

# Megatiker M3 160

## Thermal magnetic circuit breakers with earth leakage module

Cat.Nos:  
T7304F160D - T7304N160D - T7304S160D

### MS3 160 trip-free switches with earth leakage module



CONTENT	Page
1. Use .....	1
2. Range .....	1
3. Technical characteristics.....	1
4. Installation rules.....	2
5. Dimensions and weight.....	3
6. Connections .....	4
7. Equipments and accessories.....	4
8. Marking .....	6
9. Curves .....	7
10. Standards and regulations .....	11
11. Other information .....	11

#### 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

##### ■ 2.1 Megatiker M3 160 thermal magnetic circuit breaker with RCD

Icu	36 kA	50 kA
In (A)	4P	4P
160	T7304F160D	T7304N160D

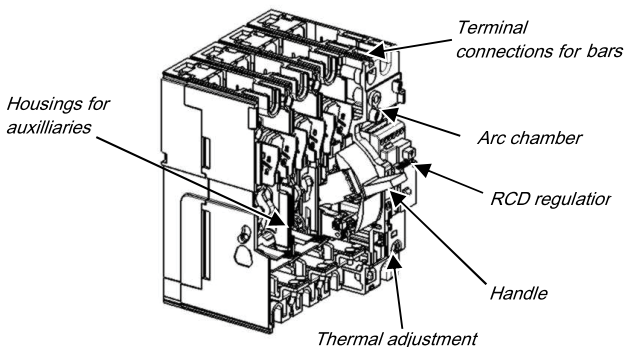
##### ■ 2.2 Megatiker MS3 160 trip-free switch with RCD

In (A)	4P
160	T7304S160D

##### ■ 2.3 Composition

Megatiker M3 160 thermal magnetic with earth leakage module module is supplied with:

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



#### 3. TECHNICAL CHARACTERISTICS

##### ■ 3.1 Electrical characteristics

Megatiker 160 thermal magnetic circuit breakers with RCD	
Rated current	160 A
Poles	4P
Pole pitch	25 mm
Rated insulation voltage (50/60Hz) Ui	500 V
Rated operating voltage (50/60Hz) Ue	500 V
Rated impulse withstand current Uimp	6 kV
Rated frequency	50 Hz to 60 Hz
Reference ambient temperature	40 °C to 50 °C
Operating temperature	-25 °C to 70 °C
Electrical endurance at In (cycles)	8000
Utilization category	A
Suitable for isolation	Yes
Type of protection	Thermal magnetic
Thermal adjustment Ir	0.8 - 0.9 - 1 x In
Magnetic adjustment Ii (A)	In = 1600 A (not adjustable)
Neutral protection for 4P (%Ith of phase pole)	100
Earth leakage type	A- Integrated
Adjustable sensitivity	0.03 A - 0.3 A - 1 A - 3 A
Adjustable tripping	0s - 0.3s - 1s - 3s (with 0.03 possible only 0s)
Reverse feed	Yes

**MS3 160 trip-free switches with earth leakage module**

**3. TECHNICAL CHARACTERISTICS (continued)**

**■ 3.1 Electrical characteristics (continued)**

<b>Megatiker MS3 160 trip-free switches with RCD</b>	
Uninterrupted nominal current Ie	160 A
Short-time resistive current Icw for 1s	1.5 kA
Rated short-circuit making capacity Icm	2.5 kA
Rated insulation voltage Ui	500 V~
Maximum rated operating voltage Ue	500 V~
Rated impulse withstand voltage Uimp	6 kV
Utilisation category	AC23A
Suitable for isolation	Yes
Rated frequency (Hz)	50 Hz - 60 Hz
Operating temperature	-25 °C to 70 °C
Electrical endurance at In (cycles)	8000
Reverse feed	Yes

The maximum temperature allowed on power terminals is 125 °C (absolute). For details, see IEC 60947-1 and 60947-2.

**Breaking capacity (4P)**

	<b>Breaking capacity (kA) &amp; Ics</b>		
	Ue	Icu	
IEC 60947-2		36 kA	50 kA
	220/240 V~	70	90
	380/415 V~	36	50
	440/460 V~	20	25
	480/500 V~	12	16
	Ics (% Icu)	100	
<b>Rated making capacity under short circuit Icm</b>			
	Icm (kA) at 415 V	76.5	105

**Rated current (In) at 40 °C / 50 °C**

<b>Phases limit trip current (A)</b>				
<b>In (A)</b>	<b>Thermal (Ir)</b>		<b>Magnetic (Ii)</b>	
	0.8 x In	1 x In	Min.	Max.
<b>160</b>	128	160	1600	1600

**■ 3.2 Mechanical characteristics**

Mechanical endurance (cycles): 20000

**Load operations**

	<b>Force on handle (N)</b>
Opening operation	40
Closing operation	40
Restore operation	53

**■ 3.3 Electrodynamical 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 recommended the use of isolators suitable for the type of conductor used and the operating voltage.

<b>Icc (kA)</b>	<b>Maximum distance (mm)</b>
36	350
50	300

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

**■ 3.4 Power losses per pole under In (W)**

<b>Circuit breakers</b>	
<b>In (A)</b>	<b>160</b>
<b>Lugs</b>	15.62
<b>Cage terminals</b>	16.94
<b>External terminals</b>	16.94
<b>Spreaders</b>	16.94
<b>Rear terminals</b>	16.94
<b>Plug-in version</b>	28.42

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.

