BTicino S. p. A.
Viale Borri 231 - 21100 VARESE - ITALIA
www.bticino.com

Megatiker M1 160 thermal magnetic circuit breakers

MS1 160 trip-free switches

Cat.Nos: T713E16/25/40/63/80/100/125/160
T714E16/25/40/63/80/100/125/160
T713B16/25/40/63/80/100/125/160
T714B16/25/40/63/80/100/125/160
T713N16/25/40/63/80/100/125/160
T714N16/25/40/63/80/100/125/160; T713S160; T714S160

CONTENT **Page**

1. USE

Megatiker range platform has been developed to give a new solution of protection devices for a more precise approach in flow installations in order to offer the correct answer for different project needs.

Megatiker range platform provides a complete project approach in premium market segment, offering a range completely suitable for medium power application with high performance breakers in compact dimensions and at a competitive costs.

2. RANGE

2.1 Megatiker M1 160 thermal magnetic circuit breaker

	16 kA			25 kA			50 kA		
In (A)	3P	4P	3P + N/2	3P	4P	3P + N/2	3P	4P	3P + N/2
16	T713E16	T714E16	-	T713B16	T714B63	-	T713N16	T714N16	-
25	T713E25	T714E25	-	T713B25	T714B63	-	T713N25	T714N25	-
40	T713E40	T714E40	-	T713B40	T714B63	-	T713N40	T714N40	-
63	T713E63	T714E63	-	T713B63	T714B63	-	T713N63	T714N63	-
80	T713E80	-	T714E80	T713B80	-	T714B80	T713N80	-	T714N80
100	T713E100	-	T714E100	T713B100	-	T714B100	T713N100	-	T714N100
125	T713E125	-	T714E125	T713B125	-	T714B125	T713N125	-	T714N125
160	T713E160	-	T714E160	T713B160	-	T714B160	T713N160	-	T714N160

2.2 Megatiker MS1 160 trip-free switch

In (A)	3P	4P
160	T713S160	T714S160

Megatiker M1 160 thermal magnetic circuit breakers

MS1 160 trip-free switches

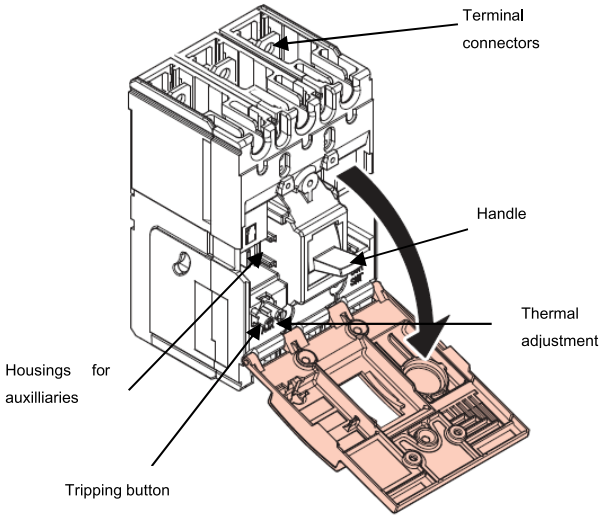
Cat.Nos: T713E16/25/40/63/80/100/125/160
T714E16/25/40/63/80/100/125/160
T713B16/25/40/63/80/100/125/160
T714B16/25/40/63/80/100/125/160
T713N16/25/40/63/80/100/125/160
T714N16/25/40/63/80/100/125/160; T713S160;T714S160

2. RANGE *(continued)*

■ 2.3 Composition

Megatiker M1 160 thermal magnetic is supplied with:

- fixing screws
- cage terminal (70 mm² max. for flexible cable, or 95 mm² max. for rigid cable)
- insulting shields (phase barrier)



3. TECHNICAL CHARACTERISTICS

■ 3.1 Electrical characteristics

Megatiker M1 160 thermal magnetic circuit breakers	
Rated current	16 A, 25 A, 40 A, 63 A, 80 A, 100 A, 125 A, 160 A
Poles	3P - 4P
Pole pitch	27 mm
Rated insulation voltage (50/60Hz) Ui	800 V
Rated operating voltage (50/60Hz) Ue	690 V
Rated impulse withstand current Uimp	8 kV
Rated frequency	50 Hz - 60 Hz
Reference ambient temperature	40 °C - 50 °C
Operating temperature	-25 °C to 70 °C
Electrical endurance at In (cycles)	8000
Electrical endurance at 0.5 x In (cycles)	10000
Utilization category	A
Suitable for isolation	Yes
Type of protection	Thermal-magnetic
Thermal adjustment Ir	0.8 to 1 x In
Magnetic adjustment Ii (A)	400 A (In up to 40 A); 10 x In (In > 40 A)
Neutral protection for 4P (%Ith of phase pole)	100
Reverse feed	Yes

Megatiker MS1 160 trip-free switches	
Uninterrupted nominal current Ie	160 A
Short-time resistive current Icw for 1s	2 kA
Rated short-circuit making capacity Icm	3 kA
Rated insulation voltage Ui	800 V~
Maximum rated operating voltage Ue	690 V~/=
Rated impulse withstand voltage Uimp	8 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
Electrical endurance at 0.5 x In (cycles)	10000
Reverse feed	Yes

