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PROGRAMMABLE LOGIC CONTROLLER BASED IMPLEMENTATION OF SUPERVISORY CONTROL FOR SUGAR REFINERY

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Abstract

Supervisory Control is widely used in industrial control processes and implemented by Supervisory Control & Data Acquisition (SCADA) system. SCADA system is developed for this process with three layers - supervision layer, process control layer and field instrument layer. Vijeo Citect SCADA software package (Schneider Electric) is used in supervisory layer, Programmable logic controller (PLC) from Schneider Electric (BMX P34 2020) and Unity Pro XL (PLC programming software) are used to build up process control layer, and field instruments (Solenoid valves, pumps etc.) are used to build up field instrument layer. The aim of this paper is to implement the hardware components for controlling the sugar refinery and to interface between master station and control unit for controlling the data. PLC is the main hardware component of this system and it is the programmable controller used to control the sugar refinery according to the downloaded program in it.

Author Keywords

SCADA, PLC, MCS, MBF, VFD

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Supervisory Control, Solenoid valves, Sugar refinery, Sulphitation process

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Reference

References (16)

1. Phani Chavali, Peng Yang, Student Member, IEEE, and Arye Nehorai, Fellow, IEEE

A Distributed Algorithm of Appliance Scheduling for Home Energy Management System

(2014) IEEE Transactions on Smart Grid, Volume 5, Issue 1, Page No 282 - 290,
DOI: IEEE Transactions on Smart Grid
Article Link: https://ieeexplore.ieee.org/document/6693797

2. Valeriy Vyatkin
   Editorial on Software Engineering in Industrial Automation

   (2013) IEEE Transactions on Industrial Informatics, Volume 9, Issue 4, Page No 2337– 2339,

3. Jingshan Li
   Editorial Automation in Green Manufacturing

   (2013) IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING, Volume 10, Issue 1, Page No 1-4,
   Article Link: https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=6363490

4. Saurabh Amin, Xavier Litrico, Member, IEEE and Alexandre M. Bayen Member, IEEE and S. Shankar Sastry, Fellow, IEEE
   Cyber Security of Water SCADA Systems-Part I: Analysis and Experimentation of Stealthy Deception Attacks

   (2013) IEEE Transactions on Control Systems Technology, Volume 21, Issue 5, Page No 1963 - 1970,
   DOI: https://doi.org/10.1109/TCST.2012.2211873
   Article Link: https://ieeexplore.ieee.org/document/6303885

5. Anthony R. Metke, Randy L. Ekl
   Security Technology for Smart Grid Networks

   (2010) IEEE Transactions on Smart Grid, Volume 1, Issue 1, Page No 99 - 107,
   DOI: https://doi.org/10.1109/TSG.2010.2046347
   Article Link: https://ieeexplore.ieee.org/document/5460903

6. J. Zhang, Q. Zhou, and J. Zhuo
   Local Control System of the Elliptically Polarized Undulator at SSRF

   (2010) IEEE Transactions on Applied Superconductivity, Volume 20, Issue 3, Page No 332 - 335,
   DOI: https://doi.org/10.1109/TASC.2010.2040952
   Article Link: https://ieeexplore.ieee.org/document/5422919

7. Andrew Kusiak and Wenyan Li, Member, IEEE
   Virtual Models for Prediction of Wind Turbine Parameters

   (2010) IEEE Transactions on Energy Conversion, Volume 25, Issue 1, Page No 245 - 252,
   DOI: https://doi.org/10.1109/TEC.2009.2033042
   Article Link: https://ieeexplore.ieee.org/document/5340659

8. Y. Z. Elhalwagy
   Three-layer PLC/SCADA system Architecture in process automation and data monitoring

   (2010) 2nd International Conference on Computer and Automation Engineering, Volume 2, Page No 774–779,
   DOI: https://doi.org/10.1109/ICCAE.2010.5451799
   Article Link: https://ieeexplore.ieee.org/document/5451799

9. Juan Garcia, Carmen Aracil, Daniel Carrion, Francisco Gamiz, Member, IEEE, Manuel Moreno, Pedro Robles, and Leopoldo G. Franquelo, Senior Member, IEEE
   Reconfigurable distributed network control system for industrial plant automation

   (2004) IEEE Transactions on Industrial Electronics, Volume 51, Issue 6, Page No 1168 - 1180,
   DOI: https://doi.org/10.1109/TIE.2004.837871

Article Link: https://ieeexplore.ieee.org/document/1360057

10. Heung-Jae Lee, Member, IEEE, Bok-Shin Ahn, Member, IEEE, and Young-Moon Park, Fellow, IEEE
A fault diagnosis expert system for distribution substations

(2000) IEEE Transactions on Power Delivery, Volume 15, Issue 1, Page No 92 – 97,
DOI: https://doi.org/10.1109/61.847234
Article Link: https://ieeexplore.ieee.org/document/847234

11. William C. Rossmann and Robert G. Ellis, Member, IEEE
Retrofit of 22 pipeline pumping stations with 3000-hp motors and variable-frequency drives

(1998) IEEE Transactions on Industry Applications, Volume 34, Issue 1, Page No 178 - 186,
DOI: https://doi.org/10.1109/28.658744
Article Link: https://ieeexplore.ieee.org/document/658744/authors#authors

12. Andrew Davis P
Diesel generation control system modernization

(1998) Conference Proceedings. IEEE Canadian Conference on Electrical and Computer Engineering, Page No 125-128,
DOI: https://doi.org/10.1109/CCECE.1998.682567
Article Link: https://ieeexplore.ieee.org/abstract/document/682567

13. Hubert Zimmermann
OSI Reference Model - The ISO Model of Architecture for Open Systems Interconnection

(1980) IEEE Transactions on Communications, Volume 28, Issue 4, Page No 425 - 432,
DOI: https://doi.org/10.1109/TCOM.1980.1094702
Article Link: https://ieeexplore.ieee.org/document/1094702

14. E.Vinothini, N. Suganya
Automated Water Distribution and Performance Monitoring System

(2014) International Journal of Engineering and Innovative Technology, Volume 3, Issue 8, Page No 30–32,
Article Link: https://www.ijeit.com/Vol 3/Issue 8/IJEIT1412201402_06.pdf

15. Baoping Cai, Yonghong Liu, Zengkai Liu, Fei Wang, Xiaojie Tian, Yanzhen Zhang
Development of an automatic subsea blowout preventer stack control system using PLC based SCADA

(2012) ISA Transactions, Volume 15, Issue 1, Page No 198-207,
DOI: https://doi.org/10.1016/j.isatra.2011.08.003
Article Link: https://www.sciencedirect.com/science/article/abs/pii/S0019057811000863

16. Sharwan Kumar Jhajharia
IMPLEMENTATION OF INTEGRATED LOAD MANAGEMENTSYSTEM WITH SCADA AT HINDALCO, RENUKOOT

(2013) International Journal of Electrical Engineering and Technology, Volume 4, Issue 2, Page No 187 - 201,
Article Link: http://iaeme.com/MasterAdmin/Journal_uploads/IJEET/VOLUME_4_ISSUE_2/40220130402018.pdf