TO compare line current of ATV340D30N4E with ATV340D22N4(E) we will start with calculating power factor, based on THDi value.

It is obvious that in nonlinear network, power factor PF is expressed as:

$$PF = \frac{1}{\sqrt{(1 + THD_i^2)}} . \cos \varphi$$

As $\cos \varphi$ for VSD is equal to 1 (or lets say very close to 1) we can write:

$$PF = \frac{1}{\sqrt{(1 + THD_i^2)}}$$

For ATV340D22N4 with THDi aprox 130% (without line choke, in heavy duty). Power factor is

$$PF = \frac{1}{\sqrt{(1 + 1.3^2)}} = 0.61$$

For ATV340D30N4 with THDi=47% (without line choke)

$$PF = \frac{1}{\sqrt{(1 + 0.47^2)}} = 0.91$$

We know that power factor is relation between active power and apparent power

$$PF = \frac{P_1}{S}$$

Where $P_1$ is power at ATV input.

If we assume that motor losses and ATV losses are proportional to mechanical power Pm on motor shaft, we can write

$$P_1 = k . P_m$$

Apparent power in 3phase network depends on phase-to-phase voltage U and ATV input current I1

$$S = \sqrt{3}.U.I_1$$

Now lets compare apparent power of 22kW drive with 30kW drive by putting them as ratio:

$$\frac{S_{(D30N4)}}{S_{(D22N4)}} = \frac{\sqrt{3}.U.I_{1(D30N4)}}{\sqrt{3}.U.I_{1(D22N4)}} = \frac{\frac{P_{1(D30N4)}}{PF_{(D30N4)}}}{\frac{P_{1(D22N4)}}{PF_{(D22N4)}}} = \frac{\frac{k.P_{m(D30N4)}}{PF_{(D30N4)}}}{\frac{k.P_{m(D22N4)}}{PF_{(D22N4)}}}$$

And so

$$\frac{I_{1(D30N4)}}{I_{1(D22N4)}} = \frac{P_{m(D30N4)}}{P_{m(D22N4)}} * \frac{PF_{(D22N4)}}{PF_{(D30N4)}} = \frac{30}{22} * \frac{0.61}{0.91} = 0.91$$

As you can see line current of D30N4E is only 0.91-times the current of D22N4.

BY comparing catalog data in HD at 380V, ($I_{1(D22N4)}$)=63.5A, while ($I_{1(D30N4)}$)=54.8

Ratio is : 54.8/63.5=0.86

In normal duty ND the effect of lower current for D30N4E is not so significant because the THDi of D22N4 goes down when the load increases. THDi in HD is greater in general, because of lower continuous current in HD than in ND.