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

Switch disconnectors category (for use in DC)

	1P*	2P in series*		3P in series*	4P in series*
In (A)	60 V	110 V	250 V	500 V	750 V
160	DC23				

*See page 6 for Connection modality of the DC trip-free switches

Breaking capacity (kA)

	Breaking capacity (kA) & Ics			
IEC 60947-2	Ue	Icu		
		16 kA	25 kA	50 kA
	240 V~	25	35	65
	415 V~	16	25	50
	500 V~	8	10	15
	690 V~	5	5	10
	250 V⎓	10		
	Ics (% Icu)	100		
	Rated making capacity under short circuit Icm			
	Icm (kA) at 415 V	32	53	105

Breaking capacity in DC (kA) (estimated values)

		1P*	2P in series*			3P in series*		
Icu (kA)	**In (A)**	**60 V**	**60 V**	**110 V**	**250 V**	**110 V**	**250 V**	**500 V**
16	16 to 160	16	16	16	10	16	12	10
25		25	25	25		25	16	
50		35	50	35		50	20	

*See page 6 for Connection modality of the DC breaker.

DC breaking capacity in the table respect the standards.
The positive tolerance is between 0% to 5% of voltage status

3. TECHNICAL CHARACTERISTICS *(continued)*

■ 3.1 Electrical characteristics

Rated current (In) at 40 °C/50 °C

	Phases limit trip current			
	Thermal (Ir)		Magnetic (Ii)	
In (A)	L1 - L2 - L3	N	L1 - L2 - L3	N
16	16	16	400	
25	25	25	400	
40	40	40	400	
63	63	63	630	
80	80	63	800	
100	100	63	1000	
125	125	80	1250	
160	160	100	1600	

■ 3.2 Mechanical characteristics

Mechanical endurance (cycles): 25000
Mechanical endurance with motor control (cycles): 25000

Load operations

	Force on handle (N)
Opening operation	45
Closing operation	78
Restore operation	75

■ 3.3 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.

Icc (kA)	Maximum distance (mm)
16	400
25	400
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, 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)

Circuit breaker								
In (A)	**16**	**25**	**40**	**63**	**80**	**100**	**125**	**160**
Cage terminals	2.4	4.4	4.1	5.5	7.0	7.4	8.6	11.3
High capacity cage terminals	2.4	4.5	4.2	5.7	7.3	7.8	9.3	12.4
Lugs	2.4	4.5	4.2	5.6	7.3	7.8	9.2	12.2
Spreaders	2.4	4.5	4.2	5.7	7.3	7.8	9.3	12.4
Rear terminals*	2.4	4.5	4.2	5.7	7.3	7.8	9.3	12.4
Plug-in version*	2.5	4.8	4.9	7.5	10.3	12.5	16.6	24.3

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.

*Products available only for maintenance of existing installations. For further information, please contact Legrand. If you need to integrate these accessories into a new installation, please refer to the Megatiker M3 range.

Trip-free switch	
In (A)	**160**
Cage terminals	7.7
High capacity cage terminals	8.4
Lugs	8.3
Spreaders	8.4
Rear terminals*	8.4
Plug-in version*	20.7

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.

*Products available only for maintenance of existing installations. For further information, please contact Legrand. If you need to integrate these accessories into a new installation, please refer to the Megatiker M3 range.

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.

	Temperature Ta (°C)											
In (A)	-25	-20	-10	-5	0	10	20	30	40	50	60	70
16	23	22	21	21	20	19	18	17	16	16	15	14
25	37	35	34	33	32	30	28	27	25	25	23	22
40	55	54	52	51	50	47	43	43	40	40	36	35
63	90	88	85	84	82	81	71	67	63	63	58	55
80	115	113	111	109	107	97	87	83	80	80	74	71
100	129	126	123	122	117	111	109	105	100	100	94	93
125	159	157	154	152	149	138	134	131	125	125	112	110
160	218	215	207	200	198	190	176	168	160	160	146	138

For derating temperature with other configurations, see table below.

