

CONVERSION GUIDE

Enclosed Breakers Transition Guide

Spectra™ and Q-Line to FORMULA A2 and Tmax® XT



- Spectra™ and Q-Line to Enclosed Circuit Breakers featuring:
- Tmax® XT MCCBs,
- NEMA 1 and 3R enclosures

Transition from Spectra™ to Tmax® XT

Combining ABB and GE Industrial Solutions leading-edge technologies offers you a new, comprehensive, one-line construction package.



The June 2019 acquisition of GE Industrial Solutions by ABB brought together the best of two technologies. As part of the continuing development of a new, leading-edge and comprehensive one-line construction package, the Spectra RMS and RMS with microEntelliGuard® technology breakers will be retired and replaced by the Tmax XT circuit breakers in traditional GE Industrial Spectra series and ReliaGear™ neXT power panelboards, A-line lighting boards, switchboards, busway plugs and motor control centers.

This brochure is designed to assist you in transitioning from Enclosed Spectra and Q-Line to Tmax XT and Formula A2.

Spectra performance range

		SE frame	SF frame	SG frame	SK frame
Frame size (A)		150	250	600	1200
Poles		2, 3	2, 3	2, 3	2, 3
Interrupt ratings (kA)	240 V AC	18, 65, 100, 200	65, 100, 200	65, 100, 200	65, 100, 200
	480 V AC	18, 25, 65, 100	35, 65, 100	35, 65, 100	50, 65, 100
	600 V AC	14, 18, 25	22, 25, 25	25, 65	25, 42, 65
Dimensions (in.)	Width	4.12	4.12	5.50	8.25
	Depth	3.38	3.81	3.81	5.50
	Height	6.31	10.12	10.09	15.50
Trip units	RMS	X	X	X	X
	microEntelliGuard	-	-	X	X

Tmax XT MCCBs

7 frame sizes to fit your application

A new generation of innovative molded case circuit breakers, designed to save you both money and time.

There's a lot more to the SACE Tmax XT than meets the eye, and the benefits for your business can be significant. To start with, everything you need is self-contained within the breaker, requiring no external relays or other devices to purchase, install or wire. Second, the Tmax XT product range includes a wide array of options and accessories. An online configurator makes it easy to select and order exactly what you need and skip what you don't. Then there's installation. Tmax XT MCCBs can be installed in up to 40% less time than traditional circuit breakers, and you can update their electronic trip units in the field in as little as 5 minutes. And finally, Tmax XT provides plug-and-play communication that allows you to connect to the cloud and access 30% more information. All these advantages add up to help deliver substantial savings in time and money to your business.



Tmax XT performance range

	XT1	XT2	XT3	XT4	XT5	XT6	XT7
Frame size (A)	125	125	225	250	600	800	1200
Poles	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4
Interrupt rating (kA)	240 V AC	50, 65, 100	65, 100, 150, 200	50, 65	65, 100, 150, 200	65, 100, 150, 200	65, 100, 200
	480 V AC	22, 35, 65	22, 35, 65, 100, 150, 200	25, 35	22, 35, 65, 100, 150, 200	35, 50, 65, 100, 150, 200	35, 50, 65
	600 V AC	-	18, 22, 25, 35, 42	-	18, 22, 25, 50, 65, 100	18, 25, 35, 65, 100	20, 25, 35
Dimensions (in.)	Width	3.00	3.54	4.13	4.13	5.51	8.27
	Depth	2.75	3.25	2.75	3.25	4.07	4.07
	Height	5.12	5.12	5.90	6.30	8.07	10.55
Trip units	TMF	X	X	X	-	-	-
	TMA	-	X	-	X	X	-
	Ekip DIP	-	X	-	X	X	X
	Ekip Touch	-	X	-	X	-	X

