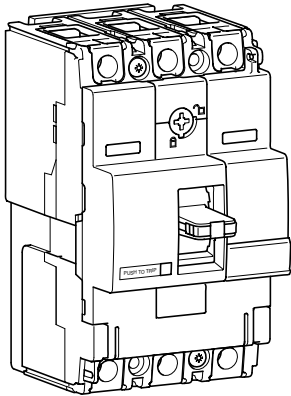


| Frame  | x160           |                    |                                |     | x250                       |   |      |
|--|----------------|--------------------|--------------------------------|-----|----------------------------|---|------|
| Product  | MCS Switch     | MCCB               |                                |     | MCS Switch                 | MCCB  |      |
| Reference  | HCA            | HDA                | HHA                            | HNA | HCB                        | HHB   | HNB  |
| Number of poles  | [No.] 3-4      | 1-2-3-4            | 1-2-3-4                        | 3-4 | 3-4                        |   |      |
| <b>Electrical characteristics</b>                            |                |                    |                                |     |                            |   |      |
| Rated current  | $I_n$ [A]      | 160                |                                |     | 250                        |   |      |
| Current rated range  | [A]            | 125-160            | 16-125 (1P), 16-160 (2, 3, 4P) |     | 250                        | 100-250   |      |
| Rated service voltage, (AC)                                  | $U_e$ [V]      | 220-440            |                                |     | 220-440                    |   |      |
| Frequency  | F [Hz]         | 50/60              |                                |     | 50/60                      |   |      |
| Rated insulation voltage                                     | $U_i$ [V]      | 690                |                                |     | 800                        |   |      |
| Rated impulse withstand voltage                              | $U_{imp}$ [kV] | 8                  |                                |     | 8                          |   |      |
| Rated ultimate short-circuit breaking capacity, ( $I_{cu}$ ) |                |                    |                                |     |                            |   |      |
| (AC) 50-60 Hz 220/230 V                                      | $I_{cu}$ [kA]  | -                  | 25                             | 35  | 85                         | -   | 35   |
| (AC) 50-60 Hz 380/415 V                                      | $I_{cu}$ [kA]  | -                  | 18                             | 25  | 40                         | -   | 25   |
| (AC) 50-60 Hz 480/500/525 V                                  | $I_{cu}$ [kA]  | -                  | 6                              | 7.5 | 12.5                       | -   | -    |
| (AC) 50-60 Hz 660/690 V                                      | $I_{cu}$ [kA]  | -                  | -                              | -   | 6                          | -   | -    |
| (DC) 250 V - 2 poles in series                               | $I_{cu}$ [kA]  | -                  | 12.5                           | 20  | 25                         | -   | 25   |
| Rated service short-circuit breaking capacity, ( $I_{cs}$ )  |                |                    |                                |     |                            |   |      |
| (AC) 50-60 Hz 220/230 V                                      | $I_{cs}$ [kA]  | -                  | 25                             | 25  | 40                         | -   | 25   |
| (AC) 50-60 Hz 380/415 V                                      | $I_{cs}$ [kA]  | -                  | 18                             | 20  | 20                         | -   | 20   |
| (AC) 50-60 Hz 480/500/525 V                                  | $I_{cs}$ [kA]  | -                  | 3                              | 4   | 7.5                        | -   | -    |
| (AC) 50-60 Hz 660/690 V                                      | $I_{cs}$ [kA]  | -                  | -                              | -   | 3                          | -   | -    |
| (DC) 250 V - 2 poles in series                               | $I_{cs}$ [kA]  | -                  | 7                              | 10  | 13                         | -   | 13   |
| Rated short-circuit making capacity                          | $I_{cm}$ [kA]  | 2.8                | -                              | -   | -                          | 6   | -    |
| Rated short-time withstand current for 1s                    | $I_{cw}$ [kA]  | 2                  | -                              | -   | -                          | 3   | -    |
| Category of use (EN 60947-2)                                 |                | -                  | A                              |     |                            | -   | A    |
| Calibration temperature                                      |                | -                  | 50°C                           |     |                            | -   | 50°C |
| Derating 40°C  |                | -                  | 100%                           |     |                            | -   | 100% |
|  | 50°C           | -                  | 100%                           |     |                            | -   | 100% |
|  | 55°C           | -                  | 95%                            |     |                            | -   | 94%  |
|  | 60°C           | -                  | 93%                            |     |                            | -   | 91%  |
|  | 65°C           | -                  | 90%                            |     |                            | -   | 88%  |
| Suitability for isolation                                    |                | ok                 |                                |     |                            | ok  |      |
| Electric endurance in number of cycles                       |                | 10000              |                                |     |                            | 10000   |      |
| Mechanical endurance in number of operations                 |                | 20000              |                                |     |                            | 20000   |      |
| Operating temperature  |                | -25 to +70°C       |                                |     | -25 to +70°C               |   |      |
| Storage temperature  |                | -35 to +70°C       |                                |     | -35 to +70°C               |   |      |
| Power loss (at $I_n$ for 3P)                                 | [W]            | 39                 |                                |     |                            | 60  |      |
| Reference standard   |                | IEC 60947-3        | IEC 60947-2                    |     | IEC 60947-3                | IEC 60947-2                                       |      |
| Releases: switch   |                | ok                 | -                              |     | ok                         | -   |      |
| Releases: TM (thermomagnetic)                                |                | -                  | ok                             |     | -                          | ok  |      |
| T fixed, M fixed   |                | -                  | ok (1P)                        |     | -                          | ok  |      |
| T adjustable, M fixed  |                | -                  | ok                             |     | -                          | -   |      |
| T adjustable, M adjustable                                   |                | -                  | -                              |     | -                          | ok  |      |
| Thermal adjustment value                                     |                | -                  | 0.63 to 1 x $I_n$              |     | -                          | 0.63 to 1 x $I_n$                                 |      |
| Magnetic adjustment value                                    |                | -                  | -                              |     | -                          | 6-8-10-13 x $I_n$ (200A)<br>5-7-9-11 $I_n$ (250A) |      |
| Releases: LSI (electronic)                                   |                | -                  | -                              |     | -                          | -   |      |
| Long delay   |                | -                  | -                              |     | -                          | -   |      |
| Short delay  |                | -                  | -                              |     | -                          | -   |      |
| Time delay   |                | -                  | -                              |     | -                          | -   |      |
| <b>Terminations</b>  |                |                    |                                |     |                            |   |      |
| Standard terminal type                                       |                | cage               |                                |     | lugs                       |   |      |
| Maximum terminal capacity                                    |                | 95 mm <sup>2</sup> |                                |     | 185 mm <sup>2</sup> (cage) |   |      |
| Terminal width   | mm             | -                  |                                |     | 25                         |   |      |
| Terminal shields   |                | ok                 |                                |     | ok                         |   |      |
| Cage terminal  |                | integrated         |                                |     | ok                         |   |      |
| Extended connections   |                | ok                 |                                |     | ok                         |   |      |
| Rear connections   |                | no                 |                                |     | ok                         |   |      |
| <b>Dimensions</b>  |                |                    |                                |     |                            |   |      |
| Height   | mm             | 130                |                                |     | 165                        |   |      |
| Width  | 1P mm          | -                  | 25                             | -   | -                          | -   | -    |
|  | 2P mm          | -                  | 50                             | -   | -                          | -   | -    |
|  | 3P mm          | 75                 |                                |     | 105                        |   |      |
|  | 4P mm          | 100                |                                |     | 140                        |   |      |
| Depth  | mm             | 68                 |                                |     | 68                         |   |      |
| Weight   | 1P kg          | -                  | 0.29                           | -   | -                          | -   | -    |
|  | 2P kg          | -                  | 0.48                           | -   | -                          | -   | -    |
|  | 3P kg          | 0.715              |                                |     | 1.3                        |   |      |
|  | 4P kg          | 0.95               |                                |     | 1.6                        |   |      |

