Variable Frequency Drive Wireless User Interface Prototype

Project Statement

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Statement of Need

A variable frequency drive (VFD) is a device used to take an AC signal at a given frequency as input and outputs an AC signal with a varying frequency. Lenze uses VFDs to adjust the rotational speed of electric motors. Some applications require VFDs mounted in remote locations or many VFDs in close proximity or even spread over an entire manufacturing plant. VFDs are usually configured with a user programming interface that is on the device itself or directly connected to each device and operated remotely. A wireless interfacing would be a useful implementation and selling point that would improve on the current model offerings.

VFDs need to be programmed with adjustments to parameters before they will operate in the desired way. VFD parameters are typically updated with an onboard keypad or a remote keypad attached directly to the VFD. This is useful for environments with few VFDs that may be in readily accessible locations. For applications requiring many VFDs, or VFDs in remote locations; programming may be far more complicated and time consuming. Implementing a wireless interface for VFDs would save time and money when programming them. The goal of this project is to research and create a prototype for a wireless interface for these VFDs. Different wireless hardware and software options will be explored to realize a working prototype which will make use of the point to point Zigbee communications standard that will integrate seamlessly with current versions of Techlink.

Preliminary Requirements

The wireless interface must be suitable for the industrial environment, including the heat and electromagnetic interference produced by the VFDs. The early prototypes may make use of modules other than Zigbee, but the final prototype must be using a Zigbee module. The interface must be able to communicate with at least one VFD. If time and resources permit, further design and implementation to allow it to communicate with multiple VFDs and to be integrated with or replace the current RS-485 module and communicate directly with the onboard microcontroller.

Basic Limitations

Maintain a reasonable cost for parts during design and testing phases as well as produce a finished product that will have a reasonable unit price. Also, depending on progress and time constraints, we might not be able to implement communication with multiple devices or complete a RS-485 module integration/replacement.

Other Data

Lenze may wish to keep information and designing confidential. If this is the case, we will need to discuss what information and data should be openly shared.
Questions
What electromagnetic standards must be met?
What operating temperatures are required?
What communication distances are required?
Will any shock vibration or temperature shock tests be required?
What interfacing software options are available and preferred?
Will the current interfacing software, Techlink, need to be modified?