Global 8 and Global 8 - Ethernet
Instruction Manual

For S/R Product Part Numbers 10479, 10477, 10476, 10473 and 10494 with 4.21 firmware

*If using the Global 8 with 1100-Series Exacta 2 tools, read new FAQ
on head and extension length before programming unit!*

Thank you for making the Global 8/Global 8 - Ethernet part of your plants' torque tool control technology.

This manual contains the information necessary to become familiar with, install and use the Global 8 family of products. The Global 8 controller is the same across the family, both in the number of tools it controls and the methodology used to communicate with them. Those versions that are Ethernet-capable extend the communications capabilities, incorporating a circuit board that has multiple external connectors and the ability to work with a specified protocol.

The Global 8 also communicates with Tool Manager software (third party software). This software is designed to assist with multiple functions related to setting up tool communication and PST 1000 data analysis and storage.

Additional information is included with the instructions for the S/R products used with the Global 8 family; SLTC-FM 2.4 GHz preset clicker-type torque wrenches, 1100-Series Exacta 2 digital torque wrenches, and the PST 1000 pressure sensor/transceiver. Information on associating electric tools with compatible radios and communications is in this manual, but detailed information on these products is contained in their manufacturers instructions. Supplemental information on applications and strategies may be found on our website.

Should any questions arise not addressed in this manual, in the other manuals, or on our website, please contact your S/R representative or our Customer Service department.

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Notes on Battery Powered Tools

Sturtevant Richmont does not manufacture battery-powered tools. Some tools of this type will communicate partially with the Global 8 series controllers through either design compatibility from the manufacturer (Panasonic brand, limited range of models) or by third-party modification. Partial support for use with these tools is provided herein, but we have no control over the design and design modifications of the battery tool manufacturers. For battery tools the primary support for the tool programming, adjustment, use and communication is the manufacturer of the tool.

As of the date of this manual, those manufacturers whose tools use the same radios as the Global 8 units and whose tools can be set up to communicate with the units:

- Provide only attribute data (Good/Bad or OK/NOK) data to the radio used with the Global 8.
- Provide other means of setting the tool for conformance to specifications; the Global 8 cannot download specifications to the tool.

As a rule, the tool is adjusted to deliver proper performance through adjustments or settings on the tool. The tool then has the radio transceiver on the tool associated with the Global 8 unit with which it is to work using the procedure in that section of this manual.

Once communication has been established and the other programming items for the specification group (or parameter) have been programmed, the tool can be used in production.

When the tool is used a "Good" or "Bad" evaluation of the tightening is made by the tool. The tool communicates the attribute (Good or Bad) to the assembler by illuminating a green (Good) or red (Bad) LED on the tool. When this occurs the same circuit that illuminates that LED also tells the radio board that a fastening has occurred and the quality attribute (Good or Bad, not actual torque data) for the fastening.

The radio board firmware sends this data to the Global 8 unit where it is handled as other attribute data is according to the specification group (parameter) settings.

See the sections on Radio Communications and Programming the Global 8 functions for details on setting up the Global 8 to communicate with your tools. See the instructions from the tool manufacturer for details on setting up, adjusting and operating the tool.

Note that there is no support at all provided for battery-powered tools not designed to work with the Global 8 units but modified by third parties for that purpose. See the third-party provider for all support items on such tools.

1   Nomenclature

1.1   Definitions

1100-Series _Exacta 2_
The digital torque wrenches from the Sturtevant Richmont "Exacta" family of tools designed to work with the Global 8 controller. These torque wrenches have a 2.4 GHz radio transceiver that can communicate with the Global 8 transceiver. They are capable of providing both attribute and variable data on the torques applied during use. **See FAQ on head length before using this tool with the Global 8.**

Wireless Clicker-type Preset Torque Wrenches (SLTC-FM 2.4 GHz)
The clicker-type torque wrench from the Sturtevant Richmont line of FM Switch Wrenches designed to work with the Global 8 controller. These torque wrenches have a 2.4 GHz radio transceiver that can communicate with the Global 8 transceiver. They are capable of providing attribute data (OK/Bad) on the torque applications on which they are used.

Pneumatic Tool
A torque tool that uses compressed air as a power source, and having a torque control mechanism (automatic shutoff or clutch), a port, and an attached PST 1000 pressure sensor/transceiver. The PST 1000 is required for the pneumatic tool to work with the Global 8.

Learn or Learning
The process of associating the wrench-mounted transceiver of one of the S/R torque wrenches above, or a PST 1000-equipped pneumatic tool, with the Global 8 controller. It is the process by which the two transceivers identify themselves to each other and create a communication link.

Function Programming - Global 8
The process of telling the controller and tools what to do and what tools to do it with. The specifications for each joint tightening and tool are created during this process. This process may be performed through the user interface on the front of the Global 8 or through the use of software on a computer connected to the Global 8 USB port.

Parameter, Parameter Group (Common to all components)
As used herein, a parameter is a setting for a data type used by the Global 8 or the network to which it is connected. A parameter may be a component of a communication setting, a torque specification, an angle specification, a batch size, or any other data used by the unit. Parameters are combined into groups (sets) and applied as a set in many tool-related operations.

Batch (Common to all components)
The number of fasteners in a single assembly to be tightened by a single tool.

Total (Common to all components)
A count of a number of batches successfully completed within in a given parameter set.

Name (Common to all components)

Each tool associated with the Global 8 has a name assigned to it, regardless of tool type. This assignment is made during programming. The most common approach for assigning a name is to use an abbreviation for the joint the tool will be used on.

Tmr Bmp (Applies to PST 1000)

This is a specification pertinent to air tools used with the PST 1000. It is a maximum amount of time that the air tool may be run without the operation being treated as an attempt to tighten a fastener. This specification is designed to compensate for accidental tool operation when a fastener is not being tightened. Tmr Bmp is a required specification for each PST 1000 in use, and the time value is entered during Global 8 programming for a given combination of tool and joint or via Autocal (preferred).

Tmr Min (Applies to PST 1000)

This is a specification pertinent to air tools used with the PST 1000. It is the minimum amount of operating time that a correct fastening with the tool must use before clutch activation. If the tool is operated for more than the Tmr Bmp specified but less than this amount of time, the tool operation is treated as an unacceptable attempt to tighten the fastener. This tightening is evaluated as nonconforming or "Bad" because the specified minimum operating time was not achieved. Tmr Min is a required specification for each PST 1000 in use, and the time value is entered during Global 8 programming for a given combination of tool and joint or via Autocal (preferred).

Tmr Max (Applies to PST 1000)

This specification applies to air tools used with the PST 1000. It is the maximum amount of operating time that a correct fastening with the tool must use before clutch activation. If the tool is operated in a single tightening for longer than this specified time, the tool operation is treated as an unacceptable attempt to tighten the fastener. This tightening is evaluated as nonconforming or "Bad" because the specified maximum operating time was exceeded. Tmr Max is a required specification for each PST 1000 in use, and the time value is entered during Global 8 programming for a given combination of tool and joint or via Autocal (preferred).

Tmr Pls (Applies to PST 1000)

This is a specification pertinent to pulse-type air tools used with the PST 1000. It is the minimum number of times the tool needs to pulse to achieve a correct tightening of the fastener. If the tool does not pulse this number of times or more, the tightening is evaluated as nonconforming or "Bad" because the number of pulses to achieve the correct torque was not attained. Tmr Pls is a specification limited to pulse tools that exhibit distinct pulses in the final tightening phase. The count is entered into the Global 8 during the programming for the combination of tool and joint or via Autocal (preferred).

Tmr Clch (Applies to PST 1000)

This is a specification pertinent to clutch-type air tools used with the PST 1000. It is the minimum amount of time the operator must hold the tool trigger after the clutch stops transferring torque to the fastener. If the tool trigger is released before this time elapses, a nonconforming or "Bad" evaluation for the tightening will result. This time is entered into the Global 8 during programming of the tool and joint or via Autocal (preferred).

Thr 1 (Applies to PST 1000)
This is a pressure setting applicable to the PST 1000. Below this pressure the PST 1000 will not record and store data; above this pressure data will be recorded and stored. This specification is entered during programming or via Autocal (preferred).

Thr 2 (Applies to PST 1000)
This is pressure setting applies to the PST 1000. The PST 1000 evaluates air pressure above this setting to be that of a tool in use and tightening a fastener. A tightening that results in air pressure above Thr 1 but below Thr 2 will be ignored. This specification is entered during programming or via Autocal (preferred).

Thr 3 (Applies to PST 1000)
This is a pressure setting applicable to the PST 1000. The PST 1000 evaluates an air pressure above this setting to be that of a clutch-type tool that has completed an installation and has the clutch no longer transmitting the full torque to the fastener (tool has "clutched out"). A tightening that does not achieve this specification will be evaluated as nonconforming or "Bad" for this characteristic. This specification is entered during programming or via Autocal (preferred).

Timer Min (Applies to SLTC-FM Clicker-Type Wrenches and some battery-powered tools)
This specification is the minimum amount of time the wrench must spend in the "clicked" position each time the tool is used to tighten a fastener on a specific joint. If the tool use does not meet this specification during a fastener tightening, the tightening will be evaluated as nonconforming or "Bad". This specification is entered during programming.

Timer Max (Applies to SLTC-FM Clicker-Type Wrenches and some battery-powered tools)
This specification is the maximum amount of time the wrench may spend in the "clicked" position each time the tool is used to tighten a fastener on a specific joint. If the tool use exceeds this specification during a fastener tightening, the tightening will be evaluated as nonconforming or "Bad". This specification is entered during programming.

TBC - Time Between Cycles (Applies to SLTC-FM Clicker-Type Wrenches, 1100-Series Exacta 2, and battery-powered tools)
This is the minimum time between the completion of a conforming or "Good" cycle and the completion of another conforming cycle. If the tool cycles before this amount of time has elapsed, the tool cycle will be evaluated as nonconforming or "Bad". This value is entered during programming.

TBB - Time Between Batches (Applies to SLTC-FM Clicker-Type Wrenches, 1100-Series Exacta 2 and battery-powered tools)
This is the minimum time between the completion of the last fastener in a batch and the completion of the first conforming cycle in the next batch. If the tool cycles before this amount of time has elapsed, the tool cycle will be evaluated as nonconforming or "Bad". This value is entered during programming.

Units (Applies to 1100-Series Exacta 2)
This is the unit of measure for torque to be used in the torque specification and cycle evaluation.

Direction (Applies to 1100-Series Exacta 2)
Fasteners may have threads that tighten in the clockwise or counter-clockwise direction, and the Exacta 1100 torque wrenches can be used on either type. This specification sets the requirement for acceptable torque direction on the application; clockwise, counter-clockwise, or both.

Mode (Applies to 1100-Series Exacta 2)
This setting controls how the Exacta 1100 captures the torque value for the application. See tool instructions for an explanation of the modes available.

Min Trq (Applies to 1100-Series Exacta 2)
This is the minimum torque specification for the application. Failure to attain this torque during a tightening will result in an evaluation of the tightening as nonconforming.

Max Trq (Applies to 1100-Series Exacta 2)
This is the maximum torque specification for the application. Exceeding this torque during a tightening will result in an evaluation of the tightening as nonconforming.

1.2   Component Definitions and Key

1. Cabinet
   Houses all components of the unit.

2. Antenna Housing
   This covers the antenna for the transceiver used to communicate with the tools.

3. Cycle LED (Light Emitting Diode)
   This light illuminates upon completion of each conforming fastener installation.

4. Reject LED (Light Emitting Diode)
   This light illuminates each time a fastener installation is nonconforming.

5. Batch LED (Light Emitting Diode)
   This light illuminates each time the last fastener in a batch receives a conforming installation and the batch is completed.

6. User Interface
    The User Interface (see the image on the prior page and the image to the right) includes the following:

    LCD Screen
    This is a 320 pixel wide x 240 pixel high screen used to display information during programming and operation.

    Soft Keys
    These are switches covered by soft black plastic located on the left, right and bottom sides of the LCD Screen. These are called "soft" keys because their function is changed by the "software". A single key can be "Autocal" on one screen and "Enter" on the next.
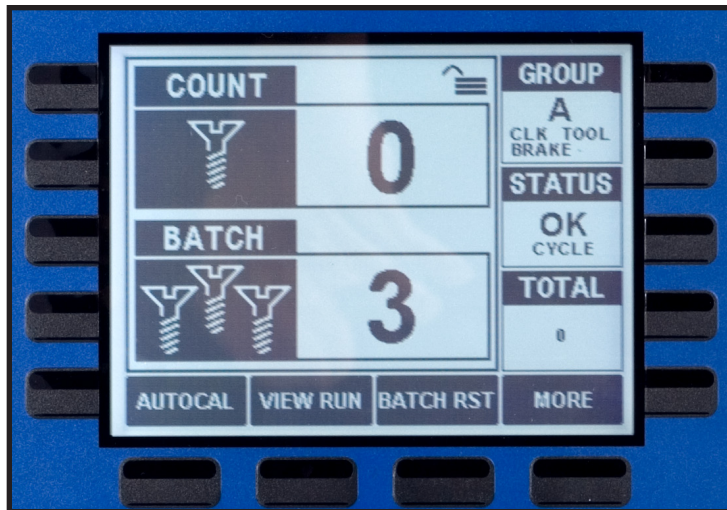
7. Human-Machine Interface (HMI) Panel.
    This panel has a 2-line, 16-character display and keys for monitoring and programming the Ethernet communications between the Global 8 - Ethernet and the Ethernet system. It appears only on models with Ethernet communications. See the sections in this manual specific to your unit for details.
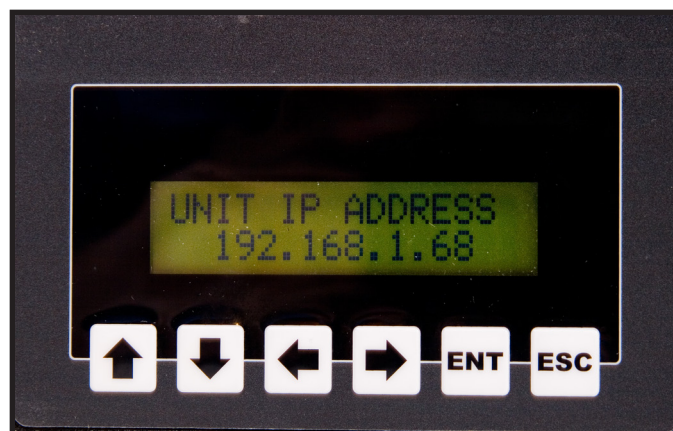
8. Key Lock
    The Key Lock is a security feature that permits or denies access to group specifications.

9. Beeper
    The beeper provides audible notice of the occurrence of an event. The beeper is at a fixed volume. It can be turned on or off via I/O programming. Note: Adjustable volume beeper on early models has been discontinued.

11. Input/Output (I/O) Port
    This port provides standard 24 VDC input and output communications.
    This is a 10-pin configuration, with the pins numbered as shown in the
    accompanying photograph. The electrical diagram for the pins is shown
    in the sections on Installation and that on Input/Output
    Communications.
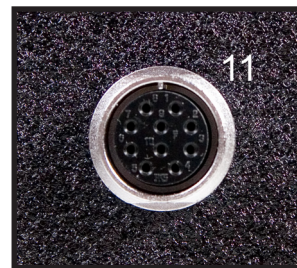
12. Power Module
    The power module provides the connection for the power cable
    and houses the power switch.

13. USB Connector
    Provides connectivity to computers using Device Programmer
    software to program various settings. See your S/R representative
    for a demonstration of Tool Manager software and to find where to
    acquire it.

14. Network Connector (RJ45) (Ethernet-capable models only)
    This Ethernet port is used to transmit and receive TCP/IP messages
    that are formatted to comply with the protocol for which the unit is
    matched. See section on Ethernet Communications specific to your
    units protocol for full information.

15. Male DSUB9 Connector (Some Ethernet-capable models only)
    Port for use with a serial bar code reader. This unit was developed
    using a Symbol LS2208 bar code reader and uses CODE39 bar
    codes. For pin configuration see the section pertinent to your model.

16. Female DSUB9 Connector (Ethernet-capable models only)
    Port for use with a serial printer. Using this will result in an output for
    each torque tool use. See Appendix for pin configuration. On
    Ethernet IP model this port has a different use, see chapter on
   Ethernet IP Network Card and Programming.

2   Principles of Operation

The Global 8 is designed to integrate ported power tools, clicker-type torque wrenches, digital torque wrenches and a limited number of battery-operated tools into assembly line operations. The communication with the tools is achieved through the use of transceivers on the tools and a transceiver on the Global 8 unit. Communication with the line control automation is achieved through an input/output system designed to work with 24 VDC I/O systems and programmable logic controllers. On Ethernet-capable units, communication extends also to Ethernet systems on the plant floor, and for some versions, bar code readers and serial printers.

To make the basic Global 8 system work it is necessary that:

1. Each power tool to be used with it must be properly ported and equipped with the PST 1000 Pressure Sensor/Transceiver.
2. The clicker torque wrenches must be from the SLTC-FM 2.4 GHz family of tools.
3. The digital torque wrenches must be from the 1100-Series Exacta 2 tools.
4. Battery powered tools capable of communicating with the Global 8 units do so essentially like SLTC-FM 2.4 GHz clicker torque wrenches (OK/NOK transmission only)

Up to eight (8) tools from those listed above can be associated with or "learned by" the Global 8 unit. The tools can be in any combination and from any of the families, but only eight may be in the memory of the unit at any time.
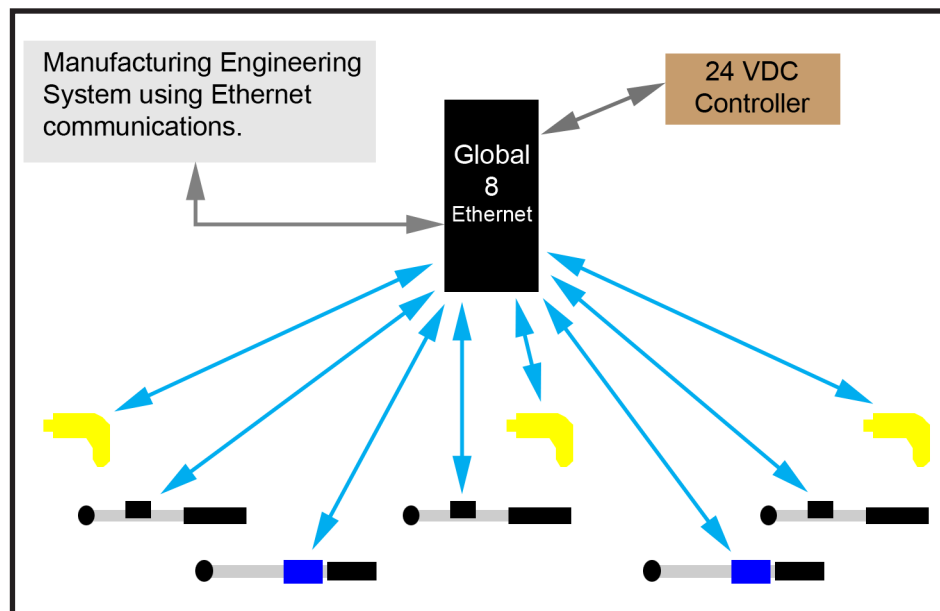

When an 1100-Series Exacta 2 tool is used, data on the actual torque is used for control. The actual torque application specification is used to determine whether any individual tightening is "OK" (conforming) or "Bad" (nonconforming).

When power tools equipped with the PST 1000 are used, the control is indirect. An experiment is conducted (using a torque tester or the joint itself) and tool adjustments are made to the tool to apply the correct torque on the fastener application. The PST 1000 records a profile of the correct air pressure behavior for a "correct" or properly-tightened fastener, and converts the profile to specifications.

The specifications are stored on the PST 1000, and subsequent fastenings are compared to them. Those that match the specifications indicate that the tool performed as desired and are considered "correct" tightenings. Those that do not match the specifications are considered "Bad" or nonconforming. The actual torque is determined by the power tool, the behavior of the power tool is what is monitored.

