Westinghouse Electric Corporation
Dry-Type Distribution Transformer Division
Greenville, Pennsylvania 16125

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New Information
Mailed to: E,D,C/46-700A,
46-700B; 46-800A
For standard terms of sale,
refer to Selling Policy 46-700

Dry-Type Distribution Transformers, Power Conditioners and Mini-Power Centers

General Information

Application: The basic purpose of a dry type transformer is voltage transformation, in the load area, for economy and distribution of power. Loads are lighting, heating, ranges, air conditioners, exhaust fans, control circuits, appliances, and portable tools. Such loads are found in commercial, institutional, and residential structures.

How to select

- Determine the primary voltage — the voltage presently available.
- Determine the secondary voltage — the voltage needed at the load.
- Determine the Kva load, allowing room for expansion.
- Using the facts determined in the above three steps, select the transformer catalog number from the listings in the catalog.

Temperature Class: Industry standards classify insulation systems in accordance with the rating system shown below.

Insulation System Classification

Ambient +	Winding Rise	+ Hot Spot =	Temp. Class
40°C	55°C	10°C	105°C
40°C	80°C	30°C	150°C
40°C	115°C	30°C	185°C
40°C	150°C	30°C	220°C

All regular Westinghouse dry type distribution transformers meet present NEMA, ANSI, ASA, UL and IEEE standards were applicable.

Frequency: Standard types EP/EPT and DS-3/DT-3 transformers are designed for 60 Hertz operation only. Transformers required for other frequencies must be specifically designed.

Additional active material (conductor and iron) is needed for 50 Hertz designs. The basic transformer design equation offers the best explanation.

$$N = \frac{34.9 \times 10^5 \times E}{f \times A_{net} \times B}$$

transposing

$$f = \frac{34.9 \times 10^5 \times E}{N \times A_{net} \times B}$$

Where N = turns
E = volts on N turns
A = net magnetic cross section in^3
B = magnetic induction (gauss)
f = frequency

As shown above, for a specified induction or voltage, a lower frequency requires more N or A, or a compromise of both. The requirements call for additional conductor and iron.

Operating a 60 Hertz transformer at 50 Hertz causes 25 to 50 percent more iron loss plus an increase in the exciting current of two to three times and is not recommended.

Intermittent Loading: As the cycles of "overload followed by no load" become more frequent, the swings in temperature fluctuate less and the final temperature will be less.

You can take advantage of this situation by obtaining more than nameplate rating from the transformer for short periods of time.

The transformer rating for intermittent loading may be determined by the following equation:

$$\text{Equivalent Continuous Rating} = \frac{1 \times \text{Load (Overload)}}{1 + \frac{\text{time off}}{\text{time on}}}$$

The fractional number in front of "Load" always is less than one. Consequently, the transformer heating is less than if the load is steady state.

The transformer will not be damaged by the overload if the equation gives a value equal to or less than the rated Kva. The equation is most accurate when the "time off" plus "time on" is less than one hour.

Long periods of "on" — two to four hours — cause the transformer to approach a steady state temperature condition.

Other harmful effects are an increase in the noise level from 6 to 10 db and a temperature rise increase.

Overload Rating: Overload capacity is not deliberately designed into a transformer because the objective is to be within the allowed winding temperature rise with nameplate loading.

Therefore, an overload causes "over temperature." Its effect on the life of the transformer is dictated by time and temperature. A transformer's capacity permits overloading and repetitive overloads of a cyclic nature. When heat storage is involved, the overload capacity is proportionate to the weight of the magnetic circuit and the conductor material.

The temperature reached during overload also is affected by prior load history. If the overload temperature exceeds rated temperature briefly, perhaps two to four hours, no measurable shortening of insulation life occurs. It is difficult to be specific regarding transformer overload capacity because several factors are involved, including amount of overload, duration and size of transformer.

The most accurate assessment of reliability in an overload situation is that a Westinghouse dry type transformer will deliver 200% load for one-half hour, 150% for one hour and 125% load during a four-hour period without being damaged.

If overloading becomes a critical problem, we advise that you consult a Westinghouse representative and describe the related operation in detail.

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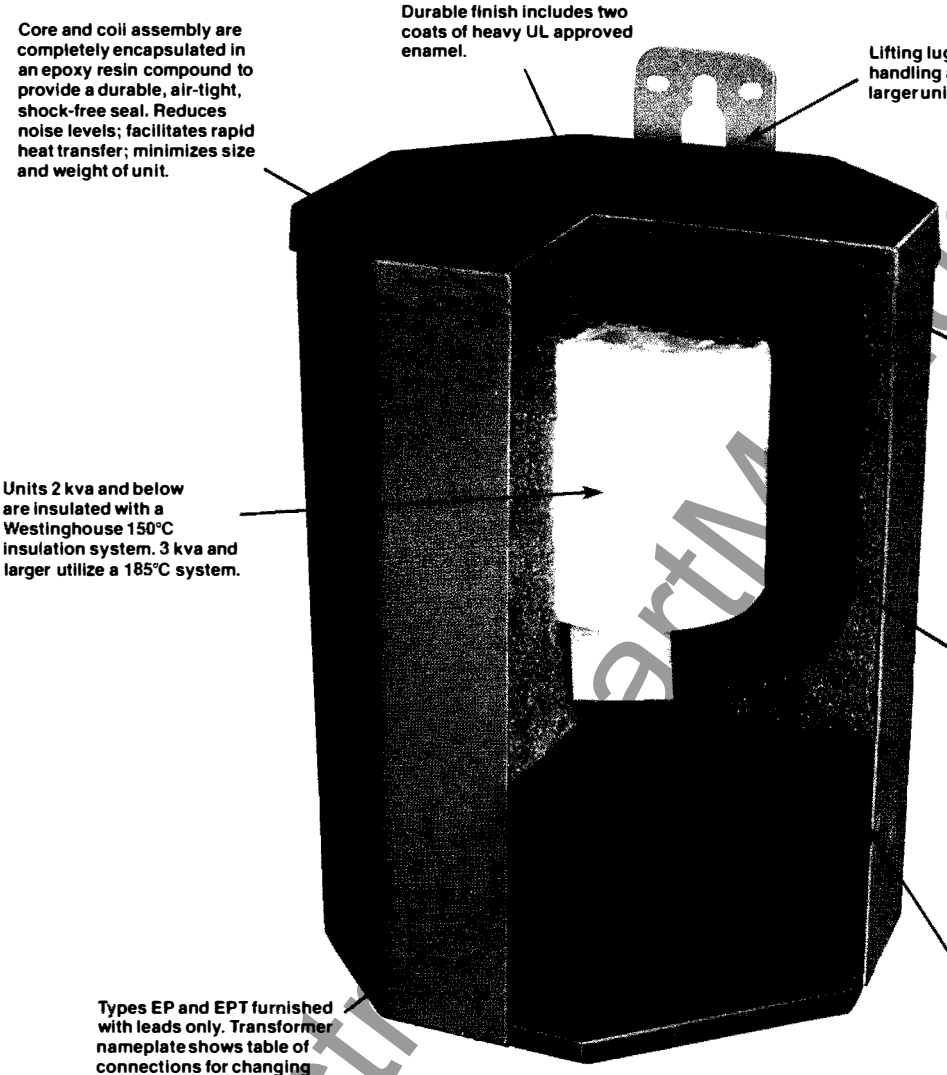
Type EP and EPT Transformer Features
.250 Kva-30 Kva



TYPE EP AND EPT Westinghouse Type EP and EPT transformers are air insulated and cooled by natural convection of air. Totally enclosed, non-ventilated design is suitable for indoor or outdoor applications.

SAFETY Type EP and EPT transformers are ideally suited for any indoor environment that is not subjected to submersion or to a high concentration of destructive fumes. No toxic gases are emitted by units, minimizing fire hazards. Totally enclosed design makes these units suitable for sensitive environments where safety, quiet operation, and continuous uninterrupted service are essential.

APPLICATION Type EP and EPT transformers are virtually maintenance free because there are no moving parts. Other advantages for installation in hospitals, schools, commercial complexes, industrial environments, and high rise buildings include low sound levels, low operating costs, safe, efficient operation, and minimum size and weight. The totally encapsulated design is a proven performer in A.C. power distribution.

INDUSTRY STANDARDS All Westinghouse Type EP and EPT transformers are built in accordance with the latest ASA, ANSI, NEMA and IEEE standards for transformers.

UL LISTED Units through 30 Kva, 3-phase and 25 Kva single phase, 600 volts and below are UL listed and bear the UL label. These transformers are designed and tested in strict accordance with UL-506 transformer standards. 2 Kva and below are UL listed for indoor applications only. Weathershields are not required for outdoor use on encapsulated units.

ELECTRICAL TESTING All units are 100% tested in accordance with applicable NEMA and ANSI standards.

Type EP Encapsulated Transformers
600 Volts and below, 2400-5000 Volts
.25 Kva-25 Kva, Single Phase, 60 Hertz

FIG. 1
2 Kva and below

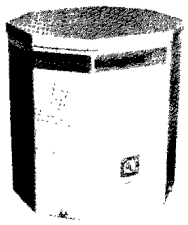


FIG. 2
3-25 Kva

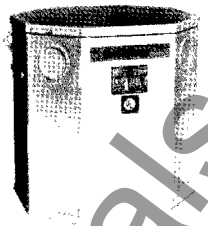


FIG. 3
25 Kva

Features • Specifications

- U.L. listed for indoor/outdoor mounting (600 volt class)
- Can be mounted in any position indoors. Outdoors mounts upright only
- All units 100% tested prior to being shipped.
- Constructed in accordance with NEMA, ANSI, ASA, and IEEE standards
- Totally enclosed-non-ventilated design permits installation in areas that contain dust, moisture or corrosive fumes
- As much as 40% smaller in cubic volume than equal Kva ratings in other dry-type designs
- Low sound levels permit installation in hospitals, hotels, schools and libraries.
- Large terminal compartment permits easier cable connections
- Immersion of core and coil in sand and resin provides rigid construction which attenuates sound and will withstand short circuit stresses up to 25 times normal load current for two seconds.

DIMENSIONS
For detailed dimensions, by frame number, refer to Westinghouse Technical Certification Section 46-770.

600 Volts and below

KVA	FIG.	H	W	D
.25	1	7 1/16	4 5/16	4 1/8
.5	1	7 1/16	4 7/8	4 5/8
.75	1	8 3/8	6	5 1/8
1	1	8 3/8	6	5 1/2
1.5	1	9 1/2	6 3/8	6 1/8
2	1	10 1/2	6 3/8	6 1/8
3	2	14 1/4	7 1/2	7 3/4
5	2	15 3/4	9 3/8	9
7.5	2	16	12	10 5/8
10	2	19	12	10 5/8
15	2	19	12	10 5/8
25	2	21 5/16	15 1/4	14 1/8
25*	3	17 1/4	15 17/32	13 5/8

2400 to 5000V

1.5	1	11 1/2	6 3/8	6 1/8
3	2	15 3/4	9 3/8	9
5	2	16	12	10 5/8
10	2	19	12	10 5/8
15	2	21 5/16	15 1/4	14 1/8
25	2	26 5/16	15 1/4	14 1/8

120 x 240 to 120 240V (No Taps)

KVA	CATALOG NUMBER	NT. WT.	MT.
1	Ⓢ S10N11S01M	26	W
1.5	Ⓢ S10N11S16M	36	W
2	Ⓢ S10N11S02M	40	W
3	Ⓢ S10N11S03M	48	W
5	Ⓢ S10N11S05M	75	W
7.5	Ⓢ S10N11S07M	102	W
10	S10N11S10M	128	W
15	S10N11S15M	158	W
25	S10N11S25M	247	W

208 to 120 240V (No Taps)

3	Ⓢ S29N11S03M	48	W
5	Ⓢ S29N11S05M	75	W
7.5	S29N11S07M	102	W
10	Ⓢ S29N11S10M	128	W
15	S29N11S15M	158	W
25	S29N11S25M	247	W

240 x 480 to 120 240V (No Taps)

.250	Ⓢ S20N11S26M	12	W
.500	Ⓢ S20N11S51M	13	W
.750	Ⓢ S20N11S76M	20	W
1	Ⓢ S20N11S01M	26	W
1.5	Ⓢ S20N11S16M	36	W
2	Ⓢ S20N11S02M	40	W
3	Ⓢ S20N11S03M	48	W
5	Ⓢ S20N11S05M	75	W
7.5	Ⓢ S20N11S07M	102	W
10	Ⓢ S20N11S10M	128	W
15	Ⓢ S20N11S15M	158	W
25	Ⓢ S20N11S25M	247	W

240 x 480 to 120 240V (1-10% x 2-5% FCBN Taps)

3	Ⓢ S20K11S03M	48	W
5	Ⓢ S20K11S05M	75	W
7.5	Ⓢ S20K11S07M	102	W
10	Ⓢ S20K11S10M	128	W

240 x 480 to 120 240V (2-5% x 4-2 1/2% FCBN Taps)

15	Ⓢ S20L11S15M	158	W
25	Ⓢ S20L11S25M	247	W

277 to 120 240V (No Taps)

3	S27N11S03M	48	W
5	S27N11S05M	75	W
7.5	S27N11S07M	102	W
10	S27N11S10M	128	W
15	S27N11S15M	158	W
25	S27N11S25M	247	W

480 to 120 240V (2-5% FCBN Taps)

1	Ⓢ S48G11S01M	26	W
1.5	Ⓢ S48G11S16M	36	W
2	Ⓢ S48G11S02M	40	W
3	Ⓢ S48G11S03M	48	W
5	Ⓢ S48G11S05M	75	W
7.5	Ⓢ S48G11S07M	102	W
10	Ⓢ S48G11S10M	128	W

For wiring diagrams refer to Westinghouse Technical Certification Section 46-771.

Ⓢ Normally stocked *Floor mounting only

For price information see Ⓦ Price List 46-720.

480 to 120 240V (2-5% FCBN Taps) — contd.

