# Snap-on CTLNKCTRL User Manual


**ZCNTRL07-SO REV. D**

**2021-04**

# General Safety

**WARNING** ***Electrical Shock Hazard***

## Warnings

**Read User Manual before operating.**

Do not disassemble the unit for repair or modifications. There is a high electrical voltage inside the unit that could cause electric shock.

Do not allow any type of liquid to come into contact with any part of the unit.

Insert all fittings fully into their mating receptacles. Failure to do so could result in injury.

Do not fold, bend or apply excessive force to any cable or fitting.

## Cautions

Please use caution when handling this or any other electrical appliance.

- This unit accepts an AC input voltage from 100-240 VAC. Trying to operate this unit with a voltage outside that range may cause damage to the unit.
- Avoid placing or storing this unit in a location where it may become wet or dust covered.
- Do not place or mount this unit in an unstable area.
- Dropping this unit may result in personal injury or damage to the unit.
- Before performing any maintenance on the unit, make sure to turn it off and remove the power plugs.
- There are no user serviceable parts inside the main enclosure of the unit.

## Disclaimer

Operation of CONTROLTECH-LINK controller is not warranted in an EU member state if operating instructions are not in that State's language. Contact Snap-on if a translation is needed.

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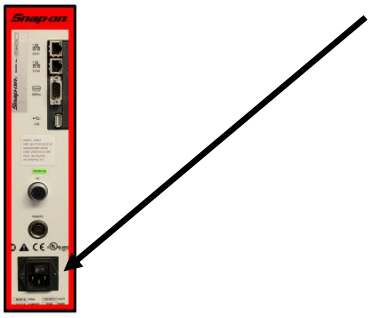
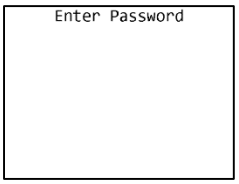
Snap-on

This quick start will guide you through the process of configuring the unit for first time use.



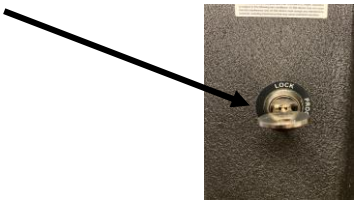
Plug the provided power cable into the unit and 100-240 VAC power and turn on the power switch. The beeper should sound a series of quick beeps and the display should show the loading progress.

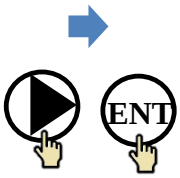



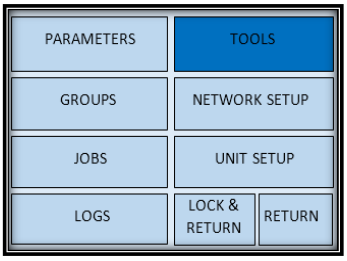

Once the loading is completed, the unit should go to the Run screen. If the unit stays on the loading screen with an error, please contact your local Snap-on Representative.

To use a tool with the CONTROLTECH-LINK, you must first "learn" the tool to the CONTROLTECH-LINK. To do so, press the button below **MENU**.

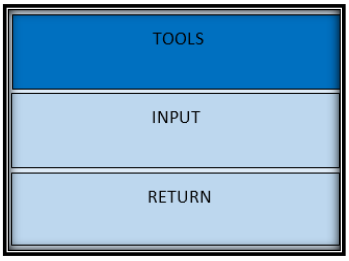
Enter the password (0104 by default) using the numeric keypad and pressing ENT when completed. . Or use the supplied key to unlock Control Box.



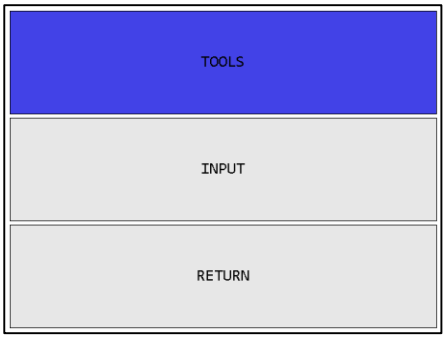



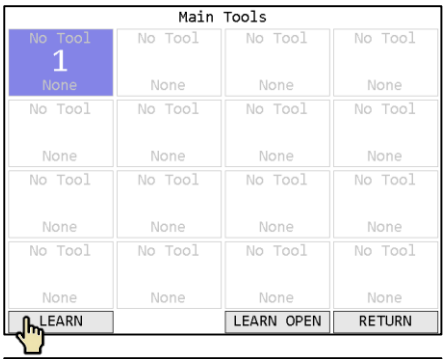




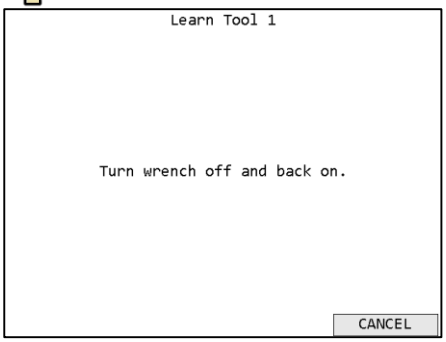

***Note: See operation manual 20-CTM2500-SO for ControlTechManager PC CTLNKCTRL setup.***



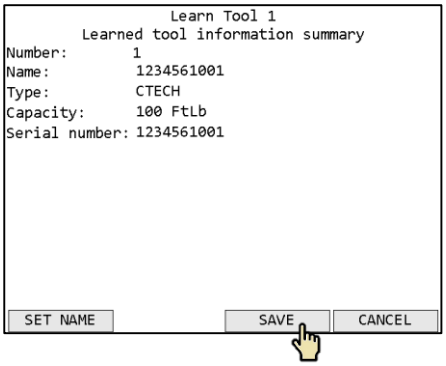

In the tools menu, press ENT to go to the main tools page.

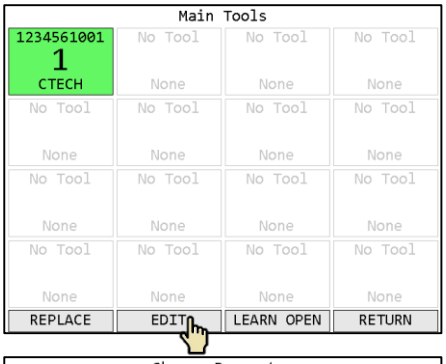

If the tool you are going to learn to the CONTROLTECH-LINK has previously been used with another unit, make sure the tool has been "forgotten" from that unit before continuing. Press the button beneath **LEARN** to begin the learn process.



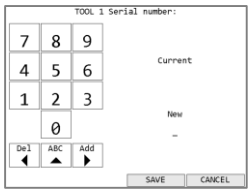

Follow the directions on screen to learn the tool.



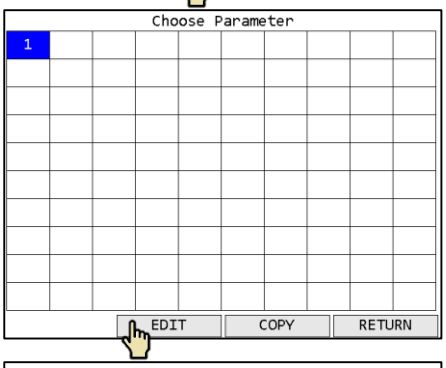

Once the tool learn is completed, the unit will show a summary of the new tool information. Press **SAVE** to store the tool information and continue.



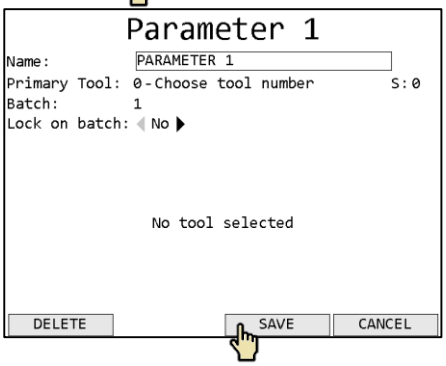

The unit will return to the Tools screen with the just learned tool now with a tool name matching the serial number of the learned tool instead of “No Tool”.



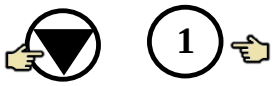

In this screen the tool can be given a unique alpha-numeric name. However the tools internal factory primary serial number CANNOT be changed. Once changes are made press the SAVE button. (This is optional).

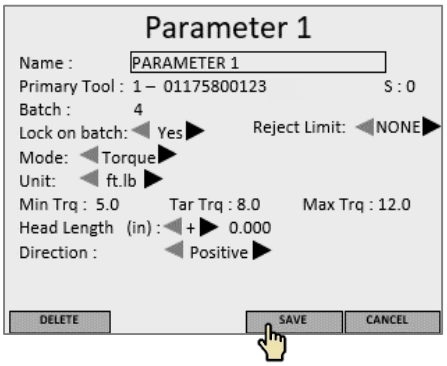



Before you can run the tool, you must first assign it to a parameter. Return to the menu by pressing ESC twice. Then press ENT to go to the Choose Parameter screen. Press the button below **EDIT** to go to the Parameter Edit screen.

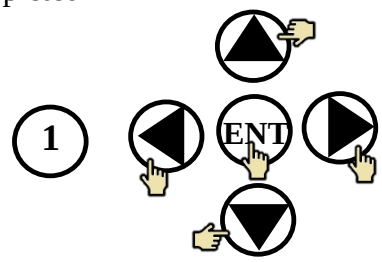


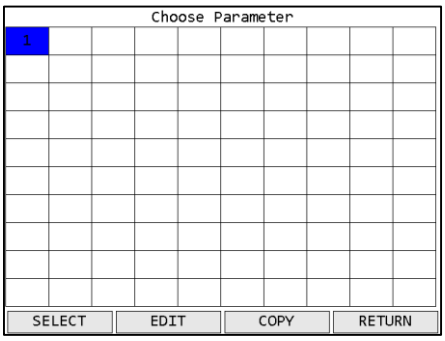

Press the down arrow to move the cursor to the Primary Tool row, followed by 1 to assign the tool to the parameter. Press ENT or the button below **SAVE** to save the changes and return to the Choose Parameter screen.



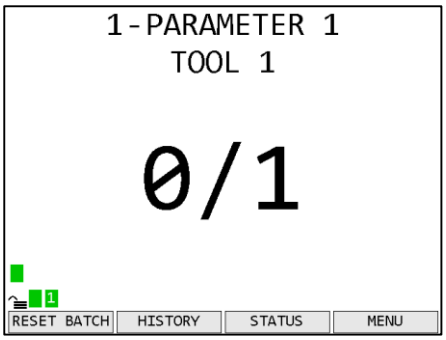




The complete Parameters screen inputs will appear. The Arrow buttons can be used to move the floating cursor to all input selections. The numerical buttons can be used for numerical inputs. Press SAVE button once all inputs are completed






Parameter 1 value should now be shown in black instead of white to indicate that it was set up successfully. Press the button below SELECT to select Parameter 1 and send to Tool.




You will be returned to the Run screen, now with Parameter 1 selected. You can now perform tightenings with Tool 1 that will be monitored, stored, and reported by the CTLNKCTRL.

# Chapter 1: Overview

## Unit Overview


The CONTROLTECH-LINK is equipped with a color LCD display, four function keys immediately below the LCD, a numeric keypad with decimal point, navigation keys, and enter and escape buttons. The current function of the function keys is indicated at the bottom of the LCD above the button.

The beeper provides an audio indication for any combination of accepts, rejects, and batch completions. The beeper volume can be adjusted through the user interface. (See the *Unit Setup* section in the next chapter.)

The CONTROLTECH-LINK has two RJ-45 Ethernet ports to allow it to be used in a chain or ring network configuration.

The USB-A connector is used to provide firmware updates via a standard USB drive.

The RS232 DSUB9 connector can be used with a serial barcode reader or serial printer.

The 10-pin I/O connector provides discrete I/O capabilities. The 5-pin remote connector connects to other devices that can provide additional I/O capabilities.

The power plug accepts 100-240 VAC at 50-60 Hz.

## Compatible Tools

The CONTROLTECH-LINK works with the following models of tools:

- C-TECH

# Chapter 2: Using the unit

## Concepts

### Mode

The CONTROLTECH-LINK can run in two different modes, Report and Control. In Report mode, the unit will forward tightening reports from the tools to the network and provides an alternate interface to configure the presets in the tool but does not attempt to control which settings the tool is actually running at any given time.

In Control mode, the unit will forward tightening reports from the tools to the network. Unlike in Report mode, the unit will store desired parameter settings itself and will send them to the tools as instructed by the network or faceplate to control the mode and ranges used by the tool. When the unit is in Control mode, the tool keypad will be locked.

Repeated switching between Control and Report modes is not recommended, as tool presets are not guaranteed to be preserved and may need to be reconfigured every time you enter Report mode.

### Tools

The CONTROLTECH-LINK can associate with up to 16 Snap-on radio torque tools. Additionally, you may define up to 8 input tools using the discrete I/O capabilities of the CONTROLTECH-LINK. At most, 4 torque or input tools will be active at a time, depending on the selected operation. To use a tool with the CONTROLTECH-LINK, you must first "learn" the tool to the qualifier. The process to do this is described in the Quick Start.

Tools are not activated directly by the unit. Instead, they are activated when a parameter that uses the tool is running. A tool may be used by more than one parameter.

The CONTROLTECH-LINK can store some information about when calibration or preventative maintenance should occur. These are set up in the Tool Configuration screen, which is described in the next chapter.

### Parameters

Parameters are the basic unit of operation for the CONTROLTECH-LINK. A parameter contains a tool to run and some settings to use with it, such as the batch size and minimum and maximum torques. In Control mode, the CONTROLTECH-LINK supports 100 parameters. Each parameter must be associated with one of the learned tools before it can be run.

In Report mode, the presets stored in the tools are used instead of the parameters stored in the CONTROLTECH-LINK. See the user manual for the tool to determine how many presets are available.

### Groups

Groups are multiple parameters that must all run together and can run simultaneously in any order. The CONTROLTECH-LINK supports 100 groups with up to 4 parameters each. A group cannot contain more than one parameter that uses a given tool, as it would not be able to determine which parameter a result should be assigned to. Additionally, a group may only contain parameters with the same type of primary tools. When defining a group, you may override the batch count for parameters in the group while the group is running. This does not

change the batch size defined in the parameter. When running a group, all parameters must complete a full batch before any parameter can begin running a second batch.

Groups are only available in Control mode.

## Jobs

Jobs are the top level of operation in the CONTROLTECH-LINK, made up of multiple parameters or groups that must all run together in a sequence. The CONTROLTECH-LINK supports 100 jobs with up to 30 steps each. Unlike groups, a job may have multiple parameters that use the same tool or even the same parameter or group multiple times and may use parameters with different types of primary tools. As with groups, you may override the batch count for parameter steps in the job. You cannot change the batch sizes for groups when run in a job.

Jobs are only available in Control mode.

## Run Screen

The run screen shows which parameters the unit is currently running. Depending on the controller mode and the number of active parameters, the run screen will be in one of several modes.

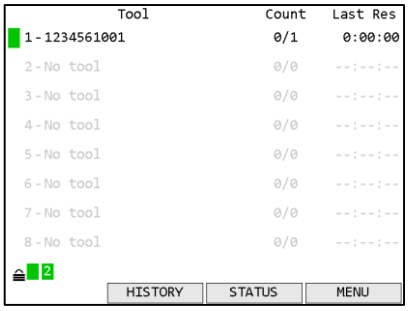



**Figure 1: Report Mode**


**Figure 2: No active parameter**

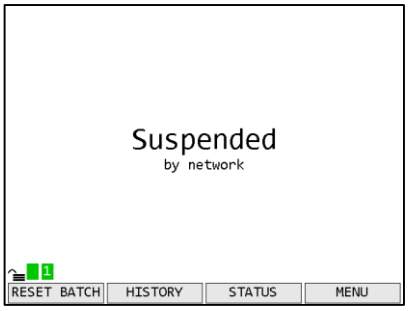



**Figure 3: Suspended**

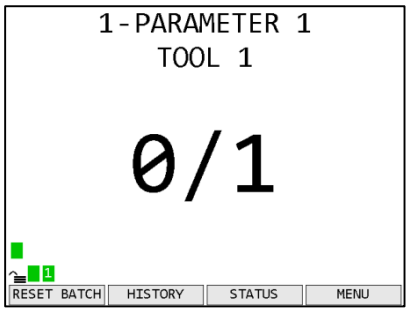



**Figure 4: 1 active parameter**

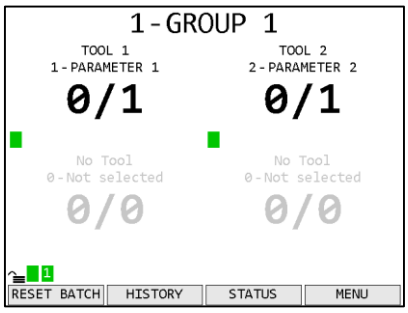


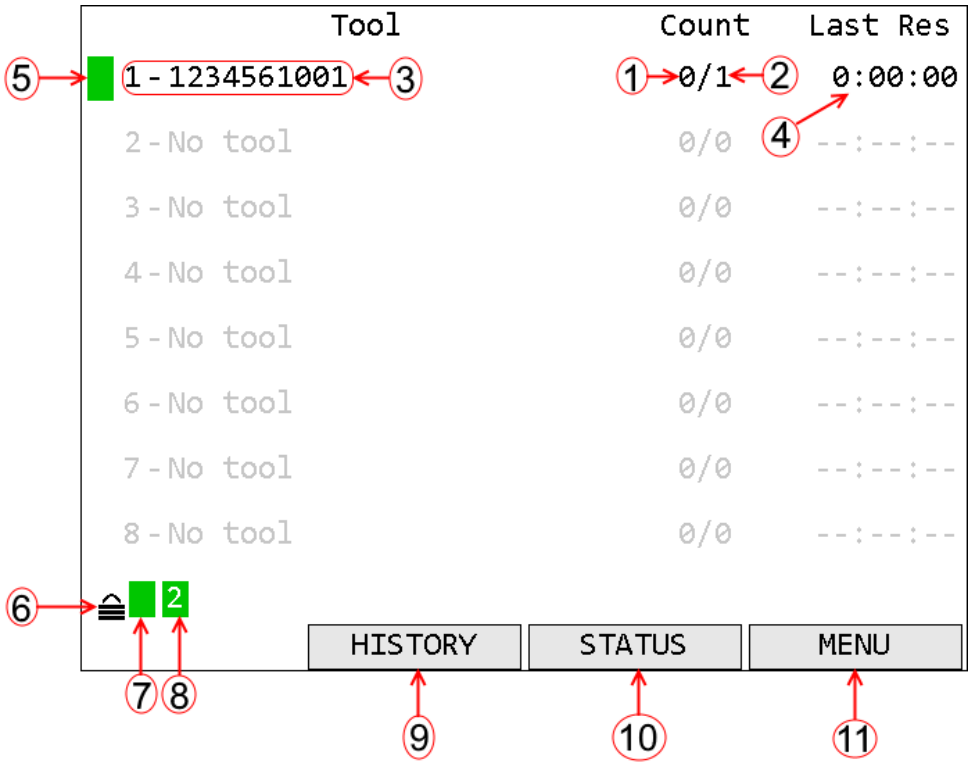

**Figure 5: 2-4 active parameters**

### Tightening Notifications

Every time a tightening is received from a running tool, the background of the area of the screen showing the current parameter and batch count for the tool will be shaded with a color indicating the status of the tightening.