The SLTC-FM clicker-type torque wrenches also use an indirect control methodology. These tools are preset torque wrenches; the torque is set using a torque tester, then locked in. With the torque preset, the remaining variable is how the tool is used. The usage variable for clicker-type torque wrenches is time. The amount of time the tool spends in the "clicked" position is a good determinant of how it was used. A tool that is used correctly will have the force applied to it in a steadily-increasing amount. When the tool "clicks", the operator will release the pressure and the tool will reset. A tool that is used too quickly or "jerked" will normally exhibit two characteristics. It will apply the wrong torque to the fastener and it will spend less time in the "clicked" position than does a tool used properly. A tool that is pulled past the click also has two characteristics. It will apply too much torque to the fastener and it will spend more time in the "clicked" position than a tool used properly.
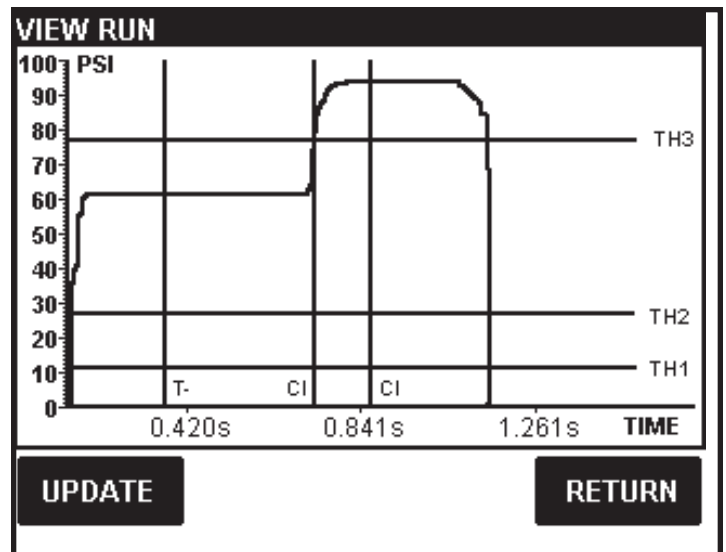
The torque specifications for the digital torque wrenches and the time specifications for the duration of a correct use of the clicker wrenches are stored on the Global 8 unit. Each tool also has the current information stored in memory so the evaluation can be made and displayed to the operator immediately upon completion of each fastener installation.

Many components of a product have multiple fasteners that must be tightened for the component to be properly installed. On such components there is an additional error type that can occur in the process; a fastener can not only be improperly tightened, it can be missed entirely. To help reduce the probability of this error type, the Global 8 system uses a batch count to manage the number of fasteners that must be tightened on the assembly before it is evaluated as complete.

Using a count of correct tightenings as an additional layer of control is both effective and common. If both ends of a hydraulic hose have fittings that must be properly tightened and a batch count of two (2) is used for the tool that will be performing the tightening, the odds of the assembly being released for later operations with only one fastener properly tightened are diminished markedly. Even if the operator is interrupted while performing the tightening tasks, the Global 8 system provides immediate information on how many fittings were tightened when the interruption occurs. The operator can look at the display and know immediately what was completed when the interruption occurred and how many correct fastenings remain to be performed before that assembly is complete.

This progress tracking feature is sometimes performed by programmable logic controllers working with visual display devices. By providing this feature on the Global 8, there is less demand on the I/O control system and controllers managing the functions. The function is effectively "off-loaded" to the Global 8, conserving resources.

The Global 8 assists in assembly task sequencing management. If there are four components that must be assembled in a strict sequence, the sequence can be enforced by assigning the first component as Group A, the second as Group B, the third to Group C, and the fourth component as Group D. The steady and rigorous progression of tasks from Group A through the last group, is an asset whether it is installing one component in a series of operations or installation of multiple components in a series.

The sequencing does not require a different tool for each group. A single preset tool at a fixed torque specification can be applied as the component in multiple groups in the sequence. A digital torque wrench that is the tool for Group A can be used in other groups. The PST 1000 is similar to the digital torque wrench in this regard. In some system applications this can reduce the number of tools needed at this location on the assembly line.

The sequencing function can be active or inactive. If sequencing is active, it can be controlled through the selections native to the unit, through the input/output port or it can be controlled by the operator (if programming is enabled). On Ethernet-capable units this can be controlled via protocol use. This ability to manage the process as needed easily accommodates production lines that assemble different product versions with differing requirements. See the section on sequencing for details on this function.

Global 8 units that are Ethernet-capable can have programming functions handled via the Ethernet system using appropriate commands. Augmenting this is the ability to add data via a bar code reader and to output data to a serial printer if so desired (ACOP model). For additional information on the Ethernet capabilities, see those sections of the manual.

Battery-powered tools equipped with compatible 2.4 GHz radios function similarly to the SLTC-FM 2.4 GHz clicker type torque wrenches we manufacture. The similarity lies in the transmission of attribute data (Good or Bad) to the Global 8 unit when each fastening is completed. These tools differ from our tools in that the Global 8 cannot be used to download specifications to the electric tools. The criteria for the Good/Bad decision (specifications) must be entered into the tool via the method prescribed by the individual tool manufacturer. Once that is done and the tool radio associated with the Global 8 unit then the tool can be used within the communications system.

Safety - Warnings and Cautions

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.

Immediately discontinue use of the unit if smoke, an abnormal odor, or an unusual sound is detected coming from 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:

- This unit accepts an AC input voltage from 90VAC to 264VAC. Trying to operate this unit with a voltage outside that range will 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.

Contains FCC ID: OUR-XBEE/OUR-XBEE PRO

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.

Installation

The following items should be taken into consideration when deciding where to install the Global 8 unit:

- The radios used by the Global 8 and the system components that communicate with it work best when used within 50 feet (16 meters) of each other. Factories with "noisy" RF environments or significant barriers to RF transmission are likely to have a reduced transmission distance, usually of about 30 feet (10 meters) due to the environment.

- Radio communication between the Global 8 and the system components that communicate with it work best when the space between them is unimpeded by metal structures.

- A source of clean electric power in the 90VAC - 264VAC range is necessary to operate the unit. The power source should be located within six feet (two meters) of the unit.

- The unit should be attached to a solid support that will prevent the unit falling or being tipped over.

- The operator interface (screen and buttons) should be readily visible and accessible to the assembler using the tools associated with the unit. The unit must be installed with the antenna at the top.

- Liquid cannot be allowed to spray on or drip on the unit.

- The unit generates some heat during operation, as with most electrical and/or electronic devices. The unit also has connectors for electric power, input/output system connections, a serial port and buzzer mounted on its' sides. There should be at least 6 inches (150 mm) between the sides of the unit and any obstruction to allow for heat dissipation and the connection of power and other devices.

- Space must be allowed on either side of the unit for the wires and connectors that will be attached to and used with the Global 8.

When opening the box the unit is shipped in, the following should be inside the box:

- One (1) Global 8 unit
- Two (2) keys for the key lock on the unit
- One (1) compact disk
- One (1) power cord, 3-connector computer type, United States standard

Once the mounting location for the unit has been determined, the unit can be installed in the selected location. The cabinet has two mounting flanges that run along the rear from the top to the bottom of the unit. Each flange has two holes to permit the passage of a screw or bolt through the flange so the unit may be secured in place.

Once the unit has been attached to the mount, the power cord can be attached. Connect the power cord to the unit, and make sure the prongs fully engage the recess in the cord connector. When this is complete, the power cord can be connected to the source of electric power.

The next step is to make the connections for the input/output control system. The electric diagram for the relays and optically isolated inputs is below.
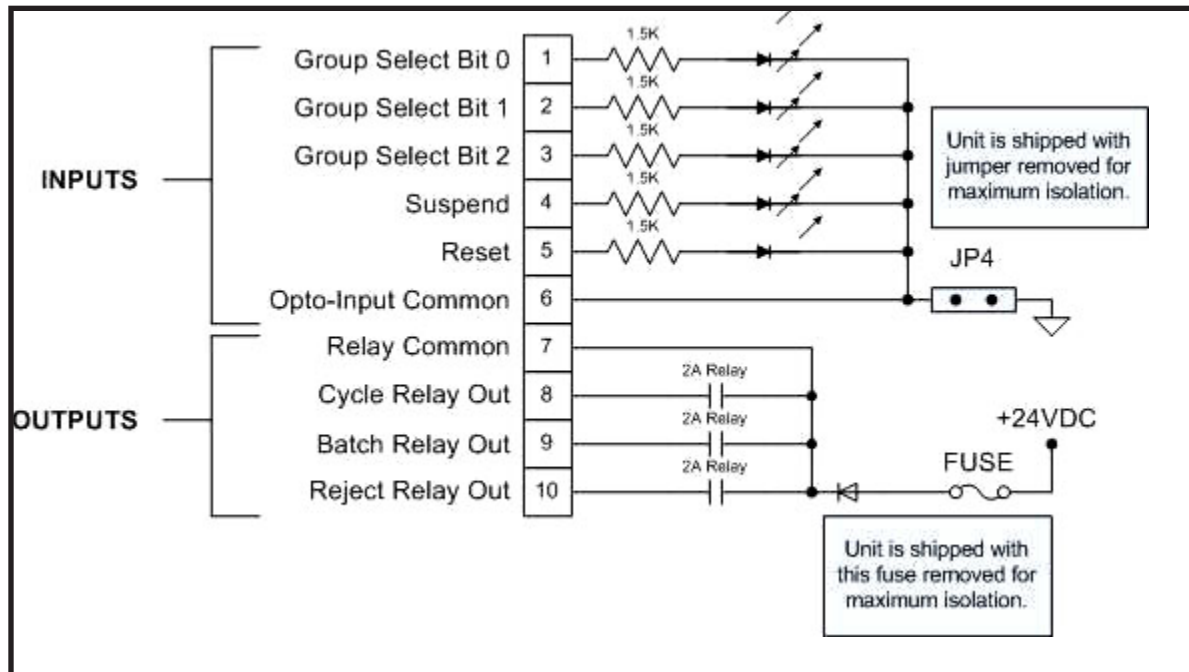
The pin numbers in the chart are those found on the 10-pin connector on the side of the cabinet. The image to the right shows the numbering on the connectors.

If the unit is Ethernet-capable, the cabling should now be connected to the RJ45 Ethernet port.

If a bar code reader is to be used (some Ethernet-capable units only), the output cable from the reader should be connected to the male DSUB9 connector.

If a serial printer is to be used (some Ethernet-capable units only), connect the serial printer input to the Global 8 via the female DSUB9 port.

The unit can now be programmed.

If using a socket tray with the Global 8, the jumper JP4 must be installed. Contact your S/R Representative for guidance in this installation.

Radio Communications - "Learning the Tools"

Each Global 8 unit needs to have the tools to be used with it associated with or "learned by" the unit. The reverse is also true; each tool needs to "learn" which Global 8 unit is sending the information that is applicable to the tool.

The learning process for each type of tool; FM Switch Wrench, 1100 Series Exacta® 2 wrench, and PST 1000-equipped ported air tool is slightly different. All three processes start out the same way, but diverge after the first several steps.

Step 1
Energize the unit; move the power switch to the On position. The unit will:

- load its' software program into memory
- read the stored settings
- initialize the transceiver on the Global 8 radio
- display the initial screen
- attempt to contact a tool that is associated with (learned into) the memory of the Global 8 unit.
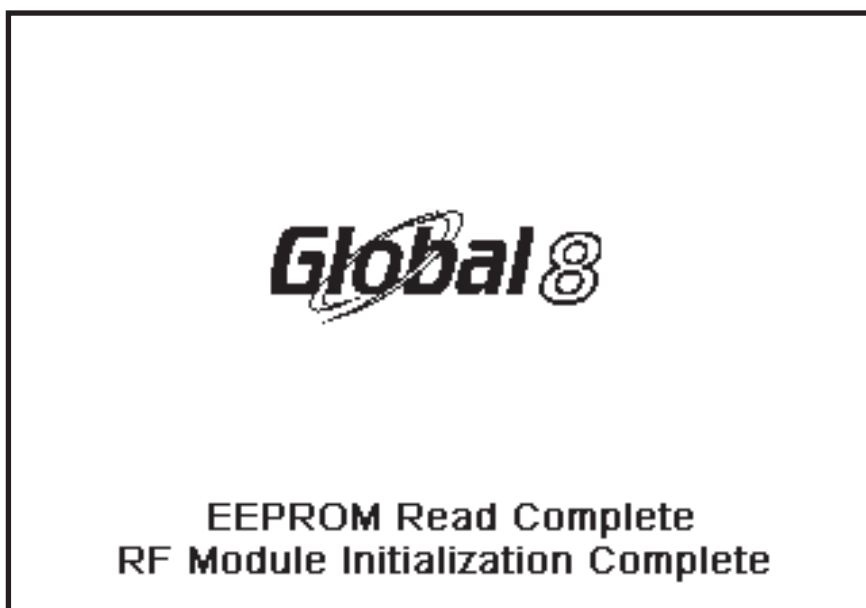
Step 2
An initial operating screen will be displayed, as shown to the right. Press the button below the "MORE" option.

Note: As part of the final quality testing for the unit and for network cards, an SLTC-FM switch wrench has communicated with the unit. Each of the parameters has a 2.4 GHz SLTC-FM preset click wrench "learned in"; you will be changing this to your tool from the one used for the test.

Step 3
The display will show the password entry screen. To gain access to the programming function you may perform either of two actions.

You may enter the password for the unit (0104 is the default) or you can insert the key into the key lock and turn the key to the unlocked position.

To enter the password, press the soft key beside the number to be entered. Do this for each number in the password.

Once you have taken one of those two actions, press the soft key below the displayed "ENTER" button.

0		5
1	ENTER PASSWORD	6
2	* * * *	7
3		8
4	ENTER ESCAPE	9
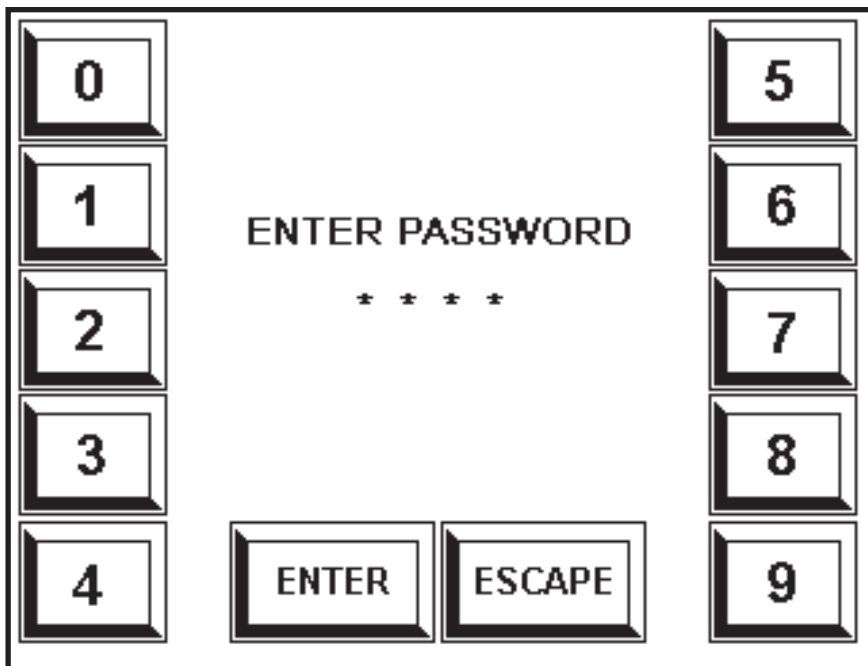
Step 4
The unit will display the menu screen shown to the right (Menu 1).

Select "MORE OPTIONS" from the menu by pressing the soft key beside it (fourth key from top on right side).

EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN / RETURN
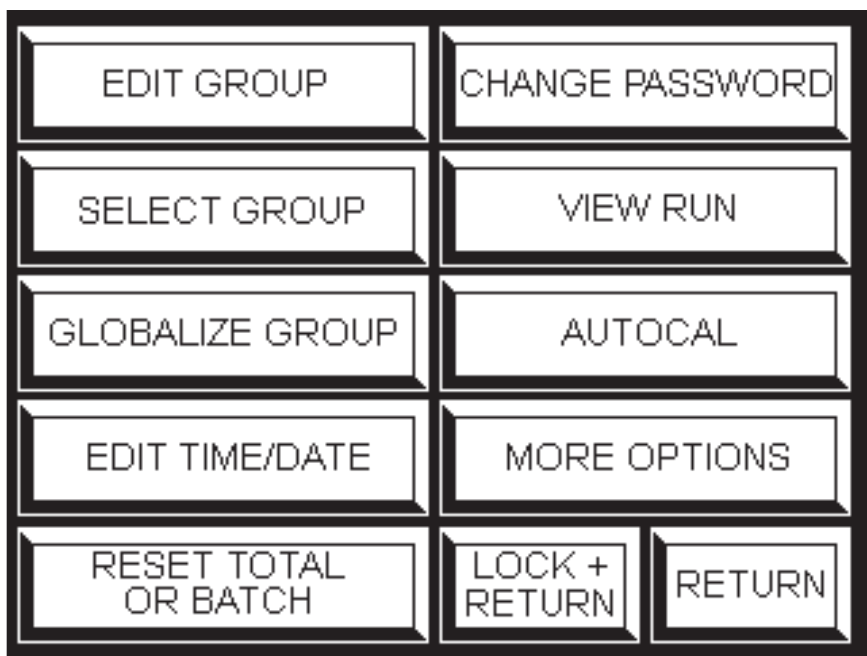
Step 5

The display will change to show a new menu of choices (Menu 2) as shown to the right.

Select the "LEARN NEW RADIO" option by pressing the soft key beside it (second key from top on the right side of the display).

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN RETURN

Step 6

The display will change to show a new menu of choices as shown to the right. This menu allows you to select the type of tool to be learned by the unit.

To make the selection, press the soft key beside the number that corresponds to the tool type to be learned.

PLEASE SELECT TOOL TYPE

0 = PNEUMATIC
1 = CLICK
2 = DIGITAL
3 = BATTERY TOOL

0 1 2 3 4   ENTER ESCAPE   5 6 7 8 9

Step 7

This step establishes the group of specifications that will be associated with this tool. The specifications are created in steps later in the overall programming process.

Select the specification group to represent and be used with this tool. The group selected here will be the specification group applied when the tool is in use.

To make the selection active, press the soft key beside the number for the group.

```
┌──────────────────────────────────────────────┐
│  [0]                                    [5]   │
│        PLEASE SELECT ACTIVE                   │
│  [1]   GROUP FOR THIS TOOL             [6]   │
│          0 = GROUP A                          │
│          1 = GROUP B                          │
│  [2]     2 = GROUP C                    [7]   │
│          3 = GROUP D                          │
│          4 = GROUP E                          │
│          5 = GROUP F                          │
│  [3]     6 = GROUP G                    [8]   │
│          7 = GROUP H                          │
│                                               │
│  [4]    [ENTER]   [ESCAPE]              [9]   │
└──────────────────────────────────────────────┘
```

Step 8

The radio transceivers in the Global 8 unit and the tool must be set to the same frequency for them to communicate with each other. Each frequency used by the system is assigned a channel number. There are twelve channels, numbered 1 through 12.

Use the soft keys on the sides of the display to type in the number of the channel to be used.

Note: A table of Channel Numbers and the actual frequency of each is located at the end of this section.

Note: The learning process always occurs on Channel 1. After the information exchange between unit and tool, the selected channel is used for subsequent communications.

```
┌──────────────────────────────────────────────┐
│  [0]                                    [5]   │
│        USE KEYPAD TO ENTER                    │
│  [1]    A RADIO CHANNEL                 [6]   │
│         FROM 1 TO 12                          │
│  [2]                                    [7]   │
│            CHANNEL =                          │
│  [3]                                    [8]   │
│                                               │
│  [4]    [ENTER]   [ESCAPE]              [9]   │
└──────────────────────────────────────────────┘
```

Step 9
Each tool is given a name for convenience.

