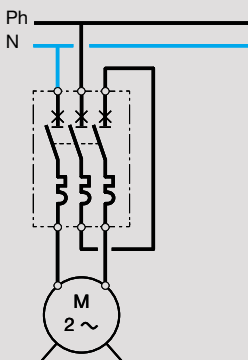


Technical specifications

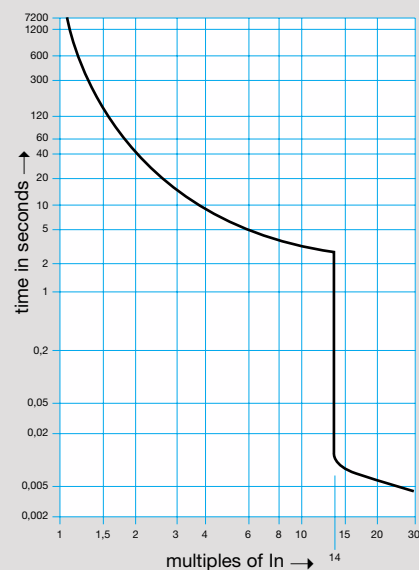
Electrical characteristics

- electrical supply : 230/400V
- ambient temperature range : 25°C to +55°C
- working life : 100 000 operations AC-3
- maximum of 40 operations/hour
- tropicalized for all climates
- connection with clamp type, terminals connection capacity :
flexible : 1□ to 4□
rigid : 1.5□ to 3□

Electrical connection single phase



Time/current characteristics



	230V	400V	230/400V + spare cartridge fuses aM/gI
MM 501N	150kA	150kA	150kA
MM 502N			
MM 503N			
MM 504N			
MM 505N			
MM 506N			
MM 507N			
MM 508N			
MM 509N			
MM 510N			
MM 511N	50kA	50kA	50kA
MM 512N			
MM 513N			

Nominal breaking capacity \geq short circuit current : fuses are not necessary, if nominal breaking capacity $<$ short circuit current : fuses must be used, breaking capacity of association is 80kA (with BS 88 fuses)

Under voltage release (no volt coil)

MZ 528N
230V~

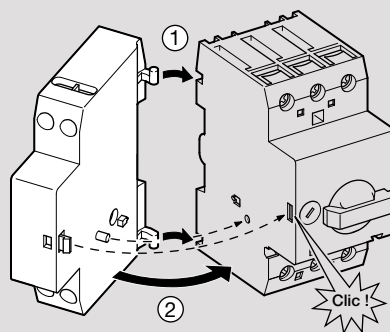
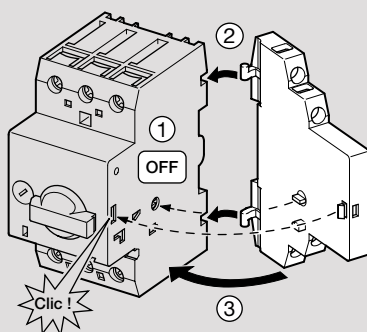
MZ 529N
400V~

Auxiliary contact (mounted inside starter)

