Global 400mp User Manual

v4.0

17 August 2016

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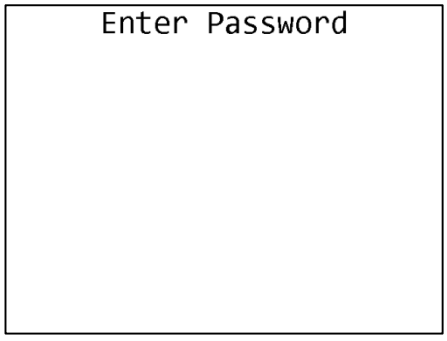
Quick Start

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

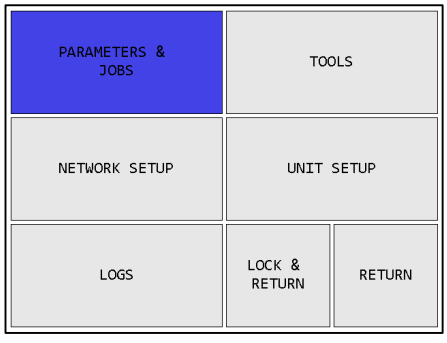
Plug the provided power cable into the unit and 100-240 VAC power and turn on the power switch. The beeper should sound a series of quick beeps and the display should show the loading progress.

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 SR Distributor, or call Sturtevant Richmont at +1-847-455-8677. Email is customerservice@srtorque.com.

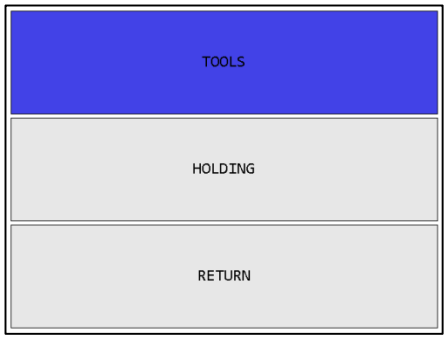
To use a tool with the Global 400mp, you must first "learn" (connect the radios) in the tool and the Global 400mp. To do so, press the button below **MENU**.



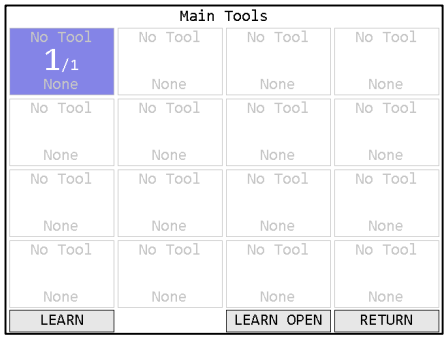
Enter the password (0104 by default) using the numeric keypad and pressing ENT when completed.



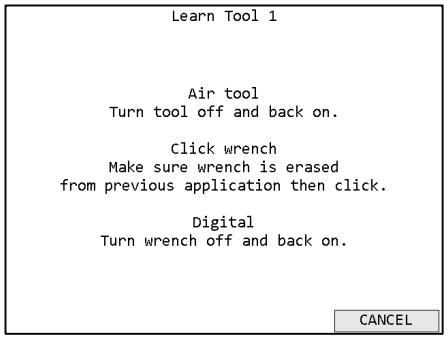
In the menu, press the right arrow to select TOOLS and press ENT.



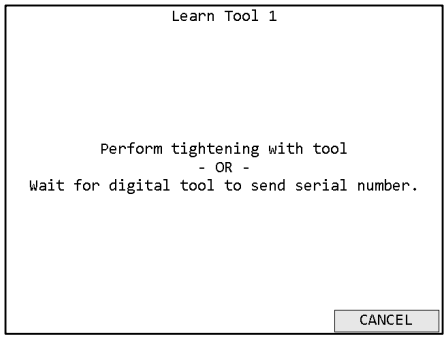
In the tools menu, press ENT to go to the main tools page.



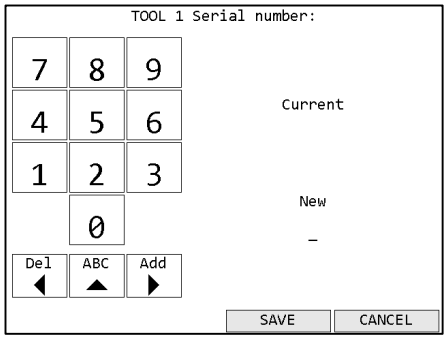
If the tool you are going to learn to the Global 400mp has previously been used with another unit, make sure the tool has been "forgotten" (radio disconnected) from that unit before continuing. Press the button beneath **LEARN** to begin the learn process.



Follow the directions on screen to learn the tool.



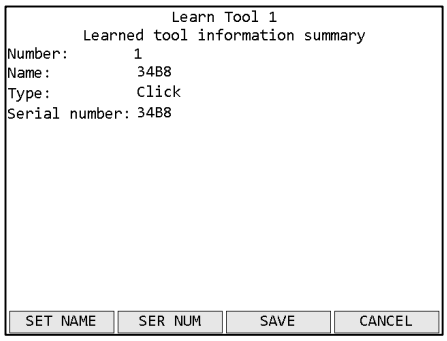
Once the tool has found the unit, you may need to perform an additional step for the unit to know which type of tool was just learned. Holding tools, air tools, and newer click tools can be distinguished by the unit. The 1200 Series and 1250 Series Exacta digital tools and older click tools will require some additional information. The digital tools will automatically transmit their serial number in a few seconds. However, if you are learning an older click tool, you will need to perform a tightening (good or bad) with the wrench, or push the appropriate button on screen.



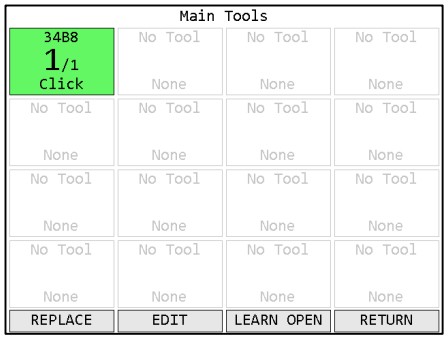
Once the tool type is identified, you must enter the tool's serial number. The PST 1200, SLTC FM, and HT Series holding tools require manual entry of the serial number.

Digital tools report its serial number automatically and this step will be skipped.

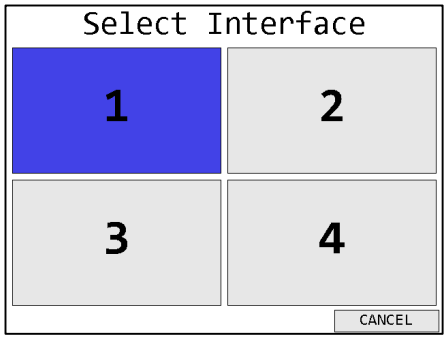
The serial number entered in this step will be used as the default tool name.



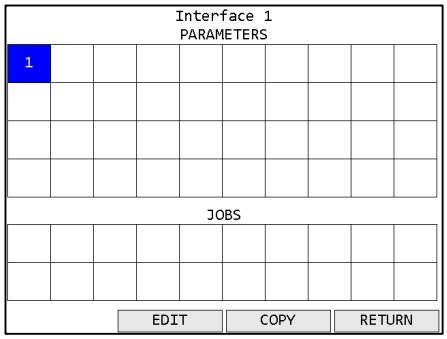
Once the tool learn is completed, the unit will show a summary of the new tool information. Press **SAVE** to store the tool information and continue.



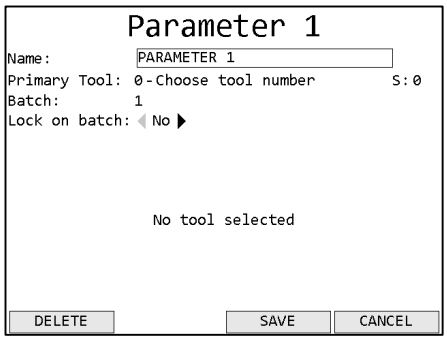
The unit will return to the Tools screen with the just learned tool now shown.



