

PHOENIX

Phase Converters

**240
VOLTS
ONLY**

**Detailed
Step-by-Step
Manual**



NL | PL | DZ Models

www.phoenixphaseconverters.com



Important Installation Information

Critical safety, startup, and wiring reminders before energizing your converter.



CAUTION – READ BEFORE INSTALLATION & STARTUP

Failure to follow these instructions can result in equipment damage, serious injury, or death.



READ FIRST

1



Do NOT Start Under Load

Do NOT start the phase converter with any load connected, including transformers or any equipment.

2



Verify Power Source & Capacity

Ensure your electrical service can handle converter startup.
The utility transformer kVA must be greater than the converter horsepower rating of the idler motor being started.

3



Use a Qualified Licensed Electrician

Installation must be performed by a licensed professional and comply with the NEC and all applicable local codes.

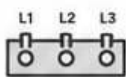
4



Do NOT Use Wire Nuts for Power Wiring

Use proper lugs and secure terminations for all power connections.
Carefully inspect and recheck all connections after installation.

5



Confirm Wiring & Grounding Before Energizing

Verify input on T1 and T2. Verify output/load on L1, L2, and L3.
Torque all lugs, confirm grounding, and ensure the breaker is correct.

6



Keep Single-Phase Feed Short & Adequate

Keep the single-phase feed as short as practical—50 ft or less is recommended.
For longer runs, increase conductor size as required by code.

7



Watch Idler Startup Behavior

If the idler motor does not reach full speed, runs too slowly, or sounds abnormal, shut the unit down immediately and correct the issue.



QUICK STARTUP CHECKLIST



No load connected during startup.



Input landed on T1 and T2.



Output/load wiring landed on L1, L2, and L3.



All lugs torqued, ground confirmed, and breaker verified.



Idler turns freely and reaches full speed.



IMPORTANT ELECTRICAL NOTES

- Use MOTOR LOAD or HACR-rated protection where applicable.
- Avoid light-duty breakers that may nuisance trip during startup.
- Follow all NEC requirements and local or state electrical codes.



WHEN TO STOP

- If startup is abnormal or the idler won't reach full speed.
- If unusual noises, vibration, or odors occur.
- If any wiring or connection appears incorrect.
- Shut down immediately and consult a qualified electrician.



For optimal performance, install the phase converter as close to the power supply as possible. Keep the single-phase supply line under 50 feet whenever possible. If a longer distance is necessary, increase the wire size by one gauge for every additional 50 feet to help minimize voltage drop and maintain reliable operation.



Phase Converter Wiring Distance – Do & Don't Guide

✓ Do:

- Install the phase converter close to the power source.
- Keep the single-phase line under 50 feet whenever possible to reduce voltage drop.
- Use properly sized wire for longer runs.
- If the single-phase line must exceed 50 feet, increase the wire size by one gauge for every additional 50 feet.
- Plan for voltage drop.
 - Upsizing wire helps ensure the converter receives sufficient voltage, especially during motor startup.

✗ Don't:

- Don't use long runs of undersized wire.
 - This can cause excessive voltage drop, poor performance, overheating, or equipment failure.
- Don't assume 50 feet is a hard limit.
 - Longer runs can work if you compensate correctly with larger wire.



Why It Matters:

Voltage drops as current travels through wire because of resistance. The longer the run, the greater the voltage loss. For phase converters, maintaining proper voltage is especially important during startup, when inrush current is highest. Using larger wire for longer runs helps reduce resistance, support reliable starting, and protect both the converter and the connected equipment.

Service Requirements & Quick Reference

Single-phase supply, breaker selection, and installation checks for NL / PL models.



Single-Phase Power Reference Chart (kVA to Amps @ 240V)

Use this chart to determine the maximum amperage available from a single-phase 240V utility supply based on the utility transformer kVA rating. Formula: $AMPS = (kVA \times 1000) / 240$.

kVA	Amps @ 240V
25	104
50	208
75	312
100	416
150	625
200	833
225	937
240	1000

Important Utility Note



The kVA number from the power company should not exceed the horsepower rating of the rotary phase converter you are trying to start. Oversizing the utility transformer can cause high inrush currents that may prevent proper startup or damage the converter.

Breaker & Wiring Quick Reference



1. Input Service Breaker

- Use MOTOR LOAD / HACR-rated protection where applicable.
- Breaker must match panel brand, interrupt rating, voltage, and listing.
- Do not use light-duty breakers that nuisance trip during startup.



2. Wire Run & Voltage Drop

- Chart wire sizes are for 75°C copper conductors up to 50 ft one-way.
- Increase conductor size for longer runs or aluminum conductors as required by code.
- Keep the single-phase feed as short as practical.



3. Before Energizing

- Verify input lands only on T1 and T2.
- Verify output/load wiring lands on L1, L2, and L3.
- Torque lugs, check grounding, and confirm the idler turns freely.



Standard NL / PL Reminder

Standard NL and PL units use one idler/generator motor. Do not follow Dual Zone two-motor startup or zone sequencing instructions for these models. Always follow the wiring diagram and label supplied with the specific unit.



Warning

Phase converters can draw high starting current. Use MOTOR LOAD type breakers only. Standard breakers may nuisance trip and cause downtime.



Important

Refer to the model wiring diagram for correct wiring of input, output, and idler motor connections.



Standard NL / PL Wire Size & Breaker Reference

Recommended service, breaker range, wire size, and common breaker references.



Important

Use MOTOR LOAD type breakers only. Standard light-duty breakers may nuisance trip due to high starting current.

Standard NL / PL Wire Size & Breaker Size Chart

Use this chart to determine recommended service size, breaker range, and wire size for standard Phoenix NL and PL rotary phase converter models. All wiring must be verified by a qualified licensed electrician and the label supplied with the specific unit.

Model	HP	Service	Max Ind.	Max Res.	Motor Brkr	1PH Wire	Idler Wire	Panel Size
GP3NL / GP3PL	3	7.5 KVA / 40A	8	4	10-20	10 AWG	12 AWG	20x12x8
GP5NL / GP5PL	5	15 KVA / 60A	14	7	10-30	8 AWG	10 AWG	20x12x8
GP7.5NL / GP7.5PL	7.5	15 KVA / 60A	20	10	20-50	6 AWG	10 AWG	20x12x8
GP10NL / GP10PL	10	25 KVA / 100A	28	14	30-60	6 AWG	8 AWG	20x12x10
GP15NL / GP15PL	15	25 KVA / 100A	41	21	40-100	4 AWG	6 AWG	20x16x8
GP20NL / GP20PL	20	37.5 KVA / 150A	52	28	50-125	3 AWG	6 AWG	20x16x8
GP25NL / GP25PL	25	50 KVA / 200A	68	35	50-150	2 AWG	4 AWG	20x16x8
GP30NL / GP30PL	30	50 KVA / 200A	80	42	50-150	2 AWG	3 AWG	20x16x8
GP40NL / GP40PL	40	50 KVA / 200A	104	56	80-200	1/0 AWG	1 AWG	20x16x8
GP50NL / GP50PL	50	50 KVA / 200A	130	75	80-200	2/0 AWG	2/0 AWG	20x20x8
GP60NL / GP60PL	60	75 KVA / 300A	160	90	100-250	3/0 AWG	2/0 AWG	20x20x8
GP75NL / GP75PL	75	100 KVA / 400A	200	112	125-300	4/0 AWG	3/0 AWG	24x24x8
GP100NL / GP100PL	100	150 KVA / 600A	260	150	150-400	350 MCM	4/0 AWG	24x24x8

HOW TO USE THIS CHART

1

Match the exact NL / PL model.

2

Confirm service KVA / amps and motor-load breaker range.

3

Use 75°C copper wire size shown for runs up to 50 ft.

4

Verify against the unit label and local code before startup.



Wire Sizing Notes

- Wire size is based on 75°C copper conductors with a maximum 50-foot total run, one-way.
- For longer runs or aluminum conductors, increase wire size as required by code.
- All wiring must be sized in accordance with NEC and local requirements.
- Idler motor wire size is for the idler/generator motor feed.



Installation Notes

- Installation must be performed by a qualified licensed electrician.
- Verify all connections are tight and secure.
- Verify voltage before energizing the unit.
- Use proper strain relief and cable support.

Common Motor-Load Breaker Part Numbers

Manufacturer	Breaker Series (Motor-Load)	1 Pole	2 Pole	3 Pole	Notes
SQUARE D by Schneider Electric	QO™	QO1xxx	QO2xxx	QO3xxx	Standard QO series; use HACR or motor-rated as required by code.
SIEMENS	QP™	QP1xxx	QP2xxx	QP3xxx	Type QP circuit breakers; verify interrupt rating and panel listing.
EATON Powering Business Worldwide	BR™	BR115	BR215	BR315	BR Type breakers; suitable for motor-load applications.
ABB	THQL®	THQL1115	THQL2115	THQL3115	THQL series; verify panel compatibility and voltage rating.
MURRAY by EATON	MP™	MP115	MP215	MP315	MP series; used in Murray / Eaton panelboards.
GE	THQL®	THQL1115	THQL2115	THQL3115	GE THQL series; confirm panel type and application.

