Application guide

Tmax Link
OEM UL891 Switchboard Program

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ABB

Tmax Link Overview

ABB's Tmax Link enables OEMs to build UL 891 distribution switchboards (dead-front) by fabricating bus, chassis's, enclosures, and breaker mounting straps to group mount ABB molded case circuit breakers (MCCB) into an electrical distribution assembly with a UL® label. Tmax Link allows OEMs to manufacture basic components under an extension of the ABB UL® certification while using the OEM's own logo. The Tmax Link distribution switchboard 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.

Figure 1

Benefits

- No direct competition from ABB
- Easy to manufacture mounting straps (no casting components)
- Commonly available standoff insulators
- Covers 1.25" and 1.38" hole spacing on the vertical bus
- Up to 1200A frame breaker in 32" width section
- No limitation in the use of 100% rated circuit breakers
- Up to 200kAIC

Standards

Tmax Link is designed, tested, and constructed in accordance with the following industry standard: UL 891	
American National Standards Institute (ANSI)	UL891, File# E466042
Underwriters Laboratories Inc. (UL®)	

UL File Extension Process Overview

Step 1. ABB has designed and tested two versions of switchboard interiors and strap kits to the UL891 standard utilizing the Tmax family of molded case circuit breakers.

Step 2. ABB will extend the UL file to the OEM. The extension package will include:

- Drawings of straps (2 designs); includes Tmax circuit breaker frames T1 – T5 dual mounted and T4 – T7 single mounted
- Drawings for circuit breaker support plates
- Drawings for the switchboard interior structures
- Assembly instructions with torque values
- Bill of Materials

Step 3. The OEM now has the ability to build a UL891 switchboard according to the ABB UL file extension using Tmax circuit breakers.

Step 4. The OEM has the option to build or purchase breaker mounting kits that include the straps, breaker support plate, breaker cover plate and hardware for installation.

Electrical Data

Horizontal/Main Bus Ratings:		600A	1200A	1600A	2000A	2500A	3000A	3600A	4000A	5000A
Copper Bus	1 layer 0.25” x 3.00”	•	-	-	-	-	-	-	-	-
	1 layer 0.25” x 5.00”[1]	•	•	•	-	-	-	-	-	-
	2 layer 0.25” x 4.00”	•	•	•	•	-	-	-	-	-
	2 layer 0.25” x 5.00”[1]	•	•	•	•	•	-	-	-	-
	3 layer 0.25” x 5.00”[1]	•	•	•	•	•	•	•	-	-
	4 layer 0.25” x 5.00”[1]	•	•	•	•	•	•	•	•	-
	6 layer 0.25” x 5.00”[1]	•	•	•	•	•	•	•	•	•

[1]Up to 480 Volts

Vertical Bus Current Ratings:		400A	600A	800A	1000A	1200A	1600A	2000A
Copper Bus Per UL 891 Standard table 23 & 25	1 layer 0.25” x 3.00”	•	•	•	-	-	-	-
	2 layer 0.25” x 3.00”	•	•	•	•	•	-	-
	3 layer 0.25” x 3.00”	•	•	•	•	•	•	•
Aluminum Bus Per UL 891 Standard table 23 & 25	1 layer 0.25” x 3.00”	•	-	-	-	-	-	-
	2 layer 0.25” x 3.00”	•	•	•	•	-	-	-
	3 layer 0.25” x 3.00”	•	•	•	•	•	•	-

Configuration:	3 phase, 3 wire 3 phase, 4 wire (100% Neutral)

Rated Voltage (+/-10%):		240VAC	480VAC	600VAC
Maximum Short Circuit Ratings[2]**:**	65kA	**MLO**	**MLO**	**MLO**
MLO = Main Lugs Only	100kA	**MCB**	**MCB**	**MCB**
MCB = Main Circuit Breaker	150kA	**MCB**	**MCB**	-
	200kA	**MCB**	-	-

[2] 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 circuit breaker must be used as a group mounted, individually 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 breaker used.

Rated Frequency (+/- 2%): 50/60Hz

Table 1

Technical Data

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 Figure 2 and Figure 3). 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® and NEMA® standards for temperature rise.

