

SECTION E

COMMUNICATION PORTS

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INTRODUCTION

RS232 Port COM1 uses the Modbus RTU protocol and is for connection to a SCADA system.

Ethernet Port ENET1 uses the Modbus TCP protocol and is for connection to a SCADA system.

The Controller's Communication Ports operate as Modbus Slaves, where all communication is initiated by the device connected to them, which must be a Modbus Master.

MODBUS FUNCTIONS SUPPORTED

Function Code	Function Description	Notes
01	Read Coil Status	
02	Read Input Status	
03	Read Holding Registers	
04	Read Input Registers	
05	Force Single Coil	
06	Preset Single Register	
08	Diagnostics - Sub-function 00 (Return Query Data)	
15	Force Multiple Coils	Limited to 104 Coils
16	Preset Multiple Registers	Limited to 1 Register

RX & TX LED Mode

User / Operator Info.			SCADA	Description of Parameter
Parameter	Default Value	Current Value	Register Address	
E.07	1		40187	RX & TX LED Mode 1 = Show COM1 & ENET1 2 = Show COM1 Only 3 = Show ENET1 Only Note: The RX and TX LEDs show the Receive and Transmit communication traffic.

PARAMETER SECURITY

The Controller has a Parameter Security feature that may be used to guard the Controller's Setup Parameters from unauthorized tampering. If the Parameter Security Feature is setup to operate and is locked, the entry of a 48 bit Security Code is required in order to gain Write Access to the Setup Parameters.

Security Code entry is never required to read and view the Parameters.

If the Parameters are locked, entry of the Security Code is required to change them.

Each of the two Communication Ports have their own Parameter Security that may be locked or unlocked individually to gain Write Access through the respective Communication Port.

While locked, Write Access protection covers all of the Setup Parameters (Modbus Registers), and all the Control Bits (Modbus Coils). However, there is an exception made to allow for the Fault Code to be reset remotely by setting Modbus Coil 719 (Register 40045 Bit 14), without the need to enter the Security Code.

Both Communication Ports also have a "Parameter Security Alert" feature that detects an Unusually High Number of Entries into the Security Code Entry Parameters (SCE1, SCE2 and SCE3) and locks out any further attempts to write to Parameters SCE1, SCE2 and SCE3.

For more about Parameter Security see Section S.

RS232 PORT - COM1

Description

The RS232 serial port COM1 allows a SCADA system to communicate with the Controller using the Modbus RTU protocol.

The serial port must be setup to communicate with the device it is connected to. The Baud Rate, Parity Mode and Stop Bits Parameter values of the two devices must be set to match.

User / Operator Info.			SCADA	Description of Parameters and SCADA Notes
Parameter	Default Value	Current Value	Register Address	
RS232 Port COM1 Setup				
E.11	1		40191	Slave Address Range: 1 - 247
E.12	3		40192	Baud Rate 1 = 2400 bps 2 = 4800 bps 3 = 9600 bps 4 = 19200 bps
E.13	0		40193	Parity Mode 0 = No Parity 1 = Odd Parity 2 = Even Parity
E.14	2		40194	Stop Bits 1 = 1 Stop Bit 2 = 2 Stop Bits Note: The 2 nd Stop Bit is available only when No Parity is selected.

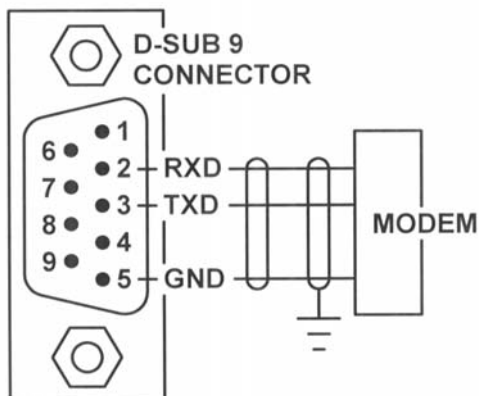
Note:

The Serial Port logic reads the setup values upon power up. Any changes to the above settings require that the power to be cycled before the new values are used.

