Westinghouse Electric Corporation
Distribution and Control Business Unit
Small Power Transformer Division
South Boston, Virginia 24592

October 1986
Supersedes Catalog 46-700
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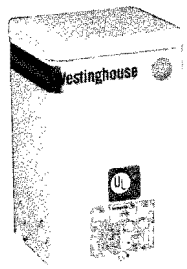
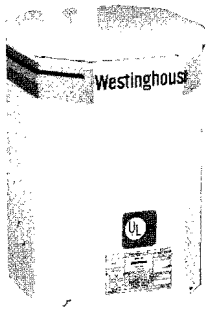
For standard terms and conditions
of sale, refer to Selling Policy 47-700
Mailed to E, D, C/46-700A,
46-700B; 46-800A

Dry-Type Distribution and Control Transformers

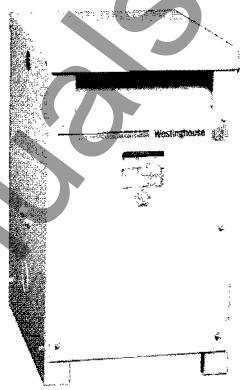
General Purpose, Single Phase
Types EP and DS-3



TYPE EP
2 KVA AND BELOW



TYPE EP
3-25 KVA



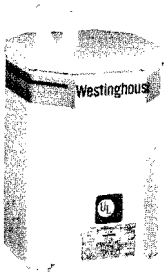
TYPE DS-3
37½-100 KVA

KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KIT STYLE NO.
120 x 240 VOLTS TO 120/240 VOLTS											
1	**S10N11S01M**	None	EP	80	8 3/8	6	5 1/2	26	73	6	Not Required③
1.5	**S10N11S16M**	None	EP	80	9 1/2	6 3/8	6 1/8	36	74	6	
2	**S10N11S02M**	None	EP	80	10 1/2	6 3/8	6 1/8	40	75	6	
3	**S10N11S03M**	None	EP	115	14 1/4	7 1/2	7 3/4	48	176	6	Not Required③
5	**S10N11S05M**	None	EP	115	15 3/4	9 3/8	9	75	177	6	
7.5	**S10N11S07M**	None	EP	115	16	12	10 5/8	102	178	6	
10	**S10N11S10M**	None	EP	115	19	12	10 5/8	128	179	6	
15	**S10N11S15M**	None	EP	115	19	12	10 5/8	158	180	6	
25	**S10N11S25M**	None	EP	115	21 5/16	15 1/4	14 1/8	247	182	6	
37.5	**T10N11S37C**	None	DS-3	150	27 1/2	15 3/8	19 1/4	275	800	233A	783C427G01
50	**T10N11S50C**	None	DS-3	150	37	16 1/2	21 1/2	360	801	233A	783C427G02
208 VOLTS TO 120/240 VOLTS											
3	**S29N11S03M**	None	EP	115	14 1/4	7 1/2	7 3/4	48	176	26	Not Required③
5	**S29N11S05M**	None	EP	115	15 3/4	9 3/8	9	75	177	26	
7.5	**S29N11S07M**	None	EP	115	16	12	10 5/8	102	178	26	
10	**S29N11S10M**	None	EP	115	19	12	10 5/8	128	179	26	
15	**S29N11S15M**	None	EP	115	19	12	10 5/8	158	180	26	
25	**S29N11S25M**	None	EP	115	21 5/16	15 1/4	14 1/8	247	182	26	
240 x 480 VOLTS TO 120/240 VOLTS											
.250	**S20N11S26M**	None	EP	80	7 1/16	4 5/16	4 1/8	12	202	3	Not Required③
.500	**S20N11S51M**	None	EP	80	7 1/16	4 7/8	4 5/8	13	71	3	
.750	**S20N11S76M**	None	EP	80	8 3/8	6	5 1/2	20	72	3	
1	**S20N11S01M**	None	EP	80	8 3/8	6	5 1/2	26	73	3	
1.5	**S20N11S16M**	None	EP	80	9 1/2	6 3/8	6 1/8	36	74	3	
2	**S20N11S02M**	None	EP	80	10 1/2	6 3/8	6 1/8	40	75	3	
3	**S20N11S03M**	None	EP	115	14 1/4	7 1/2	7 3/4	48	76	3	Not Required③
3	**S20K11S03M**	−1-10% x −2-5%	EP	115	14 1/4	7 1/2	7 3/4	48	176	9	
5	**S20N11S05M**	None	EP	115	15 3/4	9 3/8	9	75	177	3	
5	**S20K11S05M**	−1-10% x −2-5%	EP	115	15 3/4	9 3/8	9	75	177	9	
7.5	**S20N11S07M**	None	EP	115	16	12	10 5/8	102	178	3	
7.5	**S20K11S07M**	−1-10% x −2-5%	EP	115	16	12	10 5/8	102	178	9	
10	**S20N11S10M**	None	EP	115	19	12	10 5/8	128	179	3	
10	**S20K11S10M**	−1-10% x −2-5%	EP	115	19	12	10 5/8	128	179	9	
15	**S20N11S15M**	None	EP	115	19	12	10 5/8	158	180	3	
15	**S20L11S15M**	−2-5% x −4-2.5%	EP	115	19	12	10 5/8	158	180	23	
25	**S20N11S25M**	None	EP	115	21 5/16	15 1/4	14 1/8	247	182	3	
25	**S20L11S25M**	−2-5% x −4-2.5%	EP	115	21 5/16	15 1/4	14 1/8	247	182	23	
37.5	**T20N11S37D**	None	DS-3	150	27 1/2	15 3/8	19 1/4	275	800	233B	783C427G01
37.5	**T20L11S37D**	−2-5% x −4-2.5%	DS-3	150	27 1/2	15 3/8	19 1/4	275	800	235A	783C427G01
50	**T20N11S50D**	None	DS-3	150	37	16 1/2	21 1/2	360	801	233B	783C427G02
50	**T20L11S50C**	−2-5% x −4-2.5%	DS-3	150	37	16 1/2	21 1/2	360	801	235A	783C427G02
75	**T20L11S75C**	−2-5% x −4-2.5%	DS-3	150	41 1/4	21	23 1/2	500	802	235A	783C427G03
100	**T20L11S99C**	−2-5% x −4-2.5%	DS-3	150	41 1/4	21	23 1/2	610	803	235A	783C427G03

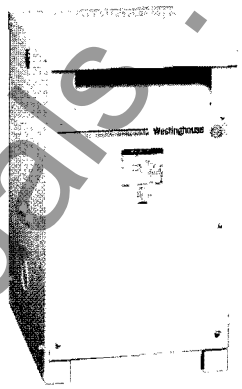
① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ NEMA 3R outdoor enclosure is standard for Westinghouse Type EP.
NOTE: Refer to SPTD for availability of special designs.

General Purpose, Single Phase
Types EP and DS-3

TYPE EP
2 KVA AND BELOW



TYPE EP
3-25 KVA

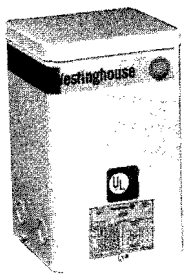


TYPE DS-3
37½-100 KVA

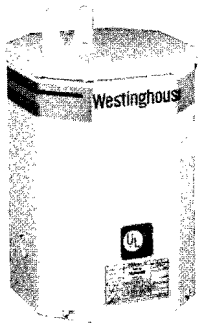
KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KITSTYLE NO.
277 VOLTS TO 120 240 VOLTS											
3	**S27N11S03M**	None	EP	115	14¼	7½	7¾	48	176	24	Not Required③
5	**S27N11S05M**	None	EP	115	15¾	9⅜	9	75	177	24	
7.5	**S27N11S07M**	None	EP	115	16	12	10⅝	102	178	24	
10	**S27N11S10M**	None	EP	115	19	12	10⅝	128	179	24	
15	**S27N11S15M**	None	EP	115	19	12	10⅝	158	180	24	
25	**S27N11S25M**	None	EP	115	21 5/16	15¼	14⅛	247	182	24	
37.5	**T27N11S37C**	None	DS-3	150	27½	15⅜	19¼	275	800	237A	783C427G01
50	**T27N11S50C**	None	DS-3	150	37	16½	21½	360	801	237A	783C427G02
75	**T27N11S75C**	None	DS-3	150	41¼	21	23½	500	802	237A	783C427G03
100	**T27N11S99B**	None	DS-3	150	41¼	21	23½	610	803	237A	783C427G03
480 VOLTS TO 120 240 VOLTS											
1	**S48G11S01M**	−2-5%	EP	80	8⅜	6	5½	26	73	19	Not Required③
1.5	**S48G11S16M**	−2-5%	EP	80	9½	6⅜	6⅛	36	74	19	
2	**S48G11S02M**	−2-5%	EP	80	10½	6⅜	6⅛	40	75	19	
3	**S48G11S03M**	−2-5%	EP	115	14¼	7½	7¾	48	176	19	Not Required③
3	**S48D11S03M**	+2-2.5%, −2-2.5%	EP	115	14¼	7½	7¾	48	176	16	
5	**S48G11S05M**	−2-5%	EP	115	15¾	9⅜	9	75	177	19	
5	**S48D11S05M**	+2-2.5%, −2-2.5%	EP	115	15¾	9⅜	9	75	177	16	
7.5	**S48G11S07M**	−2-5%	EP	115	16	12	10⅝	102	178	19	
7.5	**S48D11S07M**	+2-2.5%, −2-2.5%	EP	115	16	12	10⅝	102	178	16	
10	**S48G11S10M**	−2-5%	EP	115	19	12	10⅝	128	179	19	
10	**S48D11S10M**	+2-2.5%, −2-2.5%	EP	115	19	12	10⅝	128	179	16	
15	**S48G11S15M**	−2-5%	EP	115	19	12	10⅝	158	180	19	
15	**S48D11S15M**	+2-2.5%, −2-2.5%	EP	115	19	12	10⅝	158	180	16	
25	**S48G11S25M**	−2-5%	EP	115	21 5/16	15¼	14⅛	247	182	19	
25	**S48M11S25M④**	+2-2.5%, −4-2.5%	EP	115	17¼	15 17/32	13⅝	247	132	83A	
37.5	**T48M11S37D**	+2-2.5%, −4-2.5%	DS-3	150	27½	15⅜	19¼	275	800	276A	783C427G01
50	**T48M11S50D**	+2-2.5%, −4-2.5%	DS-3	150	37	16½	21½	360	801	276A	783C427G02
75	**T48M11S75D**	+2-2.5%, −4-2.5%	DS-3	150	41¼	21	23½	500	802	276A	783C427G03
100	**T48M11S99C**	+2-2.5%, −4-2.5%	DS-3	150	41¼	21	23½	610	803	276A	783C427G03
600 VOLTS TO 120 240 VOLTS											
1	**S60G11S01M**	−2-5%	EP	80	8⅜	6	5½	26	73	2	Not Required③
1.5	**S60G11S16M**	−2-5%	EP	80	9½	6⅜	6⅛	36	74	2	
2	**S60G11S02M**	−2-5%	EP	80	10½	6⅜	6⅛	40	75	2	
3	**S60N11S03M**	None	EP	115	14¼	7½	7¾	48	176	8	Not Required③
3	**S60G11S03M**	−2-5%	EP	115	14¼	7½	7¾	48	176	2	
5	**S60N11S05M**	None	EP	115	15¾	9⅜	9	75	177	8	
5	**S60G11S05M**	−2-5%	EP	115	15¾	9⅜	9	75	177	2	
7.5	**S60N11S07M**	None	EP	115	16	12	10⅝	102	178	8	
7.5	**S60G11S07M**	−2-5%	EP	115	16	12	10⅝	102	178	2	
10	**S60N11S10M**	None	EP	115	19	12	10⅝	128	179	8	
10	**S60G11S10M**	−2-5%	EP	115	19	12	10⅝	128	179	2	
15	**S60N11S15M**	None	EP	115	19	12	10⅝	158	180	8	
15	**S60J11S15M**	−4-2.5%	EP	115	19	12	10⅝	158	180	28	
25	**S60J11S25M**	−4-2.5%	EP	115	21 5/16	15¼	14⅛	247	182	28	
25	**S60M11S25M④**	+2-2.5%, −4-2.5%	EP	115	17¼	15 17/32	13⅝	247	132	83B	
37.5	**T60M11S37B**	+2-2.5%, −4-2.5%	DS-3	150	27½	15⅜	19¼	275	800	276B	783C427G01
50	**T60M11S50C**	+2-2.5%, −4-2.5%	DS-3	150	37	16½	21½	360	801	276B	783C427G02
75	**T60M11S75C**	+2-2.5%, −4-2.5%	DS-3	150	41¼	21	23½	500	802	276B	783C427G03
100	**T60M11S99A**	+2-2.5%, −4-2.5%	DS-3	150	41¼	21	23½	610	803	276B	783C427G03

① Not for construction. Refer to TCS47-720 by frame number for certification
② For wiring diagram, refer to TCS47-730 by diagram number.
③ NEMA 3R outdoor enclosure is standard for Westinghouse Type EP.
④ Floor mounted only.
NOTE: Refer to SPTD for availability of special designs.

General Purpose, Single Phase
Types EP and DS-3



TYPE EP
2 KVA AND BELOW



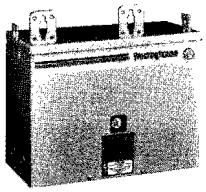
TYPE EP
3-25 KVA

TYPE DS-3
37½-100 KVA

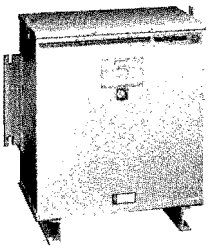
KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)● HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KIT STYLE NO.
1.5	**S42N11S16M**	None	EP	80	11½	6⅜	6⅛	40	75B	18	Not Required③
3	**S42N11S03M**	None	EP	115	15¾	9⅜	9	75	177	18	
3	**S42J11S03M**	−4-2.5%	EP	115	15¾	9⅜	9	75	177	12	
5	**S42N11S05M**	None	EP	115	16	12	10⅝	114	178	18	
5	**S42J11S05M**	−4-2.5%	EP	115	16	12	10⅝	114	178	12	
10	**S42N11S10M**	None	EP	115	19	12	10⅝	158	180	18	Not Required③
10	**S42J11S10M**	−4-2.5%	EP	115	19	12	10⅝	158	180	12	
15	**S42N11S15M**	None	EP	115	21 5/16	15¼	14⅛	247	182	18	
15	**S42J11S15M**	−4-2.5%	EP	115	21 5/16	15¼	14⅛	247	182	12	
25	**S42N11S25M**	None	EP	115	21 5/16	15¼	14⅛	375	190	18	
25	**S42J11S25M**	−4-2.5%	EP	115	26 5/16	15¼	14⅛	375	190	12	
37.5	**T42D11S37B**	+2-2.5%, −2-2.5%	DS-3	150	27½	15⅜	19¼	275	825	241E	
50	**T42D11S50C**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	360	826	241E	④
75	**T42D11S75C**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	500	827	241E	
100	**T42D11S99B**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	610	828	241E	
37.5	**T42D21S37B**	+2-2.5%, −2-2.5%	DS-3	150	27½	15⅜	19¼	275	825	241D	
50	**T42D21S50D**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	360	826	241D	④
1.5	**S46N11S16M**	None	EP	80	11½	6⅜	6⅛	40	75B	11	Not Required
3	**S46J11S03M**	−4-2.5%	EP	115	15¾	9⅜	9	75	177	17	
5	**S46J11S05M**	−4-2.5%	EP	115	16	12	10⅝	114	178	17	Not Required
37.5	**T46D11S37B**	+2-2.5%, −2-2.5%	DS-3	150	27½	15⅜	19¼	275	825	242E	
50	**T46D11S50C**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	360	826	242E	
75	**T46D11S75C**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	500	827	242E	●
100	**T46D11S99B**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	610	828	242E	
37.5	**T46D21S37B**	+2-2.5%, −2-2.5%	DS-3	150	27½	15⅜	19¼	275	825	242B	
50	**T46D21S50C**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	360	826	242B	
75	**T46D21S75C**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	500	827	242B	④
100	**T46D21S99B**	+2-2.5%, −2-2.5%	DS-3	150	41¼	21	23½	610	827	242B	

① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ NEMA 3R outdoor enclosure is standard for Westinghouse Type EP.
④ Units rated above 600V are not recommended for outdoor applications.
NOTE: Refer to SPTD for availability of special designs.

