iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** IV **Month of publication:** April 2023

DOI: https://doi.org/10.22214/ijraset.2023.51194

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue IV Apr 2023- Available at www.ijraset.com

Motor Protection Scheme

Anusuya Patil[1], Adarsha J[2], Pradeep Kumar[3], Praveen Kumar B Ronada[4], Mahabasha P[5]
Department of Electrical Engineering, R.Y.M Engineering college Ballari, Karnataka, India

Abstract: ***Motor is a device which converts electrical energy into mechanical energy. Motor protection is also essential. To protect the motor we are using the microprocessor based motor protection relay against various faults. Induction motors are widely used in industry because of their rigidity and speed-control flexibility. Therefore, the problem of induction motor protection attracted many researchers. The digital protection techniques that are used in digital relays provide better performance and higher accuracy than the conventional electromagnetic and solid-state relays.***

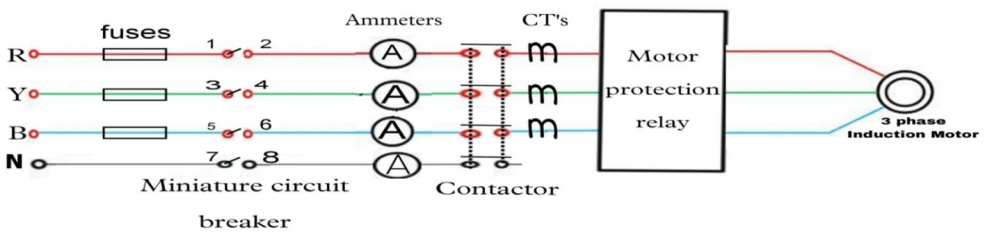
I. INTRODUCTION

The purpose of all protective relay designs is to protect the system or certain components against a variety of hazards and abnormal operating conditions and to limit the financial and operational liabilities incase of motor or system failure. Electromechanical or electronic elements ,this depends largely on the quality and reliability of the digital components utilized in the relay circuits. It is well recognized that the quality and reliability of these components are far superior to other comparative system components such as mechanical devices. Another very important consideration is the economics of the digital relay compared to the other types .Digital relays cost less then or at least equal to the cost of their electromechanical or electronic counter parts. Taking into consideration that the costs of electromechanical and electronics relays have been increasing, while at the same time and the cost of digital devices have been rapidly decreasing in the last decade. In the case of a large induction motor digital protection is far superior compared to other electromagnetic or electronic systems currently used. Since the digital relay is much more flexible than the other types the only limitation being the availability of the hardware and software specifically designed for this applications, expandable to take advantage of any future developments in the system integration and speed. The protection of motor(5HP) under all operating conditions that the conventional relay can protect it from. The relay will use the same input signals used to drive an electromechanical or electronic relay. The algorithm will calculate the operating conditions of the motor and will trip it only if it detects an abnormally that could cause damage to the motor or its drive.

II. APPARATUS REQUIRED

SL.NO	APPARATUS	QUANTITY	TYPE	RATING
01	Microprocessor based relay for motor protection	01	Static Relay MM30	1A
02	Induction Motor	01	3 Phase AC	0.5HP
03	Current Transformer	03	AC	5A/1A
04	Contactor	01	3 Phase AC	10A

III. CONNECTION DIAGRAM



ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue IV Apr 2023- Available at www.ijraset.com

IV. RELATED WORK

The following functions are recommended for induction motor protection and the actual functions used depend on the size ofthe motor, type of drive, and the economics of the plant or process this particular motor is a part of:

Protection	Functions
Over load	Time overcurrent
Short circuit	Instantaneous
Ground Fault	Ground sensor
	Residual overcurrent
	Zero sequence
Stator temperature	Temperature
Unbalanced currents	Negative sequence
Abnormal voltage	Under voltage
	Over voltage
	Phase sequence

V. ADVANTAGES

1) Can generate any protective function that a conventional relay can generate.
2) Can generate multiple protective functions simultaneously.
3) Improved dynamic characteristics of the relay.
4) Increased sensitivity.
5) Fits any load and motor characteristics.

