

Megatiker M3 160 thermal magnetic circuit breakers with earth leakage Megatiker MS3 160 switch disconnectors with earth leakage

Reference(s) :

T7304F160D; T7304N160D;

T7304D160D



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1. USE

Megatiker M3 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.

Megatiker M3 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

Circuit breakers

	Megatiker M3 160 + earth leakage	
	36 kA	50 kA
I _n (A)	4P	
160	T7304F160D	T7304N160D

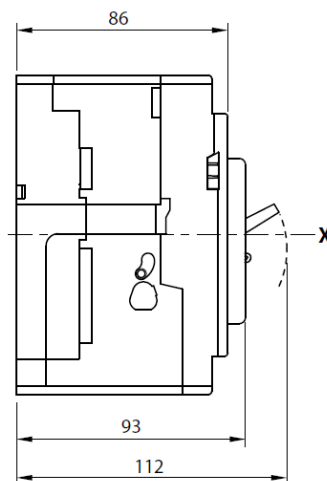
Switch disconnectors

Megatiker MS3 125 + earth leakage	
I _n (A)	4P
160	T7304S160D

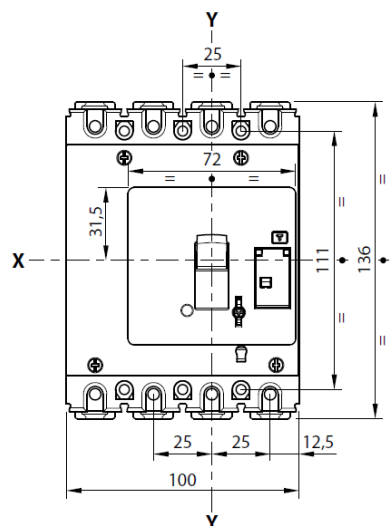
3. DIMENSIONS AND WEIGHTS

3.1 Dimensions

Lateral view



Frontal view (4 poles)



Megatiker M3 160 thermal magnetic circuit breakers with earth leakage

Megatiker MS3 160 switch disconnectors with earth leakage

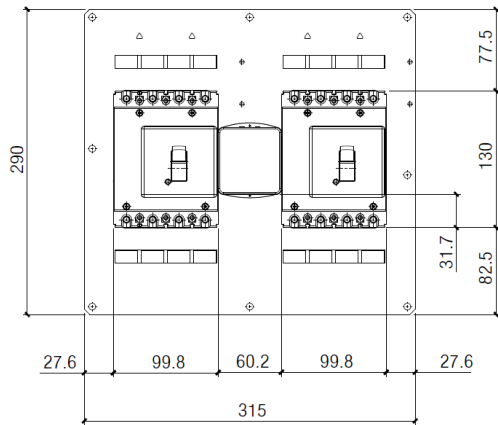
Reference(s) :

T7304F160D; T7304N160D;

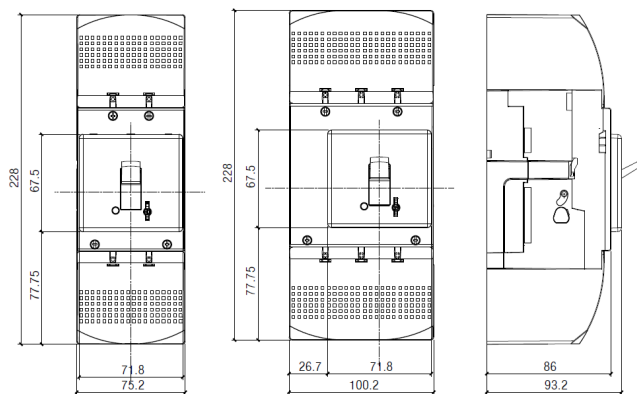
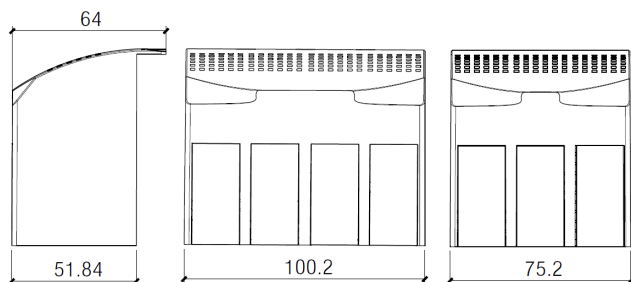
T7304D160D

Interlock

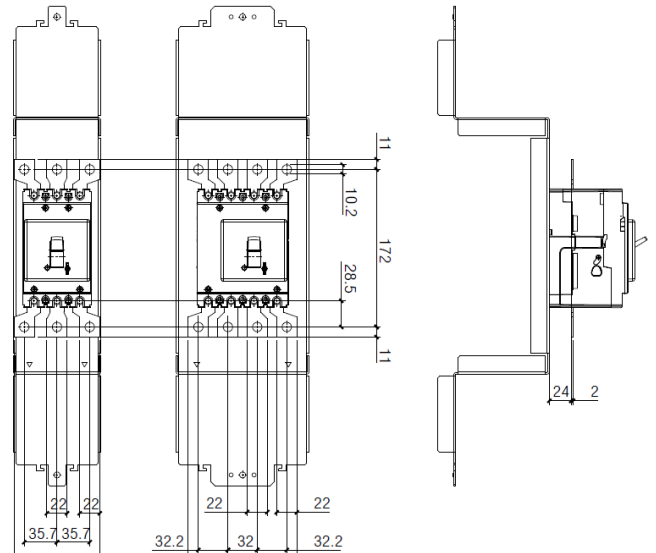
(for rear plate interlock dimension, see relative instruction sheet)