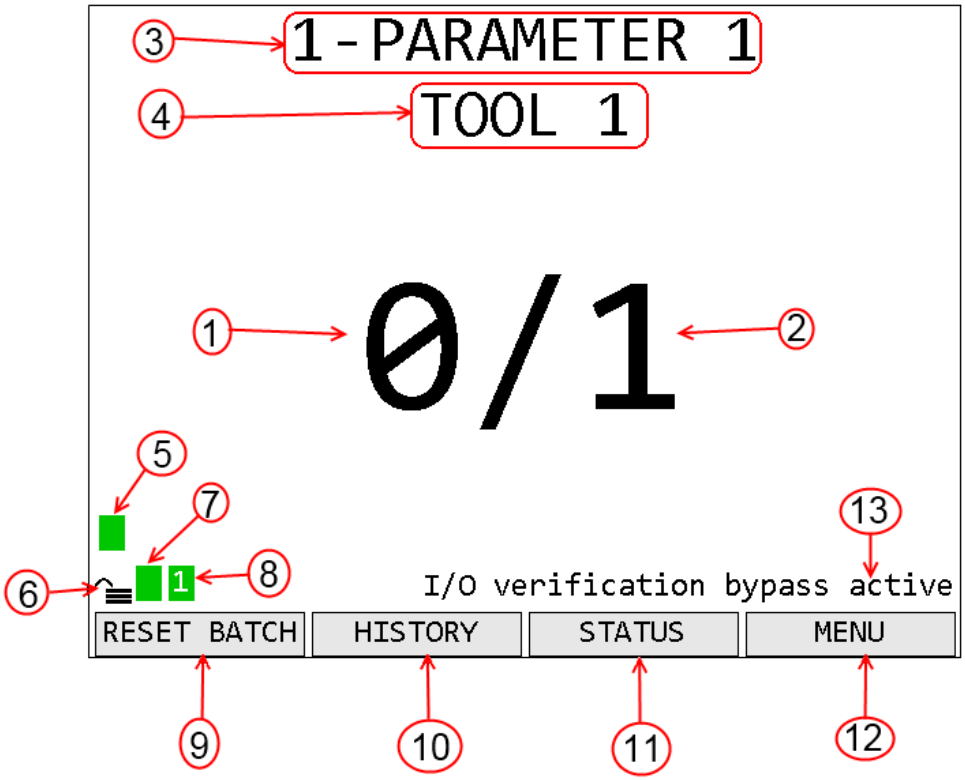
- Red – A rejected tightening occurred.
- Green – An accepted tightening occurred that did not complete a batch.
- Blue – An accepted tightening occurred that completed a batch. If the qualifier NOKs setting is set to Count, this further indicates that no rejected tightenings were counted towards this batch.
- Yellow – An accepted or rejected tightening occurred that completed a batch. This color will only occur when the qualifier NOKs setting is set to Count and one or more rejected tightenings were counted towards the current batch.

## Report Mode



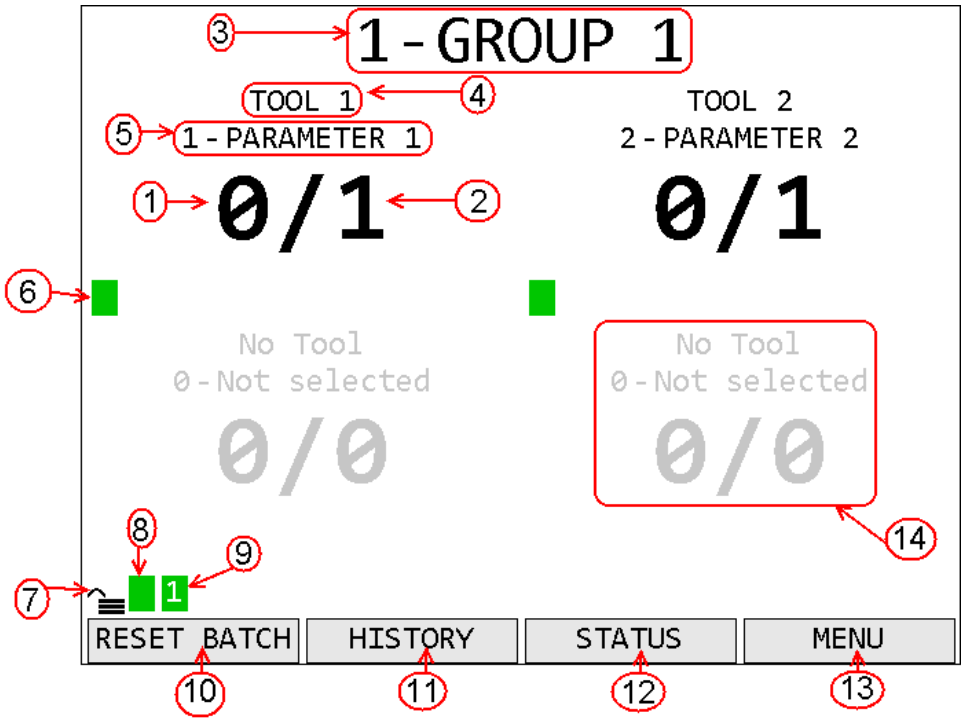

1. Count – The number of tightenings completed in the current batch for the tool
2. Batch – The number of tightenings required for the current batch for the tool
3. Tool– Number and name of the currently running parameter.
4. Last Result – Time of the last result from the tool
5. Tool Status Indicator – Shows the status of the tool for the parameter
6. Unit lock – Indicates if the unit is locked and requires a password to access menu functions
7. Unit Radio Status – Shows the status of the unit radio
8. Network Status – Shows the status of the Ethernet and current number of connections.
9. Function key 2 – Shows the current function of function key 2.
10. Function key 3 – Shows the current function of function key 3.
11. Function key 4 – Shows the current function of function key 4.

## 1 Active Parameter




1. Count – The number of tightenings completed in the current batch
2. Batch – The number of tightenings required for the current batch
3. Parameter Name – Name of the currently running parameter. When running a job, this is the job name and the parameter name is shown below the tool name.
4. Tool Name – Name of the tool for the currently running parameter
5. Tool Status Indicator – Shows the status of the tool for the parameter
6. Unit lock – Indicates if the unit is locked and requires a password to access menu functions
7. Unit Radio Status – Shows the status of the unit radio
8. Network Status – Shows the status of the Ethernet and current number of connections.
9. Function key 1 – Shows the current function of function key 1.
10. Function key 2 – Shows the current function of function key 2.
11. Function key 3 – Shows the current function of function key 3.
12. Function key 4 – Shows the current function of function key 4.
13. Notifications – Shows notifications of unit status beyond radio and network statuses

## 2-4 Active Parameters




1. Count – The number of tightenings completed in the current batch of the parameter. Repeated for each active parameter.
2. Batch – The number of tightenings required for the current batch of the parameter. Repeated for each active parameter.
3. Group Name – Name of the currently running group.
4. Parameter Name – Name of the parameter. Repeated for each active parameter.
5. Tool Name – Name of the tool for the parameter. Repeated for each active parameter
6. Tool Status Indicator – Shows the status of the tool for the parameter. Repeated for each parameter
7. Unit lock – Indicates if the unit is locked and requires a password to access menu functions
8. Unit Radio Status – Shows the status of the unit radio
9. Network Status – Shows the status of the Ethernet and current number of connections.
10. Function key 1 – Shows the current function of function key 1.
11. Function key 2 – Shows the current function of function key 2.
12. Function key 3 – Shows the current function of function key 3.
13. Function key 4 – Shows the current function of function key 4.
14. Inactive parameter – When not all the parameter slots on a screen are needed to show all the active parameters, the rest of the slots will be grayed out.

## Tool Radio Status Codes

The radio status indicator for each active parameter shows the status of the tool radio for the parameter. When the tool is ready to run, the indicator should be green with no number. If the tool is not ready to run or a warning or error condition occurs, the indicator will change to yellow for a warning or red for an error and display a code to indicate the radio condition. The possible codes are:

| Code | Color | Meaning |
|---|---|---|
| 1 | Red | Tool has not communicated with the unit since power-up |
| 2 | Yellow | Programming tool |
| 2 | Red | Tool programming failed |
| 3 | Yellow | Tool is disabled |
| 4 | Yellow | The battery is low. It should be changed when possible to avoid interruptions in service. |
| 4 | Red | The battery is very low. Interruptions in service may occur until the battery is replaced. |
| 5 | Yellow | Radio signal strength is below recommended level for best performance |
| 5 | Red | Radio signal strength is below recommended minimum level for use |
| 6 | Yellow | Tool requires calibration |
| 7 | Yellow | Tool requires preventative maintenance |
| 8 | Red | Tool programming failed |

### Unit Radio Status Indicator

The unit radio status indicator shows the status of the radio in the unit. In normal use, the indicator should be green with no number. If the radio is not working correctly, the indicator will be red with an error code.

### Network Status Indicator

The network status indicator shows the status of the Ethernet ports on the unit. When the Ethernet is used, the indicator will be green and show the number of currently active network connections. If no Ethernet cable is plugged into either port, the indicator will be yellow. If the network initialization fails, the indicator will be red and show an error code. The Network Status screen shows more detailed information.

## History

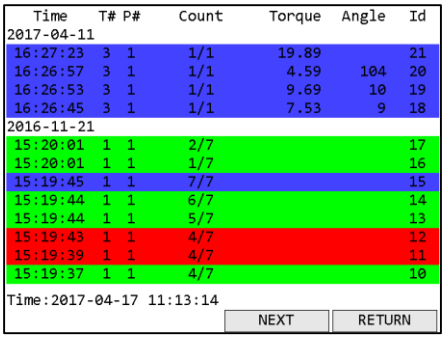



**Figure 6: History screen**

### *Function keys*

1. No function
2. PREVIOUS – Go to the previous page of more recent tightenings. When on the first page, this key will be blank.
3. NEXT [ENT] – Go to the next page of older tightenings. When on the last page, this key will be blank.
4. RETURN [ESC] – Returns to the Run Screen.

The History screen shows some information about the tightenings stored in unit memory. More information about the tightenings is not shown but is available via the network protocols. This screen shows

- Time – The time the tightening occurred. The date is indicated at the top of the table and each time it changes in a white row.
- T# – The tool number that produced the tightening
- Param – The number and name of the parameter that produced the tightening
- Count – The current batch count and batch size for the tightening
- Torque – The torque of the tightening. The unit of torque will be whatever the unit of the parameter that produced the tightening was at the time.
- Angle – The angle of the tightening.
- Id – The tightening id number. This screen shows only the last 4 digits of the id number; additional digits may be present in the network commands.

## Unit Status

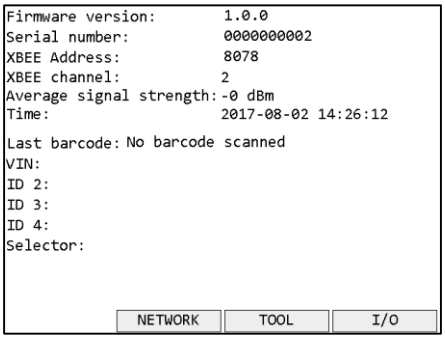



**Figure 7: Unit Status screen**

### *Function keys*

1. No function
2. NETWORK – Go to the Network Status screen.
3. TOOL – Go to the Tool Status screen.
4. I/O – Go to the I/O State screen

The Unit Status screen shows some basic information about the current unit configuration that may be useful for diagnostics purposes. Press ESC to return to the Run Screen

The average signal strength is for all tools learned to the unit and should be from 0 to -70 dBm. If the signal strength is weaker, the unit may have frequent slow or failed communication. To improve the signal strength, try bringing the unit and tools closer together, changing the XBEE channel, or reducing sources of interference from the environment.

*Last barcode* shows the command number of the last barcode scanned (see *Chapter 6: Serial Communications*) or an error if the last attempt barcode could not be processed. *VIN* and *ID 2-4* show what will be included with tightenings in the associated result data fields. The *Selector* field is used with the VIN Selections field described in *Chapter 6: Serial Communications*.

## Network Status

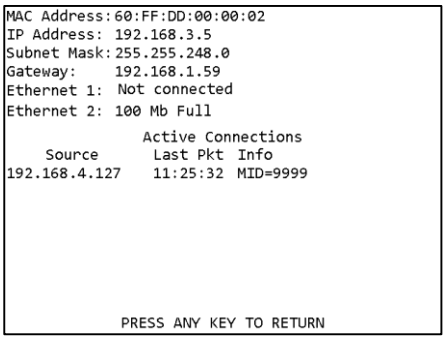



**Figure 8: Network Status screen**

The network status screen shows the current Ethernet status of the unit. The MAC address is assigned by the factory and cannot be changed. The IP address, subnet mask, and gateway may be edited from the Network Setup - General screen or assigned via DHCP.

The Ethernet 1 and 2 lines indicate if a physical cable connection is detected on the corresponding Ethernet ports of the unit. If no connection on a port is detected, the unit will show "Not connected". If a connection is detected, the baud rate and duplex of the connection will be listed.

The rest of the screen shows some basic information about the active Ethernet connections. For each connection, this page shows the source address, time of the last packet on the connection, and some protocol specific information, such as last MID received or which EtherNet/IP™ connection points are being used.

## Tool Status

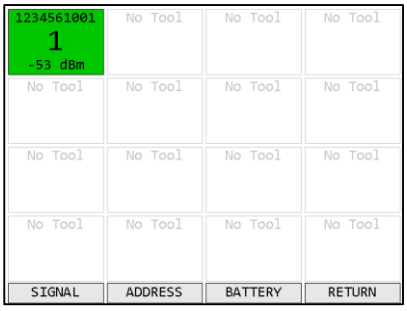



**Figure 9: Tool Status - Good Signal**

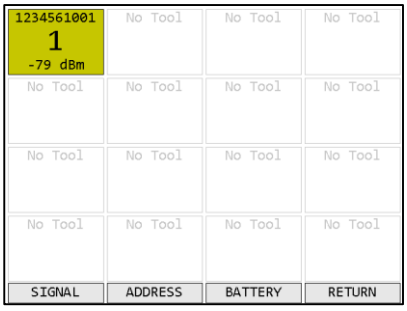



**Figure 10: Tool Status – Low Signal**

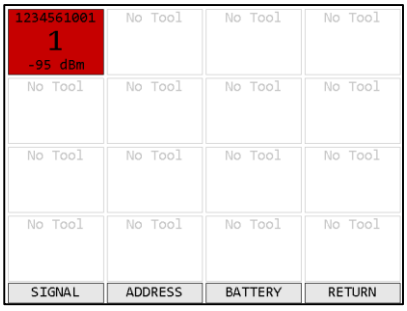



**Figure 11: Tool Status - Bad Signal**

### *Function keys*

1. SIGNAL – Show the signal strength of each tool.
2. ADDRESS – Show the address of each tool
3. BATTERY – Shows the battery level of each tool, if available. Not all tools report battery level.
4. RETURN – returns to the Unit Status page.

The Tool Status screen shows the status of the tools learned into the unit. This screen shows the signal strength of the last packet from the tool but can also show the radio address and battery level of the tools. Press ESC to return to the Unit Status screen.

For signal strength, a less negative number indicates a better signal (-50 dBm is better than -60 dBM). The screen shows a color based on the quality of the signal.

- Green – The signal from this radio is strong and will work at best performance.

- Yellow – The signal from the radio is weaker than recommended for best performance. The radio should work but may have slower or occasionally interrupted communication with the unit.
- Red – The signal from the radio is weaker than recommended for any use. The radio may successfully transmit some results but will frequently have slow or failed communication with the unit. If only one tool is red, bring it and unit closer together. If multiple tools are red, consider using a different radio channel (changed from the Unit Setup screen).

For battery level, the charge remaining is shown. Not all tools report their current battery level. The screen shows a color based on the level.

- Green – The battery is full and will work at best performance.
- Yellow – The battery is low and should be changed when possible.
- Red – The battery is very low and should be changed. The tool may fail to transmit some results until the battery is changed.

## I/O State

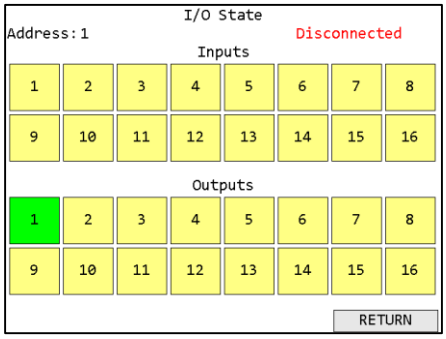



**Figure 12: I/O State screen**

### *Function keys*

1. No function
2. PREVIOUS – Show the I/O device with the previous address. When showing the first defined device, this key will be blank.
3. NEXT [ENT] – Show the I/O device with the next address. When showing the last defined device, this key will be blank.
4. RETURN [ESC] – Returns to the Unit Status Screen.

The I/O State screen shows the status of the defined I/O devices. If an input or output is active, its box will be shaded in green. Inactive inputs and outputs will be shown in yellow. See the GIM400 User Manual for more information about the available I/O options.

# Chapter 3: Configuring the unit

## Introduction

Most of the features of the CONTROLTECH-LINK can be configured directly on the unit. Some screens differ based on the controller mode, and some are only present in one mode or the other. In both modes, the menu is available from the Run screen by pressing function key 4 or ENT.

The navigation keys are used primarily to move from entry to entry on a screen. The numeric keypad is used for any data entry and occasionally to assist in navigation. When describing the function keys for a screen, [ENT] or [ESC] will be listed next to the key if the ENT or ESC buttons perform the same operation. The ESC key is generally used to cancel changes or exit a screen without performing an action.

## Saving Configuration Changes

Configuration editing screens will always have **SAVE** as function key 3 and **CANCEL** as function key 4. You may also press ESC for Cancel. If you enter a screen and have not made any changes or do not want to save the changes you have made, press **CANCEL**. To commit changes, press **SAVE**. Even if you have not made any changes, saving will update the last modified time for the item.

## Entering letters

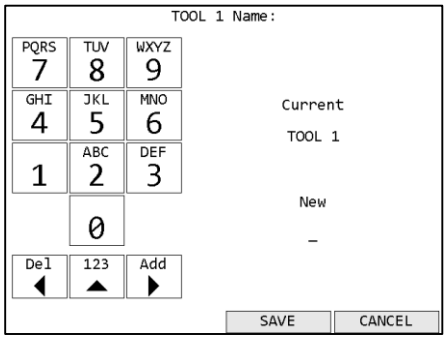



**Figure 13: Letter Entry screen**

The unit has a special screen that allows using the numeric keypad to enter letters for fields that allow them, such as a parameter name. To get to this screen, press [ENT] when cursor is on a row with such a field. Lowercase letters cannot be entered from the unit but can be entered through the PC software application.

The left side of this screen shows the letters associated with each number. Pressing a number repeatedly will cycle through the letters associated with the number followed by the number itself. Pressing a different number will commit the character to the new value and add the first letter associated with the new number pressed. Pressing the left arrow will remove the last entered character. Pressing the up arrow will toggle between entering letters and numbers or just numbers.

Pressing the right arrow will commit the current character and move to the next position. You do not have to use the right arrow for every letter. However, there are two situations when you must use the right arrow. The first is to enter a blank space, which is accomplished by pressing the right arrow twice in a row. The second is to enter a name with two letters in a row associated with the same number. For example, to enter “TOOL 1”, you would need to press the following sequence of keys:

| Key | New name |
|---|---|
| 8 | T |
| 6 | TM |
| 6 | TN |
| 6 | TO |
| right arrow | TO_ |
| 6 | TOM |
| 6 | TON |
| 6 | TOO |
| 5 | TOOJ |
| 5 | TOOK |
| 5 | TOOL |
| right arrow | TOOL_ |
| right arrow | TOOL _ |
| 1 | TOOL 1 |

(Since neither 1 nor 0 have associated letters, pressing them will only enter the number.)