VI. APPLICATIONS

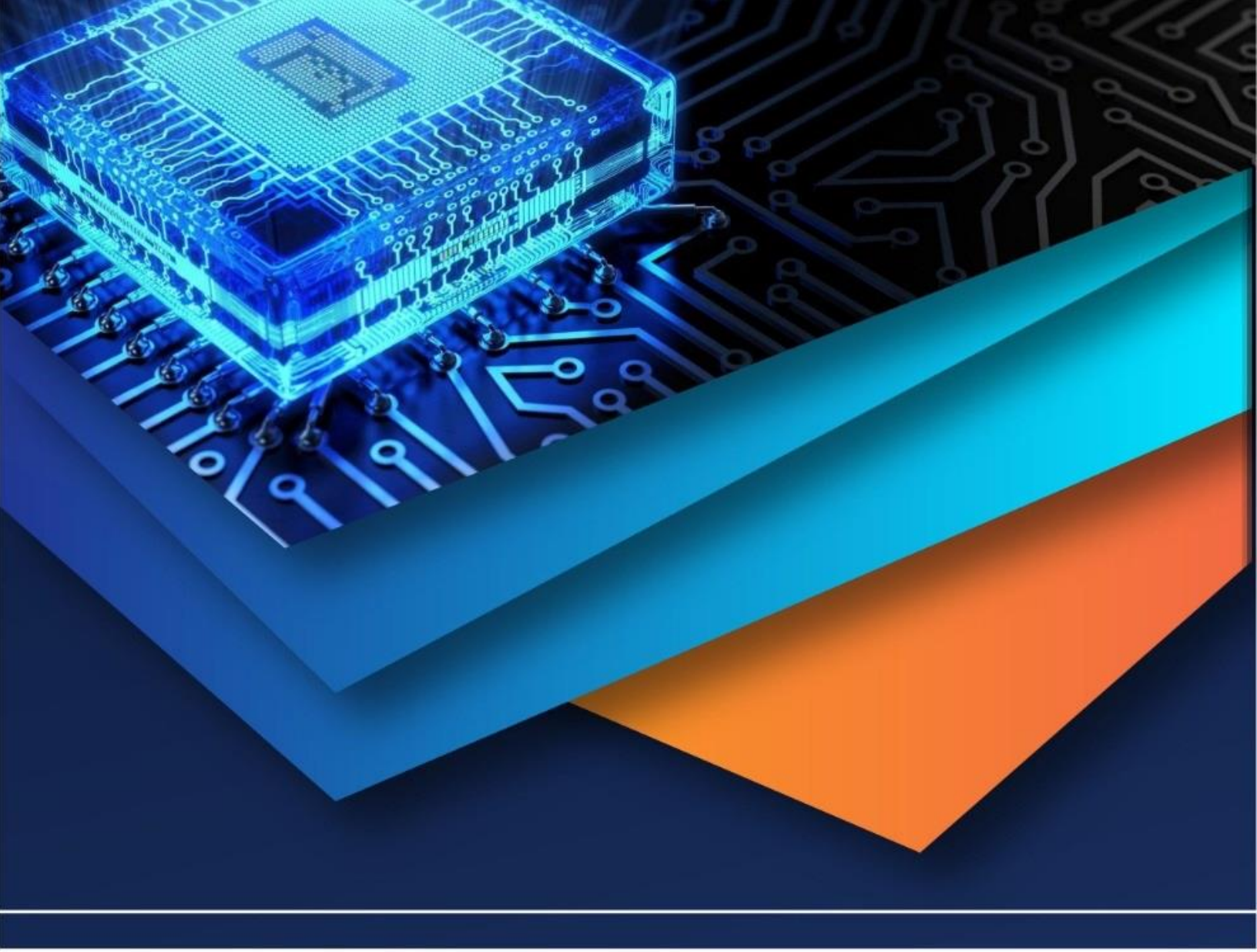
1) Used for over voltage protection.
2) Used for under voltage protection.
3) Used for over load protection.
4) Used for over current protection.
5) Used for earth fault protection.

VII. CONCLUSION

Microprocessor-based digital protection relay for induction motor protection represents a major improvement over conventional electromechanical and electronic schemes. However, at the present time, it can be justified only for large motors (> 1500 HP) and for motors in critical installations.

REFERENCES

[1] G. D. Rockefeller, "Fault Protection with Digital Computers", IEEE Transactions on Power .Apparatus··and Systems, Vol..PAS-88, No. 4, April 1969, pp. 438-46L.
[2] "Type MCGG, Overcurrent Relay for Phase and Earth Faults", GEC Pyb. R-6002A, GEC Measurements, Stafford, England.
[3] DASH-8, Data Acquisition and Control.Interface Board, Metra-Byte, 440 Myles.Stand.ieh Blvd., Taunton, HA 02780, 1987. 55
[4] M. S. Sachdev, H. C. Wood and N. G. Johnson, "Kalman Filtering applied to Power System Measurements for Relaying", IEEE Transactions on Power Apparatus and System, Vol. PAS 104, No. 12, Dec. 1985.
[5] Martiny, W. J., McCoy, R. M., Margolie, H.B. "Thermal Relationships in an Induction Motor Under Normal and Ubnormal Operation.", AIEE Transactions. EAS, Presented at AIEE Winter General Meeting, New York, NY, Jan. 31- Feb. 5, 1960. ·
[6] Y. V. V. S. Murty and W. J. Smolinski, "Design and Implementation of a Digital Differential Relay for a 3-Phase Power Transformer Baaed on Kalman Filtering Theory", IEEE Transactions on Power Deliyerv, pp. 525-533, April 1988.
[7] D. J. Fink, H. W. Beaty, Standard Handbook for Electrical Engineers~ Eleventh Edition, McGraw-Hill, New York,·NY, 1978.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY