

General Purpose

Energy efficient dry-type transformers 600 Volt Class, isolation type, single and three phase, 15 kVA through 500 kVA. Indoor and outdoor models available.

Accessories and Optional Design Styles

- Electrostatic shield for quality power
- Wall mounting brackets (500 lbs maximum) (Item WB1C)
- Weather Shields (UL-3R)\*
- Stainless Steel Enclosures
- Totally enclosed non-ventilated designs (TENV) (Non UL)
- Open core and coil designs (UL Recognized)
- Copper Wound designs
- Low temperature designs

Features

- UL-3R ventilated outdoor enclosures when used with optional weather shields (order separately)
- UL Class 220°C insulation system, 150°C temperature rise under full load
- Terminal board connections and spacious wiring compartment



- ..Panel enclosure design reduces labor time. Wiring diagram on inside front cover.
- ...High efficiency for low cost operation
- ...Compliant to NEMA TP-1 Standards
- ..Single and three phase availability
- ...Fast delivery
- ...10 year warranty

Selection Tables: Single Phase

Group 1: 240 x 480 Volt Primary, 120/240 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ES5H15S	WS-15	28	16	16	210	1	1	62.5/31.3	125/62.5
25	ES5H25S	WS-15	28	16	16	245	1	1	104/52.1	208/104
37.5	ES5H37S	WS-17	31	18	18	340	1	1	156/78	313/156
50	ES5H50S	WS-17	31	18	18	415	1	1	208/104	416/208
75	ES5H75S	WS-09	44	23	21	610	1	1	313/156	625/313
100	ES5H100S	WS-09	44	23	21	705	1	1	417/208	833/417
167	ES5H167S	WS-16	46	26	24	980	1	1	695/348	1392/695

Group 2 – 120/208/240/277 Volt Primary, 120/240 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn	Primary Amps @ 277 V	Secondary Amps
15	ES12H15S	WS-15	28	16	16	215	1	2	54.2	125/62.5
25	ES12H25S	WS-15	28	16	16	250	1	2	90.3	208/104

Notes:

\* Weather shields (set of two) must be ordered separately.

\*\*Design Style and Electrical Connections can be found on pages 204-205.

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## Selection Tables: Single Phase

## Group 3 – 600 Volt Primary, 120/240 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ES10H15S	WS-15	28	16	16	175	1	4	25	125/62.5
25	ES10H25S	WS-15	28	16	16	265	1	4	41.7	208/104
37.5	ES10H37S	WS-17	31	18	18	340	1	4	62.5	313/156
50	ES10H50S	WS-17	31	18	18	410	1	4	83.3	416/208
75	ES10H75S	WS-09	44	23	21	655	1	4	125	625/313
100	ES10H100S	WS-09	44	23	21	750	1	4	167	833/417
167	ES10H167S	WS-16	46	26	24	980	1	4	278	1392/695

## Group 4 – Export 190/200/208/220/380/400/415/440 Volt Primary, 110/220 Secondary, 50/60 Hz

Export 200/208/-/230/400/415/-/460 Volt Primary, 115/230 Secondary, 50/60 Hz

Export 208/-/240/415/-/480 Volt Primary, 120/240 Secondary, 60 Hz only



kVA	Catalog Number	NEMA 3R Weather Shield*	Height inch (mm)	Width inch (mm)	Depth inch (mm)	Approx. Ship Weight - lbs (kg)	Design Style**	Elec Conn	Primary Amps @ 220/440 V	Secondary Amps
15	ES14H15S	WS-15	28 (711.2)	16 (406.4)	16 (406.4)	210 (95.25)	1	3	68.2/34.1	136.4/68.2
25	ES14H25S	WS-15	28 (711.2)	16 (406.4)	16 (406.4)	265 (120.20)	1	3	113.6/56.8	227.3/113.6

## Notes:

\* Weather shields (set of two) must be ordered separately.

\*\* Design Style and Electrical Connections can be found on pages 199-200.