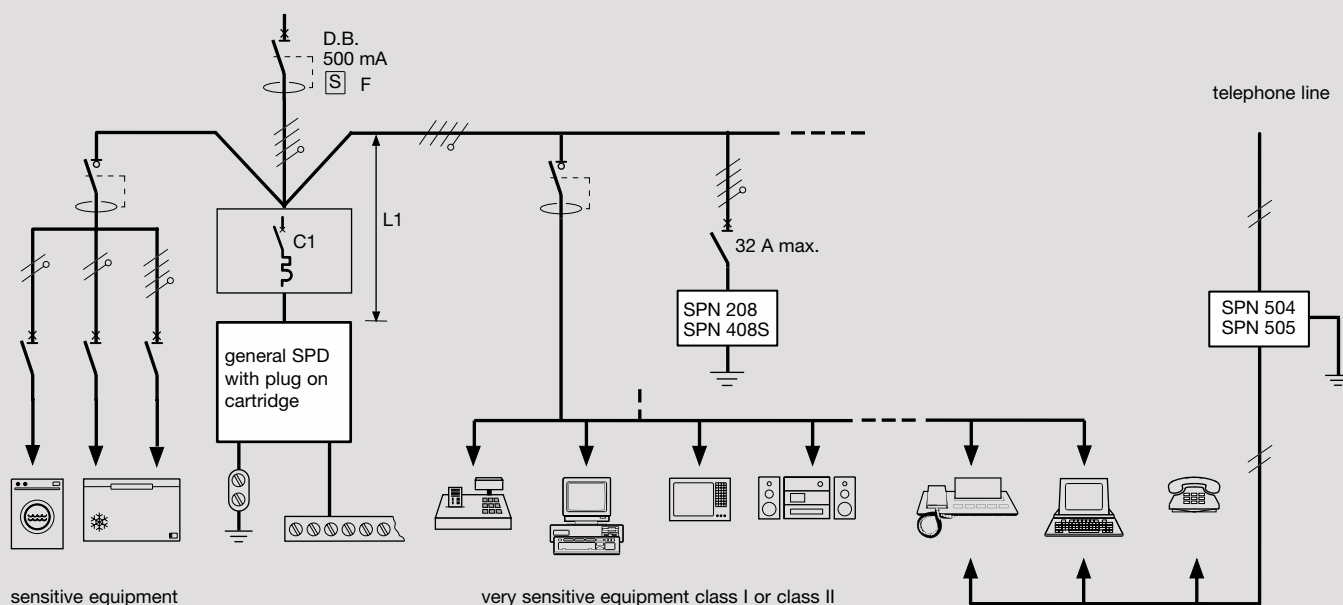
MZ 520N
2A - 400V~
3.5A - 230V~

Alarm contact (mounted inside starter)

MZ 527N
2A - 400V~
3,5A - 230V~



Installation example



Some installation rules for SPDs

- General SPD protects the whole installation by diverting the lightning current to the earth. Fitted in directly downstream the type S differential function or delayed for system TT and TN-S.
- The cable length L1 must be reduced to less than 0,5m
- The resistance of the earth connection must be weakest possible (approx. 10 Ω) and only one is requested by installation,
- SPDs SPN 208 and SPN 408S protect very sensitive devices of class I and class II.
- a cable length of at least 1m is requested between general and secondary SPD to ensure a minimum impedance in order to avoid the simultaneous bringing into conduction of both SPDs,
- SPDs SPN 504 and SPN 505 protect analog or digital telephone lines from very sensitive receivers.

N.b. : when SPD is fitted downstream of RCD, the system should preferably be selectif (with time delay) to avoid nuisance tripping.

Choice of disconnection device

The choosen device is an MCB

Selection chart for disconnection device according to the SPD type

general SPD	C1 (1)
SPN 165P SPN 265R SPN 465R	32 A curve C
SPN 140C - SPD 140D SPN 240R - SPD 240D SPN 440R - SPD 440D	32 A curve C
SPN 215R - SPD 215D SPN 415R - SPD 415D	32 A curve C

(1) The breaking capacity of MCB must be choosen according to the short circuit intensity at the head of the installation and according to the number of poles (1,2 or 4)

Distressing of SPD

Successive discharging of current due to lightning reduces progressively the performance of SPDs, with the consequence of a possible short circuit for the installation.

For this reason, all our SPDs are fitted with an automatic thermic and dynamic disconnection device

LED on front indicates the good working of the device :

- for normal version :
green = OK red = replacement
- for version with reserve indicator :
green = OK yellow = caution red = replacement
- for version with electric LED for SPDs for fine protection
green = OK LED off = replacement

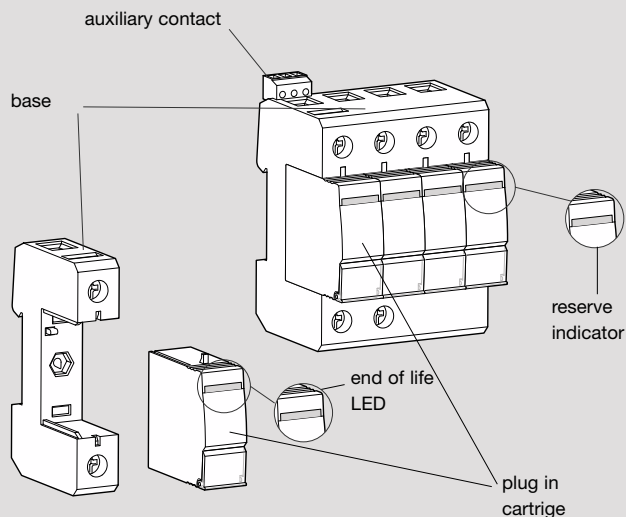
Warranty

Warranty can not be applied for SPDs as their life expectancy depends on the perturbation level absorbed to protect the electric installation.