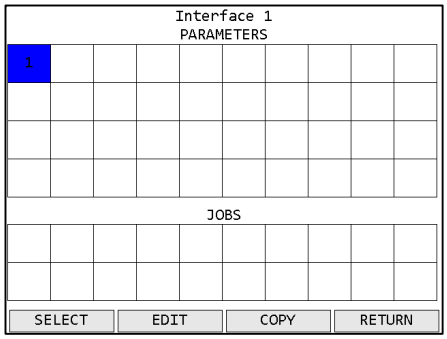
Before you can run the tool, you must first assign it to a parameter. Return to the menu by pressing ESC twice. Then press ENT to go to the Select Interface screen. By default, tools learn into interface 1. Press ENT to select interface 1 and go to the Choose Parameter or Job screen.



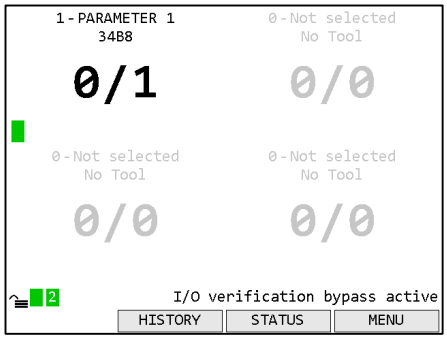
Press the button below **EDIT** to go to the Parameter Edit screen. The parameter number will remain white until the parameter has been successfully set up.



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.



Parameter 1 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.



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 Global 400mp.

Chapter 1: Overview

Warnings

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.

Unit Overview

The Global 400mp 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 Global 400mp 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 5-pin remote connector connects to other devices that provide I/O capabilities.

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

Compatible Tools

The Global 400mp works with the following models of tools:

- SLTC-FM 2.4 GHz preset clicker-type torque wrenches
- 1200-Series Exacta 2 digital torque wrenches
- 1250-Series Exacta 2 Torque and Angle wrenches
- PST series air tool transducers (requires transmitter software version 2)
- HT Series Holding wrenches

Chapter 2: Using the unit

Concepts

Interfaces

The Global 400mp has 4 interfaces. Interfaces within the Global 400mp work almost like having 4 logical process monitors inside the single physical Global 400mp. Some settings, such as IP Address and beeper settings, are shared between the interfaces. Each interface has its own parameters and jobs as well as its own tightening log and can be controlled separately by a plant control system.

Tools

The Global 400mp can associate with up to 16 Sturtevant Richmont radio torque tools and 8 holding tools. At most, 4 torque tools and 4 holding tools will be active at a time, depending on the selected operations. To use a tool with the Global 400mp, you must first "learn" (connect the radio) the tool to the Global 400mp. 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. Tools are assigned to a single interface, which may be changed at any time. A tool may be used by more than one parameter, but only by parameters belonging to the same interface as the tool.

The Global 400mp 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 Global 400mp. A parameter contains a tool to run and some settings to use with it, such as the batch size and minimum and maximum torques. The Global 400mp supports 40 parameters per interface. Each parameter must be associated with one of the learned tools assigned to its interface before it can be run.

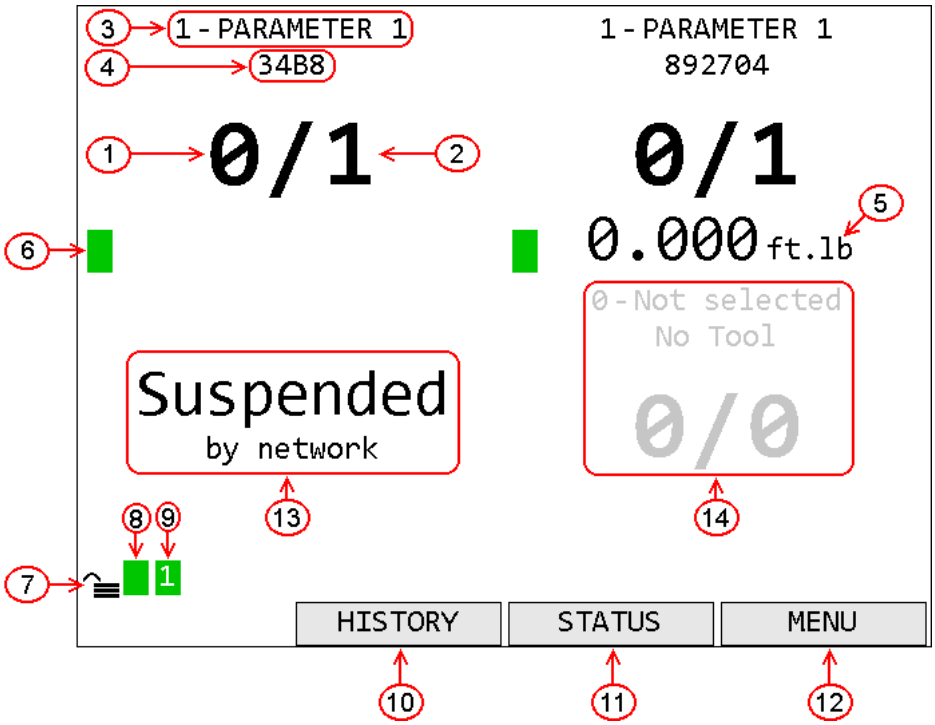
A parameter may additionally have one holding tool assigned.

Jobs

Jobs are the top level of operation in the Global 400mp, made up of multiple parameters that must all run together in a sequence. The Global 400mp supports 20 jobs per interface with up to 30 steps (parameters or p-sets) each. A job will only use parameters belonging to the same interface as the job. A job may have multiple parameters that use the same tool or even the same parameter multiple times and may use parameters with different types of primary tools. When defining a job, you may override the batch count for parameter steps in the job.

Run Screen

The run screen shows which parameter is currently running in each interface. Interface 1 appears in the top left, interface 2 in the top right, interface 3 in the bottom left, and interface 4 in the bottom right.



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. Parameter Name – Name of the parameter. Repeated for each active parameter.
4. Tool Name – Name of the tool for the parameter. Repeated for each active parameter
5. Torque Value – Value of the last torque received for the parameter. Only present for parameters with Exacta tools. Repeated for each active Exacta 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 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. Suspend notification – When an interface is suspended, it will show the source of the suspend. If an interface is suspended by multiple sources, only one will be shown.
14. Inactive parameter – When an interface has no active parameter, the interface slot will be grayed out.

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 Global 400mp 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 Global 400mp NOKs setting is set to Count and one or more rejected tightenings were counted towards the current batch.

Tool Radio Status Codes

The radio status indicator for each active parameter shows the status of the tool radio for the parameter. If no tool is assigned to an interface the radio status is not available. 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	Enabling or disabling 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

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 0/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

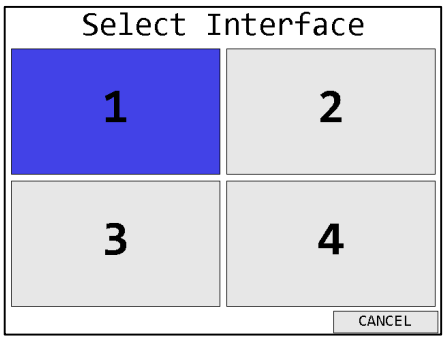


Figure 1: Select Interface screen

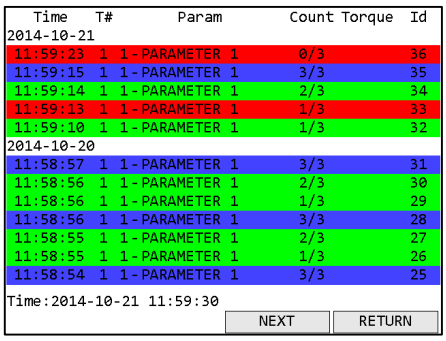


Figure 2: History screen

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 from an interface 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. This value is only provided for digital tools. The unit of torque will be whatever the unit of the parameter that produced the tightening was at the time.
- 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

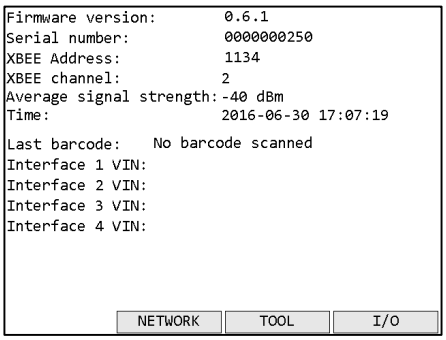


Figure 3: Unit Status screen

Function keys

1. GRAPH –Goes to the Rundown Graph screen to show the rundown graph for an air tool active in an interface.
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 greater than -70 dBm, 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 4: Serial communications*) or an error if the last attempt barcode could not be processed. *Interface 1-4 VIN* show what VIN will be included with tightenings for each interface.

