**Component: Three-phase Transformer**

**Notes:**

* **The variable names for DiTTo in the first column are exactly copied from DiTTo in order to get the parameters in DiTTo easily.**
* **For ePHASORSIM, the symbols in the third column are put exactly same as the ePHASORSIM user guide and the demo examples.**
* **The DiTTo parameters which match the ePHASORSIM’s parameters are put in the same rows.**
* **If one or more parameters which are available in ePHASORSIM but not in DiTTo, in that case the corresponding columns of the Ditto are left empty or necessary suggestions are provided.**
* **The parameters which are available only in DiTTo but not in ePHASORSIM, in that case the corresponding columns of the ePHASORSIM are left empty.**

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| --- | --- | --- | --- | --- | --- | --- |
| Ditto | | ePHASORSIM | | | |  |
| Name of the variable | Description | | Symbol | Description | Unit | Default value |
| name | Name of the transformer object | | ID | Transformer name | Name must be unique |  |
| num\_phases | The number of phases that the transformer handles | | bus a | Primary bus: phase A | Name must be unique |  |
| bus b | Primary bus: phase B | Name must be unique |  |
| high\_num\_phases | The number of phases that the high end of the transformer has | |  |
| bus c | Primary bus: phase C | Name must be unique |  |
| high\_phases | '''A list of the phases (A, B, C, N, s1, s2) that the high side of the transformer has | |  |
| high\_nominal\_voltage | The nominal voltage of the high end of the transformer | | kV (ph-ph RMS) | Primary winding nominal voltage (phase to phase (RMS)) | Unit: kV |  |
| rated\_power | This is the rated power for the transformer | | kVA\_base | Nominal power in primary side | Unit: kVA |  |
| resistance | This is the resistance between the from and to end as seen from the from end''' | | R\_w0 (pu) | Primary winding resistance. Here w0: means primary winding | Unit: p.u. |  |
| resistance0 | This is the zero sequence resistance between the from and to end as seen from the from end | |  |
| high\_connection\_type | This is the type of connection that the transformer connects to on the high side | | conn | Primary winding connection type | ‘wye’ and ‘delta’ |  |
| num\_phases | The number of phases that the transformer handles | | bus\_a | Secondary bus: phase A | Name must be unique |  |
| low\_num\_phases | The number of phases that the low end of the transformer has | | bus\_b | Secondary bus: phase B | Name must be unique |  |
| low\_phases | '''A list of the phases (A, B, C, N, s1, s2) that the low side of the transformer has | | bus\_c | Secondary bus: phase C | Name must be unique |  |
| low\_nominal\_voltage | The nominal voltage of the low end of the transformer | | kV (ph-ph RMS) | Secondary winding nominal voltage (phase to phase (RMS)) | Unit: kV |  |
| rated\_power | This is the rated power for the transformer | | kVA\_base | Nominal power in secondary side | Unit: kVA |  |
| resistance | Resistance between the from and to end as seen from the from end''' | | R\_w1 (pu) | Secondary winding resistance. Here w1: means secondary winding | Unit: p.u. |  |
| resistance0 | This is the zero sequence resistance between the from and to end as seen from the from end | |  |
| low\_connection\_type | This is the type of connection that the transformer connects to on the low side | | conn | Secondary winding connection type | ‘wye’ and ‘delta’ |  |
| reactance | This is the reactance between the from and to end as seen from the from end''' | | X (pu) | Total reactance | p.u. |  |
| reactance 0 | This is the zero sequence reactance between the from and to end as seen from the from end | |  |
| This parameter is unavailable in DiTTo; |  | | Tap A | Initial tap position for phase A | Integer between Lowest and  Highest Tap | 0 |
| This parameter is unavailable in DiTTo; |  | | Tap B | Initial tap position for phase B | Integer between Lowest and  Highest Tap | 0 |
| This parameter is unavailable in DiTTo; |  | | Tap C | Initial tap position for phase C | Integer between Lowest and  Highest Tap | 0 |
| This parameter is unavailable in DiTTo; |  | | Lowest Tap | The lowest tap position | Integer value | -16 |
| This parameter is unavailable in DiTTo; |  | | Highest Tap | The highest tap position | Integer value | 16 |
| This parameter is unavailable in DiTTo; |  | | Min Range (%) | Max voltage buck | 0 < value < 100 | 10 |
| This parameter is unavailable in DiTTo; |  | | Max Range (%) | Max voltage boost | value > 0 | 10 |
| susceptance | This is the susceptance of the transformer | |  |  |  |  |
| susceptance0 | This is the zero sequence susceptance of the transformer | |  |  |  |  |
| capacitance | This is the capacitance of the transformer | |  |  |  |  |
| capacitance0 | This is the zero sequence capacitance of the transformer | |  |  |  |  |
| emergency\_power | This is the emergency power for the transformer | |  |  |  |  |
| phase\_shift | This is the phase shift that the transformer causes in degrees in the range | |  |  |  |  |
| high\_has\_neutral | A boolean to describe whether or not the high transformer end has a neutral line | |  |  |  |  |
| low\_has\_neutral | A boolean to describe whether or not the low transformer end has a neutral line | |  |  |  |  |
| high\_impedance\_leak | The impedance leak for short-circuit tests on the high end | |  |  |  |  |
| low\_impedance\_leak | The impedance leak for short-circuit tests on the low end''' | |  |  |  |  |
| high\_noload\_impedance\_leak | The impedance leak for zero-sequence short-circuit tests on the high end''' | |  |  |  |  |
| low\_noload\_impedance\_leak | The impedance leak for zero-sequence short-circuit tests on the low end''' | |  |  |  |  |
| high\_ground\_resistance | The real part of the neutral ground impedance on the high side | |  |  |  |  |
| low\_ground\_resistance | The real part of the nuetral ground impedance on the low side | |  |  |  |  |
| high\_ground\_reactance | The imaginary part of the neutral ground impedance on the high side''' | |  |  |  |  |
| low\_ground\_reactance | The imaginary part of the neutral ground impedance on the low side | |  |  |  |  |
| windings | This is a list containing one element for windings in the voltage regulator | |  |  |  |  |
| positions | This parameter is a list of positional points describing the transformer | |  |  |  |  |
| high\_from | The node which connects to the 'from' end of the transformer''' | |  |  |  |  |
| low\_to | The node which connects to the 'to' end of the transformer''' | |  |  |  |  |
| reactance\_list | This gives the pairwise reactances between each winding in the winding list | |  |  |  |  |
| noload\_loss | The no-load loss for a zero sequence short-circuit test on the entire transformer | |  |  |  |  |
| install\_type | This is the mounting type i.e. POLETOP, PADMOUNT or VAULT | |  |  |  |  |
| fullload\_loss | The full-load loss for a zero sequence short-circuit test on the entire transformer | |  |  |  |  |

Example: in ePHASORSIM



**Component: Single-phase Transformer**

Note: According to Monohor’s mapping, single-phase transformer is represented exactly same as three-phase transformer in ePHASORSIM. For example, if the primary side of the transformer is connected at phase-b o bus-1 and secondary side of the transformer is connected at phase-b of bus-2, it is required to put the connection information for all the three nodes for both primary side connected bus and secondary side connected bus. The only information is needed to update that the apparent power is multiplied by 3.