AcraDyne®
A Division of AIMCO

Gen IV iBC Controller Operation Manual

AIMCO

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www.aimco-global.com

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1. Safety Information

General Power Tool Safety Warnings

WARNING

Read all safety warnings, instructions, illustrations, and specifications provided with this power tool. Failure to follow all instructions listed below may result in electric shock, fire, and/or serious injury.

Save all warnings and instructions for future reference.

1. Work area safety

a. Keep work area clean and well lit.

b. Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.

c. Keep children and bystanders away while operating a power tool.

2. Electrical safety

a. Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools.

b. Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges, and refrigerators.

c. Do not expose power tools to rain or wet conditions.

d. Do not abuse the cord. Never use the cord for carrying, pulling, or unplugging the power tool. Keep cord away from heat, oil, sharp edges, or moving parts.

e. When operating a power tool outdoors, use an extension cord suitable for outdoor use.

f. If operating a power tool in a damp location is unavoidable, use a residual current device (RCD) protected supply.

3. Personal safety

a. Stay alert, watch what you are doing, and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol, or medication.

b. Use personal protective equipment. Always wear eye protection.

c. Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool.

d. Remove any adjusting key or wrench before turning the power tool on.

e. Do not overreach. Keep proper footing and balance at all times.

f. Dress properly. Do not wear loose clothing or jewelry. Keep your hair, clothing, and gloves away from moving parts.

g. Do not let familiarity gained from frequent use of tools allow you to become complacent and ignore tool safety principles. A careless action can cause severe injury within a fraction of a second.

4. Power tool use and care

a. Do not force the power tool. Use the correct power tool for your application.

b. Do not use the power tool if the switch does not turn it on and off.

c. Disconnect the plug from the power source and/or remove the battery pack, if detachable, from the power tool before making any adjustments, changing accessories, or storing power tools. Such preventive safety measures reduce the risk of starting the power tool accidentally.

d. Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool. Power tools are dangerous in the hands of untrained users.

e. Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools.

f. Use the power tool, accessories, and tool bits, etc., in accordance with these instructions, taking into account the working conditions and the work to be performed. Use of the power tool for operations different from those intended could result in a hazardous situation.

g. Keep handles and grasping surfaces dry, clean, and free from oil and grease. Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.

5. Service

a. Have your power tool serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the power tool is maintained.

6. Equipment Installation, Operation, and Maintenance

a. Safety of any system incorporating the equipment is the responsibility of the system assembler

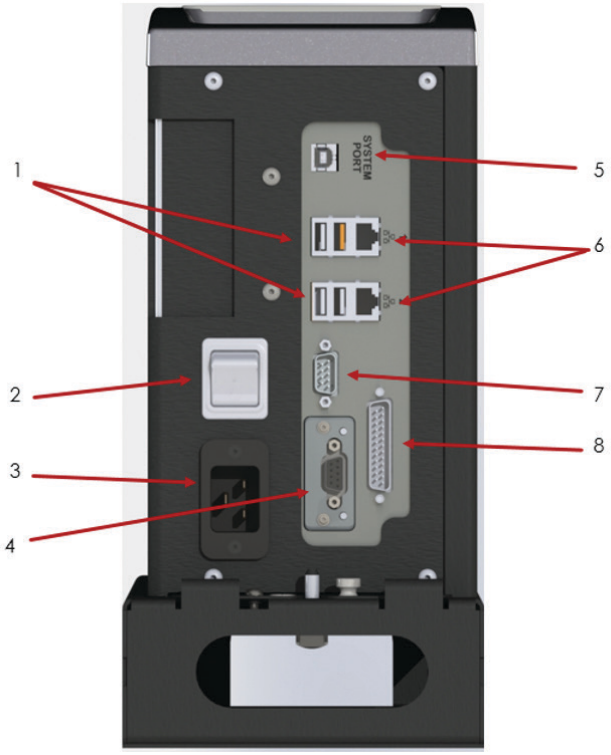
b. Position the equipment so that it is easy to access the disconnecting device

c. Do not replace main power cord with an inadequately rated cord

d. Only allow your power tool to be repaired by a qualified technician using only original spare parts, available from AIMCO. This ensures that the safety of your device is maintained.

2. Controller Diagram

2.1 Bottom Panel



1	USB port-for import/export of data including firmware updates
2	Power Disconnect Switch-Turns controller on and off
3	Power Cord Connection
4	Anybus-To connect to customer's fieldbus network (Ex: Profibus)
5	System Port- USB connection used to connect external computer to configure/monitor the controller
6	Ethernet Port RJ45- Connection used to connect external computer to configure/ monitor the controller
7	Serial Port (DB-9 Pin M) Serial data Output for communication with peripherals such as barcode readers and printers
8	24 Volt I/O Connector (DB-25 Pin M)- Input and output of signals for process control

2.2 Front Console LED Display

Indicator Lights

Green	Indicates fastening cycle meets specified parameters.
Red	Indicates fastening cycle rejected for exceeding high torque.
Red Flashing	Indicates low torque. Fastening cycle was rejected for not achieving low torque.
Yellow	Indicates High Angle. Fastening cycle was rejected for exceeding high angle.
Yellow Flashing	Indicates Low Angle. Fastening cycle was rejected for not achieving low angle.
Blue	Tool is In-cycle, above threshold.

Torque Display
Always displays torque value

Secondary Display
Toggle button switches secondary display between
- Units of measure
- Ethernet IP address
- USB (System Port) IP address
- Angle report

NOTE: If Jobs are enabled refer to "4.2 Job" on page 14 for Toggle Button function.

Toggle Button
Toggles what is shown in the secondary display

Parameter Settings (PSet)/Job Display

Increment/Decrement Buttons
Change PSet

3. Initial Setup

Step 1
Plug female end of power cable into Power Cable Connector (Figure 1, pg. 11).

Step 2
Plug male end of power cable into appropriate power source.

Due to a variety of 230Vac power outlets, the standard power cable plug-end provided with the controller may need to be modified in order to connect to local 230Vac power outlets. AcraDyne has a wide variety of country specific power cord options available. Check with your authorized AcraDyne representatives to see if your specific configuration is available. In any case, connection to local power should be made in consultation with a qualified electrician.

Step 3: The Redundant Earth Ground (required) must be connected to ground using the #14 AWG conductor, a green wire with a yellow stripe. Attach using a #10-14AWG ring terminal and #10 star washer (Figure 1).

Figure 1 — Redundant Earth Ground Attachment

Step 4: Turn controller on by pushing the Power Disconnect Switch to the POWER ON position, a light indicates power on.

Step 5
Reference AcraDyne Tool Manager Manual/ Software for wireless tool connection to AcraDyne IBC Controller

3.1 Connecting to the Controller

There are three ways to program/communicate with the controller:

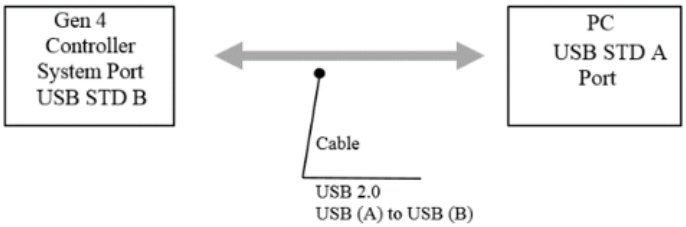
- Controller touch-screen console
- System Port: (USB connection) Direct connection to controller.
- Ethernet Port: Via direct connection or LAN.

Touchscreen Console

Controller functions and programming can be accessed directly through the touch-screen.

1. Power on controller.
2. Run screen will appear
3. Controller is ready for use.

Connecting via the System Port Directly to PC

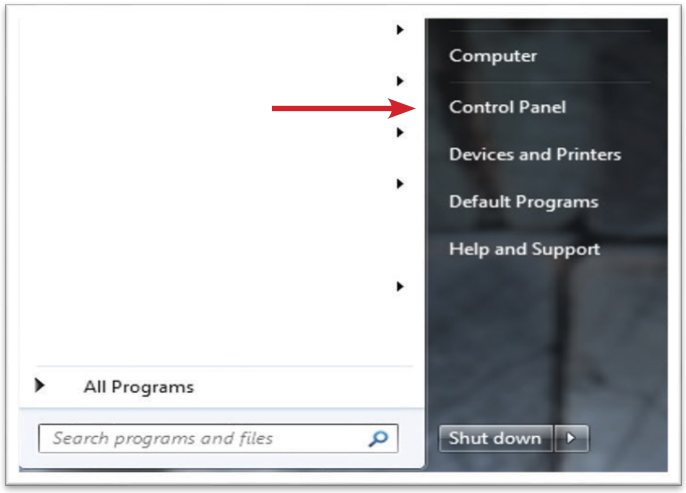


The following is an example using Window 7. Your screen may look different depending on the operating system.

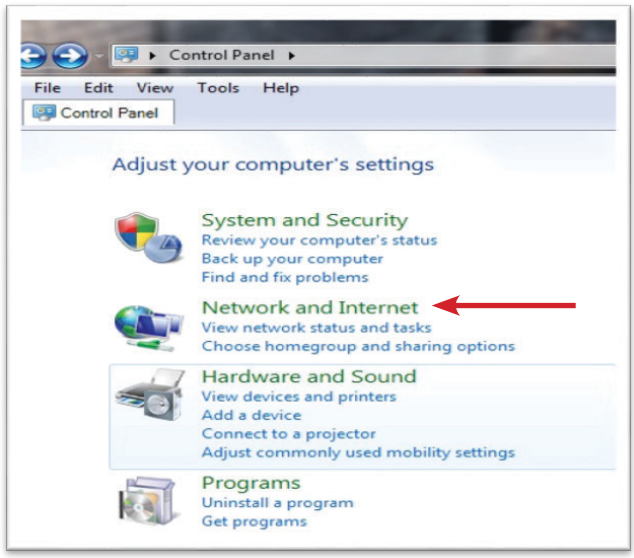
Windows USB Setup
Step 1: Power on PC and controller, allow enough time for them to become fully operational.

Step 2: Attach controller to PC using a USB 2.0 A-B cable. If this is the first time connecting the devices, wait for Windows to install the RNDIS driver. This should happen automatically.

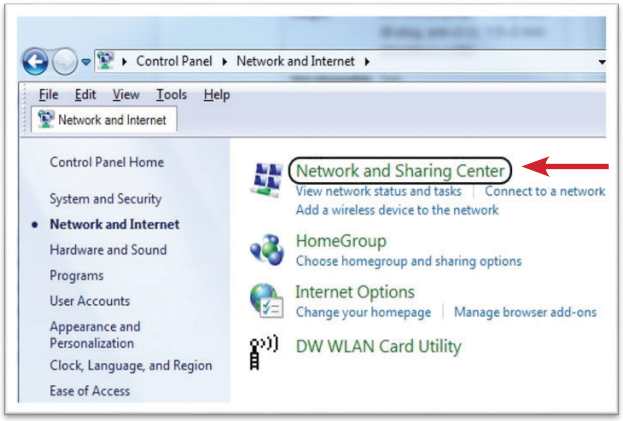
Step 3: After the driver is installed, go to 'Control Panel'.



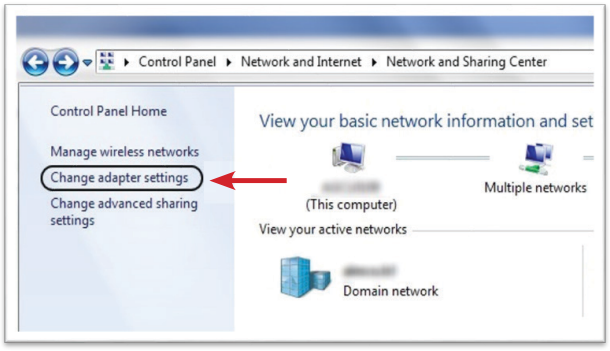
Step 4: Go to 'Network and Internet'.



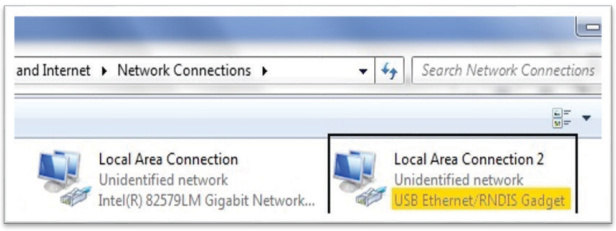
Step 5: Go to 'Network and Sharing Center'.



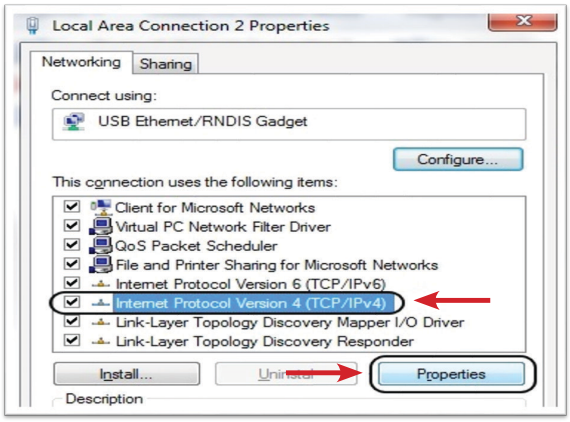
Step 6: Go to 'Change adapter settings'.



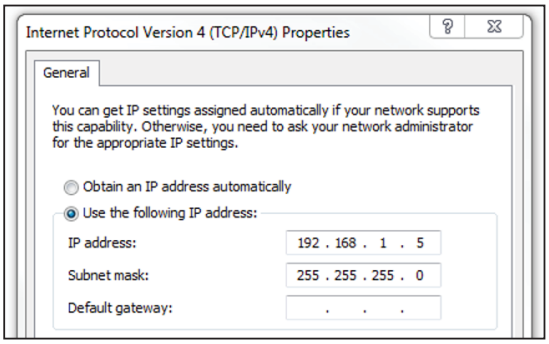
Step 7: Find the Local Area Connection that is using the 'USB Ethernet/RNDIS Gadget' network. Right click this network and go to 'Properties'.



Step 8: In Properties window select 'Internet Protocol Version 4' and click 'Properties'.

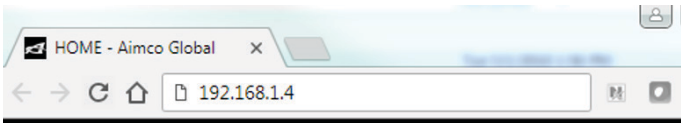


Step 9: In 'Properties', set the IP address to a static address.



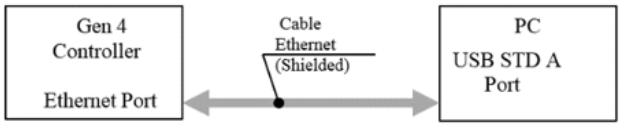
Type an IP address of 192.168.1.5 (Any address on the same subnet as the controller will work). Set subnet mask to 255.255.255.0

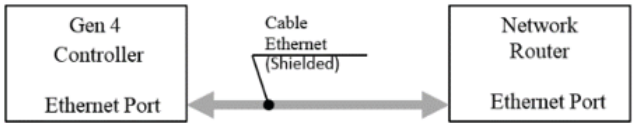
Step 10: To connect to the controller, open a browser such as Chrome or Firefox. Enter 192.168.1.4, the default system port IP address.



You will see the controller software on your computer screen.

Connecting using the Ethernet Port Directly or via LAN to PC



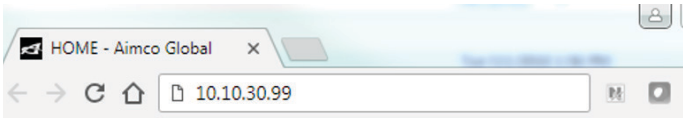


Turn on the computer and make a physical connection by using a straight through Ethernet cable.

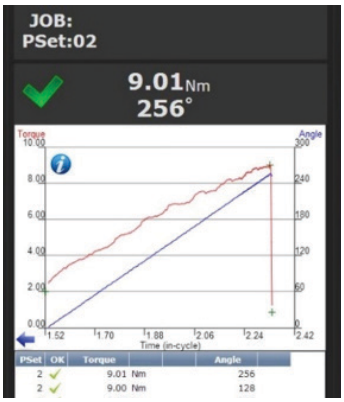
Turn on controller. Verify the controller IP address in 'Communication Interfaces' or press toggle button to verify the IP address. If defaulted 0.0.0.0 set desired IP address.

Set a static IP address of the Computer/Laptop to 10.10.30.98 (example) and subnet mask to 255.255.255.0. (For instructions, see the example in "Step 9" earlier in this section.)

To connect to the controller. In the Computer/Laptop open a browser such as Chrome or Firefox. Enter 10.10.30.99, the default Ethernet port IP address.



You will see on your computer screen the controller software



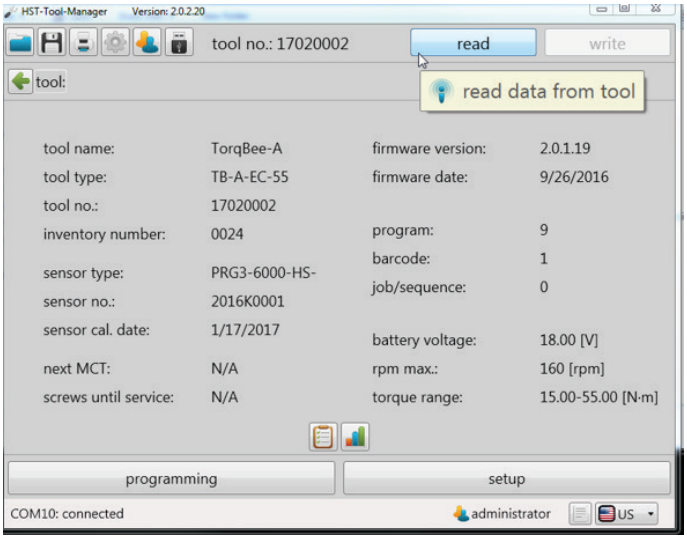
NOTE: Controller does not have a DHCP client, it will not automatically configure itself with a usable IP address. Consult your Network Administrator for configuring a correct IP address for your network. The PC, Laptop or Tablet IP address will need to be configured to communicate with the controller.

3.2 Gen IV iBC Wi-Fi Controller

This section lists the recommended iBC tool settings for connection to the iBC. It also contains example Wi-Fi communication settings for the tool and a few examples of how to set up the most common type or rundown strategies.

Required Items:

- Acradyne-Tool-Manager Software
  - Can be found at www.aimco-global.com
- iBC Manuals
  - Can be found at www.aimco-global.com
- USB-A to Mini USB Cable (included with the tool)
- Wi-Fi Router with connection to an iBC Controller or plant wifi configuration (user responsibility)

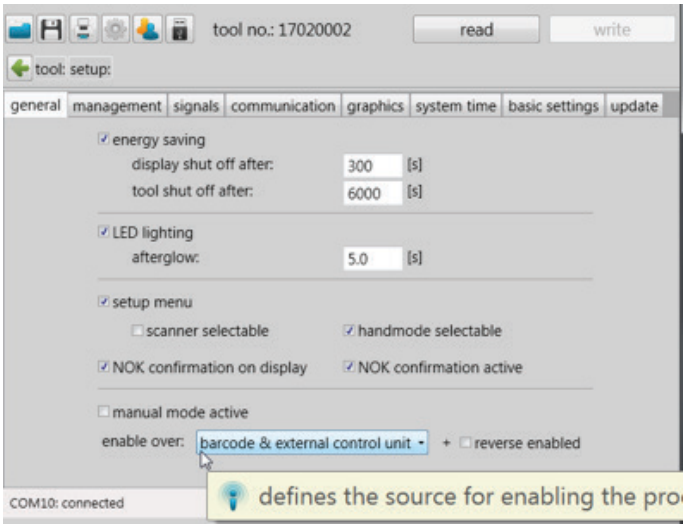


Editing the tool's parameters via the AcraDyne-Tool-Manager Software:

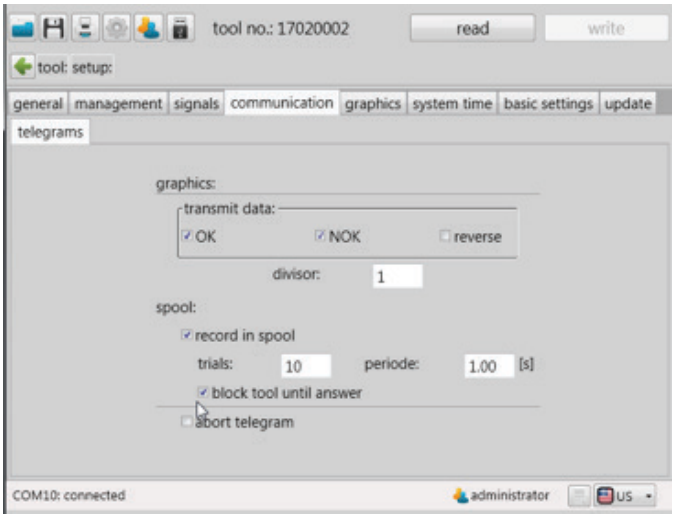
- Remove the battery from the tool.
- Connect tool to PC using the mini-USB cable.
- Launch the AcraDyne Tool Manager
  - Login as:
    - Administrator: "Admin" - This accesses the tool setup and program menus **OR**
    - Network Administrator: "Instand" - This accesses the Wi-Fi setup menu
  - Read the Tool parameters from the tool.
  - Edit parameters as needed.
  - Write the new parameters to the Tool.
- Disconnect the Tool from the computer.
- Install the battery on the Tool.

Recommended tool setup parameter settings for iBC connection:

- Tool: setup menu (Login as: Administrator, passcode "Admin")
  - General
    - Manual mode active: [unchecked]
    - Enable over: 'external control unit' **OR** 'barcode & external control unit' if the tool is equipped with a scanner.



  - Communication
    - Spool: record in spool, 10 trials, 1s period
    - Block tool until answer: [checked]. This prevents the tool from running a second rundown, if the tool is disconnect from the controller just before or while running.



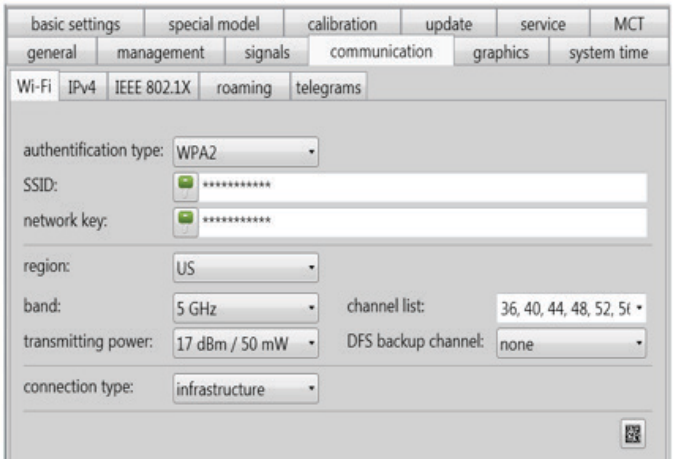
  - Basic settings
    - Hardware configuration:
      - Display: [checked]
      - Scanner: [checked if equipped]
      - Radio: [checked]

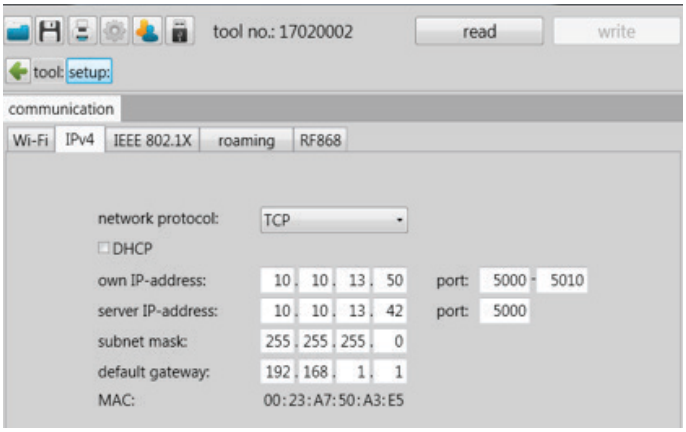
        - Recovery: [unchecked]. Note: On power up, this prevents the tool from running until connection to the controller is established.
- Tool: programs menu
    - Delete all jobs
    - Delete all barcodes

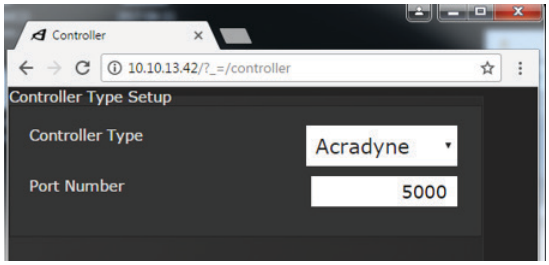
Establishing Wi-Fi Connection to iBC:

- Wi-Fi Network Setup (Login as: Network Administrator, passcode "Instand")
    - Setup – WILAN
        - Wi-Fi Router settings (SSID, Network Key) or plant network settings
        - If the router is compatible, it is recommended to use 5 Ghz band.
        - It is recommended to select 3 channels from the channel list
    - Setup – IPv4
        - Own IP Address (unique IP Address for the tool)
            - Port (5000 - 5010)
        - Server IP Address (controller's IP Address)
            - Port (5000)
        - Subnet Mask
        - Default Gateway (Wi-Fi Router IP Address)

Example Wi-Fi settings for tool and iBC controller:



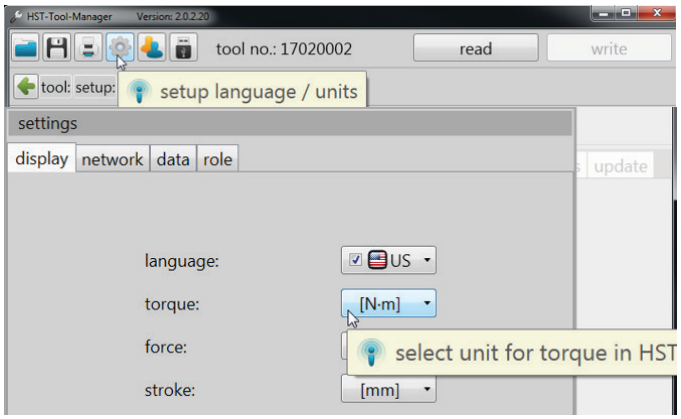




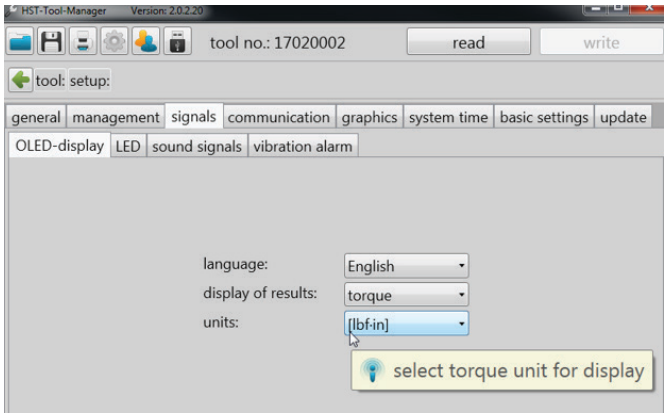
- When the tool battery is plugged in, the display will show:
    - Scan – While looking for the Network.
    - Join – Network found, entering credentials.
    - Join Server – Connected to Network, looking for controller.
    - Depending on PSet Number selected on the controller, the tool's display will show:
        - Enable n – Where n is a valid PSet Number.
        - Disable – If the selected PSet Number does not exist in the tool. The controller LED Display will show INVP.

