

XR21

Rotary Phase Converter Data Sheet



“POWER Wave XR™ - Clean... Sophisticated... Reliable”

Through many hundreds of hours of research and design optimization, TEMCo is proud to offer POWER Wave XR™; a new breed of Phase Conversion technology. Based on many years of experience in the industrial power conversion industry, TEMCo has melded all of the best of each of the available tools in its technological arsenal to provide a new and unique approach to this fundamental need.

Engineered to meet the rigorous requirements of the most demanding three phase machines, TEMCo’s POWER Wave™ technology is a signature feature found only on TEMCo phase converters.

POWER Wave™ produces a three phase sinusoidal waveform, generated from a single phase source, offset at 120°, which smoothly alternates the voltage and current of AC (alternating current) power without harmonic distortion. It implements precision rotor/winding tuning to produce its sinusoidal output. Many competing technologies produce harmonic distortion and unbalanced waveforms. Harmonic distortion can cause overheating, and reduce the lifespan of the machinery attached to this type of converter. POWER Wave™ technology eliminates this problem.

The sky is the limit with POWER Wave™. With its versatility it can power any type of three phase machinery, ranging from Miller welders and Hobart mixers, to Hurco machining centers and Yamaha robotics. TEMCo is on the forefront of phase converter technology and continues to innovate and provide products that produce superior quality power. *When you demand the best, demand TEMCo.*

Common Phase Converter Applications:

- | | | |
|------------------------|------------------|-------------|
| ▪ Machine Shops | ▪ Petrochemicals | ▪ High Tech |
| ▪ Woodworking | ▪ Home Hobbyist | ▪ Military |
| ▪ Farm Equipment | ▪ Oil Fields | ▪ Aerospace |
| ▪ Restaurant Equipment | ▪ Irrigation | ▪ Hospitals |

“Make Your Money Work for You – not Against You”

You know your business and how to make it make you money. Why purchase a solution with a limited lifespan without heavy maintenance? The TEMCo POWER Wave XR™ Phase Converter line has been engineered to eliminate the cost of long term maintenance.

Of course none of this means anything without a guarantee...
It comes with a 5 Year Warranty – “Now that’s Quality”



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POWER Wave XR™ Features



100% Copper Windings
(Energy Efficient,
Environmentally Friendly)

**HEAVY
DUTY**

Rugged Heavy Duty
Rotary Design



Quiet Operation, 63db @
10ft
(No Louder Than Normal
Conversation)



American Design &
Assembly

**5
yr**

Industry Leading 5 Year
Warranty



100% Satisfaction
Guarantee*



TEMCo Opto-Sense™ 80 Point Quality Inspection System.

A multitude of tests such as fastener torque check, vibration band analysis, full spec electrical and more are performed on every unit prior to being released from manufacturing.



Designed for CNC First - Not as an Afterthought.

TEMCo was one of the first to provide a single to three phase power conversion solution for CNC Equipment users. In fact, TEMCo is the only company to offer a 100% Satisfaction Guarantee* backing the POWER Wave™ Phase Converter Line for the operation of ANY CNC machine!



Unique Design Approach to Connections

TEMCo uses the simplest and fastest connections systems in the industry. Save time during installation through clearly marked, committed connections points for your single phase input, three phase output and grounding connections. Just insert each wire and tighten it down; "it's that simple".

* Ask your sales representative for details.

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POWER Wave™ Phase Converter Specifications

1-phase input voltage	230v (max deviation ±10%)
1-phase input frequency	60Hz
3-phase output voltage	= Input voltage + 5% on T2 (non-loaded)
3-phase output frequency	same as input
3-phase output voltage tolerance	± 5%
3-phase output phase angle	120°
Temperature rating	40° C Ambient
Ambient humidity	<95% (non-condensing)
Maximum altitude (de-rate .004% for each foot above 3300ft)	3300 ft above sea level
Enclosure	NEMA 1
Recommended for All General Electrical Loads	YES
Recommended for All CNC and Electronic Loads	YES
Required RVI Mounting Isolator	RVI521
Recommended Magnetic Starter	MAG21

