

# ePLUS Family units

## SPLIT PHASE operation mode



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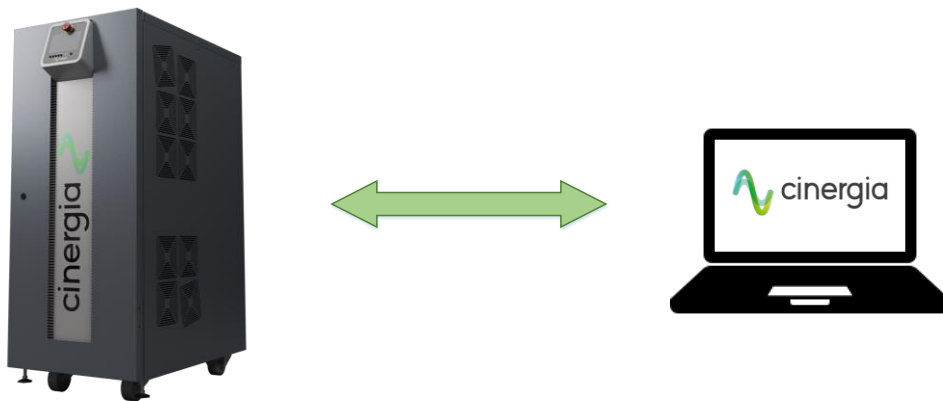
## 1. GENERAL

The purpose of this manual is to provide information to the final user to connect the Cinergia equipments with SPLIT PHASE configuration.

The end user must read all the information provided with the unit (in the USB) before operating the unit in any case.

This document tries to be easy to understand, created with schematics and real pictures of the equipment and the interface with parts marked with letters and numbers which you can find the explanation just below the picture.

Cinergia is in constant development to deliver always the best service to you, so it is possible to find some discrepancy between this manual and the real converter itself. Don't hesitate to contact us and ask for the latest version of the documentation.



This manual is valid for the ePLUS platform units.



**Any change on wiring must be done with no power in the system (input/grid and output/EUT) and following the premises of the *Cinergia Unit Installation and Operation manual* provided with the units.**

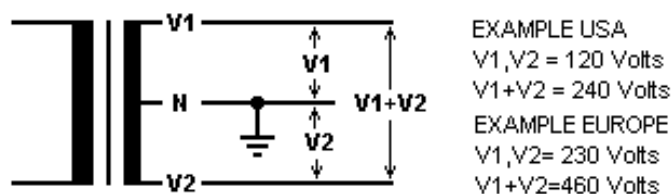
## 2. SPLIT PHASE CONFIGURATION

First of all, **any change on wiring must be done** with no power in the system and **following the premises of the CINERGIA UNITS Installation and Operation manual**.

The **SPLIT PHASE** or single phase three wire system is a type of single-phase electric power distributor. There are two mainly configuration:

- **2 wires:** L1 – L2 for balanced tests
- **3 wires:** L1 – L2 – N for balanced and unbalanced tests

As an example of this topology, please see the picture<sup>1</sup> below:



There are different configurations, that the user could do with our products:

TEST	# WIRES	UN/BALANCED	VOLTAGE RANGE	SETUP	CINERGIA CONFIG
1	2	BALANCED	240V – N	GE	See CASE B
2	2	BALANCED	120V – N	GE	See CASE B
3	2	BALANCED	240V – N	EL	See CASE D
4	2	BALANCED	120V – N	EL	See CASE D
5	3	BALANCED	120V – 0 – 120V	GE	See CASE A
6	3	BALANCED	120V – 0 – 120V	EL	See CASE C
7	3	UNBALANCED	120V – 0 – 120V	GE	See CASE A
8	3	UNBALANCED	120V – 0 – 120V	EL	See CASE C



If the Neutral wire is connected to the PE, an isolation transformer will be **MANDATORY** installed at the grid side of the CINERGIA unit.



Take care that an isolation transformer is need at the grid side of the unit.