Reference only. Always verify compatibility with your panel, voltage, interrupt rating, and application.



Idler Motor Wiring

The idler/generator motor must be wired according to the wiring diagram located inside the motor conduit box or on the motor nameplate.

Verify the **correct voltage** before making connections.



For standard **NL and PL** models, use the **230V low-voltage** connection.



For **NH and PH** models, use the **460V high-voltage** connection.



DO NOT USE WIRE NUTS

on the idler motor, even just if it is temporary.



APPROVED CONNECTION METHODS



SPLIT-BOLT
CONNECTOR



SCREW-DOWN
LUG



POLARIS INSULATED
CONNECTOR

WIRING DIAGRAM LOCATION

Inside the motor
conduit box cover
or on the motor
nameplate.



READ BEFORE WIRING



1. Verify the
correct voltage.



2. Follow the wiring
diagram on the
motor.



3. Use approved
lugs or connectors
only.



4. Tighten all
connections
securely.

230V Low-Voltage Motor Connections

The wiring diagrams shown on this page are for 230V idler/generator motor connections only.

460V motor lead wiring is not shown on this page and is covered in the separate 460V high-voltage motor manual.

12 Wire Motor For 230 Volts Only

12 LEAD MOTOR		
Yellow ①	Black ②	Red ③
Blue ④	White ⑤	Orange ⑥
Blue ⑦	White ⑧	Orange ⑨
Red ⑩	Yellow ⑪	Black ⑫
INSIDE CONDUIT BOX		



L1 + T1, T12, T6, T7

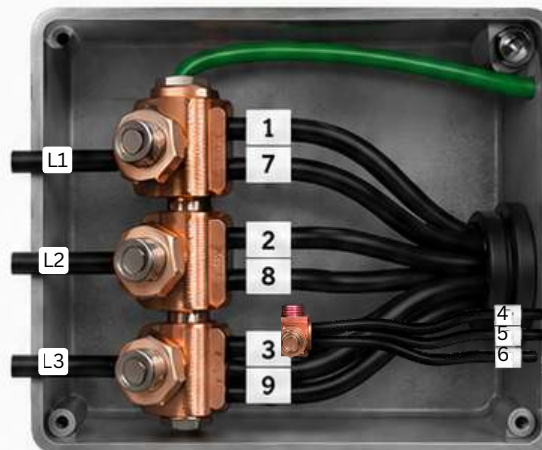
L2 + T2, T10, T4, T8

L3 + T3, T11, T5, T9

- Connect 1, 6, 7, 12 together to L1
- Connect 2, 4, 8, 10 together to L2
- Connect 3, 5, 9, 11 together to L3

9 Wire Motor For 230 Volts Only

9 LEAD MOTOR		
Blue ①	White ②	Orange ③
Yellow ⑦	Black ⑧	Red ⑨
Blue ④	White ⑤	Orange ⑥
INSIDE CONDUIT BOX		



T6, T5, T4

L1 + T7, T1

L2 + T8, T2

L3 + T3, T9

- Connect 1 & 7 together to L1
- Connect 2 & 8 together to L2
- Connect 3 & 9 together to L3
- 4, 5, and 6 together



DO NOT USE WIRE NUTS



**USE APPROVED LUGS
OR CONNECTORS ONLY.**

APPROVED CONNECTION METHODS



**SPLIT-BOLT
CONNECTOR**



**SCREW-DOWN
LUG**



**POLARIS INSULATED
CONNECTOR**



NOTE

Do NOT use this chart for Dual Zone Phase Converters.

**230 VOLT
MODELS**

SCENARIO 1

ONE PIECE OF EQUIPMENT

Follow the step-by-step process below to size the breaker and wire for one machine.

- 1 Identify Full Load Amperage (FLA)**
Check the equipment's nameplate or manual for the FLA.
- 2 Choose the Right Breaker**
Select a breaker size that is 125% of the motor's FLA (per NEC 430).
- 3 Select Wire Size**
Use the chart below to match your breaker size with the recommended wire size.

SCENARIO 2

MULTIPLE PIECES OF EQUIPMENT

Follow the step-by-step process to size the breaker and wire for multiple machines.

- 1 Add Up All Individual Loads**
Add the FLA of all equipment that may run at the same time.
- 2 Apply Diversity Factors**
Apply a diversity factor (70%–80%) to the total FLA to account for non-simultaneous operation.
- 3 Add Largest Motor Adjustment**
Add 125% of the largest motor's FLA.
- 4 Choose the Right Breaker**
Select the next standard breaker size up (per NEC 240.6).
- 5 Select Wire Size**
Use the chart below to match your breaker size with the recommended wire size.

230 VOLT BREAKER SIZES AND WIRE SIZES

Breaker Size (A)	Max Continuous Amps	Single Phase Wire (AWG)	Idle Motor Wire (AWG)
10	10	10	10
15	15	8	10
20	20	8	10
30	30	6	8
40	40	4	8
50	50	4	6
60	60	2	4
80	80	1/0	3
100	100	3/0	3
125	125	4/0	2
150	150	250 MCM	2/0
200	200	350 MCM	3/0
250	250	500 MCM	4/0
300	300	600 MCM	250 MCM
350	350	750 MCM	300 MCM
400	400	1000 MCM	400 MCM

TIPS & REMINDERS

-  **Use Motor Load Breakers**
Always use motor load breakers (MPCB) — not standard magnetic breakers.
-  **Verify Compatibility**
Make sure the breaker is compatible with your panel and phase converter.
-  **Follow NEC Guidelines**
Installed must be completed by a qualified electrician in accordance with NEC and local codes.



IMPORTANT

Always verify all numbers and confirm with a licensed electrician before installation.



EXAMPLE – MULTIPLE MACHINES

- 3 HP Motor (FLA = 13A)
- 3 HP Motor (FLA = 13A)
- Dust Collector (FLA = 18A)
- Planer (FLA = 20A)

TOTAL FLA = 13A + 13A + 18A + 20A = 64A
 Apply 70% Diversity Factor: $64A \times 0.70 = 44.8A$
 Add 125% of Largest Motor ($20A \times 1.25 = 25A$)
 TOTAL LOAD = $44.8A + 25A = 69.8A$
 Choose next breaker size up: 80A
 Use 1/0 AWG wire (per chart)



REMEMBER

Correct sizing protects your equipment and ensures reliable performance.

Connecting Your Single-Phase Wire

NL Model • 230V Input



Single-Phase Input

Connect utility power to L1 and L2.



How to Connect

- 1 Run the two hot conductors from your single-phase panel.
- 2 Terminate them at the phase converter input terminals marked L1 and L2.
- 3 Verify all connections are tight and comply with local electrical codes.



IMPORTANT

These terminals receive the two active legs of the single-phase power supply. Confirm proper voltage before energizing.



**Start the phase converter first.
Do not start the converter under load.**



Connecting Your Idler Motor



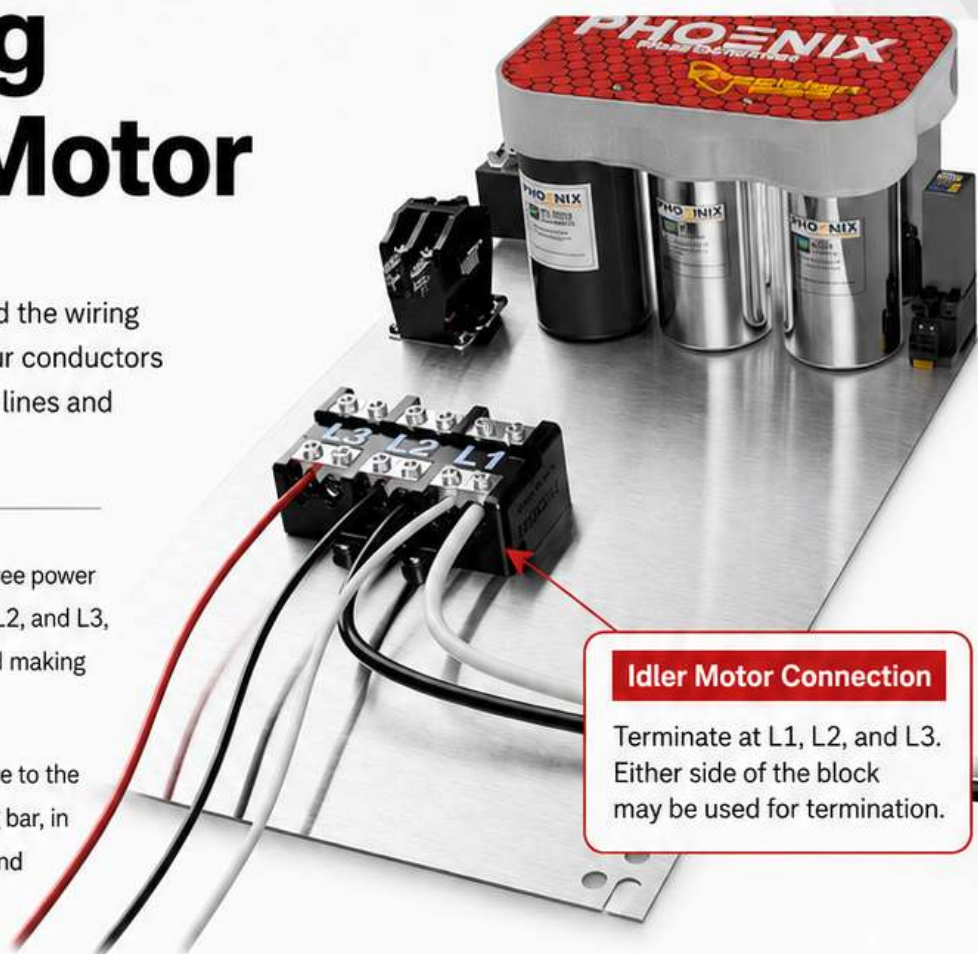
After you have securely connected the wiring at the idler motor, run a total of four conductors to the terminal block: three power lines and one ground wire.



