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DPX³ 250 HP S1 electronic (no display) with earth leakage circuit breakers

Reference(s) :
from 4 232 15 to 4 232 18;
from 4 232 35 to 4 232 38;

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1. USE

DPX³ HP platform has been developed to give a new solution of protection devices for a more precise approach in power installations in order to offer the correct answer for different project needs.
DPX³ HP platform provide a complete project approach in premium market segment, offering a range completely suitable for high power application with high performance breakers in compact dimensions and at a competitive costs.

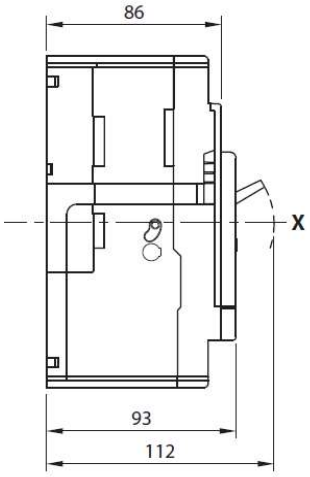
2. RANGE

	DPX³ 250 HP electronic (no display) + earth leakage version	
	36 kA	50 kA
In (A)	4P	
40	423215	423235
100	423216	423236
160	423217	423237
250	423218	423238

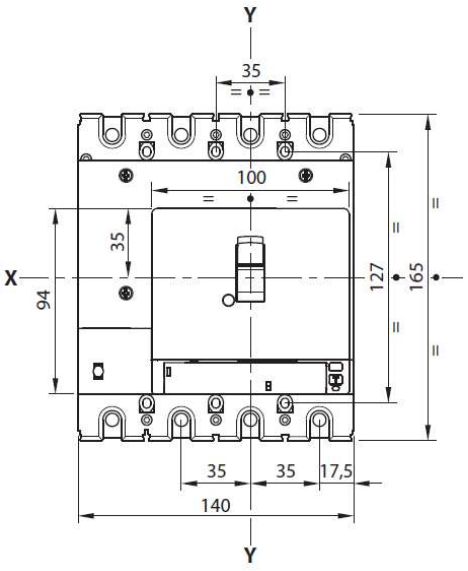
3. DIMENSIONS AND WEIGHTS

3.1 Dimensions

Lateral view



Frontal view



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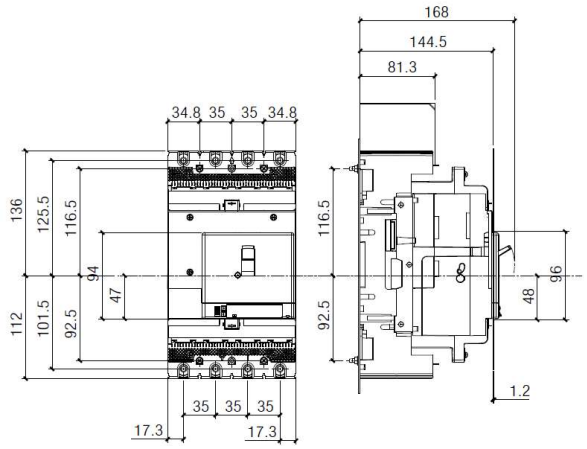
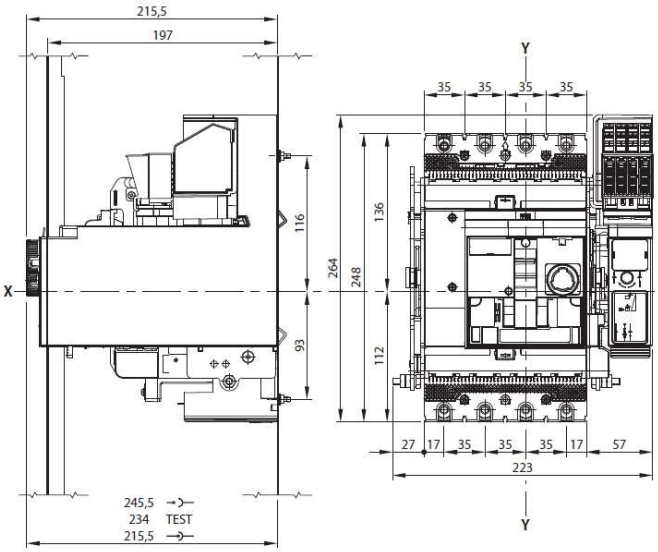
Plug-in version

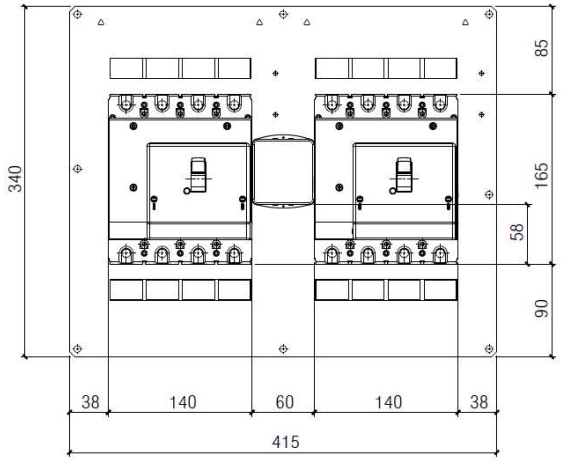


Draw-out version

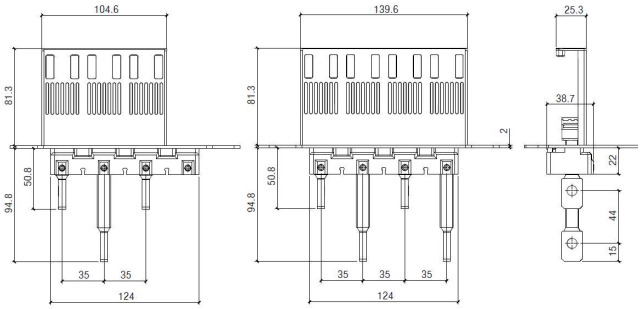


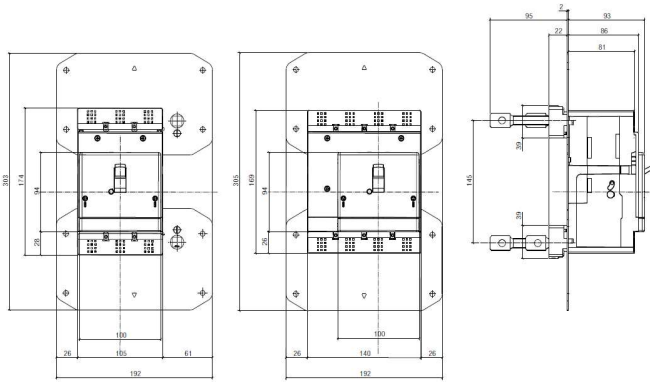
Interlock

(for rear plate interlock dimension, see relative instruction sheet)

