

Chroma Systems Solutions, Inc.

# Input Current Calculation of AC Source 61512

**61500 AC Power Sources**

Keywords: Input current, delta/wye configuration, line current, phase current,  
neutral line

# Input Current Calculation of AC Source 61512

Title:

Product Family: **61500 AC Power Sources**

## Abstract

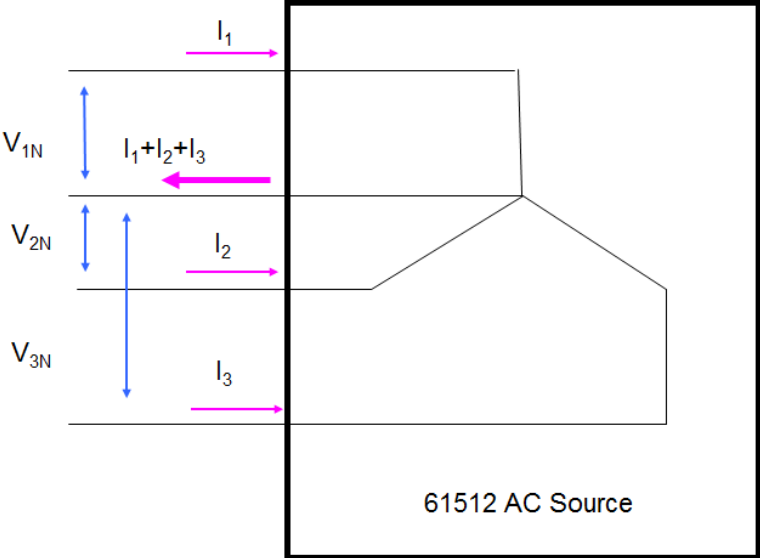
Three phase high power AC source 61512 is widely used in testing products for all different industries. The input rated current of 61512 varies in delta and wye configuration. The rated input current is the key factor that determines the rating of circuit breakers and fuses in the system.

## Solution

The input current of 61512 is calculated under the worst case condition.

|                             |                                |
|-----------------------------|--------------------------------|
| Input AC Power (each phase) |                                |
| AC type                     | 3-phase, Delta or WYE          |
| Voltage range               | 190-250V(Delta: L-L, WYE: L-N) |
| Max. current                | Delta: 120A WYE: 90A           |

Case 1: WYE configuration



Assume  $V_1=V_2=V_3=165V$

$$S_{1-phase} = \frac{P}{3 \times PF \times Eff} = \frac{18KVA}{3 \times 0.8 \times 0.7} = 10714VA$$

$$I_1 = I_2 = I_3 = \frac{S_{1-phase}}{V_1} = \frac{10714VA}{165V} = 65A$$

$V_1, V_2, V_3$ : 3-phase input voltage, 165V is the internal RD specification in worst case

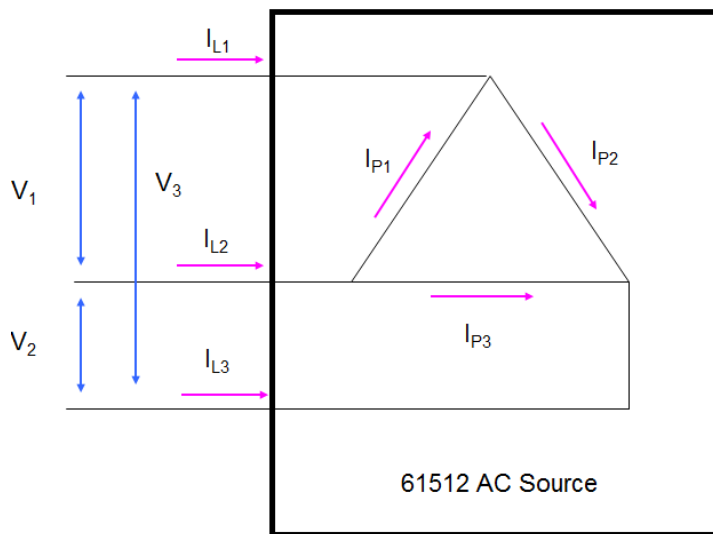
PF: power factor

Eff: AC source conversion efficiency

$I_1, I_2, I_3$ : phase current

However, when the load is unbalanced, there will be a significant current flowing in the neutral line. The maximum current measured on the neutral line is 90A due to the passive power factor correction of 61512 sources. Therefore, 90A is stated as the maximum current in the specification.

Case 2: Delta configuration



Assume  $V_1=V_2=V_3=165V$

$$S_{1-phase} = \frac{P}{3 \times PF \times Eff} = \frac{18KVA}{3 \times 0.8 \times 0.7} = 10714VA$$

$$I_1 = I_2 = I_3 = \frac{S_{1-phase}}{V_1} = \frac{10714VA}{165V} = 65A$$

$$I_{L1}=I_{L2}=I_{L3}=I_1 * \sqrt{3} = I_2 * \sqrt{3} = I_3 * \sqrt{3} = 65 \times 1.732 = 112A$$

$V_1, V_2, V_3$ : 3-phase input voltage

PF: power factor

Eff: AC source conversion efficiency

$I_1, I_2, I_3$ : phase current

## Conclusion

From the above calculation, we can see that at least 112 A will be drawn from each phase under delta configuration for 61512 AC source to deliver the full power. For wye configuration, the maximum current measured in the neutral line exceeded 80A. We recommend using 90A as the max input current for wye configuration.