Power Conductors: Terminate the three power conductors at the terminals labeled L1, L2, and L3, ensuring they are tightened properly and making solid electrical contact.



Ground Wire: Connect the ground wire to the designated ground terminal or grounding bar, in accordance with local electrical codes and safety standards.



Idler Motor Connection

Terminate at L1, L2, and L3. Either side of the block may be used for termination.



Your idler motor and your load connect to L1, L2, and L3.
Either side of the block may be used for termination.



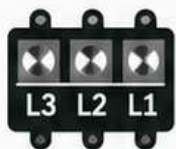
1



Run Conductors

Run three power conductors and one ground wire from the idler motor.

2



Terminate Power Leads

Terminate the three power conductors at L1, L2, and L3. Ensure tight connections and solid electrical contact.

3



Connect Ground

Connect the ground wire to the designated ground terminal or grounding bar per local codes.

4



Secure & Verify

Tighten all connections securely. Verify compliance with local electrical codes and safety standards.



Use approved lugs/connectors only. Verify secure terminations before startup.





Completed Panel Wiring

NL Model • 230V Low Voltage



Terminal Block Detail

Load Output

3 Phase Output

Power Input

1 Phase Input,
230V (Low)

Idler Motor

3 Phase 230V (Low)



1. WHAT THIS DIAGRAM SHOWS

- **Load Output (3 Phase Output):** Delivers three-phase power to your machinery.
- **Power Input (1 Phase Input, 230V Low):** Feeds single-phase 230V power into the panel.
- **Idler Motor (3 Phase 230V Low):** Connects to the rotary phase converter's idler motor.

BEFORE STARTUP: QUICK CHECKLIST

- | | | |
|--|---|--------------------------|
| | Verify backplate is properly grounded. | ☐ |
| | Confirm all connections are tight and secure. | ☐ |
| | Verify both disconnects are installed: input and load side. | ☐ |
| | Verify input voltage is 230V (Low). | ☐ |



2. SAFETY & CODE NOTES



Grounding

Backplate must be bonded to the system ground per NEC Article 250.



Disconnects

- Install a disconnect switch before the phase converter input line — this allows for safe maintenance and complies with NEC 430.102(A).
- Install a second disconnect after the converter on the load side to isolate the three-phase output safely, as per NEC 430.102(B).



Startup Procedure

- Add a caution label.
- **NEVER** start the phase converter under load. Always power up the converter first before turning on connected equipment.



IMPORTANT:

NEVER start the phase converter under load.

Always power up the converter first before turning on connected equipment.



PHOENIX
Phase Converters



240 VOLTS

PL *Model*

PHASE CONVERTER

Precision Power. Reliable Performance.



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GETTING STARTED

Thank you for choosing a Phoenix Phase Converter.

Before installing your unit, review the layout below and the instructions in this manual. Identify all connection points and the wire size chart inside the panel before making any wiring connections.

This manual will guide you through the installation, wiring, and start-up of your phase converter to ensure safe and reliable operation.



READ THIS MANUAL

Read this manual completely before installing or operating the unit. Keep this manual for future reference.

IN THIS MANUAL YOU WILL FIND:



Single-Phase
Input Power
Connection



Idler/Generator
Motor
Connection



Three-Phase
Output/Load
Connection



Wire and
Breaker
Sizing



Start-Up
and
Operation



Safety
Precautions
and Checks



IMPORTANT: Installation must be performed by a qualified, licensed electrician.

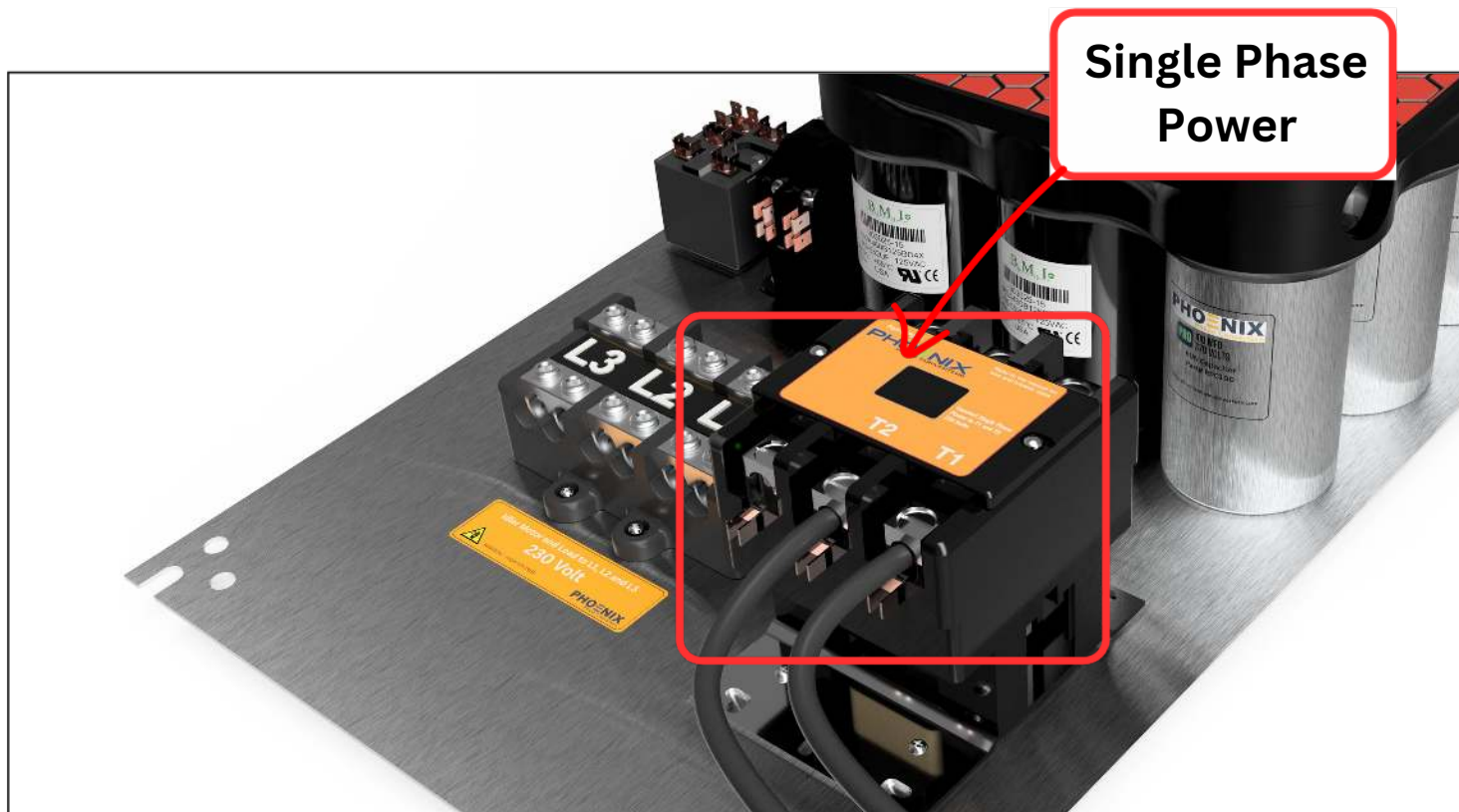
Disconnect and lock out all power sources before installing or servicing this equipment. Failure to follow safety instructions can result in serious injury or equipment damage.

NEED HELP? Contact your authorized Phoenix Phase Converter dealer or visit www.phoenixphaseconverters.com

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SINGLE PHASE CONNECTION

DualZone must be taught as a sequence, not just a spectacle. Each zone needs labels, photos, startup order, and a support handoff that shows both idlers and the panel connections.



Single-Phase Line Connection

Connect the incoming single-phase power line to terminals **T1** and **T2**.

Use **bolt-down lugs** and properly sized wire for the installation. Refer to the wire size chart for the correct wire gauge. The wire size chart is based on a maximum wire run of **50 feet**.

It is recommended to keep the single-phase line as short as possible. If the wire run exceeds **50 feet**, increase the wire size by **one gauge size for every additional 50 feet** of distance.