<b>Trip-free switches</b>	
<b>In (A)</b>	<b>160</b>
<b>Lugs</b>	13.76
<b>Cage terminals</b>	14.93
<b>External terminals</b>	14.93
<b>Spreaders</b>	14.93
<b>Rear terminals</b>	14.93
<b>Plug-in version</b>	26.56

Note: power loss in the table above are referred and measured as described in the standard IEC 60947-3 for trip-free switches. Values in the table are referred to a single phase.

**4. INSTALLATION RULES**

According to IEC/EN 60947-1.

**Temperature deratings**

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.

<b>In (A)</b>	<b>Temperature Ta (°C)</b>										
	-20	-10	-5	0	10	20	30	40	50	60	70
<b>160</b>	201	193	189	187	179	173	166	160	160	146	138

**MS3 160 trip-free switches with earth leakage module**

**4. INSTALLATION RULES (continued)**

**Temperature deratings (continued)**

For derating temperature with other configurations, see table below.

Ambient temperature	30 °C		40 °C		50 °C		60 °C		70 °C	
	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>	I <sub>max</sub> (A)	I <sub>r</sub> / I <sub>n</sub>
Cage terminals, flexible/rigid cable	163	1.02	160	1	160	1	144	0.90	136	0.85
Lugs, flexible/rigid cable										
Spreaders, flexible/rigid cable										
Rear terminals, flexible cable										

For further technical information, please contact BTicino technical support.

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

**Electromagnetic disturbances (EMC):** for Megatiker M3 160 with RCD circuit breakers, according to IEC/EN 60947-2 Annex B.

**Pollution degree:** for Megatiker M3 160 circuit breakers, degree 3, according to IEC/EN 60947-2.

**Altitude**

Altitude derating for Megatiker M3 and MS3

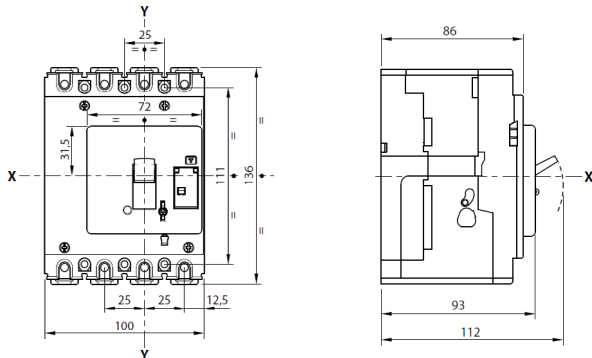
Altitude (m)	2000	3000	4000	5000
U <sub>e</sub> (V)	500	430	380	330
I <sub>n</sub> (A) (T <sub>a</sub> = 40°C/50°C)	1 x I <sub>n</sub>	0.98 x I <sub>n</sub>	0.93 x I <sub>n</sub>	0.9 x I <sub>n</sub>

**5. DIMENSIONS AND WEIGHT**

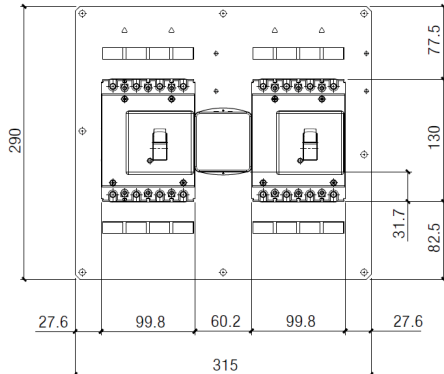
**5.1 Dimensions (mm)**

4P (W x H x D): 100 x 135 x 86

**Device without accessories**

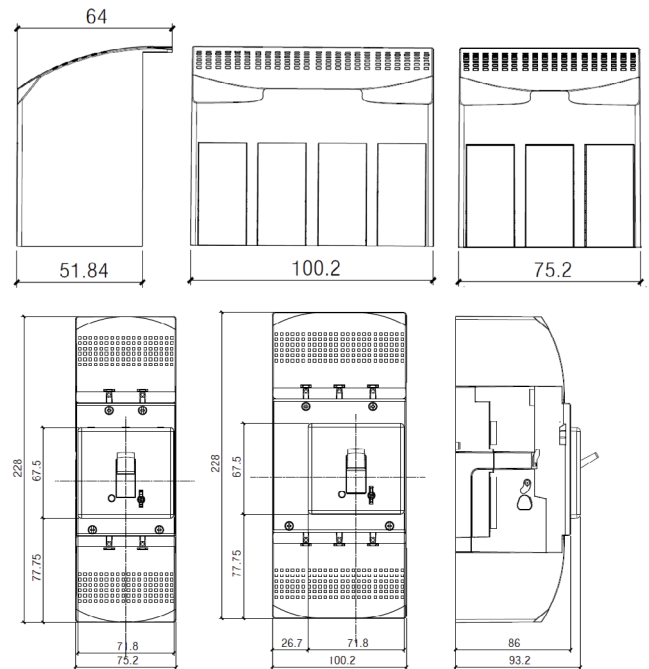


**With interlock**



For rear plate interlock dimension, see relative instruction sheet.