Use the soft keys beside each letter group to type in the name to be used for the tool.

To select the first letter assigned to a soft key, press the soft key once. To select a letter later in the set assigned to the soft key, press the soft key repeatedly to scroll to the letter needed.

When the desired letter is highlighted, press the soft key below ADD CHAR to add the letter to the name. Add letters one at a time until all the characters in the name have been added and the name is complete. Once the name is spelled completely, press the soft key below SAVE.

```
A B C D                              U V W X

E F G H                                Y Z

I  J K L                             0 1 2 3

M N O P                              4 5 6 7

Q R S T                                8 9

ADD CHAR   SAVE    ESCAPE   DEL CHAR
```

Step 10
At this point the process follows a path specific to the tool type selected for the group.

If a pneumatic tool with a PST 1000 was selected, the screen to the right will appear.

The screen will display the tool type as "AIR", followed by the name selected for the tool during Step 9 of the learning process. Displayed immediately below those items will be the channel selected for communication with the tool.

Follow the displayed instruction; hold down the button on the PST 1000 until it enters the "Learn" mode.

```
TOOL TYPE
AIR
TOOL NAME
RTFRBRK

CHANNEL
1

SAVE TO GROUP
A

Hold Button On
Transducer Until It
Enters Learn Mode


Press Any Key To Continue
```

If an FM Switch Wrench was selected as the tool type for this group, the display here will appear on the screen.

The tool type will be listed as "CLICK", and the tool name entered in Step 9 will be displayed. Below that the display will show the channel chosen for communication with this tool.

If the tool has previously been associated with another unit, erase tool by clicking wrench head over and holding in position for 10 seconds until LED emits steady red light.

The first time a tool is learned by a group in the Global 8 unit, click the tool once. The two transceivers will each learn the identity of the other.

```
TOOL TYPE
   CLICK
TOOL NAME
  AIRSNSR

CHANNEL
   1

SAVE TO GROUP
   A


Make Sure Wrench Is
Erased From Previous
Application Then Click

Press Any Key To Continue
```

If an 1100 Series Exacta 2 tool was selected for the group, the screen shown here will be displayed.

The tool type will be "DIGITAL", and the tool name assigned in Step 9 will be displayed. The channel selected and the active group will be displayed.

If the tool is off, turn the tool on.

If the tool was on (powered) when this step was started, turn it off, wait 10 seconds, then turn the tool back on.

```
TOOL TYPE
  DIGITAL
TOOL NAME
  AUDIT

CHANNEL
   1

SAVE TO GROUP
   A


Turn Wrench Off
Count to 10
Turn Wrench Back On

Press Any Key To Continue
```

If a battery-powered tool was selected as the tool type, the screen shown here will be displayed.

The tool type will be "BATTERY", and the tool name assigned in Step 9 will be displayed. The channel selected and the active group will be displayed.

Remove the battery from the tool, wait 10 seconds, then reinstall the battery in the tool. Once the battery has been installed, pull the trigger (activate the tool).

```
TOOL TYPE
   BATTERY
 TOOL NAME
  SFTYSTRP

  CHANNEL
     1

SAVE TO GROUP
     A

 Pull the Battery
Replace the Battery
 Then Pull Trigger


Press Any Key To Continue
```

Step 11
When the learning process for the tool is complete, a screen with a "RETURN" option will appear. Press the soft key by the option.

At this point, the tool to use with a group has been selected and associated with that group (learned"). The other specifications for the group have not been programmed into the unit.

Programming the other specifications is required before the unit can be put in service, and the instructions for doing so are in the next section of this manual.

Erasing a Tool From Memory
Should it be necessary to erase a tool entirely from the Global 8 memory, you can effectively do so by overwriting the information for the current tool with factory default information. To do this use the information in the "EDIT RADIO" section (Page 44) to change the current information to the factory default information.

The factory default information for each group is: RFID = 0000, Channel = 1, Type = CLK, and Name "TOOLNUM#" where the number is that representing the group.

Channel and Frequency Chart

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

Programming the Global 8 Control Functions

Each group must have the specifications and characteristics pertinent to the group and the tool programmed into the Global 8 before the unit and tools can be used. The details of programming vary among tool types, and the process for doing so is given in this section of the manual. Each group that will be used must be programmed.

Programming also includes sequencing for the tools and operations to be performed, as well as setting the characteristics of how the input/output system will perform.

To begin programming, it is necessary to access the ability to edit the group specifications. When the main screen is displayed (The main screen for clicker and air tools is shown at right for demonstration purposes.) Press the soft key below the MORE button on the display.

If the unit is locked, the screen shown below right will be displayed. There are two options available at this point.

The user can insert the key in the key lock and rotate the lock to the unlocked position. Doing so will enable the user to proceed.
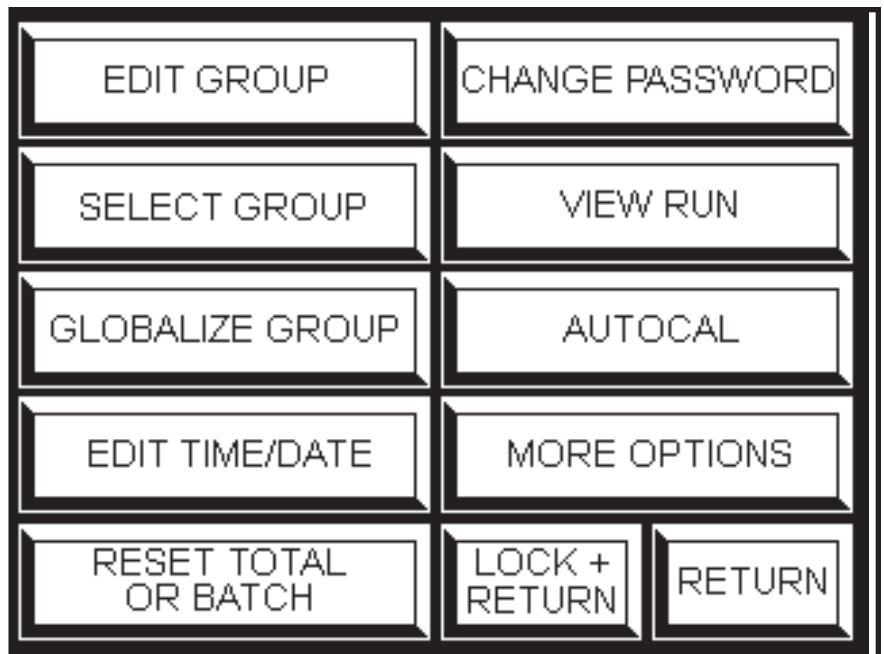
Access to the programming function can also be obtained by entering the password for the unit. The default password is 0104. To type the password, press the soft key beside the number to be entered in each position. Once all four numbers have been typed, press the soft key below the ENTER button.

Once access has been obtained, the screen of menu options shown at right will be displayed. The user can select one of the options from the menu by pressing the soft key adjacent to that option. Additional menu options can be reached by selecting the MORE OPTIONS button.

The unit can be sent back to the main screen by either of two methods. The user can press the RETURN soft key or the LOCK + RETURN soft key. If return is selected, the unit will remain unlocked if a password was used to unlock the unit. Pressing the LOCK + RETURN soft key will return the unit to the main screen and lock access to the programming function.

EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN	RETURN

To edit a group (set of specifications), press the soft key for the EDIT GROUP button.

A screen listing the groups will be displayed. From this screen select the group to be edited by pressing the soft key for the number associated with the group. Groups A through H are represented by the numbers 0 through 7. Pressing the soft key for the number will take the user to the edit screen for that group.
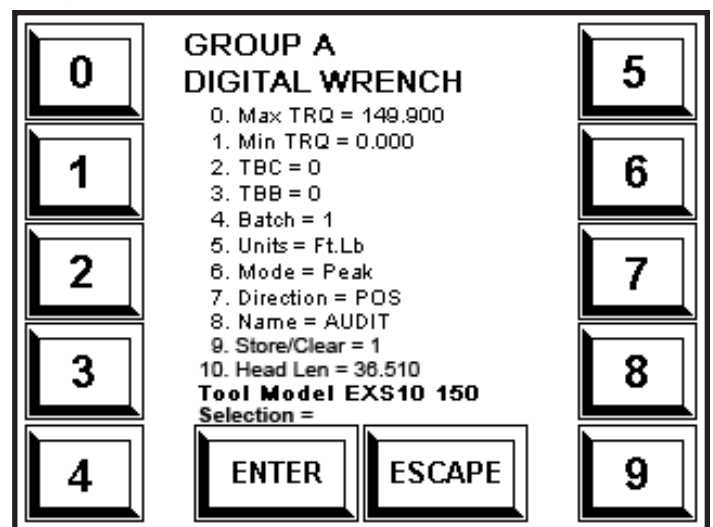
The edit screen displayed for the group is contingent upon the type of tool associated with the group.

To select the specification to be edited, press the soft key for the number associated with that specification. This applies to the main editing screen for each type of tool.

If the specification requires the entry of multiple numeric characters, a screen will open that allows the user to use the soft keys associated with number buttons, then to enter the value and return to the main editing screen. If the characteristic is a choice from among limited options, a screen of options that can be scrolled through will be presented. As with the alphabetic and numeric characteristic entering screens, once the characteristic is selected the user can enter the choice and return to the main screen.

Read the FAQ on Head Length before proceeding.

Version 4.21 software on the Global 8 added the ability to change the head length on the 1100-Series Exacta 2 from the setting when it was calibrated. This accommodates the use of extensions on these tools, but requires tools with v5 or later firmware on the tool.

GROUP A
DIGITAL WRENCH
0. Max TRQ = 149.900
1. Min TRQ = 0.000
2. TBC = 0
3. TBB = 0
4. Batch = 1
5. Units = Ft.Lb
6. Mode = Peak
7. Direction = POS
8. Name = AUDIT
9. Store/Clear = 1
10. Head Len = 36.510
Tool Model EXS10 150
Selection =

0 1 2 3 4 5 6 7 8 9 ENTER ESCAPE

The definition for each of the characteristic names and abbreviations appears in the Nomenclature section at the front of this manual.

The Exacta 1100 series of tools is the easiest to program. The specifications to obtain the torque are known, and there are no experiments necessary to determine indirect control variable values.

The specifications for a group that uses an FM Switch Wrench (click wrench) require knowing the minimum and maximum times that the tool is in the "clicked" position for the correct torque to be transmitted to the fastener. This may require a small experiment.

```
┌───┐                                   ┌───┐
│ 0 │  GROUP A                          │ 5 │
└───┘  CLICK WRENCH SETTINGS            └───┘
┌───┐     1. Timer Min = 0.00           ┌───┐
│ 1 │     2. Timer Max = 0.50           │ 6 │
└───┘     3. TBC = 0                    └───┘
┌───┐     4. TBB = 0                    ┌───┐
│ 2 │     5. Batch = 1                  │ 7 │
└───┘     6. Name = AIRSNSR             └───┘
┌───┐                                   ┌───┐
│ 3 │                                   │ 8 │
└───┘     ┌───────┐  ┌────────┐         └───┘
┌───┐     │ ENTER │  │ ESCAPE │         ┌───┐
│ 4 │     └───────┘  └────────┘         │ 9 │
└───┘                                   └───┘
```

The simplest procedure for such an experiment is:

1. Preset the tool to the correct torque using a torque tester.

2. Use the torque wrench to properly tighten several fasteners on the joint on which it will be used. Measure the time the tool spends in the "clicked" position. Note: Many customers have found that a TMIN time of 0.07 seconds and a TMAX time of 0.25 seconds is a good start point for experimenting.

```
┌───┐  GROUP A                          ┌───┐
│ 0 │  TRANSDUCER SETTINGS              │ 5 │
└───┘     0. Tmr Min = 0.105            └───┘
┌───┐     1. Tmr Max = 3.105            ┌───┐
│ 1 │     2. Tmr Pls 0.000              │ 6 │
└───┘     3. Tmr Bmp = 0.000           └───┘
┌───┐     4. Tmr Clch = 0.050           ┌───┐
│ 2 │     5. Thr1 = 14.1                │ 7 │
└───┘     6. Thr2 = 17.2               └───┘
┌───┐     7. Thr3 = 61.8                ┌───┐
│ 3 │     8. Batch = 3                  │ 8 │
└───┘     9. Name = RTFRTBRK           └───┘
┌───┐     ┌───────┐  ┌────────┐         ┌───┐
│ 4 │     │ ENTER │  │ ESCAPE │         │ 9 │
└───┘     └───────┘  └────────┘         └───┘
```

3. Verify the torque on the fasteners with a digital, dial or beam-type torque wrench.

4. If the torque on the fasteners was not correct, adjust the times to result in a consistent and correct torque. If the results were correct, no further adjustment may be needed.

5. Use periodic torque audits to determine if the settings work in the production setting. Modify the times as needed to assure correct results on a continuing basis.

The PST 1000 also measures the process rather than the torque. The PST 1000 has been designed to aid the user in establishing the specifications in the group through an "AUTOCAL" function. This procedure assumes that you have set the tool to deliver the proper torque to the fastener. If the tool has not already been set to deliver the proper torque, do so before starting this procedure.

The easiest way to set up the specifications for the rundown profile is to apply the following procedure:

1. Go to the main screen on the Global 8 unit.
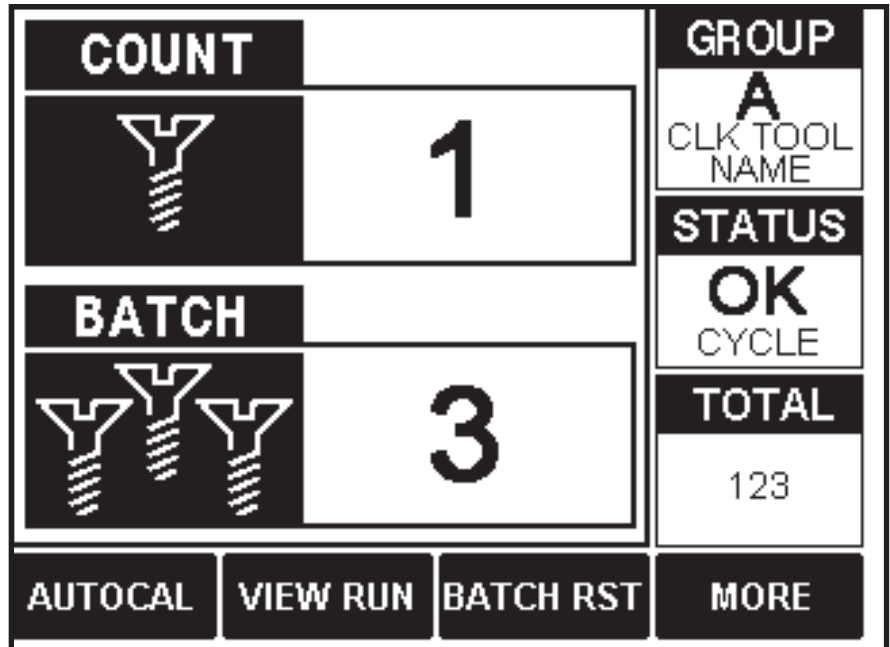
2. Press the soft key for the AUTOCAL button.

3. A new screen will be displayed. The display will prompt you to make sure the power tool is off (not running) and to press the softkey for the ENTER button. This sets up a background threshold for measurement.
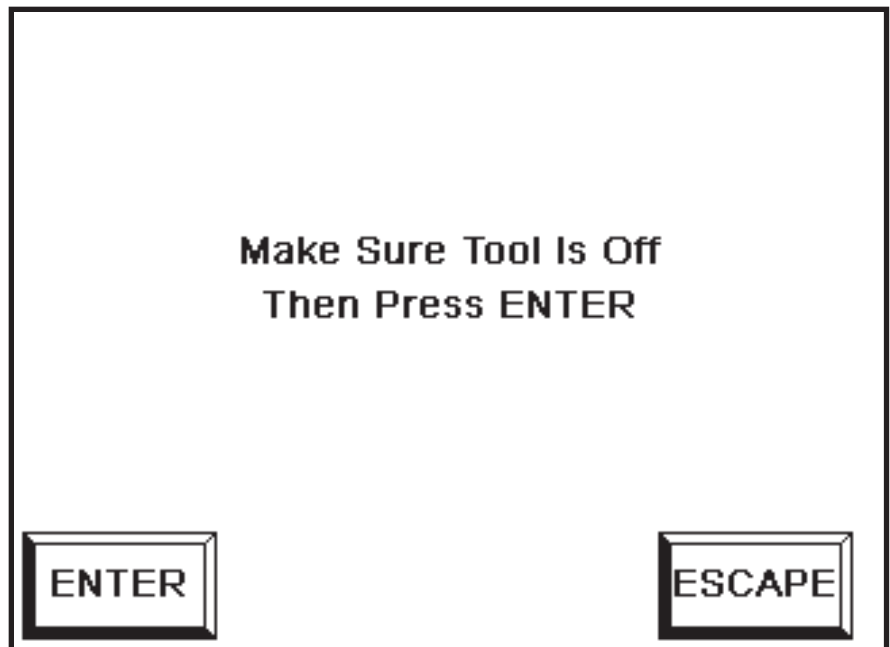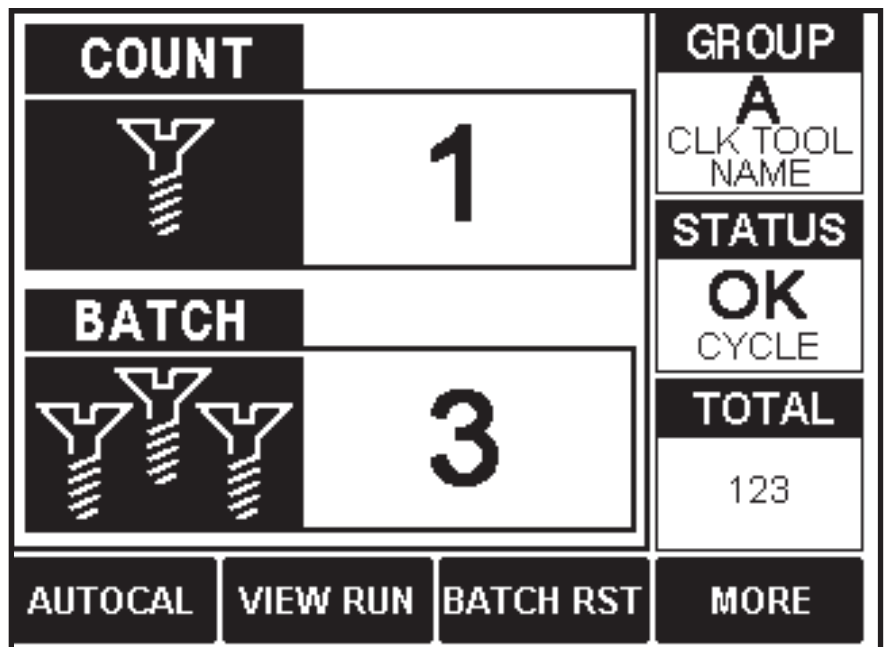
4. A new screen prompting you to run (tighten) the fastener will be displayed. Use the pneumatic tool to tighten the fastener. Once the tightening has been completed, press the soft key for the ENTER button. The PST 1000 will automatically create and store the specifications pertinent to the tool and fastener combination.

