## 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.


E25872

### 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
- Compliant to NEMA TP-1 standards

### Certifications and Compliances

- UL Listed: E25872
  - UL 1561

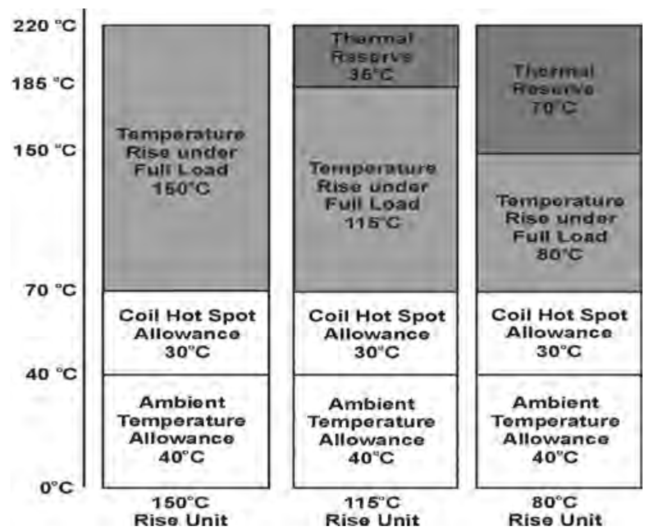



*Figure 2*

### 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 [1] | Height in (mm) | Width in (mm) | Depth in (mm) | Approx. Ship Weight lbs (kg) | Design Style [2] | Elec Conn [2] | Primary Amps | Secondary Amps |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | **ES5HB15S** | **WS–15** | 28.00 (711.2) | 16.00 (406.4) | 16.00 (406.4) | 265.0 (120.20) | 1 | 1 | 62.5/31.3 | 125/62.5 |
| 25 | **ES5HB25S** | **WS–17** | 31.00 (787.4) | 18.00 (457.2) | 18.00 (457.2) | 340.0 (154.22) | 1 | 1 | 104/52.1 | 208/104 |
| 37.5 | **ES5HB37S** | **WS–17** | 31.00 (787.4) | 18.00 (457.2) | 18.00 (457.2) | 425.0 (192.78) | 1 | 1 | 156/78 | 313/156 |
| 50 | **ES5HB50S** | **WS–09** | 44.00 (1117.6) | 23.00 (584.2) | 21.00 (533.4) | 655.0 (297.10) | 1 | 1 | 208/104 | 416/208 |
| 75 | **ES5HB75S** | **WS–09** | 44.00 (1117.6) | 23.00 (584.2) | 21.00 (533.4) | 750.0 (340.19) | 1 | 1 | 313/156 | 625/313 |
| 100 | **ES5HB100S** | **WS–16** | 46.00 (1168.4) | 26.00 (660.4) | 24.00 (609.6) | 980.0 (444.52) | 1 | 1 | 417/208 | 833/417 |

Notes:
1. Weather shields (set of two) must be ordered separately.
2. 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 △ Primary, 208Y/120 Secondary, 60 Hz, *80°C Rise*

| kVA | Catalog Number 80°C Rise | Type 3R Weather Shield [1] | Height in (mm) | Width in (mm) | Depth in (mm) | Approx. Ship Weight lbs (kg) | Design Style [2] | Elec Conn [2] | Primary Amps | Secondary Amps |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | **ET2HB15S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 292.0 (132.45) | 1 | 5 | 18.1 | 41.7 |
| 30 | **ET2HB30S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 376.0 (170.55) | 1 | 5 | 36.1 | 83.4 |
| 45 | **ET2HB45S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 569.0 (258.09) | 1 | 5 | 54.2 | 125.0 |
| 75 | **ET2HB75S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 768.0 (348.36) | 1 | 5 | 90.3 | 208.0 |
| 112.5 | **ET2HB112S** | **WS–10** | 44.00 (1117.6) | 33.00 (838.2) | 21.00 (533.4) | 933.0 (423.20) | 1 | 5 | 135.0 | 313.0 |
| 150 | **ET2HB150S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1342.0 (608.72) | 1 | 5 | 181.0 | 417.0 |
| 225 | **ET2HB225S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1525.0 (691.73) | 1 | 5 | 271.0 | 625.0 |
| 300 | **ET2HB300S** | **WS–12** | 65.00 (1651.0) | 45.00 (1143.0) | 35.00 (889.0) | 2460.0 (1115.84) | 1 | 5 | 361.0 | 834.0 |

