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THE PARTICULARITY STUDY ABOUT" Y-CONNECTION WITH UNEQUAL BRACKET"

Cristina PRODAN, Dorel CERNOMAZU and Niculina POIENAR

"Ştefan cel Mare" University of Suceava

Abstract **– The paper presents the necessity of the realization of an electric transformer with the possibility of alimentation from a tri-phased source and also from a mono-phased source, the nominal power of the transformer remaining unchanged for the two cases presented.**
The transformer realized as an experimental model presents a magnetic core tri-phased in a symmetrical plan with a tri-phased covering, asymmetrical too, realized after a connection called "Y-connection with unequal bracket".
The paper also studies the function of the transformer, pointing out the way in which the phase tensions evolve and also the position of the black point in the diagram, taking into consideration the size, the character and the degree of asymmetry of the charge.
At the end of the paper, there are presented the observations resulted from the experimental study and the conclusions concerning the applicability of the transformer which was studied.

Keywords: *three-phased electric transformers, Y-connection with unequal bracket***.**

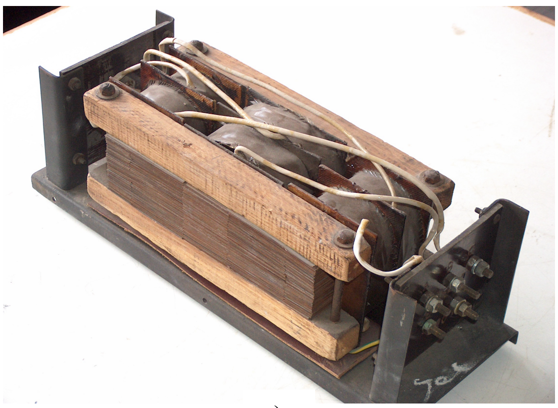
1. INTRODUCTION

In three-phases transformers case are knowed usual connection (y-connection, delta-connection, zigzag connection) and special connection. In specialty literature [2]:
- the diagram in A;
- zigzag unequal bracket sliding delta;
- Y-connection with unequal bracket;
- T transformer.

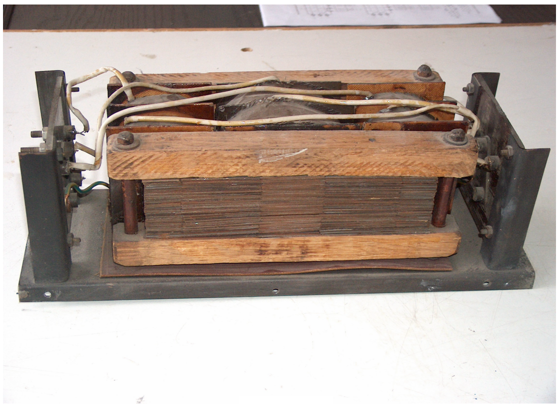
The special connection are used in particular situation: connection diagram in A gave the some lagging like in delta and it is utilized when is necessary that the winding must have delta connection and in the same time to exist and black point.
The zigzag diagram with unequal bracket and sliding delta are used for the transformers that feed the electrical furnace The T transformer represent one of the solution for the passing from a three-phases system with three conductors to a three-phases system with four conductors.
This paper approach a unpublished aspect of a elaboration and usage for Y-connection with unequal bracket.

2. CONTRIBUTION FOR Y-CONNECTION WITH UNEQUAL BRACKET ELABORATION AND USAGE

The Y-connection with unequal bracket detection and usage is bound of separation transformer projection and realization. Of course the protection separation represent one of the most attractively application domain of electrical transformer.
The protection application is used to electric transportable tools used in construction, to flag production, copper's and where the industrial activity in made in small spaces squan by conductor material. In this case the protection separation represents the solely potential protection.
In the productive activity are utilized electric transportable tool with mono-phase or three-phases feeding. Because the power of those electric transportable tools class are proximate, appeared the projection and realization necessity of a portable transformer, capable to feed the both class of electric tools.
In [4, 5] is presented a solution capable to satisfy both tools category and what to conduct to a gauge and burden, both responded for a portable separation transformer. This solution is indicated in figure 1.



a)



b)

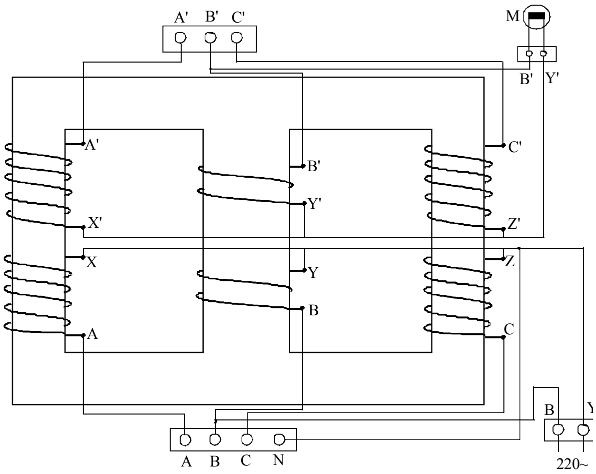
Fig.1 Separation transformer type TS- ~[4, 5]: a- above seen; b- lateral seen.