| Product<br>Frame  | Add-on blocks      |            |                                |                                |
|---|--------------------|------------|--------------------------------|--------------------------------|
|   | x160               | x160       | x250                           |                                |
| Number of poles   | 3, 4               | 3, 4       | 4                              |                                |
| Tripping Access   | mechanical         | mechanical | mechanical                     |                                |
| Standards CEI/EN 60947-2 appendix B                         | ✓                  | ✓          | ✓                              |                                |
| <b>Electrical Characteristics</b>                           |                    |            |                                |                                |
| Max rated current (40) $I_n$ A                              | $I_n$              | 125A       | 125 - 160A                     | 160 - 250A                     |
| Rated service voltage $U_e$ V AC (50/60Hz)                  | $U_e$              | 240 - 415V | 240 - 415V                     | 240 - 415V                     |
| <b>Mechanical Characteristics</b>                           |                    |            |                                |                                |
| Top and bottom supply                                       |                    | ✓          | ✓                              | ✓                              |
| For tripping, no additional external electrical sources     |                    | ✓          | ✓                              | ✓                              |
| Possible operating with two active phases                   |                    | ✓          | ✓                              | ✓                              |
| <b>Settings</b>   |                    |            |                                |                                |
| Sensitivity $I_{\Delta n}$                                  | $I_{\Delta n}$ (A) | 300mA      | 0.03, 0.1, 0.3, 1, 3, 6A       | 0.03, 0.1, 0.3, 1, 3, 6A       |
| Time delay $\Delta t$                                       | $\Delta t$ (s)     | inst.      | inst., 0.06, 0.15, 0.3, 0.5, 1 | inst., 0.06, 0.15, 0.3, 0.5, 1 |
| Max. opening time   | ms                 | 10         | 10                             | 10                             |
| Delay add-on block is not possible if $I_{\Delta n} = 30mA$ |                    | -          | ✓                              | ✓                              |
| Selective product   |                    | -          | ✓                              | ✓                              |
| Mechanical test button                                      |                    | ✓          | ✓                              | ✓                              |
| Isolating test without cable removal                        |                    | ✓          | ✓                              | ✓                              |
| Electrical test button                                      |                    | ✓          | ✓                              | ✓                              |
| Reset button  |                    | ✓          | ✓                              | ✓                              |
| Sealable setting button                                     |                    | -          | ✓                              | ✓                              |
| Isolation level signaling by led 25 and 50%                 |                    | -          | ✓                              | ✓                              |
| $I_n$ running signalisation by led                          |                    | -          | ✓                              | ✓                              |
| Residual default signaling contact                          |                    | ✓          | ✓                              | ✓                              |
| Signaling contact 50% $I_{dn}$                              |                    | -          | ✓                              | ✓                              |
| Anti-transient  | type AC            | ✓          | ✓                              | ✓                              |
| Pulsating DC current  | type A             | ✓          | ✓                              | ✓                              |
| High immunity   | type HI            | ✓          | ✓                              | ✓                              |
| -25°C   |                    | ✓          | ✓                              | ✓                              |
| <b>Accessories and connection</b>                           |                    |            |                                |                                |
| Steel terminal cage (x3/x4)                                 |                    | ✓          | ✓                              | accessories                    |
| Connection by lugs  |                    | -          | -                              | ✓                              |
| Extended connections (x4)                                   |                    | ✓          | ✓                              | ✓                              |
| Spreaders (x4)  |                    | ✓          | ✓                              | ✓                              |
| Terminal covers (3P/4P)                                     |                    | -          | -                              | ✓                              |
| Interphase barriers (x3)                                    |                    | ✓          | ✓                              | ✓                              |
| Rigid cables connection capacity mm <sup>2</sup>            |                    | 4 - 95     | 4 - 95                         | 35 - 185                       |
| Flexible cables connection capacity mm <sup>2</sup>         | (with terminal)    | 4 - 70     | 4 - 70                         | 35 - 150                       |
| Tightening torque Nm  |                    | 6          | 6                              | 12                             |
| Copper bar (width) in mm                                    |                    | -          | -                              | 25                             |
| <b>Mounting</b>   |                    |            |                                |                                |
| Clips on DIN rail   |                    | ✓          | ✓                              | -                              |
| Fixed on mounting plate                                     |                    | -          | -                              | ✓                              |
| Fixation type   |                    | side       | side                           | bottom                         |
| Mounting by customer  |                    | ✓          | ✓                              | ✓                              |
| <b>Dimensions and weight</b>                                |                    |            |                                |                                |
| Dimensions (WxHxD) in mm<br>Side mounted 4P                 | W                  | 100        | 100                            | 140                            |
|   | H                  | 165        | 165                            | 107.5                          |
|   | D                  | 95         | 95                             | 85                             |
| Weight  | 3P                 | 1.4        | 1.4                            | -                              |
|   | 4P                 | 1.55       | 1.55                           | 1.2                            |

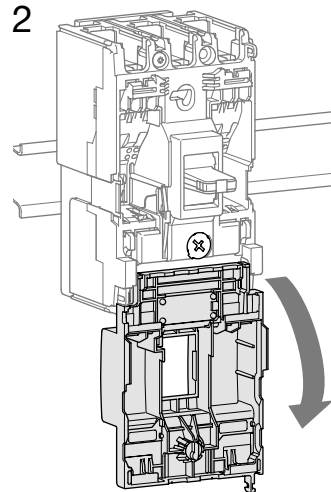
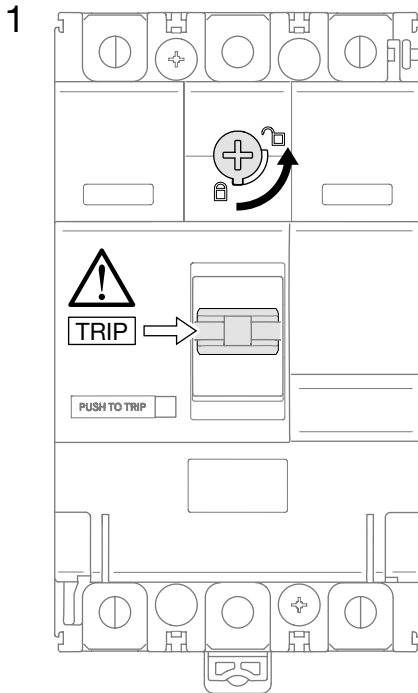
MCCBs



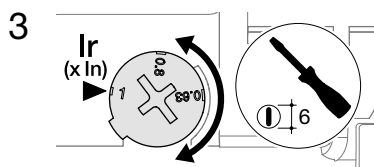
|            |          | 220/240V AC<br>IEC 60 947-2 | 380/415V AC<br>IEC 60 947-2 |
|------------|----------|-----------------------------|-----------------------------|
| <b>HDA</b> | $I_{cu}$ | 25 kA                       | 18 kA                       |
|            | $I_{cs}$ | 25 kA                       | 18 kA                       |
| <b>HHA</b> | $I_{cu}$ | 35 kA                       | 25 kA                       |
|            | $I_{cs}$ | 25 kA                       | 20 kA                       |
| <b>HCA</b> | $I_{cm}$ | -                           | 2.8 kA                      |
|            | $I_{cw}$ | -                           | 2 kA - 1s                   |

Commercial  
Distribution

Thermal settings



For DIN rail mounting, use **HYA033H**.



Thermal adjustment from 0.63 to  $1 \times I_n$

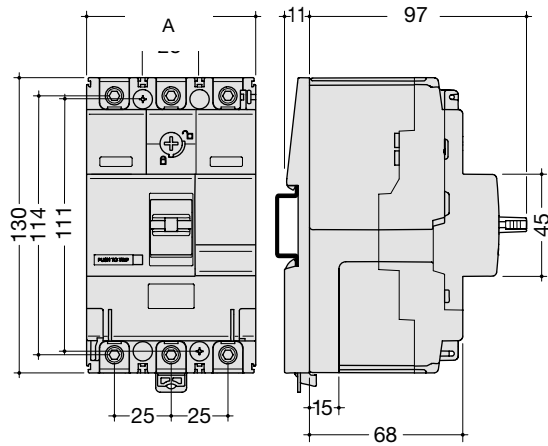
Magnetic adjustment fixed  $> 10 \times I_n$

| $I_n$     | 16 - 50 A | 63 - 80 A | 100 - 125 A | 160 A  |
|-----------|-----------|-----------|-------------|--------|
| $I_{mag}$ | 600 A     | 1000 A    | 1500 A      | 1600 A |

Dimensions

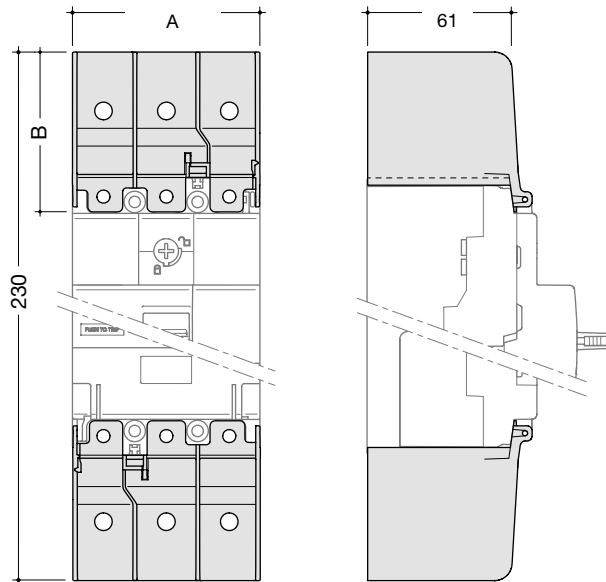
MCCB x160

Commercial  
Distribution



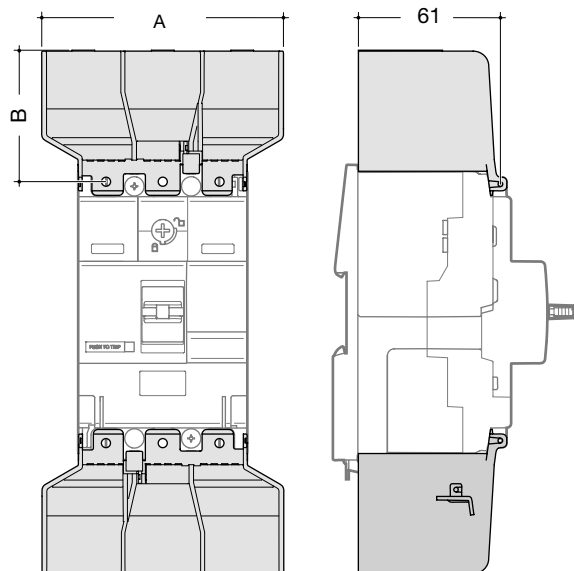
|    | A (mm) |
|----|--------|
| 1P | 24.8   |
| 3P | 74.5   |
| 4P | 99.5   |

