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TECHNICAL CATALOG

# **Tmax Link**

## UL/CSA switchboards and panelboards



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**Tmax Link enables OEMs to build UL/CSA distribution switchboards and UL Panelboards (dead-front) by fabricating bus, chassis', enclosures, and breaker mounting straps to group mount ABB molded case circuit-breakers (MCCBs) into an electrical distribution assembly with a UL/CSA label.**

**Tmax Link allows OEMs to manufacture basic components under an assembler program extension of the ABB UL/CSA certification while using the OEM's own logo.**

**The Tmax Link distribution switchboard and panelboard design incorporates features that meet application requirements for high short circuit systems, while retaining flexibility, safety and convenience.**

**With Tmax Link, the OEM has increased production capabilities, value-add and ownership of the supply chain to offer the shortest possible lead-times.**



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## Table of contents

|                |   |
|----------------|---|
| <b>004</b>     | <b>Tmax Link</b>  |
| <b>005</b>     | <b>Tmax Link assembler program</b>                                |
| <b>006</b>     | <b>Molded case circuit-breakers</b>                               |
| <b>007</b>     | <b>Added value each step<br/>of the way</b>                       |
| <b>008–014</b> | <b>Switchboard technical data</b>                                 |
| <b>015–022</b> | <b>Panelboard technical data</b>                                  |
| <b>023</b>     | <b>Molded case circuit-breakers<br/>technical data</b>            |
| <b>024–027</b> | <b>The SACE Tmax XT range<br/>at a glance</b>                     |
| <b>028</b>     | <b>Electronic trip units Ekip Dip<br/>and Ekip Touch/Hi-Touch</b> |

# Tmax Link

## Standards and UL/CSA file extension process overview

Tmax Link panelboard is designed, tested and constructed in accordance with the following industry Standards:

- National electrical manufacturer association: NEMA 1 enclosure
- Underwriters laboratories (UL®): UL67, File # E475757

Tmax Link switchboard is designed, tested and constructed in accordance with the following industry Standards:

- National electrical manufacturer association: NEMA 1 enclosure
- Underwriters laboratories (UL®): UL891, File # E466042
- Canadian standards association (CSA®): CSA C22.2 No. 244 (MC # 262686)

### Step 1

ABB has designed and tested switchboard and panelboard solutions in accordance to the above Standards using the SACE molded case circuit-breaker ranges Tmax XT and Formula.

### Step 2

OEM to submit a file extension request to UL/CSA<sup>1</sup> Assembler Program, referencing the appropriate UL file from the above.

### Step 3

ABB to review and approve file extension request with UL/CSA.

### Step 4

ABB will provide the extension package which will include:

- Drawings of strap kits
- Drawings for circuit-breaker support plates
- Drawings for interior structures
- Assembly instructions with torque values
- Bills of materials

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01 Tmax Link  
Switchboard and  
Panelboard



<sup>1</sup> The CSA file extension process may have some minor differences from the described UL process and is available for Switchboards only.

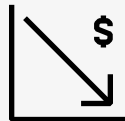
## Tmax Link assembler program

The resource to save your resources

### Easy to manufacture

Thanks to their shrewd design, panelboard and switchboard can be produced in a fast and simple way. Mounting straps are in common and no castings, special molded components or special processes are required for their construction.

Standoff insulators and consumable have been chosen among the most commonly available on the market.



### Financial risk reduction

Adopting the program enables to save design expenses using money only to cover production and certification costs.

Manufacturer has increased production capabilities, value-add and ownership of the supply chain to offer the shortest possible lead-times.

### Enhanced competitiveness

Tmax Link design is based on Tmax XT Molded Case Circuit-Breakers (MCCBs) product line, that represents the state of the art in circuit-breaker world. Maximum configuration flexibility combined with the compactness of the design makes these breakers the perfect mates for a successful business.



### Versatility

No limitation in the use of 100% rated breakers, 1.25" and 1.38" hole spacing design for Switchboard vertical bus, 100A - 1200A frame breakers available in 28", 32" or 38" wide sections are just few of the many options that make this design suitable for any kind of installation need.

## Molded case circuit-breakers

With Tmax Link, the OEM only needs to purchase the circuit-breakers required for the switchboard or panelboard from ABB, all other components can be fabricated by the OEM. Tmax Link utilizes ABB's high performance molded case circuit-breaker (MCCB) ranges to provide high interrupting ratings, compact size and industry leading features.

- Double insulation – this construction characteristic allows for field installation of UL/CSA Listed internal accessories without exposure to energized parts.
- Complete range of electrical and mechanical accessories.
- Positive operation – circuit-breakers from ABB ensure that the toggle indicates the precise position of the moving contacts. This guarantees safe and reliable signaling by the device.
- Installation – ABB molded case circuit-breakers can be installed in either the horizontal or vertical planes without any de-rating of their performance characteristics.
- Interrupting ratings up to 200kAIC.
- Compact size.
- 100% rated and 80% rated versions.
- All ABB molded case circuit-breakers are UL/CSA Listed and IEC rated for global application and acceptance.
- All versions of the Formula and Tmax XT ranges are suitable for reverse feed applications (max reverse feed voltage for XT2 is 480Vac).

### ABB circuit-breakers carry the following interrupting capacities

- **A** – Adequate interrupting rating
- **N** – Normal interrupting rating
- **S** – Standard interrupting rating
- **H** – High interrupting rating
- **L** – Extra high interrupting rating
- **V** – Very high interrupting rating
- **X** – Extremely high interrupting rating

### Details

- UL File #E93565 (MCCBs and MCPs)
- UL File #E116596 (Accessories)

For more information about ABB molded case circuit-breakers ranges, scan the following QR codes:

#### SACE FORMULA DSA UL/CSA.

Low voltage molded-case circuit-breakers up to 250A. UL489 and CSA C22.2 Standards



#### Catalog SACE Tmax XT UL/CSA.

Low voltage molded case circuit-breakers. UL489 and CSA C22.2 Standards



#### Technical Characteristics SACE Tmax XT UL/CSA.

Low voltage molded case circuit-breakers. UL489 and CSA C22.2 Standards



## Added value each step of the way

There is more than just a circuit-breaker in the SACE Tmax XT range

### A new generation of molded case circuit-breakers

There is a lot more to the range of SACE Tmax XT than what meets the eye, and the benefits for your business are noticeable. To start with, the whole selection and ordering process has been overhauled to make it far easier to get your hands on the parts you need, speeding things up by about 30%. Installation has been simplified to increase user-friendliness, frames have been streamlined to save space, and improved

connectivity - such as Bluetooth and Ekip mobile - will save you considerable time.

Another additional benefit is the reliable cloud connectivity and overall increase in information available, meaning diagnostics and maintenance are vastly improved, resulting in less downtime. Finally, thanks to the smart power controller concept, overall energy consumption can be reduced by up to 20%.

### Selection, ordering and handling

30% faster thanks to part numbers reduction (-10%), online configurator (-40% time) and smart packaging (-30% space).



Speed up  
your projects



Optimized  
logistics



Speed up  
your projects



Easy to  
install



Space  
saving

### Commissioning

The SACE Tmax XT range offers the potential to save serious time. Thanks to simplified installation of frames, integrating the circuit-breakers into a communication network, trip unit settings performed via LCD and Bluetooth and Ekip Mobile connectivity, you stand to save up to 40% time overall.

### Diagnostics and maintenance

With up to 30% more data available on the cloud and ABB unique power controller concept, it is far easier to diagnose problems and carry out necessary maintenance. This helps to prevent faults, restore energy more quickly and avoid any unnecessary charging of utilities.



Optimum  
interface



Safety and  
protection



Continuous  
operation



Continuous  
operation



Energy  
efficiency

### Energy saving

The SACE Tmax XT range comes with the exclusive ABB-patented Ekip Power Controller which monitors installation loads and can limit the amount of power consumed at any time. The result is an overall reduction in power consumption of up to 20% and lower energy bills. Furthermore, you have 1% energy measurement accuracy.

