Manual Motor Protectors

Contents

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Product Description

Eaton's new ***XT*** family of manual motor protectors (MMPs) features a pushbutton or rotary ON/OFF manual disconnect, Class 10 adjustable bimetallic overload relay and fixed magnetic short-circuit trip capability in one compact unit. Two frame sizes are available: Frame B (45 mm) for motors with FLA ratings up to 32A and Frame D (55 mm) covers motor FLA ratings up to 65A.

Application Description

The XTPB and XTPR MMPs can be used in the following applications.

Motor Protective Circuit Breaker

In many countries outside of the United States and Canada, especially Europe, the MMPs are tested and classified as thermal-magnetic circuit breakers for use in motor branch circuits. This can be an important consideration for all companies who export their equipment and machines internationally. Both the XTPB and XTPR conform to IEC/EN 60947 and have the CE Mark.

Manual Motor Protectors

The XTPB and XTPR MMPs are UL listed under UL 508 as manual motor protectors. They provide an economical solution for applications requiring simple manual starting and stopping of motors. When used as a manual starter, they are typically installed in an enclosure. Many enclosures are offered as accessories for the MMPs. Separate short-circuit protective devices, such as circuit breakers or fuses, are wired ahead of the MMPs. The short-circuit protective device should be sized per the NEC and should not exceed 400% of the maximum FLA dial setting of the MMP.

Group Motor Installations

A group motor installation can be defined as more than one motor circuit protected by a single set of fuses or circuit breaker on a motor branch circuit. This eliminates the need for individual fuses or circuit breakers for each motor circuit. Substantial component cost savings, panel space savings and reduced wiring installation time can be achieved in group motor installations.

The MMPs are tested and listed for group installation. If remote operation is required, a magnetic contactor can be wired in series with the MMP.

Article 430.53 of the NEC contains the rules and requirements for group motor installations. Refer to application note AP03402001E for NEC requirement for group motor installation.

Individual Branch Motor Applications

A UL 508 Type E self-protected manual combination starter/motor controller consists of a single device possessing four essential elements: disconnect, short circuit protection, motor controller, and motor overload protection. Some MMPs require use of a lineside adapter for this type of approval. When tested as an official combination by UL, this device takes the place of a fuse-starter or breaker-starter, ***XT*** Type E MMPs are self-protected, meaning they do not need additional short circuit protection of a fuse or breaker. Type E devices can also be used with a contactor or other types of UL approved controllers. If tested with a contactor, the combination motor controller becomes a Type F device. See **Page V5-T1-199** for XTFC Type F devices.

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Features and Benefits

- ON/OFF rotary handle with lockout provision
- Visible trip indication
- Class 10 overload protection
- Phase loss sensitivity
- Ambient temperature compensation to IEC/EN 60947, VDE 0660
- Fixed short-circuit trip—14 times maximum setting of overload FLA dial
- Type 2 coordination per IEC 947
- Identification markers standard on starter faceplate
- Motor applications from 0.1A to 65A
- Built-in heater and magnetic trip elements to protect the motor
- Adjustment dial for setting motor FLA
- DIN rail mount
- Terminal types available:
  - Screw terminals
  - Screw (line) and spring cage (load) terminals
  - Spring cage terminals
- Accessories include:
  - Front and side auxiliary contacts
  - Trip indicating contacts
  - Tamperproof cover for OLR dial
  - Undervoltage release
  - Shunt trip
  - Through-the-door operators
  - Enclosures
  - Three-phase line side connecting links