Torque Units:
There are two places in the Acradyne-Tool-Manager software to select the units for torque. One affects how units for torque are displayed in the Acradyne -Tool-Manager software. The other affects what units torque are displayed on the tool and reported to the iBC controller. Both settings are independent of each other.

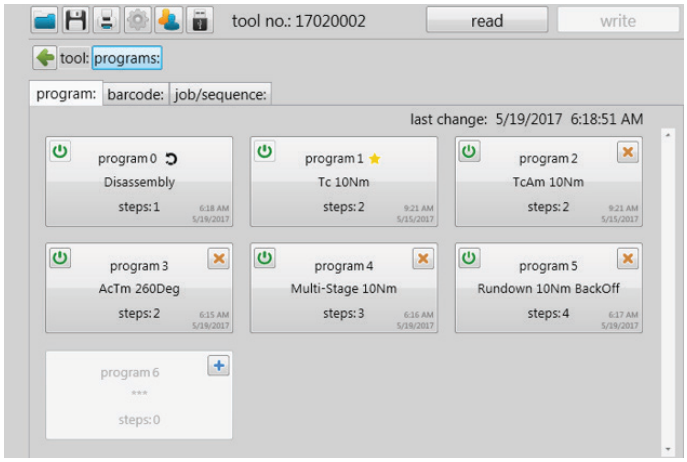
Selecting the units for the torque values displayed in the Acradyne -Tool-Manager software:



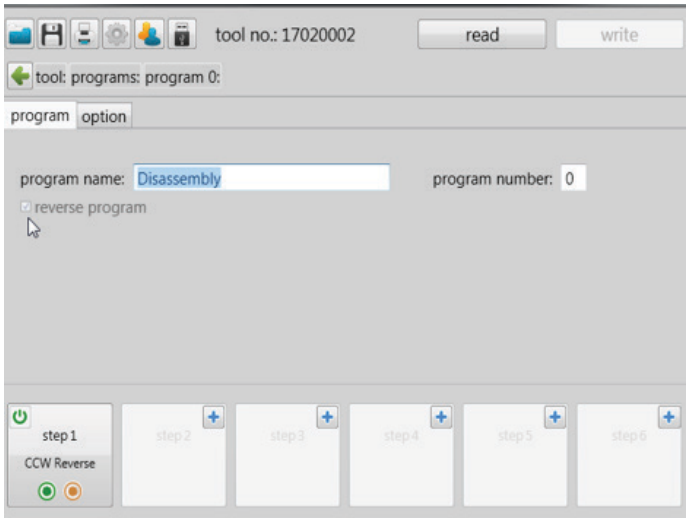
Selecting the torque units reported by the tool and displayed on the iBC controller:

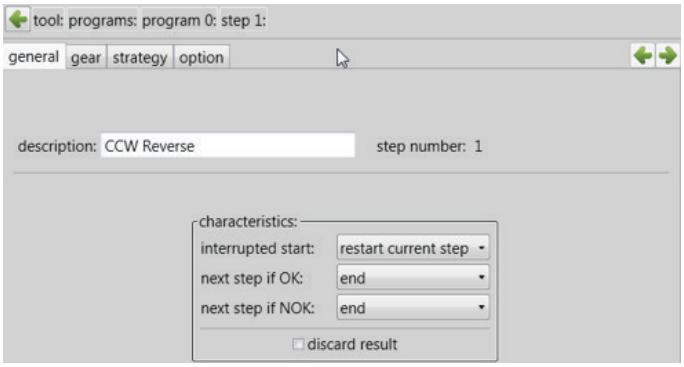


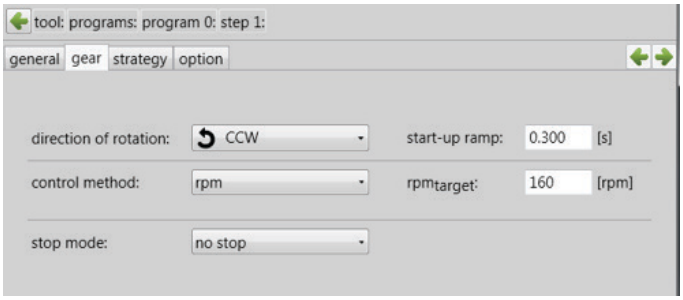
Program Examples:
The following are examples on how to setup some common rundown strategies. Note: The term 'Program' in the AcraDyne -Tool-Manager software is synonymous with 'PSet' in the iBC and the term 'Step' synonymous with 'PSet'

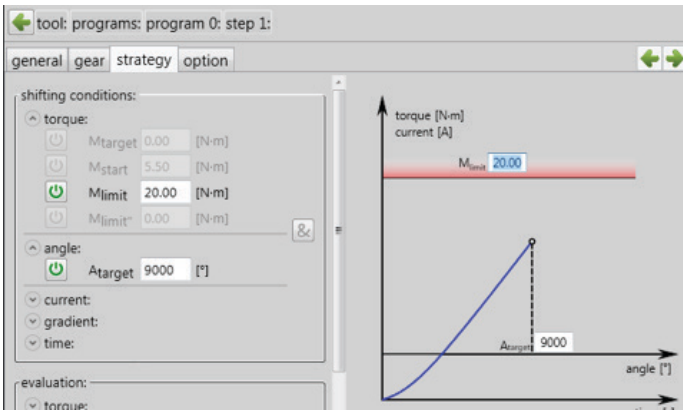


Disassembly:
The CCW program that the other programs use for reverse. Note: reverse program is checked.

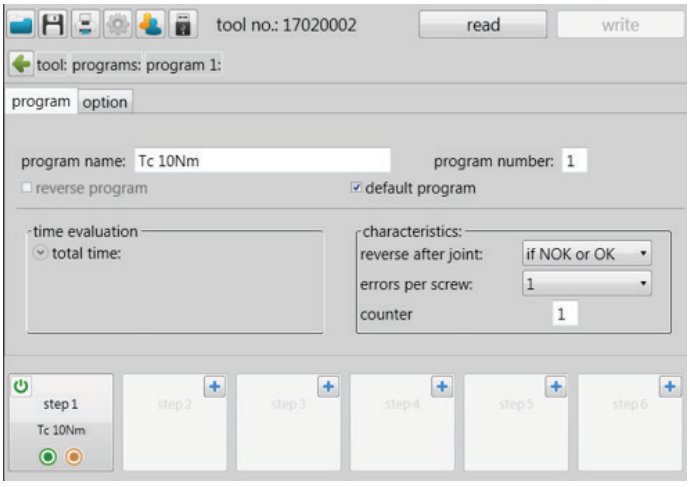


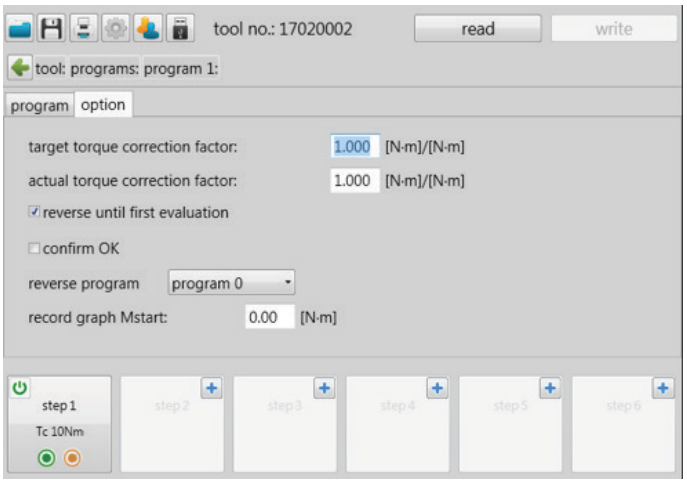


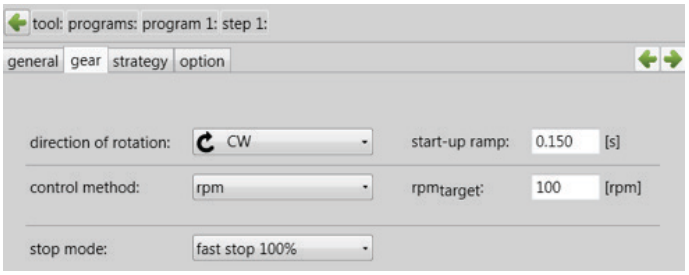


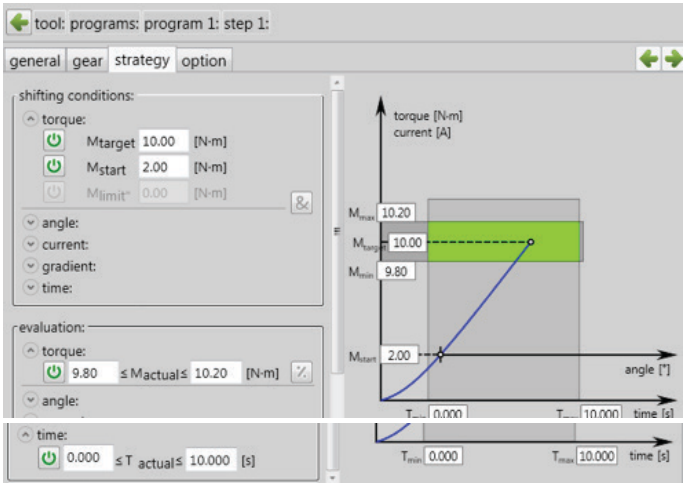


Torque Control Strategy:
Torque control with 'Mstart' ('In-Cycle') set to 2Nm. Time out set for 10 Seconds



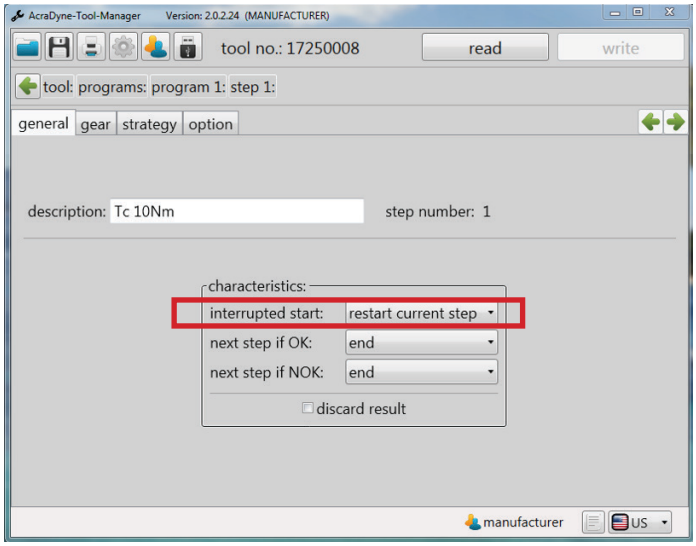






Not Sending Run Data to Controller on a 'Free Run Stage'

This setting will not send rundown data when trigger is released on a free run. Set the interrupted start to restart current step, shown below. This can be set as a stage in the program.

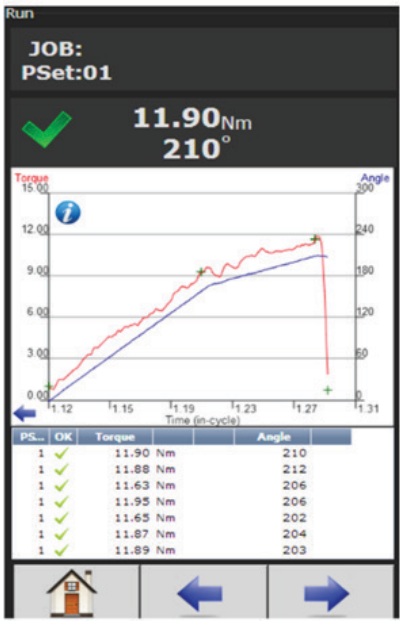


The tool will display the screen below when the trigger is released.

4. Home Page (Main Menu)

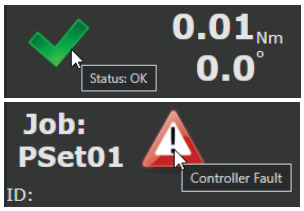
4.1 Run

The Run Screen is essentially the dashboard of the Gen IV controller and provides a look at real-time information regarding rundowns.



Time (In-Cycle) Screen

JOB:	Indicates the current JOB.
PSet:01	Indicates the current PSet in which you are operating.
	Indicates accepted rundown.
	Indicates failed rundown.
11.90Nm 210°	Displays Torque and Angle for current rundown.

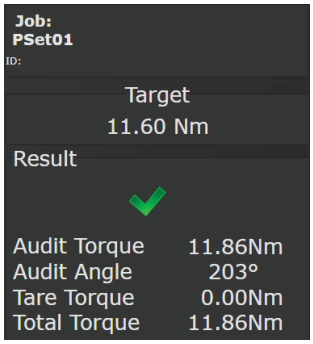


Click on (or remote sessions can hover over) the rundown status icon or stop icons for a text description.

Graph displays curves representing Torque (black trace) and Angle (blue trace). The blue left arrow at the origin of the graph will change the X-axis of the rundown curve from Time (In-Cycle) to Time (Overall) and Angle.

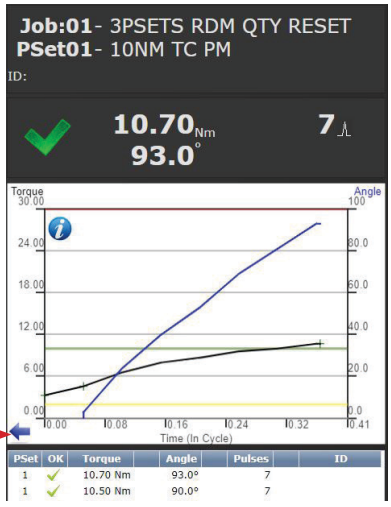
Below the graph is a historical table that will give information and status of the most recent rundowns, including current PSet, accepted/failed rundown status,torque and angle.

Arrows allow user to scroll through screens that show real time Job information such as Run Screen or rundown indicators.



Home tab will return user to the Home Page

On the Run Screen, click  for curve detail.



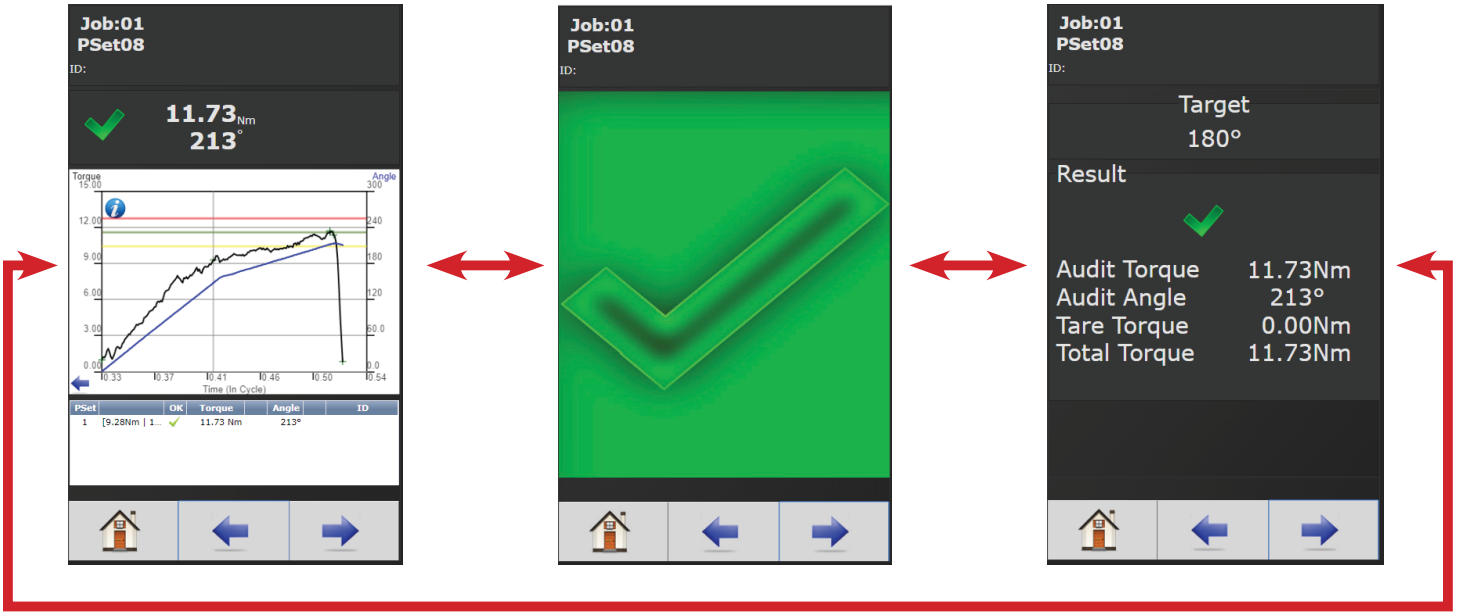
Click on blue arrow to change curve X axis.

Choose Time In-cycle, Time Overall, Angle, or Angle In-Cycle screen.

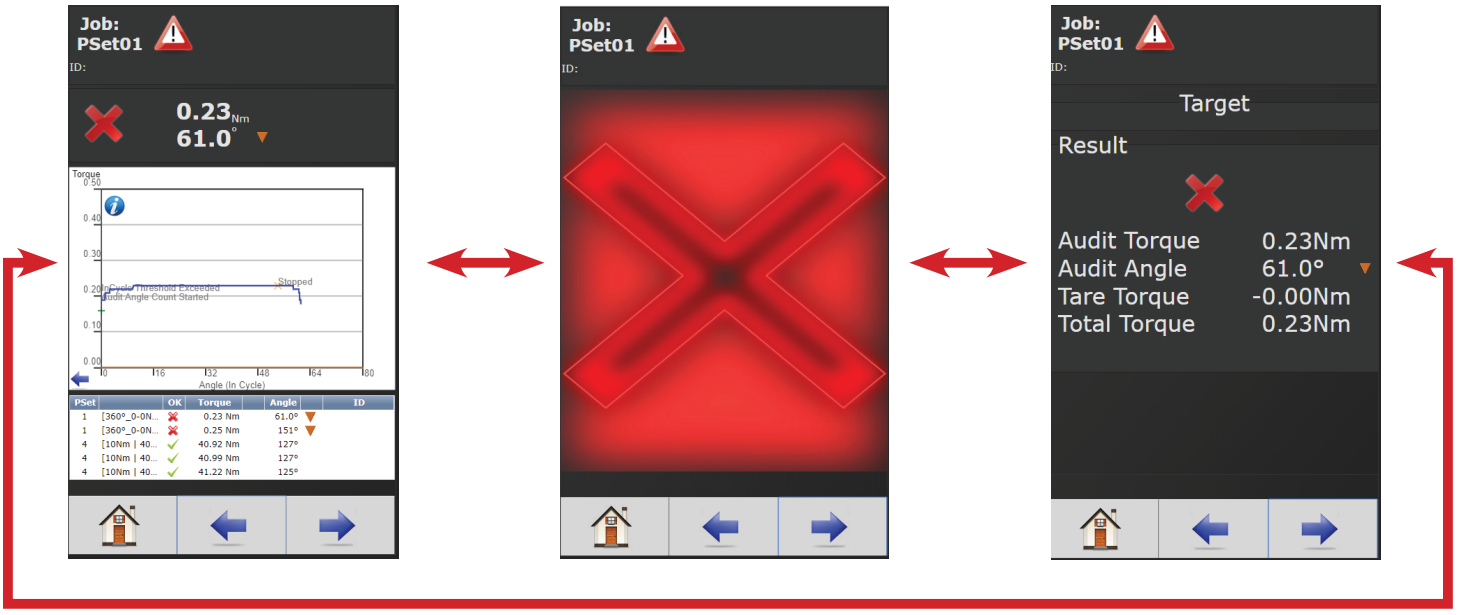
Large Screen Indicators and Audit information

The large screen indicators are helpful in viewing real time results of the rundown from a distance.

Example of Accepted Job

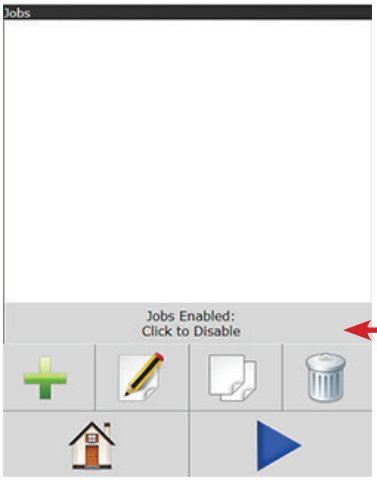


Example of Failed Job



4.2 Job

A Job is a collection of PSets which can be run when performing multiple fastening operations on a single application.



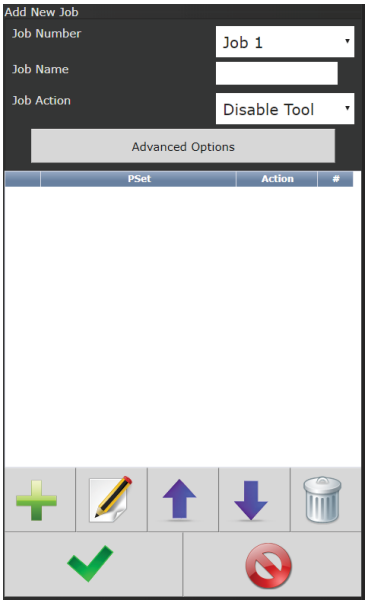
Jobs provide:

- Error proofing
- Logical grouping of PSets
- Fastening order
- Job status

Click to Enable/Disable Job function.

4.2.1 Add New Job

To add a new Job press Job on the Home Page. Press + on Jobs screen (above) to enter Add New Job screen (below)



Job Number: Up to 99 Jobs can be configured.

Job Name: Enter Job Name

Job Action:

- **Disable Tool:** Disable tool after job is finished. Job complete Icon will appear.

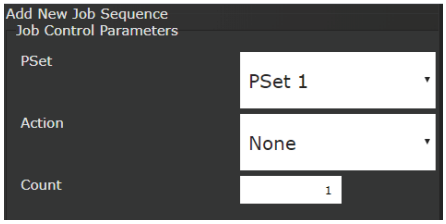
  Tool will not operate until job is reset.

- **Reset Job:** Will reset after Job is finished. Once Reset Job is finished, the following icon appears:

  This means that results from the last successful rundown of a job are cleared. Information from last successful rundown can still be accessed in the table of the rundown view/curve display on the main Run Screen (see "4.1 Run" on page 12.

After appropriate values are entered, press + to go to Add New Job Sequence screen.



PSet Number: Choose any current PSet already configured in controller.

Action:

- **None:** Will stay in current sequence.
- **Next:** will advance to next sequence set up after count is reached.

Count: Fastener number required to complete sequence.