Terminal covers for extended straight connections



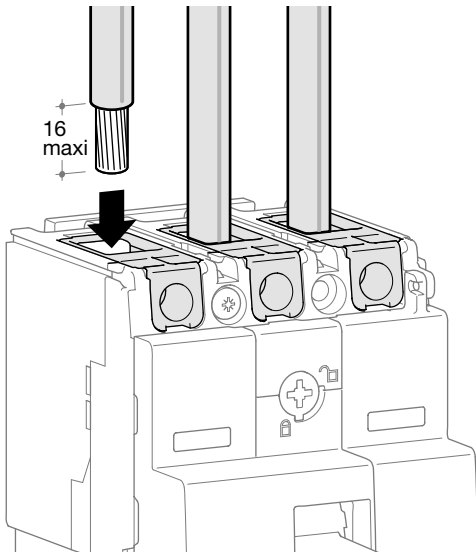
|    | A (mm) |
|----|--------|
| 1P | 24.4   |
| 3P | 74.5   |
| 4P | 99.5   |

Terminal cover for extended spreader connections






|    | A (mm) |
|----|--------|
| 3P | 106.5  |
| 4P | 141.5  |



Connection with terminals



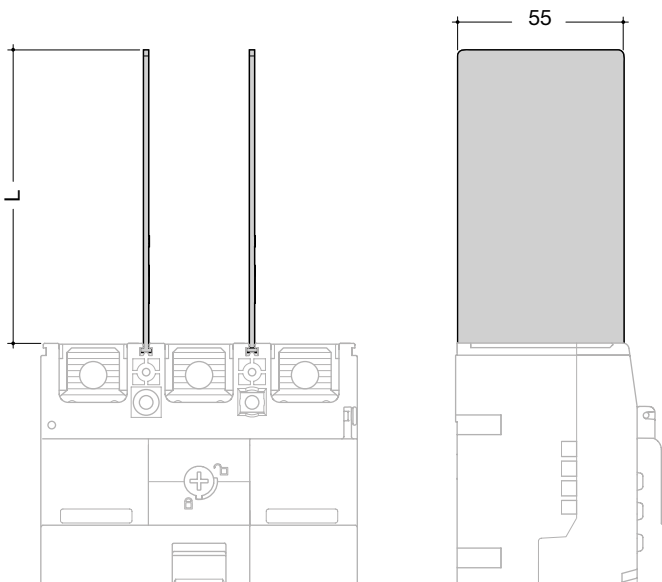
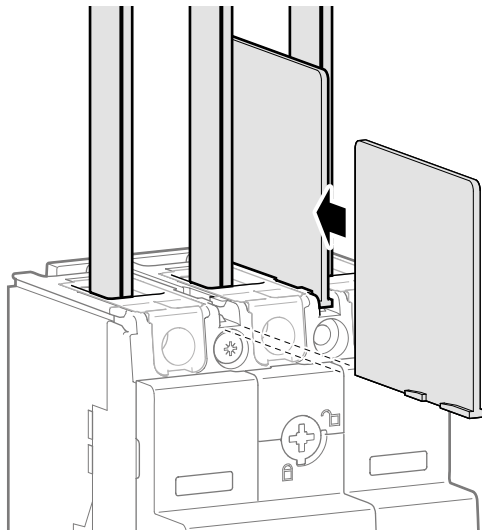
Terminals for copper conductors (standard)

|   |                        |                         |
|---|------------------------|-------------------------|
|  | min. 6 mm <sup>2</sup> | max. 70 mm <sup>2</sup> |
|  | min. 6 mm <sup>2</sup> | max. 95 mm <sup>2</sup> |
|  | 6 Nm                   |                         |

Terminals for aluminium / copper conductors (accessory)  
**HYA005H, HYA006H**

|   |                         |                         |
|---|-------------------------|-------------------------|
|  | min. 35 mm <sup>2</sup> | max. 70 mm <sup>2</sup> |
|  | 10 Nm                   |                         |

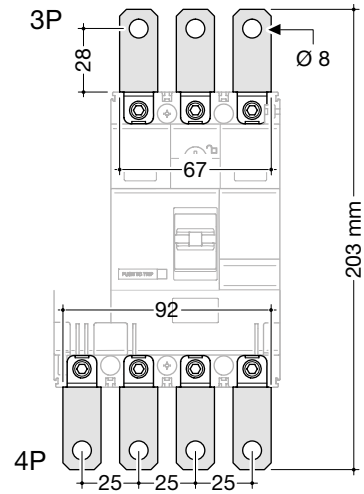
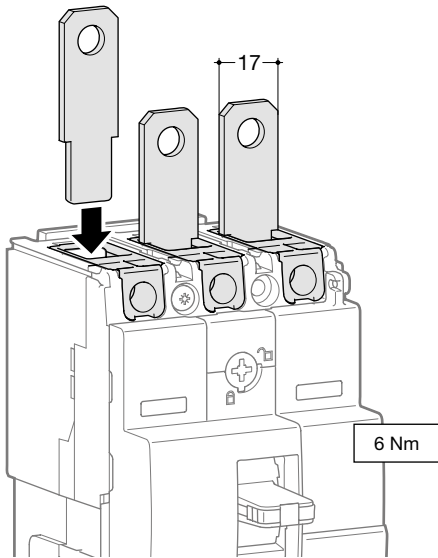
Interphase barriers



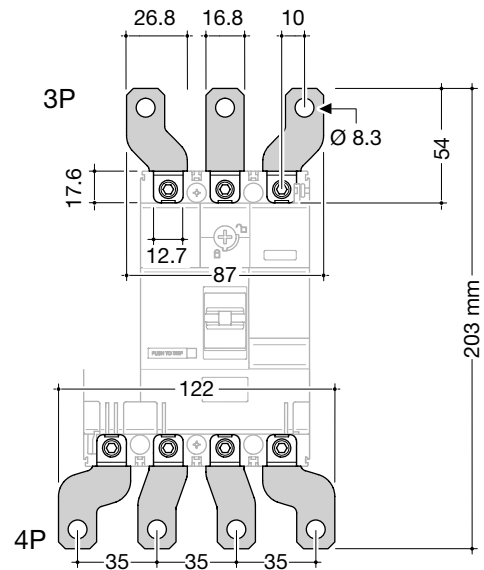
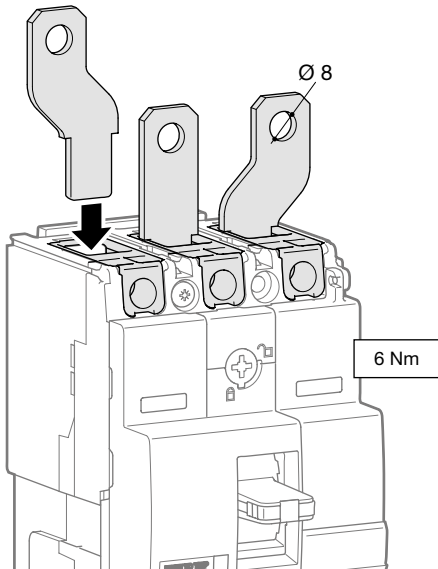
|                | L (mm) |
|----------------|--------|
| <b>HYA019H</b> | 50     |
| <b>HYB019H</b> | 97     |

Extended straight connections

Commercial  
Distribution

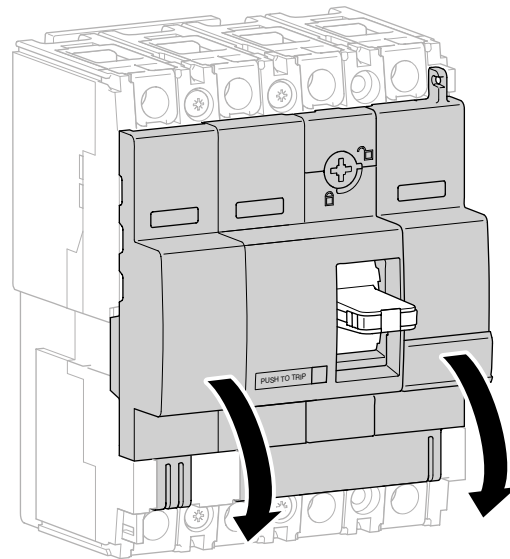
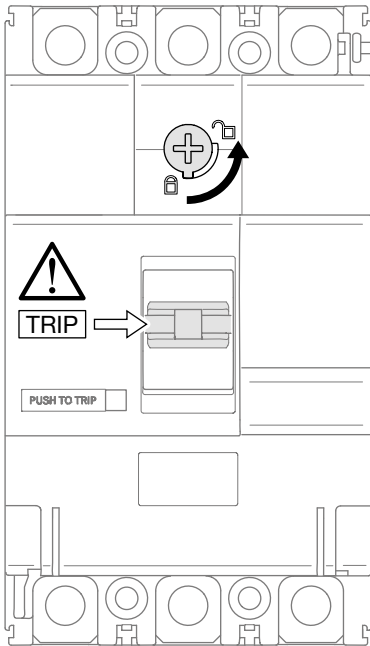


