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Reducing sizes of control power transformers and power supplies with Eaton's *XT* IEC motor control

XT Starter with XTOB Thermal OL

XT Manual Motor Controller

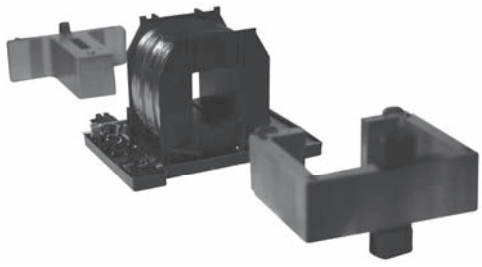
Contents

Introduction

Reducing costs is necessary for OEMs to maintain a competitive edge. Eaton's line of IEC motor starters was designed with enhanced features and benefits that help OEMs reduce material costs while improving reliability, installation, usability, and safety.

The newest line of Eaton's IEC motor starters includes new innovations in coil design, yielding greater pickup tolerances while reducing energy consumption. In many common scenarios where the control panel contains three contactors or more, switching to the Eaton ***XT*** contactor from another contactor line typically allows users to reduce their control power transformer or power supply by at least one size, with greater likelihood of larger reductions as more contactors are added to the control panel.

This application note explains how control power transformers and power supplies are sized. Coil consumption tables for Eaton ***XT*** and competitive lines are provided in **Tables 7** and **Table 8**. A CPT/power supply calculation sheet is provided at the end of this document.



Electronic Coil and Magnet Armature

Powering Business Worldwide

How to size a control power transformer (CPT)

CPTs are most commonly identified by their nominal, steady-state VA capacity, but they also have a maximum rating describing the amount of inrush they can support on the secondary. Some loads, such as relay coils or contactor coils, require a temporary spike in power once power is applied. Then after the contacts have been pulled in, very little power is needed to hold the contacts closed. Other devices, such as pilot lights, consume the same amount of energy when power is first applied through to continued operation. CPTs should be selected to ensure enough power is available on the secondary side to handle the inrush power needs of the loads the CPT supplies. Each CPT has a maximum inrush power rating. This inrush VA is the critical rating used to size CPTs. This value is determined using the following formula:

$$\text{CPT INRUSH VA} = \sqrt{(\text{Total Inrush})^2 + (\text{Total Sealed})^2}$$

where "Total Inrush" is the total sum of all the inrush power of the loads applied to the CPT, and "Sealed Inrush" is the total sum of all the sealed power of the loads applied to the CPT.

Once the Inrush power requirement on the CPT has been determined, the CPT is sized from the selection chart using either the 85%, 90%, or 95% secondary voltage. This means that the secondary voltage of the CPT will not dip below the respective percentage provided that the inrush power put on the CPT doesn't exceed the inrush power from the selection chart. 90% or 95% is mostly recommended, as exceeding the inrush power rating of the CPT could lead to a deeper decrease in coil voltage on the secondary, which could cause the contactor and relay coils or other devices to prematurely fail.

Example

A control panel contains qty (1) 7A contactor, qty (2) 18A contactors, qty (2) relays, and qty (6) indicating lights. These loads are supplied 120 Vac from a CPT with a 480 Vac primary. Determine the CPT size needed.

In this example, the CPT needs to be able to provide 250 VA to support the inrush demand of the loads. The C0075E2A has enough inrush VA capacity to support these loads.

Table 1. Example Calculating CPT Inrush Demand

Qty	Description	Inrush VA	Sealed VA	Total Inrush	Total Sealed
1	XTCE007B10A coil	25	3.3	25	3.3
2	XTCE018C10A coil	58	6.5	116	13.0
2	Relays	29	3.3	58	6.6
6	Indicating lights	7	7.0	42	42.0
Total				241	65

$$\text{CPT INRUSH VA} = \sqrt{(241)^2 + (65)^2} = 250 \text{ VA}$$

Table 2. Example CPT Selection Chart

Part Number	Primary Voltage	Secondary Voltage	Transformer VA	Inrush VA (90% Secondary Inrush Voltage)
C0050E2A	240 x 480	120	50	200
C0075E2A	240 x 480	120	75	410
C0100E2A	240 x 480	120	100	540

C0075E2A has enough inrush VA capacity to handle the 250 VA inrush of the components.

Note: See **Table 4** for CPT selection charts for a variety of primary and secondary voltages.

How to size a power supply

Power supplies are sized based on the amount of inrush (surge) and sealed (nominal or steady-state) power demands of the loads applied to the power supply. The respective loads are calculated by simply summing the loads, both for inrush and sealed.

The power supply is selected based on these calculated demands on the power supply, and any other load specifications for the respective power supply, such as minimum time allotment between surges (inrush). Always be sure to verify proper application per the power supply specifications.

Inrush load = inrush $load_1$ + inrush $load_2$ + ... + inrush $load_n$

Nominal load = sealed $load_1$ + sealed $load_2$ + ... + sealed $load_n$

For extended operational life of the power supply, increase the calculated nominal load by 20%.

Example

Select a 24 Vdc power supply for a control panel containing qty (8) 7A contactors, qty (4) 18A contactors, qty (2) relays, and qty (5) indicating lights.

In this example, the PSG60E has enough capacity to handle the surge (inrush) and nominal (steady-state) demand of the loads.