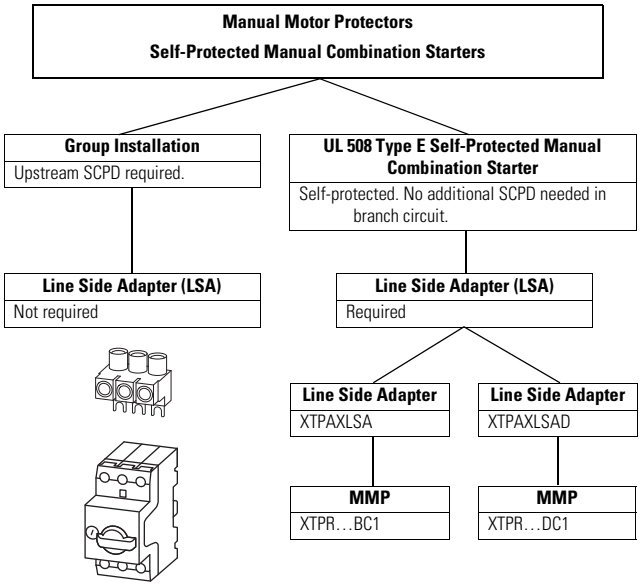
Standards and Certifications

- CE approved
- UL listed File No. E245398
- UL 508 group motor and Type E compliant
- IEC/EN 60947
- CSA File 229767, Class 3211-05
- DIN VDE 0660 Part 100, Part 101 and Part 102

Note: For Type 2 Coordination of MMCs, see **Page V5-T1-232**.

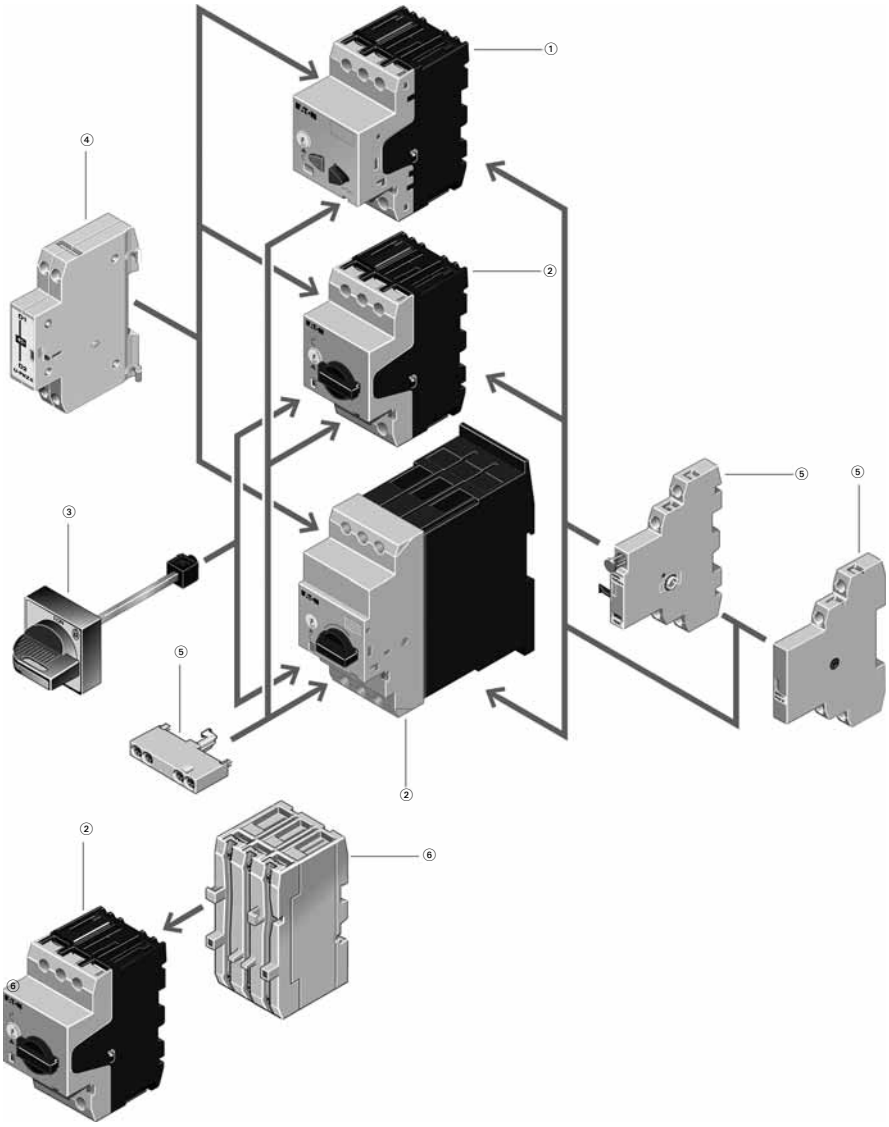
Line Side Adapters—When to Use Them

Note: Line side adapters are not required for non-US applications. Most countries outside of the US classify the MMP as a thermal magnetic circuit breaker.



