

AQ Wireless

PFCS

Addendum

9-10-08

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Quick Start Guide:

Step 1: Power up the PFCS equipped AQ Wireless.

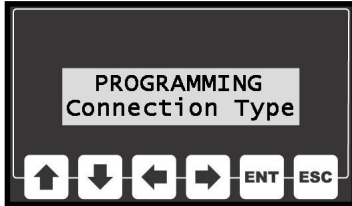
Step 2: Be sure that the unit is physically connected to the network through the preferred method (either RS-232 or RJ45 cable).

Step 3:



Use the network user interface and enter the program mode by pressing the ENT key. The unit will prompt the user for a password at this point, the default is "0 1 0 4". Using the keypad, enter the password

Step 4:



Using the up and down arrow keys, scroll through the menu until the unit displays "Connection Type". Press the ENT key. The current connection type will be displayed (either Ethernet or RS-232). Use the arrow keys to select the appropriate network type. When the proper connection type is displayed,

press the ENT key to save this value. Once the value is saved, pressing any key will return the unit to the program mode.

Step 5:



Use the arrow keys to scroll through the program menu until the unit reaches the Machine Name function. Press the ENT key to view the current settings. The machine name has to be defined manually. Each parameter set can have a unique machine name associated with it. Once the appropriate values are set, press the ENT key to save these settings. Pressing any key will return the unit to the program mode.

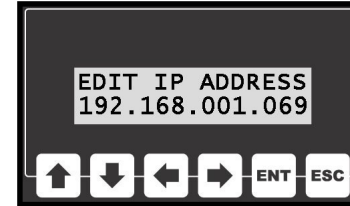
Step 6 (RS-232): Proceed to Step 9.

Step 6 (Ethernet): Continue on to Step 7.

Step 7 (IP Addresses):



Scroll through the program menu until the unit displays IP Address. Press the ENT key to view the unit's IP address. Using the arrow keys alter this address to the desired value (please consult your IT group for this address). Press the ENT key to store the value.



The Subnet Mask, Gateway and Server Address should be also programmed in a similar method (once again consult your IT group for these values).

Step 8 (Port Numbers):

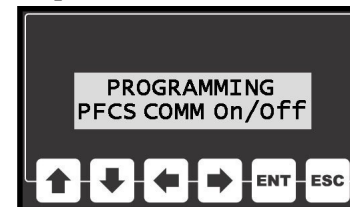


The Local and Remote ports are two more Ethernet related values that need to be programmed during initial set-up. Using the program menu select either Local Port or Remote Port and set the value to the desired number using the keypad (please consult your IT group for the appropriate values for your network).



Be sure to save the new values by pressing the ENT key once the new value is programmed.

Step 9:



Scroll through the program menu to the PFCS COMM On/Off setting. Press the ENT key and make sure that the PFCS communications are set to "On". If the unit is set to "Off" use the arrow keys to change the setting to on and then press the ENT key to store the value.

Step 10:



Press the ESC key to return to the main screen. The display will show the network connection status until it connect successfully. Once connected, the unit will display the machine id.

Overview:

The AQ wireless can be equipped with a network card that provides connectivity to Chrysler's Plant Floor Control System PFCS. This interface includes a network card, a human-machine interface (LCD display & keypad), an additional 25-pin serial connector, and an RJ45 network connector.

Human-Machine Interface:

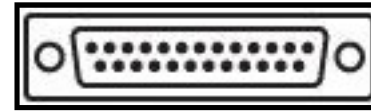


An additional human-machine interface (HMI) is added to AQ Wireless systems that are network enabled. The human-machine interface consists of an 2-line by 16 character backlit LCD display and a six-button keypad. During power-up, the display on the HMI will display the firmware version contained inside the microprocessor's memory.

During operation, the HMI will show the user connectivity status and the unit's machine name if the unit is successfully connected to the network.

The HMI is also used during the programming phase allowing the user to enter program menus. These program menus allow access to settings that govern how the PFCS interface functions.