KVA	CATALOG NUMBER	NT. WT.	MT.
15	Ⓢ S48G11S15M	158	W
25	Ⓢ S48G11S25M	247	W

480 to 120 240V (2-2 1/2% FCAN and FCBN Taps)

3	Ⓢ S48D11S03M	48	W
5	Ⓢ S48D11S05M	75	W
7.5	Ⓢ S48D11S07M	102	W
10	Ⓢ S48D11S10M	128	W
15	Ⓢ S48D11S15M	158	W

480 to 120 240V (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

25	Ⓢ S48M11S25M	247	F*

600 to 120V (No Taps)

.250	Ⓢ S60N12S26M	12	W
.500	Ⓢ S60N12S51M	13	W
.750	Ⓢ S60N12S76M	20	W

600 to 120 240V (No Taps)

3	Ⓢ S60N11S03M	48	W
5	Ⓢ S60N11S05M	75	W
7.5	Ⓢ S60N11S07M	102	W
10	Ⓢ S60N11S10M	128	W
15	S60N11S15M	158	W

600 to 120 240V (2-5% FCBN Taps)

1	Ⓢ S60G11S01M	26	W
1.5	Ⓢ S60G11S16M	36	W
2	Ⓢ S60G11S02M	40	W
3	Ⓢ S60G11S03M	48	W
5	Ⓢ S60G11S05M	75	W
7.5	Ⓢ S60G11S07M	102	W
10	Ⓢ S60G11S10M	128	W

600 to 120 240V (4-2 1/2% FCBN Taps)

15	Ⓢ S60J11S15M	158	W
25	Ⓢ S60J11S25M	247	W

600 to 120 240V (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

25	Ⓢ S60M11S25M	247	F*

2400 to 120 240V (No Taps)

1.5	Ⓢ S42N11S16M	40	W
3	S42N11S03M	75	W
5	S42N11S05M	114	W
10	S42N11S10M	158	W
15	S42N11S15M	247	W
25	S42N11S25M	375	W

2400 to 120 240V (4-2 1/2% FCBN Taps)

3	Ⓢ S42J11S03M	75	W
5	Ⓢ S42J11S05M	114	W
10	S42J11S10M	158	W
15	S42J11S15M	247	W
25	S42J11S25M	375	W

4160 to 120 240V (No Taps)

1.5	Ⓢ S46N11S16M	40	W

4160 to 120 240V (4-2 1/2% FCBN Taps)

3	Ⓢ S46J11S03M	75	W
5	Ⓢ S46J11S05M	114	W

NOTE: Discount symbol STD-1 applies to type EP Catalog Numbers beginning with letter S.

Type EPT Encapsulated Transformers
600 Volts and below, 2400-5000 Volts
3 Kva-30 Kva, Three Phase, 60 Hertz

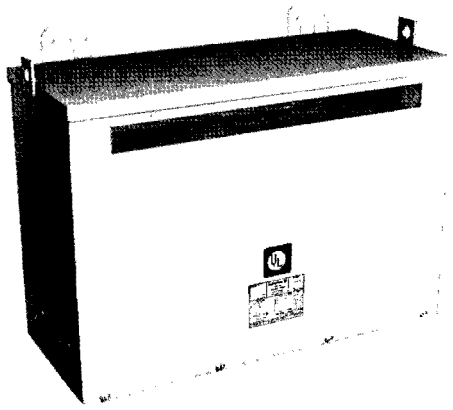


FIG. 1
3-15 Kva

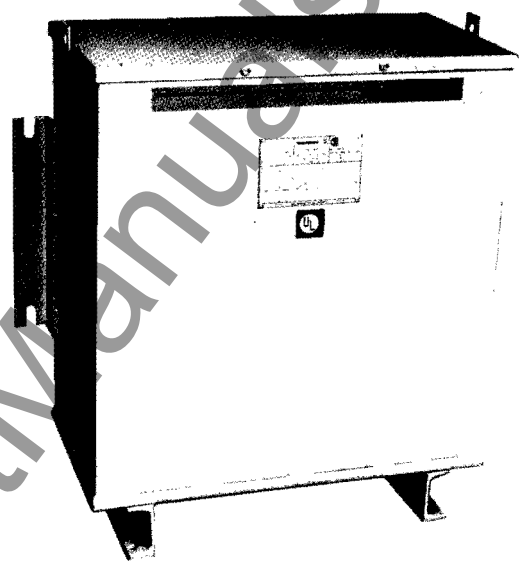


FIG. 2
30 Kva

Features • Specifications

- U.L. listed for indoor/outdoor service (600 volt class).
- 115°C rise 185°C total insulation system.
- 15 Kva and below has terminal compartment on the bottom.
- 30 Kva has terminal compartment at top. No knockouts.
- Lifting holes are provided.
- Flexible leads built into the unit for ease of making connections.

DIMENSIONS
For detailed dimensions, by frame number, refer to Westinghouse Technical Certification Section 46-770.

600 Volts and below

KVA	FIG.	H	W	D
3	1	13 3/8	15 15/16	8 5/16
6	1	15 7/8	16 3/8	7 1/2
9	1	15 7/8	16	9 1/16
15	1	17 3/8	20	8 11/16
30	2	26 5/8	25 1/8	12 3/4

2400 to 5000V

3	1	13 1/8	19 9/16	6 1/4
6	1	14 15/16	21 7/8	7 3/8
9	1	15 15/16	25 3/4	8 3/8
15	1	20 3/4	21 11/16	11 5/16
30	2	27 11/16	12	20 11/16

480Δ to 208Y 120V (No Taps)

KVA	CATALOG NUMBER	NT. WT.	MT.
3	Ⓢ **Y48N28T03M**	70	W
6	Ⓢ **Y48N28T06M**	115	W
9	Ⓢ **Y48N28T09M**	160	W
15	Ⓢ **Y48N28T15M**	210	W

480Δ to 208Y 120V (2-5% FCBN Taps)

3	Ⓢ **Y48G28T03M**	70	W
6	Ⓢ **Y48G28T06M**	115	W
9	Ⓢ **Y48G28T09M**	160	W
15	Ⓢ **Y48G28T15M**	210	W

480Δ to 208Y 120V (4-2 1/2% FCBN Taps)

9	Ⓢ **Y48J28T09M**	160	W
15	Ⓢ **Y48J28T15M**	210	W

480Δ to 208Y 120V (2-2 1/2% FCAN and FCBN Taps)

6	Ⓢ **Y48D28T06M**	115	W
9	Ⓢ **Y48D28T09M**	160	W
15	Ⓢ **Y48D28T15M**	210	W

480Δ to 208Y 120V (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

30	Ⓢ **Y48M28T30M**	422	W/F

480Δ to 240VΔ (2-5% FCBN Taps)

3	Ⓢ **Y48G24T03M**	70	W
6	Ⓢ **Y48G24T06M**	115	W

480Δ to 240VΔ (4-2 1/2% FCBN Taps)

9	Ⓢ **Y48J24T09M**	160	W
15	Ⓢ **Y48J24T15M**	210	W

For wiring diagrams refer to Westinghouse Technical Certification Section 46-771

Ⓢ Normally stocked

For price information see Ⓦ Price List 46-720.

480Δ to 240VΔ (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

KVA	CATALOG NUMBER	NT. WT.	MT.
30	Ⓢ **Y48M24T30M**	422	W/F

480Δ to 480Y 277V (2-2 1/2% FCAN and 2-2 1/2% FCBN Taps)

9	**Y48D47T09M**	160	W
15	**Y48D47T15M**	210	W

480Δ to 480Y 277V (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

30	**Y48M47T30M**	422	W/F

600Δ to 208Y 120V (2-5% FCBN Taps)

9	Ⓢ **Y60G28T09M**	160	W
15	Ⓢ **Y60G28T15M**	210	W

600Δ to 208Y 120V (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

30	Ⓢ **Y60M28T30M**	422	W/F

600Δ to 240VΔ (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

30	**Y60M24T30M**	422	W/F

2400Δ to 208Y 120V (2-2 1/2% FCAN and FCBN Taps)

3	**Y42D28T03M**	115	W
6	**Y42D28T06M**	160	W
9	**Y42D28T09M**	210	W
15	**Y42D28T15M**	340	W
30	**Y42D28T30M**	475	F

4160Δ to 208Y 120V (2-2 1/2% FCAN and FCBN Taps)

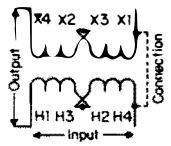
3	**Y46D28T03M**	115	W
6	**Y46D28T06M**	160	W
9	**Y46D28T09M**	210	W
15	**Y46D28T15M**	340	W
30	**Y46D28T30M**	475	F

NOTE: Discount symbol STD-1 applies to type EPT Catalog Numbers beginning with letter Y.

Type EP Encapsulated Transformers
BOOST Transformers, 600 Volts and below
Single Phase and Three Phase Wye

SINGLE PHASE

Dia. 1



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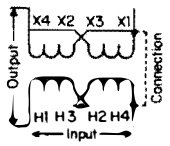
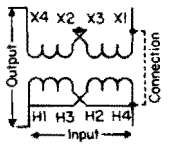
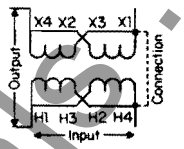


Dia. 3

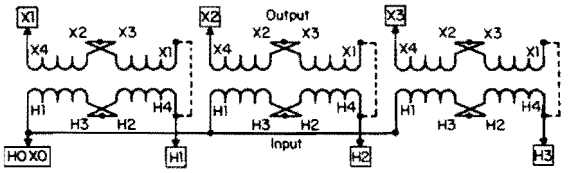


Dia. 4

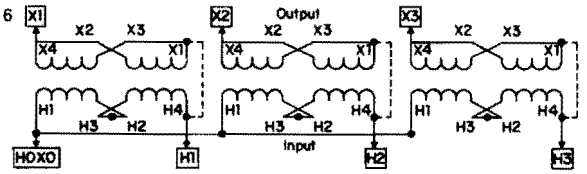


THREE PHASE

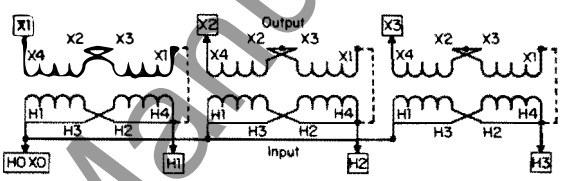
Dia. 5



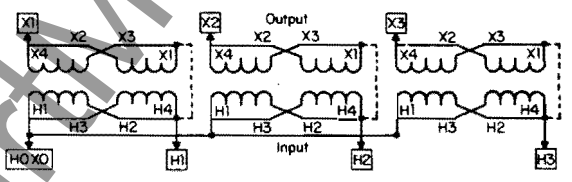
Dia. 6



Dia. 7



Dia. 8



DESCRIPTION
BUCK and BOOST
Type EP Single Phase 60 Hertz
150 C Insulation System, 1 — 2 Kva
185 C Insulation System, 3 — 7½ Kva

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.

KVA	CATALOG NUMBER 120 x 240 to 12/24 Volts	CATALOG NUMBER 120 x 240 to 16/32 Volts	FRAME NO. ①
.250	S10N04A26M	S10N06A26M	202
.500	S10N04A51M	S10N06A51M	71
.750	S10N04A76M	S10N06A76M	72
1	S10N04A01M②	S10N06A01M	73
1.5	S10N04A16M②	S10N06A16M	74
2	S10N04A02M	S10N06A02M	75B
3	S10N04A03M	S10N06A03M	176
5	S10N04A05M	S10N06A05M	177
7.5	S10N04A07M	S10N06A07M	178

VOLTAGES	SINGLE PHASE				THREE PHASE⑥				CATALOG NUMBER
INPUT	240	240	120	120	416	416	208	208	
OUTPUT③	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	S10N04A03M⑤
	55.0	106.0	30.0	55.0	165.0	318.0	90.0	165.0	S10N04A05M⑤†
	82.5	157.5	45.0	82.5	247.5	472.5	135.0	247.5	S10N04A07M⑤†

VOLTAGES	SINGLE PHASE				THREE PHASE⑥				CATALOG NUMBER
INPUT	240	240	120	120	416	416	208	208	
OUTPUT③	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	S10N06A03M⑤
	42.4	80.0	23.7	42.4	127.2	240.0	71.1	127.2	S10N06A05M⑤†
	63.7	120.0	35.6	63.7	191.2	360.0	106.8	191.2	S10N06A07M⑤†
†Non UL Listed	Dia. 1	Dia. 2	Dia. 3	Dia. 4	Dia. 5	Dia. 6	Dia. 7	Dia. 8	

① For detailed dimensions, by frame number, refer to Westinghouse Technical Certification Section 46-770.

② These frame numbers have a B suffix. Example: S10N04A01M frame number is 73B.

③ Output voltage for lower input voltage can be found by: $\frac{\text{rated output voltage}}{\text{rated input voltage}} \times \text{actual input voltage} = \text{new output voltage}$

④ Output kva available at reduced input voltage can be found by: $\frac{\text{actual input voltage}}{\text{rated input voltage}} \times \text{output kva} = \text{new kva rating}$

⑤ When used in a three phase connection, the addition of a wiring trough is recommended.

⑥ For three phase, order three units.

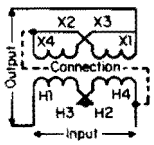
NOTE: Discount symbol STD-1 applies to BUCK and BOOST transformers.

For price information see Ⓦ Price List 46-920.

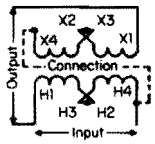
Type EP Encapsulated Transformers
BUCK Transformers, 600 Volts and below
Single Phase and Three Phase WYE

SINGLE PHASE

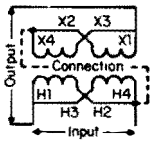
Dia. 9



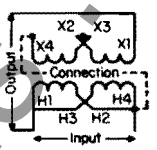
Dia. 10



Dia. 11

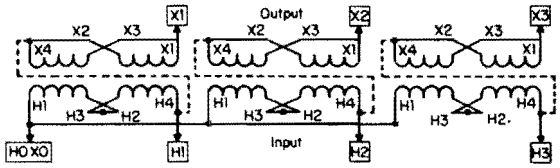


Dia. 12

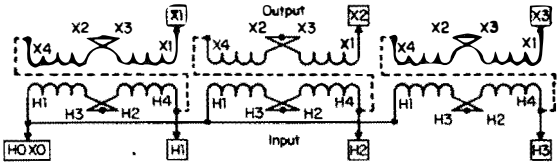


THREE PHASE

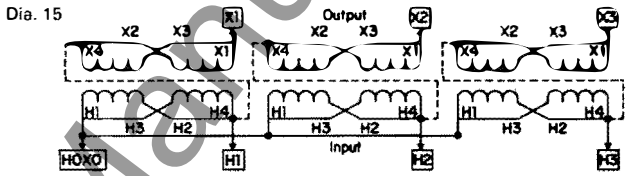
Dia. 13



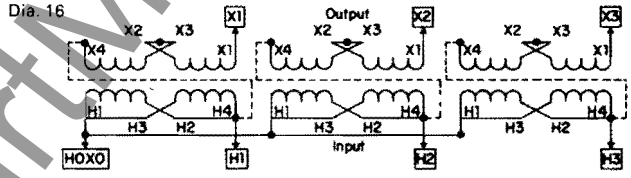
Dia. 14



Dia. 15



Dia. 16



Choosing the Correct Catalog Number

STEP ONE
Determine the load Kva, load line voltage and phase plus the source line voltage and phase.