Extended spreader connections



Auxiliaries

Auxiliaries for MCCBs and moulded case switches

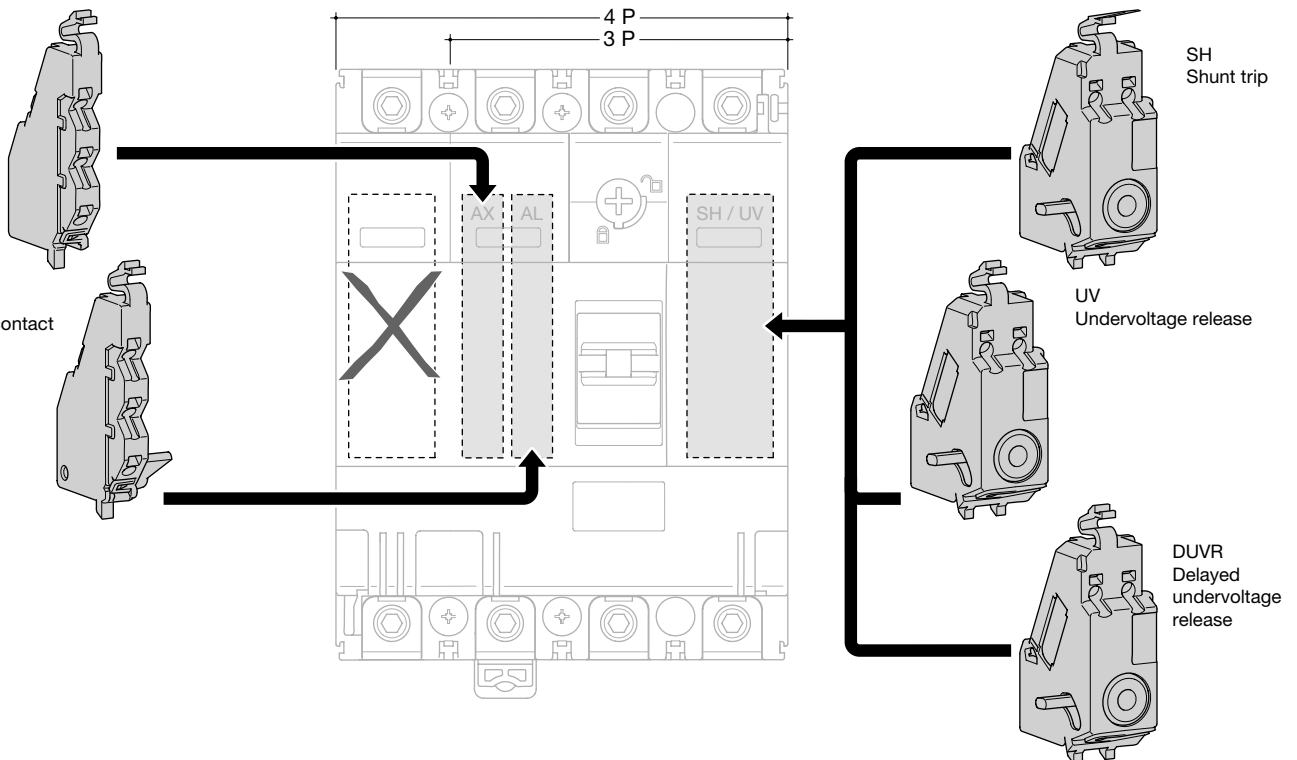


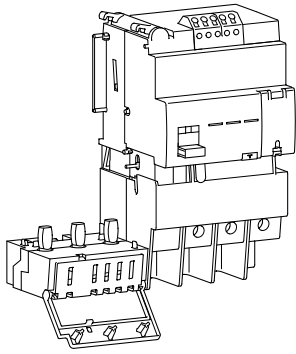
Commercial  
Distribution

Mounting combination for auxiliaries and releases

AX  
Auxiliary contact

AL  
Alarm contact





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

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

### Characteristics

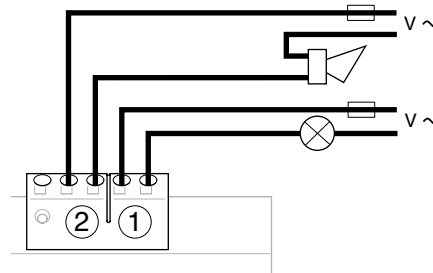
**Reset button :**  
Signals add-on block tripping and must be reset before switching on the installation.

**Test button for RCD function :**  
Checks the electrical operating of the MCCB / Add-on block association.

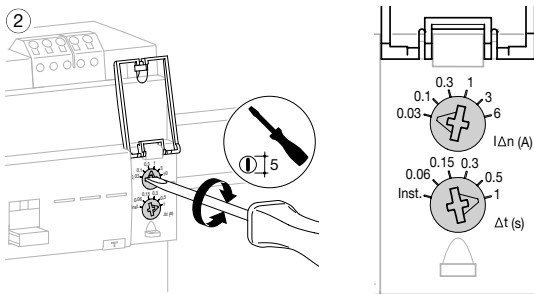
**Mechanical test button :**  
Checks the mechanical operating of the MCCB / Add-on block association.

**LED signaling residual current level in the installation:**  
25% (orange) and 50% (red)  $I_{\Delta n}$ ; green light to signal correct operating.

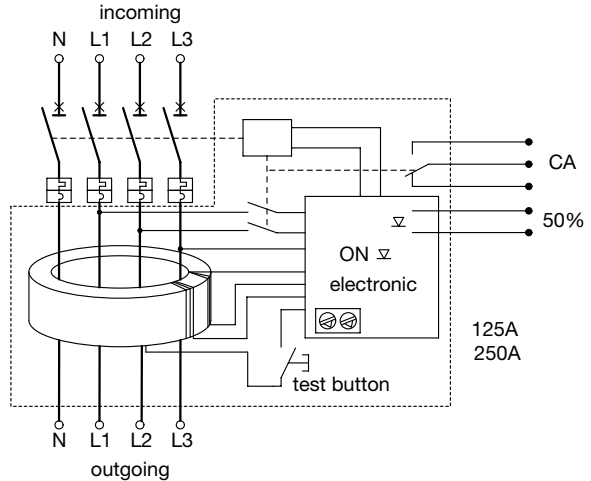
**Remote tripping and advanced warning (50%  $I_{\Delta n}$ ) signaling thanks to these contacts:**



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



### Add-on block operating

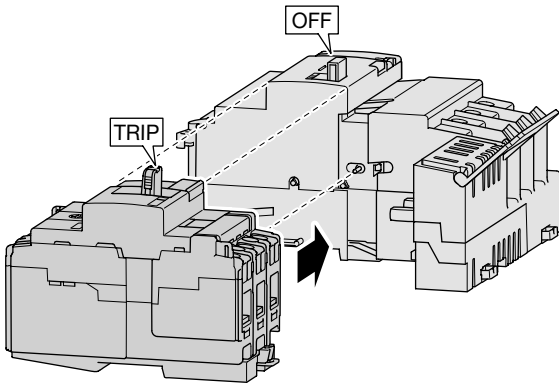


|                    |       | A ( $I_{\Delta n}$ ) |     |     |    |    |    |
|--------------------|-------|----------------------|-----|-----|----|----|----|
|                    |       | 0.03                 | 0.1 | 0.3 | 1  | 3  | 6  |
| ( $t_{\Delta}$ ) S | Inst. | OK                   | OK  | OK  | OK | OK | OK |
|                    | 0.06  | no                   | OK  | OK  | OK | OK | OK |
|                    | 0.15  | no                   | OK  | OK  | OK | OK | OK |
|                    | 0.3   | no                   | OK  | OK  | OK | OK | OK |
|                    | 0.5   | no                   | OK  | OK  | OK | OK | OK |
|                    | 1     | no                   | OK  | OK  | OK | OK | OK |

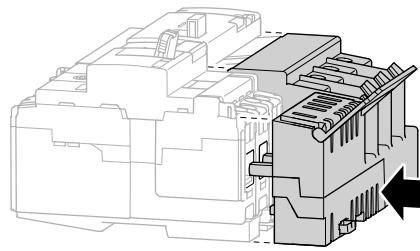


Add-on block mounting

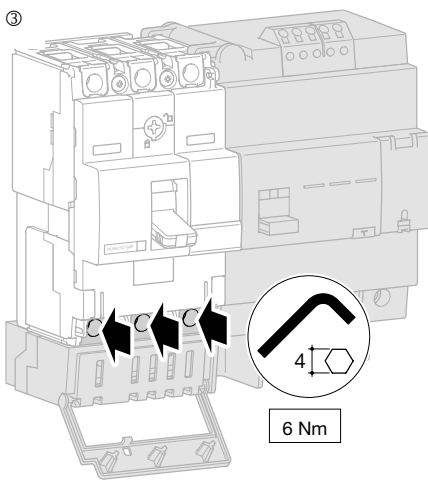
①



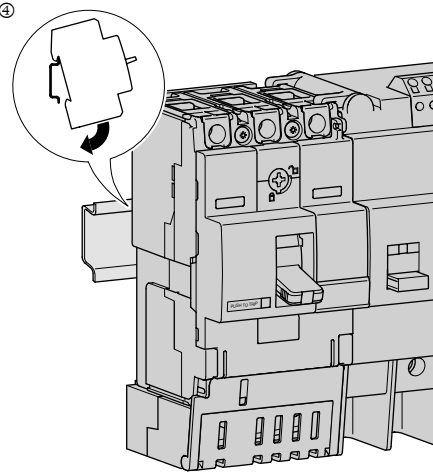
②



③



④

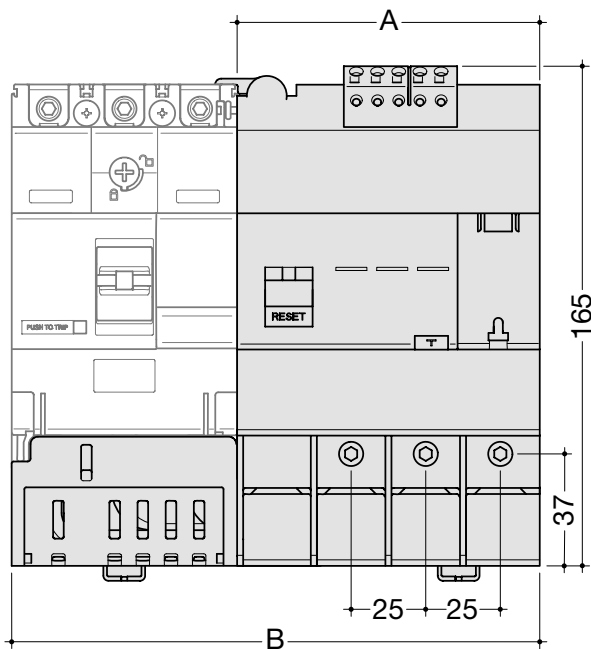


Exclusive drawer assembly system allows quick mounting and makes MCCB and add-on block association a complete monoblock unit.