Rundown Graph

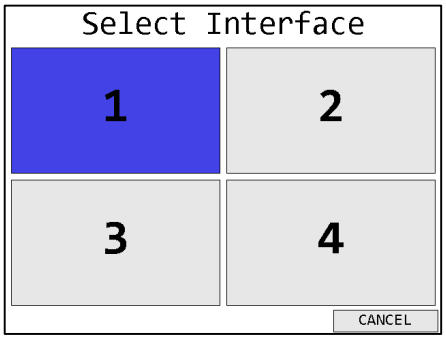


Figure 4: Select Interface screen

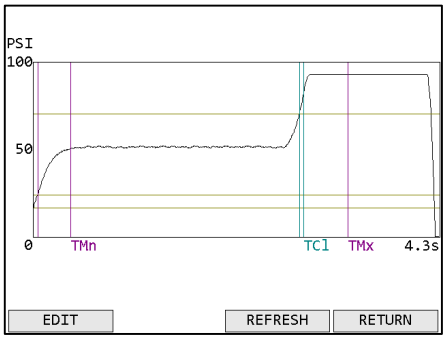


Figure 5: Rundown Graph screen

Function keys

1. EDIT – Go to the Parameter Edit screen for the running parameter. This will require the password to be entered.

2. No function
3. REFRESH – Refresh the graph with the data for the most recent run of the tool.
4. RETURN [ESC] – Returns to the Unit Status Screen.

The Rundown Graph screen retrieves and shows the last rundown from the active air tool in the selected interface. If no air tool is active for the selected interface, no graph will be retrieved. The rundown will be overlaid with yellow horizontal lines for each of the three thresholds and vertical lines showing the timers, purple for Timer Min and Timer Max, blue for Timer Clutch. Additionally, the total time for the rundown is shown at the right end of the horizontal axis.

Network Status

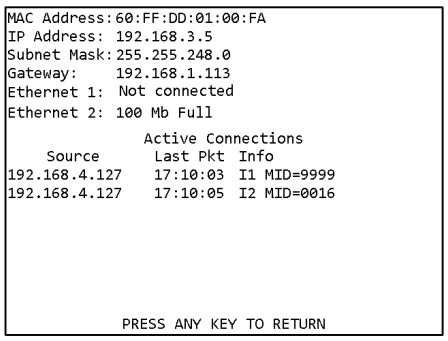


Figure 6: Network Status screen

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, which interface the connection is to, and some protocol specific information, such as last MID received or which EtherNet/IP™ connection points are being used.

Tool Status

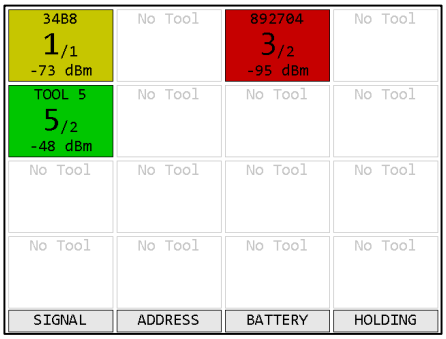


Figure 7: Tool Status screen

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. HOLDING / TOOLS – Toggles between showing main tools and holding tools.

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).
- White – The Global 400mp has not received a packet from the tool since it started up.

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

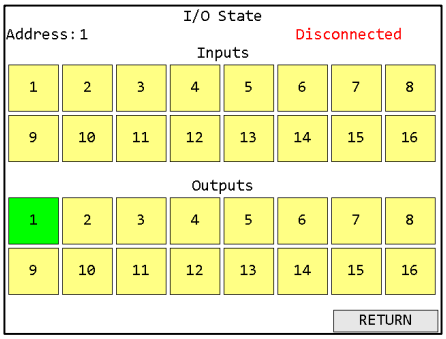


Figure 8: I/O State screen

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 Global 400mp can be configured directly on the unit. The configuration, along with parameter and job selection is available from the unit menu. 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

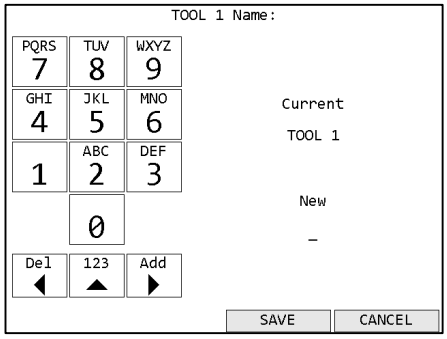


Figure 9: Letter Entry screen

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

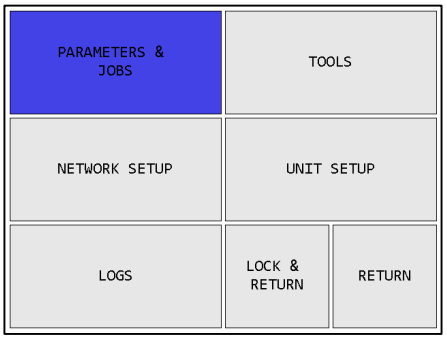


Figure 10: Main menu

The Global 400mp 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.

Tools

Tools in the Global 400mp are divided into two groups, primary and holding tools. Primary tools (torque application tools) are those that can perform tightenings, such as click and digital tools. Holding tools cannot perform a tightening themselves and are only used along with a primary tool. The Global 400mp allows you to learn up to 16 primary tools and 8 holding tools. While each set of tools gets a separate screen, the processes for learning and editing them is similar.