RS-232 25 Pin DSUB Connector:

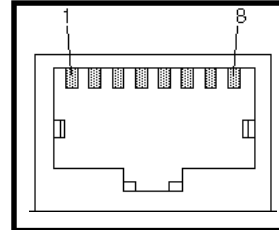


DSUB 25 Connector

Pin 2 - TX
 Pin 3 - RX
 Pin 4 - RTS
 Pin 5 - CTS
 Pin 6 - DSR
 Pin 7 - GND
 Pin 8 - DCD
 Pin 9 - DTR
 Pin 22 - RNG

A 25 pin DSUB connector is one of two ports that can connect this unit to the PFCS. This connector is used for communicating with PFCS if RS-232 communications are required. This port can be turned on and off through the user interface.

RJ45 Network Connector:



Ethernet Connector

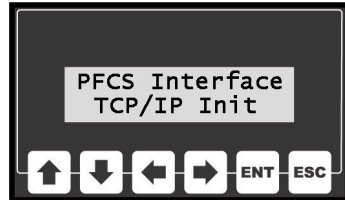
Pin 1 - TX+
 Pin 2 - TXPin
 3 - RX+
 Pin 6 - RXENTER

The Ethernet port is one of two ports that can connect this unit to PFCS. If this port is enabled through the user interface, this device will transmit TCP/IP messages directly to PFCS each time the AQ Wireless witnesses a completed cycle.

Operating Mode:



When the PFCS network interface powers up, the display briefly shows the firmware version information and then the unit enters its operating mode.



In the main operating mode, the top line of the display always reads PFCS Interface. The bottom line of the display gives information about the connection status.



If the unit is set up to communicate via RS-232 to PFCS, the bottom line of the display will read RS-232 Initialize, RS-232 Connecting, or ID = XXXX (where XXXX is the Machine Name).

If the unit is communicating with the network via Ethernet, the bottom line on the display will read TCP/IP Init, TCP/IP Open Port, TCP/IP Establish, or ID = XXXX (where XXXX is the Machine Name).

Once the Machine Name is displayed, the unit has successfully negotiated a connection with the network.

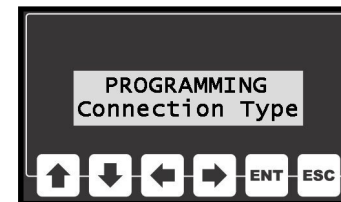
Program Mode:



There are several items that are user configurable through the programming menu. In order to reach this menu from the main display, press the enter (ENT) key.



The display will prompt the user to enter a password before reaching the programming menu. The default password is "0 1 0 4".

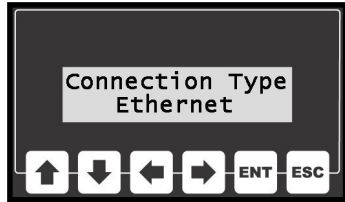
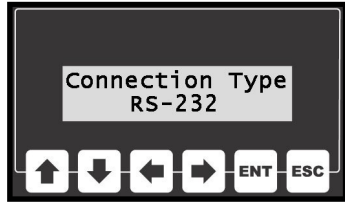
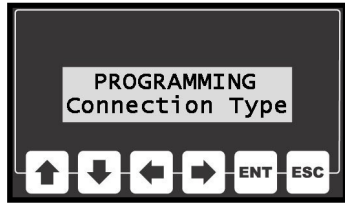


While entering the password, the left and right arrow keys will move the cursor back and forth.

The up and down arrows will raise and lower the value of the digit that the cursor is highlighting.

The escape key (ESC) will send the program back to the main screen without attempting to read the password. If the enter key (ENT) is pressed, the unit will compare the entered password to the password that is stored in the unit's non-volatile memory. If these values match, the unit will continue onto the programming menu.

Programming the Connection Type:



The PFCS Interface unit can connect with the Plant Floor Communication System (PFCS) in one of two different ways. It can either send messages over the RS-232 port or the Ethernet port. This option is programmable.

To edit this feature, the user needs to navigate to the PFCS Connection Type option on the programming menu by using the UP and DOWN arrow keys and then pressing the enter key. After

the enter key is pressed, the unit will display the current connection type (either RS-232 or Ethernet). If any of the arrow keys are pressed (UP, DOWN, LEFT or RIGHT) the display will toggle to show the other connection type.

Once the desired connection type is displayed, the enter key can be pressed to save that value. All programmable values are stored in non-volatile memory. This allows the unit to “remember” these values even when the unit is turned off and unplugged.