The transformer is made from a three-phases plane magnetic core in out-of-balance variant. The middle column is dimensioned for S power and the extreme column are dimensioned for S/3 power. On magnetic system described are placed the primary and secondary windings like in figure 2.
The spire number of those windings is calculating function of sectional area of the column where are assembled. Results that the spire number of extreme column is bigger and it is made with a conductor with the section lower than the central column. If we note with A, B, C the beginning and with X, Y, z the ends of primary phases winding and with a, b, c the beginnings respective x, y, z the ends secondary phases winding it arrives to the situation presented in table 1 the presents the primary and secondary spire number for a transformer with the power S_n=630 VA.
Like results from figure 1 the primary and secondary winding are assembled for electro security in end to end variant. For the function in three-phases the primary and the secondary windings are connected after the star winding.

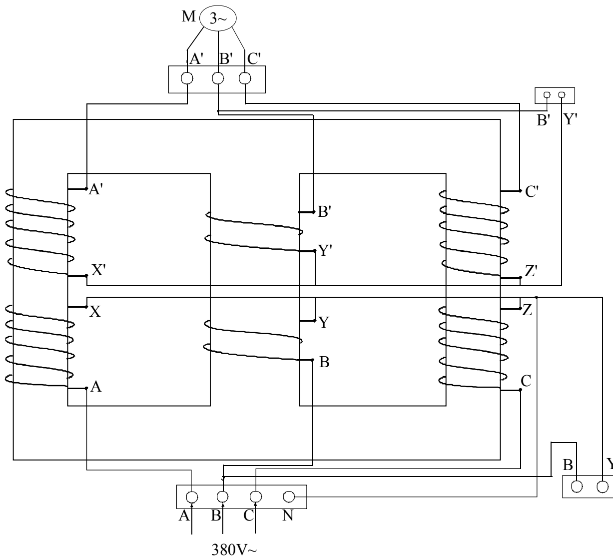
Tabel 1

Primary winding			Secondary winding		
w_{AX} [sp]	w_{BY} [sp]	w_{CZ} [sp]	w_{ax} [sp]	w_{by} [sp]	w_{cz} [sp]
500	284	500	520	298	520

The operated transformer winding electric diagram from a network without neutral is presented in figure 2



a)



b)

Fig. 2 Transformer circuit diagram

In mono-phases portable electric tools are enabled only winding (primary and secondary) placed on central column (figure 2a). The windings nest set are placed on extreme column doesn't play an active role in electric energy transfer from primary to secondary. In this case the extreme column play the lateral framework role meet in a mono-phases magnetic system in shroud. In three-phases portable diagram for figure 2b like it observe the energy transfer from primary to secondary it is made through all the primary and secondary phases windings placed on the transformer three columns.
The magnetic system unbalanced reflects over the fazorial diagram an voltage and current from primary transformer.

In figure 3 in presented the fazorial diagram of linear and phases primary voltage. It is ascertained that in deficiency of neutral from feeding network it is registered a displacement of neutral point from O to O'. the displacement is due because of electromotive homopolar voltage E_h produced from unrequited homopolar currents system.

Of course this fact doesn't have no importance in three-phases portable tools case that are feed with a three-phases symmetrical system of linear voltage and that doesn't depend of neutral point displacement.

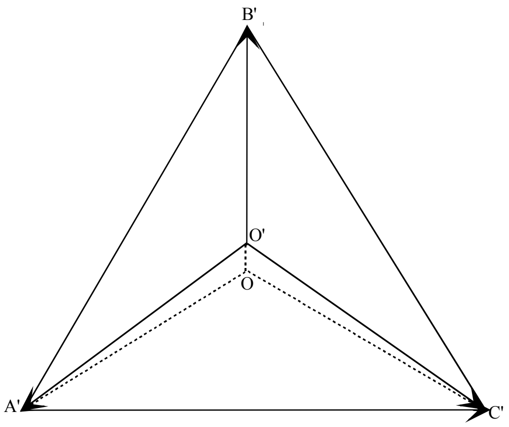


Fig. 3 Fazorial diagram of linear and phase voltage for the case presented in figure 2

In case the transformer primary is feed from a three-phases source stipulate with neutral (figure 4) the black point displacement in fazorial diagram cache of linear voltage is drop out like present figure 5.