## Selection Tables: Three Phase

Group A: 480 Volt  $\Delta$  Primary, 208/120 Secondary, 60 Hz

kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET2H15***	WS-02	23	18	14	187	1	5	18.1	41.7
	ET2H15S									
30	ET2H30***	WS-14	28	23	16	292	1	5	36.1	83.4
	ET2H30S									
45	ET2H45***	WS-14	28	23	16	376	1	5	54.2	125.0
	ET2H45S									
75	ET2H75***	WS-30	34	28	22	569	1	5	90.3	208.0
	ET2H75S									
112.5	ET2H112S	WS-30	34	28	22	768	1	5	135.0	313.0
150	ET2H150S	WS-10	44	33	21	933	1	5	181.0	417.0
225	ET2H225S	WS-11	46	36	24	1342	1	5	271.0	625.0
300	ET2H300S	WS-11	46	36	24	1525	1	5	361.0	834.0
500	ET2H500S	WS-12	65	45	35	2460	1	5	602.0	1390.0

## Notes:

\* Weather shields (set of two) must be ordered separately.

\*\* Design Style and Electrical Connections can be found on pages 199-200.

\*\*\* Unshielded model.

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contact **Technical Services** at **(800) 377-4384** with any questions.

## Selection Tables: Three Phase

### Group B: 480 Volt $\Delta$ Primary, 240 Volt $\Delta$ , Secondary with reduced capacity center tap\*\*\*, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET5H15****	WS-02	23	19	14	189	1	6	18.1	36.1
	ET5H15S									
30	ET5H30****	WS-14	28	23	16	292	1	6	36.1	72.3
	ET5H30S									
45	ET5H45****	WS-14	28	23	16	381	1	6	54.2	108.0
	ET5H45S									
75	ET5H75****	WS-30	34	28	22	560	1	6	90.3	181.0
	ET5H75S									
112.5	ET5H112S	WS-30	34	28	22	760	1	6	135.0	271.0
150	ET5H150S	WS-10	44	33	21	940	1	6	181.0	361.0
225	ET5H225S	WS-11	46	36	24	1342	1	6	271.0	542.0
300	ET5H300S	WS-11	46	36	24	1525	1	6	361.0	723.0
500	ET5H500S	WS-12	65	45	35	2460	1	6	602.0	1204.0

### Group C: 480 Volt $\Delta$ Primary, 480Y/277 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET81H15S	WS-02	23	18	14	189	1	8	18.1	18.1
30	ET81H30S	WS-14	28	23	16	295	1	8	36.1	36.1
45	ET81H45S	WS-14	28	23	16	380	1	8	54.2	54.2
75	ET81H75S	WS-30	34	28	22	560	1	8	90.3	90.3
112.5	ET81H112S	WS-30	34	28	22	780	1	8	135.0	135.0
150	ET81H150S	WS-10	44	33	21	933	1	8	181.0	181.0
225	ET81H225S	WS-11	46	36	24	1342	1	8	271.0	271.0
300	ET81H300S	WS-11	46	36	24	1525	1	8	361.0	361.0
500	ET81H500S	WS-12	65	45	35	2460	1	8	602.0	602.0

### Group D: 208 Volt $\Delta$ Primary, 480Y/277 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Ship Weight Approx. (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET84H15S	WS-02	23	18	14	195	1	10	41.7	18.1
30	ET84H30S	WS-14	28	23	16	295	1	10	83.4	36.1
45	ET84H45S	WS-14	28	23	16	375	1	10	125.0	54.2
75	ET84H75S	WS-30	34	28	22	570	1	10	208.0	90.3
112.5	ET84H112S	WS-30	34	28	22	780	1	10	313.0	135.0
150	ET84H150S	WS-10	44	33	21	972	1	10	417.0	181.0

#### Notes:

- \* Weather shields (set of two) must be ordered separately.
- \*\* Electrical Connections and Design Style can be found on pages 197 and 204 respectively.
- \*\*\* See the Technical Notes section with respect to capacity of center tap.
- \*\*\*\* Unshielded model.

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## Selection Tables: Three Phase

Group E: 208 Volt  $\Delta$  Primary, 208Y/120 Secondary, 60 Hz

kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Ship Weight Approx. (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET3H15S	WS-02	23	18	14	190	1	9	41.7	41.7
30	ET3H30S	WS-14	28	23	16	295	1	9	83.4	83.4
45	ET3H45S	WS-14	28	23	16	380	1	9	125.0	125.0
75	ET3H75S	WS-30	34	28	22	570	1	9	208.0	208.0
112.5	ET3H112S	WS-30	34	28	22	805	1	9	313.0	313.0
150	ET3H150S	WS-10	44	33	21	972	1	9	416.0	416.0