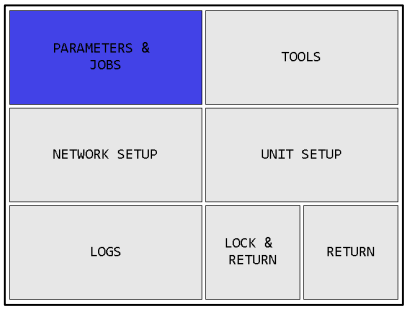


Figure 11: Main menu - Tools

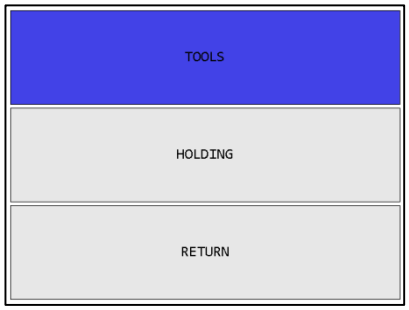


Figure 12: Tools Menu - Tools

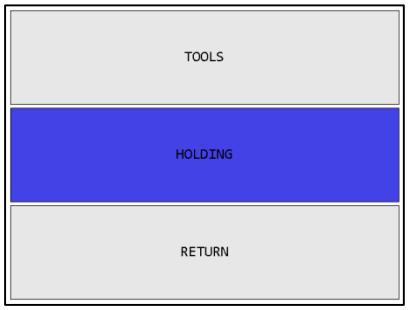


Figure 13: Tools Menu - Holding

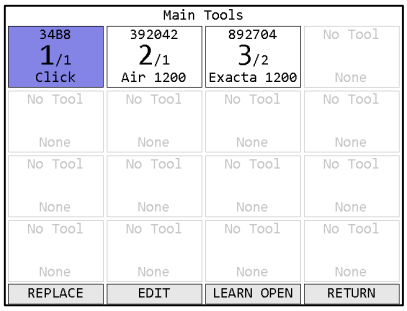


Figure 14: Learned tool selected

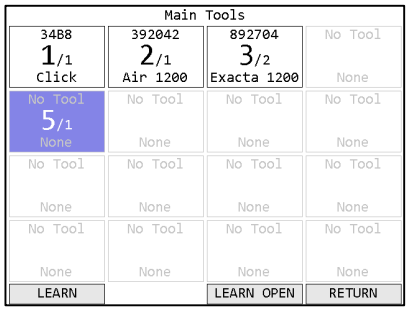


Figure 15: Empty slot selected

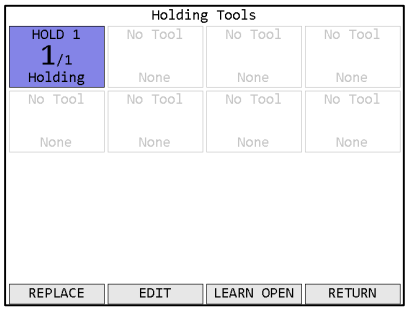


Figure 16: Holding tool selected

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

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

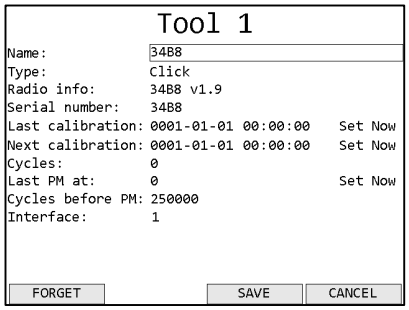


Figure 17: Tool Edit Screen - Click

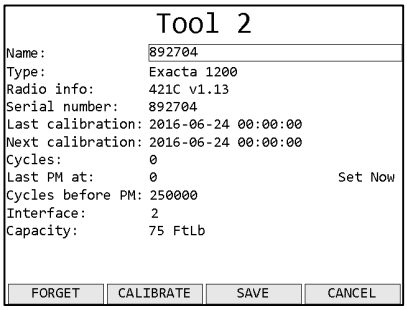


Figure 18: Tool Edit Screen - Digital

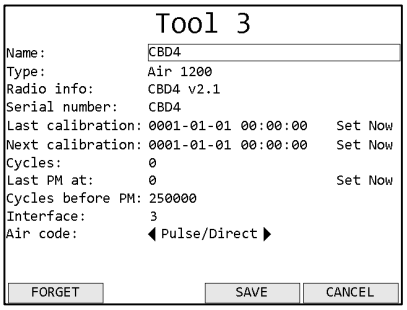


Figure 19: Tool Edit Screen - Air

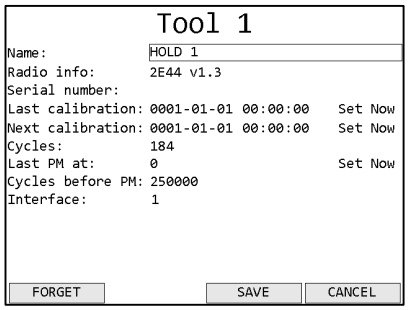


Figure 20: Tool Edit Screen - Holding

Function keys

1. FORGET – Removes the tool from the unit.
2. CALIBRATE – For digital tools, this key puts the unit into a mode that allows it to be verified. For other tools, this key has no function. If the digital wrench needs to be calibrated please see the 1200 Series or 1250 Series Exacta 2 instructions.
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 Global 400mp.

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

For digital tools, this field is reported by the tool and must be updated in the tool instead of edited in the Global 400mp.

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 Global 400mp 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

For digital tools, 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 Global 400mp 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 the tool radio was connected to the Global 400mp. This cycle count is incremented for both accepted and rejected cycles.

This field cannot be edited. If the radio connected is erased and then is reconnected to a Global 400mp, 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'.

Interface

Range: 1 to 4

This field indicates which interface will use the tool. A tool can only be used by parameters or jobs that belong to the same interface as the one to which the tool is assigned.

Capacity

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

This field is only listed for digital tools and cannot be edited.

Air code

This field indicates which type of air tool is attached to the transducer.

This field is only listed for air tools.

Interface

Range: 1 to 4

This field indicates which interface to which the tool is currently assigned.

If this tool is assigned to any parameters in its current interface, those parameters and any jobs using those parameters will become invalid when the tool's interface is changed.

Forgetting Tools (breaking/erasing the radio connection)

Each tool can only be associated with a single Global 400mp at a time, but learning a tool to another Global 400mp does not automatically remove it from the previous Global 400mp. If you have changed or are planning to change a tool from a Global 400mp to another Global 400mp, you should erase (the forget function) the radio connection in the tool with the Global 400mp. To do so, press **Forget** on the Tool Edit screen to remove the tool from the Global 400mp. This will cause the Global 400mp to no longer respond to the tool and will make any parameters using the tool and any jobs using those parameters invalid.

Parameters

Selecting Parameters

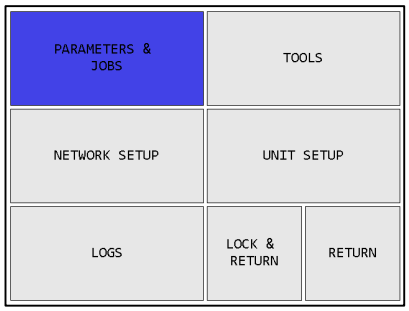


Figure 21: Main menu – Parameters

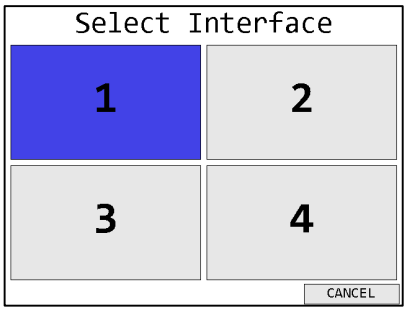


Figure 22: Select Interface screen

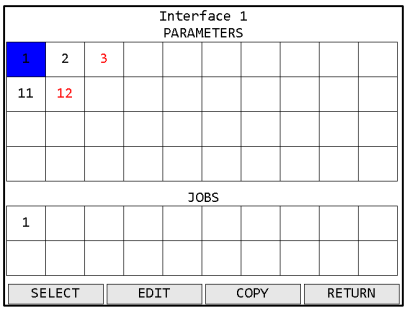


Figure 23:Choose Parameter screen

Function keys

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

The Choose Parameters and Jobs screen shows all the parameters and jobs for an interface. 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.

A defined parameter will be unable to be selected in a few circumstances:

- The assigned tool number is an empty tool slot, because either no tool was ever learned or the previous tool was forgotten
- The assigned tool is assigned to another interface
- The parameter configuration is invalid

Configuration Options

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

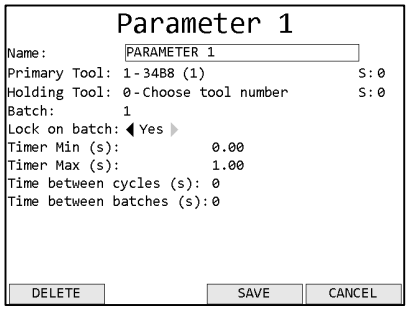


Figure 24: Parameter Edit Screen - Click

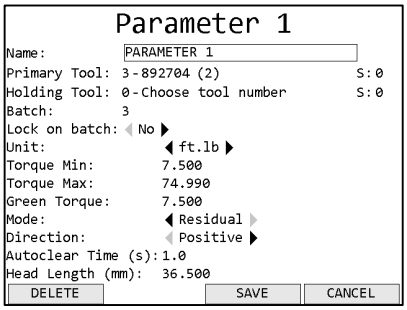


Figure 25: Parameter Edit Screen - Digital

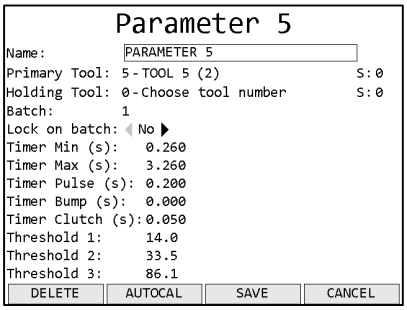


Figure 26: Parameter Edit Screen - Air

Function keys

1. DELETE – Deletes all information in the parameter and returns to the Choose Parameter screen.
2. AUTOCAL – Begins the autocal procedure for an air tool. For other tool types, this key has no function.
3. SAVE – Saves changes to the parameter and returns to the Choose Parameter screen
4. 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.

Primary 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.