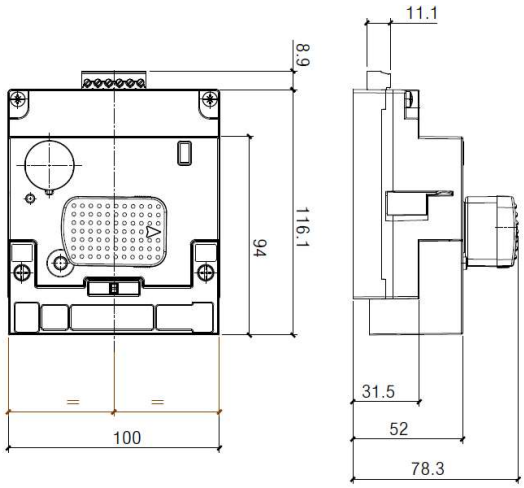


Rear terminals





Direct rotary handle



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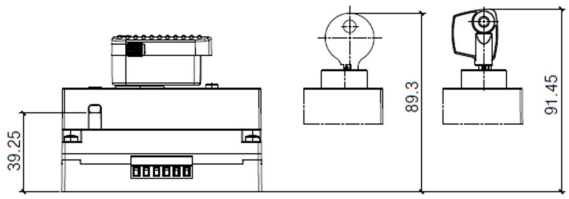
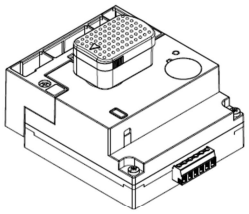
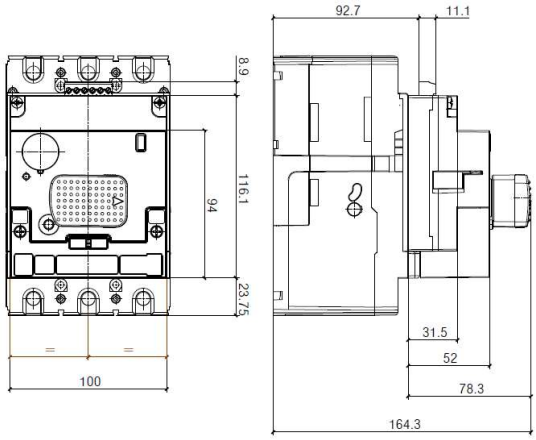
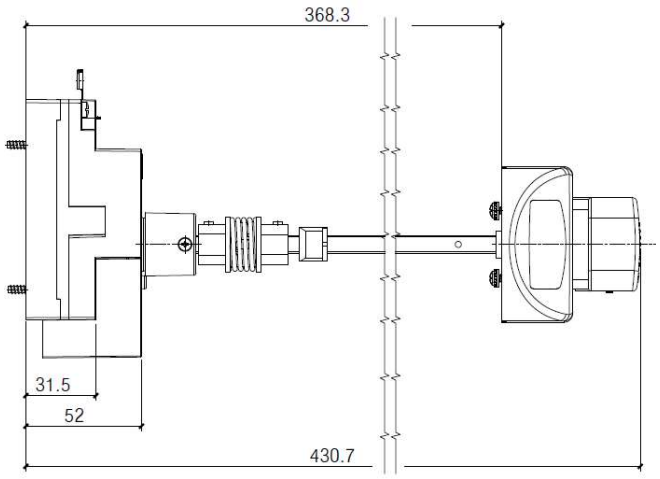
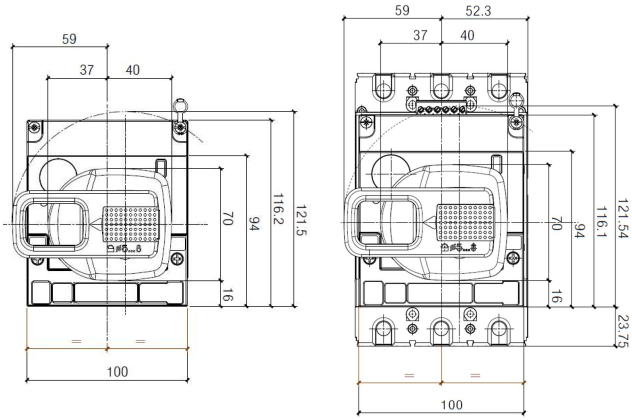


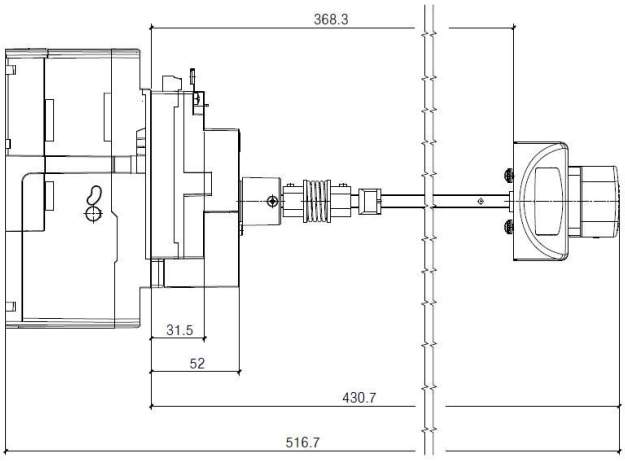




Vari-depth rotary handle







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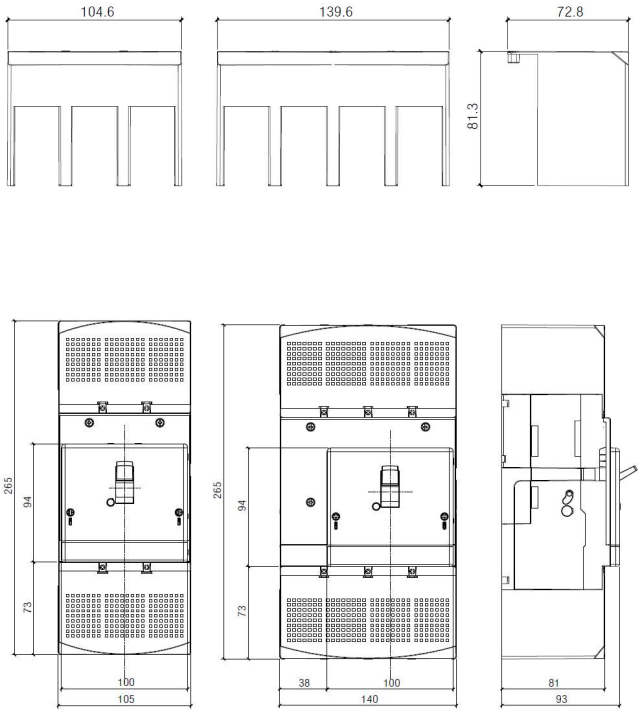
Reference(s) :

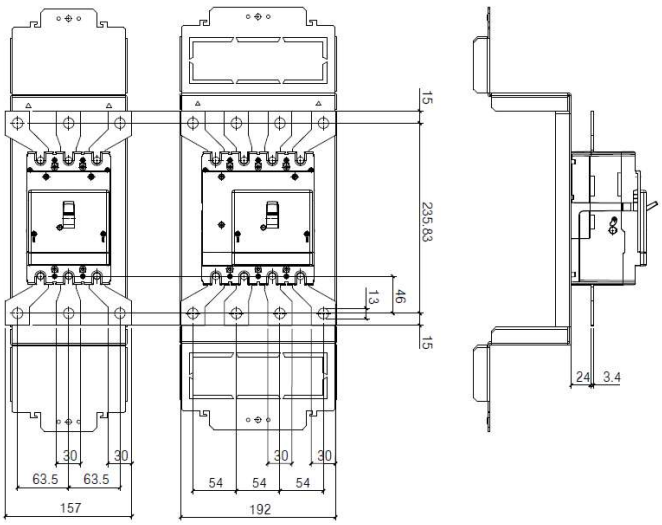
from 4 232 15 to 4 232 18;

from 4 232 35 to 4 232 38;