STEP TWO
Consult the Buck and Boost tables for matching input and output voltages in the appropriate single or three phase columns.

STEP THREE
Under the appropriate column, read down and choose a Kva slightly larger than the load Kva.

STEP FOUR
The corresponding catalog number for the selected Kva is located in the far right hand column. (Three phase requires three units.) Connect the Buck and Boost transformer you have selected per the connection diagram specified in the voltage column.

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

Quote three S 10 N 04 A 02 M to be connected per diagram 16 above.

VOLTAGES	SINGLE PHASE				THREE PHASE⑥				CATALOG NUMBER
INPUT	240	240	120	120	416	416	208	208	
OUTPUT③	228	216	108	96	394	374	187	166	
	Load Kva When Connected as Autotransformer ④								
	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	S10N04A03M⑤
	95.0	45.0	45.0	20.0	285.0	135.0	135.0	60.0	S10N04A05M⑤†
	142.5	67.5	67.5	30.0	427.5	202.5	202.5	90.0	S10N04A07M⑤†

VOLTAGES	SINGLE PHASE				THREE PHASE⑥				CATALOG NUMBER
INPUT	240	240	120	120	416	416	208	208	
OUTPUT③	224	208	104	88	388	360	180	152	
	Load Kva When Connected as Autotransformer ④								
	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	S10N06A03M⑤
	70.0	32.5	32.5	13.7	210.0	97.2	97.2	41.1	S10N06A05M⑤†
	105.0	48.7	48.7	20.6	315.0	146.2	146.2	61.8	S10N06A07M⑤†
†Non UL Listed	Dia. 9	Dia. 10	Dia. 11	Dia. 12	Dia. 13	Dia. 14	Dia. 15	Dia. 16	

① For detailed dimensions, by frame number, refer to Westinghouse Technical Certification Section 46-770.

② These frame numbers have a B suffix. Example: S1ⓄN04AⓄ1M frame number is 73B

③ Output voltage for lower input voltage can be found by:
$$\frac{\text{rated output voltage}}{\text{rated input voltage}} \times \text{actual input voltage} = \text{new output voltage}$$

④ Output kva available at reduced input voltage can be found by:
$$\frac{\text{actual input voltage}}{\text{rated input voltage}} \times \text{output kva} = \text{new kva rating}$$

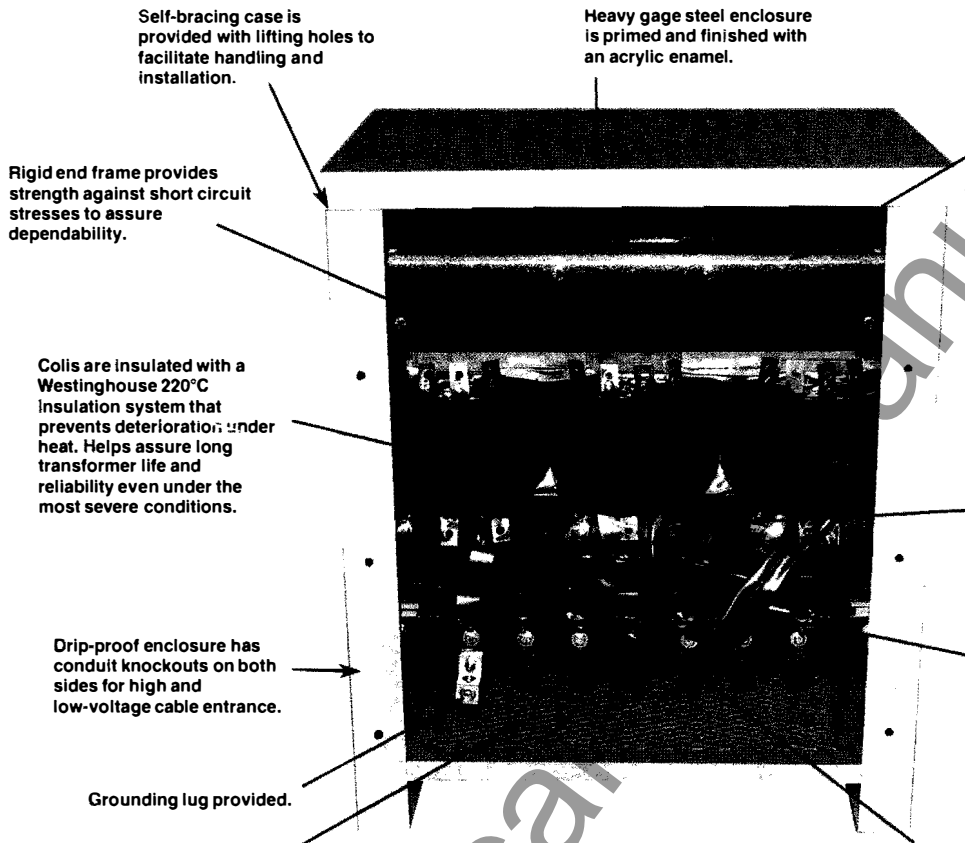
⑤ When used in a three phase connection, the addition of a wiring trough is recommended

⑥ For three phase, order three units.

NOTE: Discount symbol STD-1 applies to BUCK and BOOST transformers.

For price information see Ⓦ Price List 46-920.

Dry Type Ventilated
Type DS-3 and DT-3 Transformer Features
30 Kva-1500 Kva



TYPE DS-3 and DT-3 Westinghouse Type DS-3 and DT-3 transformers are ventilated at the top and bottom of the transformer case to allow for cooling by the surrounding air entering and exiting from the enclosure. The temperature rise refers to the current carrying conductors inside the coil windings, not the outside surface. However, the ventilated design keeps case temperatures at a minimum acceptable level for 30 kva thru 1500 kva.

SAFETY Type DS-3 and DT-3 transformers are suited for both indoor and outdoor environments. When used outdoors, field installed weathershields are required in order to comply with NEMA 3R enclosure requirements. High temperature insulation materials include silicone resins rated as self-extinguishing Class 1 rating. When operated within recommended local ratings for continuous operation, these units will not exceed the 50°C rise over a 40°C maximum ambient established by UL as the maximum surface temperature limit. Allowing for proper installation and adequate air flow, these units will assure conformance with UL electrical safety installation practices. Units may be installed in practically any indoor location not subject to submersion or to a high concentration of destructive fumes. No toxic gases are emitted by the units, minimizing fire hazards.

APPLICATION Virtually maintenance free because there are no moving parts. Type DS-3 and DT-3 transformers offer installed advantages of long, low term operating costs, low sound levels, installation flexibility, quality construction, 100% testing, and safe and efficient operating characteristics. Units are ideally suited for a wide array of building environments. The ventilated design, like the encapsulated design, is a proven performer in A.C. power distribution.

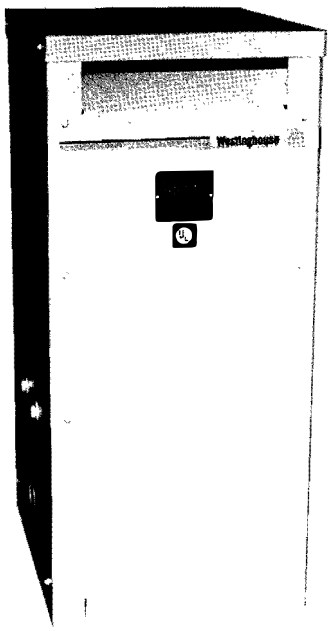
INDUSTRY STANDARDS All Westinghouse type DS-3 and DT-3 transformers are built in accordance with the latest ASA, ANSI, NEMA, and IEEE standards for transformers.

UL LISTED All units 600 volts and below and 1000 kva and below are UL listed.

ELECTRICAL TESTING All units are 100% tested in accordance with applicable NEMA and ANSI standards.

Type DS-3 Ventilated Transformers

600 Volts and below, 2400-5000 Volts
37.5 Kva-500 Kva, Single Phase, 60 Hertz



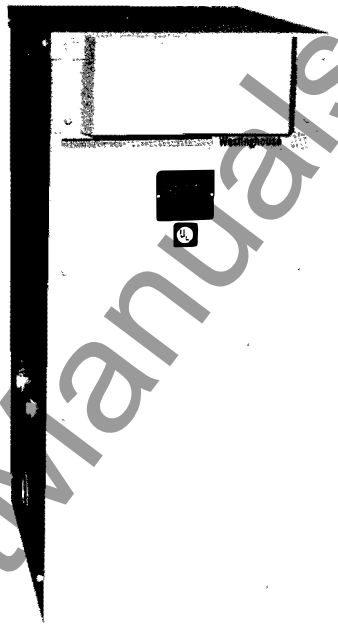


FIG. 1 **With Weathershields attached (Front and Back)**

Features • Specifications

- UL listed (600 volt class) 37.5 Kva thru 167 Kva
- 150° rise — 220°C total insulation system
- Drip proof enclosure has conduit knockouts on both sides for high and low voltage cable entrance
- Core is constructed from stacked laminations that are braced and dipped in resin to assure quiet operation
- Manufactured in accordance with NEMA, ANSI, ASA, and IEEE standards
- 100% tested to meet ANSI and NEMA sound levels

DIMENSIONS
For detailed dimensions, by frame number, refer to Westinghouse Technical Certification Section 46-770.

600 Volts and below

KVA	FIG.	H	W	D
37.5	1	27 1/2	15 3/8	19 1/4
50	1	37	16 1/2	21 1/2
75	1	41 1/4	21	23 1/2
100	1	41 1/4	21	23 1/2
167	1	63	30	34
250	1	63	30	34
333	1	75	37	43
500	1	75	37	43

2400 to 5000V

37.5	1	27 1/2	15 3/8	19 1/4
50	1	41 1/4	21	23 1/2
75	1	41 1/4	21	23 1/2
100	1	41 1/4	21	23 1/2
167	1	63	30	34
250	1	63	30	34
333	1	75	37	43
500	1	75	37	43

① For transformers with weathershields (see accessory page 20 for weathershield catalog numbers) 37.5-167 kva, add 2 inches to Depth (D) dimension

120 x 240 to 120 240V (No Taps)

KVA	CATALOG NUMBER	NT. WT.	MT.
37.5	**T10N11S37C**	275	F
50	**T10N11S50B**	360	F

240 x 480 to 120 240V (No Taps)

37.5	Ⓢ **T20N11S37D**	275	F
50	Ⓢ **T20N11S50D**	360	F

240 x 480 to 120 240V (2-5% x 4-2 1/2% FCBN Taps)

37.5	Ⓢ **T20L11S37D**	275	F
50	Ⓢ **T20L11S50C**	360	F
75	Ⓢ **T20L11S75B**	500	F
100	Ⓢ **T20L11S99B**	610	F
167	**T20L11S67B**	1100	F

277 to 120 240V (No Taps)

37.5	**T27N11S37C**	275	F
50	**T27N11S50B**	360	F
75	**T27N11S75B**	500	F
100	**T27N11S99B**	610	F

480 to 120 240V (2-2 1/2% FCAN and 4-2 1/2% FCBN Taps)

37.5	Ⓢ **T48M11S37D**	275	F
50	Ⓢ **T48M11S50D**	360	F
75	Ⓢ **T48M11S75D**	500	F
100	Ⓢ **T48M11S99B**	610	F
167	Ⓢ **T48M11S67B**	1100	F
250	**T48M11S52A**	1350	F

480 to 240 120V (1-5% FCAN and 2-5% FCBN Taps)

333	**T48R22S54A**	2350	F
500	**T48R22S55A**	2950	F

600 to 120 240V (2-2 1/2% FCAN and 4-2 1/2% FCBN Tap)

37.5	Ⓢ **T60M11S37B**	275	F
50	Ⓢ **T60M11S50B**	360	F
75	Ⓢ **T60M11S75C**	500	F
100	**T60M11S99A**	610	F
167	**T60M11S67A**	1100	F

For wiring diagrams refer to Westinghouse Technical Certification Section 46-771.

Ⓢ Normally stocked

For price information see Ⓦ Price List 46-720.

2400 to 120 240V (2-2 1/2% FCAN and FCBN Taps)

KVA	CATALOG NUMBER	NT. WT.	MT.
37.5	**T42D11S37B**	275	F
50	**T42D11S50C**	360	F
75	**T42D11S75C**	500	F
100	**T42D11S99B**	610	F
167	**T42D11S67C**	1200	F

2400 to 240 480V (2-2 1/2% FCAN and FCBN Taps)

37.5	**T42D21S37B**	275	F
50	Ⓢ **T42D21S50C**	360	F
75	Ⓢ **T42D21S75C**	500	F
100	**T42D21S99B**	610	F
167	**T42D21S67D**	1200	F
250	**T42D21S52B**	1500	F

2400 to 600V (2-2 1/2% FCAN and FCBN Taps)

37.5	**T42D60S37B**	275	F
50	**T42D60S60B**	360	F
75	**T42D60S75B**	500	F
100	**T42D60S99B**	610	F

4160 to 120 240V (2-2 1/2% FCAN and FCBN Taps)

37.5	**T46D11S37B**	275	F
50	**T46D11S50C**	360	F
75	**T46D11S75C**	500	F
100	**T46D11S99B**	610	F
167	**T46D11S67C**	1200	F

4160 to 240 480V (2-2 1/2% FCAN and FCBN Taps)

37.5	**T46D21S37B**	275	F
50	**T46D21S50C**	360	F
75	**T46D21S75C**	500	F
100	**T46D21S99B**	610	F

NOTE: Discount symbol STD-2 applies to type DS-3 Catalog Numbers beginning with letter T.