Current = Power/Voltage

Table 3. Calculating Demand on Power Supply

Quantity	Description	Inrush W	Sealed W	Surge Current	Nominal Current	Total Surge Current	Total Nominal Current
8	XTCE007B10TD coil	3	3	0.125	0.13	1.00	1.00
4	XTCE018C10TD coil	12	0.5	0.50	0.02	2.00	0.08
2	Relay	2.6	2.6	0.11	0.11	0.22	0.22
5	Indicating light	1.2	1.2	0.05	0.05	0.25	0.25
Total						3.47 A	1.55 A
Derating for extended operation: Total nominal current = 1.55 x 120% = **1.86**							

Table 4. Example Power Supply Selection Chart

Part Number	Capacity W	Input Voltage	Output Voltage	Surge Current	Nominal Current	Surge Capacity
PSG60E	60	100–240 Vac, single-phase	24 Vdc	3.75A	2.5A	1s at 10s intervals
PSG120E	120	100–240 Vac, single-phase	24 Vdc	7.5A	5A	1s at 10s intervals
PSG240E	240	100–240 Vac, single-phase	24 Vdc	15A	10A	1s at 10s intervals
PSG60E has enough nominal and surge current capacity for these components.						

Note: See **Table 5** and **Table 6** for power supply selection charts for various Eaton power supplies.

Control power transformer selection

Table 5. Type MTE—Product Selection

	Dimensions (Inches)				Inrush VA at 20% Power Factor (Secondary Voltage)			
Transformer VA	**Height**	**Width**	**Depth**	**Weight (Lbs)**	**95%**	**90%**	**85%**	**Part Number**
Primary: 240 x 480, 230 x 460, 220 x 440 with jumpers / Secondary: 120/115/110 with fuse clips for 13/32 x 1-1/2 fuses								
25	2-9/16	3	2-1/2	1.7	100	130	150	**C0025E2A**
50	2-9/16	3	3	2.6	170	200	240	**C0050E2A**
75	2-9/16	3	3-1/2	3.5	310	410	540	**C0075E2A**
100	2-7/8	3-3/8	3-3/8	4.2	370	540	730	**C0100E2A**
150	3-3/16	3-3/4	4	6.7	780	930	1150	**C0150E2A**
200	3-13/16	4-1/2	4	8.5	810	1150	1450	**C0200E2A**
250	3-13/16	4-1/2	4-3/8	10	1400	1900	2300	**C0250E2A**
300	3-13/16	4-1/2	4-3/4	11.3	1900	2700	3850	**C0300E2A**
350	3-13/16	4-1/2	5-1/4	13.6	3100	3650	4800	**C0350E2A**
500	4-3/4	5-1/4	5-1/2	19.2	4000	5300	7000	**C0500E2A**
750	4-3/4	5-1/4	7	28.1	8300	11000	14000	**C0750E2A**
1000	5-11/16	6-3/4	6-7/16	29.5	15000	21000	27000	**C1000E2A**
Primary: 240 x 480 with jumpers / Secondary: 24 with fuse clips for 13/32 x 1-1/2 fuses (through 500 VA)								
50	2-9/16	3	3	2.7	170	200	240	**C0050E2B**
75	2-9/16	3	3-1/2	3.5	310	410	540	**C0075E2B**
100	2-7/8	3-3/8	3-3/8	4.2	370	540	730	**C0100E2B**
150	3-3/16	3-3/4	4	6.7	780	930	1150	**C0150E2B**
200	3-13/16	4-1/2	4	8.5	810	1150	1450	**C0200E2B**
250	3-13/16	4-1/2	4-3/8	10.1	1400	1900	2300	**C0250E2B**
300	3-13/16	4-1/2	4-3/4	11.4	1900	2700	3850	**C0300E2B**
350	3-13/16	4-1/2	5-1/4	13.4	3100	3650	4800	**C0350E2B**
500	4-3/4	5-1/4	5-5/8	17.5	4000	5300	7000	**C0500E2B**
750	4-3/4	5-1/4	7	28.1	8300	11000	14000	**C0750E2B**
Primary: 550/575/600 / Secondary: 110/115/120 with for 13/32 x 1-1/2 fuses								
50	2-9/16	3	3	2.7	170	200	240	**C0050E4C**
75	2-9/16	3	3-1/2	3.6	310	410	540	**C0075E4C**
100	2-7/8	3-3/8	3-3/8	4.2	370	540	730	**C0100E4C**
150	3-3/16	3-3/4	4	6.8	780	930	1150	**C0150E4C**
200	3-13/16	4-1/2	4	8.4	810	1150	1450	**C0200E4C**
250	3-13/16	4-1/2	4-3/8	10	1400	1900	2300	**C0250E4C**
300	3-13/16	4-1/2	4-3/4	11.3	1900	2700	3850	**C0300E4C**
350	3-13/16	4-1/2	5-1/4	13.6	3100	3650	4800	**C0350E4C**
500	4-3/4	5-1/4	5-3/8	16.8	4000	5300	7000	**C0500E4C**
750	4-3/4	5-1/4	7	25.7	8300	11000	14000	**C0750E4C**
Primary: 240 x 480, 230 x 460, 220 x 440 with jumpers and two-pole primary fuse block for rejection type fuses / Secondary: 120/115/110 with fuse clips for 13/32 x 1-1/2 fuses								
50	3-15/16	3	3	2.8	170	200	240	**C0050E2AFB**
75	3-15/16	3	3-1/2	3.7	310	410	540	**C0075E2AFB**
100	4-1/4	3-3/8	3-3/8	4.4	370	540	730	**C0100E2AFB**
150	4-9/16	3-3/4	4	6.9	780	930	1150	**C0150E2AFB**
200	5-3/16	4-1/2	4	8.7	810	1150	1450	**C0200E2AFB**
250	5-3/16	4-1/2	4-3/8	10.2	1400	1900	2300	**C0250E2AFB**
300	5-3/16	4-1/2	4-3/4	11.5	1900	2700	3850	**C0300E2AFB**
350	5-3/16	4-1/2	5-1/4	13.8	3100	3650	4800	**C0350E2AFB**
500	6-1/8	5-1/4	5-1/2	19.4	4000	5300	7000	**C0500E2AFB**
750	6-1/8	5-1/4	7	28.3	8300	11000	14000	**C0750E2AFB**
1000	7-1/16	6-3/4	6-7/16	29.7	15000	21000	27000	**C1000E2AFB**
Primary: 240 x 480 with jumpers and two-pole primary fuse block for rejection type fuses / Secondary: 24 with fuse clips for 13/32 x 1-1/2 fuses								
50	3-15/16	3	3	2.8	170	200	240	**C0050E2BFB**
75	3-15/16	3	3-1/2	3.8	310	410	540	**C0075E2BFB**
100	4-1/4	3-3/8	3-3/8	4.4	370	540	730	**C0100E2BFB**
150	4-9/16	3-3/4	4	6.9	780	930	1150	**C0150E2BFB**
200	5-3/16	4-1/2	4	8.7	810	1150	1450	**C0200E2BFB**
250	5-3/16	4-1/2	4-3/8	10.3	1400	1900	2300	**C0250E2BFB**
300	5-3/16	4-1/2	4-3/4	11.6	1900	2700	3850	**C0300E2BFB**
350	5-3/16	4-1/2	5-1/4	13.6	3100	3650	4800	**C0350E2BFB**
500	6-1/8	5-1/4	5-5/8	17.7	4000	5300	7000	**C0500E2BFB**