Run Fastener
Then Press ENTER

ENTER   ESCAPE
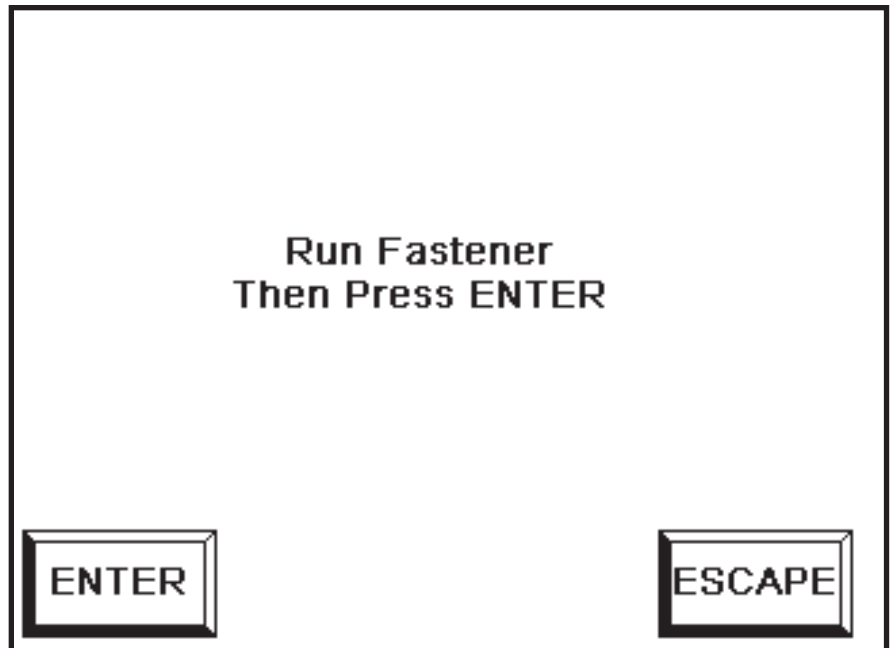
At this point specifications for radio communications and torque control have been created for each combination of tool and fastener. The next part of the programming process is to set the batch count (number of fasteners) for each group.

To enter the batch count:
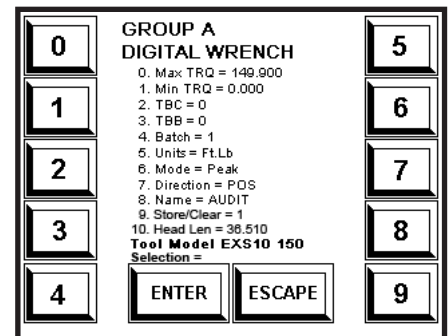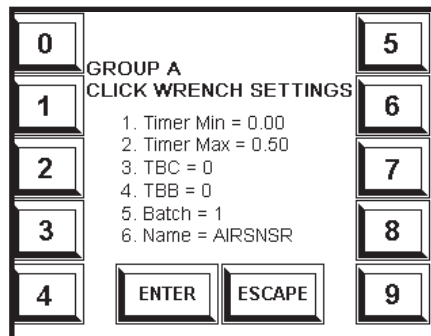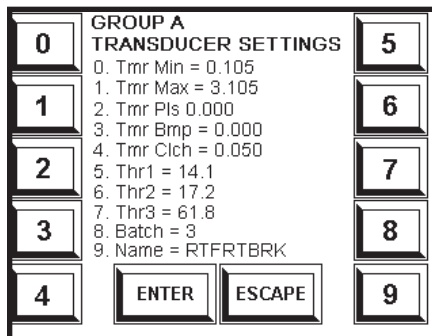1. Go to the main screen.

COUNT   1   GROUP
                          A
                          CLK TOOL
                          NAME

                          STATUS
BATCH   3   OK
                          CYCLE

                          TOTAL
                          123

AUTOCAL | VIEW RUN | BATCH RST | MORE

2. Press the soft key for the MORE button.

3. Press the soft key for the EDIT GROUP button.

EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN / RETURN
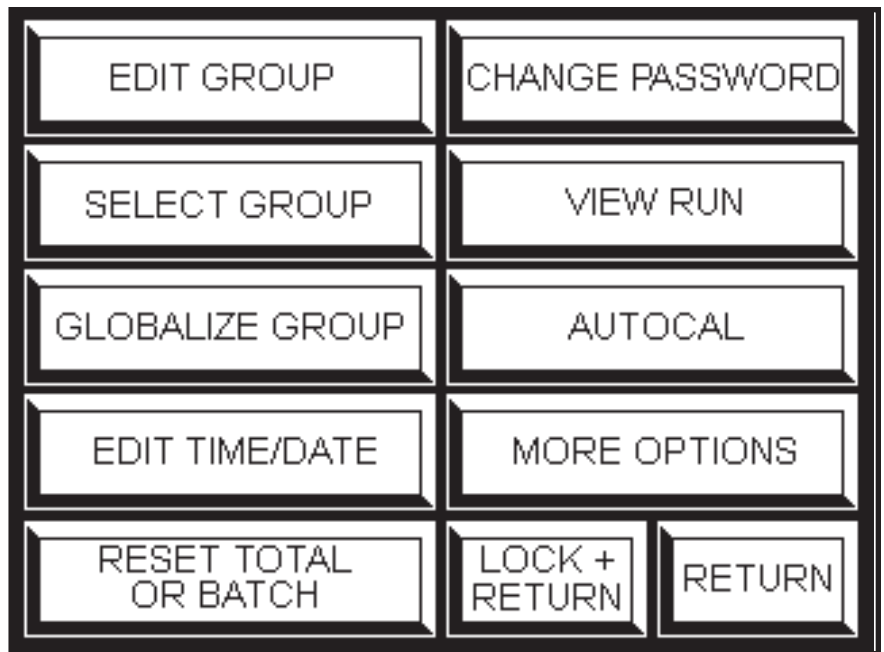
4. The window that will be displayed depends upon the tool type for that group.
   - For pneumatic tools with PST 1000, press the soft key for the 8 button.
   - For FM Switch Wrenches, press the soft key for the 5 button.
   - For 1100-Series Exacta 2 digital tools, press the soft key for the 4 button.

GROUP A
TRANSDUCER SETTINGS
0. Tmr Min = 0.105
1. Tmr Max = 3.105
2. Tmr Pls 0.000
3. Tmr Bmp = 0.000
4. Tmr Clch = 0.050
5. Thr1 = 14.1
6. Thr2 = 17.2
7. Thr3 = 61.8
8. Batch = 3
9. Name = RTFRTBRK
ENTER   ESCAPE

GROUP A
CLICK WRENCH SETTINGS
1. Timer Min = 0.00
2. Timer Max = 0.50
3. TBC = 0
4. TBB = 0
5. Batch = 1
6. Name = AIRSNSR
ENTER   ESCAPE

GROUP A
DIGITAL WRENCH
0. Max TRQ = 149.900
1. Min TRQ = 0.000
2. TBC = 0
3. TBB = 0
4. Batch = 1
5. Units = Ft.Lb
6. Mode = Peak
7. Direction = POS
8. Name = AUDIT
9. Store/Clear = 1
10. Head Len = 36.510
Tool Model EXS10 150
Selection =
ENTER   ESCAPE

5. A screen will display that shows the current (old) batch count and prompts the user to type in a new batch count. Use the soft keys associated with the numbers displayed on the screen to type in the new batch count. If the wrong new batch count is typed incorrectly, use the soft key for the ESCAPE button to return to the prior screen, then start over. If the new batch count is typed in properly, use the soft key for the ENTER button to store the new count and return to the Group Edit screen.

The basic programming for the Global 8 unit and tool(s) it is to work with is now complete. The system may be used with no further programming.

Those features which may be programmed to facilitate integration, convenience or productivity enhancements follow.
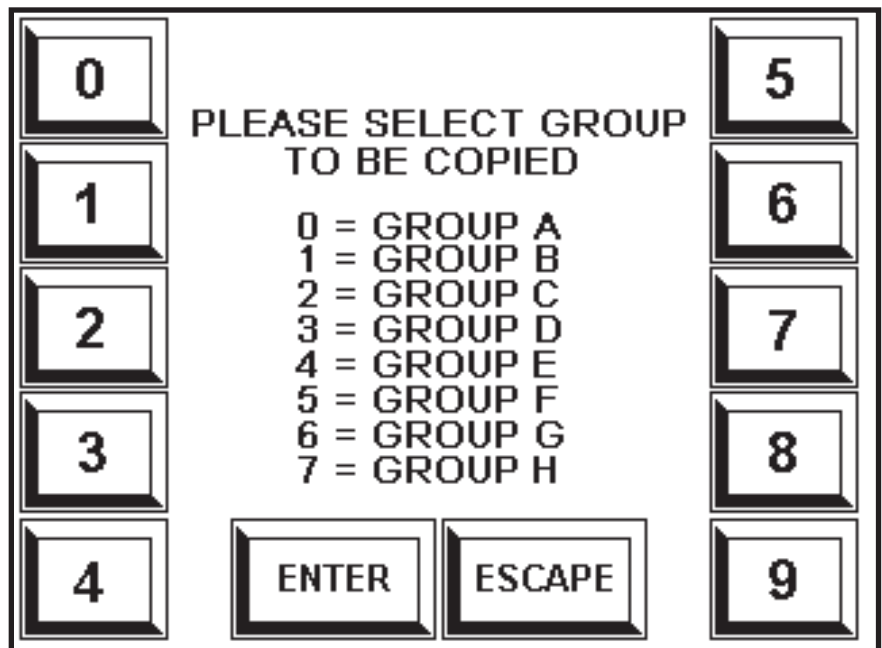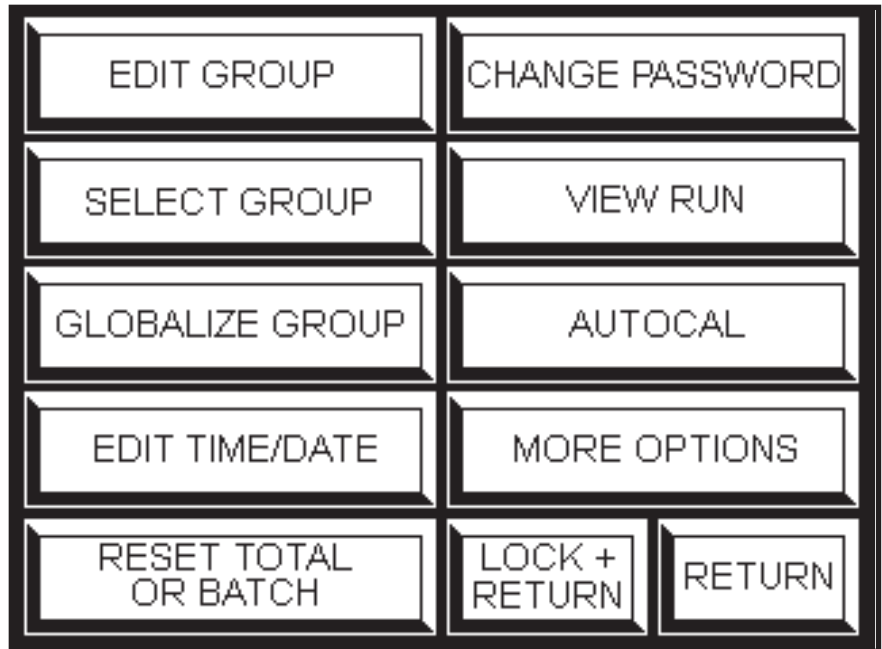
GLOBALIZE GROUP
This function simplifies programming when one tool is to be used to tighten multiple batches of fasteners having the same torque requirement but different batch counts. The user can learn the tool into a single specification group, edit the specifications for the group, then copy the information to the other groups on the Global 8. The copying of the information to all the other groups is to "Globalize" the group.

To change the batch count for the varying groups the user need only edit the batch count for each group instead of editing all of the specifications individually.

To globalize a group:

1. Go to the main menu.

2. Press the soft key for the GLOBALIZE GROUP button.

3. Select the group to be copied by pressing the soft key associated with the group.

4. The specifications for the selected group will immediately be copied to the other groups. There will be a short pause while the information is stored, after which the user will be returned to the main screen.
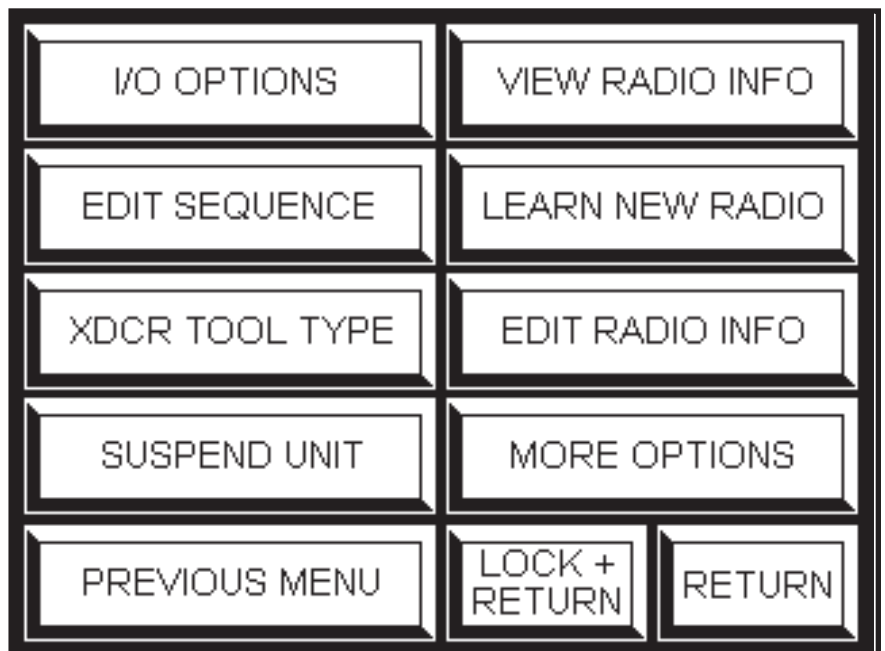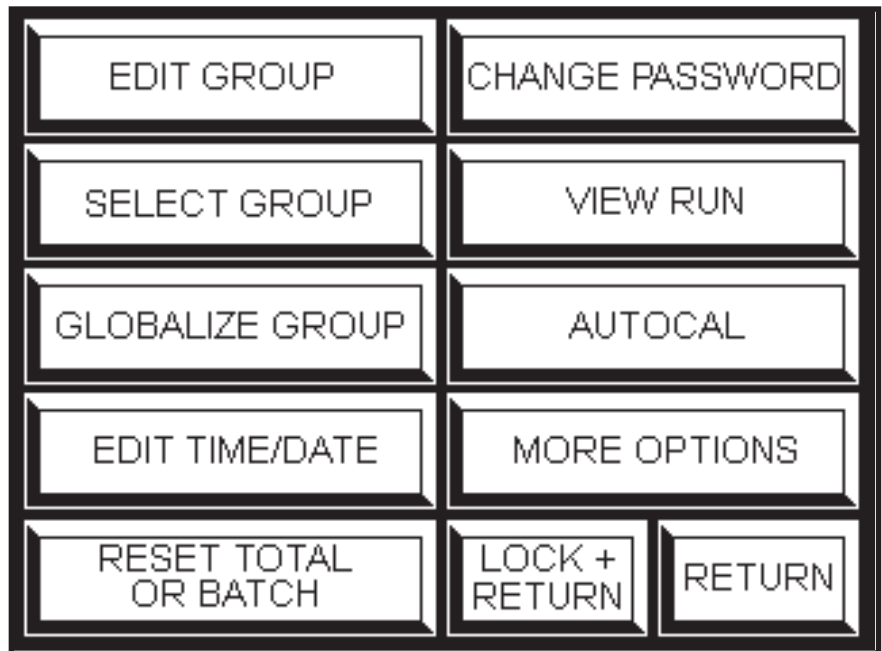
EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN / RETURN

```
0                              5

    PLEASE SELECT GROUP
1        TO BE COPIED          6

      0 = GROUP A
      1 = GROUP B
2     2 = GROUP C              7
      3 = GROUP D
      4 = GROUP E
      5 = GROUP F
3     6 = GROUP G              8
      7 = GROUP H

4     ENTER    ESCAPE         9
```

SEQUENCING

The Global 8 can be set up so that it automatically changes from group to group as batches are completed. This is called sequencing. If the sequencing is off (not activated) the Global 8 will work from one group until the user changes the group through either the user interface, the input/output controls or via Ethernet commands (Ethernet-ACOP and Ethernet-Toolsnet models only).

If the sequencing is on (activated), the unit will start with group A. When the batch of fasteners in group A is completed, the unit will automatically change to the next group - group B. This completion and change cycle will continue until all of the groups programmed into the unit have been cycled through. When the last programmed group has been completed, the unit will return to group A and repeat this default sequence.

The default sequence can be altered manually during use if the user has the password. Once a group has been completed, and before the next group is started, the user can change the sequence. To change the sequence:

1. Go to the main menu screen.

2. Press the soft key for the MORE OPTIONS button.

EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN / RETURN

3. At the second menu screen, press the soft key for the EDIT SEQUENCE button.

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN / RETURN

4. At this screen press the soft key for the number associated with the new sequence to be applied. The new sequence will be stored and the user will be returned to the main screen.

```
┌─────┐                                          ┌─────┐
│  0  │   SEQUENCE = A thru B                    │  5  │
└─────┘   SELECT NEW SEQUENCE                    └─────┘
┌─────┐                                          ┌─────┐
│  1  │   0 = SEQUENCE OFF                       │  6  │
└─────┘   1 = SEQUENCE A to B                    └─────┘
          2 = SEQUENCE A to C
┌─────┐   3 = SEQUENCE A to D                    ┌─────┐
│  2  │   4 = SEQUENCE A to E                    │  7  │
└─────┘   5 = SEQUENCE A to F                    └─────┘
          6 = SEQUENCE A to G
┌─────┐   7 = SEQUENCE A to H                    ┌─────┐
│  3  │                                          │  8  │
└─────┘                                          └─────┘
┌─────┐        ┌──────────────┐                  ┌─────┐
│  4  │        │   ESCAPE     │                  │  9  │
└─────┘        └──────────────┘                  └─────┘
```

Group selection may also be controlled through the input/output system. This method uses three of the input/output connections to select the group on the basis of conditions set by a programmable logic controller responding to other inputs. See the section on the input/output system.

The sequence can also be controlled via protocol commands on Ethernet equipped models.

SUSPEND

A time may arise when the tools need to be operated in a repair, rework, recalibration or maintenance situation and it is desired that the controls not be operated during that use of the tool. The suspend function is included in the Global 8 to accommodate such situations by ignoring cycles, batches and reject signals from the tool.