Type DT-3 Ventilated Transformers 150°C Rise

600 Volts and below, 2400-5000 Volts
30 Kva-1500 Kva, Three Phase, 60 Hertz

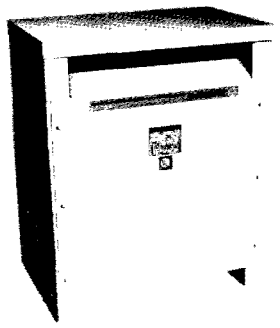
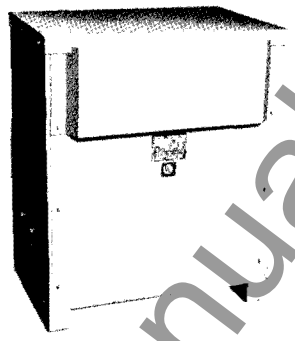


FIG. 1



With Weathershields attached (Front and Back)

Features • Specifications

- UL listed (600 volt class) 30 KVA thru 1000 KVA
- 150°C rise — 220°C total insulation system
- Drip proof enclosure has conduit knockouts on both sides for high and low voltage cable entrance
- Core is constructed from stacked laminations that are braced and dipped in resin to assure quiet operation
- All ratings are constructed in accordance with NEMA, ANSI, ASA and IEEE standards
- 100% tested to meet ANSI and NEMA sound levels
- The ventilated designs are furnished with terminal straps only.
- Front and rear panels are provided for easy installation and maintenance.

DIMENSIONS

For detailed dimensions, by frame number, refer to Westinghouse Technical Certification Section 46-770.

600 Volts and below

KVA	FIG.	H	W	D
30	1	29 1/4	24	15 3/4
37.5	1	29 1/4	24	15 3/4
45	1	29 1/4	24	15 3/4
50	1	38 3/8	28	19 1/4
75	1	38 3/8	28	19 1/4
112.5	1	38 3/8	28	19 1/4
150	1	45	31 5/8	22 1/8
225	1	50	34 1/4	26 1/4
300	1	50	34 1/4	26 1/4
500	1	75	44	36
750	1	75	44	36
1000	1	90	53	36
1500	1	90	57	43

2400 to 5000V

45	1	38 3/8	28	19 1/4
75	1	38 3/8	28	19 1/4
112.5	1	45	31 5/8	22 1/8
150	1	50	34 1/4	26 1/4
225	1	50	34 1/4	26 1/4
300	1	50	34 1/4	26 1/4
500	1	75	44	36
750	1	75	44	36
1000	1	90	53	36
1500	1	90	57	43

① For transformers with weathershields (see accessory page 20 for weathershield catalog numbers) 30-300 kva, add 2 inches to Depth (D) dimension. 500-1500 kva, add 6 inches to depth (D) dimension.

480Δ to 208Y 120V (2-2½% FCAN and 4-2½% FCBN Taps)

KVA	CATALOG NUMBER	NT. WT.	MT.
30	Ⓢ V48M28T30H	450	F
37.5	Ⓢ V48M28T37H	500	F
45	Ⓢ V48M28T45H	500	F
50	Ⓢ V48M28T50G	650	F
75	Ⓢ V48M28T75G	650	F
112.5	Ⓢ V48M28T12F	850	F
150	Ⓢ V48M28T49H	950	F
225	Ⓢ V48M28T22J	1250	F
300	Ⓢ V48M28T33H	1500	F
500	Ⓢ V48M28T55D	2085	F
750	Ⓢ V48M28T77E	3100	F
1000	Ⓢ V48M28T11E	4800	F

480Δ to 240VΔ (2-2½% FCAN and 4-2½% FCBN Taps)

45	Ⓢ V48M24T45G	500	F
75	Ⓢ V48M24T75F	650	F
112.5	Ⓢ V48M24T12E	850	F
150	Ⓢ V48M24T49G	950	F
225	Ⓢ V48M24T22G	1250	F
300	Ⓢ V48M24T33F	1500	F
500	V48M24T55C	2085	F
750	V48M24T77B	3100	F
1000	V48M24T11B	4800	F

480Δ to 480Y 277V (2-2½% FCAN and 4-2½% FCBN Taps)

45	Ⓢ V48M47T45F	500	F
75	Ⓢ V48M47T75E	650	F
112.5	Ⓢ V48M47T12D	850	F
150	Ⓢ V48M47T49E	950	F
225	Ⓢ V48M47T22E	1250	F
300	Ⓢ V48M47T33D	1500	F
500	Ⓢ V48M47T55A	2085	F

600Δ to 208Y 120V (2-2½% FCAN and 4-2½% FCBN Taps)

45	Ⓢ V60M28T45G	500	F
75	Ⓢ V60M28T75F	650	F
112.5	V60M28T12D	850	F
150	V60M28T49D	950	F
225	V60M28T22D	1250	F
300	V60M28T33D	1500	F

600Δ to 240V Δ (2-2½% FCAN and 4-2½% FCBN Taps)

45	Ⓢ V60M24T45G	500	F
75	Ⓢ V60M24T75F	650	F
112.5	V60M24T12D	850	F
150	V60M24T49D	950	F
225	V60M24T22D	1250	F
300	V60M24T33D	1500	F

For wiring diagrams refer to Westinghouse Technical Certification Section 46-771.

Ⓢ Normally stocked

For price information see Ⓦ Price List 46-720.

2400Δ to 208Y 120V (2-2½% FCAN and FCBN Taps)

KVA	CATALOG NUMBER	NT. WT.	MT.
45	V42D28T45D	500	F
75	V42D28T75D	650	F
112.5	V42D28T12D	850	F
150	V42D28T49E	950	F
225	V42D28T22D	1250	F
300	V42D28T33D	1500	F
500	V42D28T55D	2085	F
750	V42D28T77C	3100	F
1000	V42D28T11B	4800	F

2400Δ to 480Y 277V (2-2½% FCAN and FCBN Taps)

45	V42D47T45C	500	F
75	V42D47T75C	650	F
112.5	V42D47T12C	850	F
150	V42D47T49C	950	F
225	V42D47T22C	1250	F
300	V42D47T33C	1500	F

4160Δ to 208Y 120V (2-2½% FCAN and FCBN Taps)

45	Ⓢ V46D28T45E	500	F
75	Ⓢ V46D28T75E	650	F
112.5	Ⓢ V46D28T12E	850	F
150	Ⓢ V46D28T49G	950	F
225	Ⓢ V46D28T22F	1250	F
300	Ⓢ V46D28T33F	1500	F
500	Ⓢ V46D28T55E	2085	F
750	Ⓢ V46D28T77D	3100	F
1000	V46D28T11D	4800	F
1500	V46D28T14B	6000	F

4160Δ to 240V Δ (2-2½% FCAN and FCBN Taps)

45	V46D24T45C	500	F
75	V46D24T75C	650	F
112.5	V46D24T12C	850	F
150	V46D24T49D	950	F
225	V46D24T22C	1250	F
300	V46D24T33C	1500	F

4160Δ to 480Y 277V (2-2½% FCAN and FCBN Taps)

45	V46D47T45C	500	F
75	V46D47T75C	650	F
112.5	V46D47T12C	850	F
150	V46D47T49D	950	F
225	Ⓢ V46D47T22E	1250	F
300	Ⓢ V46D47T33E	1500	F
500	Ⓢ V46D47T55E	2085	F
750	Ⓢ V46D47T77D	3100	F
1000	Ⓢ V46D47T11D	4800	F
1500	V46D47T14B	6000	F

NOTE: Discount symbol STD-2 applies to type DT-3 Catalog Numbers beginning with letter V.

Shielded Isolation Transformers
600 Volts and below-60 Hertz
3 Kva-500 Kva

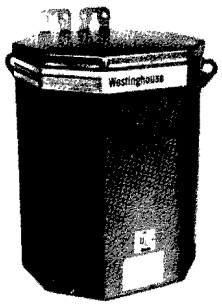


FIG. 1
TYPE EP

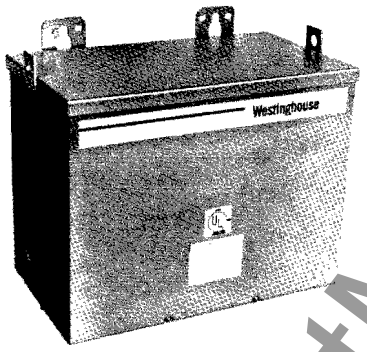


FIG. 2
TYPE EPT

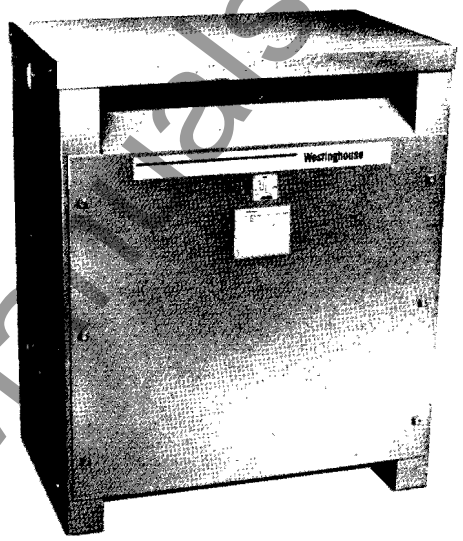


FIG. 3
TYPE DT-3

Description

Contaminated electrical systems are a growing concern to users of electronic equipment. Transients and electrical noise often found in the power source can be detrimental to the operation of this electronic equipment, hence the need for some protection. Some electrical installations, especially hospital operating rooms, X-ray rooms and computer applications, require complete isolation of electrical apparatus. Other sensitive loads include communications equipment, data processing, programmable controllers and instrumentation components. Protection for these systems can be expensive, or it can be economical. This is determined by the amount of protection selected to correct a problem.

Effective and economical protection is provided by a shielded isolation transformer. The Westinghouse shielded isolation transformers:

- Suppress high-frequency signals between the supply line and ground from reaching sensitive electronic equipment.
- Prevent electrical disturbances from being transmitted to load circuits.
- Contribute to attenuation ratio of 100:1 for suppression of common mode noise.

SINGLE PHASE, 3 KVA — 25 KVA

120 to 120V (No Taps)

KVA	CATALOG NUMBER	FIG.	NT. WT.	MT.
3	**S12N12E03M**	1	48	W
5	**S12N12E05M**	1	75	W
7.5	**S12N12E07M**	1	102	W
10	**S12N12E10M**	1	128	W
15	**S12N12E15M**	1	158	W
25	**S12N12E25M**	1	247	W

240 to 240V (No Taps)

3	**S24N24E03M**	1	48	W
5	**S24N24E05M**	1	75	W
7.5	**S24N24E07M**	1	102	W
10	**S24N24E10M**	1	128	W
15	**S24N24E15M**	1	158	W
25	**S24N24E25M**	1	247	W

277 to 120/240V (No Taps)

3	**S27N11E03M**	1	48	W
5	**S27N11E05M**	1	75	W
7.5	**S27N11E07M**	1	102	W
10	**S27N11E10M**	1	128	W
15	**S27N11E15M**	1	158	W
25	**S27N11E25M**	1	247	W

208 to 120/240V (No Taps)

3	**S29N11E03M**	1	48	W
5	**S29N11E05M**	1	75	W
7.5	**S29N11E07M**	1	102	W
10	**S29N11E10M**	1	128	W
15	**S29N11E15M**	1	158	W
25	**S29N11E25M**	1	247	W

① 9 and 15 Kva have two 2½% FCAN and two 2½% FCBN Taps.

● 30, 45 and 75 Kva have two 2½% FCAN and four 2½% FCBN taps.

THREE PHASE, 9 KVA — 500 KVA

208V Δ to 208Y 120V (1-5% FCAN and 2-5% FCBN)

KVA	CATALOG NUMBER	FIG.	NT. WT.	MT.
15	**Y29D28E15A①**	2	225	F
30	Ⓢ **V29M28E30A②**	3	450	F
45	Ⓢ **V29M28E45A②**	3	500	F
75	Ⓢ **V29M28E75A②**	3	650	F
112.5	**V29R28E12A**	3	850	F
150	**V29R28E49A**	3	950	F
225	**V29R28E22A**	3	1250	F
300	**V29R28E33A**	3	1500	F

480V Δ to 208Y 120V (2-2½% FCAN and 4-2½% FCBN)

9	**Y48D28E09M①**	2	160	W
15	**Y48D28E15A①**	2	225	F
30	Ⓢ **V48M28E30A**	3	450	F
45	Ⓢ **V48M28E45A**	3	500	F
75	Ⓢ **V48M28E75A**	3	650	F
112.5	**V48M28E12A**	3	850	F
150	**V48M28E49A**	3	950	F
225	**V48M28E22A**	3	1250	F
300	**V48M28E33A**	3	1500	F
500	**V48M28E55A**	3	2085	F

480V Δ to 480Y 277 (2-2½% FCAN and 4-2½ FCBN)

9	**Y48D47E09M●**	2	160	W
15	**Y48D47E15A①**	2	225	F
30	**V48M47E30A**	3	450	F
45	**V48M47E45A**	3	500	F
75	**V48M47E75A**	3	650	F
112.5	**V48M47E12A**	3	850	F
150	**V48M47E49A**	3	950	F
225	**V48M47E22A**	3	1250	F
300	**V48M47E33A**	3	1500	F
500	**V48M47E55A**	3	2085	

NOTE: Discount symbol STD-1 applies to types EP, EPT Catalog Numbers beginning with letters S or Y. Discount symbol STD-2 applies to type DT-3 Catalog Numbers beginning with letter V.

For price information see Ⓢ Price List 46-920.

80°C Rise-115°C Rise Transformers
600 Volts and below
30 Kva-500 Kva, Three Phase, 60 Hertz

Description

The 80/115 TX Dry Type Transformers are UL listed and labeled, and utilize a UL recognized 220°C insulation system which features an 80°C or a 115°C temperature rise. Each unit is designed for floor mounting and indoor service. Weathershields are available for outdoor service.

These transformers are most effective when applied to systems requiring loading factors of 85 to 100 percent of nameplate rating 24 hours a day.