## Switchboard technical data

### Horizontal/Main bus

| Current ratings         |                       | 800A | 1200A | 1600A | 2000A | 2500A | 3000A | 3500A | 4000A | 5000A |
|-------------------------|-----------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Copper bus              | 1 layer 0.25" x 3.00" | ■    | —     | —     | —     | —     | —     | —     | —     | —     |
|                         | 1 layer 0.25" x 5.00" | ■    | ■     | ■     | —     | —     | —     | —     | —     | —     |
|                         | 2 layer 0.25" x 4.00" | ■    | ■     | ■     | ■     | —     | —     | —     | —     | —     |
|                         | 2 layer 0.25" x 5.00" | ■    | ■     | ■     | ■     | ■     | —     | —     | —     | —     |
|                         | 3 layer 0.25" x 5.00" | ■    | ■     | ■     | ■     | ■     | ■     | ■     | —     | —     |
|                         | 4 layer 0.25" x 5.00" | ■    | ■     | ■     | ■     | ■     | ■     | ■     | ■     | —     |
|                         | 6 layer 0.25" x 5.00" | ■    | ■     | ■     | ■     | ■     | ■     | ■     | ■     | ■     |
| Aluminum horizontal bus | 2 layer 0.25" x 3.00" | ■    | —     | —     | —     | —     | —     | —     | —     | —     |
|                         | 2 layer 0.25" x 4.00" | ■    | ■     | ■     | —     | —     | —     | —     | —     | —     |
|                         | 3 layer 0.25" x 3.00" | ■    | ■     | ■     | —     | —     | —     | —     | —     | —     |
|                         | 3 layer 0.25" x 4.00" | ■    | ■     | ■     | ■     | —     | —     | —     | —     | —     |

### Vertical bus

| Current ratings                                      |                       | 400A | 600A | 800A | 1000A | 1200A | 1600A | 2000A |
|--|-----------------------|------|------|------|-------|-------|-------|-------|
| Copper bus<br>Per UL 891 standard<br>table 23 and 25 | 1 layer 0.25" x 3.00" | ■    | ■    | ■    | —     | —     | —     | —     |
|  | 2 layer 0.25" x 3.00" | ■    | ■    | ■    | ■     | ■     | —     | —     |
|  | 3 layer 0.25" x 3.00" | ■    | ■    | ■    | ■     | ■     | ■     | ■     |
| Aluminum bus<br>Per UL 891 standard                  | 1 layer 0.25" x 3.00" | ■    | —    | —    | —     | —     | —     | —     |
|  | 2 layer 0.25" x 3.00" | ■    | ■    | ■    | ■     | —     | —     | —     |
|  | 3 layer 0.25" x 3.00" | ■    | ■    | ■    | ■     | ■     | ■     | —     |

| Rated voltage (+/-10%):           |       | 240VAC | 480VAC | 600VAC |
|-----------------------------------|-------|--------|--------|--------|
| Maximum short circuit ratings:    | 65kA  | MLO    | MLO    | MLO    |
| MLO = main lugs only              | 100kA | MCB    | MCB    | MCB    |
| MCB = main circuit-breaker        | 150kA | MCB    | MCB    | —      |
| Rated frequency (+/- 2%): 50/60Hz | 200kA | MCB    | MCB    | —      |

### Vertical distribution bus

Tmax Link will offer two vertical bus designs, one based on a 1.25" vertical hole spacing and one based on a 1.38" vertical hole spacing (reference Figures 1.25" Design and 1.38" Design).

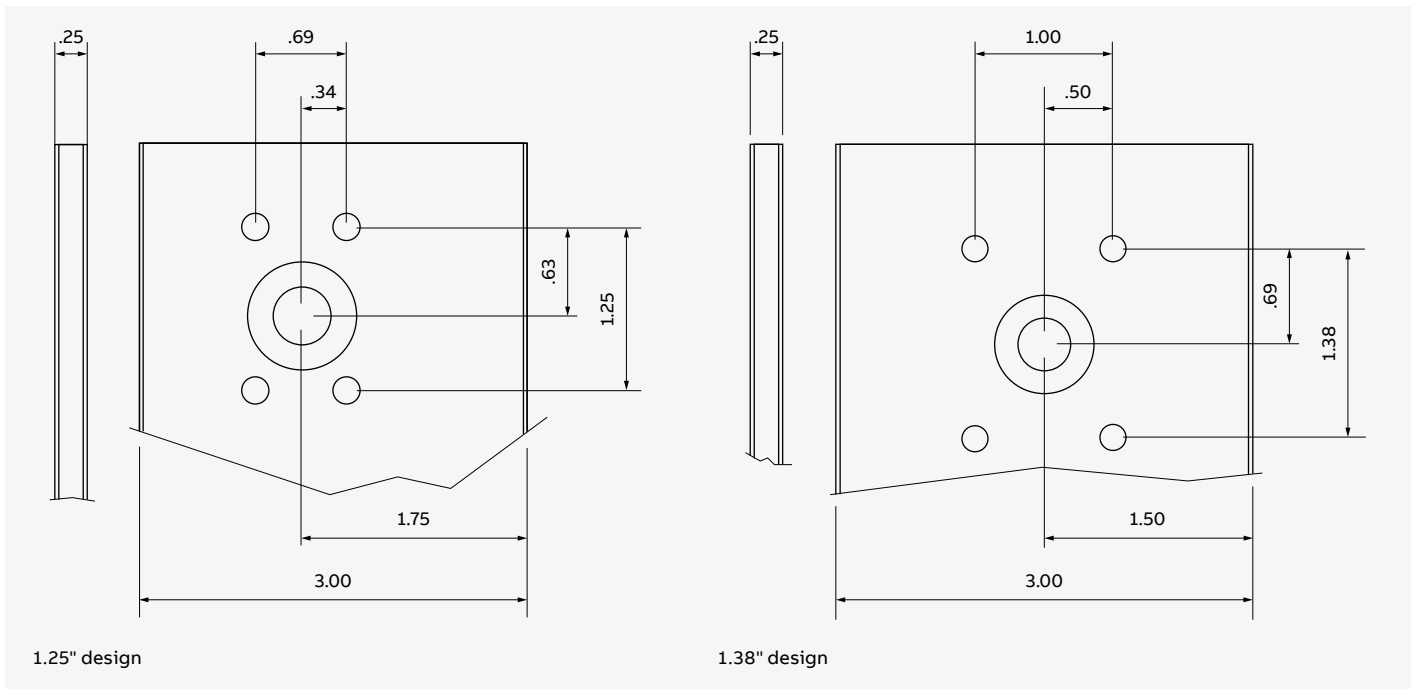
The OEM has the ability to produce these vertical bus bars with either hole pattern.

The Tmax Link switchboard design uses standardized bus bar sizes and commonly

available standoff insulators throughout the product range; thereby, minimizing the inventory level of raw materials required by the OEM.

The switchboard design accommodates several bus materials including tin-plated aluminum bus, silver-plated copper bus, or tin-plated copper bus. Vertical bus meets UL, CSA and NEMA standards for temperature rise.





### Bus bracing system

The Tmax Link bus bracing design has a standard short circuit withstand rating of 65kA RMS at 240VAC, 480VAC, and 600VAC.

It has the ability to increase the short circuit rating up to: 200kA @ 240VAC, 200kA @ 480VAC, or 100kA @ 600VAC with the use of an ABB Tmax XT as a main circuit-breaker.

### Circuit-breaker arrangement

Group mounted circuit protective devices are an assembly of circuit-breakers mounted on a panelboard type chassis. A main molded case circuit-breaker within the sizes listed for the switchboard design can be included in the panel mounted assembly in lieu of a separate, individually mounted main circuit-breaker.