**With sealable terminal shield**

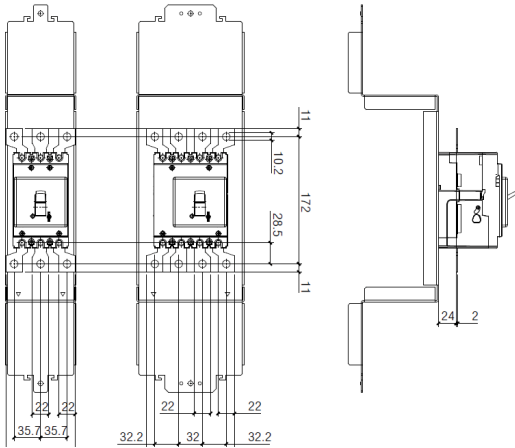


**MS3 160 trip-free switches with earth leakage module**

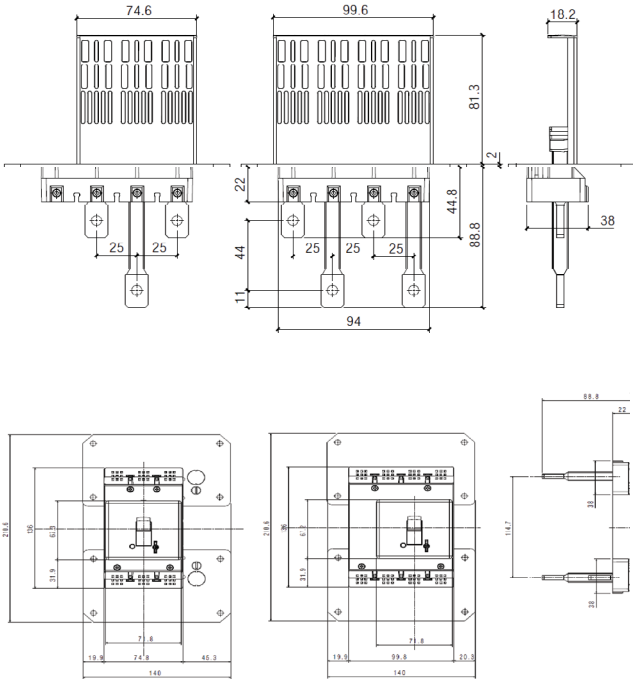
**5. DIMENSIONS AND WEIGHT (continued)**

**■ 5.1 Dimensions (continued)**

**With spreaders**



**With rear terminal**



**■ 5.2 Weight**

Weight (kg)	
<b>Configuration</b>	<b>4P</b>
Circuit breaker/trip-free switch	1.4
Interlock*	0.35
Spreader*	0.175

\* to add to device weight

**6. CONNECTIONS**

Possible way of assembly on plate:

- vertical
- horizontal

To ensure the circuit breaker's connection, it is possible to use:

- busbars;
- cables lugs;
- spreaders;
- cage terminals;

For detailed mounting procedures, see instruction sheet.

**7. EQUIPMENTS AND ACCESSORIES**

**■ 7.1 Releases**

There are 3 types of releases (also suitable for Megatiker M3 125/250 and Megatiker M1/M2):

**Shunt releases (ST)**

- 12 V $\sim$ /=
- 24 V $\sim$ /=
- 48 V $\sim$ /=
- 110 to 130 V $\sim$
- 220 to 277 V $\sim$
- 380 to 480 V $\sim$
- Maximum power = 400 VA / W

- Cat.No M7S012
- Cat.No M7S024
- Cat.No M7S048
- Cat.No M7S110
- Cat.No M7S230
- Cat.No M7S415

**Undervoltage releases (UVR)**

- 12 V $\sim$ /=
- 24 V $\sim$ /=
- 48 V $\sim$ /=
- 110 to 130 V $\sim$ /=
- 220 to 240 V $\sim$
- 277 V $\sim$
- 380 to 415 V $\sim$
- 440 to 480 V $\sim$
- Maximum power = 4 VA
- Circuit breaker opening time < 50 ms

- Cat.No M7U012
- Cat.No M7U024
- Cat.No M7U048
- Cat.No M7U110
- Cat.No M7U230
- Cat.No M7U277
- Cat.No M7U415
- Cat.No M7U480

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

**Time-lag undervoltage releases (800 ms)**

- Release
- to be equipped with a time-lag module:
- 230 V $\sim$
- 400 V $\sim$

- Cat.No M7UEM
- Cat.No M7000MR/230
- Cat.No M7000MR/400

**■ 7.2 Auxiliary contacts**

For Megatiker M3 160 thermal magnetic, with earth leakage module version, auxiliary contacts are integrated inside module M.C.I (see instruction sheet for details).

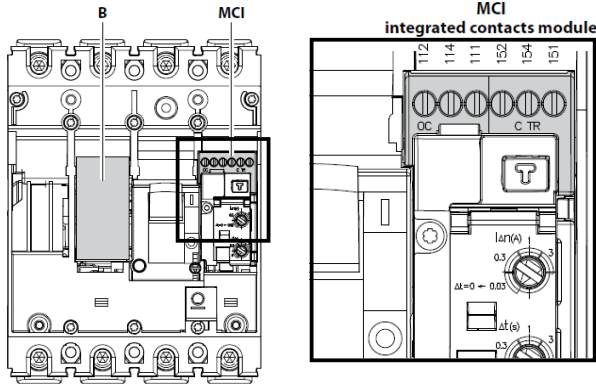
Rated voltage (Vn)	Intensity (A)
24 V $\sim$	5
48 V $\sim$	1.7
110 V $\sim$	0.5
230 V $\sim$	0.25
110 V $\sim$	4
230/250 V $\sim$	3