			230v
Output Configuration			DELTA
CNC & ELECTRONIC LOADS			
Continuous kW output			11.6 kW
Continuous 3-phase Amp output			37.0 A
RESISTIVE ELECTRICAL LOADS			
Continuous kW output			21.8 kW
Continuous 3-phase Amp output			55.0 A
INDUCTIVE ELECTRICAL LOADS			
Continuous kW output			15.1 kW
Continuous 3-phase Amp output			47.0 A
MOTOR LOADS			
Maximum Easy run or start HP			20 HP
Maximum Medium run or start HP			15 HP
Maximum Hard run or start HP			10 HP
Maximum group load HP			22.5 HP
RLA 1-phase input	calculated based on three phase load x 1.732		
Approx. 1-phase idle amps			10.0 A
MCA 1-phase			70 A
Min 1-phase fuse			70 A
MOP 1-phase			100 A
Recommended 1-phase wire size *(1)			3 AWG
Recommended 3-phase wire size *(1)	Based on load requirement		

RLA – Rated Load Amps

MCA – Minimum Circuit Amps

MOP – Maximum Overcurrent Protection

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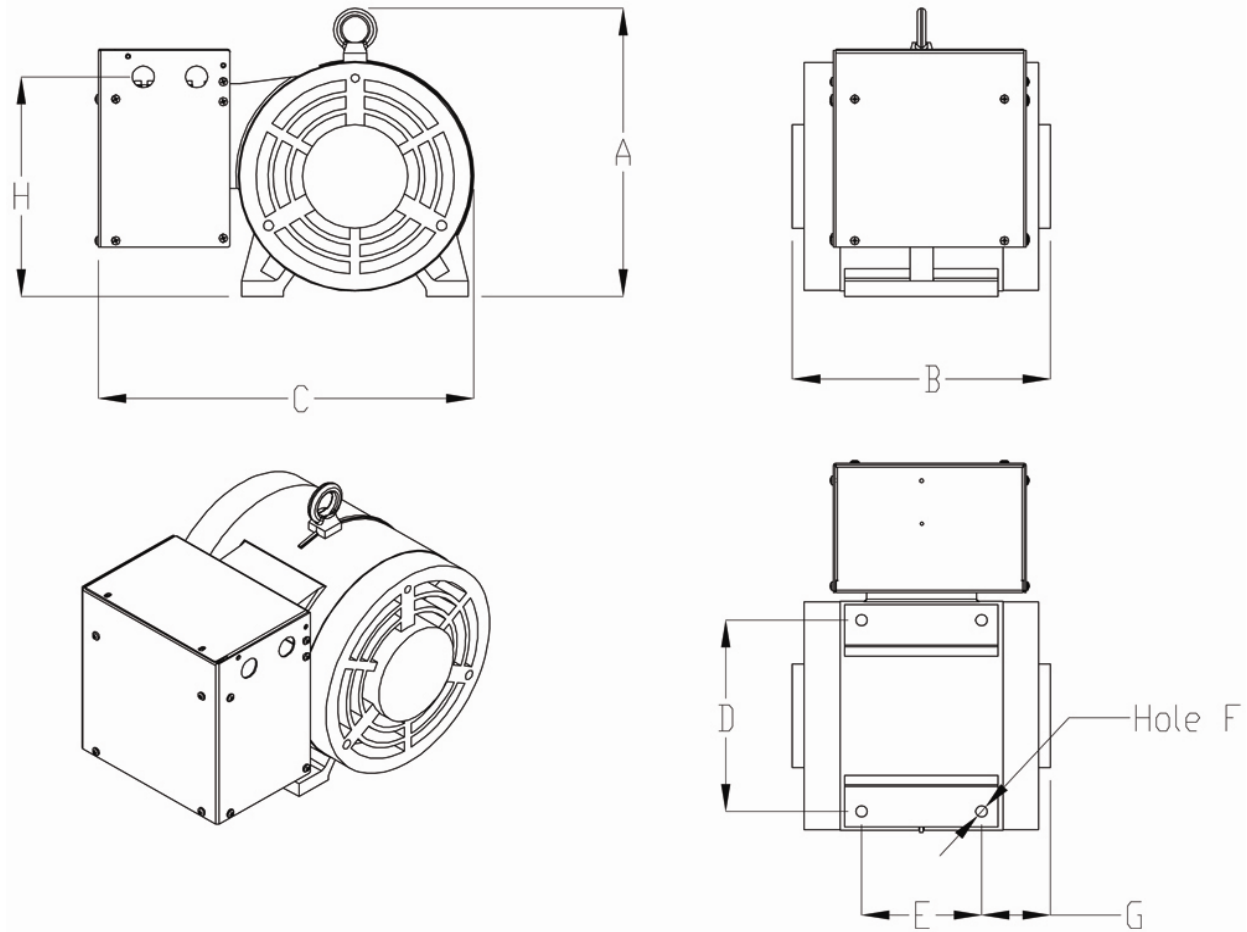
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POWER Wave™ Phase Converter Dimensions