To suspend the receipt and counting of tool operations:

1. At the primary operating display screen, press the soft key for the MORE button.

```
┌─────────────────────────────────────┬──────────┐
│  COUNT                              │  GROUP   │
│                                     │    A     │
│    Y              1                 │ CLK TOOL │
│                                     │  NAME    │
│                                     ├──────────┤
├─────────────────────────────────────┤  STATUS  │
│  BATCH                              │    OK    │
│                                     │  CYCLE   │
│   Y Y Y          3                  ├──────────┤
│                                     │  TOTAL   │
│                                     │   123    │
├──────────┬──────────┬──────────────┼──────────┤
│ AUTOCAL  │ VIEW RUN │ BATCH RST    │   MORE    │
└──────────┴──────────┴──────────────┴──────────┘
```

2. At the first menu screen press the soft key for the MORE OPTIONS button.

EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN / RETURN

3. At the second menu screen press the soft key for the SUSPEND UNIT button.

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN / RETURN

4. A new screen will appear on the display. This screen gives the user the option of leaving the screen without suspending the receipt of tool transmissions or of entering a suspended state. To suspend receipt of tool transmissions, press the soft key associated with the ENTER button.

```
Press ENTER button
   To Suspend Unit
Press ESCAPE button
     To EXIT




  ┌────────┐ ┌────────┐
  │ ENTER  │ │ ESCAPE │
  └────────┘ └────────┘
```
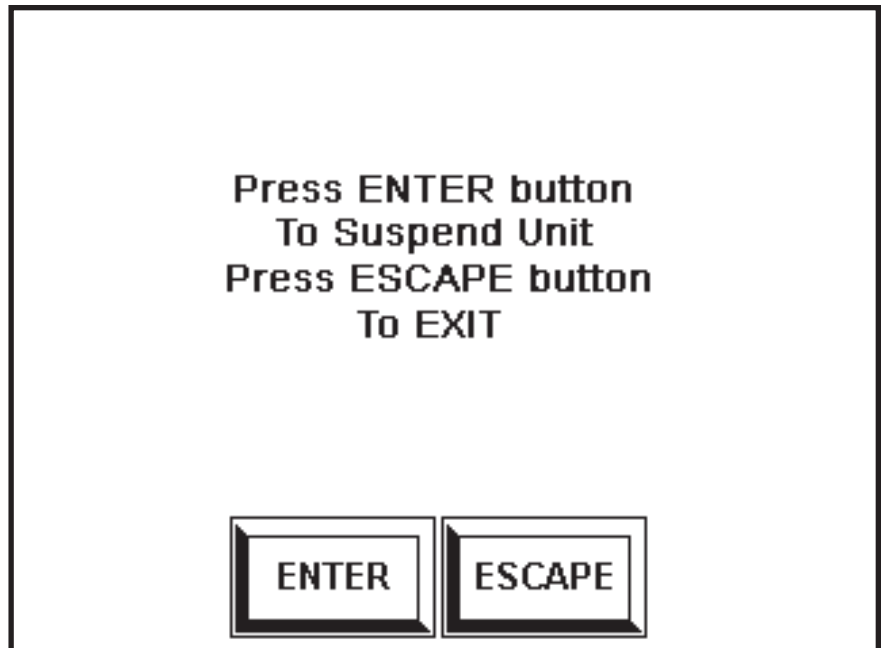
5. When the unit enters the suspended state, the user will be notified by the appearance of this screen. To exit from the suspended state when it is time to resume normal operation, press any soft key.

```
    Unit is Currently
        Suspended









  Press Any Key To Resume
```
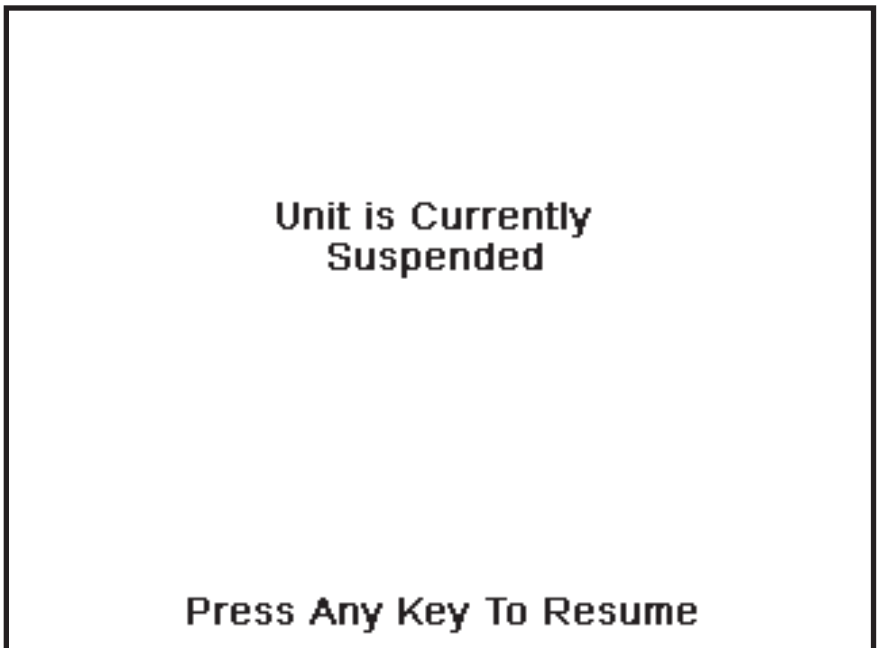
TRANSDUCER MODES
(Applicable to PST 1000 only)
The PST 1000 has several different modes for monitoring pneumatic tools. Each of these modes looks for different patterns and characteristics of the pneumatic signature of the tool.

When the Autocal feature of the PST 1000 is used, a plot of the pneumatic signature of the tool is made. The PST 1000 analyzes the plot and assigns a specific mode for monitoring it based on the characteristics of the plot and how the plot compares to the known performance characteristics of the major pneumatic tool types. Algorithms for these tool types are stored in memory, and form the basis for comparison. The algorithm used is the "mode" of operation for the PST 1000.

Of the seven tool type algorithms stored in memory, the vast majority of tools will use the one for Pulse/Direct tools. This is the one that has proven to be the most broadly applicable and effective in assuring that the known comparison tightening, when replicated by the tool and operator, is evaluated as an "Accept" or conforming tightening.

There are a total of seven modes available, and the mode can be selected by the user if the user finds that the mode selected by the PST 1000 does not provide the replication sought.

The process for changing the mode is:

1. At the main operating screen of the display, press the soft key for the MORE button.

2. The first menu screen will appear on the display. Press the soft key for the MORE OPTIONS button.

EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN RETURN

3. The second menu screen will appear on the display. Press the soft key for the XDCR TOOL TYPE button.

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN RETURN

4. The display will change to show the current mode used by the PST 1000 assigned to the active group. To change the mode of operation, press the soft key for the ENTER button on the screen. If no change is desired, press the soft key for the ESCAPE button.

Current Tool Type
Pulse /Direct
Press ENTER to Program

ENTER   ESCAPE
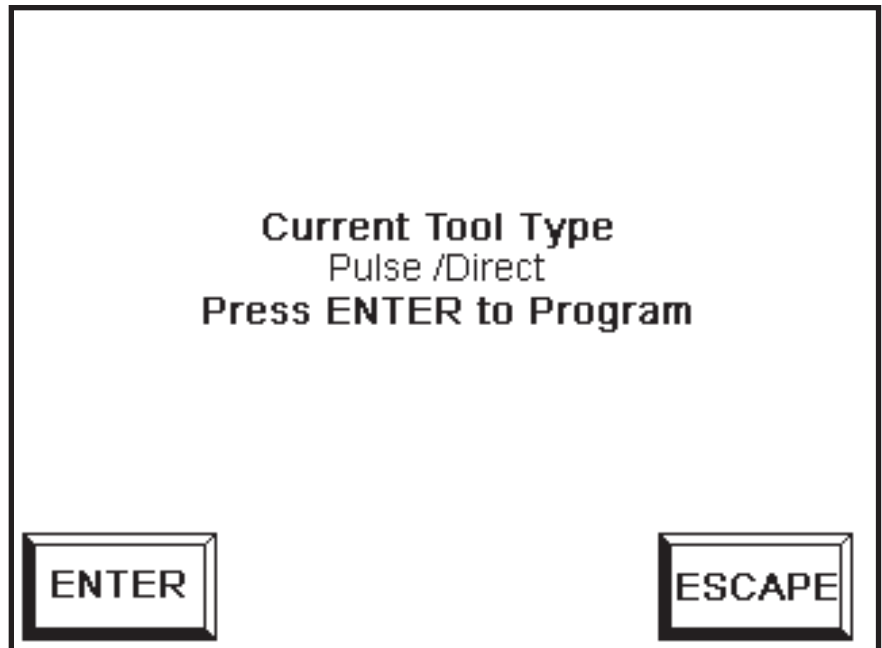
5. The next screen to appear in the mode selection process is the transducer modes screen shown here. To change the mode of operation for the PST 1000, find the tool type to be used from among the list on the screen. Use the soft key for the number associated with the desired tool type to select the mode of operation for the PST 1000. The ENTER and ESCAPE buttons will cause the program to leave this menu without changing the current setting for the PST 1000 mode of operation. Press the soft key for either button to execute this departure.

0   Transducer Modes   5
             1. Pulse
1   2. Pulse/Direct   6
             3. Push To Start
2   4. Governed Pulse   7
             5. Governed Direct
             6. Governed Pulse II
3   7. Direct Drive II   8

4   ENTER   ESCAPE   9
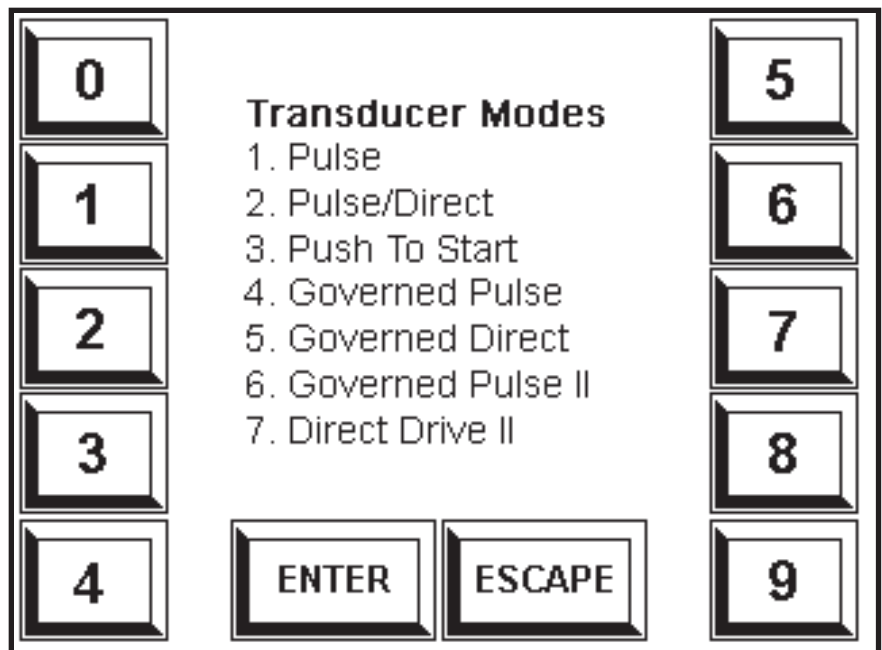
TRANSDUCER INFORMATION (PST 1000 only)
The transducer information function displays information about the PST 1000 that is associated with the active group. The available information can be used as part of a diagnostic process in the event there is a question as to the performance of the unit.

To obtain the transducer information:

1. From the main operating screen, press the soft key associated with the MORE OPTIONS button.

2. The first menu screen will appear on the display. Press the soft key for the MORE OPTIONS button.

3. The second menu screen will appear on the display. Press the soft key associated with the MORE OPTIONS button.

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN	RETURN

4. The third menu screen will appear on the display. Press the soft key associated with the TRANSDUCER INFO button.

TRANSDUCER INFO	
VERSION INFO	
I/O CONNECTOR	
PREVIOUS MENU	LOCK + RETURN	RETURN

5. The Transducer Information screen will appear on the display. The firmware version appears near the top. Below that will be the current voltage and air pressure information. These two items update frequently from the PST 1000 during the information display. To return to the menu, press any soft key.

```
Transducer Firmware Version
            1.1

  Transducer Voltage = 0.63
  Transducer Pressure = 9.6 PSI




    Press Any Key To Return
```
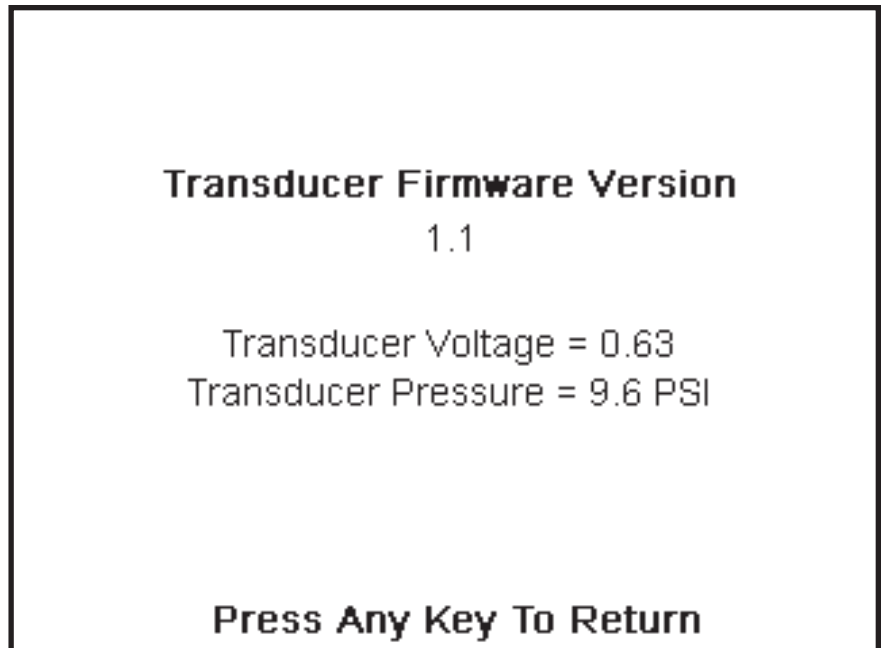
VERSION INFORMATION
In the event that there is a need to know the version of firmware used by the PST 1000 associated with a group, follow the first three steps in the Transducer information procedure. For the fourth step, press the soft key for the VERSION INFO button. The firmware version on the active PST 1000 will be displayed. To return to the menu from that screen, press any soft key.

VIEW RADIO

The View Radio information screen is a summary report that lists the groups, the radios learned into each group, what channel each radio is operating on, and the tool type being used by each group, and the name that was given to each tool. This information is useful when investigating system performance.

To view this information:

1. At the main operating screen, press the soft key for the MORE button.

COUNT		GROUP
⏚	1	A CLK TOOL NAME
		STATUS OK CYCLE
BATCH	3	TOTAL 123
AUTOCAL	VIEW RUN	BATCH RST	MORE

2. At the first menu screen, press the soft key for the MORE OPTIONS button.

EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN / RETURN

3. At the second menu screen press the soft key for the VIEW RADIO INFO button.

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN	RETURN
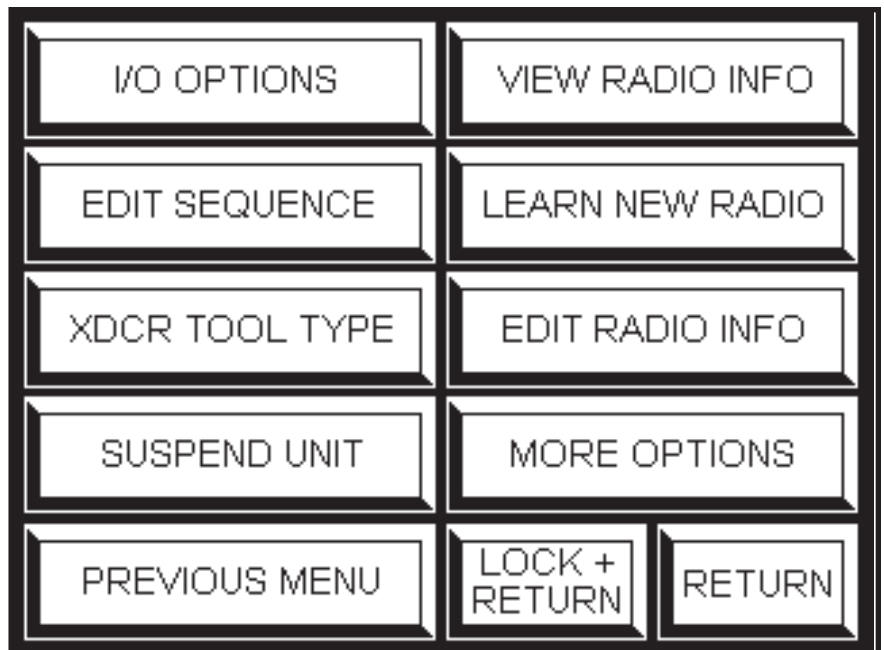
4. The tabulated information will appear in the new screen. Press any soft key to exit this function.

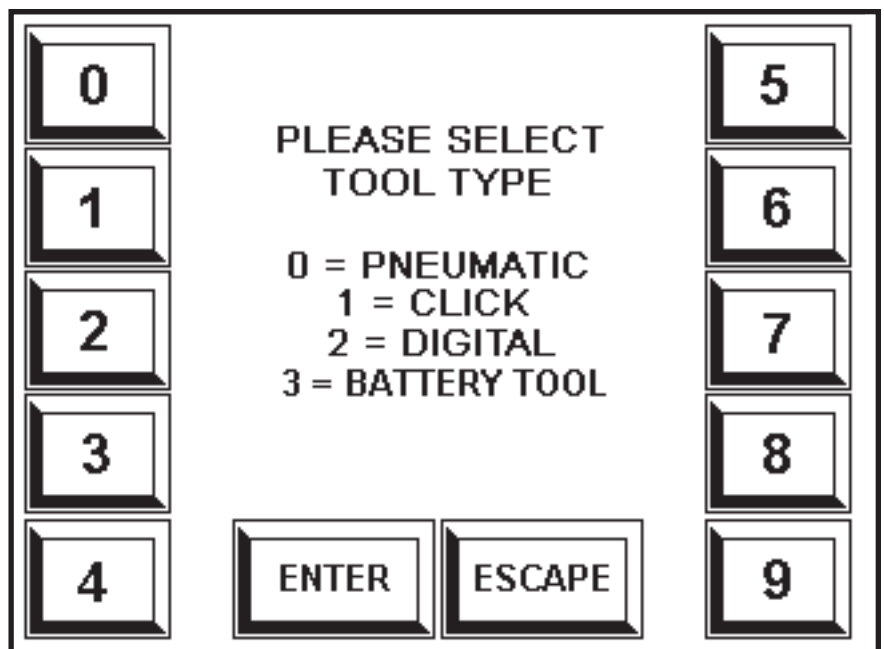| GROUP	RFID	CHNL	TYPE	NAME
A	07CB	1	AIR	PULSE1
B	CA3A	2	CLK	CLICK1
C	7EF9	1	DIG	EXACTA1
D	8675	1	AIR	PULSE2
E	0309	5	CLK	CLICK2
F	ABCD	8	DIG	EXACTA2
G	1245	3	AIR	PULSE3
H	9F1C	1	CLK	CLICK3

Press Any Key To Return

EDIT RADIO

This function is useful for investigating problems associated with radio communications. It permits the user to change information pertinent to the radio, and to alter the communication scheme when desired. It will not add a radio that has not been associated with or learned into the Global 8 unit, but it does permit one that has been learned into one group to be associated with a second group if desired. It also permits the "delisting" of a radio from those active on the unit by resetting the radio ID for that tool to the factory default of "0000".

1. At the main operating screen, press the soft key for the MORE button.

2. At the first menu screen, press the soft key for the MORE OPTIONS button.

3. At the second menu screen, press the soft key for EDIT RADIO INFO. It is often helpful to use the "VIEW RADIO INFO" before editing. The View Radio Info function displays the information for each radio currently associated with the Global 8 unit. The View Radio Info function does not permit editing, it simply displays the information and permits an immediate return to this screen.

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN	RETURN
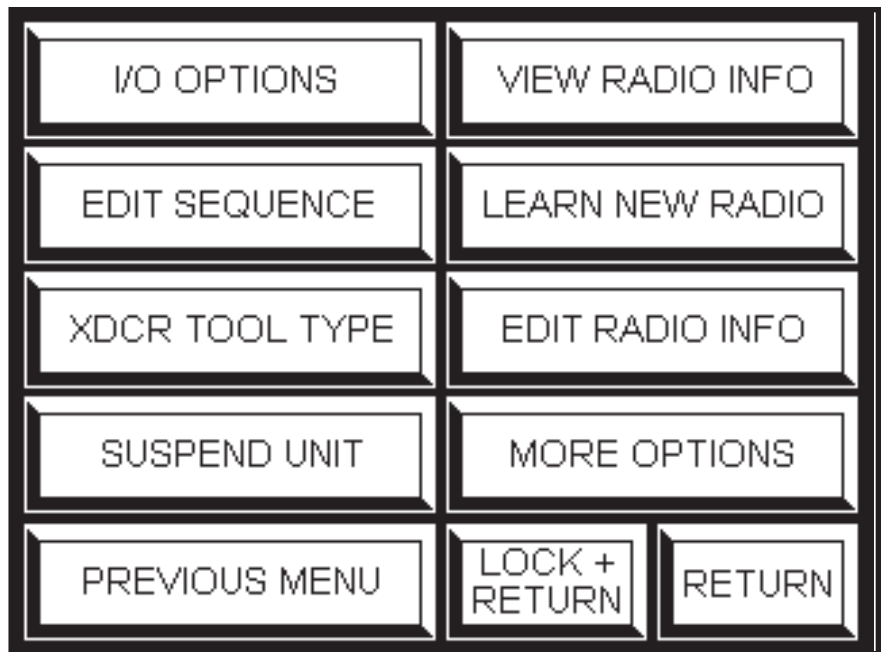
4. The tool type selection screen will appear on the display. At this screen the type of tool is displayed and a number is associated with the tool type. Press the soft key for the number associated with the tool type that has the radio you wish to edit.