SPDs with plug in cartridge

Presentation of 1 pole and multi pole SPDs :
available in two versions :

- base with an auxiliary contact and cartridges with reserve indicator
- base without auxiliary contact and cartridges with end of life LED



Keying system for fitting of neutral and phase cartridge

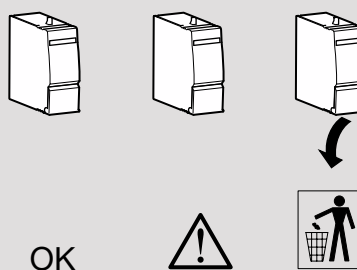
Neutral plug in cartridges can not be fitted in slots for phase cartridges and visa versa

On the front of the cartridge, a mechanical LED indicates the state of SPD

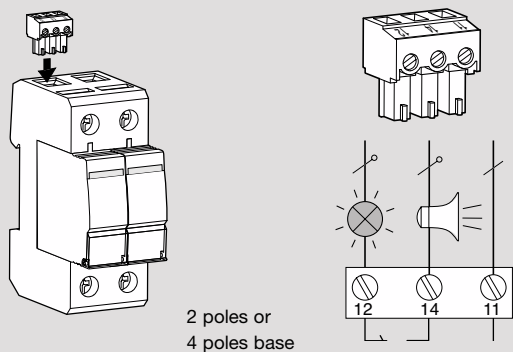
with reserve indicator



end of life LED



Auxiliary contact for signalling and remote monitoring

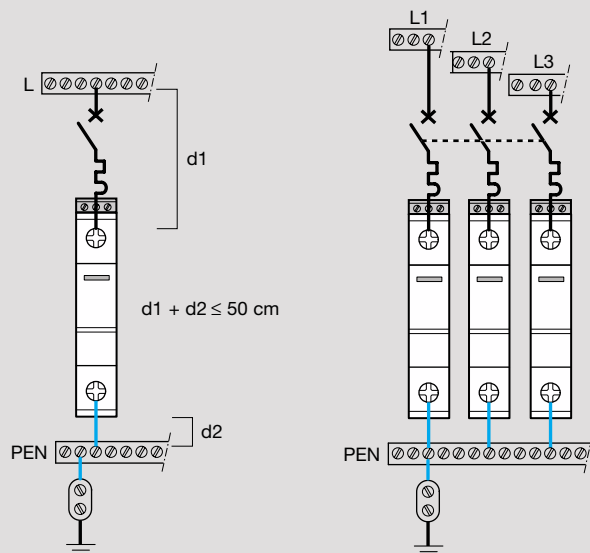


auxiliary contact connection capacity	mini	0,5 mm ²	
	maxi	1,5 mm ²	
remote signalling	voltage	230 V~	250 V ∴
	nominal current	1 A	0,1 A

Connection diagrams

Single pole SPDs : SPN1xx - SPD1xx
protection only in common mode

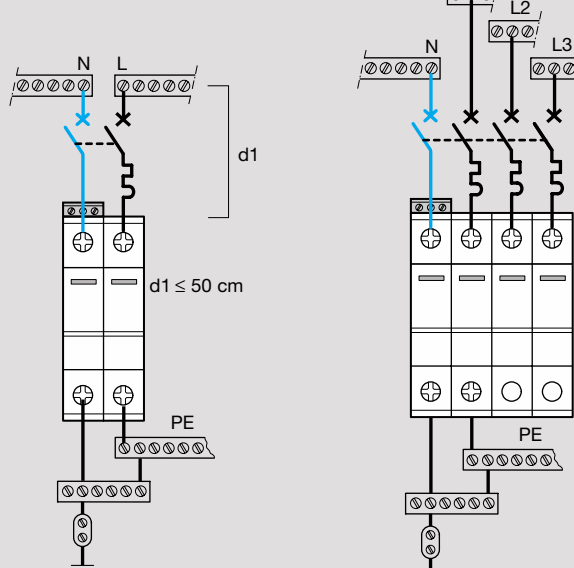
IT / TN-C



Multi pole SPDs : SPN2xx - SPN4xx - SPD2xx - SPD4xx

protection is assured in both common and differential modes without adding devices