All wiring should be installed in accordance with applicable electrical codes and performed by a qualified electrician.

IMPORTANT: Verify utility transformer size, service capacity, breaker/fuse rating, and wire size before installation. Undersized supply equipment may cause low voltage, overheating, equipment damage, or failure to start. Installation must be performed by a qualified electrician.

Single-Phase Input Power for Smaller Units

On smaller units, the incoming single-phase power connects to T1 and T2.



Connect the two incoming single-phase power wires to the terminals marked:

T1 Input Single Phase
230V

T2 Input Single Phase
230V



IMPORTANT:

On smaller units,
connect incoming
single-phase power
only to T1 and T2.



Do not connect incoming single-phase power to the generator output terminals.

Those terminals are for the three-phase output/load connections.



BEFORE ENERGIZING:

- Verify the input voltage is 230V single phase.
- Ensure all electrical connections are clean, secure, and properly tightened.
- Loose connections can cause overheating, voltage issues, or equipment damage.



For recommended wire and breaker sizes, refer to the wire size chart inside the panel or see Part #3PC60 in this manual.



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Connecting Your Idler Motor

Once you have securely connected the wiring at the idler motor, run a total of four conductors—three power lines and one ground wire—from the idler motor to the terminal block.



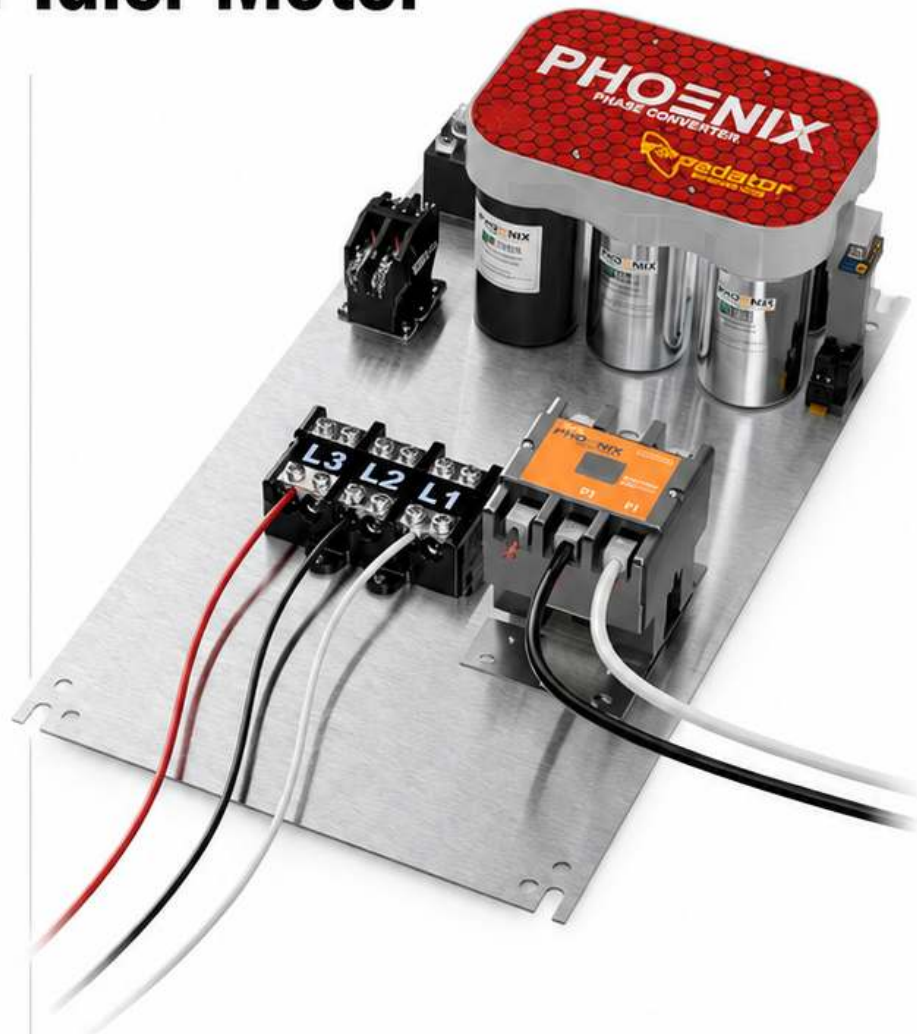
Power Conductors (3)

Terminate the three power conductors at the terminals labeled L1, L2, and L3, ensuring they are tightened properly for solid electrical contact.



Ground Wire (1)

Connect the ground wire to the designated ground terminal or grounding bar, in accordance with local electrical codes and safety standards.



Your idler motor and your load connect to L1, L2, and L3, and you can use either side of the block to terminate your connection.



1



Connect idler motor leads to L1, L2, L3.

Terminate the three power conductors at the labeled terminals.

2



Connect ground to grounding bar.

Use the designated ground terminal or grounding bar for the ground wire.

3



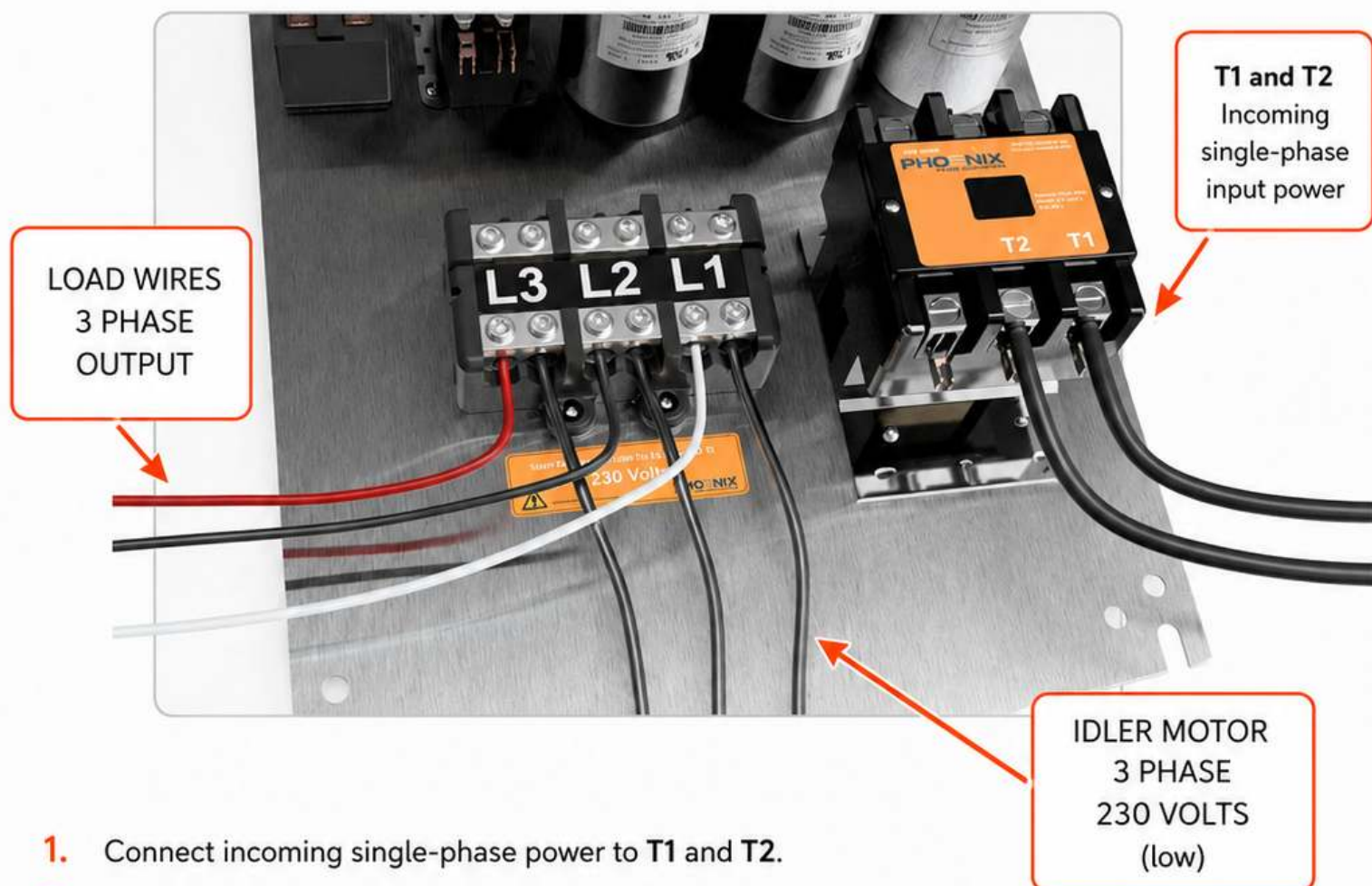
Tighten and verify all terminations.

Ensure all connections are secure and in accordance with local codes.



Panel Wiring Diagram for Smaller Units

This diagram shows the general panel wiring layout for smaller units. Use this page as a visual reference together with the detailed wiring instructions in this manual.