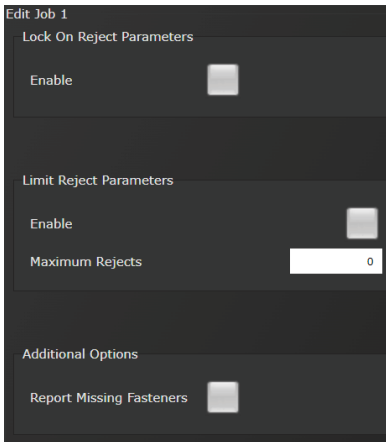
Once values are entered press ✓ two times to return to Job screen

4.2.2 Advanced Options

Enter Advanced Options Advanced Options if needed

Lock on Reject Parameters:

- **Enable:** When enabled, this prevents tool from starting a new rundown if the result of the last rundown was a reject. The tool can be enabled with the "Remove Lock on Reject" assignable input.



Limit Reject Parameters:

- **Enable:** Enable or Disable
- **Maximum Rejects:** Number of rejected fasteners allowed

Additional Options:

- **Report Missing Fasteners:** Add an option to each JOB to allow the reporting of any missing fasteners. When it is set the controller will report an NOK rundown for each fastener that is defined in the JOB but has not been ran. These NOK results will be reported whenever a new job is started AND the prior JOB is incomplete.

These generated NOK results are treated like any other fastening. They are displayed on the run screen, stored in the results and transmitted on all protocols.

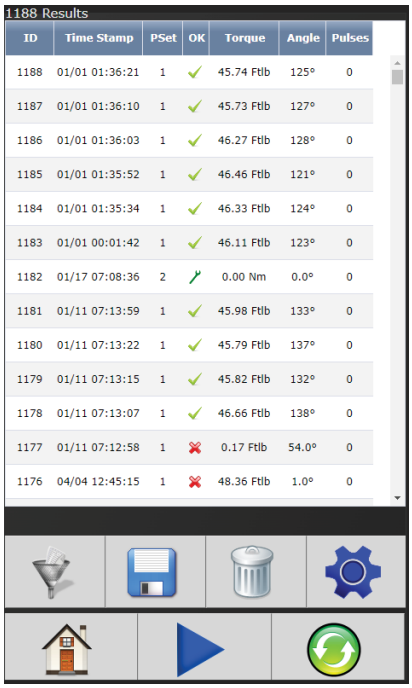
4.2.3 Jobs "Enabled" Display and Button Function

- Increment and Decrement buttons change the job sequence. The PSet number will change and job sequence number on secondary display will change if jobs are enabled.
- Holding the toggle button will display will display the Job number, while pressing increment or decrement buttons will change it. The two numbers on the PSet/Job display will be separated by decimals.
- Pressing the toggle button will change secondary display between:
    - Units of measure
    - Ethernet 1 IP address
    - Ethernet 2 IP address
    - System port IP address
    - Angle report
    - Bolt count
    - Job sequence

NOTE: Job sequence shows which PSet you are currently on in the job (this is not the pset number). The first pset in the job is always job sequence 1, and the next is 2, etc.

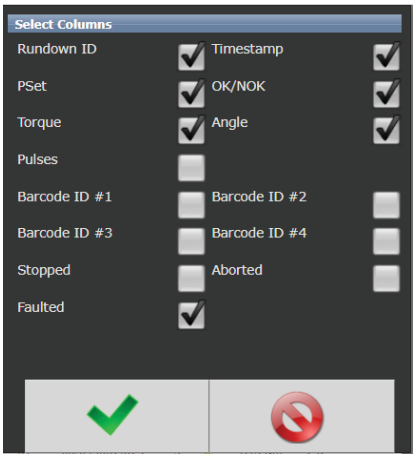
Bolt count is shown as current bolt count out of total number of bolts. Example: If you have 3 total bolts. When you start the job you will see 0.3. After one rundown you will see 1.3 and then 2.3 on the next run and so on until the job is completed.

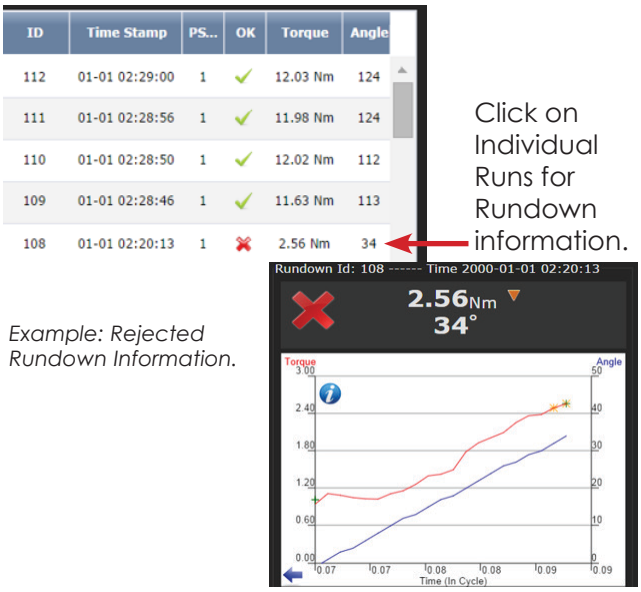
4.3 Results


1188 Results

ID	Time Stamp	PSet	OK	Torque	Angle	Pulses
1188	01/01 01:36:21	1	✓	45.74 Ftlb	125°	0
1187	01/01 01:36:10	1	✓	45.73 Ftlb	127°	0
1186	01/01 01:36:03	1	✓	46.27 Ftlb	128°	0
1185	01/01 01:35:52	1	✓	46.46 Ftlb	121°	0
1184	01/01 01:35:34	1	✓	46.33 Ftlb	124°	0
1183	01/01 00:01:42	1	✓	46.11 Ftlb	123°	0
1182	01/17 07:08:36	2	↗	0.00 Nm	0.0°	0
1181	01/11 07:13:59	1	✓	45.98 Ftlb	133°	0
1180	01/11 07:13:22	1	✓	45.79 Ftlb	137°	0
1179	01/11 07:13:15	1	✓	45.82 Ftlb	132°	0
1178	01/11 07:13:07	1	✓	46.66 Ftlb	138°	0
1177	01/11 07:12:58	1	✗	0.17 Ftlb	54.0°	0
1176	04/04 12:45:15	1	✗	48.36 Ftlb	1.0°	0

This screen provides a history of rundowns performed. Information such as ID Number, Time Stamp, Parameter Set#, Accept / Reject status, and Torque and Angle are recorded for each rundown.

	Filter Button gives filter options in Rundown screen.
	Save Button saves rundowns as .Txt File.
	Deletes individual rundowns by clicking on them
	Select Columns Button lets you customize the columns shown on the Results Screen 
	Home Button returns to main display menu.
	Play Button sends you directly to Run Screen.
	Refresh Button refreshes screen to include latest rundowns.



Click on Individual Runs for Rundown information.

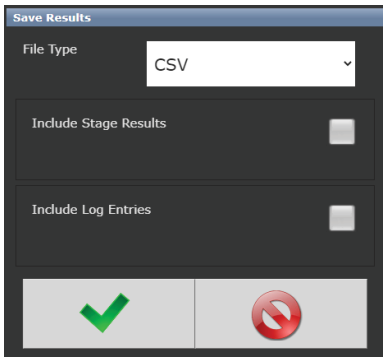
Example: Rejected Rundown Information.

4.3.1 Saving Rundown(s)

Saving All Rundowns

Click on in main rundown screen to view/save total rundowns. A dialog box will open that allows you to choose the download format, either a CSV file or a TW4 file. The CSV file includes rundown data in tab separated variables and can be viewed using Excel or opened it text editor such as Notepad. The raw data can be imported to Excel to build graphs, charts etc. Contact AIMCO Technical Service for pre-made Torque and Angle Templates.

The TW4 file can be opened using the ACE Platform G4 Utility located on the software page of the AIMCO website.



The dialog box also shows options for including stage results or log entries in the downloaded file. If downloading a TW4 file, all information will be automatically selected.

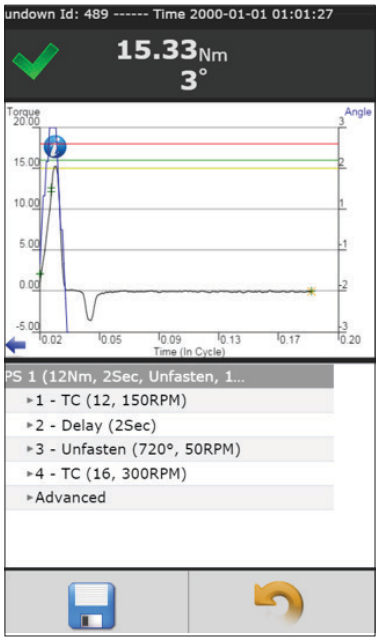
Click and your browser will download the file.

Saving Individual Rundowns

To save an individual rundown, select a rundown from the Results screen.

This opens the Rundown Information View. Click on in save the rundown. The file will automatically download as a CSV file.

Rundown Information View



Sample of Individual Rundown Information

1	Result	65	
2	Job Numb	1	
3	Job Name	Paramont	
4	Job Seque	1	
5	Bolt Coun	3	
6	Date	########	4:18:00
7	Master Ru	0	
8	PSet ID	59	
9	PSet Num	1	
10	PSet Name		
11	Tool Mod	AEN32030A	
12	Tool Seria	191111	
13	Torque	11.69	
14	Angle	57	
15	Pulses	0	
16	Torque St	P	
17	Angle Stat	--	
18	Pulse Stat	--	
19	Rundown	P	
20	Tool Cycle	1111	
21	ID1 ("ID #1	2.2E+10	
22	ID2 ("ID #2	4.86E+10	
23	ID3 ("ID #3")		
24	ID4 ("ID #4")		
25			
26			
27			
28	Curves		
29	Tick	Torque	Angle
30	0	0.02	0
31	1	0.02	0
32	2	0.05	0
33	3	0.04	0
34	4	0.09	0

HTTP Method for Retrieving and Saving Rundown Results

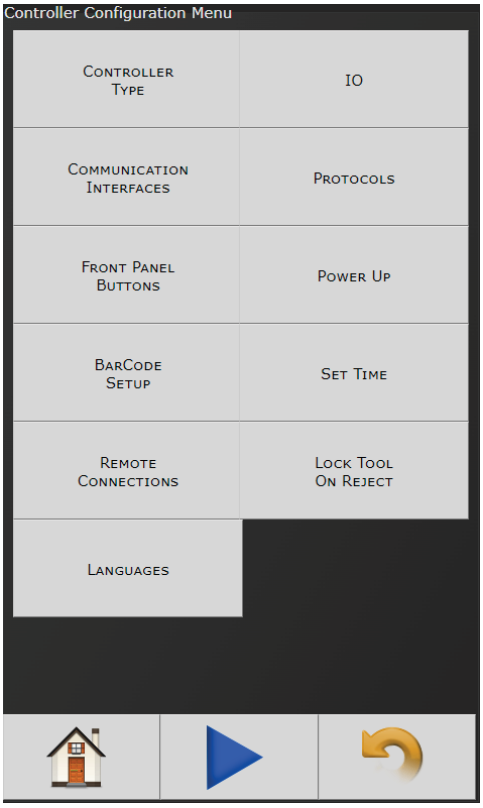
An http request to the controller for file "fastening.csv" (http://ipaddress/fastening.csv) will return the most recent rundown in the full rundown CSV format. This is in the same format as "Home->Results" selecting a results then selecting save.

Optionally, a specific ID can be selected. An http request to the controller for file "fastening.csv" with the optional parameter "id" set to the desired id number (http://ipaddress/fastening.csv?id=47) will return rundown id the full rundown CSV format.

The format can also be changed with the optional "version" parameter. An http request to the controller for file "fastening.csv" with the optional parameter "version" set to 1 (http://ipaddress/fastening.csv?version=1) will return a CSV file in the "QualityWorX File" format.

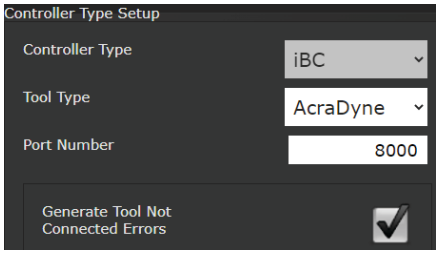
The "id" and "version" options can be used in any combination as needed.

4.4 Controller



The controller menu is where all of the settings for the Gen IV controller are configured. All of the different configuration capabilities are explained in the following sections.

4.4.1 Controller Type



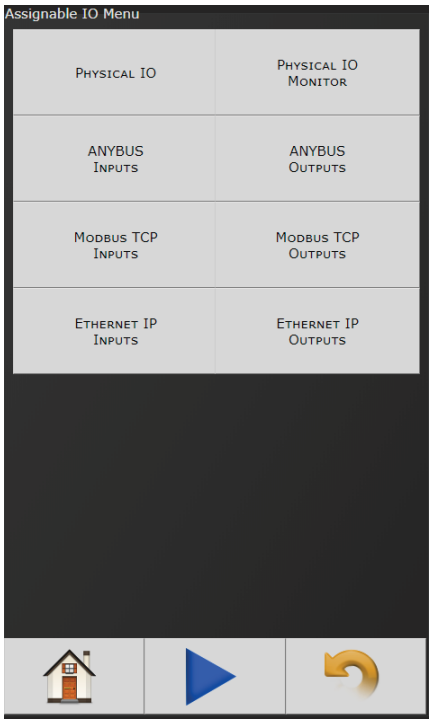
Controller Type:
- **IBC**: Intelligent Battery Tool Controller

Tool Type:
- **AcraDyne**
- **Tohnichi**

Port Number: This is the data port that the controller will be looking to in order to communicate with the tool over WiFi. Default setting is 8000. User may configure the Port to what is desired. ***Note: The tool settings must also be configured to match what the controller port setting is configured to. Using AcraDyne Tool Manager Software adjust settings in the Network Administrator area with the tool connected to a PC (See AcraDyne Tool Manager Software and Manual for specifics.***

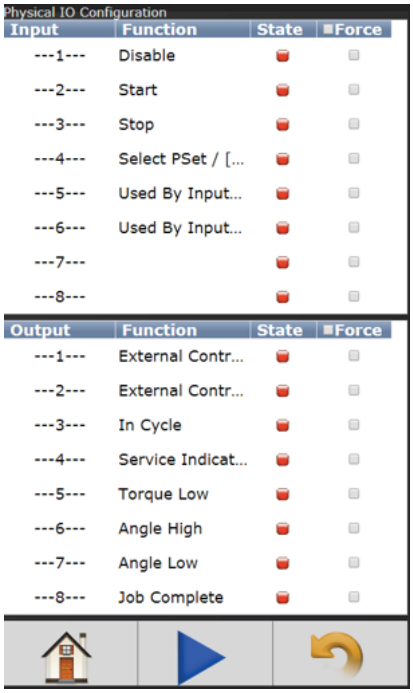
Generate Tool Not Connected Errors: Select this box when user desires network traffic to include a "Tool Not Connected" error message.

4.4.2 IO



NOTE: See "11. Assignable I/O" on page 45 for details.

4.4.2.1 *Physical I/O*

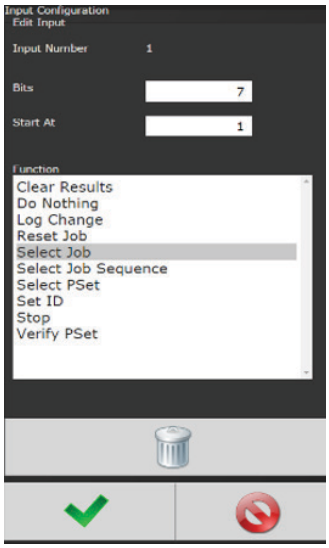


Assign functionality to 24V Input and Output pins. Shows the "live state" of each Input and Output.

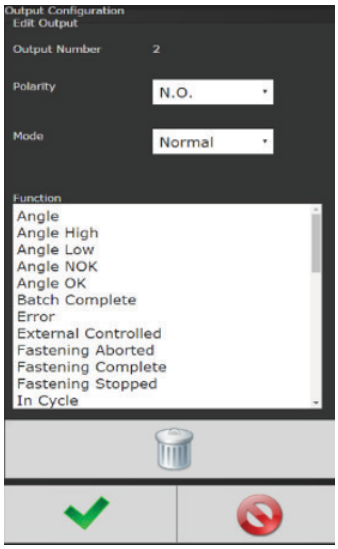
Functions shown in screen shot are default settings.

To change these assignments, click on any I/O state to enter Output/Input Configuration screen (following).

Input Configuration



Output Configuration



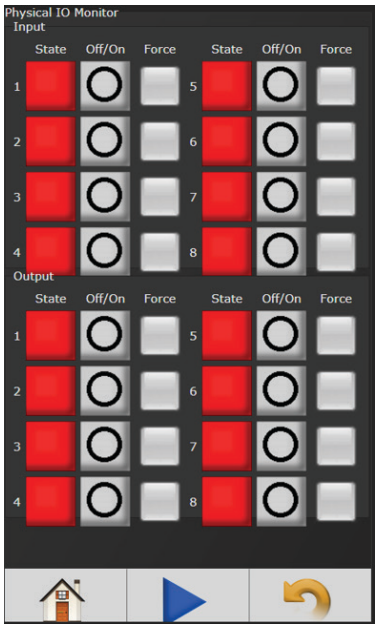
See "11. Assignable I/O" on page 45 for more details on available assignment functions and how to configure.

See "10. 24 Volt I/O" on page 43 for the pinout of the 24Volt Logic IO port, and wiring examples.

4.4.2.2 *Physical I/O Monitor*

Provides monitoring of Physical 24 Volt I/O. Force on/off the individual I/O pins for testing of field wiring.

Each indicator shows the state of the associated pin.
Green = On
Red = Off



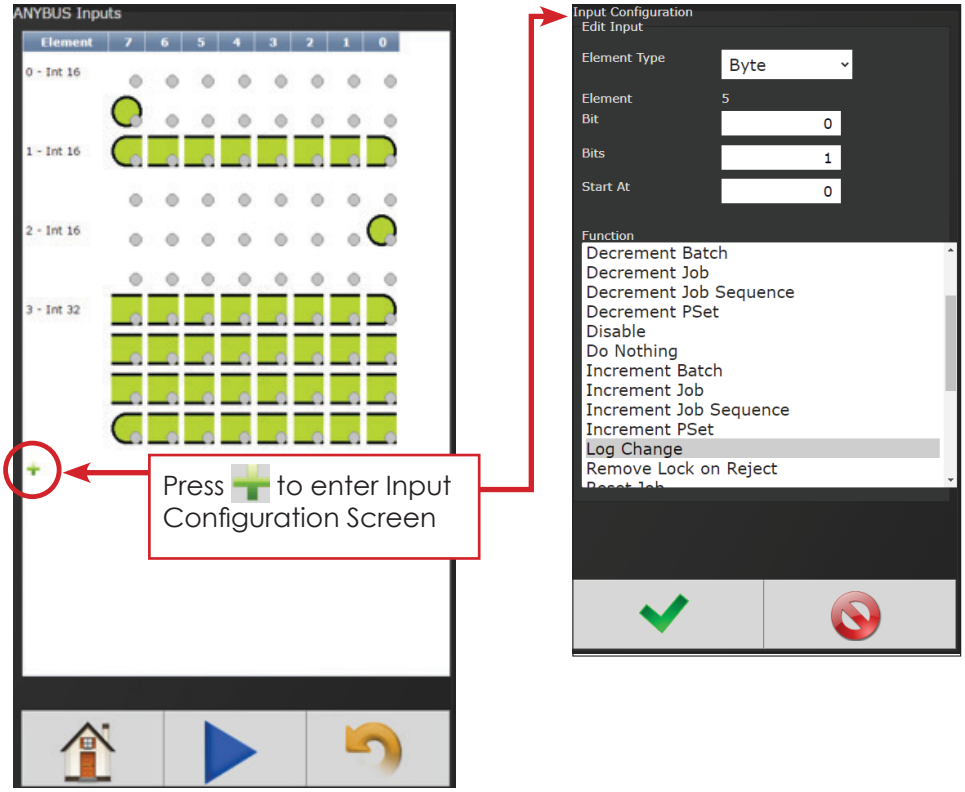
- **Force:** When Buttons from I/O are selected, this field selects which Inputs and Outputs can be forced through the Monitor I/O screen.

- **Off/On:** If Force is enabled this button will toggle the state of input or output selected.

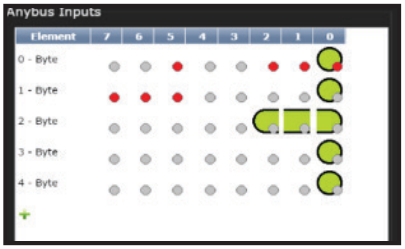
NOTE: See "11. Assignable I/O" on page 45 for details.

4.4.2.3 Anybus/Modbus TCP/Ethernet IP Inputs

These types of communication are useful for data communication between controller and PLCs. It is an effective, quick way for the data transfer of short data packages.



Example of the Anybus Input screen with five Inputs set up.



Click on to change an individual Element or return to Input Configuration screen.

Will delete individual Elements.

Element Type: Choose from Byte, Int16, Int32, or ASCII.

Element: Shows element # being configured

Bit: Enter Bit #.

Bits: # of bits the assignment will read.

Start at: Starting bit location.

Polarity (not shown): Select Normally Open (N.O.) or Normally Closed Outputs (N.C.).

Length (not shown, available in ASCII ID function): Number of characters desired to send.

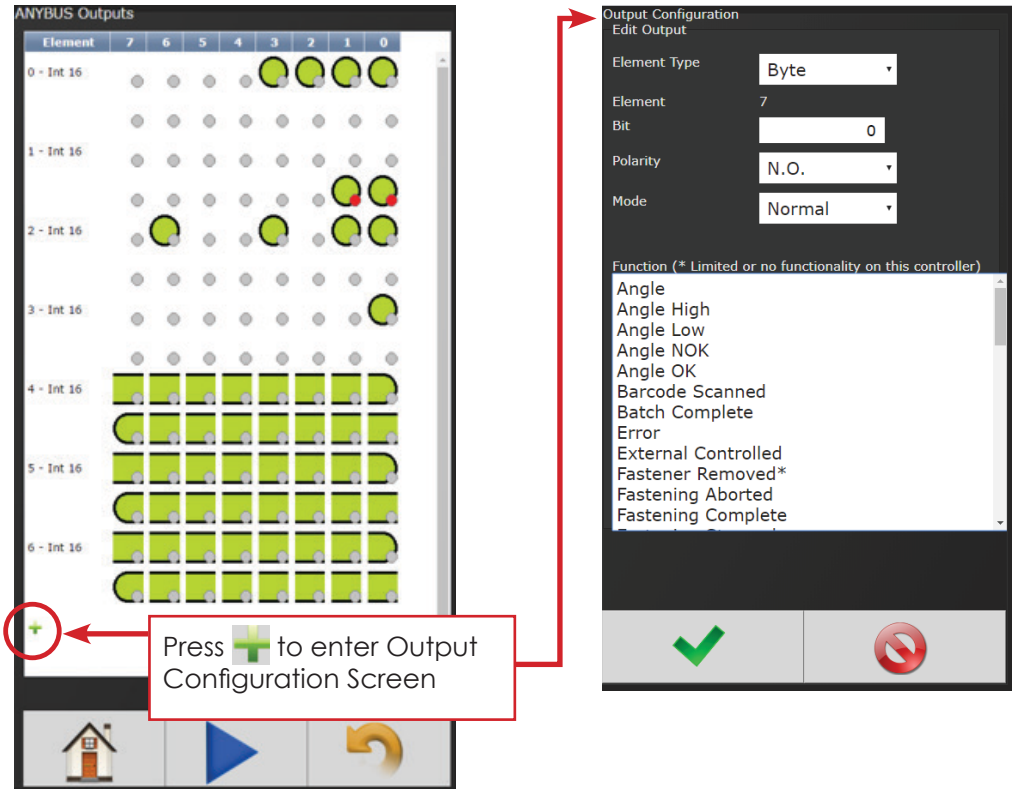
Torque (not shown, available in Click Wrench function): Torque value to be reported when using Click Wrench input. Value input is what will be sent from controller when Input Signal is received from a Click Wrench. ***Value is NOT calculated by the controller rather it is solely what the Click Wrench is calibrated to by outside means.***

Torque Units (not shown, available with Click Wrench function): Choose from Nm, Kgm, Kgcm, Ftlb, and Inlb.

Function: See "11. Assignable I/O" on page 45 for details.
Select desired Input Function(s).

Click on after appropriate selections are made.

4.4.2.4 *Anybus/Modbus TCP/Ethernet IP Outputs*



Element Type: Choose from Byte, Int16, Int32, or ASCII.

Element: Shows element # being configured

Bit: Enter Bit #.

Bits (not shown)**:** # of bits the assignment will read.

Start at: Starting bit location.

Polarity: Select Normally Open or Normally Closed Outputs.

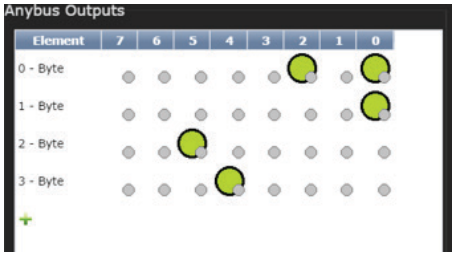
Mode:

- **Normal:** Output signal sent.
- **Timed Signal Sent:** Time entered in seconds
- **Flash Signal Sent:** Time entered in seconds

Function: See "11. Assignable I/O" on page 45 for more details on assignable functions.