If the escape key is pressed during the edit process the unit will return to the program menu.

Programming the Unit's IP Address:



If the unit is using its Ethernet Connection to communicate with PFCS, an IP address will need to be programmed.

This value is unused if the unit is in RS-232 mode (terminal server).

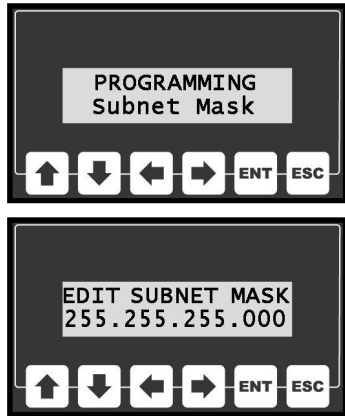
It's important that each device on the network has its own unique IP address. In order to edit this interface's IP address, select Programming IP Address from the main menu and press enter.

The current IP address will be displayed at this point. In order to change the address use the LEFT and RIGHT arrow keys to select any given digit in the address and then use the UP and DOWN keys to alter that digit's value.

Pressing the enter key will allow the user to save the IP address that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Programming the Subnet Mask:



The Subnet Mask is used to identify which part of the IP address is the network ID and which part is the host ID. This is accomplished by a logical bitwise ANDing of the IP address and the netmask.

This value is unused if the unit is in RS-232 mode (terminal server).

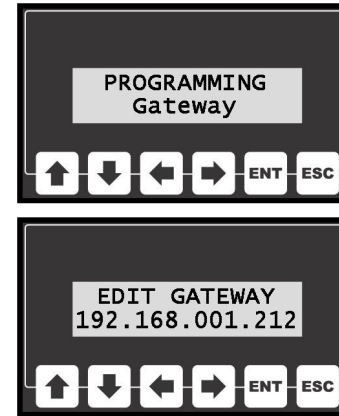
In order to edit the netmask, select Subnet Mask from the main menu and press enter.

The current mask value will be displayed at this point. In order to change the mask's value use the LEFT and RIGHT arrow keys to select any given digit in the address and then use the UP and DOWN keys to alter that digit's value.

Pressing the enter key will allow the user to save the new subnet mask that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Programming the Gateway:



Gateways perform routing functions. This gateway value identifies the router that connects a LAN to other networks. Some gateways also perform protocol conversions.

This value is unused if the unit is in RS-232 mode (terminal server).

In order to edit this gateway's IP address, select Gateway from the main menu and press enter.

The current gateway address will be displayed at this point. In order to change the address use the LEFT and RIGHT arrow keys to select any given digit in the address and then use the UP and DOWN keys to alter that digit's value.

Pressing the enter key will allow the user to save the gateway's IP address that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Programming the Local Port:



The Local Port sets the service port value that is used to connect to the PFCS system.



This value is programmable to any number between 0 and 32000.

This value is unused if the unit is in RS-232 mode (terminal server).

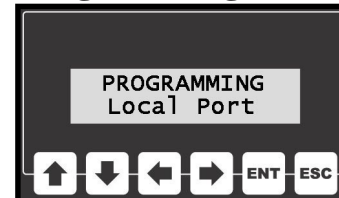
In order to edit the local port, select Edit Local Port from the main menu and press enter.

The current port number address will be displayed at this point. In order to change the address use the LEFT and RIGHT arrow keys to select any given digit in the address and then use the UP and DOWN keys to alter that digit's value.

Pressing the enter key will allow the user to save the port number that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Programming the Remote Port:



The Remote Port specifies the port value of the PFCS server.



This value is programmable to any number between 0 and 32000.

This value is unused if the unit is in RS-232 mode (terminal server).

In order to edit the remote port, select Edit Remote Port from the main menu and press enter.

The current port number will be displayed at this point. In order to change the address use the LEFT and RIGHT arrow keys to select any given digit in the address and then use the UP and DOWN keys to alter that digit's value.

Pressing the enter key will allow the user to save the port number that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Programming the Server Address:



The Server Address represents the IP address of the PFCS Server.

This value is unused if the unit is in RS-232 mode (terminal server).



In order to program the server's IP address, select Edit Server

Address from the main menu and press enter.

