

# A Noval Method of Single Phase to Three Phase Cyclo Converter for Three Phase Induction Motor Drive

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**Abstract:** This paper present the study on analysis of speed of induction motor when the motor is made to run on different loads torque. fed by single phase to three phase cyclo converter.. Normally, constant voltage constant frequency single phase AC or three phase AC is used. However in some rural areas, only a single phase utility is available, so it became necessary to convert single phase supply to three phase supply to run three phase induction motors. For this purpose, cyclo converter model is patterned by MATLAB/SIMULINK SOFTWARE to convert single phase supply to three phase supply. Converter model employs only six IGBT so the resulting Cyclo converter-motor drive system is cheap and compact, As we know that the rating of the machine increases with the increase in number of phase .eg. output of three phase motor is 1.5 times the output of a single phase motor of same size. therefore it is beneficial to use three phase induction motor instead of single phase induction motor for low industrial applications.

**Keywords:** Cycloconverter, Single-Phase to Three-Phase conversion, Induction motor, IGBT.

## REFERENCES

- [1]. H. N. Hickok, "Adjustable speed - a tool for saving energy losses in pumps, fan, blowers and compressors," IEEE Trans. Ind. Appl, vol. IA-21, no. 1, pp. 124–136, January 1985.
- [2]. S. B. Dewan, M. Shohleh, "A novel static single-to three-phase converter", IEEE Trans. Magn., vol. 17, pp. 3287–3289, November 1981.
- [3]. H. Nishiyama, "a graphical solution for balanced operation of three phase induction motor driven by a single phase source", Electrical Engineering in Japan, vol. 90, no. 5, pp. 101–105, 1970.
- [4]. Claude M.Mertz, "Current techniques in phase conversion systems", IEEE Rural Electric Power Conference, May 1978.
- [5]. Singh, B., Singh, B.N., and Chandra, A, "A review of single-phase improved power quality AC-DC converters", IEEE Trans. Ind. Electron., vol. 50, pp. 962–981, October 2003.
- [6]. O. Ojo, S. Asuri, G. Dong, Z. Wu, "Control of an induction motor drive fed with a single-phase fed sparse PWM rectifier/inverter", IEE Proc. Electr. Power Appl., vol.152, pp. 526–534, May 2005.
- [7]. Bose. B.K.: 'Recent advances in power electronics', IEEE Trans, vol.7, pp. 2–16, January 1992.
- [8]. J.Zhang, G.P. Hunter and V.S. Ramsden, "A single phase input cycloconverter driving a three phase motor", Proceedings of Fifth European Conference, vol. 5, pp. 128–132, September 1993.
- [9]. J.Zhang, G.P. Hunter and V.S. Ramsden, "Performance of a single-phase to three-phase cycloconverterdrive", IEE Proc.-Electr. Power Appl., vol. 142, pp. 169–175, May 1995.
- [10]. Burakozpineci "Cycloconverters" www.uv.es/emaset/iep00/cycloconvertertutorial.pdf.
- [11]. B. R. Pelly, Thyristor Phase-Controlled Converters and Cycloconverters, Wiley, New York, 1971
- [12]. C. Lander, Power Electronics, Second Edition, McGraw Hill, England, 1987
- [13]. B. K. Bose, Power Electronics and Ac Drives, Prentice-Hall, New Jersey, 1986

- [14]. H. Li, B.Ozpineci and B.K.Bose, “A Soft-Switched High Frequency Non-Resonant Link Integral Pulse Modulated DC-DC Converter for AC Motor Drive”, Conference Proceedings of IEEE-IECON, Aachen/Germany, 1998, vol. 2, pp 726-732
- [15]. B. Ozpineci, B.K. Bose, “A Soft-Switched Performance Enhanced High Frequency NonResonant Link Phase-Controlled Converter for AC Motor Drive”, Conference Proceedings of IEEE-IECON, Aachen/Germany, 1998, vol. 2, pp 733-739
- [16]. Ali Azam, 'three to 1 $\phi$  high-power quality switch-mode cycloconverter', IET Power Electron., 2014, Vol. 7, Iss. 6, pp. 1603–1617 doi: 10.1049/iet-pel.2013.0333, IEEE
- [17]. S. Sasirekha, S. Sasirekha, K.Sakthidhasan, K.ImmanuvelArokia James, “A Novel Variant of Cyclo – Converter Designed for High Frequency Applications”, 2013 International Conference on Green Computing, Communication and Conservation of Energy (ICGCE), IEEE.
- [18]. Xiaofeng Yang, RuixiangHao, Xiaojie You, Trillion Q. Zheng, “A New Single-Phase to Three-Phase Cycloconverter for Low Cost AC Motor Drives”, 978-1-4244-1718-6/08/\$25.00 ©2008 IEEE
- [19]. SohrabSahraneshin , Mohammad HasanAmeri , Ali YazdianVarjani,” A (SPTTP)AC/ AC cycloconverter for Inductive Power Transfer”, 4th Power Electronics, Drive Systems & Technologies Conference (PEDSTC2013), Feb 13-14, 2013, Tehran, Iran, IEEE
- [20]. M.V. Palandurkar, M. A. Chaudhari, J. P. Modak, S. G. Tarnekar” Cycloconverter Based Three Phase Induction Motor to Replace Flywheel of the Process Machine”, 1-4244-0645-5/07/\$20.00©2007 IEEE.