General Purpose, Three Phase
Types EPT and DT-3



TYPE EPT 3-15 KVA



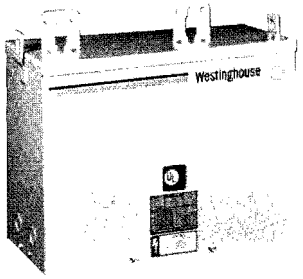
TYPE EPT 30 KVA

TYPE DT-3 30-1500 KVA

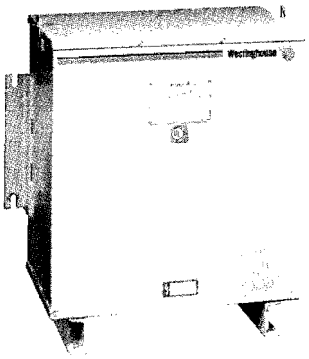
KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING DIAGRAM ②	WEATHERSHIELD KIT STYLE NO.
9	**Y24G28T09M**	−2-5%	EPT	115	15 7/8	16	9 1/16	160	103	70C	Not Required③
15	**Y24G28T15M**	−2-5%	EPT	115	17 3/8	20	8 11/16	210	95	70C	
30	**Y24M28T30M**	+2-2.5%, −4-2.5%	EPT	115	26 5/8	25 1/8	12 3/4	422	243	84C	
45	**V24M28T45M**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	280C	783C426G01
75	**V24M28T75M**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	853	280C	783C426G02
112.5	**V24M28T12M**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	76C	783C426G02
150	**V24M28T49M**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	76C	783C426G03
3	**Y48N28T03M**	None	EPT	115	13 3/8	15 15/16	8 5/16	70	201	71A	
3	**Y48G28T03M**	−2-5%	EPT	115	13 3/8	15 15/16	8 5/16	70	201	70A	
6	**Y48N28T06M**	None	EPT	115	15 7/8	16 3/8	7 1/2	115	200	71A	Not Required③
6	**Y48G28T06M**	−2-5%	EPT	115	15 7/8	16 3/8	7 1/2	115	200	70A	
6	**Y48D28T06M**	+2-2.5%, −2-2.5%	EPT	115	15 7/8	16 3/8	7 1/2	115	200	72A	
9	**Y48N28T09M**	None	EPT	115	15 7/8	16	9 1/16	160	103	71A	
9	**Y48G28T09M**	−2-5%	EPT	115	15 7/8	16	9 1/16	160	103	70A	
9	**Y48J28T09M**	−4-2.5%	EPT	115	15 7/8	16	9 1/16	160	103	72A	
9	**Y48D28T09M**	+2-2.5%, −2-2.5%	EPT	115	15 7/8	16	9 1/16	160	103	72B	
15	**Y48N28T15M**	None	EPT	115	17 3/8	20	8 11/16	210	95	71A	
15	**Y48G28T15M**	−2-5%	EPT	115	17 3/8	20	8 11/16	210	95	70A	
15	**Y48J28T15M**	−4-2.5%	EPT	115	17 3/8	20	8 11/16	210	95	72A	
15	**Y48D28T15M**	+2-2.5%, −2-2.5%	EPT	115	17 3/8	20	8 11/16	210	95	72B	
30	**Y48M28T30M**	+2-2.5%, −4-2.5%	EPT	115	26 5/8	25 1/8	12 3/4	422	243	84A	
30	**V48M28T30J**	+2-2.5%, −4-2.5%	DT-3	150	32	20 1/8	14 1/8	230	910	280B	7073C04G01
37.5	**V48M28T37J**	+2-2.5%, −4-2.5%	DT-3	150	32	20 1/8	14 1/8	310	911	280B	7073C04G01
45	**V48M28T45J**	+2-2.5%, −4-2.5%	DT-3	150	32	20 1/8	14 1/8	310	912	280B	7073C04G01
50	**V48M28T50H**	+2-2.5%, −4-2.5%	DT-3	150	37 7/8	26 1/8	19 1/8	480	913	280B	7073C04G02
75	**V48M28T75H**	+2-2.5%, −4-2.5%	DT-3	150	37 7/8	26 1/8	19 1/8	480	914	280B	7073C04G02
112.5	**V48M28T12G**	+2-2.5%, −4-2.5%	DT-3	150	37 7/8	26 1/8	19 1/8	600	915	280B	7073C04G02
150	**V48M28T49J**	+2-2.5%, −4-2.5%	DT-3	150	46 1/2	26	20 5/16	950	916	280B	7073C04G03
225	**V48M28T22K**	+2-2.5%, −4-2.5%	DT-3	150	56	29	24 1/4	1200	917	280B	7073C04G04
300	**V48M28T33J**	+2-2.5%, −4-2.5%	DT-3	150	56	29	24 1/4	1400	918	280B	7073C04G04
500	**V48M28T55G**	+2-2.5%, −4-2.5%	DT-3	150	75	44	36	2700	④	④	3720C94G05
750	**V48M28T77F**	+2-2.5%, −4-2.5%	DT-3	150	75	50	36	3300	④	④	3720C94G06
1000	**V48M28T11F**	+2-2.5%, −4-2.5%	DT-3	150	90	53	36	4900	④	④	3720C94G07
3	**Y48G24T03M**	−2-5%	EPT	115	13 3/8	15 15/16	8 5/16	70	201	74	Not Required
6	**Y48G24T06M**	−2-5%	EPT	115	15 7/8	16 3/8	7 1/2	115	200	74	
9	**Y48J24T09M**	−4-2.5%	EPT	115	15 7/8	16	9 1/16	160	103	73	
15	**Y48J24T15M**	−4-2.5%	EPT	115	17 3/8	20	8 11/16	210	95	73	
30	**Y48M24T30M**	+2-2.5%, −4-2.5%	EPT	115	26 5/8	25 1/8	12 3/4	422	243	85A	
30	**V48M24T30M**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	450	862	281B	783C426G01
45	**V48M24T45G**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	281B	783C426G01
75	**V48M24T75F**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	281B	783C426G02
112.5	**V48M24T12E**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	281B	783C426G02
150	**V48M24T49G**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	281B	783C426G03
225	**V48M24T22G**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	856	274B	783C426G04
300	**V48M24T33F**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	857	274B	783C426G04
500	**V48M24T55F**	+2-2.5%, −4-2.5%	DT-3	150	75	44	36	2700	④	④	3720C94G05
750	**V48M24T77F**	+2-2.5%, −4-2.5%	DT-3	150	75	50	36	3300	④	④	3720C94G06
1000	**V48M24T11F**	+2-2.5%, −4-2.5%	DT-3	150	90	53	36	4900	④	④	3720C94G07

① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ NEMA 3R outdoor enclosure is standard for Westinghouse Type EPT.
④ Refer to SPTD.
NOTE: Refer to SPTD for availability of special designs.

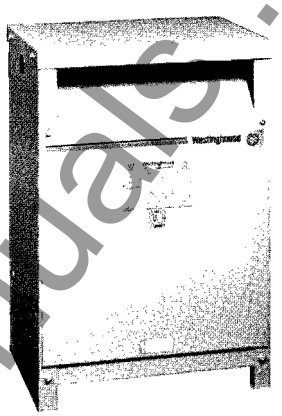
General Purpose, Three Phase
Types EPT and DT-3



TYPE EPT
3-15 KVA



TYPE EPT
30 KVA

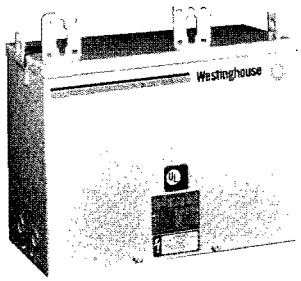


TYPE DT-3
30-1500 KVA

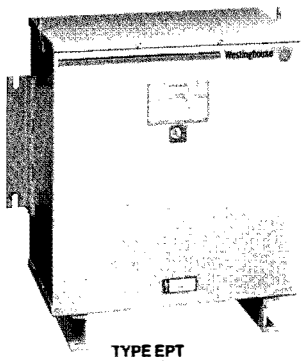
KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KIT STYLE NO.
480Δ VOLTS TO 240Δ VOLTS WITH 120 VOLTS LIGHTING TAP ON "B" PHASE											
30	**V48M22T30M**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	450	862	④	783C426G01
45	**V48M22T45M**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	④	783C426G01
75	**V48M22T75M**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	④	783C426G02
112.5	**V48M22T12M**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	⑤	783C426G02
150	**V48M22T49M**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	●	783C426G03
225	**V48M22T22M**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	856	●	783C426G04
300	**V48M22T33M**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	857	●	783C426G04
480Δ VOLTS TO 480Y/277 VOLTS											
9	**Y48D47T09M**	+2-2.5%, −2-2.5%	EPT	115	15 7/8	16	9 1/16	160	107	④	Not Required●
15	**Y48D47T15M**	+2-2.5%, −2-2.5%	EPT	115	17 3/8	20	8 11/16	210	95	④	
30	**Y48M47T30M**	+2-2.5%, −4-2.5%	EPT	115	26 5/8	25 1/8	12 3/4	422	243	④	
30	**V48M47T30M**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	857	280B	783C426G01
45	**V48M47T45F**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	280B	783C426G01
75	**V48M47T75E**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	280B	783C426G02
112.5	**V48M47T12D**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	280B	783C426G02
150	**V48M47T49E**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	280B	783C426G03
225	**V48M47T22E**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	856	280B	783C426G04
300	**V48M47T33D**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	857	280B	783C426G04
500	**V48M47T55B**	+2-2.5%, −4-2.5%	DT-3	150	75	44	36	2700	④	④	783C426G05
600Δ VOLTS TO 208Y/120 VOLTS											
9	**Y60G28T09M**	−2-5%	EPT	115	15 7/8	16	9 1/16	160	103	70B	Not Required③
15	**Y60G28T15M**	−2-5%	EPT	115	17 3/8	20	8 11/16	210	95	70B	
30	**Y60M28T30M**	+2-2.5%, −4-2.5%	EPT	115	26 5/8	25 1/8	12 3/4	422	243	280A	
30	**V60M28T30M**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	280A	783C426G01
45	**V60M28T45G**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	280A	783C426G01
75	**V60M28T75F**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	280A	783C426G02
112.5	**V60M28T12E**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	280A	783C426G02
150	**V60M28T49E**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	280A	783C426G03
225	**V60M28T22F**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	856	280A	783C426G04
300	**V60M28T33E**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	857	280A	783C426G04
600Δ VOLTS TO 240Δ VOLTS											
30	**Y60M24T30M**	+2-2.5%, −4-2.5%	EPT	115	26 5/8	25 1/8	12 3/4	422	243	85B	Not Required③
45	**V60M24T45G**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	281A	783C426G02
75	**V60M24T75F**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	281A	783C426G02
112.5	**V60M24T12D**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	281A	783C426G02
150	**V60M24T49E**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	281A	783C426G03
225	**V60M24T22F**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	856	281A	783C426G04
300	**V60M24T33E**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	857	281A	783C426G04

① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ NEMA 3R outdoor enclosure is standard for Westinghouse Type EPT.
④ Refer to SPTD.
⑤ Lighting top capacity limited to 5% of rated kVA.
NOTE: Refer to SPTD for availability of special designs

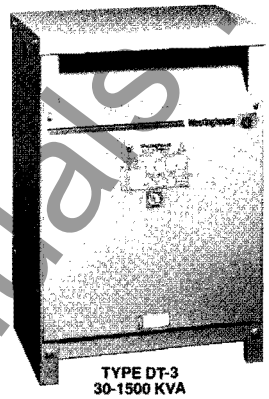
General Purpose, Three Phase
Types EPT and DT-3