Manual Motor Protector and Line Side Adapter

Product Identification



Notes

Basic Units

① XTPB pushbutton manual motor protectors (see **Page V5-T1-161**)
- Rated operational current up to 25A
- Switching capacity 50 kA/415V
- Short-circuit release, adjustable 0.6–1 x I_u
- Single-phasing sensitive

② XTPR rotary manual motor protectors (see **Page V5-T1-162**)
- Rated operational current up to 32A, 65A
- Switching capacity 150/50 kA/415V
- Short-circuit release, fixed setting to 14 x I_u
- Overload release, adjustable 0.6–1 x I_u
- Single-phasing sensitive
- With screws or spring-loaded terminals

Mounting Accessories

③ Rotary handle mechanism (see **Page V5-T1-167**)
- ON/OFF/tripped switch position indication
- Lockable door/cover interlock
- Extendable y plug fit extension shaft
- Handle latched in switch positions
- Optionally also without locking and door interlock function

Insulated enclosures (see **Page V5-T1-171**)
- Surface mounting, enclosures, IP40, IP55 and IP40 and IP55 front flush mounting enclosure

Mounting/wiring (see **Page V5-T1-167**)
- Component adapter for busbar mounting
- Three-phase commoning link for side-by-side-mounting
- Mounting kits for rapid mounting of direct-on-line, reversing and star-delta starters

Add-On Functions

④ Voltage releases (see **Page V5-T1-166**)
- Undervoltage release
- Shunt releases
- With screws or spring-loaded terminals

⑤ Standard auxiliary contacts (see **Page V5-T1-164**)
- ON/OFF indication
- Differential fault indication overload/short-circuit release
- ON/OFF for (high capacity) contact module
- ON/OFF for starter combination
- With early-make contacts
- With screws or spring-loaded terminals

⑥ Current limiter (see **Page V5-T1-166**)
- Increases the switching capacity of the 10–25A manual motor protectors to 100 kA/440V
- Can be used for individual group protection

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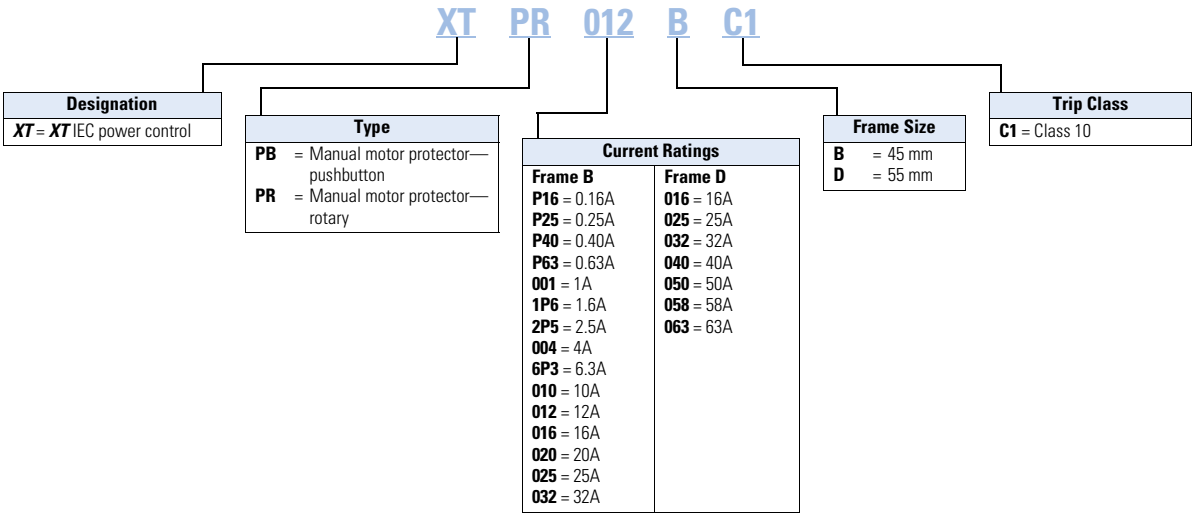
Catalog Number Selection