### Group B: 480 △ Primary, 240 △ Secondary with 120V Reduced Capacity Center Tap [3], *80°C Rise*

| kVA | Catalog Number 80°C Rise | Type 3R Weather Shield [1] | Height in (mm) | Width in (mm) | Depth in (mm) | Approx. Ship Weight lbs (kg) | Design Style [2] | Elec Conn [2] | Primary Amps | Secondary Amps |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | **ET5HB15S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 292.0 132.45) | 1 | 6 | 18.1 | 36.1 |
| 30 | **ET5HB30S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 381.0 (172.82) | 1 | 6 | 36.1 | 72.3 |
| 45 | **ET5HB45S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 580.0 (263.08) | 1 | 6 | 54.2 | 108.0 |
| 75 | **ET5HB75S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 760.0 (344.73) | 1 | 6 | 90.3 | 181.0 |
| 112.5 | **ET5HB112S** | **WS–10** | 44.00 (1117.6) | 33.00 (838.2) | 21.00 (533.4) | 940.0 (426.38) | 1 | 6 | 135.0 | 271.0 |
| 150 | **ET5HB150S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1342.0 (608.72) | 1 | 6 | 181.0 | 361.0 |
| 225 | **ET5HB225S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1525.0 (691.73) | 1 | 6 | 271.0 | 542.0 |
| 300 | **ET5HB300S** | **WS–12** | 65.00 (1651.0) | 45.00 (1143.0) | 35.00 (889.0) | 2460.0 (1115.84) | 1 | 6 | 361.0 | 723.0 |

Notes:

1. Weather shields (set of two) must be ordered separately.
2. Design Styles and Electrical Connections can be found at the end of the Ventilated Distribution Transformers section.
3. 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 [1] | Height in (mm) | Width in (mm) | Depth in (mm) | Approx. Ship Weight lbs (kg) | Design Style [2] | Elec Conn [2] | Primary Amps | Secondary Amps |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | **ES5HF15S** | **WS–15** | 28.00 (711.2) | 16.00 (406.4) | 16.00 (406.4) | 210.0 (95.25) | 1 | 1 | 62.5/31.3 | 125/62.5 |
| 25 | **ES5HF25S** | **WS–15** | 28.00 (711.2) | 16.00 (406.4) | 16.00 (406.4) | 245.0 (111.13) | 1 | 1 | 104/52.1 | 208/104 |
| 37.5 | **ES5HF37S** | **WS–17** | 31.00 (787.4) | 18.00 (457.2) | 18.00 (457.2) | 340.0 (154.22) | 1 | 1 | 156/78 | 313/156 |
| 50 | **ES5HF50S** | **WS–17** | 31.00 (787.4) | 18.00(457.2) | 18.00 (457.2) | 425.0 (192.78) | 1 | 1 | 208/104 | 416/208 |
| 75 | **ES5HF75S** | **WS–09** | 44.00 (1117.6) | 23.00 (584.2) | 21.00 (533.4) | 610.0 (276.69) | 1 | 1 | 313/156 | 625/313 |
| 100 | **ES5HF100S** | **WS–09** | 44.00 (1117.6) | 23.00 (584.2) | 21.00 (533.4) | 750.0 (340.19) | 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 [1] | Height in (mm) | Width in (mm) | Depth in (mm) | Approx. Ship Weight lbs (kg) | Design Style [2] | Elec Conn [2] | Primary Amps | Secondary Amps |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | **ET2HF15S** | **WS–02** | 23.00 (584.2) | 18.00 (457.2) | 14.00 (355.6) | 187.0 (84.82) | 1 | 5 | 18.1 | 41.7 |
| 30 | **ET2HF30S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 292.0 (132.45) | 1 | 5 | 36.1 | 83.4 |
| 45 | **ET2HF45S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 378.0 (171.46) | 1 | 5 | 54.2 | 125.0 |
| 75 | **ET2HF75S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 569.0 (258.09) | 1 | 5 | 90.3 | 208.0 |
| 112.5 | **ET2HF112S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 768.0 (348.36) | 1 | 5 | 135.0 | 313.0 |
| 150 | **ET2HF150S** | **WS–10** | 44.00 (1117.6) | 33.00 (838.2) | 21.00 (533.4) | 933.0 (423.20) | 1 | 5 | 181.0 | 417.0 |
| 225 | **ET2HF225S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1342.0 (608.72) | 1 | 5 | 271.0 | 625.0 |
| 300 | **ET2HF300S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1525.0 (691.73) | 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 | Type 3R Weather Shield [1] | Height in (mm) | Width in (mm) | Depth in (mm) | Approx. Ship Weight lbs (kg) | Design Style [2] | Elec Conn [2] | Primary Amps | Secondary Amps |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | **ET5HF15S** | **WS–02** | 23.00 (584.2) | 19.00 (482.6) | 14.00 (355.6) | 189.0 (85.73) | 1 | 6 | 18.1 | 36.1 |
| 30 | **ET5HF30S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 292.0 (132.45) | 1 | 6 | 36.1 | 72.3 |
| 45 | **ET5HF45S** | **WS–14** | 28.00 (711.2) | 23.00 (584.2) | 16.00 (406.4) | 381.0 (172.82) | 1 | 6 | 54.2 | 108.0 |
| 75 | **ET5HF75S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 560.0 (254.01) | 1 | 6 | 90.3 | 181.0 |
| 112.5 | **ET5HF112S** | **WS–30** | 34.00 (863.6) | 28.00 (711.2) | 22.00 (558.8) | 760.0 (344.73) | 1 | 6 | 135.0 | 271.0 |
| 150 | **ET5HF150S** | **WS–10** | 44.00 (1117.6) | 33.00 (838.2) | 21.00 (533.4) | 940.0 (426.38) | 1 | 6 | 181.0 | 361.0 |
| 225 | **ET5HF225S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1342.0 (608.72) | 1 | 6 | 271.0 | 542.0 |
| 300 | **ET5HF300S** | **WS–11** | 46.00 (1168.4) | 36.00 (914.4) | 24.00 (609.6) | 1525.0 (691.73) | 1 | 6 | 361.0 | 723.0 |