Tmax XT trip unit capability

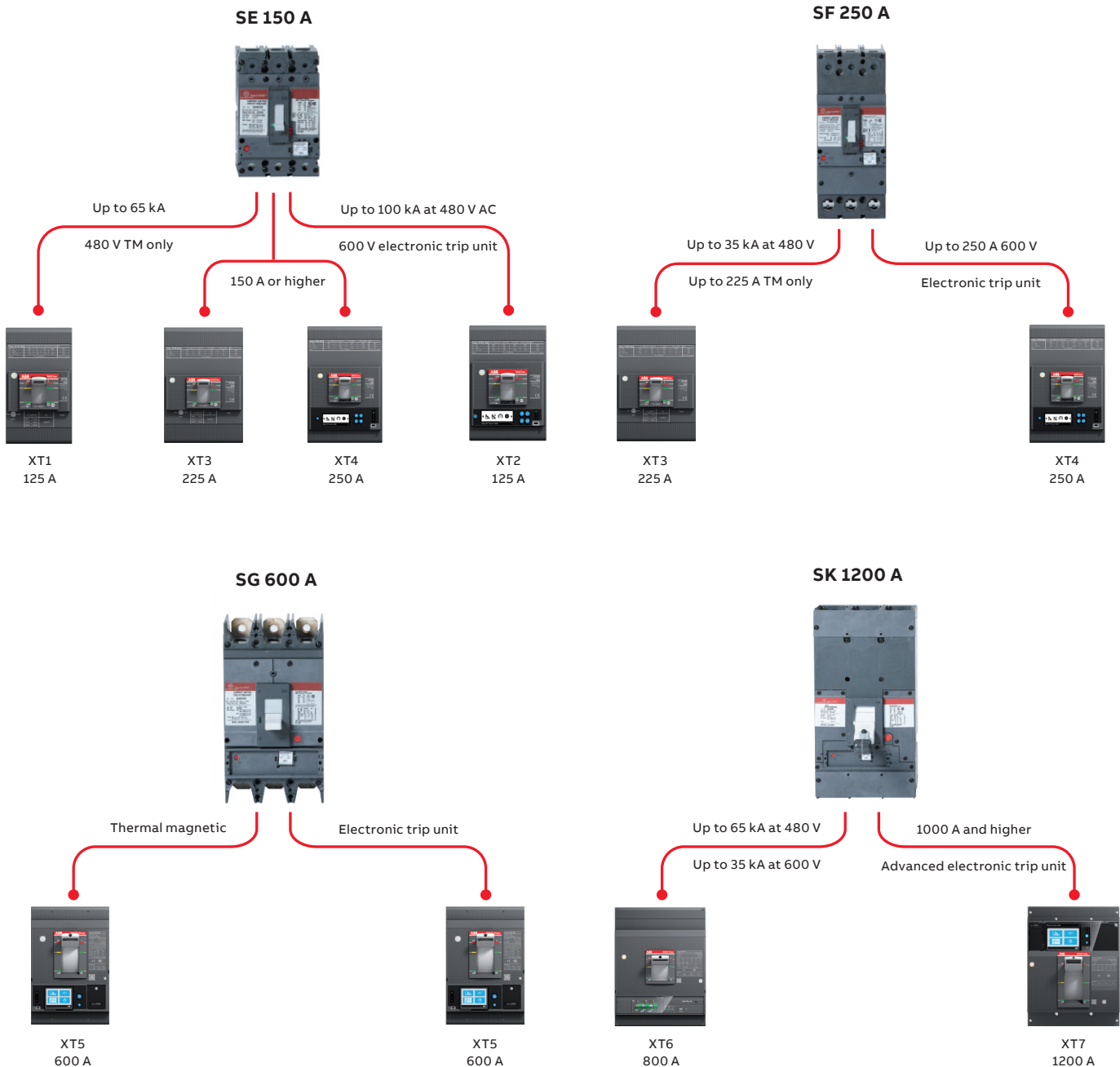
Features	TMF	TMA	Ekip DIP	Ekip Touch
Standard protection	X	X	X	X
LSIG	-	-	X	X
Adjustability to 40% of rating	-	-	X	X
Connectivity and communication	-	-	-	X
Embedded advanced functions	-	-	-	X
Online upgradability	-	-	-	X

Selecting the right Tmax XT molded case circuit breaker

Order exactly what you need, skip what you don't

Correct cross-referencing

Spectra breakers come with four frame options (SE, SF, SG and SK). Tmax XT breakers have seven frames (XT1, XT2, XT3, XT4, XT5, XT6 and XT7), bringing you more options to get your most efficient cross-reference.