## Switchboard technical data

### Group mounted molded case circuit-breaker layout and space requirements

| Group mounted layout |                     |       | Breaker mounting configuration | Required space 1.25" design | Required space 1.38" design | Integral main breaker | Trip unit options |               |
|----------------------|---------------------|-------|--------------------------------|-----------------------------|-----------------------------|-----------------------|-------------------|---------------|
| A1 1p                | 100A                | 100A  | A1 1p                          | Dual                        | 2.5"                        | 2.75"                 | No                | TMF           |
| A1 2p                | 100A                | 100A  | A1 2p                          | Dual                        | 2.5"                        | 2.75"                 | No                | TMF           |
| A1 3p                | 100A                | 100A  | A1 3p                          | Dual                        | 3.75"                       | 4.12"                 | No                | TMF           |
| XT1                  | 125A                | 125A  | XT1                            | Dual                        | 3.75"                       | 4.12"                 | No                | TMF           |
| XT2                  | 125A                | 125A  | XT2                            | Dual                        | 3.75"                       | 4.12"                 | No                | TMF, ELT      |
| XT2 <sup>(1)</sup>   | 125A                | 125A  | XT2                            | Dual                        | 5.25"                       | 4.12"                 | No                | TMF, ELT      |
| XT3                  | 225A                | 225A  | XT3                            | Dual                        | 6.25"                       | 6.87"                 | No                | TMF           |
| A2 2p                | 250A                | 250A  | A2 2p                          | Dual                        | 3.75"                       | 4.12"                 | No                | TMF           |
| A2 3p                | 250A                | 250A  | A2 3p                          | Dual                        | 6.25"                       | 6.87"                 | No                | TMF           |
| XT4                  | 250A                | 250A  | XT4                            | Dual                        | 6.25"                       | 6.87" <sup>(2)</sup>  | Yes               | TMF, TMA, ELT |
|                      |                     | 250A  | XT4                            | Single                      | 6.25"                       | 6.87"                 | Yes               | TMF, TMA, ELT |
| XT5                  | 400A                | 400A  | XT5                            | Single                      | 6.25"                       | 6.87"                 | Yes               | TMA, ELT      |
|                      |                     | 400A  | XT5 <sup>(3)</sup>             | Single                      | 8.75"                       | 6.87"                 | Yes               | TMA, ELT      |
| XT5                  | 600A <sup>(4)</sup> | 600A  | XT5                            | Single                      | 6.25"                       | 6.87"                 | Yes               | TMA, ELT      |
|                      |                     | 600A  | XT5 <sup>(3)</sup>             | Single                      | 8.75"                       | 6.87"                 | Yes               | TMA, ELT      |
|                      |                     | 600A  | XT6                            | Single                      | 10.25"                      | 9.62"                 | Yes               | TMA, ELT      |
|                      |                     | 800A  | XT6                            | Single                      | 10.25"                      | 9.62"                 | Yes               | TMA, ELT      |
|                      |                     | 1200A | XT7                            | Single                      | 10.25"                      | 9.62"                 | Yes               | ELT           |

<sup>(1)</sup> XT2 with Modbus TCP internal module installed requires a wider cover in 1.25" design.

<sup>(2)</sup> A dedicated strap kit drawing for XT4 28" panel must be used.

<sup>(3)</sup> XT5 with cable rack on the side requires a wider cover in 1.25" design.

<sup>(4)</sup> Strap kits for XT5 400A and XT5 600A are different.

## Standard circuit-breaker cable lugs

| Frame | Ampere rating | Wire size             | Catalog number            | Terminal cover included |
|-------|---------------|-----------------------|---------------------------|-------------------------|
| A1 3p | 80            | 14 AWG – 2            | KA1080-3                  | yes                     |
|       | 100           | 4 AWG – 1             | KA1100-3                  | yes                     |
| A1 2p | 80            | 14 AWG – 2            | KA1080-2                  | no                      |
|       | 100           | 4 AWG – 1             | KA1100-2                  | no                      |
| A1 1p | 80            | 14 AWG – 2            | KA1080-1                  | no                      |
|       | 100           | 4 AWG – 1             | KA1100-1                  | no                      |
| XT1   | 125           | 14 AWG – 1/0          | KXT1CU-3PC <sup>(1)</sup> | no                      |
|       |               | 10-2/0 AWG            | KXT1CUAL1-3PC             | no                      |
| XT2   | 125           | 14 AWG – 1/0          | KXT2CU-3PC <sup>(1)</sup> | no                      |
|       |               | 10-2/0 AWG            | KXT2CUAL2-3PC             | no                      |
| XT3   | 100           | 14 AWG – 1/0          | KXT3CUAL1-3PC             | no                      |
|       | 225           | 4 AWG – 300 kcmil     | KXT3CUAL2-3PC             | no                      |
| A2 3p | 225           | 1 AWG – 300 kcmil     | KA2225-3                  | yes                     |
| A2 2p | 225           | 1 AWG – 300 kcmil     | KA2225-2                  | no                      |
| XT4   | 100           | 14 AWG – 1/0          | KXT4CUAL1-3PC             | no                      |
|       | 150           | 4 AWG – 300 kcmil     | KXT4CUAL2-3PC             | no                      |
|       | 225           | 4 AWG – 300 kcmil     | KXT4CUAL2-3PC             | no                      |
|       | 250           | 3/0 – 350 kcmil       | KXT4CUAL4-3PC             |                         |
|       | 250           | 10 AWG – 250 kcmil    | KXT4CU-3PC <sup>(1)</sup> | no                      |
| XT5   | 300           | 250 kcmil – 500 kcmil | KXT5CUAL500K-3PC          | no                      |
|       | 400           | (2) 2/0 – 500 kcmil   | KXT5CUAL2X500K-3PC        | no                      |
|       | 600           | (2) 2/0 – 500 kcmil   | KXT5CUAL2X500K-3PC        | no                      |
| XT6   | 600           | (2) 250 – 500 kcmil   | KXT6CUAL2X500K-3PC        | no                      |
|       | 800           | (3) 2/0 – 400 kcmil   | KXT6CUAL3X500K-3PC        | yes                     |
| XT7   | 1200          | (4) 4/0 – 500 kcmil   | KXT7CUAL4X500K-3PC        | yes                     |
|       |               | (3) 500-750kcmil      | KXT7CUAL3X750KC-3         | yes                     |

<sup>(1)</sup> FC Cu Terminals for copper cables only.

## Switchboard technical data

### Circuit-breaker mounting strap kits

The circuit-breaker mounting straps required for mounting MCCBs to the 1.25" and 1.38" hole patterns have been designed in a manner that allows the OEM to fabricate them at their own facility.

Special care has been taken to ensure that no extraordinary forging, die casting process or

specialized tooling is required to realize the ABB design for the mounting straps, thereby reducing the OEMs cost and lead-times. This also allows the OEM to have greater control of their supply chain. Some breakers require a terminal cover to be installed on line side, this additional terminal cover must be purchased from ABB.

| Breaker frame      |                     | Mounting configuration | Panel Width (inches) |     |     |
|--------------------|---------------------|------------------------|----------------------|-----|-----|
|                    |                     |                        | 28"                  | 32" | 38" |
| A1-A2 XT1-XT4      | 100A – 250A         | Dual                   |                      | ■   | ■   |
| XT4 <sup>(1)</sup> | 250A                | Dual                   | ■                    | ■   | ■   |
| XT5                | 400A                | Single                 | ■                    | ■   | ■   |
| XT5                | 600A <sup>(3)</sup> | Single                 |                      | ■   | ■   |
| XT6                | 600A - 800A         | Single                 | ■                    | ■   | ■   |
| XT7 <sup>(2)</sup> | 1200                | Single                 |                      | ■   | ■   |

<sup>(1)</sup> Dedicated kit for XT4 dual mount in 1.38" design.

<sup>(2)</sup> XT7 equipped with 750MCM lugs can be installed only in 38" panel.

<sup>(3)</sup> Strap kits for XT5 400A and XT5 600A are different.

### Line Side Terminal Covers Required

| Size | Type                | U.S. Ordering Code | Note              | 1.25 Design | 1.38 Design |
|------|---------------------|--------------------|-------------------|-------------|-------------|
| XT5  | High Terminal Cover | KXT5HTC-3          |                   | ■           | ■           |
| XT6  | High Terminal Cover | KXT6HTC-3          |                   | ■           | ■           |
| XT7  | Low Terminal Cover  | KXT7LTC-3          |                   | ■           | ■           |
| XT7  | High Terminal Cover | KXT7HTC2PCS-2      | 2 Covers Included | ■           |             |

### Enclosure details

The height and depth of the enclosure is to be determined by the OEM and the application the switchboard will operate in. ABB has established the minimum widths to be used in the Tmax Link

design based on UL wire bending space requirements and arcing distance test results. The OEM will be able to include breaker ratings up to 1200A within a 32" wide enclosure.