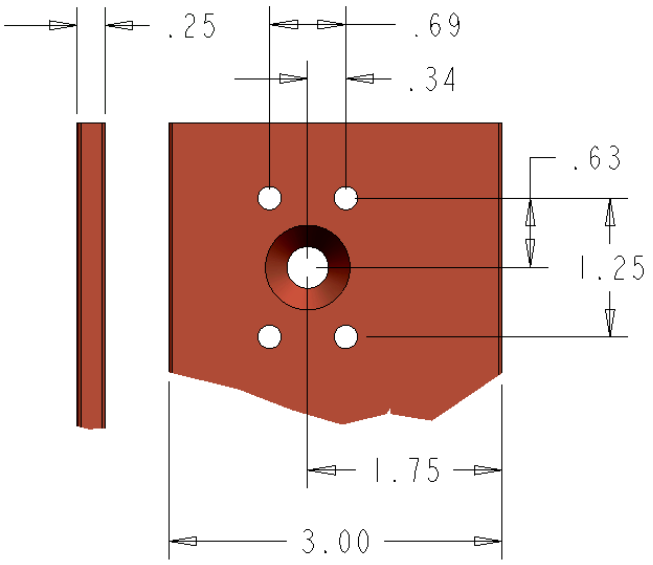


Figure 2 - 1.25 Design

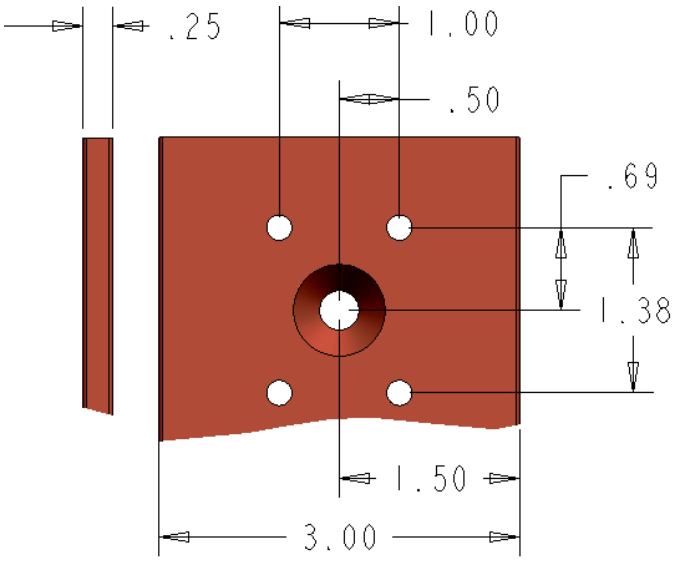


Figure 3 - 1.38 Design

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 rating up to: 200kA @ 240VAC, 150kA @ 480VAC, or 100kA @ 600VAC with the use of an ABB Tmax main circuit breaker.

Molded Case Circuit Breakers

With Tmax Link, the OEM only needs to purchase the circuit breakers required for the switchboard from ABB, all other components can be fabricated by the OEM. Tmax Link will utilize ABB's high performance molded case circuit breaker lines. The Tmax Link design has **no limitation on the quantity of 100% rated breakers that can be utilized.** These MCCBs cover frame sizes from 100A to 1200 amps. The ABB Tmax line of MCCBs have several key features that go along with their very small physical size:

- Double insulation – this construction characteristic allows for field installation of UL 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 – Tmax molded case circuit breakers can be installed in panels and switchboards in either the horizontal or vertical planes without any de-rating of their performance characteristics.
- Interrupting ratings at 480VAC up to 150kAIC.
- Compact size
- 100% rated and 80% rated versions
- All Tmax molded case circuit breakers are UL Listed and IEC rated for global application and acceptance.
- All versions of the Tmax family are suitable for reverse feed applications.