IMPORTANT: Installation must be performed by a qualified, licensed electrician. Disconnect and lock out all power before installation or service.



For recommended wire and breaker sizes, refer to the wire size chart inside the panel or see Part #3PC60 in this manual.



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INSTALLATION & OPERATION MANUAL

PRECISION BALANCED
SINGLE TO THREE PHASE CONVERTER



WARNING
HIGH VOLTAGE
DISCONNECT POWER
BEFORE SERVICING

BUILT TO PERFORM. ENGINEERED TO LAST.

Thank you for choosing Phoenix Precision Balanced.
Please read this manual completely before installation
and operation.

Mounting and Location



Mounting and Location

The phase converter panel must be mounted securely on a solid wall or structure, with the idler motors positioned on a stable, level surface.

Adequate clearance must be provided around the panel and motors for ventilation, wiring access, inspection, and service.

The installation area should be dry, protected, and free of obstructions.

Service Size and Breaker Sizes

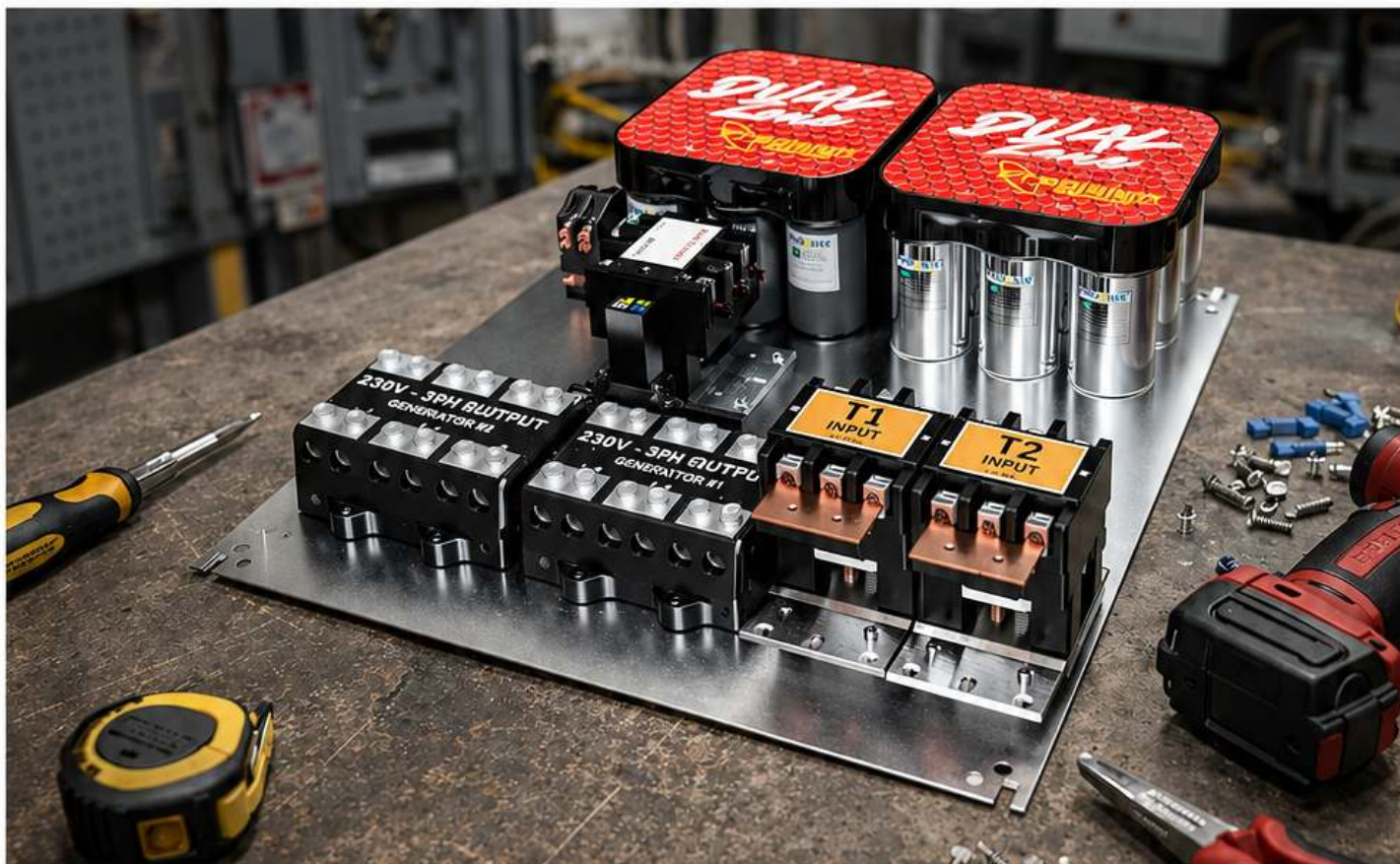
Service size, wire size, and breaker sizing must be selected according to the model requirements, input voltage, and load conditions.

The installer must follow the wire size chart and breaker recommendations provided in the manual or inside the panel.

All final sizing and overcurrent protection must be verified by a qualified licensed electrician before energizing the unit.



IMPORTANT: Installation, service sizing, and breaker selection must be performed by a qualified licensed electrician. Verify all wiring, grounding, and breaker sizes before startup.



GETTING STARTED

Thank you for choosing a Phoenix Phase Converter.

Before installing your unit, review the layout below and the instructions in this manual. Identify all connection points and the wire size chart inside the panel before making any wiring connections.

This manual will guide you through the installation, wiring, and start-up of your phase converter to ensure safe and reliable operation.



READ THIS MANUAL

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IN THIS MANUAL YOU WILL FIND:



Single-Phase
Input Power
Connection



Idler/Generator
Motor
Connection



Three-Phase
Output/Load
Connection



Wire and
Breaker
Sizing



Start-Up
and
Operation



Safety
Precautions
and Checks



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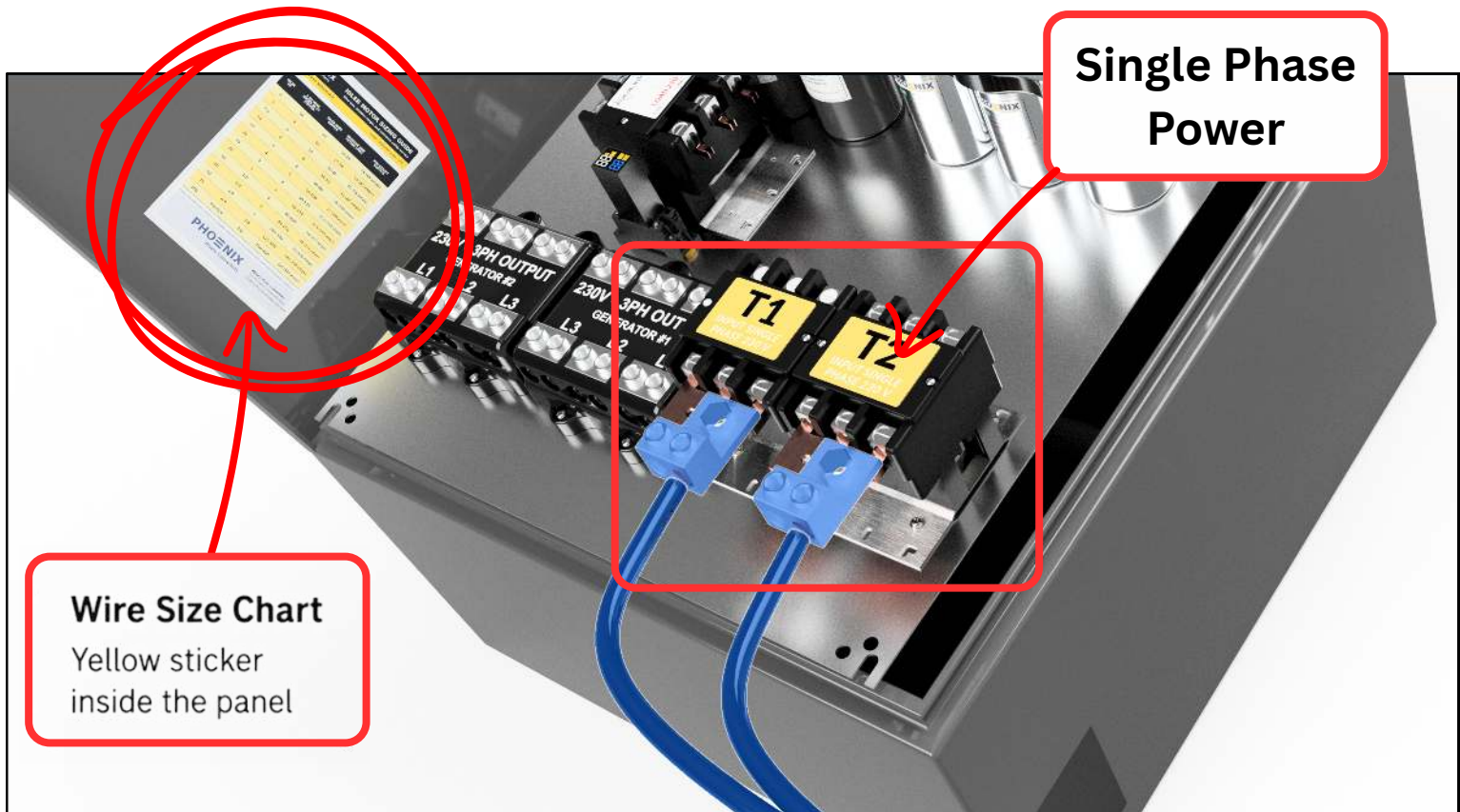
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Dual Zone 230V Series - SINGLE PHASE CONNECTION

Dual Zone must be taught as a sequence, not just a spec table. Each zone needs labels, photos, startup order, and a support handoff that shows both idlers and the panel connections.