The current IP address will be displayed at this point. In order to change the address use the LEFT and RIGHT arrow keys to select any given digit in the address and then use the UP and DOWN keys to alter that digit's value.

Pressing the enter key will allow the user to save the IP address that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Programming the Machine Name:



Each message that is sent from this unit to the PFCS contains a machine name that identifies this unit to the PFCS system.



The AQ Wireless has the ability to manage eight different tools with its eight parameter sets. Therefore eight machine names can be defined so that results for

each tool will be unique to PFCS.

In order to set the Machine Name, select Edit Machine Name from the main menu and press enter. At this point either the display will read Edit Name A. Use the arrow keys to select the parameter set that needs edited. Once the desired selection is on the display, the enter key may be pressed.



The current machine name for the parameter being edited will appear on the display. Use the arrow keys to program a four character alpha-numeric name.

This is the name that will identify the messages that are sent from this unit in this parameter set.

Once the characters are programmed, the enter key may be pressed in order to save the new machine name.

Escape can be pressed at any time in order to exit without saving a new value.

Programming the ACK Timeout:



Every time this unit sends out a message to the PFCS system, it expects a response message in return. The amount of time that the unit will wait for this response before taking some action is programmable. This value is called the Acknowledge (ACK) Timeout. The ACK timeout can be set to a value between

5 and 30 seconds.

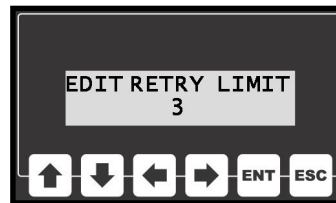
In order to program the acknowledge timeout, select Edit ACK Timeout from the main menu and press enter.

The current timeout value (in seconds) will be displayed at this point. In order to change the value the arrow keys may be pressed. The UP key will add one second, DOWN will subtract a second, RIGHT will add 10 seconds, and LEFT will subtract 10 seconds from the value.

Pressing the enter key will allow the user to save the value that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving.

Programming the Retry Limit:



When a message is sent to the PFCS system and an acknowledgment is not received, this unit will wait for an amount of time defined by the ACK Timeout setting before resending the message. The number of times the unit will attempt sending a message is defined by the Retry Limit.

The retry limit is programmable between 1 and 10 attempts.

In order to program the retry limit, select Edit Retry Limit from the main menu and press enter.

The current limit value (number of attempts) will be displayed at this point. In order to change the value the arrow keys may be pressed. The UP key will add one attempt, DOWN will subtract an one attempt, RIGHT will add 10 attempts, and LEFT will subtract 10 attempts from the value.

Pressing the enter key will allow the user to save the value that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving.

Programming the Keep Alive Timer:



The PFCS system expects to see messages from PFDs (Plant Floor Devices) on a regular interval. The Keep Alive value defines the amount of time that this unit will wait to send a “keep alive” message if there is no other information (like fastening results) to send.

The keep alive value can be programmed to a value between 30 and 240 seconds.

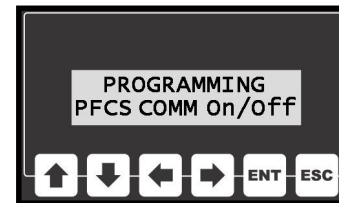
In order to program the keep alive timeout, select Keep Alive from the program menu and press enter.

The current timeout value (in seconds) will be displayed at this point. In order to change the value the arrow keys may be pressed. The UP key will add one second, DOWN will subtract a second, RIGHT will add 10 seconds, and LEFT will subtract 10 seconds from the value.

Pressing the enter key will allow the user to save the value that is displayed on the LCD.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving.

Turning the PFCS Communications On and Off:



While programming a unit, it may be advantageous for the unit not to be sending information to the PFCS system.

If the PFCS COMM value is off, no messages will be generated or sent to PFCS.

In order to set this communications value, select PFCS COMM On/Off from the main menu and press enter.

The display will read either “PFCS Comm On” or “PFCS Comm Off”. Pressing the LEFT, RIGHT, UP, or DOWN arrows will toggle the value between the two settings. Once the desired selection is on the display, the enter key may be pressed in order to save the selection.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving.