**MS3 160 trip-free switches with earth leakage module**

**7. EQUIPMENTS AND ACCESSORIES (continued)**

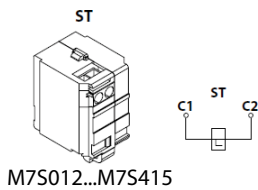
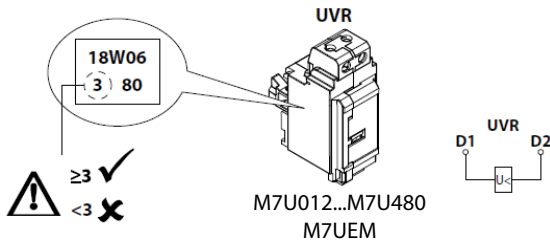
**7.2 Auxiliary contacts (continued)**

Configurations:



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

<b>CTR</b>	<b>152-151</b>	<b>154-151</b>	<b>OC</b>	<b>112-111</b>	<b>114-111</b>
OFF			OFF		
TRIP			TRIP		
ON			ON		



In the space B, it is possible to insert 1 (max.) shunt release, or alternatively 1 (max.) undervoltage release. The space B is not suited for a standard auxiliary contact (OC) or a fault signal (CTR).

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

**7.3 Rotary handles**

Rotary handles are not compatible with Megatiker M3 160 thermal magnetic with earth leakage module because they cover the access to the earth leakage settings.

**7.4 Mechanical accessories**

Padlock (for locking in "OPEN" position) Cat.No M7X02  
 also compatible with Megatiker M3 125/250 and Megatiker M1/M2

Sealable terminal shields - Set of 3 (for 4P) Cat.No M7C21

Insulated shields - Set of 3 (for 4P) Cat.No M7F02  
 also compatible with Megatiker M3 250

**7.5 Connection accessories**

**Cage terminals**  
 - Set of 4 standard terminals for Cat.No M7X51  
 1 x 95 mm<sup>2</sup> max (rigid) or 1 x 70 mm<sup>2</sup> max (flexible) Cu/Al cables  
 (for Al cables In max 80 A)

- Set of 4 high capacity terminals for Cat.No M7X53  
 1 x 120 mm<sup>2</sup> max (rigid) or 1 x 95 mm<sup>2</sup> max (flexible) Cu/Al cables

**Cage terminal use specifications**

Cable standard suggested cross-section (mm <sup>2</sup> )*			
	In (A)	Cu	Al
Standard cage terminals Cat.No M7X51	16	2.5	4
	20	2.5	4
	25	4	6
	32	6	10
	40	10	16
	50	10	16
	63	16	25
	80	25	35
	100	35	-
	125	50	-
High capacity cage terminals Cat.No M7X53	160	70	-
	80	25	35
	100	35	50
	125	50	70
	160	70	120

\* The suggested cross-section are in compliance with standard IEC 60947-1 (ed.6 2020/04) and IEC 60947-2 (ed.5.1 2019/07)

**Dimensions limits of cable for cage terminals**

Standard cage terminals Cat.No M7X51	Min. cross-section (mm <sup>2</sup> )		Max. cross-section (mm <sup>2</sup> )	
	Flexible	Rigid	Flexible	Rigid
	2.5	4	70	95
High capacity cage terminals Cat.No M7X53	Min cross-section (mm <sup>2</sup> )		Max cross-section (mm <sup>2</sup> )	
	Flexible	Rigid	Flexible	Rigid
	35		95	120

Note : when the cross-section exceeds the maximum value specified for the material in the table, the allowable current is limited to the indicated value.

**MS3 160 trip-free switches with earth leakage module**

**7. EQUIPMENTS AND ACCESSORIES (continued)**

**7.5 Connection accessories (continued)**

**Spreaders (incoming or outgoing)**

- Set of 4 (for 4P) Cat.No M7A51

**Rear terminals (incoming or outgoing)**

- Set of 4 (for 4P) Cat.No M7A55

**7.6 Interlock mechanism**

It is used for interlocking 2 Megatiker M3 160, either with another Megatiker M3 160 or with a Megatiker M3 125.

It is not possible to use other accessories than those recommended below for interlocking Megatiker M3 160 circuit breakers.

- Interlock mechanism – standard version Cat.No M7101  
 (for fixed version)

- Interlock mechanism – for electronic module Cat.No M7102  
 (for fixed version)

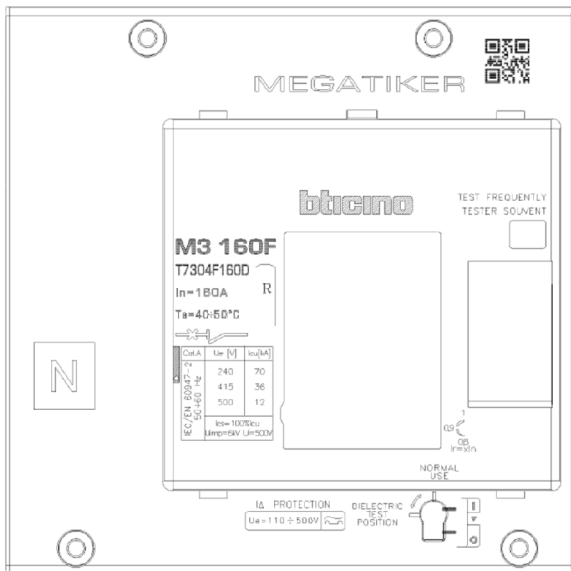
- Interlock plate Cat.No M7104

**8. MARKING**

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

**Product laser label on front**

- Manufacturer responsible
- Denomination, type product, code
- Standard conformity
- Standard characteristics declared
- Coloured identification of Icu at 415 V