Once you have entered the desired name, press **Save**. This does not permanently save the value just entered. You must also save from the screen that sent you to the letter screen. If you no longer want to change the value, press **Cancel**. At this point, the unit will return to the previous screen without changing the value.

## Main Menu

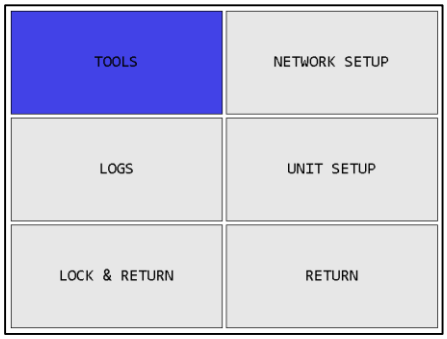



**Figure 14: Report Main menu**

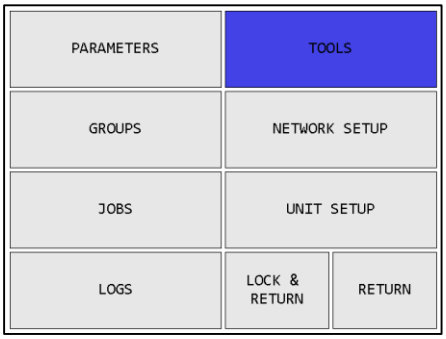



**Figure 15: Control Main menu**

The CONTROLTECH-LINK menu provides the entry point to configure and control the unit. You must enter the box password before entering the menu from the Run screen. If you cannot remember the password, you may reset it to the factory default (0104) by entering the sequence "6853.48" on the Run screen. Use the arrow keys to navigate to the desired entry and press ENT to go to the entry's screen. To exit the menu, press ESC or navigate to **LOCK & RETURN** or **RETURN** and press ENT. Pressing ESC or **LOCK & RETURN** will "lock" the menu and return to the Run screen, requiring the password to be reentered before the menu can be accessed again. Pressing **RETURN** will return to the Run screen without locking the unit, allowing the menu to be reentered without entering the password.

## Network Setup

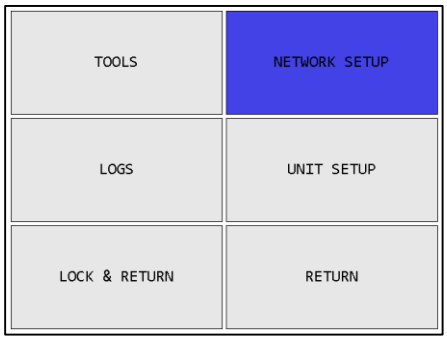



**Figure 16: Report Main menu - Network Setup**

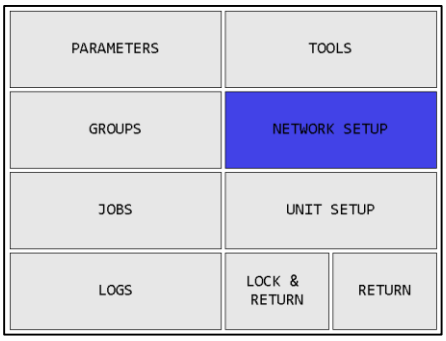



**Figure 17: Control Main menu - Network Setup**

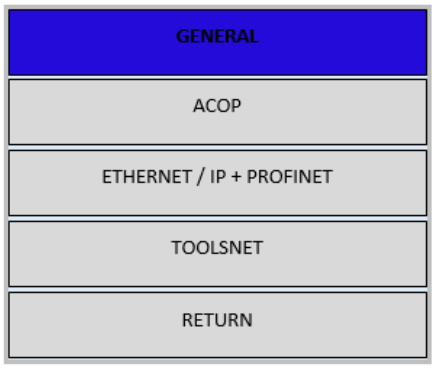



**Figure 18: Network Setup Menu - General**

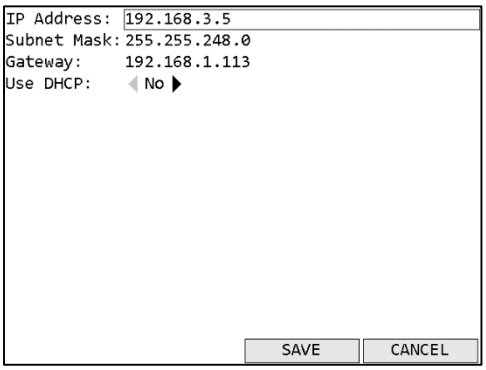



**Figure 19: General Network Setup**

### *Function keys*

1. No function
2. No function
3. SAVE – Saves changes to the general Network Setup and returns to the Network Setup menu
4. CANCEL [ESC] – Discards changes to the general Network Setup and returns to the Network Setup menu

Changes to these settings only apply after the qualifier is restarted.

See the protocol specific chapters for information about the configuration options for each protocol.

### Configuration Options

### *IP Address*

Default: 192.168.1.67

This setting controls the IP address of the qualifier for Ethernet networks.

### *Subnet Mask*

Default: 255.255.255.0

This setting controls the subnet mask for Ethernet networks.

### *Gateway*

Default: 192.168.1.113

This setting controls the default gateway setting for Ethernet networks.

### *Use DHCP*

Default: No

This setting determines if the qualifier will attempt to automatically acquire a network address or if it will use the one entered manually. When set to yes, the IP Address, Subnet Mask, and Gateway settings are ignored.

## Unit Setup

The Unit Setup screen contains the settings for the overall unit.

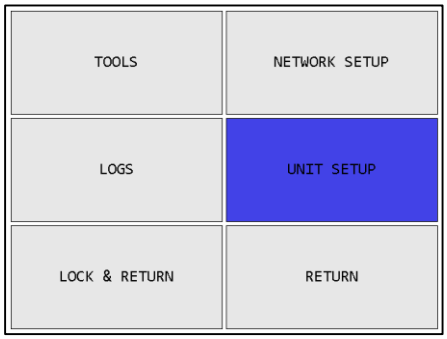



**Figure 20: Report Main menu - Unit Setup**

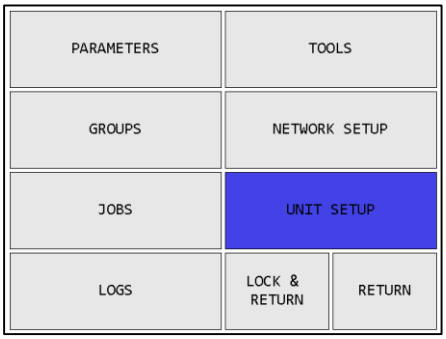



**Figure 21: Control Main menu - Unit Setup**

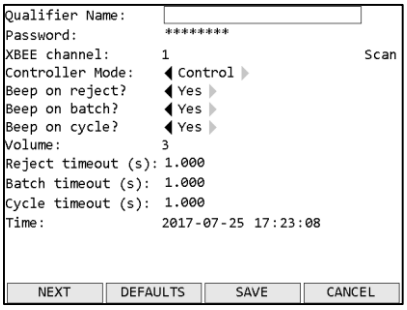



**Figure 22: Unit Setup screen – page 1**

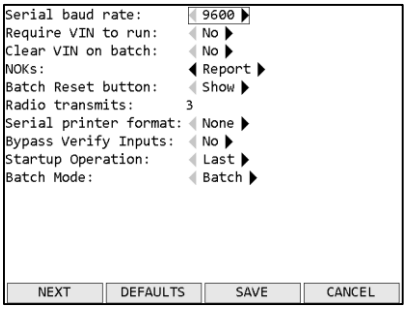



**Figure 23: Unit Setup screen – page 2**

### *Function keys*

1. NEXT – Goes to the other page of the unit setup screen.
2. DEFAULTS – Goes to the Reset Defaults screen
3. SAVE – Saves changes made to the qualifier configuration.
4. CANCEL [ESC] – Cancels changes made to the qualifier configuration.

Page 1

### *Qualifier Name*

The qualifier name can be up to 25 numbers, letters, or decimal points.

The qualifier name is sent to the network in the Controller Name field of various commands.

### *Password*

The password can be up to 10 numbers. The "password" shown on this screen is a placeholder and does not necessarily represent the length of the actual password. To change the unit password, select the password field and press ENT, which will take you to the Enter new Password screen. If there is no password, this field will be blank.

### *XBEE Channel*

Default: 1

Range: 1 to 12

This setting controls which channel is used by the qualifier radio. All tools learned to the qualifier will be set to this channel automatically as part of the learn process. In general, this setting does not have to be changed, but if tool communication is not working reliably, changing this setting may improve communication. When a change to this setting is saved, the unit will go to the Channel Change screen to guide you through updating all learned tools to use the new channel.

If you want the CONTROLTECH-LINK to suggest a channel, you can press **Scan** to go to the XBEE Channel Noise screen shown below.

The radio frequencies used by each channel can be found in *Chapter 14: Product Specifications*.

### *Controller Mode*

Default: Control

Values: Report, Control

This setting determines the mode the qualifier will run in. Changes to this setting will not take effect until the qualifier is rebooted.

### *Beep on reject?*

Default: yes

This setting determines if the qualifier will sound the beeper when a rejected tightening is received. The reject sound is one long beep.

### *Beep on batch?*

Default: yes

This setting determines if the qualifier will sound the beeper when a batch is completed. The batch sound is four short beeps. When running a group or job, the beep controlled by this setting

may be for each parameter batch or for the complete group or job. See the Groups and Jobs sections for more information about those settings.

### *Beep on cycle?*

Default: yes

This setting determines if the qualifier will sound the beeper when an accepted tightening is received that would not trigger the batch sound. The cycle sound is two short beeps.

### *Volume*

Default: 3

Range: 0 to 10

This setting controls the volume of the beeper. When set to 0, the beeper will not sound at all, regardless of the other *Beep on X* settings. A setting of 3 or below is recommended while using the qualifier in an office or other environment without much background noise.

### *Reject timeout*

Default: 1

Range: 0 to 10 seconds

This setting controls how long the on-screen indication of a rejected tightening will be shown. When set to 0, the indication will remain until another tightening is received or the qualifier changes or stops the currently running operation. Partial seconds may be entered for this setting.

Rejects are indicated by shading the screen red behind the parameter that received the reject.

### *Batch timeout*

Default: 1

Range: 0 to 10 seconds

This setting controls how long the on-screen indication of a rejected tightening will be shown. When set to 0, the indication will remain until another tightening is received or the qualifier changes or stops the currently running operation. Partial seconds may be entered for this setting.

Batch completions are indicated by shading the screen blue or yellow behind the parameter that received the result to complete a batch.

### *Cycle timeout*

Default: 1

Range: 0 to 10 seconds

This setting controls how long the on-screen indication of an accepted tightening that was not the last in a batch will be shown. When set to 0, the indication will remain until another tightening is received or the qualifier changes or stops the currently running operation. Partial seconds may be entered for this setting.

Cycles are indicated by shading the screen green behind the parameter that received the cycle.

### *Time*

This row allows you to set the current time used by the unit. The display order of this field is:

year-month-day hour:minute:second

Each piece of the time may be edited by using the left and right arrows to select the various pieces of the time and the number keys to set the new value.

Page 2

### *Serial baud rate*

Default: 9600

Values: 9600, 19200, 38400, 57600, 115200

This setting should be set to match the baud rate used by a serial barcode reader or printer, if either is used. If this setting is not configured correctly, barcodes will not be correctly processed.

### *Require VIN to run*

Default: no

This setting determines if the qualifier requires a VIN to be entered before tools will be allowed to run. When set to yes, the qualifier will be automatically suspended whenever there is no currently entered VIN. When set to no, the qualifier will not check the VIN before allowing tools to run.

A VIN may be entered through either the barcode scanner or a network command. The VIN may be cleared by a network command, an external input, or the *Clear VIN on batch* setting. If the VIN is cleared while an operation is running and this setting is set to yes, the qualifier will immediately suspend until a new VIN is entered.

### *Clear VIN on batch*

Default: no

This setting determines if the qualifier automatically clears the VIN when a batch completes. When set to no, the qualifier will never automatically clear the VIN. The VIN may still be cleared by other means, such as a network command or external input.

When set to yes, the qualifier will clear the VIN when an operation completes, regardless of if the operation is set to repeat. When directly running a parameter, the VIN will be cleared when a batch is completed. When running a standard group, the VIN will be cleared when all parameters in the group have completed. When running a job, the VIN will be cleared when the last step in the job is completed.

When using the VIN Selections feature, the selector will also be cleared with the VIN.

### *NOKs*

Default: Report

Values: Ignore, Display, Report, Count

This setting determines how the unit will handle NOK results (or rejects). The following table summarizes the behavior for the different levels:

| Level | Beep[1] | Show on Screen | Store in Flash | Report to Network | Overall bad[2] | Increment Count |
|---|---|---|---|---|---|---|
| Ignore | No | No | No | No | No | No |
| Display | Yes | Yes | No | No | No | No |
| Report | Yes | Yes | Yes | Yes | No | No |
| Count | Yes | Yes | Yes | Yes | Yes | Yes |

1. Unit will only beep if Beep on reject is set to yes and Volume is not 0.
2. Overall bad will be indicated by shading the operation name on the top row of the run screen yellow and will show yellow instead of blue or green in the parameter area when the parameter batch is completed.

All results from tools that are not currently running are ignored, regardless of this setting.

### *Batch Reset button*

Default: Show

Values: Show, Hide

This setting determines if the Batch Reset button is available on the Run screen.

### *Radio transmits*

Default: 3

This setting controls how many times a tool radio will attempt to send a result before giving up. In general, this setting does not have to be changed, but if tool communication is not working reliably, changing this setting may improve communication.

### *Serial printer format*

Default: None

Values: None, Line, CSV

This setting determines the format used for serial printing of tightenings.

### *Bypass Verify Inputs*

Default: no

This setting determines if the Verify Tool and Verify Socket inputs are ignored. See the GIM400 User Manual for more information about the inputs.

### *Startup Operation*

Default: Last

Values: Last, None

This setting what operation will be run on unit startup. If set to Last, the last running operation when the unit turned off will be restarted at the beginning of the operation when the unit turns on. If set to None, the unit will be in the No active parameter state on startup.

### *Batch Mode*

Default: Batch

Values: Batch, Single

This setting determines how the CTECH will behave when it loses communication with the CONTROLTECH-LINK. If set to Batch, the CTECH will record tightenings up to the completion of a full batch before disabling. If set to Single, the CTECH will disable after each result until it receives confirmation that the result was received by the CONTROLTECH-LINK.

## Enter new Password


**Figure 24: Enter new Password screen**

### *Function keys*

1. REMOVE – Clears the unit password and returns to the Unit Setup screen.
2. No function
3. SAVE [ENT] – Keeps changes to the password and returns to the Unit Setup screen.
4. CANCEL [ESC] – Cancels changes made to the password and returns to the Unit Setup screen.

The Enter new Password screen allows you to change the password to a string of up to 10 digits. *Note that the password entered on this screen will be shown in clear text as it is typed.* Enter the new password by typing the desired series of digits and pressing **SAVE** or ENT. *The new password will not be saved to permanent memory until saving from the Unit Setup screen*.

If you decide not to change the password, press **CANCEL** or ESC.

You may completely remove the password from the unit by pressing **REMOVE**. Removing the password will allow unrestricted access to all functions of the unit until a new password is entered. If you only want to temporarily disable the password, use the **RETURN** button as described on the Main menu screen to return to the run screen.

## XBEE Channel Noise

The XBEE Channel Noise screen will test each of the available channels to determine how much noise is already on those channels. The channel with the lowest amount of noise will be indicated by a blue bar.

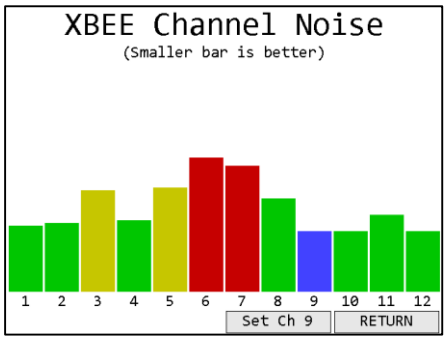



**Figure 25: XBEE Channel Noise screen**

### *Function keys*

1. No function
2. No function
3. Set Ch X [ENT] – Selects the best channel and returns to the Unit Setup screen.
4. RETURN [ESC] – Returns to the Unit Setup screen without selecting a channel.

The new channel will not be saved to permanent memory until saving from the Unit Setup screen. When a channel change is saved, the unit will go to the Channel Change screen to guide you through updating all learned tools to use the new channel after saving from the Unit Setup screen.

## Reset Defaults

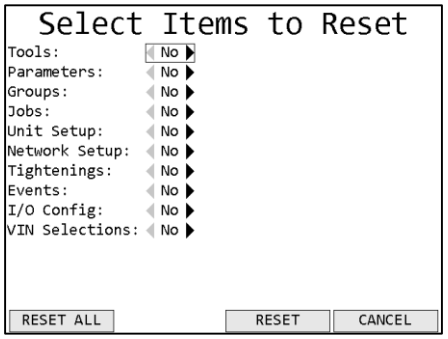



**Figure 26: Reset Defaults screen**

### *Function keys*

5. RESET ALL – Resets all configuration to factory defaults.
6. No function
7. RESET – Resets the selected parts of the configuration to factory defaults.
8. CANCEL [ESC] – Returns to the Unit Setup screen without resetting any configuration.

The Reset Defaults screen allows you to restore the unit to the factory defaults. You may select some or all parts of the configuration to reset.

Resetting some parts of the configuration may invalidate other parts that are not being reset.

| Resetting… | May invalidate… |
|---|---|
| Tools | Parameters, Groups, Jobs, Tightenings |
| Parameters | Groups, Jobs, Tightenings |
| Groups | Jobs, Tightenings |
| Jobs | Tightenings |
| Unit Setup | Tools[1] |
| Network Setup | none |
| Tightenings | none |
| Events | none |
| I/O Config | none |
| VIN Selections | none |

## Channel Change

When you change the XBEE channel from the Unit Setup screen, the unit will begin the channel change process. Follow the on-screen prompts to update each tool to the new channel.

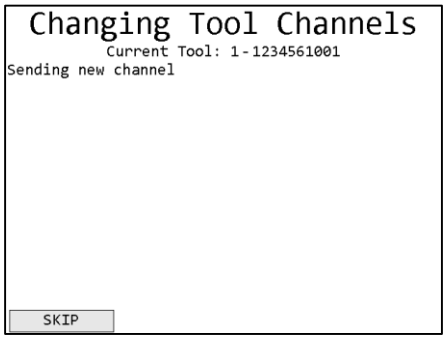



**Figure 27: Channel Change screen**


**Figure 28: Channel Change, tool 1 complete**

Tools should only need to be on and will perform the channel change automatically. Once the last tool is updated, you will be returned to the main menu.

Once all tools have been updated, the unit will return to the main menu. If you cannot perform the update on all learned tools at this time, you may press **SKIP** to skip the tool. This will allow the unit to finish the channel change, but will leave any skipped tools on the previous channel. When you want to use the tools that were not updated, they must be updated to the correct channel by turning the tool off and back on. Make sure no other units are in learn mode when you do this, or the tool may learn to the other unit instead. The tool should reconnect to the unit on the new channel and return to normal function.

[1] If the XBEE channel was changed from the default, the unit will go to the Channel Change screen to update the tools back to the default XBEE channel when resetting the default qualifier settings.