PLEASE SELECT TOOL TYPE

0 = PNEUMATIC
1 = CLICK
2 = DIGITAL
3 = BATTERY TOOL

0   5
1   6
2   7
3   8
4   ENTER   ESCAPE   9

5. At the group screen, the group that uses this tool must be selected. There is a number associated with the each group. Press the soft key for the number of the group that has the tool to be edited.

```
 0                 PLEASE SELECT ACTIVE        5
                   GROUP FOR THIS TOOL
 1                    0 = GROUP A               6
                      1 = GROUP B
 2                    2 = GROUP C               7
                      3 = GROUP D
                      4 = GROUP E
                      5 = GROUP F
 3                    6 = GROUP G               8
                      7 = GROUP H
 4              [ENTER]   [ESCAPE]              9
```

6. At the radio channel screen you can change the radio channel the Global 8 and the tool radio use to communicate. Press the soft key or keys for the number or numbers of the channel the system should use. When the number is displayed, press the soft key for the ENTER button to make the change.

```
 0              USE KEYPAD TO ENTER             5
                  A RADIO CHANNEL
 1                FROM 1 TO 12                   6

 2                CHANNEL =                      7

 3                                               8

 4              [ENTER]   [ESCAPE]               9
```

7. At the Name screen the name of the tool can be changed if so desired.

```
A B C D                          U V W X

E F G H                          Y Z

I J K L                          0 1 2 3

M N O P                          4 5 6 7

Q R S T                          8 9

   ADD CHAR   SAVE    ESCAPE   DEL CHAR
```

VIEW RUN (PST 1000)

The PST 1000 captures analog data on the air pressure from the tool during the fastener tightening process. This information may be viewed as a graph when desired. The information available is that from the PST 1000 associated with the current group. Only the most recent information is available; the PST 1000 does not store the information for multiple fastenings.

1. From the main operating screen for the group on which the information is desired, press the soft key for the MORE button.

```
COUNT                          GROUP
                                  A
         Y         1          CLK TOOL
                               NAME
                               STATUS
BATCH                           OK
                               CYCLE
       YYY        3            TOTAL
                                123

AUTOCAL | VIEW RUN | BATCH RST | MORE
```

2. At the first menu screen, press the soft key for the VIEW RUN button.

The Global 8 will send an inquiry to the PST 1000 and the PST 1000 will send the analog data to the Global 8 unit. During the transfer of data, a message will appear on the display showing the progress of the data transfer.

Once the transfer is complete, the data will be graphed on the screen. The thresholds and timers for the current group will be drawn, permitting comparison of performance data to the specifications.
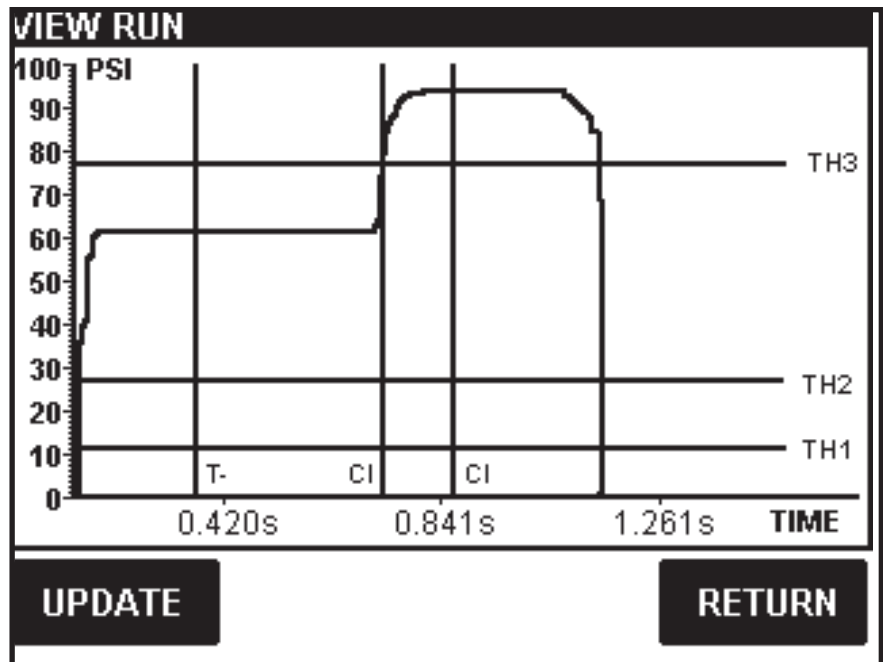
If the soft key for the UPDATE function is pressed, the information will again be uploaded from the PST 1000 and displayed.

To exit this function, press the soft key for the RETURN button.

RESET BATCH/TOTAL
This function permits resetting the batch count, the total count of batches, or both counts through the user interface. The batch count may also be reset through the input/output system.

1. At the main operating screen, press the soft key for the MORE function.

2. At the first menu display screen,
   press the soft key for the
   RESET TOTAL OR BATCH
   button.

| EDIT GROUP	CHANGE PASSWORD
SELECT GROUP	VIEW RUN
GLOBALIZE GROUP	AUTOCAL
EDIT TIME/DATE	MORE OPTIONS
RESET TOTAL OR BATCH	LOCK + RETURN / RETURN
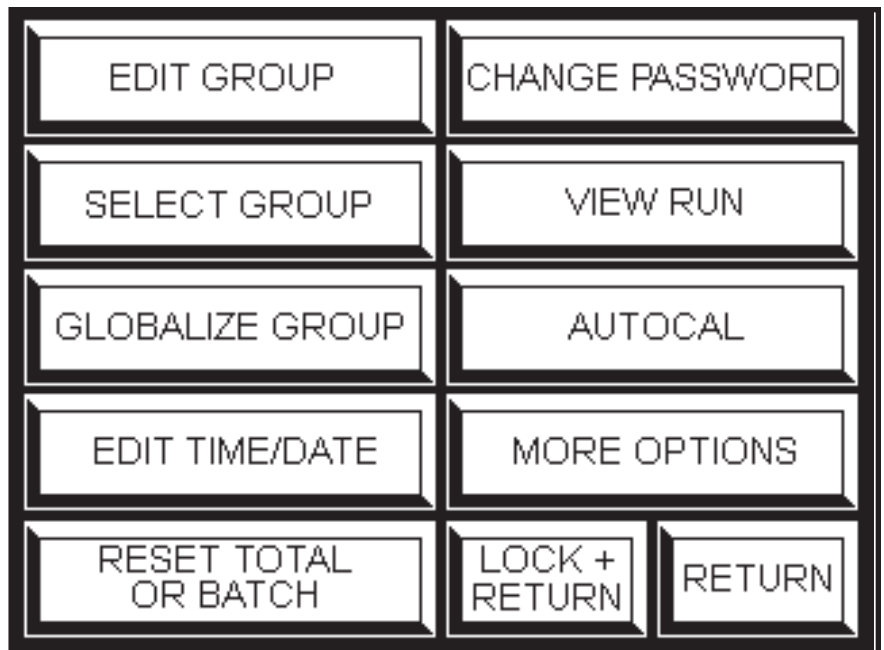
3. At the reset selection screen,
   press the soft key for the value or
   values you wish to reset.

If RESET BATCH is selected, the
batch count is returned to zero, and
the cycle, batch and or reject outputs
are returned to their programmed
state.

If RESET TOTAL is selected, the total
value associated with this group
(number of batches processed) is
reset to zero.

If RESET BOTH is selected, both the
batch and total values are set to
zero, and the cycle, batch and reject
outputs are returned to their
programmed state.

Select Value To Reset

RESET BATCH	RESET TOTAL	RESET BOTH	ESCAPE

Selecting the ESCAPE function returns the user to the operating menu without resetting any of the
values.
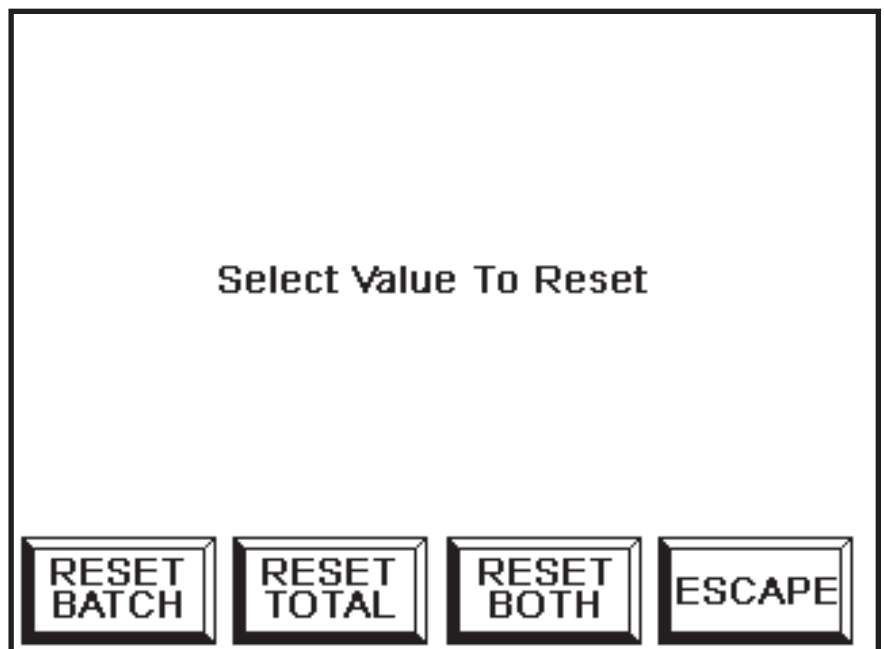
CHANGING THE PASSWORD

The Global 8 is shipped from the factory with a default password of "0104". The password can be changed to any four-digit number.

To change the password:

1. At the main operating screen, press the soft key for the MORE button.

2. At the first menu screen press the soft key for the "CHANGE PASSWORD" button.

3. At the new password screen, use the soft keys for the numbers to create a new password. Once the four numbers have been typed, press the soft key for the ENTER button to make the new password active. To exit without changing the password, press the soft key for the ESCAPE button.

```
 ┌───┐                    ┌───┐
 │ 0 │                    │ 5 │
 └───┘                    └───┘
 ┌───┐                    ┌───┐
 │ 1 │  ENTER NEW PASSWORD│ 6 │
 └───┘                    └───┘
 ┌───┐      *  *  *  *    ┌───┐
 │ 2 │                    │ 7 │
 └───┘                    └───┘
 ┌───┐                    ┌───┐
 │ 3 │                    │ 8 │
 └───┘                    └───┘
 ┌───┐  ┌──────┐┌──────┐  ┌───┐
 │ 4 │  │ENTER ││ESCAPE│  │ 9 │
 └───┘  └──────┘└──────┘  └───┘
```

24VDC Input/Output Communications

The Global 8 provides a 10-pin receptacle for accessing I/O and relays for use with 24VDC control systems and components. The system permits selecting the groups in the Global 8 through inputs as well as using the Global 8 outputs to trigger external events.

The contacts are supplied in a non-energized state. Only 24 VDC systems should be used with the Global 8; it is not designed to handle higher voltages.

The Input/Output connector pin functions are as shown in the diagram to the right. This diagram is also accessible through the menu system via the following procedure:
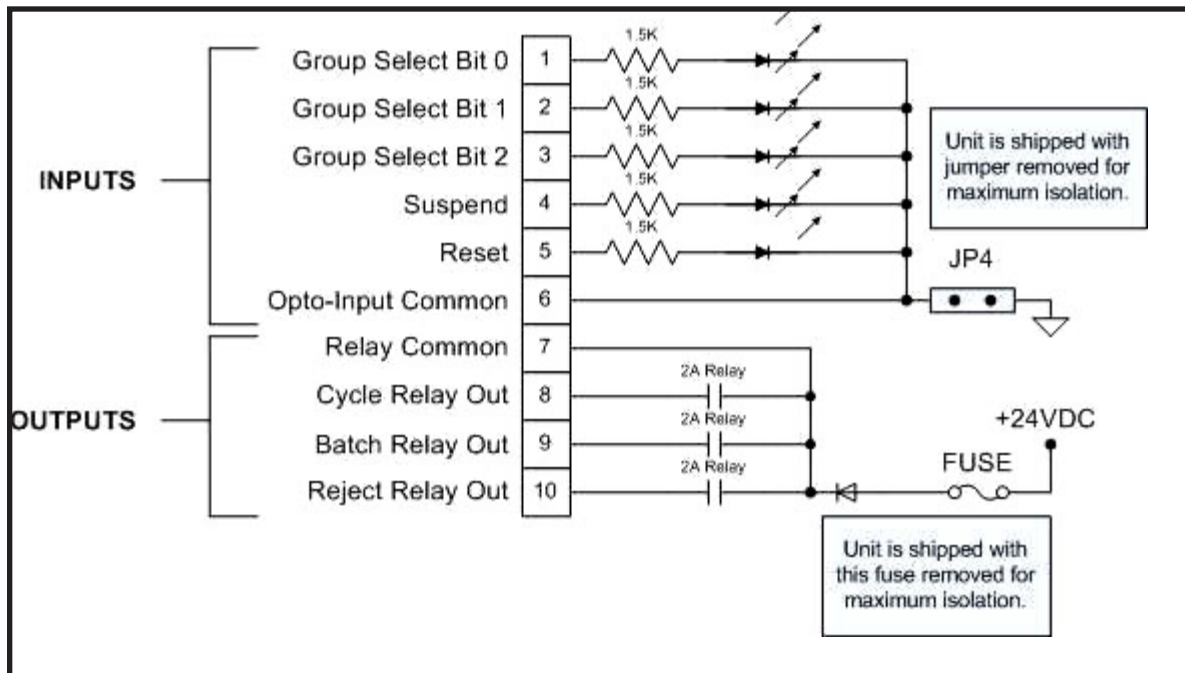
1. At the main operating screen, press the soft key for the MORE button.

2. At the first menu screen, press the soft key for the MORE OPTIONS button.

3. At the second menu screen, press the soft key for the MORE OPTIONS button.

4. At the third menu screen, press the soft key for the I/O CONNECTOR button. This will display the image above. Press any soft key to exit this screen. Note: A convenience feature has been added to this section. Pressing the More Options button again will display a color-coded wiring diagram for the optional mating S/R cable. (S/R P/N 10474)

I/O CONNECTOR PINOUT

1. Group Select Bit 0 Input
2. Group Select Bit 1 Input
3. Group Select Bit 2 Input
4. Suspend Input
5. Reset Input
6. Opto Common/Ground
7. Relay Voltage In/24VDC Out
8. Cycle Accept Relay
9. Batch Accept Relay
10. Reject Relay

The pin numbers are also on the connector alongside the hole for each pin. The connector is a Hirose RM15TRD-10S(71) or equivalent. The mating connector for the installed receptacle is a Hirose RM-15TPD-10P or equivalent.
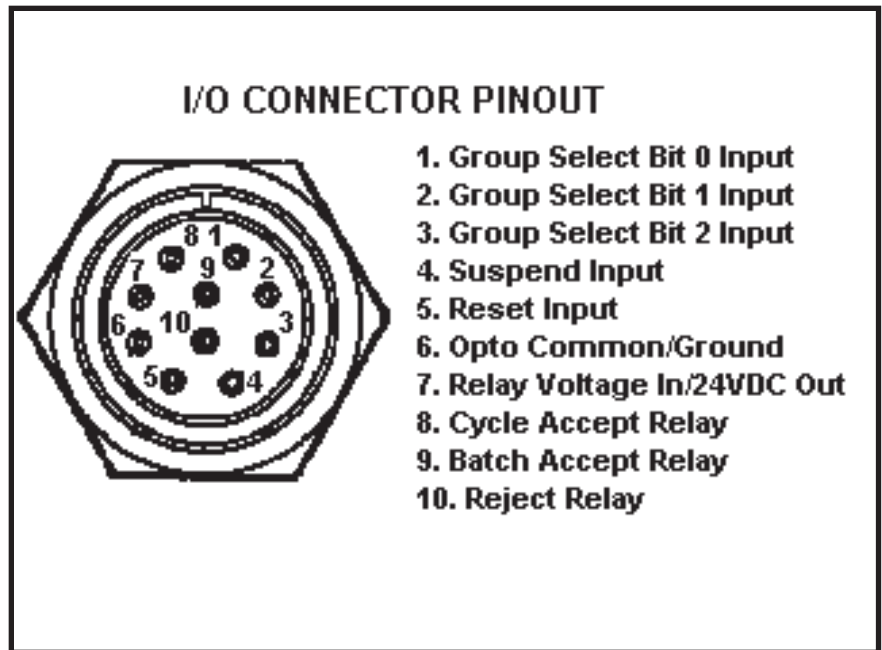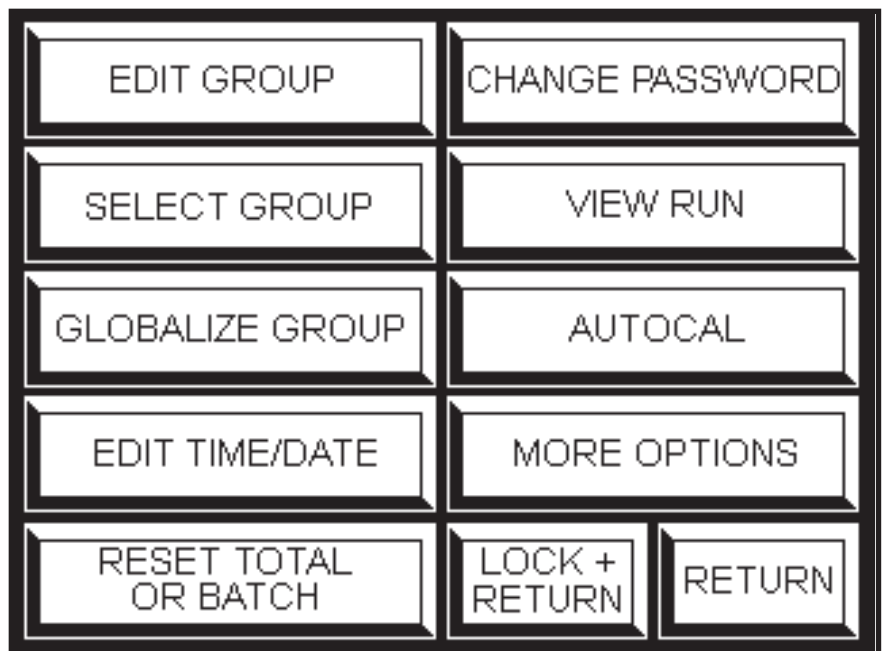
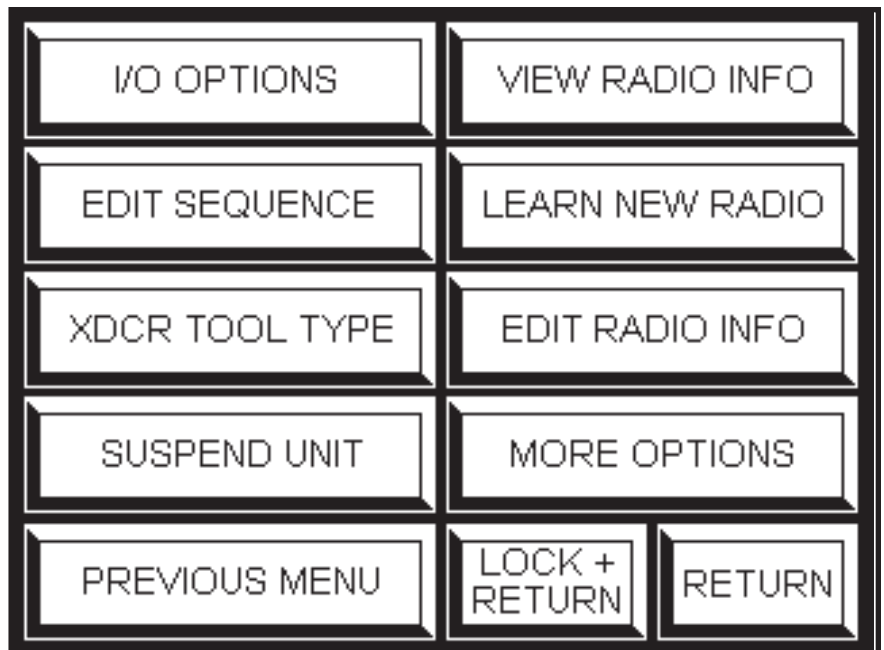The pins are connected as shown in the circuit diagram below.

