DISTRIBUTION TRANSFORMER CONNECTIONS

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26 MVA SUBSTATION TRANSFORMER

» High Voltage connected 115KV Delta
» Distribution Voltage 7200/12,470 (12.5) Wye
» 26MVA

VOLTAGE REGULATING TRANSFORMER

» 3 Single Phase Regulators
» Distribution Voltage 7200
» Each Regulator can raise or lower the voltage by 16, 5/8% steps
A conductor carrying current has a magnetic field around it.

With alternating current (ac), the magnetic field expands and contracts, reversing polarity each half cycle.
When more conductors are placed near the first conductor carrying current, a current is induced in them and in the opposite direction.

The main purpose of a distribution transformer is to transform the primary voltage level (usually high) to a specific secondary voltage level which is required for specific connected equipment.
TRANSFORMER MAIN PARTS

» The core, which is usually made of iron with low magnetic permeability.

» Primary windings, a coil which receives the energy from the source.

» Secondary windings, a coil that receives the energy from the primary and delivers it to the load.
COOLANT

» For distribution transformers the coolant is almost always oil.
» The electrical insulating qualities of oil is excellent, as well as the ability of oil to transmit heat away from the core and coils to the exterior radiating surfaces.
TURNS RATIO

» The ratio is the number of turns on the primary winding to the number of turns on the coil of the secondary winding.

» A primary coil with 600 turns at 7200 volts coupled with a secondary coil with 10 turns will deliver a secondary voltage of...

TRANSFORMER LOSSES

» The transformer is not 100% efficient due to two types of energy losses.

» No load losses are associated with magnetizing the iron core.

» Load losses are associated with current flow.
DISTRIBUTION TRANSFORMER CONNECTIONS
DELTA / DELTA

120/240/208 or 240/480/415 Volt 3-Phase 4-Wire, grounded neutral bushing.
If your transformer is:
A) 8660v or higher
or
B) 200kVa or more
Then it is Subtractive Polarity
OPEN WYE / OPEN DELTA

» High Voltage Connected 2-Phase Wye with Neutral

» Secondary connected 3-Phase 4-Wire Open Delta
WYE – WYE

» High Voltage Connected 3-Phase 4-Wire Wye.
» Secondary Connected 3-Phase 4-Wire Wye.
» The secondary voltage is 120/208 or 277/480 volts.
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Neutral

NWEMS

Western Energy Institute

Exchanging Expertise Since 1893
What is Fleming's Left-Hand Rule for Electric Motors?

Fleming’s Left-Hand Rule can be used to determine the direction of the magnetic force on a conductor with an electric current flowing through it. The rule is as follows:

- **Thumb** = Thrust (movement)
- **Forefinger** = Magnetic field (north to south)
- **Centre Finger** = Current (positive to negative)

A left-hand rule is shown in the illustration, with the three fingers pointing according to the direction of the current in the wire, the magnetic field, and the force resulting from the interaction.