Tmax circuit breakers carry the following interrupting capacities:
- N – Normal Interrupting rating
- S – Standard Interrupting rating
- H – High Interrupting rating
- L – Extra high Interrupting rating
- V – Very high Interrupting rating

Trip Unit Options:
- Thermal magnetic (Fixed & Adjustable)
- Electronic (LS/I, LSI, & LSIG)

ABB Tmax UL Details

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

Electrical Characteristics of ABB Circuit Breakers

Circuit Breaker Ratings				UL 489 Interrupting Capacity (kA Symmetrical Amperes)			
				Volts AC			
Type	Continuous Ampere Rating	Version	Poles	240V	480V	600V	600/347V
T1	100A	N	3	50kA[1]	22kA[1]	-	10kA
T2	100A	S	3	65kA	35kA	-	-
		H	3	150kA	65kA	-	-
T3	225A	N	3	50kA	25kA	-	10kA
		S	3	65kA	35kA	-	10kA
T4	250A	N	3	65kA	25kA	18kA	-
		S	3	100kA	35kA	25kA	-
		H	3	150kA	65kA	35kA	-
		L	3	200kA	100kA	65kA	-
		V	3	200kA	150kA	100kA	-
T5	400A	N	3	65kA	25kA	18kA	-
		S	3	100kA	35kA	25kA	-
		H	3	150kA	65kA	35kA	-
		L	3	200kA	100kA	65kA	-
		V	3	200kA	150kA	100kA	-
T6	600A	N	3	65kA	35kA	20kA	-
		S	3	100kA	50kA	25kA	-
		H	3	200kA	65kA	35kA	-
		L	3	200kA	100kA	42kA	-
T6	800A	N	3	65kA	35kA	20kA	-
		S	3	100kA	50kA	25kA	-
		H	3	200kA	65kA	35kA	-
		L	3	200kA	100kA	42kA	-
T7	1200A	S	3	65kA	50kA	25kA	-
		H	3	100kA	65kA	50kA	-
		L	3	150kA	100kA	65kA	-

[1] In 15A ≥35kA @ 240 V AC - 14 kA @ 480Y/277 V AC

All breakers available as 100% and 80% rated.

Table 2

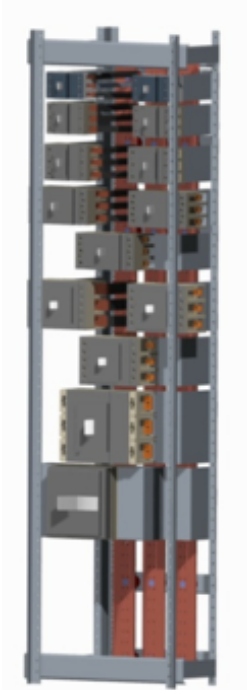


Figure 4

Circuit Breaker Arrangement

Group-mounted circuit protective devices are an assembly of breakers mounted on a panelboard type chassis. A main molded-case 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.

Group Mounted Molded Case Circuit Breaker Layout & Space Requirements

ABB UL891 Offering

GROUP MOUNTED LAYOUT				Breaker Mounting Configuration	Required Space 1.25 DESIGN	Required Space 1.38 DESIGN	Integral Main Breaker	Trip Unit Options
T1	100A	100A	T1	DUAL	3.75”	4.12”	No	TMF
T2	100A	100A	T2	DUAL	3.75”	4.12”	No	TMF, ELT
T3	225A	225A	T3	DUAL	6.25”	6.87”	No	TMF
T4	250A	250A	T4	DUAL	6.25”	6.87”	Yes	TMF, TMA, ELT
250A			T4	SINGLE	6.25”	6.87”	Yes	TMF, TMA, ELT
T5	400A	400A	T5	DUAL	6.25”	6.87”	Yes	TMA, ELT
400A			T5	SINGLE	6.25”	6.87”	Yes	TMA, ELT
600A			T6	SINGLE	8.75”	9.62”	Yes	TMA, ELT
800A			T6	SINGLE	8.75”	9.62”	Yes	TMA, ELT
1200A			T7	SINGLE	8.75”	9.62”	Yes	ELT

The maximum chassis height is 68.75”. Refer to table 7 to determine chassis heights with various main breakers.
TMF = Thermal Magnetic Fixed; TMA = Thermal Magnetic Adjustable; ELT = Electronic