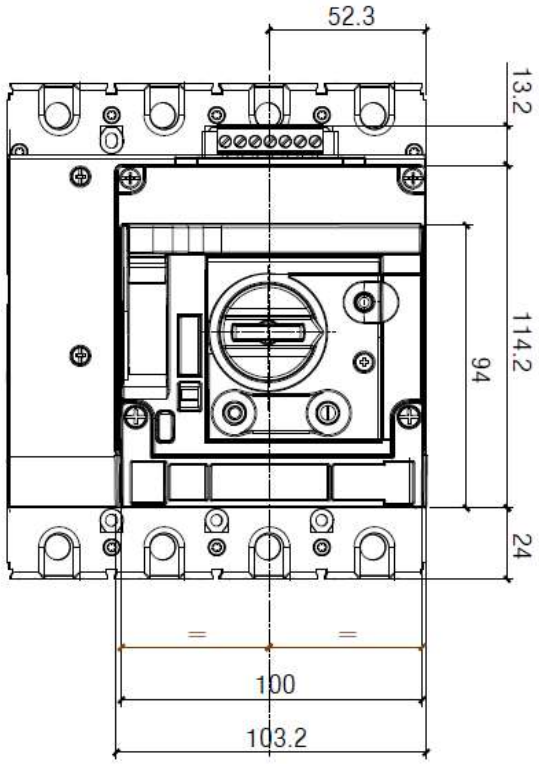
Sealable terminal shields



Spreaders



Motor operator



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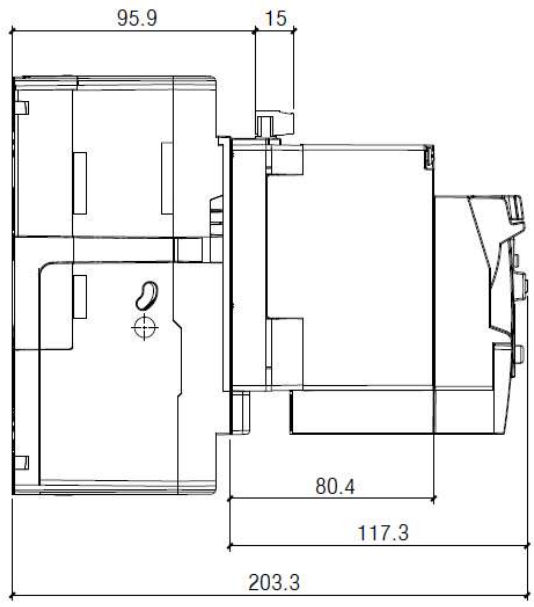
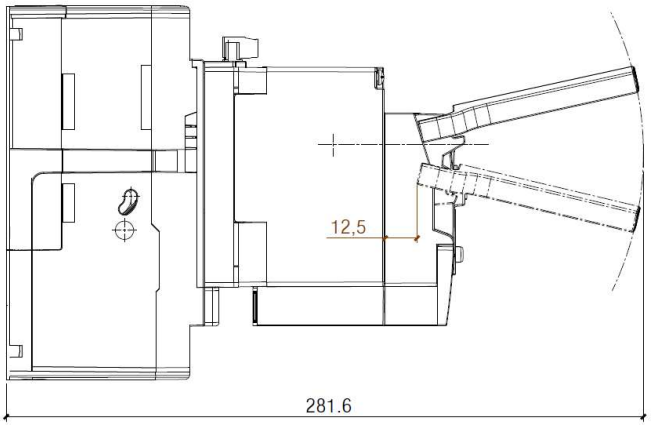
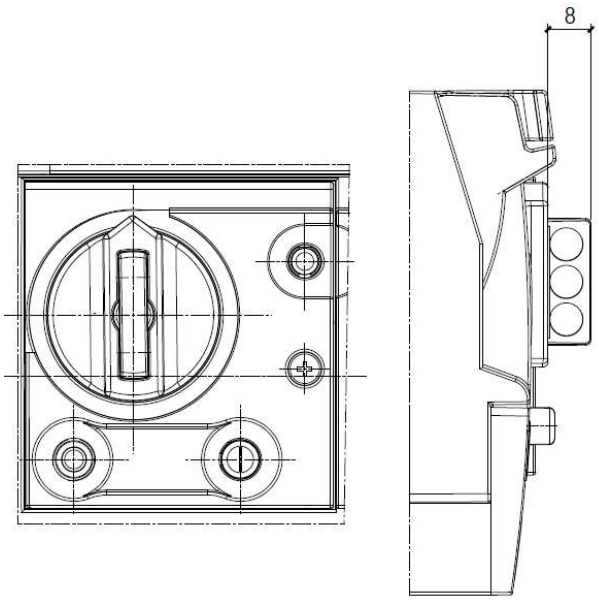
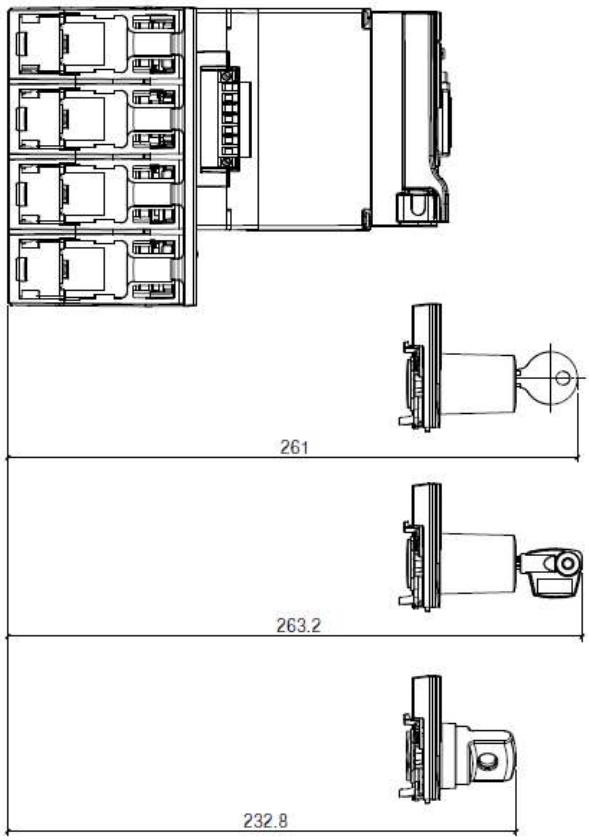








3.2 Weights

	Weights (Kg)
Configuration	4P
Circuit breaker	2.5
Plug-in*	4.5
Draw-out**	2.5
Interlock*	0.35
Rear interlock (for plug-in/draw-out version)*	5
Motor operator*	1
** to add to deveice weight*	
** to add to deveice and plug-in weights*	

4. OVERVIEW

4.1 Supplied with:

- 4 fixing screws
- 8 screws for connections
- 3 phase insulators

5. ELECTRICAL CONNECTIONS

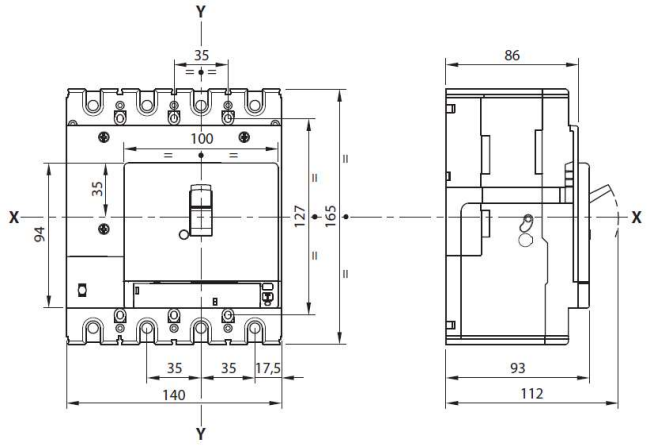
5.1 Mounting possibilities

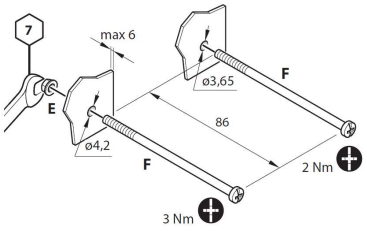
On plate:

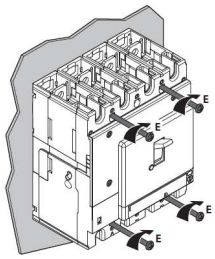
- Vertical
- Horizontal
- Supply invertor type

5.2 Mounting

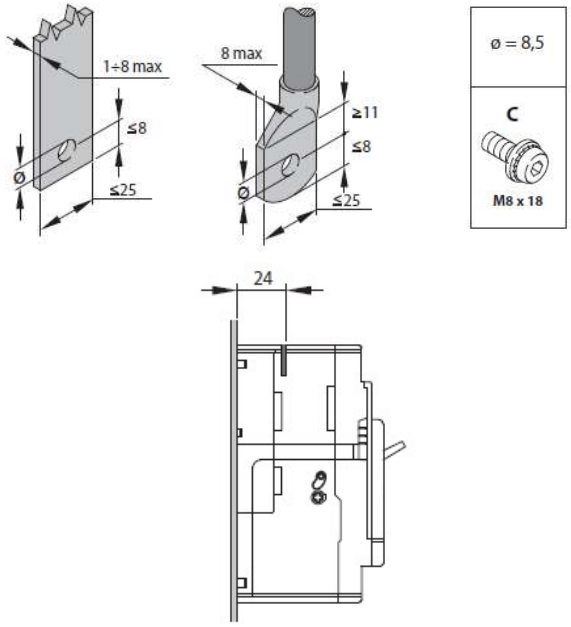
(see instruction sheet for detailed mounting procedures)

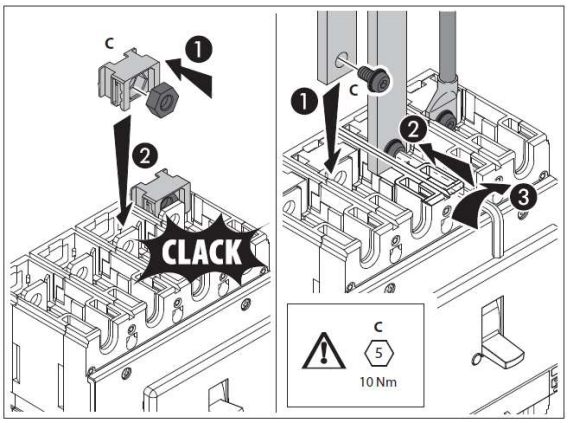


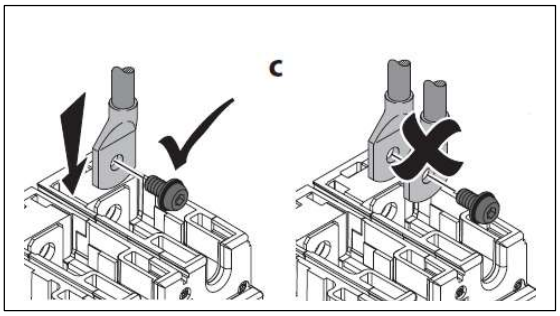




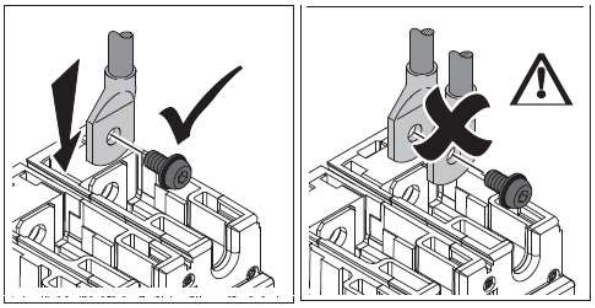
Busbars/cable lugs:







Cables:



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Reference(s) :
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from 4 232 35 to 4 232 38;

6. ELECTRICAL AND MECHANICAL CHARACTERISTICS

Circuit Breaker	DPX³ 250 HP + RCD F/N (36kA, 50kA)
Rated current (A)	40-100-160-250
Poles	4
Pole pitch (mm)	35
Rated insulation voltage (50/60Hz) U_i (V)	500
Rated operating voltage (50/60Hz) U_e (V)	500
Rated impulse withstand current U_{Imp} (kV)	6
Reference ambient temperature(°C)	40 - 50
Operating temperature (°C)	-25 ÷ 70
Mechanical endurance (cycles)	12000
Mechanical endurance with motor control (cycles)	12000
Electrical endurance at I_n (cycles)	6000
Electrical endurance at 0.5 I_n (cycles)	6000
Utilization category	A
Suitable for isolation	Yes
Type of protection	Electronic (with knobs)
Thermal adjustment I_r	(0.4÷1) x I_n
Magnetic adjustment I_{sd} (**)	(1,5÷10) x I_r
Neutral protection for 4P (%I_{th} of phase pole)	OFF-50(*)-100
Dimensions (W x H x D) (mm)	140 x 165 x 86 (4P)
Earth leakage type	A - integrated
Adjustable sensitivity (A)	0.03 - 0.3 - 1 - 3
Adjustable tripping (s)	0 - 0.3 - 1 - 3 (with 0.03 possible only 0s)
Dimensions (W x H x D) (mm)	140 x 165 x 86 (4P)