Click on after appropriate selections are made.

Example of the Anybus Output screen with five Outputs set up.

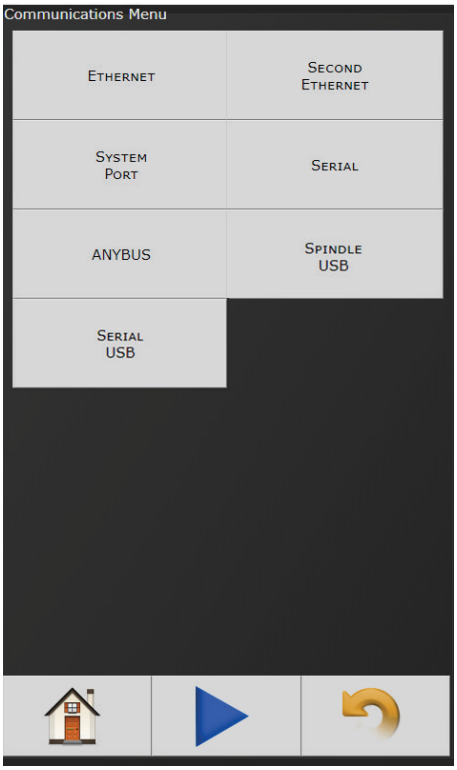


Click on to change an individual Element or return to Input Configuration screen.

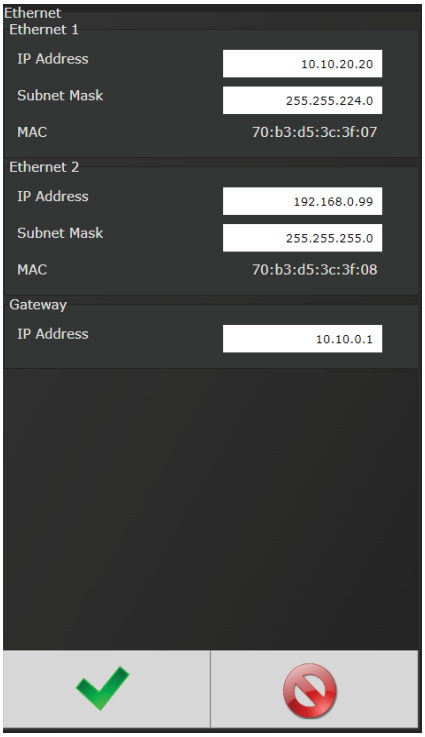
Will delete individual Elements.

4.4.3 Communication Interfaces

The Communications Menu will vary depending on system configuration.



4.4.3.1 *Ethernet/Second Ethernet*



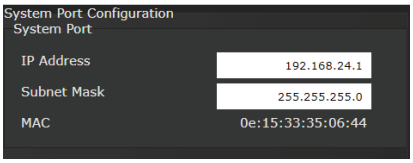
IP Address: IP address of controller's Ethernet port.

Subnet Mask: Subnet mask of the controller.

Gateway: Gateway is the IP address of the gateway computer that provides access beyond the local network.

NOTE: Consult your local System Administrator to connect the controller to your Network and assign IP addresses.

4.4.3.2 *System Port*

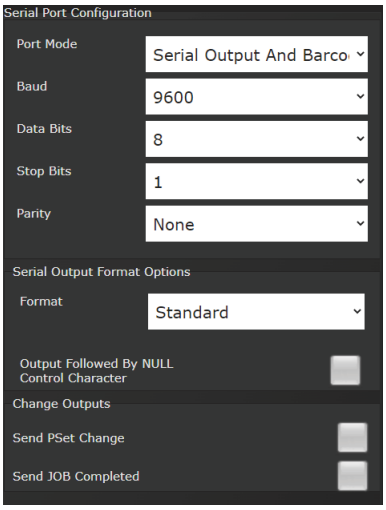


IP Address: IP address of the controller's System Port (Default is 192.168.1.4)

Subnet Mask: The Subnet Mask of controller's System Port.

NOTE: It is not recommended to change this setting.

4.4.3.3 *Serial Port*



Port Mode: The following modes are available:

- **Serial Output:** A serial data string will be Output in the following format after each rundown:
  - # P 1 BB TTT.T AAAA 0000 0000 J (Notice the decimal point next to the least significant T)
  - P: Parameter set ("1" – "9") for PSets 1-9, ("A" – "W") for PSets 10-32.
  - B: Job count
  - T: Torque result
  - A: Angle result
  - J: Judgment @=overall pass, H=low torque, I (eye)=high torque, J=low angle, K=high angle, G=fault during fastening
- **Barcode Reader:** See "5. Barcode Reader Details" on page 34 for Barcode setup.
- **Serial Output and Barcode Reader**
- **Open Protocol**
- **PFCS:** Select from dropdown and configure per hardware requirements
- **PI Line Control:** This is customer specific. Please reference PI Line Control Document on AIMCO Website/Product Manuals
- **Tohnichi Wrench:** Supports connecting a Tohnichi wrench/R-CM receiver to the controller. See "6. Tohnichi Wrench Details" on page 36 for Tohnichi Wrench setup.

Baud: Serial ports can be configured for different baud rates available

- 75, 110, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Data Bits/Stop Bits/Parity: Configure per hardware requirements

Serial Output Format Options: (see "Serial Output Format Options" on page 23)

- Standard
- Standard with PSet
- UEC Serial Modified
- Profibus
- UEC Serial

Output Followed by Null Control Character: Adds a one-byte NULL character to the end of the serial string. Needed by systems that use the NULL character to signify the end of the string. See following section for more information.

Send PSet Change

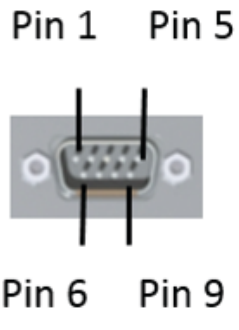
- Sends a serial string any time the PSet is changed. String is in the form '%%CAN8X%%%%CAN4YNAC%%' where X is the previous pset and Y is the new pset. See following section for more information.

Send Job Completed

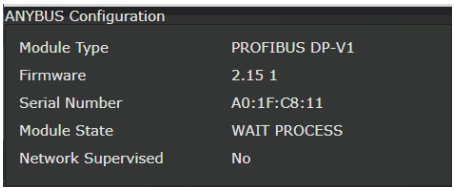
- Sends a serial string containing "Job Completed" whenever a job has been completed.

Gen IV Serial Port Pin-out

Pin	Signal
1	
2	RX
3	TX
4	DTR
5	GND
6	
7	
8	
9	

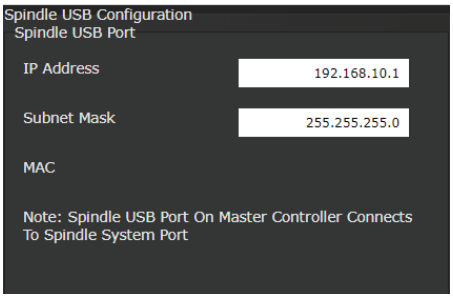


4.4.3.4 Anybus



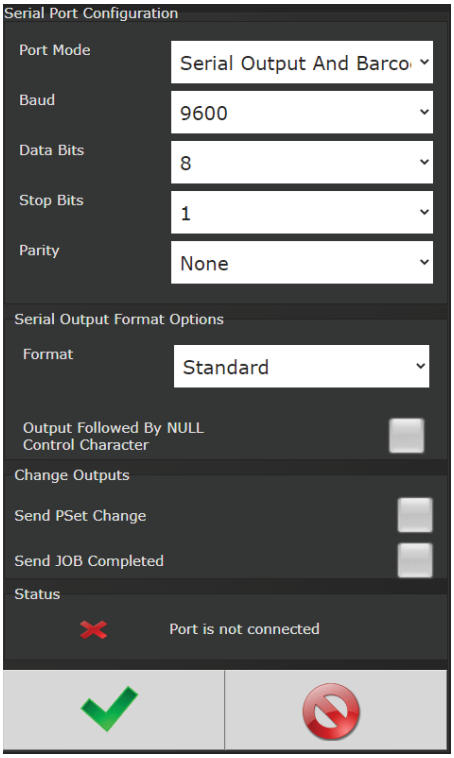
Node Address: Configures the Anybus node address for controller.

4.4.3.5 Spindle USB



This can be used to set up a 2 spindle network through the USB port.

4.4.3.6 Serial USB



See "4.4.3.3 Serial Port" on page 21 for reference

Serial Output Format Options

Standard Output Format:

- O P HHHHH LLLLL TTTTT P HHHHH LLLLL AAAAA CR CR NULL*
  - O: Overall Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - P: Torque Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - HHHHH: Torque High Limit
    - Units selected in the PSet X10
  - LLLLL: Torque Low Limit
    - Units selected in the PSet X10
  - TTTTT: Torque Result
    - Units selected in the PSet X10
  - P: Angle Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - HHHHH: Angle High Limit
    - • Degrees
  - LLLLL: Angle Low Limit
    - Degrees
  - AAAAA: Angle Result
    - Degrees
  - CR: Carriage return control character
  - CR: Carriage return control character
  - NULL*: Null control character (*if option is selected)

Standard Output with Carriage Return, Line Feed and PSet Format:

- O P HHHHH LLLLL TTTTT P HHHHH LLLLL AAAAA 1 CR LF NULL*
  - O: Overall Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - P: Torque Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - HHHHH: Torque High Limit
    - Units selected in the PSet X10
  - LLLLL: Torque Low Limit
    - Units selected in the PSet X10
  - TTTTT: Torque Result
    - Units selected in the PSet X10
  - P: Angle Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - HHHHH: Angle High Limit
    - Degrees
  - LLLLL: Angle Low Limit
    - Degrees
  - AAAAA: Angle Result
    - Degrees
  - 1: PSet
    - PSet('1' – '9') for PSets 1-9, ('A' – 'Z') for PSets 10-35
  - CR: Carriage return control character
  - LF: Line feed control character
  - NULL*: Null control character (*if option is selected)

UEC Serial Modified Format (matches some Gen4 earlier versions):

- # P 1 BB TTT.T AAAA PPPP 0000 J CR NULL*
  - #: Message Start
  - P: PSet
    - PSet('1' – '9') for PSets 1-9, ('A' – 'Z') for PSets 10-35
  - 1: Spindle Number (Always 1)
  - BB: Job Bolt Count
    - Total number of accepts during the Job
  - TTT.T: Torque Result
    - Units selected in the PSet
  - AAAA: Angle Result
    - Degrees
  - PPPP: Pulse Count
  - 0000
  - J: Judgment
    - '@' = Overall Pass, 'H' = Low Torque, 'I' = High Torque, 'J' = Low Angle, 'K = High Angle, 'G' = Fault During Fastening
  - CR: Carriage return control character
  - NULL*: Null control character (*if option is selected)

Profibus Output Format:

- %CAN 1 O P HHHHH LLLLL TTTTT P HHHHH LLLLL AAAAA NAC% CR LF NULL*
  - %CAN: Message Start
  - 1: PSet
    - PSet('1' – '9') for PSets 1-9, ('A' – 'Z') for PSets 10-35
  - O: Overall Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - P: Torque Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - HHHHH: Torque High Limit
    - Units selected in the PSet X10
  - LLLLL: Torque Low Limit
    - Units selected in the PSet X10
  - TTTTT: Torque Result
    - Units selected in the PSet X10
  - P: Angle Pass/Fail
    - 'P' = Pass, 'F' = Fail
  - HHHHH: Angle High Limit
    - Degrees
  - LLLLL: Angle Low Limit
    - Degrees
  - AAAAA: Angle Result
    - Degrees
  - NAC%: Message End
  - CR: Carriage return control character
  - LF: Line feed control character
  - NULL*: Null control character (*if option is selected)

UEC Serial Format (matches UEC 4800 and Gen3):

- # 1 P BB TTT.T AAAA PPPP 0000 J CR NULL*
  - #: Message Start
  - 1: Spindle Number (Always 1)
  - P: PSet
    - PSet('1' – '9') for PSets 1-9, ('A' – 'Z') for PSets 10-35
  - BB: Job Bolt Count
    - Total number of accepts during the Job
  - TTT.T: Torque Result
    - Units selected in the PSet
  - AAAA: Angle Result
    - Degrees
  - PPPP: Pulse Count
    - L = Low Pulse Count, M = High Pulse Count
  - 0000
  - J: Judgment
    - '@' = Overall Pass, 'H' = Low Torque, 'I' = High Torque, 'J' = Low Angle, 'K = High Angle, 'G' = Fault During Fastening, '*' = None of these conditions apply
  - CR: Carriage return control character
  - NULL*: Null control character (*if option is selected)

- 'CSV String'
  - S01,JB01, TTT.T, S, AAA.A, S, O, MM/DD/YYYY HH:MM:SS, VVV<CR><LF>
  - S01: Spindle number
  - JB01: Job number
  - TTT.T: Torque
  - S: Torque Status (A = OK, H = High, L = Low)
  - AAA.A: Angle
  - S: Angle Status (A = OK, H = High, L = Low)
  - O: Overall Status (A = OK, R = NOK)
  - MM: Month
  - DD: Day
  - YYYY: Year
  - HH: Hour
  - MM: Minute
  - SS: Second
  - VVV: 32 character barcode ID
  - <CR>: Carriage Return
  - <LF>: Line Feed

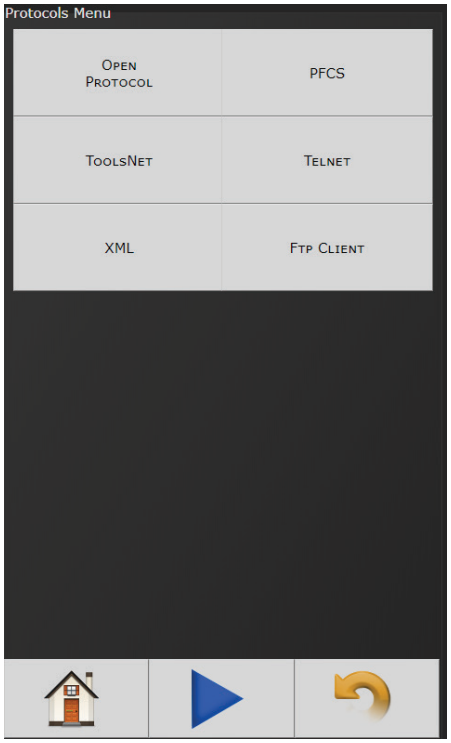
'Output Followed by NULL Character'.

- The NULL characters can be seen by using PUTTY and connecting to the controller in 'Raw' mode. Then set logging to log all output and check the log to see the NULL characters.

'Send PSet Change'.

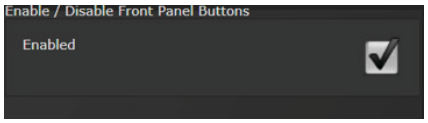
- PSets up to 9 match the number, 10-35 are A-Z, greater than 35 is '*':
  - %%CAN8X%%%%CAN4YNAC%%
  - X: Last PSet
  - Y: New PSet

4.4.4 Protocols



For information about these settings, see individual protocol instructions on AIMCO's website at www.aimco-global.com/manuals.

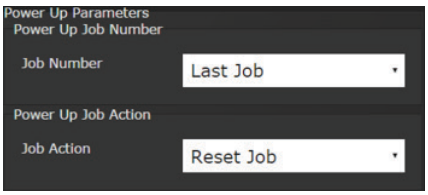
4.4.5 Front Panel Buttons



Enable/ Disable front panel buttons on controller console.

4.4.6 Power Up

Allows user several "Job" choices upon controller Power Up:



Power Up Job Number: Controller will power up on the job # selected. When "Last job" is selected, controller will power up on last job selected prior to being Powered Down.

- **Last Job:** Controller will default to last job performed.

Power Up Job Action

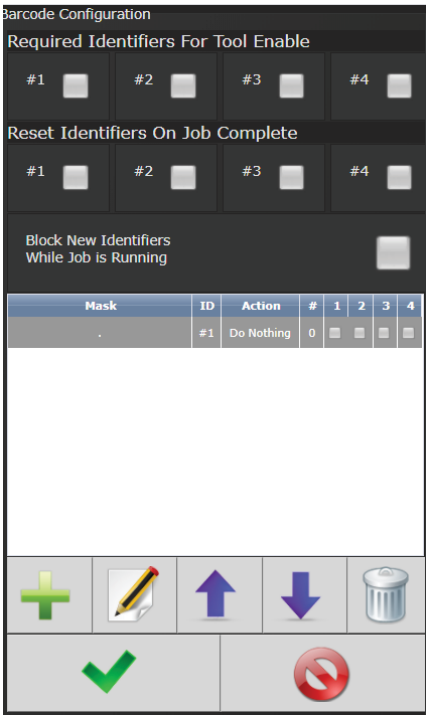
- **Reset Job:** Job will be reset when controller is Powered Up.
- **Wait for Job Reset:** Controller will wait for an External Job reset command upon Power Up and will retain job information existing prior to power down.
- **Resume Last Job:** Upon Power Up, tightening sequence will resume at the next fastening from the point in the job when power was shut down.

4.4.7 Bar Code Setup

Required Identifiers for Tool Enable: Selects which four Identifiers (ID#1-4) are required to enable tool.

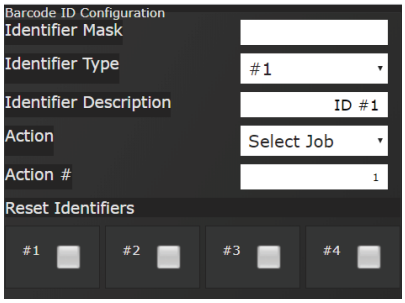
Reset identifiers for Job Complete: Selects which four Identifiers (ID#1-4) to reset on a job complete. Select Identifiers by clicking on them.

Block New Identifiers While Job is Running: Check to enable feature that ignores any barcode scanning while a JOB is in progress



Step 2: Enter appropriate information on Barcode ID Configuration Screen.

Identifier Mask: The Mask is a string used to compare against the received barcode. The received barcode must be at least as long in length as the Mask. The Mask can also contain "don't care" characters of a decimal point or period in the string. These characters are counted in the length, however, the actual received character in that position doesn't matter.



Example:

VIN#123456

Identifier Type: Identifies which identifier (ID#1-4) received barcode will be stored into.

Identifier Description: Text field can be used to give a description to each identifier type. (Example: Vehicle).

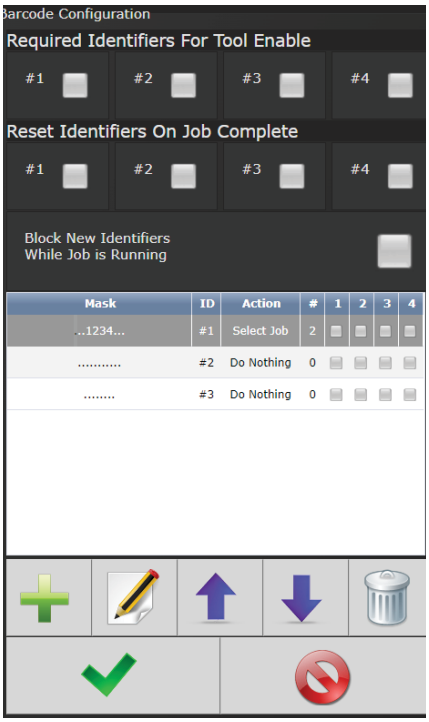
Action: Action executed by controller when barcode with a matching identifier mask is scanned. The actions are:

- Do Nothing
- Select Job (This will require a Job to be configured on the JOB page when using this option)
- Select PSet

Action #: When Select Job or Select PSet is selected, this is the number of the Job or PSet that will be selected.

Reset Identifiers: Can reset other identifiers (ID#1-4) when barcode is received. Click on identifiers to reset.

Step 3: Press  to save and re-enter completed barcode configuration screen.



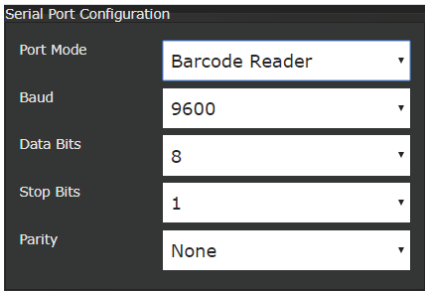
Click anywhere in body if additional identifiers are required.

Press  to save barcode configuration.

See "5. Barcode Reader Details" on page 34 for more information)

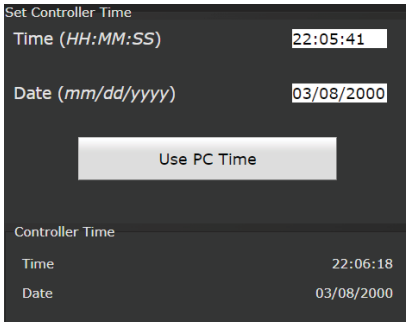
To configure Serial Port for Barcode Reader:
On Home page click Controller → Communication Interfaces → Serial

Select Barcode Reader and the correct Baud rate.



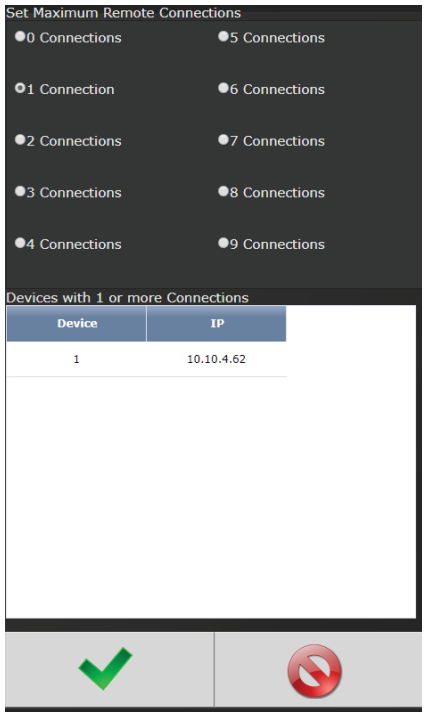
Press  to save changes.

4.4.8 Set Time



Set time and date. If connected to a PC, use PC Time to set controller time.

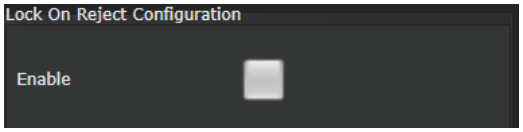
4.4.9 Remote Connections



Sets number of remote browser connections to controller.

4.4.10 Lock Tool on Reject

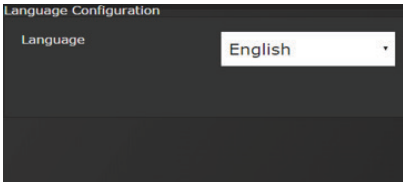
When enabled, the tool will be disabled after an NOK rundown. The tool can be enabled with the "Remove Lock on Reject" assignable input.



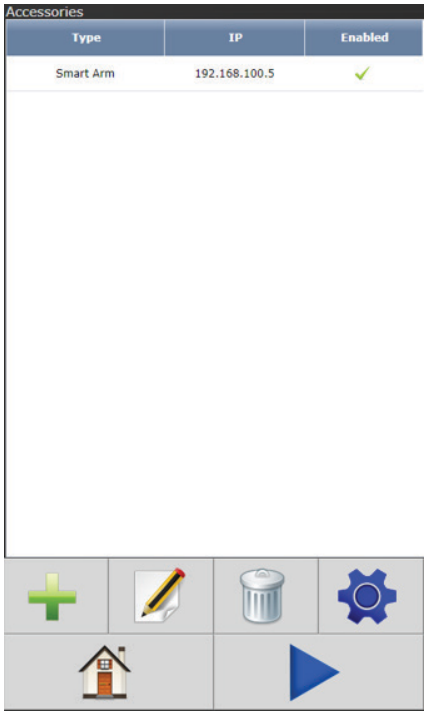
4.4.11 Languages

Select from:

- English
- Chinese
- Japanese
- Korean
- Spanish
- Portuguese

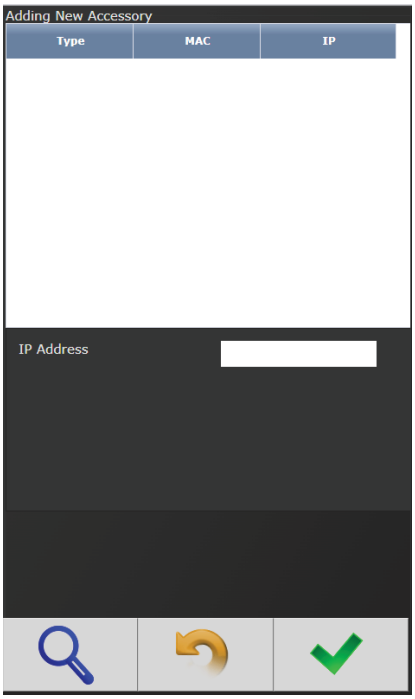


4.5 Accessories



This screen shows accessories configured in the controller. New accessories can be added, edited, and deleted using the buttons at the bottom of the table.

To add a new accessory, press  or  to navigate to the Accessory Scanning and Setup page.