TT / TN-S



Technical characteristics of single pole SPDs

references		SPN 140C	SPD 140D
installation exposure level (risk)		medium	medium
installation of SPDs		in parallel	in parallel
nominal voltage Un frequency		230 V~ 50/60 Hz	230 V~ 50/60 Hz
Max. continuous operating voltage Uc		440 V	275 V
voltage protection level Up		2 kV	1,2 kV
discharge current capacity 8/20 µs wave	nominal current In	15 kA	15 kA
	max. current Imax	40 kA	40 kA
degree of protection		IP 20	IP 20
short circuit resistance Icc (MCB - curve C)		20 kA - 32 A	20 kA - 32 A
temperature	working	-20 à+ 60°C	-20 à+ 60°C
	storage	-40 à+70°C	-40 à+70°C
end of live LED		yes	yes
reserve indicator + auxiliary contact		-	-
domestic building	collective/individual	yes	yes
	industrial/commercial	yes	yes
earthing systems		IT, TN-C	IT, TN-C
max. connection capacity (Ph, N, E)	flexible	25 mm ²	25 mm ²
	rigid	35 mm ²	35 mm ²
screw head		PZ2	PZ2

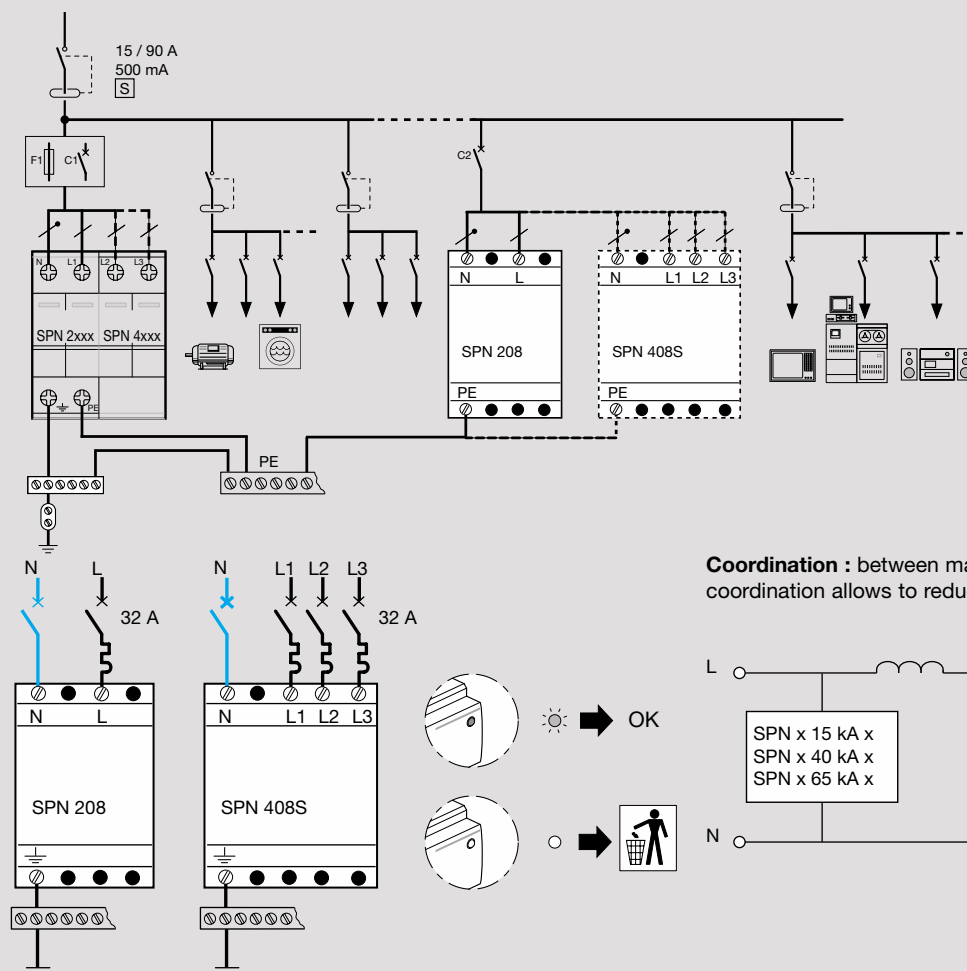
technical characteristics of multipole SPDs