Holding Tool

This setting controls which tool is used by this parameter as a holding tool. You must select a primary tool before a parameter can be used. Holding tools can only be used in a parameter with click tools.

If the holding 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. The socket cannot be the same for both the primary and holding tool within a parameter.

Batch

Default: 1

Range: 1 to 255

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

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 Global 400mp will stop when a batch is completed and transition to a no active parameter state. When set to no, the Global 400mp will restart the parameter when a batch is completed.

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

Click Tool Fields

Timer Min

Default: 0

Range: 0 to 2.55 seconds

This setting controls the minimum amount of time the tool must be held in the clicked position for a valid tightening. This value must be less than Timer Max.

Timer Max

Default: 1.00 seconds

Range: 0 to 2.55 seconds

This setting controls the maximum amount of time the tool may be held in the clicked position for a valid tightening. This value must be greater than Timer Min.

Time between cycles

Default: 0

Range: 0 to 9999 seconds

This setting controls the minimum amount of time after an accepted tightening before another tightening should be accepted. Any additional tightenings performed within this time after an accepted tightening will be automatically considered a reject.

Time between batches

Default: 0

Range: 0 to 9999 seconds

This setting controls the minimum amount of time after a batch completion before another tightening should be accepted. Any additional tightenings performed within this time after a batch completion will be automatically considered a reject.

Digital Tool Fields

Unit

Default: ft.lb

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

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

Torque Min

Default: 10% of tool capacity

Range: 0 to tool capacity

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

Torque Max

Default: 99% of tool capacity

Range: 0 to tool capacity

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

Green Torque

Default: 10% of tool capacity

Range: Torque Min to Torque Max

This setting controls the torque at which the green light on the tool will become active. This value allows you to keep the green light on the tool from activating at minimum torque to encourage the operator to pull to a torque farther up within the allowed range.

Mode

Default: Peak

Values: Peak, Residual

This setting controls the mode the tool uses to determine the torque.

Direction

Default: Positive

Values: Positive, Negative, Both

This setting controls the allowed torque directions for the parameter.

Autoclear Time

Default: 1

Range: 1 to 255 seconds

This setting controls the amount of time the torque must be steady before it is reported.

Head Length

Default: 36.50 mm

Values: 0 to 100 mm

This setting is used to tell the tool how long the head is for the parameter. The standard head length is 36.50 mm. *If this value is not entered correctly, torque measurements will be invalid.*

Air Tool Fields

Timer Min

Range: 0 to 65.5 s

This setting controls the minimum time the tool must run for a valid tightening.

Timer Max

Range: 0 to 65.5 s

This setting controls the maximum time the tool can run for a valid tightening.

Timer Pulse

Range: 0 to 65.5 s

This setting controls the minimum time a tool needs to pulse, if using a pulse tool algorithm.

Timer Bump

Range: 0 to 65.5 s

This setting controls the maximum time the tool can run without creating a status. This setting is provided to allow the tool trigger to be bumped without creating a spurious reject.

Timer Clutch

Range: 0 to 65.5 s

This setting controls the minimum time the tool's trigger must be held after clutching out.

Threshold 1

Range: 0 to 99.9 psi

This setting controls the pressure at which the transducer will start monitoring a tightening.

Threshold 2

Range: 0 to 99.9 psi

This setting controls the pressure at which the transducer will consider the tool to be in cycle.

Threshold 3

Range: 0 to 99.9 psi

This setting controls the pressure at which the transducer will consider the tool to have clutched out.

Jobs

Selecting Jobs

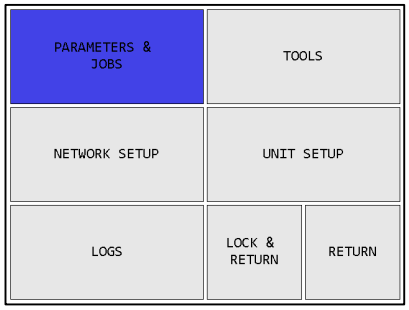


Figure 27: Main menu – Jobs

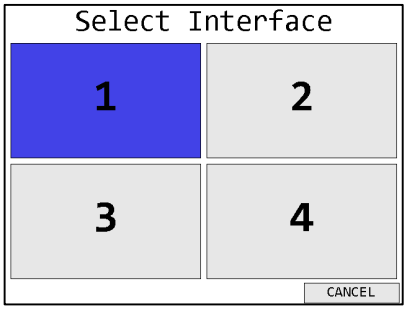


Figure 28: Select Interface screen

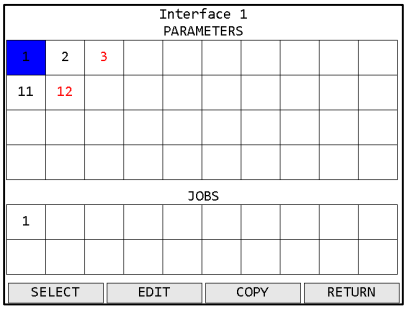


Figure 29:Choose Job screen

Function keys

1. SELECT [ENT] – Select the currently highlighted job to run. Only available for selectable jobs.
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 Parameters and Jobs screen shows all the parameters and jobs for an interface. 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 are assigned to it. If an assigned parameter is unable to be selected, the job cannot be selected.

Configuration Options

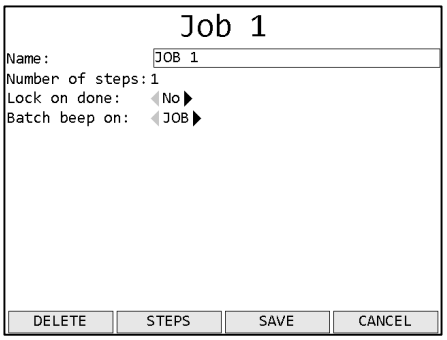


Figure 30: Job Edit screen

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 Global 400mp will stop when the job completes and transition to a no active parameter state. When set to no, the Global 400mp 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

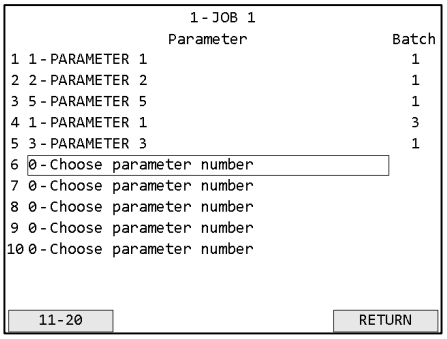


Figure 31: Job Step Select screen

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. No function
3. No function
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 column

In the Parameter column, you may select the parameter to run at each step in the job by typing the number of the desired parameter in each row. The order on this screen determines the order they are run in the job.

Parameters 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. 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 job or when the parameter runs on its own.

Network Setup

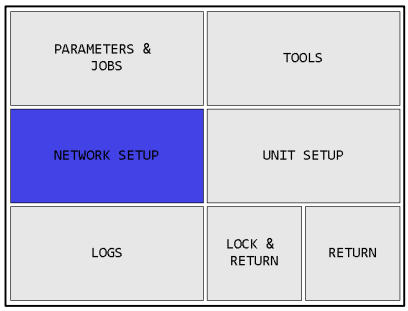


Figure 32: Main menu - Network Setup

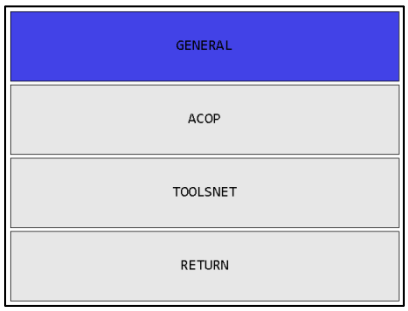


Figure 33: Network Setup Menu - General

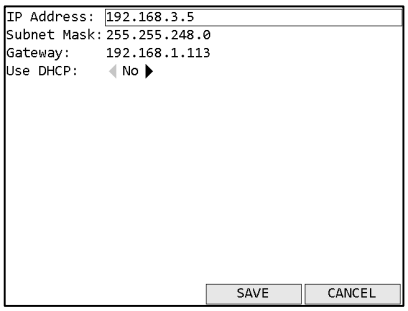


Figure 34: General Network Setup

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 Global 400mp is restarted. The settings in this page apply to all interfaces.