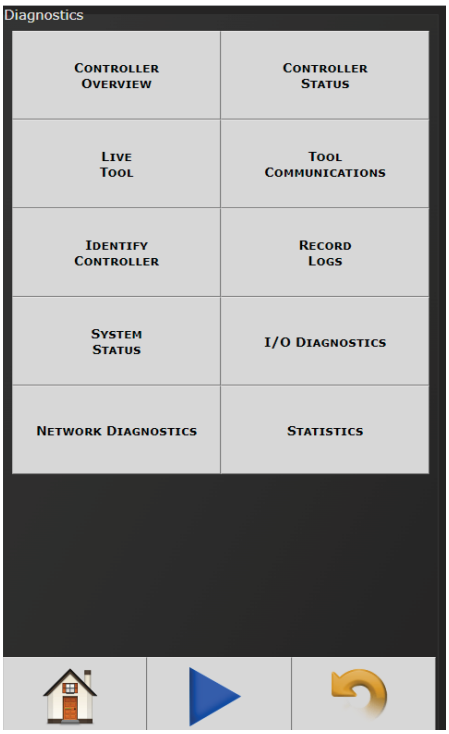


Press the scan button to search for AcraDyne accessories on the network or enter the IP address of the accessory manually

The Smart Arm Accessory allows an articulated arm with encoders to be used with the Gen IV controller. Fastener locations can be programmed into the controller so that the controller will perform specific actions when the tool is located on a specific fastener.

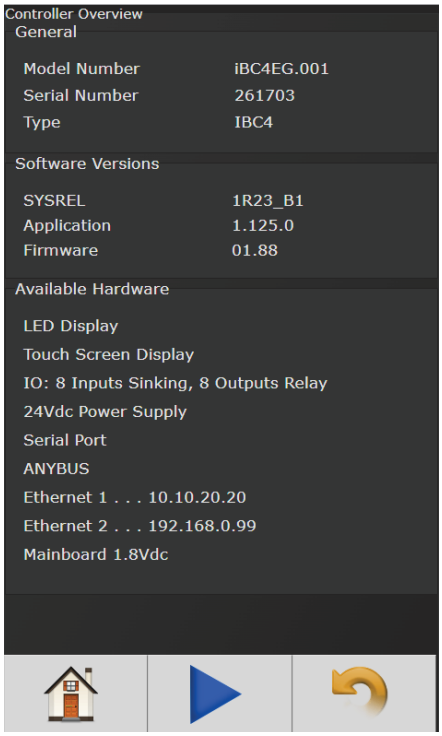
For more specific instruction contact: **AIMCO Technical Service, Toll Free 1-800-852-1368 or go to** www.aimco-global.com/Resources/Manuals and download the **Gen-IV Controller Smart Arm Configuration Manual.**

4.6 Diagnostics



The Diagnostics menu contains all pertinent information regarding unusual behavior of the system. Detailed descriptions are given below.

4.6.1 Controller Overview



Model Number: Model Number of the controller.

Serial Number: Serial Number of the controller.

Type: Type of controller:

- **IBC4**: Intelligent Battery Tool Controller

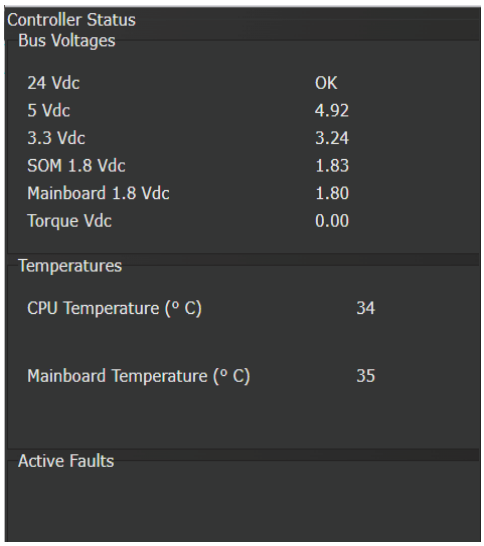
SYSREL: System Release # shown

Application: Current Application software version.

Firmware: Current Firmware software version.

Available Hardware: Available hardware on the controller.

4.6.2 Controller Status



Shows "Live" status of controller, voltages, active faults, and temperature.

Bus Voltages: Alarm icon will appear on controller console and under "Active Faults" (see below) if any of these values are out of range:

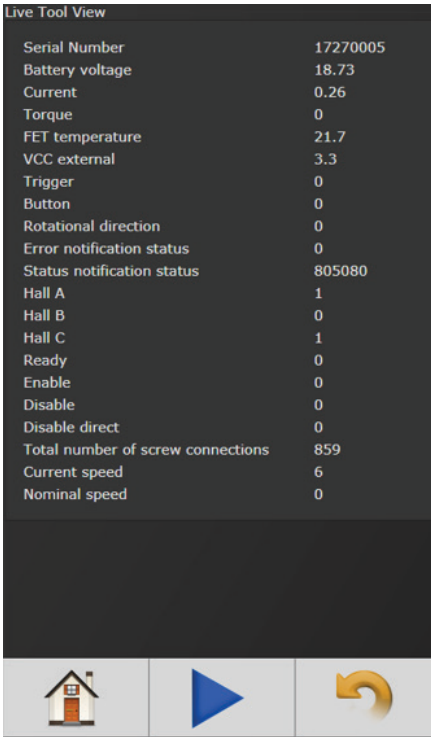
- **24 Vdc:** Represents voltage from 24V power supply. Value is reported as on or off (.0-24.0 volts) and is for external use via 24V I/O port.
- **5 Vdc:** Represents voltage from 5V power supply powering controller electronics.
- **3.3 Vdc:** Represents controller electronics internal 3.3V Bus voltage.
- **SOM 1.8 Vdc:** Represents controller electronics internal 1.8V Bus voltage
- **Mainboard 1.8 Vdc:** Represents controller electronics internal 1.8V Bus voltage
- **Torque Vdc:** Status indication of tool transducer voltage

CPU Temperature (°C): Represents temperature of CPU measured in Celsius.

Mainboard Temperature (°C): Represents temperature inside controller measures in Celsius.

Active Faults: Any tool/ controller faults will be shown in this area.

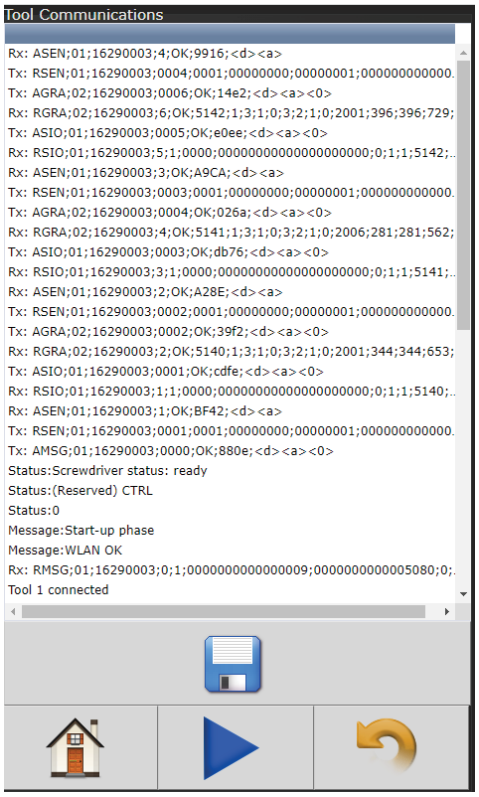
4.6.3 Live Tool



Current tool information is available on the Live Tool screen

4.6.4 Tool Communications

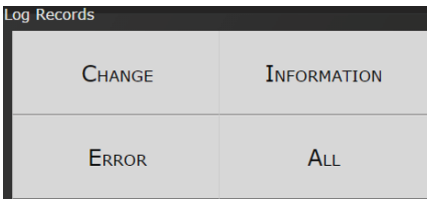
Shows real time communication between iBC controller and tool



4.6.5 Identify Controller

'Identify Controller' will cause lights on controller and tool to flash making the system easy to locate. This is especially helpful when programming is being done and multiple controllers are being used in close proximity to each other.

4.6.6 Record Logs



Logs information describing usage of controller and tools that have been used with that controller.

4.6.6.1 Change Log

Log displays changes made to tool or controller.

4.6.6.2 Information Log

Log displays all information entries.

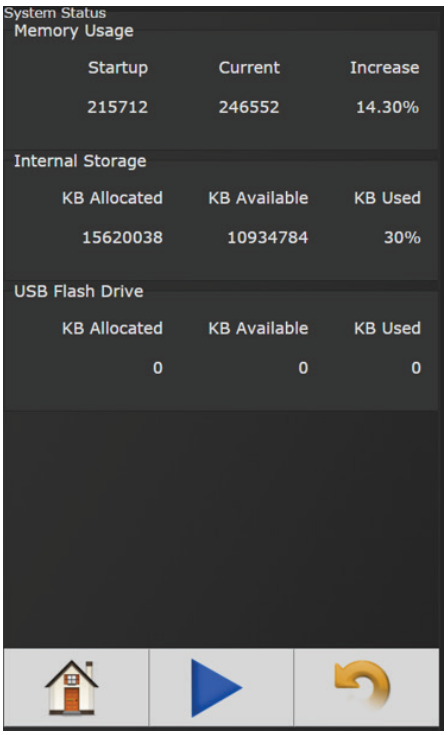
4.6.6.3 Error Log

Log displays ONLY Error Entries.

4.6.6.4 All

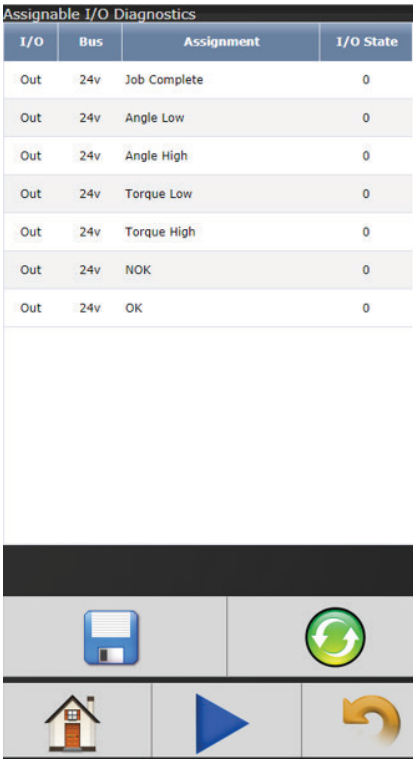
Displays all Changes, Information and Error entries.

4.6.7 System Status



4.6.8 I/O Diagnostics

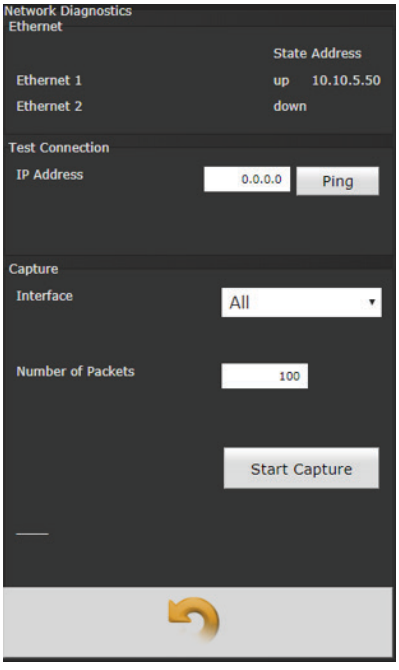
The I/O Diagnostics screen shows a log of all IO state changes from any assignable input or output. This can aid in verifying the correct functionality for IO configuration.



The refresh button will update the screen with the most recent IO changes.
The save button will generate a log file that can be viewed on a PC. This file can be downloaded when viewing from a PC or saved to a USB drive when using the controller touch screen. This saved CSV file contains much more detailed information (timing, IO settings, etc) than can be displayed on the controller screen.

4.6.9 Network Diagnostics

Network Diagnostics can be useful in troubleshooting Ethernet communication issues



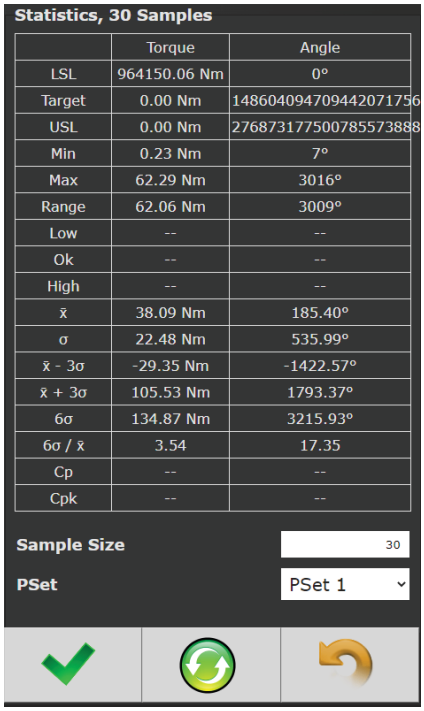
Ethernet: Shows if the Ethernet port is physically connected and if the hardware is operational.

Test Connection: Provides a way to check the ethernet connection to other devices on the same network.

Capture: Captures and saves the ethernet traffic for evaluation.

4.6.10 Statistics

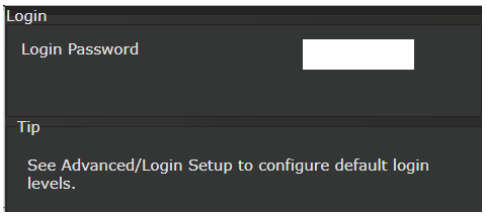
Enter the desired number of samples and PSET to observe calculated statistics. Number of samples must be equal to or less than the existing recent results stored within the controller. Statistics are presented as a courtesy to users who wish to review them in quick fashion on the controller screen.



The Lower Spec Limit (LSL) and Upper Spec Limit (USL) are the lowest and highest torque or angle values that should occur in the audit torque or angle stage. By default, the audit torque or angle stage is the last auditable stage. This can be changed in PSet → Edit Stage → Audit Options.

4.7 Login

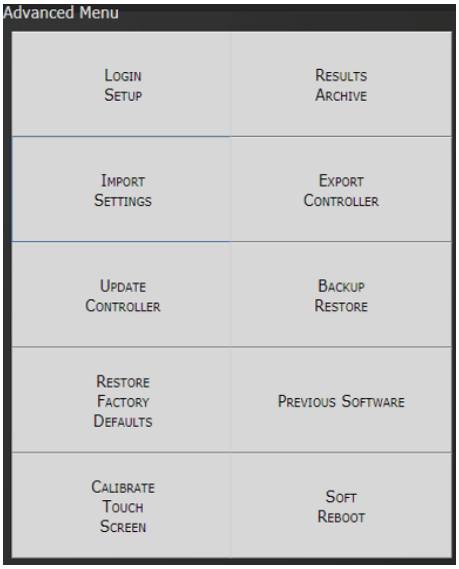
When a password is required it can be entered in this screen.



Three levels of access to the controller are available:

- **Operator:** Run/Login/View PSet screens available.
- **Technician:** Run/PSet/Job/Diagnostics and Login screens available.
- **Administrator:** All screens available.

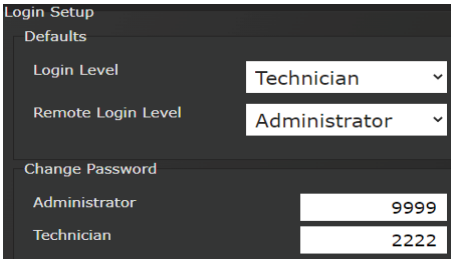
4.8 Advanced



The 'Advanced' menu handles complex settings within the controller. Detailed descriptions are given in the following sections.

4.8.1 Login Setup

This screen allows the user to select the default Login level upon controller start up.



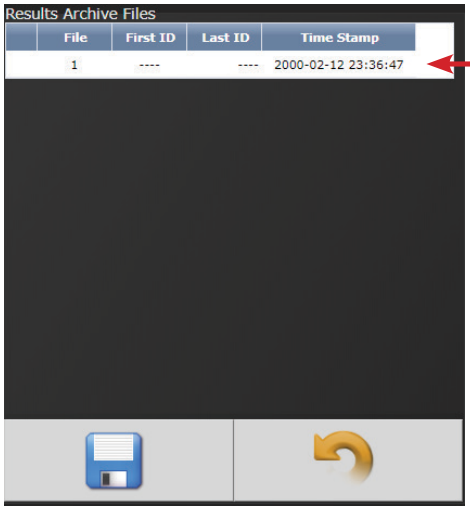
- **Operator**
- **Technician**
- **Administrator**

The Remote Login Level sets the default login level for remote sessions, allowing administrators to avoid logging in when accessing the controller over the network.

4.8.2 Results Archive

See below

4.8.2 Results Archive



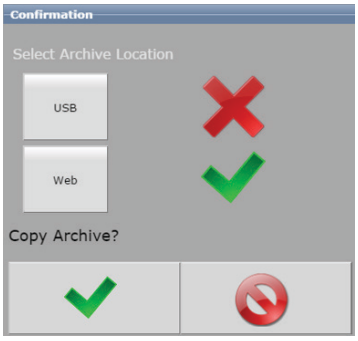
Select a file and press 

Approximately one million rundowns can be stored. Twenty files with approximately 50,000 rundowns are maintained at a time. The user can, at any time, save the runs to either a USB stick or to the Web as a CSV file imported directly into an Excel spreadsheet.

Using the touchscreen console, you can select multiple files to save.

Using the web option, you can select one of these files at a time to save (web option is default).

Select either USB or Web Archive location.



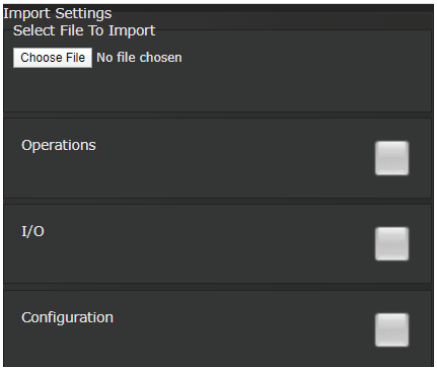
Example of Saved Excel File

Rundown	Job Num	Job Name	Sequence	Bolt count	Status	Date	Time	Torque	Status	Angle	Status	PSet Num	PSet Name	Tool Mode	Tool Serial	Id1 (ID #1	Id2 (ID #2	Id3 (ID #3	Id4 (ID #4)
2068	0		0	0	P	########	11:13:42	5.08	P	480	--	1			0				
2069	0		0	0	P	########	11:13:49	5.054	P	535	--	1			0				
2070	0		0	0	P	########	11:13:50	5.002	P	450	--	1			0				
2071	0		0	0	P	########	11:13:52	5.013	P	595	--	1			0				
2072	0		0	0	P	########	11:13:53	5.085	P	495	--	1			0				
2073	0		0	0	P	########	11:13:54	5.1	P	440	--	1			0				
2074	0		0	0	P	########	11:13:56	5.089	P	575	--	1			0				

4.8.3 Import Settings

This allows the user to download any previously saved settings onto the controller (refer to 'Export Controller' for help with saving data).

1. Plug the USB with an export file into any port on the controller.
2. From the Home screen, navigate to Advanced → Import Settings.
3. Select the settings to be checking the corresponding box ☑



Operations: This includes PSets and Jobs.

I/O: This includes I/O settings for the local I/O, Anybus, Modbus, and EtherNet/IP.

Configuration: This includes all settings of the controller except I/O, Master Spindle, Rundowns, PSets or Jobs.

Spindle: This includes any Master Spindle setup (i.e. number of spindles, IP addresses, etc).

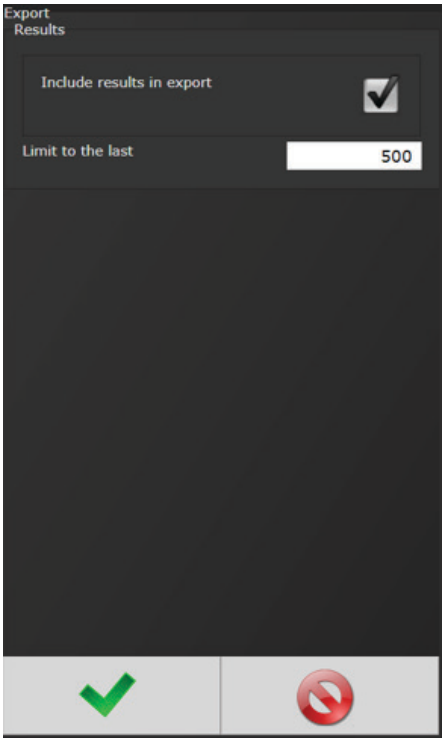
4. Press ✔ to accept the changes.
5. Press ✔ to proceed.
6. Press ✔ when the import is complete and the controller will restart.

Import settings that were exported from another controller via a USB flash drive. Use this to quickly apply the same settings across several controllers. For example, it is common to have multiple controllers with the same I/O configuration. Set up one controller with the correct I/O configuration and export the controller from Advanced → Export Controller. Now the I/O settings can be imported using this screen.

NOTE: Setting can only be imported from controllers running the same version of software.

4.8.4 Export Controller

This allows the user to save Configuration, Operations, I/O, and Spindle settings onto a USB flash drive.

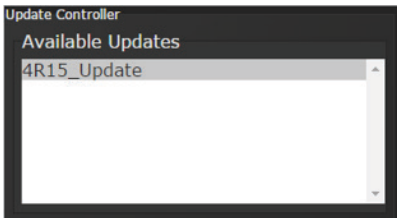


1. Plug a USB into any port on the controller.
2. From the Home screen, navigate to Advanced → Export Controller.
3. Press ✔ to continue, and the controller will begin the export process.
4. Press ✔ to complete the export.

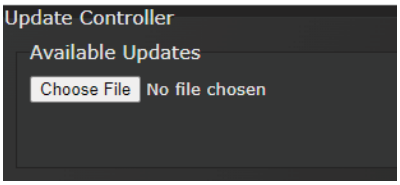
4.8.5 Update Controller

NOTE: Updated firmware versions will typically be sent via email zip file. Always save PSet and IP address information before upgrading controller.

Upgrading the AIMCO Gen IV Controller
Using the TouchScreen or a System Port browser session, navigate to the 'Advanced' menu. Click 'Update Controller.'

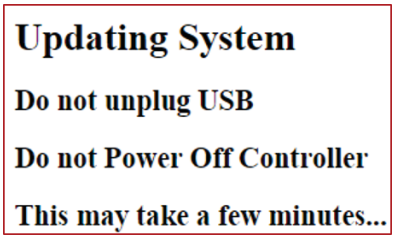


If a USB stick containing the zip file has been plugged in to the controller, the file will show in the Available Updates list. Select the latest release and click ✔ when ready.



If updating through a system port browser session, a dialog box will appear. Click the Choose File button and navigate to the folder where the zip file is located on the computer. Select the latest release and click ✔ when ready.

After the controller restarts, the user should see following messages



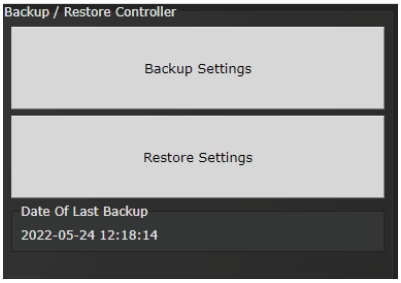
Controller Upgrade Notification

When the controller has finished, navigate to Diagnostics → Controller Overview to view any changes to the 'Software Versions'. Any system settings (Ethernet IP address, PSets, Jobs, etc.) will remain unchanged.

4.8.6 Backup Restore

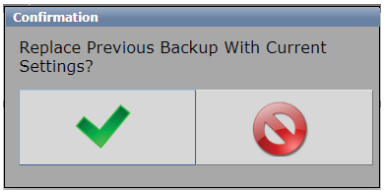
The Backup function allows the user to create an image of the controller software/firmware including all Configurations, Operations, I/O, and Spindle settings. This is used to create a point in which the controller can restore to if the need arises. In that case, the Restore function would be used.

1. From the Home screen, navigate to Advanced → Backup Restore.



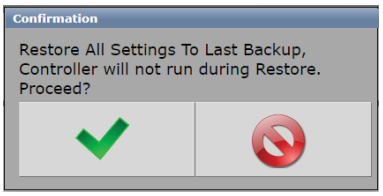
2. Press Backup to initialize the backup process.

3. Press ✔ to replace previous backup with current system, the backup process will begin.



4. Press **Restore** to initialize the restore process.

5. Press ✔ to restore all settings and firmware to last backup, the restore process will begin.

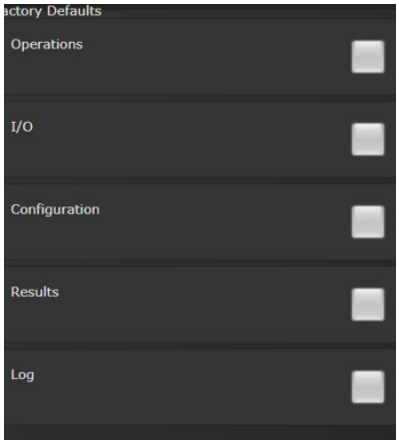


6. The controller will restart when finished.

4.8.7 Restore Factory Defaults

This allows the user to reset the controller's parameters to factory settings

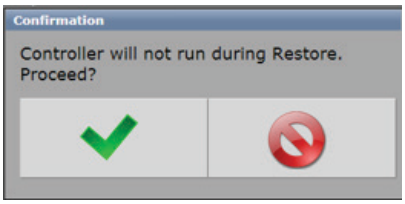
1. From the Home screen, navigate to Advanced → Restore Factory Defaults.
2. Select the settings to be changed and accept ✔



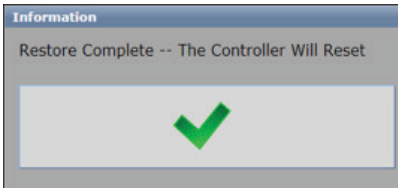
- **Operations:** This includes PSets and Jobs.
- **I/O:** This includes I/O settings for the local I/O, Anybus, Modbus, and EtherNet/IP.
- **Configuration:** This includes all settings of the controller except I/O, Master Spindle, Rundowns, PSets or Jobs.
- **Results:** This includes all rundown data / information
- **Log:** This includes the Change, Information, Error, and Combined logs.