Ambient temperature	**30 °C**		**40 °C**		**50 °C**		**60 °C**		**70 °C**	
	Imax (A)	**Ir/In**	**Imax (A)**	**Ir/In**	**Imax (A)**	**Ir/In**	**Imax (A)**	**Ir/In**	**Imax (A)**	**Ir/In**
Fixed version - vertical installation										
Flexible/semirigid cable	160	1	152	0.95	152	0.95	146	0.91	138	0.86
Flexible/semirigid cable + sealable terminal shields	152	0.95	144	0.90	144	0.90	144	0.90	138	0.86
Clamps, flexible/semirigid cable	160	1	152	0.95	152	0.95	146	0.91	138	0.86
Clamps, flexible/semirigid cable + sealable terminal shields	152	0.95	152	0.95	144	0.90	144	0.90	138	0.86
Cage terminals, flexible/semirigid cable	160	1	160	1	160	1	146	0.91	138	0.86
Spreaders, flexible/semirigid cable	160	1	160	1	160	1	146	0.91	138	0.86
Rear terminals*, flexible/semirigid cable	160	1	160	1	160	1	146	0.91	138	0.86
Rear terminals*, flexible/semirigid cable + sealable terminal shields	160	1	160	1	160	1	146	0.91	138	0.86
Fixed version - horizontal installation										
Flexible/semirigid cable	160	1	152	0.95	152	0.95	146	0.91	138	0.86
Flexible/semirigid cable + sealable terminal shields	152	0.95	144	0.90	144	0.90	144	0.90	138	0.86
Clamps, flexible/semirigid cable	152	0.95	152	0.95	152	0.95	146	0.91	138	0.86
Clamps, flexible/semirigid cable + sealable terminal shields	144	0.90	144	0.90	144	0.90	144	0.90	138	0.86
Cage terminals, flexible/semirigid cable	160	1	152	0.95	152	0.95	146	0.91	138	0.86
Spreaders, flexible/semirigid cable	160	1	160	1	160	1	146	0.91	138	0.86
Rear terminals*, flexible/semirigid cable	160	1	160	1	160	1	146	0.91	138	0.86
Rear terminals*, flexible/semirigid cable + sealable terminal shields	160	1	160	1	160	1	146	0.91	138	0.86

For further technical information, please contact BTicino technical support.

*Products available only for maintenance of existing installations. For further information, please contact Legrand. If you need to integrate these accessories into a new installation, please refer to the Megatiker M3 range.

4. INSTALLATION RULES *(continued)*

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 M1 160 circuit breakers, according to IEC/EN 60947-2 Annex F

Pollution degree: for Megatiker M1 160 circuit breakers, degree 3, according to IEC/EN 60947-2.

Altitude
Altitude derating for Megatiker M1 and MS1 160

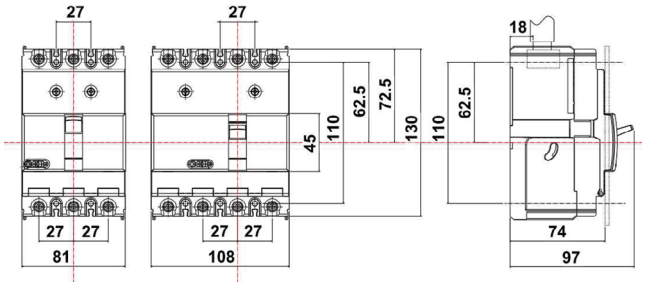
Altitude (m)	2000	3000	4000	5000
Ue (V)	690	590	520	460
In (A) (Ta = 40 °C/50 °C)	1 x In	0.98 x In	0.93 x In	0.9 x In

5. DIMENSIONS AND WEIGHT

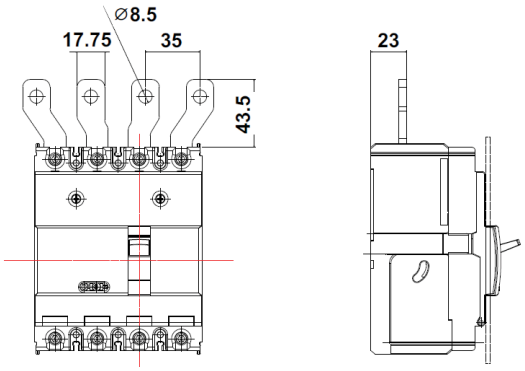
5.1 Dimensions (mm)

3P (W x H x D): 80 x 130 x 97
4P (W x H x D): 110 x 130 x 97

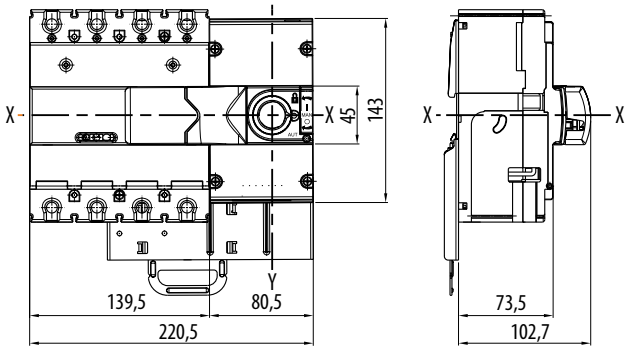
Fixed version
Device without accessories