Table 3

Standard Circuit Breaker Cable Lugs

Main Breaker or Feeder Breaker

Frame	Ampere Rating	Wire Size	Catalog number (set of 3)
T1	100	14 AWG-1/0	Integral
T2	100	14 AWG-1/0	KT2100-3
T3	100	14 AWG - 1/0	KT3100-3
	225	4 AWG - 300 kcmil	KT3225-3
T4	100	14 AWG-1/0	KT4100-3
	250	6 AWG-350 kcmil	KT4250-3
T5	400	250 kcmil-500 kcmil	KT5300-3
		(2) 3/0-250 kcmil	KT5400-3
T6	600	(2) 250-500 kcmil	K6TH
	800	(3) 2/0-400 kcmil	K6TJ
T7	1200	(4) 4/0-500 kcmil	KT7X1200-3

Table 4

Figure 5

Mounting Straps

The circuit breaker mounting straps required for mounting Tmax MCCBs to the 1.25 Design and 1.38 Design 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 over their supply chain. Additionally, ABB will offer the ability to purchase the mounting strap kits.

The mounting kit will contain the straps, the breaker support, the circuit breaker enclosure cover and the hardware to install these components.

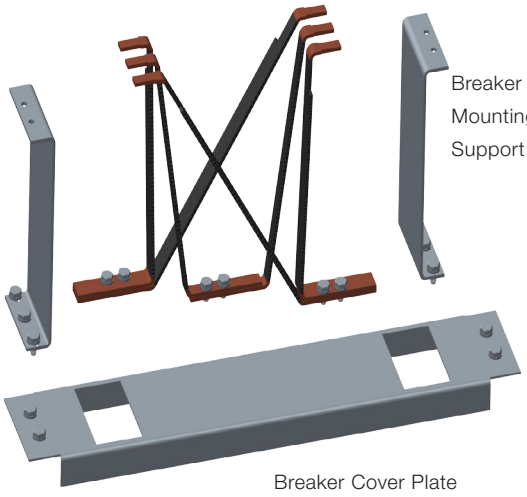


Figure 6 - **T1 Mounted Kit**

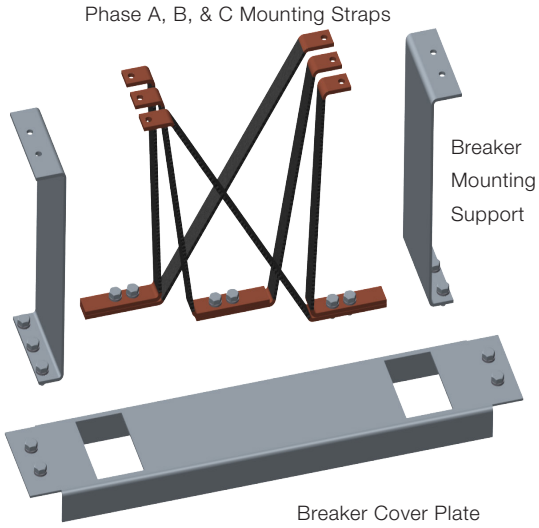


Figure 7 - **T2 Dual Mounted Kit**

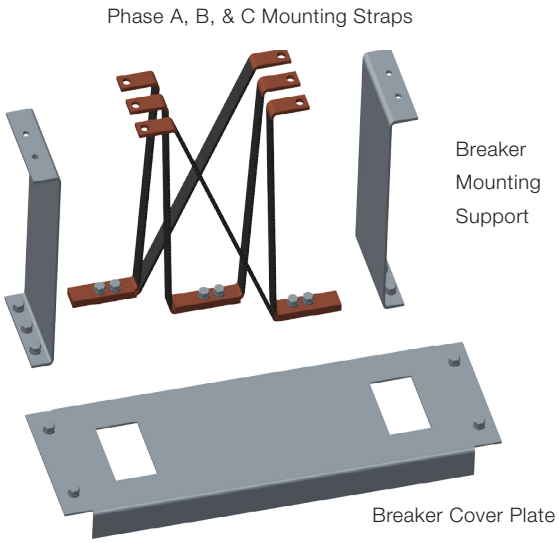


Figure 8 - **T3 Dual Mounted**

The catalog number explanation for ordering the kit is as follows:

K T 4 D 1.25 Example

- 1.25 = strap design for 1.25“ pitch
- 1.38 = strap design for 1.38” pitch
- D = Dual Mounted Breaker[1]
- S = Single Mounted Breaker[2]
- 1 = T1 – 100AF
- 2 = T2 – 100AF
- 3 = T3 – 225AF
- 4 = T4 – 250AF
- 5 = T5 – 400AF
- 6 = T6 – 600AF & 800AF
- 7 = T7 – 1200AF
- T = Tmax Molded Case Circuit Breaker
- K = Kit catalog number prefix

[1] Dual mounted breaker only available up to 400A T5 breaker frame
[2] Single mounted breaker available from 250A T4 breaker frame up to 1200A T7 breaker

Typical Bill of Material: T1, T2 & T3 Dual Mounted Kit

Qty	Item	Description
2	Phase A or C Straps (long)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
2	Phase A or C Straps (short)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
1	Phase B Strap (right)	Bus straps for connecting phase B of the right mounted breaker to phase B of the vertical bus
1	Phase B Strap (left)	Bus straps for connecting phase B of the left mounted breaker to phase B of the vertical bus
1	Breaker Cover Plate	14 GA steel material, painted ANSI 61 (grey) with openings for the toggles of dual mounted circuit breakers
2	Breaker Mounting Supports	12 GA steel material, breaker mounting supports to mount the left and right breakers
6	1/4-20 X 1/2”LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 1 lamination
6	1/4-20 X 3/4” LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 2 lamination
6	1/4-20 X 1” LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 3 lamination
10	1/4-20 X 1/2” LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the breaker mounting support & breaker cover plate

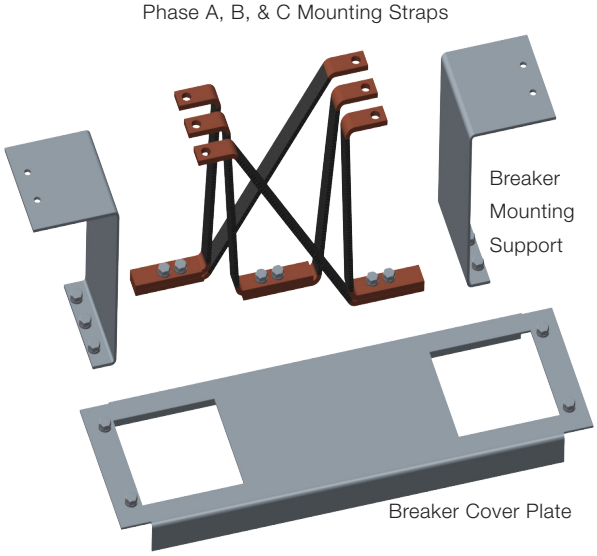


Figure 9 - **T4 Dual Mounted Kit**

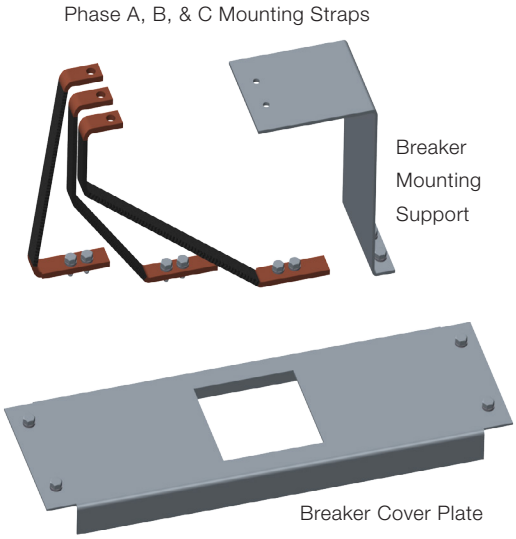


Figure 10 - **T4 Single Mounted**

Typical Bill of Material: T4 Dual Mounted Kit

Qty	Item	Description
2	Phase A or C Straps (long)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
2	Phase A or C Straps (short)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
1	Phase B Strap (right)	Bus straps for connecting phase B of the right mounted breaker to phase B of the vertical bus
1	Phase B Strap (left)	Bus straps for connecting phase B of the left mounted breaker to phase B of the vertical bus
1	Breaker Cover Plate	14 GA steel material, painted ANSI 61 (grey) with openings for the toggles of dual mounted circuit breakers
2	Breaker Mounting Supports	12 GA steel material, breaker mounting supports to mount the left and right breakers
6	1/4-20 X 3/4"LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 1 lamination
6	1/4-20 X 1" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 2 lamination
6	1/4-20 X 1 1/4" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 3 lamination
10	1/4-20 X 1/2" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the breaker mounting support & breaker cover plate