Single-Phase Line Connection

Connect the incoming single-phase power line to terminals **T1** and **T2**.

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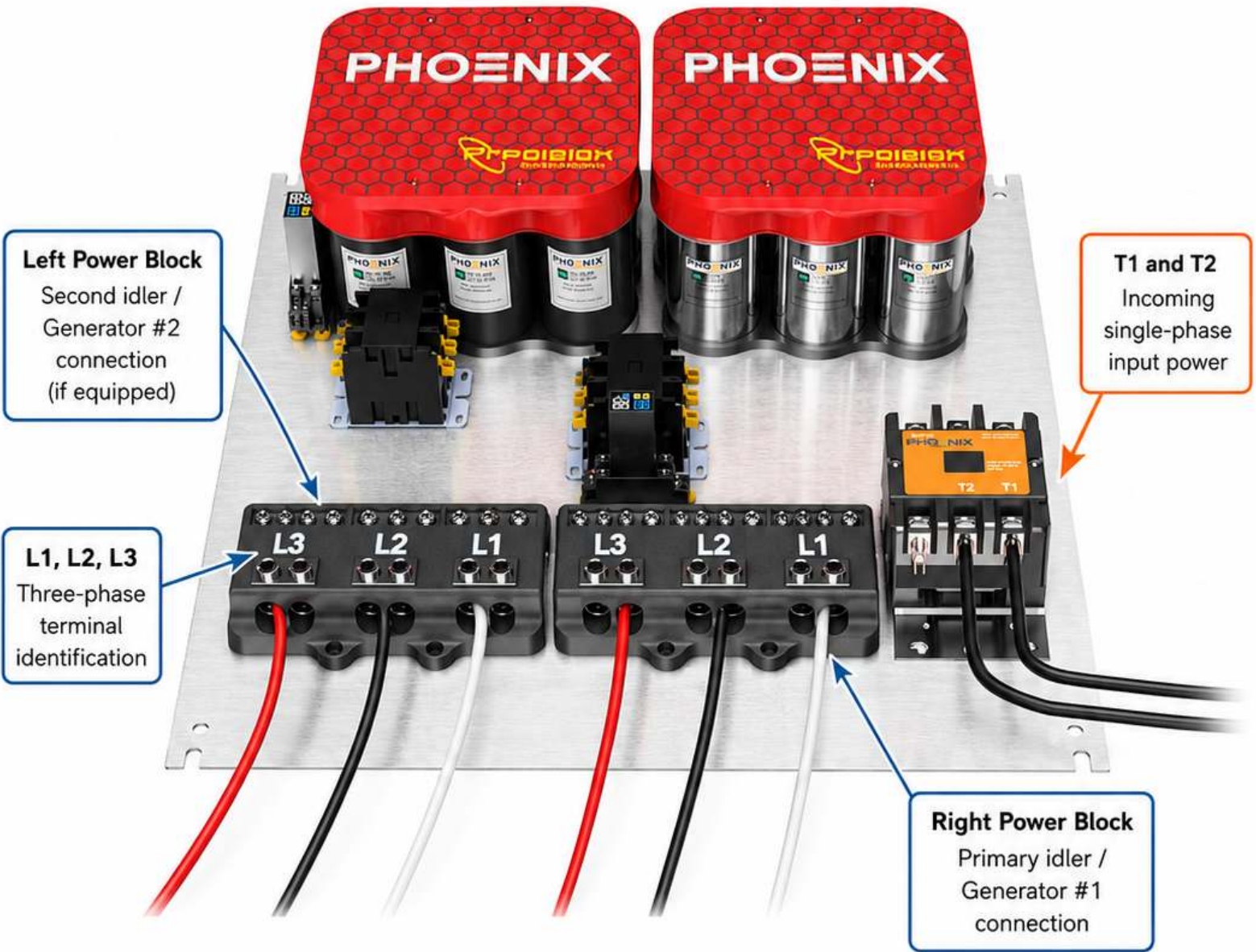
It is recommended to keep the single-phase line as short as possible. If the wire run exceeds **50 feet**, increase the wire size by **one gauge size for every additional 50 feet** of distance.

All wiring should be installed in accordance with applicable electrical codes and performed by a qualified electrician.

IMPORTANT: Verify utility transformer size, service capacity, breaker/fuse rating, and wire size before installation. Undersized supply equipment may cause low voltage, overheating, equipment damage, or failure to start. Installation must be performed by a qualified electrician.

Panel Wiring Diagram for Smaller Units

This diagram shows the general panel wiring layout for smaller units. Use this page as a visual reference together with the detailed wiring instructions in this manual.



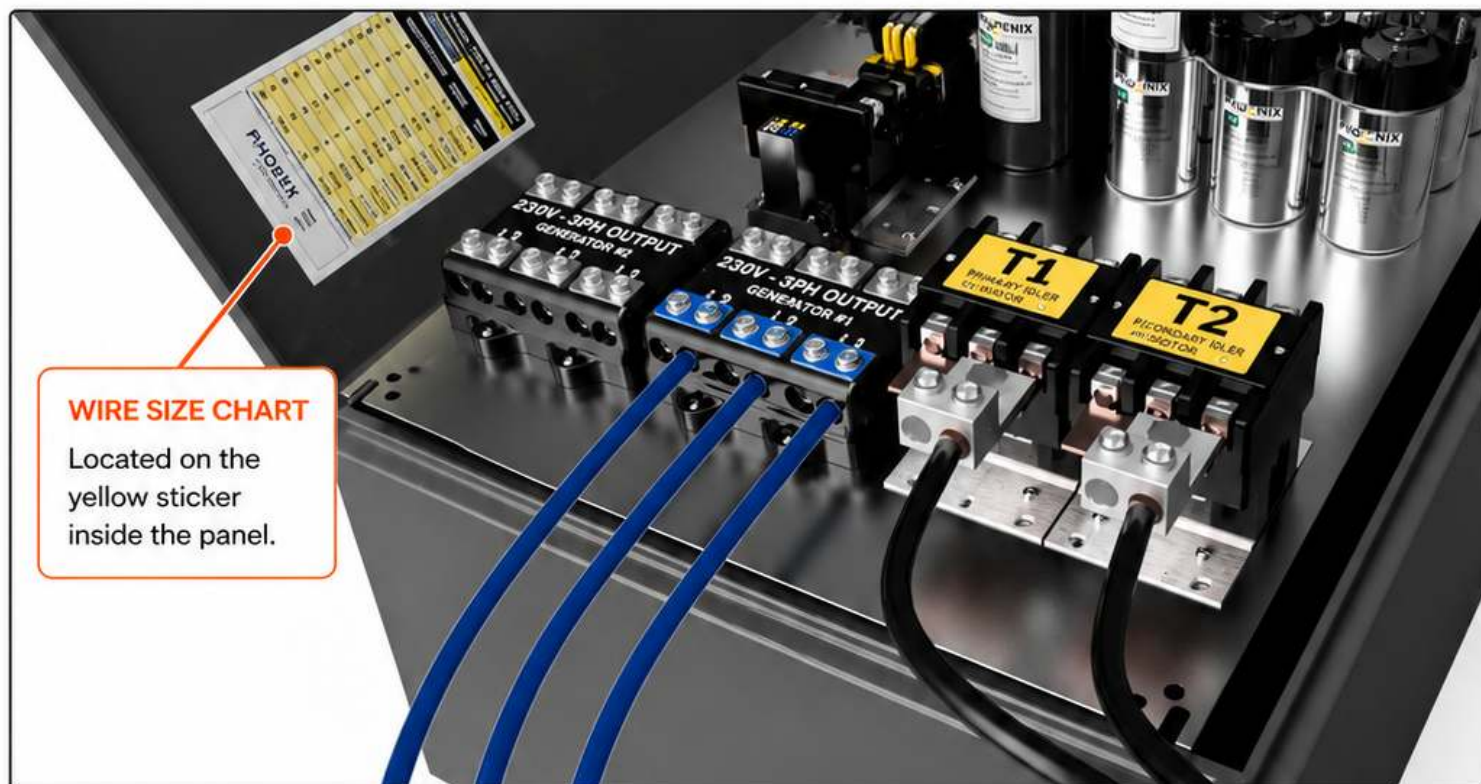
1. Connect incoming single-phase power to T1 and T2.
2. Connect the primary idler motor to the power block on the right.
3. If equipped, connect the second idler motor to the power block on the left.
4. Verify all wiring and voltage before energizing the unit.



