

APPLICATION NOTE

YS170 RS485 Communications

OVERVIEW

YS100 series instruments are stand alone devices that control or indicate process variables throughout a manufacturing plant. RS485 communications cards can be optionally provided to transfer data from each instrument digitally to a PC-based operators station. Below is a typical system configuration to transfer data bi-directionally through this communications bus. Up to sixteen (16) instruments can be connected to a single PC serial communications port. Each YS100 is assigned an address on the communications link (1-16). More can be added by installing a second serial port to the PC hardware platform. Typically, an RS485/RS232C converter is required to convert the four-wire RS485 configuration to the RS232C computer serial input. RS485 allows the instruments to be located up to 4000 feet from the supervisory computer without specially constructed cable.

The RS485 digital connection to YS100 instruments can operate at a transmission speed of up to 9600 bps. The transmission control is strictly a command/response format. YS100 receives and transmits in a standard ASCII 8 bit code. This

format allows communication drivers to be developed without being restricted by a proprietary protocol.

COMPUTER INTERFACE

In a joint effort, Yokogawa has worked with companies that developed Windows-based Graphical User Interfaces (GUI) for supervisory control and data acquisition (SCADA). These software packages allow complete operator interaction between the controlled process and a supervisory PC. Using newly developed communications software drivers, the YS100 instrument acts as a node on the data bus in a master/slave relationship. In the event of PC failure, all process control is uninterrupted, since the control functions are resident in the YS100 instrument. The PC-based GUI software allows complete access to the data base of the YS100 devices. Process variables, set points, outputs, alarms and tuning parameters can be exhibited and changed from the PC. Dynamic process data received from YS100 instruments can be applied to graphical process representation displays, current and historical trending, SQC (Statistical Quality Control), sequence or recipe management, inventory management and other application-

specific software packages resident in the PC.

Running the YSS10-200 Programming Software applicable to the YS170 Programmable Loop Controller, programs can be written and modified on the PC and downloaded to the instrument via the RS485 bus.

SOFTWARE PACKAGES

Currently, YS100 communication drivers have been written by Iconics (GENESIS), Intellution (FIX-DMACS), TA Engineering (AIMAX) and Wonderware (IN-TOUCH). Additional drivers are available for PLC's (programmable logic controllers) and other devices typically used in a process control and manufacturing environment. GUI allows complete interaction among several different devices, regardless of the manufacturer and function. This open communications architecture allows users to select instruments and controls that best suit their specific needs.

Plant automation using distributed functionality is essential to minimize down-time and maximize production. YS100 instruments are designed to perform process control/ monitoring at the local unit level. Operating personnel have complete access to control the process from the front panel of the instrument. Additionally, trend displays are available locally to observe the measured variable over a specified time period. Set point and output changes can be entered locally and the revised values transferred to the supervisory PC via the RS485 communications link.



APPLICATION NOTE

The display below depicts a Windows-based graphical representation of a tank level and fluid flow control operation. Analog indicators are configured and linked to YS100 instruments to display dynamic level and flow data. This data is displayed directly on the graphic in numeric format with engineering units. A trend of both level and flow rate is shown over a selectable time base. Push buttons allow operator intervention to override normal automatic control by starting/stopping the pump and varying the level set point. Numerous graphics can be developed to allow operation of several process units from a single PC station.

GUI software packages allow expanded and more comprehensive access to operations. For example, two or more process units (locally controlled by several YS100 instruments) can be monitored and regulated from a single supervisory PC. Process information can be exchanged between different operational controllers using the PC database to maximize plant efficiency and anticipate any potential problem areas.

COMPUTER DIAGNOSTICS

YS100 instruments can be programmed to operate in an SPC (Set Point Control) or DDC (Direct Digital Control) mode. The YS100 controllers track set points and/or outputs sent from the supervisory PC on the communications bus. In both supervisory modes, the instrument is looking for a watchdog timer command from the PC at a preset interval. If this signal stops, the YS100 assumes PC or communications network failure and assumes control in MANUAL or local AUTO mode. This backup mode is assigned using the YSS10-210 Programming Software (YS170 Programmable Controller) or selecting an engineering menu at the front panel display of the YS100 instrument.

SUMMARY

Using YS100 series instruments is a cost effective means to provide process control and monitoring. The unique CRT-quality front panel display provides an excellent operator interface at the local unit level. Trending and alarm displays are available to provide all

necessary process information. The YS170 Dual Loop Programmable Controller incorporates unique PID functions to control the process units.

GUI software packages allow the versatility of a PC platform to be implemented in a process control environment. Data transfer from YS100 instruments provides process information in an *easy-to-read* format. Real time data acquisition allows operations to respond quickly to varying process conditions. Process data can be used in application-specific software packages to determine the effectiveness of process units. Overall production costs should be reduced and efficiency increased by implementing distributed process control/monitoring using YS100 Series instruments and a PC-based graphical user interface.