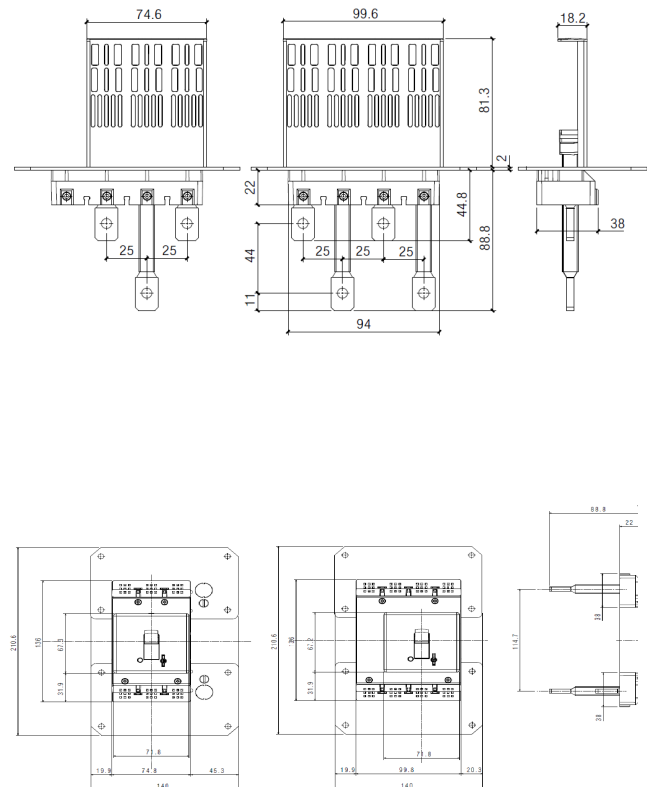
Sealable terminal shields



Spreaders



Rear terminals



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Reference(s) :

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T7304D160D

3.2 Weights

	Weights (Kg)
Configuration	4P
Circuit breaker/switch disconnecter	1.4
Direct rotary handle*	0.18
Vari depth rotary handle*	0.55
Interlock*	0.35
Spreader*	0.175

** to add to device weight*

4. OVERVIEW

4.1 Supplied with:

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

5. ELECTRICAL CONNECTIONS

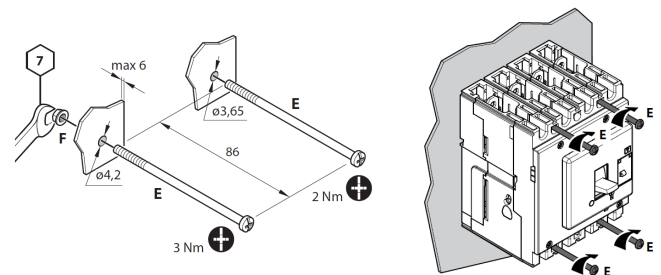
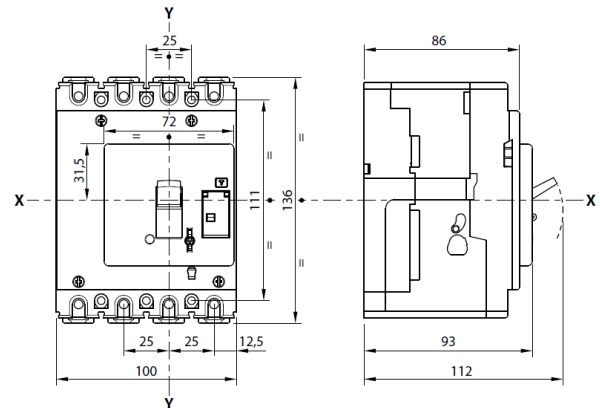
5.1 Mounting possibilities

On plate:

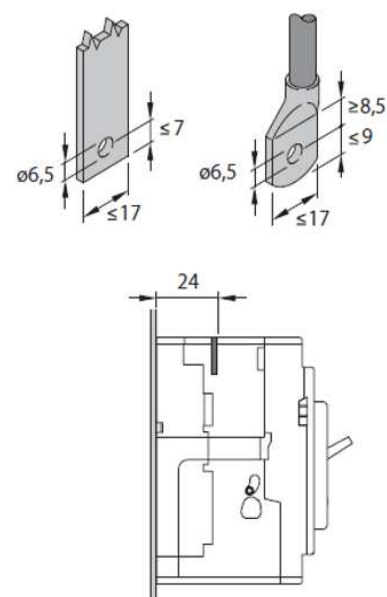
- Vertical
- Horizontal
- Supply inverter type

5.2 Mounting

(see instruction sheet for detailed mounting procedures)



Busbars/cable lugs:

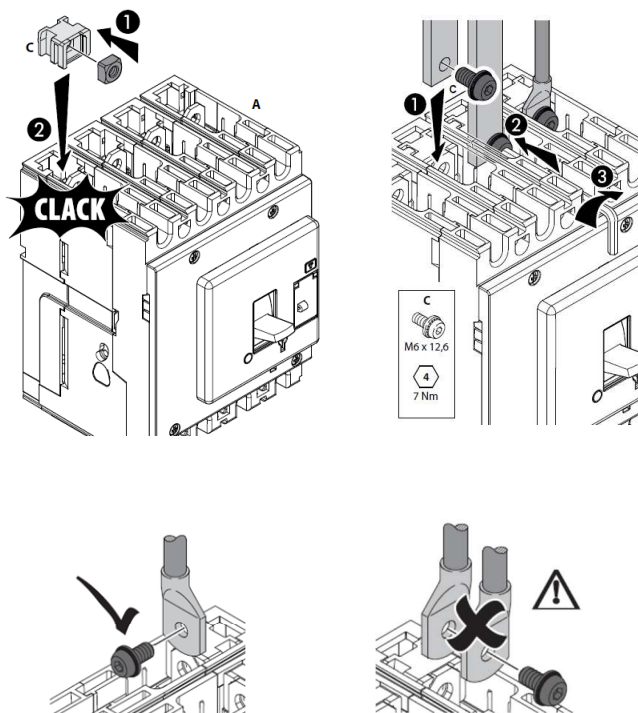


Megatiker M3 160 thermal magnetic circuit breakers with earth leakage Megatiker MS3 160 switch disconnectors with earth leakage