IMPORTANT: Installation must be performed by a qualified, licensed electrician. Disconnect and lock out all power before installation or service.

First Idler Motor Connection

Wire the first idler motor to the **power block on the right**.



WIRE SIZE CHART

Located on the yellow sticker inside the panel.

1

This is the primary idler motor and will always be the first motor to start when the phase converter is engaged.



Follow the **wire size chart on the yellow sticker inside the panel**. Wire sizing shown on the chart is based on a wire run of **50 feet or shorter**.



Make sure all electrical connections are clean, secure, and properly tightened. Loose connections can cause overheating, voltage issues, nuisance breaker tripping, or equipment damage.



IMPORTANT:

Verify wire size, breaker size, and terminal connections before energizing the unit. Installation must be performed by a qualified licensed electrician.

Second Idler Motor Connection and Operation



IMPORTANT: The second idler motor connects to the **left power block**.

Do not energize or engage the second power block unless the second idler motor is connected. Operating the second power block without the motor connected may cause improper operation or equipment damage.



A **green** disable button is located on the front of the unit.

When the **green** button is **pressed**, the second idler motor is **engaged**.

There is normally no reason to disable the generator during operation.
The green button may be left in the engaged position during normal use.



NORMAL OPERATION:

- The green button should remain **pressed** (engaged) during normal use.
- There is normally no reason to disable the generator.



WARNING: Always ensure the second idler motor is connected before engaging the left power block. Failure to do so may result in equipment damage.

Idler Motor Wiring

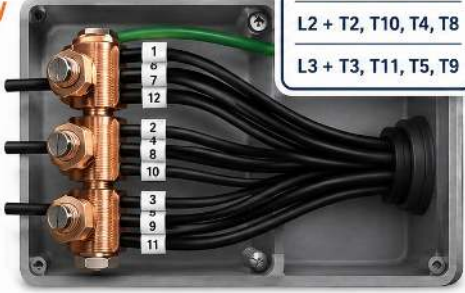
The idler/generator motor must be wired according to the wiring diagram located inside the motor conduit box or on the motor nameplate. Verify the correct voltage before making connections.

For standard **NL and PL models**, use the **230V low-voltage** connection. For **NH and PH models**, use the **460V high-voltage** connection.

12 Wire Motor

For 230 Volts Only

12 LEAD MOTOR		
Yellow 1	Black 2	Red 3
Blue 4	White 5	Orange 6
Red 7	Yellow 8	Black 9
White 10	Orange 11	Blue 12
INSIDE CONDUIT BOX		



- Connect 1, 6, 7, 12 together to L1
- Connect 2, 4, 8, 10 together to L2
- Connect 3, 5, 9, 11 together to L3

9 Wire Motor

For 230 Volts Only

9 LEAD MOTOR		
Blue 1	White 2	Orange 3
Yellow 4	Black 5	Red 6
Blue 7	White 8	Orange 9
INSIDE CONDUIT BOX		



- Connect 1 & 7 together to L1
- Connect 2 & 8 together to L2
- Connect 3 & 9 together to L3
- 4, 5, and 6 together.

IMPORTANT: The wiring diagrams shown on this page are for 230V idler/generator motor connections only. 460V motor lead wiring is not shown here and is covered in the separate 460V high-voltage motor manual.

RECOMMENDED LUGS FOR IDLER MOTOR CONNECTIONS

SPLIT BOLT CONNECTOR



- Secure mechanical splice connection
- Suitable for properly sized copper conductors
- Tighten to manufacturer specifications
- Insulate connection as required

EXAMPLE SHOWN

SCREW-DOWN LUG



- Reliable mechanical connection
- Available for various wire sizes
- Tighten set screws to proper torque
- Suitable for motor lead terminations

EXAMPLE SHOWN

POLARIS INSULATED CONNECTOR



- Pre-insulated for added safety
- Compact and easy to install
- Suitable for stranded copper conductors
- Tighten to manufacturer specifications

EXAMPLE SHOWN



IMPORTANT:
Do not use wire nuts for idler motor wiring connections.
Use only split bolts, screw-down lugs, or Polaris-style insulated connectors.
All connections must be tight, secure, and enclosed in an approved junction box.



Wiring Diagram



Before Testing

Before testing the phase converter, verify that the panel, conduit, and idler motors are installed correctly and that all wiring connections are complete, secure, and tightened properly. Confirm that the installation area is clear and safe before energizing the unit.



Before Testing Checklist

- ✓ Verify incoming single-phase power is connected correctly.
- ✓ Verify the idler motor wiring is complete and matches the motor wiring diagram.
- ✓ Verify all power connections are tight and secure.
- ✓ Confirm the motors are mounted securely and able to rotate freely.
- ✓ Make sure the area around the motors and panel is clear of tools and debris.
- ✓ Do not energize the unit until all covers, wiring, and connections have been checked.



This page is intended as a visual pre-start inspection reference.



IMPORTANT

Installation and testing must be performed by a qualified, licensed electrician. Disconnect and lock out all power before making wiring changes or servicing the unit.

Dual Zone Wire Size & Breaker Size Chart

Use the chart below to determine the recommended service size, breaker size, and wire size for Dual Zone rotary phase converter models. All wiring must be sized and installed by a qualified licensed electrician in accordance with local electrical code.



IMPORTANT

Use MOTOR LOAD type breakers only. Standard (light-duty) breakers may nuisance trip due to high starting current.

Model	Total HP	Qty	Each HP	KVA	Service	Max Ind.	Max Res.	Min Brkr	Max Brkr	1PH Wire	Idler Wire	Panel Size
GP5/10L	10	2	5	9	10	30	15.5	10	60	8	10	20x12x10
GP7/15L	15	2	7.5	14	10	41	20.9	15	60	6	10	20x12x10
GP10/20L	20	2	10	19	15	52	25.8	20	100	6	8	20x12x10
GP15/30L	30	2	15	28.2	25	80	42.7	30	120	4	6	20x16x8
GP20/40L	40	2	20	37	30	104	50.2	40	150	4	6	20x16x8
GP25/50L	50	2	25	47	30	126	63.1	60	200	2	4	20x16x8
GP30/60L	60	2	30	56	50	160	84.5	60	200	3	3	20x20x8
GP40/80L	80	2	40	74	50	206	112.5	80	300	1	3	20x20x8
GP50/100L	100	2	50	94	75	250	148.9	80	350	1/0	2	24x24x8
GP60/120L	120	2	60	112	75	320	160	125	400	3/0	1/0	20x20x8 x
GP75/150L	150	2	75	140	100	448	225	125	500	4/0	1/0	24x24x8 x 2

WIRE SIZING NOTES

- Wire size is based on 75°C copper conductors with a maximum of 100 feet total run (one-way).
- For longer runs or aluminum conductors, increase wire size as required by code.
- All wiring must be sized in accordance with the National Electrical Code (NEC) and local requirements.
- Idler motor wire size is for the individual idler/generator motor feed.

INSTALLATION NOTES

- Installation must be performed by a qualified licensed electrician.
- Verify all connections are tight and secure.
- Verify the voltage before energizing the unit.
- Use proper strain relief and cable support.



WARNING:

Phase converters can draw high starting current. Use MOTOR LOAD type breakers only. Standard breakers may nuisance trip and cause downtime.



IMPORTANT:

Refer to the model wiring diagram for correct wiring of input, output, and idler motor connections.

All electrical work must comply with the National Electrical Code (NEC) and local codes.

PHOENIX PHASE CONVERTERS

Common Motor-Load Breaker Part Numbers

The table below lists common motor-load breaker part numbers used with rotary phase converter installations. These are reference only. Always verify compatibility with your panel, voltage, and application requirements.

Manufacturer	Breaker Series (Motor-Load)	1 Pole	2 Pole	3 Pole	Notes
 by Schneider Electric	QO™	QO1xxx	QO2xxx	QO3xxx	Standard QO series; use HACR or motor-rated as required by code.
	QP™	QP1xxx	QP2xxx	QP3xxx	Type QP circuit breakers; verify interrupt rating and panel listing.
 Powering Business Worldwide	BR™	BR115	BR215	BR315	BR Type breakers; suitable for motor-load applications.
	THQL®	THQL1115	THQL2115	THQL3115	THQL series; verify panel compatibility and voltage rating.
 by Eaton	MP™	MP115	MP215	MP315	MP series; used in Murray / Eaton panelboards.
	THQL®	THQL1115	THQL2115	THQL3115	GE THQL series; confirm panel type and application.



IMPORTANT:

Breaker part numbers vary by amp rating, interrupt rating, voltage rating, and pole configuration. Always match the breaker to the service panel manufacturer and panel label. Do not install breakers that are not listed for use in the panel.

SUPPORT DECISION CARDS

Use these decision cards to quickly identify common issues and actions. Always follow safety procedures and the installation manual.



