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2XD SERIES Output Voltage Explained

Phase Converting & Voltage Doubling Variable Frequency Drives

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Output Voltage Explained

The output voltage for a 2XD Series Drive is generally less than 480V. Voltage drops occur through output filters, input filters, and line losses; these are common phenomenon and should not be a cause for concern under most circumstances.

For Phase Technologies voltage doubling 2XD Series VFD Drives equipped with an output filter, the estimated actual output voltage (for a given input voltage and output current) is shown in the table below.

2XD Series VFD Estimated Output Voltage

Model	2XD205R-OF	2XD207R-OF	2XD210R-OF	2XD215R-OFD
Input Voltage V	240	240	240	240
Output Current A	10	13	18	24
Input Inductor Impedance %	3.07	3.8	4	4.1
Output Filter Impedance* %	2.8	3.7	5.4	1.5
Total Impedance %	5.87	7.5	9.4	5.6
Output Voltage V	**451**	**444**	**434**	**453**

* The 2XD205R-OF, 2XD207R-OF, and 2XD210R-OF use a sinewave output filter, while the 2XD215R-OFD has a dv/dt output filter.

NEMA Motor Voltage Tolerances

Though utility power is commonly stated to be 480V nominal, motors are generally designed for a nominal voltage of 460V. Additionally, NEMA motors are designed to tolerate voltage swings of ± 10%. Thus, on a typical 460V motor this would equate to an operating range of 414V at the lower limit and 506V at the upper limit. The typical output voltages of a 2XD Series VFD comfortably fit within the 10% range of a NEMA 460V motor.

Effects of High and Low Voltage on an Induction Motor

A common misconception is that because low voltage increases current on a motor, high voltage must be an improvement or will decrease current draw and reduce heat on said motor. This is not reality. High voltage on a motor will cause the magnetic in the motor to saturate. This effect, in turn, causes the motor to draw more current in an effort to magnetize the iron beyond the point where magnetizing is practical. In reality, the ideal voltage to supply a motor is the rated voltage for the motor.

SUMMARY

When supplied with 240V input, 2XD Series VFDs may exhibit output voltages less than 480V due to voltage losses within the drive. However, the power provided by these drives will still comfortably meet the ± 10% voltage requirements for a standard NEMA 460V motor.

Additionally, the commonly held "bigger is better" belief that higher voltage is better for a motor is not accurate – high voltage to a motor also causes additional current draw, though for different reasons than low voltage conditions.

About Phase Technologies
Founded in 1999, Phase Technologies developed Phase Perfect® Digital Phase Converters, the first major advancement of phase conversion technology in decades. Recognized as the world's leading manufacturer of phase converter technologies, the company has expanded its product offerings to include a full line of phase converting, voltage doubling, low harmonic, regenerative variable frequency drives (VFD's).

Specializing in VFD with Active Front End technology, Phase Technologies produces the only low harmonic, fully regenerative, phase-converting VFD that complies with IEEE 519, the international standard for allowable harmonic levels on utility mains. The company has an extensive product line-up of low harmonic, fully regenerative drives in both three-phase and phase-converting models.

Phase Technologies relies on a team of in-house power electronics and mechanical design engineers to develop innovative products, encompassing all aspects of hardware and firmware design. All products are manufactured at our facilities in the USA under exacting quality standards. In-house processes include printed circuit board population and custom magnetics fabrication.

The company operates a certified UL508A panel shop to integrate our drives into rugged outdoor panels with custom options for applications including irrigation, oil and gas production and general industrial control.

Integrity and honesty are the cornerstones of customer interaction at Phase Technologies. Knowledgeable sales experts are available to help customers select the right product to fit their needs, and we partner with the best distributors and dealers to make our products available with rapid delivery times and local service. Experts in our customer service department are standing by to answer technical questions and provide the support to keep your application up and running.

For more information, visit www.phasetechnologies.com

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