DIMENSIONS — 80°C RISE

KVA	H	W	D
30	29 1/4"	24"	15 3/4"
45	38 3/8	28	19 1/4
75	38 3/8	28	19 1/4
112.5	45	32 1/2	22 1/2
150	50	35	26 1/2
225	50	35	26 1/2
300	75	44	36
500	90	53	36

115°C RISE

KVA	H	W	D
30	29 1/4	24	15 3/4
45	29 1/4	24	15 3/4
75	38 3/8	28	19 1/4
112.5	38 3/8	28	19 1/4
150	45	32 1/2	22 1/2
225	50	35	26 1/2
300	50	35	26 1/2
500	75	44	36

① For transformers with weathershields (see accessory page 20 for weathershield catalog numbers). For the addition of weathershields 783C426H05 or 783C427H06 add 6 inches to Depth (D) dimension. For the addition of 783C426 H01 or H02, or H03 or H04 add 2 inches to depth (D) dimension.

80°C RISE

480 Delta Primary to 208 WYE 120V Secondary
6-2 1/2% FC Taps — 2 Above and 4 Below

KVA	CATALOG NUMBER	NT. WT.	FRAME NO.
30	Ⓢ V48M28B30N	460	851
45	Ⓢ V48M28B45N	600	853
75	Ⓢ V48M28B75N	750	854
112.5	Ⓢ V48M28B12N	950	855
150	V48M28B49N	1400	856
225	V48M28B22N	1600	857
300	V48M28B33N	2100	858
500	V48M28B55N	4800	860

480 Delta Primary to 240V Delta Secondary
6-2 1/2% FC Taps — 2 Above and 4 Below

30	V48M24B30N	460	851
45	V48M24B45N	600	853
75	V48M24B75N	750	854
112.5	V48M24B12N	950	855
150	V48M24B49N	1400	856
225	V48M24B22N	1600	857
300	V48M24B33N	2100	858
500	V48M24B55N	4800	860

600 Delta Primary to 208 WYE 120V Secondary
6-2 1/2% FC Taps — 2 Above and 4 Below

30	V60M28B30N	460	851
45	V60M28B45N	600	853
75	V60M28B75N	750	854
112.5	V60M28B12N	950	855
150	V60M28B49N	1400	856
225	V60M28B22N	1600	857
300	V60M28B33N	2100	858
500	V60M28B55N	4800	860

For wiring diagrams refer to Westinghouse Technical Certification Section 46-771.

Ⓢ Normally stocked

For price information see Ⓦ Price List 46-720.

115°C RISE

480 Delta Primary to 208 WYE 120V Secondary
6-2 1/2% FC Taps — 2 Above and 4 Below

KVA	CATALOG NUMBER	NT. WT.	FRAME NO.
30	Ⓢ V48M28F30N	460	862
45	Ⓢ V48M28F45N	460	851
75	Ⓢ V48M28F75N	600	853
112.5	Ⓢ V48M28F12N	750	854
150	V48M28F49N	950	855
225	V48M28F22N	1400	856
300	V48M28F33N	1600	857
500	V48M28F55N	3000	859

480 Delta Primary to 240V Delta Secondary
6-2 1/2% FC Taps — 2 Above and 4 Below

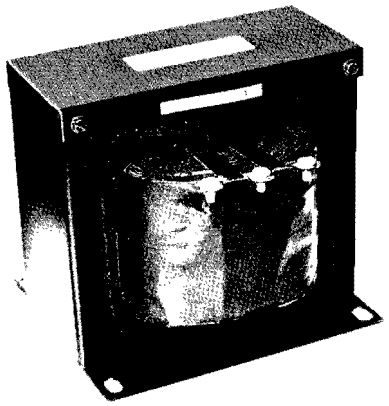
30	V48M24F30N	460	862
45	V48M24F45N	460	851
75	V48M24F75N	600	853
112.5	V48M24F12N	750	854
150	V48M24F49N	950	855
225	V48M24F22N	1400	856
300	V48M24F33N	1600	857
500	V48M24F55N	3000	859

600 Delta Primary to 208 WYE 120V Secondary
6-2 1/2% FC Taps — 2 Above and 4 Below

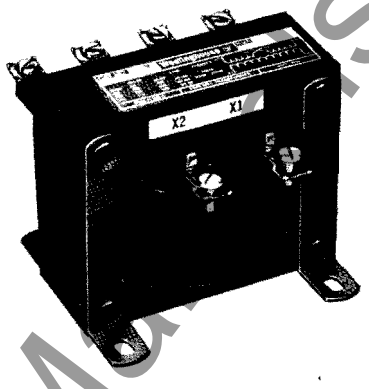
30	V60M28F30N	460	862
45	V60M28F45N	460	851
75	V60M28F75N	600	853
112.5	V60M28F12N	750	854
150	V60M28F49N	950	855
225	V60M28F22N	1400	856
300	V60M28F33N	1600	857
500	V60M28F55N	1600	859

NOTE: Discount symbol STD-2 applies to type DT-3 Catalog Numbers beginning with letter V.

Control Transformer Type MTA and MTC
600 Volts and below, Single Phase
50-5000 Volt Amperes



TYPE MTA



TYPE MTC

Features • Specifications

- Provides stepped-down voltages to machine tool control devices
- Isolates control circuits from power and lighting circuits
- Provides safety for machine tool operators
- Electrical performance equals or exceeds NEMA, JIC and NMTBA standards

DIMENSIONS

FRAME NO.	H	W	D
1310	2 19-32"	3"	3 1/4"
1312	2 19/32	3	3 3/4
1314	2 19/32	3	3 3/4
1412	2 7/8	3 3/8	4
1413	2 7/8	3 3/8	4
1510	3 5/16	3 3/4	3 3/4
1512	3 5/16	3 3/4	4
1513	3 5/16	3 3/4	4 1/8
1516	3 5/16	3 3/4	4 3/4
1517	3 5/16	3 3/4	4 3/4
1520	3 5/16	3 3/4	4 3/4
1714	3 13/16	4 1/2	4 1/2
1717	3 13/16	4 1/2	5
1721	3 13/16	4 1/2	5
1722	3 13/16	4 1/2	5 3/8
1723	3 13/16	4 1/2	5 1/2
1724	3 13/16	4 1/2	5 3/8
1726	3 13/16	4 1/2	6
1727	3 13/16	4 1/2	6
1730	3 13/16	4 1/2	6
1923	4 3/8	5 1/4	5 5/8
1930	4 3/8	5 1/4	6 1/4
1931	4 3/8	5 1/4	6 1/8
1932	4 3/8	5 1/4	6 1/4
1943	4 3/8	5 1/4	7 3/4
2236	5 7/16	6 3/8	7 1/2
C-613	5 1/4	6 1/8	6 3/4
C-614	6	6 7/8	7 1/2
C-822	6 1/2	6 7/8	8 3/8
C-823	6	6 3/4	8 1/2
C-824	7 3/8	8 7/16	8 3/4
C-825	7 7/8	8 11/16	11
C-827	5 7/8	6 7/8	8 1/2
C-828	6 1/2	8 3/16	8 3/4
C-829	7 5/8	8 15/16	10 1/4

TYPE MTA ①
115V to 24V, 50 60 Hertz

VOLT. AMP.	CATALOG NUMBER	FRAME NO.	NT. WT.
50	**1F3052**	1310	2
100	**1F3053**	1513	5
200	**1F3054**	1714	7
208 380 416V to 115 95V, 50 60 Hertz			
50	**1F1025**	1314	3
150	**1F1028**	1714	7
200	**1F1029**	1717	8
250	**1F1030**	1723	10
300	**1F1031**	1730	13
500	**1F1033**	1931	18
750	**1F1034**	1943	27
1000	**1F1035**	C614	25
1500	**1F1036**	C827	33
230 460V to 115V, 60 Hertz			
50	**1F0890**	1310	2
75	**1F0927**	1510	3
100	**1F0906**	1512	4
150	**1F0907**	1520	6
200	**1F0908**	1714	7
250	**1F0909**	1717	8
300	**1F0910**	1723	10
350	**1F0911**	1727	12
500	**1F0912**	1923	15
750	**1F0913**	1931	19
1000	**1F0914**	C613	19
1500	**1F0965**	C614	27
2000	**1F0966**	C827	36
3000	**1F0967**	C828	52
5000	**1F0968**	C829	79
230 460V to 115 230V, 60 Hertz			
50	**1F2198**	1310	2
75	**1F2185**	1510	3
100	**1F2186**	1512	4
150	**1F2189**	1520	6
200	**1F2191**	1714	7
250	**1F2034**	1717	8
500	**1F2190**	1930	15

All catalog numbers on this page normally stocked

TYPE MTA ①
230 460V to 115 230V, 60 Hertz contd.

VOLT. AMP.	CATALOG NUMBER	FRAME NO.	NT. WT.
750	**1F2188**	C613	19
1000	**1F1687**	C613	19
1500	**1F1688**	C614	27
2000	**1F1696**	C827	36
3000	**1F1690**	C828	52
5000	**1F1701**	C829	79
230 460 575V to 115 95V, 50 60 Hertz			
50	**1F0987**	1314	2
75	**1F0988**	1512	4
100	**1F0989**	1517	5
150	**1F0990**	1714	7
200	**1F0991**	1717	8
250	**1F0992**	1723	10
300	**1F0993**	1730	12
350	**1F0994**	1923	14
500	**1F0995**	1931	17
750	**1F0996**	1943	27
1000	**1F0997**	C614	24
1500	**1F0998**	C827	34

TYPE MTC ①
220 440V to 110V, 50 60 Hertz
230 460V to 115V, 50 60 Hertz
240 480V to 120V, 60 Hertz

50	**1F0890**	1310	2
75	**1F0891**	1314	3
100	**1F0892**	1413	3
150	**1F0893**	1517	6
200	**1F0894**	1714	7
250	**1F0895**	1717	8
300	**1F0896**	1722	10
350	**1F0897**	1726	11
500	**1F0898**	1931	20
750	**1F0899**	1943	28
1000	**1F0900**	2236	34
1500	**1F0901**	C822	35
2000	**1F0902**	C823	38
3000	**1F0903**	C824	53
5000	**1F0904**	C825	82

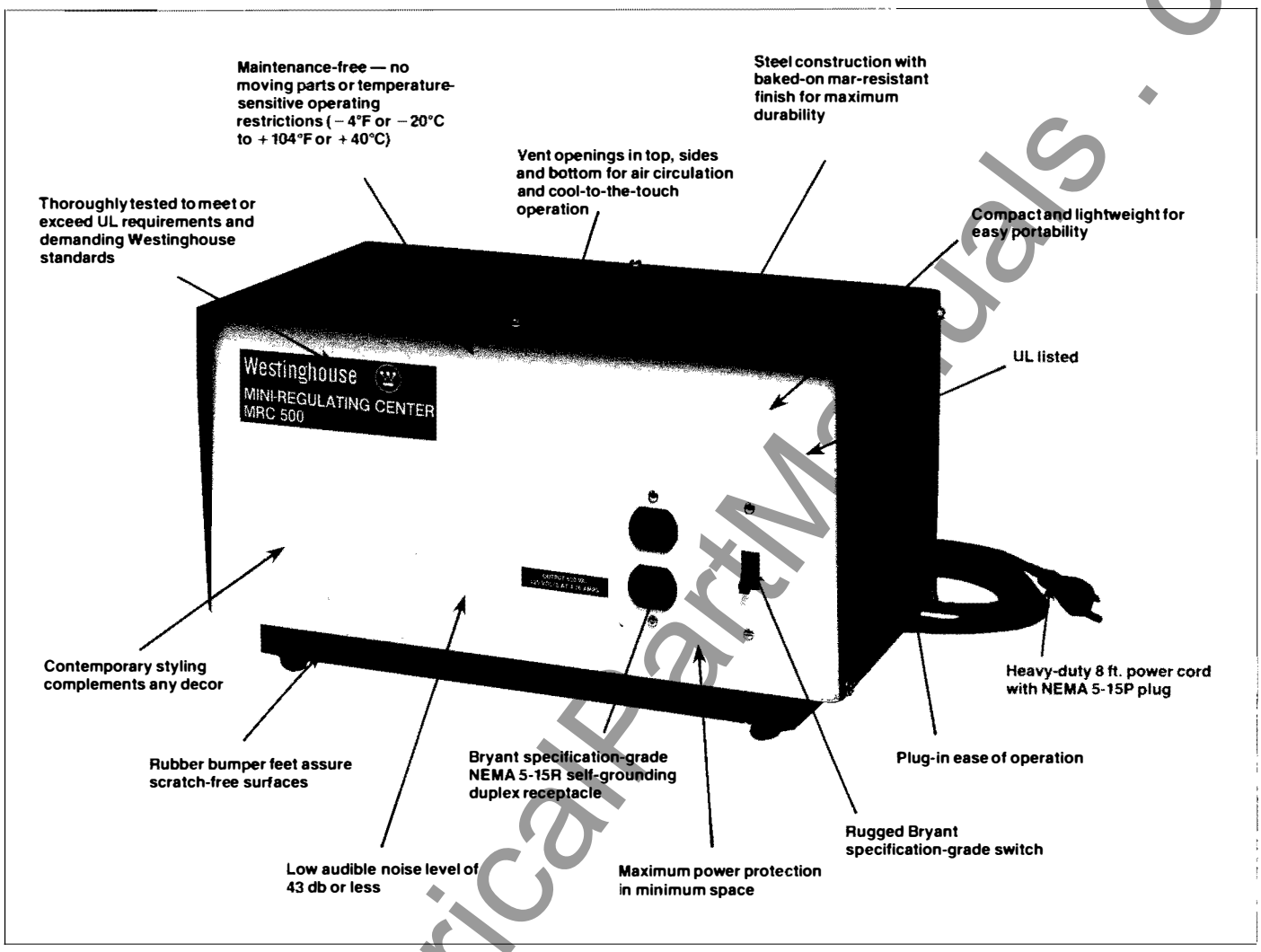
① **All MTA and MTC transformers 1000 Va and below on this page are listed as a recognized component by Underwriters' Laboratory, Inc. (E10156).**

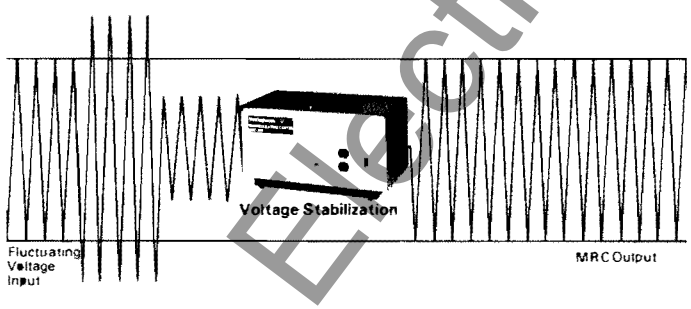
NOTE: Discount symbol STD-5 applies to type MTA and to type MTC Control Transformers.