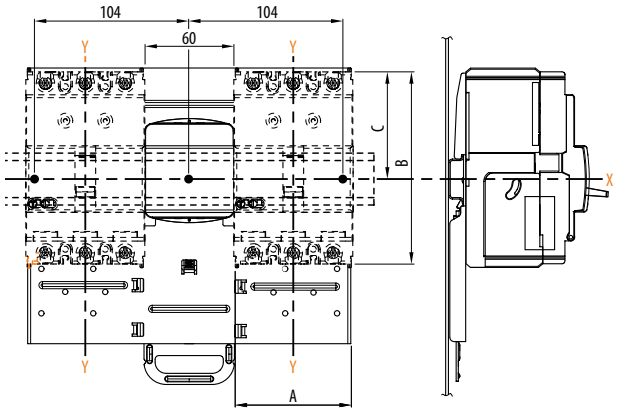
With front terminal



With side motor operator

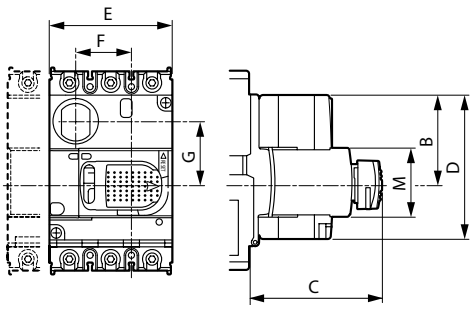


With interlock



	A (mm)	B (mm)	C (mm)
3P	81	130	72.5
4P	108		

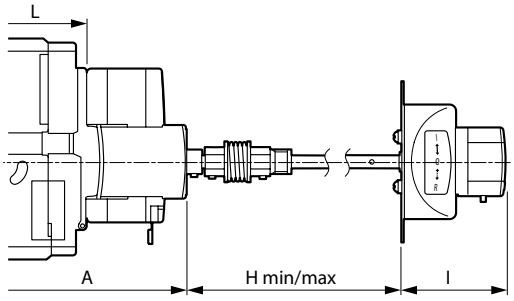
With direct rotary handle



	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	M (mm)
3P/4P	57	155	94	80.5	36.5	41.7	45

5. DIMENSIONS *(continued)*

With vari-depth rotary handle



	A (mm)	H (min.) (mm)	H (max.) (mm)	I (mm)	L (mm)
3P/4P	122	132	361	62	74

5.2 Weight (kg)

Configuration	3P	4P
Circuit breaker/trip-free switch	1.27	1.38
Direct rotary handle*	0.35	
Vari depth rotary handle*	0.72	
Interlock*	1.08	
Spreader*	0.13	0.17

*to add to device weight

6. CONNECTIONS

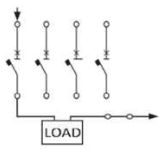
Possible way of assembly on DIN rail:
- vertical
- horizontal

To unsure the circuit breaker's connection, it is possible to use:
- busbars;
- cables lugs;
- cables;
- extended front terminals;
- cage terminals;

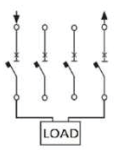
	Cage terminals capacity
Bars	14 mm wide max.
Flexible cables	1.5 mm^2 min. / 70 mm^2 max.
Rigid cables	1.5 mm^2 min. / 95 mm^2 max.

For detailed mounting procedures, see instruction sheet.

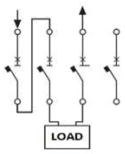
DC connections modality for breakers



1 pole

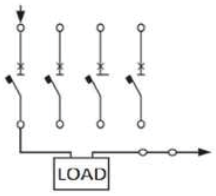


2 poles in series

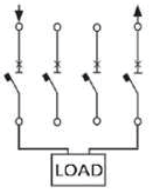


3 poles in series

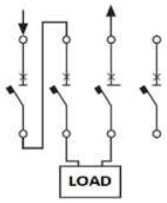
DC connections modality for trip-free switches (polarity can be inverted)



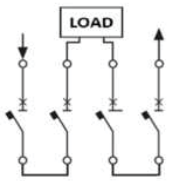
1 pole



2 poles in series

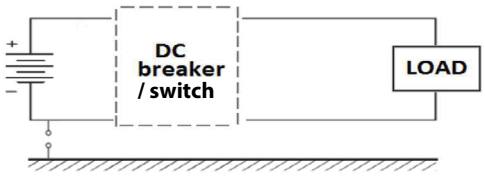


3 poles in series



4 poles in series

Applied to DC breaker/switch networks insulated from the ground



7. EQUIPMENTS AND ACCESSORIES

7.1 Releases

There are 3 types of releases (suitable for Megatiker M3 125/160/250 HP and Megatiker M1/M2):

Shunt releases (ST)

12 V~/=	Cat.No M7S012
24 V~/=	Cat.No M7S024
48 V~/=	Cat.No M7S048
110 to 130 V~	Cat.No M7S110
220 to 277 V~	Cat.No M7S230
380 to 480 V~	Cat.No M7S415

Maximum power = 400 VA/W

Undervoltage releases (UVR)

12 V~/⎓	Cat.No M7U012
24 V~/⎓	Cat.No M7U024
48 V~/⎓	Cat.No M7U048
110 to 130 V~/⎓	Cat.No M7U110
220 to 240 V~	Cat.No M7U230
277 V~	Cat.No M7U277
380 to 415 V~	Cat.No M7U415
440 to 480 V~	Cat.No M7U480

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

7. EQUIPMENTS AND ACCESSORIES *(continued)*

7.1 Releases *(continued)*

Time-lag undervoltage releases (800 ms)

- Release — Cat.No M7UEM

to be equipped with a time-lag module:

- 230 V~ — Cat.No M7000MR/230
- 400 V~ — Cat.No M7000MR/400

7.2 Auxiliary contacts

It is used to show the state of the contacts or opening of the Megatiker/ MS1 on a fault.