Power supply selection

Table 6. PSG Power Supply Selection

	PSG60E	PSG120E	PSG240E	PSG480E	PSG60F	PSG120F	PSG240F	PSG480F
Capacity	**60W**	**120W**	**240W**	**480W**	**60W**	**120W**	**240W**	**480W**
Input								
Nominal voltage	100–240 Vac	100–240 Vac	100–240 Vac	100–240 Vac	3 x 400–500 Vac	3 x 400–500 Vac	3 x 400–500 Vac	3 x 400–500 Vac
Voltage range	85–264 Vac ②	85–264 Vac ②	85–264 Vac ②	85–264 Vac ②	320–575 Vac ③	320–575 Vac ③	320–575 Vac ③	320–575 Vac ③
Frequency	47–63 Hz ④	47–63 Hz ④	47–63 Hz ④	47–63 Hz ④	47–63 Hz ④	47–63 Hz ④	47–63 Hz ④	47–63 Hz ④
Nominal current ①	1.1A	1.4A	2.9A	5.7A	0.3A	0.5A	0.8A	1.6A
Inrush current limitation ①	30A	<80A	N/A	N/A	<30A	<30A	<40A	<50A
Mains buffering at nominal load (typ.) ①	>20 ms	>35 ms	>20 ms	>20 ms	>30 ms	>35 ms	>35 ms	>20 ms
Turn-on time	<2.5 sec	<1 sec	<1 sec	<1 sec	<2 sec	<1 sec	<1 sec	<1 sec
Internal fuse	T3.15 AH/250V	T3.15 AH/250V	T6.3AH/250V	F10H/250V	3.15AH/500V	3.15AH/500V	3.15AH/500V	3.15AH/500V
External fusing	6A, 10A, or 16A	6A, 10A, or 16A	10A or 16A	10A or 16A	⑤	⑤	⑤	⑤
Leakage current	<1 mA	<1 mA	<3.5 mA	<1 mA	<3.5 mA	<3.5 mA	<3.5 mA	<3.5 mA
Output								
Nominal output voltage	24 Vdc ±2%	24 Vdc ±2%	24 Vdc ±2%	24 Vdc ±2%	24 Vdc ±2%	24 Vdc ±2%	24 Vdc ±2%	24 Vdc ±2%
Adjustment range	22–28 Vdc	22–28 Vdc	22–28 Vdc	22–28 Vdc	22–28 Vdc	22–28 Vdc	22–28 Vdc	22–28 Vdc
Nominal current	**2.5A**	**5A**	**10A**	**20A**	**2.5A**	**5A**	**10A**	**20A**
Startup with capacitive loads	Max. 8000 µF	Max. 10,000 µF	Max. 10,000 µF	Max. 10,000 µF	Max. 10,000 µF	Max. 10,000 µF	Max. 10,000 µF	Max. 10,000 µF
Max. power dissipation idling/ nominal load approx.	10W	22.5W	42.5W	72W	9W	18W	36W	72W
Efficiency (at 400 Vac and nominal values)	>85% typ	>84% typ	>84% typ	>86% typ	>86% at 3 x 400 Vac >85% at 3 x 500 Vac		>87% at 3 x 400 Vac >86% at 3 x 500 Vac	
Current surge (at 24 Vdc)	**3.75A**	**7.5A**	**15A**	**30A**	**3.75A**	**7.5A**	**15A**	**30A**
Current surge time/cycle	1s ⑥	1s ⑥	1s ⑥	1s ⑥	1s ⑥	1s ⑥	1s ⑥	1s ⑥
Residual ripple/peak switching (20 MHz)	<50 mV/<240 mVpp	<50 mV/<240 mVpp	<50 mV/<240 mVpp	<50 mV/<240 mVpp	<50 mV/<240 mVpp	<50 mV/<240 mVpp	<50 mV/<240 mVpp	<50 mV/<240 mVpp
Parallel operation	With oring diode	With oring diode	With oring diode	With oring diode	With oring diode	With oring diode	With oring diode	With oring diode

① Ratings for single-phase models are at 115 Vac; three-phase models are at 400 Vac.