### Minimum enclosure widths

| Mounting configuration | Breaker frame | Width (inches) |
|------------------------|---------------|----------------|
| Dual                   | 100A – 250A   | A1-A2 XT1-XT4  |
|                        | 125A – 250A   |                |
| Single                 | 250A – 1200A  | XT4 – T7       |

**Required wire bending space**

UL requires a minimum wire bending radius for various cable sizes. The table below provides the minimum horizontal space required for each circuit-breaker frame size and the maximum cable size that can be utilized for load connections.

| Frame | [A]  | Maximum cable size      | Required wire bending space (UL 891) |
|-------|------|-------------------------|--------------------------------------|
| A1    | 100  | #1 AWG                  | 3.00"                                |
| XT1   | 125  | #2/0                    | 3.50"                                |
| XT2   | 125  | #2/0                    | 3.50"                                |
| XT3   | 225  | 300 kcmil               | 5.00"                                |
| A2    | 250  | 350 kcmil               | 5.00"                                |
| XT4   | 250  | 350 kcmil               | 5.00"                                |
| XT5   | 400  | 500 kcmil               | 6.00"                                |
|       | 600  | 500 kcmil               | 8.00"                                |
| XT6   | 800  | 400kcmil                | 10.00"                               |
| XT7   | 1200 | 500Kcmil                | 12.00"                               |
| XT7   | 1200 | 750Kcmil <sup>(1)</sup> | 14.00"                               |

<sup>(1)</sup> Available only in 38" width switchboard



# Switchboard technical data

## Switchboard layout

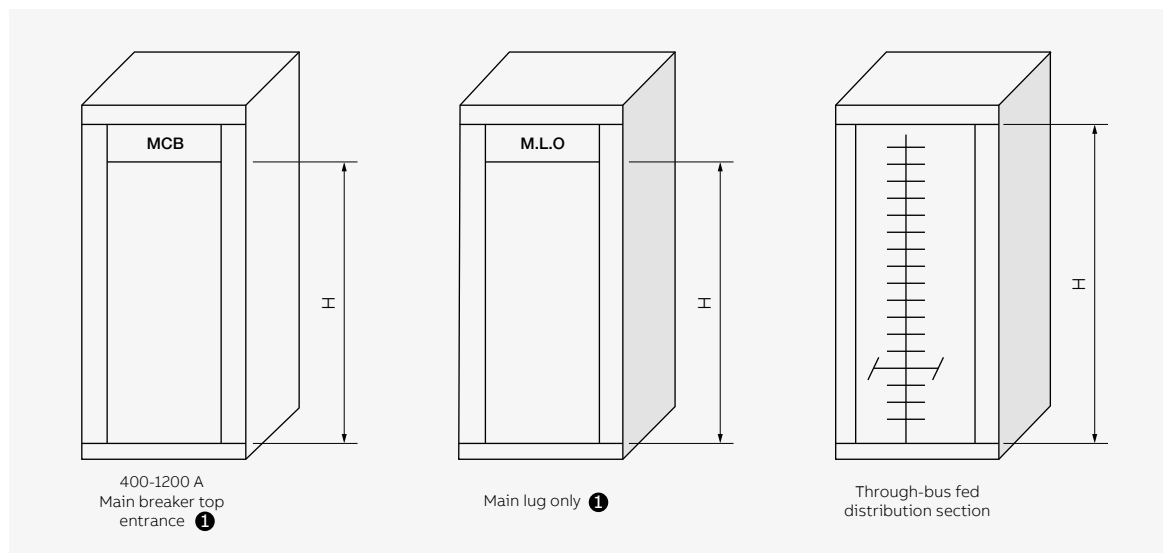
The Tmax Link switchboard design includes several layouts to accommodate many applications.

These layouts are as follows:

- An integral (chassis mounted) main circuit-breaker with group mounted feeder circuit-breakers in one structure
- A main lug only supply connection with group mounted feeder circuit-breakers

- An individually mounted molded case circuit-breaker with a separate group mounted feeder circuit-breaker chassis in one structure
- A through-bus (horizontal/main bus) fed chassis with group mounted feeder circuit-breakers

The maximum chassis circuit-breaker mounting space for branch/feeder MCCBs is indicated below for each layout that has been incorporated in the Tmax Link switchboard design.



### Application note:

The UL standard requires that the vertical bus be sized based on the quantity of branch/feeder circuit protective devices in accordance with Table 26 of the UL891 standard. The table can be found below titled "Minimum ampacity of section or branch bus".

## Remaining chassis height "H"

| 250A – 1200A        |                               |       |                    |             |   |
|---------------------|-------------------------------|-------|--------------------|-------------|---|
| Vertical bus rating | Integral mounted main breaker |       |                    |             | Main/through bus fed distribution section |
|                     | Tmax XT                       |       | 1.25 design        | 1.38 design |   |
| 400A                | XT4                           | 250A  | 62.50"             | 61.88"      | 68.75"                                    |
| 400A                | XT5                           | 400A  | 62.50"             | 61.88"      | 68.75"                                    |
| 600A                | XT5                           | 600A  | 62.50"             | 61.88"      | 68.75"                                    |
| 400A                | XT5                           | 400A  | 60" <sup>(1)</sup> | 61.88"      | 68.75"                                    |
| 600A                | XT5                           | 600A  | 60" <sup>(1)</sup> | 61.88"      | 68.75"                                    |
| 600A                | XT6                           | 600A  | 58.50"             | 59.13"      | 68.75"                                    |
| 800A                | XT6                           | 800A  | 58.50"             | 59.13"      | 68.75"                                    |
| 1200A               | XT7                           | 1200A | 58.50"             | 59.13"      | 68.75"                                    |
| 1600A               |                               |       | –                  | –           | 68.75"                                    |
| 2000A               |                               |       | –                  | –           | 68.75"                                    |

<sup>(1)</sup> XT5 with cable rack on the side requires a wider cover in 1.25" design.

# Panelboard technical data

## Tmax Link panelboard electrical data

| Vertical bus current ratings |                       | 400A | 600A | 800A | 1000A | 1200A |
|------------------------------|-----------------------|------|------|------|-------|-------|
| Copper bus                   | 1 Layer 0.25" x 3.00" | ■    | ■    | ■    | ■     | ■     |
| Aluminum bus                 | 1 Layer 0.25" x 3.00" | ■    | ■    | –    | –     | –     |
|                              | 2 Layer 0.25" x 3.00" | –    | –    | ■    | ■     | ■     |

## Ventilation requirements

Each opening for ventilation measures 0.12" H by 1.25" W (0.15 sq. in.), small enough to prevent a tool from being inserted through the openings.

A barrier is placed behind the openings to provide an additional degree of protection from foreign object touching the live parts.

The air inlet is located in the bottom front of the enclosure and has 2 groups of openings with each group or array containing 98 ventilation openings (14 rows by 7 columns) for a total of 196 openings with a total area of 29.4 sq. in.

The air outlet is located in the top front of the enclosure and has an equal number of ventilation openings as the air inlet, 2 groups of openings with each group or array containing 98 ventilation openings (14 rows by 7 columns) for a total of 196 openings with a total area of 29.4 sq. in.

## Configurations

- 3 phase, 3 wire
- 3 phase, 4 wire (100% rated neutral)

| Rated voltage (+/-10%):                        |       | 240VAC | 480VAC | 600VAC |
|--|-------|--------|--------|--------|
| Maximum short circuit ratings <sup>(1)</sup> : | 65kA  | MLO    | MLO    | MLO    |
| MLO = main lugs only                           |       |        |        |        |
| MCB = main circuit-breaker                     | 100kA | MCB    | MCB    | MCB    |
| Rated frequency (+/- 2%): 50/60Hz              | 150kA | MCB    | MCB    | –      |
|  | 200kA | MCB    | MCB    | –      |

<sup>(1)</sup> On systems capable of producing up to 65,000A RMS symmetrical short circuit current at the incoming terminals, MLO connection, no main circuit-breaker is required. To achieve bus short circuit ratings higher than 65kAIC, the ABB Tmax XT circuit-breaker must be used as an integrally mounted or remote mounted main device. The maximum short circuit rating of the bus is equivalent to the maximum short circuit rating of the main circuit-breaker used.

## Panelboard technical data

### Service conditions

Ambient temperature: 40 °C (104 °F)

Altitude: 6,600 feet (2000 meters)

For other service conditions, refer to the Formula and Tmax XT technical catalogs for appropriate de-rating tables.