Approximate dimensions, given in inches.

Model	A	B	C	D	E	F	G	H	Ship Dim	Ship Wt
XR2	11.0	10.75	14.25	7.5	5.5	7/16	2.75	7.75	24Hx18Wx18D	106 Lbs
XR3	11.0	10.75	14.25	7.5	5.5	7/16	2.75	7.75	24Hx18Wx18D	106 Lbs
XR5	13.5	12.5	16.75	9.0	5.5	7/16	3.5	9	24Hx18Wx18D	160 Lbs
XR7	13.5	14.25	16.75	9.0	5.5	7/16	3.5	9	24Hx18Wx18D	176 Lbs
XR11	15	17	22.5	10	8.25	1/2	4.25	13	24Hx24Wx30D	336 lbs
XR15	15	18.5	22.5	10	10	1/2	4.5	13	24Hx25Wx30D	362 Lbs
XR21	18	21.5	24.5	11	11	1/2	5	15.5	24Hx27Wx30D	498 Lbs

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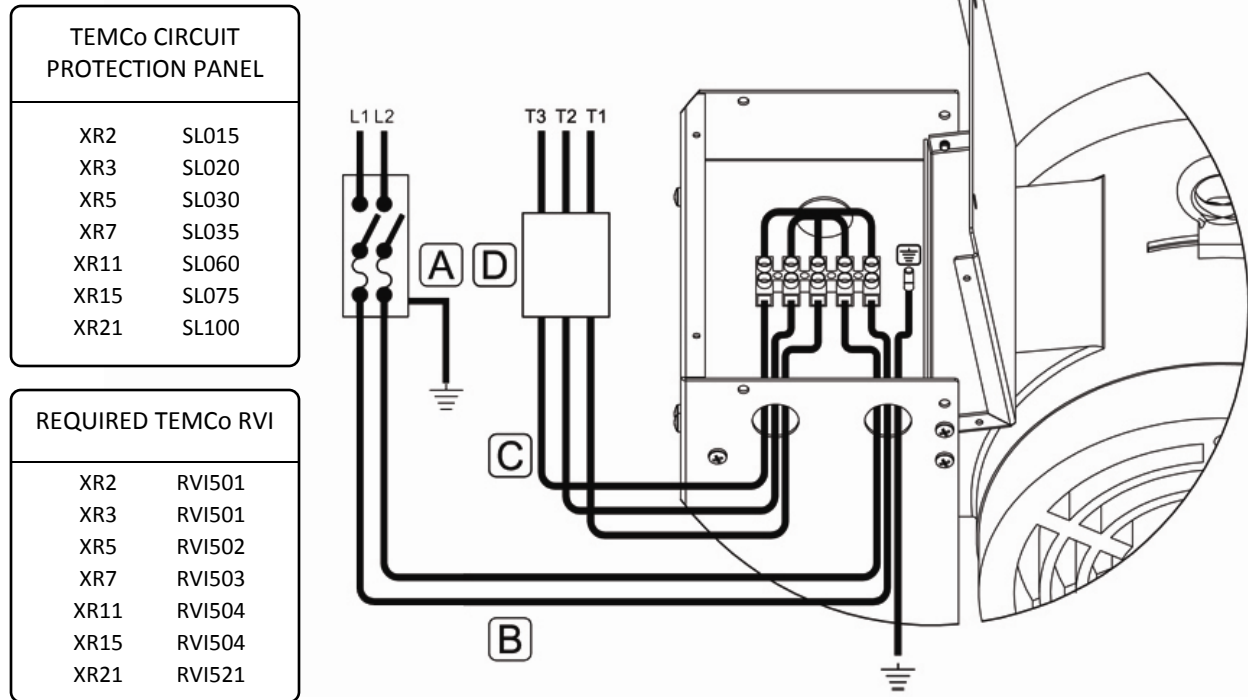
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Single Unit Operation Electrical Connection Diagram