The settings for the Input/Output system are programmed through the user interface. To access the settings for the various options use the following procedure:

1. From the main screen, press the soft key for the MORE button.

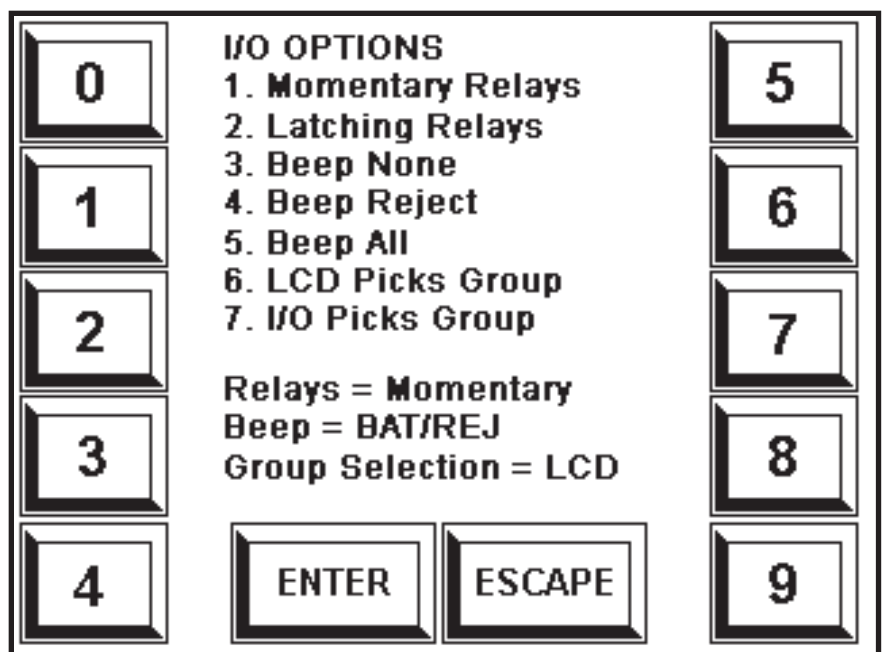2. At the first menu screen, press the soft key for the MORE OPTIONS button.

3. At the second menu screen, press the soft key for the I/O OPTIONS button.

I/O OPTIONS	VIEW RADIO INFO
EDIT SEQUENCE	LEARN NEW RADIO
XDCR TOOL TYPE	EDIT RADIO INFO
SUSPEND UNIT	MORE OPTIONS
PREVIOUS MENU	LOCK + RETURN	RETURN

4. The I/O Options screen will open. Each option applicable to the Input/Output system has a number associated with the option. There is also a set of number buttons for use in selecting and applying the associated option.

   At the bottom, the screen shows the current settings for the relays, the beep, and how the active group is selected.

I/O OPTIONS
1. Momentary Relays
2. Latching Relays
3. Beep None
4. Beep Reject
5. Beep All
6. LCD Picks Group
7. I/O Picks Group

Relays = Momentary
Beep = BAT/REJ
Group Selection = LCD

| 0 | 1 | 2 | 3 | 4 | ENTER | ESCAPE | 5 | 6 | 7 | 8 | 9 |

The relays inside the Global 8 can be set to be either momentary or latching. If set to momentary, the relays will be closed for 200ms every time an event (completion of a cycle, completion of a batch, or the occurrence of a reject) occurs.

The relays can also be set to latching. When set to latch, they will remain energized until the next event occurs or until a batch reset command is issued.

The beeper can be turned off, set to activate for rejected cycles only, or set to activate on all events. The selection is made by choosing the applicable associated number.

Groups (specification sets) can be selected through the user interface or through the input/output system.

When the selections have been made, press the soft key for the ENTER button to save and apply the selections. Press the soft key for the ESCAPE button to exit input/output system programming without saving new selections or changes.

To use the input/output system to set the active group, use the Group Select Chart below to set the active group.

| Group	Group 0 Input	Group 1 Input	Group 2 Input
A	0VDC	0VDC	0VDC
B	0VDC	0VDC	24VDC
C	0VDC	24VDC	0VDC
D	0VDC	24VDC	24VDC
E	24VDC	0VDC	0VDC
F	24VDC	0VDC	24VDC
G	24VDC	24VDC	0VDC
H	24VDC	24VDC	24VDC

Global 8 Operation

Operating the Global 8 is automatic once the programming and input/output system connections have been performed.

Energize the Global 8 unit by moving the power switch to the "On" position. The unit will perform the required internal checks. When the checks are completed, the main operating display screen will appear on the user interface.

Using the Global 8 with the PST 1000, 2.4 GHz FM Switch Wrench or Battery-Powered Tool

The first group to be worked on will be displayed in the upper right-hand corner of the screen. In the sample here, the first group is Group A. The type of tool to be used and the name assigned to the group are displayed below the letter designation for the group. In the example here, an FM Switch Wrench (Clk Tool) is assigned to the group and the Brake is what will be worked on.

The number of fasteners to be tightened - the batch count - is shown in the lower-center part of the display. The count is shown through an icon that uses outlines of screws and with the actual number to be tightened displayed.
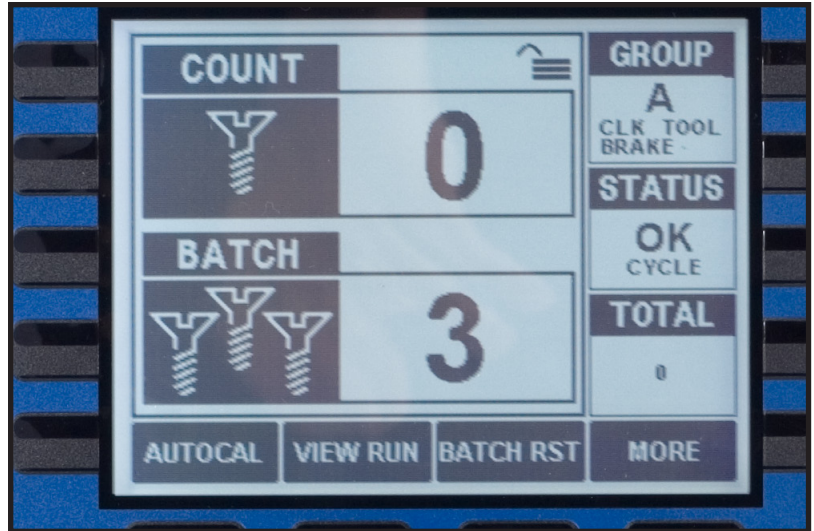
The number of fasteners that has been tightened up to this point is zero, so that number appears in the upper-center part of the display in the section marked "Count". This section shows the number of fasteners in the group that have been properly and correctly tightened.

The "Status" section of the display shows the status of the last fastener tightening, either "OK" or BAD", in the right-center part of the screen.

The "Total" part of the display on the right side just above the row of buttons shows the count of completed groups tightened.

To use the Global 8, use the tool associated with the group to tighten the first fastener in the group. If the fastener is correctly tightened, the Count will change from "0" to "1" and the Status will show "OK". When this occurs, simply proceed to tighten the next fastener in the group. Each time a fastener in the group is tightened, the count will increase. When the last fastener in the group is correctly tightened, the Count will change to "3", the "OK" will be displayed, then the unit will index to the next group to be worked on and the batch count and fastener count will reset for that group. The tool to be used with the next group will also be displayed.

The tighten/evaluate/display/index cycle will continue until all the fasteners in each group have been correctly tightened. The Global 8 will then return to the original group.

If a fastener is incorrectly tightened, the Status will be shown as "BAD" and the count of fasteners correctly tightened will not increase. To proceed, loosen the incorrectly-tightened fastener and tighten it properly before moving to the next fastener.

If the Global 8 unit is connected to a programmable logic controller or other 24VDC input/output device that controls the sequence of groups, the groups will change according to the commands from that system. The balance of the operation remains the same.

The screens available to the operator are determined by the lock status of the Global 8 unit. If the unit is locked, there are a few functions (such as "View Run") that are available, but most of the programming functions are inaccessible. This is to prevent inadvertent change of specifications during operation.

Using the Global 8 With The 1100-Series Exacta 2 Digital Torque Wrenches

When the Global 8 is used with 1100 Series tools Exacta, the actual torque is measured and communicated. A different menu is used during operation to reflect this difference from use with other tools.

The current group and tool type is shown in the upper right-hand corner of the display. The current COUNT and BATCH size numbers, as well as the TOTAL number of batches successfully completed are shown along the bottom of the display. The tightening status of the last fastener tightened is shown in the Status section. The actual torque on the last fastener is shown in the Torque section in the large section at the top of the display. The Angle section displays the Angle results for Exacta series tools having this feature.

As each fastener is properly tightened, the display will update. The final torque applied to the fastener will be displayed, and the count of completed fasteners in the batch will increment. When a batch is completed, the total batches completed will update, and the count of completed fasteners within the batch will be reset to zero.

Network Card and Ethernet Communications - ACOP (Atlas Copco Open Protocol)

Ethernet-capable Global 8 units have two additional items not appearing on the standard Global 8 units. These are a network card with multiple connectors and a Human-Machine Interface (HMI).

The four connectors are on the left side of the unit and are shown in an image on Page 8 of this manual. The HMI is used to track communications with and program communications settings for the Global 8 that will be connected to your Ethernet system. Note that the Ethernet system to which the Global 8 will be connected must be using the Atlas-Copco Open Protocol (ACOP) for the Global 8 - Ethernet part number 10474 to work with the system.

Network Card Connectors - USB
The USB connector is designed to permit the use of a computer to store additional protocols and to perform additional functions provided in the AQ software. This software is available through a third-party supplier, with a link on our website. It can be used with the Global 8 by connecting the computer through the USB port.

Network Card Connectors - Network Connector RJ45
This is the connector to be used when connecting the Global 8 - Ethernet to your internal Ethernet system.

Network Card Connectors - Male DSUB9 Connector
This is the connector to be used when a bar code reader is to be connected to the Global 8 - Ethernet. See the section on Creating Bar Codes for details on using a bar code reader with the unit.

Network Card Connectors -Female DSUB9 Connector
This connector provides the serial output required for a serial printer. Connecting the printer to this port will result in a print event each time a torque event occurs. Note: This port can be used to communicate the results to HyperTerminal or other terminal program.

Ethernet Functionality
The Global 8 - Ethernet ACOP supports Ethernet communications using the Atlas-Copco Open Protocol. The ACOP interface acts as a server. This server waits for a client to make a connection with it and can only accept one connection at a time. The TCP/IP messages that are sent and received by this unit adhere to the PowerFocus Open Protocol version 3.0.

This control will **send** the following commands/responses:

MID	Description
0002	Communication Start Ack
0004	Command Error
0005	Command Accepted
0011	Parameter Set Number Upload Reply
0013	Parameter Set Data Upload Reply
0015	Parameter Set Selected
0041	Tool Data Upload Reply
0052	Vehicle ID Number Upload
0061	Last Tightening Result Data upload
0065	Old Tightening Result Reply
0081	Time Upload Reply

The system will **accept** the following commands/responses:

MID	Description
0001	Communication Start
0003	Communication Stop
0010	Parameter Set Numbers Upload Request
0012	Parameter Set Data Upload Request
0014	Parameter Set Selected Subscribe
0016	Parameter Set Selected Ack
0017	Parameter Set Selected Unsubscribe
0018	Select Parameter Set
0019	Set Parameter Set Batch Size
0020	Reset Parameter Set Batch Size
0040	Tool Data Upload Request
0042	Disable Tool
0043	Enable Tool
0044	Disconnect Tool
0050	Vehicle ID Number Download Request
0051	Vehicle ID Number Upload Subscribe
0053	Vehicle ID Number Upload Ack
0054	Vehicle ID Number Upload Unsubscribe
0060	Last Tightening Result Data Subscribe
0062	Last Tightening Result Data Ack
0063	Last Tightening Result Data Unsubscribe
0064	Old Tightening Result Upload Request
0080	Read Time Upload Request
0082	Set Time In The Torque Controller
9999	Keep Alive

Ethernet Human-Machine Interface (HMI) in Operating Mode

When the network interface is enabled (Global 8 unit power is enabled), the display briefly shows the firmware version information. The unit then enters it's operating mode.
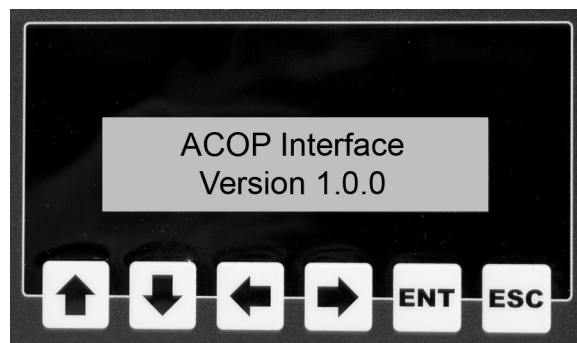
In the main operating mode, the display will show the unit's IP address or the client's IP address. Using the UP or DOWN keys (arrows below the display) the user can select which IP address is visible.

UNIT IP ADDRESS
192.168.1.1

The client IP address screen can be used to determine if the unit has successfully connected to the target device.

If a connection has not been established, this screen will show the word "Disconnected". If the connection has been established, the client IP address will be displayed.

CLIENT IP ADDRESS
192.168.1.233

Programming Ethernet Communications Through the HMI
The Global 8 - Ethernet ACOP can be configured for Ethernet communications through the programming menu accessed via the HMI. To access the programming menu, the unit must have electric power supplied and enabled.

The program menu is multi-level. It is navigated using the UP, DOWN, LEFT, RIGHT, ENT (Enter) and ESC (Escape) buttons just below the display.

UNIT IP ADDRESS
192.168.1.1
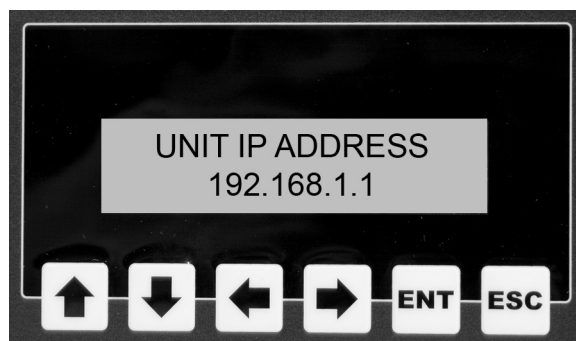
Entering the Programming Menu
The programming menu is accessed from the Operating window shown to right. To reach the programming menu, press the Enter (ENT) button.

The display will prompt the user to enter a password before reaching the programming menu. The default password is "0104".

To enter the password, use the LEFT and RIGHT buttons to move among the digits and the UP and DOWN buttons to raise and lower the digit value of the highlighted character.

ENTER PASSWORD
0***

Once the password digits have been selected and displayed, press the Enter (ENT) button to proceed. The unit will compare the entered password to the password that is stored in the units' memory. If these values match, the unit will continue into the programming menu.

The Escape (ESC) button will send the program back to the operating screen without attempting to read the password.

Programming the Unit IP Address

Each device on the network must have its' own unique IP address. To edit the Global 8 units' IP address, navigate to the Programming IP Address option in the menu items. Press the Enter (ENT) button.
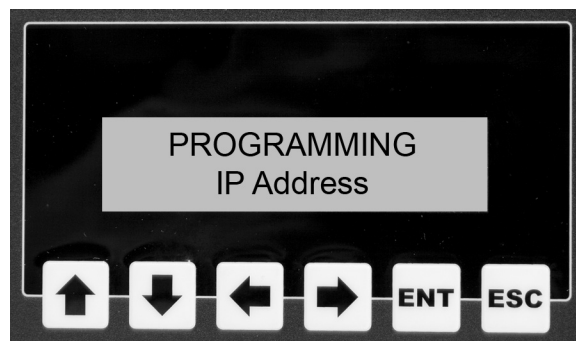
The current IP address will be displayed. To change the address use the LEFT and RIGHT arrow buttons to navigate among the digits in the address. The active digit will always be highlighted.

Use the UP and DOWN arrow keys to increment or decrement the numeric value of the active digit.

Once the desired IP address is displayed, press the Enter (ENT) button to save that value in the units' memory. The Global 8 uses a non-volatile memory that will retain programmed values even when the unit is in an unpowered state.

The Escape button can be pressed at any time during the editing to allow the user to return to the main menu without saving a new value.

Programming the Subnet Mask

The Subnet Mask is used to identify which part of the IP address is the network ID and which part is the host ID. The Subnet Mask is an essential component of this requirement.

To edit the Subnet Mask, navigate to the Subnet Mask item in the Programming menu, then press the Enter (ENT) button.

The EDIT SUBNET MASK screen shown will appear. To change the Subnet Mask value, use the LEFT and RIGHT arrow buttons to navigate among the digits. The active digit will always be highlighted. Use the UP and DOWN buttons to change the value for the highlighted digit.

Once the desired value for the Subnet Mask is displayed, press the Enter (ENT) button to store the new value. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.

```
Edit Subnet Mask
255.255.255.000
```
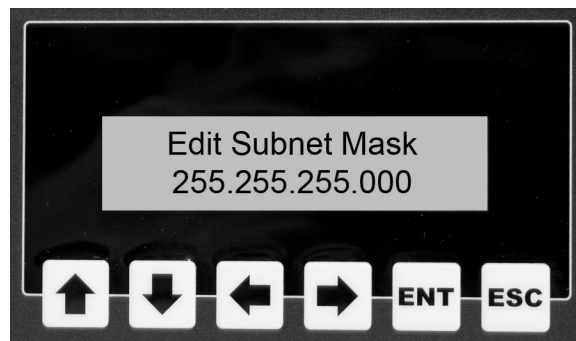
Programming the Gateway

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

To edit the Global 8 gateways' IP address, navigate to the to the Gateway programming screen, then press the Enter (ENT) button.

```
PROGRAMMING
Gateway
```

The current gateway address will be displayed. To change the gateway value, use the LEFT and RIGHT arrow buttons to navigate among the digits. The active digit will always be highlighted. Use the UP and DOWN buttons to change the value for the highlighted digit.

Once the desired value for the gateway is displayed, press the Enter (ENT) button to store the new value. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.

```
EDIT GATEWAY
192.168.001.113
```

Programming the Port Number

The Port Number sets the service port value that is used to connect to Ethernet system running the ACOP protocol.

To edit the Port Number, navigate to the to the Port Number programming screen, then press the Enter (ENT) button.

The port number may be any number between 0 and 32000. Typically, the port value of 4545 is used with the Atlas-Copco Open Protocol.

```
PROGRAMMING
Port Number
```

The current port number will be displayed. To change the port number, use the LEFT and RIGHT arrow buttons to navigate among the digits. The active digit will always be highlighted. Use the UP and DOWN buttons to change the value for the highlighted digit.

Once the desired value for the port number is displayed, press the Enter (ENT) button to store the new value. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.

Programming the Message Timeout
When the Global 8 sends a message to a client, the client is expected to acknowledge receipt of the message. The Message Timeout sets the amount of time that the Global 8 will wait for acknowledgement before re-sending the message or closing down the socket.

The Message Timeout is set in whole seconds, and can be any value between 5 and 30 seconds.