3. Press ✔ to accept the changes.

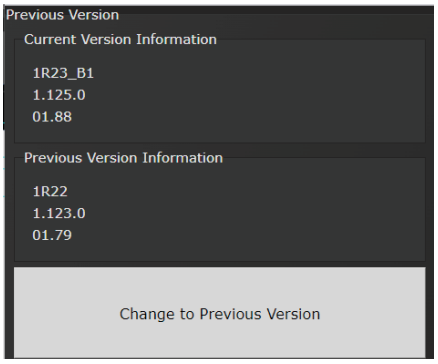
4. Press ✔ to proceed.



5. Press ✔ when the calibration is complete, the controller will restart.



4.8.8 Previous Software



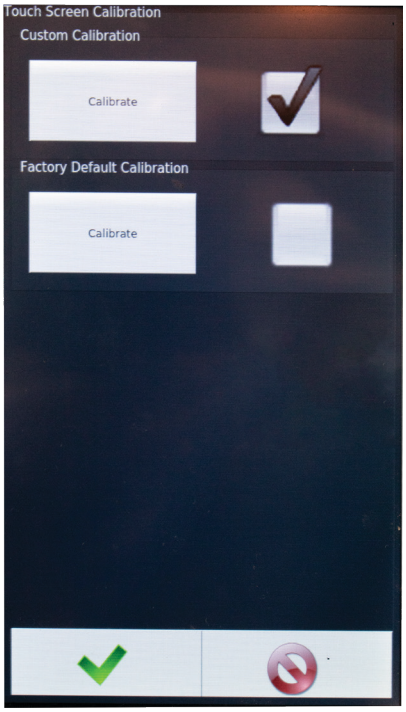
The 'Previous Software' page enables users to change the software to an alternate version. When the controller is updated, the previous version will be retained to easily revert versions. Settings are not affected. Any changes to settings are retained when changing to an alternate version. The screen shows the current version along with the version information of the alternate version.

This feature is only available for versions 3R19 going forward. It is not possible to revert to a release earlier than 3R19.

4.8.9 Calibrate Touch Screen

Custom and Factory default calibration are available on the controller console.

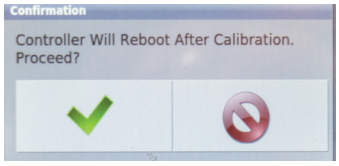
1. From the Home screen, navigate to Advanced → Calibrate Touch Screen.
2. Press ✔ to disable the tool.
3. Select the desired calibration



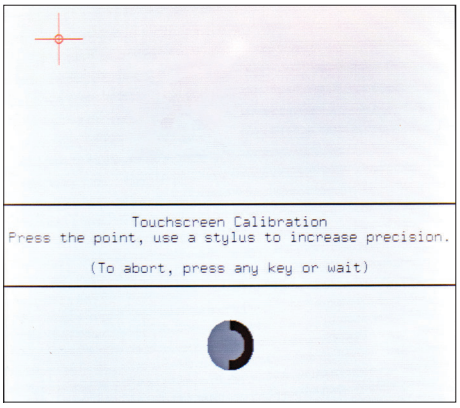
Custom Calibration: This allows the user to create a custom calibration setting for the touch screen.

Factory Default Calibration: This calibrates the touchscreen to the factory defaults.

4. Press ✔ to accept the selection.
5. Press ✔ to proceed.



In the case of custom calibration, a screen will appear with instructions on how to increase precision.



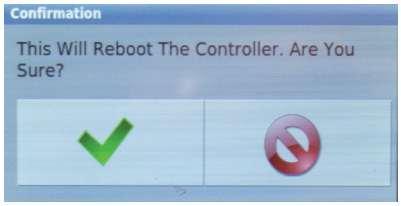
6. Press ✔ when the calibration is complete, the controller will restart.

NOTE: The controller may need to be reset before the custom calibration is possible.

4.8.10 Soft Reboot

Restart the controller without turning the power off.

1. From the Home screen, navigate to Advanced → Soft Reboot.
2. Press ✔ to proceed, the controller will restart.



5. Barcode Reader Details

The Gen IV iBC controller supports the following barcode reader functionality:

- Support up to four identifiers.
- Each rundown result can be associated with up to four identifiers.
- Identifier(s) can be used to select a parameter set or a job.
- Display identifier(s) on controller.
- Ability to lock-out tool until correct identifier(s) is entered.
- Ability to block barcode reads while a job is in progress.
- Barcode reads (identifiers) can come from any or all the following sources:
  - Serial barcode reader
  - Open protocol
  - Fieldbus network
  - Telnet port

Solution
Regardless of the source (serial barcode reader, telnet, fieldbus, or protocol) each new string is passed through the same process:

- All four identifiers are reset to an empty string on power-up.
- Each received barcode is processed through a Barcode Match Table to look for a match, if one is found the barcode is accepted.
- Each fastening will then be associated with the received barcode(s) until a new one is received or they are reset.

Parameters
The parameters that pertain to the processing of barcode strings:

- The Barcode Match Table is used to identify the newly received barcode string.
- Which of the four Identifiers (ID#1-4) are required to enable the tool?
- Which of the four Identifiers (ID#1-4) to reset on a job complete?
- Parameter to disable all barcode reads while a job is in progress. If set, barcode reads will be disabled after the first fastener is ran until job is complete.

Barcode Match Table
The Barcode Match Table is used to identify which barcode has been received. The controller can have up to 99 entries (rows) in the table. Each entry has actions that will be performed when a matching barcode is received. The table is searched from top to bottom in an attempt to find a matching barcode. If none are found, the barcode is ignored.

Mask
The Mask is a string used to compare against the received barcode. The received barcode must be at least as long in length as the Mask. The Mask can also contain "don't care" characters of a decimal point or period in the string. These "don't care" characters are counted in the length but the actual received character in that position doesn't matter.

Identifier Type
The "Identifier Type" field identifies which identifier (ID#1-4) the received barcode will be stored in.

Action
Action can be one of the following:
- None
- Select PS#1-256
- Select Job#1-20

Reset ID
The "Reset ID" has the ability to reset other identifiers (ID#1-4) when barcode is received.

Examples:

Operator Scans
When a vehicle enters the station, the operator scans the VIN. The controller selects the correct job number and enables the tool. Each fastener will be identified with this VIN stored locally, and/or sent to a server for storage. The job settings will disable the tool when the job is complete.

Setup
In this example, there are three possible vehicle types each with its own job. The barcode scan will select the correct job (enabling the tool) and the scan will be stored into ID#1.

				Reset ID			
Mask	ID type	Action		ID#1	ID#2	ID#3	ID#4
"VIN…..7…"	ID#1	Select Job#	1	No	No	No	No
"VIN…..8…"	ID#2	Select Job#	2	No	No	No	No
"VIN…..9…"	ID#3	Select Job#	3	No	No	No	No

The tool enable/disable will be controlled by the job settings; the correct job will be selected by the barcode scan. The "ID Required to Enable the Tool" feature does not need to be utilized.

Required Identifiers for Tool Enable			
ID#1	**ID#2**	**ID#3**	**ID#4**
No	No	No	No

These settings are irrelevant since the only way to enable the tool is with a new job and the only way to select a new job is to scan a new barcode.

Reset Identifiers on Job Complete			
ID#1	**ID#2**	**ID#3**	**ID#4**
Yes	No	No	No

Examples
This is what the 'Operator Scans' example looks like once set up in the Barcode Configuration Screen (see "4.4.7 Bar Code Setup" on page 24).

Airbag Install
The customer wants to track the serial number of each airbag being installed, as well as the operator installing it. When the operator reports to the station, they will scan their employee ID. When the vehicle comes into the station, the operator scans the VIN of the vehicle and the serial number of the airbag. Once all three scans are received, the tool is enabled. Once the correct number of fasteners are installed, the tool is disabled by the job settings. From that point, the operator only needs to scan the vehicle and the airbag to enable the tool.

Setup
We will assign the employee ID to ID#1, the vehicle VIN to ID#2, and the airbag serial number to ID#3. Scanning a new employee ID will reset the other IDs and force a scan of the vehicle VIN and airbag serial number. The scan of the vehicle VIN will also select the correct job number.

Mask	ID type	Action		Reset ID			
				ID#1	ID#2	ID#3	ID#4
"EMP…."	ID#1	None		No	Yes	Yes	No
"VIN……."	ID#2	Select Job#	1	No	No	No	No
"SN……."	ID#3	None		No	No	No	No

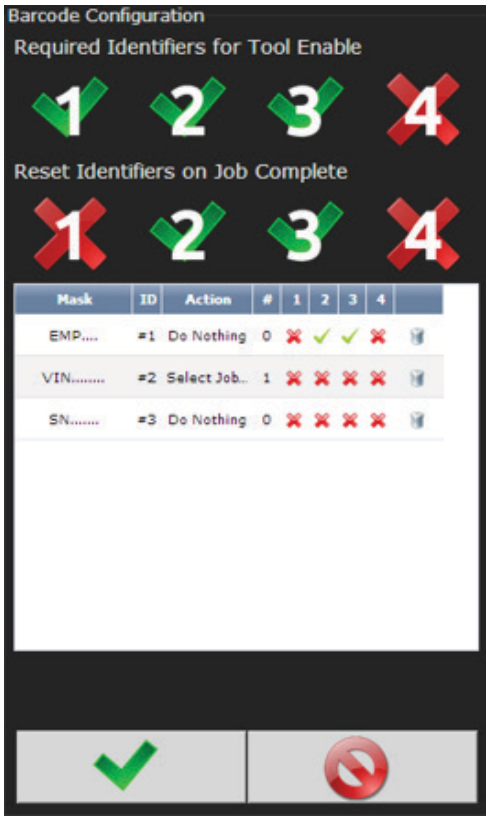
Once all three scans are received, the tool will be enabled.

Required Identifiers for Tool Enable			
ID#1	**ID#2**	**ID#3**	**ID#4**
Yes	Yes	Yes	No

When job is complete, the vehicle VIN will be reset and the airbag serial number, but not the employee ID; this way subsequent vehicles will only require a VIN and S/N to enable tool.

Reset Identifiers on Job Complete			
ID#1	**ID#2**	**ID#3**	**ID#4**
No	Yes	Yes	No

This is what the Airbag Install example looks like set up in "4.4.7 Bar Code Setup" on page 24.



6. Tohnichi Wrench Details

Serial Port Mode "Tohnichi Wrench"

The Gen IV iBC controller supports connecting a Tohnichi wrench/R-CM receiver. The R-CM receiver connects to the Gen IV controller via the serial port with a straight through serial cable (do not use a null modem cable). The R-CM receiver data format needs to be configured as "STD" (the default setting). Once configured the controller will monitor the serial port for a string from the R-CM receiver and record the click as a manual install.

The manual install record will contain the following data from the wrench:

- Torque value
- Torque units (the following units are supported Nm, Kgcm, Kgm, Lbin, Lbft)
- 7 digit ID (will be recorded as the tool S/N)
- Angle when supported by the wrench
- Low, High, or OK status in some configurations

Using the controller parameter set to evaluate the click results:

Setting all the limits in the R-CM receiver to 0 (default) will cause it to report the values without any status. In this setup, the controller will evaluate the value(s) against the current parameter set limits and generate the correct status. Then report the status back to the R-CM receiver and wrench.

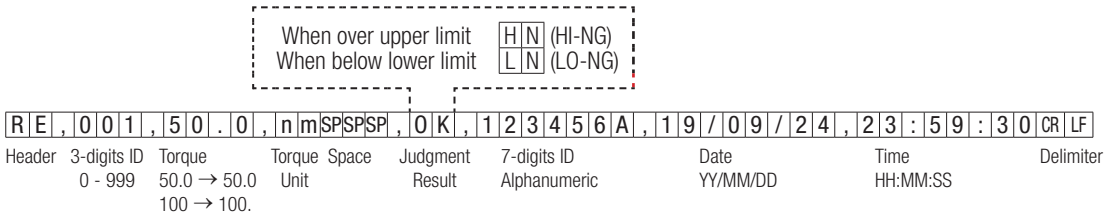
Using the R-CM receiver to evaluate the click results:

Setting limits in the R-CM receiver will cause it to report the status to the wrench and the controller. In this setup the controller parameter set settings are ignored.

Wrench Configuration

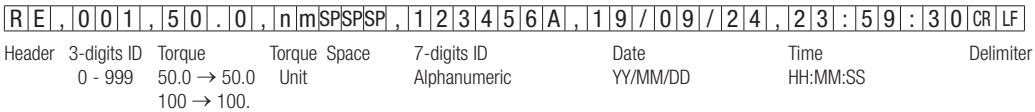
The controller supports torque and torque/angle wrenches and both modes of operation. The four possible wrench/configurations from the R-CM are as follows:

1. Torque only wrench with limits programmed in the R-CM
   - R-CM output format would be as follows:



   - The controller will use the status from the record

2. Torque only wrench with no limits programmed in the R-CM
   - R-CM output format would be as follows:



   - The controller will evaluate the torque value against the current parameter set low and high torque limits and set the results accordingly
   - The controller will tell the R-CM module the Low, High, or OK status

3. Torque and angle wrench with limits programmed in the R-CM
   - R-CM output format would be as follows:

Torque Result	Angle Result	Judgment	
OK	OK	O	O
OK	HIGH NG	O	H
OK	LOW NG	O	L
High NG	OK	H	O
High NG	HIGH NG	H	H
High NG	LOW NG	H	L
Low NG	OK	L	O
Low NG	HIGH NG	L	H
Low NG	LOW NG	L	L

R	E	,	0	0	1	,	5	0	.	0	,	n	m	SP	SP	SP	,	0	4	5	,d	e	g	,	0	0	,	1	2	3	4	5	6	A	,	1	9	/	0	9	/	2	4	,	2	3	:	5	9	:	3	0	CR	LF
Header			3-digits ID 0 - 999				Torque 50.0 → 50.0 100 → 100.					Torque Unit					Space	Angle 45 → 045 120 → 120				Angle Unit			Result			7-digits ID Alphanumeric								Date YY/MM/DD								Time HH:MM:SS								Delimiter		

   - The controller will use the status from the record.

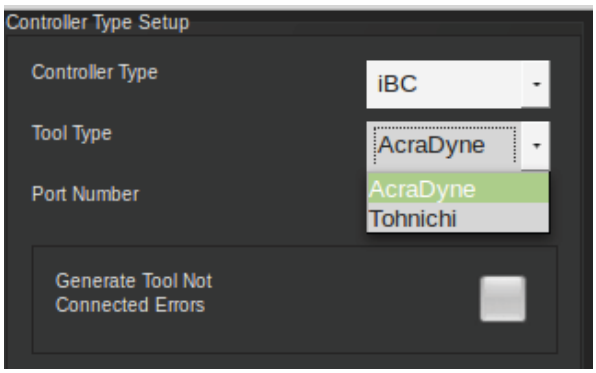
4. Torque and angle wrench with no limits programmed in the R-CM
   - R-CM output format would be as follows:

R	E	,	0	0	1	,	5	0	.	0	,	n	m	SP	SP	SP	,	0	4	5	,d	e	g	,	1	2	3	4	5	6	A	,	1	9	/	0	9	/	2	4	,	2	3	:	5	9	:	3	0	CR	LF
Header			3-digits ID 0 - 999				Torque 50.0 → 50.0 100 → 100.					Torque Unit					Space	Angle 45 → 045 120 → 120				Angle Unit			7-digits ID Alphanumeric								Date YY/MM/DD								Time HH:MM:SS								Delimiter		

   - The controller will evaluate the torque and angle values against the current parameter set low and high torque and angle limits and set the results accordingly
   - The controller will tell the R-CM module the Low/High torque, Low/High angle or OK status.

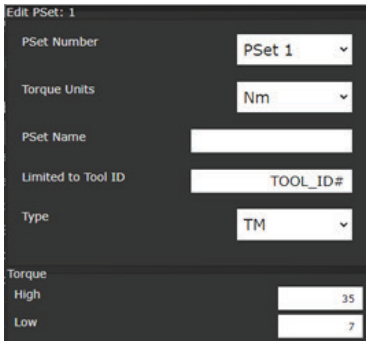
Using an iBC as a Standalone Tohnichi Monitor

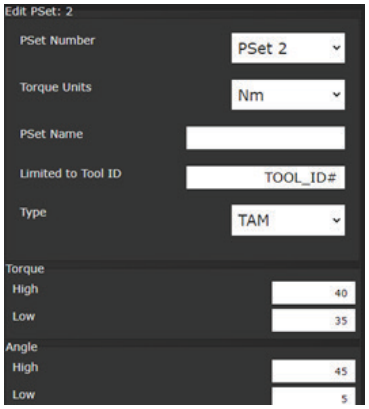
A standard iBC can be configured as a Tohnichi wrench monitor with or without the monitoring parameter sets programmed into the controller. In the "Controller Type Setup" screen there is an option to select the "Tool Type" between AcraDyne or Tohnichi. Setting it to Tohnichi will disable the use of an AcraDyne tool and force the serial port option to Tohnichi Wrench.



This will also enable the parameter set menu where the user will be able to create a torque or torque and angle monitor strategy.

If the "Limited to Tool ID" parameter" is populated, rundown results only from the Tohnichi wrench with the matching ID will be evaluated and recorded.



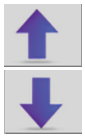


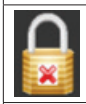
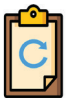
If the R-CM has limits programmed, the controller parameter sets will be ignored.

7. Glossary of Terms

Accept Tone	Controls tone made from handle of handheld tools for accepted fastening cycles.
Angle	Degree fastener rotates from snug, or threshold level, to peak torque.
Cycle Complete	Torque level that determines completion of a fastening cycle.
High Angle	When peak angle recorded exceeds High Angle, the fastening cycle is recorded as a reject for High Angle, the High Angle light (flashing yellow) illuminates and fastening cycle is given an overall status of NOK.
High Torque	When peak torque recorded exceeds the High Torque, the fastening cycle is recorded as a reject for High Torque, the High Torque light (flashing red) illuminates and fastening cycle is given an overall status of NOK.
Job	A Job is a collection of Psets or Multi-stages, which are useful when performing several multiple fastening operations, each with different requirements. This is convenient since the operator does not have to select a new Pset or Multistage for every fastening.
Low Angle	When the peak angle recorded during the Angle Audit Step fails to reach the Low Angle, fastening cycle is recorded as a reject for Low Angle, the low angle light (flashing yellow) illuminates and fastening cycle is given an overall status of NOK.
Low Torque	When the peak torque recorded fails to reach the Low Torque, fastening cycle is recorded as a reject for Low Torque, the Low Torque light (flashing red) illuminates and fastening cycle is given an overall status of NOK.
Parameter Set	A Parameter Set is a collection of instructions that define how the tool should perform the fastening process. It may be selected from the console or device such as a socket tray or PC
Snug Torque	Controller begins to monitor tool for angle at a preselected threshold torque. Any increase in angle, after the snug point, results in a corresponding increase in tension or clamp load within the joint.
Speed	Speed at which tool operates during the initial portion of the fastening cycle prior to downshift.
Spindle	A spindle represents a connection to a handheld, or fixtured, tool connected to a controller.
Strategy	Identifies the variables being used to control tool during a fastening cycle.
Thread Direction	Sets assembly direction to clockwise (CW) or counter clockwise (CCW).
Threshold Torque	Sets point at which tool is "In Cycle".
Torque Calibration	Determines how torque values are assigned to the electrical signals for torque transducer on tool. Value is unique to each tool and changes over time.
Torque Target	When the tool is being controlled for torque, the torque target instructs controller when to shutoff tool. Torque target should be greater than Low Torque and less than High Torque, this is required for torque control.

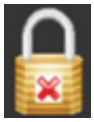
8. Icons Defined

Icon	Description	Function	Where Used
	Home Navigation Button	Navigate to the main menu ("HOME") screen.	All screens except for edit screens.
	Run Navigation Button	Navigate to the Run Screen.	All screens except for edit screens.
	Run Screen Select Buttons	Switch between the different run screen pages.	Run Screen
	Go Back Button	Navigate to one menu level back.	All screens except for edit screens.
	Accept Changes Button	Accept the changes made and return to the parent screen.	Edit screens
	Cancel Changes Button	Reject the changes made and return to the parent screen.	Edit screens
	Add New Button	Add a new item (Pset, Stage, Job, and other).	PSet and Job edit screens.
	Edit Button	Edit selected Item.	PSet and Job edit screens.
	Move Up and Down Buttons	Move selected item up or down in the sequence order.	PSet and Job edit screens.
	Copy Button	Copy selected Items	PSet, Job, and other edit screens.
	Delete Button	Remove or un-assign selected items.	Edit and list view screens.
	Filter Button	Filter Items in a list or table.	List view screens
	Save Button	Save selected item to file.	List view screens
	Select Columns Button	Allows customization of columns shown on the Results Screen.	Results Screen
	Fault Indicator	Fault exists that is preventing the tool from running (can be pressed for more Info).	Run Screen
	Invalid PSet Indicator	Selected Pset does not exist or is not valid.	Run Screen

Icon	Description	Function	Where Used
	Barcode Scan Required Indicator	A barcode is required to enable the tool.	Run Screen
	Job Complete Indicator	Job is complete.	Run Screen
	Lock on Reject (LOR)	Lock tool on rejected fastener.	Run Screen
	Disassembly	A disassembly event has been detected.	Run Screen
	Job Reset Complete	Reset Job has finished. Results from last successful rundown of a job are cleared.	Add New Job Screen
	Scan	Search for accessories on the network	Add Accessories Screen

9. Stop Codes

If a Stop condition is detected that prevents the tool from running, a code will appear on the LED display. Any active stop conditions are also displayed on the RUN screen.

Code	Icon	Description
IO		Stopped or Disabled from Physical 24 volt IO input
ABUS		Stopped or Disabled from ANYBUS
MODB		Stopped or Disabled from Modbus
EIP		Stopped or Disabled from Ethernet IP
RTU		Stopped or Disabled from Modbus RTU
OP		Stopped or Disabled from Open Protocol
OP		Lost Open Protocol Connection
REV		Disassembly Disabled
ARM		Tool Requires Arming – MFB button configured to enable the tool to run.
JOB		Job Sequence Complete
JOB		Job Complete
JOB		XML Count Complete
LOR		Locked on Reject

Code	Icon	Description
BRCD		Bar Code ID scan required to enable tool
SRVC		Tool Disabled For Service - Tool service or calibration interval has expired
INVP		Invalid PSet - Parameter set number for a non-existent Pset has been selected to run. Most likely via one of the following methods: ◦ Job ◦ MFB ◦ I/O
INVP		PSet outside of Job - Parameter set number outside of the job has been selected. Most likely via one of the following methods: ◦ MFB ◦ I/O
INVJ		Invalid Job - Job number for a non-existent Job has been selected to run. Most likely via one of the following methods: ◦ MFB ◦ I/O
PSET		PSet Mismatch
SPND		Spindle Not Configured – Spindle selected to run from a Multi-Spindle Job has not been configured
NET		XML Disconnected
XML		Stop from XML
NOK		XML Max Rejects Exceeded
FLT		Controller Fault - Error has been detected. See fault code list for details

10. Error Codes

If an error condition is detected that prevents the tool from running, a fault code will appear on the LED display. Any active faults are also displayed on GUI RUN screen. Fault history can be viewed in the Controller Error Log.