A Single Phase TEMCo MAG Starter, Fused Disconnect, or Circuit Breaker: Refer to technical specifications for sizing. For optimal protection, device setting(s) should be based on minimum requirements of three phase load converted to single phase ($3\text{-phase load amps} \times 1.732$) but not lower than recommendation in technical specifications.

B Single phase supply conductors should be based on circuit protection rating as required by NEC.

C Three phase output conductors should be based on circuit protection rating as required by NEC and the requirement of the three phase load equipment.

D Three phase TEMCo MAG Starter, Fused Disconnect or Circuit Breaker. Refer to three phase load equipment specifications for sizing details.

For Multiple Unit Operation:

E Single Phase Input Buss: Each unit should be brought on-line separately to reduce system start up current and it's affect on the single phase line. Verify that all units wiring corresponds with one another. L1 connected to L1 etc.

F Three Phase Output Buss: Verify that all units wiring corresponds with one another. T2 connected to T2 etc.

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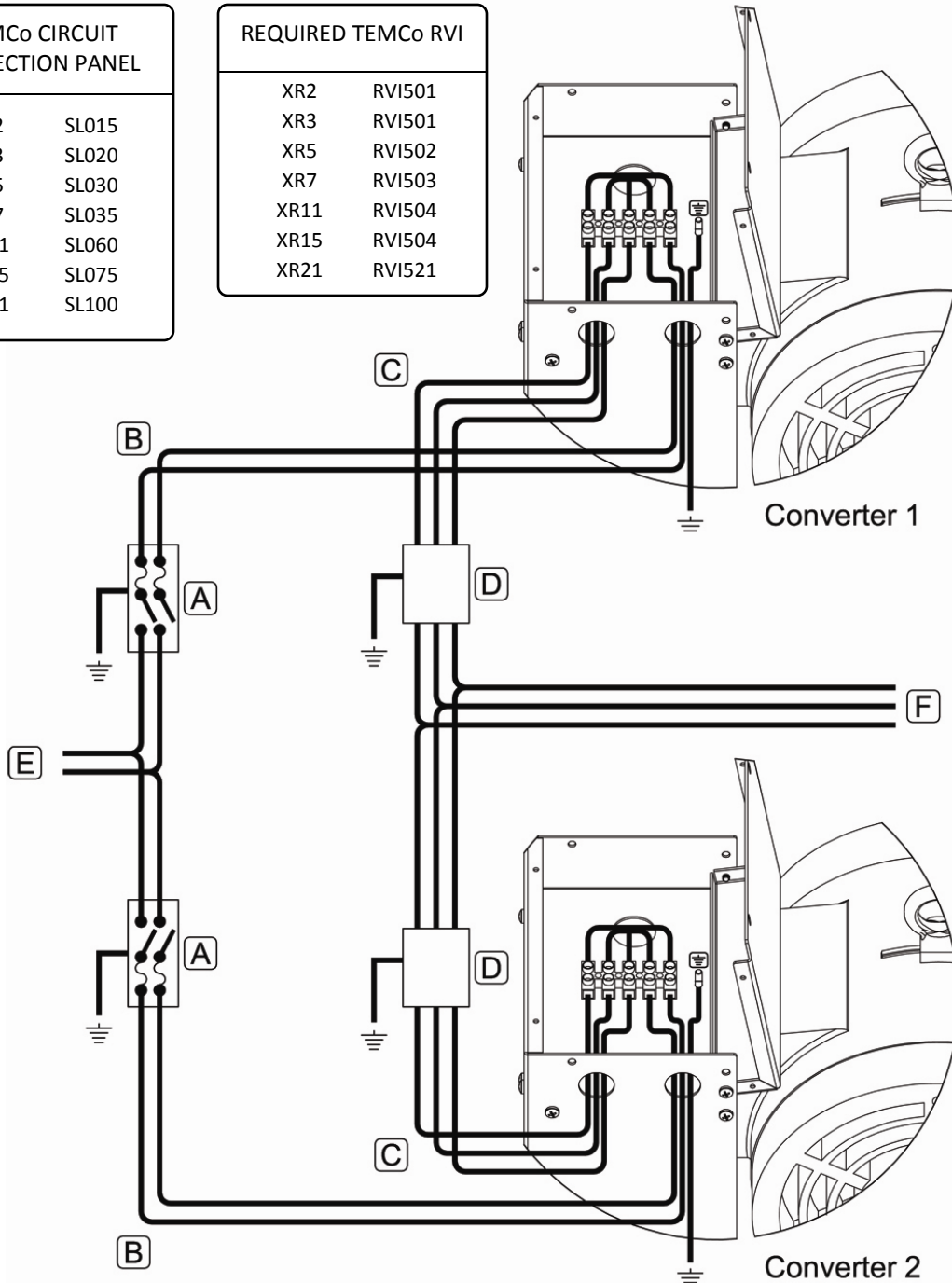