## Events

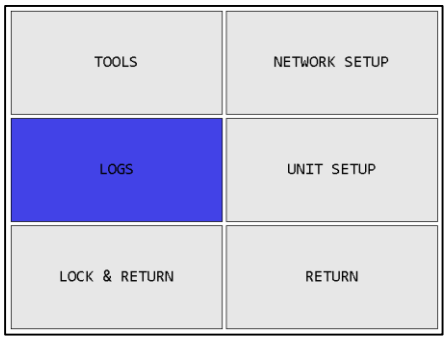



**Figure 29: Report Main menu - Logs**

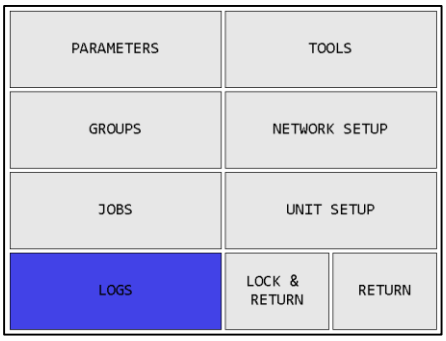



**Figure 30: Control Main menu - Logs**

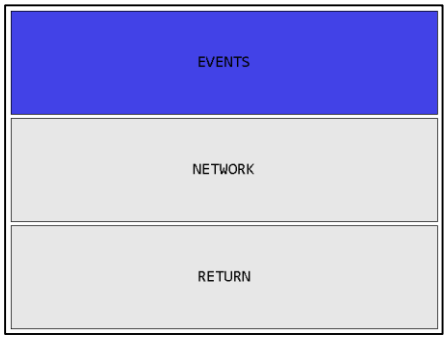



**Figure 31: Logs Menu screen - Events**

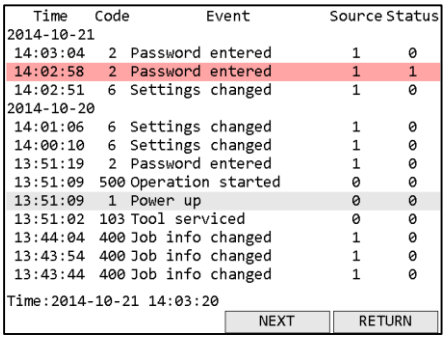



**Figure 32: Events screen**

### *Soft keys*

1. No function
2. PREVIOUS – Go to the previous page of more recent tightenings. When on the first page, this key will be blank.
3. NEXT [ENT] – Go to the next page of older tightenings. When on the last page, this key will be blank.
4. RETURN [ESC] – Returns to the Run Screen.

The Events screen shows the log of non-tightening events that have occurred. More information is available via the PC software application. This screen shows:

- Time – The time the event occurred. The date is indicated at the top of the table and each time it changes. The current time is shown at the bottom of the screen for comparison.
- Code – The event code for this event.
- Event – The name of this event.
- Source – The source that caused the event.
- Status – The status of the event. 0 indicates success, non-zero indicates an error.

## Network Log

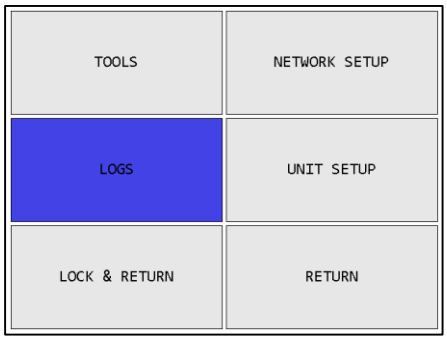



**Figure 33: Report Main menu - Logs**

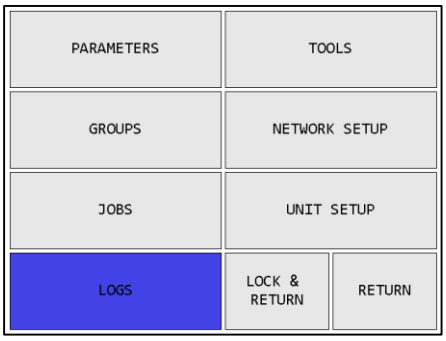



**Figure 34: Control Main menu - Logs**

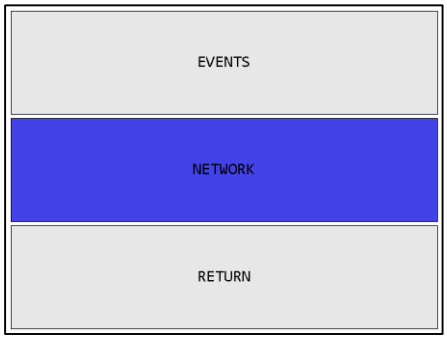



**Figure 35: Logs Menu screen - Network**

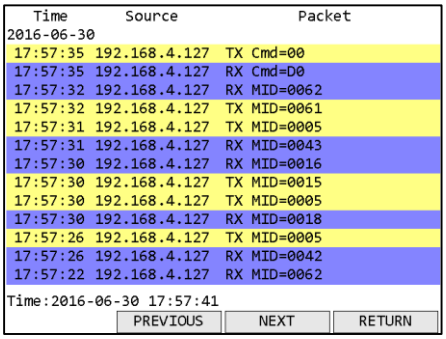



**Figure 36: Events screen**

### *Function keys*

1. No function
2. PREVIOUS – Go to the previous page of more recent network events. When on the first page, this key will be blank.
3. NEXT [ENT] – Go to the next page of older network events. When on the last page, this key will be blank.
4. RETURN [ESC] – Returns to the Run Screen.

The Network Log screen shows the log of network events that have occurred since the qualifier started up. This log is not maintained across reboots or power cycles. This screen shows:

- Time – The time the event occurred. The date is indicated at the top of the table and each time it changes. The current time is shown at the bottom of the screen for comparison.
- Source – The remote IP address for this event.
- Packet – Information about the packet sent or received or network connection start/stop.

# Chapter 4: Configuring Report Mode

## Tools

In report mode, the CONTROLTECH-LINK allows you to learn up to 8 primary tools. If tools are learned into slots 9-16 in Control mode, they will not be available in Report mode, but will return if you switch back to Control mode.

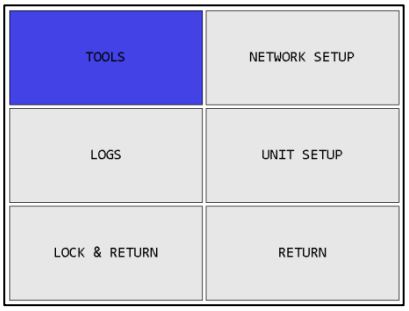



**Figure 37: Main Menu - Tools**

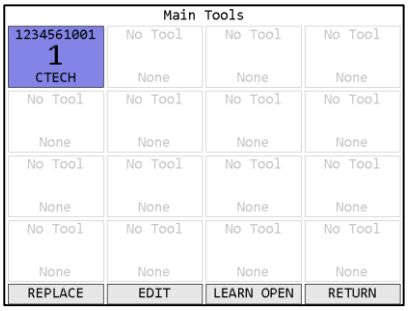



**Figure 38: Learned tool selected**

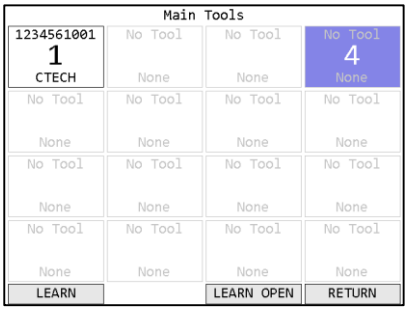



**Figure 39: Empty slot selected**

### *Function keys*

When a learned tool is highlighted, the function keys are:

1. REPLACE – Learn a new tool in place of the current tool in this slot. If you cancel out of the learn sequence, the current tool will remain in the slot.
2. EDIT [ENT] – Go to the Tool Edit screen, which is discussed below, for the selected tool.
3. LEARN OPEN – Starts the learn sequence for the empty tool slot with the lowest number.
4. RETURN [ESC] – Returns to the main menu.

When an empty tool slot is highlighted, the function keys are:

1. LEARN [ENT] – Starts the learn sequence for the highlighted tool slot.
2. No function
3. LEARN OPEN – Starts the learn sequence for the empty tool slot with the lowest number.
4. RETURN [ESC] – Returns to the main menu.

### Tool Configuration

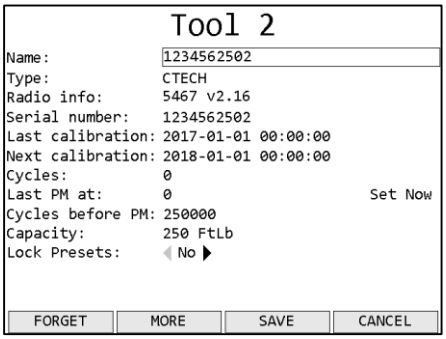



**Figure 40: Report mode Tool Edit screen**

### *Function keys*

1. FORGET – Removes the tool from the unit.
2. MORE – Goes to the tool sub-menu.
3. SAVE – Saves changes made to the tool configuration.

4. CANCEL [ESC] – Cancels changes made to the tool configuration.

### *Name*

The tool name can be up to 25 numbers, letters, or decimal points.

The tool name is shown on screen when running a parameter that uses the tool but is not reported to the network.

### *Radio Info*

The radio info shows the radio address and the firmware version used by the radio to communicate with the qualifier.

This field cannot be edited.

### *Serial Number*

The tool serial number can be up to 14 numbers, letters, or decimal points.

The tool serial number is reported to the network with tightenings performed by the tool but is not shown anywhere on screen besides this menu.

### *Last Calibration*

This field is used to store the date when the tool was last calibrated. The display order of this field is:

year-month-day hour:minute:second

This field is reported by the tool and must be updated in the tool instead of edited in the unit.

For other tools, this field must be updated manually when the tool is calibrated and is for informational purposes only. The date can be set to the current time in the qualifier by selecting **Set Now** at the end of the Last Calibration row and pressing the ENT key.

### *Next Calibration*

This field is used to store the date at which the tool should be recalibrated. The display order of this field is:

year-month-day hour:minute:second

This field is reported by the tool and must be updated in the tool instead of edited in the unit.

For other tools, this field must be updated manually when the tool is calibrated. The date can be set to the current time in the qualifier by selecting **Set Now** at the end of the Next Calibration row and pressing the ENT key. This can be helpful when the recalibration period is a full month because you will only need to update the month (and year when at the end of the year).

The tool can be configured via the PC software application to reject all results after this date passes.

### *Cycles*

This field tracks the total number of cycles performed by the tool since it was learned to the box. This cycle count is incremented for both accepted and rejected cycles.

This field cannot be edited. If the tool is forgotten and relearned, the cycle count will restart at 0.

### *Last PM at*

This field stores the cycle count at which the tool last received preventative maintenance. This field must be updated manually when the tool is serviced. The count can be set to the current cycle count by selecting **Set Now** at the end of the row and pressing the ENT key.

### *Cycles before PM*

Range: 0 to 4,294,967,295

This field indicates the number of cycles between preventative maintenance for the tool. If this field is set to 0, no tracking of cycle counts for preventative maintenance is performed.

The tool can be configured via the PC software application to reject all results when the cycle count is greater than the 'Last PM at' value plus the 'Cycles before PM'.

### *Capacity*

This field indicates the maximum torque the tool can withstand in ft-lb as reported by the tool.

This field cannot be edited.

### *Lock Presets*

Values: Yes, No

This field indicates if the tool is running with the presets locked.

## Forgetting Tools

Each tool can only be associated with a single qualifier at a time, but learning a tool to another qualifier does not automatically remove it from the previous qualifier. If you have changed or are planning to change a tool from a CONTROLTECH-LINK to another qualifier, you should have the qualifier "forget" the tool. To do so, press **Forget** on the Tool Edit screen to remove the tool from the qualifier. This will cause the qualifier to no longer respond to the tool and will make any parameters using the tool and any groups or jobs using those parameters invalid.

# Presets

## Selecting Presets

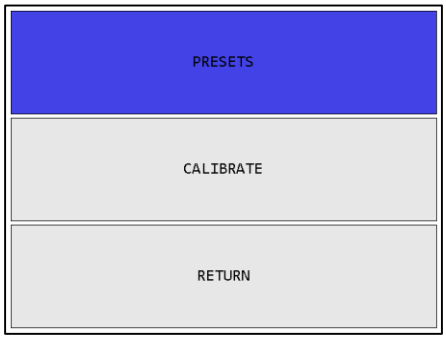



**Figure 41: Tool sub-menu Presets**

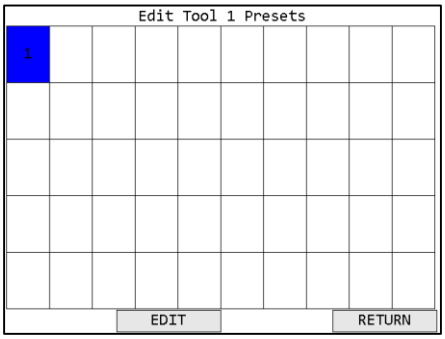



**Figure 42: Choose Preset screen**

### *Function keys*

1. No function
2. EDIT – Edit the currently highlighted preset in the tool.
3. No function
4. RETURN [ESC] – Returns to the tools sub-menu.

The Choose Presets screen shows all the presets in the tool in a 10x5 grid. Only the presets defined in the tool will show their numbers on the grid.

## Configuration Options

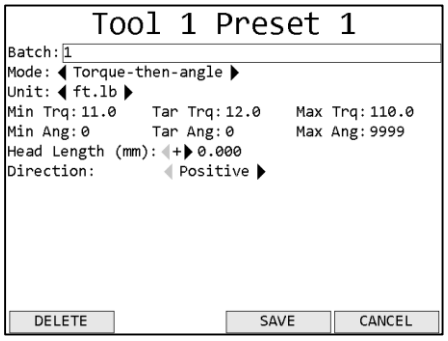



**Figure 43: Preset Edit screen**

### *Function keys*

1. DELETE – Deletes the preset from the tool and returns to the Choose Preset screen.
2. No function.
3. SAVE – Writes the changes to the preset to the tool and returns to the Choose Preset screen
4. CANCEL [ESC] – Discards changes to the preset and returns to the Choose Parameter screen

## Fields

### *Batch*

Default: 1

Range: 1 to 255

This setting determines how many good tightenings must be performed in the parameter to complete a batch.

### *Mode*

Default: Torque

Values: Torque, Torque-then-angle, Torque-and-angle, Angle

This setting controls the mode the tool uses to evaluate a tightening.

### *Unit*

Default: ft.lb

Values: in.lb, ft.lb, N.m, cm.kg, m.kg

Available Modes: all except Angle

This setting determines the units of the Min Torque, Target Torque, and Max Torque, as well as the torque reported with each tightening.

### *Min Trq*

Default: 10% of tool capacity

Range: 0 to tool capacity

Available Modes: all except Angle

This setting controls the minimum required torque for a valid tightening. This value must be less than Max Trq.

### *Tar Trq*

Default: 10% of tool capacity

Range: Min Trq to Max Trq

Available Modes: all except Angle

This setting controls the target torque displayed on the tool.

### *Max Trq*

Default: 99% of tool capacity

Range: 0 to tool capacity

Available Modes: all except Angle

This setting controls the maximum allowed torque for a valid tightening. This value must be greater than Min Trq.

### *Min Ang*

Default: 0

Range: 0 to 9999

Available Modes: all except Torque

This setting controls the minimum required angle for a valid tightening. This value must be less than Max Ang.

### *Tar Ang*

Default: 0

Range: Ang Min to Ang Max

Available Modes: all except Torque

This setting is the target number of degrees for a tightening.

### *Max Ang*

Default: 0

Range: 0 to 9999

Available Modes: all except Torque

This setting controls the maximum allowed angle for a valid tightening. This value must be greater than Min Ang.

### *Head Length*

Default: 0 mm

Values: 0 to 100 mm

Available Modes: all

This setting is used to tell the tool how long the head is for the parameter. *If this value is not entered correctly, torque measurements will be invalid.*

### *Direction*

Default: Positive

Values: Positive, Negative, Both

Available Modes: all

This setting controls the allowed torque directions for the parameter.

# Chapter 5: Configuring Control Mode

## Tools

In Control mode, the CONTROLTECH-LINK allows you to learn up to 16 primary tools and define up to 8 input tools using the discrete I/O. While each set of tools gets a separate screen, the processes for editing them is similar.

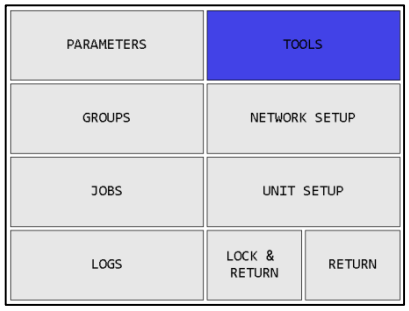



**Figure 44: Main menu - Tools**

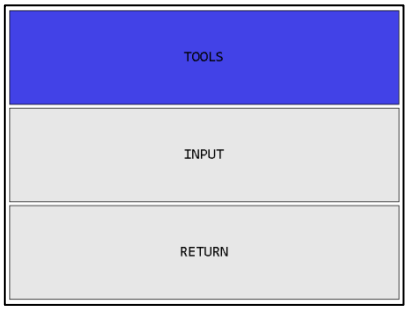



**Figure 45: Tools Menu**

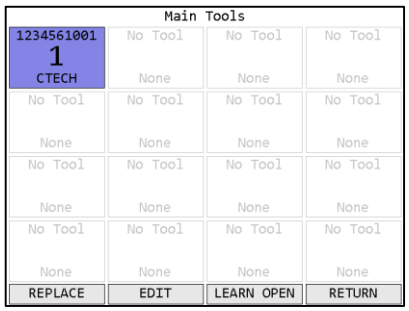



**Figure 46: Learned tool selected**

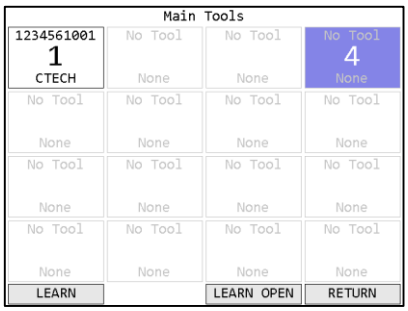



**Figure 47: Empty slot selected**

### *Function keys*

When a learned tool is highlighted, the function keys are:

5. REPLACE – Learn a new tool in place of the current tool in this slot. If you cancel out of the learn sequence, the current tool will remain in the slot.
6. EDIT [ENT] – Go to the Tool Edit screen, which is discussed below, for the selected tool.
7. LEARN OPEN – Starts the learn sequence for the empty tool slot with the lowest number.
8. RETURN [ESC] – Returns to the main menu.

When an empty tool slot is highlighted, the function keys are:

5. LEARN [ENT] – Starts the learn sequence for the highlighted tool slot.
6. No function
7. LEARN OPEN – Starts the learn sequence for the empty tool slot with the lowest number.
8. RETURN [ESC] – Returns to the main menu.

### Tool Configuration

Depending on the type of tool, the Tool Edit screen will have a slightly different set of fields.