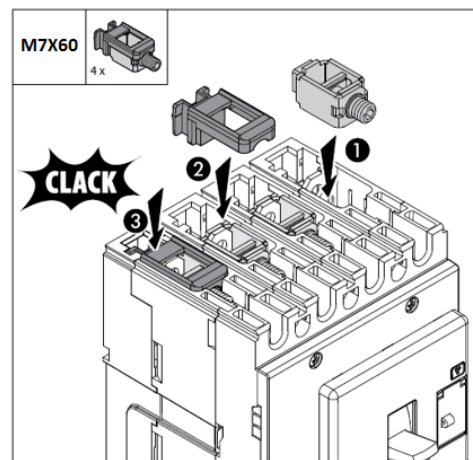
Reference(s) :

T7304F160D; T7304N160D;

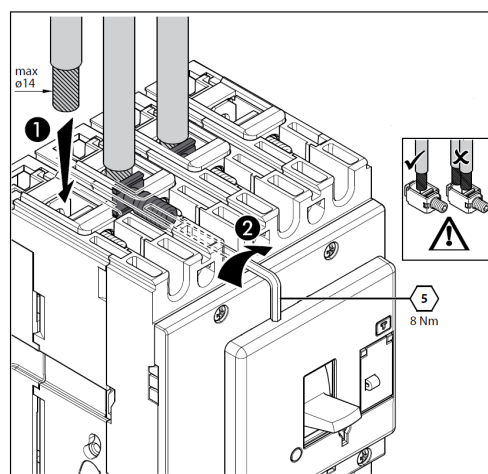
T7304D160D



Cables:



For Cu/Al cables, 1x70 mm² for flexible and rigid cables
(for Al cables In max 80A)



Megatiker M3 160 thermal magnetic circuit breakers with earth leakage

Megatiker MS3 160 switch disconnectors with earth leakage

Reference(s) :

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T7304D160D

6. ELECTRICAL AND MECHANICAL CHARACTERISTICS

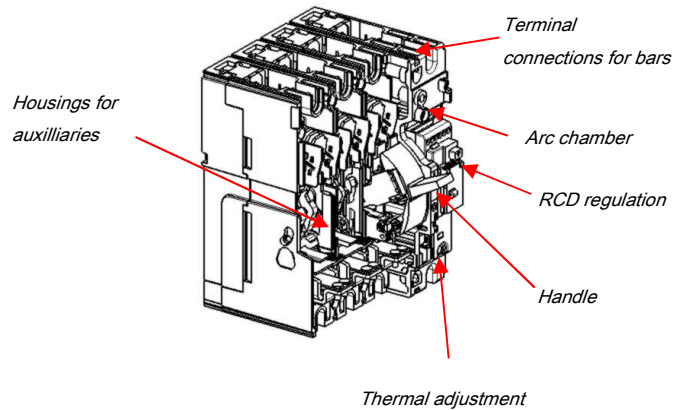
Circuit breaker

Circuit Breaker	Megatiker M3 160 + RCD F/N (36kA, 50kA)
Rated current (A)	160
Poles	4
Pole pitch (mm)	25
Rated insulation voltage (50/60Hz) U_i (V)	500
Rated operating voltage (50/60Hz) U_o (V)	500
Rated impulse withstand current U_{imp} (kV)	6
Rated frequency (Hz)	50 - 60
Reference ambient temperature (°C)	40 - 50
Operating temperature (°C)	-25 + 70
Mechanical endurance (cycles)	20000
Electrical endurance at I_n (cycles)	8000
Utilization category	A
Suitable for isolation	Yes
Type of protection	Thermal-magnetic
Thermal adjustment I_t	0,8 - 0,9 - 1 x I_n
Magnetic adjustment I_t (A)	$I_n=1600A$ (not adjustable)
Neutral protection for 4P (% I_{th} of phase pole)	100
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)	100 x 135 x 86 (4P)

Switch disconnectors

Switch	Megatiker MS3 160
Uninterrupted nominal current I_n (A)	160
Short-time resistive current I_{sr} (kA) for 1s	1.5
Rated short-circuit making capacity I_{cm} (kA)	2.5
Rated insulation voltage U_i (V AC)	500
Maximum rated operating voltage U_o (V AC)	500
Rated impulse withstand voltage U_{imp} (kV)	6
Utilisation category	AC23A
Suitable for isolation	Yes
Nominal frequency (Hz)	50-60
Operating temperature (°C)	-25 + 70
Mechanical endurance (cycles)	20000
Electrical endurance at I_n (cycles)	8000
Dimensions (W x H x D) (mm)	100 x 135 x 86 (4P)

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	20	25
	480/500 V AC	12	16
	I_{cs} (% I_{cu})	100	100
NEMA AB-1	Rated making capacity under short circuit I_{cm}		
	I_{cm} (kA) at 415V	76.5	105
	220/240 V AC	70	90
	480/500 V AC	12	16

6.3 Rated current (I_n) at 40°C / 50°C

	Phases limit trip current			
	thermal (I _t)		magnetic (I _i)	
I _n (A)	0.8 x I _n	1 x I _n	min	max
160	128	160	1600	1600

6.3 Load operations

Force on handle	N
Opening operation	40
Closing operation	40
Restore operation	53

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.

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Megatiker MS3 160 switch disconnectors with earth leakage

Reference(s) :

T7304F160D; T7304N160D;

T7304D160D

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)
I _n (A)	160
Lugs	15.62
Spreaders	18.18
Rear terminals	24.58

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.