*Rating plug into lower frame capacity = Consult lower frame
 *Most efficient cross = Thermal magnetic, 480 V

Preliminary for reference only; subject to change.

Spectra RMS and RMS with microEntelliGuard molded case circuit breakers

Product number structure

Spectra RMS catalog number construction

Family

Digit	S
Spectra	

Frame rating

Digit	E
150 A	
Digit	F
250 A	
Digit	G
600 A	
Digit	K
1200 A	

Interruption rating

Digit	D
18 kA (65 kA ²)	
Digit	L
65 kA	
Digit	H
25 ³ /35 kA	
Digit	R
100 kA	

Continuous load rating

Digit	A
Standard	
Digit	H
100%	
Digit	L
100%	
Digit	R
100%	

Poles

Digit	2
2 poles	
Digit	3
3 poles	

Voltage rating

Digit	2
240 V	
Digit	4
480 V	
Digit	6
600 V	

Trip unit

Digit	A
RMS ¹	

Trip function

Digit	T
LSI ¹	

Sensor (max. amps)

Digit	0 0 3 0
0 1 5 0	
0 6 0 0	
Digit	0 0 6 0
0 2 5 0	
0 8 0 0	
Digit	0 1 0 0
0 4 0 0	
1 2 0 0	

Family

Digit	S
Spectra	

Frame rating

Digit	E
150 A	
Digit	F
250 A	
Digit	G
600 A	
Digit	K
1200 A	

Interruption rating

Digit	D
18 kA (65 kA ²)	
Digit	L
65 kA	
Digit	H
25 ³ /35 kA	
Digit	R
100 kA	

Continuous load rating

Digit	A
Standard	
Digit	H
100%	
Digit	L
100%	
Digit	R
100%	

Poles

Digit	2
2 poles	
Digit	3
3 poles	

Voltage rating

Digit	2
240 V	
Digit	4
480 V	
Digit	6
600 V	

Trip unit

Digit	A
RMS ¹	

Trip function

Digit	T
LSI ¹	

Sensor (max. amps)

Digit	0 0 3 0
0 1 5 0	
0 6 0 0	
Digit	0 0 6 0
0 2 5 0	
0 8 0 0	
Digit	0 1 0 0
0 4 0 0	
1 2 0 0	

¹Adjustable instantaneous with tracking short time (long time established via interchangeable rating plugs)
²SGD rated 65 kA for 240 V (SG frame)
³25 kA for SE frame

Spectra RMS with microEntelliGuard catalog number construction

Family

Digit	S
Spectra	

Frame

Digit	G
600 A	
Digit	K
1200 A	

Interruption rating

Digit	H
35/50 ¹ kA	
Digit	L
65 kA	
Digit	P
100 kA	
Digit	T
65 kA extended instantaneous (selective) ⁵	
Digit	S
100 kA extended instantaneous (selective)	

Continuous load rating

Digit	C
Standard	
Digit	H
100%	
Digit	L
100%	
Digit	P
100%	
Digit	S
100%	
Digit	T
100%	

Max. amps

Digit	0 1
150 A	
Digit	0 4
400 A	
Digit	0 6
600 A	
Digit	0 8
800 A	
Digit	1 0
1000 A ²	
Digit	1 2
1200 A	