### Vertical distribution bus

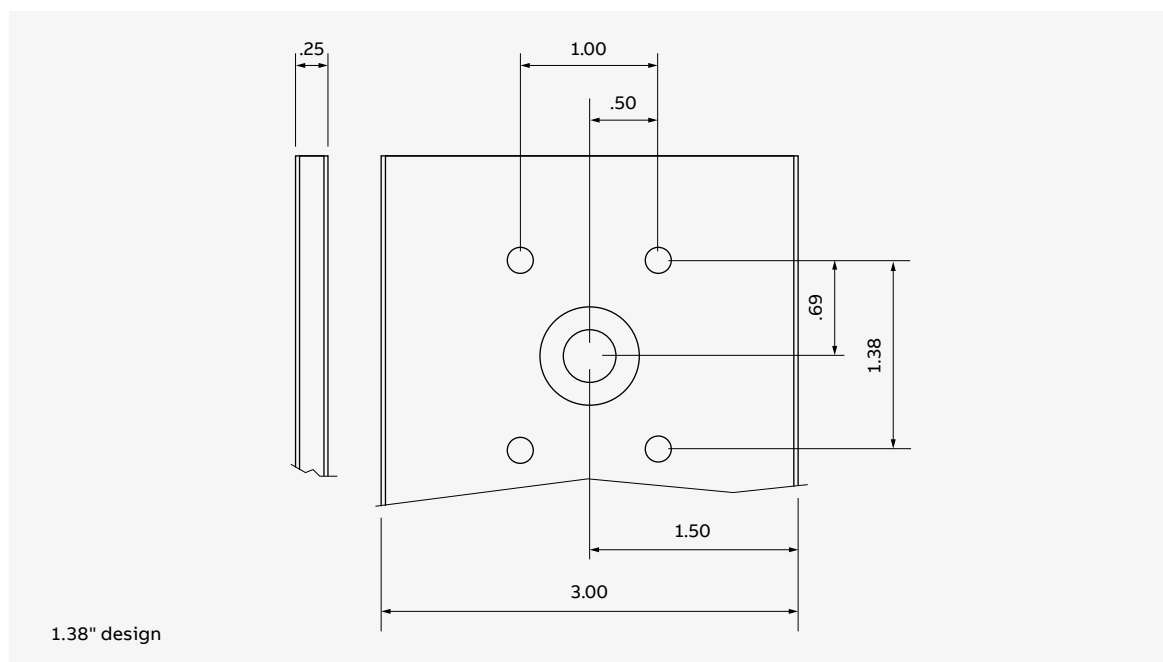
Tmax Link has a vertical bus design based on 1.38" vertical hole spacing, reference figure below.

The Tmax Link panelboard design uses standardized bus bar sizes and commonly available standoff insulators throughout the product range thereby minimizing the inventory level of raw materials required by the OEM.

The panelboard design accommodates multiple bus materials and plating options including; tin-plated aluminum bus, silver-plated copper bus, or tinplated copper bus. The vertical bus meets UL®, CSA® and NEMA® standards for temperature rise and has optimized ratings based on thermal testing.

### Bus bracing system

The Tmax Link bus bracing design has a standard short circuit withstand rating of 65kA RMS at 240VAC, 480VAC, and 600VAC, with the ability to increase the short circuit ratings up to: 200kA @ 240VAC, 200kA @ 480VAC, or 100kA @ 600VAC with the use of a Tmax XT circuit-breakers as a remote or integrally mounted main overcurrent protective device.



01 Detail of Tmax  
XT5 mounted in  
the switchboard

Circuit-breaker arrangement

Group-mounted circuit-breakers are an assembly of circuit protective devices mounted on a single chassis. A main molded-case circuit-breaker within the sizes listed for the panelboard design can be included in the panel-mounted assembly in lieu of a separate, remote mounted main circuit-breaker.

Group mounted molded case circuit-breaker layout and space requirements

| Group mounted layout |       |       |       | Breaker mounting configuration | Required space 1.38" design | Integral main breaker | Trip unit options |
|----------------------|-------|-------|-------|--------------------------------|-----------------------------|-----------------------|-------------------|
| A1 1p                | 100A  | 100A  | A1 1p | Dual                           | 2.75"                       | No                    | TMF               |
| A1 2p                | 100A  | 100A  | A1 2p | Dual                           | 2.75"                       | No                    | TMF               |
| A1 3p                | 100A  | 100A  | A1 3p | Dual                           | 4.12"                       | No                    | TMF               |
| XT1                  | 125A  | 125A  | XT1   | Dual                           | 4.12"                       | No                    | TMF               |
| XT2                  | 125A  | 125A  | XT2   | Dual                           | 4.12"                       | No                    | TMF, ELT          |
| XT3                  | 225A  | 225A  | XT3   | Dual                           | 6.87"                       | No                    | TMF               |
| A2 2p                | 250A  | 250A  | A2 2p | Dual                           | 4.12"                       | No                    | TMF               |
| A2 3p                | 250A  | 250A  | A2 3p | Dual                           | 6.87"                       | No                    | TMF               |
| XT4                  | 250A  | 250A  | XT4   | Dual                           | 6.87" <sup>(1)</sup>        | Yes                   | TMF, TMA, ELT     |
|                      | 250A  | 250A  | XT4   | Single                         | 6.87"                       | Yes                   | TMF, TMA, ELT     |
|                      | 400A  | 400A  | XT5   | Single                         | 6.87"                       | Yes                   | TMA, ELT          |
|                      | 600A  | 600A  | XT5   | Single                         | 6.87"                       | Yes                   | TMA, ELT          |
|                      | 600A  | 600A  | XT6   | Single                         | 9.62"                       | Yes                   | TMA, ELT          |
|                      | 800A  | 800A  | XT6   | Single                         | 9.62"                       | Yes                   | TMA, ELT          |
|                      | 1200A | 1200A | XT7   | Single                         | 9.62"                       | Yes                   | ELT               |

<sup>(1)</sup> A dedicated strap kit drawing for XT4 28" panel must be used.  
The minimum chassis height is 13.75" (10X); the maximum chassis height is 27.50" (20X).  
TMF = Thermal Magnetic Fixed; TMA = Thermal Magnetic Adjustable; ELT = Electronic





# Panelboard technical data

### Enclosure details

The height of the enclosure is to be determined by the available circuit-breaker mounting space and the type of incoming supply connection (MLO or MCB) the panelboard will have. ABB has established the minimum widths.

Required wire bending space UL requires a minimum wire bending radius for various cable sizes.

The table below provides the minimum wire bending space required for each Formula and Tmax XT circuit-breaker frame size and the maximum cable size that can be utilized for field wiring connections.

Minimum enclosure widths—Table X

| Breaker frame      |             | Mounting configuration | Panel Width (inches) |     |
|--------------------|-------------|------------------------|----------------------|-----|
|                    |             |                        | 28"                  | 32" |
| A1-A2 XT1-XT4      | 100A – 250A | Dual                   |                      | ■   |
| XT4 <sup>(1)</sup> | 250A        | Dual                   | ■                    | ■   |
| XT5                | 400A        | Single                 | ■                    | ■   |
| XT5                | 600A        | Single                 |                      | ■   |
| XT5                | 600A        | Vertical main          | ■                    | ■   |
| XT6                | 600A - 800A | Single                 | ■                    | ■   |
| XT7                | 600A - 800A | Vertical main          | ■                    | ■   |
| XT7                | 1200A       | Single                 |                      | ■   |
| XT7                | 1200A       | Vertical main          | ■                    | ■   |

<sup>(1)</sup> Dedicated kit for XT4 dual mount in 1.38" design.

| Frame | [A]  | Maximum cable size | Required wire bending space (UL 891) |
|-------|------|--------------------|--------------------------------------|
| A1    | 100  | #1 AWG             | 3.00"                                |
| XT1   | 125  | #2/0               | 3.50"                                |
| XT2   | 125  | #2/0               | 3.50"                                |
| XT3   | 225  | 300 kcmil          | 5.00"                                |
| A2    | 250  | 350 kcmil          | 5.00"                                |
| XT4   | 250  | 350 kcmil          | 5.00"                                |
| XT5   | 400  | 500 kcmil          | 6.00"                                |
|       | 600  | 500 kcmil          | 8.00"                                |
| XT6   | 800  | 400kcmil           | 10.00"                               |
| XT7   | 1200 | 500Kcmil           | 12.00"                               |



### Panelboard layout

The Tmax Link panelboard design includes several layouts to accommodate many applications.

