

## 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. 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 and cooler operating temperatures. All are available with either a 115°C or 80°C thermal rise and a Class 220°C insulation system.



### Features

- Energy Efficient Compliant to DOE 2016 <sup>1</sup>
- Extra thermal reserve
- Meets transit test requirements for ISTA (International Safe Transit Association) – Test Procedure 1E for packaged-product
- Quiet operation with sound levels 3-6 dB below the NEMA ST-20 requirements

### Accessories and Optional Design Styles

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

### Certifications and Compliances

- Listed: E25872
- UL 1561

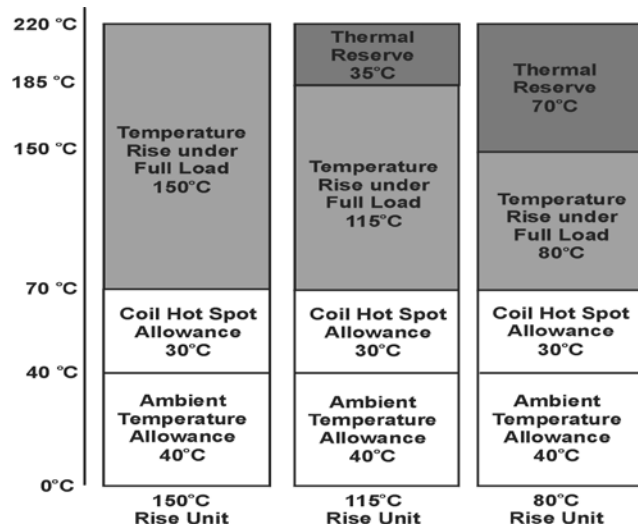


Figure 2

### 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	Type 3R Weather Shield <sup>2</sup>	Height in (mm)	Width in (mm)	Depth in (mm)	Approx. Ship Weight lbs (kg)	Design Style <sup>3</sup>	Elec Conn <sup>3</sup>	Primary Amps	Secondary Amps
15	ES5HB15S	WS-15	28 (711)	16 (406)	16 (406)	265 (120)	1	1	62.5/31.3	125/62.5
25	ES5HB25S	WS-17	31 (787)	18 (457)	18 (457)	340 (154)	1	1	104/52.1	208/104
37.5	ES5HB37S	WS-17	31 (787)	18 (457)	18 (457)	425 (193)	1	1	156/78	313/156
50	ES5HB50S	WS-09	44 (1118)	23 (584)	21 (533)	655 (297)	1	1	208/104	416/208
75	ES5HB75S	WS-09	44 (1118)	23 (584)	21 (533)	750 (340)	1	1	313/156	625/313
100	ES5HB100S	WS-16	46 (1168)	26 (660)	24 (610)	980 (445)	1	1	417/208	833/417

Notes:

1. DOE 2016 refers to Department of Energy CFR (Code of Federal Regulations) title 10, part 431.196).
  2. Weather shields (set of two) must be ordered separately.
  3. Design Styles and Electrical Connections can be found at the end of the Ventilated Distribution Transformers section.
- \* Not all optional designs are UL listed. Contact Technical Services.

## 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	Type 3R Weather Shield <sup>1</sup>	Height in (mm)	Width in (mm)	Depth in (mm)	Approx. Ship Weight lbs (kg)	Design Style <sup>2</sup>	Elec Conn <sup>2</sup>	Primary Amps	Secondary Amps
15	E2HB15S	WS-14	28 (711)	23 (584)	16 (406)	310 (141)	1	5	18.1	41.7
30	E2HB30S	WS-14	28 (711)	23 (584)	16 (406)	387 (176)	1	5	36.1	83.4
45	E2HB45S	WS-30	34 (864)	28 (711)	22 (559)	678 (308)	1	5	54.2	125
75	E2HB75S	WS-30	34 (864)	28 (711)	22 (559)	794 (360)	1	5	90.3	208
112.5	E2HB112S	WS-10	44 (1118)	33 (838)	21 (533)	1005 (456)	1	5	135	313
150	E2HB150S	WS-11	46 (1168)	36 (914)	24 (610)	1368 (621)	1	5	181	417
225	E2HB225S	WS-11	46 (1168)	36 (914)	24 (610)	1479 (671)	1	5	271	625
300	E2HB300S	WS-12	65 (1651)	45 (1143)	35 (889)	2457 (1114)	1	5	361	834