Group F: 240 Volt  $\Delta$  Primary, 208Y/120 Secondary, 60 Hz

kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Ship Weight Approx. (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET6H15S	WS-02	23	18	14	190	1	11	36.1	41.7
30	ET6H30S	WS-14	28	23	16	295	1	11	72.3	83.4
45	ET6H45S	WS-14	28	23	16	380	1	11	108.0	125.0
75	ET6H75S	WS-30	34	28	22	570	1	11	181.0	208.0
112.5	ET6H112S	WS-30	34	28	22	805	1	11	271.0	313.0
150	ET6H150S	WS-10	44	33	21	972	1	11	361.0	417.0

Group G: 240 Volt  $\Delta$  Primary, 480Y/277 Secondary, 60 Hz

kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Ship Weight Approx. (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET85H15S	WS-02	23	18	14	190	1	12	36.1	18.1
30	ET85H30S	WS-14	28	23	16	295	1	12	72.3	36.1
45	ET85H45S	WS-14	28	23	16	380	1	12	108.0	54.2
75	ET85H75S	WS-30	34	28	22	560	1	12	181.0	90.3
112.5	ET85H112S	WS-30	34	28	22	805	1	12	271.0	135.0
150	ET85H150S	WS-10	44	33	21	972	1	12	361.0	181.0

Group H: 600 Volt  $\Delta$  Primary, 208Y/120 Secondary, 60 Hz

kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET7H15S	WS-02	23	18	14	190	1	13	14.5	41.7
30	ET7H30S	WS-14	28	23	16	292	1	13	28.9	83.4
45	ET7H45S	WS-14	28	23	16	376	1	13	43.4	125.0
75	ET7H75S	WS-30	34	28	22	570	1	13	72.3	208.0
112.5	ET7H112S	WS-30	34	28	22	770	1	13	108.0	313.0
150	ET7H150S	WS-10	44	33	21	933	1	13	145.0	417.0
225	ET7H225S	WS-11	46	36	24	1325	1	13	217.0	625.0
300	ET7H300S	WS-11	46	36	24	1525	1	13	289.0	834.0
500	ET7H500S	WS-12	65	45	35	2460	1	13	482.0	1390.0

## Notes:

\* Weather shields (set of two) must be ordered separately.

\*\* Design Style and Electrical Connections can be found on pages 204-205.

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Selection Tables: Three Phase

Group I: 600 Volt Δ Primary, 480Y/277 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Ship Weight Approx. (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET71H15S	WS-02	23	18	14	190	1	14	14.5	18.1
30	ET71H30S	WS-14	28	23	16	292	1	14	28.9	36.1
45	ET71H45S	WS-14	28	23	16	380	1	14	43.4	54.2
75	ET71H75S	WS-30	34	28	22	560	1	14	72.3	90.3
112.5	ET71H112S	WS-30	34	28	22	770	1	14	108.2	135.3
150	ET71H150S	WS-10	44	33	21	933	1	14	144.3	180.4

Group J: 480 Volt Δ Primary, 380Y/220 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Ship Weight Approx. (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET79H15S	WS-02	23	18	14	190	1	7	18.1	22.8
30	ET79H30S	WS-14	28	23	16	292	1	7	36.1	45.6
45	ET79H45S	WS-14	28	23	16	380	1	7	54.2	68.4
75	ET79H75S	WS-30	34	28	22	360	1	7	90.3	114.0
112.5	ET79H112S	WS-30	34	28	22	770	1	7	135.3	170.9
150	ET79H150S	WS-10	44	33	21	933	1	7	180.4	227.9

Group K: 480 Volt Δ Primary, 208Y/120 Secondary, 60Hz, Copper-Wound



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Ship Weight Approx. (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET2H15SCU	WS-02	23	18	14	205	1	5	18.1	41.7
30	ET2H30SCU	WS-14	28	23	16	305	1	5	36.1	83.4
45	ET2H45SCU	WS-14	28	23	16	405	1	5	54.2	125.0
75	ET2H75SCU	WS-30	34	28	22	535	1	5	90.3	208.0
112.5	ET2H112SCU	WS-30	34	28	22	805	1	5	135.0	313.0
150	ET2H150SCU	WS-10	44	33	21	972	1	5	181.0	417.0
225	ET2H225SCU	WS-11	46	36	24	1325	1	5	271.0	625.0
300	ET2H300SCU	WS-11	46	36	24	1515	1	5	361.0	834.0
500	ET2H500SCU	WS-12	65	45	35	2460	1	5	602.0	1390.0

Notes:

- \* Weather shields (set of two) must be ordered separately.
- \*\* Design Style and Electrical Connections can be found on pages 204-205.

