

Industrial Control Transformers Type EO Transformers

TYPE EO TRANSFORMERS

Type EO VA Ratings

Type	VA	
	60 Hz	50 Hz
EO17	25	25
EO1	50	35
EO18	75	75
EO2	100	70
EO3	150	120
EO19	200	200
EO15	250	200
EO4	300	240
EO16	350	280
EO51	500	400
EO61	750	500
EO71	1000	900
EO81	1500	1300
EO91	2000	1800
EO10	3000	3000
EO11	5000	5000

The Type EO units are designed with exceptional voltage regulation. These control transformers are constructed using traditional materials and manufacturing techniques, and are designed for 25 VA to 5000 VA with a 55° C temperature rise. When exceptional regulation and very low temperature rise are an absolute necessity, choose the Type EO units.

Type EO Listings

Listing	File	VA Range
UL	E61239	25–5000
CSA	LR37055, Guide 184-N-90	25–5000



Selection Guide

1. Determine inrush and sealed VA of each coil in the control circuit and VA of all other components.
2. Total all sealed VA of all operating coils and other loads VA (determines minimal VA size required for the circuit).
3. Total the inrush VA of all coils that are starting at the same time and all loads and coils that are running (using the regulation chart to give possible units to be used).
4. Take VA size from step 2, go to standard VA size in chart below. Make sure inrush VA from chart is greater than total VA from step 3. If not, go to next larger VA size and repeat.

Example:

This example assumes the following:

- Two NEMA size 0 contactors do not start together, but one could be ON when the other starts.
 - One NEMA size 2 contactor can start with either of the other contactors.
 - One pilot light at 2 VA
1. VA and inrush are:
NEMA 0: sealed 27 VA; inrush 245 VA
NEMA 2: sealed 37 VA; inrush 311 VA; pilot light 2 VA
 2. Total VA: 27 + 27 + 37 + 2 = 93 VA
 3. Total inrush VA: 245 + 311 + 27 + 2 = 582 VA
 4. From Regulation Chart for Type EO at right below:
100 VA minimum unit; inrush 606 VA will not work at 90%
150 VA (next standard size); inrush 755 VA will work at 95%

If your supply voltage is stable and fluctuates less than 5%, we recommend you use the 90% secondary voltage column. If your supply voltage is not stable and fluctuates more than 10%, we recommend you use the 95% secondary voltage column. We recommend that you never use the 85% secondary voltage column since magnetic devices lose life expectancy if they are continuously started at 85% of rated voltage.

Regulation Chart for Type EO

VA	Secondary Voltage					
	Inrush UL VA at 20% Power Factor			Inrush UL VA at 40% Power Factor		
	95%	90%	85%	95%	90%	85%
25	95	...	146	60	...	119
50	164	213	277	123	168	225
75	387	487	622	284	375	798
100	479	606	770	346	463	613
150	755	1177	1532	567	930	1252
200	1260	1883	2419	910	1462	1950
250	1530	2327	2995	1115	1811	2419
300	2030	2981	3800	1455	2290	3038
350	2920	4586	5981	2180	3637	4903
500	4230	5984	7707	3120	4661	6229
750	7430	11460	14736	5380	8907	11891
1000	10300	16873	21734	7450	13145	17571
1500	19200	30042	39217	14500	23859	32179
2000	27750	45194	60022	21750	36901	50994
3000	31800	82333	108205	26750	66072	89509
5000	86100	148768	202077	72600	126887	175552

Industrial Control Transformers

Type EO Transformers

Use the following tables to quickly find a Type EO transformer for your specific application. First, find your source and load voltages in either the 120 or 24 Volt table below. Then, go to the indicated pages for details on the transformer(s) matching those voltages.

Type EO Transformers for 120 Volt Loads

Source Voltage	Load Voltage	Voltage Code(s)	Go To Page(s)
110	110	D24	30
115	115	D24	30
120	120	D24	30
200	115	D93	30
208	120	D3	30
220	110	D1	29
230	115	D1	29
240	120	D1	29
277	120	D4	30
380	110	D6	30
400	120	D103	30
415	110	D17	30
440	110	D1	29
460	115	D1	29
480	120	D1	29
550	110	D5	30
575	115	D5	30
600	120	D5	30

Type EO Transformers for 24 Volt Loads

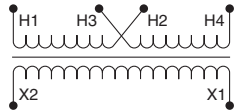
Source Voltage	Load Voltage	Voltage Code(s)	Go To Page(s)
115	24	D89	31
120	24	D23, D7	31, 32
208	24	D14	20
230	24	D89, D112	31, 32
240	24	D2, D23	31, 31
277	24	D25	32
380	24	D88	32
460	24	D92	31
480	24	D2	31
600	24	D16	32

Industrial Control Transformers Type EO Transformers

120 Volt Control Secondary

Voltage and Connection Options

Voltage Code	Voltages		Connections	
	Primary	Secondary	Primary	Secondary
D1	220 x 440 230 x 460 240 x 480	110 115 120	220/230/240: Connect to H1 and H4 Jumper H1 with H3 Jumper H2 with H4 440/460/480: Connect to H1 and H4 Jumper H2 with H3 ¹	Connect to X1 and X2



¹ Jumper kit (two jumpers) supplied with unit.

Dimensions

VA	Catalog Number	Figure	A		B		C		E		F		Slots	
			IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
25	9070EO17D1	6	3.31	84	3.00	76	2.50	64	1.75	44	2.50	64	0.20 x 0.38	5 x 10
50	9070EO1D1	6	3.31	84	3.00	76	2.50	64	2.00	51	2.50	64	0.20 x 0.38	5 x 10
75	9070EO18D1	6	3.78	96	3.38	86	2.81	71	2.19	56	2.81	71	0.20 x 0.38	5 x 10
100	9070EO2D1	6	3.78	96	3.38	86	2.81	71	2.38	60	2.81	71	0.20 x 0.38	5 x 10
150	9070EO3D1	6	4.44	113	3.75	95	3.13	80	2.88	73	3.13	80	0.20 x 0.38	5 x 10
200	9070EO19D1	6	4.81	122	4.50	114	3.75	95	2.5	63	3.75	95	0.20 x 0.38	5 x 10
250	9070EO15D1	6	5.19	132	4.50	114	3.75	95	2.88	73	3.75	95	0.20 x 0.38	5 x 10
300	9070EO04D1	6	5.56	141	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
350	9070EO16D1	6	6.19	157	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
500	9070EO51D1	6	6.56	167	5.25	133	4.38	111	3.81	97	4.38	111	0.28 x 0.56	7 x 14
750	9070EO61D1	6	7.94	202	5.25	133	4.38	111	5.13	130	4.38	111	0.28 x 0.56	7 x 14
1000	9070EO71D1	6	7.94	202	6.00	152	5.00	127	4.75	121	5.00	127	0.28 x 0.56	7 x 14
1500	9070EO81D1	6	8.59	218	7.06	179	6.03	153	5.88	149	5.81	148	0.44 x 0.69	11 x 18
2000	9070EO91D1	6	9.22	234	7.06	179	6.03	153	6.50	165	5.81	148	0.44 x 0.69	11 x 18
3000	9070EO10D1	6	9.44	239	9.00	229	7.50	191	5.88	149	7.63	194	0.44 x 0.69	11 x 18
5000	9070EO11D1	6	12.06	306	9.00	229	7.50	191	8.50	216	7.63	194	0.44 x 0.69	11 x 18

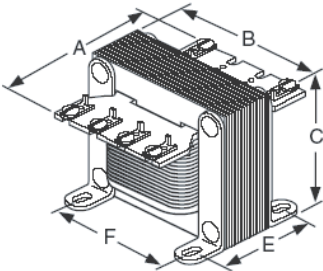


Figure 6

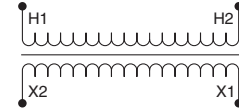
Industrial Control Transformers

Type EO Transformers

120 Volt Control Secondary

Voltage and Connection Options

Voltage Code	Voltages		Connections	
	Primary	Secondary	Primary	Secondary
D3	208	120	Connect to H1 and H2	Connect to X1 and X2
D4	277	120		
D5	550	110		
	575	115		
	600	120		
D6	380	110		
D17	415	110		
D24	110	110		
	115	115		
	120	120		
D93	200	115		
D103	400	120		



Dimensions

VA	Catalog Number ¹	Figure	A		B		C		E		F		Slots	
			IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
25	9070EO17●	6	3.31	84	3.00	76	2.50	64	1.75	44	2.50	64	0.20 x 0.38	5 x 10
50	9070EO1●	6	3.31	84	3.00	76	2.50	64	2.00	51	2.50	64	0.20 x 0.38	5 x 10
75	9070EO18●	6	3.78	96	3.38	86	2.81	71	2.19	56	2.81	71	0.20 x 0.38	5 x 10
100	9070EO2●	6	3.78	96	3.38	86	2.81	71	2.38	60	2.81	71	0.20 x 0.38	5 x 10
150	9070EO3●	6	4.44	113	3.75	95	3.13	80	2.88	73	3.13	80	0.20 x 0.38	5 x 10
200	9070EO19●	6	4.81	122	4.50	114	3.75	95	2.5	63	3.75	95	0.20 x 0.38	5 x 10
250	9070EO15●	6	5.19	132	4.50	114	3.75	95	2.88	73	3.75	95	0.20 x 0.38	5 x 10
300	9070EO04●	6	5.56	141	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
350	9070EO16●	6	6.19	157	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
500	9070EO51●	6	6.56	167	5.25	133	4.38	111	3.81	97	4.38	111	0.28 x 0.56	7 x 14
750	9070EO61●	6	7.94	202	5.25	133	4.38	111	5.13	130	4.38	111	0.28 x 0.56	7 x 14
1000	9070EO71●	6	7.94	202	6.00	152	5.00	127	4.75	121	5.00	127	0.28 x 0.56	7 x 14
1500	9070EO81●	6	8.59	218	7.06	179	6.03	153	5.88	149	5.81	148	0.44 x 0.69	11 x 18
2000	9070EO91●	6	9.22	234	7.06	179	6.03	153	6.50	165	5.81	148	0.44 x 0.69	11 x 18
3000	9070EO10●	6	9.44	239	9.00	229	7.50	191	5.88	149	7.63	194	0.44 x 0.69	11 x 18
5000	9070EO11●	6	12.06	306	9.00	229	7.50	191	8.50	216	7.63	194	0.44 x 0.69	11 x 18

¹ Complete the catalog number by replacing the ● with the correct Voltage Code from the "Voltage and Connection Options" table above.

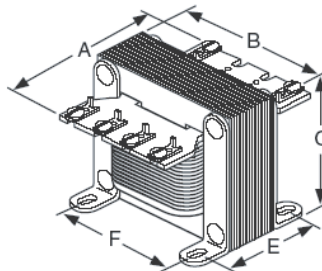
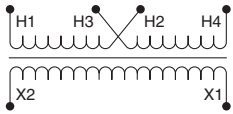


Figure 6

24 Volt Control Secondary

Voltage and Connection Options

Voltage Code	Voltages		Connections	
	Primary	Secondary	Primary	Secondary
D2	240 x 480	24	240 or 120 or 115 or 230: Connect to H1 and H4 Jumper H1 with H3 Jumper H2 with H4	Connect to X1 and X2
D23	120 x 240			
D89	115 x 230		480 or 240 or 230 or 460: Connect to H1 and H4 Jumper H2 with H3	
D92	230 x 460			