<sup>1</sup> Source information: Wikipedia

2.1. SPLIT PHASE CONFIGURATION in GE MODE (GRID EMULATOR)

Please find attached the CINERGIA equipment connection configuration in case of GE:

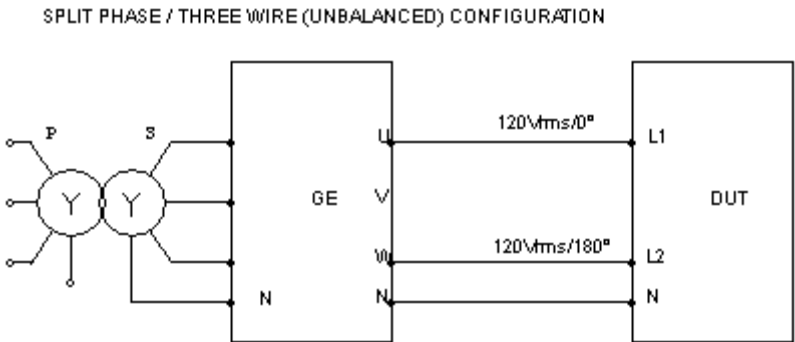
2.1.1.CASE A: GRID EMULATOR: UNBALANCED TESTS – 3 wires

**CASE A:** In case of UNBALANCED tests, CINERGIA propose to the user the following configuration, please see the diagram below.

The user can use a GE generating a 120V@0° on phase U and 120V@-180° on phase W.

The final user must connect the N (neutral wire) between the EUT and the GE.

The user must connect the phase U and W as a L1 and L2 respectively on the EUT.



**Take care that an isolation transformer is need at the grid side of the unit.**

Take into account that, using this configuration (split phase configuration), the unit is not working in full power, so the unit will not be using all the power available and it will be underrated. The limitation is the rated current that the unit can supply in one phase.

*As an Example*

In case of a 30kVA unit, the rated current is 40A per phase. The total power that the user can supply, at a voltage of 120Vrms, it is a maximum of 4800W per phase (120V@40A). Remember, that the rated power for a 30kVA unit is 9200W per phase.

With this configuration, for a 30kVA test (120V@125A), the user will need a GE+100. This model has a 145A per phase as a rated current.

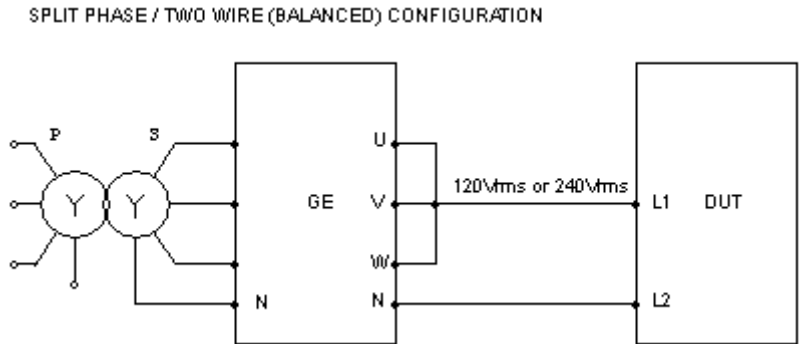
GE&EL+ vAC/DC	AC Power	AC Current
GE&EL+30 vAC/DC	27 kW	40 A / 120 A
GE&EL+100 vAC/DC	100 kW	145 A / -

2.1.2.CASE B: GRID EMULATOR: BALANCED TESTS – 2 wires

**CASE B:** In case of BALANCED tests, CINERGIA propose to the user, the following configuration, please see the diagram below.

The user can use a GE generating a 120V@0° or 240V@0° (depend on the setup to test) on phase U, V and W working in 1CHANNEL operation mode (it is possible to work on 3channel configuration).

The final user must use the N (neutral wire) from the GE as L2 from the EUT. The three phases will be L1.



**Take care that an isolation transformer is need at the grid side of the unit.**

Take into account that, using this configuration (split phase configuration), the unit can be used at rated current and power in case of 240Vrms setup. In case of 120Vrms grid, there is a power limitation.

*As an Example*

In case of a 30kVA unit, the rated current is 40A per phase, this means a 120A in 1CHANNEL mode. The total power that the user can supply, at a voltage of 240Vrms, it is 27kW. In case of 120Vrms, the total power supplied by the unit is 14.4kW (120V@40A).

With this configuration, for a 30kVA test (120V@125A), the user will need a GE+40. This model has a 174A in 1 CHANNEL mode. Remember that a GE+30 has 120A in 1 CHANNEL mode.