### Low Temperature Rise

SolaHD low temperature rise transformers feature a 220°C insulation system and temperature rise of only 80°C or 115°C under full nameplate load. The result is 13-21% lower operating losses than conventional 150°C rise units. Reduction in temperature rise increases reliability.

The 35°C thermal reserve on 115°C rise units and 70°C reserve on 80°C rise units definitely mean higher reliability. The extra benefit is being able to operate either of these transformers as a 150°C rise unit and have a short term overload capacity of 15-30% without compromising normal life expectancy (See Figure 2).

Low temperature rise transformers are designed for any critical application requiring extra overload capability, lower than average total losses and/or cooler operating temperatures. All are available with either a 115°C or 80°C thermal rise and a Class 220°C insulation system.



### Accessories and Optional Design Styles

- Wall mounting brackets (500 lbs maximum) (Item WB1C)
- Weather Shields (UL-3R)\*
- Stainless Steel Enclosures
- Totally enclosed non-ventilated designs (TENV) (Non UL)
- Open core and coil designs (UL Recognized)
- Copper Wound designs
- Compliant to NEMA TP-1 standards

\* Not all optional designs are UL listed. Contact Technical Services.

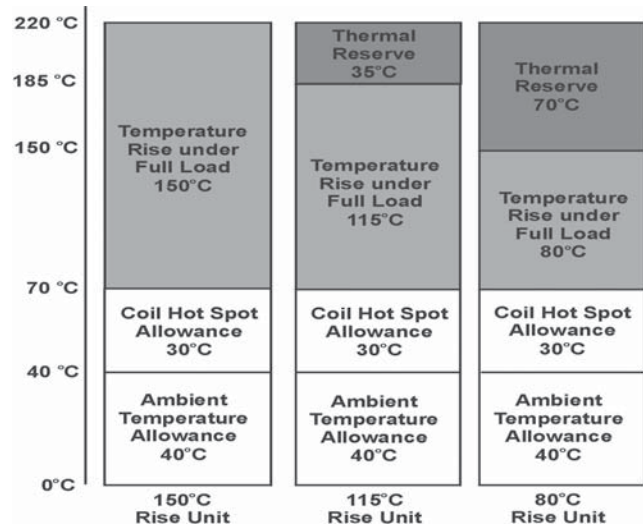


Figure 2

### Selection Tables: Low Temperature Rise, Single Phase, 80°C Rise

Group 1: 240 x 480 Volt Primary, 120/240 Secondary, 60 Hz, 80°C Rise



kVA	Catalog Number 80°C Rise	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ES5HB15S	WS-15	28	16	16	265	1	1	62.5/31.3	125/62.5
25	ES5HB25S	WS-17	31	18	18	340	1	1	104/52.1	208/104
37.5	ES5HB37S	WS-17	31	18	18	425	1	1	156/78	313/156
50	ES5HB50S	WS-09	44	23	21	655	1	1	208/104	416/208
75	ES5HB75S	WS-09	44	23	21	750	1	1	313/156	625/313
100	ES5HB100S	WS-16	46	26	24	980	1	1	417/208	833/417

#### Notes:

\* Weather shields (set of two) must be ordered separately.

\*\*Design Style and Electrical Connections can be found on pages 204-205.

Selection Tables: Low Temperature Rise, Single Phase, 80°C Rise

Group 2: 600 Volt Primary, 120/240 Secondary, 60 Hz, 80°C Rise



kVA	Catalog Number 80°C Rise	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ES10HB15S	WS-15	28	16	16	265	1	4	25.0	125/62.5
25	ES10HB25S	WS-17	31	18	18	340	1	4	41.7	208/104
37.5	ES10HB37S	WS-17	31	18	18	425	1	4	62.5	313/156
50	ES10HB50S	WS-09	44	23	21	655	1	4	83.3	416/208
75	ES10HB75S	WS-09	44	23	21	750	1	4	125.0	625/313
100	ES10HB100S	WS-16	46	26	24	980	1	4	167.0	833/417