XT Manual Motor Protectors



Product Selection

Product Selection for Manual Motor Starter Applications

When ordering, specify catalog numbers according to the following stipulations:

XT manual motor protectors are selected based on the overload current range required for a given motor. This current range is determined from the motor full load ampere rating and motor service factor usually found on the motor nameplate.

For motors with service factors less than 1.15, multiply the motor FLA by 0.90 to select appropriate MMP.

Example: For motor having FLA of 6.4A and service factor of 1.0 (6.4A x 0.90 = 5.76A) select catalog number XTPB6P3B01.

See Application Note—AP03402001E.

For motor with service factor of 1.15 or greater, use motor nameplate full load amperes to select the appropriate MMP.

Example: For motor having FLA of 11A and service factor of 1.15, select catalog number XTPR012BC1.

Frame B

XTPB Pushbutton Manual Motor Protectors—Global and North American Ratings—Frame B

Type 1 and Type 2 Coordination Motor Protective Device with Thermal and Magnetic Trip

Rated Uninterrupted Current— $I_u = I_e$ (Amps)	FLA Adjustment Range/ Overload Release— I_r (Amps)	Short Circuit Release— I_{rm} (Amps)	Maximum Motor Ratings ① Maximum kW Rating AC-3—P (kW) Three-Phase					Maximum hp Rating—P (hp) UL 508/CSA C22.2 No. 14 Three-Phase				Screw Terminal Catalog Number
			220–240V	380–415V	440V	500V	660–690V	200V	240V	480V	600V	
0.16	0.1–0.16	2.2	—	—	—	—	0.06	②	②	②	②	**XTPBP16BC1**
0.25	0.16–0.25	3.5	—	0.06	0.06	0.06	0.12	②	②	②	②	**XTPBP25BC1**
0.4	0.25–0.4	5.6	0.06	0.09	0.12	0.12	0.18	②	②	②	②	**XTPBP40BC1**
0.63	0.4–0.63	8.8	0.09	0.12	0.18	0.25	0.25	②	②	②	②	**XTPBP63BC1**
1	0.63–1	14	0.12	0.25	0.25	0.37	0.55	②	②	2	1/2	**XTPB001BC1**
1.6	1–1.6	22	0.25	0.55	0.55	0.75	1.1	②	②	3/4	3/4	**XTPB1P6BC1**
2.5	1.6–2.5	35	0.37	0.75	1.1	1.1	1.5	1/2	1/2	1	1-1/2	**XTPB2P5BC1**
4	2.5–4	56	0.75	1.5	1.5	2.2	3	3/4	3/4	2	3	**XTPB004BC1**
6.3	4–6.3	88	1.1	2.2	3	3	4	1	1-1/2	3	5	**XTPB6P3BC1**
10	6.3–10	140	2.2	4	4	4	7.5	3	3	7-1/2	10	**XTPB010BC1**
12	8–12	168	3	5.5	5.5	5.5	11	3	3	7-1/2	10	**XTPB012BC1**
16	10–16	224	4	7.5	9	9	12.5	3	5	10	10	**XTPB016BC1**
20	16–20	280	5.5	9	11	12.5	15	5	—	—	15	**XTPB020BC1**
25	20–25	350	5.5	12.5	12.5	15	22	—	7-1/2	15	20	**XTPB025BC1**

Notes

Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.

Can be snap-fit to IEC/EN 60715 top-hat (DIN) with 7.5 or 15 mm height.

Service Factor (SF)—Setting I_r of current scale in dependence of load factor:
SF = 1.15 → $I_r = 1 \times I_{n\ mot}$
SF = 1 → $I_r = 0.9 \times I_{n\ mot}$

For manual motor protective circuit breaker switching capacity, see **Page V5-T1-181**.

① Select manual motor protectors by full load amperes. Maximum motor ratings (kW, hp) are for reference only.
② In this range, calculate motor rating according to rated current. Specified values to NEC 430.6(A)(1).

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Features and Benefits

- ON/OFF rotary handle with lockout provision
- Visible trip indication
- Class 10 overload protection
- Phase loss sensitivity
- Ambient temperature compensation to IEC/EN 60947, VDE 0660
- Fixed short-circuit trip—14 times maximum setting of overload FLA dial
- Type 2 coordination per IEC 947
- Identification markers standard on starter faceplate
- Motor applications from 0.1A to 65A
- Built-in heater and magnetic trip elements to protect the motor
- Adjustment dial for setting motor FLA
- DIN rail mount
- Terminal types available:
  - Screw terminals
  - Screw (line) and spring cage (load) terminals
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- Accessories include:
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Standards and Certifications

- CE approved
- UL listed File No. E245398
- UL 508 group motor and Type E compliant
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Note: For Type 2 Coordination of MMCs, see **Page V5-T1-232**.

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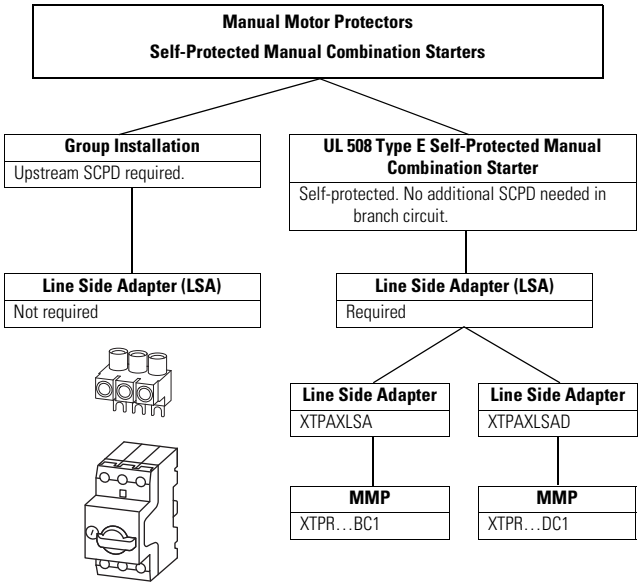

Manual Motor Protector and Line Side Adapter

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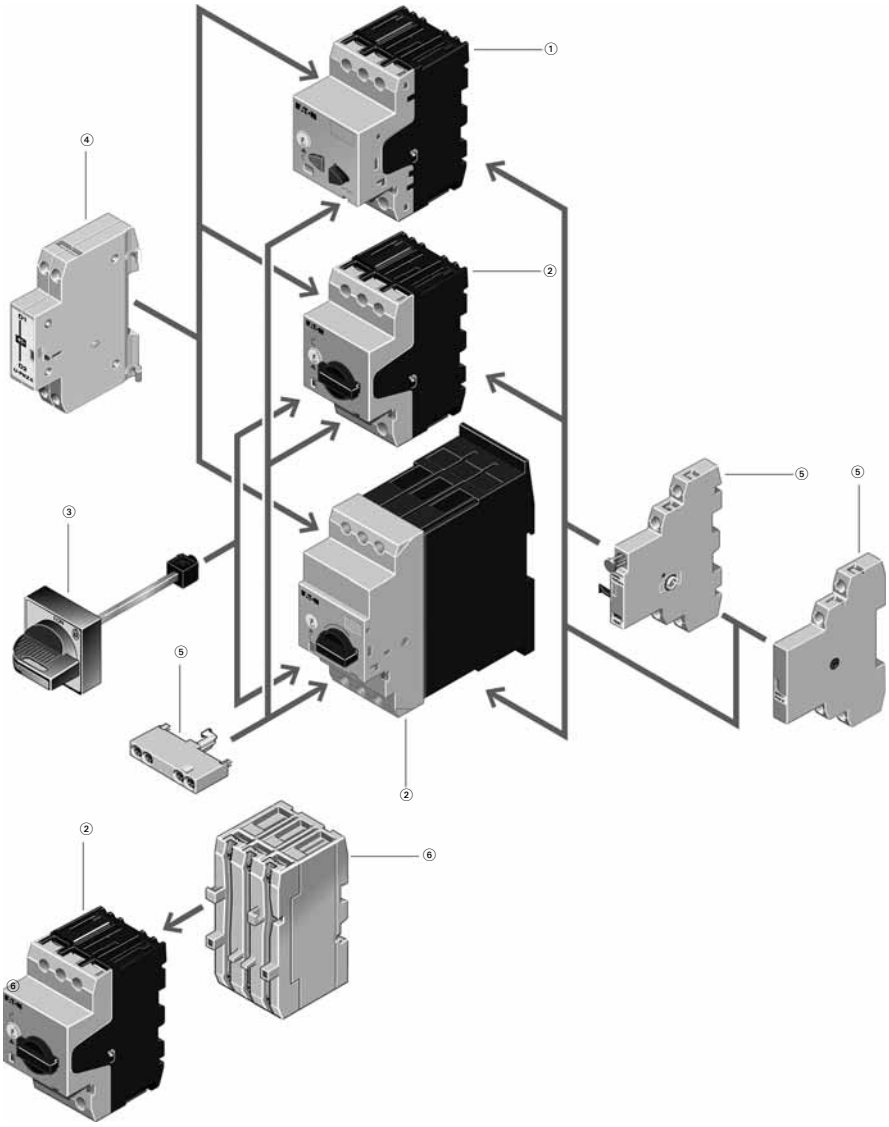