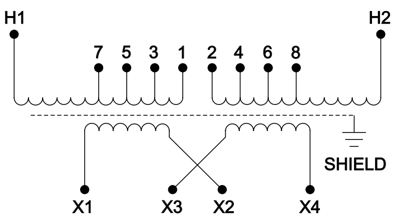
Notes:

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

## Electrical Connections (Single Phase)

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

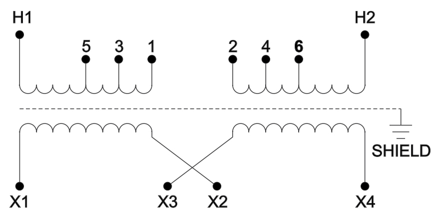
**1**




| 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 ⏚ | X1-X2-X4 |
| 120 | X1 to X3 X2 to X4 | X1 & X4 |
| **ES5 Series** | | |

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

**2**

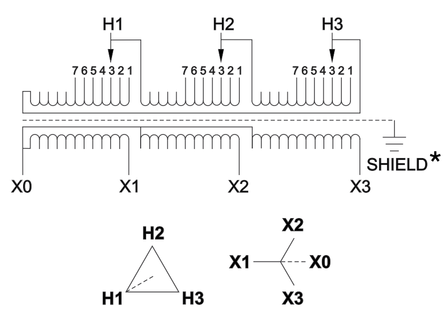



| Primary Voltage | Interconnect | Connect Lines To |
|---|---|---|
| 277 | 1 to 2 | H1 & H2 |
| 240 | 3 to 4 | H1 & H2 |
| 208 | 5 to 6 | H1 & H2 |
| 120 | H1 to 4<br>H2 to 3 | H1 & H2 |
| **Secondary Voltage** | **Interconnect** | **Connect Lines To** |
| 240 | X2 to X3 | X1 & X4 |
| 120-0-120 | X2 to X3<br>X2 to ⏚ | X1-X2-X4 |
| 120 | X1 to X3<br>X2 to X4 | X1 & X4 |
| **ES12 Series** | | |

## Electrical Connections (Three Phase)

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

**5**

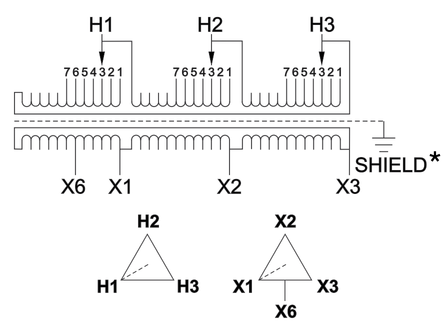



| Primary H1-H2-H3 | | Secondary Voltage | |
|---|---|---|---|
| @ Tap | Voltage | X1, X2, X3 | X0- X1, X2, X3 |
| 1 | 504 | 208 | 120 |
| 2 | 492 | | |
| 3 | 480 | | |
| 4 | 468 | | |
| 5 | 456 | | |
| 6 | 444 | | |
| 7 | 432 | | |
| **ET2 and 3H Series** | | | |

** Shield available in electrostatically shielded units only.*

480 Δ Volt Primary,
240 Δ 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.*