TYPE EPT
3-15 KVA



TYPE EPT
30 KVA

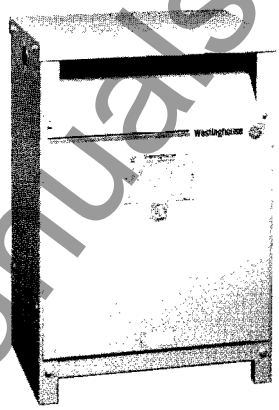


TYPE DT-3
30-1500 KVA

KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KIT STYLE NO.
2400Δ VOLTS TO 208Y 120 VOLTS											
3	**Y42D28T03M**	+2-2.5%, −2-2.5%	EPT	115	13 1/8	19 9/16	6 1/4	115	102	65B	Not Required③
6	**Y42D28T06M**	+2-2.5%, −2-2.5%	EPT	115	14 5/16	21 7/8	7 3/16	160	97	65B	
9	**Y42D28T09M**	+2-2.5%, −2-2.5%	EPT	115	15 15/16	25 3/4	8 3/8	210	96	65B	
15	**Y42D28T15M**	+2-2.5%, −2-2.5%	EPT	115	20 3/4	21 11/16	11 5/16	340	195	65B	
30	**Y42D28T30M**	+2-2.5%, −2-2.5%	EPT	115	27 11/16	12	20 11/16	475	196	65B	
45	**V42D28T45E**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	500	875	266A	⑤
75	**V42D28T75F**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	650	876	266A	
112.5	**V42D28T12F**	+2-2.5%, −2-2.5%	DT-3	150	45	31 5/8	22 1/8	850	877	266A	
150	**V42D28T49H**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	950	878	266A	
225	**V42D28T22G**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	879	266A	
300	**V42D28T33G**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	880	266A	
500	**V42D28T55F**	+2-2.5%, −2-2.5%	DT-3	150	76	46	36	2900	④	④	
750	**V42D28T77F**	+2-2.5%, −2-2.5%	DT-3	150	80	50	36	3650	④	④	
1000	**V42D28T11F**	+2-2.5%, −2-2.5%	DT-3	150	90	55	36	4800	④	④	
2400Δ VOLTS TO 480Y 277 VOLTS											
45	**V42D47T45D**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	500	875	266C	⑤
75	**V42D47T75D**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	650	876	266C	
112.5	**V42D47T12D**	+2-2.5%, −2-2.5%	DT-3	150	45	31 5/8	22 1/8	850	877	266C	
150	**V42D47T49E**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	950	878	266C	
225	**V42D47T22F**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	879	266C	
300	**V42D47T33E**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	880	266C	
4160Δ VOLTS TO 208Y 120 VOLTS											
3	**Y46D28T03M**	+2-2.5%, −2-2.5%	EPT	115	13 1/8	19 9/16	6 1/4	115	102	65C	Not Required③
6	**Y46D28T06M**	+2-2.5%, −2-2.5%	EPT	115	14 5/16	21 7/8	7 3/16	160	97	65C	
9	**Y46D28T09M**	+2-2.5%, −2-2.5%	EPT	115	15 15/16	25 3/4	8 3/8	210	96	65C	
15	**Y46D28T15M**	+2-2.5%, −2-2.5%	EPT	115	20 3/4	21 11/16	11 5/16	340	195	65C	
30	**Y46D28T30M**	+2-2.5%, −2-2.5%	EPT	115	27 11/16	12	20 11/16	475	196	65C	
45	**V46D28T45E**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	500	875	266B	⑤
75	**V46D28T75E**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	650	876	266B	
112.5	**V46D28T12E**	+2-2.5%, −2-2.5%	DT-3	150	45	31 5/8	22 1/8	850	877	266B	
150	**V46D28T49G**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	950	878	266B	
225	**V46D28T22F**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	879	266B	
300	**V46D28T33F**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	880	266B	
500	**V46D28T55F**	+2-2.5%, −2-2.5%	DT-3	150	76	46	36	2900	④	④	
750	**V46D28T77F**	+2-2.5%, −2-2.5%	DT-3	150	80	50	36	3650	④	④	
1000	**V46D28T11F**	+2-2.5%, −2-2.5%	DT-3	150	90	55	36	4800	④	④	
1500	**V46D28T14F**	+2-2.5%, −2-2.5%	DT-3	150	90	57	43	5900	④	④	
4160Δ VOLTS TO 240Y VOLTS											
45	**V46D24T45D**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	500	875	254C	⑤
75	**V46D24T75D**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	650	876	254C	
112.5	**V46D24T12D**	+2-2.5%, −2-2.5%	DT-3	150	45	31 5/8	22 1/8	850	877	254C	
150	**V46D24T49F**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	950	878	254C	
225	**V46D24T22E**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	879	254C	
300	**V46D24T33E**	+2-2.5%, −2-2.5%	DT-3	150	50	31 1/4	26 1/4	1500	880	254C	
4160Δ VOLTS TO 480Y 277 VOLTS											
45	**V46D47T45D**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	500	875	266D	⑤
75	**V46D47T75D**	+2-2.5%, −2-2.5%	DT-3	150	38 3/8	28	19 1/4	650	876	266D	
112.5	**V46D47T12D**	+2-2.5%, −2-2.5%	DT-3	150	45	31 5/8	22 1/8	850	877	266D	
150	**V46D47T49F**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	950	878	266D	
225	**V46D47T22E**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1250	879	266D	
300	**V46D47T33E**	+2-2.5%, −2-2.5%	DT-3	150	50	34 1/4	26 1/4	1500	880	266D	
500	**V46D47T55F**	+2-2.5%, −2-2.5%	DT-3	150	76	46	36	2900	④	④	
750	**V46D47T77F**	+2-2.5%, −2-2.5%	DT-3	150	80	50	36	3650	④	④	
1000	**V46D47T11F**	+2-2.5%, −2-2.5%	DT-3	150	90	55	36	4800	④	④	
1500	**V46D47T14F**	+2-2.5%, −2-2.5%	DT-3	150	90	57	43	5900	④	④	

① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ NEMA 3R outdoor enclosure is standard for Westinghouse Type EPT.
● Refer to SPTD.
⑤ Units rated above 600V are not recommended for outdoor applications.
NOTE: Refer to SPTD for availability of special designs.

Energy Efficient
Three Phase

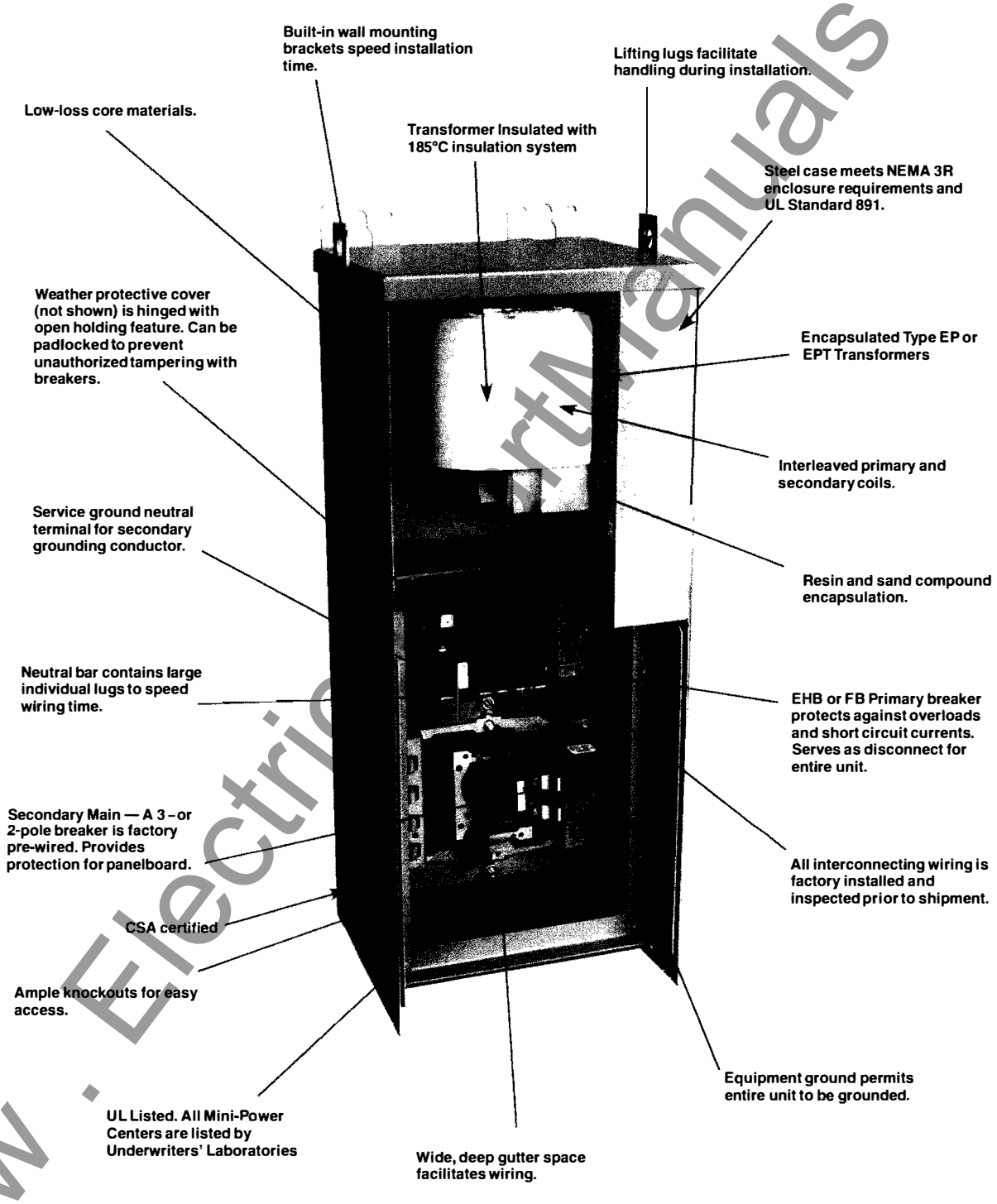


These transformers are specifically designed for conserving electrical power and longer insulation life by reducing the normal conductor losses. When operated at 80 to 100% rated KVA, Westinghouse Energy Efficient transformers can reduce the operating expenses up to 30% compared to those of the General Purpose transformers. In addition, these transformers can be operated at higher than nameplate rated KVA (losses are increased) for emergency overload capability without seriously reducing the life expectancy of the transformer. The 115°C. rise units can carry a continuous 15% overload and the 80°C. rise units can carry a 30% overload without exceeding the 220°C insulation capabilities.

KVA	STYLE NO.	FULL CAPACITY TAPS	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KIT STYLE NO.
30	**V48M28B30P**	+2-2.5%, −4-2.5%	80	29¼	24	15¾	460	851	275B	7073C04G01
45	**V48M28B45P**	+2-2.5%, −4-2.5%	80	38⅜	28	19¼	600	853	275B	7073C04G02
75	**V48M28B75P**	+2-2.5%, −4-2.5%	80	38⅜	28	19¼	950	855	275B	7073C04G02
112.5	**V48M28B12P**	+2-2.5%, −4-2.5%	80	45	32½	22½	950	855	275B	7073C04G03
150	**V48M28B49N**	+2-2.5%, −4-2.5%	80	50	35	26½	1400	856	275B	783C426G04
225	**V48M28B22N**	+2-2.5%, −4-2.5%	80	50	35	26½	1600	857	275B	783C426G04
300	**V48M28B33R**	+2-2.5%, −4-2.5%	80	75	44	36	2100	③	③	3720C94G05
500	**V48M28B55P**	+2-2.5%, −4-2.5%	80	90	53	36	4800	③	③	3720C94G07
30	**V48M28F30P**	+2-2.5%, −4-2.5%	115	29¼	24	15¾	460	862	275B	7073C04G01
45	**V48M28F45P**	+2-2.5%, −4-2.5%	115	29¼	24	15¾	460	851	275B	7073C04G01
75	**V48M28F75P**	+2-2.5%, −4-2.5%	115	38⅜	28	19¼	600	853	275B	7073C04G02
112.5	**V48M28F12P**	+2-2.5%, −4-2.5%	115	38⅜	28	19¼	750	854	275B	7073C04G02
150	**V48M28F49N**	+2-2.5%, −4-2.5%	115	45	32½	22½	950	855	275B	783C426G03
225	**V48M28F22N**	+2-2.5%, −4-2.5%	115	50	35	26½	1400	856	275B	783C426G04
300	**V48M28F33N**	+2-2.5%, −4-2.5%	115	50	35	26½	1600	③	③	783C426G04
500	**V48M28F55P**	+2-2.5%, −4-2.5%	115	75	44	36	3000	③	③	3720C94G06
30	**V48M24B30P**	+2-2.5%, −4-2.5%	80	29¼	24	15¾	460	851	274B	7073C04G01
45	**V48M24B45N**	+2-2.5%, −4-2.5%	80	38⅜	28	19¼	600	853	274B	7073C04G02
75	**V48M24B75N**	+2-2.5%, −4-2.5%	80	38⅜	28	19¼	750	854	274B	7073C04G02
112.5	**V48M24B12N**	+2-2.5%, −4-2.5%	80	45	32½	22½	950	855	274B	7073C04G03
150	**V48M24B49N**	+2-2.5%, −4-2.5%	80	50	35	26½	1400	856	274B	783C426G04
225	**V48M24B22N**	+2-2.5%, −4-2.5%	80	50	35	26½	1600	857	274B	783C426G04
300	**V48M24B33N**	+2-2.5%, −4-2.5%	80	75	44	36	2100	③	③	3720C94G05
500	**V48M24B55N**	+2-2.5%, −4-2.5%	80	90	53	36	4800	③	③	3720C94G05
30	**V48M24F30N**	+2-2.5%, −4-2.5%	115	29¼	24	15¾	460	862	274B	7073C04G01
45	**V48M24F45N**	+2-2.5%, −4-2.5%	115	29¼	24	15¾	460	851	274B	7073C04G01
75	**V48M24F75N**	+2-2.5%, −4-2.5%	115	38⅜	28	19¼	600	853	274B	7073C04G02
112.5	**V48M24F12N**	+2-2.5%, −4-2.5%	115	38⅜	28	19¼	750	854	274B	7073C04G03
150	**V48M24F49N**	+2-2.5%, −4-2.5%	115	45	32½	22½	950	855	274B	783C426G03
225	**V48M24F22N**	+2-2.5%, −4-2.5%	115	50	35	26½	1400	856	274B	783C426G04
300	**V48M24F33N**	+2-2.5%, −4-2.5%	115	50	35	26½	1600	③	③	783C426G04
500	**V48M24F55N**	+2-2.5%, −4-2.5%	115	75	44	36	3000	③	③	3720C94G05

① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ Refer to SPTD.
NOTE: Refer to SPTD for availability of special designs.

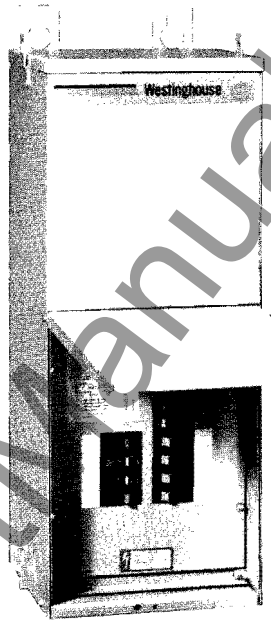
Mini-Power Center Features
Single and Three Phase



SINGLE-PHASE MINI-POWER CENTER

Mini-Power Centers
Single Phase and Three Phase

The Westinghouse Mini-Power Center combines an EP or EPT dry-type transformer with a primary breaker and secondary panelboard into one product. This saves considerable space and installation time when compared with the requirements for the three separate components. The Mini-Power Center is UL Listed and can be mounted in indoor *and* outdoor locations.



SINGLE PHASE

KVA	STYLE NO.	FULL CAPACITY TAPS	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	PRIMARY③ MAIN CIRCUIT BREAKER	SECONDARY③ MAIN CIRCUIT BREAKER	FEEDER BREAKERS①④⑤ MAXIMUM NUMBER 1-POLE	2-POLE	MAXIMUM AMPERAGE
5	**P48G11S05M**	– 2-5%	25 7/16	9 5/8	8 7/8	95	224	98	EHB2020	BR225	4	2	20
10	**P48G11S10M**	– 2-5%	34	12 3/8	11 7/8	167	225	99	EHB2040	BR250	8	4	40
15	**P48G11S15M**	– 2-5%	34	12 3/8	11 7/8	202	226	100	EHB2060	BR270	12	6	60
25	**P48G11S25M**	– 2-5%	41 1/2	15 7/8	14 5/8	358	227	101	EHB2100	BR2125	20	10	100
5	**P60G11S05M**	– 2-5%	25 7/16	9 5/8	8 7/8	95	224	98	FB2020	BR225	4	2	20
10	**P60G11S10M**	– 2-5%	34	12 3/8	11 7/8	167	225	99	FB2040	BB250	8	4	40
15	**P60G11S15M**	– 2-5%	34	12 3/8	11 7/8	202	226	100	FB2060	BR270	12	6	60
25	**P60G11S25M**	– 2-5%	41 1/2	15 7/8	14 5/8	358	227	101	FB2100	BR2125	20	10	100

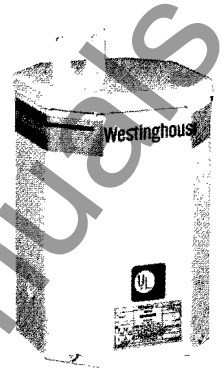
KVA	STYLE NO.	FULL CAPACITY TAPS	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	PRIMARY③ MAIN CIRCUIT BREAKER	SECONDARY③ MAIN CIRCUIT BREAKER	FEEDER BREAKERS①④⑤ MAXIMUM NUMBER 1-POLE	3-POLE	MAXIMUM AMPERAGE
15	**P48G28T15M**	– 2-5%	31 1/16	25 3/4	9 3/8	310	229	102	EHB3040	BR350	12	4	40
22.5	**P48G28T21M**	– 2-5%	35 13/16	29 13/16	13 5/8	555	230	103	EHB3070	QP3070	18	6	60
30	**P48G28T30M**	– 2-5%	36 13/16	29 13/16	13 5/8	625	233	104	EHB3090	EHB3100	24	8	80
15	**P60G28T15M**	– 2-5%	31 1/16	25 3/4	9 3/8	310	229	102	FB3040	BR350	12	4	40
22.5	**P60G28T21M**	– 2-5%	35 13/16	29 13/16	13 5/8	555	230	103	FB3070	QP3070	18	6	60
30	**P60G28T30M**	– 2-5%	36 13/16	29 13/16	13 5/8	625	233	104	FB3090	FB3100	24	8	80

① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagrams, refer to TCS47-730 by diagram number.
③ Main breakers fixed only. No substitutes.
④ Combinations can be selected.
⑤ Feeder breakers not included.