Dimensions

VA	Catalog Number ¹	Fig.	A		B		C		E		F		Slots	
			IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
25	9070EO17●	6	3.31	84	3.00	76	2.50	64	1.75	44	2.50	64	0.20 x 0.38	5 x 10
50	9070EO1●	6	3.31	84	3.00	76	2.50	64	2.00	51	2.50	64	0.20 x 0.38	5 x 10
75	9070EO18●	6	3.78	96	3.38	86	2.81	71	2.19	56	2.81	71	0.20 x 0.38	5 x 10
100	9070EO2●	6	3.78	96	3.38	86	2.81	71	2.38	60	2.81	71	0.20 x 0.38	5 x 10
150	9070EO3●	6	4.44	113	3.75	95	3.13	80	2.88	73	3.13	80	0.20 x 0.38	5 x 10
200	9070EO19●	6	4.81	122	4.50	114	3.75	95	2.5	63	3.75	95	0.20 x 0.38	5 x 10
250	9070EO15●	6	5.19	132	4.50	114	3.75	95	2.88	73	3.75	95	0.20 x 0.38	5 x 10
300	9070EO04●	6	5.56	141	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
350	9070EO16●	6	6.19	157	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
500	9070EO51●	6	6.56	167	5.25	133	4.38	111	3.81	97	4.38	111	0.28 x 0.56	7 x 14
750	9070EO61●	6	7.94	202	5.25	133	4.38	111	5.13	130	4.38	111	0.28 x 0.56	7 x 14
1000	9070EO71●	6	7.94	202	6.00	152	5.00	127	4.75	121	5.00	127	0.28 x 0.56	7 x 14
1500	9070EO81●	6	8.59	218	7.06	179	6.03	153	5.88	149	5.81	148	0.44 x 0.69	11 x 18

¹ Complete the catalog number by replacing the ● with the correct Voltage Code from the "Voltage and Connection Options" table above.

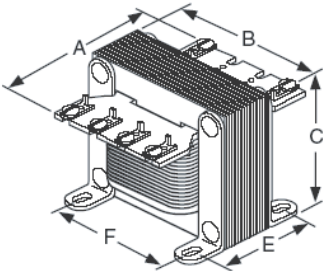


Figure 6

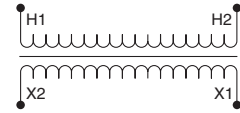
Industrial Control Transformers

Type EO Transformers

24 Volt Control Secondary

Voltage and Connection Options

Voltage Code	Voltages		Connections	
	Primary	Secondary	Primary	Secondary
D7	120	24	Connect to H1 and H2	Connect to X1 and X2
D14	208			
D16	600			
D25	277			
D88	380			
D112	230			



Dimensions

VA	Catalog Number ¹	Fig.	A		B		C		E		F		Slots	
			IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm
25	9070EO17●	6	3.31	84	3.00	76	2.50	64	1.75	44	2.50	64	0.20 x 0.38	5 x 10
50	9070EO1●	6	3.31	84	3.00	76	2.50	64	2.00	51	2.50	64	0.20 x 0.38	5 x 10
75	9070EO18●	6	3.78	96	3.38	86	2.81	71	2.19	56	2.81	71	0.20 x 0.38	5 x 10
100	9070EO2●	6	3.78	96	3.38	86	2.81	71	2.38	60	2.81	71	0.20 x 0.38	5 x 10
150	9070EO3●	6	4.44	113	3.75	95	3.13	80	2.88	73	3.13	80	0.20 x 0.38	5 x 10
200	9070EO19●	6	4.81	122	4.50	114	3.75	95	2.5	63	3.75	95	0.20 x 0.38	5 x 10
250	9070EO15●	6	5.19	132	4.50	114	3.75	95	2.88	73	3.75	95	0.20 x 0.38	5 x 10
300	9070EO04●	6	5.56	141	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
350	9070EO16●	6	6.19	157	4.50	114	3.75	95	3.81	97	3.75	95	0.20 x 0.38	5 x 10
500	9070EO51●	6	6.56	167	5.25	133	4.38	111	3.81	97	4.38	111	0.28 x 0.56	7 x 14
750	9070EO61●	6	7.94	202	5.25	133	4.38	111	5.13	130	4.38	111	0.28 x 0.56	7 x 14
1000	9070EO71●	6	7.94	202	6.00	152	5.00	127	4.75	121	5.00	127	0.28 x 0.56	7 x 14
1500	9070EO81●	6	8.59	218	7.06	179	6.03	153	5.88	149	5.81	148	0.44 x 0.69	11 x 18