references		SPN 265R-SPN 465R	SPN 240R, SPN 440R SPD 240D, SPD 440D	SPN 215R, SPN 415R SPD 215D, SPD 415D
installation exposure level (risk)		very high	medium	low
installation of SPDs		in parallel	in parallel	in parallel
nominal voltage Un frequency		230/400 V~ 50/60 Hz	230/400 V~ 50/60 Hz	230/400 V~ 50/60 Hz
Max. continuous operating voltage Uc		255 V 275 V	255 V 275 V	255 V 275 V
protection mode	common	yes	yes	yes
	differential	yes	yes	yes
voltage protection level Up		1,5 kV	1,2 kV	1,0 kV
discharge current capacity 8/20 µs wave	nominal current In	20 kA	15 kA	5 kA
	maxial current Imax	65 kA	40 kA	15 kA
degree of protection		IP 20		
short circuit resistance Icc	(MCB - curve C)	20 kA - 32 A	20 kA - 32 A	10 kA - 32 A
working temperature		-40°C à+60°C		
end of life LED		-	SPN 240D - SPN 440D	SPN 215D - SPN 415D
reserve indicator + auxiliary contact		SPN 265R - SPN 465R	SPN 240R - SPN 440R	SPN 215R - SPN 415R
domestic buildings	collective / individual	yes		
	industrial / commercial	yes		
earthing systems		TT TN - S	TT TN - S	TT TN - S
connection capacity (Ph, N, E)	flexible	25 mm ²		
	rigid	35 mm ²		
screw head		PZ2		

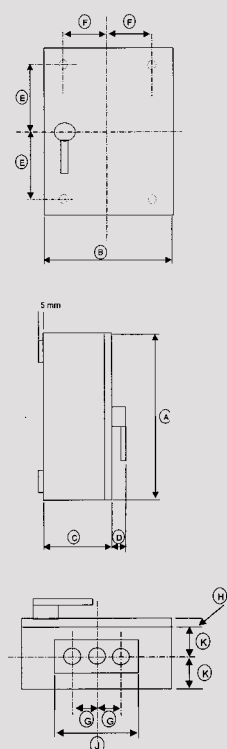
Technical characteristics of secondary SPDs (fine protection)

references		SPN 208	SPN 408S
installation exposure level (risk)		low	low
installation of SPDs		in parallel	in parallel
nominal voltage U_n		230 V~	230/400 V~
frequency		50/60 Hz	50/60 Hz
Max. continuous operating voltage U_c	between N / PE between Phase and Neutral	255 V 255 V	255 V 255 V
protection mode	common differential	yes yes	yes yes
voltage protection level U_p		1,5 kV	1,0 kV
discharge current capacity 8/20 μ s wave	nominal current I_n maximal current I_{max}	2 kA 8 kA	2 kA 8 kA
degree of protection		IP 20	IP 20
short circuit resistance I_{cc} (with fuse or associated MCB)		6 kA - 16 A	6 kA - 32 A
temperature	working storage	-25°C à +40°C -25°C à +60°C	-25°C à +40°C -25°C à +40°C
well functioning indicator		green LED	green LED
domestic buildings	collective / individual industrial / commercial	yes yes	yes yes
earthing systems		TT, IT, TN - S	TT, IT, TN - S
connection capacity (Ph, N, E)	flexible min./max. rigid min./max.	2,5/6 mm ² 6/10 mm ²	2,5/6 mm ² 6/10 mm ²
screw head		PZ1	

SPDs SPN 208S and SPN 408S



Enclosed fuse combination switch



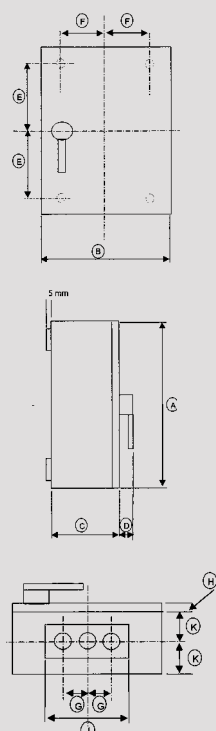
Dimensions:

1P + Switched Neutral	A	B	C	D	E	F	G	H	J	K	BS88 Fuse Size
JG02FC	350	300	130	60	135	110	65	15	292	107	A1
JG04FC	350	300	130	60	135	110	65	15	292	107	A2 - A3
JG06FC	350	300	130	60	135	110	65	15	292	107	A4

3P + N 4P

3P + N	4P	A	B	C	D	E	F	G	H	J	K	BS88 Fuse Size
JG09FC	JG10FC	350	300	130	60	135	110	65	15	292	107	A1
JG11FC	JG12FC	350	300	130	60	135	110	65	15	292	107	A2 - A3
JG17FC	JG18FC	350	300	130	60	135	110	65	15	292	107	A4
JG23FC	JG24FC	450	380	200	60	165	130	70	15	372	177	B1 - B2
JG26FC	JG27FC	450	380	200	60	165	130	70	15	372	177	B1 - B2
JG30FC	JG31FC	500	450	250	60	190	165	-	15	442	227	B1 - B3
JG32FC	JG33FC	500	450	250	60	190	165	-	15	442	227	B1 - B4
JG36FC	JG37FC	700	600	350	91	250	200	-	15	592	327	C1 - C2