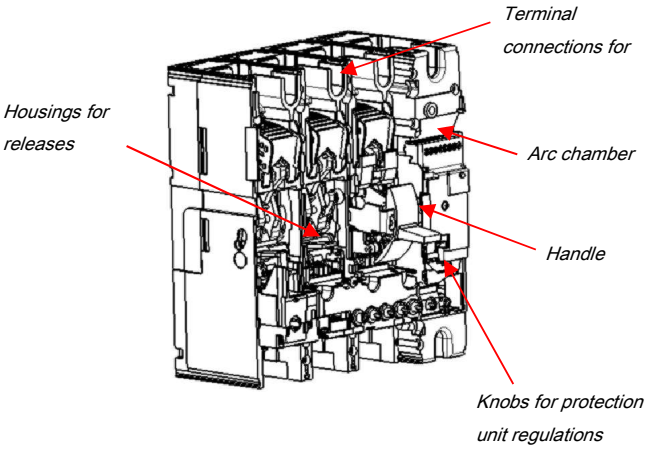
(*) if I_n=40A, then 50% regulation is allowed only if $I_r \geq 0,8$

(**) Regulations not adjustable:

- t_r=5s
- t_{sd}=0.1s
- Ii=3250A

When I_r < 0.8, knob setting marked with 50% equals to a 100% value.

6.1 Main parts constituting the circuit breaker



6.2 Breaking capacity (kA)

		Breaking capacity (kA) & I_{cs}	
		4P	
IEC 60947-2	U_e/I_{cu} (I_{cu} letter)	36kA (F)	50kA (N)
	220/240 V AC	70	90
	380/415 V AC	36	50
	440/460 V AC	25	30
	480/500 V AC	16	18
	I_{cs}(% I_{cu})	100	100
	Rated making capacity under short circuit I_{cm}		
	I_{cm} (kA) at 415V	76.5	105
NEMA AB-1	220/240 V AC	70	90
	480/500 V AC	16	18

6.3 Rated current (I_n)

	Phases limit trip current			
	thermal (I_r)		magnetic (I_{sd})	
I_n (A)	0.4 x I_n	1 x I_n	min	max
40	16	40	60	400
100	40	100	150	1000
160	64	160	240	1600
250	100	250	375	2500

6.3 Load operations

Force on handle	N
Opening operation	63,5
Closing operation	66
Restore operation	86,5

6.4 Electrodynamic forces

The table below shows an indication of suggested distances to keep between the breaker and the first fixing point of the conductor and bars in order to reduce the effects of the electrodynamic stresses that may be created during a short circuit. In the realization of anchorage system it is recommend the use of isolators suitable for the type of conductor used and the operating voltage.

I_{cc} (kA)	Maximum Distance (mm)
36	350
50	300

According to conductor type and bar system (except Legrand bar kits), the choice of the distance to keep is to be calibrated by the installer. Also installer must take into account the weight of the conductors so that this does not affect the electrical junction between the conductor itself and the connection point.

6.5 Power losses per pole under I_n

Circuit breaker

	Power losses per pole (W)			
In (A)	40	100	160	250
Cage terminals	0.54	3.37	8.63	21.07
Lugs	0.49	3.08	7.88	19.25
Spreaders	0.41	2.59	6.64	16.21
Rear terminals	0.51	3.18	8.13	19.86

Note: power losses in the table above are referred and measured as described in the standard IEC 60947-2 (Annex G) for circuit-breakers. Values in the table are referred to a single phase.

6.6 DERATINGS

according to IEC/EN 60947-1

6.6.1 Temperature

Rated current and his adjustment has to be considered relating to a rise or fall of ambient temperature and to a different version or installation conditions. The table below indicates the maximum long-time (LT) protection setting depending on the ambient temperature.

	Temperature Ta (°C)			
I_n (A)	40	50	60	70
40	40	40	40	40
100	100	100	100	95
160	160	160	160	155
250	250	250	210	190

For derating temperature with other configurations, see table A.

6.6.2 Specific condition use

Climatic conditions

according to IEC/EN 60947-1 Annex Q, Cat. F subject to temperature, humidity, vibration, shock and salt mist.

Pollution degree

for DPX³ 250 HP circuit breakers, degree 3, according to IEC/EN 60947-2

6.6.3 Altitude

Altitude derating for DPX³

Altitude (m)	2000	3000	4000	5000
U_e (V)	500	430	380	330
I_n (A)	1 x I_n	0.98 x I_n	0.93 x I_n	0.9 x I_n

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7. CONFORMITY

DPX³ HP range of product concerning circuit-breakers and switch-disconnectors exceed compliance with the IEC/EN standard 60947-2 and 60947-3 respectively. Certification available by IECEE CB-scheme or LOVAG Compliance scheme.
DPX³ HP respect the European Directives REACh, RoHS, RAEE.

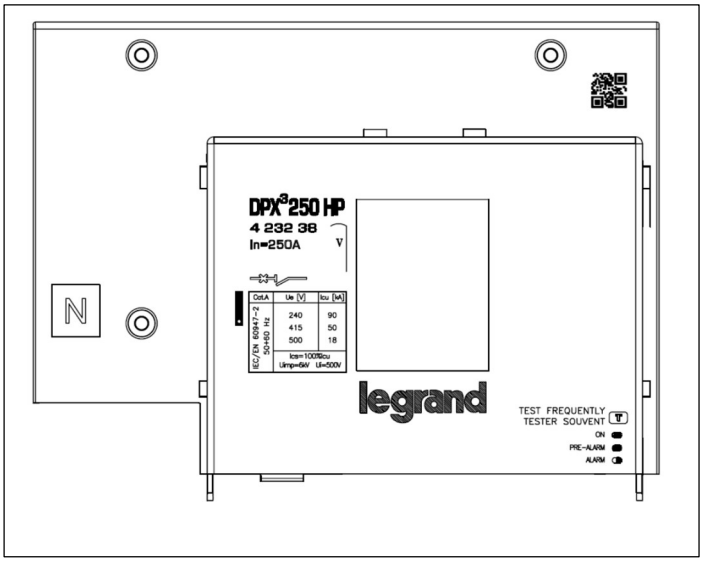
For specific information, please contact Legrand support.

7.1 Marking

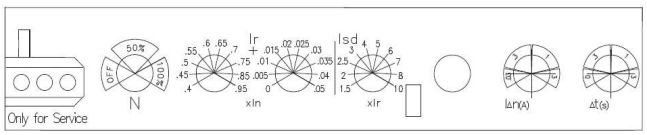
Product (circuit breakers) are provided with labelling in full conformity to the referred standard and directives requirements by laser or sticker labels (for illustrative purposes only) as:

Product laser label on front

- -Manufacturer responsible
- -Denomination, type product, code
- -Standard conformity
- -Standard characteristics declared
- -Coloured identification of I_{cu} at 415V

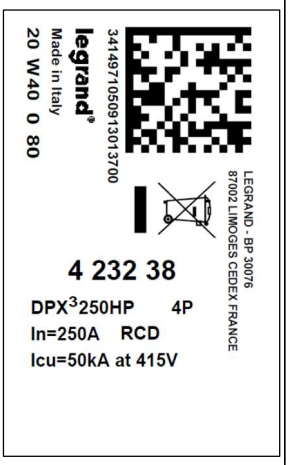


Electronic release label



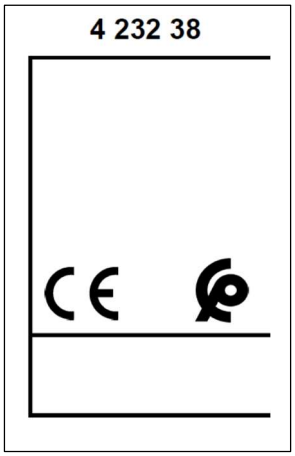
Product sticker label on side

- -Manufacturer responsible
- -Denomination and type product
- -Standard conformity
- -Mark/Licence (if any)
- -Directive requirements
- -Bar code identification product
- -Manufacturing Country



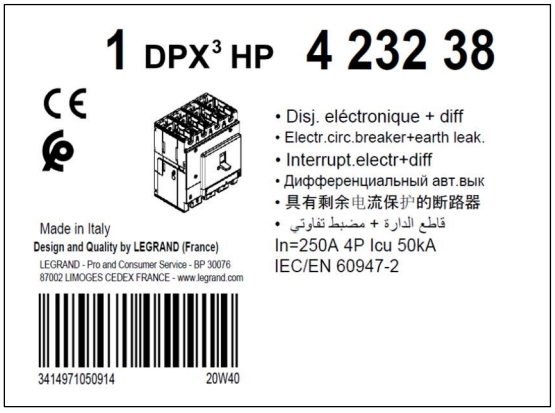
Mark sticker label on side

- -Product code
- -Mark/Licence (if any)
- -Country deviation, if any



Packaging sticker label

- -Manufacturer responsible
- -Denomination and type product
- -Mark/Licence (if any)
- -Directive requirements
- -Bar code identification product