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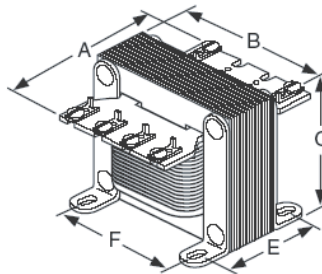


Figure 6

Industrial Control Transformers Type EO Transformers

TYPE EO PERFORMANCE DATA

Catalog Number	Core Watts	Coil Watts	FL Total Watts	Reg 1.0PF	Eff 100%	%IZ	X/R	BTU/hr					Inrush (x FL RMS)
								100%	75%	50%	25%	No Load	60HZ
9070EO17D1	2.25	2.25	4.50	6.37%	84.75%	7.38	0.151	15.35	10.84	9.16	8.32	7.68	44.70
9070EO1D1	3.50	4.20	7.70	7.35%	86.66%	7.69	0.158	26.27	20.66	16.20	13.19	11.94	44.70
9070EO18D1	4.25	4.85	9.10	5.63%	89.18%	5.62	0.079	31.05	25.45	20.79	17.45	14.50	32.30
9070EO2D1	4.91	7.29	12.20	6.53%	89.13%	6.21	0.056	41.63	30.86	24.07	20.59	16.75	26.50
9070EO3D1	8.53	6.77	15.30	4.40%	90.74%	4.16	0.173	52.20	43.02	36.73	32.53	29.10	52.60
9070EO19D1	8.38	8.52	16.90	4.04%	92.21%	3.72	0.111	57.66	46.69	38.68	33.48	28.59	40.60
9070EO15D1	9.83	10.37	20.20	4.10%	92.52%	3.73	0.119	68.92	55.46	45.77	39.58	33.54	39.00
9070EO4D1	6.50	10.00	16.50	3.75%	94.79%	3.61	0.075	56.30	43.20	31.47	24.85	22.18	51.10
9070EO16D1	17.75	8.85	26.60	2.85%	92.94%	2.44	0.188	90.76	80.23	69.07	62.61	60.56	59.70
9070EO51D1	17.51	14.69	32.20	2.91%	93.95%	2.72	0.13	109.87	87.55	69.97	61.54	59.74	37.20
9070EO61D1	23.67	19.53	43.20	2.72%	94.55%	2.31	0.113	147.40	114.30	91.41	83.37	80.76	43.40
9070EO71D1	18.12	15.78	33.90	2.01%	96.72%	2.02	0.125	115.67	98.130	77.00	64.93	61.83	57.10
9070EO81D1	38.51	24.89	63.40	1.66%	95.94%	1.63	0.188	216.32	180.18	153.47	138.03	131.40	37.50
9070EO91D1	53.09	30.01	83.10	1.50%	96.01%	1.25	0.300	283.54	238.94	204.12	184.07	181.14	41.80
9070EO10D1	31.36	27.64	59.00	1.20%	98.07%	1.13	0.227	201.31	178.51	137.86	114.75	107.00	36.40
9070EO11D1	61.44	45.56	107.00	0.89%	97.90%	0.79	0.514	365.08	300.12	249.03	219.66	209.63	37.20