Shielded Isolation, Single Phase
Type EP

Westinghouse electrostatically shielded isolation transformers are used to protect sensitive electrical equipment from undesirable high frequency signals commonly generated by lightning, switching surges, motors, and SCR's feeding noise back into the line. An electrostatic shield, consisting of a single turn of foil placed between the primary and secondary winding, is used to provide from 30 to 70 DB attenuation of wide band line-to-ground (common mode) noise.

Typical uses of shielded isolation transformers include:
- Suppression of transients and noise which travel from its source to the sensitive load equipment.
- Suppression of noise and transients at the point where the noise or transients are originating, thus preventing them from backfeeding from the source to the feeders.
- Transforming one voltage level to another.
- Isolates one circuit from another.



TYPE EP

KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KIT STYLE NO.
120 VOLTS TO 120 VOLTS											
3	S12N12E03M	None	EP	115	14 1/4	7 1/2	7 3/4	48	176	77	Not Required③
5	S12N12E05M	None	EP	115	15 3/4	9 3/8	9	75	177	77	
7.5	S12N12E07M	None	EP	115	16	12	10 5/8	102	178	77	
10	S12N12E10M	None	EP	115	19	12	10 5/8	128	179	77	
15	S12N12E15M	None	EP	115	19	12	10 5/8	158	180	77	
25	S12N12E25M	None	EP	115	21 5/16	15 1/4	14 1/8	247	182	77	
208 VOLTS TO 120 240 VOLTS											
3	S29N11E03M	None	EP	115	14 1/4	7 1/2	7 3/4	48	176	78	Not Required③
5	S29N11E05M	None	EP	115	15 3/4	9 3/8	9	75	177	78	
7.5	S29N11E07M	None	EP	115	16	12	10 5/8	102	178	78	
10	S29N11E10M	None	EP	115	19	12	10 5/8	128	179	78	
15	S29N11E15M	None	EP	115	19	12	10 5/8	158	180	78	
25	S29N11E25M	None	EP	115	21 5/16	15 1/4	14 1/8	247	182	78	
208 VOLTS TO 208 VOLTS											
3	S29N29E03M	None	EP	115	14 1/4	7 1/2	7 3/4	48	176	77	Not Required③
5	S29N29E05M	None	EP	115	15 3/4	9 3/8	9	75	177	77	
7.5	S29N29E07M	None	EP	115	16	12	10 5/8	102	178	77	
10	S29N29E10M	None	EP	115	19	12	10 5/8	128	179	77	
15	S29N29E15M	None	EP	115	19	12	10 5/8	158	180	77	
25	S29N29E25M	None	EP	115	21 5/16	15 1/4	14 1/4	247	182	77	
240 VOLTS TO 240 VOLTS											
3	S24N24E03M	None	EP	115	14 1/4	7 1/2	7 3/8	48	176	77	Not Required③
5	S24N24E05M	None	EP	115	15 3/4	9 3/8	9	75	177	77	
7.5	S24N24E07M	None	EP	115	16	12	10 5/8	102	178	77	
10	S24N24E10M	None	EP	115	19	12	10 5/8	128	179	77	
15	S24N24E15M	None	EP	115	19	12	10 5/8	158	180	77	
25	S24N24E25M	None	EP	115	21 5/16	15 1/4	14 1/8	247	182	77	
277 VOLTS TO 120 240 VOLTS											
3	S27N11E03M	None	EP	115	14 1/4	7 1/2	7 3/8	48	176	77	Not Required③
5	S27N11E05M	None	EP	115	15 3/4	9 3/8	9	75	177	77	
7.5	S27N11E07M	None	EP	115	16	12	10 5/8	102	178	77	
10	S27N11E10M	None	EP	115	19	12	10 5/8	128	179	77	
15	S27N11E15M	None	EP	115	19	12	10 5/8	158	180	77	
25	S27N11E25M	None	EP	115	21 5/16	15 1/4	14 1/8	247	182	77	

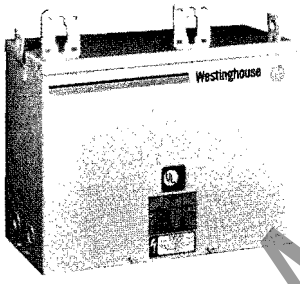
① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ NEMA 3R outdoor enclosure is standard for Westinghouse Type EP.
NOTE: Refer to SPTD for availability of special designs.

Shielded Isolation, Three Phase
Types EPT and DT-3

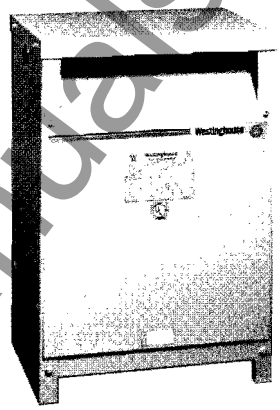
Westinghouse electrostatically shielded isolation transformers are used to protect sensitive electrical equipment from undesirable high frequency signals commonly generated by lightning, switching surges, motors, and SCR's feeding noise back into the line. An electrostatic shield, consisting of a single turn of foil placed between the primary and secondary winding, is used to provide from 30 to 70 DB attenuation of wide band line-to-ground (common mode) noise.

Typical uses of shielded isolation transformers include:

- Suppression of transients and noise which travel from its source to the sensitive load equipment.
- Suppression of noise and transients at the point where the noise or transients are originating, thus preventing them from backfeeding from the source to the feeders.
- Transforming one voltage level to another.
- Isolates one circuit from another.



TYPE EPT



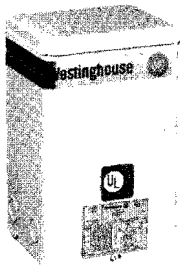
TYPE DT-3

KVA	STYLE NO.	FULL CAPACITY TAPS	TYPE	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING② DIAGRAM	WEATHERSHIELD KIT STYLE NO.
208 VOLTS TO 2											
15	**Y29D28E15A**	+2-2.5%, −2-2.5%	EPT	115	17 3/8	20	8 11/16	225	95	③	Not Required④
30	**V29M28E30A**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	450	862	③	783C0426G01
45	**V29M28E45A**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	③	783C0426G01
75	**V29M28E75A**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	③	783C0426G02
112.5	**V29R28E12A**	+1-5%, −2-5%	DT-3	150	38 3/8	28	19 1/4	850	854	③	783C0426G02
150	**V29R28E49A**	+1-5%, −2-5%	DT-3	150	45	31 5/8	22 1/8	950	855	●	783C0426G03
225	**V29R28E22A**	+1-5%, −2-5%	DT-3	150	50	34 1/8	26 1/8	1250	856	●	783C0426G04
300	**V29R28E33A**	+1-5%, −2-5%	DT-3	150	50	34 1/8	26 2/8	1500	857	●	783C0426G04
480 VOLTS TO 2											
9	**Y48D28E09M**	+2-2.5%, −2-2.5%	EPT	115	15 7/8	16	9 1/16	160	103	③	Not Required④
15	**Y48D28E15A**	+2-2.5%, −2-2.5%	EPT	115	17 3/8	20	8 11/16	225	95	③	
30	**V48M28E30A**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	450	862	③	783C426G01
45	**V48M28E45A**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	③	783C426G01
75	**V48M28E75A**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	③	783C426G02
112.5	**V48M28E12A**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	③	783C426G02
150	**V48M28E49A**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	③	783C426G03
225	**V48M28E22A**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/8	26 1/8	1250	856	③	783C426G04
300	**V48M28E33A**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/8	26 1/8	1500	857	③	783C426G04
500	**V48M28E55F**	+2-2.5%, −4-2.5%	DT-3	150	75	44	36	2085	858	③	3720C94G05
480 VOLTS TO 6											
9	**Y48D47E09M**	+2-2.5%, −2-2.5%	EPT	115	15 7/8	16	9 1/16	160	103	③	Not Required④
15	**Y48D47E15A**	+2-2.5%, −2-2.5%	EPT	115	17 3/8	20	8 11/16	225	95	③	
30	**V48M47E30A**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	450	862	③	783C426G01
45	**V48M47E45A**	+2-2.5%, −4-2.5%	DT-3	150	29 1/4	24	15 3/4	500	851	③	783C426G01
75	**V48M47E75A**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	650	853	③	783C426G02
112.5	**V48M47E12A**	+2-2.5%, −4-2.5%	DT-3	150	38 3/8	28	19 1/4	850	854	③	783C426G02
150	**V48M47E49A**	+2-2.5%, −4-2.5%	DT-3	150	45	31 5/8	22 1/8	950	855	③	783C426G03
225	**V48M47E22A**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/8	26 1/8	1250	856	③	783C426G04
300	**V48M47E33A**	+2-2.5%, −4-2.5%	DT-3	150	50	34 1/8	26 1/8	1500	857	③	783C426G04
500	**V48M47E55F**	+2-2.5%, −4-2.5%	DT-3	150	75	44	36	2085	858	③	3720C94G05

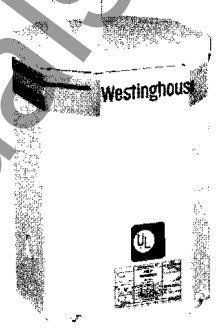
① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagram, refer to TCS47-730 by diagram number.
③ Refer to SPTD.
④ NEMA 3R outdoor is standard for Westinghouse Type EPT.
NOTE: Refer to SPTD for availability of special designs.

Autotransformers, Single Phase
Buck and Boost Applications

These Type EP two-winding transformers are used to obtain a wide variety of autotransformer connections. Used for buck and boost general light and power applications, these transformers are suitable for use in a three phase autotransformer bank in either direction to supply 3-wire loads. They are also suitable for use in a three phase autotransformer bank in either direction to supply 4-wire loads, provided source of power is also a 4-wire circuit which provides a neutral return for unbalanced current. They are not suitable for use in a three phase autotransformer bank to supply a 4-wire unbalanced load when the source is a 3-wire circuit. A bank of two winding transformers should be used for this application.



TYPE EP BUCK AND BOOST 2KVA AND BELOW



TYPE EP BUCK AND BOOST ABOVE 2KVA

Determine the line (source) voltage — the voltage presently available which you want to buck (decrease) or boost (increase).

Determine the load voltage — the voltage at which your equipment is designed to operate.

Determine the load kVA:

If the load is rated in amperes instead of kVA, use the below appropriate formula for conversion to kVA.

$$\text{KVA } 1\phi = \frac{\text{Volts x Amperes}}{1000}$$

$$\text{KVA } 3\phi = \frac{\text{Volts x Amperes x 1.732}}{1000}$$

Consult the Buck or Boost tables (on page 22 or 23) for matching input and output voltages in the appropriate single or three phase columns.

Under the appropriate column, read down and choose a kVA slightly larger than the load kVA.

The corresponding style number for the selected kVA is located in the far right hand column in the tables on these pages. (Three phase requires three units.) The Buck-Boost Transformer must be connected as specified by the corresponding wiring diagram.

Available line voltage is 208 Volts, three phase, and the load is three phase, 60 Hertz rated 60 kVA at 230 Volts.

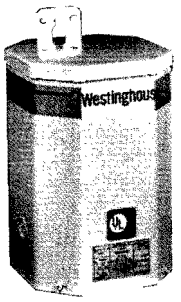
Quote three style number S10N04A02M to be connected per diagram 16 as indicated on page 23.

KVA	STYLE NO.	DEG.C TEMP. RISE	DIMENSIONS, (IN.)① HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WIRING DIAGRAM
.25	**S10N04A26M**	80	7 1/16	4 5/16	4 1/8	12	202	②
.50	**S10N04A51M**	80	7 1/16	4 7/8	4 5/8	13	71	②
.75	**S10N04A76M**	80	8 3/8	6	5 1/2	20	72	②
1	**S10N04A01M**	80	9 3/8	6	5 1/2	26	73B	②
1.5	**S10N04A16M**	80	10 1/2	6 3/8	6 1/8	36	74B	②
2	**S10N04A02M**	80	11 1/2	6 3/8	6 1/8	40	75B	②
3	**S10N04A03M**	115	14 1/4	7 1/2	7 11/16	48	176	②
5	**S10N04A05M**③	115	15 3/4	9 3/8	9	75	177	②
7.5	**S10N04A07M**③	115	16	12	10 5/8	102	178	②
.25	**S10N06A26M**	80	7 1/16	4 5/16	4 1/8	12	202	②
.50	**S10N06A51M**	80	7 1/16	4 7/8	4 5/8	13	71	②
.75	**S10N06A76M**	80	8 3/8	6	5 1/2	20	72	②
1	**S10N06A01M**	80	8 3/8	6	5 1/2	26	73	②
1.5	**S10N06A16M**	80	9 1/2	6 3/8	6 1/8	36	74	②
2	**S10N06A02M**	80	11 1/2	6 3/8	6 1/8	40	75B	②
3	**S10N06A03M**	115	14 1/4	7 1/2	7 11/16	48	176	②
5	**S10N06A05M**③	115	15 3/4	9 3/8	9	75	177	②
7.5	**S10N06A07M**③	115	16	12	10 5/8	102	178	②

① Not for construction. Refer to TCS47-720 by frame number for certification.
② For wiring diagrams, refer to pages 22 & 23.
③ Non-UL listed.
NOTE: Buck and boost transformers are not suitable for use in a three-phase autotransformer bank to supply a four-wire unbalanced load when the source is a three-wire circuit. When used in a three-phase connection, the addition of a wiring trough is recommended.

Autotransformers, Single Phase
Buck Application

TYPE EP BUCK AND BOOST 2 KVA AND BELOW



TYPE EP BUCK AND BOOST ABOVE 2 KVA

VOLTAGES	SINGLE PHASE				THREE PHASE②				STYLE NO.
INPUT	240	240	120	120	416	416	208	208	
OUTPUT●	228	216	108	96	394	374	187	166	
Load Kva When Connected as Autotransformer									
	4.7	2.2	2.2	1.0	14.2	6.7	6.7	3.0	**S10N04A26M**
	9.5	4.5	4.5	2.0	28.5	13.5	13.5	6.0	**S10N04A51M**
	14.2	6.7	6.7	3.0	42.7	20.2	20.2	9.0	**S10N04A76M**
	19.0	9.0	9.0	4.0	57.0	27.0	27.0	12.0	**S10N04A01M**
	28.5	13.5	13.5	6.0	84.5	40.5	40.5	18.0	**S10N04A16M**
	38.0	18.0	18.0	8.0	114.0	54.0	54.0	24.0	**S10N04A02M**
	57.0	27.0	27.0	12.0	171.0	81.0	81.0	36.0	**S10N04A03M④**
	95.0	45.0	45.0	20.0	285.0	135.0	135.0	60.0	**S10N04A05M④⑤**
	142.5	67.5	67.5	30.0	427.6	202.5	202.5	90.0	**S10N04A07M④⑤**

VOLTAGES	SINGLE PHASE				THREE PHASE②				STYLE NO.
INPUT	240	240	120	120	416	416	208	208	
OUTPUT①	224	208	104	88	388	360	180	152	
Load Kva When Connected as Autotransformer									
	3.5	1.6	1.6	.7	10.5	4.8	4.8	2.1	**S10N06A26M**
	7.0	3.2	3.2	1.3	21.0	9.7	9.7	4.1	**S10N06A51M**
	10.5	4.8	4.8	2.0	31.5	14.6	14.6	6.2	**S10N06A76M**
	14.0	6.5	6.5	2.7	42.0	19.5	19.5	8.2	**S10N06A01M**
	21.0	9.7	9.7	4.1	63.0	29.2	29.2	12.3	**S10N06A16M**
	28.0	13.0	13.0	5.5	84.0	39.0	39.0	16.5	**S10N06A02M**
	42.0	19.5	19.5	8.2	126.0	58.5	58.5	24.7	**S10N06A03M④**
	70.0	32.5	32.5	13.7	210.0	97.2	97.2	41.1	**S10N06A05M④⑤**
	105.0	48.7	48.7	20.6	315.0	146.2	146.2	61.8	**S10N06A07M④⑤**
	Dia. 1	Dia. 2	Dia. 3	Dia. 4	Dia. 5	Dia. 6	Dia. 7	Dia. 8	

① Output voltage for lower input voltage can be found by:

$$\frac{\text{rated output voltage}}{\text{rated input voltage}} \times \text{actual input voltage} = \text{new output voltage}$$

② For three phase, order three units.