Changing the Password:



In order to gain access to the programming menu, the user must enter a password. The password is a four digit (numeric) code.



All units ship with a default code of “0 1 0 4”. This default code may be changed to a value that is more easily remembered by the user.

In order to edit the password, select Edit Password from the programming menu and press enter.

To change the password use the LEFT and RIGHT arrow keys to select any given digit in the address and then use the UP and DOWN keys to alter that digit's value.

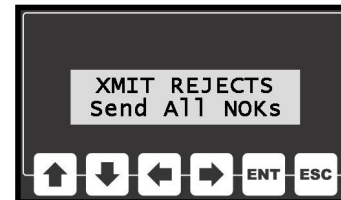
Pressing the enter key will allow the user to save the new password.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Transmitting Rejects:



In some situations where rejects are being logged it may be advantageous to not send torque results that are rejects. The XMIT Rejects setting allows the user to determine if rejects will be reported to PFCS or not.



In order to edit this setting, select XMIT Rejects from the program-

ming menu.

The display will show the current setting either “Send All NOKs” or “Send No NOKs”. Pressing any of the arrow keys will toggle this setting.

Once the appropriate setting is displayed, the enter key can be pressed to save the new value.

The escape key can be pressed any time during the editing process allowing the user to return to the main menu without saving a new value.

Supported Messages:

This particular PFD (plant floor device) is capable of sending out two different types of messages to the PFCS system. When the Qualifier this unit is attached to witnesses the completion of a fastening process, this unit will generate a Test Result Data message (type 0002).

If the keep alive timer times out, a Keep Alive message (type 9999) will be generated and sent to the PFCS system.

Test Result Data Message (type 0002):

Start	End	Length	Description
1	4	4	Machine ID
5	7	3	ACK/NAK area
8	13	6	Message Sequence Number
14	17	4	Message Type (0002)
18	21	4	Data Byte Count (position 22 to the end of message)
22	25	4	Number of Record in block: 0001
26	27	2	Filler Spaces
28	33	6	Last 6 digits of VIN (Set to all 0's)
34	39	6	Last 6 digits of Track Seq# (Set to all 0's)
40	51	12	Date and Time (YYMMDDHHMMSS)
52	52	1	Overall Pass or Fail Flag (P=Pass F=Fail)
53	53	1	Pass or Fail for fastening (P=Pass F=Fail)
54	55	2	Spindle Number (Always 01)
56	57	2	Bolt Count (Always 01)
58	58	1	Torque Status (P=Pass F=Fail)
59	63	5	Torque High Limit (Always set to 000.0)
64	68	5	Torque Low Limit (Always set to 000.0)
69	73	5	Torque Reading (Always set to 000.0)
74	74	1	Angle Status (P=Pass F=Fail)
75	79	5	Angle High Limit (Always 00000)
80	84	5	Angle Low Limit (Always 00000)
85	89	5	Angle Reading (Always 00000)
90	90	1	Message Terminator (0x0D <CR>)

Keep Alive Message (type 9999):

Start	End	Length	Description
1	4	4	Machine ID
5	7	3	ACK/NAK Area (Blanks)
8	13	6	Message Sequence Number (Last Sequence Number)
14	17	4	Message Type (9999)
18	21	4	Data Byte Count (position 22 to the end of message)
22	29	8	Vendor ID (CE ELTR.)
30	35	6	Hardware Model (Q2/PFD)
36	42	7	PFCS Protocol Changes Version Number
43	43	1	DLL Version Number (NA) “:”
44	47	4	Solicited or Unsolicited Port (Sol:)
48	50	3	Connection Number (01:)
51	64	14	Message (Firmware Version)
65	120	56	Tool ID and Tool Type
121	121	1	Message Terminator (0x0D <CR>)

The Keep Alive is sent out at regular intervals to let the system know that the unit is still connected and functioning properly but no new data has occurred. The Keep Alive message has several required fields (like Machine ID, vendor ID, etc.).

The Keep Alive message also has an area where the unit can add some additional information. In this region, bytes 65 through 120 contain the machine IDs for all 8 parameters and the tool type they are representing. The tool types are as follows:

- A = Air Tool**
- C = Click Wrench**
- D = Digital Torque Wrench**
- U = Undefined**