Modbus/TCP Option

OVERVIEW

Modbus is one of the most popular Programmable Logic Controller (PLC) communication protocols used in the industrial world. Modbus/TCP is a popular variant of the Modbus communication protocol. The Modbus/TCP standard allows devices to communicate with PLCs and operator panels with PLC based software installed by embedding Modbus messages inside TCP/IP frames.

MODBUS/TCP BACKGROUND

Modbus/TCP combines Ethernet, TCP/IP and the Modbus protocol. A synergy is created by combining these standards, through leveraging the most common physical network with a universally common networking standard and a vendor neutral communication standard, resulting in a truly open, accessible network for exchange of process data.

The use of Modbus/TCP provides a totally scaleable solution from ten nodes to ten thousand nodes without the risk of compromise that other multicast techniques would give. Significant benefits of Modbus/TCP over Modbus include the ability to remote access devices over the internet, ease of implementation and taking advantage of existing networking hardware.

Modbus/TCP embeds a Modbus frame into a TCP frame in a simple manner. The basics of Modbus/TCP communication consists of a request message and a response message from the scale. Typically the request is for a weight value, sometimes combined with other necessary data like the current scale status.

APPLICATION DESCRIPTION

Data Collection and Remote Configuration

A manufacturing plant wants to station three 10 lb capacity Doran Model 4300 checkweighers on the production floor and transmit all weighments to a PC, which collect and store all the weighment data. Several different products will be weighed on this line for confirmation that all parts are present in the box before shipment to their customer. Each product will have different over, under and accept checkweigh tolerances. The checkweigh tolerances will be programmed by the PC.

Although RS-232 is available in each scale, only one serial port is available on the PC for communication. An RS485 to RS232 converter is used to connect the PC RS232 port to the RS485 bus. As the finished product is weighed, the weight data is stored in the scale's data buffer. The PC is programmed to poll each scale, one at a time, for the weighments stored in the data buffer.

When the product line is changed to manufacture a different product, the PC sends out a command to each scale to reprogram the under, over and accept checkweigh tolerances. Once programmed, each scale is polled for its current checkweigh settings to confirm the settings were received before the next product is checkweighed.

AVAILABILITY AND ORDERING INSTRUCTIONS

Doran is able to provide the following option for 4-20mA Analog Output, this option can be found in the Option Section of all Excel Series Scales:

EXOPT105: RS485 serial data output option. Includes: 10 ft long two conductor, shielded cable with pigtail ends.

MODBUS/TCP OPTION SPECIFICATION

Maximum Cable length	4,000 ft.
Maximum number of scales per bus	32 nodes
Maximum Number of Print commands that can be stored in Print Buffer	256 bytes or 15 data strings with Print Output format = "FO"
Bus common mode range	±7 volts
RS485 node load impedance	12K ohms
Termination resistors available on board	120 ohm line to line termination resistor 1K ohm pull up bias resistor 1K pull down bias resistor