Poles

Digit	3
3 poles	

Voltage rating

Digit	6
600 V	
Digit	4
480 V ⁵	

Trip function

Digit	L 3
LSI ³	
Digit	L 4
LSIG	
Digit	L 5
LSIA	
Digit	L 7
LSI-CP ⁴	

Advanced protection functions

Digit	X
None	
Digit	M
ZSI (ST+GF) + neutral protection	
Digit	K
Neutral protection	
Digit	N
ZSI (ST+GF) + RELT + neutral protection	
Digit	Z
ZSI (ST/GF)	
Digit	V
RELT + neutral protection	
Digit	T
ZSI (ST/GF/INST)	
Digit	P
ZSI (ST/GF/INST) + RELT	
Digit	R
RELT	
Digit	S
ZSI (ST/GF/INST) + neutral protection	
Digit	L
ZSI (ST+GF) + RELT	
Digit	W
ZSI (ST/GF/INST) + RELT + neutral protection	

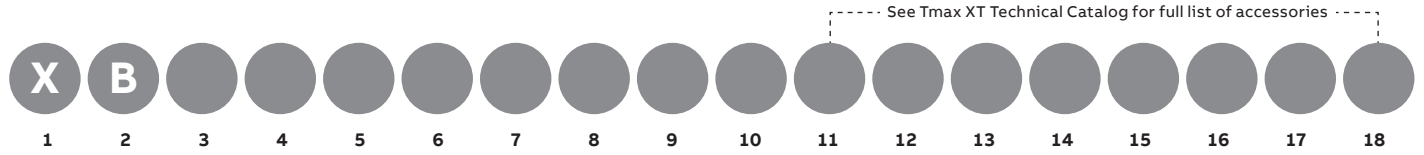
Advanced features and metering

Digit	X
Metering (basic)	
Digit	2
Metering (basic) + Modbus	
Digit	6
Metering (adv.) + Modbus	
Digit	8
Metering (adv.) + Modbus	

¹50 kA for SK frames
²Max amps option 10 only available on 100% rated breakers
³Without a control power connection, unless required by advanced protection functions or advanced features and communication
⁴With a control power connection. The only valid trailing product digits for L7 are XX.
⁵SC, SS, TC and TT catalog codes are optimized for selectivity (extended instantaneous) and will carry a 480 V AC max voltage rating

Enclosed Circuit Breakers

Product number structure



1 & 2 Version

Digit
X B

3 Frame

Digit
1 2 3 4 5 6 7

4 Interrupting ratings – 480 V AC*

Digits	XT1	XT2	XT3	XT4	XT5	XT6	XT7
N	25	25	25	25	35	35	–
S	35	35	35	35	50	50	50
H	65	65	–	65	65	65	65
L	–	100	–	100	100	–	100
V	–	150	–	150	150	–	–
X	–	200	–	200	200	–	–

5 Standard UL and IEC

Digit	
U	UL 80%
Q	UL 100%

6 Number of poles

Digit	
2	2 Poles
3	3 Poles

7, 8, 9 Frame amps

XT1–4		XT5–7	
Digits	Amps	Digits	Amps
0 1 0	10	2 5 A	250 (XT5)
0 1 5	15	3 0 A	300 (XT5)
0 2 0	20	4 0 A	400 (XT5)
0 2 5	25	5 0 B	500 (XT5)
0 3 0	30	6 0 B	600 (XT5)
0 3 5	35	6 0 0	600 (XT6)
0 4 0	40	6 0 C	600 (XT7)
0 4 5	45	8 0 0	800 (XT6)
0 5 0	50	8 0 C	800 (XT7)
0 6 0	60	1 0 D	1000 (XT7)
0 7 0	70	1 2 E	1200/1250 (XT7)
0 8 0	80		
0 9 0	90		
1 0 0	100		
1 1 0	110		
1 2 5	125		
1 5 0	150		
1 7 5	175		
2 0 0	200		
2 2 5	225		
2 5 0	250		

10 Trip unit

Digit	
A	TMF
B	TMA/TMD
C	Ekip DIP LIG
D	MCS
E	Ekip DIP LS/I
F	Ekip DIP LSI
G	Ekip DIP LSIG
H	Ekip DIP E-LSIG
J	Ekip DIP I
K	Ekip DIP M-I
L	Ekip DIP M-LIU
M	MA (MCP)
N	TMG
P	Ekip Touch LSI
Q	Ekip Touch LSIG
R	Ekip Touch Measuring LSI
S	Ekip Touch Measuring LSIG
T	Ekip Hi-Touch LSI
U	Ekip Hi-Touch LSIG
W	Ekip M Touch LRIU
X	Ekip G DIP LS/I
Y	Ekip G Touch LSIG
Z	Ekip G Hi-Touch LSIG



*For 240 V AC and 600 V AC ratings, refer to Tmax XT UL Technical Catalog.
†IEC only.