### Group B: 480 Δ Primary, 240 Δ Secondary with 120 V Reduced Capacity Center Tap <sup>3</sup>, 80°C Rise

kVA	Catalog Number 80°C Rise	Type 3R Weather Shield <sup>1</sup>	Height in (mm)	Width in (mm)	Depth in (mm)	Approx. Ship Weight lbs (kg)	Design Style <sup>2</sup>	Elec Conn <sup>2</sup>	Primary Amps	Secondary Amps
15	E5HB15S	WS-14	28 (711)	23 (584)	16 (406)	322 (146)	1	6	18.1	36.1
30	E5HB30S	WS-14	28 (711)	23 (584)	16 (406)	387 (176)	1	6	36.1	72.3
45	E5HB45S	WS-30	34 (864)	28 (711)	22 (559)	678 (308)	1	6	54.2	108
75	E5HB75S	WS-30	34 (864)	28 (711)	22 (559)	792 (359)	1	6	90.3	181
112.5	E5HB112S	WS-10	44 (1118)	33 (838)	21 (533)	1009 (458)	1	6	135	271
150	E5HB150S	WS-11	46 (1168)	36 (914)	24 (610)	1367 (620)	1	6	181	361
225	E5HB225S	WS-11	46 (1168)	36 (914)	24 (610)	1478 (670)	1	6	271	542
300	E5HB300S	WS-12	65 (1651)	45 (1143)	35 (889)	2457 (1114)	1	6	361	723

Notes:

- Weather shields (set of two) must be ordered separately.
- Design Styles and Electrical Connections can be found at the end of the Ventilated Distribution Transformers section.
- Refer to *Capacity of Center Tap in Center Tap Delta Transformers* at the beginning of this section.

## 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	Type 3R Weather Shield <sup>1</sup>	Height in (mm)	Width in (mm)	Depth in (mm)	Approx. Ship Weight lbs (kg)	Design Style <sup>2</sup>	Elec Conn <sup>2</sup>	Primary Amps	Secondary Amps
15	ES5HF15S	WS-15	28 (711)	16 (406)	16 (406)	210 (95)	1	1	62.5/31.3	125/62.5
25	ES5HF25S	WS-15	28 (711)	16 (406)	16 (406)	245 (111)	1	1	104/52.1	208/104
37.5	ES5HF37S	WS-17	31 (787)	18 (457)	18 (457)	340 (154)	1	1	156/78	313/156
50	ES5HF50S	WS-17	31(787)	18(457)	18 (457)	425 (193)	1	1	208/104	416/208
75	ES5HF75S	WS-09	44 (1118)	23 (584)	21 (533)	610 (277)	1	1	313/156	625/313
100	ES5HF100S	WS-09	44 (1118)	23 (584)	21 (533)	750 (340)	1	1	417/208	833/417

## 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	Type 3R Weather Shield <sup>1</sup>	Height in (mm)	Width in (mm)	Depth in (mm)	Approx. Ship Weight lbs (kg)	Design Style <sup>2</sup>	Elec Conn <sup>2</sup>	Primary Amps	Secondary Amps
15	E2HF15S	WS-02	23 (584)	18 (457)	14 (356)	222 (101)	1	5	18.1	41.7
30	E2HF30S	WS-14	28 (711)	23 (584)	16 (406)	307 (139)	1	5	36.1	83.4
45	E2HF45S	WS-14	28 (711)	23 (584)	16 (406)	378 (171)	1	5	54.2	125
75	E2HF75S	WS-30	34 (864)	28 (711)	22 (559)	672 (305)	1	5	90.3	208
112.5	E2HF112S	WS-30	34 (864)	28 (711)	22 (559)	794 (360)	1	5	135	313
150	E2HF150S	WS-10	44 (1118)	33 (838)	21 (533)	1002 (454)	1	5	181	417
225	E2HF225S	WS-11	46 (1168)	36 (914)	24 (610)	1393 (632)	1	5	271	625
300	E2HF300S	WS-11	46 (1168)	36 (914)	24 (610)	1519 (689)	1	5	361	834