Selection Tables: Low Temperature Rise, Three Phase, 80°C Rise

Group A: 480 Δ Primary, 208Y/120 Secondary, 60 Hz, 80°C Rise



kVA	Catalog Number 80°C Rise	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET2HB15S	WS-14	28	23	16	292	1	5	18.1	41.7
30	ET2HB30S	WS-14	28	23	16	376	1	5	36.1	83.4
45	ET2HB45S	WS-30	34	28	22	569	1	5	54.2	125.0
75	ET2HB75S	WS-30	34	28	22	768	1	5	90.3	208.0
112.5	ET2HB112S	WS-10	44	33	21	933	1	5	135.0	313.0
150	ET2HB150S	WS-11	46	36	24	1342	1	5	181.0	417.0
225	ET2HB225S	WS-11	46	36	24	1525	1	5	271.0	625.0
300	ET2HB300S	WS-12	65	45	35	2460	1	5	361.0	834.0

Group B: 480 Δ Primary, 240 Δ Secondary with 120V Reduced Capacity Center Tap\*\*\*, 80°C Rise



kVA	Catalog Number 80°C Rise	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET5HB15S	WS-14	28	23	16	292	1	6	18.1	36.1
30	ET5HB30S	WS-14	28	23	16	381	1	6	36.1	72.3
45	ET5HB45S	WS-30	34	28	22	580	1	6	54.2	108.0
75	ET5HB75S	WS-30	34	28	22	760	1	6	90.3	181.0
112.5	ET5HB112S	WS-10	44	33	21	940	1	6	135.0	271.0
150	ET5HB150S	WS-11	46	36	24	1342	1	6	181.0	361.0
225	ET5HB225S	WS-11	46	36	24	1525	1	6	271.0	542.0
300	ET5HB300S	WS-12	65	45	35	2460	1	6	361.0	723.0

Notes:

\* Weather shields (set of two) must be ordered separately.

\*\*Design Style and Electrical Connections can be found on pages 204-205.

\*\*\*See the Technical Notes section with respect to capacity of center tap.

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contact **Technical Services** at **(800) 377-4384** with any questions.

## Selection Tables: Low Temperature Rise, Single Phase, 115°C Rise

## Group 1: 240 x 480 Volt Primary, 120/240 Secondary, 60 Hz, 115°C Rise



kVA	Catalog Number 115°C Rise	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ES5HF15S	WS-15	28	16	16	210	1	1	62.5/31.3	125/62.5
25	ES5HF25S	WS-15	28	16	16	245	1	1	104/52.1	208/104
37.5	ES5HF37S	WS-17	31	18	18	340	1	1	156/78	313/156
50	ES5HF50S	WS-17	31	18	18	425	1	1	208/104	416/208
75	ES5HF75S	WS-09	44	23	21	610	1	1	313/156	625/313
100	ES5HF100S	WS-09	44	23	21	750	1	1	417/208	833/417

## Group 2: 600 Volt Primary, 120/240 Secondary, 60 Hz, 115°C Rise



kVA	Catalog Number 115°C Rise	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ES10HF15S	WS-15	28	16	16	175	1	4	25	125/62.5
25	ES10HF25S	WS-15	28	16	16	265	1	4	41.7	208/104
37.5	ES10HF37S	WS-17	31	18	18	340	1	4	62.5	313/156
50	ES10HF50S	WS-17	31	18	18	425	1	4	83.3	416/208
75	ES10HF75S	WS-09	44	23	21	655	1	4	125	625/313
100	ES10HF100S	WS-09	44	23	21	750	1	4	167	833/417

## Notes:

\* Weather shields (set of two) must be ordered separately.

\*\*Design Style and Electrical Connections can be found on pages 204-205.