Transition from Q-Line to FORMULA A2

Legacy Product Line: TQD & THQD

Replacement Product Line: FORMULA



TQD & THQD 2 pole molded case circuit breaker



FORMULA A2 2 pole molded case circuit breaker



TQD & THQD 3 pole molded case circuit breaker

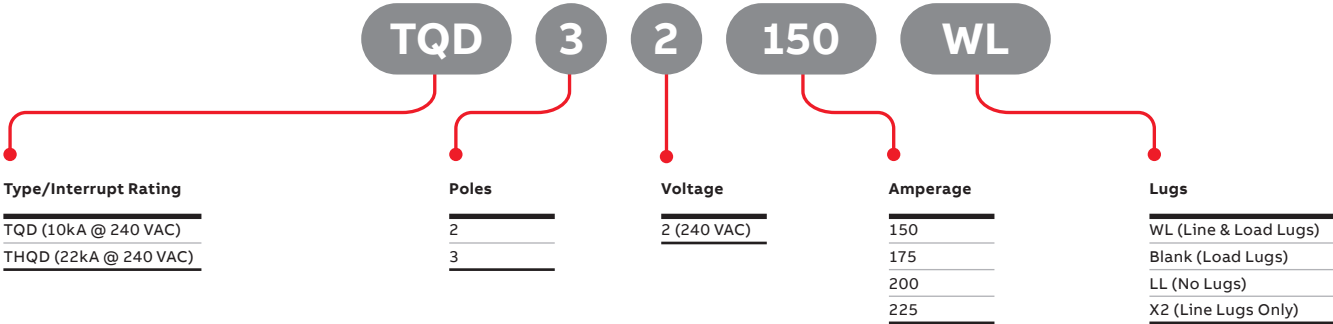


FORMULA A2 3 pole molded case circuit breaker



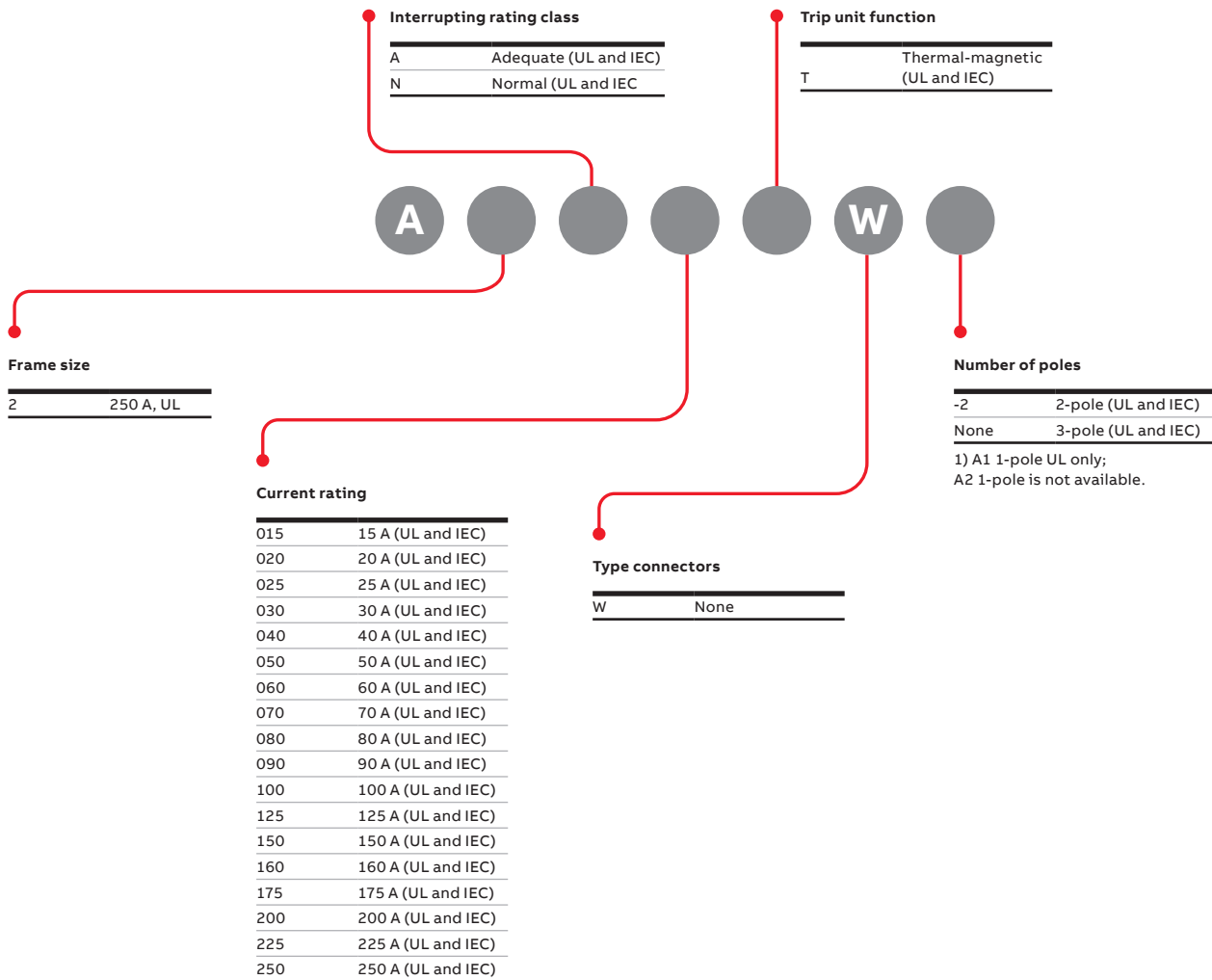
Affected Legacy Products

TQD/THQD Product Number Structure



Replacement Products

FORMULA A2 circuit breaker part number scheme



Circuit Breaker Enclosures

NEMA Type 1

Product Features

- Suitable for use as service equipment (SE) as noted.
- 60°C/75°C conductor ratings
- Short circuit ratings are equal to the rating of the installed breaker.

To order enclosed or accessorized circuit breakers, a configurator is available at: empower.abb.com



Type 1, Indoor Surface or Flush Mounting

NEMA Type 1

Max. Ampere Rating	Frame Type	No. of Poles	Certifications				Product Number	Suffix Options (Mounting)			For 3P4W Enclosures	For Enclosures with Ground Fault Protection		