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 Global 400mp 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 Global 400mp 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.

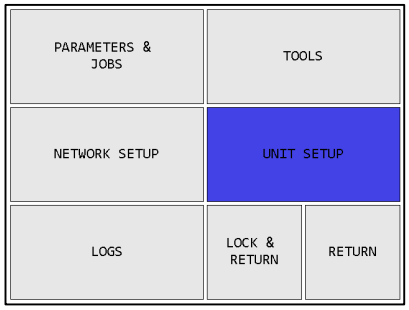


Figure 35: Main menu – Unit Setup

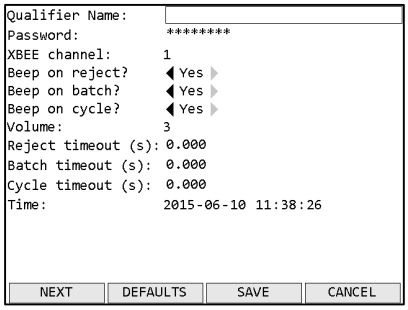


Figure 36: Unit Setup screen – page 1

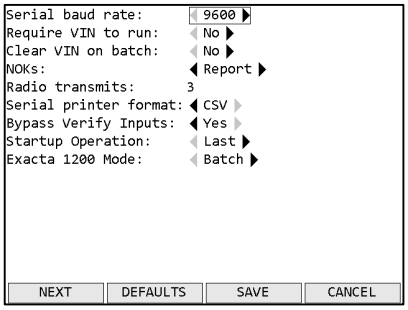


Figure 37: Unit Setup screen – page 2

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 Global 400mp configuration.
4. CANCEL [ESC] – Cancels changes made to the Global 400mp configuration.

Page 1

Global 400mp Name

The Global 400mp name can be up to 25 numbers, letters, or decimal points.

The Global 400mp 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 Global 400mp radio. All tools learned to the Global 400mp 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.

The radio frequencies used by each channel can be found in *Chapter 10: Product Specifications*.

Beep on reject?

Default: yes

This setting determines if the Global 400mp 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 Global 400mp will sound the beeper when a batch is completed. The batch sound is four short beeps. When running a job, the beep controlled by this setting may be for each parameter batch or for the complete job. See the Jobs sections for more information about those settings.

Beep on cycle?

Default: yes

This setting determines if the Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp requires a VIN to be entered before tools will be allowed to run. When set to yes, the Global 400mp will be automatically suspended an interface whenever there is no currently entered VIN for that interface. When set to no, the Global 400mp 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 Global 400mp will immediately suspend that interface until a new VIN is entered for the interface. There is only one copy of this setting for the entire Global 400mp, but each interface has its own VIN and is suspended and resumed separately when this setting is enabled.

Clear VIN on batch

Default: no

This setting determines if the Global 400mp automatically clears the VIN when a batch completes. When set to no, the Global 400mp 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 Global 400mp will clear the VIN for an interface when an operation completes on the interface, 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 job, the VIN will be cleared when the last step in the job is completed.

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 showing 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 logged in the event log but otherwise ignored, regardless of this setting.

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.

Not all tools support this setting. Only click tools with code 1.13 or later and holding tools support this setting. This setting is only sent to a tool during the learn process

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 determines 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.

Exacta 1200 Mode

Default: Batch

Values: Batch, Single

This setting determines how the Exacta 1200 will behave when it loses communication with the Global 400mp. If set to Batch, the Exacta 1200 will record tightenings up to the completion of a full batch before disabling. If set to Single, the Exacta 1200 will disable after each result until it receives confirmation that the result was received by the Global 400mp.

Enter new Password

Figure 38: 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.

Reset Defaults

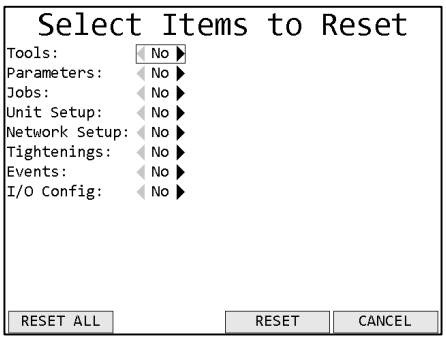


Figure 39: Reset Defaults screen

Function keys

1. RESET ALL – Resets all configuration to factory defaults.
2. No function
3. RESET – Resets the selected parts of the configuration to factory defaults.
4. 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, Jobs, Tightenings
Parameters	Jobs, Tightenings
Jobs	Tightenings
Unit Setup	Tools[1]
Network Setup	none
Tightenings	none
Events	none

[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 Global 400mp settings.

I/O Config	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.

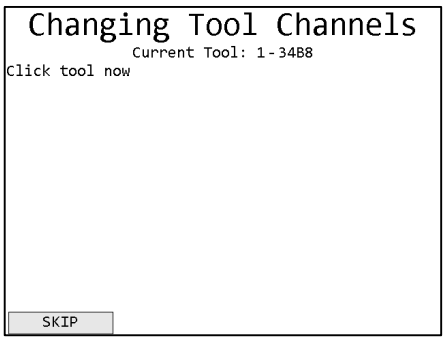


Figure 40: Channel Change screen

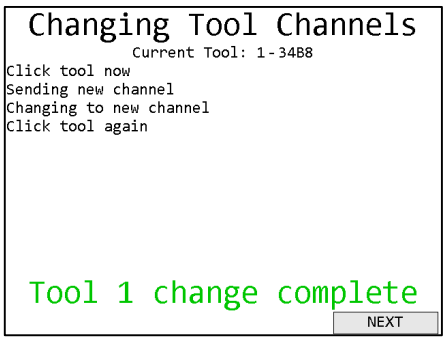


Figure 41: Channel Change, tool 1 complete

Click and holding tools will need to be cycled to perform the channel change. Air and digital tools 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. For digital and air tools, this only requires turning the tool off and back on. For holding tools and newer click wrenches, erasing the wrench and clicking it will cause it to reassociate with the unit on the correct channel. Older click wrenches will need to be forgotten and relearned. 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.

Events

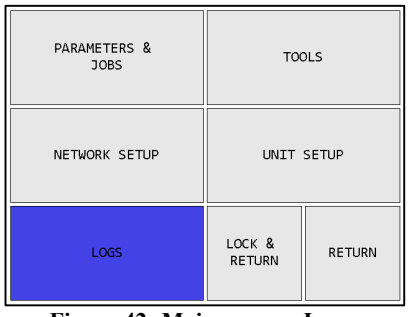


Figure 42: Main menu – Logs

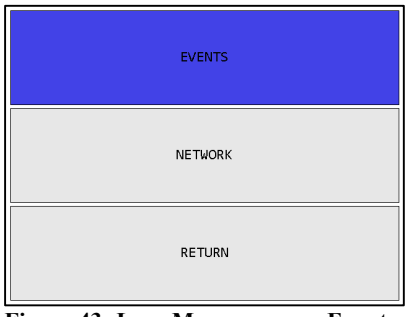


Figure 43: Logs Menu screen – Events

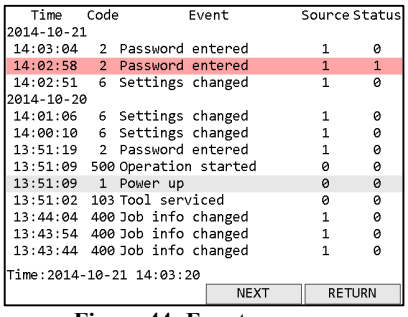


Figure 44: Events screen

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 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

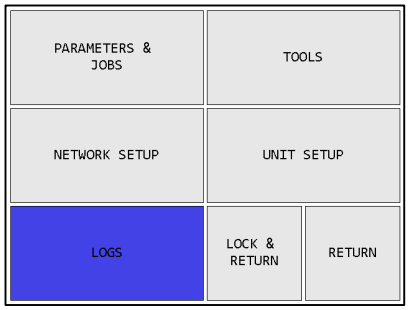


Figure 45: Main menu – Logs

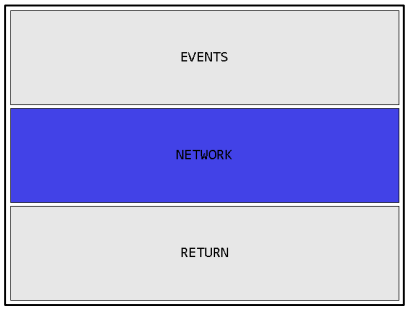


Figure 46: Logs Menu screen – Network

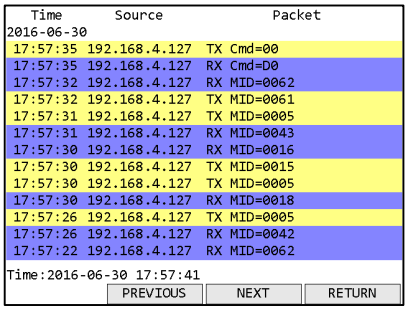


Figure 47: Network Log screen

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 Global 400mp 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: Serial communications

Introduction

The Global 400mp 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 Global 400mp at the same time.