Typical Bill of Material: T4 Single Mounted Kit

Qty	Item	Description
1	Phase A Strap	Bus straps for connecting phase A of the breaker to phase A of the vertical bus
1	Phase B Strap	Bus straps for connecting phase B of the breaker to phase B of the vertical bus
1	Phase C Strap	Bus straps for connecting phase C of the breaker to phase B of the vertical bus
1	Breaker Cover Plate	14 GA steel material, painted ANSI 61 (grey) with openings for the toggles of a singular mounted circuit breaker
1	Breaker Mounting Supports	12 GA steel material, breaker mounting supports to mount the left and right breakers
6	1/4-20 X 1/2"LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 1 lamination
6	1/4-20 X 3/4" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 2 lamination
6	1/4-20 X 1" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 3 lamination
7	1/4-20 X 1/2" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the breaker mounting support & breaker cover plate

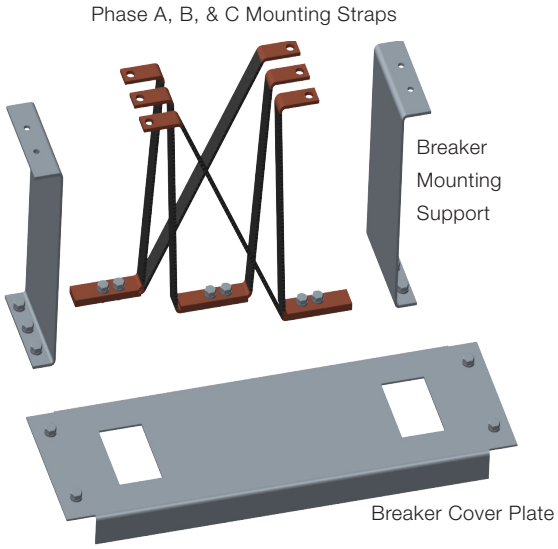


Figure 11 - **T5 Dual Mounted Kit**

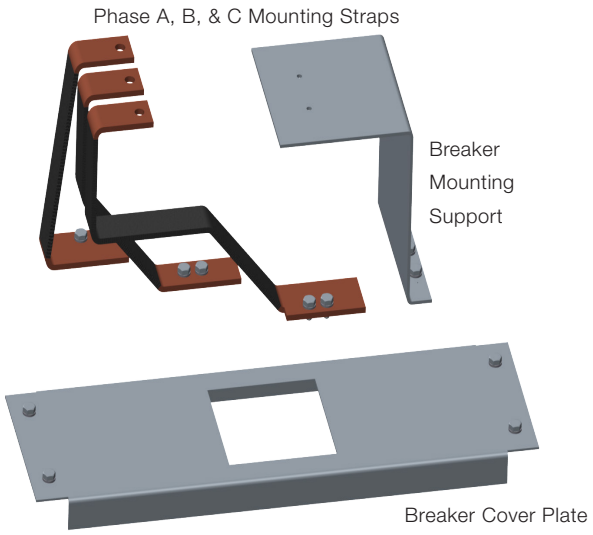


Figure 12 - **T5 Single Mounted Kit**

Typical Bill of Material: T5 Dual Mounted Kit

Qty	Item	Description
2	Phase A or C Straps (long)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
2	Phase A or C Straps (short)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
1	Phase B Strap (right)	Bus straps for connecting phase B of the right mounted breaker to phase B of the vertical bus
1	Phase B Strap (left)	Bus straps for connecting phase B of the left mounted breaker to phase B of the vertical bus
1	Breaker Cover Plate	14 GA steel material, painted ANSI 61 (grey) with openings for the toggles of dual mounted circuit breakers
2	Breaker Mounting Supports	12 GA steel material, breaker mounting supports to mount the left and right breakers
6	1/4-20 X 3/4"LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 1 lamination
6	1/4-20 X 1" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 2 lamination
6	1/4-20 X 1 1/4" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 3 lamination
10	1/4-20 X 1/2" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the breaker mounting support & breaker cover plate