## Selection Tables: Low Temperature Rise, Three Phase, 115°C Rise

Group A: 480 Δ Primary, 208Y/120 Secondary, 60 Hz, 115°C Rise



kVA	Catalog Number 115°C Rise	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET2HF15S	WS-02	23	18	14	187	1	5	18.1	41.7
30	ET2HF30S	WS-14	28	23	16	292	1	5	36.1	83.4
45	ET2HF45S	WS-14	28	23	16	378	1	5	54.2	125.0
75	ET2HF75S	WS-30	34	28	22	569	1	5	90.3	208.0
112.5	ET2HF112S	WS-30	34	28	22	768	1	5	135.0	313.0
150	ET2HF150S	WS-10	44	33	21	933	1	5	181.0	417.0
225	ET2HF225S	WS-11	46	36	24	1342	1	5	271.0	625.0
300	ET2HF300S	WS-11	46	36	24	1525	1	5	361.0	834.0

Group B: 480 Volt Δ Primary, 240 Volt Δ, Secondary with reduced capacity center tap, 60 Hz, 115°C Rise



kVA	Catalog Number	NEMA 3R Weather Shield**	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	ET5HF15S	WS-02	23	19	14	189	1	6	18.1	36.1
30	ET5HF30S	WS-14	28	23	16	292	1	6	36.1	72.3
45	ET5HF45S	WS-14	28	23	16	381	1	6	54.2	108.0
75	ET5HF75S	WS-30	34	28	22	560	1	6	90.3	181.0
112.5	ET5HF112S	WS-30	34	28	22	760	1	6	135.0	271.0
150	ET5HF150S	WS-10	44	33	21	940	1	6	181.0	361.0
225	ET5HF225S	WS-11	46	36	24	1342	1	6	271.0	542.0
300	ET5HF300S	WS-11	46	36	24	1525	1	6	361.0	723.0

**Notes:**

\* Weather shields (set of two) must be ordered separately.

\*\*Design Style and Electrical Connections can be found on pages 204-205.

\*\*\*See the Technical Notes section with respect to capacity of center tap.

## K-Factor Transformers

K-Factor transformers are designed to reduce the heating effects of harmonic currents created by loads like those shown in Chart A. The K-Factor rating is an index of the transformer's ability to withstand harmonic content while operating within the temperature limits of its insulating system. SolaHD K-Factor transformers have UL ratings of K-4, K-13, and K-20.

The SolaHD K-Factor design is a specialized transformer that offers these benefits:

- Conductors capable of carrying the harmonic currents of non-linear loads without exceeding the temperature rating of the insulation system.
- A transformer design that takes into account the increase in naturally occurring "stray" losses caused by non-linear loads. These losses cause standard transformers to dramatically overheat and substantially shorten design life.
- A core and coil design that manages the DC flux caused by triplen harmonics. As these harmonics increase, they cause additional current to circulate in the delta winding. This produces a DC flux in the core which leads to core saturation, voltage instability and overheating.

### Features

- Conductors to carry harmonics of a K-rated load without exceeding insulation temperature ratings
- UL 1561 listed up to K-20 rated protection
- Rated temperature rise of 150°C, 220°C insulation
- Shielded for quality power
- Basic design takes "stray losses" into account and functions within safe operating temperatures
- Core and coil design engineered to manage the zero sequence flux caused by triplen harmonics
- Provides 100% rated current without overheating the windings or saturating the core



 **Listed**  
E25872

### Accessories and Optional Design Styles\*

- Wall mounting brackets (500 lbs maximum) (Item WB1C)
- Weather Shields (UL-3R)
- Totally enclosed non-ventilated designs (TENV) (Non UL)
- Low temperature rise units available
- Open core and coil designs (UL Recognized)
- Copper Wound designs
- Alternate voltages
- Compliant to NEMA TP-1 Standards

\* Not all optional designs are UL listed. Contact Technical Services.

### Chart A: Typical Load K-Factors

Load	K-Factor
Electric discharge lighting.....	K-4
UPS with optional input filter.....	K-4
Welders.....	K-4
Induction heating equipment.....	K-4
PLCs and solid state controls.....	K-4
Telecommunications equipment (e.g., PBX).....	K-13
UPS without input filtering.....	K-13
Multiwire receptacle circuits in general care areas of health care facilities and classrooms of schools, etc.....	K-13
Multi-wire receptacle circuits supplying inspection or testing equipment on an assembly or production line.....	K-13
Mainframe computer loads.....	K-20
Solid state motor drives (variable speed drives).....	K-20

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## Selection Tables: Three Phase