③ Output kva available at reduced input voltage can be found by:

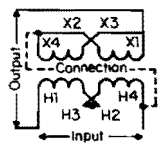
$$\frac{\text{actual input voltage}}{\text{rated input voltage}} \times \text{output kva} = \text{new kva rating}$$

● When used in a three phase connection, the addition of a wiring trough is recommended.

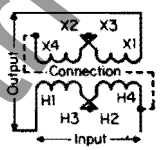
⑤ Non UL Listed

SINGLE PHASE

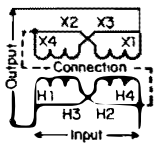
DIA. 1



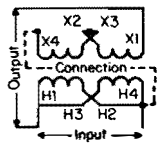
DIA. 2



DIA. 3

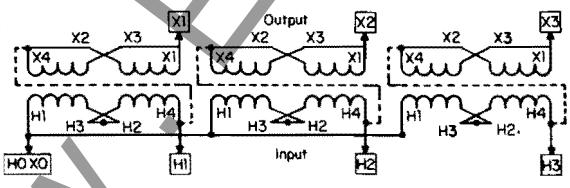


DIA. 4

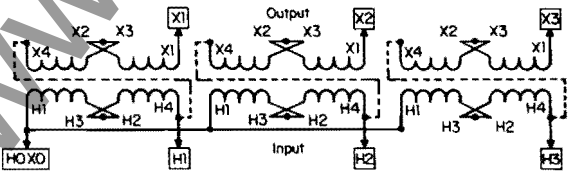


THREE PHASE

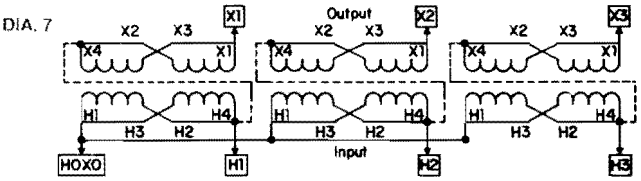
DIA. 5



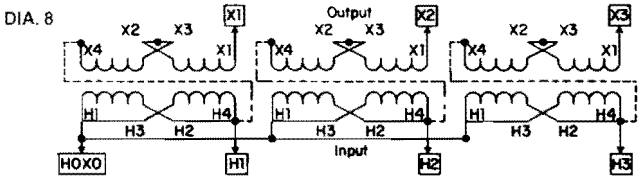
DIA. 6



DIA. 7



DIA. 8

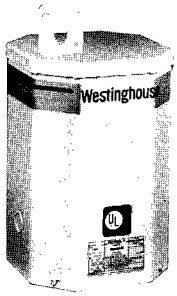


☐ Indicates line connection junctures for customer's source load leads.

Autotransformers, Single Phase
Boost Applications

TYPE EP BUCK AND BOOST 2 KVA AND BELOW

VOLTAGES	SINGLE PHASE				THREE PHASE②				STYLE NO.
INPUT	240	240	120	120	416	416	208	208	
OUTPUT●	264	252	144	132	457	436	250	229	
Load Kva When Connected as Autotransformer									
	2.7	5.2	1.5	2.7	8.2	15.7	4.5	8.2	**S10N04A26M**
	5.5	10.5	3.0	5.5	16.5	31.5	9.0	16.5	**S10N04A51M**
	8.2	15.7	4.5	8.2	24.7	47.2	13.5	24.7	**S10N04A76M**
	11.0	21.0	6.0	11.0	33.0	63.0	18.0	33.0	**S10N04A01M**
	16.5	31.5	9.0	16.5	49.5	94.5	27.0	49.5	**S10N04A16M**
	22.0	42.0	12.0	22.0	66.0	126.0	36.0	66.0	**S10N04A02M**
	33.0	63.0	18.0	33.0	99.0	189.0	54.0	99.0	**S10N04A03M④**
	55.0	106.0	30.0	55.0	165.0	318.0	90.0	165.0	**S10N04A05M④⑤**
	82.5	157.5	45.0	82.5	247.5	472.5	135.0	247.5	**S10N04A07M④⑤**



TYPE EP BUCK AND BOOST ABOVE 2 KVA

VOLTAGES	SINGLE PHASE				THREE PHASE②				STYLE NO.
INPUT	240	240	120	120	416	416	208	208	
OUTPUT●	272	256	152	136	470	444	264	236	
Load Kva When Connected as Autotransformer									
	2.1	4.0	1.1	2.1	6.3	12.0	3.5	6.3	**S10N06A26M**
	4.2	8.0	2.3	4.2	12.7	24.0	7.1	12.7	**S10N06A51M**
	6.4	12.0	3.5	6.4	19.2	36.0	10.7	19.2	**S10N06A76M**
	8.5	16.0	4.7	8.5	25.5	48.0	14.2	25.5	**S10N06A01M**
	12.7	24.0	7.1	12.7	38.2	72.0	21.4	38.2	**S10N06A16M**
	17.0	32.0	9.5	17.0	51.0	96.0	28.5	51.0	**S10N06A02M**
	25.5	48.0	14.2	25.5	76.5	144.0	42.7	76.5	**S10N06A03M④**
	42.4	80.0	23.7	42.4	127.2	240.0	71.1	127.2	**S10N06A05M④⑤**
	63.7	120.0	35.6	63.7	191.2	360.0	106.8	191.2	**S10N06A07M④⑤**
	Dia. 9	Dia. 10	Dia. 11	Dia. 12	Dia. 13	Dia. 14	Dia. 15	Dia. 16	

● Output voltage for lower input voltage can be found by:

$$\frac{\text{rated output voltage}}{\text{rated input voltage}} \times \text{actual input voltage} = \text{new output voltage}$$

$$\frac{\text{actual input voltage}}{\text{rated input voltage}} \times \text{output kva} = \text{new kva rating}$$

② For three phase, order three units.

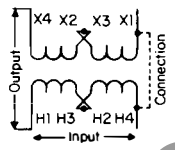
③ Output kva available at reduced input voltage can be found by:

④ When used in a three phase connection, the addition of a wiring trough is recommended.

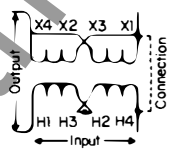
⑤ Non UL Listed

SINGLE PHASE

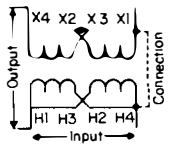
DIA. 9



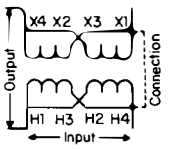
DIA. 10



DIA. 11

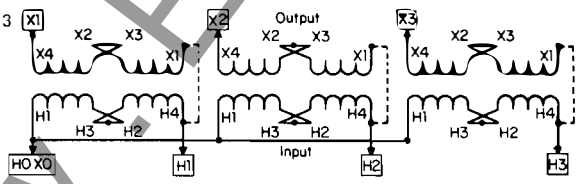


DIA. 12

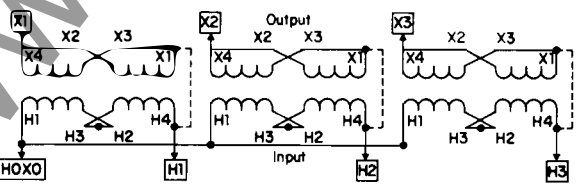


THREE PHASE

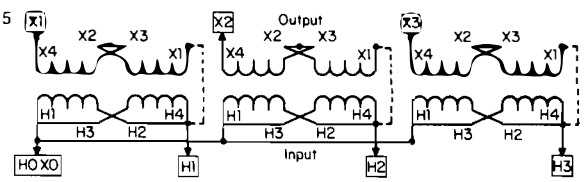
DIA. 13



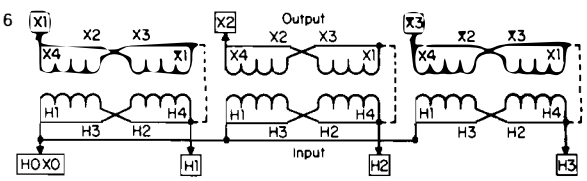
DIA. 14



DIA. 15

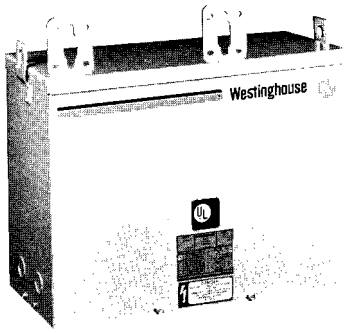


DIA. 16

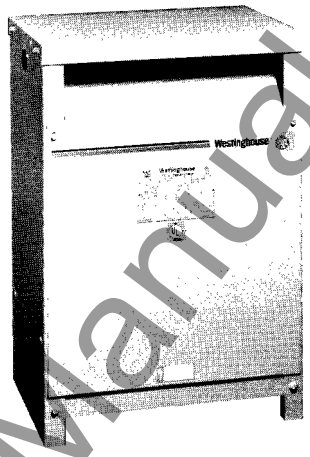


☐ Indicates line connection junctures for customer's source load leads.

Motor Drive Isolation
Three Phase, Type MD



TYPE MD ENCAPSULATED



TYPE MD VENTILATED

COMPLETION OF STYLE NUMBER

To complete the style number, select the desired voltage from chart and insert the code number in the place of ( ) in the style number.

CODE	PRIMARY VOLTAGE	SECONDARY VOLTAGE	WIRING DIAGRAM
88	230Δ	230Y	①
89	230Δ	460Y	①
90	230Δ	575Y	①
91	460Δ	230Y	①
92	460Δ	460Y	①
93	460Δ	575Y	①

Westinghouse Motor Drive Isolation transformers are specifically designed for use with 3-phase AC and DC adjustable speed drives to provide

Electrical isolation between the incoming line and the drive circuitry.

Voltage conversion of input line to standard drive input voltages.

Minimized line disturbances caused by SCR (silicon controlled rectifiers) firing.

Reduced short circuit currents and voltage line transients.

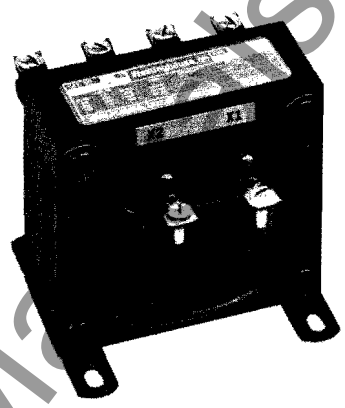
They are specifically sized to the drive kVA requirements and are braced to withstand the mechanical stresses of current reversals and short circuits associated with SCR drives from 5 to 500 horsepower.

HP	KVA	STYLE NO.②	FULL CAPACITY TAPS	DESIGN	DEG. C. TEMP. RISE	DIMENSIONS, (IN.)③ HEIGHT	WIDTH	DEPTH	WT. (LBS.)	FRAME	WEATHERSHIELD KIT STYLE NO.
5	7.5	MD7.5E( )	+1-5%, −1-5%	Encap.	115	15 7/8	16	9 1/16	160	103	Not Required④
7.5	11	MD11E( )	+1-5%, −1-5%	Encap.	115	17 3/8	20	8 11/16	210	95	
10	14	MD14E( )	+1-5%, −1-5%	Encap.	115	17 3/8	20	8 11/16	210	95	
15	20	MD20E( )	+1-5%, −1-5%	Encap.	115	20 3/4	21 11/16	11 5/16	340	195	
20	27	MD27E( )	+1-5%, −1-5%	Encap.	115	26 2/3	25 1/8	12 3/4	422	243	
25	34	MD34E( )	+1-5%, −1-5%	Vent.	150	29 1/4	24	15 3/4	320	862	783C426G02
30	40	MD40E( )	+1-5%, −1-5%	Vent.	150	29 1/4	24	15 3/4	460	851	783C426G02
40	51	MD51E( )	+1-5%, −1-5%	Vent.	150	29 1/4	24	15 3/4	460	851	783C426G02
50	63	MD63E( )	+1-5%, −1-5%	Vent.	150	38 3/8	28	19 1/4	600	853	783C426G02
60	75	MD75E( )	+1-5%, −1-5%	Vent.	150	38 3/8	28	19 1/4	600	853	783C426G02
75	93	MD93E( )	+1-5%, −1-5%	Vent.	150	38 3/8	28	19 1/4	750	854	783C426G02
100	118	MD118E( )	+1-5%, −1-5%	Vent.	150	38 3/8	28	19 1/4	750	854	783C426G02
125	145	MD145E( )	+1-5%, −1-5%	Vent.	150	45	31 5/8	22 1/8	950	855	783C426G03
150	175	MD175E( )	+1-5%, −1-5%	Vent.	150	50	34 1/4	26 1/4	1250	856	783C426G04
200	220	MD220E( )	+1-5%, −1-5%	Vent.	150	50	34 1/4	26 1/4	1250	856	783C426G04
250	275	MD275E( )	+1-5%, −1-5%	Vent.	150	50	34 1/4	26 1/4	1500	857	783C426G04
300	330	MD330E( )	+1-5%, −1-5%	Vent.	150	50	34 1/4	26 1/4	1500	857	783C426G04
400	440	MD440E( )	+1-5%, −1-5%	Vent.	150	75	44	36	①	①	3720C94G04
500	550	MD550E( )	+1-5%, −1-5%	Vent.	150	75	44	36	①	①	3720C94G04

① Refer to SPTD.
② To complete style number, see table above right.
③ Not for construction. Refer to TCS47-720 by frame number for certification.
④ NEMA 3R outdoor enclosure is standard for encapsulated design Type MD.
NOTE: Refer to SPTD for availability of special designs

Machine Tool and Control Transformers
Applications, Type MTA

Applications
Westinghouse Control Transformers provide stepped-down voltages to machine tool control devices enabling control circuits to be isolated from all power and lighting circuits, thus allowing the use of grounded or ungrounded circuits that are independent of the power or lighting grounds. Greater safety is afforded the operator, and the more rugged 115-volt coils can be used on the control devices regardless of the line voltage. The control transformer line is particularly adaptable on applications where compact construction is demanded. Electrical performance equals or exceeds ANSI/NEMA standards.