Typical Bill of Material: T5 Single Mounted Kit

Qty	Item	Description
1	Phase A Strap	Bus straps for connecting phase A of the breaker to phase A of the vertical bus
1	Phase B Strap	Bus straps for connecting phase B of the breaker to phase B of the vertical bus
1	Phase C Strap	Bus straps for connecting phase C of the breaker to phase B of the vertical bus
1	Breaker Cover Plate	14 GA steel material, painted ANSI 61 (grey) with openings for the toggles of a singular mounted circuit breaker
1	Breaker Mounting Supports	12 GA steel material, breaker mounting supports to mount the left and right breakers
6	1/4-20 X 1/2"LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 1 lamination
6	1/4-20 X 3/4" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 2 lamination
6	1/4-20 X 1" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 3 lamination
7	1/4-20 X 1/2" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the breaker mounting support & breaker cover plate

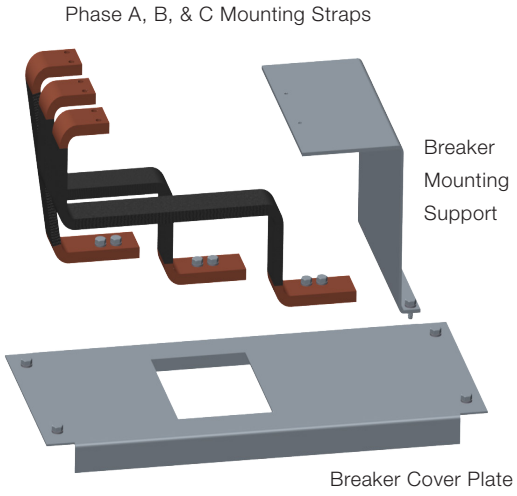


Figure 13 - **T6 Single Mounted Kit**

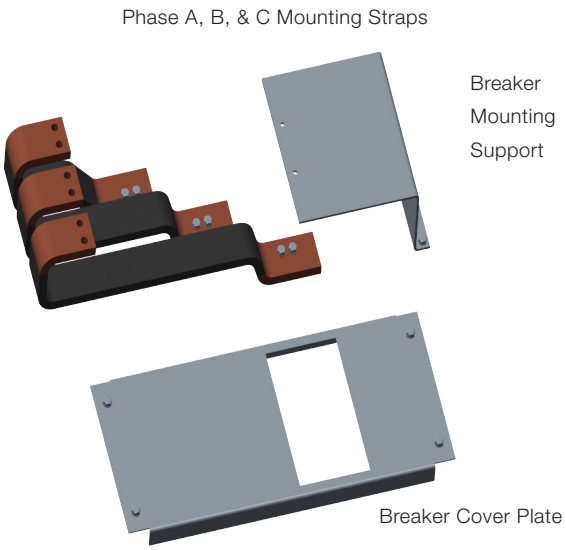


Figure 14 - **T7 Single Mounted Kit**

Typical Bill of Material: T6 & T7 Single Mounted Kit

Qty	Item	Description
2	Phase A or C Straps (long)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
2	Phase A or C Straps (short)	Bus straps for connecting phase A or C of the breaker to phase A or C of the vertical bus
1	Phase B Strap (right)	Bus straps for connecting phase B of the right mounted breaker to phase B of the vertical bus
1	Phase B Strap (left)	Bus straps for connecting phase B of the left mounted breaker to phase B of the vertical bus
1	Breaker Cover Plate	14 GA steel material, painted ANSI 61 (grey) with openings for the toggles of dual mounted circuit breakers
2	Breaker Mounting Supports	12 GA steel material, breaker mounting supports to mount the left and right breakers
6	1/4-20 X 3/4"LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 1 lamination
6	1/4-20 X 1" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 2 lamination
6	1/4-20 X 1 1/4" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the bus straps with 3 lamination
9	1/4-20 X 1/2" LG Screws	Hex Washer Head Tap-Tite Thread forming screws for installing the breaker mounting support & breaker cover plate

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 1200AF within a 32” wide enclosure (see table 5).

