Southwestern Industries, Inc

White Paper

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Q: My customer has single-phase power; what type of phase converter should he use?

A: There are 3 kinds of phase converters. The following is an explanation of each:

Static Phase Converter – creates 3 phase power only during start up of the motor. The motor then runs on single-phase power. The power of the motor is then de-rated to ½ to 2/3 of its normal capacity. This type of converter is **NOT** to be used on any of our equipment.

Rotary Phase Converter – this device creates the 3 rd leg of power continuously during the operation of the motor. This type of phase converter is **not** recommended on machines that have 3 phase electronics, like our V series machines. The problem with these types of converters is the voltage does not get regulated very well and can vary enough to cause problems with the electronics. Some of these also do not regulate the 120° angle between the 3 phase lines. Some manufacturers also recommended doubling the size of the rotary phase converter to ensure that the converter has enough power to run the machine or motor at start up. For example, TEMCo asks whether the motor you are powering is easy, medium, or hard to start and that drives the size of the phase converter.

CNC Rotary Phase Converter – this device also creates the 3 rd leg of power continuously during the operation of the motor. This type of phase converter **is** recommended for our V series machines because the electronics of the axis drives are 220 volt 3 phase. This type of converter will regulate the voltage and phase angle closely, within 10% is typical. They also eliminate the high voltage of the 3 rd leg, which is typical. Some of these converters come with an isolation transformer built in to regulate the voltage, such as the Roto-Load converters from Ronk. These types of converters are typically 2 times to 5 times as expensive as regular rotary converters. The latest technology in this area includes rotary phase converters that are digitally controlled to help regulate the voltage very closely. TEMCo is a manufacture that sells this type of converter.

Nameplate Ratings

The following are the nameplate ratings found on each of our machines. This information will be needed by the phase converter manufacturer. (FLA – full load amps)

Machine Type	FLA of Largest Motor at 220v	FLA of Machine at 220v
Non-Spindle Control DPSX2, K2SX, K3SX	8.5	8.5
Non Spindle Control K4SX, DPMSX5, DPMSX3	14	14
DPMV5	17.5	36.5
1540V	33	47
DPME2	11	11
DPMV7	33	52
1630SX	25	25
1840SX	33	35
2460V	45	59
Spindle Control DPMSX2, K2SX, K3SX	11	11
Spindle Control DPMSX3,DPMSX5, K4SX	17.5	17.5
1540SX	33	33
2460SX	45	45
FHM5	17.5	17.5
FHM7	37.5	37.5
LPM	27.7	78
1845SX	30	33

Approximate Phase Converter Sizes

The following table lists the recommended size of phase converters for our machines. Having said this, phase converters should **not** be quoted directly from SWI. We should ultimately tell the customer to contact their local phase converter manufacturer for the final sizing requirements. The numbers below will tell the customer the approximate size that will be needed. We recommend referring our customers who inquire to one of the two vendors, Ronk or TEMCo. The recommendation of each vendor varies. The table below was created by using the information on TEMCo's website. See http://www.phaseconverter.com/cncpro.html for more information. It should be noted that Ronk's prices are very high when compared to TEMCo.

Machine Type 220v	Phase Converter Size Recommended Range KVA	Site Prep FLA	Price From TEMCo***
DPMSX2, K2SX, K3SX	~5-7	8.5	$835
DPMSX3, DPMSX5	~7-10	14	$1095
DPMV5	~20-25	36.5	$1995
1540V	~25-30	47	$2295
DPME2	~5-7	11	$835
DPMV7	~25-30	52	$2295
1630SX	~15-20	25	$1735

Machine Type 220v	Phase Converter Size Recommended Range KVA	Site Prep FLA	Price From TEMCo***
1840SX	~20-25	35	$1995
2460V	~30-35	59	$2295
Spindle Control DPMSX2, K2SX, K3SX	~5-7	11	$835
Spindle Control DPMSX3, DPMSX5, K4SX	~7-10	17.5	$1095
1540SX	~20-25	33	$1995
2460SX	~25-30	45	$2295
FHM5	~7-10	17.5	$1095
FHM7	~20-25	37.5	$1995
LPM	~55 KW or 75HP	78	$4700 (P/N AC55)
1845SX	~20-25	33	$1995

*** price based on the highest KVA rating for each machine. For the 7 to 10 KVA range, the price is based on 10 KVA.

Note – 1 Horsepower = 0.746 KVA or Kilowatt

TEMCo's phone number – 800/613-2290