



SUBJECT: Quattro™ DC Input vs. Output Voltage Requirements

Quattro™ DC has an active front that can regulate DC motor voltage to be higher than the nominal Vac line-to-line input. This application note shows how to determine the minimum input line voltage required.

There are three limitations when determining nominal line-to-line voltage requirements of a Quattro™ DC drive. Motor current, line amps, and motor voltage are all factors in the voltage input requirement of the drive.

1. Select drive size to meet motor ampere requirements. Selections are 125A, 200A, or 250A.
2. Perform Equation 1 and Equation 2 using Motor Voltage and Current the motor needs to run at contract car speed with contract load in up direction (Full Load Up Voltage / Current)

$$V_{L-L} = \frac{(Motor\ Voltage \times 1.3) - 75}{\sqrt{2}}$$

Equation 1: Nominal Line-to-line Voltage

$$(V_{L-L}) = \left(\frac{Rated\ Motor\ Current \times Motor\ Voltage \times 0.92}{Rated\ Drive\ Amps} \right)$$

Equation 2: Nominal Line-to-line Voltage

Where: V_{L-L} = Nominal Input Line-to-Line Voltage

Drive Amps = Current Rating of Quattro™ DC (125A, 200A, or 250A)

Rated Motor Current = Armature Motor Current required to go contract speed and load up

Rated Motor Voltage = Armature Motor Voltage required to go contract speed and load up

3. Use the *LARGER* of the values from Equation 1 and Equation 2. Note: This value must be lower than 480VAC due to input limitations of the drive.

Example:

Rated Motor Run Current	115A
Rated Full Load Motor Voltage	460VDC
Drive Current Rating	125A

$$V_{L-L} = \frac{(460 \times 1.3) - 75}{\sqrt{2}} ; (V_{L-L}) = 370\ VAC$$

$$(V_{L-L}) = \left(\frac{115 \times 460 \times 0.92}{125} \right) ; (V_{L-L}) = 389\ VAC$$

Therefore, the drive requires a minimum nominal voltage of 389VAC on the input to run a motor with the Rated Full Load Motor Voltage of 460VDC and rated current of 115A.



Below are three graphical representations of what each drive size is capable of producing in relationship to Rated Motor Current and commonly supplied nominal line-to-line VAC input to drive.

