



Application Note: ACGRID  
Revision: 070517

## CPS 3Phs String Inverter Compatible AC Connections

This Application Note describes the compatibility of 3-Phase transformer winding configurations, and the neutral connection requirements associated with the CPS SCA14KTL-DO/US-208(**14kW**), CPS SCA20KTL-DO/US-480(**20kW**), SCA23KTL-DO/US-480(**23kW**), CPS SCA28KTL-DO/US-480(**28kW**), CPS SCA36KTL-DO/US(**36kW**), CPS SCA50KTL-DO/US-480(**50kW**), and CPS SCA60KTL-DO/US-480(**60kW**) inverters.

### ALL INVERTERS:

1. The winding configuration on the INVERTER side of the transformer must be WYE for ALL CPS 3-Phase String Inverters.
2. The array **must** be floating (not grounded).
3. If the neutral on the Utility Side is grounded, the core structure must be 4 or 5 limbs to detect an open phase condition on the Inverter Side of the Transformer. Special detection configurations are required to implement Inverter shut-down on loss of utility phase if the core is a 3-limb construction.
4. The function of the neutral connection is to provide a point of reference for measurement purposes that is essentially at ground potential. The neutral conductor is for control or measurement purposes only (when required – see specific inverter requirements below). No power will flow through the neutral conductor, and as such may be sized according to NEC 2017 Article 705.95(B). The ground conductor (PE) is sized to article 250.122 (Table 250.122).

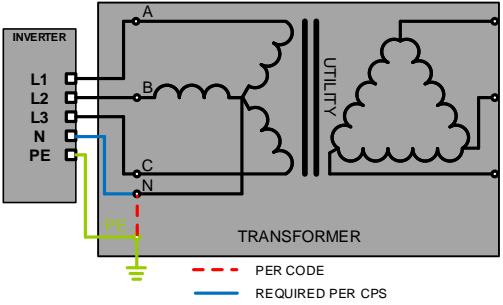
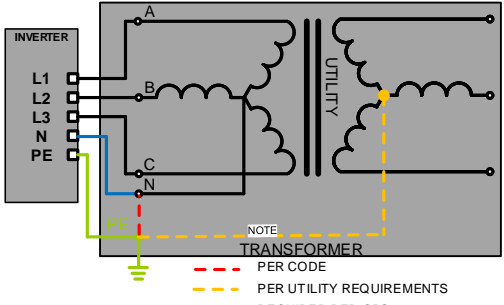
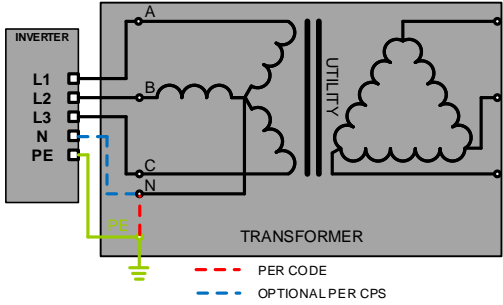
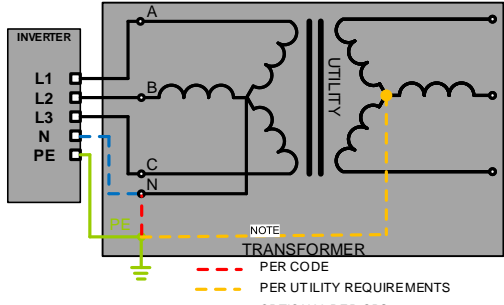
### (14kW), (23kW), and (28kW) INVERTERS

These inverters are designed to be installed as 4-wire systems. As required by their UL 1741 listing, a neutral conductor from the utility-interconnect **must be terminated at the Neutral terminal** within the AC wiring box to ensure that the AC voltage sensing circuit can perform an individual phase voltage (line-to-neutral) measurement.

### (20kW), (36kW), (50kW) and (60kW) INVERTERS

These inverters are designed to be installed as either 3-wire or 4-wire systems. Termination or connection of the neutral conductor from the utility interconnect is **optional**.

### Common 3-Phase Transformer Wye Primary Winding Configuration

Transformer Winding Configuration	Wye (Inverter) / DELTA (Utility)	Wye (Inverter) / WYE (Utility)
<b>Inverter Models</b>  SCA14KTL-DO/US-208 SCA23KTL-DO/US-480 SCA28KTL-DO/US-480	 <p>Diagram showing a transformer with a Wye primary winding connected to an Inverter (L1, L2, L3, N, PE) and a Delta secondary winding connected to a Utility. The Inverter neutral (N) is grounded. A red dashed line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'PER CODE'. A blue solid line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'REQUIRED PER CPS'.</p>	 <p>Diagram showing a transformer with a Wye primary winding connected to an Inverter (L1, L2, L3, N, PE) and a Wye secondary winding connected to a Utility. The Inverter neutral (N) is grounded. A red dashed line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'PER CODE'. A blue solid line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'REQUIRED PER CPS'. A yellow dashed line indicates a connection from the Utility neutral (N) terminal to the Utility ground, labeled 'PER UTILITY REQUIREMENTS'. A legend includes 'NOTE', 'PER CODE', 'PER UTILITY REQUIREMENTS', and 'REQUIRED PER CPS'.</p>
<b>Inverter Models</b>  SCA20KTL-DO/US-480 SCA36KTL-DO/US SCA50KTL-DO/US-480 SCA60KTL-DO/US-480	 <p>Diagram showing a transformer with a Wye primary winding connected to an Inverter (L1, L2, L3, N, PE) and a Delta secondary winding connected to a Utility. The Inverter neutral (N) is grounded. A red dashed line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'PER CODE'. A blue dashed line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'OPTIONAL PER CPS'.</p>	 <p>Diagram showing a transformer with a Wye primary winding connected to an Inverter (L1, L2, L3, N, PE) and a Wye secondary winding connected to a Utility. The Inverter neutral (N) is grounded. A red dashed line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'PER CODE'. A blue dashed line indicates a connection from the Inverter PE to the Utility neutral (N) terminal, labeled 'OPTIONAL PER CPS'. A yellow dashed line indicates a connection from the Utility neutral (N) terminal to the Utility ground, labeled 'PER UTILITY REQUIREMENTS'. A legend includes 'NOTE', 'PER CODE', 'PER UTILITY REQUIREMENTS', and 'OPTIONAL PER CPS'.</p>

**NOTES:**

1. If the neutral on the Utility Side is grounded, the core structure must be 4 or 5 limbs to detect an open phase condition on the Inverter Side of the Transformer. Special detection configurations are required to implement Inverter shut-down on loss of utility phase if the core is a 3-limb construction.  
The Neutral on the Utility Side (H0) and Inverter Side (X0) may be connected internally and brought out as one terminal in the LV compartment and labeled (H0X0).
2. Transformer short-circuit impedance (Z%) should be less than 6%.
3. The transformer VA rating should be 105% of the sum of the connected inverter ratings.
4. The transformer does not require a static shield.
5. The maximum number of inverters connected to a single transformer is 70.
6. The recommended maximum voltage-drop on the Inverter to Point of Common Coupling (to the grid) is 2% at full load – including conductor temperature considerations.