Minimum Enclosure Widths

Mounting Configuration	Breaker Frame		Width (inches)
Dual	100A – 250A	T1 – T4	32”
Dual	400A	T5	38”
Single	250A – 1200A	T4 – T7	32”

Table 5

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 Tmax breaker frame size and the maximum cable that can be utilized for load connections.

FRAME	[A]	Maximum Cable Size	Required wire bending space (UL 891)	ABB Enclosure Width
T1 - Dual	100	#1/0	3.50”	32”
T2 - Dual	100	#1/0	3.50”	32”
T3 - Dual	225	300 kcmil	5.00”	32”
T4 - Single.	250	350 kcmil	5.00”	32”
T4 – Dual	250	350 kcmil	5.00”	32”
T5 - Single.	400	(1) 500 kcmil	6.00”	32”
T5 - Single.	400	(2) 250 kcmil	6.00”	32”
T5 – Dual	400	(1) 500 kcmil	6.00”	38”
T5 – Dual	400	(2) 250 kcmil	6.00”	38”
T6 - Single.	800	(2) 500 kcmil	8.00”	32”
T6 - Single.	800	(3) 400 kcmil	10.00”	32”
T7 - Single.	1200	(4) 500kcmil	12.00”	32”

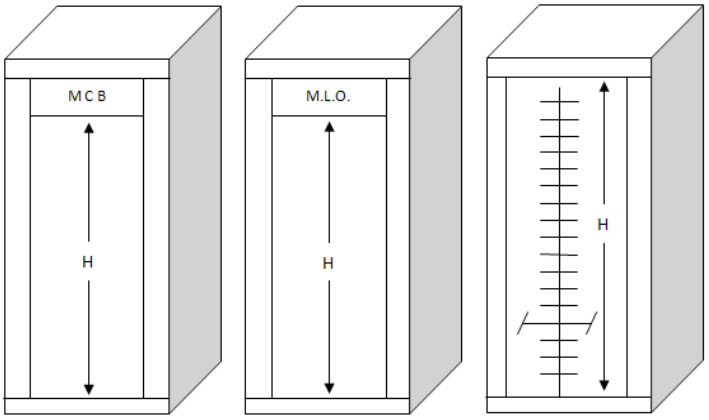
Table 6

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 (UL489) 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.



400-1200A Main Breaker top entrance ❶ | Main Lug Only ❶ | Through-Bus Fed Distribution Section

❶ Unit may be inverted for bottom-feed applications

Figure 15

Remaining Chassis Height "H"

Vertical Bus Rating	250A – 1200A Integral Mounted Main Breaker				Main/Through-Bus fed Distribution Section
	TMAX		1.25 Design	1.38 Design	
400A	T4	250A	62.50"	64.61"	68.75"
400A	T5	400A	62.50"	61.85"	68.75"
600A	T6	600A	60.00"	59.09"	68.75"
800A	T6	800A	60.00"	59.09"	68.75"
1200A	T7	1200A	60.00"	59.09"	68.75"
1600A	-		-	-	68.75"
2000A	-		-	-	68.75"

NOTE: The chassis height for a MLO layout is determined by the OEM.

Table 7

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".

Minimum ampacity of section or branch bus	
# of branch circuit protective devices	% of the sum of the ratings
1	100
2 – 3	80
4 – 6	70
7 – 12	60
Over 12	50

Reference from UL891 standard 11th Edition, Table 26

The Tmax Link design allows for all ABB Tmax 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 Tmax circuit breakers) therefore, the application of table 26 from the UL 891 standard to determine the minimum size of the vertical bus bars may not be valid. It should be considered to size the vertical bus bars to meet 100% of the total ampacity of all MCCBs connected to the vertical bus when multiple 100% rated circuit breakers are used.

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