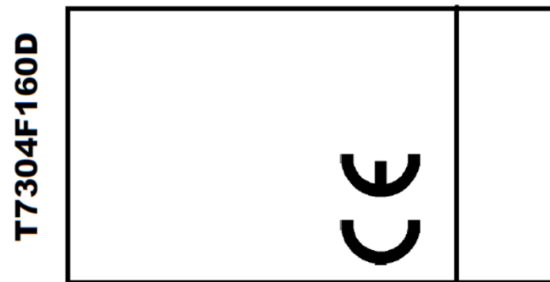
**Product sticker label on side**

- 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

- int. autom.+diff
- MCCB+earth leakage
- disjoncteur+diff.
- interruptor aut.+dif
- aut. schalter+diff.
- MCCB + vazamento de terra
- aut. schakelaar+diff

**M3 160F In 160A 4P**

BTicino SpA [www.bticino.com](http://www.bticino.com)  
 Viale Borri, 231 - 21100 Varese - Italy  
 Design & Quality by BTicino (Italy)

**T7304F160D**  
**MEGATIKER**

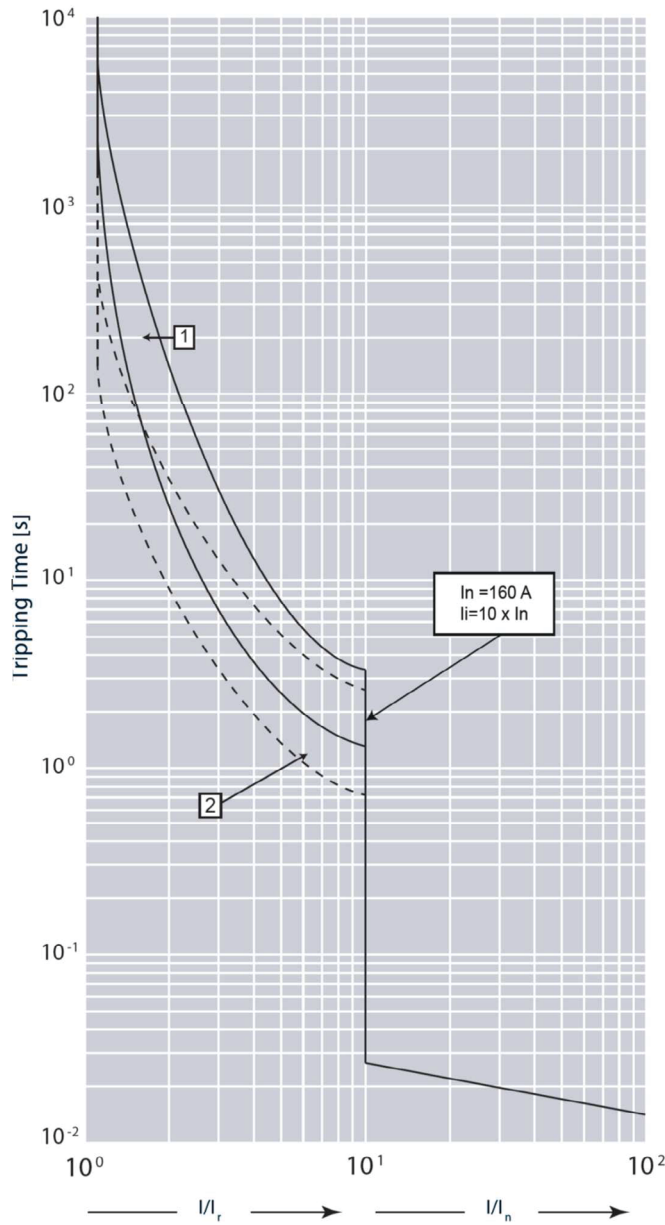


**MS3 160 trip-free switches with earth leakage module**

**9. CURVES**

■ **9.1 Thermal magnetic tripping curve**

Update: 01/04/2022