WILL NOT START

Check disconnect, breaker, input voltage, control power, and start circuit. Check for voltage dropping while trying to start. Never leave the phase converter on for more than 2 seconds if it does not start.

- ✓ Verify main disconnect is ON.
- ✓ Verify breaker is ON and sized correctly.
- ✓ Verify input voltage matches nameplate.
- ✓ Check for voltage dropping while trying to start.
- ✓ Verify control power is present.
- ✓ Verify start circuit and connections.
- ✓ Never leave the converter energized for more than 2 seconds if it does not start.



BREAKER TRIPS

Record breaker size/type, feeder distance, service details, and whether idler reaches speed.

- ✓ Verify motor-load type breaker is used.
- ✓ Verify breaker size is correct.
- ✓ Check for short circuits or ground faults.
- ✓ Check feeder wire size and distance.
- ✓ Verify idler motor reaches full speed.
- ✓ Inspect for overloading the converter.



VOLTAGE ISSUE

Confirm meter placement phase-to-phase. Capture no-load and under-load readings.

- ✓ Verify meter is measuring phase-to-phase.
- ✓ Record no-load voltage on all three phases.
- ✓ Record under-load voltage on all three phases.
- ✓ Check for loose connections.
- ✓ Verify idler motor reaches full speed.
- ✓ Ensure load is balanced as possible.



LOAD WILL NOT START

Separate converter startup from machine startup. Confirm machine voltage and controls.

- ✓ Start converter first. Let idler reach full speed.
- ✓ Measure voltage at machine terminals.
- ✓ Verify machine controls and wiring.
- ✓ Check for overload or locked rotor condition.
- ✓ Try reducing load and test again.
- ✓ Consult factory if issue persists.



HIGH AMP READING

Explain generated-leg behavior and where to measure. Do not diagnose from one clamp reading.

- ✓ Measure amperage on all three output legs.
- ✓ Compare amperage on each leg.
- ✓ Check for unbalanced loads.
- ✓ Verify idler motor reaches full speed.
- ✓ Inspect for tight or damaged connections.
- ✓ Verify wire size and breaker size are correct.



SUPPORT HANDOFF

Send model, order/serial, photos, readings, breaker/service info, and machine nameplate.

- ✓ Include converter model and serial number.
- ✓ Include photos of panel and connections.
- ✓ Include voltage and amperage readings.
- ✓ Include breaker size and service details.
- ✓ Include machine nameplate and load HP.
- ✓ Include a clear description of the issue.



IMPORTANT:

Only qualified, licensed electricians should install, service, and troubleshoot this equipment. Disconnect and lock out all power before opening or working on the panel.



Start-Up & Voltage Verification

Use this procedure after mounting, wiring, grounding, and breaker selection have been verified by a qualified licensed electrician.



START-UP SEQUENCE

- 1** Lock out power and inspect all wiring, conduit, and grounding.
- 2** Confirm single-phase input is connected to T1 and T2 only.
- 3** Confirm idler motor wiring matches the motor nameplate diagram.
- 4** Disconnect or switch off all load equipment before first start.
- 5** Energize the converter and allow the idler motor to reach full speed.
- 6** Start load equipment one machine at a time and monitor voltage.



VOLTAGE TEST RECORD

Test	L1-L2	L2-L3	L1-L3
No load			
With load			
Final check			



IF SOMETHING LOOKS WRONG

- Shut down immediately.
- Recheck that single-phase input is connected only to T1 and T2.
- Verify idler motor wiring and grounding.
- Inspect for overheating, unusual smells, or abnormal noise.
- Consult a qualified electrician if unstable voltage is observed.



IMPORTANT

Do not energize the unit until all covers, wiring, grounding, wire size, and breaker selection have been checked. Shut down immediately if abnormal noise, smoke, odor, overheating, or unstable voltage is observed.



INSTALLATION RECORD

Model: _____
 Serial Number: _____
 Installation Date: _____
 Installer / Company: _____

Input Voltage: _____

Breaker Size: _____

Notes: _____



All electrical work must comply with the National Electrical Code (NEC) and local codes.



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1 CONTROL PANEL

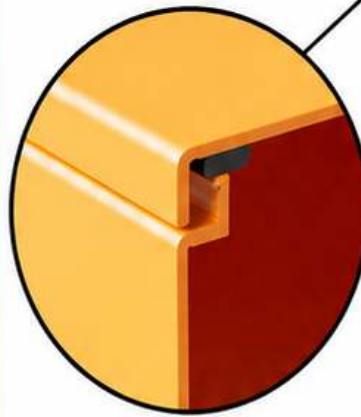
At Phoenix Phase Converters we use the best components that last a lifetime. The GP10NLA 10 HP rotary phase converter control panel is sealed from any outside environment and is made to be used in a metal shop, woodshop, and outdoors.

The phase converter is designed to be utilized in cold or hot weather. An intuitive standard voltage meter display monitors your generated phase.

The rotary phase converter is engineered with a NEMA 4 enclosure to ensure it is durable in a variety of commercial environments. The AutoLink protects your equipment.

NEMA 4

Indoor / Outdoor



Saw Dust



Metal chips



Air borne contaminants



Moisture / Rain



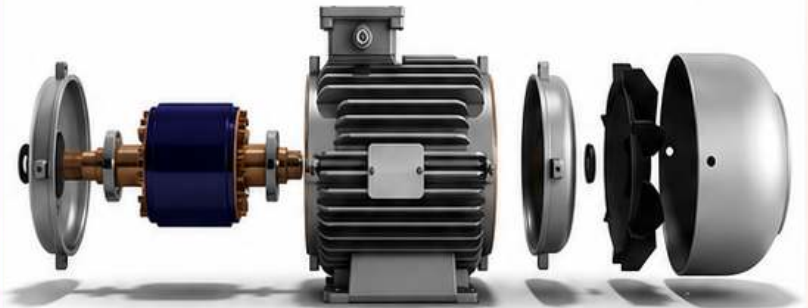
Hot or Cold Weather

2 GENERATOR / IDLER

Standard Feature TEFC (Totally Enclosed Fan Cooled) Generator and Cast Iron Frame. Our Highly Reliable Motors: At Phoenix Phase Converters we use the best components that last a lifetime.

The 10 HP rotary phase converter GP10NLA single phase to three phase converter features a totally enclosed fan cooled motor and cast iron frame motor. It is sealed from any outside environment and is made to be used in a metal shop, woodshop, and outdoors.

The phase converter is designed to be utilized in cold or hot weather.



LEARN WHAT MAKES TEFC DIFFERENT THAN ODP



WARRANTY & RETURN POLICY



PHASE CONVERTER CONTROL PANEL WARRANTY

All Phoenix Phase Converters Rotary Phase Converter Control Panels are backed by a lifetime warranty, protecting against defects in materials and craftsmanship.

Please note that DIY panels are excluded from this warranty; refer to the DIY panel manual for further details.

If any component is found to be defective within the warranty period, Phoenix Phase Converters will either repair or replace it at our discretion at no cost. Warranty services for the control panel must be conducted exclusively at a Phoenix Phase Converters authorized facility.



ELECTRIC MOTOR / IDLER WARRANTY

The Electric Motor/Idler is covered by a three-year warranty provided by North American Electric Motors or Techtop. Additionally, the rotor has a lifetime warranty for the original owner, covering defects in materials and workmanship.

Any necessary repairs or replacements for the North American Electric Motors or Techtop Idler must be carried out by a North American Electric Motors or Techtop Authorized Service Center and require prior written consent from Phoenix Phase Converters. Before any replacement is approved, the warranty inspection report and generator's specification tags must be presented.



LIFETIME WARRANTY



90-DAY RETURN POLICY

RETURN POLICY



RETURN ELIGIBILITY

- Only sealed, unopened packages are eligible for return.
- Returns must be initiated within 90 days from the date of purchase.



RETURN PROCESS

- 1 Initiate a Return:**
Contact our customer service team to obtain a Return Authorization (RA) number. Returns without an RA number will not be accepted.
- 2 Prepare the Package:**
 - Ensure the product is in its original, unopened packaging.
 - Include all accessories, manuals, and documentation that came with the product.
 - Clearly mark the RA number on the outside of the return package.
- 3 Shipping:**
Ship the product to the address provided by our customer service team. You are responsible for the cost of shipping the product back to us.



REFUND DETAILS

- Once we receive and inspect the returned product, a refund will be processed to your original method of payment.
- The refund amount will be the original purchase price minus the cost of shipping to and from your location. Shipping costs will be deducted based on what it cost us to ship the product to you.



IMPORTANT NOTES

- Products that are opened, used, or not in their original packaging are not eligible for return.
- Refunds will be processed within 10-15 business days after we receive the returned product.



If you have any questions or need assistance with a return, please contact our customer service team at (888) 379-3481.



TRANSFORMER RETURN POLICY

Please note that transformers purchased from Phoenix Phase Converters are non-returnable under any circumstances except for defects. Defective transformers will be addressed according to our warranty policy. If you believe your transformer is defective, please contact our customer service team for assistance.