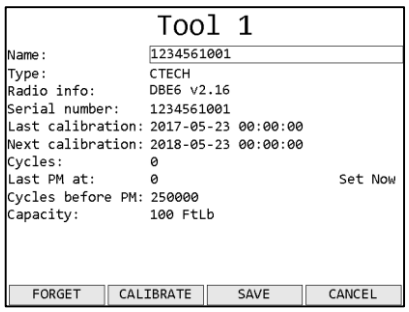



**Figure 48: Tool Edit Screen – CTECH**

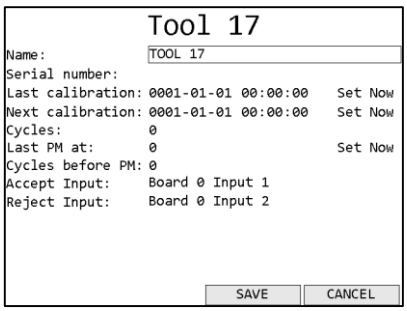



**Figure 49: Tool Edit Screen – Input**

### *Function keys*

5. FORGET – Removes the tool from the unit.
6. No function
7. SAVE – Saves changes made to the tool configuration.
8. CANCEL [ESC] – Cancels changes made to the tool configuration.

### *Name*

The tool name can be up to 25 numbers, letters, or decimal points.

The tool name is shown on screen when running a parameter that uses the tool but is not reported to the network.

### *Radio Info*

The radio info shows the radio address and the firmware version used by the radio to communicate with the qualifier.

This field cannot be edited.

### *Serial Number*

The tool serial number can be up to 14 numbers, letters, or decimal points.

The tool serial number is reported to the network with tightenings performed by the tool but is not shown anywhere on screen besides this menu.

### *Last Calibration*

This field is used to store the date when the tool was last calibrated. The display order of this field is:

year-month-day hour:minute:second

This field is reported by the tool and must be updated in the tool instead of edited in the unit.

For other tools, this field must be updated manually when the tool is calibrated and is for informational purposes only. The date can be set to the current time in the qualifier by selecting **Set Now** at the end of the Last Calibration row and pressing the ENT key.

### *Next Calibration*

This field is used to store the date at which the tool should be recalibrated. The display order of this field is:

year-month-day hour:minute:second

This field is reported by the tool and must be updated in the tool instead of edited in the unit.

For other tools, this field must be updated manually when the tool is calibrated. The date can be set to the current time in the qualifier by selecting **Set Now** at the end of the Next Calibration row and pressing the ENT key. This can be helpful when the recalibration period is a full month because you will only need to update the month (and year when at the end of the year).

The tool can be configured via the PC software application to reject all results after this date passes.

### *Cycles*

This field tracks the total number of cycles performed by the tool since it was learned to the box. This cycle count is incremented for both accepted and rejected cycles.

This field cannot be edited. If the tool is forgotten and relearned, the cycle count will restart at 0.

### *Last PM at*

This field stores the cycle count at which the tool last received preventative maintenance. This field must be updated manually when the tool is serviced. The count can be set to the current cycle count by selecting **Set Now** at the end of the row and pressing the ENT key.

### *Cycles before PM*

Range: 0 to 4,294,967,295

This field indicates the number of cycles between preventative maintenance for the tool. If this field is set to 0, no tracking of cycle counts for preventative maintenance is performed.

The tool can be configured via the PC software application to reject all results when the cycle count is greater than the 'Last PM at' value plus the 'Cycles before PM'.

### *Capacity*

This field indicates the maximum torque the tool can withstand in ft-lb as reported by the tool.

This field cannot be edited.

### *Accept Input/Reject Input*

These fields indicate which inputs were defined as the inputs for the tool. An input tool must have an Accept Input to be used but may be used without a Reject Input. See the chapter on Discrete I/O for more information about how these are configured.

These fields are only listed for input tools and cannot be edited.

## Forgetting Tools

Each radio tool can only be associated with a single qualifier at a time, but learning a tool to another qualifier does not automatically remove it from the previous qualifier. If you have changed or are planning to change a tool from a CONTROLTECH-LINK to another qualifier, you should have the qualifier "forget" the tool. To do so, press **Forget** on the Tool Edit screen to remove the tool from the qualifier. This will cause the qualifier to no longer respond to the tool and will make any parameters using the tool and any groups or jobs using those parameters invalid.

# Parameters

## Selecting Parameters

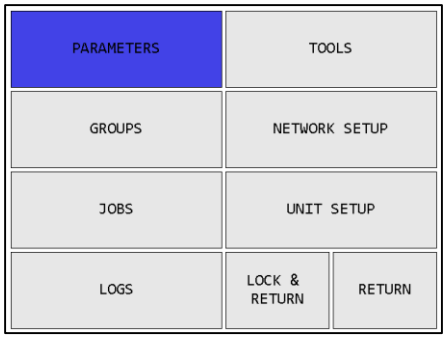



**Figure 50: Main menu - Parameters**

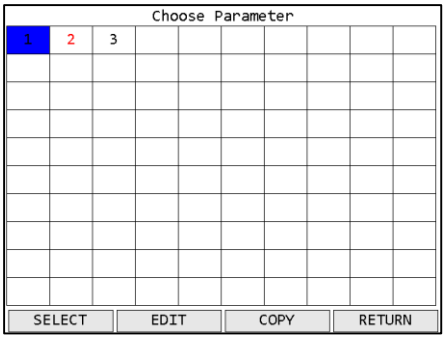



**Figure 51: Choose Parameter screen**

### *Function keys*

5. SELECT – Select the currently highlighted parameter to run. Only available for selectable parameters.
6. EDIT – Edit the currently highlighted parameter.
7. COPY – Selects the currently highlighted parameter to be copied to another location.
8. RETURN [ESC] – Returns to the main menu.

The Choose Parameter screen shows all the parameters in the unit in a 10x10 grid. Only the parameters with tools assigned will show their numbers on the grid. A selectable parameter will have a black number. A defined, but not selectable, parameter will be shown in red. A parameter is defined when a tool number is assigned to it. If the assigned tool number is an empty tool slot, because either no tool was ever learned or the previous tool was forgotten, the parameter will become unselectable.

## Configuration Options

The configuration options for a parameter depend on the type of tool selected for the parameter.

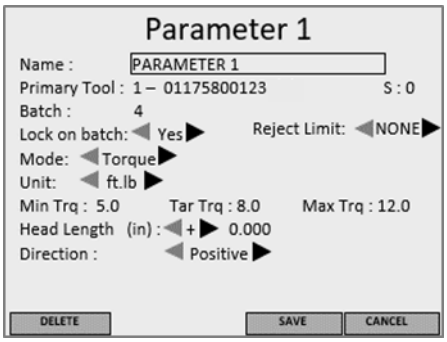



**Figure 52: Parameter Edit Screen – CTECH**

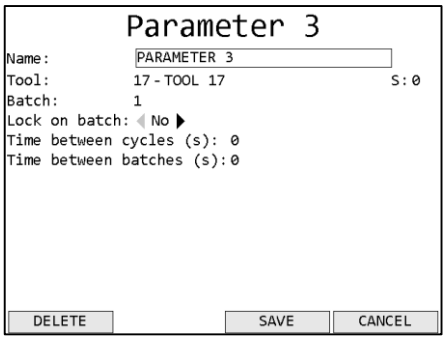



**Figure 53: Parameter Edit Screen – Input**

### *Function keys*

5. DELETE – Deletes all information in the parameter and returns to the Choose Parameter screen.
6. No function.
7. SAVE – Saves changes to the parameter and returns to the Choose Parameter screen
8. CANCEL [ESC] – Discards changes to the parameter and returns to the Choose Parameter screen

## Common Fields

### *Name*

The parameter name can be up to 25 numbers, letters, or decimal points.

The parameter name is shown on screen when running the parameter and reported to the network with tightenings performed in the parameter.

### *Tool*

This setting controls which tool is used by this parameter. You must select a learned tool before a parameter can be used.

If the tool used by a parameter is forgotten, the parameter will become invalid.

### *S*

Range: 1 to 100

These settings determine which socket is used with the tool for a parameter. If set to 0, no socket is defined for the tool. The socket settings are only relevant when combined with the Verify Socket discrete inputs.

### *Batch*

Default: 1

Range: 1 to 255

This setting determines how many good tightenings must be performed in the parameter to complete a batch.

*Reject Limit*

Default: None

Values: None, 0, 1, 2

This setting determines the limit for how many bad tightenings may be performed in a row before the parameter is locked and must be re-selected to continue. When set to "None," the parameter will never be locked due to rejects. When set to 0, the parameter will be locked after any reject. When set to 1 or 2, the parameter will be locked if 2 or 3 consecutive rejects are performed.

### *Lock on batch*

Default: no

This setting determines if the unit will lock or restart the parameter when a batch is completed. When set to yes, the qualifier will stop when a batch is completed and transition to a no active parameter state. When set to no, the qualifier will restart the parameter when a batch is completed.

This setting is ignored when running the parameter as part of a group or job.

### CTECH Tool Fields

Parameters using CTECH tools will have different settings based on the selected Mode option. All options will be described here.

### *Mode*

Default: Torque

Values: Torque, Torque-then-angle, Torque-and-angle, Angle

This setting controls the mode the tool uses to evaluate a tightening.

### *Unit*

Default: ft.lb

Values: in.lb, ft.lb, N.m, cm.kg, m.kg

Available Modes: all except Angle

This setting determines the units of the Min Torque, Target Torque, and Max Torque, as well as the torque reported with each tightening.

### *Min Trq*

Default: 10% of tool capacity

Range: 0 to tool capacity

Available Modes: all except Angle

This setting controls the minimum required torque for a valid tightening. This value must be less than Max Trq.

### *Tar Trq*

Default: 10% of tool capacity

Range: Min Trq to Max Trq

Available Modes: all except Angle

This setting controls the target torque displayed on the tool.

### *Max Trq*

Default: 99% of tool capacity

Range: 0 to tool capacity

Available Modes: all except Angle

This setting controls the maximum allowed torque for a valid tightening. This value must be greater than Min Trq.

### *Min Ang*

Default: 0

Range: 0 to 9999

Available Modes: all except Torque

This setting controls the minimum required angle for a valid tightening. This value must be less than Max Ang.

### *Tar Ang*

Default: 0

Range: Ang Min to Ang Max

Available Modes: all except Torque

This setting is the target number of degrees for a tightening.

### *Max Ang*

Default: 0

Range: 0 to 9999

Available Modes: all except Torque

This setting controls the maximum allowed angle for a valid tightening. This value must be greater than Min Ang.

### *Head Length*

Default: 0 mm

Values: 0 to 100 mm

Available Modes: all

This setting is used to tell the tool how long the head is for the parameter. *If this value is not entered correctly, torque measurements will be invalid.*

### *Direction*

Default: Positive

Values: Positive, Negative, Both

Available Modes: all

This setting controls the allowed torque directions for the parameter.

## Groups

### Selecting Groups

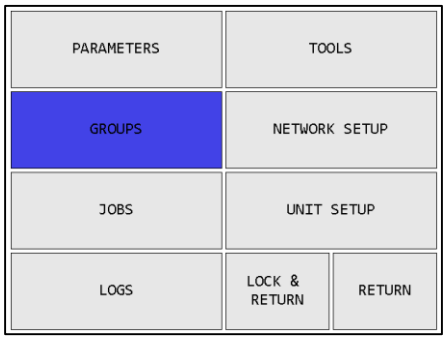



**Figure 54: Main menu - Groups**

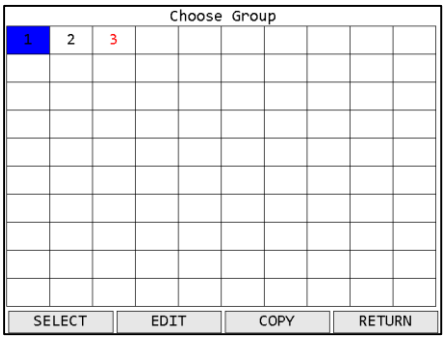



**Figure 55: Choose Group screen**

### *Function keys*

1. SELECT – Select the currently highlighted group to run. Only available for selectable groups.
2. EDIT – Edit the currently highlighted group.
3. COPY – Selects the currently highlighted group to be copied to another location.
4. RETURN [ESC] – Returns to the main menu.

The Choose Group screen shows all the groups in the unit in a 10x10 grid. Only the groups with parameters assigned will show their numbers on the grid. A selectable group will have a black number. A defined, but not selectable, group will be shown in red. A group is defined when one or more parameters are assigned to it. If an assigned parameter is unselectable, the group will become unselectable.

## Configuration Options

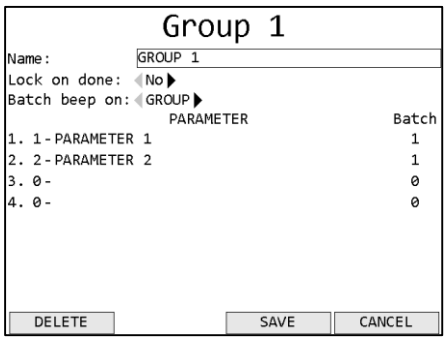



**Figure 56: Group Edit screen**

### *Function keys*

1. DELETE – Deletes all information in the group and returns to the Choose Group screen.
2. No function
3. SAVE – Saves changes to the group and returns to the Choose Group screen
4. CANCEL [ESC] – Discards changes to the group and returns to the Choose Group screen

### *Name*

The group name can be up to 25 numbers, letters, or decimal points.

The group name is shown on screen when running the group but is not sent to the network.

### *Lock on done*

Default: no

This setting determines if the unit will lock or restart the group when the group is completed. When set to yes, the qualifier will stop when the group completes and transition to a no active parameter state. When set to no, the qualifier will restart the group when it completes.

This setting is ignored when running the group as part of a job.

### *Batch beep on*

Default: Group

Values: Group, Parameter

This setting determines if the unit will sound the batch beep for each parameter in the group or only when the entire group is completed. The UI will show the batch color for each individual parameter when it completes regardless of this setting.

## Group Parameter Selection

### *Parameter column*

In the parameter column, you may select the parameters for the group by typing the number of the desired parameter in each row. The order on this screen determines the order they are shown on the run screen but is otherwise not important.

### *Batch column*

In the batch column, you may enter the batch size for the parameter when running it as part of the group. When a parameter is selected, this column will be filled with the batch currently defined in the parameter itself. Changing values in this column only affect the parameter while it is running in the group but does not change it in any other group or job or when the parameter runs on its own.

## Jobs

### Selecting Jobs

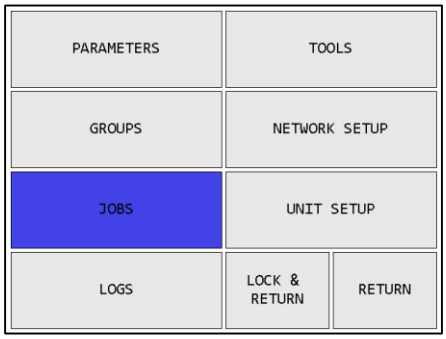



**Figure 57: Main menu - Jobs**

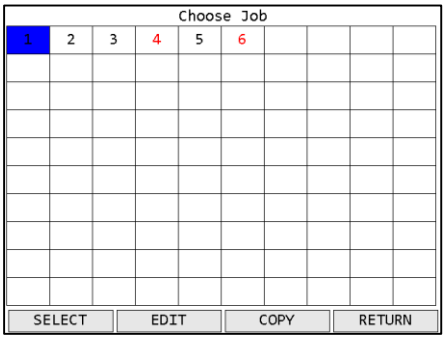



**Figure 58: Choose Job screen**

### *Function keys*

1. SELECT [ENT] – Select the currently highlighted job to run. Only available for selectable job.
2. EDIT – Edit the currently highlighted job.
3. COPY – Selects the currently highlighted job to be copied to another location.
4. RETURN [ESC] – Returns to the main menu.

The Choose Job screen shows all the jobs in the unit in a 10x10 grid. Only the jobs with parameters assigned will show their numbers on the grid. A selectable job will have a black number. A defined, but not selectable, job will be shown in red. A job is defined when one or more parameters or groups are assigned to it. If an assigned parameter or group is unselectable, the job will become unselectable.

### Configuration Options

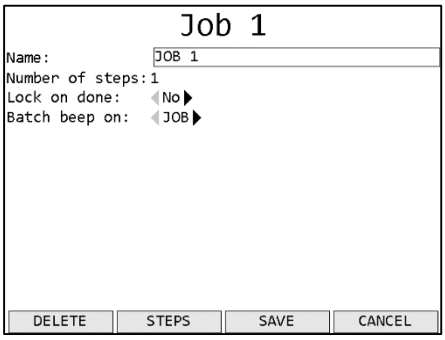



**Figure 59: Job Edit screen**

1. DELETE – Deletes all information in the job and returns to the Choose Job screen.
2. STEPS – Goes to the Job Step Select screen
3. SAVE – Saves changes to the job and returns to the Choose Job screen
4. CANCEL [ESC] – Discards changes to the job and returns to the Choose Job screen

### *Name*

The job name can be up to 25 numbers, letters, or decimal points.

The job name is shown on screen when running the job but is not sent to the network.

### *Number of Steps*

Shows the number of steps currently defined in the job.

### *Lock on done*

Default: no

This setting determines if the unit will lock or restart the job when the job is completed. When set to yes, the qualifier will stop when the job completes and transition to a no active parameter state. When set to no, the qualifier will restart the job when it completes.

### *Batch beep on*

Default: Job

Values: Job, Parameter

This setting determines if the unit will sound the batch beep for each parameter in the job or only when the entire job is completed. The UI will show the batch color for each individual parameter when it completes regardless of this setting.

## Job Step Selection

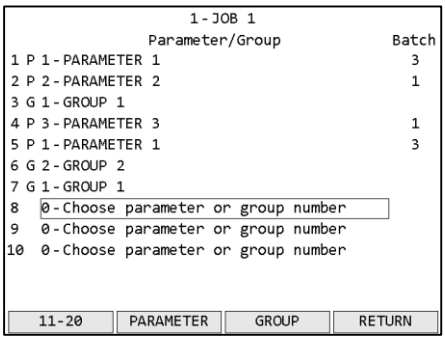



**Figure 60: Job Step Select screen**

### *Function keys*

1. 11-20 – Shows steps 11-20 of the job. When steps 11-20 are showing, this key changes to "21-30". When steps 21-30 are showing, this key changes to "1-10".
2. PARAMETER – Makes the selected step in the job a parameter step
3. GROUP – Makes the selected step in the job a group step
4. RETURN [ESC] –Returns to the Job Edit screen

Changes made on this screen are saved or discarded when exiting the Job Edit screen.

### *Parameter/Group column*

In the Parameter/Group column, you may select the parameter or group to run at each step in the job by typing the number of the desired parameter in each row. The P or G to the left of this column indicates whether a parameter or group is currently selected. To switch between a parameter and a group, use the function keys. The order on this screen determines the order they are run in the job.

Parameters and groups may be used multiple times within the same job.

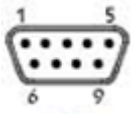
### *Batch column*

In the batch column, you may enter the batch size for the parameter steps when running it as part of the job. This column will be empty for group steps. When a parameter is selected, this column will be filled with the batch currently defined in the parameter itself. Changing values in this column only affect the parameter while it is running in the job but does not change it in any other group or job or when the parameter runs on its own.

# Chapter 6: Serial Communications

## Introduction

The CONTROLTECH-LINK has a DSUB-9 serial port that provides bar code reading and serial printing functionality. As the same connector is used for both functions, you will need a special Y-style cable if you want to attach both a barcode reader and a serial printer to the CONTROLTECH-LINK at the same time.




| Pin | Usage |
|---|---|
| 2 | Receive |
| 3 | Transmit |
| 5 | Ground |

## Barcode

The bar code functionality of the CONTROLTECH-LINK was developed and tested against the Symbol LS2208 bar code reader, which uses CODE39 bar codes. This format starts and ends all bar codes with an asterisk "*".