TYPE MTA

U.L. recognized component for units rated 1000 VA and below
100% tested to verify product quality

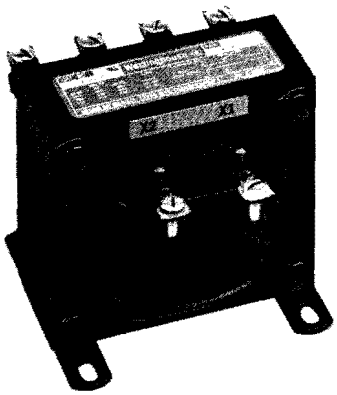
Electrical performance equals or exceeds requirements of ANSI/NEMA ST-1
Regulation exceeds ANSI/NEMA requirements for all ratings

VA	STYLE NO.	DIMENSIONS (IN.)② HEIGHT	WIDTH	DEPTH	WEIGHT (LBS.)	FRAME	WIRING② DIAGRAM
50	**1F0890**	**Use Type MTC, 1F0890**					
75	**1F0927**	3 3/16	3 3/4	3 3/4	3	1510	1
100	**1F0906**	3 3/16	3 3/4	4	4	1512	1
150	**1F0907**	3 3/16	3 3/4	4 3/4	6	1520	1
200	**1F0908**	3 13/16	4 1/2	4 1/2	7	1714	1
250	**1F0909**	3 13/16	4 1/2	5	8	1717	1
300	**1F0910**	3 13/16	4 1/2	5 1/2	10	1723	1
350	**1F0911**	3 13/16	4 1/2	6	12	1727	1
500	**1F0912**	4 3/8	5 1/4	5 5/8	15	1923	1
750	**1F0913**	4 3/8	5 1/4	6 1/8	19	1931	1
1000	**1F0914**	5 1/4	6 1/8	6 3/4	19	C613	1
1500	**1F0965**	6	6 7/8	7 1/2	27	C614	1
2000	**1F0966**	5 7/8	6 7/8	8 1/2	36	C827	1
3000	**1F0967**	6 1/2	8 3/16	8 3/4	52	C828	1
5000	**1F0968**	7 5/8	8 15/16	10 1/4	79	C829	1
50	**1F2198**	2 19/32	3	3 1/4	2	1310	3
75	**1F2185**	3 3/16	3 3/4	3 3/4	3	1510	3
100	**1F2186**	3 3/16	3 3/4	4	4	1512	3
150	**1F2189**	3 3/16	3 3/4	4 3/4	6	1520	3
200	**1F2191**	3 13/16	4 1/2	4 1/2	7	1714	3
250	**1F2034**	3 13/16	4 1/2	5	8	1717	3
300	**1F1113**	3 13/16	4 1/2	6	10	1727	3
350	**1F2187**	3 13/16	4 1/2	6	12	1727	3
500	**1F2190**	4 3/8	5 1/4	6 1/4	15	1930	3
750	**1F2188**	5 1/4	6 1/8	6 3/4	19	C613	3
1000	**1F1687**	5 1/4	6 1/8	6 3/4	19	C613	3
1500	**1F1688**	6	6 7/8	7 1/2	27	C614	3
2000	**1F1696**	5 7/8	6 7/8	8 1/2	36	C827	3
3000	**1F1690**	6 1/2	8 3/16	8 3/4	52	C828	3
5000	**1F1701**	5 5/8	8 15/16	10 1/4	79	C829	3

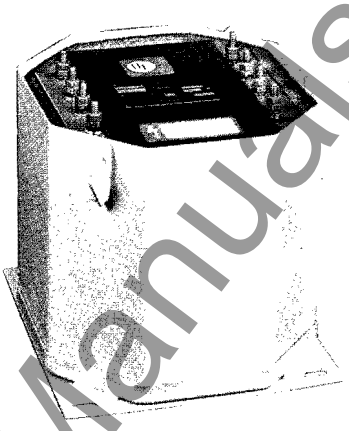
VA	STYLE NO.	DIMENSIONS (IN.)② HEIGHT	WIDTH	DEPTH	WEIGHT (LBS.)	FRAME	WIRING② DIAGRAM
50	**1F0987**	2 19/32	3	3 3/4	2	1314	2A
75	**1F0988**	3 3/16	3 3/4	4	4	1512	2A
100	**1F0989**	3 3/16	3 3/4	4 3/4	5	1517	2A
150	**1F0990**	3 13/16	4 1/2	4 1/2	7	1714	2A
200	**1F0991**	3 13/16	4 1/2	5	8	1717	2A
250	**1F0992**	3 13/16	4 1/2	5 1/2	10	1723	2A
300	**1F0993**	3 13/16	4 1/2	6	12	1730	2A
350	**1F0994**	4 3/8	5 1/4	5 5/8	14	1923	2A
500	**1F0995**	4 3/8	5 1/4	6 1/8	17	1931	2A
750	**1F0996**	4 3/8	5 1/4	7 3/4	27	1943	2A
1000	**1F0997**	6	6 7/8	7 1/2	24	C614	2A
1500	**1F0998**	5 7/8	6 7/8	8 1/4	34	C827	2A
50	**1F3052**	2 19/32	3	3 1/4	2	1310	4B
100	**1F3053**	3 3/16	3 3/4	4 1/8	5	1513	4B
200	**1F3054**	3 13/16	4 1/2	4 1/2	7	1714	4B
50	**1F1025**	2 19/32	3	3 3/4	3	1314	2B
100	**1F1027**	3 3/16	3 3/4	4 3/4	5	1516	2B
150	**1F1028**	3 13/16	4 1/2	4 1/2	7	1714	2B
200	**1F1029**	3 13/16	4 1/2	5	8	1717	2B
250	**1F1030**	3 13/16	4 1/2	5 1/2	10	1723	2B
300	**1F1031**	3 13/16	4 1/2	6	13	1730	2B
500	**1F1033**	4 3/8	5 1/4	6 1/8	18	1931	2B
750	**1F1034**	4 3/8	5 1/4	7 3/4	27	1943	2B
1000	**1F1035**	6	6 7/8	7 1/2	25	C614	2B
1500	**1F1036**	5 7/8	6 7/8	8 1/2	33	C827	2B

① Refer to Specification Data 47-820 for regulation data.
② Not for construction. Refer to SD 47-820 by frame number and wiring diagrams for certification.
NOTE: Refer to SPTD for availability of special designs.

Machine Tool and Control Transformers
Type MTC, Type AP



TYPE MTC



TYPE AP

TYPE MTC FEATURES:

Type MTC control transformers are similar to Type MTA except MTC provide increased regulation.

- Designed specifically for loads requiring extremely good regulation — 10% to 200% better regulation than Type MTA[1]
- U.L. recognized component for units rated 1000 VA and below
- Electrical performance exceeds requirements of ANSI/NEMA ST-1
- 100% tested; each unit must pass rigid tests for turns ratio, insulation, continuity, over potential

TYPE AP FEATURES:

The Type AP control transformers feature an encapsulated core and coil which provides a totally enclosed, non-ventilated construction. Smaller than open core and coil type units, connections are made with the convenient screw type terminal board. For ease of installation two types of mounting are provided. Select a design with the base plate arranged for bottom mounting or for side/wall mounting.

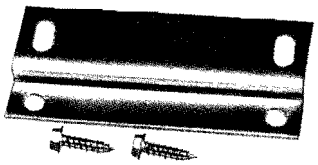
- U.L. listed and labelled
- Resin encapsulated
- Convenient screw-type terminal board
- Bottom or side/wall mounting designs
- Performance meets/exceeds ANSI/NEMA ST-1 requirements
- Regulation exceeds ANSI/NEMA requirements for all ratings[1]

VA	STYLE NO.	DIMENSIONS (IN.)[2] HEIGHT	WIDTH	DEPTH	WEIGHT (LBS.)	FRAME	WIRING[2] DIAGRAM
240/480 VOLTS TO 120 VOLTS, 60 HZ 230/460 VOLTS TO 115 VOLTS, 50/60 HZ 220/440 VOLTS TO 110 VOLTS, 50/60 HZ							
50	**1F0890**	2 19/32	3	3 1/4	2	1310	1
75	**1F0891**	2 19/32	3	3 3/4	3	1314	1
100	**1F0892**	2 7/8	3 3/8	4	3	1413	1
150	**1F0893**	3 3/16	3 3/4	4 3/4	6	1517	1
200	**1F0894**	3 13/16	4 1/2	4 1/2	7	1714	1
250	**1F0895**	3 13/16	4 1/2	5	8	1717	1
300	**1F0896**	3 13/16	4 1/2	5 3/8	10	1722	1
350	**1F0897**	3 13/16	4 1/2	6	11	1726	1
500	**1F0898**	4 3/8	5 1/4	6 1/8	20	1931	1
750	**1F0899**	4 3/8	5 1/4	7 3/4	28	1943	1
1000	**1F0900**	5 7/16	6 3/8	7 1/2	34	2236	1
1500	**1F0901**	6 1/8	6 7/8	8 3/8	35	C822	1
2000	**1F0902**	6	6 3/4	8 1/2	38	C823	1
3000	**1F0903**	7 3/8	8 7/16	8 3/4	53	C824	1
5000	**1F0904**	7 7/8	8 11/16	11	82	C825	1

KVA	STYLE NO.	MOUNTING	DIMENSIONS (IN.)[2] HEIGHT[3]	WIDTH	DEPTH	WEIGHT (LBS.)	FRAME	WIRING DIAGRAM[2]
240/480 VOLTS TO 120/240 VOLTS, 60 HZ								
3	**6F495**	Bottom	8 5/16	7 17/32	7 17/32	48	133	6
5	**6F201**	Bottom	9 3/16	9 13/32	8 25/32	75	99	5
7.5	**6F202**	Bottom	9 3/8	12 1/32	10 13/32	102	100	5
10	**6F203**	Bottom	11 1/4	12 1/32	10 13/32	128	101	5
15	**6F496**	Bottom	12 1/2	11 9/32	11 9/32	158	134	6
3	**6F320**	Side/Wall	8 7/8	7 1/2	7 5/8	48	283	6
5	**6F321**	Side/Wall	9 3/4	8 3/4	9 9/16	75	256	6
7.5	**6F322**	Side/Wall	11 5/8	8 5/8	10 3/4	102	257	6
10	**6F323**	Side/Wall	11 5/8	10 1/8	10 3/4	128	258	6
15	**6F324**	Side/Wall	12 3/8	10 7/16	12 3/16	158	259	6

[1] Refer to Specification Data 47-820 for regulation data.
[2] Not for construction. Refer to SD 47-820 by frame number and wiring diagram for certification.
[3] Height over terminals.
NOTE: Refer to SPTD for availability of special designs.

Accessories for Field Installation



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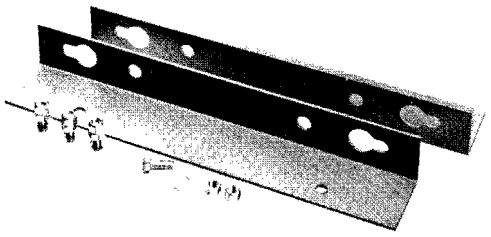
"B" BRACKET-TYPE EP, 2 KVA AND BELOW

"B" Bracket is used with type EP, 2 kVA and below, transformers requiring greaterrigidity in such applications as panelboards and control centers.



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WALL MOUNTING BRACKET — TYPES DS-3/DT-3

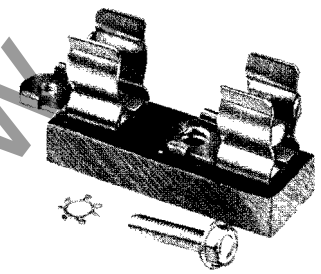
Wall mounting brackets are used to wall mount most 30 through 112.5 kVA dry type transformers. See availability guide.

Availability Guide — Wall Mounting Brackets

KVA	FOR TYPE DS-3		FOR TYPE DT-3		FOR ENERGY EFFICIENT	
	600V & BELOW	2400-5000V	600V & BELOW	2400-5000V	80°C Rise	115°C RISE
30			✓			
37½	✓	✓	✓	✓		
45			✓	✓	✓	✓
50	✓	✓	✓	✓		
75	✓	✓	✓	✓	✓	✓
100	✓					
112½			✓			✓

WEATHERSHIELD KIT

A weathershield kit, consisting of a front and rear cover panel, must be installed on all ventilated dry-type distribution transformers when the unit is located outdoors. The panels shield the transformer top ventilation openings against rain but allow for proper ventilation. Field installation hardware is not required. Refer to specific transformer listing for selection of weathershield kit.



ADD-A-PART FUSE HOLDERS FOR TYPES MTA AND MTC CONTROL TRANSFORMERS (Fuses not included)

Add-a-part fuse holders mount directly on terminal screws of types MTA and MTC control transformers to provide secondary fusing when required without increasing control panel space requirements. Fuse holders are rated 240 VAC.

VA	STYLE NO.	TYPE
50-750	**257A574G01**	MTA/MTC
1000-3000	**257A564G01**	MTA/MTC

Typical Specifications
General Purpose

Furnish and install, single phase and three phase General Purpose dry-type transformers of the two-winding type, self-cooled, with ratings (KVA) as indicated on the drawings. Transformers shall be manufactured by Westinghouse or approved equal.

Transformers shall be designed, manufactured, and tested in accordance with all applicable ANSI/NEMA & IEEE standards.

All 600 volt class transformers, three phase through 1000 KVA and single phase through 100 KVA, shall be listed by Underwriters, Laboratories and bear the UL label.

Transformers shall be designed for continuous operation at rated KVA, 24-hours a day, 365 days a year, with normal life expectancy as defined in ANSI C 57.96.

INSULATION SYSTEMS

Transformers shall be insulated as follows:
- 150°C. insulation with 80°C. rise, 2 KVA & below
- 185°C. insulation with 115°C. rise, 3 - 30 KVA
- 220°C. insulation with 150°C. rise, above 30 KVA

Required performance must be obtained without exceeding the above rise in a 40°C. maximum, 30°C. average ambient temperature.

All insulation materials shall be flame-retardant and shall not support combustion as defined in ASTM Standard Test Method D635.

CORE/COIL ASSEMBLIES

Transformer core shall be constructed with high grade, non-aging, grain-oriented silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities shall be substantially below the saturation point. The core volume shall allow efficient transformer operation at 10% above the highest tap voltage. The core laminations shall be tightly clamped and compressed. Coils shall be wound of electrical grade aluminum with continuous wound construction.

On units rated 30 KVA and below, the core/coil assembly shall be completely encapsulated in a proportioned mixture of resin and aggregate to provide a moisture-proof, shock-resistant seal. The core/coil encapsulation system shall minimize the sound level and the transformer size and weight.

On units rated above 30 KVA, the core/coil assembly shall be impregnated with a non-hydroscopic, thermo-setting varnish and cured to reduce hot-spots and seal out moisture. The assembly shall be installed on vibration-absorbing pads and securely bolted to the base to minimize sound transmission.

ENCLOSURES

The enclosure shall be made of heavy gauge, steel and shall be degreased, cleaned, primed, and finished with ANSI 61 color weather-resistant enamel.

On units rated 30 KVA and below, the enclosure construction shall be totally-enclosed, non-ventilated, NEMA 3R, with lifting eyes.

On units rated above 30 KVA, the enclosure construction shall be ventilated, NEMA 2, drip-proof, with lifting holes. All ventilation openings shall be protected against falling dirt.

All transformers shall be equipped with a wiring compartment suitable for conduit entry and large enough to allow convenient wiring. The maximum temperature of the enclosure shall not exceed 90°C.

The core of the transformer shall be visibly grounded to the enclosure.