Enclosed Load Break

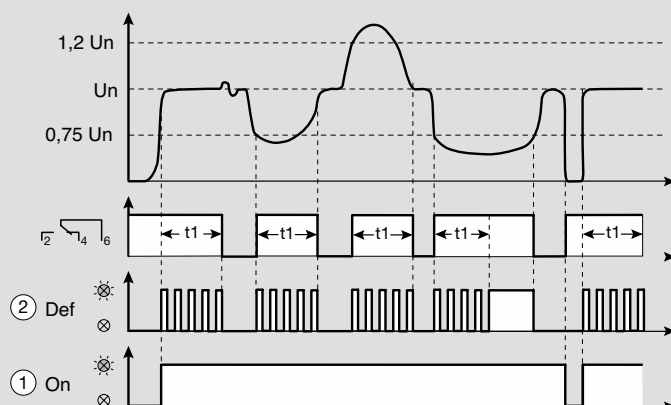
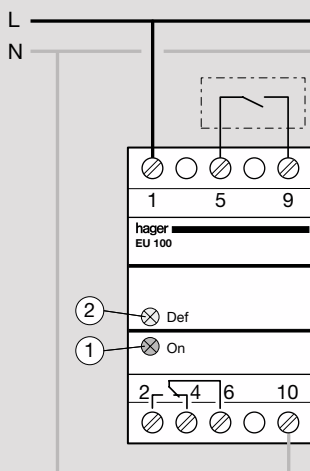


Dimensions:

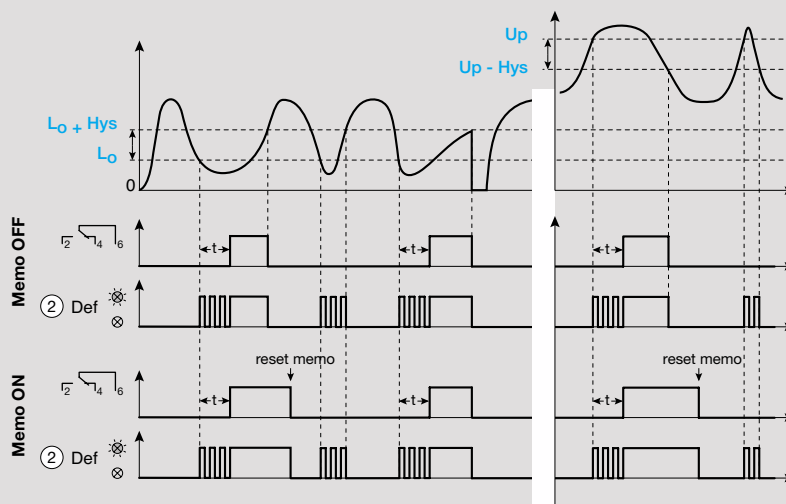
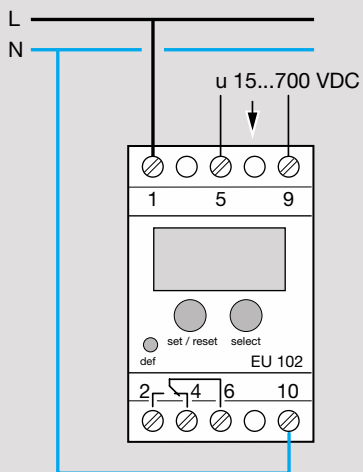
3P + N	4P	A	B	C	D	E	F	G	H	J	K
JG07SC	JG08SC	200	150	100	60	55	35	36	15	142	78
JG09SC	JG10SC	200	150	100	60	55	35	36	15	142	78
JG11SC	JG12SC	200	150	100	60	55	35	36	15	142	78
JG17SC	JG18SC	300	250	130	60	95	85	70	15	242	108
JG23SC	JG24SC	300	250	130	60	95	85	70	15	242	108
JG26SC	JG27SC	400	300	200	60	140	110	-	15	292	118
JG28SC	JG29SC	400	300	200	60	140	110	-	15	292	118
JG30SC	JG31SC	600	400	250	60	250	160	-	15	392	228
JG32SC	JG33SC	600	400	250	60	250	160	-	15	392	228
JG36SC	JG37SC	600	450	250	70	225	165	-	15	442	228