Switch disconnectors

	Power losses per pole (W)
I _n (A)	
160	
Lugs	12.80
Spreaders	15,36
Rear terminals	21.76

Note: power loss in the table above are referred and measured as described in the standard IEC 60947-3 for switches. 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)										
In (A)	-20	-10	-5	0	10	20	30	40	50	60	70
160	201	193	189	187	179	173	166	160	160	146	138

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 Megatiker M3 160 circuit breakers, degree 3, according to IEC/EN 60947-2

6.6.3 Altitude

Altitude derating for Megatiker M3 circuit breakers and switch disconnectors with RCD

Altitude (m)	2000	3000	4000	5000
U _e (V)	500	430	380	330
I _n (A) (T _a = 40°C/50°C)	1 x I _n	0.98 x I _n	0.93 x I _n	0.9 x I _n

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Reference(s) :

T7304F160D; T7304N160D;
T7304D160D

7. CONFORMITY

Megatiker M3 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.

Megatiker M3 respect the European Directives REACH, RoHS, RAEE.

For specific information, please contact Legrand support

7.1 Marking

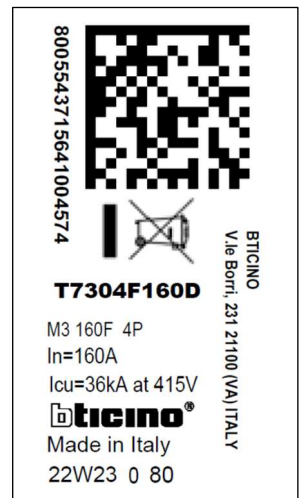
Product (both circuit breakers and switch disconnectors) are provided with labelling in full conformity to the referred standard and directives requirements by laser or sticker labels (for illustrative purposes only) as:

Product laser label on front

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

Product sticker label on side

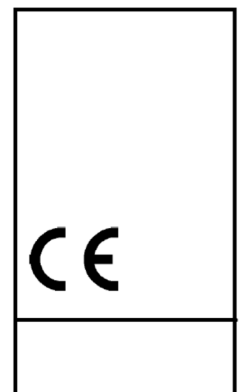
- Manufacturer responsible
- Denomination and type product
- Standard conformity
- Mark/Licence (if any)
- Directive requirements
- Bar code identification product
- Manufacturing Country



T7304F160D

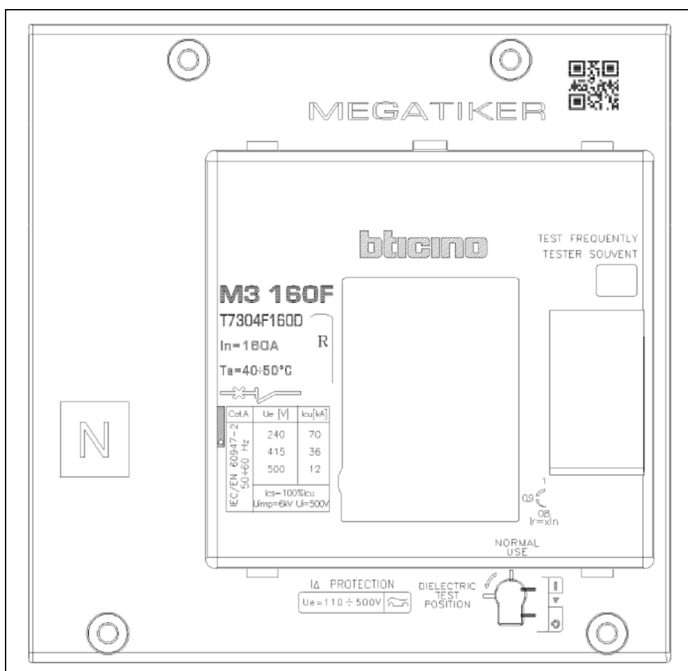
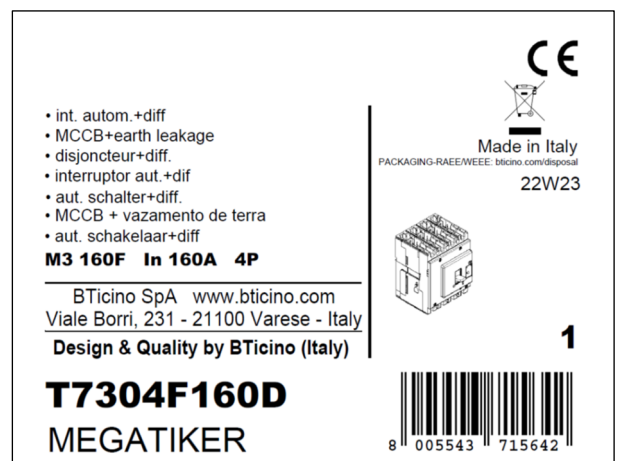
Mark sticker label on side

- 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



Megatiker M3 160 thermal magnetic circuit breakers with earth leakage

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Reference(s) :

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T7304D160D

8. EQUIPMENTS AND ACCESSORIES

8.1 Releases (for Megatiker M3 125/160/250, M1 and M2)

shunt releases with voltage:

12 Vac and dc
24 Vac and dc
48 Vac and dc
110÷130 Vac
220÷277 Vac
380÷480 Vac

ref. M7S012
ref. M7S024
ref. M7S048
ref. M7S110
ref. M7S230
ref. M7S415

Maximum power = 400 VA / W

• undervoltage releases with voltage:

12 Vac and dc
24 Vac and dc
48 Vac and dc
110÷130 Vac and dc
220÷240 Vac
277 Vac
380÷415 Vac
440÷480 Vac

ref. M7U012
ref. M7U024
ref. M7U048
ref. M7U110
ref. M7U230
ref. M7U277
ref. M7U415
ref. M7U480

Maximum power = 4 VA

Circuit breaker opening time < 50 ms

UVR releases can be used on Megatiker M3 125/160/250 starting from batch 19W15

• time-lag undervoltage releases (800 ms)