Reinforced insulation connection (class II)

System avoids the omission of terminal tightening

Dimensions

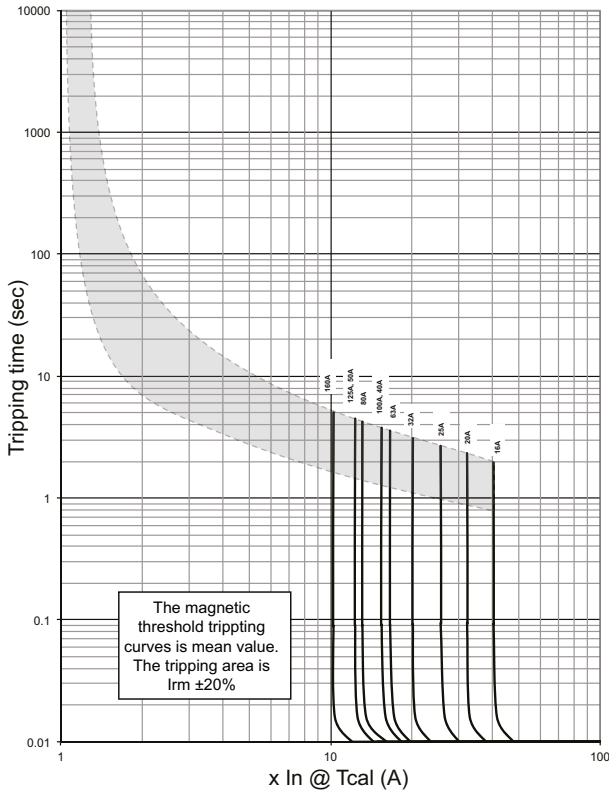


|        | 3P    | 4P    |
|--------|-------|-------|
| A (mm) | 100   | 100   |
| B (mm) | 174.5 | 199.5 |

Tripping curve

MCCB x160

Commercial Distribution



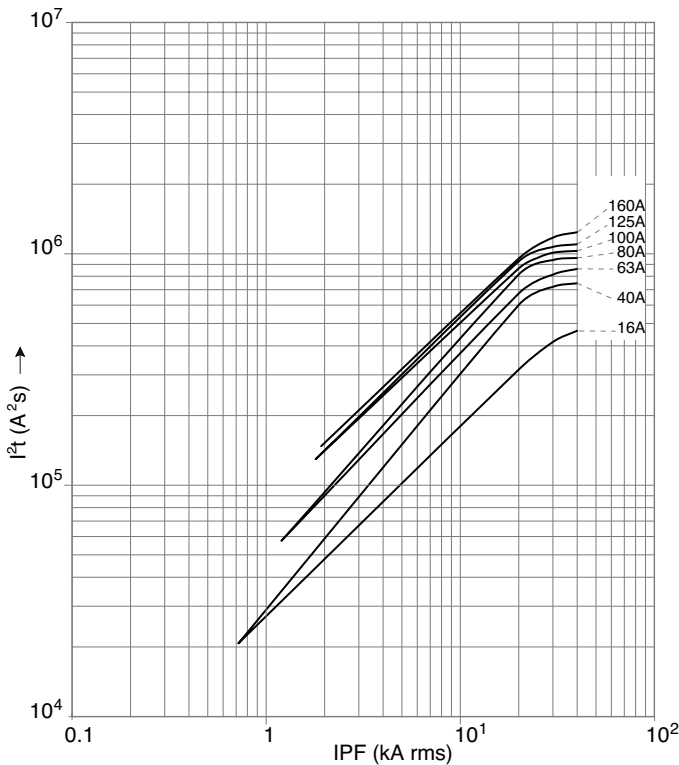
The earth fault loop impedance requirements for larger devices can be calculated by the formula given in BS7671:2008

$$Z_s \leq 230 \times C_{min}$$

Where  $I_a = I_n$  of MCCB x Mag setting x 1.2

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

MCCB x160



MCCB Disconnection Data

Earth Fault Loop Impedance Data

Disconnection time 0.2s, 0.4s, 1s

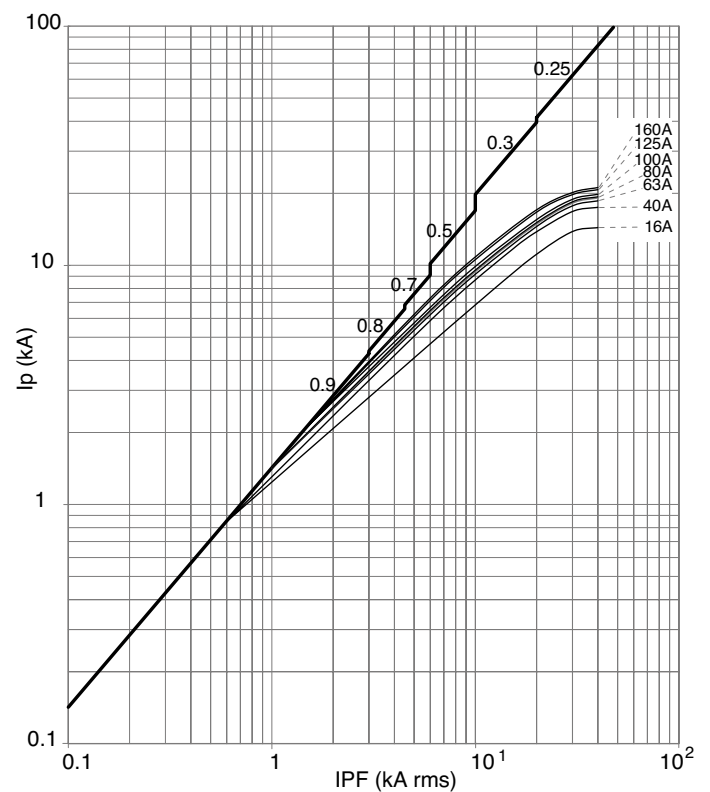
| Device rating (A) | Instantaneous trip ( $xI_n$ ) | Instantaneous trip (A) | add 20% tolerance ( $I_a$ ) | $Z_s = (230 \times 0.95) / I_a$ |
|-------------------|-------------------------------|------------------------|-----------------------------|---------------------------------|
| 16                | 40.3                          | 644.8                  | 773.8                       | 0.28                            |
| 20                | 32.2                          | 644.0                  | 773                         | 0.28                            |
| 25                | 25.7                          | 643                    | 771                         | 0.28                            |
| 32                | 20.13                         | 644.2                  | 773.0                       | 0.28                            |
| 40                | 15.0                          | 600.0                  | 720.0                       | 0.30                            |
| 50                | 12.0                          | 600.0                  | 720.0                       | 0.30                            |
| 63                | 16.6                          | 1045.8                 | 1255.0                      | 0.17                            |
| 80                | 13.1                          | 1048.0                 | 1258                        | 0.17                            |
| 100               | 15.4                          | 1540.0                 | 1848.0                      | 0.12                            |
| 126               | 12.3                          | 1538                   | 1845.0                      | 0.12                            |
| 160               | 10.22                         | 1635.2                 | 1962.2                      | 0.11                            |

Disconnection time 5s

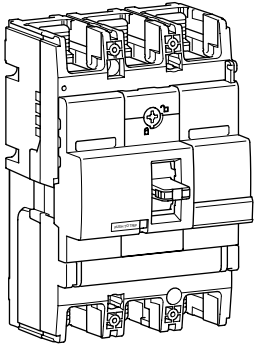
| Device rating (A) | trip ( $xI_n$ ) | $I_a$ (A) | $Z_s = (230 \times 0.95) / I_a$ |
|-------------------|-----------------|-----------|---------------------------------|
| 16                | 10              | 160       | 1.37                            |
| 20                | 10              | 200       | 1.09                            |
| 25                | 10              | 250       | 0.87                            |
| 32                | 10              | 320       | 0.68                            |
| 40                | 10              | 400       | 0.55                            |
| 50                | 10              | 500       | 0.44                            |
| 63                | 10              | 630       | 0.35                            |
| 80                | 10              | 800       | 0.27                            |
| 100               | 10              | 1000      | 0.22                            |
| 125               | 10              | 1250      | 0.17                            |
| 160               | 10              | 1600      | 0.14                            |