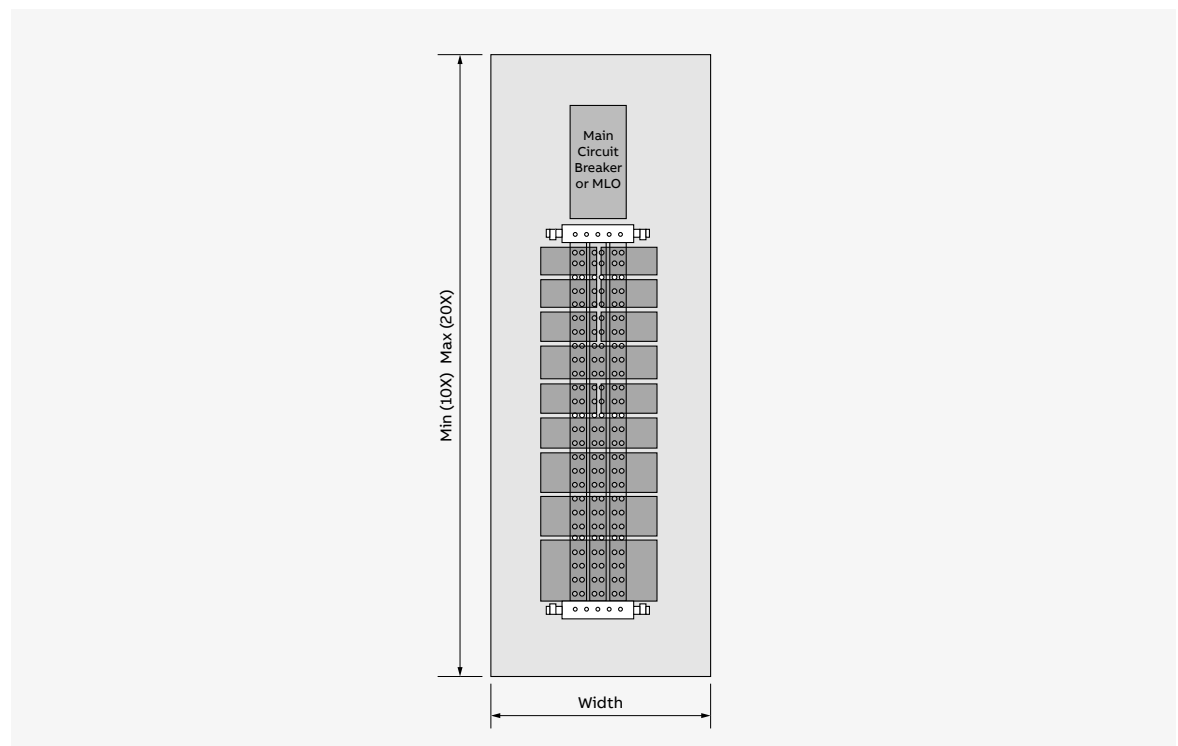
These layouts are as follows:

- An integral (vertical or horizontal mounted) main circuit-breaker with group mounted branch circuit-breakers
- A main lug only (MLO) supply connection with group mounted branch circuit-breakers  
(No integral or remote main circuit-breaker)

Note: This configuration may be used as service entrance equipment with up to six service disconnect circuit-breakers installed up to the maximum 3 cycle bus withstand current rating of 65kA

- A main lug only (MLO) supply connection panelboard may be used with a remote mounted Tmax XT molded case circuit-breaker (MCCB) and applied at short circuit ratings up to the maximum interrupting rating of the remote main circuit-breaker
- A panelboard may also be equipped with feed through or sub-feed lugs

The maximum chassis circuit-breaker mounting space for branch/feeder MCCBs is indicated below for each layout that has been incorporated in the Tmax Link panelboard.

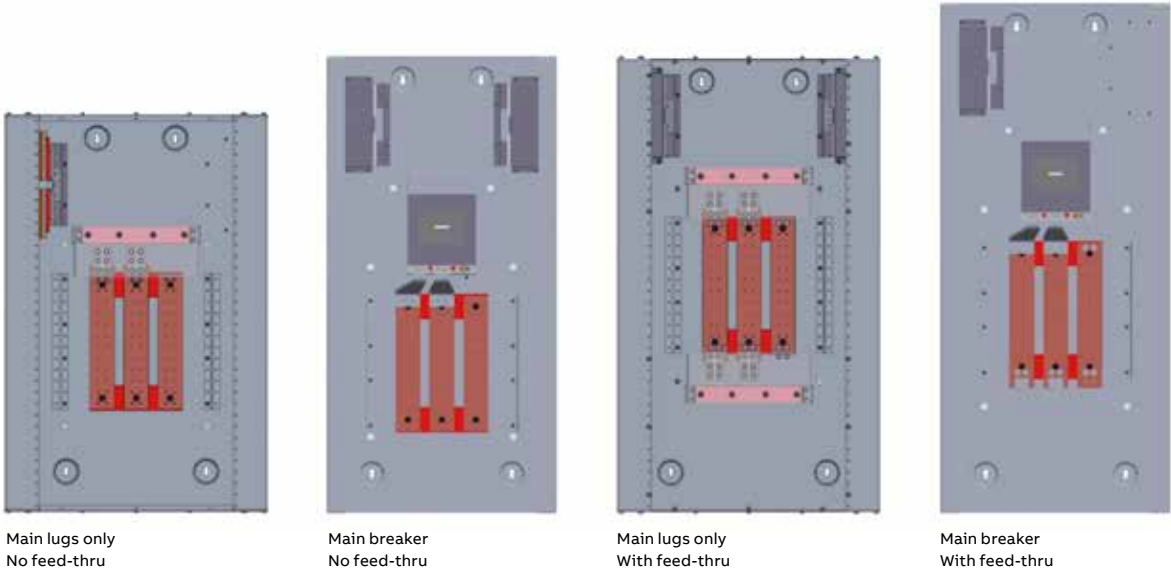




# Panelboard technical data

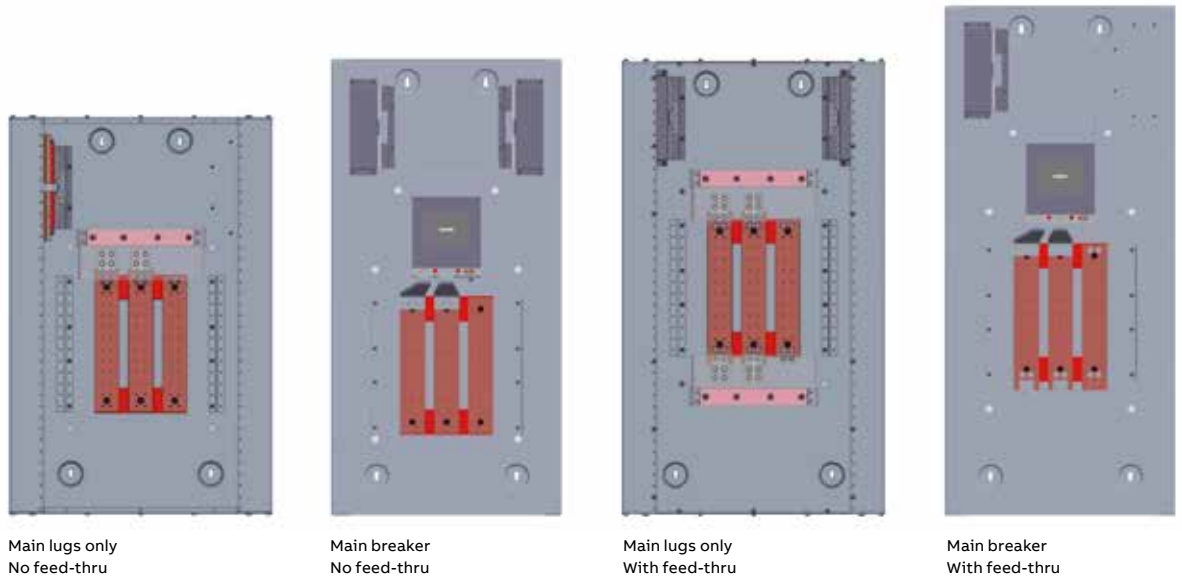
250A – 1200A - Enclosure height (Minimum) with 10X mounting space

| Enclosure height (Minimum) with 10X mounting space |         |       |                    |                            |                         |                           |                        |                           |                           |
|--|---------|-------|--------------------|----------------------------|-------------------------|---------------------------|------------------------|---------------------------|---------------------------|
| Vertical bus rating [A]                            | Tmax XT |       | Horz. Main breaker | Main Lug only No Feed-thru | Main Lug only Feed-thru | Main Breaker No Feed-thru | Main Breaker Feed-thru | Enclosure depth (Minimum) | Enclosure width (Minimum) |
| 400A   | XT4     | 250A  | 34.25"             | 34.25"                     | 35                      | 43,5                      | 45,5                   | 10.27"                    | 28                        |
| 400A   | XT5     | 400A  | 34.25"             | 34.25"                     | 35                      | 43,5                      | 45,5                   | 10.27"                    | 28                        |
| 600A   | XT5     | 600A  | 39.50"             | 43                         | 49,5                    | 55,5                      | 62                     | 10.27"                    | 28                        |
| 600A   | XT6     | 600A  | 39.50"             | 43                         | 49,5                    | 55,5                      | 62                     | 10.27"                    | 28                        |
| 800A   | XT6     | 800A  | 43.25"             | 43                         | 49,5                    | 55,5                      | 62                     | 10.27"                    | 28                        |
| 1200A  | XT7     | 1200A | 48.00"             | 48                         | 55                      | –                         | –                      | 10.27"                    | 32                        |
| 1200A  | XT7     | 1200A | –                  | –                          | –                       | 60                        | 67,25                  | 10.27"                    | 28                        |