Time-lag modules with voltage:

230 V ac
400 V ac

ref. M7000MR/230
ref. M7000MR/400

Release

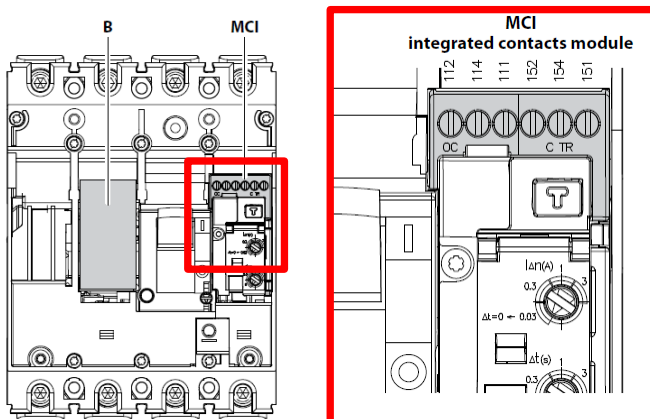
ref. M7UEM

(to be equipped with a time-lag module M7000MR/230 and M7000MR/400)

8.2 Auxiliary contacts

For version of Megatiker M3 125 thermal magnetic, with earth leakage module, auxiliary contacts are integrated inside module M.C.I (see instruction sheet for details).

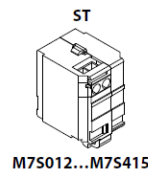
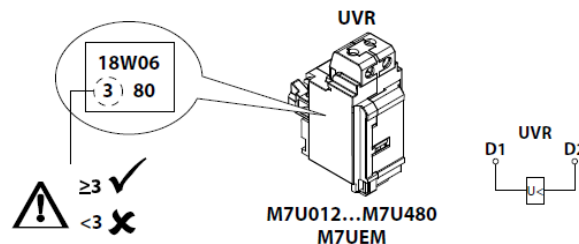
auxiliary functionality:



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

CTR	152-151	154-151
OFF		
TRIP		
ON		

OC	112-111	114-111
OFF		
TRIP		
ON		



M7S012...M7S415

	B
UVR	✓
ST	(max 1)
OC/CTR	✗

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

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. M7R24
- 1 lock + 1 flat key with fixed mapping (EL43525) ref. M7R25
- 1 lock + 1 flat key with fixed mapping (EL43363) ref. M7R26
- 1 lock + 1 star key with random mapping ref. M7R27

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Megatiker MS3 160 switch disconnectors with earth leakage

Reference(s) :

T7304F160D; T7304N160D;

T7304D160D

8.4 Mechanical accessories

- Padlock (for locking in "OPEN" position) *ref. M7X02*
(*ref. M7X02 is compatible with Megatiker M1/M2 and M3 250*)
- Sealable terminal shields:
 - Set of 3 (for 4P) *ref. M7C21*
- Insulated shields:
 - Set of 3 (for 4P) *ref. M7F02*
(*ref. M7F02 is compatible with Megatiker M3 250*)

8.5 Connection accessories

Cage terminals

- Set of 4 terminals for Al/Cu cables, 1x70 mm² for flexible and rigid cables *ref. M7X60*
(for Al cables In max 80A)
- Set of 4 terminals (high capacity) *ref. M7X53*
for cables 70 mm² max for Cu and 95 mm² max for Al
Section relative to maximum current is 70 mm² (for Al)

8.6 Interlock mechanism

(for interlocking 2 Megatiker M3 125/160 HP or 2 Megatiker M3 250)

No frame mixing in interlock mechanism

- Interlock mechanism – standard version *ref. M7I01*
(for fixed version Megatiker M3 125/160 and 250)
- Interlock mechanism – for electronic module *ref. M7I02*
(for fixed version Megatiker M3 125/160 and 250)
- Interlock plate for Megatiker M3 125/160 *ref. M7I04*

Spreaders (incoming or outgoing):

- Set of 4 (for 4P) *ref. M7A51*

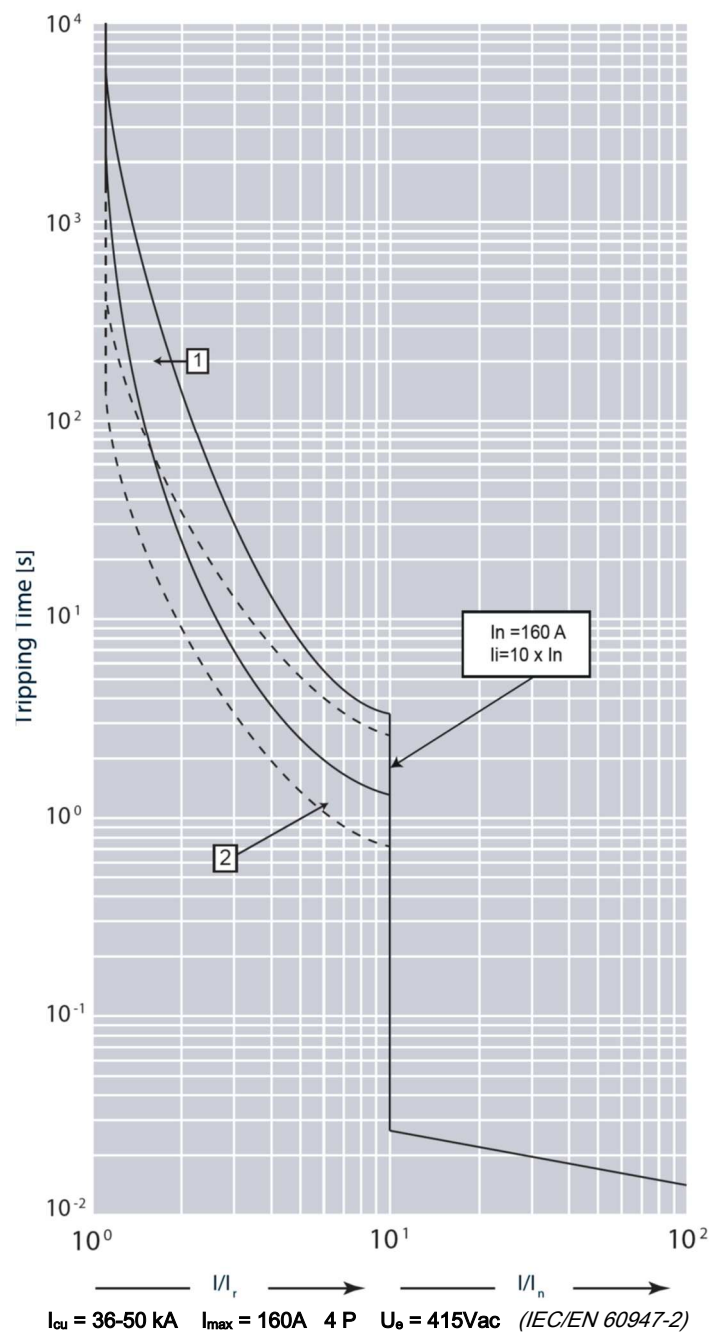
Rear terminals (incoming or outgoing):