Notes

Basic Units

① XTPB pushbutton manual motor protectors (see **Page V5-T1-161**)
- Rated operational current up to 25A
- Switching capacity 50 kA/415V
- Short-circuit release, adjustable 0.6–1 x I_u
- Single-phasing sensitive

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- Rated operational current up to 32A, 65A
- Switching capacity 150/50 kA/415V
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- Overload release, adjustable 0.6–1 x I_u
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- With screws or spring-loaded terminals

Mounting Accessories

③ Rotary handle mechanism (see **Page V5-T1-167**)
- ON/OFF/tripped switch position indication
- Lockable door/cover interlock
- Extendable y plug fit extension shaft
- Handle latched in switch positions
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- Differential fault indication overload/short-circuit release
- ON/OFF for (high capacity) contact module
- ON/OFF for starter combination
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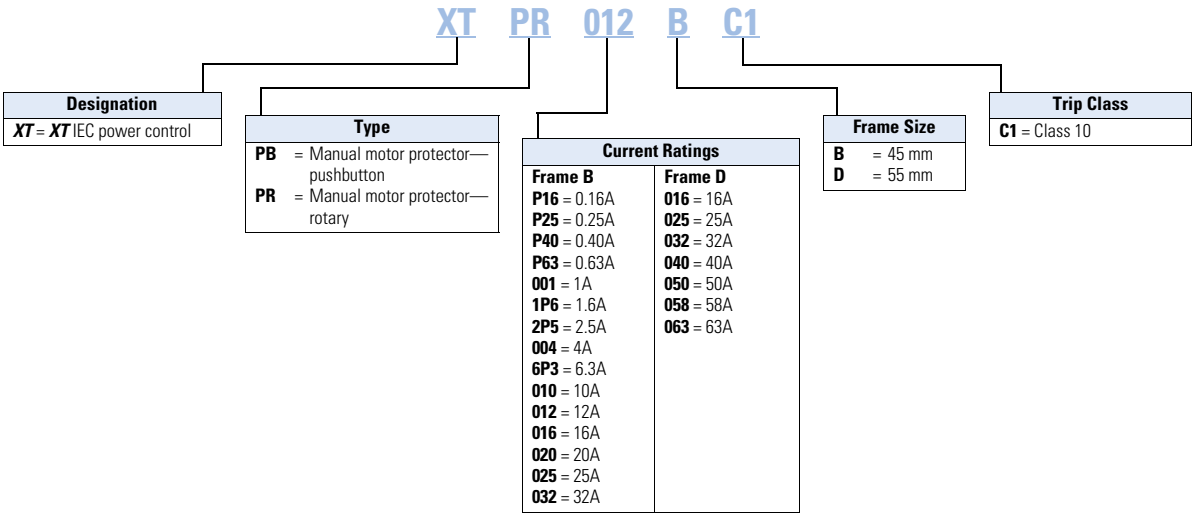

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For motors with service factors less than 1.15, multiply the motor FLA by 0.90 to select appropriate MMP.