Group A: K-4 Rated 480 Δ Primary, 208Y/120 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	3H4T2H15S	WS-02	23	18	14	187	1	5	18.1	41.7
30	3H4T2H30S	WS-14	28	23	16	292	1	5	36.1	83.4
45	3H4T2H45S	WS-14	28	23	16	376	1	5	54.2	125.0
75	3H4T2H75S	WS-30	34	28	22	569	1	5	90.3	208.0
112.5	3H4T2H112S	WS-30	34	28	22	768	1	5	135.0	313.0
150	3H4T2H150S	WS-10	44	33	21	933	1	5	181.0	417.0
225	3H4T2H225S	WS-11	46	36	24	1342	1	5	271.0	625.0
300	3H4T2H300S	WS-11	46	36	24	1525	1	5	361.0	834.0
500	3H4T2H500S	WS-12	65	45	35	2460	1	5	602.0	1390.0

Group B: K-13 Rated 480 Δ Primary, 208Y/120 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	3H13T2H15S	WS-14	28	23	16	305	1	5	18.1	41.7
30	3H13T2H30S	WS-14	28	23	16	405	1	5	36.1	83.4
45	3H13T2H45S	WS-30	34	28	22	590	1	5	54.2	125.0
75	3H13T2H75S	WS-30	34	28	22	805	1	5	90.3	208.0
112.5	3H13T2H112S	WS-10	44	33	21	972	1	5	135.0	313.0
150	3H13T2H150S	WS-11	46	36	24	1325	1	5	181.0	417.0
225	3H13T2H225S	WS-11	46	36	24	1515	1	5	271.0	625.0
300	3H13T2H300S	WS-12	65	45	35	2460	1	5	361.0	834.0

Group C: K-20 Rated 480 Δ Primary, 208Y/120 Secondary, 60 Hz



kVA	Catalog Number	NEMA 3R Weather Shield*	Height (inch)	Width (inch)	Depth (inch)	Approx. Ship Weight (lbs)	Design Style**	Elec Conn**	Primary Amps	Secondary Amps
15	3H20T2H15S	WS-14	28	23	16	305	1	5	18.1	41.7
30	3H20T2H30S	WS-14	28	23	16	405	1	5	36.1	83.4
45	3H20T2H45S	WS-30	34	28	22	590	1	5	54.2	125.0
75	3H20T2H75S	WS-30	34	28	22	805	1	5	90.3	208.0
112.5	3H20T2H112S	WS-10	44	33	21	972	1	5	135.0	313.0
150	3H20T2H150S	WS-11	46	36	24	1325	1	5	181.0	417.0
225	3H20T2H225S	WS-11	46	36	24	1515	1	5	271.0	625.0
300	3H20T2H300S	WS-12	65	45	35	2460	1	5	361.0	834.0

**Notes:**

\* Weather shields (set of two) must be ordered separately.

\*\*Design Style and Electrical Connections can be found on pages 204-205.

### Electrical Connections (Single Phase)

**1**

240 x 480 Volt Primary,  
120/240 Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

Primary Voltage	Interconnect	Connect Lines To
504	1 to 2	H1 & H2
492	2 to 3	H1 & H2
480	3 to 4	H1 & H2
468	4 to 5	H1 & H2
456	5 to 6	H1 & H2
444	6 to 7	H1 & H2
432	7 to 8	H1 & H2
252	H1 to 2 H2 to 1	H1 & H2
240	H1 to 4 H2 to 3	H1 & H2
228	H1 to 6 H2 to 5	H1 & H2
216	H1 to 8 H2 to 7	H1 & H2
Secondary Voltage	Interconnect	Connect Lines To
240	X2 to X3	X1 & X4
120-0-120	X2 to X3 X2 to $\frac{\perp}{\perp}$	X1-X2-X4
120	X1 to X3 X2 to X4	X1 & X4

ES5 Series

**2**

120/208/240/277 Volt Primary,  
120/240 Volt Secondary  
Taps: None

Primary Voltage	Interconnect	Connect Lines To
277	1 to 2	H1 & H2
240	3 to 4	H1 & H2
208	5 to 6	H1 & H2
120	H1 to 4 H2 to 3	H1 & H2
Secondary Voltage	Interconnect	Connect Lines To
240	X2 to X3	X1 & X4
120-0-120	X2 to X3 X2 to $\frac{\perp}{\perp}$	X1-X2-X4
120	X1 to X3 X2 to X4	X1 & X4