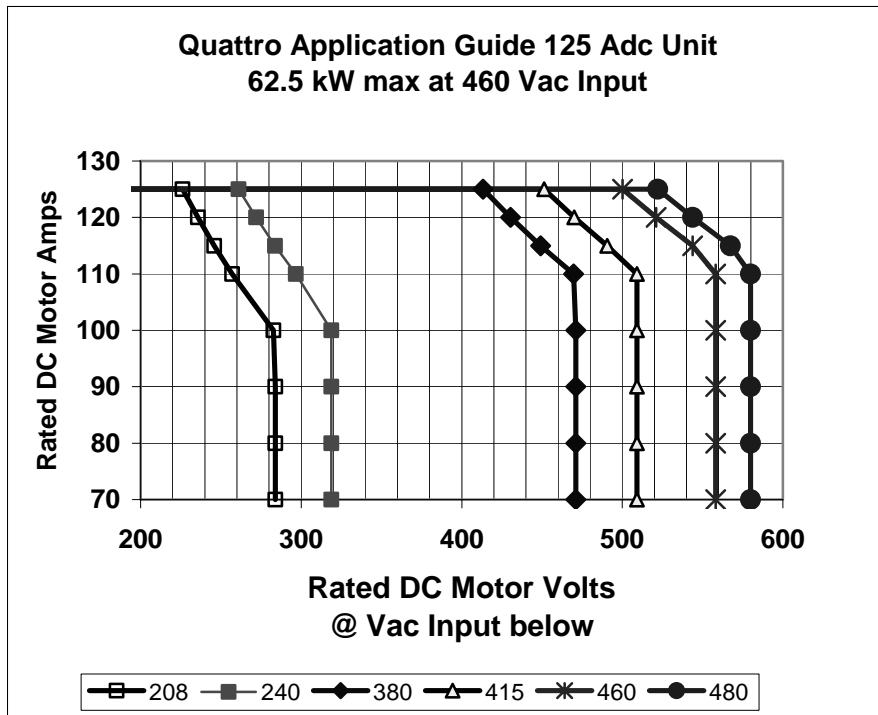


Figure 1: 125A Application Guide

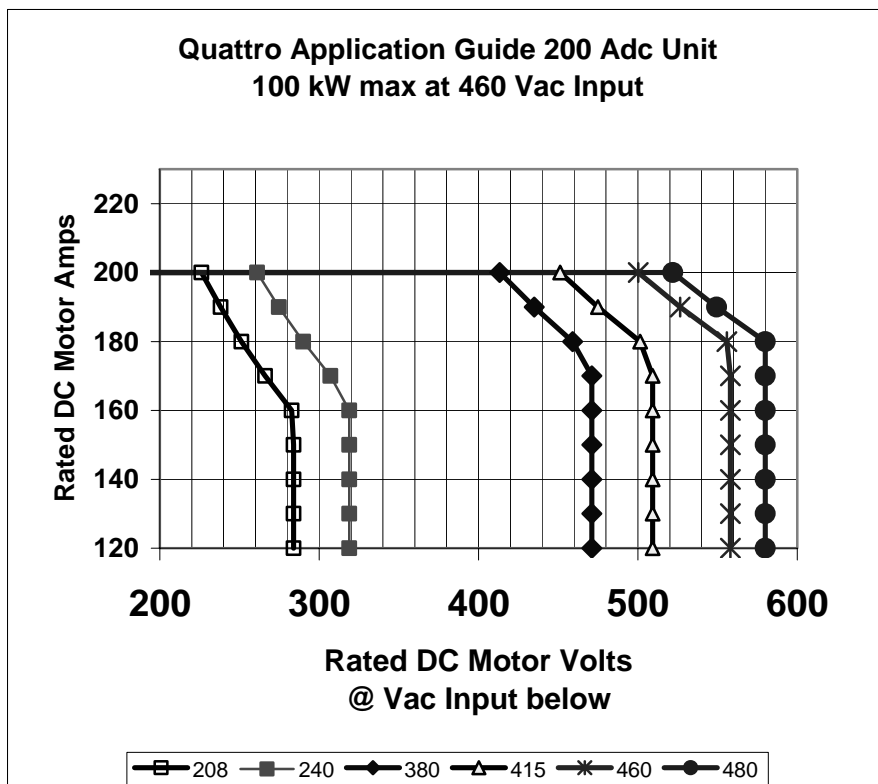


Figure 2: 200A Application Guide

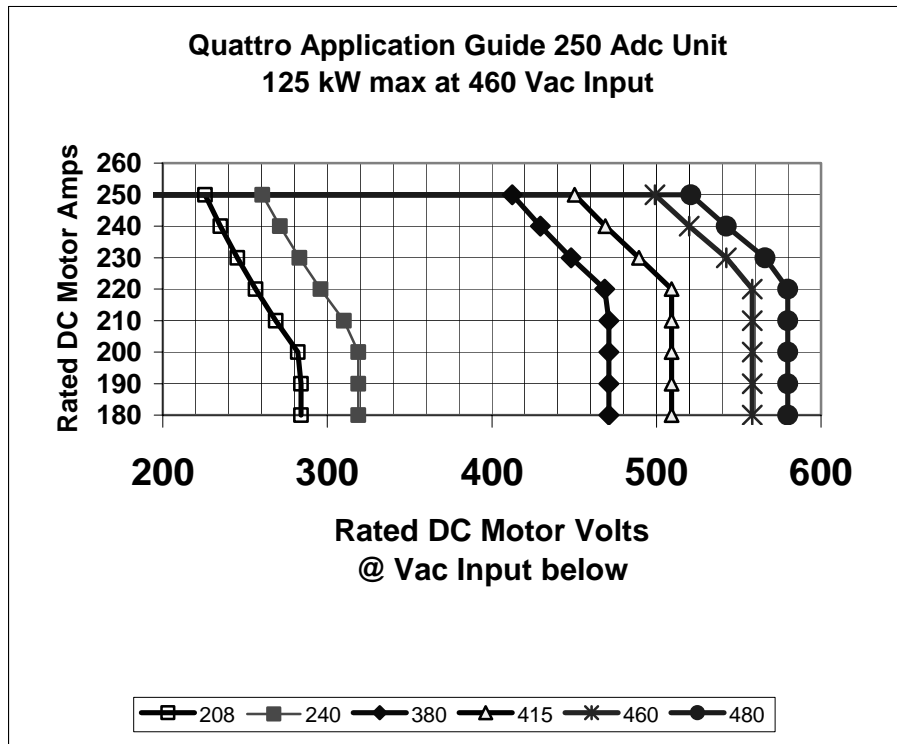


Figure 3: 250A Application Guide