**250A – 1200A - Enclosure height (Minimum) with 20X mounting space**

| Enclosure height (Minimum) with 20X mounting space |         |       |                    |                            |                         |                           |                        |                           |                           |
|--|---------|-------|--------------------|----------------------------|-------------------------|---------------------------|------------------------|---------------------------|---------------------------|
| Vertical bus rating [A]                            | Tmax XT |       | Horz. Main breaker | Main Lug only No Feed-thru | Main Lug only Feed-thru | Main Breaker No Feed-thru | Main Breaker Feed-thru | Enclosure depth (Minimum) | Enclosure width (Minimum) |
| 400A   | XT4     | 250A  | 48.00"             | 48.00"                     | 48,75                   | 57,25                     | 59,25                  | 10.27"                    | 28                        |
| 400A   | XT5     | 400A  | 48.00"             | 48.00"                     | 48,75                   | 57,25                     | 59,25                  | 10.27"                    | 28                        |
| 600A   | XT5     | 600A  | 53.25"             | 56,75                      | 63,25                   | 69,25                     | 75,75                  | 10.27"                    | 28                        |
| 600A   | XT6     | 600A  | 53.25"             | 56,75                      | 63,25                   | 69,25                     | 75,75                  | 10.27"                    | 28                        |
| 800A   | XT6     | 800A  | 57.00"             | 56,75                      | 63,25                   | 69,25                     | 75,75                  | 10.27"                    | 28                        |
| 1200A  | XT7     | 1200A | 61.75"             | 61,5                       | 68,75                   | –                         | –                      | 10.27"                    | 32                        |
| 1200A  | XT7     | 1200A | –                  | –                          | –                       | 73,75                     | 81                     | 10.27"                    | 28                        |

**Application note:**

The Tmax Link panelboard design allows for all ABB Tmax XT MCCBs that can physically fit onto the switchboard interior to be 100% rated (i.e. there is no limitation on the quantity of 100% rated circuit-breakers that can be installed) therefore, careful consideration should be given to the busbar rating of the panelboard to meet the total loading requirements of all MCCBs connected to the vertical bus when multiple 100% rated circuit-breakers are used. Check breakers catalogs to verify which frame are eligible for 100% loading. See links at page 21.

## Panelboard technical data

### Standard circuit-breaker cable lugs

| Frame | Ampere rating | Wire size             | Catalog number            | Terminal cover included |
|-------|---------------|-----------------------|---------------------------|-------------------------|
| A1 3p | 80            | 14 AWG – 2            | KA1080-3                  | yes                     |
|       | 100           | 4 AWG – 1             | KA1100-3                  | yes                     |
| A1 2p | 80            | 14 AWG – 2            | KA1080-2                  | no                      |
|       | 100           | 4 AWG – 1             | KA1100-2                  | no                      |
| A1 1p | 80            | 14 AWG – 2            | KA1080-1                  | no                      |
|       | 100           | 4 AWG – 1             | KA1100-1                  | no                      |
| XT1   | 125           | 14 AWG – 1/0          | KXT1CU-3PC <sup>(1)</sup> | no                      |
|       |               | 10-2/0 AWG            | KXT1CUAL1-3PC             | no                      |
| XT2   | 125           | 14 AWG – 1/0          | KXT2CU-3PC <sup>(1)</sup> | no                      |
|       |               | 10-2/0 AWG            | KXT2CUAL2-3PC             | no                      |
| XT3   | 100           | 14 AWG – 1/0          | KXT3CUAL1-3PC             | no                      |
| XT3   | 225           | 4 AWG – 300 kcmil     | KXT3CUAL2-3PC             | no                      |
| A2 3p | 225           | 1 AWG – 300 kcmil     | KA2225-3                  | yes                     |
| A2 2p | 225           | 1 AWG – 300 kcmil     | KA2225-2                  | no                      |
| XT4   | 100           | 14 AWG – 1/0          | KXT4CUAL1-3PC             | no                      |
|       | 150           | 4 AWG – 300 kcmil     | KXT4CUAL2-3PC             | no                      |
|       | 225           | 4 AWG – 300 kcmil     | KXT4CUAL2-3PC             | no                      |
|       | 250           | 3/0 – 350 kcmil       | KXT4CUAL4-3PC             |                         |
|       | 250           | 10 AWG – 250 kcmil    | KXT4CU-3PC <sup>(1)</sup> | no                      |
| XT5   | 300           | 250 kcmil – 500 kcmil | KXT5CUAL500K-3PC          | no                      |
|       | 400           | (2) 2/0 – 500 kcmil   | KXT5CUAL2X500K-3PC        | no                      |
|       | 600           | (2) 2/0 – 500 kcmil   | KXT5CUAL2X500K-3PC        | no                      |
| XT6   | 600           | (2) 250 – 500 kcmil   | KXT6CUAL2X500K-3PC        | no                      |
|       | 800           | (3) 2/0 – 400 kcmil   | KXT6CUAL3X500K-3PC        | yes                     |
| XT7   | 1200          | (4) 4/0 – 500 kcmil   | KXT7CUAL4X500K-3PC        | yes                     |
|       |               | (3) 500-750kcmil      | KXT7CUAL3X750KC-3         | yes                     |

<sup>(1)</sup> FC Cu Terminals for copper cables only.

### Circuit-breaker mounting strap kits

The circuit-breaker mounting straps required for mounting MCCBs have been designed in a manner that allows the OEM to fabricate them at their own facility. Special care has been taken to ensure that no extraordinary forging, die casting processes or specialized tooling is required to realize the ABB

design for the mounting straps, thereby reducing the OEMs cost and lead-times.

This also allows the OEM to have greater control of their supply chain. Some breakers require a terminal cover to be installed on line side, this additional terminal cover must be purchased from ABB.

### Line Side Terminal Covers Required

| Size | Type                | U.S. Ordering Code | Note              | 1.38 Design |
|------|---------------------|--------------------|-------------------|-------------|
| XT5  | High Terminal Cover | KXT5HTC-3          |                   | ■           |
| XT6  | High Terminal Cover | KXT6HTC-3          |                   | ■           |
| XT7  | Low Terminal Cover  | KXT7LTC-3          |                   | ■           |
| XT7  | High Terminal Cover | KXT7HTC2PCS-2      | 2 Covers Included | ■           |