The following settings are required for COM1 to communicate with the TSID:

Slave Address = 1 Baud Rate = 9600 bps Parity Mode = No Parity Stop Bits = 2

Connection Diagram



ETHERNET PORT - ENET1

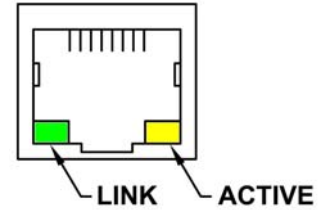
Description

The Ethernet Port has the following features:

- Protocol Supported: Modbus TCP
- IEEE 802.3 Compliant
- Auto-negotiation of Communication Speed: 10 or 100 Mbps
- Auto-negotiation of Duplex Mode: Half or Full Duplex
- Link, and Active status LED indicators

LED Indicator	OFF	ON
LINK (Green)	Not Linked	Linked
ACTIVE (Yellow)	Idle	Active Communication

RJ45 Connector



User / Operator Info.		Scada	Parameter Definitions
Parameter	Default Value	Register Address	
Ethernet Port ENET1 Setup			
E.101	2	40200	Protocol 2 = Modbus TCP
E.114 - E.111	192 . 168 . 80 . 12 (E.114 . E.113 . E.112 . E.111)	40204-40201	IP Address Range: 0 -255 Identifier for the device on an IP net- work.
E.144 - E.141	255 . 255 . 255 . 0 (E.144 . E.143 . E.142 . E.141)	40226-40223	Subnet Mask Range: 0 -255 Range of IP addresses that can be Directly connected in the network.
E.154 - E.151	192 . 168 . 80 . 1 (E.154 . E.153 . E.152 . E.151)	40230-40227	Default Gateway Range: 0 -255 A node on the network that serves as an entrance to another network when no direct connection exists.
E.161	502	40232	Port Number Range: 1 -65,535
Ethernet Port ENET1 MAC Address			
E.176 - E.171	0 : 80 : 194 : 219 : XXX : XXX (E.176 : E.175 : E.174 : E.173 : E.172 : E.171)	40222-40217	MAC Address Unique number that identifies each field device. It is set at the factory, and should not be changed.

Note:

The Ethernet Port logic reads the setup values upon power up. Any changes to the above settings require that the power to be cycled before the new values are used.

REMOTE CONTROL COMMAND CANCELING

Remote control commands should (in most applications) be automatically canceled upon a loss of communication with the SCADA system. This requires that there be a delay before canceling the remote control commands that is longer than the interval between polling events. Therefore, each of the Communication Ports has its own "Remote Control Command Canceling Delay" Parameter (E.01 & E.02) where an operator may set the delay.

The Following Occurs when one of the Communication Ports stops being poled by its Master and when the respective Remote Control Canceling Delay has expired:

Pump 1-4 Force On - All Remote Force Pump On Commands are Canceled.

Pump 1-4 Disable - All Remote Pump Disable Commands are Canceled.

VFD Speed - The VFD Speed Reference of all pumps that were forced on returns to normal speed.

Relays ROX1 - ROX6 Remote Control - All Remote Relay Control Commands are Canceled.

If the Controller is setup to follow the Remote Control Level Input (Parameter P.22 = 4), then the value entered as the Default Remote Level (Parameter E.03) is copied into the Remote Control Level Input (Parameter rCLn), the Numerical Display is made to flash, the Fault LED is turned on and Fault Code 1037 is generated.

User / Operator Info.			SCADA	Description of Parameters and SCADA Notes
Parameter	Default Value	Current Value	Register Address	
Remote Control Command Canceling Delays				
E.01	60 sec.		40181	Remote Control Command Canceling Delay - RS232 Port - COM1 Delay Range: 1 - 65535 seconds Set to "0" to disable the Remote Control Command Canceling feature. See Note 3.
E.02	60 sec.		40182	Remote Control Command Canceling Delay - Ethernet Port - ENET1 Delay Range: 1 - 65535 seconds Set to "0" to disable the Remote Control Command Canceling feature. See Note 3.
Default Remote Level				
E.03	0.0 feet		40183	Default Remote Level See Note 4. Range: 0.0 - 231.0 feet

Notes:

- Each Communication Port has its own separate Remote Control Command Canceling Delay. The delay for each port is reset and restarted each time a successful polling event occurs through that port.
- Each of the delays must be set long enough so that it will not time out between polling events of the port.
- It may be desirable to not cancel the remote control commands upon a loss of communication through one of the ports. In this case set the Remote Control Command Canceling Delay Parameter to "0" for that port, so that a loss of communication through that port will not initiate the canceling of the remote control commands.
- The Default Remote Level (Parameter E.03) is only used when the Level Input Select (Parameter P.22) is set for Remote Control Level Input (Parameter P.22 = 4).
- Upon loss of power, all remote control commands will be canceled. When power is restored the Default Remote Level (Parameter E.03) will be copied to the Remote Control Level Input (Parameter rCLn).