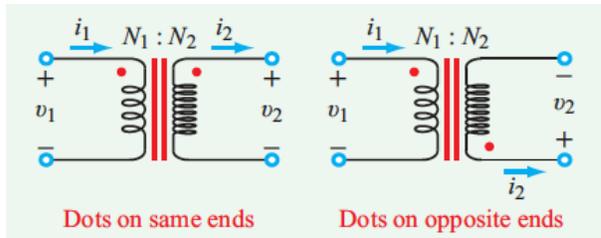


**Concept Question 7-17:** In a transformer, how are the voltage polarities and current directions defined relative to the dots on the primary and secondary windings?



**Figure 7-36:** Schematic symbol for an ideal transformer. Note the reversal of the voltage polarity and current direction when the dot location at the secondary is moved from the top end of the coil to the bottom end. For both configurations:

$$\frac{v_2}{v_1} = \frac{N_2}{N_1} = n, \quad \frac{i_2}{i_1} = \frac{N_1}{N_2} = \frac{1}{n}, \quad \frac{p_2}{p_1} = \frac{v_2 i_2}{v_1 i_1} = 1$$

The expressions are applicable to both configurations, so long as the voltage polarity and current direction are reversed in the opposite-ends configuration relative to those in the same-ends configuration.