IBC (AcraDyne DC Tool) Specific Fault Codes

CODE	Fault Type	Description	Possible Causes
BT01	Tool Not Connected	Tool is not communicating with the controller	• Tool battery unplugged • Tool out of Wi-Fi Range • Tool Wi-Fi or IP settings not configured correctly
BT02	Tool Voltage Error	Error reported by the tool	• Faulty Tool electronics
BT03	Excessive Current	Error reported by the tool	• Maximum allowable current exceeded
BT04	Excessive Force	Error reported by the tool	• Maximum allowable torque exceeded
BT05	USB Mode	Error reported by the tool	• Tool is in programming mode
BT06	WLAN Error	Error reported by the tool	• Tool out of Wi-Fi Range • Tool Wi-Fi or IP settings not configured correctly
BT07	SD Card Error	Error reported by the tool	• Missing or corrupted SD card • Faulty Tool electronics
BT08	FET excessive temperature	Error reported by the tool	• Duty cycle too high • Faulty Tool electronics
BT09	Motor excessive temperature	Error reported by the tool	• Speed settings too low
BT10	Angle encoder error	Error reported by the tool	• Maximum allowable current exceeded
BT11	VCC excessive voltage	Error reported by the tool	• Faulty Tool electronics
BT12	VCC insufficient voltage	Error reported by the tool	• Faulty Tool electronics
BT13	Excessive internal temperature	Error reported by the tool	• Duty cycle too high • Faulty Tool electronics
BT14	Motor stopped	Error reported by the tool	• Tool Stalled
BT15	Spool full	Error reported by the tool	• Rundown data storage full
BT16	Spool error	Error reported by the tool	• Rundown data storage faulty
BT17	No data from digital sensor	Error reported by the tool	• Faulty Tool electronics
BT18	CRC error in program level	Error reported by the tool	• Programming Download Error
BT19	Error: program level does not exist	Error reported by the tool	• Programming Error
BT20	User flash error	Error reported by the tool	• Programming Download Error
BT21	Program sequence error	Error reported by the tool	• Programming Error
BT22	Torque Sensor Error	Error reported by the tool	• Tool electronics error

Gen4 Common Hardware Fault Codes

Code	Fault Type	Description	Possible Causes
FH17	1.8vdc MB out of tolerance	Main board 1.8 bus voltage exceeds electrical limits	• Faulty Controller main board or other Controller electronics
FH18	1.8vdc SOM out of tolerance	System on Module 1.8 bus voltage exceeds electrical limits	• Faulty Controller main board or other Controller electronics
FH19	3.3vdc out of tolerance	Main board 3.3 bus voltage exceeds electrical limits	• Faulty Controller main board or other Controller electronics
FH20	5vdc out of tolerance	5 Volt bus voltage out of range	• Faulty power supply or wiring • Faulty Controller main board or other Controller electronics
FH21	9vdc out of tolerance	9 Volt bus voltage out of range	• Faulty power supply or wiring • Faulty Controller main board or other Controller electronics • Faulty tool cable • Faulty tool electronics or wiring
FH22	24 volt level low	24 Volt I/O power not detected	• Faulty power supply or wiring • Short or other problem with external connections to the 24Volt I/O port.
FH23	Controller temp high	Controller's internal temperature exceeds limit	• Ambient air temperature exceeds rating of Controller
FH24	+15vdc out of tolerance	+15 Volt bus voltage out of range	• Faulty power supply or wiring • Faulty Controller main board or other Controller electronics • Faulty tool cable • Faulty tool electronics or wiring
FH25	–15vdc out of tolerance	–15 Volt bus voltage out of range	• Faulty power supply or wiring • Faulty Controller main board or other Controller electronics • Faulty tool cable • Faulty tool electronics or wiring
FH32	Processor Fault	RTOS processor not communicating with the Application processor	• Faulty mainboard electronics • RTOS processor firmware corrupted or not loaded • Faulty SOM board or connector

11. 24 Volt I/O

Port Pinout and Diagrams

An I/O wiring adapter kit is available (Part #**27348**) from AIMCO to make connection to I/O port on the controller easier. Contact your AIMCO Sales Representative for ordering information. Toll Free: 1-800-852-1368.

Pin #	Function	Default Assignment
1	Output 1	Torque Low
2	Output 2	Angle High
3	Output 3	Angle Low
4	Output 4	Job Complete
5	Outputs 1-4 common	
6	Input 1	
7	Input 2	
8	Input 3	Disable Tool
9	Input 4	PSet Bit 1
10	Input 5	PSet Bit 2
11	Input 6	PSet Bit 3
12	Input 7	Reset Job
13	Input 8	
14	Output 5	Torque Low
15	Output 6	Angle High
16	Output 7	Angle Low
17	Output 8	Job Complete
18	Outputs 5-8 common	
19	N/C	
20	N/C	
21	24 V Return	
22	24 V Return	
23	+24 Vdc	
24	+24 Vdc	
25	+24 Vdc	

NOTE: The Default Assignments in Table above are factory defaults and can be changed. See "11. Assignable I/O" on page 45.

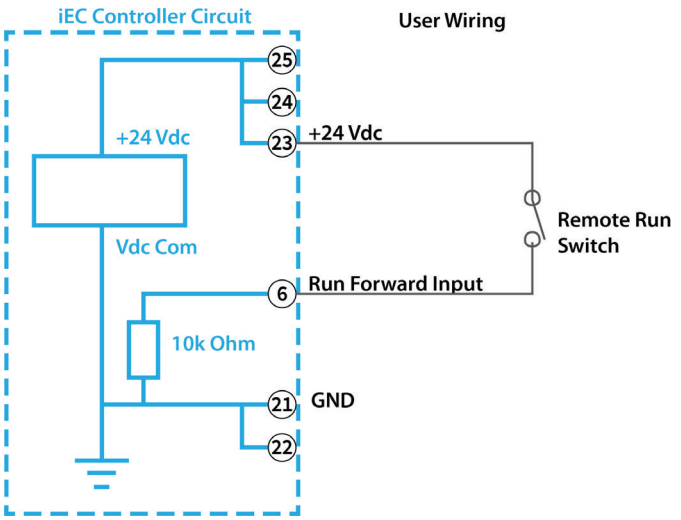
24 Volt I/O Connections

Turn off system before connecting to the LOGIC I/O port. There may be risk of damaging the controller.

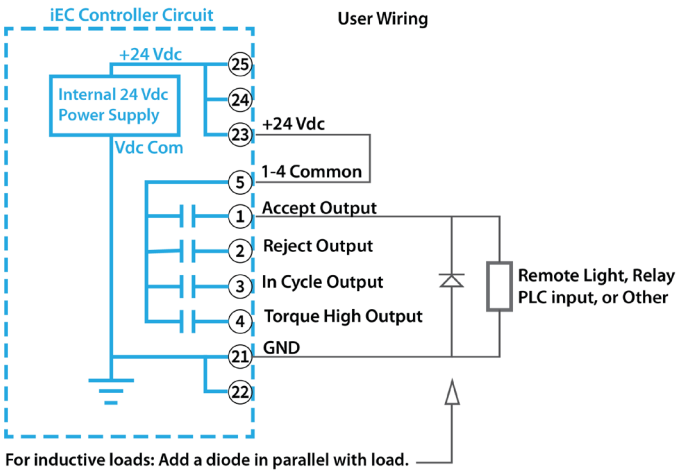
- **24Vdc Supply:** The internal 24Vdc power can supply up to 1 amp.
- **Inputs:** Inputs are a sinking configuration with the common connected to the ground pins. 24Vdc is logic ON and 0Vdc is logic OFF.
- **Outputs:** Outputs are normally open relay contacts. The relays are rated for 24Vdc, 1 amp.

NOTE: If Outputs are driving an inductive load, such as a solenoid or large relay, it is recommended to add a diode in parallel with the load to prevent voltage surges.

LOGIC I/O INPUT CONNECTION EXAMPLE

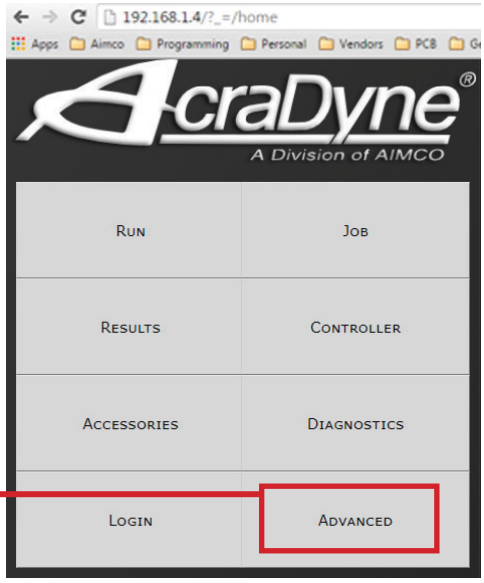


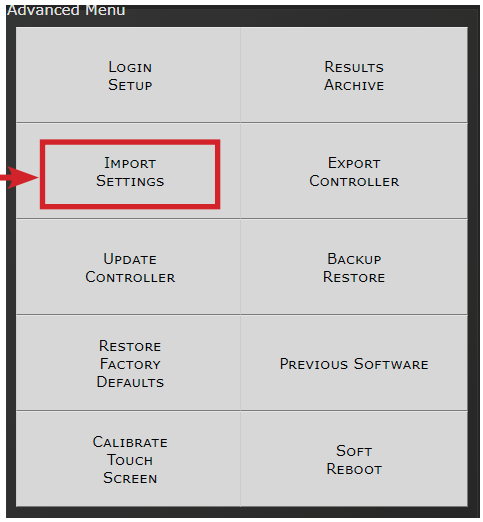
LOGIC I/O OUTPUT CONNECTION EXAMPLE



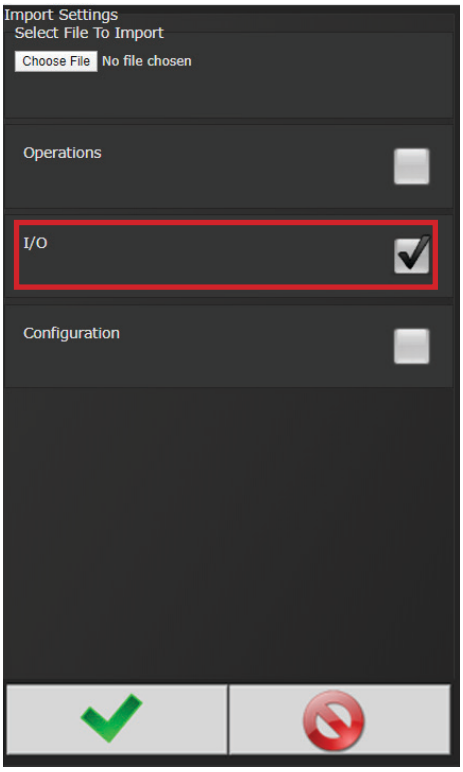
Importing I/O on an iBC Controller
These instructions detail how to import I/O into an iBC4 controller via the system port to modify the Anybus outputs.

1. Power on the controller
2. Insert the USB stick into a USB port
3. Connect to the controller via system port and web browser (default address 192.168.1.4)
4. Navigate to Advanced → Import Settings





5. Choose file and select **ONLY I/O**



6. Click OK
7. Click OK in the Confirmation dialog box
8. The controller will restart
9. Verify the Anybus outputs.
    a. Navigate to Controller → IO → Anybus Outputs
    b. Click on the first row of element #1 and verify it is set as 'Running Job Number', Bit 0, Bits 8, Start at 0.
    c. Click on element #4 and verify it is set as "Torque (x100)", Bit 0, Bits 16

12. Assignable I/O

The Gen IV controller supports assignable I/O.

Buses: The controller is divided up into buses. Each bus has a set of inputs and a set of outputs. Currently the controller supports the following buses.

Bus Number	Bus
1	Physical I/O
2	Fieldbus (Anybus module) I/O
3	Modbus TCP
4	Ethernet/IP

All assignments have a bus, element, and bit configuration to define its location in the system. The bus value needs to be set from the list above. The element and bit define the location in the bus. The first element on the bus is 0 and goes up the last legal element for the given bus. The bits in each element is referenced from 0(LSB) to 31(MSB).

Inputs

All input assignments have a Bus, Element, and Bit configuration to define its location in the system. Along with the basic configuration many also have other configuration(s) that allow its behavior to be modified to suit the application.

	Supported Feature						Controllers				
	Bus	Element	Bit 0-31	Polarity N.O./N.C.	Width	Offset	iEC	iAC	iPC	iBC	iBC-Z
Do Nothing	√	√	√				√	√	√	√	√
Start	√	√	√	√			√				
Stop	√	√	√	√			√	√	√	√	
Reverse	√	√	√	√			√				
Disable	√	√	√	√			√	√	√		
Reset Job	√	√	√	√			√	√	√	√	√
Select PSet	√	√	√		√	√	√	√	√	√	
Select Job	√	√	√		√	√	√	√	√	√	√
Select Job Sequence	√	√	√		√	√	√	√	√	√	√
Disable Assembly	√	√	√	√			√				
Set ID	√	√	√		√		√	√	√	√	√
Set ID (word swap)	√	√	√		√		√	√	√	√	√
Set Date/Time	√	√	√		√		√	√	√	√	√
Set Date/Time (word swap)	√	√	√		√		√	√	√	√	√
Verify PSet	√	√	√		√	√	√	√	√	√	√
Clear Results	√	√	√	√			√	√	√	√	√
Log Change	√	√	√		√	√	√	√	√	√	√
Decrement Batch	√	√	√	√			√	√	√	√	√
Increment Batch	√	√	√	√			√	√	√	√	√
Click Wrench	√	√	√	√			√	√	√	√	√
Click Wrench NOK	√	√	√	√			√	√	√	√	√
Bypass Stops	√	√	√	√			√	√	√	√	√
Verify Job Sequence	√	√	√		√	√	√	√	√	√	√
ASCII ID	√	√					√	√	√	√	√
Abort Job	√	√	√	√			√	√	√	√	
Remote Start	√	√	√	√			√				
Remove Lock on Reject	√	√	√	√			√	√	√	√	
Dual Start Interlocked	√	√	√	√			√				
Decrement Job	√	√	√	√			√	√	√	√	√
Increment Job	√	√	√	√			√	√	√	√	√
Decrement PSet	√	√	√	√			√	√	√	√	√
Increment PSet	√	√	√	√			√	√	√	√	√
Decrement Job Sequence	√	√	√	√			√	√	√	√	√
Increment Job Sequence	√	√	√	√			√	√	√	√	√
Set Tool Home Position	√	√	√	√			√				

Polarity
When the polarity is set to N.O. the input is considered active high (24vdc for physical inputs and logic 1 for all network type buses). When the polarity is set to N.C. the input is considered active low (0vdc for physical inputs and logic 0 for all network type buses).

Width and Offset
For multiple bit inputs (for example "Select PSet") the width variable defines the number of bits the assignment will read for its input. This allows the input size to be restricted to a few bits saving space for other assignments.

The offset variable allows a fixed value to be added to the read value.

For example to use bits 4 & 5 of the physical inputs to select parameter sets 1-4 the assignment would look like…

Select PSet		
Bus	1	For the physical bus
Element	0	For the first element on the bus
Bit	4	For the starting bit location
Width	2	To span the two bits 4 & 5
Offset	1	Adding 1 to the read input value so we get… Binary 00 = 1 Binary 01 = 2 Binary 10 = 3 Binary 11 = 4

Input Assignments

Do Nothing	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√			

The "Do Nothing" assignment will run do nothing if it is active or inactive.

Start	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Start" assignment will run the tool while the input is active. Start is available for the Physical I/O bus only.

Stop	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Stop" assignment will stop the tool if it is running and prevent it from being started.

Reverse	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Reverse" will put the controller in disassembly mode while the input is active.

Disable	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Disable" will disable the tool while the input is active. It will not stop a fastening cycle that is progress.

Reset Job	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

On the transition of inactive to active the "Reset Job" assignment will reset the active job.

Select PSet	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	√

The "Select PSET" input will select the parameter set according to the input value. Uses the width parameter limit the width of the input bits read. The minimum width is 1 and the maximum is 8. After the input is read the offset parameter will be added to the value do get the actual parameter set number. Selecting an invalid parameter set number will disable the tool.

Select Job	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	√

The "Select Job" input will select the job number according to the input value. Uses the width parameter limit the width of the input bits read. The minimum width is 1 and the maximum is 8. After the input is read the offset parameter will be added to the value do get the actual job number. Selecting an invalid job number will disable the tool.

Select Job Sequence	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	√

The "Select Job Sequence" input will select the job sequence number according to the input value. Uses the width parameter limit the width of the input bits read. The minimum width is 1 and the maximum is 8. After the input is read the offset parameter will be added to the value do get the actual job sequence number. Selecting an invalid job sequence number or a sequence that is already complete will disable the tool.

Disable Assembly	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Disable Assembly" assignment will disable the tool in the assembly direction. It will not disable the tool in disassembly or tube nut homing. It w ill not stop a fastening cycle that is progress.

Set ID	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	

The "Set ID" assignment will set the ID to an integer value of the input value. The width can be set from 1 to 32 bits. The input value will read as an integer value and an ASCII string with leading zeros will be produced and passed to the ID recognition system. The length of the string is based on the width of the assignment. The string will always be sized to accommodate the maximum value of the input. For example a width setting of 16 can have an integer value of 0-65535 so the produced ID would be "00000" to "65535" (always five character long).

Width setting	Length of ID string	ID value
1 - 3	1	"0" – "n"
4 - 6	2	"00" – "nn"
7 - 9	3	"000" – "nnn"
10 - 13	4	"0000" – "nnnn"
14 - 16	5	"00000" – "nnnnn"
17 – 19	6	"000000" – "nnnnnn"
20 – 23	7	"0000000" – "nnnnnnn"
24 – 26	8	"00000000" – "nnnnnnnn"
27 – 29	9	"000000000" – "nnnnnnnnn"
30 - 32	10	"0000000000" – "nnnnnnnnnn"

Set ID (word swap	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	

The "Set ID (word swap)" assignment is the same as the "Set ID" assignment except the high and low words (16bit) are swapped prior to evaluation. This is to correct the mixed endianness of some PLC. See the "Set ID" for behavior.

Set Date/ Time	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	

The "Set Date/Time" assignment will set the date and time of the controller. The width can be set from 1 to 32 bits but should always be set to 32 to get the correct results. The input value will be read as the number of seconds since 00:00:00 January 1, 1970 (POSIX time or Epoch time). If the input value changes and it is non-zero the date and time of the controller will be set to the new value.

Set Date/ Time (word swap)	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	

The "Set Date/Time (word swap)" assignment is the same as the "Set Date/Time" assignment except the high and low words (16bit) are swapped prior to evaluation. This is to correct the mixed endianness of some PLC. See the "Set Date/Time" for behavior.

Verify PSet	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	√

The "Verify PSET" input will compare the current parameter set to the input value. Uses the width parameter limit the width of the input bits read. The minimum width is 1 and the maximum is 8. After the input is read the offset parameter will be added to the value do get the actual parameter set number. If the parameter set input value does not match the current parameter of the controller the tool will be disabled.

Clear Results	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Clear Results" assignment will clear the latest results outputs (Ok, Nok, etc.) on the same bus.

Log Change	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	√

The "Log Change" assignment will add entries to the controller event log when the input changes.

Decrement Batch	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Decrement Batch" assignment will remove the latest OK rundown from the current running JOB. This will cause the JOB count to be reduced by one.

Increment Batch	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Increment Batch" assignment will insert a manual rundown into the current sequence of the current JOB. This will cause the JOB count to increment by one.

Click Wrench	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Click Wrench" assignment is the same as "Increment Batch" with the addition of a programmable torque value.

Click Wrench NOK	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Click Wrench NOK" assignment is the same as "Click Wrench," but the inserted manual rundown always reports a torque of 0.

Bypass Stops	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Bypass Stops" assignment removes most stop conditions, allowing the tool to be ran in an override type condition. Hardware faults, stop and disable inputs are not removed.

Verify Job Sequence	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√		√	√

The "Verify Job Sequence" input will compare the current Job sequence to the input value. Uses the width parameter limit the width of the input bits read. The minimum width is 1 and the maximum is 8. After the input is read the offset parameter will be added to the value do get the actual Job sequence number. If the Job sequence input value does not match the current Job sequence of the controller the tool will be disabled.

ASCII ID	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√				

The "ASCII ID" assignment will set the ID to the of the input (ASCII) value. This assignment consumes the entire element so the Bit is not used. It also has a length parameter to set the length of the input in bytes. The input value will be passed directly to the ID recognition system.

Abort Job	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Abort Job" assignment aborts the job and disables the tool. A job reset is required to enable the tool for the next job.

Remote Start	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Remote Start" assignment will run the tool while the input is active. Remote Start is available for non-physical I/O buses.

Remove Lock on Reject	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Remove Lock on Reject" assignment unlocks the tool if locked on reject, re-enabling the tool.

Dual Start Interlocked	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Dual Start Interlocked" assignment will run the tool if the interlock conditions are met. Dual Start Interlock is available for the Physical IO bus only. The Dual Start Interlocked input works in combination with the Physical input assigned to the 'Start' input. The Dual Start Interlocked is only available for iEC controllers.

Setup

- Only 1 Start Input and 1 Dual Start Interlocked Input should be assigned.
- Controller->Tool Setup –> Start Input Configuration:
  - The Start Input Source Must be set to 'Start From IO'.
  - Latching throttle is disabled for Dual Interlocked Start.

Dual Start Interlocked - Operation

- The tool will not run unless both inputs are activated within two seconds of each other.
- If the two second timer times out, both inputs must be deactivated to reset the timer.
- If either input is deactivated the tool stops.
- To restart the tool, both inputs must be deactivated then reactivated within two seconds of each other.

Tubenut Tool Homing Exceptions for Dual Start Interlocked functionality

- If controller's tubenut homing configuration is set to RELEASE:
  - Deactivating either, or both, of the inputs will initiate the homing sequence.
  - Homing will continue until sequence is complete.
- If controller's tubenut homing configuration is set to RELEASE AND REPRESS:
  - Deactivating either of the inputs, then activating both inputs will initiate the homing sequence.
  - Homing will continue while both inputs are active.
  - If either input is deactivated, before homing is complete, the tool will stop, and homing will pause until both inputs are reactivated.
  - To restart tool, after homing is complete, both inputs must be deactivated, then reactivated within two seconds of each other.

Decrement Job	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Decrement Job" assignment will decrement the Job Number, selecting the last job if decrementing past the first one.

Increment Job	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Increment Job" assignment will increment the Job Number, selecting the first job if incrementing past the last one.

Decrement PSet	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Decrement PSet" assignment will decrement the PSet Number, selecting the last PSet if decrementing past the first one.

Increment PSet	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Increment PSet" assignment will increment the PSet Number, selecting the first PSet if incrementing past the last one.

Decrement Job Sequence	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Decrement Job Sequence" assignment will decrement the Job sequence, selecting the last job sequence if decrementing past the first one.

Increment Job Sequence	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Increment Job Sequence" assignment will increment the Job sequence, selecting the first job if incrementing past the last one.

Set Tool Home Position	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Width	Offset
	√	√	√	√		

The "Set Tool Home Position" assignment will set the home position to the tool's current angular location. This can be used in conjunction with the Homing stage to bring the tool's output back to the home position.

Outputs

All output assignments have a Bus, Element, and Bit configuration to define its location in the system. Along with the basic configuration many also have other configuration(s) that allow its behavior to be modified to suit the application.

	Supported Feature											Controller				
	Bus	Element	Bit 0-32	Polarity N.O./ N.C.	Mode Normal, Timed, Flashed	Time	Width	Offset	Input Bus	Input Element	Input Bit	iEC	iAC	iPC	iBC	iBC-Z
Ok	√	√	√	√	√							√	√	√	√	√
Nok	√	√	√	√	√							√	√	√	√	√
Torque Ok	√	√	√	√	√							√	√	√	√	√
Torque Nok	√	√	√	√	√							√	√	√	√	√
Low Torque	√	√	√	√	√							√	√	√	√	√
High Torque	√	√	√	√	√							√	√	√	√	√
Angle Ok	√	√	√	√	√							√	√	√	√	√
Angle Nok	√	√	√	√	√							√	√	√	√	√
Low Angle	√	√	√	√	√							√	√	√	√	√
High Angle	√	√	√	√	√							√	√	√	√	√
Fastening Complete	√	√	√	√	√							√	√	√	√	√
In Cycle	√	√	√	√	√							√	√	√		
Fastening Aborted	√	√	√	√	√							√	√	√	√	√
Fastening Stopped	√	√	√	√	√							√	√	√	√	√
Batch Complete	√	√	√	√	√							√	√	√	√	√
Job Complete	√	√	√	√	√							√	√	√	√	√
Error	√	√	√	√	√							√	√	√	√	√
Tool Start Switch	√	√	√	√	√							√				
Tool Push to Start Switch	√	√	√	√	√							√				
Tool MFB	√	√	√	√	√							√				
Tool Enabled	√	√	√	√	√							√	√	√	√	√
Tool Running	√	√	√	√	√							√	√	√		
Service Indicator	√	√	√	√	√							√	√	√		√
ToolsNet Connected	√	√	√	√	√							√	√	√	√	√
Open Protocol Connected	√	√	√	√	√							√	√	√	√	√
PFCS Connected	√	√	√	√	√							√	√	√	√	√
Running PSet Number	√	√	√				√	√				√	√	√	√	√
Running Job Number	√	√	√				√	√				√	√	√	√	√
External Controlled	√	√	√						√	√	√	√	√	√	√	√
Tool In CCW	√	√	√	√	√							√	√	√		
Tool In CW	√	√	√	√	√							√	√	√		
Torque	√	√	√				√					√	√	√	√	√
Torque (x10)	√	√	√				√					√	√	√	√	√
Torque (x100)	√	√	√				√					√	√	√	√	√
Angle	√	√	√				√					√	√	√	√	√
Rundown Saved to FTP Server	√	√	√				√					√	√	√	√	√
Fastener Removed	√	√	√	√	√							√	√	√		
Spindle Ok	√	√	√	√	√							√				
Spindle NOk	√	√	√	√	√							√				
Spindle Fastening Complete	√	√	√	√	√							√				
Pulses	√	√	√				√						√	√		√
Pulses High	√	√	√	√	√								√	√		√
Pulses Low	√	√	√	√	√								√	√		√
Pulses NOk	√	√	√	√	√								√	√		√
Pulses Ok	√	√	√	√	√								√	√		√
ON	√	√	√	√	√							√	√	√	√	√
Job Aborted	√	√	√	√	√							√	√	√	√	
Tool In Use	√	√	√	√		√						√	√	√	√	√
Barcode Scanned	√	√	√	√								√	√	√	√	√
Start Trigger Active	√	√	√	√								√				

Polarity
When the polarity is set to N.O. the output will be high when it is active (24vdc for physical outputs and logic 1 for all network type buses). When the polarity is set to N.C. the output will be low for active (0vdc for physical inputs and logic 0 for all network type buses).