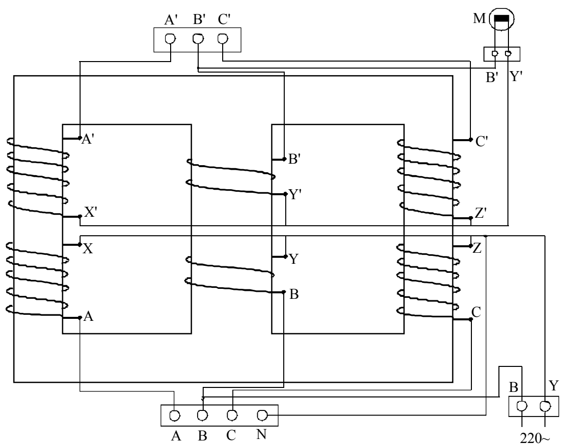


Fig. 4 Transformer circuit diagram

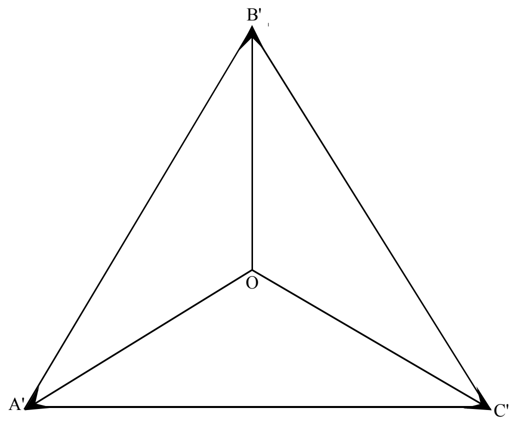


Fig. 5 Fazorial diagram

In continuation are presented the transformer principle diagram circuit analyzed when the feeding network is stipulated or not with neutral.

It is proposed that the Y-connection utilized in primary and secondary case to wear the denomination Y-connection with unequal bracket.

It is propos that the symbolization of that connection to be done with Ψ character for the windings high potential and ψ for three-phases windings with lower voltage.

In the case when the connection black point is accessible the literary symbol of connection will be note with N character in winding case with high voltage and with n character in winding case with lower voltage.

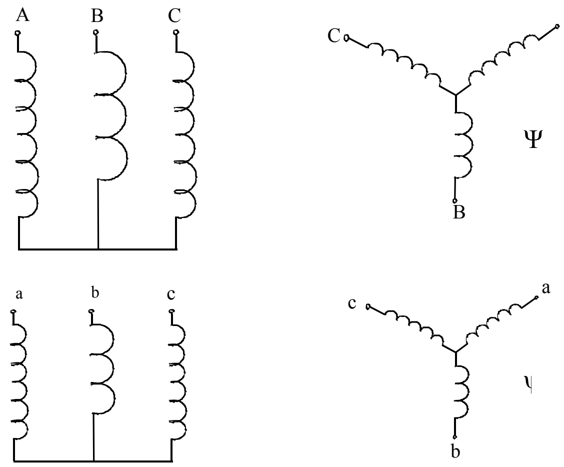


Fig. 6 The transformer principle circuit diagram for the case when feeding network it isn't stipulate with neutral.

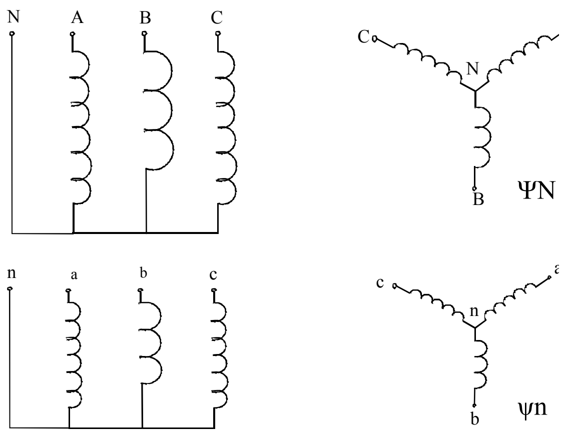


Fig. 7 The transformer principle circuit diagram for the case when the feeding network in stipulate with neutral.

3. CONCLUSIONS

The Y-connection with unequal vane diagram or Ψ diagram has the application in the electric transformer fated for individual feeding of mono-phases or three-phases user.

The function of some assignation is associated with some particular phenomenon through them the most representative are bounded homopolar electromotive force and the black point displacement in fazorial diagram of phases voltage case.

The researcher future directions are bounded of the three-phases load capacity and character influence over the black point displacement, establishment. The establishment of running peculiarity in unbalanced load case.

The elaboration and testing of some new methods of proofing and marking of no load running and voltage running character.

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