② DC input range 120–375 Vdc.

③ DC input range 450–800 Vdc.

④ 0 Hz at DC input.

⑤ 3 x circuit breakers 6A, 10A, or 16A.

⑥ At 10-second intervals.

Table 7. PSS Power Supply Selection

	PSS10E	PSS10F	PSS25E	PSS25F	PSS55A	PSS55B	PSS55C	PSS55D
Capacity	**10W**	**10W**	**25W**	**25W**	**55W**	**55W**	**55W**	**55W**
Input								
Voltage	110–240 Vac	380–480 Vac	110–240 Vac	380–480 Vac	115 Vac	230 Vac	380–480 Vac three-phase	480–600 Vac three-phase
Input current (rms)	0.19A	0.1A	0.45A	0.17A	0.9A	0.54A	0.20A/phase	0.07A/phase
Frequency	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz
Voltage range	±10%	±10%	±10%	±10%	±15%	±15%	±10%	±15%
Inrush current	25A	25A	35A	35A	16A	32A	15A	15A
Overvoltage	330 Vac	550 Vac	330 Vac	550 Vac	Varistor	Varistor	Varistor	Varistor
Internal input fuse	T2A at 250V	T2A at 250V	T4A at 250V	T2A at 250V	T2A at 250V	T2A at 250V	3 x T2A at 250V	—
External fusing	Not required 2A 250 Vac slow blow	Not required 2A 250 Vac slow blow	Not required 2A 250 Vac slow blow	Not required 2A 250 Vac slow blow	Not required 2A 250 Vac slow blow	Not required 2A 250 Vac slow blow	Not required 2A 250 Vac slow blow	3 x 1A 600 Vac slow blow
Output								
Voltage nominal	24 Vdc	24 Vdc	24 Vdc	24 Vdc	24 Vdc	24V Vdc	24 Vdc	24 Vdc
Voltage regulation	±10%	±10%	±10%	±10%	±3.5%	±3.5%	±3.5%	±3.5%
Current nominal	**0.4A**	**0.4A**	**1.0A**	**1.0A**	**2.3A**	**2.3A**	**2.3A**	**2.3A**
Voltage adj. range	None	None	None	None	None	None	None	None
Current surge	**1A**	**1A**	**6.8A**	**6.8A**	**10A**	**10A**	**10A**	**10A**
Current surge time	35 ms	35 ms	85 ms	85 ms	180 ms	180 ms	180 ms	180 ms
Surge cycle time	—	—	—	—	10s	10s	10s	10s
Hold up time	100 ms	100 ms	100 ms	100 ms	70 ms	70 ms	24 ms	30 ms
Max. load capacitance	10,000 µF	10,000 µF	10,000 µF	10,000 µF	10,000 µF	10,000 µF	10,000 µF	10,000 µF
Switching frequency	60 kHz	60 kHz	100 kHz	100 kHz	100 kHz	100 kHz	100 kHz	61 kHz
Efficiency at max. load	80%	75%	80%	80%	80%	80%	80%	85%
Output ripple	±1%	±1%	±1%	±1%	±1%	±1%	±1%	±1%

Table 8. Coil Power Consumption—AC Voltages 60 Hz

HP 460V	Eaton *XT*	Inrush VA	Sealed VA	Allen-Bradley®	Inrush VA	Sealed VA	Telemecanique®	Inrush VA	Sealed VA
3	XTCE007B	25	3.3	100-C09	70	8	LC1D09	70	7
5	XTCE009B	25	3.3	100-C09	70	8	LC1D09	70	7
7.5	XTCE012B	25	3.3	100-C12	70	8	LC1D12	70	7
10	XTCE015B	25	3.3	100-C16	70	8	LC1D18	70	7
15	XTCE025C	58	6.5	100-C23	70	9	LC1D25	70	7
20	XTCE032C	58	6.5	100-C30	80	9	LC1D32	70	7
25	XTCE040D	154	14	100-C37	80	9	LC1D40	245	26
30	XTCE040D	154	14	100-C43	130	10	LC1D40	245	26
40	XTCE050D	154	14	100-C60	200	16	LC1D50	245	26
50	XTCE065D	154	14	100-C72	200	16	LC1D65	245	26
60	XTCE080F	372	37.1	100-C85	200	16	LC1D80	245	26
75	XTCE095F	328	22.6	100-D110	650	50	LC1D115	350	6
100	XTCE115G	170	3.1	100-D140	650	50	LC1D150	350	6
125	XTCE150G	170	3.1	100-D180	650	50	LC1F185	970	66
AC-3 (A)	**Eaton *XT***	**Inrush VA**	**Sealed VA**	**Allen-Bradley**	**Inrush VA**	**Sealed VA**	**Telemecanique**	**Inrush VA**	**Sealed VA**
7	XTCE007B	25	3.3	100-C09	70	8	LC1D09	70	7
9	XTCE009B	25	3.3	100-C09	70	8	LC1D09	70	7
12	XTCE012B	25	3.3	100-C12	70	8	LC1D12	70	7
15	XTCE015B	25	3.3	100-C16	70	8	LC1D18	70	7
18	XTCE018C	58	6.5	100-C23	70	9	LC1D18	70	7
25	XTCE025C	58	6.5	100-C23	70	9	LC1D25	70	7
32	XTCE032C	58	6.5	100-C30	80	9	LC1D32	70	7
40	XTCE040D	154	14	100-C37	80	9	LC1D40	245	26
50	XTCE050D	154	14	100-C43	130	10	LC1D50	245	26
65	XTCE065D	154	14	100-C60	200	16	LC1D65	245	26
72	XTCE072D	154	14	100-C72	200	16	LC1D80	245	26
80	XTCE080F	372	37.1	100-C85	200	16	LC1D80	245	26
95	XTCE095F	328	22.6	100-D95	650	50	LC1D95	245	26
115	XTCE115G	170	3.1	100-D110	650	50	LC1D115	350	6
150	XTCE150G	170	3.1	100-D140	650	50	LC1D150	350	6
170	XTCE170G	170	3.1	100-D180	650	50	LC1F185	970	66

