

ELECTRICAL AUTOMATION SYSTEMS TOWARDS INTELLIGENT AND ENERGY EFFICIENCY APPLICATIONS

Musse Mohamud Ahmed



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APPLICATIONS

Musse Mohamud Ahmed

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CHAPTER 13

POWER LINE CARRIER COMMUNICATION SYSTEM

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This chapter presents on communications systems used for distribution automation systems. It consists of communication system, serial communication system, standard serial communication system, mod-bus communication and wiring diagrams for the communication.

13.1 Communication System

The communication systems provide a pathway for communications between the master station and the remote sites, master station and RTU for feeder automation or consumer automation. The three types of communication systems are telecommunication, radio communication and fiber optic communication [1, 2, and 3].

Power line carrier (PLC) communication is one of telecommunication services. It refers to provisioning of communications services such as internet access and telephony over the electricity grid. It uses existing power cables and extensions to enable two-way broadband and phone connectivity between the user and a service provider [1, 2, and 3]. Current power line communication systems use the LV and MV power lines like the ones installed along the roads to distribute broadband services on the frequency range of 1MHz to 30MHz. However the ripple control is very slow and suitable only for one-way load control. PLC was determined to be inappropriate for use at APSEB.

Radio communications are operated on privately licensed frequencies and usually owned by a utility. The radio channels available from licensing authorities are very limited especially in congested areas. In VHF, two frequency slots for use in the power sector in association with other users are 66-68 MHz and 136-174MHz and in UHF are 314-367MHz, 585 – 622MHz and 915-935 MHz. The radio technologies generally used are UHF point-to-point radio, UHF MARS, VHF radio, PSN and cellular radio [4].

UHF point-to-point radio available in the ranges between 915-935MHz, 314-367MHz and 585-622MHz. Antennas are mounted at reasonable height with flat terrain and reliable operation over a range of 30 to 40km in practical applications. Dish antennas are used for point-to-point radios.

MAS consist of master radio station which communicates with several remote radios with IRTU - RTU interfaced with distribution equipment. Each system uses a pair of frequencies (314MHz – 925MHz) where one for master-to-remote communications and the other for remote to master, so that duplex communication is possible. An omnidirectional rod