8. EQUIPMENTS AND ACCESSORIES

8.1 Releases (for DPX³ 125/250 HP and DPX³ 160/250)

- shunt releases with voltage:

12 Vac and dc	*ref. 4 210 12*
24 Vac and dc	*ref. 4 210 13*
48 Vac and dc	*ref. 4 210 14*
110÷130 Vac	*ref. 4 210 15*
220÷277 Vac	*ref. 4 210 16*
380÷480 Vac	*ref. 4 210 17*

Maximum power = 400 VA / W

- undervoltage releases with voltage:

12 Vac and dc	*ref. 4 210 18*
24 Vac and dc	*ref. 4 210 19*
48 Vac and dc	*ref. 4 210 20*
110÷130 Vac and dc	*ref. 4 210 21*
220÷240 Vac	*ref. 4 210 22*
277 Vac	*ref. 4 210 23*
380÷415 Vac	*ref. 4 210 24*
440÷480 Vac	*ref. 4 210 25*

Maximum power = 4 VA
Circuit breaker opening time < 50 ms

UVR releases can be used on DPX3 125/250 HP starting from batch 19W15

- time-lag undervoltage releases (800 ms)

Time-lag modules with voltage:

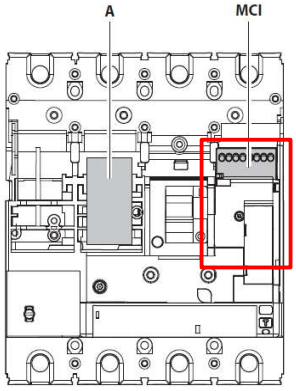
230 V ac	*ref. 0 261 90*
400 V ac	*ref. 0 261 91*

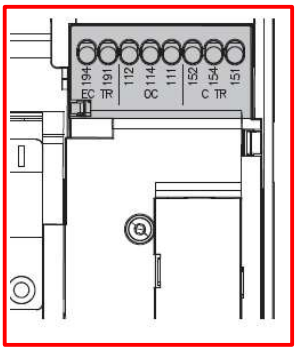
Release (to be equipped with a time-lag module 0 261 90/91)	*ref. 4 210 98*

8.2 Auxiliary contacts

For version of DPX³ 250 HP electronic version, with earth leakage module, auxiliary contacts are integrated inside module M.C.I (see instruction sheet for details).

Here a connection scheme to get auxiliary functionality:

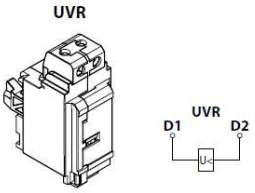


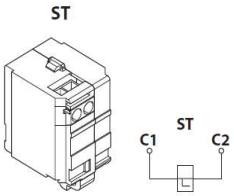


TRIP STATUS (CTR)	151 Common contact 152 Normal close contact 154 Normal open contact	154 / 151 / 152
OPEN/CLOSE STATUS (OC)	111 Common contact 112 Normal close contact 114 Normal open contact	114 / 111 / 112
TRIP RCD (EC TR)	191 Common contact 194 Normal open contact	194 / 191

CTR	152-151	154-151
OFF		
TRIP		
ON		

OC	112-111	114-111
OFF		
TRIP		
ON		





	A
UVR	✓ (max 1)
ST	

To get more information on auxiliary mounting procedures, please refer to product instruction sheet.

8.3 Universal keylocks

These keylocks must be used for all the accessories that can be locked:

- rotary handle
- motor operator
- plug-in mechanism
- draw-out mechanism

For each of these, a specific accessory (indicated in the specific section of this datasheet) must be added in order to get the complete locking kits for the specific application.

- 1 lock + 1 flat key with random mapping *ref. 4 238 80*
- 1 lock + 1 flat key with fixed mapping (EL43525) *ref. 4 238 81*
- 1 lock + 1 flat key with fixed mapping (EL43363) *ref. 4 238 82*
- 1 lock + 1 star key with random mapping *ref. 4 238 83*

8.4 Rotary handles

Direct on DPX³ (with auxiliary option)

- Standard (black) *ref. 4 238 00*
- For emergency use (red / yellow) *ref. 4 238 01*

Vari-depth handle IP55 (with auxiliary option)

- Standard (black) *ref. 4 238 02*
- For emergency use (red / yellow) *ref. 4 238 03*

Locking accessories (for rotary handle with auxiliary option)

- Key lock accessory for direct rotary handle *ref. 4 238 04*
- Key lock accessory for vari-depth rotary handle *ref. 4 238 05*
  (ref. 4 238 05 is compatible with DPX³ 125 HP also)

Ref. 4 238 04 and 4 238 05 must be used with universal keylocks to get the complete locking kit for rotary handle

8.5 Motor operators

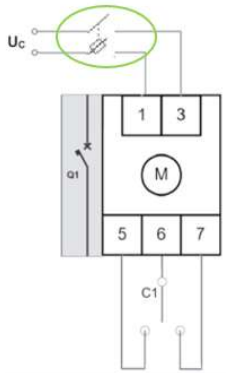
For synchronized operations (energy storage type):

- 24 Vac and dc *ref. 4 238 40*
- 48 Vac and dc *ref. 4 238 41*
- 110 Vac *ref. 4 238 42*
- 230 Vac *ref. 4 238 43*

Technical parameters:

Voltage	Property	AC		DC	
		Opening	Closing	Opening	Closing
24V ac/dc	Maximum inrush power (VA)	75	430	55	320
	Rated power (VA)	45	-	20	-
	Absorption time (s)	2.8	0.01	3.3	0.01
	Operating current time (s)	1.1	0.03	1.2	0.03
48V ac/dc	Maximum inrush power (VA)	85	1000	70	690
	Rated power (VA)	65	-	15	-
	Absorption time (s)	3.3	0.006	3.8	0.006
	Operating current time (s)	1.1	0.02	1.3	0.02
110V ac	Maximum inrush power (VA)	95	600	-	-
	Rated power (VA)	60	-	-	-
	Absorption time (s)	3	0.02	-	-
	Operating current time (s)	1.0	0.03	-	-
230V ac	Maximum inrush power (VA)	125	460	-	-
	Rated power (VA)	70	-	-	-
	Absorption time (s)	2.5	0.08	-	-
	Operating current time (s)	0.9	0.03	-	-

It is necessary to foresee a protection device (e.g. fuse) along the motor operator power line. The correct size of the fuse depends on the motor version and on the number of users.
Here a schematic example:



8.6 Mechanical accessories

- Padlock (for locking in “OPEN” position) *ref. 4 210 49*
  (ref. 4 210 49 is compatible with DPX³ 125 HP and DPX³ 160/250)
- Sealable terminal shields:
  - Set of 3 (for 4P) *ref. 4 238 24*
- Insulated shields:
  - Set of 3 (for 4P) *ref. 4 238 35*

  (ref. 4 238 35 is compatible with DPX³ 125 HP also)

8.7 Connection accessories

Cage terminals

- Set of 4 terminals for cables 150 mm² max (rigid) *ref. 4 238 31*
  or 120 mm² max (flexible) Cu/Al

Spreaders *(incoming or outcoming):*

- Set of 4 (for 4P) *ref. 6 250 18*

Rear terminals *(incoming or outcoming):*

- Set of 4 (for 4P) *ref. 4 238 22*

8.8 Plug-in version

(A plug-in is a DPX³ 250 HP fitted with special terminals and mounted on a plug-in base)

Bases

(for plug-in and draw-out versions for DPX³ 250 HP and DPX³-I 250 HP)

- Plug-in/draw-out base for 4P *ref. 4 238 51*
- Plug-in/draw-out mobile part kit for 4P *ref. 4 238 53*

Plug-in accessories

Locking accessory (for plug-in)

- Key lock accessory for plug-in *ref. 4 238 63*

Ref. 4 238 63 must be used with universal keylocks to get the complete locking kit for plug-in version

8.9 Draw-out version

(A DPX³ 250 HP draw-out version is a plug-in DPX³ 250 HP fitted with a "Debro-lift" mechanism which can be used to withdraw the breaker while keeping it on its base)

"Debro-lift" mechanism

(supplied with a rigid slide and handle for drawing-out)

- transformation kit for 4P *ref. 4 238 61*

Fontal masks for draw-out version

(to provide in addition to debro-lift mechanism according to accessory mounted)

- Frontal module, with frontal mask (3P and 4P) *ref. 4 238 55*
  (if neither motor operator nor rotary handle are mounted)
- Frontal mask for motor operator (3P and 4P) *ref. 4 238 56*
- Frontal mask for rotary handle (3P and 4P) *ref. 4 238 57*

Locking accessory (for draw-out)

- Padlock for draw-out position *ref. 4 238 64*
- Key lock accessory for draw-out *ref. 4 238 62*

Ref. 4 238 62 must be used with universal keylocks to get the complete locking kit for draw-out version

Auxiliary contacts

- Automatic auxiliary contacts for draw-out version *ref. 4 222 30*
- 6 contact connector (under sliding contacts) *ref. 0 098 19*

(Ref. *0 098 19 can be used with both plug-in and draw-out version)*

8.10 Interlock mechanism

(for interlocking 2 DPX³ 125 HP or 2 DPX³ 250 HP breakers)

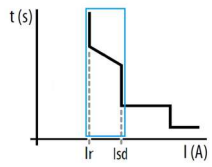
No frame mixing in interlock mechanism

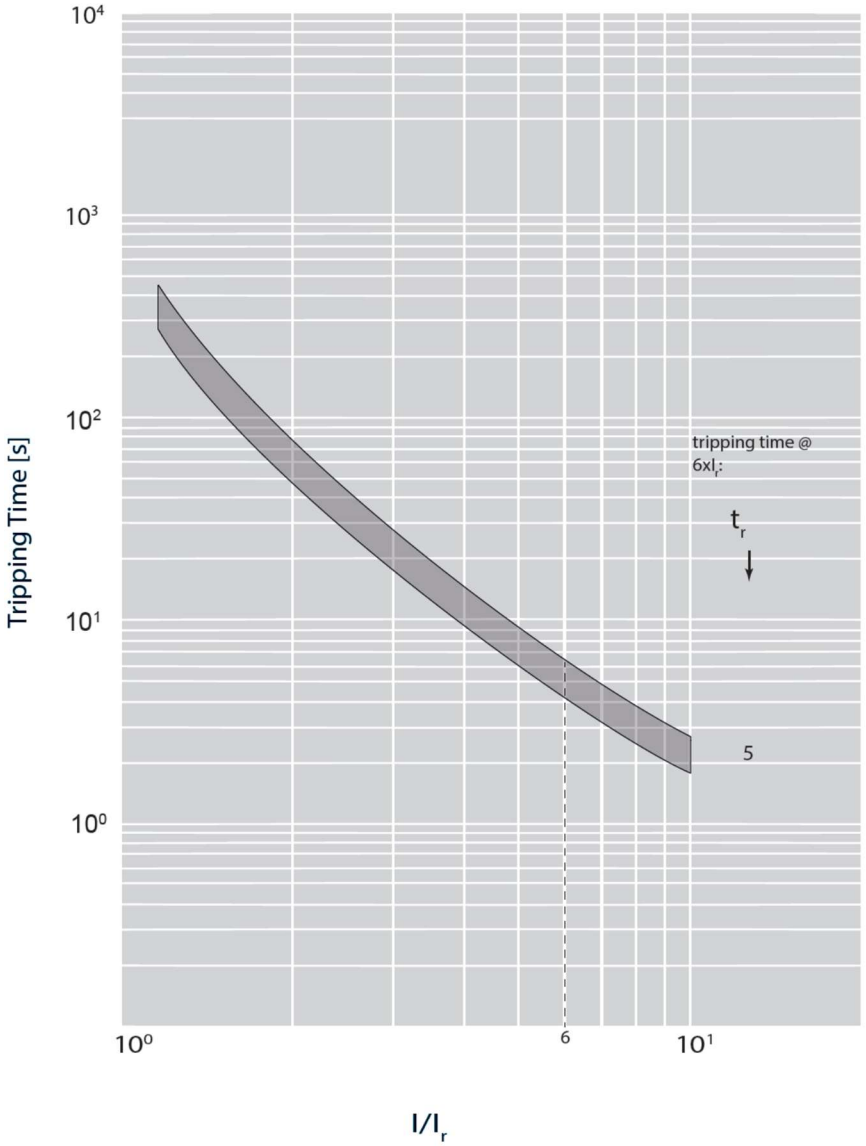
- Interlock mechanism – standard version *ref. 4 238 27*
  (for fixed version DPX³ 125 HP and DPX³ 250 HP)
- Interlock mechanism – for electronic module *ref. 4 238 28*
  (for fixed version DPX³ 125 HP and DPX³ 250 HP)
- Interlock plate for DPX³ 250 HP *ref. 4 238 26*
- Rear interlock mechanism *ref. 4 238 29*
  (for DPX³ 250 HP plug-in and/or draw-out version)
  If used ref. 0 098 19, maximum 1 set

9. CURVES

9.1.1 Tripping curve [1/3]

Update: 11/06/2019



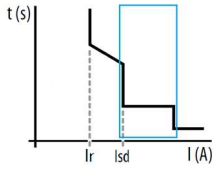


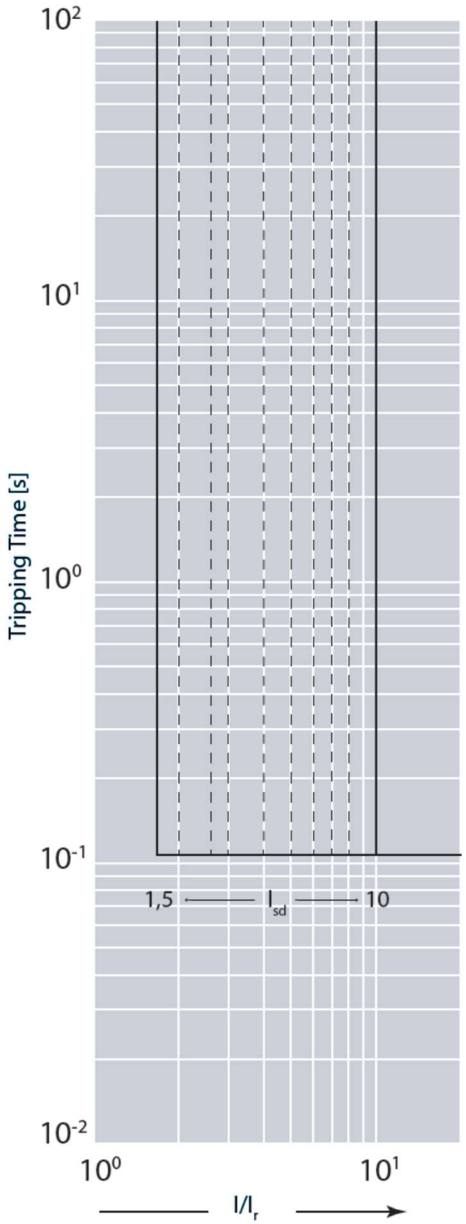
I_{cu} = 36-50 kA I_{max} = 250A 4 P U_e = 415Vac *(IEC/EN 60947-2)*

Value	Description
t	time
I	current
I_r	long time setting current
t_r	long time delay
Isd	short time setting current
tsd	short time delay
Ii	instantaneous release
Icu	rated ultimate short-circuit breaking capacity
I^2t = K	constant pass-through energy setting
t = K	constant tripping time setting
----------	long time trip curve
----------	short time trip curve
Current tolerance	10% up to I_{sd}; 20% up to I_i

9.1.2 Tripping curve [2/3]

Update: 11/06/2019



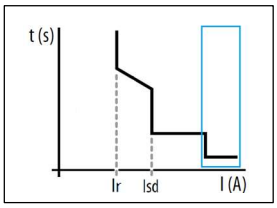


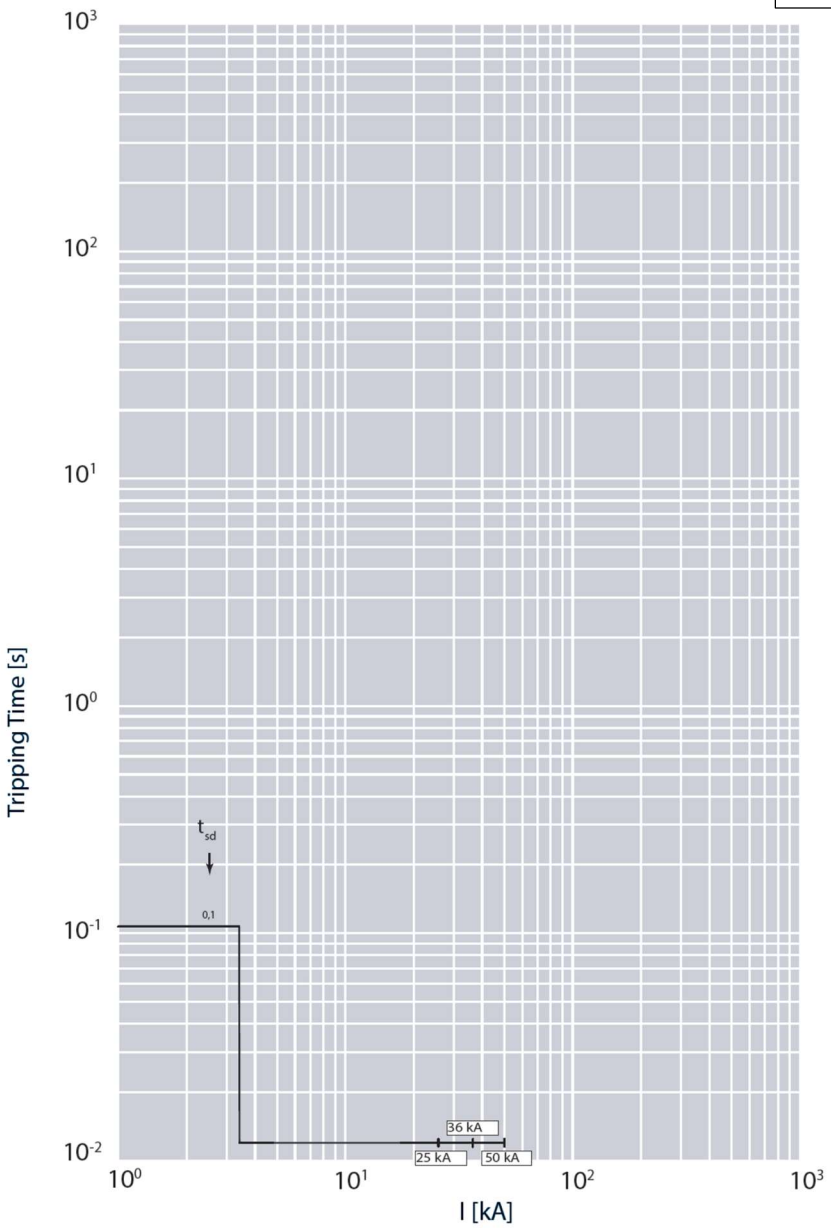
I_{cu} = 36-50 kA I_{max} = 250A 4 P U_e = 415Vac *(IEC/EN 60947-2)*

Value	Description
t	time
I	current
I_r	long time setting current
t_r	long time delay
Isd	short time setting current
tsd	short time delay
Ii	instantaneous release
Icu	rated ultimate short-circuit breaking capacity
I^2t = K	constant pass-through energy setting
t = K	constant tripping time setting
———	long time trip curve
----------	short time trip curve
Current tolerance	10% up to I_{sd}; 20% up to I_i

9.1.3 Tripping curve [3/3]

Update: 11/06/2019



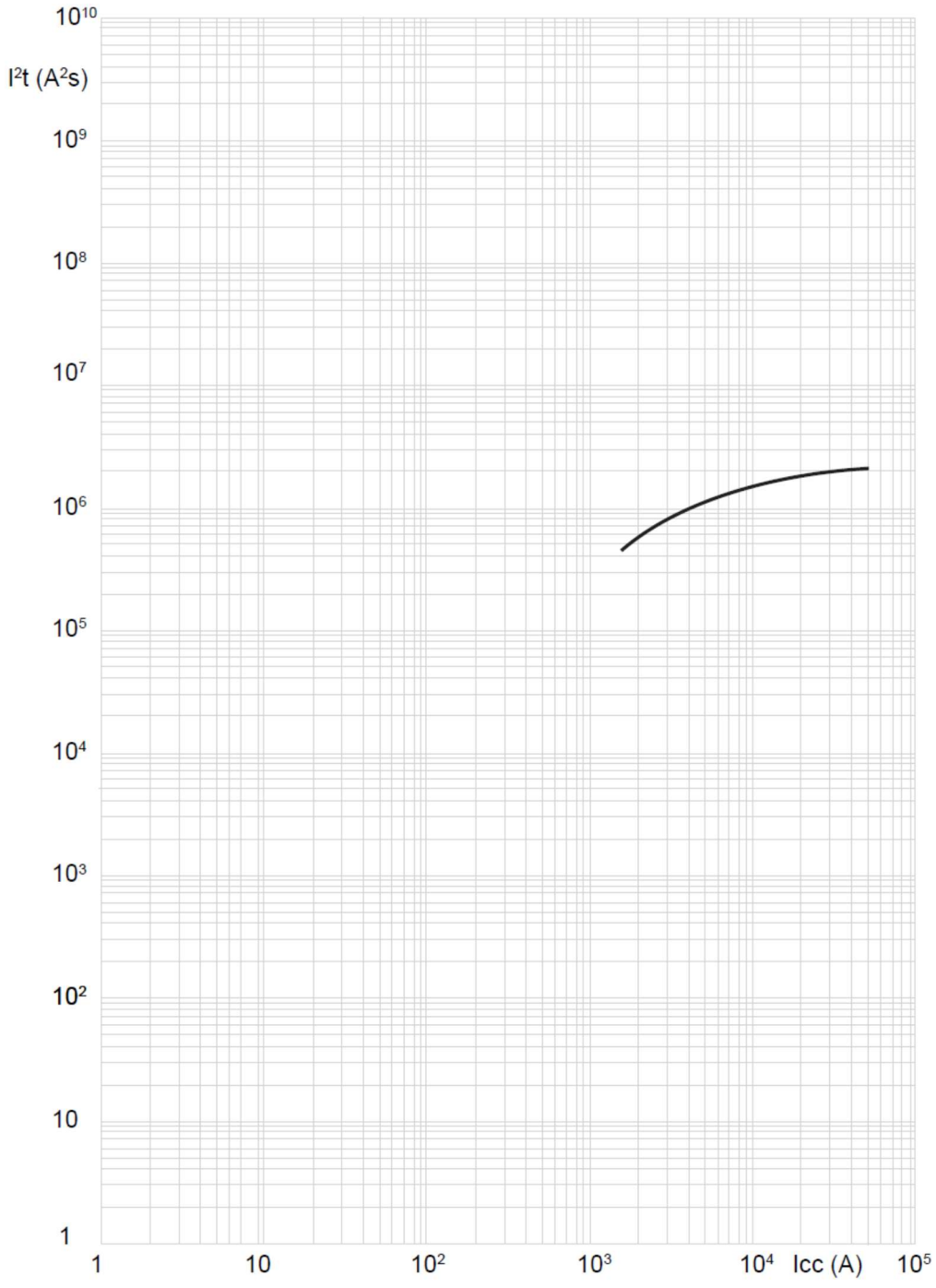


I_{cu} = 36-50 kA I_{max} = 250A 4 P U_e = 415Vac *(IEC/EN 60947-2)*

Value	Description
t	time
I	current
I_r	long time setting current
t_r	long time delay
Isd	short time setting current
tsd	short time delay
Ii	instantaneous release
Icu	rated ultimate short-circuit breaking capacity
I^2t = K	constant pass-through energy setting
t = K	constant tripping time setting
————	long time trip curve
----------	short time trip curve
Current tolerance	10% up to I_{sd}; 20% up to I_i

9.2 Pass-through specific energy characteristic curve

Update: 30/08/2019

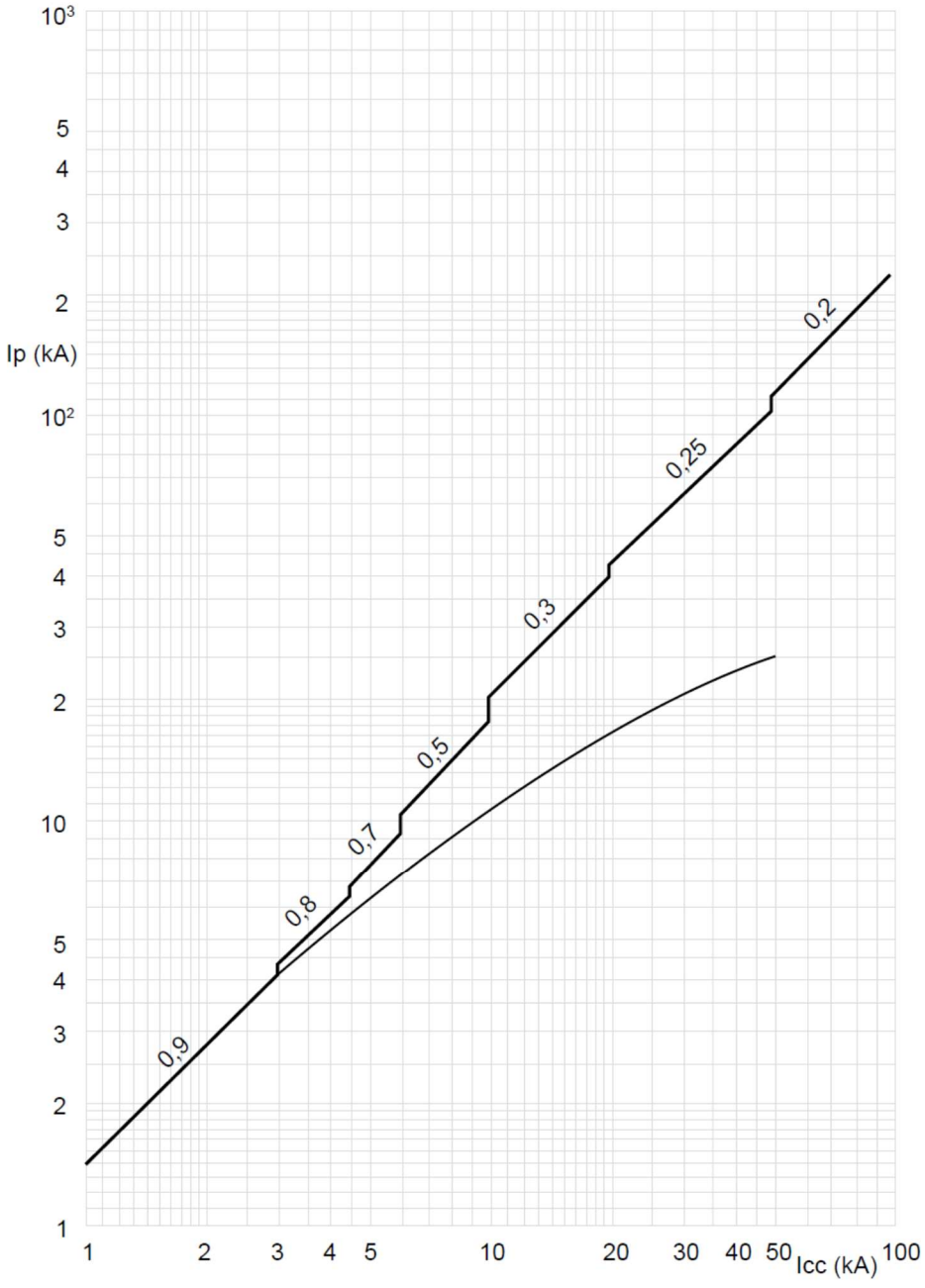


I_{cu} = 36-50 kA I_{max} = 250A 4 P U_e = 415Vac *(IEC/EN 60947-2)*

Value	Description
I_{cc}	short circuit current
I^2t (A^2s)	pass-through specific energy