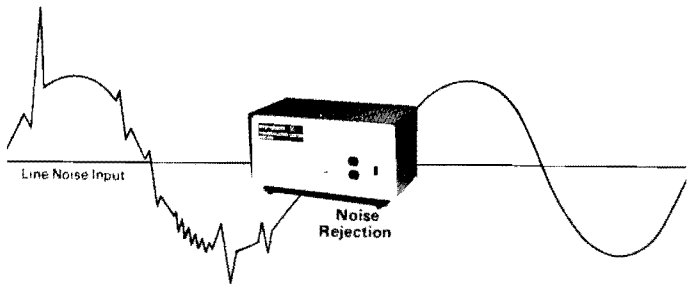
For price information see Ⓦ Price List 46-820.

Portable Power Line Conditioners

Type MRC-600 Volts and below
.250 Kva-1 Kva, Single Phase, 60 Hertz







Computers, word processors and other sensitive electronic equipment have a common need for clean, steady AC power in order to function properly. Power fluctuations lasting only a fraction of a second can disrupt operation, causing computer errors, memory failure or component damage. Costly downtime is the inevitable result.

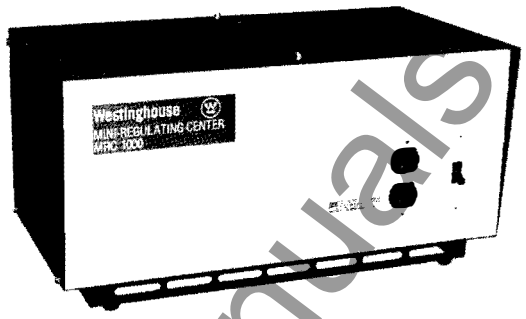
RELIABLE The Westinghouse Mini-Regulating Center eliminates the effects of power problems quickly and reliably. It precisely regulates incoming voltage and reduces electrical line noise, assuring a clean, stable power flow for wide-ranging applications in industry, retail businesses, hospitals and homes.

EASY-TO-USE Compact and portable, the Mini-Regulating Center is easy to use. Simply plug your equipment into the MRC's self-grounding Bryant receptacles, and insert the MRC plug into any standard 120V AC outlet. Duplex receptacle permits MRC protection for two pieces of equipment. Like all Westinghouse products, the Mini-Regulating Center is designed and engineered for years of dependable performance.

Portable Power Line Conditioners

Type MRC-600 Volts and below
.250 Kva-1 Kva, Single Phase, 60 Hertz

.250 Kva



1 Kva

Features • Specifications

- UL listed
- Precise voltage regulation
- 120 db common mode noise rejection
- 60 db transverse noise rejection
- Harmonic distortion 3% at full load
- Provides electrical isolation
- Portable — no installation cost
- Brownout protection
- Immediate response to voltage changes
- Low audible noise level — 43 db or less
- Operating temperature — −20°C to +40°C (−4°F to +104°F)
- No moving parts — maintenance free
- Light weight — steel construction
- Heavy duty cord and plug
- Output receptacles permit dual usage
- Operational frequency — 60 Hz.
- Electrical phase — single
- Input volts — 95-138V AC
- Output volts — 120V AC ±3%
- Efficiency — 90% at full load
- Cooling — convection
- Fully tested in accordance with UL Standard 1012
- Provides reliable power protection for computers, microprocessors, programmable controllers, numerical controls, word processors, hospital monitoring equipment, x-ray machines, data terminals, electronic cash registers, alarm systems — virtually any system connected to a 110/120V electrical circuit

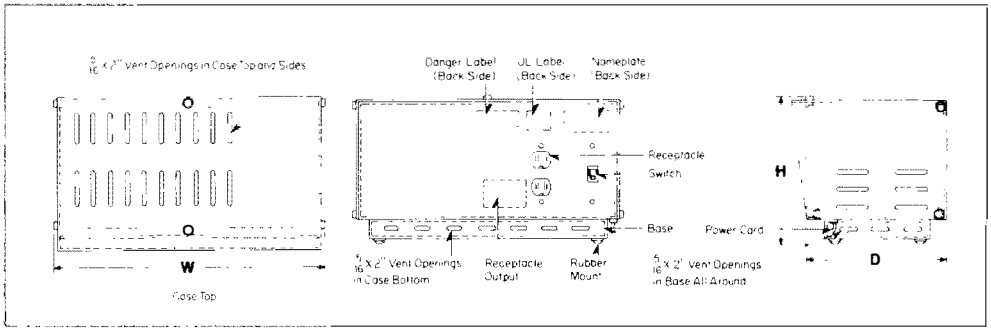
PORTABLE POWER LINE CONDITIONERS

KVA RATING	CATALOG NUMBER	WT. LBS.	RAMAD NUMBERS	NAED NUMBER 78-1786	RECEPTACLE OUTPUT
.250	**1M63**	35	51120	10000	120V-2.08A
.500	**1M64**	55	51130	10010	120V-4.16A
1.000	**1M65**	67	14977	10020	120V-8.33A

THE CAUSE AND EFFECT OF POWER-RELATED PROBLEMS

Voltage irregularities are one of the most frequent causes of malfunctions in computers and other micro-electronic systems. The most common types of irregularities are voltage spikes, sags, and line noise interference. Causes and effects are as follows:

PROBLEM	CAUSE	EFFECT	SOLUTION
Voltage Fluctuations			
Spikes (Overvoltages) - Transients: 6000V or more, lasting less than 100 microseconds - Surges: up to 3000V of longer duration than transients	Lightning storms; startups and shutdowns of power tools, air conditioners, conveyors within or near a building	Component failure or damage; output errors; memory loss	MRC voltage regulation
Sags (Undervoltages/ Brownouts)	Reduction in utility power during periods of peak demand	Output errors; memory loss; or garbled data	MRC voltage regulation
Electrical Noise Interference			
- Common mode: signals between the ground wire and hot or neutral current carrying conductors	Motor-driven equipment such as air conditioners, copy machines, typewriters, elevators, fluorescent lights, thermostat controlled heaters	Lost or altered data; lost programming; component deterioration; false triggering of logic/memory circuits	MRC 120 db common mode noise rejection
- Transverse mode: transient signals between the hot and neutral current carrying conductors	Same as above	Same as above	MRC 60 db transverse mode noise rejection



DIMENSIONS

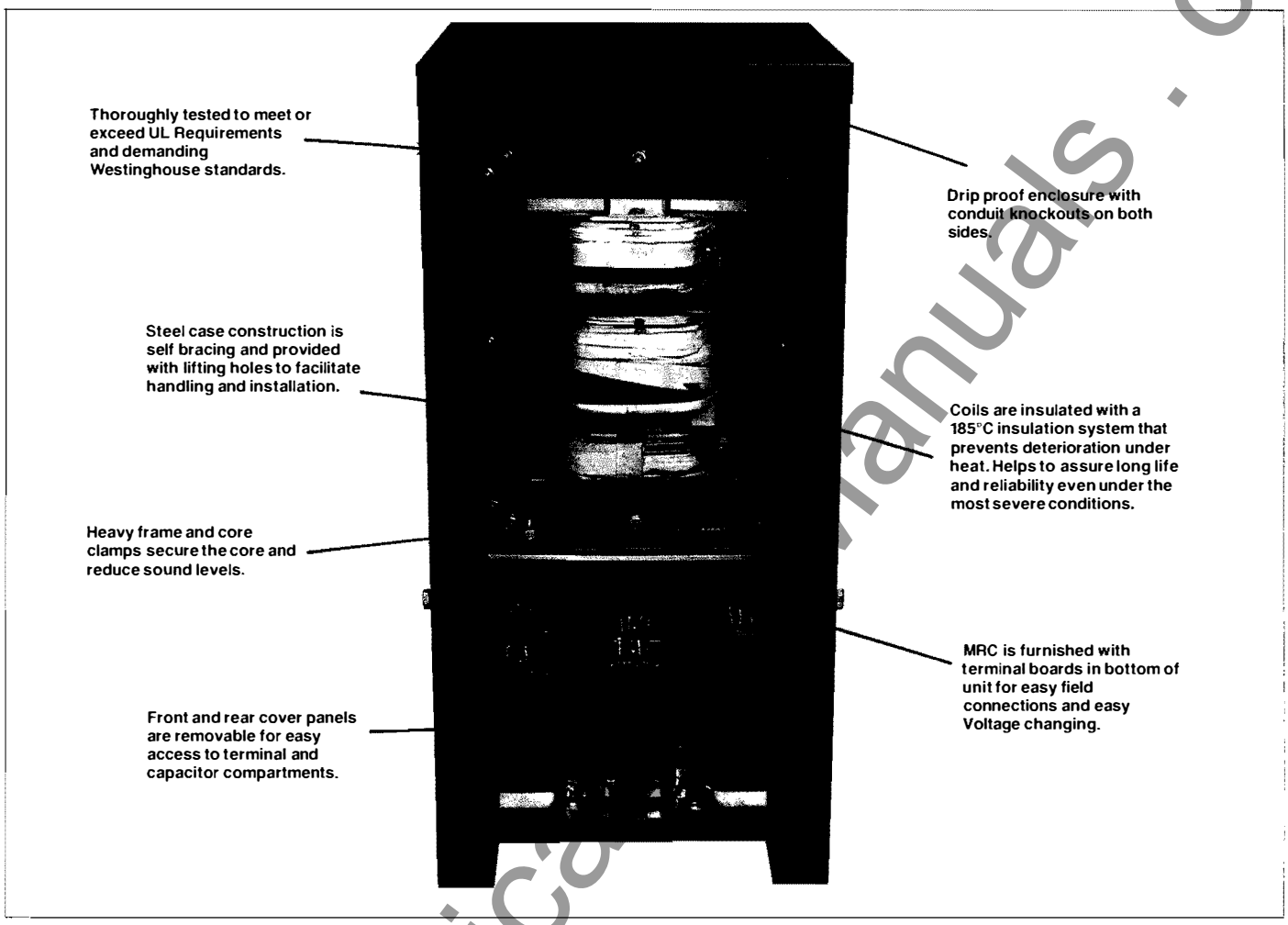
KVA	H	W	D
.250	8 5/16	16	8 3/8
.500	10 7/16	18 1/2	9 3/8
1.000	10 7/16	20 1/2	10 3/8

NOTE: Discount symbol STD-10A applies to type MRC Power Line Conditioners.

For price information see Ⓦ Price List 46-920.

Hard Wired Power Line Conditioners

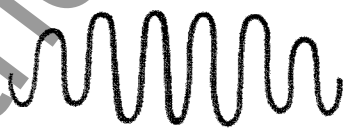
Type MRC-600 Volts and below
2.5 Kva-15 Kva, Single Phase, 60 Hertz



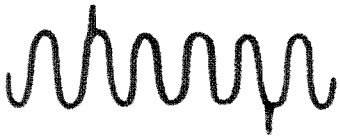
Power disturbances at computer sites can interfere with the normal operation of computers and sensitive computer-based equipment. To operate properly and safely, a clean constant supply of A.C. power is required; otherwise memory loss, program error, and even circuit damage may result. Two types of power disturbances, voltage fluctuations and electrical noise, are responsible for the majority of all power related computer problems.

VOLTAGE FLUCTUATION AFFECTS A TYPICAL SINE WAVE IN SEVERAL WAYS

A voltage sag is a short-term reduction in line voltage. It is usually the result of a short-circuit or introduction of additional load into the circuit. A brown-out is an intentional voltage sag or reduction in utility power during periods of peak demand.



A voltage surge is a temporary increase in voltage, lasting at least one cycle.



A line spike is the same as a voltage surge but for a much shorter duration of time, lasting less than 100 microseconds.

ELECTRICAL NOISE CAUSES SEVERE SINE WAVE DISTORTION

Electrical noise is high-frequency, high-voltage power line interference. Two types of electrical noise exist:

— Common mode noise can be caused by lightning, radio transmitters, motor and grounding faults.
— Transverse mode noise is usually the result of switching power supplies and power-factor correction capacitors by utility companies and similar disturbances on the power line.

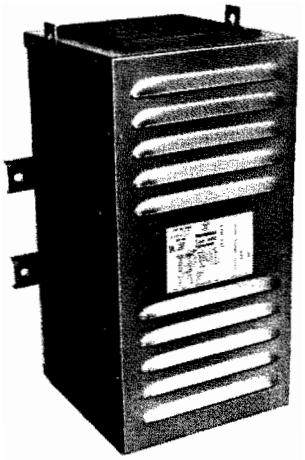
Since each of these disturbances can cause some type of electronic equipment malfunction, it is apparent that raw utility-supplied power is not suitable for its source.

The solution to this power problem is the Westinghouse Type MRC Power Line Conditioner. The Westinghouse Type MRC Power Line Conditioner can be applied on the incoming power line or on the internal distribution lines that supply power to electronic equipment involved in voltage-sensitive systems.

The MRC is the most economical method of supplying clean, stable power.