SOUND LEVELS

Transformer sound levels shall not exceed the ANSI/NEMA levels for self-cooled ratings of:

Up to 9 KVA	40db
10-50 KVA	45db
51-150 KVA	50db
151-300 KVA	55db
301-500 KVA	60db
501-700 KVA	62db
701-1000 KVA	64db
1001-1500 KVA	65db

TESTS

The following tests shall be made on all transformers:

1. Ratio tests on the rated voltage connection and on all tap connections
2. Polarity and phase-relation tests on the rated voltage connection
3. Applied potential tests
4. Induced potential tests

On ratings above 500 KVA, these additional tests shall also be performed on each transformer:

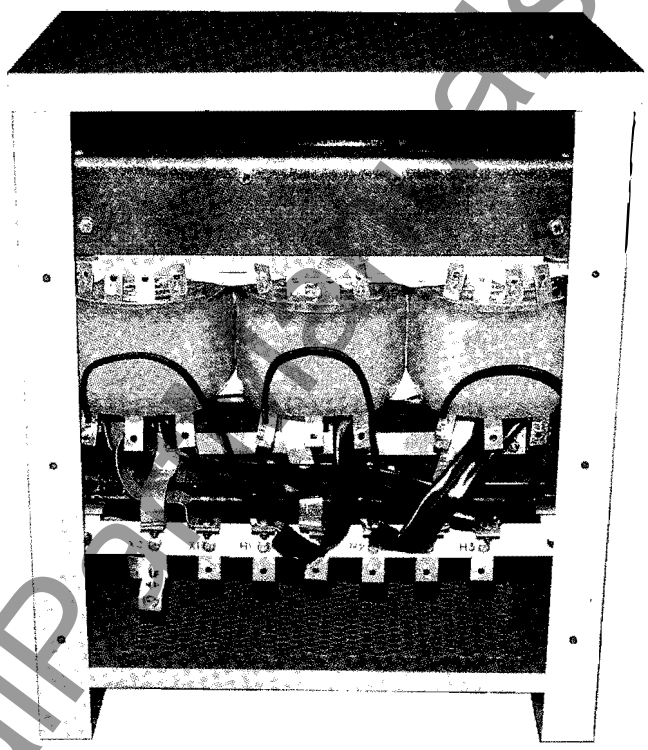
- Resistant measurements of all windings on the rated voltage connection of each unit and at the tap extremes of the first unit made on a new design.
- No-load and excitation current at rated voltage on the rated voltage connection

Typical Specifications
Energy Efficient Transformers

Furnish and install, three phase Energy Efficient dry-type transformers of the two-winding type, self-cooled, with ratings (KVA) as indicated on the drawings. Transformers shall be manufactured by Westinghouse or approved equal.

Transformers shall be designed, manufactured, and tested in accordance with all applicable ANSI/NEMA & IEEE standards, and shall be listed by Underwriters' Laboratories and bear the UL label.

Transformers shall be designed for continuous operation at rated KVA, 24-hours a day, 365 days a year, with normal life expectancy as defined in ANSI C 57.96.



INSULATION SYSTEM & RISE

Transformers shall be insulated with a 220°C. insulation system. Transformers shall be 115°C. rise (80°C. rise) and shall be capable of carrying a 15% continuous overload, (80°C. rise transformers a continuous 30% overload) without exceeding a 150°C. rise. Required performance must be obtained without exceeding the above rise in a 40°C. maximum, 30°C. average ambient temperature.

All insulation materials shall be flame-retardant and shall not support combustion as defined in ASTM Standard Test Method D635.

CORE/COIL ASSEMBLIES

Transformer core shall be constructed with high grade, non-aging, grain-oriented silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities shall be substantially below the saturation point. The core volume shall allow efficient transformer operation at 10% above the highest tap voltage. The core laminations shall be tightly clamped and compressed. Coils shall be wound of electrical grade aluminum with continuous wound construction.

The core/coil assembly shall be impregnated with a non-hydroscopic, thermo-setting varnish and cured to reduce hotspots and seal out moisture. The assembly shall be installed on vibration-absorbing pads and securely bolted to the base to minimize sound transmission.

ENCLOSURES

The enclosure shall be made of heavy gauge, cold-rolled steel and shall be degreased, cleaned, phosphatized primed, and finished with ANSI 61 color weather-resistant enamel.

The enclosure construction shall be ventilated, NEMA 2, drip-proof, with lifting holes. All ventilation openings shall be protected against falling dirt.

All transformers shall be equipped with a wiring compartment suitable for conduit entry and large enough to allow convenient wiring. The maximum temperature of the enclosure shall not exceed 90°C.

The core of the transformer shall be visibly grounded to the enclosure.

SOUND LEVELS

Transformer sound levels shall not exceed the ANSI/NEMA levels for self-cooled ratings of:

10-50 KVA	45db
51-150 KVA	50db
151-300 KVA	55db
301-500 KVA	60db
501-700 KVA	62db
701-1000 KVA	64db
1001-1500 KVA	65db

TESTS

The following tests shall be made on all transformers:

1. Ratio tests on the rated voltage connection and on all tap connections
2. Polarity and phase-relation tests on the rated voltage connection
3. Applied potential tests
4. Induced potential tests

Typical Specifications
Mini-Power Centers

Furnish and install, single phase and three phase Mini-Power Centers with dry-type transformers of the two-winding type, self-cooled, with ratings (KVA) as indicated on the drawings. Mini-Power Centers shall be manufactured by Westinghouse or approved equal.

The Mini-Power Center shall be designed, manufactured, and tested in accordance with all applicable ANSI, NEMA, IEEE, & CSA standards.

Mini-Power Centers shall be listed by Underwriters, laboratories and bear the UL label.

The Mini-Power Center shall include a main primary breaker, an encapsulated dry-type transformer, and a secondary panelboard with secondary main breaker.

All interconnecting wiring between the primary breaker and transformer, secondary main breaker and transformer, and distribution section shall be factory installed. Wiring shall be inspected prior to shipment.

Primary, secondary main and secondary feeder breakers shall be enclosed with a hinged door that can be padlocked.

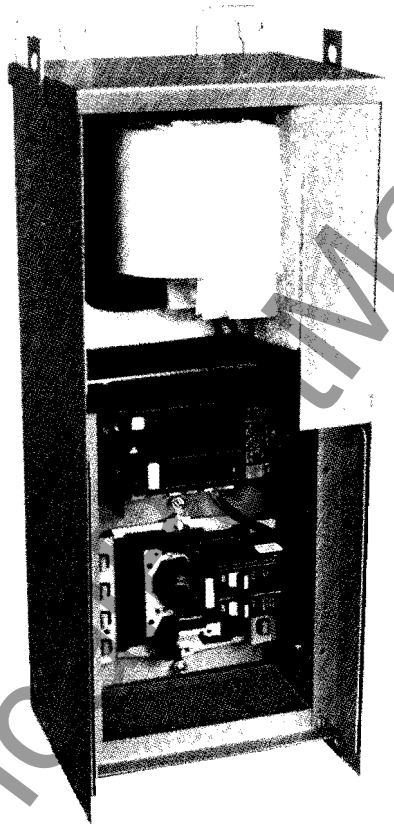
PRIMARY MAIN BREAKER

The transformer primary shall be protected by a molded case, thermal magnetic breaker. The primary breaker shall provide additional branch circuit protection and disconnect, as well as supplemental short circuit and overload protection for the transformer.

DRY-TYPE TRANSFORMER

The dry-type transformer shall be insulated with a 185°C. insulation system with 115°C. rise. Required performance must be obtained without exceeding the above rise in a 40°C. maximum, 30°C. average ambient temperature.

All insulation materials shall be flame-retardant and shall not support combustion as defined in ASTM Standard Test Method D635.



The transformer core shall be constructed with high grade, non-aging, grain-oriented silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities shall be substantially below the saturation point. The core volume shall allow efficient transformer operation at 10% above the highest tap voltage. The core laminations shall be tightly clamped and compressed.

Coils shall be wound of electrical grade aluminum with continuous wound construction.

The core/coil assembly shall be completely encapsulated in a proportioned mixture of resin and aggregate to provide a moisture-proof, shock-resistant seal. The core/coil encapsulation system shall minimize the sound level and the transformer size and weight.

SECONDARY MAIN BREAKER & PANELBOARD

The secondary main breaker shall be 2 or 3 pole sized to provide protection for the distribution feeder section.

The secondary distribution section shall accommodate one-inch, plug-in breakers.

ENCLOSURE

The enclosure shall be made of heavy gauge, steel and shall be degreased, cleaned, phosphatized primed, and finished with ANSI 61 color weather-resistant enamel. The enclosure construction shall be totally-enclosed, non-ventilated, NEMA 3R, with lifting eyes.

The core of the transformer shall be visibly grounded to the enclosure.

SOUND LEVELS

Transformer sound levels shall not exceed the ANSI/NEMA levels for self-cooled ratings of:

Up to 9 KVA	40db
10-50 KVA	45db

TESTS

The following tests shall be made on all transformers:

1. Ratio tests on the rated voltage connection and on all tap connections
2. Polarity and phase-relation tests on the rated voltage connection
3. Applied potential tests
4. Induced potential tests

Application of Two-Winding Transformers as Autotransformers

GENERAL

In some territories local codes prohibit the use of autotransformers. For some applications it is necessary that the load circuit be completely isolated from the supply circuit, since supply circuit faults will affect load circuits when autotransformers are used for voltage transformation. Autotransformers are not usually recommended for general purpose service because of the danger of destroying a device by having a voltage greater than its rated voltage accidentally impressed upon it.

SINGLE-PHASE CIRCUITS

Single-phase transformers of standard service voltage ratings can be applied as autotransformers to provide step-up or step-down service for general purpose applications.

SINGLE-PHASE TRANFORMERS APPLIED AS AUTOTRANSFORMERS

Voltage Transformation	Ratio of Low Voltage to High Voltage	Dia. No.	Transformer Rating: Volts	
			Primary	Secondary
240 to 480	0.5	1	240 × 480	120/240
240 to 480	0.5	2	120 × 240	120/240
120 to 240	0.5	3	120 × 240	120/240
480 to 600	0.8	4	240 × 480	120/240

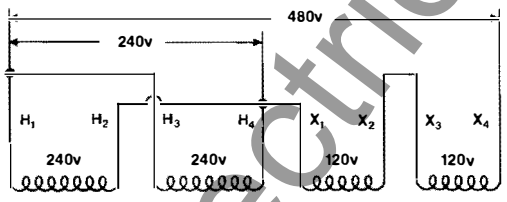
The table provides data on standard dry type, low voltage (600-volt class), single-phase, two-winding transformers used as autotransformers. For step-up service, the ratio of low voltage to high voltage in the first three cases is 0.5 and therefore, the amount of kva transformed is (1 − 0.5 = 0.5) 50 percent of the total kva; in the last case, the ratio is 0.8 and the kva transformed is (1 − 0.8 = 0.2) 20 percent. Output kva to the load is then 200 percent of the transformer nameplate rating in the first three cases and output is 500 percent for the fourth case.

For the accompanying diagrams, lead markings indicate relative directions in the windings. Thus, if H_1 is the start of one high-voltage winding, H_2 is the finish. H_3 is the start and H_4 is the finish of the other high-voltage winding. X_1 is then the start of the first low-voltage winding, and X_3 is the start of the other low-voltage winding.

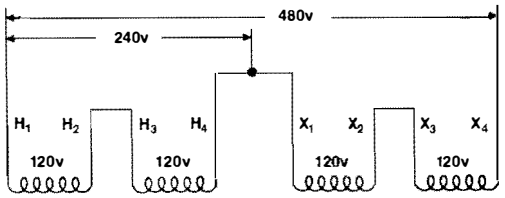
The two high-voltage windings are connected in multiple by connecting H_1 to H_3 and H_2 to H_4. The two low-voltage windings are connected in series by connecting X_2 to X_3. The two windings thus formed are connected in series aiding (boost) by connecting H_4 to X_1 and the autotransformer is complete.

This same reasoning can be applied for decreasing voltages as well as increasing by just applying the high-voltage connections to the supply and the load to the low-voltage connections.

Dia. 1



Dia. 2



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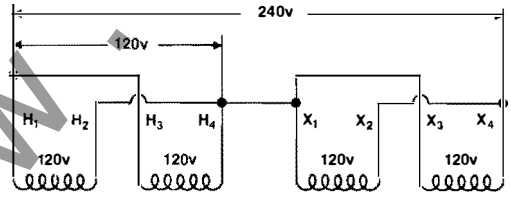

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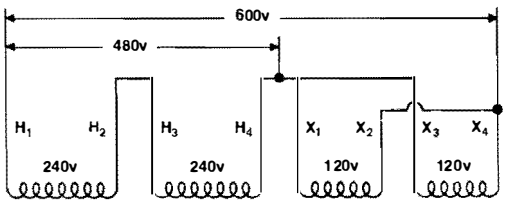


Application of Two-Winding Transformers as Autotransformers

THREE-PHASE CIRCUITS

Single-phase transformers of standard service voltage ratings can be combined into banks of three-phase autotransformers in several ways. Perhaps the most satisfactory and economical connections are the "T" and open delta. Each requires two units to make up the three-phase bank. Other connections, not recommended for use are the wye, the closed delta, and the extended delta – each requiring three units.

When using standard transformers to make an autotransformer bank in wye, each of the units composing the legs of the wye is under-excited. Assume a desired three-phase ratio of 240 volts to 480 volts. Each standard transformer is then connected as a single-phase autotransformer for the ratio of 240 to 480 volts. When placed in the **wye connection,** however, each autotransformer has impressed on it $240/\sqrt{3}$ volts and its output is $480/\sqrt{3}$ volts. Thus, the **maximum economy is not available** since the output kva is only 115 percent of the combined nameplate ratings of the transformers.

Use of the **closed-delta connection is not recommended** when utilizing standard transformers since the saving realized is small due to phase shift.

