

Part 1: Electrical Requirements



170) Transformer Connections and Taps

170.10) Acceptable Transformer Connections for We Energies Systems.

Row	Nominal System Voltage	Acceptable Transformer Connections			
		3 Wire Secondary		4 Wire Secondary	
		Primary	Secondary	Primary	Secondary
1	*3,810/2,200V 4 Wire *4,160/2,400V 4 Wire *8,320/4,800V 4 Wire *12,470/7,200V 4 Wire 13,200/7,620V 4 Wire 13,800/7,970V 4 Wire 13,200V 3 Wire 26,400V 3 Wire 34,500V 3 Wire	Δ	Δ	Δ	GND Y
		Δ	Y		
		Y	Δ		
2	13,800V 3 Wire <i>See 170.10.a.</i>	Δ	Y	Δ	GND Y
3	24,940/14,400V 4 Wire 34,500/19,920V 4 Wire <i>See 170.10.b.</i>	GND Y	Y	GND Y	GND Y
		Triplex Core Only		Triplex Core Only	
4	24,940/14,400V 4 Wire 34,500/19,920V 4 Wire <i>Transformer must be 3000kVA or larger, or be protected as described in 170.10.b.3.</i>	Δ	Δ	Δ	GND Y
		Δ	Y		
		Y	Δ		
5	24,940/14,400V 4 Wire 34,500/19,920V 4 Wire <i>Transformer must be protected as described in 170.10.b.3.</i>	GND Y	Y	GND Y	GND Y
6	*69,000V 3 Wire				
7	*138,000 V 3 Wire				

*By special permission only. Please contact the local We Energies office before designing for these systems.

Table 170.10 is continued on the next page.

Part 1: Electrical Requirements

170.10) (continued)

a) On the 13,800V 3 wire system, it is recommended that the Customer install three single phase transformers connected phase-to-phase. When the We Energies distribution system is converted to 24,940/14,400V 4 wire operation, the transformers may be reconnected in a grounded-wye configuration (taking advantage of the high voltage taps as well).

b) On the 24,940Y/14,400 volt and 34,500Y/19,920 volt systems, transformer installations shall have grounded-wye primary winding connections, and three phase triplex core and coil design with grounded-wye or ungrounded-wye secondary winding connections. These restrictions are designed to avoid ferroresonant conditions and eliminate tank heating phenomena under all abnormal system operating conditions.

b.1) Exception 1: When banking single phase transformers connected in a grounded-wye to grounded-wye configuration or grounded-wye to ungrounded-wye configuration.

b.2) Exception 2: When the transformer rating is 3000kVA or more, transformer connections in Row 4 of 170.10 are acceptable.

b.3) Exception 3: When transformer(s) are protected with devices which sense the loss of source voltage by measuring voltage magnitude and phase angle, and will simultaneously disconnect all phases of the high voltage supply to the transformer(s) in the event of a loss of phase condition. *Contact the local We Energies representative for acceptability before proceeding with this exception.*

b.4) Exception 4: Where a customer presently owns and operates a system and is adding transformation, the transformer connections on the existing equipment are acceptable for the new equipment (providing the connections are listed in Row 4 of 170.10).

170.20) T-Connected Transformers

T-connected transformers shall not be utilized by the Customer at the We Energies supply voltage.

170.30) Transformer Taps

Each transformer shall have five full capacity primary taps with one at nominal system voltage, and two taps at 2 1/2% above, and two taps at 2 1/2% below nominal system voltage. *Customers installing transformers supplied by We Energies 13,800 volt and 26,400 volt distribution system shall contact We Energies for specific tap requirements prior to ordering the equipment.*