Table 8. Coil Power Consumption—AC Voltages 60 Hz (continued)

					Conventional		Electronic	
HP 460V	**Eaton *XT***	**Inrush VA**	**Sealed VA**	**Siemens®**	**Inrush VA**	**Sealed VA**	**Inrush VA**	**Sealed VA**
3	XTCE007B	25	3.3	3RT10 15	31.7	5.1	—	—
5	XTCE009B	25	3.3	3RT10 16	31.7	5.1	—	—
7.5	XTCE012B	25	3.3	3RT10 17	31.7	5.1	—	—
10	XTCE015B	25	3.3	3RT10 25	69	7.5	—	—
15	XTCE025C	58	6.5	3RT10 26	69	7.5	—	—
20	XTCE032C	58	6.5	3RT10 34	120	10.1	—	—
25	XTCE040D	154	14	3RT10 34	120	10.1	—	—
30	XTCE040D	154	14	3RT10 35	166	12.6	—	—
40	XTCE050D	154	14	3RT10 36	166	12.6	—	—
50	XTCE065D	154	14	3RT10 44	232	20	—	—
60	XTCE080F	372	37.1	3RT10 45	300	21	—	—
75	XTCE095F	328	22.6	3RT10 46	300	21	—	—
100	XTCE115G	170	3.1	3RT10 54	300	5.8	280	4.4
125	XTCE150G	170	3.1	3RT10 55	300	5.8	280	4.4

					Conventional		Electronic	
AC-3 (A)	**Eaton *XT***	**Inrush VA**	**Sealed VA**	**Siemens**	**Inrush VA**	**Sealed VA**	**Inrush VA**	**Sealed VA**
7	XTCE007B	25	3.3	3RT10 15	31.7	5.1	—	—
9	XTCE009B	25	3.3	3RT10 16	31.7	5.1	—	—
12	XTCE012B	25	3.3	3RT10 17	31.7	5.1	—	—
15	XTCE015B	25	3.3	3RT10 25	69	7.5	—	—
18	XTCE018C	58	6.5	3RT10 25	69	7.5	—	—
25	XTCE025C	58	6.5	3RT10 26	69	7.5	—	—
32	XTCE032C	58	6.5	3RT10 34	120	10.1	—	—
40	XTCE040D	154	14	3RT10 35	166	12.6	—	—
50	XTCE050D	154	14	3RT10 36	166	12.6	—	—
65	XTCE065D	154	14	3RT10 44	232	20	—	—
72	XTCE072D	154	14	3RT10 45	300	21	—	—
80	XTCE080F	372	37.1	3RT10 45	300	21	—	—
95	XTCE095F	328	22.6	3RT10 46	300	21	—	—
115	XTCE115G	170	3.1	3RT10 54	300	5.8	280	4.4
150	XTCE150G	170	3.1	3RT10 55	300	5.8	280	4.4
170	XTCE170G	170	3.1	3RT10 56	300	5.8	280	4.4

Table 8. Coil Power Consumption—AC Voltages 60 Hz (continued)