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

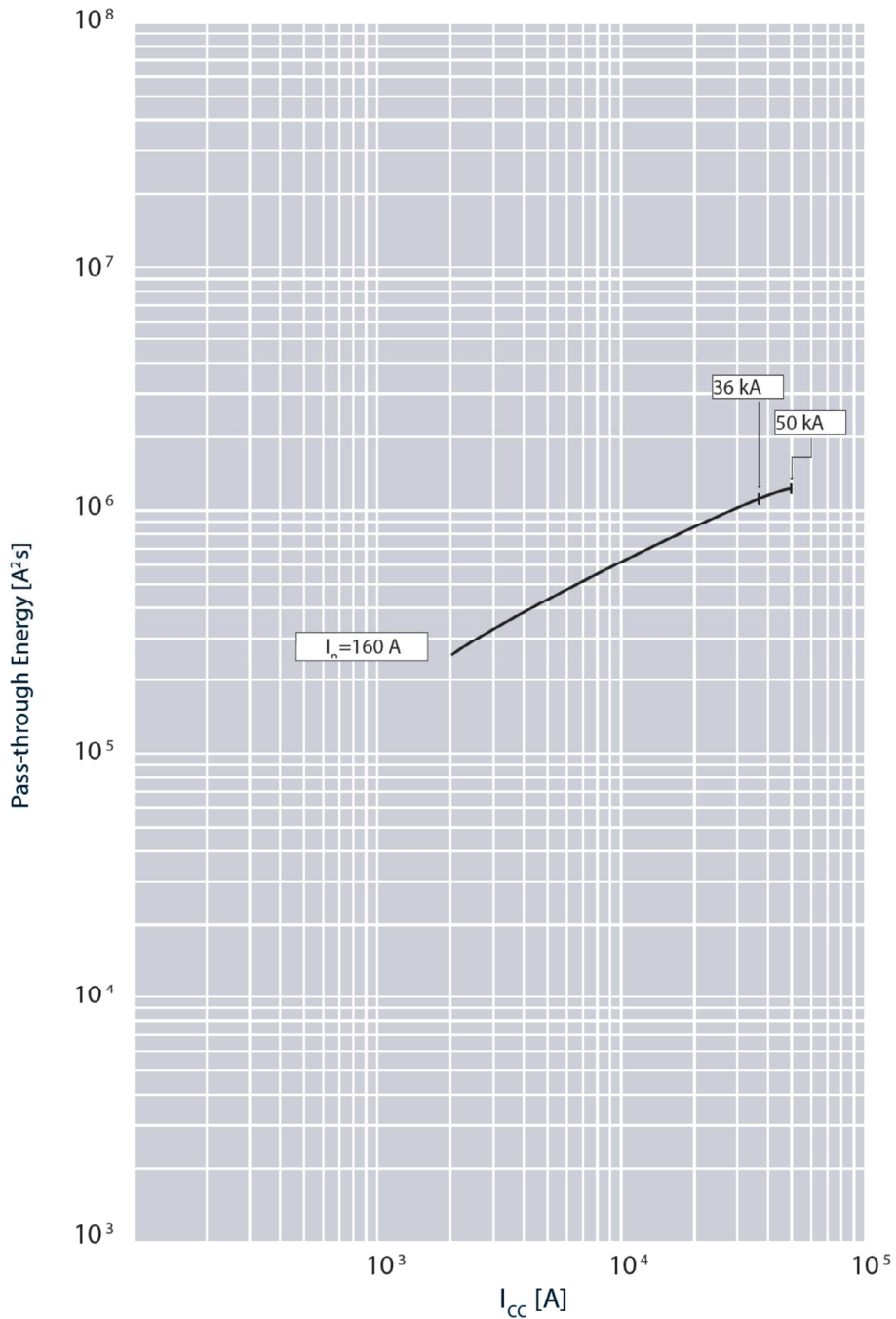
Value	Description
t	Time
I	Current
$I_n$	Rated current
$I_r$	Long time setting current
Curve 1	Characteristic with cold start
Curve 2	Characteristic with hot start

**MS3 160 trip-free switches with earth leakage module**

**9. CURVES (continued)**

■ **9.2 Pass-through specific energy characteristic curve**

Update: 01/04/2022



I<sub>cu</sub> = 36-50 kA    I<sub>max</sub> = 160 A    4P    U<sub>e</sub> = 415 V~ (IEC/EN 60947-2)

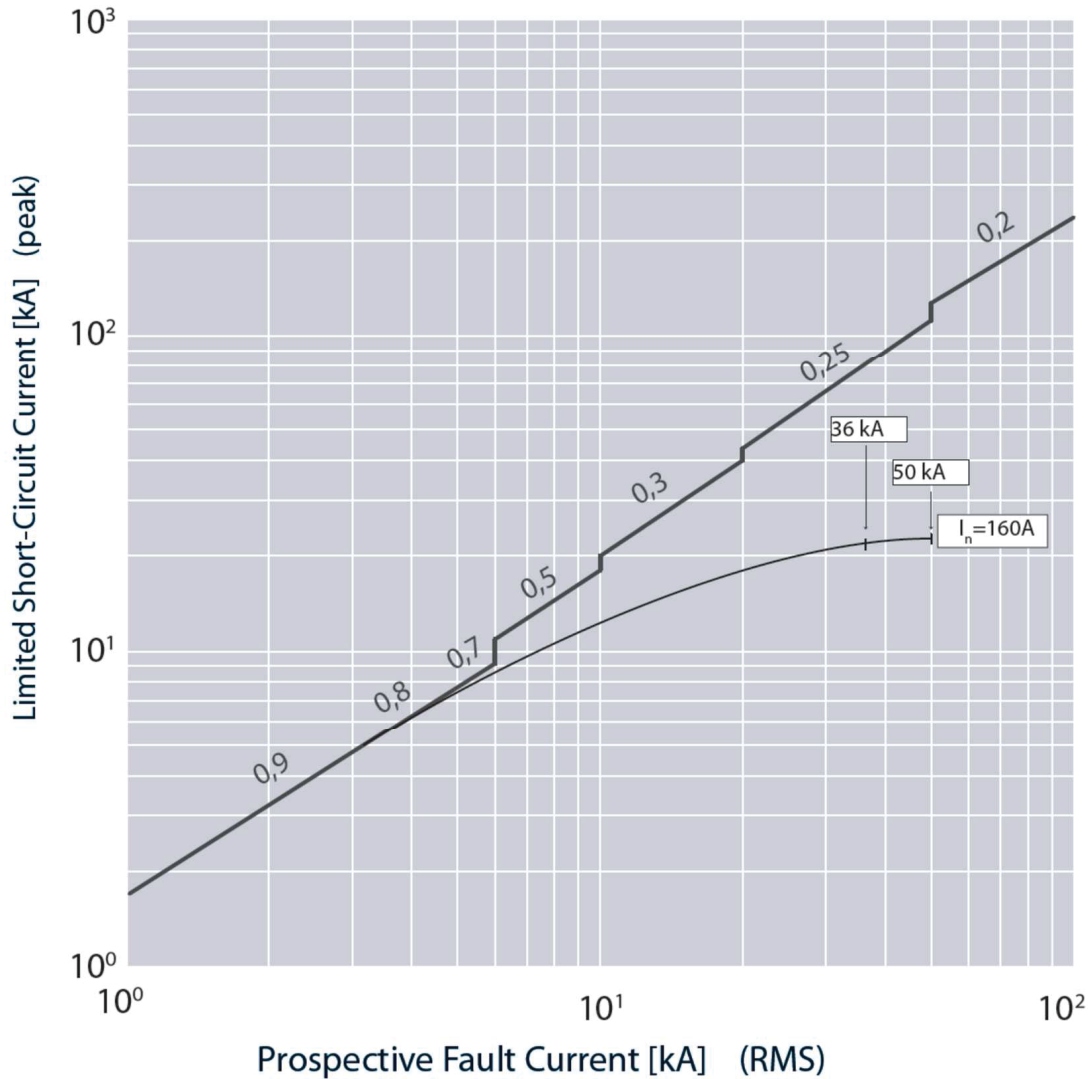
Value	Description
I <sub>cc</sub>	Short circuit current
I²t (A²s)	Pass-through specific energy