GE&EL+ vAC/DC	AC Power	AC Current
GE&EL+30 vAC/DC	27 kW	40 A / 120 A
GE&EL+40 vAC/DC	40 kW	58 A / 174 A

2.2. SPLIT PHASE CONFIGURATION in EL MODE (ELECTRONIC LOAD)

Please find attached the CINERGIA equipment connection configuration in case of EL:

2.2.1. CASE C: ELECTRONIC LOAD: UNBALANCED TESTS – 3 wires

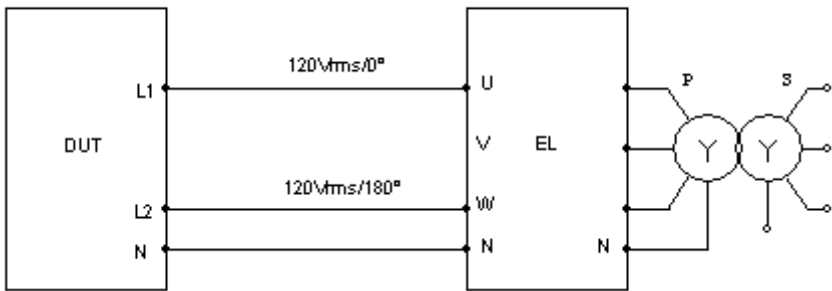
**CASE C:** In case of UNBALANCED tests, CINERGIA propose to the user the following configuration, please see the diagram below.

The user can use a EL connected between phase U and phase W and the N (neutral wire).

The final user must connect the N (neutral wire) between the EUT and the EL.

The user must connect the phase U and W as L1 and L2 respectively on the EUT.

SPLIT PHASE / THREE WIRE (UNBALANCED) CONFIGURATION



Take care that an isolation transformer is need at the grid side of the unit.

Take into account that, using this configuration (split phase configuration), the unit is not working in full power, so the unit will not be using all the power available and it will be underrated. The limitation is the rated current that the unit can supply in one phase.

*As an Example*

In case of a 30kVA unit, the rated current is 40A per phase. The total power that the user can supply, at a voltage of 120Vrms, it is a maximum of 4800Wper phase (120V@40A). Remember, that the rated power for a 30kVA unit is 9200W per phase.

With this configuration, for a 30kVA test (120V@125A), the user will need a EL+100. This model has a 145A per phase as a rated current.

GE&EL+ vAC/DC	AC Power	AC Current
GE&EL+30 vAC/DC	27 kW	40 A / 120 A
GE&EL+100 vAC/DC	100 kW	145 A / -



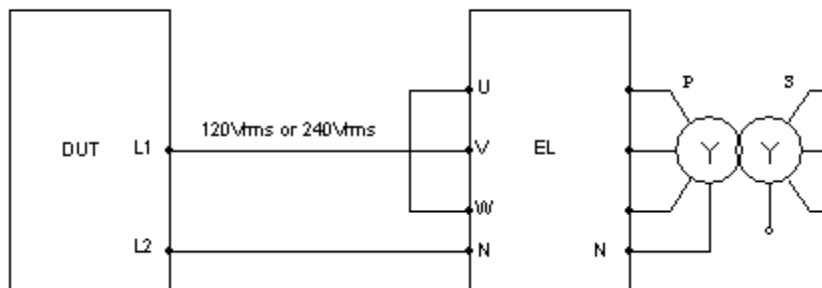
## 2.2.2.CASE D: GRID EMULATOR: BALANCED TESTS – 2 wires

**CASE D:** In case of BALANCED tests, CINERGIA propose to the user, the following configuration, please see the diagram below.

The user can use a EL consuming a 120V or 240V (depend on the setup to test) on phase U, V and W working all phases together as shown on picture below. Remember that the EL has not 1 CHANNEL mode operation and an external short circuit must be done.

The final user must use the N from the EL as L2 from the EUT. The three phases will be L1.

SPLIT PHASE / TWO WIRE (BALANCED) CONFIGURATION



**Take care that an isolation transformer is need at the grid side of the unit.**

Take into account that, using this configuration (split phase configuration), the unit can be used at rated current and power in case of 240Vrms setup. In case of 120Vrms grid, there is a power limitation.

*As an Example*

In case of a 30kVA unit, the rated current is 40A per phase, this means a 120A in 1CHANNEL mode. The total power that the user can supply, at a voltage of 240Vrms, it is 27kW. In case of 120Vrms, the total power supplied by the unit is 14.4kW (120V@40A).

With this configuration, for a 30kVA test (120V@125A), the user will need a EL+40. This model has a 174A in 1 CHANNEL mode. Remember that a EL+30 has 120A in 1 CHANNEL mode.

GE&EL+ vAC/DC	AC Power	AC Current
GE&EL+30 vAC/DC	27 kW	40 A / 120 A
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