References	EU 100	EU 101	EU 301	EU 302	EU 300	EU 102	EU 103
Function	single phase compressor control relay	single phase compressor control relay	three phase compressor control relay	three phase voltage control relay	phase control relay	voltage control relay with LCD	current control relay with LCD
LCD indicator	No					measured votlage	measured current
Power supply	230 V AC +10% -15% 50/60Hz +/-2%		230 V AC +10% -15% 50/60Hz +/-2%			230 V AC +10% -15% 50/60Hz +/-2%	
Power consumption	< 5 VA						
Output contact	8A - AC1 - 250V closed : normal status opened : default status						
Disconnection time	5min / 10min			-			
Response time	200 ms			0,1..12s set via potentiometer	200 ms	200 ms	
Monitoring function	Monitoring function over/under voltage				Monitor. funct. under voltage loss of phase	over voltage under voltage band	over current under current band
Monitoring levels	Umin : 0.75Un Umax : 1.2Un	Umin/Umax : +/-5% to +/-20%Un set via potentiometer		Umin : +/-5 to +/-20% Un Umax : 1.15Un	Asymmetry +/-5% to +/-20% Umin : 0.70Un	DC : 15V to 700V AC : 15V rms to 480V rms	DC : 0.1 to 10A AC : direct : 0.1to10A or via current transformer : X/5
Hysteresis						5 to 50%	
Latching function	No			Yes	No	Yes	
Supervised voltage	the power supply						
Width	2 modules					2 modules	
LED power supply : green	lights when powered						
LED default information : red	lights in case of fault, flashing during time elapses, off during normal status						
LED asymmetry information : yellow					asymetry fault		
Ik	3						
IP rating	IP 20						
Working temperature	-20 to +55°C						
Storage temperature	-40 to +70°C						
Connexion flexible rigid	0.75 to 4mm² 1 to 6 mm²						

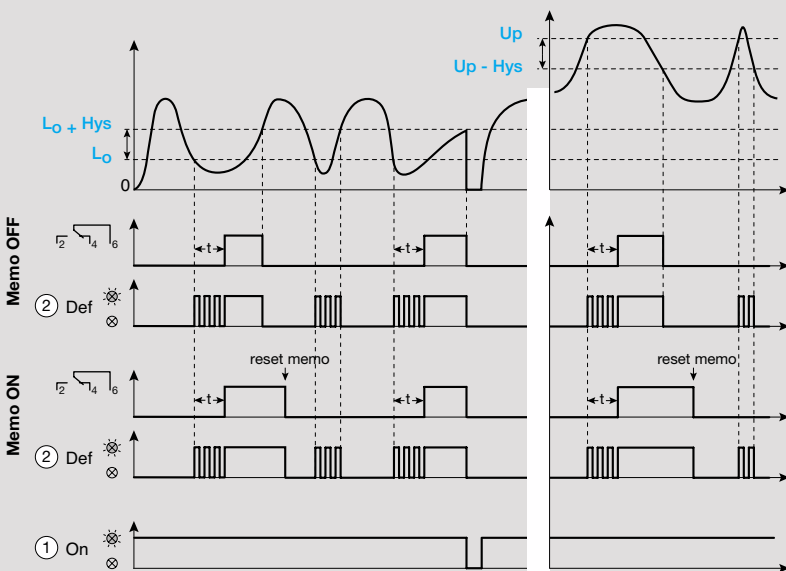
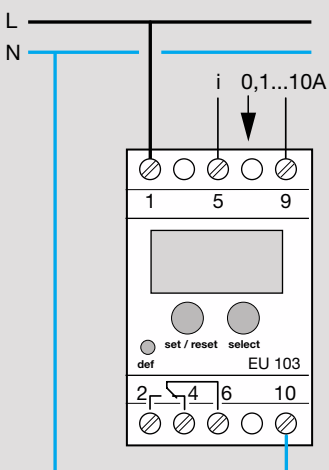
Air conditioning control relay single phase EU 100