MS3 160 trip-free switches with earth leakage module

9. CURVES (continued)

9.3 Cut-off peak current characteristic curve (kA)

Update: 01/04/2022

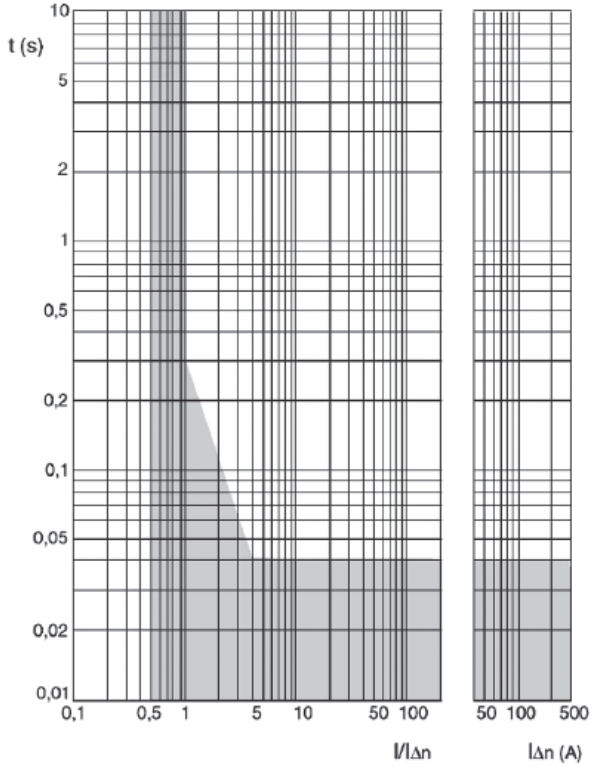


I <sub>cu</sub> = 36-50 kA	I <sub>max</sub> = 160 A	4P	U <sub>e</sub> = 415 V~ (IEC/EN 60947-2)
Value	Description		
I <sub>cc</sub>	Estimated short circuit symmetrical current (RMS value)		
I <sub>p</sub>	Maximum short circuit peak current		

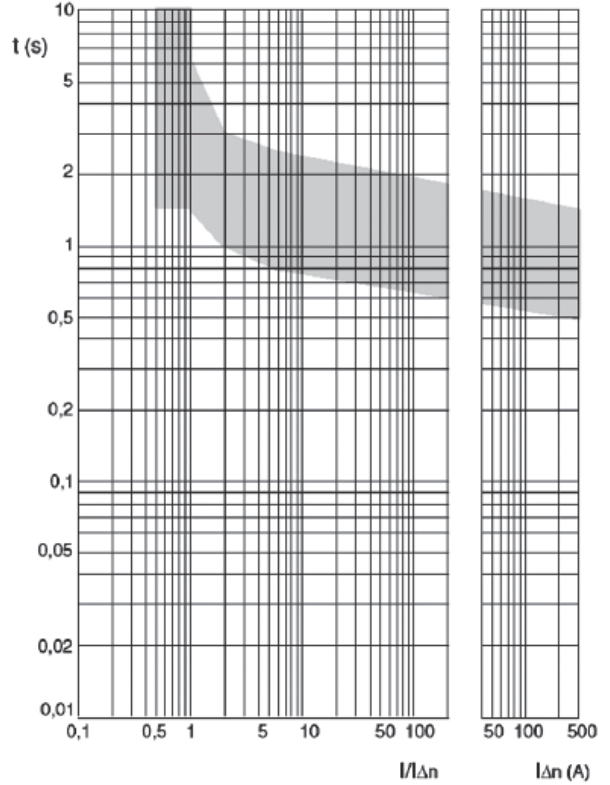
MS3 160 trip-free switches with earth leakage module