Hard Wired Power Line Conditioners

Type MRC-600 Volts and below
2.5 Kva-15 Kva, Single Phase, 60 Hertz



2.5 Kva

5 Kva — 15 Kva

Features • Specifications

- UL listed
- Precise voltage regulation
- 120 db common mode noise rejection
- 60 db transverse noise rejection
- Harmonic distortion: 3% at full load
- Brownout protection
- Immediate response to voltage changes
- Operating temperature: −20°C to +40°C (−4°F to +104°F)
- Output volts: 120V AC ±3%
- Efficiency: 90% at full load
- Operational frequency: 60 Hz
- Electrical phase: single
- Cooling: convection
- Cycle response time: 1-½ cycles (24 millisec) or less
- Fully tested in accordance with UL standard 1012

DIMENSIONS

KVA	H	W	D
2.5	11 27/32	22 1/2	13 1/2
5.0	34 3/16	17 1/16	18 3/16
7.5	34 3/16	17 1/16	18 3/16
10.0	37 3/16	20 1/16	23 3/16
15.0	37 3/16	20 1/16	22 3/16

HARD WIRED POWER LINE CONDITIONERS

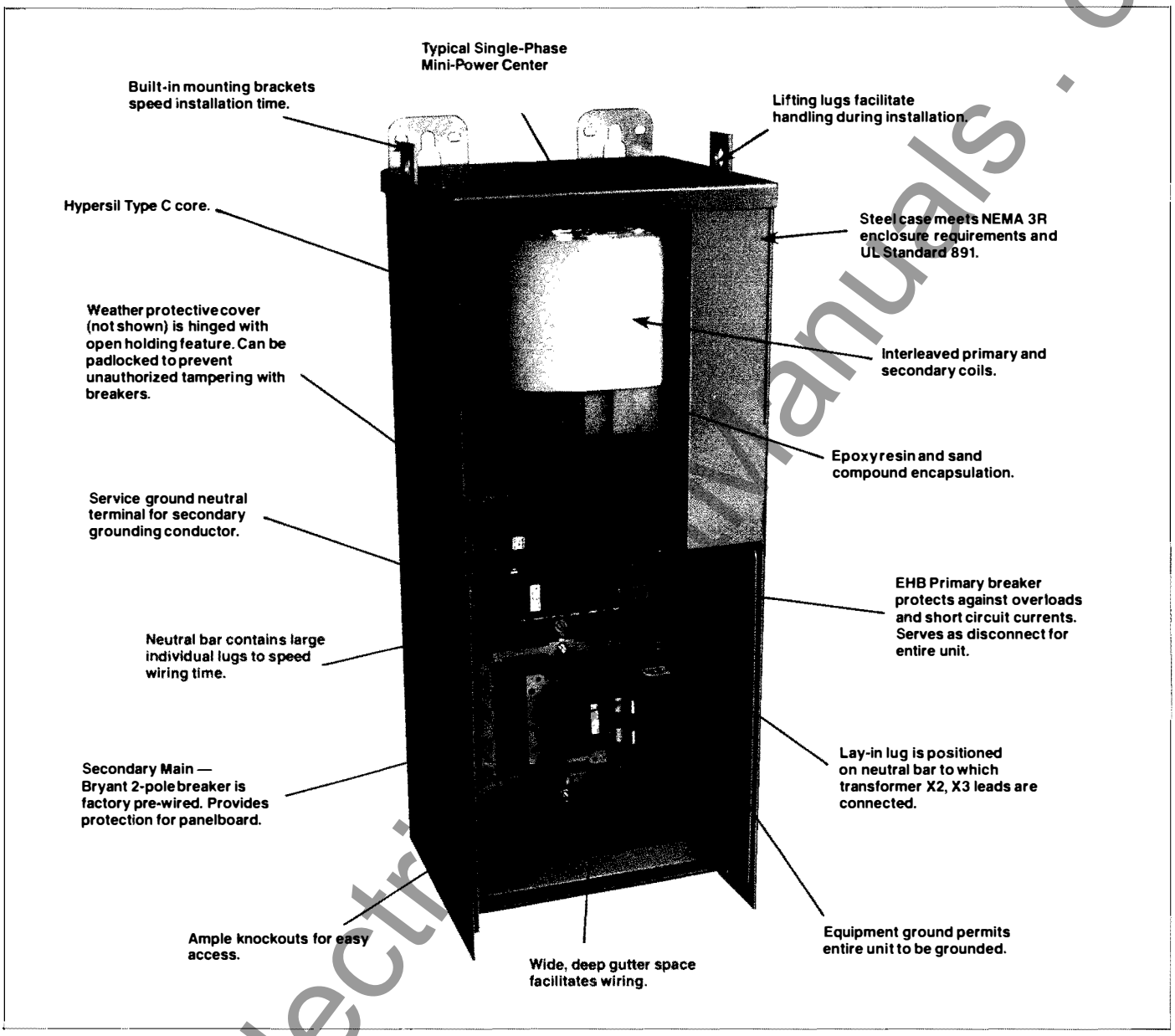
KVA RATING	CATALOG NUMBER	WT. LBS.	RAMAD NUMBERS	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE
2.5	**1M66**	145	19486	164-225, 174-238, 190-260, 348-476, 380-520	120/240
5.0	**1M67**	350	14890	164-225, 174-238, 190-260, 348-476, 380-520	120/240
7.5	**1M68**	415	15123	164-225, 174-238, 190-260, 348-476, 380-520	120/240
10.0	**1M69**	520	15798	164-225, 174-238, 190-260, 348-476, 380-520	120/240
15.0	**1M70**	680	16702	164-225, 174-238, 190-260, 348-476, 380-520	120/240

NOTE: Discount symbol STD-10A applies to type MRC Power Line Conditioners.

For price information see Ⓦ Price List 46-920.

Mini-Power Centers

600 Volts and below, 60 Hertz
5 Kva-30 Kva



MINI-POWER CENTERS Westinghouse Mini Power Center replaces three separate electrical components — a transformer, panelboard and primary breaker — by combining all three in one unit. All interconnecting wiring is factory installed and inspected prior to shipment.

SAFETY The transformer portion of the Mini-Power Center includes a totally enclosed Type EP or EPT encapsulated transformer to provide latitude in locating the unit. Heat is removed by conduction, which eliminates the necessity of air flow considerations. No toxic gases are emitted by the units, minimizing fire hazards. These units are ideally suited for installations requiring safety, quiet operation, and continuous uninterrupted service.

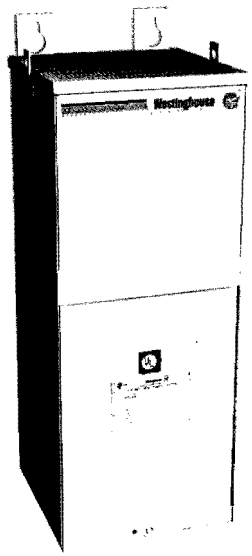
APPLICATION The space-saving design of the Mini-Power Center — three components in one enclosure — and its inherent safety features allow the unit to be installed in virtually any atmospheric or temperature environment not subjected to submersion or a high concentration of destructive fumes. Secondary breaker flexibility makes changing circuit requirements a snap. The ability to tap in 120 volt circuits from a 480 volt bus at the location eliminates the need to run long lines with their attendant line losses. These units can be used for service equipment or for small load applications. They provide a complete, compact, power supply package for use where 120 or 240 volt branch circuits are taken from a 480 volt line.

INDUSTRY STANDARDS All Westinghouse Mini-Power Centers include Types EP and EPT transformers built in accordance with the latest ASA, ANSI, NEMA, and IEEE standards for transformers.

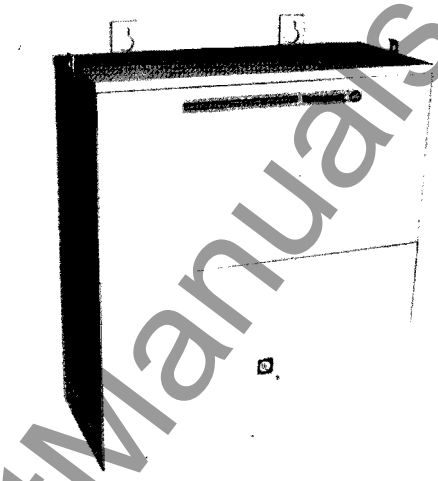
UL LISTED All Mini-Power Centers are listed by Underwriters' Laboratories and employ a 115°C rise insulation system.

ELECTRICAL TESTING All units are 100% tested in accordance with applicable NEMA and ANSI standards.

Mini-Power Centers
600 Volts and below, 60 Hertz
5 Kva-30 Kva



SINGLE PHASE



THREE PHASE

Features • Specifications

- UL listed.
- Primary Main Breaker.
- Secondary Main Breaker.
- All live parts enclosed for personnel safety and equipment protection.
- Indoor-outdoor.
- Cover is hinged to prevent removal and can be padlocked.
- Cores are positively grounded. A copper lead is secured to the core and is attached to a terminal on the case.
- A ground bar is supplied to permit grounding of individual secondary circuits.
- Neutral bar is grounded to case.
- A grounding terminal is provided on the case for easy grounding of the entire Mini-Power Center.
- For ease of installation, circuits can be added on or changed by simply taking off a line and snapping in the appropriate breaker.

DIMENSIONS
For detailed dimensions, by frame number, refer to Westinghouse Technical Certification Section 46-770.

SINGLE PHASE

KVA	FRAME NO.	H	W	D
5	224	25 7/16	9 5/8	8 7/8
10	225	34	12 3/8	11 7/8
15	226	34	12 3/8	11 7/8
25	227	41 1/2	15 5/8	14 5/8

THREE PHASE

15	229	31 1/16	25 3/4	9 3/8
22 1/2	230	35 13/16	29 13/16	13 5/8
30	233	36 13/16	29 13/16	13 5/8

SINGLE PHASE, 60 Hertz, 480V Primary with two 5% FCBN Taps to 120 240 Volts Secondary

KVA	CATALOG NUMBER	NO. OF CIRCUITS① 120V	NO. OF CIRCUITS① 240V	PRIMARY MAIN BREAKER CAT. NO.	PRIMARY MAIN BREAKER RATING	SECONDARY MAIN BREAKER CAT. NO.	SECONDARY MAIN BREAKER RATING	MAX. RATING OF SECONDARY FEEDER BREAKERS
5	**P48G11S05M**	4	2	**EHB 2020**	20A	**BR 225**	25A	20A
10	**P48G11S10M**	8	4	**EHB 2040**	40A	**BR 250**	50A	40A
15	**P48G11S15M**	12	6	**EHB 2060**	60A	**BR 270**	70A	60A
25	**P48G11S25M**	20	10	**EHB 2100**	100A	**BR 2125**	125A	100A

THREE PHASE, 60 Hertz, 480V Primary Delta with two 5% FCBN Taps to 208Wye 120V Secondary

KVA	CATALOG NUMBER	NO. OF CIRCUITS① 120V SINGLE PHASE 1 POLE	NO. OF CIRCUITS① 208V THREE PHASE 3 POLE	PRIMARY MAIN BREAKER CAT. NO.	PRIMARY MAIN BREAKER RATING	SECONDARY MAIN BREAKER CAT. NO.	SECONDARY MAIN BREAKER RATING	MAX. RATING OF SECONDARY FEEDER BREAKERS
15	**P48G28T15M**	12	4	**EHB 3040**	40A	**BR 350**	50A	40A
22 1/2	**P48G28T21M**	18	6	**EHB 3070**	70A	**QP 3070**	70A	60A
30	**P48G28T30M**	24	8	**EHB 3090**	90A	**EHB 3100**	100A	80A

Here's how the Westinghouse Mini-Power Center can save you up to 31% of installation costs. Because we knew that putting three components in one enclosure dramatically cuts installation time, we asked an electrical contractor to estimate the job two ways:

- First, using separate breaker, transformer and panelboard, including connecting cable and hardware.
- Second, using the Westinghouse Mini-Power Center.

Here are his estimates:

	15 KVA INSTALLATION		25 KVA INSTALLATION	
	3-COMPONENT SYSTEM	MINI-POWER CENTER	3-COMPONENT SYSTEM	MINI-POWER CENTER
Switch & Fuse Layout	4 hours		4 hours	
Switch & Fuse Mount	1	16	1	24
Transformer Layout, Remove Knockout etc.	16		24	
Transformer Fasten to Wall	4		4	
Panelboard-Layout, Mount and Connect Source	4	4	6	4
Total Hours	29	20	39	28
Hours saved by Westinghouse Mini-Power Center	31%		28%	

Proof that you get big savings in installation costs with the Westinghouse Mini-Power Center. (Time estimates are typical only, and will vary by geographic area.)

Take advantage of these savings by having your architects, design engineers and buyers insert in the specifications — Westinghouse Electric Corporation Mini-Power Center with the appropriate catalog number.

① Combinations can be selected.

All catalog numbers on this page normally stocked

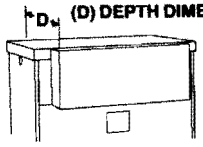
NOTE: Discount symbol STD-3 applies to Mini-Power Centers.

For price information see Ⓦ Price List 46-720.

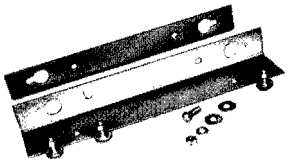
Field Installed Accessories and Catalog Number Definitions

FUSEHOLDER

"B" BRACKET



WEATHERSHIELD



WALLMOUNTING BRACKETS

FUSE HOLDERS†

VOLT-AMPS	TYPE	CAT. NO.
50VA — 750VA	MTA/MTC	257A574G01
1000VA — 3000VA	MTA/MTC	257A564G01

"B" BRACKET‡

CAT. NO.	DESCRIPTION
257A912-G01	"B" Bracket for use with 2 Kva and below. For applications requiring greater rigidity, such as panelboards and control centers. *

WEATHERSHIELDS FOR OUTDOOR APPLICATIONS ‡

KVA	DS-3 CAT. NO.		DT-3 CAT. NO.		80-115 CAT. NO.	
	600V AND BELOW	2400-5000V	600V AND BELOW	2400-5000V	80°C RISE	115°C RISE
30	—	—	783C426H01	—	783C426H01	783C426H01
37½	783C427H01	783C427H01	783C426H01	—	—	—
45	—	—	783C426H01	783C426H01	783C426H02	783C426H01
50	783C427H02	783C427H02	783C426H02	—	—	—
75	783C427H03	783C427H03	783C426H02	783C426H02	783C426H02	783C426H02
100	783C427H03	783C427H03	—	—	—	—
112½	—	—	783C426H02	783C426H03	783C426H03	783C426H02
150	—	—	783C426H03	783C426H04	783C426H04	783C426H03
167	783C427H04	783C427H04	—	—	—	—
225	—	—	783C426H04	783C426H04	783C426H04	783C426H04
250	783C427H04	783C427H04	—	—	—	—
300	—	—	783C426H04	783C426H04	783C426H05	783C426H04
333	783C427H05	783C427H05	—	—	—	—
500	783C427H05	783C427H05	783C426H05	783C426H05	783C426H06	783C426H05
750	—	—	783C426H05	783C426H05	—	—
1000	—	—	783C426H06	783C426H06	—	—
1500	—	—	783C426H07	783C426H07	—	—

WALL MOUNTING BRACKETS ‡

KVA	DS-3 CAT. NO.		DT-3 CAT. NO.		80-115 CAT. NO.	
	600V AND BELOW	2400-5000V	600V AND BELOW	2400-5000V	80°C RISE	115°C RISE
37½	600A679G02	600A679G02	600A679G02	600A679G02	—	—
45	—	—	600A679G02	600A679G02	600A679G02	600A679G02
50	600A679G02	600A679G02	600A679G02	600A679G02	—	—
75	600A679G02	600A679G02	600A679G02	600A679G02	600A679G02	600A679G02
100	600A679G02	—	—	—	—	—
112½	—	—	600A679G02	—	—	600A679G02

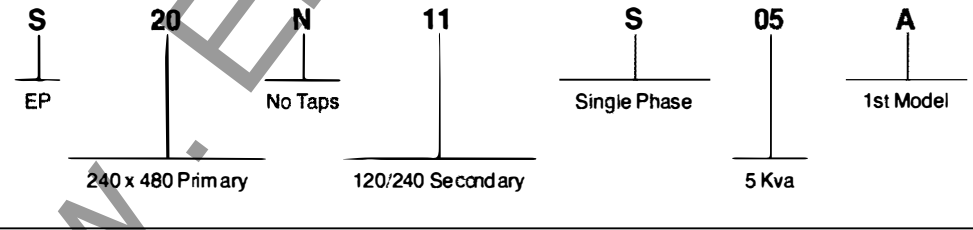
†For price information see Ⓦ Price List 46-820. Discount symbol STD-5 applies.
‡For price information see Ⓦ Price List 46-720. Discount symbol STD-2 applies.