Mode

Normal
In the "Normal" mode the output will track the state of the assignment (while still observing the polarity setting). If the polarity is set N.O. and the assignment has an active output the output will be on and stay on till the assignment goes to inactive.

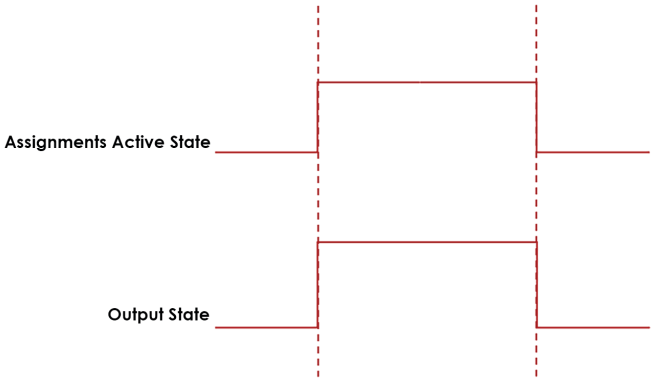


Figure 1: Normal Mode

Timed
In the "Timed" mode the output will come on when the assignments state goes active and go off based on the time value or the assignment state going inactive (while still observing the polarity setting).

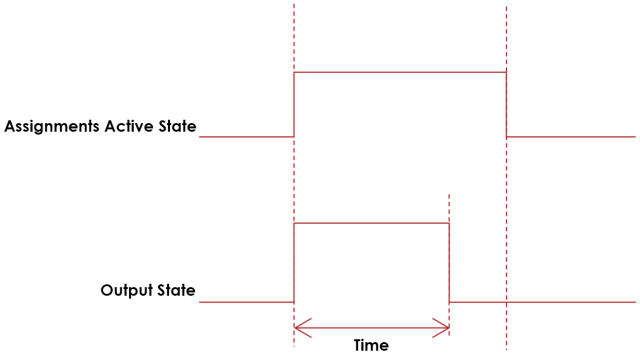


Figure 2 Timed Mode

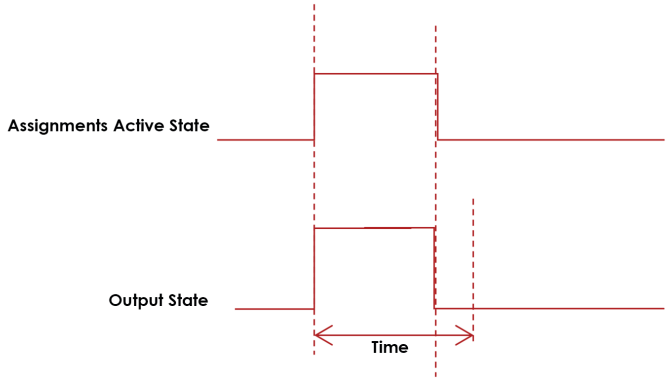


Figure 3: Timed Mode (assignment deactivates before time expires)

Flash
In the "flash" mode the output will flash at the time rate while the assignments state is active (while still observing the polarity setting).

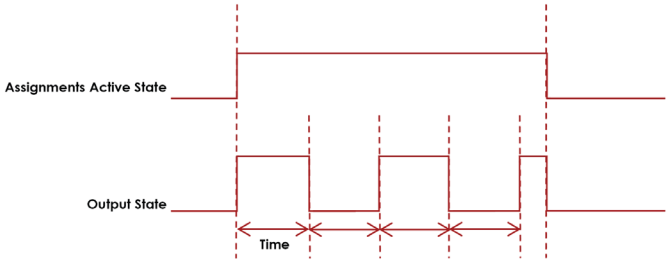


Figure 3 Flash Mode

Width and Offset
For multiple bit outputs (for example "Running PSet Number") the width variable defines the number of bits the assignment will output. This allows the output size to be restricted to a few bits saving space for other assignments.

The offset variable allows a fixed value to be added to the value before it is output.

For example to use bits 4 & 5 of the physical outputs to indicate the selected parameter set number 1-4 as binary 0-3 the assignment would look like…

Running PSet Number		
Bus	1	For the physical bus
Element	0	For the first element on the bus
Bit	4	For the starting bit location
Width	2	To span the two bits 4 & 5
Offset	-1	Adding -1 to the read input value so we get… 1 = Binary 00 2 = Binary 01 3 = Binary 10 4 = Binary 11

Output Assignments

OK	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Ok" output assignment will go active at the completion of an acceptable fastening. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Nok	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Nok" output assignment will go active at the completion of an unacceptable fastening. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Torque Ok	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Torque Ok" output assignment will go active at the completion of a fastening that has an acceptable torque value. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Torque Nok	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Torque Nok" output assignment will go active at the completion of a fastening that has an unacceptable torque value. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Low Torque	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Low Torque" output assignment will go active at the completion of a fastening that has a low torque results. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

High Torque	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "High Torque" output assignment will go active at the completion of a fastening that has a high torque results. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Angle Ok	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Angle Ok" output assignment will go active at the completion of a fastening that has an acceptable angle results. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Angle Nok	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Angle Nok" output assignment will go active at the completion of a fastening that has an unacceptable angle results. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Low Angle	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Low Angle" output assignment will go active at the completion of a fastening that has a low angle results. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

High Angle	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "High Angle" output assignment will go active at the completion of a fastening that has high angle results. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Fastening Complete	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Fastening Complete" output assignment will go active at the completion of a fastening. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

In Cycle	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "In Cycle" output assignment will go active at the start of the fastening cycle (the torque exceeds the threshold value). It will go inactive when the fastening cycle ends.

Fastening Aborted	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Fastening Aborted" output assignment will go active at the completion of a fastening that was aborted by the system. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Fastening Stopped	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Fastening Stopped" output assignment will go active at the completion of a fastening that was stopped by the user. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Batch Complete	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Batch Complete" output assignment will go active at the completion of a fastening that satisfies the bolt count of a Job sequence. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or the job is reset.

Job Complete	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Job Complete" output assignment will go active at the completion of a fastening that satisfies all the sequences. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or the job is reset.

Error	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Error" output assignment will be active while the controller has an error.

Tool Start Switch	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Tool Start Switch" output assignment will reflect the state of the tools start lever.

Tool Push to Start Switch	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Tool Push to Start Switch" output assignment will reflect the state of the tools push to start switch.

Tool MFB	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Tool MFB" output assignment will reflect the state of the tools multifunction button.

Tool Enabled	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Tool Enabled" output assignment will be active if the tool is enabled.

Tool Running	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Tool Running" output assignment will be active while the tool is running.

Service Indicator	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Service Indicator" output assignment will be active if the system is in need of service.

ToolsNet Connected	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "ToolsNet Connected" output assignment will be active if the controller has an active connection to a ToolsNet server.

Open Protocol Connected	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Open Protocol Connected" output assignment will be active if the controller has an active Open protocol connection.

PFCS Connected	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "PFCS Connected" output assignment will be active if the controller has an active PFCS connection.

Running PSet Number	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√	√			

The "Running PSet Number" output assignment will output the current PSet number.

Running Job Number	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√	√			

The "Running Job Number" output assignment will output the current Job number.

External Controlled	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√						√	√	√

The "External Controlled" output assignment will reflect the state of an input. Use the "Input Bus, "Input Element", and "Input Bit" to specify the input to reflect.

Tool in CCW	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Tool In CCW" output assignment will be active if the tool is put into disassembly mode and inactive if the tool is in assembly mode.

Tool in CW	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Tool In CW" output assignment will be active when the is in assembly mode and inactive if the tool is put into disassembly mode.

Torque	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√				

If Stage Default is selected, the "Torque" output assignment will output the final torque value of the most recent rundown. If a specific Stage is selected, the "Torque" output assignment will output the final torque value of the selected stage. In both cases, the value will be cleared to 0 at the start of a new fastening cycle or a Job reset. At the end of the fastening cycle the final torque will be truncated to an integer and output.

Torque (x10)	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√				

If Stage Default is selected, the "Torque (x10)" output assignment will output the final torque value of the most recent rundown. If a specific Stage is selected, the "Torque (x10)" output assignment will output the final torque value of the selected stage. In both cases, the value will be cleared to 0 at the start of a new fastening cycle or a Job reset. At the end of the fastening cycle the final torque will be multiplied by 10, truncated to an integer and output.

Torque (x100)	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√				

If Stage Default is selected, the "Torque (x100)" output assignment will output the final torque value of the most recent rundown. If a specific Stage is selected, the "Torque (x100)" output assignment will output the final torque value of the selected stage. In both cases, the value will be cleared to 0 at the start of a new fastening cycle or a Job reset. At the end of the fastening cycle the final torque will be multiplied by 100, truncated to an integer and output.

Angle	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√				

If Stage Default is selected, the "Angle" output assignment will output the final angle value of the most recent rundown. If a specific Stage is selected, the "Angle" output assignment will output the final angle value of the selected stage. In both cases, the value will be cleared to 0 at the start of a new fastening cycle or a Job reset.

Rundown Saved to FTP Server	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√				

The "Rundown Saved to FTP Server" output assignment will output the ID of the last rundown that was saved to the FTP server.

Fastener Removed	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Fastener Removed" output assignment will go active when a fastener is removed by the operator. The controller must be configured to report disassembly for this output to work. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Spindle OK	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Spindle Ok" output assignment will go active at the completion of multi-spindle fastening if all spindles have an OK. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Spindle NOk	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Spindle NOk" output assignment will go active at the completion of multi-spindle fastening if one or more of the spindles have an NOK. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Spindle Fastening Complete	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√	√	√						

The "Spindle Fastening Complete" output assignment will go active at the completion of multi-spindle fastening. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

Pulses	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
	√	√	√				√				

The "Pulses" output assignment will output the pulse count value of the most recent rundown. The value will be cleared to 0 at the start of a new fastening cycle or a Job reset.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Pulses High	√	√	√	√	√						

The "Pulses High" output assignment will go active at the completion of a fastening that has an pulse count that exceeds the high limit. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Pulses Low	√	√	√	√	√						

The "Pulses Low" output assignment will go active at the completion of a fastening that has an pulse count that falls below the low limit. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Pulses NOk	√	√	√	√	√						

The "Pulses Ok" output assignment will go active at the completion of a fastening that has an acceptable pulse count. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Pulses Ok	√	√	√	√	√						

The "Pulses NOk" output assignment will go active at the completion of a fastening that has an unacceptable pulse count. It will go inactive when the next fastening is started (the torque exceeds the threshold value) or a Job reset.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
ON	√	√	√	√	√						

The "ON" output assignment will be active when the controller is powered up and remains active until power down.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Job Aborted	√	√	√	√	√						

The "Job Aborted" output assignment will go active if a Job is aborted. It will go inactive when the job is reset.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Tool In Use	√	√	√	√		√					

The "Tool In Use" output assignment will go active when the trigger is pressed, whereupon a timer will restart. It will go inactive when the specified time is reached without becoming active in between.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Barcode Scanned	√	√	√	√							

The "Barcode Scanned" output assignment will go active when a barcode is scanned. The ID # (1-4) will activate the corresponding bit, if it is covered by the number of bits configured. The maximum size is 4 bits. All bits will go inactive when a tool reaches the InCycle threshold of a rundown or when they are reset.

	Bus	Element	Bit 0-32	Polarity N.O./N.C.	Mode: Normal, Timed, Flash	Time	Width	Offset	Input Bus	Input Element	Input Bit
Start Trigger Active	√	√	√	√							

The 'Start Trigger Active' assignment will reflect the state of the active Start Input configured to run the tool.

Possible Start Inputs include:

- Start from IO
  - Start
  - Dual Start Interlocked
- Start from Tool Buttons
  - Lever and/or PTS
  - Dual Levers Interlocked
  - Start from Master Tool
  - Start from Remote Start
  - Latched Throttle
- Start Trigger Active is available for the iEC Controller Only.

13. Controller Supported MIDs

Supported MID			
MID	Description	Revisions	Note
1	Communication start	1,2,3	
2	Communication start acknowledge	1,2,3	
3	Communication stop		
4	Command error		
5	Command accepted		
8	Application data subscribe		Support MID 900 curve data only
9	Application data unsubscribe		Support MID 900 curve data only
10	Parameter set ID upload request		
11	Parameter set ID upload reply		
12	Parameter set data upload request		
13	Parameter set data upload reply		Always returns a batch size of 0
14	Parameter set selected subscribe		
15	Parameter set selected		
16	Parameter set selected acknowledge		
17	Parameter set selected unsubscribe		
18	Select Parameter set		
19	Set Parameter set batch size		
20	Reset Parameter set batch counter		
30	Job ID upload request		
31	Job ID upload reply		
34	Job info subscribe		
35	Job info		
36	Job info acknowledge		
37	Job info unsubscribe		
38	Select Job		
39	Job restart		
40	Tool data upload request	1,2	
41	Tool data upload reply		
42	Disable tool		
43	Enable tool		
50	Vehicle ID number download request		
51	Vehicle ID number subscribe	1,2	
52	Vehicle ID number	1,2	Has an option to send w/without IDs
53	Vehicle ID number acknowledge		
54	Vehicle ID number unsubscribe		
60	Last tightening result data subscribe	1-6,999	
61	Last tightening result data		
62	Last tightening result data acknowledge		
63	Last tightening result data unsubscribe		
64	Old tightening result upload request		

Supported MID			
MID	Description	Revisions	Note
65	Old tightening result upload reply		
70	Alarm subscribe		
71	Alarm		
72	Alarm acknowledge		
73	Alarm unsubscribe		
76	Alarm status		
77	Alarm status acknowledge		
80	Read time upload request		
81	Read time upload reply		
82	Set time		
90	Multi spindle status subscribe		
91	Multi spindle status		
92	Multi spindle status acknowledge		
93	Multi spindle status unsubscribe		
100	Multi spindle results subscribe		
101	Multi spindle results		
102	Multi spindle results acknowledge		
103	Multi spindle results unsubscribe		
113	Flash green light on tool		
127	Abort Job		
128	Job batch increment		
129	Job batch decrement		
130	Job off		
150	Identifier download request		
157	Reset all Identifiers		
200	Set external controlled relays		Only supports 0 (off) and 1 (on)
210	Status external monitored inputs subscribe		
211	Status external monitored inputs		
212	Status external monitored inputs acknowledge		
213	Status external monitored inputs unsubscribe		
214	IO device status request	1,2	
215	IO device status reply		
216	Relay function subscribe		See supported relay functions below.
217	Relay function		
218	Relay function acknowledge		
219	Relay function unsubscribe		
241	User data subscribe		Out_1 - Pulse status (0= OK, 1 = Low, 2 = High) Out_2 - Pulses Out_3 - Undefined Out_4 - Undefined
242	User data		
243	User data acknowledge		
244	User data unsubscribe		
900	Trace data		Trace type 1 & 2 only (angle & torque)
9999	Keep alive open protocol communication		

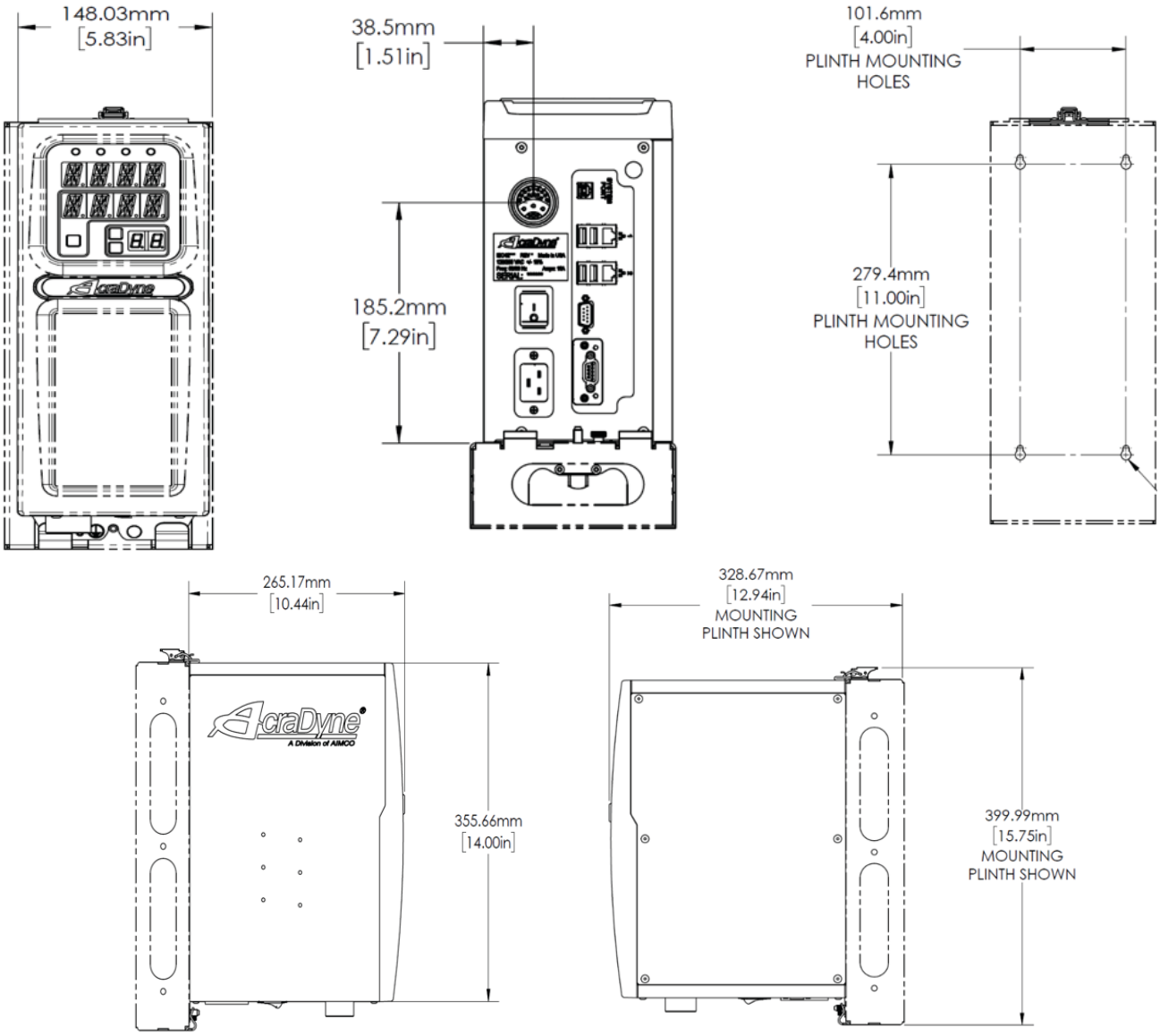
Supported Relay Functions

Supported Relay Functions	
Number	Function
1	OK
2	NOK
5	Low Torque
6	High Torque
7	Low angle
8	High angle

Supported Relay Functions	
Number	Function
9	Cycle complete
10	Alarm
11	Batch NxOK
12	Job OK
19	Tool ready
20	Tool start switch

Supported Relay Functions	
Number	Function
21	Dir. switch = CW
22	Dir. switch = CCW
26	Tool running
145	Start Trigger Active
276	Cycle abort

14. Dimensions



15. Specifications

Mechanical:

Dimensions	Width:	6.25 in	159 mm
	Height:	15.75 in	400 mm
	Depth:	12.5 in	316 mm
Weight:		15.0 lbs	7.1 kg

Operating Conditions:

Temperature:	32 to 122 °F (0 to 50 °C)
Humidity:	Non-condensing
Ingress Protection:	IP20

Electrical:

AC Power Source: 100 - 240 VAC, 50/60 Hz, 1Amp, 100 Watts

Standards:

Safety Compliance:
EC Machinery Directive 2006/42/EC EC Low Voltage Directive 2006/95/EC EN 12100-1; EN 12100-12 Safety of Machinery EN 60745-1; EN 60745-2-2 Hand-held motor operated tools
EMC
EC Directive of Electromagnetic Compatibility 2004/108/EC EN 61000-6-4; EN 6100-6-2; Class A
RoHs
Reduction of Hazardous Substances 2002/95/EC
Markings
CE

16. Troubleshooting

Issue: LED Frozen Showing "Initializing"

Solution: The rear SD card containing the system UI may have become unseated. Turn off controller power. Depending on vintage, remove the label or cover plate to access the card slot. Gently depress the card and release to unseat it. Gently then press the card into the slot until feeling and hearing the locking click indicating it is secure. Replace the label or cover plate and power the controller back on.

Issue: System Port IP Connectivity using USB Cabling

Solution: In most cases, connectivity will be automatic when connection between the controller SYSTEM PORT and a PC USB Port are made. Confirmation of the connection is noted by the presence of a USB Ethernet/RNDIS Gadget in the PC Adapter list. Should this connection not be established, specific instructions are located at the product manuals page at https://www.aimco-global.com/manuals under the heading **System Port Connectivity Troubleshooting for PCs**.

17. AIMCO Warranty

NEW TOOL AND ACCESSORY WARRANTY

Any new tool or accessory branded with the AIMCO, Uryu, AcraDyne or Eagle Group name, and purchased from AIMCO, or through one of its authorized distributors or agents, is warranted to the original buyer against defects in materials and workmanship for a period of one (1) year* from date of delivery. Under the terms of this warranty, AIMCO agrees, without charge, to repair or replace, at its option and Ex-Works (EXW) its authorized service centers, any product or accessory warranted hereunder proving to AIMCO's satisfaction to be defective as a result of defective workmanship or material. In order to qualify for this warranty, written notice to AIMCO must be given immediately upon discovery of such defect, at which time AIMCO will issue an authorization to return the tool. The defective item must be promptly returned to an authorized AIMCO service center with all freight charges prepaid.

REPAIRED TOOL WARRANTY

Once a tool is beyond the new product warranty period as detailed above, AIMCO will provide repair subject to the following warranty periods: pneumatic tools: 90 days*; electric tools and Acra-Feed: 90 days; battery tools: 30 days*; DC Electric tools: 90 days*

EXCLUSION FROM WARRANTY

This warranty is valid only on products purchased from AIMCO, or through its authorized distributors or agents. AIMCO shall have no obligation pursuant to the AIMCO Warranty with respect to any tools or accessories which in AIMCO's sole judgment have been altered damaged, misused, abused, badly worn, lost or improperly maintained. This Warranty is null and void if the customer, or any other person other than an authorized representative of AIMCO, has made any attempt to service or modify the tool or accessory prior to its return to AIMCO under this Warranty.

The warranty provision with respect to each such product may be amended by AIMCO from time to time in its sole discretion. The liability of AIMCO hereunder shall be limited to replacing or repairing, at its option, any defective products which are returned freight pre-paid to AIMCO or, at AIMCO's option, refunding the purchase price of such products.

AIMCO reserves the right to make periodic changes in construction or tool design at any time. AIMCO specifically reserves the right to make these changes without incurring any obligation or incorporating such changes or updates in tools or parts previously distributed.

THE AIMCO WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND AIMCO EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY SETS FORTH THE SOLE AND EXCLUSIVE REMEDY IN CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE.

THIS WARRANTY IS THE ONLY WARRANTY MADE BY AIMCO WITH RESPECT TO THE GOODS DELIVERED HEREUNDER, AND MAY BE MODIFIED OR AMENDED ONLY BY A WRITTEN INSTRUMENT SIGNED BY A DULY AUTHORIZED OFFICER OF AIMCO.

LIMITATION OF LIABILITY

AIMCO'S LIABILITY PURSUANT TO WARRANTY OF THE PRODUCTS COVERED HEREUNDER IS LIMITED TO REFUND OF THE PURCHASE PRICE. IN NO EVENT SHALL AIMCO BE LIABLE FOR COSTS OF PROCUREMENT OF SUBSTITUTE GOODS BY THE BUYER. IN NO EVENT SHALL AIMCO BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL OR OTHER DAMAGES (INCLUDING WITHOUT LIMITATION, LOSS OF PROFIT) WHETHER OR NOT AIMCO HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH LOSS, HOWEVER CAUSED, WHETHER FOR BREACH OR REPUDIATION OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHERWISE. THIS EXCLUSION ALSO INCLUDES ANY LIABILITY WHICH MAY ARISE OUT OF THIRD PARTY CLAIMS AGAINST BUYER. THE ESSENTIAL PURPOSE OF THIS PROVISION IS TO LIMIT THE POTENTIAL LIABILITY OF AIMCO ARISING OUT OF THIS AGREEMENT AND/OR SALE.

NOTE: The AIMCO Warranty confers specific legal rights, however some states or jurisdictions may not allow certain exclusions or limitations within this warranty. ***Note – All warranty periods addressed herein are determined using a standard shift, eight-hour work day.**

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