9. CURVES (continued)

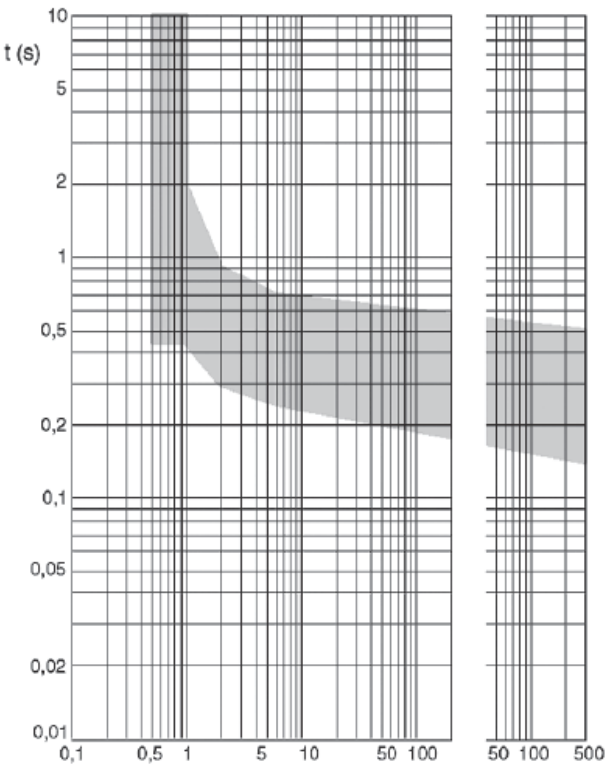
■ 9.4 Earth leakage curves, instantaneous



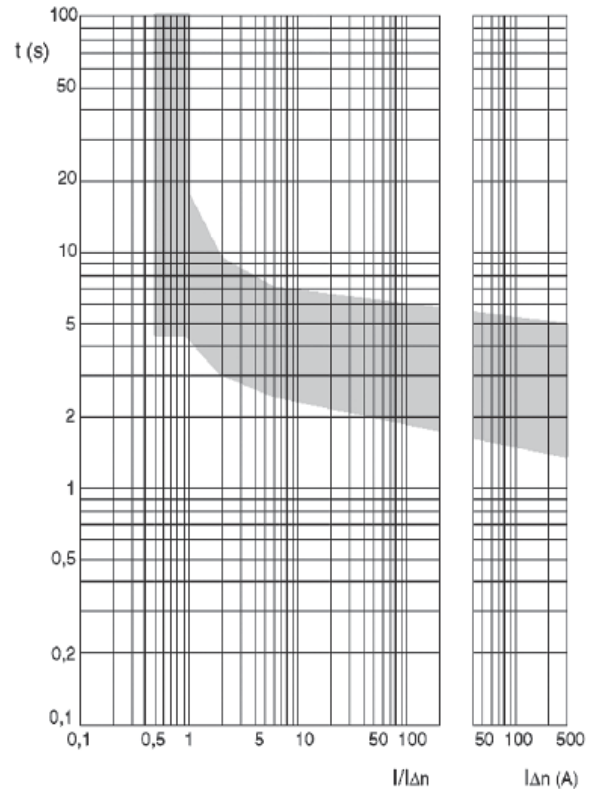
■ 9.6 Earth leakage curves, time delay = 1 s



■ 9.5 Earth leakage curves, time delay = 0.3 s



■ 9.7 Earth leakage curves, time delay = 3 s



## MS3 160 trip-free switches with earth leakage module

### 10. STANDARDS AND REGULATIONS

Megatiker M3 range of product concerning circuit-breakers and trip-free switches exceeds compliance with the IEC/EN standard 60947-2 and 60947-3 respectively.

Certification available by IECEE CB-scheme or LOVAG Compliance scheme.

Megatiker M3 range respects the European Directives :

**RoHS:** Compliance with the 2011/65/EU Directive (RoHS), as modified by the 2015/863/EU Delegated Directive, on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

**REACH:** The substances identified as SVHC (Substances of Very High Concern) according to the REACH Regulation (1907/2006), if present in the products at a concentration above 0.1% weight by weight, are declared inside the European SCIP database. At the date of publication of this document none of the substance listed in the annex XIV is found in this product.

**WEEE:** WEEE Directive (2012/19/EU): the sale of this product includes a contribution to the appointed environmental bodies of each European country in charge of handling, at the end of their life, the products falling within the scope of the EU Directive on Electrical and Electronic Equipment Waste.

**Packaging :** Design and manufacture of packaging compliant with European Directive 94/62/CE

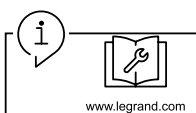
For specific information, please contact BTicino support.

### 11. OTHER INFORMATION

**XLPro Calcul:** Calculation notes creation software, addressed to installers, design office and maintenance operators. Definition of the electrical characteristics of a low voltage installation in compliance with the applicable standards

**XLPro<sup>3</sup> Tool Selectivity / BTicino Selectivity and backup:** Software dedicated to installers, panelbuilders and design offices. Definition of the selectivity and backup values of an association of electrical devices and obtention of the tripping curves of the selected products.

**XLPro Panels:** Distribution panel design software, addressed to panelbuilders and electrical panel designers. Design of the electrical distribution of the panel, production of electrical diagrams, establishment of products and overall costing of the project.



**Workshop book:** mounting informations, equipments, accessories and spare parts available on e-catalog.

**Instruction sheet:** detailed mounting procedures, available on e-catalog.

**PEP:** available on e-catalog.

For further technical information, please contact BTicino technical support.

Unless otherwise indicated, data reported in this document refers exclusively to test conditions according to product standards.

For different conditions of use of the product, inside electrical equipment or in any different installation context, refer to the regulatory requirements of the equipment, local regulations and design specifications of the system.