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

MCCB x160



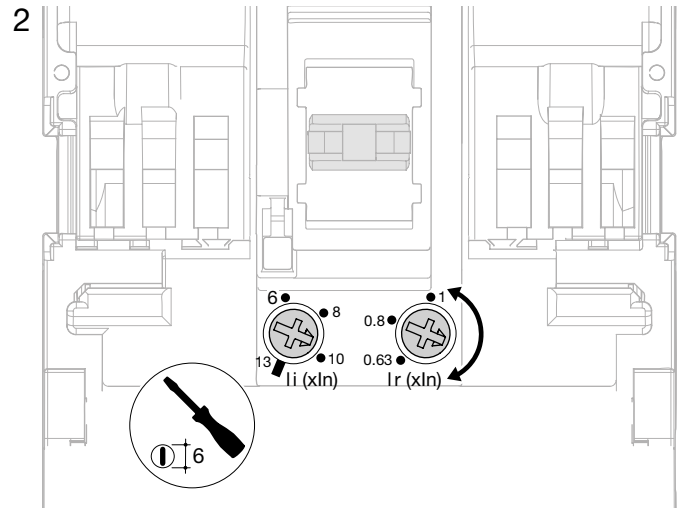
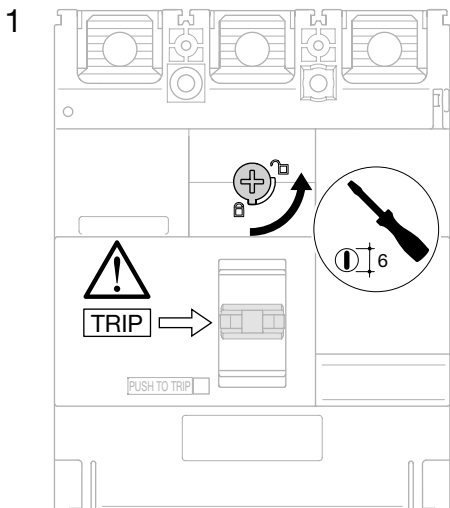
### MCCBs



|            |                 | 220/240V AC<br>IEC 60 947-2 | 380/415V AC<br>IEC 60 947-2 |
|------------|-----------------|-----------------------------|-----------------------------|
| <b>HHB</b> | l <sub>cu</sub> | 35 kA                       | 25 kA                       |
|            | l <sub>cs</sub> | 25 kA                       | 20 kA                       |
| <b>HNB</b> | l <sub>cu</sub> | 85 kA                       | 40 kA                       |
|            | l <sub>cs</sub> | 40 kA                       | 20 kA                       |
| <b>HCB</b> | l <sub>cm</sub> | -                           | 9 kA                        |
|            | l <sub>cw</sub> | -                           | 3 kA - 1s                   |

Commercial Distribution

### Magnetic and thermal settings

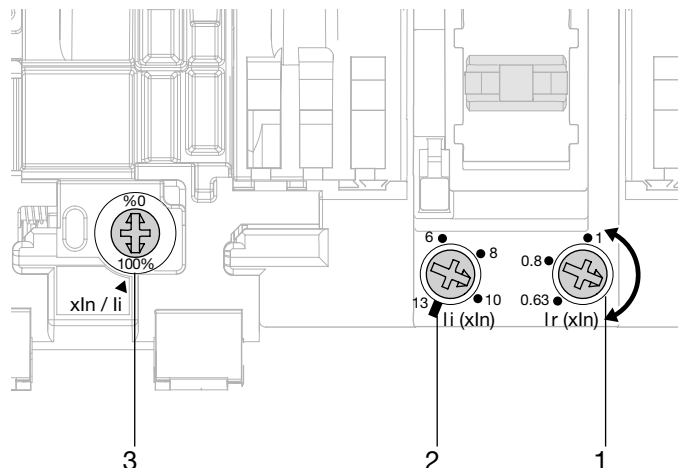


Thermal adjustment from 0.63, 0.8, 1 x I<sub>n</sub>

Magnetic adjustment from 6 to 13 x I<sub>n</sub> (100 - 200A)

from 5 to 11 x I<sub>n</sub> (250A)

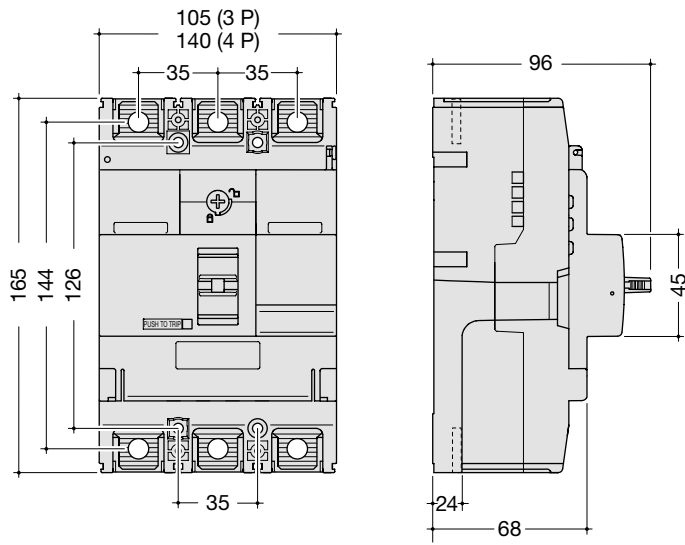
|                                      | 100 - 200A                       | 250A                            |
|--------------------------------------|----------------------------------|---------------------------------|
| I <sub>r</sub> (x I <sub>n</sub> ) 1 | 0.63 - 0.8 - 1 x I <sub>n</sub>  |                                 |
| I <sub>i</sub> (x I <sub>n</sub> ) 2 | 6 - 8 - 10 - 13 x I <sub>n</sub> | 5 - 7 - 9 - 11 x I <sub>n</sub> |
| x I <sub>n</sub> /I <sub>i</sub> 3   | 0 - 100%                         |                                 |
|                                      | 0 - 60%                          |                                 |



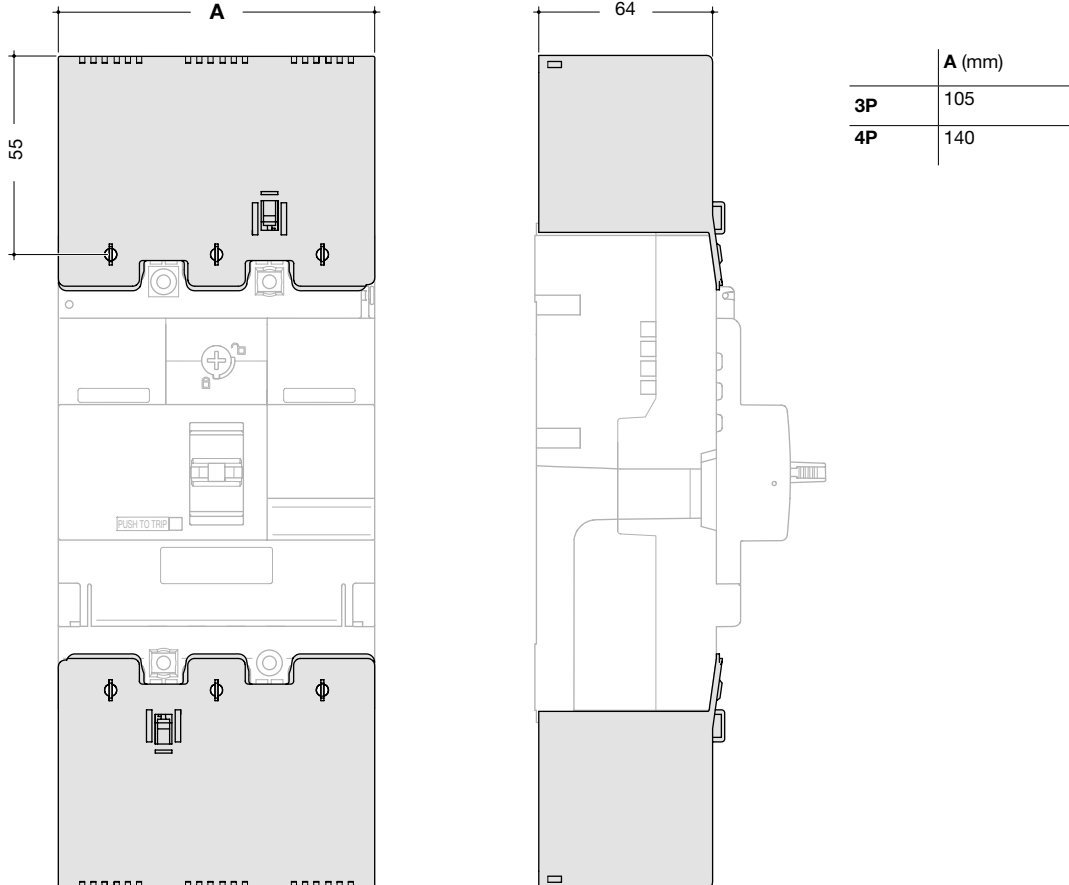
Dimensions

MCCB x250

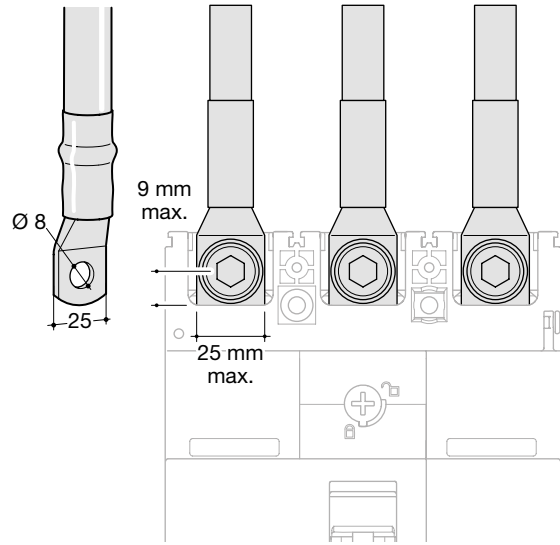
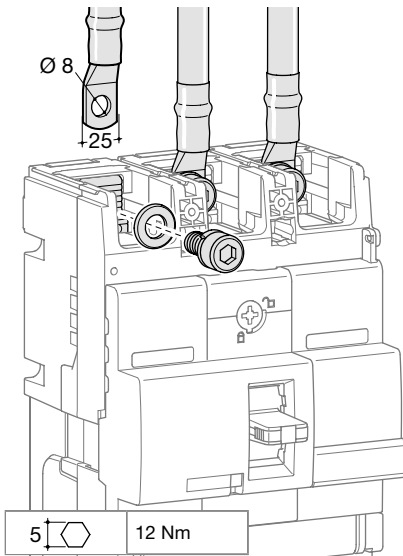
Commercial  
 Distribution