- Set of 4 (for 4P) *ref. M7A55*

9. CURVES

9.1.1 Thermal magnetic tripping curve

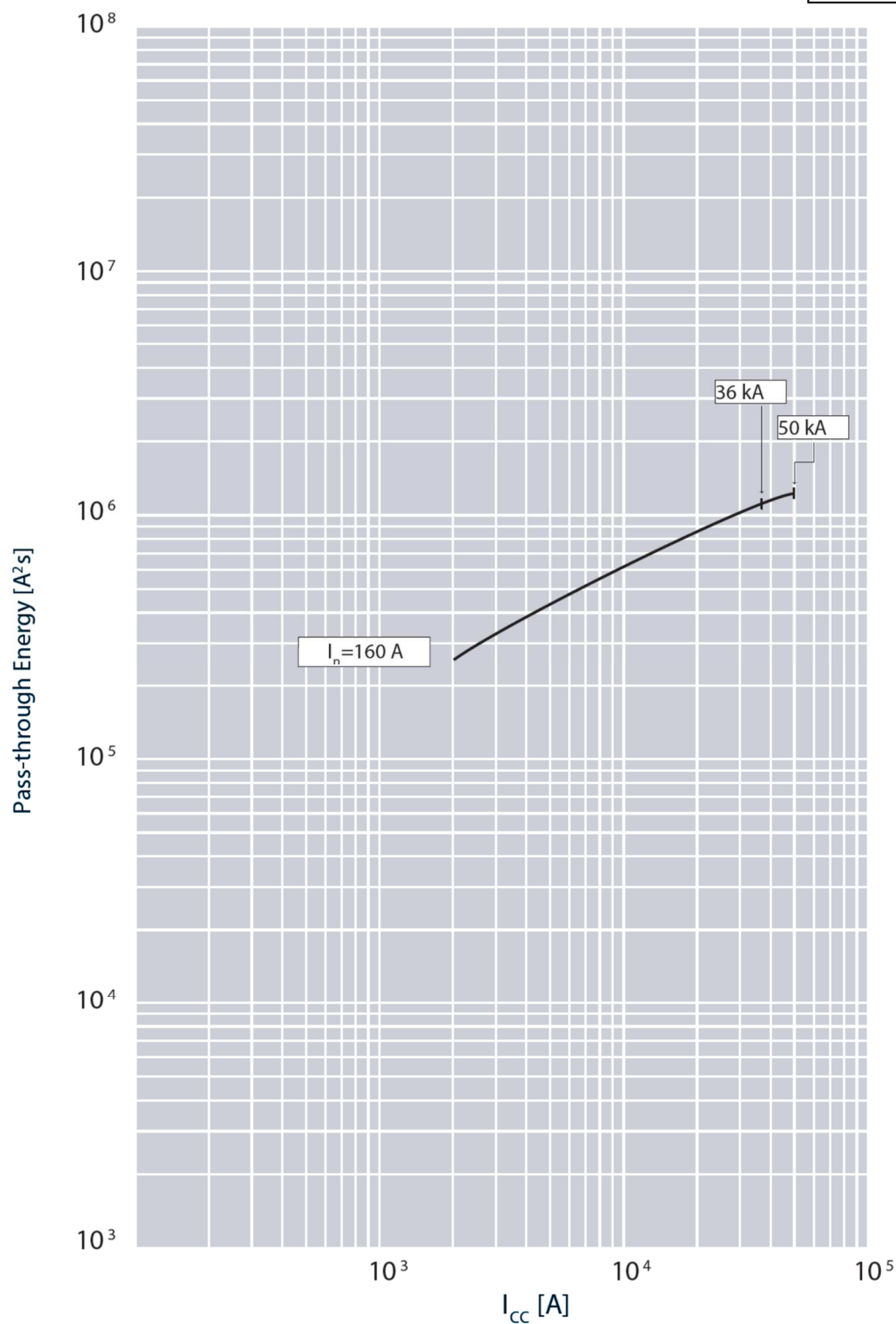
Update: 01/042022



Value	Description
t	time
I	current
I _n	rated current
I _r	long time setting current
curve 1	characteristic with cold start
curve 2	characteristic with hot start

9.2 Pass-through specific energy characteristic curve

Update: 01/04/2022



$I_{cu} = 36\text{--}50\text{ kA}$ $I_{max} = 160\text{ A}$ 4 P $U_o = 415\text{Vac}$ (IEC/EN 60947-2)