			UL SE	cUL	cUL SE ¹	CSA		Prefix	Flush	Surface		Surface, Blank End Wall ²	Neutral Product Number	Neutral Product Number ³
70	THQL, TXQL, THQL-GF	1, 2, 3	•	-	-	•	TQL70_ ⁴	F	S	-	Included	-	-	
100	THQL, TXQL, THQL-GF	1, 2, 3	•	-	-	•	TQL100_ ⁴	F	S	-	Included	-	-	
125	THQL	2	•	-	-	-	TQL125_ ⁴	F	S	-	Included	-	-	
100	THQC, THHQC, TXQC	1, 2, 3	•	-	-	•	TQC100_ ⁴	F	S	-	Included	-	-	
100	SE150, THED, TED, TEB	2, 3	•	-	-	•	TE100_ ⁴	F	S	SB	Included	-	-	
150	SE150, THED, TED	2, 3	•	-	-	•	TE150_ ⁴	F	S	SB	Included	-	-	
225	TQD, THQD	2, 3	•	-	-	•	TQD225_ ⁴	F	S	-	Included	-	-	
250	SF250	2, 3	•	-	-	•	SF250_ ⁴	F	S	SB	TNIA225 ⁵	-	-	
400	TJD, TJJ, TJK, THJK	2, 3	•	-	-	•	TJ400_ ⁶	F	S	-	TNIA400	-	-	
600	TJK, THJK	2, 3	•	-	-	•	TJ600_ ⁶	F	S	-	TNIA600	-	-	
400	SG400	2, 3	•	-	-	•	SG400_ ⁶	F	S	SB	TNIA400	TNIA400VG	TSRG201 TSRG204	
600	SG600	2, 3	•	-	-	•	SG600_ ⁶	F	S	SB	TNIA600	TNIA600VG	TSRG206	
600	FG600	2, 3	•	•	-	-	FG600_ ⁶	F	S	SB	TNIA400 TNIA600	TNIA400GGF TNIA600GGF	FGGS0250 FGGS0400 FGGS0600	
1200	SK1200	2, 3	•	-	-	•	TK4V1200_ ^{7,8}	F	S	SB	TNIA400 TNIA600 TNIA800 TNIA1200 TNIA1200	TNIA800G TNIA1200G	TSKG408 TSKG410 TSKG412	