*Mounting bracket "B" is available at no charge but must be included on the order with style number of transformers.

Catalog Number Definitions

1ST LETTER ●		1ST AND 2ND DIGITS		2ND LETTER			3RD AND 4TH DIGITS		3RD LETTER		5TH AND 6TH DIGITS		4TH LETTER
TYPE	CODE	HIGH VOLTAGE①	CODE	TAPS		CODE	LOW VOLTAGE	CODE	PHASE	CODE	KVA	CODE	MODEL
EP	S	120	12	None		N	12 24	04	Single	S	.05	81	A
		120 x 240	10				16 32	06			.10	82	
EPT	Y	120/240	11	2-2½%	±	D	120	12	Three	T	.15	83	
		240	24	1-5%	±	E	120 x 240	10			.25	26	
DS-3	T	240 x 480	20	1-10%	B②	F	120 240	11	Electro-	E	.50	51	
		240/480	21	2-5%	B	G	240 Delta	24	static		.75	76	
DT-3	V	480	48	4-2½%	B	J	240 x 480	20	Shields		1.0	01	
		600	60				240 480	21			1.5	16	
EP — Marine		2400	42	1-10%	X③		480 Delta	48	Buck & Boost	A⑥	2.0	02	
50°C Ambient	L	4160	46	2-5%	B	K	600 Delta	60			3.0	03	
		4800	49				2400	42			5.0	05	
EP — Marine		208Y/120	28	2-5%	X		4160	46	115° C Rise	F	6.0	06	
40°C Ambient	M	4150Y	41	4-2½%	B	L	4800	49			7.5	07	
		277	27				208Y 120	28			9.0	09	
		208	29	+ 2-2½%⑤			4160Y	41	80° C Rise	B	10.0	10	
Mini-Power Center Type EP or EPT Only	P			4-2½%		M	277	27			15.0	15	
							480Y 277	47			22.5	21	
				+ 1-5%			240 120⑦	22			25.0	25	
				− 2-5%							30.0	30	
											37.5	37	
											45.0	45	
											50.0	50	
											75.0	75	
											100.0	99	
											112.5	12	↓
											150.0	49	Z④
											167.0	67	
											225.0	22	
											250.0	52	
											300.0	33	
											333.0	54	
											500.0	55	
											750.0	77	
											1000.0	11	
											1500.0	14	

Example:



● Voltages are expressed as meaning either single or three phase delta connected. Example: 480 means either 480 single phase or 480 delta three phase. A wye connection is indicated by a Y in the voltage definition.
② Indicates 1-10% FCBN tap.
③ Indicates 1-10% x 2-5% FCBN taps.
④ Electrical characteristics of different model numbers are identical to model A. Manufacturing differences only.
⑤ Six tap design 2-2½% FCAN taps and 4-2½% FCBN taps.
⑥ Unit complete with enclosure.
⑦ On single phase applications, refers to 240 volt series connection or 240/120 three wire operation only. On three phase applications, refers to 240 volts delta secondary with 120 volt lighting tap on one phase only.
⑧ Type EP only.

Note: This page is to be used as reference in identifying catalog numbers in P.L. 46-720. **Do not make up catalog numbers without consulting factory.**

Typical Specifications

Transformers 30 Kva through 1500 Kva (Types DS-3, DT-3)

The transformer shall be a ventilated dry type and shall be designed according to the latest revisions of:

- ANSI C89.2 (NEMA ST-20) for all Kva ratings 600 volts and below; and through 500 Kva above 600 volts.
- NEMA TR-27 for ratings above 500 Kva and 600 volts.

Transformer shall be designed for continuous operation at rated Kva, 24 hours a day, 365 days a year, with normal life expectancy as defined in IEEE No. 65.

Required performance must be obtained without exceeding 150°C average temperature rise by resistance or 180°C hot spot temperature rise in a 40°C maximum ambient and 30°C average ambient. Maximum coil hot spot temperature shall not exceed 220°C.

Transformer shall have proven 220°C UL tested insulated system. Conductor shall be insulated with proven high temperature resistant 220°C material. All materials in the transformer shall be flame retardant and shall not support combustion as defined in ASTM Standard Test Method D635.

Final insulation treatment shall be total immersion in a 220°C insulating varnish that maintains superior bond strength, high dielectric strength and outstanding power factors of temperatures normally associated with 220°C system.

After immersion, the varnish shall be cured thoroughly at normal operating temperatures to assure the scourging of all volatiles in the varnish solvent.

Transformer shall be constructed with core materials of high quality and low loss characteristics to minimize exciting current, no-load loss and interlaminar vibrations. Design shall incorporate built-in vibration dampening systems to minimize and isolate sound transmission.

Sound levels shall meet NEMA-ANSI standards, according to Kva rating. Tests measuring sound level shall be conducted in a laboratory with anechoic features where ambient sound level does not exceed 24 db.

The core-coil assembly shall be mechanically braced to withstand short circuit tests as defined in NEMA TR-27. Coil construction and mechanical bracing members must prevent mechanical degradation of the insulation structure during short circuit.

Transformer enclosure shall be self-bracing, and provide drip-proof and protection. Lifting holes shall be provided to facilitate handling and installation without removing any enclosure components.

Convenient knockouts for conduit entrance shall be included on sizes 300 Kva and below.

Terminal compartment shall be located in bottom of transformer, below the core-coil assembly, for side or bottom conduit entrance. Temperature rise in terminal compartment must not exceed 5°C above ambient.

The following tests must be conducted at the factory:

- Applied voltage test (one minute)
  600 volt class — 4 KV
  5 KV class — 12 KV
- Induced voltage test — two times normal for 7200 cycles
- Ratio and phase relation

Test reports on electrically duplicated units shall certify that the following tests have been completed on the first rating of any design:

- No-load losses
- Induced voltage
- Total losses
- Sound level
- Applied voltage
- Impulse test
- Temperature rise

All 600 volt class transformers (1000 Kva and below, three phase; 167 Kva and below, single phase) shall be listed by Underwriters' Laboratories and bear the UL label.

Transformers 30 Kva and below (Types EP, EPT)

The transformer shall be a non-ventilated dry type and shall be built according to the latest revision of ANSI C89.2 (NEMA ST-20) Kva, taps and voltage should conform to standards for optimum value and dependability.

Transformer shall be insulated with 185°C insulation system with 115°C rise for 3 through 30 Kva. For 2 Kva and below, a 150°C insulation system with 80°C rise is required.

Construction of the core shall be of grain oriented magnetic material, such as Hypersil, to minimize no-load losses and exciting current.

Coils shall be wound of highest quality conductor material with rigidly controlled specifications to prevent burrs and slivers. Primary and secondary windings shall be interleaved to minimize voltage regulation. The core and coil shall be held rigidly to withstand short circuit stresses resulting from 25 times normal load current for a period of two seconds.

The core and coil assembly shall be completely encapsulated in a proportioned mixture of resin and aggregate to provide a moisture-proof, air-tight, shock-resistant seal.

The core and coil encapsulation shall reduce the sound level and minimize the transformer size and weight.

The case shall be constructed with a thickness that complies with UL specifications. It shall be raintight. Lifting holes are accessible without the removal of components in the case.

Conduit knockouts shall be provided on transformers 15 Kva and below. They must be of sufficient size and number to accommodate N.E.C. cable and conduit sizes.

Sound levels shall fall within ANSI-NEMA standards, according to Kva size.

Performance data shall be provided prior to acceptance and the submitting of prices. Data shall state whether figures are average, typical or guaranteed. The figures must be corrected to the corresponding NEMA reference temperatures.

Transformer shall be listed by Underwriters' Laboratories and bear UL label.

Mini-Power Center

The Mini-Power Center shall be built according to the latest revision of ANSI C89.2 (ST-20).

It shall feature a self-contained indoor outdoor non-ventilated enclosure that incorporates a primary breaker, dry type transformer, secondary main breaker and a secondary distribution section.

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.

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

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 overflood protection for the transformer.

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

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

The Mini-Power Center shall be listed by Underwriters' Laboratories.

Transformers and Mini-Power Centers shall be manufactured by Westinghouse Electric Corporation or of a type equal in construction and integrity.

Glossary

AA — An ASA (American Standards Association) designation indicating open, natural-draft ventilated construction (found in ASA Standard C 57.12 pg 9).

AIEE — American Institute of Electrical Engineers, now part of IEEE.

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, 600v and below (ASA C89.1) and on distribution transformers, 601v and above (ASA C57.12).

ASA — American Standards Association — now identified as ANSI

ASA 61 — An ASA designation for color of paint, usually written in specifications as "must be ASA-61 light gray paint," but often referred to verbally as "ASA-61."

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 high-voltage coils cast in an epoxy resin. Usually used with 5 and 15 kv transformers.

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

Class A, B, F, & H — Refers to the class of insulation system in a transformer.

Conductor Losses — See Load Losses.

Concentric Knockout — Dual-purpose knockouts designed for accepting two sizes of conduit.

*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 or controlling 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 which consist of the application of a voltage higher than the rated voltage for a specified time for the purpose of determining the adequacy against breakdowns of insulating materials and spacings under normal conditions.

Distribution Transformers — Those rated 120 to 5 Kv on the high-voltage side and normally used in secondary distribution systems. An applicable standard is ASA C-57.12.

Dripproof — Constructed or protected so that successful operation is not interfered with when subjected to falling moisture or dirt.

*Dry-type — A dry-type transformer is one in which the transformer core and coils are not immersed in liquid.

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

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.

Extended Winding — A winding made longer than necessary so that it can perform some of the duties normally expected of another winding or windings. The best example is an extended primary transformer. Its primary winding is continued on up the core beyond the point where it will do its rated job. In this additional section of the winding, taps can be added for the purpose of regulating the secondary voltage.

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 power 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 large transformers only.

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

Group II and Group III Insulation — NEMA designations for insulation systems which are commonly classified as B and H.

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.

*Insulating Transformer — An insulating transformer is one which insulates the primary from the secondary winding.

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

Iron Losses — (See No-load Losses).

Isolating Transformer — (See Insulating Transformer); isolating primary circuit from secondary circuit.

IR% — (See Percent IR).

IX% — (See Percent IX).

IZ% — (See Percent IZ).

Knockout — Easily removed circle of metal which eliminate the need for drilling holes for conduits.

*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

Note: *Definitions taken from NEMA Standard ST-1.

REFERENCES: Bean, Chackan, Moore and Wentz — Transformers; Blume — Transformer Engineering; Dawes — Course in Electrical Engineering, Vol. I Direct Currents, Vol. II Alternating Currents; Gibbs — Transformer Principles and Practice; Robertson, Black — Electric Circuits and Machines.

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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).

Natural-draft or Natural-draft Ventilated — An open transformer cooled by the draft created by the chimney effect in heating the air in its enclosure.

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 Walertight (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.).

NEMA Standard — Standards recommended by NEMA. NEMA ST-1 applies to specialty transformers 600V and below while NEMA TR-1 applies to distribution transformers, (NEMA ST-1 is same as ASA-C89.1).

Noise Level — The relative intensity of sound, measured in db.

*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.

*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 or controlling 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.

*Reactor — A device for introducing inductive reactance into a circuit for motor starting, operating transformers in parallel, and controlling current.

Reduced Capacity Taps — Taps which will carry full-rated winding current only, thus reducing available power because of lower output voltage.

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.

Shell-type Construction — A type of transformer construction where the core completely surrounds the coil.

*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

Standard — See NEMA, ANSI, ASA and IEEE.

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.

*Submersible — Submersible apparatus is constructed so that it will operate successfully when submerged in water under predetermined conditions of pressure and time.

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. (See FCBN, FCAN, and Universal taps.)

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.

Transformer Tests — Normal production tests include:

A. Core loss (no-load loss); B. Load losses (winding loss); C. Impedance; D. Hi-pot (high voltage between windings and ground); and, E. Induced (two times normal voltage between turns and layers). Special tests: A. Heat run, and, B. Noise.

*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.

Universal Taps — A combination of six primary voltage taps consisting of 2-2½% FCAN and 4-2½% FCBN, covering a 15% voltage range.

Volt-amperes — Circuit volts multiplied by circuit amperes.

Voltages:

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

Note: *Definitions taken from NEMA Standard ST-1.

REFERENCES: Bean, Chackan, Moore and Wentz — Transformers; Blume — Transformer Engineering; Dawes — Course in Electrical Engineering, Vol I Direct Currents, Vol II Alternating Currents; Gibbs — Transformer Principles and Practice; Robertson, Black — Electric Circuits and Machines

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B. 240 x 480 — suitable for series or multiple (but not normally for 3-wire operation).

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

D. 220/210/200 — reduced capacity taps with full capacity at 220 only and reduced capacity at 210 and 200 volts.

E. 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 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.

SOUND LEVELS —

WESTINGHOUSE DRY TYPE EP, EPT, DS-3 AND DT-3 TRANSFORMERS, 600 VOLTS AND BELOW, ARE IN ACCORDANCE WITH ANSI SOUND LEVEL-REQUIREMENTS AS LISTED BELOW.

KVA	ANSI AVERAGE SOUND LEVEL IN DB_{40}
0-9	40
10-50	45
51-150	50
151-300	55
301-500	60
501-700	62
701-1000	64
1001-1500	65