Terminal covers for extended straight connections

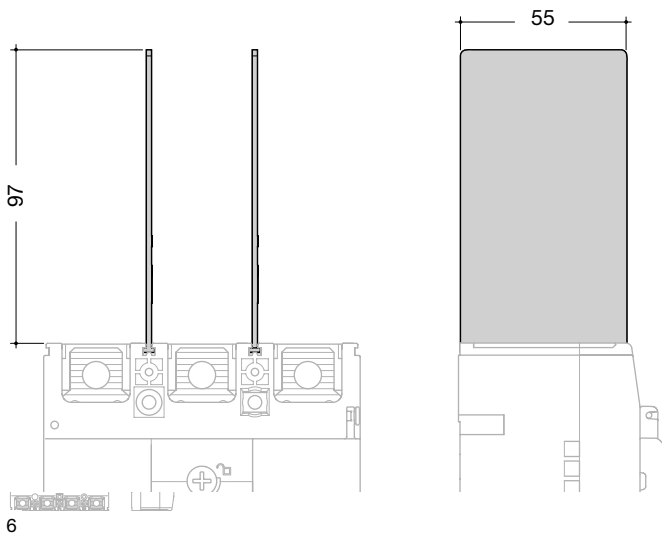


Connection with end lugs



Commercial  
Distribution

Interphase barriers

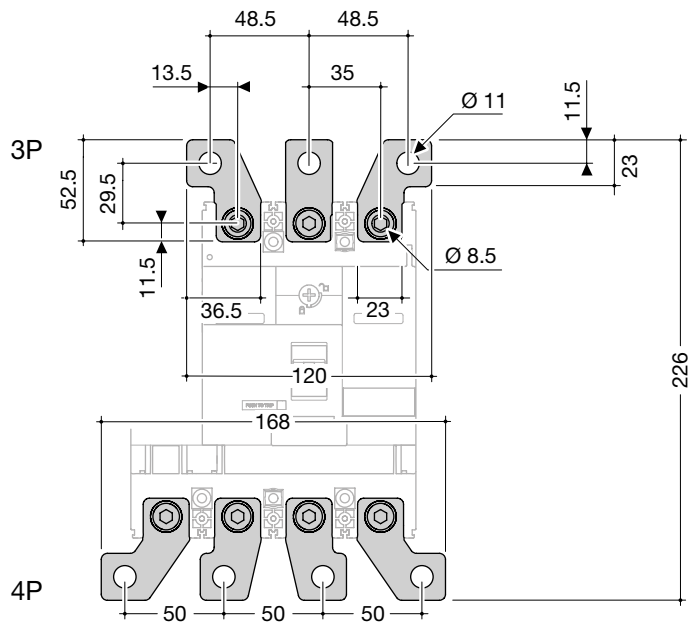
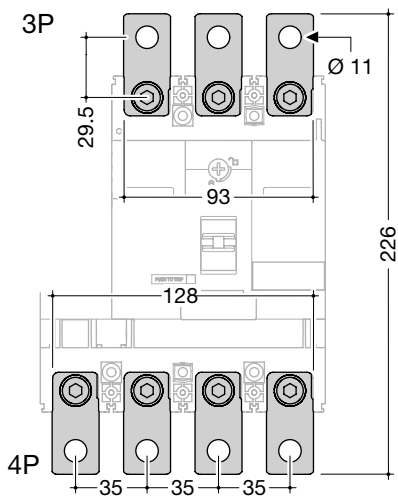
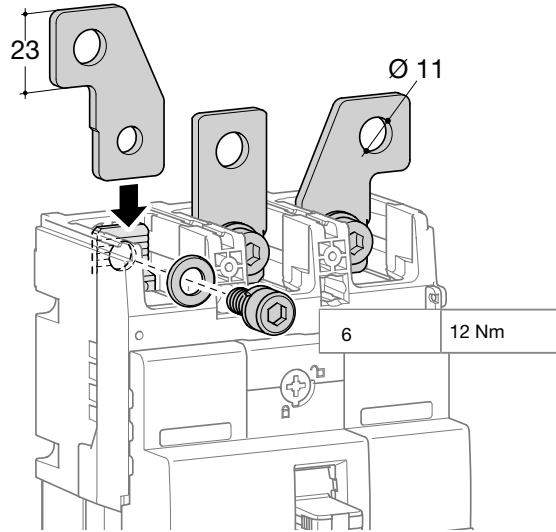
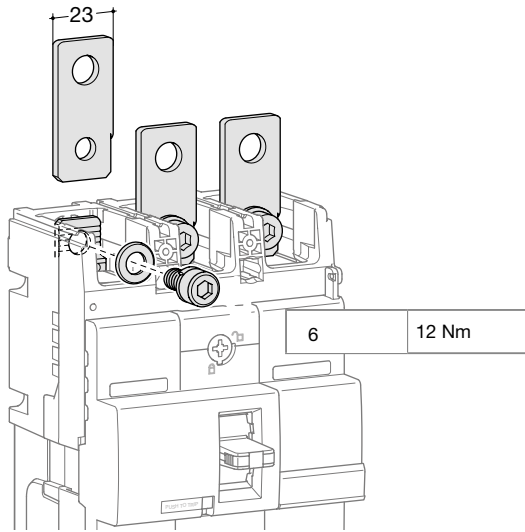


6

Connection

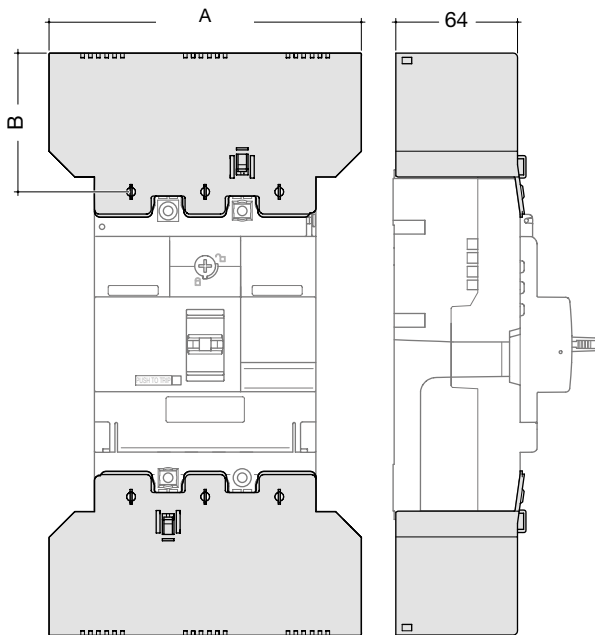
Extended straight and spreader connections

Commercial  
 Distribution



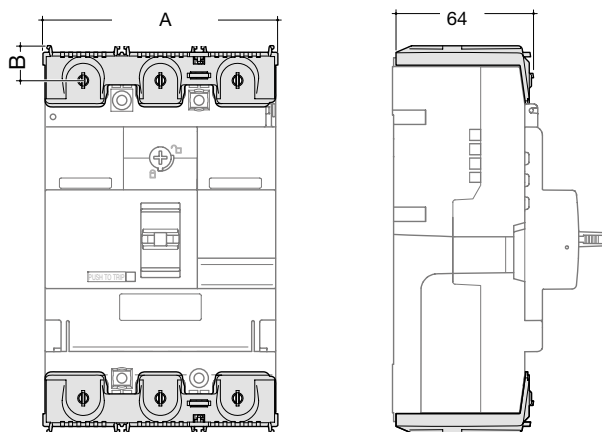
Accessories

Terminal cover for extended spreader connections



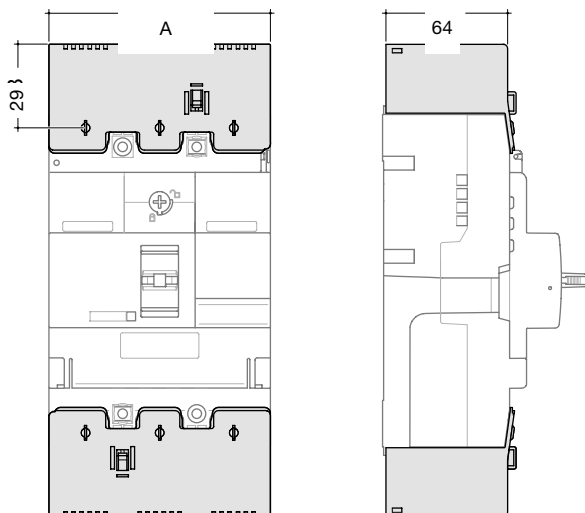
|    | A<br>(mm) | B<br>(mm) | C<br>(mm) |
|----|-----------|-----------|-----------|
| 3P | 147.5     | 54.5      | 64        |
| 4P | 196       | 54.5      | 64        |