¹cUL Listed - Suitable for use as service equipment.

²Enclosures with blank end walls (no Knockouts) and a feature to adjust the instantaneous setting on Spectra Circuit breakers.

³Neutral for ground fault required to mount neutral sensor in enclosure.

⁴3-Pole breakers with an accessory cannot be installed in these enclosures.

⁵For 250A rating, use copper cable only.

⁶Suitable for parallel 250 kcmil maximum. If larger cable is required, use 600A enclosure.

⁷Not suitable for 100% rated 1200A SK breakers.

⁸Suitable for parallel 500 kcmil maximum.

Circuit Breaker Enclosures

NEMA Type 3R

Product Features

- Suitable for use as service equipment (SE) as noted.
- 60°C/75°C conductor ratings
- Short circuit ratings are equal to the rating of the installed breaker.

To order enclosed or accessorized circuit breakers, a configurator is available at: empower.abb.com



Type 3R, Outdoor, Raintight

NEMA Type 3R

Max. Ampere Rating	Frame Type	Certifications						For 3P4W Enclosures	For Enclosures with Ground Fault Protection		
		No. of Poles	UL SE	cUL	cUL SE ¹	CSA	Product Number ¹⁰	Neutral Product Number	Neutral Product Number ²	Neutral Sensor for Ground Fault	
70	THQL, TXQL, THQL-GF	1, 2, 3	•	-	•	•	TQL70R ³	Included	-	-	
100	THQL, TXQL, THQL-GF	1, 2, 3	•	-	•	•	TQL100R ³	Included	-	-	
125	THQL	2	•	-	•	-	TQL125R	Included	-	-	
100	THQC, THHQC, TXQC	1, 2, 3	•	-	•	•	TQC100R ³	Included	-	-	
100	SE150, THED, TED, TEB	2, 3	•	-	•	•	TE100R	Included	-	-	
150	SE150, THED, TED	2, 3	•	-	•	•	TE150R	Included	-	-	
225	TQD, THQD	2	•	-	•	•	TQD225NR ⁹	Included	-	-	
225	TQD, THQD	2, 3	•	-	•	•	TQD225R	Included	-	-	
250	SF250	2, 3	•	-	-	•	TF225R	TNIA225 ⁴	-	-	
400	TJD, TJJ, TJK, THJK	2, 3	•	-	-	•	TJ400R ⁵	TNIA400	-	-	
600	TJK, THJK	2, 3	•	-	-	•	TJ600R	TNIA600	-	-	
400	SG400	2, 3	•	-	-	•	SG400R	TNIA400	TNIA400VG	TSRG201 TSRG204	
600	SG600	2, 3	•	-	-	•	SG600R	TNIA600	TNIA600VG	TSRG206	
600	FG600	2, 3	•	•	-	-	FG600R	TNIA400 TNIA600	TNIA400GGF TNIA600GGF	FGGS0250 FGGS0400 FGGS0600	
1200	SK1200	2, 3	•	-	-	•	TK4V1200R ^{6,7}	TNIA400 TNIA600 TNIA800 TNIA1200 TNIA1200	TNIA800G TNIA1200G	TSKG408 TSKG410 TSKG412	