### Group B: 480 Volt Δ Primary, 240 Volt Δ Secondary with 120 V reduced capacity center tap <sup>4</sup>, 60 Hz, **115°C Rise**

kVA	Catalog Number	Type 3R Weather Shield <sup>1</sup>	Height in (mm)	Width in (mm)	Depth in (mm)	Approx. Ship Weight lbs (kg)	Design Style <sup>2</sup>	Elec Conn <sup>2</sup>	Primary Amps	Secondary Amps
15	E5HF15S	WS-02	23 (584)	18 (457)	14 (356)	224 (102)	1	6	18.1	36.1
30	E5HF30S	WS-14	28 (711)	23 (584)	16 (406)	307 (139)	1	6	36.1	72.3
45	E5HF45S	WS-14	28 (711)	23 (584)	16 (406)	378 (171)	1	6	54.2	108
75	E5HF75S	WS-30	34 (864)	28 (711)	22 (559)	668 (303)	1	6	90.3	181
112.5	E5HF112S	WS-30	34 (864)	28 (711)	22 (559)	794 (360)	1	6	135	271
150	E5HF150S	WS-10	44 (1118)	33 (838)	21 (533)	1002 (454)	1	6	181	361
225	E5HF225S	WS-11	46 (1168)	36 (914)	24 (610)	1393 (632)	1	6	271	542
300	E5HF300S	WS-11	46 (1168)	36 (914)	24 (610)	1519 (689)	1	6	361	723

#### Notes:

- Weather shields (set of two) must be ordered separately.
- Design Styles and Electrical Connections can be found at the end of the Ventilated Distribution Transformers section.

## 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 $\frac{\perp}$	X1-X2-X4
120	X1 to X3 X2 to X4	X1 & X4

**ES5 Series**

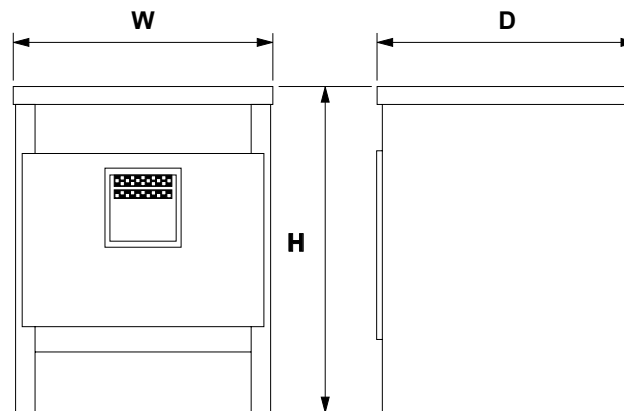
**2**

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 $\frac{\perp}$	X1-X2-X4
120	X1 to X3 X2 to X4	X1 & X4

**ES12 Series**

### Design Style



Style 1 - Ventilated

## Electrical Connections (Three Phase)

**5**

480 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	504	208	120
2	492		
3	480		
4	468		
5	456		
6	444		
7	432		

**E2 and 3H Series**

*\* Shield available in electrostatically shielded units only.*

**6**

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

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		

**E5 Series**

*\* Shield available in electrostatically shielded units only.*

**7**

480 Δ Volt Primary  
380Y/220 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	504	380	220
2	492		
3	480		
4	468		
5	456		
6	444		
7	432		

**E79 Series**

**8**

480 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	504	480	277
2	492		
3	480		
4	468		
5	456		
6	444		
7	432		

**E81 Series**

**9**

208 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	218	208	120
2	213		
3	208		
4	203		
5	198		
6	192		
7	187		

**E3 Series**

## Electrical Connections (Three Phase) cont.

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		

**E84 Series**

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

# 11

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		

**E6 Series**

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

# 12

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		

**E85 Series**