



A review on the applications of programmable logic controllers (PLCs)

Ephrem Ryan Alphonsus^a, Mohammad Omar Abdullah^{b,*}^a International College of Advanced Technology Sarawak (iCATs), Jalan Canna, Off Jalan Wan Alwi, Tabuan Jaya, 93350 Kuching, Sarawak, Malaysia^b Department of Chemical Engineering and Energy Sustainability, Faculty of Engineering, University Malaysia Sarawak (UNIMAS), 93350 Kuching, Sarawak, Malaysia

ARTICLE INFO

Article history:

Received 18 May 2014

Received in revised form

6 January 2016

Accepted 7 January 2016

Available online 27 February 2016

Keywords:

PLC

Energy systems

Industrial control

Monitoring

ABSTRACT

As the need of automation increases significantly, a control system needs to be easily programmable, flexible, reliable, robust and cost effective. In this paper a review on the application of programmable logic controller (PLC) in our current market is discussed. Investigations on the applications of PLCs in energy research, engineering studies, industrial control applications and monitoring of plants are reviewed in this paper. PLCs do have its own limitations, but findings indicate that PLCs have more advantages than limitations. This paper concludes that PLCs can be used for any applications whether it is of simple or complicated control system.

© 2016 Elsevier Ltd. All rights reserved.

Contents

1. Introduction	1186
2. Personal Computer (PC) versus PLC	1187
3. PLC Hardware	1189
3.1. Rack Assembly	1189
3.2. Power supply	1189
3.3. Programming Unit/Device/Terminal	1189
3.4. Input/Output section	1189
3.4.1. Input module	1190
3.4.2. Output module	1190
3.4.3. Discrete I/O modules	1190
3.4.4. Analog I/O modules	1190
3.4.5. Special I/O modules	1191
3.5. Central processing unit (CPU)	1191
4. PLC programming	1192
5. Other Programmable Devices	1192
5.1. Control modes	1193
5.2. Programmable Devices	1193
6. PLC applications	1194
6.1. Water and wastewater management control	1194
6.2. Energy research	1195
6.2.1. Sun-tracking system	1195
6.2.2. Wind energy	1195
6.2.3. Photovoltaic applications	1195
6.2.4. Heating, ventilating and air-conditioning (HVAC) control	1195
6.3. Research, training and education	1195
6.4. Manufacturing	1196
6.5. Control and monitoring of plants and other applications	1199

* Corresponding author. Tel.: +60 82 583280; fax: +082 583409.