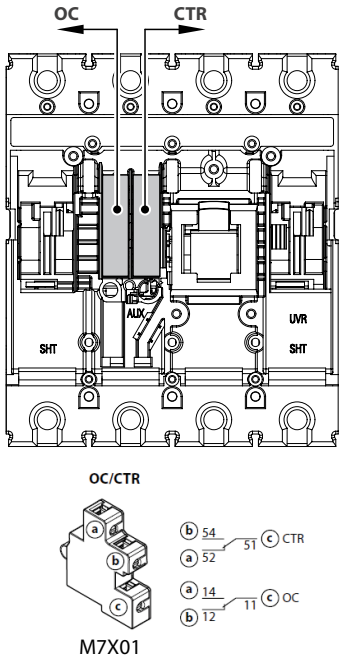
- Standard auxiliary contact (OC)/Fault signal (CTR) — Cat.No M7X01

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

- Set of connectors for auxiliary contacts — Cat.No M7B05
- Auxiliary contacts (1NC and 1 NO) — Cat.No M7R13
- Signal contact for plugged-in version* — Cat.No M7B10

*Products available only for maintenance of existing installations. For further information, please contact BTicino. If you need to integrate these accessories into a new installation, please refer to the Megatiker M3 range.

Configurations



M7X01

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

7.3 Rotary handles

There are 2 types of suited rotary handles (also compatible with Megatiker M2 250):

Direct on Megatiker

- Standard (black) — Cat.No M7R01
- For emergency use (red / yellow) — Cat.No M7R03

Vari-depth handle IP55

- Standard (black) — Cat.No M7R05
- For emergency use (red/yellow) — Cat.No M7R06

Locking accessories (for rotary handle with auxiliary option)

For direct rotary handle:

- Key barrel and flat key n°ABA90GEL6149 — Cat.No M7R07
- Key barrel and star key n°HBA90GPS6149 — Cat.No M7R08

For vari-depth rotary handle:

- Key barrel and flat key n°ABA90GEL6149 — Cat.No M7R10
- Key barrel and star key n°HBA90GPS6149) — Cat.No M7R11

7.4 Motor operators

Side motor operator 24-230 V~/= — Cat.No M7M01

Locking accessories for side motor operator

- Key barrel and n°ABA90GEL6149 — Cat.No M7M14
- Key barrel and star key n°HBA90GPS6149 — Cat.No M7M15
- Padlock — Cat.No M7M17

7.5 Mechanical accessories

Padlocks (for locking in "open" position)

Megatiker padlock accessory for handle — Cat.No M7X02

Cat.No M7X02 is compatible with Megatiker M3 125/160/250 HP and Megatiker M1/M2 160/250.

Insulated shields (phase barriers)

Set of 36 — Cat.No M7X04

Sealable terminal shields

- for front terminals 3P — Cat.No M7X05
- for front terminals 4P — Cat.No M7X06

Fixing plates in XL³ for transfer switches

Plate for mounting and interlocking 2 Megatiker.

It can be either 2 Megatiker M1 160 ; 2 Megatiker M2 250; or 1 Megatiker M1 160 and 1 Megatiker M2 250.

For fixed version — Cat.No M7X03

Fixing plates in XL³

For fixing Megatiker M1 160 on rail or on plate.

- For Megatiker M1 160 3P/4P — Cat.No M7X05
- For Megatiker M1 160 3P/4P with side mounting motor operator — Cat.No M7M08

7.6 Connection accessories

Front spreaders

- Set of 3 (for 3P) — Cat.No M7A01
- Set of 4 (for 4P) — Cat.No M7A02

Rack screw and nut

- Set of 3 rack screw and nut for cable lug kit — Cat.No M7X08
- Set of 4 rack screw and nut for cable lug kit — Cat.No M7X18

7. EQUIPMENTS AND ACCESSORIES *(continued)*

■ 7.6 Connection accessories *(continued)*

Cage terminals

- Set of 3 standard terminals for Cat.No M7X27

1 x 95 mm² max. (rigid) or 1 x 70 mm² max. (flexible) Cu/Al cables and 14 mm bars (for Al cables In max. 80 A)

- Set of 4 standard terminals for Cat.No M7X37

1 x 95 mm² max. (rigid) or 1 x 70 mm² max. (flexible) Cu/Al cables and 14 mm bars (for Al cables In max 80 A)

- Set of 3 high capacity terminals for Cat.No M7X07

1 x 150 mm² max. (rigid) or 1 x 120 mm² max. (flexible) Cu/Al cables and 18 mm bars (for Al cables In max 125 A)

- Set of 4 high capacity terminals for Cat.No M7X17

1 x 150 mm² max. (rigid) or 1 x 120 mm² max. (flexible) Cu/Al cables and 18 mm bars (for Al cables In max 125 A)

■ 7.6 Connection accessories

Cage terminal use specifications

	Cable standard suggested cross-section (mm²)*		
	In (A)	Cu	Al
Standard cage terminals Cat.Nos M7X27/M7X37	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	-
	160	70	-
High capacity cage terminals Cat.Nos M7X07/M7X17	80	25	35
	100	35	50
	125	50	70
	160	70	-

*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.Nos M7X27/M7X37	Min. cross-section (mm²)		Max. cross-section (mm²)	
	Flexible	Rigid	Flexible	Rigid
	2.5	4	70	95
High capacity cage terminals Cat.Nos M7X07/M7X17	Min. cross-section (mm²)		Max. cross-section (mm²)	
	Flexible	Rigid	Flexible	Rigid
	35		120	150

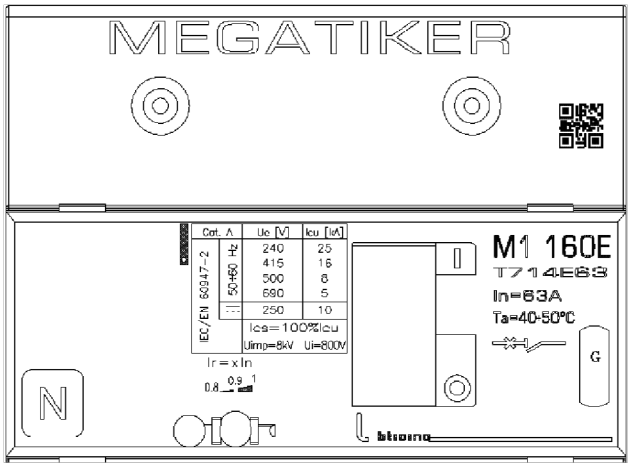
Note: when the cross-section exceeds the maximum value specified for the material, the admissible current is limited to the value indicated in the previous table for the recommended standard cable cross-section.

8. MARKING

Products (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):

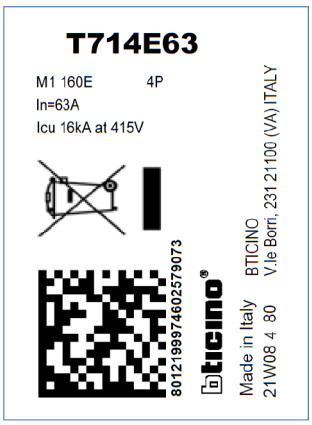
Product laser label (front face)

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



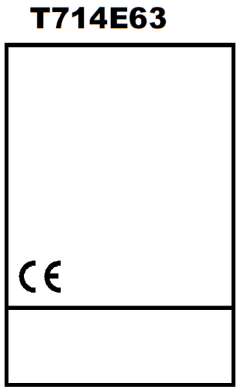
Product sticker label (on the side)

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

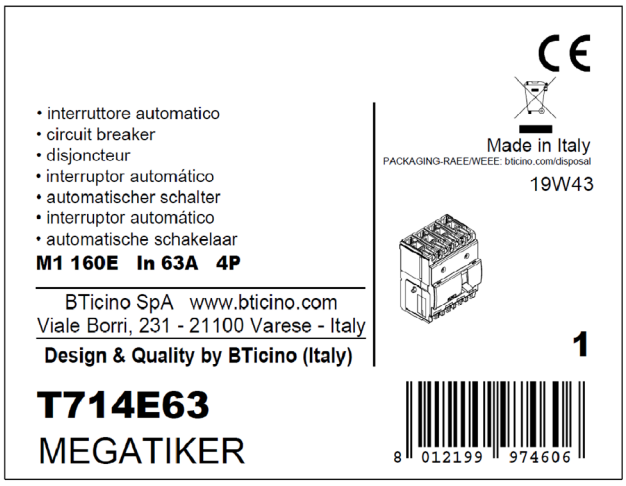


8. MARKING *(continued)*

Mark sticker label (on the side)
- Product code
- Mark/Licence (if any)
- Country deviation, if any

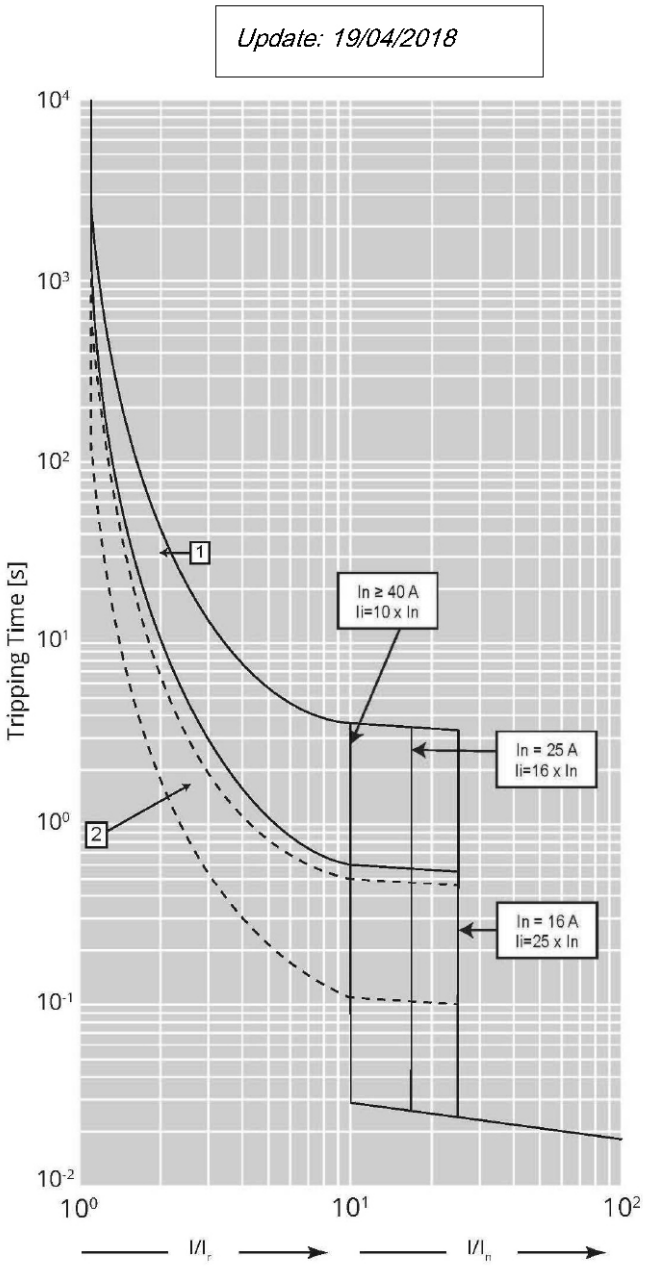


Packaging sticker label
- Manufacturer responsible
- Denomination and type product
- Mark/Licence (if any)
- Directive requirements
- Bar code identification product



9. CURVES

■ 9.1 Thermal magnetic tripping curve

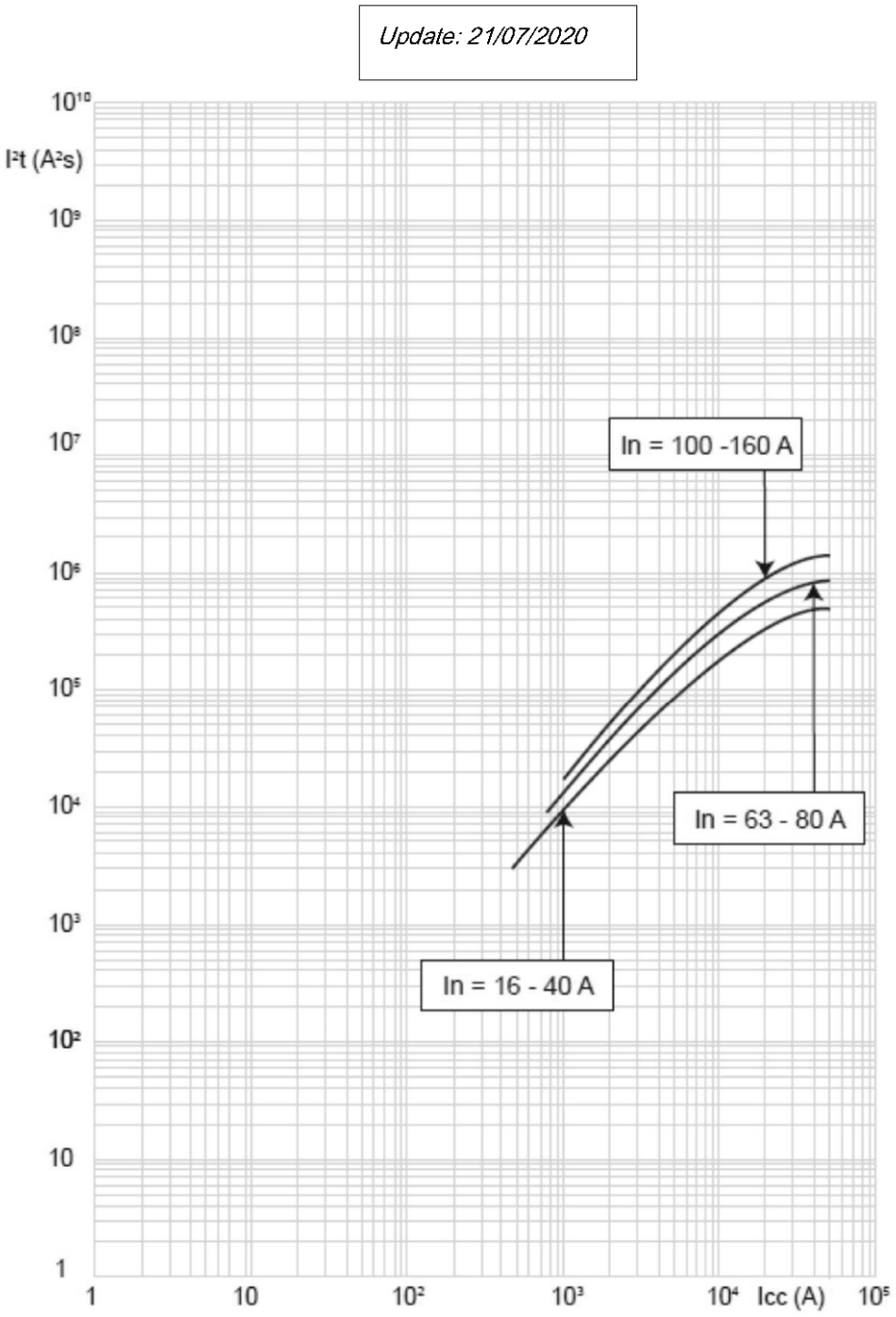


Icu = 16-25-36-50 kA Imax = 160 A 3-4 P Ue = 415 V~

Value	Description
t	Time
I	Current
In	Rated current
Ir	Long time setting current
Curve 1	Characteristic with cold start
Curve 2	Characteristic with hot start