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Multiple Unit Operation Electrical Connection Diagram

TEMCo CIRCUIT PROTECTION PANEL	
XR2	SL015
XR3	SL020
XR5	SL030
XR7	SL035
XR11	SL060
XR15	SL075
XR21	SL100

REQUIRED TEMCo RVI	
XR2	RVI501
XR3	RVI501
XR5	RVI502
XR7	RVI503
XR11	RVI504
XR15	RVI504
XR21	RVI521



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Installation Notes:

1. These diagrams are not intended to replace or supersede any requirements of local, state or national electrical codes.
2. Use only protective dual element time delay fuses or a magnetic starter with thermal overloads that carry an amperage rating within the limits set by the technical specifications.
3. Before attempting first start up, verify that the single phase input of the TEMCo Phase Converter has been connected to protective dual element time delay fuses, circuit breakers or a magnetic starter with thermal overloads that carry an amperage rating within the limits set by the table in section 18.0 Overload Protection. Failure to connect the single phase input of the TEMCo Phase Converter to a specified overload protection device can cause permanent equipment damage and will void the TEMCo Phase Converter warranty.
4. Do not bolt the TEMCo Phase Converter directly to the floor. Greater life expectancy of the rotating assembly can be achieved if it is mounted to vibration isolation mounts or set on a rubber pad. Solid mounting can cause loosening of connections and hardware, and will amplify noise levels. TEMCo offers engineered Resilient Vibration Isolators for this purpose. Consult your sales associate for supply of these at (510) 490-2187.
5. No load voltage on the three phase output from T1 – T2 or T3 – T2 will exceed T1 – T3 by 5% (T2 on the output is the generated line). Voltages will balance when a load is applied.
6. Do not connect control circuits which require ground or neutral to the generated line T2 on the three phase output. This TEMCo Phase Converter provides a three phase DELTA output. On the output, voltage from T2 (generated line) to ground / neutral will be 180-220V on a 208-240V system. If a WYE (or 4 wire) three phase output is required, a three phase DELTA to WYE transformer is required. Please consult your sales representative for the supply of this type of transformer.
7. This TEMCo Phase Converter must always be started before any load is applied. Loads include non-loaded three phase transformers which constitute a small inductive load.
8. All loads must be turned off in the event of a power failure to prevent the TEMCo Phase Converter from being restarted under load when the power comes back on. Equipping three phase loads with magnetic starters is recommended. A magnetic starter will automatically shut off equipment if power is lost, thus protecting the TEMCo Phase Converter from starting under load when power is restored.
9. If automatic load starting is desired, a timer relay may be used in conjunction with your load starting contactor to engage the TEMCo Phase Converter's output and should be set to an interval of approximately double the start up time as indicated in section 5.0 General Technical Specifications.
10. As many TEMCo POWER Wave™ Phase Converters as are needed to suit your application may be connected in parallel for increased output provided that your single phase branch circuit is capable of supporting the load. It is recommended that each unit be started independently to reduce single phase supply line loading during TEMCo Phase Converter start up. See section 12.0 Installation Electrical Diagram for further details.