



T60 Transformer Types and Setup

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DESCRIPTION

The T60 can protect a variety of power transformer types, as they are constructed, with no limitations on the transformer phase shift angle and connection group. Transformer settings are organized into two parts:

- *General settings* that include general information on the protected transformer, such as number of windings, etc.
- *Winding settings* that include type of connection, MVA, kV, phase shift angle between the transformer windings, etc.

GENERAL SETTINGS

In the transformer general settings, the number of transformer windings and type of compensation (internal or external) must be specified. If "Internal" compensation is selected, the relay applies phase and magnitude compensation for the input currents. If "External" compensation is chosen, then the T60 requires the user to wire the secondary currents from the main CTs to the relay input terminals to match the current magnitudes and ensure the currents are measured in a unified direction with respect to the protected transformer (that is, all currents either in or out the transformer).

WINDING SETTINGS

The **GROUNDING** winding setting allows for two possible choices: "Within zone" and "Not within zone". For "Within zone", the relay removes the zero-sequence currents before forming its differential signal; for "Not within zone", zero-sequence removal is not forced. Usually, the Wye connected windings are grounded star, in which case "Within zone" setting should be chosen. Forced zero-sequence removal may be a useful feature for delta-connected windings if any kind of grounding is present within the transformer zone on the delta-side. This may be, for example, a cable section connected to a delta winding and producing significant zero-sequence charging current.

The **ANGLE WRT** setting calls for the 'angle with respect to'. The Winding 1 angle WRT *must be zero* for all transformer configurations and the angles for the other windings should be entered with respect to Winding 1. Negative values represent lagging angles.

A typical D/y30° configuration is shown below.

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The screenshot displays two windows from the GET-8433 software. The left window, titled 'General // New Site 1: T35 Lubo: Settings: System S...', contains a table of transformer settings. The right window, titled 'Windings // New Site 1: T35 Lubo: Settings: Syste...', contains a table of winding parameters.

SETTING	PARAMETER
Transformer Number Of Windings	2
Transformer Phase Compensation	Internal (software)
Transformer Load Loss At Rated Load	100 kW
Transformer Rated Winding Temperature Rise	65°C (oil)
Transformer No Load Loss	10 kW
Transformer Type Of Cooling	OA
Transformer Top-oil Rise Over Ambient	35 °C
Transformer Thermal Capacity	100.00 kWh/°C
Transformer Winding Thermal Time Constant	2.00 min

PARAMETER	WINDING 1	WINDING 2
Source	SRC x (SRC 1)	SRC x (SRC 2)
Rated MVA	100.000 MVA	100.000 MVA
Nominal Phs-phs Voltage	220.000 kV	69.000 kV
Connection	Delta	Wye
Grounding	Not within zone	Within zone
Angle Wrt Winding 1	0.0 °	-30.0 °
Resistance	10.0000 ohms	10.0000 ohms

At the bottom of the 'Windings' window, there is a status bar showing 'T35 Lubo' and 'Settings: System Setup: Transformer'.



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