Pin	Usage
2	Receive
3	Transmit
5	Ground

Barcode

The bar code functionality of the Global 400mp 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 Global 400mp 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. The general structure for a command bar code is:

%<command>%<data>%

A VIN 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.

Interface Selection

Because there is only one physical port for the barcode reader, you must inform the Global 400mp which interface should receive each barcode. The Select Interface command (40) must be scanned before each other barcode, even if only one interface is using the barcode reader. If an interface is not selected first, additional barcodes will be ignored.

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 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%%

11. Start Parameter

This command instructs the unit to start a parameter. Any other running parameter 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.

13. Stop

This command instructs the unit to stop any running parameter 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.

40. Select Interface

This command selects the interface for the next barcode.

Data: single digit number specifying the interface number for the next barcode (1-4)

Example:

%40%2%

This bar code would select interface 2 to receive the next barcode.

Serial Printer

The Global 400mp provides serial printer output in two formats, line and CSV. The Global 400mp 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. The serial printer will receive tightenings from all interfaces. Both line and CSV formats contain the following fields in the same order:

- Interface
- 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

Chapter 5: Atlas Copco Open Protocol

Introduction

This chapter describes the support for the Atlas Copco Open Protocol in the Global 400mp. Command MIDs and revisions referred to in this document are from the Atlas Copco Open Protocol Specification release 1.3 revision 1.

Configuration Options

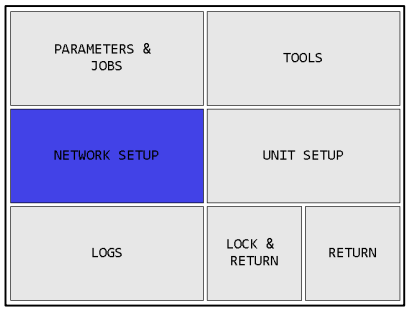


Figure 48: Main menu - Network Setup

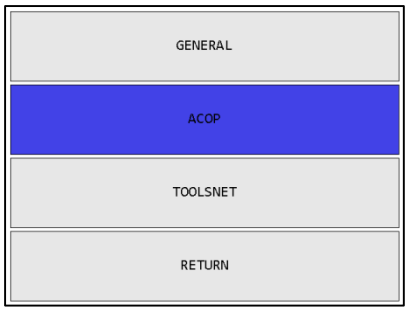


Figure 49: Network Setup Menu - ACOP

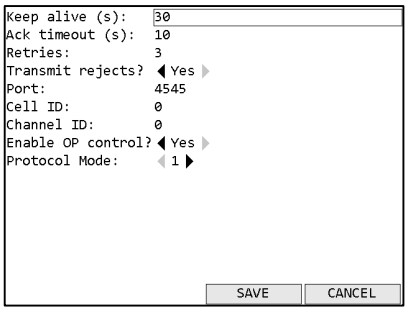


Figure 50: ACOP Settings

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 Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp 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 to interface 1. The network port used for interfaces 2-4 will be the following three ports. For example, the default setup listens for interface 1 connections on port 4545, interface 2 connections on port 4546, interface 3 connections on port 4547, and interface 4 connections on port 4548. If this setting were changed to 5000, the Global 400mp would listen for interface 1 connections on port 5000, interface 2 connections on port 5001, interface 3 connections on port 5002, and interface 4 connections on port 5003.

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.

The same Cell ID will be used for connections on all interfaces.

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.

The same Channel ID will be used for connections on all interfaces.

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 Global 400mp 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 6: ToolsNet

Introduction

This chapter describes the support for the ToolsNet Open Protocol in the Global 400mp. Implementation of the protocol is according to ToolsNet Open Protocol version 3.5.

The Global 400mp reports System Type as 29 and System Name as “Global 400”.

Configuration Options

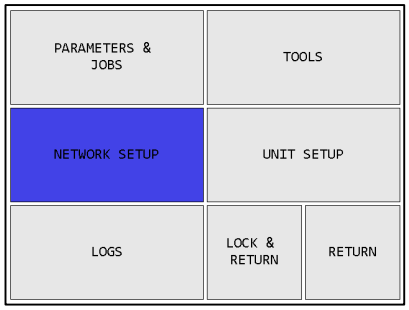


Figure 51: Main menu - Network Setup

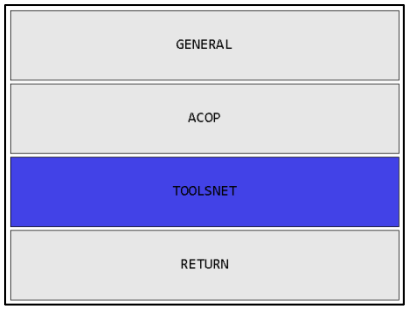


Figure 52: Network Setup Menu – ToolsNet

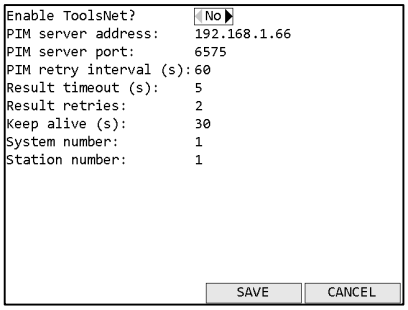


Figure 53: ToolsNet Settings

Enable ToolsNet?

Default: no

This setting determines if the Global 400mp will attempt to establish ToolsNet connections. Unlike the other network protocols supported by the Global 400mp, ToolsNet requires the controller to establish connections. Since the Global 400mp will repeatedly make network requests to attempt to establish network connections 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 Global 400mp will use to establish a ToolsNet connection.

PIM server port

Default: 6575

Range: 0 to 65535

This setting controls the port the Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp 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 Global 400mp will send a keep alive packet to the ToolsNet server if no other packets are being sent. When set to 0, the Global 400mp 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 Global 400mp reports to the ToolsNet server in identification and tightening packets.

The same System number will be used for connections from all interfaces.

Station number

Default: 1

Range: 0 to 9999

This setting controls the station number the Global 400mp reports to the ToolsNet server in identification and tightening packets.

The same System number will be used for connections from all interfaces.

Chapter 7: EtherNet/IP™

This chapter describes the assembly object connection points provided by the Global 400mp. 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.

Each connection point contains the same fields duplicated for each interface. The first set of fields corresponds to interface 1, the next set to interface 2, and so on.

Output (O->T) Connection Points

The following connection points are used by the Global 400mp to take input data from the network. These connection points allow you to control the running operation of the Global 400mp. Other setting parameters may be configured through the vendor-specific objects.

561

Name	Data Type	Description
	ARRAY of STRUCT of:	Parameter selection for each of the 4 interfaces. Each array entry corresponds to an interface.
Item Number	USINT	Instance number of item to run on the interface. Deactivate any running parameter or job if 0.
Item Type	USINT	Type of item to run on the interface: 0 - Parameter 2 – Job Ignored if Item Number is 0.
Batch Reset	USINT	When this value changes, the batch count of the currently running parameter on the interface is reset.
Suspend	BOOL	When set, suspends on the interface without stopping a running parameter or job.