ES12 Series

**3**

190/200/208/220/380/400/415/440 Volt Pri.,  
110/220 Volt Secondary  
Taps: None

Primary Voltage	Interconnect	Connect Lines To
440	1 to 2	H1 & H2
415	3 to 4	H1 & H2
400	5 to 6	H1 & H2
380	7 to 8	H1 & H2
220	H1 to 2 1 to H2	H1 & H2
208	H1 to 4 3 to H2	H1 & H2
200	H1 to 6 5 to H2	H1 & H2
190	H1 to 8 7 to H2	H1 & H2
Secondary Voltage	Interconnect	Connect Lines To
220	X2 to X3	X1 & X4
110-0-110	X2 to X3 X2 to $\frac{\perp}{\perp}$	X1-X2-X4
110	X1 to X3 X2 to X4	X1 & X4

ES14 Series

**4**

600 Volt Primary,  
120/240 Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

Primary H1-H2-H3	Interconnect	Connect Lines To
630	1 to 2	H1 & H2
615	2 to 3	H1 & H2
600	3 to 4	H1 & H2
585	4 to 5	H1 & H2
570	5 to 6	H1 & H2
555	6 to 7	H1 & H2
540	7 to 8	H1 & H2
Secondary Voltage	Interconnect	Connect Lines To
240	X2 to X3	X1 & X4
120-0-120	X2 to X3 X2 to $\frac{\perp}{\perp}$	X1-X2-X4
120	X1 to X3 X2 to X4	X1 & X4

ES10 Series

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Electrical Connections (Three Phase)

480 Δ Volt Primary,  
208Y/120 Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

**5**

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X0- X1, X2, X3
1	504	208	120
2	492		
3	480		
4	468		
5	456		
6	444		
7	432		

ET2 and 3H Series

\*Shield available in electrostatically shielded units only.

480 Δ Volt Primary,  
240 W/120 CT Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

**6**

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X6-X1, X6-X3
1	504	240	120
2	492		
3	480		
4	468		
5	456		
6	444		
7	432		

ET5 Series

\*Shield available in electrostatically shielded units only.

480 Δ Volt Primary  
380/220 Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

**7**

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X0- X1, X2, X3
1	504	380	220
2	492		
3	480		
4	468		
5	456		
6	444		
7	432		

ET79 Series

480 Δ Volt Primary  
480Y/277 Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

**8**

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X0- X1, X2, X3
1	504	480	277
2	492		
3	480		
4	468		
5	456		
6	444		
7	432		

ET81 Series

208 Δ Volt Primary  
208Y/120 Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

**9**

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X0- X1, X2, X3
1	218	208	120
2	213		
3	208		
4	203		
5	198		
6	192		
7	187		

ET3 Series

208 Δ Volt Primary  
480Y/277 Volt Secondary  
Taps: 2, 2½% FCAN; 4, 2½% FCBN

**10**

Primary X1-X2-X3		Secondary Voltage	
@ Tap	Voltage	H1-H2-H3	H0-H1, H2, H3
1	218	480	277
2	213		
3	208		
4	203		
5	198		
6	192		
7	187		

ET84 Series

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Electrical Connections (Three Phase)

**11**  
 240 Δ Volt Primary  
 208Y/120 Volt Secondary  
 Taps: 2, 2½% FCAN; 4, 2½% FCBN

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X0- X1, X2, X3
1	252	208	120
2	246		
3	240		
4	234		
5	228		
6	222		
7	216		

ET6 Series

**12**  
 240 Δ Volt Primary  
 480Y/277 Volt Secondary  
 Taps: 2, 2½% FCAN; 4, 2½% FCBN

Primary X1-X2-X3		Secondary Voltage	
@ Tap	Voltage	H1, H2, H3	H0- H1, H2, H3
1	252	480	277
2	246		
3	240		
4	234		
5	228		
6	222		
7	216		

ET85 Series

**13**  
 600 Δ Volt Primary  
 208Y/120 Volt Secondary  
 Taps: 2, 2½% FCAN; 4, 2½% FCBN

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X0- X1, X2, X3
1	630	208	120
2	615		
3	600		
4	585		
5	570		
6	555		
7	540		

ET7 Series

**14**  
 600 Δ Volt Primary  
 480Y/277 Volt Secondary  
 Taps: 2, 2½% FCAN; 4, 2½% FCBN

Primary H1-H2-H3		Secondary Voltage	
@ Tap	Voltage	X1, X2, X3	X0- X1, X2, X3
1	630	480	277
2	615		
3	600		
4	585		
5	570		
6	555		
7	540		

ET71 Series

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