Example: For motor having FLA of 6.4A and service factor of 1.0 (6.4A x 0.90 = 5.76A) select catalog number XTPB6P3B01.

See Application Note—AP03402001E.

For motor with service factor of 1.15 or greater, use motor nameplate full load amperes to select the appropriate MMP.

Example: For motor having FLA of 11A and service factor of 1.15, select catalog number XTPR012BC1.

Frame B

XTPB Pushbutton Manual Motor Protectors—Global and North American Ratings—Frame B

Type 1 and Type 2 Coordination Motor Protective Device with Thermal and Magnetic Trip

Rated Uninterrupted Current— $I_u = I_e$ (Amps)	FLA Adjustment Range/ Overload Release— I_r (Amps)	Short Circuit Release— I_{rm} (Amps)	Maximum Motor Ratings ① Maximum kW Rating AC-3—P (kW) Three-Phase					Maximum hp Rating—P (hp) UL 508/CSA C22.2 No. 14 Three-Phase				Screw Terminal Catalog Number
			220–240V	380–415V	440V	500V	660–690V	200V	240V	480V	600V	
0.16	0.1–0.16	2.2	—	—	—	—	0.06	②	②	②	②	**XTPBP16BC1**
0.25	0.16–0.25	3.5	—	0.06	0.06	0.06	0.12	②	②	②	②	**XTPBP25BC1**
0.4	0.25–0.4	5.6	0.06	0.09	0.12	0.12	0.18	②	②	②	②	**XTPBP40BC1**
0.63	0.4–0.63	8.8	0.09	0.12	0.18	0.25	0.25	②	②	②	②	**XTPBP63BC1**
1	0.63–1	14	0.12	0.25	0.25	0.37	0.55	②	②	2	1/2	**XTPB001BC1**
1.6	1–1.6	22	0.25	0.55	0.55	0.75	1.1	②	②	3/4	3/4	**XTPB1P6BC1**
2.5	1.6–2.5	35	0.37	0.75	1.1	1.1	1.5	1/2	1/2	1	1-1/2	**XTPB2P5BC1**
4	2.5–4	56	0.75	1.5	1.5	2.2	3	3/4	3/4	2	3	**XTPB004BC1**
6.3	4–6.3	88	1.1	2.2	3	3	4	1	1-1/2	3	5	**XTPB6P3BC1**
10	6.3–10	140	2.2	4	4	4	7.5	3	3	7-1/2	10	**XTPB010BC1**
12	8–12	168	3	5.5	5.5	5.5	11	3	3	7-1/2	10	**XTPB012BC1**
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20	16–20	280	5.5	9	11	12.5	15	5	—	—	15	**XTPB020BC1**
25	20–25	350	5.5	12.5	12.5	15	22	—	7-1/2	15	20	**XTPB025BC1**

Notes

Single-phasing sensitivity to IEC/EN 60947-4-1, VDE 0660 Part 102.

Can be snap-fit to IEC/EN 60715 top-hat (DIN) with 7.5 or 15 mm height.

Service Factor (SF)—Setting I_r of current scale in dependence of load factor:
SF = 1.15 → $I_r = 1 \times I_{n\ mot}$
SF = 1 → $I_r = 0.9 \times I_{n\ mot}$

For manual motor protective circuit breaker switching capacity, see **Page V5-T1-181**.

① Select manual motor protectors by full load amperes. Maximum motor ratings (kW, hp) are for reference only.
② In this range, calculate motor rating according to rated current. Specified values to NEC 430.6(A)(1).