HP 460V	Eaton *XT*	Inrush VA	Sealed VA	ABB	Inrush VA	Sealed VA	GE®	Inrush VA	Sealed VA
3	XTCE007B	25	3.3	A9-30	74	8	CL00A3	45	6
5	XTCE009B	25	3.3	A9-30	74	8	CL00A3	45	6
7.5	XTCE012B	25	3.3	A12-30	74	8	CL01A3	45	6
10	XTCE015B	25	3.3	A16-30	74	8	CL02A3	45	6
15	XTCE025C	58	6.5	A26-30	125	12	CL25A3	45	6
20	XTCE032C	58	6.5	A26-30	125	12	CL04A3	88	9
25	XTCE040D	154	14	A30-30	125	12	CL45A3	88	9
30	XTCE040D	154	14	A40-30	125	12	CL06A3	191	17
40	XTCE050D	154	14	A50-30	190	18	CL07A3	191	17
50	XTCE065D	154	14	A63-30	190	18	CL08A3	191	17
60	XTCE080F	372	37.1	A75-30	190	18	CL09A3	191	17
75	XTCE095F	328	22.6	A110-30	410	27	CL10A3	191	17
100	XTCE115G	170	3.1	A145-30	700	44	CK75CE3	350	20
125	XTCE150G	170	3.1	A185-30	700	44	CK08CE3	350	20
AC-3 (A)	**Eaton *XT***	**Inrush VA**	**Sealed VA**	**ABB**	**Inrush VA**	**Sealed VA**	**GE**	**Inrush VA**	**Sealed VA**
7	XTCE007B	25	3.3	A9-30	74	8	CL00A3	45	6
9	XTCE009B	25	3.3	A9-30	74	8	CL00A3	45	6
12	XTCE012B	25	3.3	A12-30	74	8	CL01A3	45	6
15	XTCE015B	25	3.3	A16-30	74	8	CL02A3	45	6
18	XTCE018C	58	6.5	A26-30	125	12	CL02A3	45	6
25	XTCE025C	58	6.5	A26-30	125	12	CL25A3	45	6
32	XTCE032C	58	6.5	A30-30	125	12	CL04A3	88	9
40	XTCE040D	154	14	A40-30	125	12	CL06A3	191	17
50	XTCE050D	154	14	A50-30	190	18	CL06A3	191	17
65	XTCE065D	154	14	A63-30	190	18	CL07A3	191	17
72	XTCE072D	154	14	A75-30	190	18	CL08A3	191	17
80	XTCE080F	372	37.1	A75-30	190	18	CL09A3	191	17
95	XTCE095F	328	22.6	A95-30	410	27	CL10A3	191	17
115	XTCE115G	170	3.1	A110-30	410	27	CK75CE3	350	20
150	XTCE150G	170	3.1	A145-30	700	44	CK08CE3	350	20
170	XTCE170G	170	3.1	A185-30	700	44	CK09BE3	425	20

Table 9. Coil Power Consumption—24 Vdc

					Conventional		Electronic	
HP 460V	**Eaton *XT***	**Inrush W**	**Sealed W**	**Allen-Bradley**	**Inrush W**	**Sealed W**	**Inrush W**	**Sealed W**
3	XTCE007B	3	3	100-C09	6.5	6.5	22	1.5
5	XTCE009B	3	3	100-C09	6.5	6.5	22	1.5
7.5	XTCE012B	4.5	4.5	100-C12	6.5	6.5	22	1.5
10	XTCE015B	4.5	4.5	100-C16	6.5	6.5	22	1.5
15	XTCE025C	12	0.5	100-C23	9.2	9.2	22	1.5
20	XTCE032C	12	0.5	100-C30	9.2	9.2	22	1.5
25	XTCE040D	24	0.5	100-C37	9.2	9.2	22	1.5
30	XTCE040D	24	0.5	100-C43	10.1	10.1	28	2.5
40	XTCE050D	24	0.5	100-C60	200	4.5	—	—
50	XTCE065D	24	0.5	100-C72	200	4.5	—	—
60	XTCE080F	90	1.3	100-C85	200	4.5	—	—
75	XTCE095F	90	1.3	100-D110	540	8	—	—
100	XTCE115G	149	2.1	100-D140	540	8	—	—
125	XTCE150G	149	2.1	100-D180	540	8	—	—
					Conventional		**Electronic**	
AC-3 (A)	**Eaton *XT***	**Inrush W**	**Sealed W**	**Allen-Bradley**	**Inrush W**	**Sealed W**	**Inrush W**	**Sealed W**
7	XTCE007B	3	3	100-C09	6.5	6.5	22	1.5
9	XTCE009B	3	3	100-C09	6.5	6.5	22	1.5
12	XTCE012B	4.5	4.5	100-C12	6.5	6.5	22	1.5
15	XTCE015B	4.5	4.5	100-C16	6.5	6.5	22	1.5
18	XTCE018C	12	0.5	100-C23	9.2	9.2	22	1.5
25	XTCE025C	12	0.5	100-C23	9.2	9.2	22	1.5
32	XTCE032C	12	0.5	100-C30	9.2	9.2	22	1.5
40	XTCE040D	24	0.5	100-C37	9.2	9.2	22	1.5
50	XTCE050D	24	0.5	100-C43	10.1	10.1	28	2.5
65	XTCE065D	24	0.5	100-C60	200	4.5	—	—
72	XTCE072D	24	0.5	100-C72	200	4.5	—	—
80	XTCE080F	90	1.3	100-C85	200	4.5	—	—
95	XTCE095F	90	1.3	100-D95	540	8	—	—
115	XTCE115G	149	2.1	100-D110	540	8	—	—
150	XTCE150G	149	2.1	100-D140	540	8		
170	XTCE170G	149	2.1	100-D180	540	8		

Table 9. Coil Power Consumption—24 Vdc (continued)

					Conventional (Ending in BD)	
HP 460V	**Eaton *XT***	**Inrush W**	**Sealed W**	**Telemecanique**	**Inrush W**	**Sealed W**
3	XTCE007B	3	3	LC1D09	5.4	5.4
5	XTCE009B	3	3	LC1D09	5.4	5.4
7.5	XTCE012B	4.5	4.5	LC1D12	5.4	5.4
10	XTCE015B	4.5	4.5	LC1D18	5.4	5.4
15	XTCE025C	12	0.5	LC1D25	5.4	5.4
20	XTCE032C	12	0.5	LC1D32	5.4	5.4
25	XTCE040D	24	0.5	LC1D40	22	22
30	XTCE040D	24	0.5	LC1D40	22	22
40	XTCE050D	24	0.5	LC1D50	22	22
50	XTCE065D	24	0.5	LC1D65	22	22
60	XTCE080F	90	1.3	LC1D80	22	22
75	XTCE095F	90	1.3	LC1D115	365	5.1
100	XTCE115G	149	2.1	LC1D150	365	5.1
125	XTCE150G	149	2.1	LC1F185	800	5