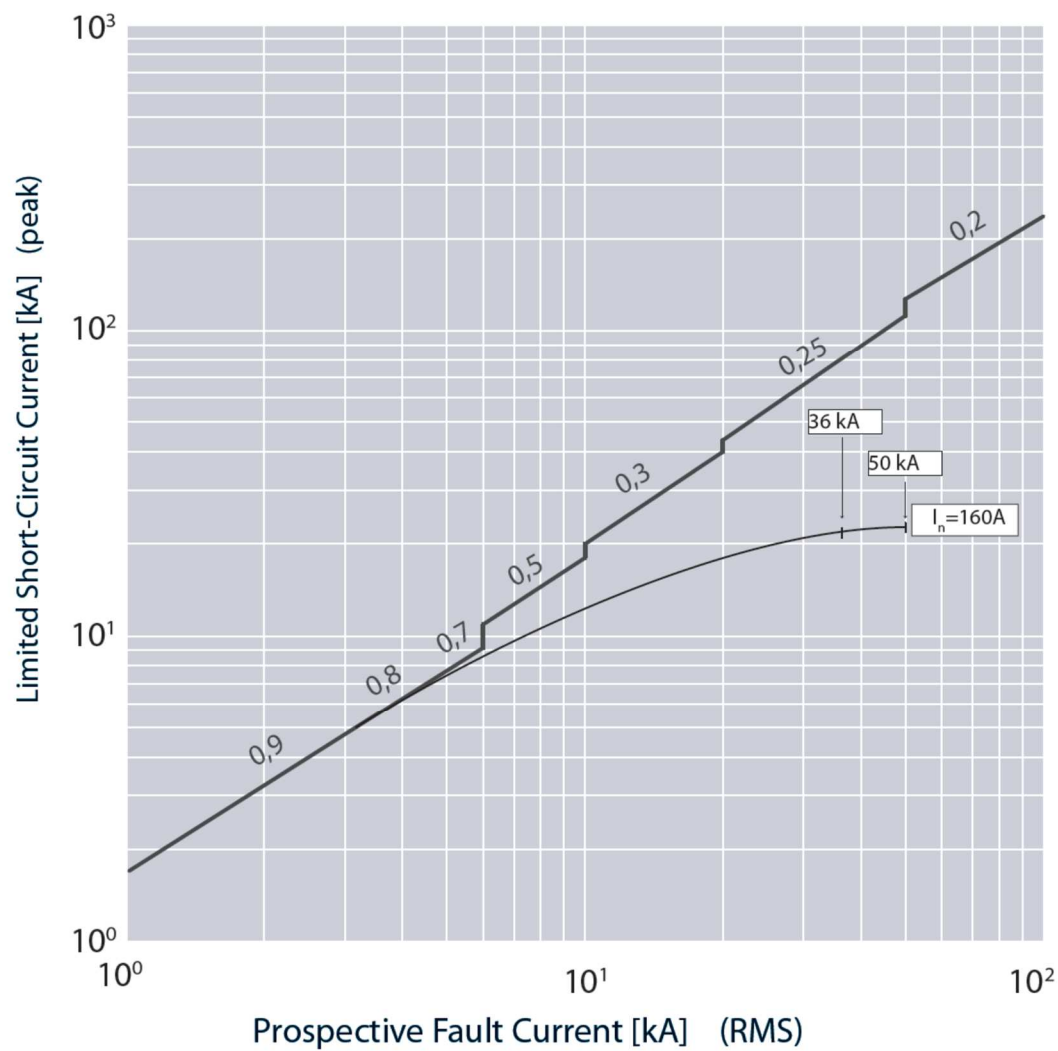
Value	Description
I_{cc}	short circuit current
$I^2t\text{ (A}^2\text{s)}$	pass-through specific energy

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9.3 Cut-off peak current characteristic curve (kA)

Update: 01/04/2022



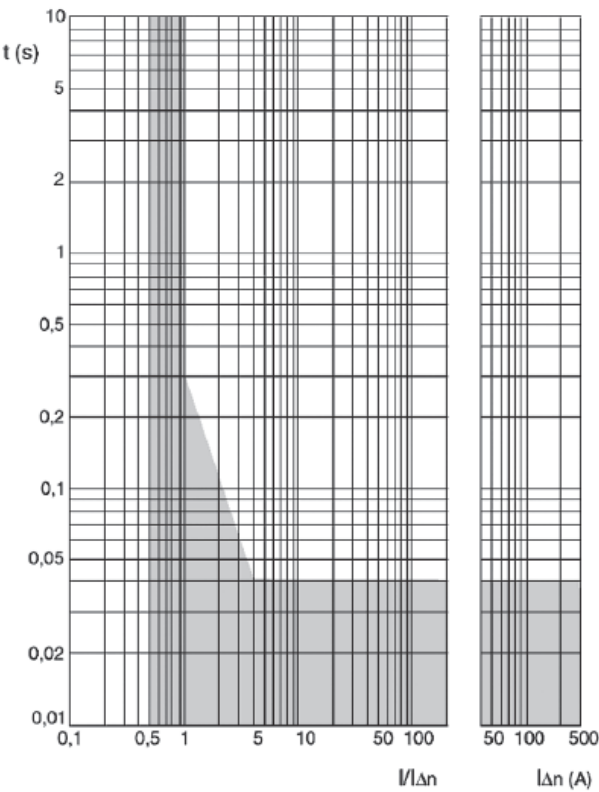
$I_{cu} = 36\text{--}50\text{ kA}$ $I_{max} = 160\text{ A}$ 4 P $U_o = 415\text{Vac}$ (IEC/EN 60947-2)