The CONTROLTECH-LINK further specifies a format of data within the bar code. The data is grouped into sections, separated by a percent symbol "%". If the bar code data does not start and end with a percent symbol, it will be treated as a VIN number. Starting with CONTROLTECH-LINK version 1.2.5, a non-command barcode may also be a selector when used with the VIN Selections feature. The general structure for a command bar code is:

*%<command>%<data>%*

A VIN/Selector bar code is:

*<VIN number>*

The remainder of this chapter lists the bar code commands provided by the unit. Section headings are the command number followed by the command name.

### 1. Cell ID

This command sets the Cell ID number reported by the unit in ACOP result messages.

Data: number of up to 4 digits (0-9999)

Example:

*%01%4305%*

This bar code would set the Cell ID of the unit to 4305.

### 2. Channel ID

This command sets the Channel ID number reported by the unit in ACOP result messages.

Data: number of up to 2 digits (0-99)

Example:

*%02%19%*

This bar code would set the Channel ID of the unit to 19.

## 3. Controller Name

This command sets the Controller Name of the unit.

Data: up to 25 characters

Example:

```
*%03%air - bag%*
```

This bar code would set the Controller name of the unit to “air - bag”.

## 4. VIN

This command sets the VIN or Identifier part 1 (VIN characters 1-25) reported by the unit in tightening result messages, the ACOP MID 0052 Vehicle ID Number, and the ACOP MID 0152 Multiple identifier and result parts notifications.

Data: up to 25 characters

Example:

```
*%04%VIN1234567%*
```

As mentioned above, a bar code is assumed to be a VIN number if the data is not in the command format. As such, the same VIN could be provided as:

```
*VIN1234567*
```

## 5. Start Job

This command instructs the unit to select a job. Any other running parameter, group, or job will be stopped before starting the new job.

Data: number of up to 3 digits specifying the job number to run (1-100)

Example:

```
*%05%32%*
```

This bar code would instruct the unit to start job number 32.

## 6. Identifier part 2

This command sets the Identifier part 2 (VIN characters 26-50) reported by the unit in tightening result messages and the ACOP MID 0152 Multiple identifier and result parts notifications.

Data: up to 25 characters

Example:

```
*%06%B23FJ9S3%*
```

## 7. Identifier part 3

This command sets the Identifier part 3 (VIN characters 51-75) reported by the unit in tightening result messages and the ACOP MID 0152 Multiple identifier and result parts notifications.

Data: up to 25 characters

Example:

*%07%GU49CN53%*

## 8. Identifier part 4

This command sets the Identifier part 4 (VIN characters 76-100) reported by the unit in tightening result messages and the ACOP MID 0152 Multiple identifier and result parts notifications.

Data: up to 25 characters

Example:

*%08%RU39CN53%*

## 10. Reset batch count

This command resets the count of all currently running parameters on the unit.

Data: none

Example:

*%10%%*

To reset the batch count of a single parameter when running a group with multiple parameters, use command 30. Reset parameter batch count.

## 11. Start Parameter

This command instructs the unit to start a parameter. Any other running parameter, group, or job will be stopped before starting the new parameter.

Data: number of up to 3 digits specifying the parameter number to select (1-100)

Example:

*%11%73%*

This bar code would select parameter 73.

## 12. Start Group

This command instructs the unit to select a group. Any other running parameter, group, or job will be stopped before starting the new group.

Data: number of up to 3 digits specifying the group number to select (1-100)

Example:

*%12%26%*

This bar code would select group 26.

## 13. Stop

This command instructs the unit to stop any running parameter, group, or job.

Data: none

Example:

*%13%%*

### 30. Reset parameter batch count

This command resets the count of the specified parameter. If the specified parameter is not running, this bar code is ignored.

Data: number of up to 3 digits specifying the parameter number to reset the batch (1-100)

Example:

*%30%35%*

This bar code would reset the current batch count of parameter 35.

To reset all batch counts at once, use command 10. Reset batch count.

## Serial Printer

The CONTROLTECH-LINK provides serial printer output in two formats, line and CSV. The CONTROLTECH-LINK will print tightenings based on the format selected on the second page of the Unit Setup menu. Additionally, rejects may not be printed based on the Report to Network column of the NOKs setting table. Both line and CSV formats contain the following fields in the same order:

- VIN
- Controller Name
- Cell ID
- Tightening ID
- Time
- Job Number
- Job Sequence Number
- Parameter Number
- Parameter Name
- Last Parameter Write Time
- Tool Type
- Tool Number
- Tool Name
- Tool Serial Number
- OK/NOK
- Result
- Count
- Batch
- Batch Status
- Torque
- Torque Min
- Torque Max
- Torque Units

- Torque Mode
- Torque Status
- Angle
- Angle Min
- Angle Max
- Angle Status

## VIN Selections

You may configure the CONTROLTECH-LINK to use VIN barcode scans to select a parameter, group, or job. The selections must be configured via the ControlTech Manager program.

Both the Atlas Copco Open Protocol and Ethernet/IP™ can provide a VIN to the CONTROLTECH-LINK. VINs received from these protocols will still be placed in the VIN field, but they are ignored by the VIN selection feature. If a network is able to provide VINs, it is expected that the network will also control the selection of operations through one of the mechanisms provided in that protocol.

### Settings

#### *No match behavior*

Default: Continue

Values: Continue, Stop, Ignore

This setting determines what happens when a selector scan does not match one of the VIN selections.

When set to Continue, the CONTROLTECH-LINK will store the scan in its Selector field, but will not stop or change the running operation for a non-matching scan.

When set to Stop, the CONTROLTECH-LINK will discard the scan and blank both the Selector and VIN fields and will stop the running operation for a non-matching scan.

When set to Ignore, the CONTROLTECH-LINK will ignore any selector scans that do not match one of the VIN selections and act as if the scan never occurred.

#### *Selection mode*

Default: Single Scan

Values: None, Single Scan, Dual Scan, VIN then Selector, Selector then VIN

This setting determines the mode the CONTROLTECH-LINK uses to for the VIN Selection feature. The modes will be described in more detail in the next section.

#### *Second scan timeout*

Default: 5

Range: 0-99 seconds

This setting determines how long the CONTROLTECH-LINK will wait for a second scan when using one of the selection modes requiring two scans. If a valid second scan is not received during the timeout, the CONTROLTECH-LINK will discard the first scan, and if No match behavior is Stop, will also stop the running operation.

#### *VIN length*

Default: Variable

Values: Variable, Fixed (1-25 characters)

This setting determines how long a scan must be to be considered a valid VIN. When set to Variable, any scan length up to 25 characters is allowed. When running in None mode, this setting allows you to specify the length of a VIN scan without using the rest of the VIN Selections features.

### *Selector length*

Default: Variable

Values: Variable, Fixed (1-25 characters)

This setting determines how long a scan must be to be considered a valid selector. When set to Variable, any scan length up to 25 characters is allowed. When running in None or Single Scan modes, this setting is ignored.

### *Characters to match*

This setting is used to specify which characters in a scan the CONTROLTECH-LINK should look at when comparing against the selection list. You may select some or all of the characters and are allowed to have gaps between matched characters if needed.

### *VIN Selection Matches*

Each entry in the VIN Selection Match list has a few values that you can set.

*Match* – The string of characters that must be found in the scan.

*Type* – The type of item to be selected for a matching selector. One of Paramter, Group, or Job.

*Number* – The item number to be selected for a matching selector. 1-100.

*Batch* – If selecting a batch, the batch size to use for a matching selector. 0 to use the batch size defined in the parameter, or 1-255 to override the batch size defined in the parameter.

## Match Examples

Consider the following selectors:

1**FV**6HL**B**AXP

1**FV**PP3**B**X5M

J**H2**RC4**4**1X2

To have the CONTROLTECH-LINK look at the marked (bold/underline) characters in the scans for its match, you would select characters 2, 3, and 7 as the Characters to match. To match the first two scans, you would enter “FVB” for the Match field in the selection list. To match the third scan, you would enter “H24” for the Match field in the selection list.

## Selection Modes

The CONTROLTECH-LINK will use one of several modes to determine how it uses the VIN to make selections:

### *None*

No selections are made based on barcode scans. The VIN length setting will still be used to validate VIN scans, but the CONTROLTECH-LINK will not select an operation based on the scan. If you want to keep the defined list of selections, but temporarily not use them, put the CONTROLTECH-LINK in this mode.

### *Single Scan*

All scans are treated as both VINs and selectors. The selector length setting is not used in this mode, and only scans matching the VIN length will be processed. The CONTROLTECH-LINK will check each scan against its selection list for a match and start the appropriate operation if a match is found.

### *Dual Scan*

Scans are treated as either VINs or selectors based on their length. The VIN and selector lengths must be different to use this mode. The VIN length or selector length may be variable, but not both. Any scan that matches the VIN length (or does not match the selector length, if the VIN is variable length) will be put in the VIN field but will not cause the CONTROLTECH-LINK to select an operation. The CONTROLTECH-LINK will check any scan that matches the selector length (or does not match the VIN length, if the selector is variable length) against its selection list for a match and start the appropriate operation if a match is found.

### *Selector then VIN*

The CONTROLTECH-LINK will require a selector scan first followed by a VIN scan. In this mode, the VIN and selector lengths may be the same or different. While the CONTROLTECH-LINK is waiting for the first scan, it will ignore any scans that do not match the selector length. Once a valid length scan is found, the CONTROLTECH-LINK will process it as a selector, checking it against the selection list for a match but not immediately starting the matching operation. If the scan is a match or the No match behavior is Continue, the CONTROLTECH-LINK will start waiting for a VIN scan. Once a valid length scan is found, the CONTROLTECH-LINK will start the matching operation from the selector scan.

### *VIN then Selector*

The CONTROLTECH-LINK will require a VIN scan first followed by a selector scan. In this mode, the VIN and selector lengths may be the same or different. While the CONTROLTECH-LINK is waiting for the first scan, it will ignore any scans that do not match the VIN length. Once a valid length scan is found, the CONTROLTECH-LINK will store it as the VIN and start waiting for a selector scan. Once a valid length selector scan is found, the CONTROLTECH-LINK will process it as a selector, checking it against the selection list for a match and starting the matching operation if a match is found.

# Chapter 7: Atlas Copco Open Protocol

## Introduction

This chapter describes the support for the Atlas Copco Open Protocol in the CONTROLTECH-LINK. Command MIDs and revisions referred to in this document are from the Atlas Copco Open Protocol Specification release 1.3 revision 1.

## Using Groups with Atlas Copco Open Protocol

The group features of the CONTROLTECH-LINK are not defined directly in the protocol specification. Instead, they are represented as jobs when using this protocol. To reference a group instead of a job in one of the job commands, add 300 to the group number. To represent groups, you must use a revision that uses 4 characters for the job number.

For example, sending MID 0038 Select Job with a job number of 7 will select Job 7 in the unit. Sending MID 0038 with "job number" of 306 will select Group 6 in the unit. If groups 1, 2, and 3 and jobs 10, 11, and 12 are defined in the unit, MID 0030 Job ID Upload request would return "jobs" 10, 11, 12, 301, 302, and 303 in the reply. Similarly, the MID 0034 Job Info subscription will give a message with "job number" 305 when group 5 is selected in the unit.

## Configuration Options

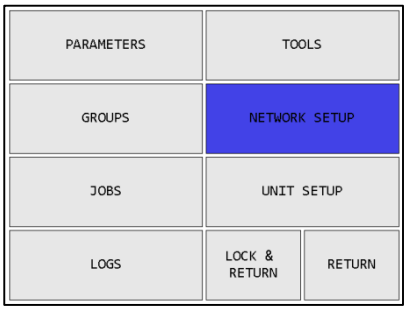



**Figure 61: Main menu - Network Setup**

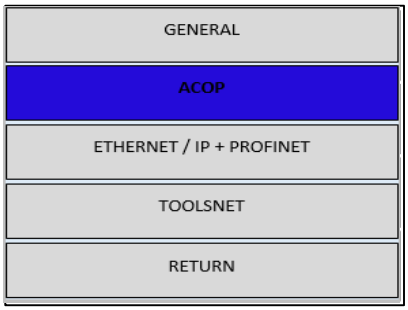



**Figure 62: Network Setup Menu - ACOP**

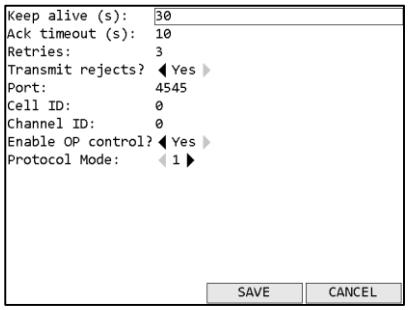



**Figure 63: ACOP Settings**

### *Keep Alive*

Range: 0 to 3600 seconds

Default: 30 seconds

This setting controls how long in seconds the unit will keep a connection open without any commands. This value is recommended to be more than twice the rate at which the client will send keep alive packets to ensure the connection is not closed due to a single missed keep alive packet. For example, if the client is configured to send keep alive packets at a 20 second interval, the keep alive setting on the unit should be more than 40 seconds.

The keep alive function can be disabled by setting the keep alive to 0. When set keep alive is set to 0, the unit will not close an Open Protocol connection due to inactivity.

### *Ack Timeout*

Range: 0 to 3600 seconds

Default: 10 seconds

This setting controls how long the qualifier will wait for a response from the client when sending a subscription notification packet, such as MID 0015 or MID 0061. If no response is received within the specified ack timeout, the qualifier will try again, up to the specified number of retries. If no response is received after all retries, the ACOP connection is considered broken and will have to be re-established. This will terminate all subscriptions that were established on that connection, regardless of which one did not receive a response.

### *Retries*

Range: 0 to 10

Default: 3

This setting controls how many times the qualifier will resend a subscription notification packet, such as MID 0015 or MID 0061, to the client. If no response is received within the specified ack timeout, the qualifier will try again, up to the specified number of retries. If no response is received after all retries, the ACOP connection is considered broken and will have to be re-established. This will terminate all subscriptions that were established on that connection, regardless of which one did not receive a response.

### *Transmit Rejects*

Default: yes

This setting determines if reject tightenings are sent to the Open Protocol network. If set to yes, all tightenings will be sent to the network. If set to no, only accepts will be sent to the network, both cycles and batch completes. This setting does not affect if rejects are logged to the unit storage and has no effect if the qualifier NOKs setting is not set to Report or Count.

### *Port*

Range: 0 to 65535

Default: 4545

This setting controls the network port on which the unit listens for Open Protocol connections.

### *Cell ID*

Range: 0 to 9999

Default: 0

This setting controls the value put in the Cell ID field of Open Protocol commands such as MID 0001 and 0061.

### *Channel ID*

Range: 0 to 99

Default: 0

This setting controls the value put in the Channel ID field of Open Protocol commands such as MID 0001 and 0061.

### *Enable OP Control*

Default: yes

This setting determines if the unit will respond to "Open Protocol control" commands. These commands are generally the ones that control unit operation or modify configuration. When this setting is set to yes, all supported commands listed below are handled. When set to no, the following MID commands will return an error:

- 0018 Parameter Select
- 0019 Parameter Batch Size
- 0020 Parameter Reset Batch
- 0038 Job Select
- 0039 Job Restart
- 0042 Tool Disable
- 0043 Tool Enable
- 0050 VIN Download
- 0082 Write Time
- 0127 Job Abort
- 0130 Job Off
- 0150 Multi ID Download
- 0156 Reset Latest Identifier
- 0157 Reset All Identifiers

### *Protocol Mode*

Default: 1

This setting determines the mode used by the qualifier for Open Protocol connections. This setting should be left on the default unless specifically advised otherwise by the factory.

## Supported Commands

Revision lists with a '*' indicate that one or more revisions of the MID is not supported. Otherwise, the listed supported revisions are all revisions in the specification version mentioned above.

| MID | Revisions | Command |
|---|---|---|
| 0001,0002 | 1-4 | Communication start (acknowledge) |
| 0003 | 1 | Communication stop |
| 0004 | 1 | Command error |
| 0005 | 1 | Command accepted |
| 0010,0011 | 1 | Parameter set ID upload request/reply |
| 0012,0013 | 1-2* | Parameter set data upload request/reply |
| 0014-0017 | 1 | Parameter set selected (subscribe/acknowledge/unsubscribe) |
| 0018 | 1 | Select Parameter set |
| 0019 | 1 | Set Parameter set batch size |
| 0020 | 1 | Reset Parameter set batch counter |
| 0030,0031 | 1-2 | Job ID upload request/reply |
| 0032,0033 | 1-3 | Job data upload request/reply |
| 0034-0037 | 1-4 | Job info (subscribe/acknowledge/unsubscribe) |
| 0038 | 1-2 | Select Job |
| 0039 | 1-2 | Job restart |
| 0040,0041 | 1-4 | Tool data upload request/reply |
| 0042 | 1 | Disable tool |
| 0043 | 1 | Enable tool |
| 0050 | 1 | Vehicle ID Number download request |
| 0051-0054 | 1-2 | Vehicle ID Number (subscribe/acknowledge/unsubscribe) |
| 0060-0063 | 1-4* | Last tightening result data (subscribe/acknowledge/unsubscribe) |
| 0064,0065 | 1-4* | Old tightening result upload request/reply |
| 0070-0073 | 1 | Alarm (subscribe/acknowledge/unsubscribe) |
| 0080,0081 | 1 | Read time upload request/reply |
| 0082 | 1 | Set Time |
| 0127 | 1 | Abort Job |
| 0130 | 1 | Job off |
| 0150 | 1 | Identifier download request |
| 0151-0154 | 1 | Multiple identifier and result parts (subscribe/acknowledge/unsubscribe) |
| 0156 | 1 | Reset latest Identifier |
| 0157 | 1 | Reset all Identifiers |
| 0270 | 1 | Controller reboot request |
| 0420-0423 | 1 | Open Protocol commands disabled (subscribe/acknowledge/unsubscribe) |
| 9999 | 1 | Keep alive message |

## Unsupported Commands

If revisions are listed for a MID, there are other revisions for that MID that are supported. Otherwise, the entire command is unsupported.

| MID | Revisions | Command |
|---|---|---|
| 0012,0013 | 3 | Parameter set data upload request/reply |
| 0021-0024 | | Lock at batch done (subscribe/acknowledge/unsubscribe) |
| 0025 | | Parameter user set download request |
| 0044 | | Disconnect tool request |
| 0045 | | Set calibration value request |
| 0046 | | Set primary tool request |
| 0060-0063 | 5-6,998,999 | Last tightening result data (subscribe/acknowledge/unsubscribe) |
| 0064,0065 | 5-6 | Old tightening result upload request/reply |
| 0074,0075 | 1 | Alarm acknowledged on controller (acknowledge) |
| 0076,0077 | 1 | Alarm status (acknowledge) |
| 0078 | 1 | Acknowledge alarm remotely on controller |
| 0090-0093 | | Multi-spindle status (subscribe/acknowledge/unsubscribe) |
| 0100-0103 | | Multi-spindle result (subscribe/acknowledge/unsubscribe) |
| 0105 | | Last PowerMACS tightening result data subscribe |
| 0106 | | Last PowerMACS tightening result Station data |
| 0107 | | Last PowerMACS tightening result Bold data |
| 0108 | | Last PowerMACS tightening result data acknowledge |
| 0109 | | Last PowerMACS tightening result data unsubscribe |
| 0110 | | Display user text on compact |
| 0111 | | Display user text on graph |
| 0113 | | Flash green light on tool |
| 0120 | | Job line control info subscribe |
| 0121 | | Job line control started |
| 0122 | | Job line control alert 1 |
| 0123 | | Job line control alert 2 |
| 0124 | | Job line control done |
| 0125 | | Job line control info acknowledge |
| 0126 | | Job line control info unsubscribe |
| 0128 | | Job batch increment |
| 0129 | | Job batch decrement |
| 0131 | | Set Job line control start |
| 0132 | | Set Job line alert 1 |
| 0133 | | Set Job line alert 2 |
| 0140 | | Execute dynamic Job request |
| 0155 | | Bypass Identifier |
| 0200 | | Set externally controlled relays |
| 0210-0213 | | Status externally monitored inputs (subscribe/acknowledge/unsubscribe) |
| 0214,0215 | | IO device status request/reply |
| 0216-0219 | | Relay function (subscribe/acknowledge/unsubscribe) |
| 0220-0223 | | Digital input function (subscribe/acknowledge/unsubscribe) |
| 0224 | | Set digital input function |
| 0225 | | Reset digital input function |
| 0240 | | User data download |
| 0241-0244 | | User data (subscribe/acknowledge/unsubscribe) |
| 0250-0253 | | Selector socket info (subscribe/acknowledge/unsubscribe) |
| 0254 | | Selector control green lights |
| 0255 | | Selector control red lights |
| 0260 | | Tool tag ID request |

| MID | Revisions | Command |
|---|---|---|
| 0300,0301 | | Histogram upload request/reply |
| 0261-0264 | | Tool tag ID (subscribe/acknowledge/unsubscribe) |
| 0400-0403 | | Automatic/Manual mode (subscribe/acknowledge/unsubscribe) |
| 0410,0411 | | AutoDisable settings request/reply |

# Chapter 8: ToolsNet

# Introduction

This chapter describes the support for the ToolsNet Open Protocol in the CONTROLTECH-LINK. Implementation of the protocol is according to ToolsNet Open Protocol version 3.2.