9. CURVES *(continued)*

■ 9.2 Pass-through specific energy characteristic curve



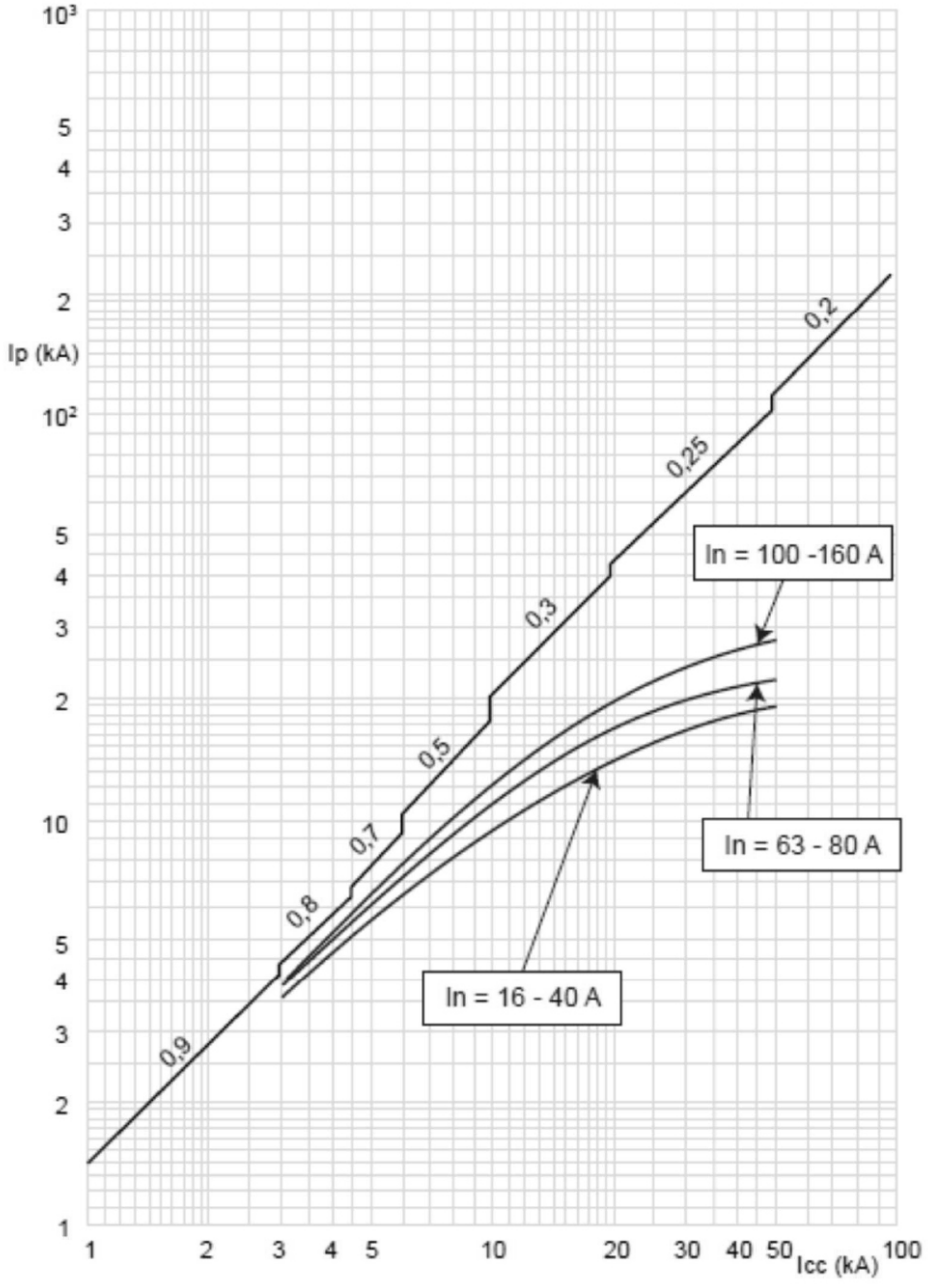
Icu = 16-25-36-50 kA Imax = 160 A 3-4 P Ue = 415 V~

Value	Description
Icc	Short circuit current
I^2t (A^2s)	Pass-through specific energy

9. CURVES *(continued)*

9.3 Cut-off peak current characteristic curve (kA)

Update: 10/02/2017



Icu = 16-25-36-50 kA Imax = 160 A 3-4 P Ue = 415 V~

Value	Description
Icc	Estimated short circuit symmetrical current (RMS value)
Ip	Maximum short circuit peak current

10. STANDARDS AND REGULATIONS

Megatiker range of product concerning circuit-breakers and trip-free switches exceed compliance with the IEC/EN standard 60947-2 and 60947-3 respectively. Certification available by IECEE CB-scheme or LOVAG Compliance scheme.

Megatiker 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

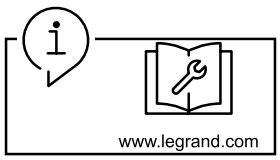
For specific information, please contact Legrand support.

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

XLPro³ Tool Selectivity / Legrand 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.

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.