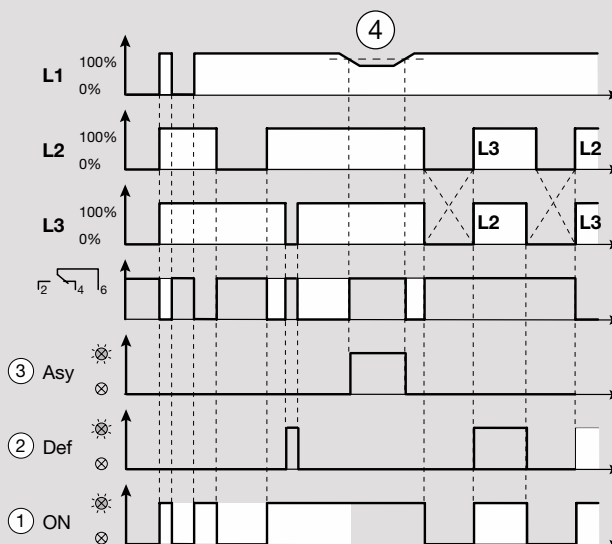
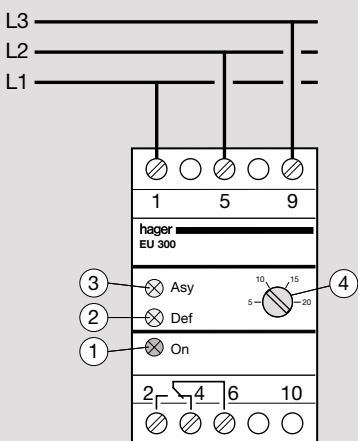
Voltage control relay single phase EU 102



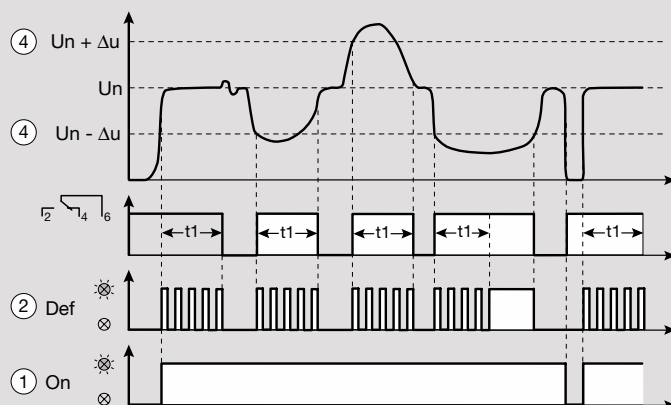
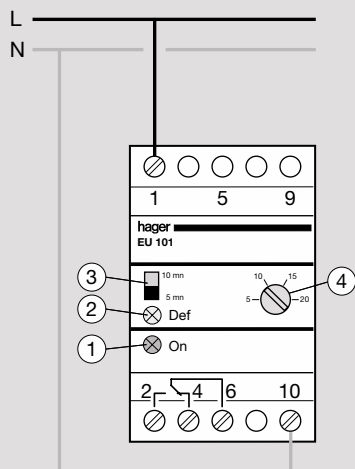
Current control relay single phase EU 103



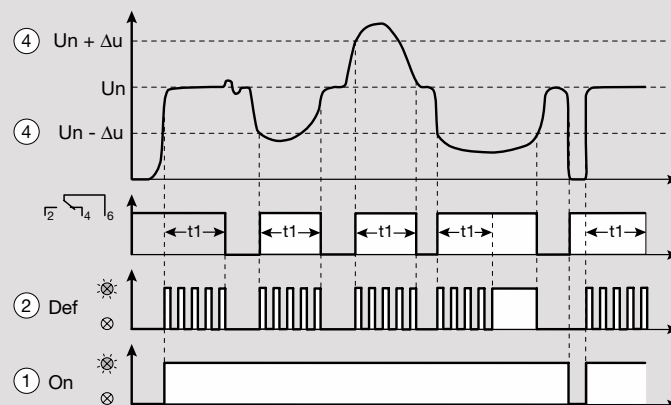
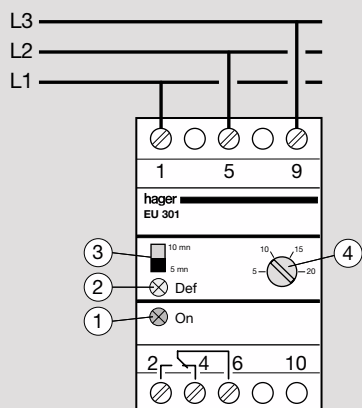
Phase control relay EU 300



Air conditioning control relay single phase EU 101



Air conditioning control relay three phase EU 301



Voltage control relay three phase EU 302