The CONTROLTECH-LINK reports System Type as 29 and System Name as "CONTROLTECH-LINK".

# Configuration Options

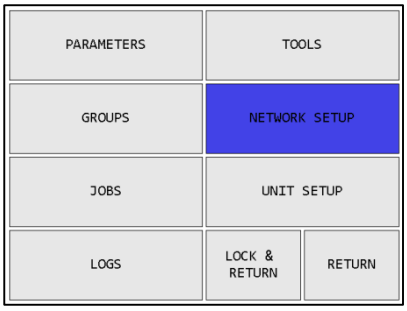



**Figure 64: Main menu - Network Setup**

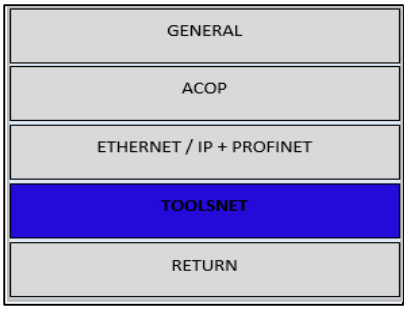



**Figure 65: Network Setup Menu – ToolsNet**

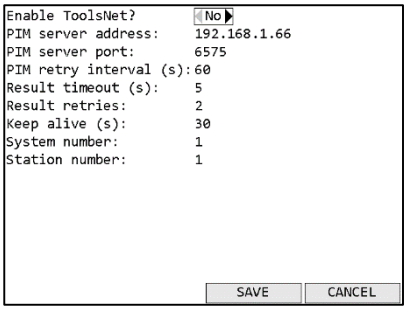



**Figure 66: ToolsNet Settings**

## *Enable ToolsNet?*

Default: no

This setting determines if the qualifier will attempt to establish a ToolsNet connection. Unlike the other network protocols supported by the qualifier, ToolsNet requires the controller to establish connections. Since the qualifier will repeatedly make network requests to attempt to establish a network connection to the ToolsNet server, you should only enable ToolsNet if you have a server set up in the network.

## *PIM server address*

Default: 192.168.1.66

This setting controls the IP address the qualifier will use to establish a ToolsNet connection.

## *PIM server port*

Default: 6575

Range: 0 to 65535

This setting controls the port the qualifier will use to establish a ToolsNet connection at the PIM server address.

## *PIM retry interval*

Default: 60 seconds

Range: 0 to 3600 seconds

This setting controls how long the qualifier will wait after a failed attempt to establish a ToolsNet connection before it tries again.

### *Result timeout*

Default: 5 seconds

Range: 0 to 60 seconds

This setting controls how long the qualifier will wait for a response from the ToolsNet server when sending a tightening or keep alive packet. If no response is received within the specified result timeout, the qualifier will try again, up to the specified number of retries. If no response is received after all retries, the ToolsNet connection is considered broken and will have to be re-established.

### *Result retries*

Default: 2

Range: 0 to 10

This setting controls how many times the qualifier will resend a tightening or keep alive packet to the ToolsNet server before considering the connection broken. If no response is received within the specified result timeout, the qualifier will try again, up to the specified number of retries. If no response is received after all retries, the ToolsNet connection is considered broken and will have to be re-established.

### *Keep alive*

Default: 30 seconds

Range: 0 to 3600 seconds

This setting controls how often the qualifier will send a keep alive packet to the ToolsNet server if no other packets are being sent. When set to 0, the qualifier does not send keep alive packets.

This value is recommended to be less than half the inactivity timeout of the server to ensure the connection is not closed due to a single missed keep alive packet. For example, if the server is configured to timeout after 30 seconds of inactivity, the keep alive setting on the unit should be less than 15 seconds.

### *System number*

Default: 1

Range: 0 to 9999

This setting controls the system number the qualifier reports to the ToolsNet server in identification and tightening packets.

### *Station number*

Default: 1

Range: 0 to 9999

This setting controls the station number the qualifier reports to the ToolsNet server in identification and tightening packets.

# Chapter 9: EtherNet/IP™ + PROFINET

This chapter describes the assembly object connection points and provided by the CONTROLTECH-LINK. Implementation was done against EtherNet/IP™ specification edition 1.16 (April 2014) and the associated CIP specification edition 3.16 (April 2014). As per the EtherNet/IP™ specification for the Assembly Object, instance number and connection point are equivalent. This document will refer to them as connection point throughout.

## Output (O->T) Connection Points

The following connection points are used by the CONTROLTECH-LINK to take input data from the network. These connection points allow you to control the running operation of the qualifier.

### *163*

| Name | Data Type | Description |
|---|---|---|
| Item Number | UINT | Instance number of item to run. Deactivate any running parameter, job, or group if 0. |
| Item Type | USINT | Type of item to run:<br>0 - Parameter<br>1 – Group<br>2 – Job<br>Ignored if Item Number is 0. |
| Batch Reset | USINT | When this value changes, the batch counts of the currently running parameter or group is reset. |
| Suspend | BOOL | When set, suspends the unit without stopping a running parameter, group, or job. |
| Batch | USINT | Sets the batch size for the selected parameter. If Item Type is not 0 (Parameter), this value is ignored. If this value is 0, the parameter size stored in the CONTROLTECH-LINK will be used. |

Total size: 6 bytes

### *172*

| Name | Data Type | Description |
|---|---|---|
| Item Number | UINT | Instance number of item to run. Deactivate any running parameter, job, or group if 0. |
| Item Type | USINT | Type of item to run:<br>0 - Parameter<br>1 – Group<br>2 – Job<br>Ignored if Item Number is 0. |
| Batch Reset | USINT | When this value changes, the batch counts of the currently running parameter or group is reset. |
| Suspend | BOOL | When set, suspends the unit without stopping a running parameter, group, or job. |
| Batch | USINT | Sets the batch size for the selected parameter. If Item Type is not 0 (Parameter), this value is ignored. If this value is 0, the parameter size stored in the CONTROLTECH-LINK will be used. |
| VIN | USINT[100] | |

Total size: 106 bytes

## Input (T->O) Connection Points

This section defines the connection points are used by CONTROLTECH-LINK to send output data to the network

### *113*

This connection point will contain data about the last tightening. As such, it is not updated after a parameter, group, or job selection until a tightening occurs.

| Name | Data Type | Description |
|---|---|---|
| Tightening ID | UDINT | ID number of the last tightening |
| Time | DT | Timestamp of the last tightening |
| Tightening Status | BOOL | Indicates if the last tightening was accepted as valid. |
| Reserved | USINT | Padding byte for devices requiring even connection point sizes. |

Total size: 11-12 bytes

### *120*

| Name | Data Type | Description |
|---|---|---|
| Parameters | ARRAY of STRUCT of: | Status of up to 16 parameters currently running. |
| - Parameter Number | UINT | Parameter number (0 means parameter not running.) |
| - Count | USINT | Number of results performed in the current batch for the parameter. |
| - Batch | USINT | Number of results required for a batch in the parameter. |
| Multi Number | UINT | Number of multi-parameter operation (job or group) currently running. Ignored if 0. |
| Multi Type | USINT | Type of multi-parameter operation currently running:<br>1 – Group<br>2 – Job<br>Ignored if Multi-Number is 0. |
| Suspend | BOOL | |

Total size: 68 bytes

### *121*

| Name | Data Type | Description |
|---|---|---|
| Parameters | ARRAY of STRUCT of: | Status of up to 4 parameters currently running. |
| - Parameter Number | UINT | Parameter number (0 means parameter not running.) |
| - Count | USINT | Number of results performed in the current batch for the parameter. |
| - Batch | USINT | Number of results required for a batch in the parameter. |
| - Status | USINT | Status of parameter<br>0 – None<br>1 – Cycle<br>2 – Batch<br>3 – Reject<br>4 – Batch NOK (batch complete with a counted reject) |
| - Torque Unit | ENGUNIT | Unit of torque for the last tightening performed by the parameter. |
| - Torque | REAL | Torque of the last tightening performed by the parameter. |
| - Angle | UDINT | Angle of the last tightening performed by the parameter. |

| | | |
|---|---|---|
| Multi Number | UINT | Number of multi-parameter operation (job or group) currently running. Ignored if 0. |
| Multi Type | USINT | Type of multi-parameter operation currently running:<br>1 – Group<br>2 – Job<br>Ignored if Multi-Number is 0. |
| Suspend | BOOL | Indicates if the qualifier is suspended. |
| Operation Status | USINT | 0 – None/In Progress<br>1 – Complete<br>When running an individual Parameter (Multi Number = 0), Complete will correspond to a batch completion.<br>When running a Group (Multi Number non-zero, Multi Type = 1), Complete will happen when the last parameter in the group to completes its batch.<br>When running a Job (Multi Number non-zero, Multi Type = 2), Complete will happen when the last step (parameter or group) in the job is completed. |
| Reserved | | Padding byte for devices requiring even connection point sizes. |

Total size: 65-66 bytes

*130:* This connection point will contain data about the last tightening. As such, it is not updated after a parameter, group, or job selection until a tightening occurs. Strings shorter than the field length are left-aligned in the field and null-padded.

| Name | Data Type | Description |
|---|---|---|
| Tightening ID | UDINT | ID number of the last tightening |
| Time | DT | Timestamp of the last tightening |
| Multi Sequence Number | UINT | Sequence number of the running multi-parameter operation. |
| Multi Number | UINT | Instance number of multi-parameter operation (job or group) currently running. Ignored if 0. |
| Multi Type | USINT | Type of multi-parameter operation currently running:<br>1 – Group<br>2 – Job<br>Ignored if Multi-Number is 0. |
| Parameter | UINT | Instance number of the parameter that produced the tightening |
| Parameter Name | USINT[25] | Name of the parameter |
| Parameter Timestamp | DT | Timestamp of the last change to the parameter |
| Tool Serial Number | USINT[14] | Serial number of the tool that produced the tightening. |
| Tightening Status | BOOL | Indicates if the last tightening was accepted as valid. |
| Count | USINT | Number of results performed in the current batch for the parameter. |
| Batch | USINT | Number of results required for a batch in the parameter. |
| Torque Unit | ENGUNIT | Unit used for torque fields |
| Torque | REAL | Torque of the tightening just performed. |
| Min Torque | REAL | Minimum torque required for a tightening in the parameter. |
| Max Torque | REAL | Maximum torque required for a tightening in the parameter. |
| Angle | UDINT | Angle of the tightening just performed. |
| Min Angle | UDINT | Minimum angle required for a tightening in the parameter. |
| Max Angle | UDINT | Maximum angle required for a tightening in the parameter. |
| VIN | USINT[100] | |
| Reserved | USINT | Padding byte for devices requiring even connection point sizes. |

Total size: 192 bytes

In this chapter describes the PROFINET implementation provided by the ControlTechLink.

## Configuration Options

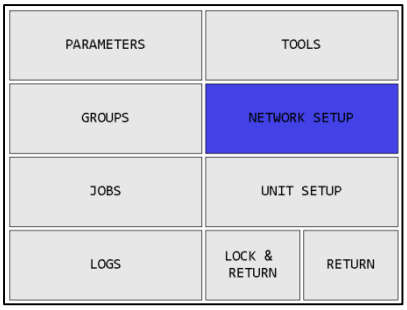



**Figure 45: Main menu - Network Setup**

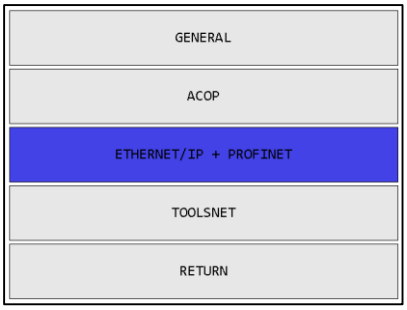



**Figure 46: Network Setup Profinet**

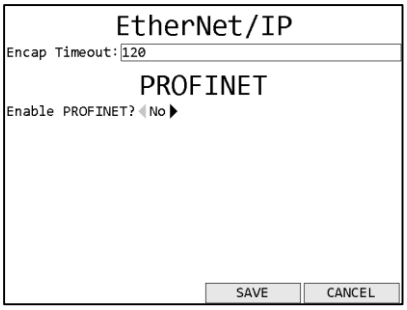



**Figure 47: PROFINET Setting**

### *Enable PROFINET?*

Default: no

This setting determines if PROFINET is enabled in the ControlTechLink. Please be aware that when enabling PROFINET, the IP address in the ControlTechLink will be erased and will either need to be reentered through the menu or set by a PROFINET configuration tool.

## Data Format

The below tables show the data available for the input and output slots. The offsets are relative to the start address for each slot's address space.

### Tool IO Module Input

| Offset | Size | Name | Type | Description |
|---|---|---|---|---|
| 0 | 1 | Job Number | USINT | Job number. (0 means job not running) |
| 1 | 1 | Parameter Number | USINT | Parameter number. (0 means parameter not running.) |
| 2 | 1 | Tool Number | USINT | Active tool number. (0 means no tool active) |
| 3 | 1 | Status | USINT | Status of parameter<br>0 – None<br>1 – Cycle<br>2 – Batch<br>3 – Reject<br>4 – Batch NOK (batch complete with a counted reject) |
| 4 | 1 | Count | USINT | Number of tightenings performed in the current batch for the parameter. |
| 5 | 1 | Batch | USINT | Number of tightenings required for a batch in the parameter. |
| 6 | 1 | Torque Unit | USINT | Unit used for torque fields<br>0 – in.lb<br>1 – ft.lb<br>2 – N.m<br>3 – cm.kg |

| | | | | |
|---|---|---|---|---|
| | | | | 4 – m.kg<br>5 – cN.m |
| 7 | 1 | Torque Mode | USINT | Mode used for measuring torque and angle |
| 8 | 2 | Timestamp Date | DATE | Date portion of timestamp of the last tightening |
| 10 | 4 | Timestamp Time | TOD | Time portion of timestamp of the last tightening |
| 14 | 2 | Last Parameter Write Date | DATE | Date portion of the last time the parameter of the last tightening was written |
| 16 | 4 | Last Parameter Write Time | TOD | Time portion of the last time the parameter of the last tightening was written |
| 20 | 4 | Torque | REAL | Torque of the tightening just performed. |
| 24 | 4 | Min Torque | REAL | Minimum torque required for a tightening in the parameter. |
| 28 | 4 | Max Torque | REAL | Maximum torque required for a tightening in the parameter. |
| 32 | 4 | Snug Torque | REAL | Snug torque required for a tightening in the parameter. |
| 36 | 4 | Angle | UDINT | Angle of the tightening just performed. |
| 40 | 4 | Min Angle | UDINT | Minimum angle required for a tightening in the parameter. |
| 44 | 4 | Max Angle | UDINT | Maximum angle required for a tightening in the parameter. |
| 48 | 4 | Prevailing Torque | REAL | Prevailing torque of the tightening just performed. |
| 52 | 4 | Min Prevailing Torque | REAL | Minimum prevailing torque required for a tightening in the parameter. |
| 56 | 4 | Max Prevailing Torque | REAL | Maximum prevailing torque required for a tightening in the parameter. |
| 60 | 4 | Tightening ID | UDINT | ID number of the last tightening |
| 64 | 1 | Result Status | USINT | 0 – OK; 1 – NOK |
| 65 | 1 | Torque Status | USINT | 0 – OK; 1 – Low; 2 – High; 255 – N/A |
| 66 | 1 | Angle Status | USINT | 0 – OK; 1 – Low; 2 – High; 255 – N/A |
| 67 | 1 | Prevailing Torque Status | USINT | 0 – OK; 1 – Low; 2 – High; 255 – N/A |
| 68 | 14 | Tool Serial Number | CHAR[14] | Serial number of the tool that performed the last tightening |
| 82 | 25 | VIN | CHAR[25] | VIN of the last tightening. |
| 107 | 1 | Reserved | USINT | Padding byte to make size even. |

## Tool IO Module Output

| Offset | Size | Name | Type | Description |
|---|---|---|---|---|
| 0 | 1 | Job Number | USINT | Job number to run. |
| 1 | 1 | Parameter Number | USINT | Parameter number to run. Ignored if Job Number is not 0. 255 means temporary parameter with information below. |
| 2 | 1 | Batch | USINT | Sets the batch size for the selected parameter. Ignored if Job Number is not 0. If this value is 0, the parameter size stored in the ControlTechLink will be used. |
| 3.0 | bit | Suspend | BOOL | When set, suspends on the interface without stopping a running parameter or job. |
| 3.1 | bit | Batch Reset | BOOL | When this value changes from false to true, the batch count of the currently running parameter on the interface is reset. |
| 3.2 | bit | Job Step Increment | BOOL | When this value changes from false to true, the ControlTechLink will move to the next step in the active job. Ignored if Job Number is 0. |
| 3.3 | bit | Job Step Decrement | BOOL | When this value changes from false to true, the ControlTechLink will move to the previous step in the active job.<br>Ignored if Job Number is 0 or if already on the first step in the job. |

| | | | | |
|---|---|---|---|---|
| 3.4 | bit | Batch Increment | BOOL | When this value changes from false to true, the ControlTechLink will increment the count as if a valid tightening was performed. |
| 3.5 | bit | Batch Decrement | BOOL | When this value changes from false to true, the ControlTechLink will decrement the batch count. Ignored if the count is 0. |
| 4 | 25 | VIN | CHAR[25] | Sets the VIN to be used by the controller. |
| 29 | 1 | Reserved | USINT | Padding byte to align structure. This field does not need to be listed in the PLC data type. |
| | | Temporary Parameter Settings | | |
| 30 | 1 | Temp Tool Number | USINT | Tool number used for temporary parameter |
| 31 | 1 | Reserved | USINT | Reserved for future use |
| 32 | 1 | Temp Socket | USINT | |
| 33 | 1 | Reserved | USINT | Reserved for future use |
| 34 | 1 | Temp Batch | USINT | |
| 35 | 1 | Temp Lock on Batch | BOOL | |
| 36 | 1 | Temp Torque Unit | USINT | Torque unit used for temporary parameter. Only used if temporary tool is a digital tool.<br>0 – in.lb<br>1 – ft.lb<br>2 – N.m<br>3 – cm.kg<br>4 – m.kg<br>5 – cN.m |
| 37 | 1 | Temp Torque Mode | USINT | Torque mode used for temporary parameter. Not all modes are available for all digital tool types. This field also determines which of the torque and angle fields below are used. Only used if temporary tool is a digital tool.<br>0 – Peak<br>1 – Residual<br>2 – T2A<br>3 – TAM<br>4 – PTM<br>6 – Initial Peak<br>7 – Initial Peak TAM |
| 38 | 1 | Temp Autoclear Time | USINT | Listed in 0.1 seconds |
| 39 | 1 | Temp Direction | USINT | 0 – Positive<br>1 – Negative<br>2 – Both |
| 40 | 4 | Temp Min Torque | REAL | |
| 44 | 4 | Temp Max Torque | REAL | |
| 48 | 4 | Temp Target Torque | REAL | |
| 52 | 4 | Temp Snug Torque | REAL | |
| 56 | 4 | Temp Min Angle | UDINT | |
| 60 | 4 | Temp Max Angle | UDINT | |
| 64 | 4 | Temp Yellow Angle | UDINT | |
| 68 | 4 | Temp Min Prevailing Torque | REAL | |

| | | | | |
|---|---|---|---|---|
| 72 | 4 | Temp Max Prevailing Torque | REAL | |
| 76 | 4 | Temp Head Length | UDINT | Listed in um. |
| 80 | 20 | Reserved | USINT[20] | Reserved for future use |

# Chapter 10: Discrete I/O

# Introduction

The CONTROLTECH-LINK comes with a limited amount of discrete I/O that can be configured for various control and status reporting purposes. If more discrete I/O is needed than is provided internally, a GIM 400 module should be purchased.