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

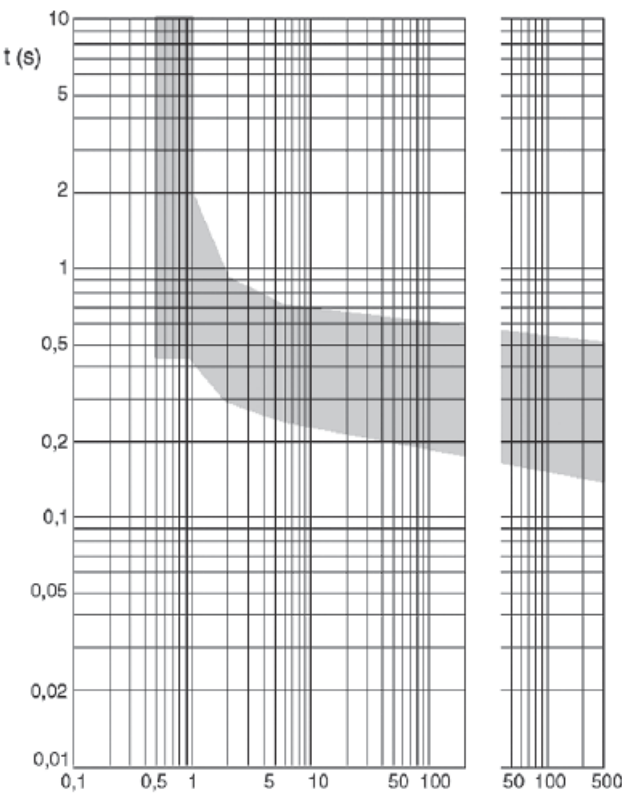
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Reference(s) :
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T7304D160D

9.4.1 Earth leakage curves, instantaneous



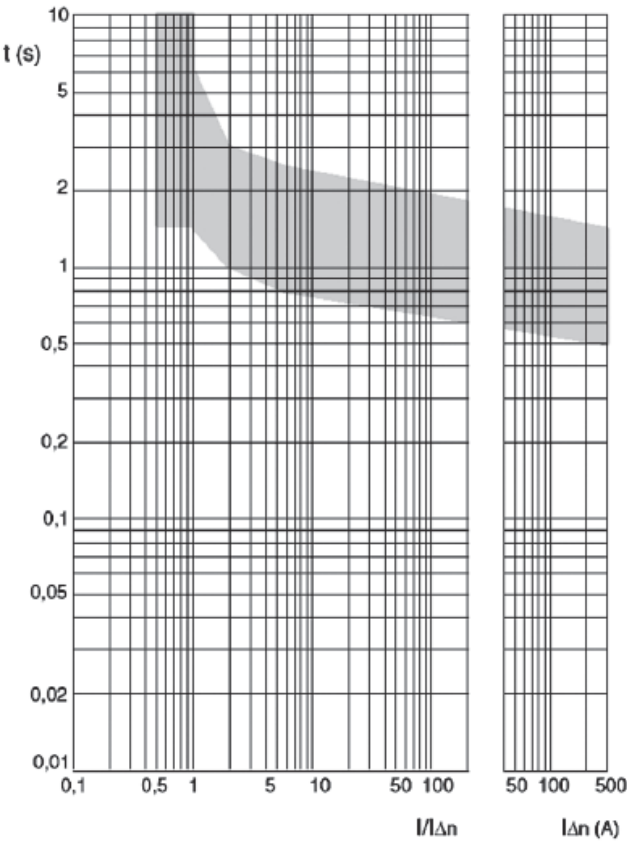
9.4.2 Earth leakage curves, time delay = 0.3 s



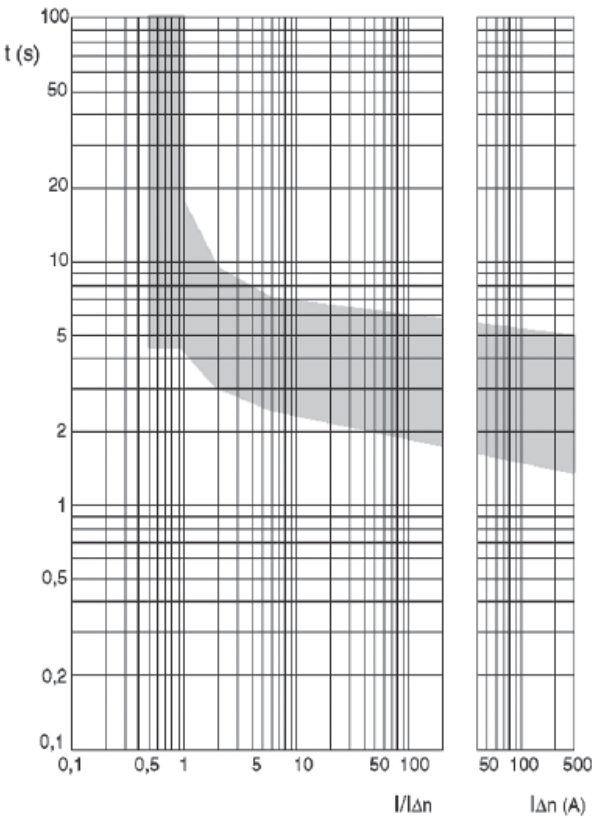
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9.4.3 Earth leakage curves, time delay = 1 s



9.4.4 Earth leakage curves, time delay = 3 s



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Megatiker MS3 160 switch disconnectors with earth leakage

Reference(s) :
T7304F160D; T7304N160D;
T7304D160D

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	163	1.02	160	1	160	1	144	0.90	136	0.85
Cage terminals, rigid cable	163	1.02	160	1	160	1	144	0.90	136	0.85
Lugs, flexible cable	163	1.02	160	1	160	1	144	0.90	136	0.85
Lugs, rigid cable	163	1.02	160	1	160	1	144	0.90	136	0.85
Spreaders, flexible cable	163	1.02	160	1	160	1	144	0.90	136	0.85
Spreaders, rigid cable	163	1.02	160	1	160	1	144	0.90	136	0.85

For further technical information, please contact Legrand technical support.