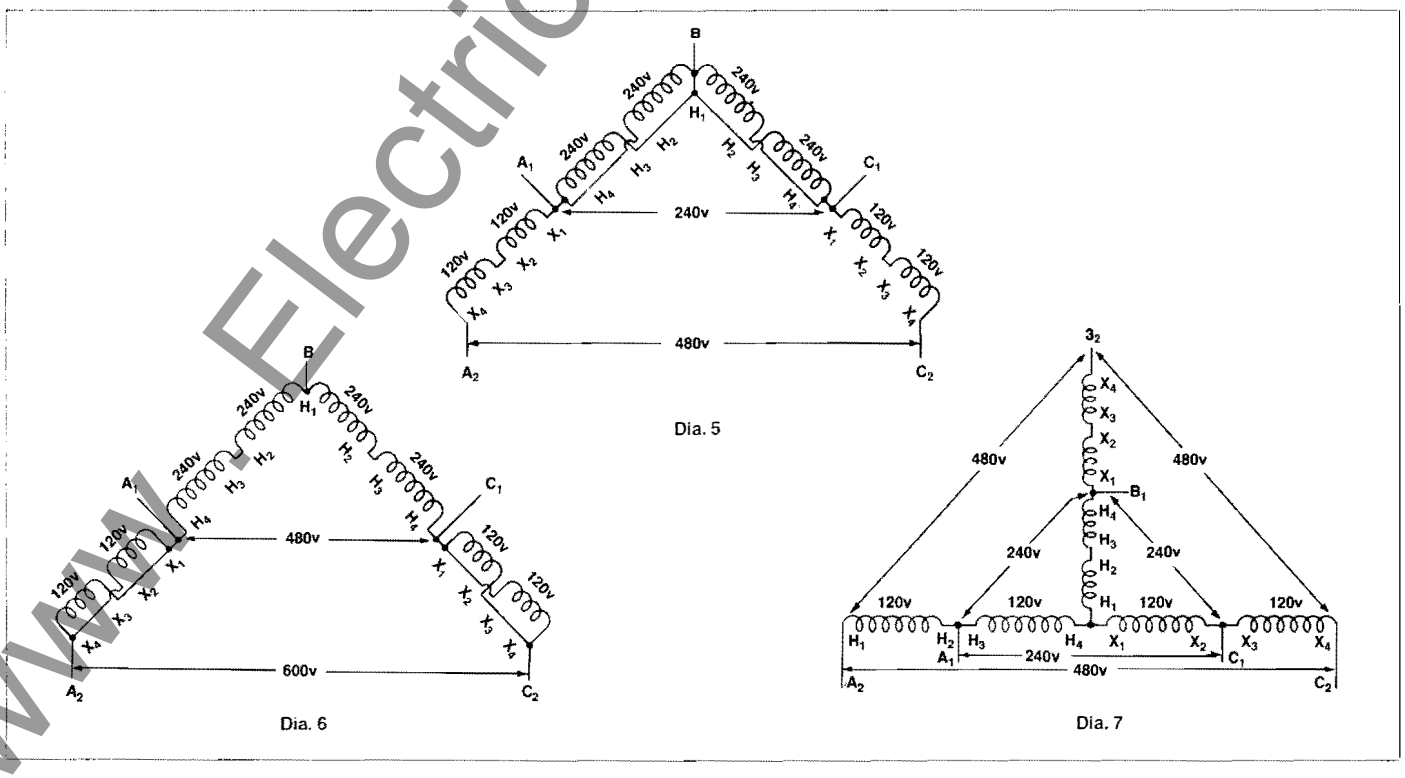
Extended-delta connection presents odd voltage ratios and phase shift is present. It therefore **is not recommended.**

Diagram 5 shows the connections for two autotransformers in an open-delta bank for three-phase conversion from 240 volts to 480 volts, using transformers rated 240 x 480 volts primary, 120/240 volts secondary. Lead markings indicate relative directions in the windings. The high-voltage windings are connected in multiple, and the low-voltage windings are connected in series. The two groups of windings are connected series aiding (boost) to form the autotransformers, and the H_1 points are connected together for the common line to form the three-phase bank. This connection provides a bank output kva equal to 173 percent of the sum of nameplate ratings of the two transformers.

Diagram 6 shows the connections for the same transformers in an open-delta autotransformer bank to provide three-phase conversion from 480 to 600 volts. This connection provides a bank output kva equal to 433 percent of the sum of the nameplate ratings of the two transformers.

Diagram 7 shows the T-connection for two autotransformers to provide three-phase conversion from 240 to 480 volts, using transformers rated 120 × 240 primary, 120/240 volts secondary. All windings of each transformer are connected series aiding (boost) and the teaser unit is connected at midpoint of the main unit. In this connection the nameplate rating of each transformer should represent at least 28.85 percent of the bank output kva desired; in other words, the bank output kva is equal to 173 percent of the sum of the nameplate ratings of the two transformers (same as Diagram 5).

As with single-phase circuits, three-phase arrangements may be used to decrease voltages by placing the load on low-voltage connections and the line on high-voltage connections.



Dia. 5

Dia. 6

Dia. 7

Glossary

AA — An ANSI designation indicating open, natural-draft ventilated construction.

Ambient Noise Level — The noise level of the surrounding area measured in decibels.

Ambient Temperature — Ambient temperature is temperature of surrounding atmosphere into which the heat of the transformer is dissipated.

Ampere — Unit of current flow.

ANSI — American National Standards Institute, Inc. — an organization which provides written standards on dry-type transformers.

ASTM — American Society for Testing Materials.

Autotransformer — An autotransformer is a transformer in which part of the winding is common to both the primary and the secondary circuits.

BIL — Basic Impulse Level, (see Impulse Tests).

Buck-Boost Application — The name of a standard, two-winding, one-phase transformer with low-voltage secondary windings which can be connected as an autotransformer for boosting and bucking single- and three-phase supply voltages in small amounts.

Cast-coil Transformer — Transformer with coils cast in an epoxy resin using molds.

Certified Tests — Actual values taken during production tests and certified as applying to a given unit shipped on a specific order.

Conductor Losses — See Load Losses.

Continuous Rating — Continuous rating defines the constant load which a transformer can carry at rated primary voltage and frequency without exceeding the specified temperature rise.

Corrosion Resistant — (Also see Rust Resistant and Rust Inhibiting); specifically prepared or treated to resist corrosion and rusting.

Current Transformer — A transformer generally used in instrumentation circuits for measuring current.

Decibel (DB) — A term used in sound measurement. A change of one db in sound level is the smallest change the human ear can detect. A busy office might measure from 60-75 db. DB is a measure of sound intensity.

Delta (Δ) — A standard three-phase connection with the ends of each phase winding connected in series to form a closed loop with each phase 120 degrees from the other. Sometimes referred to as 3-wire.

Delta Wye (Δ-Y) — A term or symbol indicating the primary connected in delta and the secondary in wye when pertaining to a three-phase transformer or transformer bank.

Dielectric Tests — Dielectric tests are tests performed to verify turn-to-turn insulation and layer-to-layer insulation. ANSI/NEMA defines the values and procedures for dielectric tests.

Distribution Transformers — Transformers rated 500 KVA and below are usually referred to as distribution type. Exceptions include current and potential and other specialty transformers.

Dripproof — Constructed or protected so that successful operation is not interfered with when subjected to falling moisture or dirt. NEMA type 2 enclosures are dripproof.

Dry-type — A dry-type transformer is one in which the transformer core and coils are immersed in air or other dry gas.

Electrostatic Shield — Copper or other conducting sheet placed between primary and secondary and grounded to provide additional protection against electrical interference.

Encapsulated Winding — Transformer having coils either dipped or cast in an epoxy resin.

Enclosed — In contrast to open or core-and-coil construction.

Enclosures — (Also see NEMA Enclosures). The metal case parts surrounding the core-and-coil and (usually) wiring compartment.

Exciting Current (No-load Current) — Exciting current is current which flows in any winding used to excite the transformer when all other windings are open-circuited and is usually expressed in per cent of the rated current of a winding in which it is measured.

FCAN — Like FCBN taps, except full capacity above normal nameplate voltage.

FCBN — "Full capacity below normal" taps. An abbreviation which, when pertaining to transformers, designates that they are suitable for full-rated KVA at voltages below rated level.

Fan-Cooled — Cooled mechanically to stay within rated temperature rise by addition of fans internally and/or externally. Normally used on larger transformers only.

Flexible Connection — A non-rigid connection designed to eliminate transmission of noise, in contrast to rigid bus or conduits, etc.

Frequency — On a-c circuits, designates number of times that polarity alternates from positive to negative and back again . . . such as 60 cycles per second.

Full-capacity Tap — A full-capacity tap is one through which the transformer can deliver its rated kva output without exceeding the specified temperature rise.

Grounding Transformer — A special 3-phase autotransformer for establishing a neutral on a 3-wire delta secondary.

Grounds or Grounding — Connecting one side of a circuit to the earth through low-resistance or low-impedance paths. This helps prevent transmitting electrical shock to personnel.

Hazardous Location — Area contaminated with gases or dust which could explode or ignite.

High-voltage and Low-voltage Windings — Terms used to distinguish the winding having the greater voltage rating from that having the lesser in two-winding transformers. The terminations on the high-voltage windings are identified by H1, H2, etc., and on the low-voltage by X1, X2, etc.

Hi Pot — A standard test on dry-type transformers consisting of extra-high potentials (high voltages) impressed on the windings. (see Transformer Tests).

IEEE — Institute of Electrical and Electronic Engineers.

Impulse Tests — Impulse tests are dielectric tests consisting of the application of a high-frequency steep-wavefront voltage between windings and between windings and ground.

Impedance — Retarding forces of current flow in a-c circuits.

Indoor Transformer — An indoor transformer is one which, because of its construction, is not suitable for outdoor service.

Induced Test — A standard high-frequency test of transformer insulation.

Insulating Materials — Those materials used to electrically insulate the transformer windings from each other and ground.

Insulation System — Balancing of insulation materials to properly insulate a given product.

Iron Losses — (See No-load Losses).

Isolating Transformer — Isolating primary circuit from secondary circuit.

IR% — (See Percent IR).

IX% — (See Percent IX).

IZ% — (See Percent IZ).

KVA or Volt-ampere Output Rating — The kva or volt-ampere rating designates the output which a transformer can deliver for a specified time at rated secondary voltage and rated frequency without exceeding the specified temperature rise (1 kva = 1000 va).

Liquid-immersed Transformer — A liquid-immersed transformer is one with core and coils immersed in liquid (as opposed to a dry-type transformer).

Load — The load of a transformer is the power — in kva or volt-amperes — supplied by the transformer.

Load Losses — Load losses are those losses in a transformer which are incident to load carrying. Load losses include I^2R loss in the windings due to load current, stray loss due to stray fluxes in the winding, core clamps, etc., and to circulating currents (if any), in parallel windings.

Mid-tap — A reduced-capacity tap midway in a winding — usually the secondary.

Moisture-resistant — Moisture-resistant apparatus is one which is constructed or treated so that it will not be harmed readily by exposure to a moist atmosphere.

Multiple Winding — (See Parallel and Series/Multiple).

NEC — National Electrical Code.

NEMA — National Electrical Manufacturers Association.

NEMA Enclosures — Specifications of various enclosures:

- NEMA 1 General purpose (protection only).
- NEMA 2 Drip-tight (cover protects transformer).
- NEMA 3 Weather resistant (can be installed outside).
- NEMA 4 Watertight (applicable for spray, hose, etc.).
- NEMA 5 Dust-tight (gasketed to keep out dust, dirt).
- NEMA 6 Submersible (operates under water).
- NEMA 7 Hazardous locations (Class I, air break).
- NEMA 8 Hazardous locations (oil immersed).
- NEMA 9 Hazardous locations (meets NEC).
- NEMA 10 Bureau of Mines (explosion-proof).
- NEMA 11 Acid and fume resistant (oil immersed).
- NEMA 12 Industrial use (non-ventilated — protected from flying dirt, dust, etc.)

Noise Level — The relative intensity of sound, measured in db. (see decibel)

No-load Losses (Excitation Losses) — Loss in a transformer which is excited at rated voltage and frequency but which is not supplying load. No-load losses include core loss, dielectric loss, and copper loss in the winding due to exciting current.

Glossary

Parallel Operation — Single- and three-phase transformers having appropriate terminals may be operated in parallel by connecting similarly-marked terminals, provided their ratios, voltages, resistances, reactances, and ground connections are designed to permit parallel operation and provided their angular displacements are the same in the case of three-phase transformers.

Per Cent IR — (Per cent resistance) — Voltage drop due to resistance at rated current in per cent of rated voltage.

Per Cent IX — (Per cent reactance) — Voltage drop due to reactance at rated current in per cent of rated voltage.

Per Cent IZ — (Per cent impedance) — Voltage drop due to impedance at rated current in per cent of rated voltage.

Phase — Type of a-c electric circuit, usually single-phase, 2-wire or 3-wire, or three-phase, 3- or 4-wire.

Polarity Tests — A standard test on transformers to determine instantaneous direction of the voltages in the primary compared to the secondary, (see Transformer Tests).

Poly-phase — More than one phase.

Potential (Voltage) Transformer — A transformer generally used in instrumentation circuits for measuring voltage.

Power Factor — The relation of watts to volt amps in a circuit.

Primary Taps — Taps added in the primary winding, (see Tap).

Primary Voltage Rating — Designates the input circuit voltage for which the primary winding is designed.

Primary Winding — The primary winding is the winding on the energy input (supply) side.

Rating — The rating of a transformer or other induction apparatus consists of the output or input and any other characteristic, such as primary and secondary voltage, current, frequency, power factor and temperature rise assigned to the transformer by the manufacturer.

Ratio Test — A standard test of transformers to determine the ratio of the primary to the secondary voltage, (see Transformer Tests).

Reactance — The effect of inductive and capacitive components of the circuit producing other than unity power factor.

Regulation — Usually expressed as the percent change in output voltage when the load goes from full load to no load.

Rust Inhibiting — Material added as a protective cover thus making the covered surface rust resistant.

Rust-proof — Will not rust during normal life.

Rust Resistant — Can successfully resist rust much better than a non-treated material but is not rust-proof.

Scott Connection — Connection for poly-phase transformers. Usually used to change from two-phase to three-phase or three-phase to two-phase.

Sealed Transformer — Completely sealed from outside atmosphere and usually contains an inert gas which is slightly pressurized.

Secondary Voltage Rating — Designates the load-circuit voltage for which the secondary winding (winding on the output side) is designed.

Secondary Taps — Taps located in the secondary winding, (see Tap).

Series/Multiple — A winding of two similar coils that can be connected for series operation or multiple (parallel) operation.

Specialty Transformer — A specialty transformer is generally intended to transform electric power for low-voltage, general-purpose control, machine-tools, Class 2 signalling, ignition, luminous-tube, cold-cathode lighting, series street-lighting, and similar applications.

Star Connection — Same as wye connection.

Step-down Transformer — A step-down transformer is one in which the energy transfer is from the high-voltage winding to the low-voltage winding or windings.

Step-up Transformer — A step-up transformer is one in which the energy transfer is from the low-voltage winding to a high-voltage winding or windings.

Surface Temperature — Actual temperature of the surface (much lower than the allowed temperature rise stamped on the nameplate).

T-Connection — Use of Scott connection for three-phase operation.

Tap — A tap is a connection brought out of a winding at some point between its extremities, usually to permit changing the voltage or current ratio.

Temperature Rise — The increase over ambient temperature of the winding due to energizing and loading the transformer.

Test Reports — See Certified Tests.

Total Losses — Total losses are the losses represented by the sum of the no-load and the load losses.

Transformer — A transformer is an electrical device, without continuously moving parts, which, by electro-magnetic induction, transforms energy from one or more circuits to other circuits at the same frequency, usually with changed values of voltage and current.

Turns Ratio — The turns ratio of a transformer is the ratio of the number of turns in the high-voltage winding to that in the low-voltage winding.

Typical Test Data — Tests on similar units which have already been produced and tested.

Volt-amperes — Circuit volts multiplied by circuit amperes.

Voltages:

A. 240/480 — suitable for series or multiple or 3-wire operation.

B. 240 x 480 — suitable for senes or multiple (but nor normally for 3-wire operation).

C. 240/120, 3-wire only — suitable for reduced kva output at 120.

D. 200/210/220 — full capacity taps with full capacity at either 200, 210 or 220 volts.

Voltage Ratio — The voltage ratio of a transformer is the ratio of the RMS primary terminal voltage to the RMS secondary terminal voltage to the RMS secondary terminal voltage under specified conditions of load.

Voltage Regulation — Voltage regulation of a transformer is the change in secondary voltage which occurs when the load is reduced from rated value to zero, with the values of all other quantities remaining unchanged. The regulation may be expressed in percent (or per unit) on the basis of the rated secondary voltage at full load.

Weatherproof — Constructed so that exposure to weather will not interfere with successful operation.

Winding Losses — See Load Losses.

Winding Voltage Rating — The winding voltage rating designates the voltage for which the winding is designed.

Wye Connection (Y) A standard 3-wire transformer connection with similar ends of the single-phase coils connected. This common point forms the electrical neutral point and may be grounded.

Zig-Zag Connection — Special transformer connection commonly used in grounding transformers.

Numerical Index

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