9.3 Cut-off peak current characteristic curve

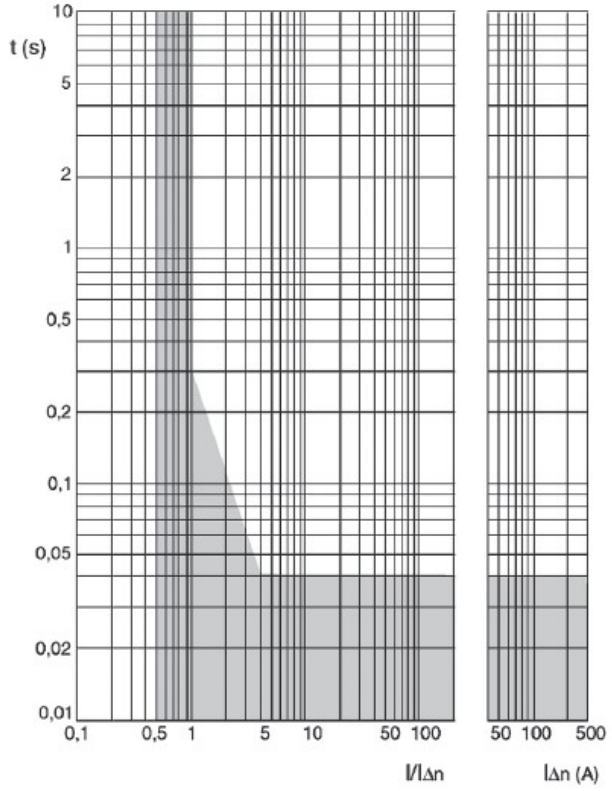
Update: 30/08/2019



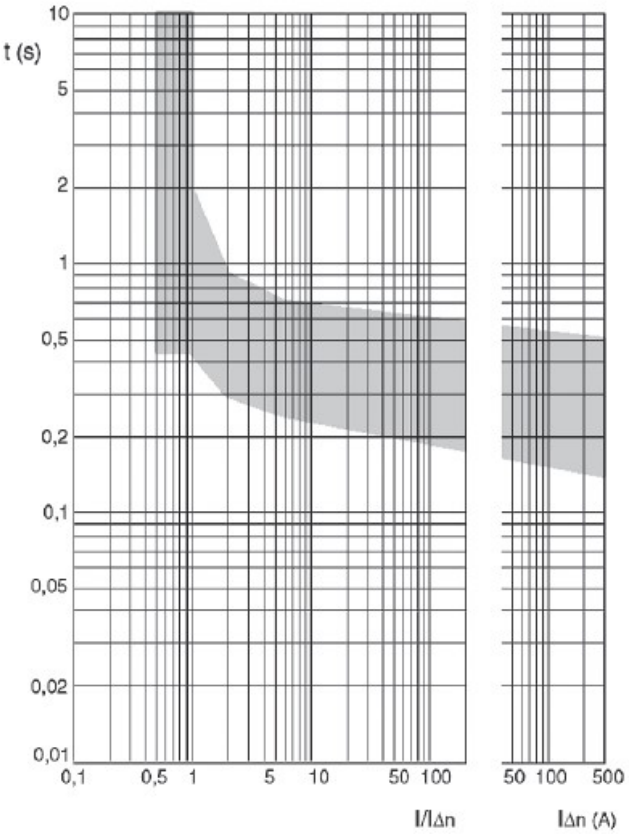
I_{cu} = 36-50 kA I_{max} = 250A 4 P U_e = 415Vac *(IEC/EN 60947-2)*

Value	Description
I_{cc}	estimated short circuit symmetrical current (RMS value)
I_p	maximum short circuit peak current
	maximum prospective short circuit peak current corresponding at the power factor
	maximum real peak short circuit current

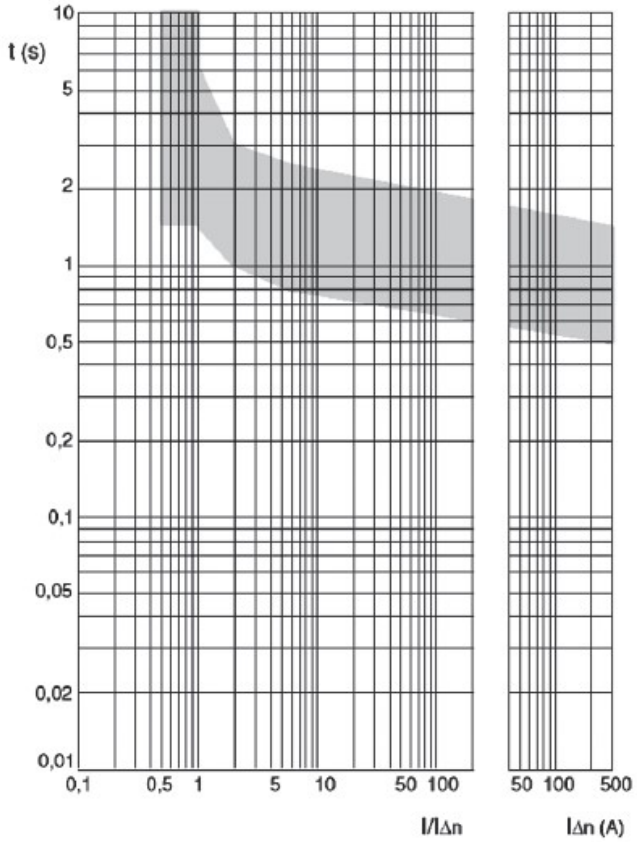
9.4.1 Earth leakage curves, instantaneous



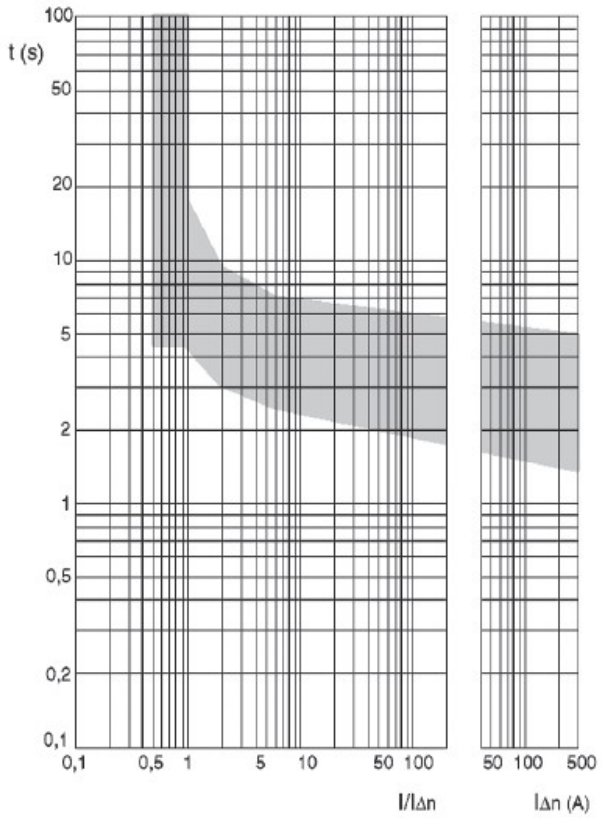
9.4.2 Earth leakage curves, time delay = 0.3 s



9.4.3 Earth leakage curves, time delay = 1 s



9.4.4 Earth leakage curves, time delay = 3 s



A) Derating Temperature and configurations

	Ambient temperature									
	30 °C		40 °C		50 °C		60 °C		70 °C	
Fixed version	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n
Cage terminals, flexible cable	238	0.95	225	0.90	200	0.80	175	0.70	163	0.65
Cage terminals, flexible cable + sealable terminal shields	238	0.95	225	0.90	200	0.80	175	0.70	163	0.65
Spreaders, flexible cable	250	1	213	0.85	200	0.80	175	0.70	163	0.65
Rear terminals, flexible cable	238	0.95	200	0.80	188	0.75	163	0.65	150	0.60
Plug-in/draw-out version	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n	I_{max} (A)	I_r / I_n
Cage terminals, flexible cable	250	1	238	0.95	238	0.95	233	0.93	225	0.90

For further technical information, please contact Legrand technical support.