NEMA Type 3R with Factory Installed Breaker

Max. Ampere Rating	Frame Type	Certifications						For 3P4W Enclosures	Notes
		No. of Poles	UL SE	cUL	cUL SE ¹	CSA	Product Number ¹⁰	Neutral Product Number	
100	THQL, TXQL, THQL-GF	1, 2, 3	•	-	-	•	TQL70RE ³	Included	100A circuit breaker factory installed (2-pole)
150	TQD, THQD	2	•	-	-	•	TQD150NRE	Included	150A circuit breaker factory installed (2-pole)
200	TQD, THQD	2	•	-	•	•	TQD200NRE	Included	200A circuit breaker factory installed (2-pole)
150	THQMV	2	•	-	•	•	THQMV150NRE ⁸	Included	150A circuit breaker factory installed (2-pole)
200	THQMV	2	•	-	•	•	THQMV200NRE ⁸	Included	200A circuit breaker factory installed (2-pole)

¹cUL Listed - Suitable for use as service equipment.

²Neutral for ground fault required to mount neutral sensor in enclosure.

³3-Pole breakers with an accessory can not be installed in these enclosures.

⁴For 250A rating, use copper cable only.

⁵Suitable for parallel 250 kcmil maximum. If larger cable is required, use 600A enclosure.

⁶Not suitable for 100% rated 1200A SK breakers.

⁷Suitable for parallel 500 kcmil maximum.

⁸Service rated equipment only.

⁹TQD225NR is 2P only and differs in size from TQD225R.

¹⁰100-250A devices have removable closing cap. Larger ampere devices require field cut openings. Order hubs separately. See page 7-8.

Guide for the migration process, focused on application requirements

Questions to ask your customer

What are your system requirements?

1. What voltage do you need?
2. What amperage do you need?
3. What interrupting current do you need?
4. How many poles do you need?
5. Do you need 80% or 100% rated?

What are your electrical requirements?

1. What trip unit do you need?
 - L (overload protection) – Fixed or adjustable?
 - S (selective short circuit protection) – Yes (adjustable) or no?
 - I (short circuit protection) – Fixed or adjustable?
 - G (ground fault protection) – Yes or no?
2. What will the application be?
 - General protection?
 - Motor protection?
 - Generator protection?
 - Molded case switch?
3. Do you need communications/monitoring?
 - Bluetooth® connectivity?
 - Metering?
 - Monitoring?
 - Communication?
 - Cloud connectivity?

Migration example

Your customer currently uses a Spectra SF frame breaker, outlined below.

What are your system requirements?

1. What voltage do you need?
 - 480 V
2. What amperage do you need?
 - 200 A
3. What interrupting current do you need?
 - 65 kA
4. How many poles do you need?
 - 3 poles
5. Do you need 80% or 100% rated?
 - 80% rated

What are your electrical requirements?

1. What trip unit do you need?
 - L (overload protection), fixed
2. What will the application be?
 - General protection
3. Do you need communications/monitoring?
 - No communications/monitoring

Based on the customer's needs, ABB would suggest the following options:

1. XT3 – Since the customer wants a thermal magnetic trip for a breaker rated 200 A at 480 V.
2. XT4 – If the customer ends up needing an electronic trip unit or needs the ability to install the breaker into a Spectra power panelboard with the Spectra retrofit kit.

System	Spectra SF	Tmax XT3	Tmax XT4
Frame size (max.) (A)	250	225	250
Interrupt rating (kA)	65	65	65
Poles	3	3	3
Voltage (V)	600	480	480
Amperage (A)	250	200	200
Trip unit	Electronic trip	Thermal magnetic	Thermal magnetic, ETU
Dimensions (W X H X D) (in.)	4.12 x 3.81 x 10.12	4.13 x 2.75 x 5.90	4.13 x 3.25 x 6.30



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