					Conventional (Ending in BD)	
AC-3 (A)	**Eaton *XT***	**Inrush W**	**Sealed W**	**Telemecanique**	**Inrush W**	**Sealed W**
7	XTCE007B	3	3	LC1D09	5.4	5.4
9	XTCE009B	3	3	LC1D09	5.4	5.4
12	XTCE012B	4.5	4.5	LC1D12	5.4	5.4
15	XTCE015B	4.5	4.5	LC1D18	5.4	5.4
18	XTCE018C	12	0.5	LC1D18	5.4	5.4
25	XTCE025C	12	0.5	LC1D25	5.4	5.4
32	XTCE032C	12	0.5	LC1D32	5.4	5.4
40	XTCE040D	24	0.5	LC1D40	22	22
50	XTCE050D	24	0.5	LC1D50	22	22
65	XTCE065D	24	0.5	LC1D65	22	22
72	XTCE072D	24	0.5	LC1D80	22	22
80	XTCE080F	90	1.3	LC1D80	22	22
95	XTCE095F	90	1.3	LC1D95	22	22
115	XTCE115G	149	2.1	LC1D115	365	5.1
150	XTCE150G	149	2.1	LC1D150	365	5.1
170	XTCE170G	149	2.1	LC1F185	800	5

Table 9. Coil Power Consumption—24 Vdc (continued)

					Electronic		Conventional	
HP 460V	**Eaton *XT***	**Inrush W**	**Sealed W**	**Siemens**	**Inrush W**	**Sealed W**	**Inrush W**	**Sealed W**
3	XTCE007B	3	3	3RT10 15	3.3	3.3	—	—
5	XTCE009B	3	3	3RT10 16	3.3	3.3	—	—
7.5	XTCE012B	4.5	4.5	3RT10 17	3.3	3.3	—	—
10	XTCE015B	4.5	4.5	3RT10 25	5.4	5.4	—	—
15	XTCE025C	12	0.5	3RT10 26	5.4	5.4	—	—
20	XTCE032C	12	0.5	3RT10 34	13.3	13.3	—	—
25	XTCE040D	24	0.5	3RT10 34	13.3	13.3	—	—
30	XTCE040D	24	0.5	3RT10 35	13.3	13.3	—	—
40	XTCE050D	24	0.5	3RT10 36	13.3	13.3	—	—
50	XTCE065D	24	0.5	3RT10 44	15	15	—	—
60	XTCE080F	90	1.3	3RT10 45	15	15	—	—
75	XTCE095F	90	1.3	3RT10 46	15	15	—	—
100	XTCE115G	149	2.1	3RT10 54	320	2.8	360	5.2
125	XTCE150G	149	2.1	3RT10 55	320	2.8	360	5.2

					Electronic		Conventional	
AC-3 (A)	**Eaton *XT***	**Inrush W**	**Sealed W**	**Siemens**	**Inrush W**	**Sealed W**	**Inrush W**	**Sealed W**
7	XTCE007B	3	3	3RT10 15	3.3	3.3	—	—
9	XTCE009B	3	3	3RT10 16	3.3	3.3	—	—
12	XTCE012B	4.5	4.5	3RT10 17	3.3	3.3	—	—
15	XTCE015B	4.5	4.5	3RT10 25	5.4	5.4	—	—
18	XTCE018C	12	0.5	3RT10 25	5.4	5.4	—	—
25	XTCE025C	12	0.5	3RT10 26	5.4	5.4	—	—
32	XTCE032C	12	0.5	3RT10 34	13.3	13.3	—	—
40	XTCE040D	24	0.5	3RT10 35	13.3	13.3	—	—
50	XTCE050D	24	0.5	3RT10 36	13.3	13.3	—	—
65	XTCE065D	24	0.5	3RT10 44	15	15	—	—
72	XTCE072D	24	0.5	3RT10 45	15	15	—	—
80	XTCE080F	90	1.3	3RT10 45	15	15	—	—
95	XTCE095F	90	1.3	3RT10 46	15	15	—	—
115	XTCE115G	149	2.1	3RT10 54	320	2.8	360	5.2
150	XTCE150G	149	2.1	3RT10 55	320	2.8	360	5.2
170	XTCE170G	149	2.1	3RT10 56	320	2.8	360	5.2

Table 9. Coil Power Consumption—24 Vdc (continued)

					Conventional	
HP 460V	**Eaton *XT***	**Inrush W**	**Sealed W**	**ABB**	**Inrush W**	**Sealed W**
3	XTCE007B	3	3	AE9-30	90	2
5	XTCE009B	3	3	AE9-30	90	2
7.5	XTCE012B	4.5	4.5	AE12-30	90	2
10	XTCE015B	4.5	4.5	AE16-30	90	2
15	XTCE025C	12	0.5	AE26-30	110	2.5
20	XTCE032C	12	0.5	AE26-30	110	2.5
25	XTCE040D	24	0.5	AE30-30	110	2.5
30	XTCE040D	24	0.5	AE40-30	110	2.5
40	XTCE050D	24	0.5	AE50-30	200	4
50	XTCE065D	24	0.5	AE63-30	200	4
60	XTCE080F	90	1.3	AE75-30	200	4
75	XTCE095F	90	1.3	AE110-30	400	2.4
100	XTCE115G	149	2.1	AF145-30	500	2
125	XTCE150G	149	2.1	AF185-30	500	2

					Conventional	
AC-3 (A)	**Eaton *XT***	**Inrush W**	**Sealed W**	**ABB**	**Inrush W**	**Sealed W**
7	XTCE007B	3	3	AE9-30	90	2
9	XTCE009B	3	3	AE9-30	90	2
12	XTCE012B	4.5	4.5	AE12-30	90	2
15	XTCE015B	4.5	4.5	AE16-30	90	2
18	XTCE018C	12	0.5	AE26-30	110	2.5
25	XTCE025C	12	0.5	AE26-30	110	2.5
32	XTCE032C	12	0.5	AE30-30	110	2.5
40	XTCE040D	24	0.5	AE40-30	110	2.5
50	XTCE050D	24	0.5	AE50-30	200	4
65	XTCE065D	24	0.5	AE63-30	200	4
72	XTCE072D	24	0.5	AE75-30	200	4
80	XTCE080F	90	1.3	AE75-30	200	4
95	XTCE095F	90	1.3	AE95-30	400	2.4
115	XTCE115G	149	2.1	AE110-30	400	2.4
150	XTCE150G	149	2.1	AF145-30	500	2
170	XTCE170G	149	2.1	AF185-30	500	2

Table 9. Coil Power Consumption—24 Vdc (continued)

HP 460V	Eaton *XT*	Inrush W	Sealed W	GE	Inrush W	Sealed W
3	XTCE007B	3	3	CL00D3	5.5	5.5
5	XTCE009B	3	3	CL00D3	5.5	5.5
7.5	XTCE012B	4.5	4.5	CL01D3	5.5	5.5
10	XTCE015B	4.5	4.5	CL02D3	5.5	5.5
15	XTCE025C	12	0.5	CL25D3	5.5	5.5
20	XTCE032C	12	0.5	CL04D3	7.5	7.5
25	XTCE040D	24	0.5	CL45D3	7.5	7.5
30	XTCE040D	24	0.5	CL06E3	125	2.5
40	XTCE050D	24	0.5	CL07E3	125	2.5
50	XTCE065D	24	0.5	CL08E3	125	2.5
60	XTCE080F	90	1.3	CL09E3	125	2.5
75	XTCE095F	90	1.3	CL10E3	125	2.5
100	XTCE115G	149	2.1	CK75CE3	202	12
125	XTCE150G	149	2.1	CK08CE3	202	12
AC-3 (A)	**Eaton *XT***	**Inrush W**	**Sealed W**	**GE**	**Inrush W**	**Sealed W**
7	XTCE007B	3	3	CL00D3	5.5	5.5
9	XTCE009B	3	3	CL00D3	5.5	5.5
12	XTCE012B	4.5	4.5	CL01D3	5.5	5.5
15	XTCE015B	4.5	4.5	CL02D3	5.5	5.5
18	XTCE018C	12	0.5	CL02D3	5.5	5.5
25	XTCE025C	12	0.5	CL25D3	5.5	5.5
32	XTCE032C	12	0.5	CL04D3	7.5	7.5
40	XTCE040D	24	0.5	CL06E3	125	2.5
50	XTCE050D	24	0.5	CL06E3	125	2.5
65	XTCE065D	24	0.5	CL07E3	125	2.5
72	XTCE072D	24	0.5	CL08E3	125	2.5
80	XTCE080F	90	1.3	CL09E3	125	2.5
95	XTCE095F	90	1.3	CL10E3	125	2.5
115	XTCE115G	149	2.1	CK75CE3	202	12
150	XTCE150G	149	2.1	CK08CE3	202	12
170	XTCE170G	149	2.1	CK09BE3	246	12

Control power transformer sizing sheets

Use the following tables to calculate CPT size with ***XT*** versus the competition.

Table 10. Control Power Transformer Sizing Sheet A

Control Panel with present motor control

Part Number	Description	Qty	Inrush VA ea.	Sealed VA ea.	Total Inrush VA	Total Sealed VA
				TOTAL		

CPT INRUSH VA = $\sqrt{(\text{Total Inrush})^2 + (\text{Total Sealed})^2}$

CPT INRUSH VA = _____

CPT VA Size = _____

Table 11. Control Power Transformer Sizing Sheet B

Control Panel using Eaton *XT*

Part Number	Description	Qty	Inrush VA ea.	Sealed VA ea.	Total Inrush VA	Total Sealed VA
				TOTAL		

CPT INRUSH VA = $\sqrt{(\text{Total Inrush})^2 + (\text{Total Sealed})^2}$

CPT INRUSH VA = _____

CPT VA Size = _____

Power supply sizing sheets

Use the following tables to calculate power supply size with ***XT*** versus the competition.

Table 12. Power Supply Sizing Sheet A

Control Panel with present motor control

Part Number	Description	Qty	Inrush W ea.	Sealed W ea.	Total Inrush W	Total Sealed W	Total Inrush (Surge) A	Total Sealed (Nominal) A
						TOTAL		

Power Supply Size = _____

Table 13. Power Supply Sizing Sheet B

Control Panel using Eaton *XT*

Part Number	Description	Qty	Inrush W ea.	Sealed W ea.	Total Inrush W	Total Sealed W	Total Inrush (Surge) A	Total Sealed (Nominal) A
						TOTAL		

Power Supply Size = _____

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