Terminal cover for rear connections



|    | A<br>(mm) |
|----|-----------|
| 3P | 105       |
| 4P | 140       |

Terminal covers for collar terminals

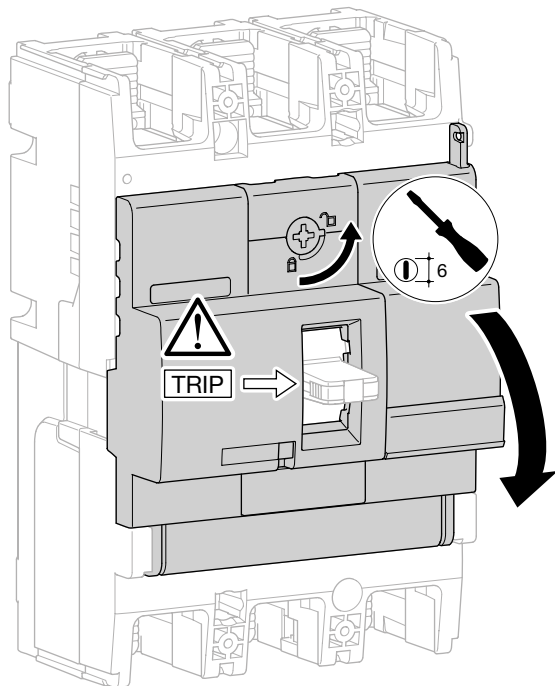


|    | A<br>(mm) |
|----|-----------|
| 3P | 105       |
| 4P | 140       |

Auxiliaries

Auxiliaries for MCCBs and moulded case switches

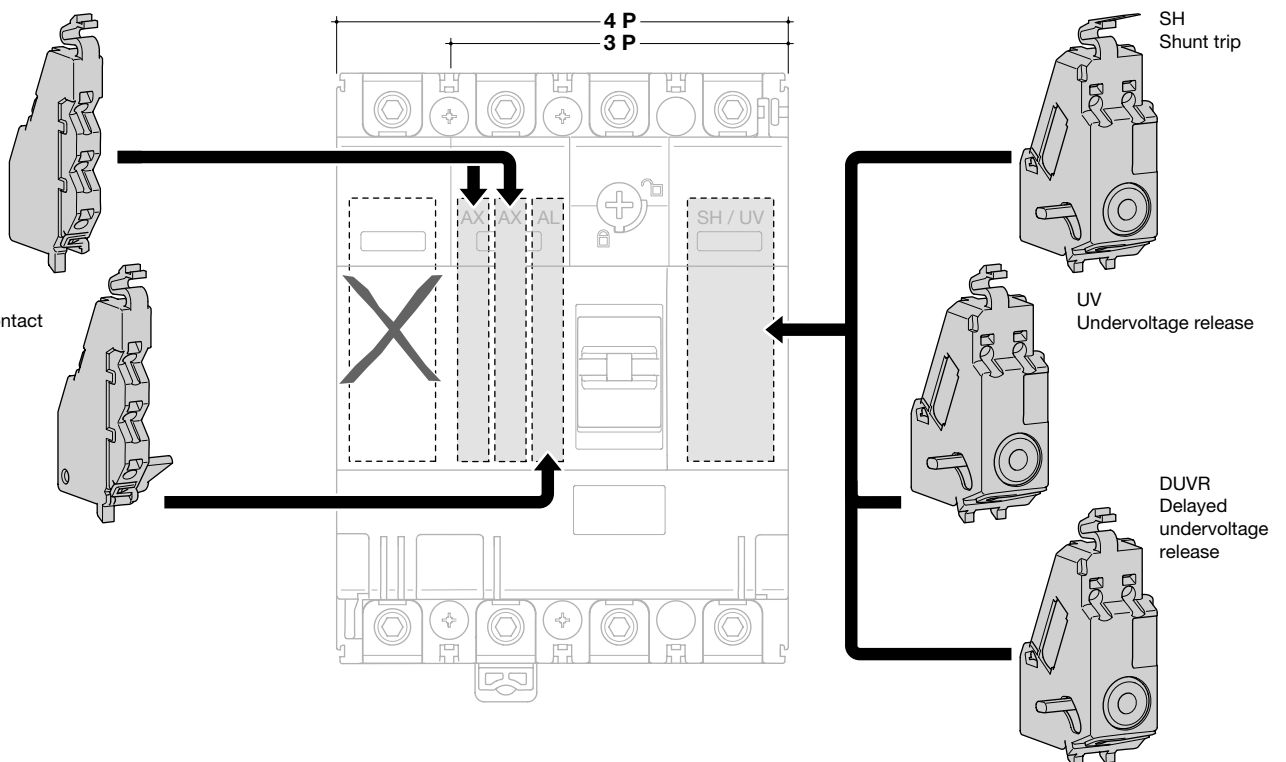
Commercial  
 Distribution



Mounting combination for auxiliaries and releases

AX  
 Auxiliary contact

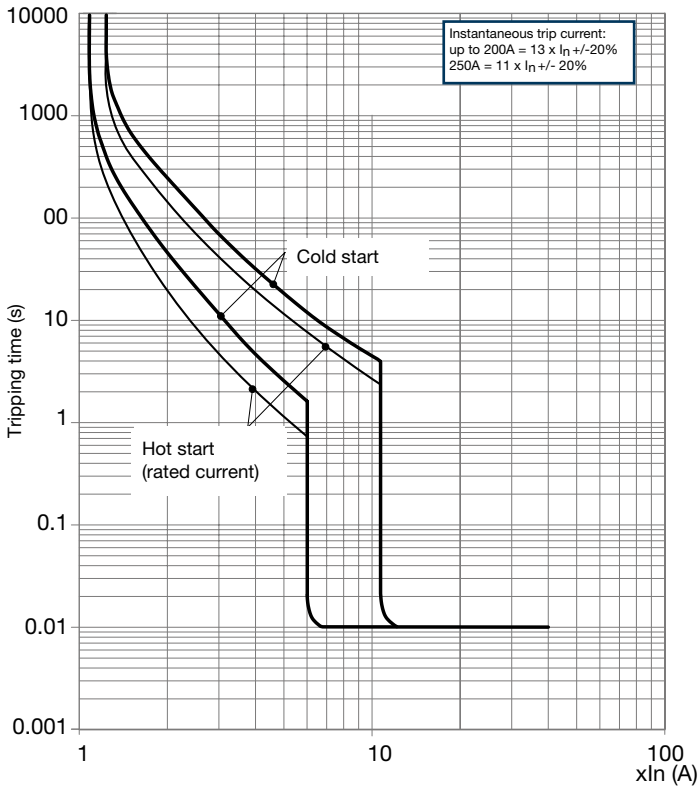
AL  
 Alarm contact





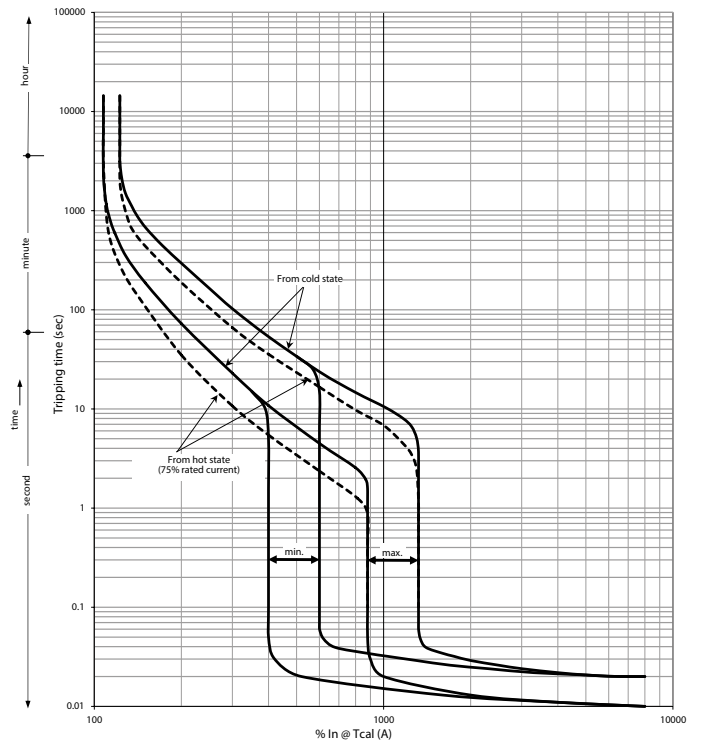
Tripping curve

MCCB x250



Tripping curve

MCCB h250 TM

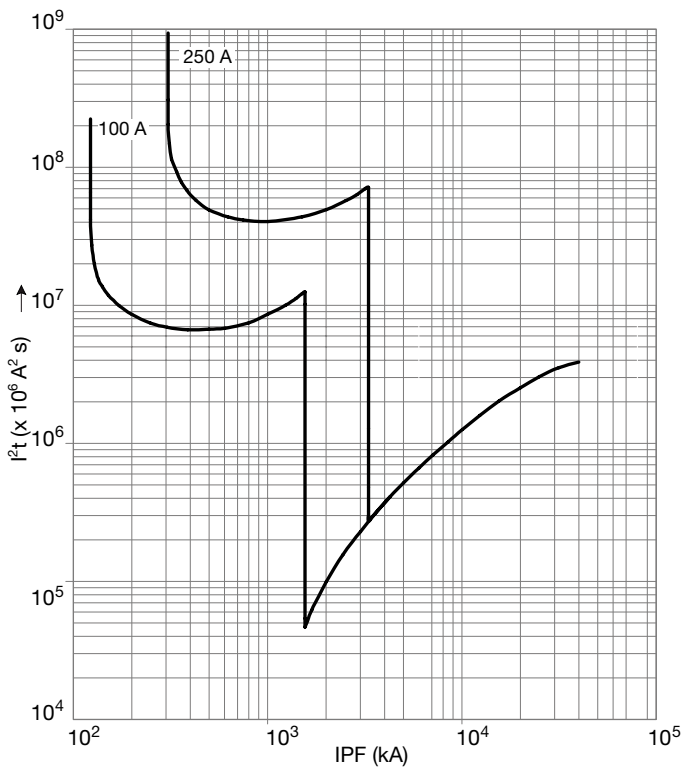


Earth fault loop impedance ( $Z_s$ ) can be calculated from the formula  
 $Z_s \leq \frac{230}{I_a} \times 0.95$

Where  $I_a = I_n$  of MCCB x mag setting x 1.2

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

MCCB x250



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

MCCB x250