# Electrical Specifications

## Opto-Isolated Inputs

| Item | Value | | | Unit |
|---|---|---|---|---|
| | min | typ | max | |
| Voltage | 3.3 | 24 | 24 | V DC |
| Current | | 20 | 60 | mA |
| Impedance | | 1.5 | | KΩ |

## Relay Outputs

| Item | | Value | Unit |
|---|---|---|---|
| Dry contact | Voltage | 24 | V DC |
| | Current (each) | 2 | A |
| Wet contact | Voltage | 24 | V DC (fixed) |
| | Current (each) | 2 | A |
| | Current (total) | 2 | A (fused) |

## Pinout


**Figure 67: I/O Connector Pinout**

| Number | Type | Wire color | Function |
|---|---|---|---|
| 1 | Input | Red | Opto 1 |
| 2 | Input | Green | Opto 2 |
| 3 | Input | White | Opto 3 |
| 4 | Power | Orage | +24 VDC |
| 5 | Power | Blue | Relay common |
| 6 | Power | Black | Opto common |
| 7 | Output | Yellow | Relay 1 |
| 8 | Output | Brown | Relay 2 |
| 9 | Output | Purple | Relay 3 |
| 10 | Output | Grey | Relay 4 |

Because the opto inputs and relay outputs may be assigned to a variety of functions, this table can only show the location of the relays and optos.

## Common Points

All inputs share a single common, which is tied to the CONTROLTECH-LINK ground.

All relays share a common point. By default, the relays are configured in a dry contact configuration. To convert the unit to wet contacts, connect +24 VDC (pin 4) to Relay common (pin 5) on the I/O connector. This makes all outputs wet contacts; the unit does not support configurations with some wet and some dry contacts.

## Assigning I/O Functions

The inputs and outputs must be configured before use. By default, the CONTROLTECH-LINK does not ship with any relay configuration. To configure the inputs and outputs, you will need to use the ControlTech Manager PC software application. See the GIM 400 User Manual for the full list of available input and output options.

# Chapter 11: Data Management

The CONTROLTECH-LINK can download configuration data, results and event logs to and upload configuration data and firmware from a USB drive. When a USB drive is plugged into the unit, it will switch from whatever screen it is on to the USB Menu.

## Download data to USB

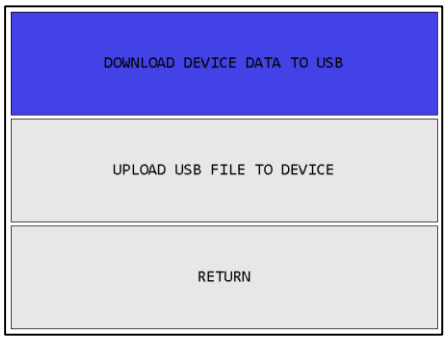



**Figure 68: USB Menu - Download**

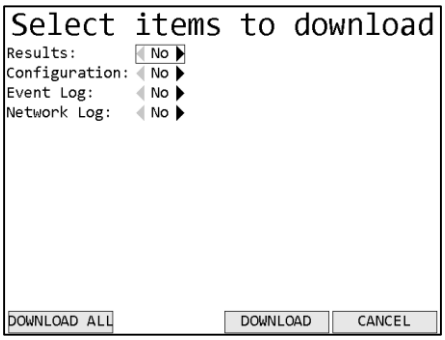



**Figure 69: USB Download screen**

### *Soft keys*

1. DOWNLOAD ALL – Downloads all files to the USB drive.
2. No function
3. DOWNLOAD – Downloads the selected files to the USB drive.
4. CANCEL [ESC] – Returns to the USB Menu screen.

### Available Files

#### *Results*

The results file will be saved to the USB drive as "####res.csv" where the #### is the last four digits of the unit serial number. This file contains all tightening results saved in the unit's memory in a CSV format.

#### *Configuration*

The configuration file will be saved to the USB drive as "####conf.g4d" where the #### is the last four digits of the unit serial number. This file contains all the configuration settings for the unit, including tools, parameters, groups, jobs, qualifier and network settings, and I/O settings. This file can be loaded into the PC application for viewing or editing.

#### *Event Log*

The event log file will be saved to the USB drive as "####evt.csv" where the #### is the last four digits of the unit serial number. This file contains all non-tightening events saved in the unit's memory in a CSV format.

#### *Network Log*

The network log file will be saved to the USB drive as "####net.g4n" where the #### is the last four digits of the unit serial number. This file contains the network log data in a binary format.

## Upload USB file to device

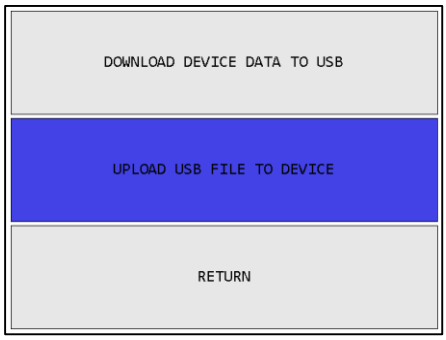



**Figure 70: USB Menu - Upload**

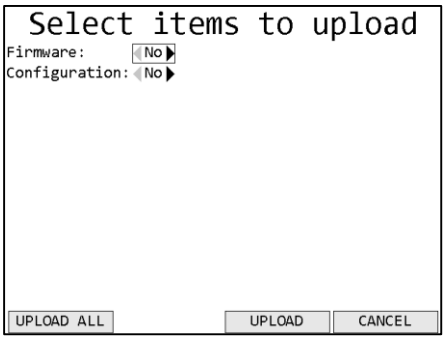



**Figure 71: USB Upload screen**

When entering the USB Upload screen, the unit will look in the root folder to find any available files to upload. Make sure you have no more than one file of a given type on the USB drive, as the unit does not provide a way to select between multiple files of a given type.

### *Soft keys*

1. UPLOAD ALL – Uploads all files from the USB drive.
2. No function
3. UPLOAD – Uploads the selected files from the USB drive.
4. CANCEL [ESC] – Returns to the USB Menu screen.

### Available Files

#### *Firmware*

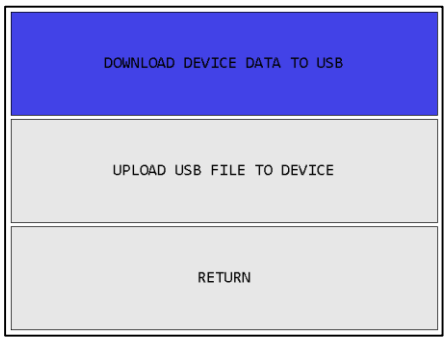
Firmware files have the extension ".bec". If a file is found, the unit will validate the file before uploading it. If a firmware file is uploaded, the unit will reprogram itself with the new firmware and reboot.

#### *Configuration*

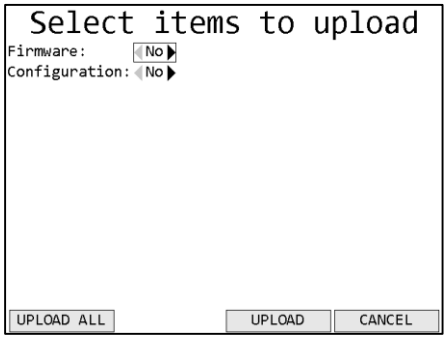
Configuration files have the extension ".sod". If a file is found, the unit must validate the file before uploading it. These files can be created by downloading from a qualifier or by saving a configuration file from the PC application. This file contains all the configuration settings for the unit, including tools, parameters, groups, jobs, and qualifier and network settings. When uploading the configuration, all existing settings will be overwritten with the new values. New tools referenced in the configuration file will need to be associated with the qualifier, as if learning them to the unit.

# Chapter 12: Firmware Updates

1. If the firmware update file was emailed to you, put it on a USB drive, in the root folder of the drive. If you received the firmware update already on a USB drive, proceed to step 2.
2. Turn on power to the unit and let it go through the startup process.
3. Insert the USB drive into the connector on the unit.
4. Wait for the unit to detect the USB drive. (This may take several seconds.) When the drive is detected, you should see the USB menu.




   If the unit does not detect the drive, contact support. If the update was emailed to you, you may also try another USB drive.
5. To upload the update to the unit, press the down arrow followed by ENT to go to the USB Upload screen.

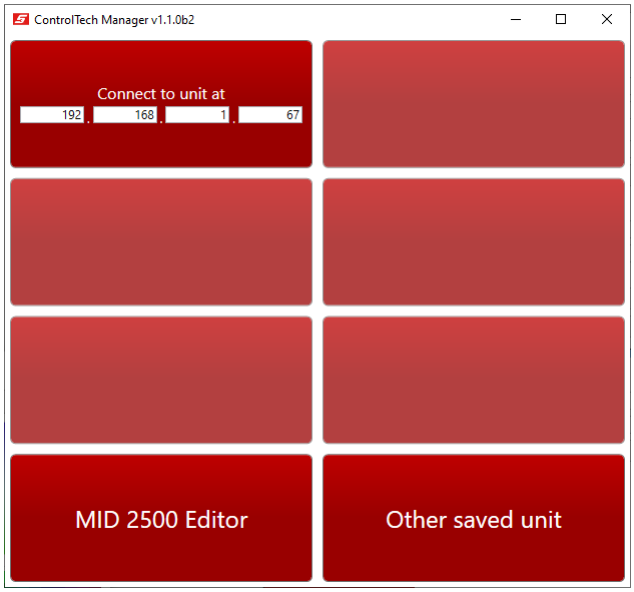


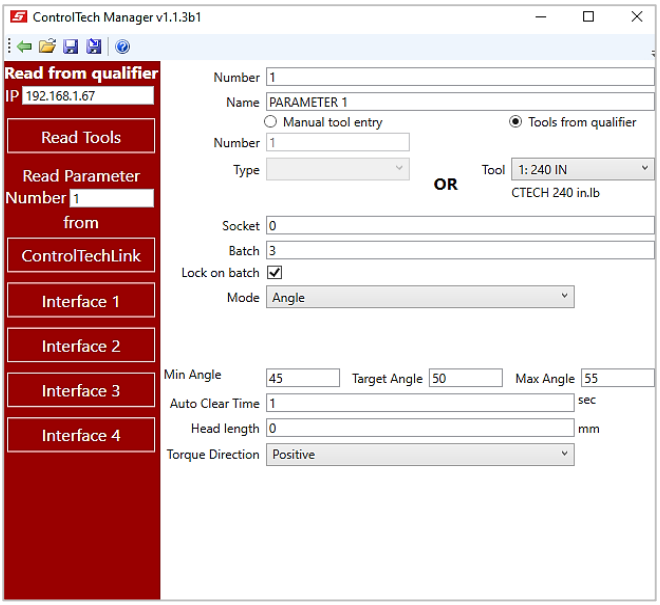

6. When the unit changes to the upload screen, it will search the root folder of the drive for the firmware update. If no valid update file is found, the screen will show an error. Otherwise, press the right arrow to select the firmware update and then **UPLOAD** to start the upload.
7. When the upload is complete, the unit will restart. At this point, you may remove the USB drive.

# Chapter 13: Creating and editing MID 2500 files with ControlTech Manager

# Introduction

Starting with version 1.1.0, ControlTech Manager supports the creation and editing of files that can be used with MID 2500. You can access this page from the MID 2500 Editor Button on the starting screen. This page will allow you to create and edit files that contain the data needed to program a CTLNKCTRL device via MID 2500 commands.




The MID 2500 Editor works similarly to the Parameters edit page in the main portion of the ControlTech Manager program. The primary difference is that you are able to define a parameter using just a tool type and number rather than requiring it to be linked to a specific tool from a specific CTLNKCTRL device.

# Converting existing setups to MID 2500 commands

If you have already configured a parameter in a CTLNKCTRL device that you want to use as a MID 2500 command, you may read it from the device using the buttons on the left. Enter the IP address of the CTLNKCTRL device, the parameter you want to read, and then press the button corresponding to the device type and interface you want to read from. Once the parameter is read from the device, the screen is updated with the parameter setup.

Please note that the Tools from qualifier option is strictly for convenience of the initial setup. Only the tool number, type, and capacity will be saved and the parameter will be usable on any CTLNKCTRL device with any tool of the same type and capacity learned into the specified slot.

## Saving setups for use in a MID 2500 command

Pressing the Save or Save As buttons on the top of the window will let you save a parameter setup into the MID 2500 data format. This will create a text file containing the full data portion of a MID 2500 command that will recreate the parameter setup in a CTLNKCTRL device.

These files may be modified later by using the Open button on the top of the window.

## Constructing a MID 2500 command from a file

ControlTech Manager will only put the data potion of the command in the text files it creates. An Open Protocol system wishing to use MID 2500 to program a CTLNKCTRL device will need to wrap this data in the rest of the command format. For example, the contents of a file representing a parameter could be:


0010220100000301000000000185001002010000000018500200201000000013850030020100000000785007011040000000PARAMETER·1850050030100000000000001000030100000000202058001060000000085020001010000002850220020100000000002003008030010000002 0.000020020080300100000022.000020130050105000000000020120050105000000000085024008033510000000 0.000850230050120200000100002060001010000000102000008030010000002 1.000020140080300100000000.000850210050105000000000002073008030010000000 0.00002072008030010000000 0.00000


The corresponding MID 2500 command to be sent to a CTLNKCTRL would be:


05092500001·····0010220100000301000000000185001002010000000018500200201000000013850030020100000000785007011040000000PARAMETER·1850050030100000000000001000030100000000202058001060000000085020001010000002850220020100000000002003008030010000002 0.000020020080300100000022.000020130050105000000000020120050105000000000085024008033510000000 0.000850230050120200000100002060001010000000102000008030010000002 1.000020140080300100000000.000850210050105000000000002073008030010000000 0.00002072008030010000000 0.00000<NUL>


where · represents a space and <NUL> is the null character at the end of a command

Please note that the data length will vary from one parameter to the next, depending on tool type and parameter name.

# Chapter 14: Product Specifications

## Dimensions

| | English | | Metric | |
|---|---|---|---|---|
| | **Value** | **Unit** | **Value** | **Unit** |
| Height | 14.625 | in | 37.1 | cm |
| Width | 9.5 | in | 24.1 | cm |
| Depth | 4.25 | in | 10.8 | cm |

## Radio Information

| Item | Value |
|---|---|
| Indoor/Urban range | 300 ft. / 100 m |
| Outdoor line-of-sight range | 1 mile / 1500 m |
| Transmit power | 60 mW (18 dBm) conducted<br>100 mW (20 dBm) EIRP |
| Receiver sensitivity | -100 dBm (1% packet error) |
| FCC Part 15.247 | OUR-XBEEPRO |
| Industry Canada | 4214A XBEEPRO |
| Europe(CE) | ETSI |

### FCC Statement

**Contains FCC ID: OUR-XBEE/OUR-XBEEPRO**

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

### Channel Frequencies

| Channel | Frequency (GHz) |
|---|---|
| 1 | 2.410 |
| 2 | 2.415 |
| 3 | 2.420 |
| 4 | 2.425 |
| 5 | 2.430 |
| 6 | 2.435 |
| 7 | 2.440 |
| 8 | 2.445 |
| 9 | 2.450 |
| 10 | 2.455 |
| 11 | 2.460 |
| 12 | 2.465 |

# CE Declaration

C.E. Electronics
2107 Industrial Drive
Bryan, OH 43506
419.636.6705 phone
419.636.2516 fax
www.ceelectronics.com

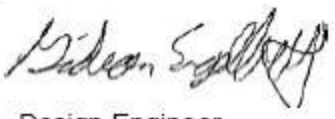
***Declaration of Conformity***

| | |
|---|---|
| Product Description | Multi-operation qualifier for CTECH wrenches |
| Model Number | CONTROLTECH-LINK |
| Marketing Model Names / Part Numbers | CTLNKCTRL |
| Type of Equipment | Information Technology Equipment |
| Manufacturers Name | C.E. Electronics, Inc. |
| Manufacturers Address | 2107 Industrial Drive<br>Bryan, OH 43506, USA |
| CE Marking Date | 2017-08-28 |

Complies with the following directives based on testing to the standards listed below:

| European Standards | Test Report Numbers |
|---|---|
| EN 60950-1:2006<br>+A11:2009 +A1:2010 +A2:2013 + A12:2011<br>IEC 60950-1:2005 | D61024S1<br>D70830S1 |
| IEC 61000-4-2: 2008<br>IEC 61000-4-3: 2006<br>IEC 61000-4-4: 2006 A1: 2007 A1: 2014<br>IEC 61000-4-5: 2014<br>IEC 61000-4-6: 2013<br>IEC 61000-4-11: 2004<br>IEC 61000-6-4: 2006 + A1: 2011<br>EN 61000-3-2: 2014<br>EN 61000-3-3: 2013<br>EN 61000-6-2: 2005<br>EN 61000-6-4: 2006<br>IEC 61000-6-2: 2005 | B70824V2 |

This declaration of conformity is issued under the sole responsibility of the manufacturer listed below:

| | |
|---|---|
| C.E. Electronics, Inc.<br>2107 Industrial Drive<br>Bryan, OH 43506, USA | Name: Gideon Engelberth<br>Signature:  <br>Title: Design Engineer |
| Date: September 20, 2017 | |

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**IMPORTANT ENVIRONMENTAL NOTES:**

1. THIS EQUIPMENT MAY CONTAIN HAZARDOUS MATERIALS WHICH CAN BE HARMFUL TO THE ENVIRONMENT.
2. DO NOT DISPOSE OF THIS EQUIPMENT AS MUNICIPAL WASTE. RETURN IT TO DISTRIBUTOR OR A DESIGNATED COLLECTION CENTER

THANK YOU FOR CARING ABOUT OUR ENVIRONMENT!

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**Printed in USA**
2021-04

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**2021-04**