# Molded case circuit-breakers technical data

| Circuit-breaker ratings |                             |         |       | UL/CSA interrupting capacity (kA symmetrical amperes)<br>Volts Ac |       |       |          |
|-------------------------|-----------------------------|---------|-------|---|-------|-------|----------|
| Frame                   | Continuous<br>ampere rating | Version | Poles | 240V  | 480V  | 600V  | 600/347V |
| A1                      | 100A                        | A       | 1     | 10kA  | -     | -     | -        |
|                         |                             | A       | 2, 3  | 10kA  | -     | -     | -        |
|                         |                             | N       | 1     | 18kA  | -     | -     | -        |
|                         |                             | N       | 2, 3  | 25kA  | -     | -     | -        |
| XT1                     | 125A                        | N       | 3     | 50kA  | 25kA  | -     | 18kA     |
|                         |                             | S       | 3     | 65kA  | 35kA  | -     | 22kA     |
|                         |                             | H       | 3     | 100kA   | 65kA  | -     | 25kA     |
| XT2                     | 125A                        |         | 3     | 65kA  | 25kA  | 18kA  | -        |
|                         |                             | S       | 3     | 100kA   | 35kA  | 22kA  | -        |
|                         |                             | H       | 3     | 150kA   | 65kA  | 25kA  | -        |
|                         |                             | L       | 3     | 200kA   | 100kA | 35kA  | -        |
|                         |                             | V       | 3     | 200kA   | 150kA | 42kA  | -        |
|                         |                             | X       | 3     | 200kA   | 200kA | 42kA  | -        |
| XT3                     | 225A                        | N       | 3     | 50kA  | 25kA  | -     | 10kA     |
|                         |                             | S       | 3     | 65kA  | 35kA  | -     | 10kA     |
| A2                      | 250A                        | A       | 2, 3  | 10kA  | -     | -     | -        |
|                         |                             | N       | 2, 3  | 25kA  | -     | -     | -        |
| XT4                     | 250A                        | N       | 3     | 65kA  | 25kA  | 18kA  | -        |
|                         |                             | S       | 3     | 100kA   | 35kA  | 22kA  | -        |
|                         |                             | H       | 3     | 150kA   | 65kA  | 25kA  | -        |
|                         |                             | L       | 3     | 200kA   | 100kA | 50kA  | -        |
|                         |                             | V       | 3     | 200kA   | 150kA | 65kA  | -        |
|                         |                             | X       | 3     | 200kA   | 200kA | 100kA | -        |
| XT5                     | 400A-600A                   | N       | 3     | 65kA  | 35kA  | 18kA  | -        |
|                         |                             | S       | 3     | 100kA   | 50kA  | 25kA  | -        |
|                         |                             | H       | 3     | 150kA   | 65kA  | 35kA  | -        |
|                         |                             | L       | 3     | 200kA   | 100kA | 65kA  | -        |
|                         |                             | V       | 3     | 200kA   | 150kA | 100kA | -        |
| XT6                     | 800A                        | N       | 3     | 65kA  | 35kA  | 20kA  | -        |
|                         |                             | S       | 3     | 100kA   | 50kA  | 25kA  | -        |
|                         |                             | H       | 3     | 200kA   | 65kA  | 35kA  | -        |
| XT7                     | 800A-1000A-1200A            | S       | 3     | 65kA  | 50kA  | 25kA  | -        |
|                         |                             | H       | 3     | 100kA   | 65kA  | 50kA  | -        |
|                         |                             | L       | 3     | 200kA   | 100kA | 65kA  | -        |

Tmax XT circuit-breakers available as 80% or 100% rated.

Formula circuit-breakers available as 80% rated only.

Check breakers catalogs for more details. See links at page 21



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## The SACE Tmax XT range at a glance

The world of circuit breaking and circuit protection in your hands.

According to UL 489 and CSA C22.2 Standards.

The SACE Tmax XT range takes circuit protection to the next level. Designed to perform at extremely high levels, simple to install and able to provide increasingly better safety, there is a frame to meet each and every one of your requirements. From a basic solution for standard applications - such as hotels - through to advanced, heavy-duty applications with cloud connectivity for ships, chemical parks or airports, the new range has got it covered: securely, professionally, reliably.



**SACE Tmax XT1** - The founder

**At a glance:**

- Up to 125A
- For basic functionalities
- Dimensions 3 x 2.75 x 5.12 (WxDxH in)
- Thermal-magnetic trip unit



**SACE Tmax XT2** - The aspirer

**At a glance:**

- Up to 125A
- For heavy duty
- Dimensions 3.54 x 3.25 x 5.12 (WxDxH in)
- Thermal-magnetic, Ekip Dip, Ekip Touch/Hi-Touch



**SACE Tmax XT3** - The workhorse

**At a glance:**

- Up to 225A
- For basic functionalities
- Dimensions 4.13 x 2.75 x 5.90 (WxDxH in)
- Thermal-magnetic trip unit



**SACE Tmax XT4** - The entrepreneur

**At a glance:**

- Up to 250A
- For heavy duty
- Dimensions 4.13 x 3.25 x 6.3 (WxDxH in)
- Thermal-magnetic, Ekip Dip, Ekip Touch/Hi-Touch

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## The SACE Tmax XT range at a glance

The world of circuit breaking and circuit protection in your hands.



**SACE Tmax XT5** - The gamechanger

**At a glance:**

- Up to 600A
- For heavy duty
- Dimensions 5.51x4.05x8.07 (WxDxH in)
- Thermal-magnetic, Ekip Dip, Ekip Touch



**SACE Tmax XT6** - The carpenter

**At a glance:**

- Up to 800A
- For basic functionalities
- Dimensions 8.26x4.07x10.55 (WxDxH in)
- Thermal-magnetic, Ekip Dip



**SACE Tmax XT7** - The superhero

**At a glance:**

- Up to 1200A
- For heavy duty
- Dimensions 8.26x6.53x10.55 (WxDxH in)
- Ekip Dip, Ekip Touch/Hi-Touch



**SACE Tmax XT7 M** - The motorized superhero

**At a glance:**

- Up to 1200A
- For heavy duty
- Dimensions 8.26x7x10.55 (WxDxH in)
- Ekip Dip, Ekip Touch

# Electronic trip units Ekip Dip and Ekip Touch/Hi-Touch

## The network under control

When it comes to accurate protection of the network, you cannot go wrong with Ekip Dip and Touch technology.

01 All the tools needed to set up a competent and effective energy management strategy. 30% more information about a running system to empower ABB Ability™

**Trip unit range**

The protection units available for the SACE Tmax XT range is organized in three layers, characterized by increasing performance, interfaces, information sets and integration functions.

Each layer includes several trip unit versions, designed to match specific application needs such as distribution, generator protection and motor protection.

|       | Applications |    |       |           | Advanced functionalities |          |               |                          |
|-------|--------------|----|-------|-----------|--------------------------|----------|---------------|--------------------------|
|       | Distribution |    | Motor | Generator | Selectivity              | Metering | Communication | ABB Ability™ Marketplace |
|       | DC           | AC |       |           |                          |          |               |                          |
| Touch |              | ■  | ■     | ■         | ■                        | ■        | ■             | ■                        |
| Dip   |              | ■  | ■     | ■         | ■                        |          |               |                          |
| TM    | ■            | ■  | ■     | ■         |                          |          |               |                          |

**Thermal-magnetic trip units**

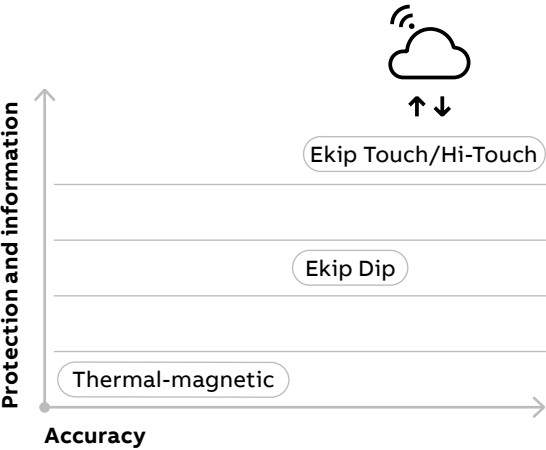
Thermal-magnetic trip units are intended for the protection of AC and DC networks. They are a solution for basic protection such as overloads and short-circuits.

**Ekip Dip trip units**

Ekip Dip trip units represent the first level of electronic trip unit and are used to protect AC networks. Compared to thermal-magnetic trip units, they can provide increased accuracy, a wider regulation range, delayed short-circuit protection, individual trip information and test capability.

**Ekip Touch/Hi-Touch trip units**

Ekip Touch/Hi-Touch trip units offer state-of-the-art technology for AC-network protection. These trip units integrate a great number of protection and automation functionalities, performed with best-in-class accuracy. Measurement and supervision data can be transmitted both on the local communication network (the most popular communication protocols are available) or directly over the Internet. Configuration of the trip unit is extremely user-friendly, mainly on the sizes where a color touchscreen display is available. Furthermore, as operational requirements evolve, for the first time ever customers can download new functions from the ABB Ability™ Marketplace, choosing among more than fifty different protection, metering and automation functionalities.







## Notes





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