Total size: 16 bytes

563

Name	Data Type	Description
	ARRAY of STRUCT of:	Parameter selection for each of the 4 interfaces. Each array entry corresponds to an interface.
Item Number	USINT	Instance number of item to run on the interface. Deactivate any running parameter or job if 0.
Item Type	USINT	Type of item to run on the interface: 0 - Parameter 2 – Job Ignored if Item Number is 0.
Batch Reset	USINT	When this value changes, the batch count of the currently running parameter on the interface is reset.
Suspend	BOOL	When set, suspends on the interface without stopping a running parameter 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 Global 400mp will be used.

Total size: 20 bytes

Input (T->O) Connection Points

This section defines the connection points are used by Global 400mp to send output data to the network. The connection points are in the range 110-129 and are grouped by their content.

- 51x: Last tightening data
- 53x: Current Global 400mp status

Input Connection Points for Last Tightening Data

The connection points in this group will contain data about the last tightening. As such, they are not updated after a parameter or job selection until a tightening occurs.

510

Name	Data Type	Description
	ARRAY of STRUCT of:	Last tightening data for each of the 4 interfaces. Each array entry corresponds to an interface.
Tightening ID	UDINT	ID number of the last tightening
Time	DT	Timestamp of the last tightening
Job Sequence Number	UINT	Sequence number of the running job.
Job Number	USINT	Instance number of job currently running. Ignored if 0.
Parameter	USINT	Instance number of the parameter 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.

Total size: 172 bytes

511

Name	Data Type	Description
	ARRAY of STRUCT of:	Last tightening data for each of the 4 interfaces. Each array entry corresponds to an interface.
Tightening ID	UDINT	ID number of the last tightening
Time	DT	Timestamp of the last tightening
Job Sequence Number	UINT	Sequence number of the running job.
Job Number	USINT	Instance number of job currently running. Ignored if 0.
Parameter	USINT	Number of the parameter 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.
Angle	UDINT	Angle of the tightening just performed.

Total size: 108 bytes

512

Name	Data Type	Description
	ARRAY of STRUCT of:	Last tightening data for each of the 4 interfaces. Each array entry corresponds to an interface.
Tightening ID	UDINT	ID number of the last tightening
Time	DT	Timestamp of the last tightening
Job Sequence Number	UINT	Sequence number of the running job.
Job Number	USINT	Instance number of job currently running. Ignored if 0.
Parameter	USINT	Number of the parameter 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.

Total size: 68 bytes

513

Name	Data Type	Description
	ARRAY of STRUCT of:	Last tightening data for each of the 4 interfaces. Each array entry corresponds to an interface.
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.

Total size: 44 bytes

Input Connection Points for Current Operation Status

The connection points in this group provide a view of the current operation status.

530

Name	Data Type	Description
	ARRAY of STRUCT of:	Current status for each of the 4 interfaces. Each array entry corresponds to an interface.
Parameter Number	USINT	Parameter number (0 means parameter not running.)
Job Number	USINT	Job number. (0 means job not running)
Suspend	BOOL	
Count	USINT	Number of tightenings performed in the current batch for the parameter.
Batch	USINT	Number of tightenings required for a batch in the parameter.
Status	USINT	Status of parameter 0 – None 1 – Cycle 2 – Batch 3 – Reject 4 – Batch NOK (batch complete with a counted reject)

Total size: 24 bytes

531

Name	Data Type	Description
	ARRAY of STRUCT of:	Current status for each of the 4 interfaces. Each array entry corresponds to an interface.
Parameter Number	USINT	Parameter number (0 means parameter not running.)
Job Number	USINT	Job number. (0 means job not running)
Suspend	BOOL	

Count	USINT	Number of tightenings performed in the current batch for the parameter.
Batch	USINT	Number of tightenings required for a batch in the parameter.
Status	USINT	Status of parameter 0 – None 1 – Cycle 2 – Batch 3 – Reject 4 – Batch NOK (batch complete with a counted reject)
Torque Unit	ENGUNIT	Unit of torque for last result
Torque	REAL	Torque of last tightening performed by the parameter
Angle	UDINT	Angle of the last tightening performed by the parameter
Last Tightening ID	UDINT	ID number of the last tightening performed by the parameter

Total size: 80 bytes

Chapter 8: Data Management

The Global 400mp 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

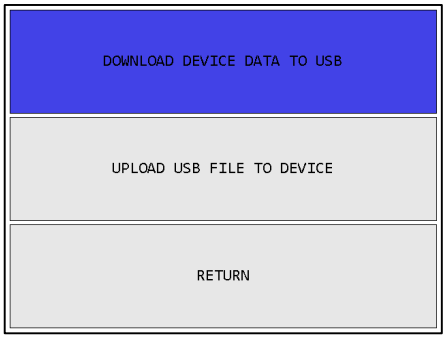


Figure 54: USB Menu - Download

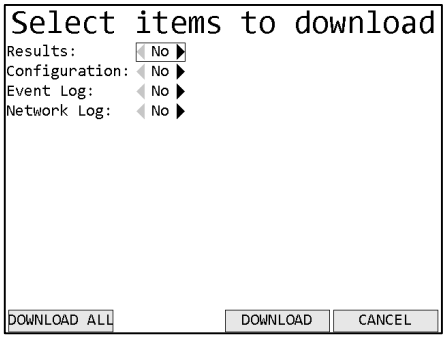


Figure 55: USB Download screen

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

One results file per interface will be saved to the USB drive as "####resI.csv" where the #### is the last four digits of the unit serial number and I is the interface number. These files contain all tightening results saved in the unit's memory for the interface in a CSV format.

Configuration

The configuration file will be saved to the USB drive as "####conf.g4m" 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, jobs, Global 400mp 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

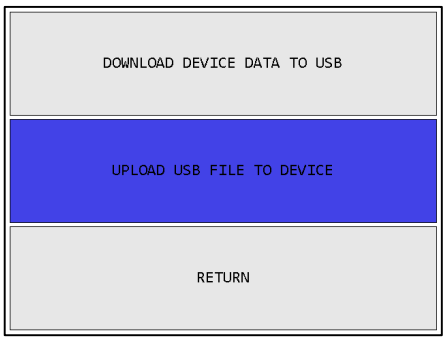


Figure 56: USB Menu - Upload

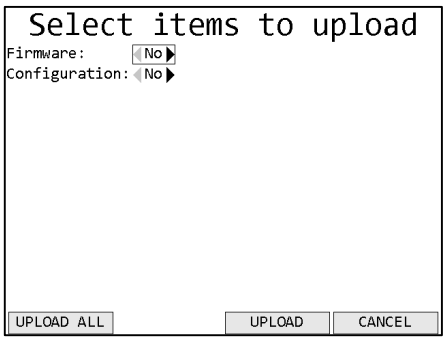


Figure 57: USB Upload screen

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

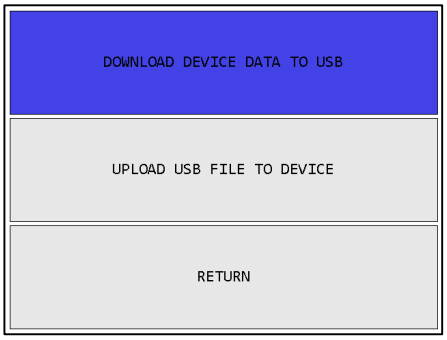
Firmware files have the extension ".bec". If a file is found, the unit will validate the file before uploading it. If a firmware file is uploaded, the unit will reprogram itself with the new firmware and reboot.

Configuration

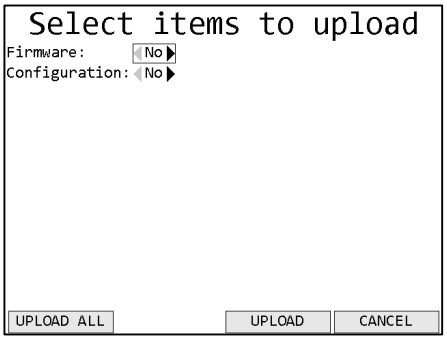
Configuration files have the extension ".g4m". If a file is found, the unit must validate the file before uploading it. These files can be created by downloading from a Global 400mp or by saving a configuration file from the PC application. This file contains all the configuration settings for the unit, including tools, parameters, jobs, and Global 400mp 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 Global 400mp, as if learning them to the unit.

Chapter 9: 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 10: 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 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

TEMPLATE
GLOBAL 400