To edit the Message Timeout, navigate to the Message Timeout item in the Programming menu, then press the Enter (ENT) button.

The current timeout value will be displayed.

The value may be changed using the UP, DOWN, LEFT and RIGHT arrow buttons as follows:

UP	Increases value by 1 second
DOWN	Decreases value by 1 second
LEFT	Decreases value by 10 seconds
RIGHT	Increases value by 10 seconds

Once the desired value for the Message Timeout (Acknowledgement Timeout) is displayed, press the Enter (ENT) button to store the new value. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.

Programming the Resend Attempts

When a message is sent out using the ACOP and an acknowledgement is not received by the sending unit, the sending unit will wait for a predefined amount of time before resending the message. The amount of time is defined by the Message Timeout (ACK Timeout) setting. The number of times the unit will attempt to resend the message is defined by the Retry Limit.

If the Retry Limit is reached without receiving an appropriate response, the socket is closed. The retry limit is programmable with limits of 1 attempt to 10 attempts.

To program the Resend Attempts (Retry Limit), navigate to the to the Resend Attempts programming screen, then press the Enter (ENT) button.

The Retry Limit value will be displayed.

The value may be changed using the UP, DOWN, LEFT and RIGHT arrow buttons as follows:

UP	Increases value by 1 attempt
DOWN	Decreases value by 1 attempt
LEFT	Decreases value to 10 attempts
RIGHT	Increases value to 10 attempts

Once the desired value for the Resend Attempts is displayed, press the Enter (ENT) button to store the new value. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.
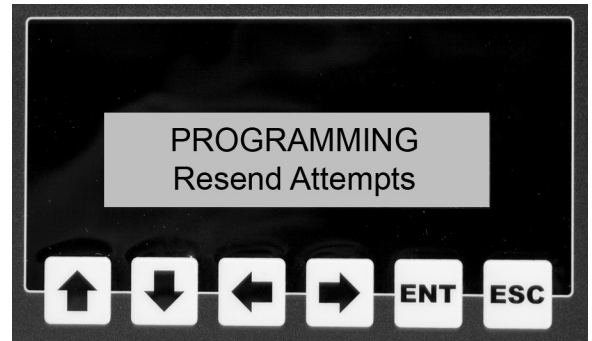
Programming the Keep Alive

The Global 8 anticipates receiving messages from the client on a regular interval. The Keep Alive value defines the amount of time (in seconds) that the Global 8 will wait to receive a message before closing the socket. If a data message does not need to be sent within this time interval, the client should send a keep-alive message.

The Keep Alive limit can be programmed to any value between 30 and 119 (seconds). Note: Values over 119 seconds disarm Keep Alive function.

To program the Keep Alive value, navigate to the Keep Alive programming screen, then press the Enter (ENT) button.

The current Keep Alive value will be displayed.

The value may be changed using the UP, DOWN, LEFT and RIGHT arrow buttons as follows:

    UP Increases value by 1 second
    DOWN   Decreases value by 1 second
    LEFT   Decreases value by 10 seconds
    RIGHT   Increases value by 10 seconds
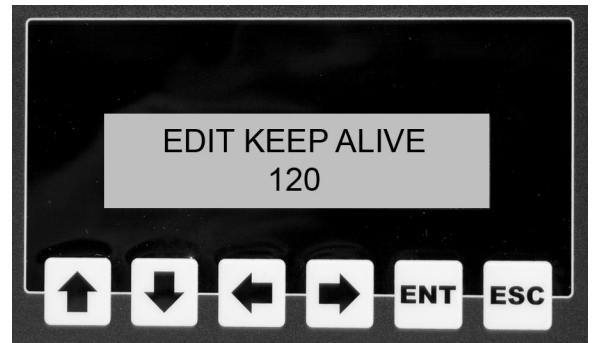
Once the desired value for the Keep Alive interval is
displayed, press the Enter (ENT) button to store the new value. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.

Programming the No Message Timeout
In a system where the use of keep alive messages are not used, a No Message Timeout can be implemented. This will close the socket if communications between the unit and client are lost.

The operation of the No Message Timeout is very similar to that of the Keep Alive timer. If a valid message is not received before the programmed time limit expires, the socket will close and wait for a new connection to be made.

To edit the No Message Timeout, navigate to the No Message Timeout item in the Programming menu, then press the Enter (ENT) button.

The current No Message Timeout value will be displayed.

If the No Message Timeout value is set to 0, this timer will not be used.

The value may be changed using the UP, DOWN, LEFT and RIGHT arrow buttons as follows:

    UP   Increases value by 1 second
    DOWN   Decreases value by 1 second
    LEFT   Decreases value by 10 seconds
    RIGHT   Increases value by 10 seconds

Once the desired value for the No Message Timeout is displayed, press the Enter (ENT) button to store the new value. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.

Programming the Xmit REV/SPACE

Messages in the Atlas-Copco Open Protocol are comprised of a Header, a Data Field, and a Null at the end of the message.

Each message's header contains the length of the message, MID, revision, and a spare field.

The revision field describes which revision of message is being sent. Some messages, like tightening results, can have multiple revisions.

If the revision is 001, spaces can be sent in place of the revision information. To have this unit send spaces instead of 001 for revision messages, use the Xmit REV/SPACE program menu item.

To program the Xmit REV/SPACE function, navigate to the to the function in the programming screen, then press the Enter (ENT) button.

The current setting will be displayed. The arrow buttons (any) can be used to toggle between the values of 0 and 1. The 0 value will send the revision; the 1 value will send spaces.

When the desired value is displayed, press the Enter (ENT) button to store the value and function setting. The Escape (ESC) button can be pressed at any time when this screen is active to exit this function without saving the new value.
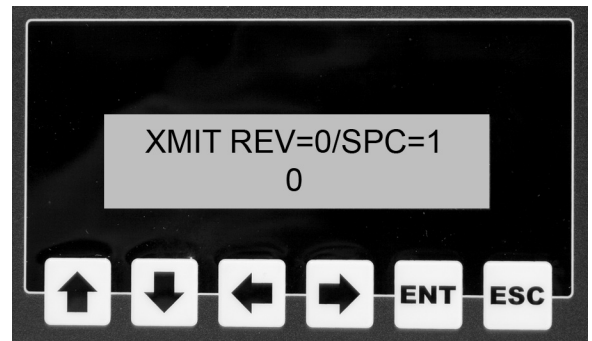
Programming the Control Cell ID, Control Channel and Control Name

In the ACOP, torque records contain a Control Cell ID, Control Channel and Control Name. All of these are alpha-numeric fields that will be placed in a record each time a torque event occurs. Each of these identification values is programmable from the HMI.

To change the Control Cell ID, navigate to the to the Control Cell ID programming screen, then press the Enter (ENT) button.

The current Control Cell ID value will be displayed. To change the address use the LEFT and RIGHT arrow buttons to navigate among the digits in the address. The active character will always be highlighted.

Use the UP and DOWN arrow keys to change the value of the active character. When the desired characters are displayed, press the Enter (ENT) button to save the new ID or the Escape button to exit this item without
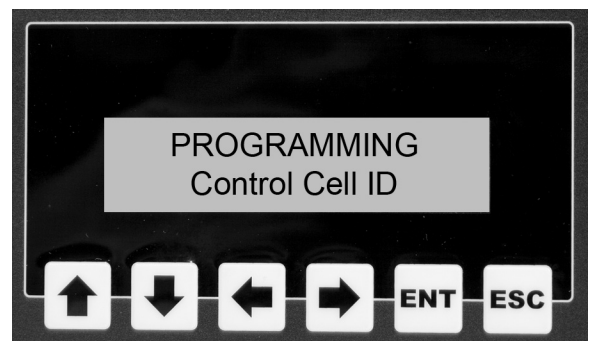
saving the change.

To change the Control Channel ID, navigate to the to the Control Cell ID programming screen, then press the Enter (ENT) button.

CONTROL CELL ID
ID = 0000

The current Control Channel ID character will be displayed. To change the ID use the LEFT and RIGHT arrow buttons to navigate among the digits in the ID. The active character will always be highlighted.

Use the UP and DOWN arrow keys to change the value of the active character. When the desired characters are displayed, press the Enter (ENT) button to save the new ID or the Escape button to exit this item without saving the change.

PROGRAMMING
Control Chan ID

To change the Control Name, navigate to the to the Control Name programming screen, then press the Enter (ENT) button.

CONTROL CHAN ID
ID = 00

The current Control Name will be displayed. To change the name use the LEFT and RIGHT arrow buttons to navigate among the characters in the name. The active character will always be highlighted.

Use the UP and DOWN arrow keys to change the value of the active character. When the desired characters are displayed, press the Enter (ENT) button to save the new name or the Escape button to exit this item without saving the change.

PROGRAMMING
Control Name

NAME =

Programming the Serial Printer

A serial printer can be connected to the female 9-pin DSUB connector on the side of the Global 8 unit. The serial printing function must be activated and the baud rate for the printer selected if the function is to be used. This function can also be turned off entirely. When activated, a print string will be transmitted for each torque event.

This port is configured to use 8/N/1 transmission; 8 data bits, no parity, 1 stop bit. The available baud rates are 9600, 19200, 38400, 57600, 115200.

To program printer communications, navigate to the to the Programming Serial Printer programming screen, then press the Enter (ENT) button.

At the new display, use the UP or DOWN buttons to scroll among the available baud rates. When the baud rate matching that of the printer is displayed, press the Enter (ENT) button to save that rate.

To exit this function without saving a change, press the Escape (ESC) button.
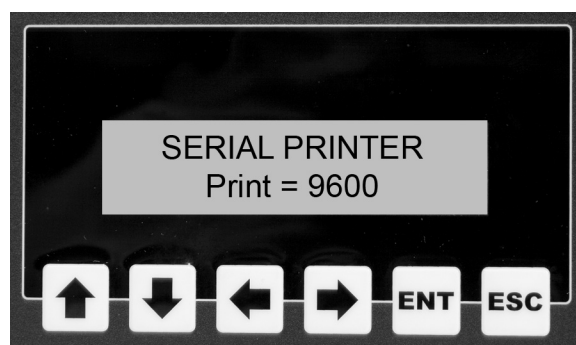
Programming the Bar Code Function

A bar code reader can be used to program items immediately during assembly operations. To enable this flexibility, the bar code function must be enabled through the programming menu.

The bar code reader will be connected to the male 9-pin DSUB port on the side of the Global 8 unit.

This port is configured to receive 8/N/1 transmission; 8 data bits, no parity, 1 stop bit. The available baud rates are 9600, 19200, 38400, 57600, 115200.

To program bar code reader communications, navigate to the to the Programming Bar Code Reader programming screen, then press the Enter (ENT) button.

At the new display, use the UP or DOWN buttons to scroll among the available baud rates. When the baud rate matching that of the bar code reader is displayed, press the Enter (ENT) button to save that rate.

To exit this function without saving a change, press the Escape (ESC) button.

```
BAR CODE READER
B-CODE = 9600
```

Programming - Changing the Password
The password restricts access to the programming menu. The password is always a four-digit numeric code. All Global 8 - Ethernet units ship with a default password of "0104". This default password may be changed to one better suited to the purposes of the user.

To change the password, navigate to the to the Programming Edit Password screen, then press the Enter (ENT) button.

The current password will be displayed. To change the password use the LEFT and RIGHT arrow buttons to navigate among the digits in the password. The active digit will always be highlighted.

Use the UP and DOWN arrow keys to change the numeric value of the active digit.

```
PROGRAMMING
Edit Password
```

Once the desired password is displayed, press the Enter (ENT) button to save that value in the units' memory.

The Escape button can be pressed at any time during the editing to allow the user to return to the main menu without saving a new password.

```
ENTER NEW P-WORD
0***
```

Creating Bar Codes - Ethernet (ACOP)

Some Global 8 - Ethernet units are designed to work with bar code readers using the code39 bar code system. Those that are will have four connectors on the side of the unit instead of three.

Bar code data sent to the Global 8 - Ethernet will be interpreted either as a command or as a Vehicle Identification Number (VIN).

In order for the bar code reader to decipher a given bar code as a command, the bar code must be formatted in a specific structure. Using code39 bar codes, the bar code must begin and end with an asterisk ("*").

The bar code must also contain command and data sections. Each section within the bar code must be separated by percent ("%") symbols.

Example: The command for the Cell ID is "01". The Cell ID is four data bytes in length. So if the Cell ID was to be "1234", then the bar code would look like:

<p align="center">*%01%1234%*</p>

Bar Code (VIN)
VIN bar codes may be generated in either of two ways. They may be expressed in a command format as shown above, or without a command.

When expressed as a command, the command is "04", and the data bytes may be from 1 to 25, as shown in this example:

<p align="center">*%04%VIN1234567%*</p>

The VIN may also be represented without a command. All alphanumeric bar codes without commands will be interpreted as VIN's, such as shown here:

<p align="center">*VIN-ABCDE123456*</p>

The following table provides information on the commands and bar codes used in this system.

Command	Structure	Example(s)
Batch Reset	Command = 10, Data Bytes = 0	*%10%0%*

Command	Structure	Example(s)
Group Group A	Command = 11, Data Bytes = 1	*%11%0%* * % 1 1 % 0 % *
Group B		*%11%1%* * % 1 1 % 1 % *
Group C		*%11%2%* * % 1 1 % 2 % *
Group D		*%11%3%* * % 1 1 % 3 % *
Group E		*%11%4%* * % 1 1 % 4 % *
Group F		*%11%5%* * % 1 1 % 5 % *
Group G		*%11%6%* * % 1 1 % 6 % *
Group H		*%11%7%* * % 1 1 % 7 % *
Cell ID	Command = 01, Data bytes = 4	*%01%1234%* * % 0 1 % 1 2 3 4 % *

Command	Structure	Example(s)
Channel ID	Command = 02, Data Bytes = 2	*%02%56%* * % 0 2 % 5 6 % *
Controller Name	Command = 03, Data Bytes = 1-25	*%03%lf-brake-line%* * % 0 3 % L F - B R A K E - L I N E % *
Job Number	Command = 05, Data Bytes = 4	*%05%9989%* * % 0 5 % 9 9 8 9 % *
Batch Size	Command = 09, Data Bytes = 4	*%09%0004%* * % 0 9 % 0 0 0 4 % *
Torque Minimum Limit	Command = 21, Data Bytes = 6	*%21%012500%* * % 2 1 % 0 1 2 5 0 0 % *
Torque Maximum Limit	Command = 22, Data Bytes = 6	*%22%013000%* * % 2 2 % 0 1 3 0 0 0 % *
Torque Final Target	Command = 23, Data Bytes = 6	*%23%012750%* * % 2 3 % 0 1 2 7 5 0 % *
Angle Minimum	Command = 25, Data Bytes = 5	*%25%00010%* * % 2 5 % 0 0 0 1 0 % *

Command	Structure	Example(s)
Angle Maximum	Command = 26, Data Bytes = 5	*%26%09999%* * % 2 6 % 0 9 9 9 9 % *
Angle Final Target	Command = 27, Data Bytes = 5	*%27%00100%* * % 2 7 % 0 0 1 0 0 % *
Job Sequence Number	Command = 42, Data bytes = 5	*%42%55555%* * % 4 2 % 5 5 5 5 5 % *
Group Set Name	Command = 47, Data Bytes = 1-25	*%47%group01brakes%* * % 4 7 % G R O U P 0 1 B R A K E S % *
Torque Units InLb (inch-pounds)	Command = 48, Data Bytes = 1	*%48%0%* * % 4 8 % 0 % *
FtLb (foot-pounds)		*%48%1%* * % 4 8 % 1 % *
Nm (Newton-meters)		*%48%2%* * % 4 8 % 2 % *

Command	Structure	Example(s)
Exacta 2 Torque Direction CCW (Counter-clockwise or -)	Command = 49, Data Bytes = 1	*%49%0%*
CW (Clockwise or +)		*%49%1%*
Both CCW and CW		*%49%2%*
Exacta 2 Torque Mode Peak	Command = 50, Data Bytes = 1	*%50%0%*
Residual		*%50%1%*

Network Card and Ethernet Communications
Global 8 - Ethernet IP

Network Card and Connectors
The Global 8 - Ethernet IP units have two additional items not appearing on the other Global 8 units. These are a network card with three connectors and a Human-Machine Interface (HMI).

The three connectors are on the network card, and are located on the left side of the unit and are shown in the image here.

The top connector is a USB connector. The USB connector is designed to permit the use of a computer to store additional information and to perform additional functions provided in the AQ software. This software is available through your S/R Representative.

The middle connector is an RJ45 Connector. This Ethernet port is used to transmit and receive IP messages that are formatted to comply with Ethernet IP.

The bottom connector is a 9-pin female DSUB 9 connector. It is used for debugging when communication problems arise. A terminal program and a null-modem adapter (or null-modem serial cable) are all that is necessary to use this port. The settings for the program should be 38400 baud, 8-bit, no-parity, and 1 stop bit.

> DSUB 9 Pinout
> 2 - RX
> 3 - TX
> 5 - GND

Human-Machine Interface
The Human-Machine Interface (HMI) is used to track communications with and program communications settings for the Global 8 that will be connected to your Ethernet system. Note that the Ethernet system to which the Global 8 - Ethernet IP unit will be connected must be using the Ethernet IP protocol for the Global 8 - Ethernet IP part number 10473 to work with the system.

The HMI consists of a 2-line by 16-character backlit LCD display and a six-button keypad, all located below the main panel on the front of the unit. When the power is first enabled, the unit follows a starting routine. During the routine, the HMI will display the firmware version in memory. During operation, the display will show the unit's IP address.

The HMI is used during the programming phase. It displays program menus that provide access to settings that govern how the Ethernet IP functions.

HMI - Operating Mode

When power to the unit is enabled, the display briefly shows the resident active firmware version information. Upon completion of the starting instructions in the firmware, the unit enters operating mode.

When the unit is in the operating mode, the display will show the unit's IP address.

From this main screen the user can press the ENT button to enter the Ethernet communications programming mode.
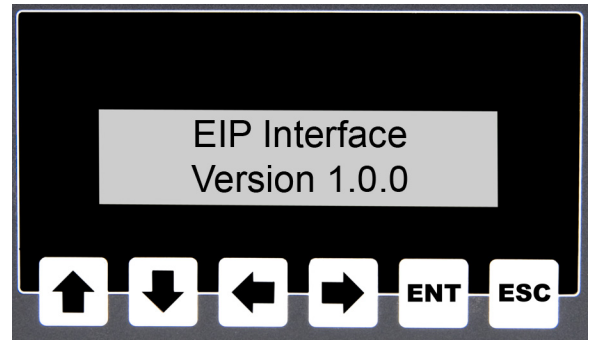
Enter HMI Programming Mode

The Ethernet IP communication settings required to facilitate communication may be configured through the programming menus. Access to these menus is protected by a password requirement.

At the Operating Mode screen press the ENT button.

The Password Entry screen will appear on the display, with a prompt to enter the password before access to other programming functions is obtained.

The default password is "0 1 0 4".

When entering the password, the left and right arrow buttons move the cursor (active character) horizontally among the four characters. The up and down buttons increment and decrement the highlighted character by a value of 1.

To exit the program without entering the programming menus, press the ESC button.

Press the ENT button to submit the password for comparison to the stored password in memory. If the value entered matches the value in memory, the unit will enter the programming menus. The stored password is kept in non-volatile memory and will not be lost in the event power to the unit is disabled.
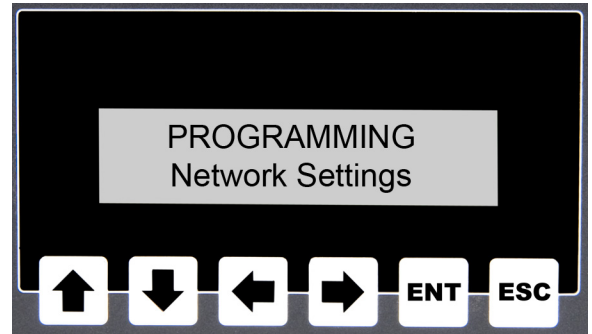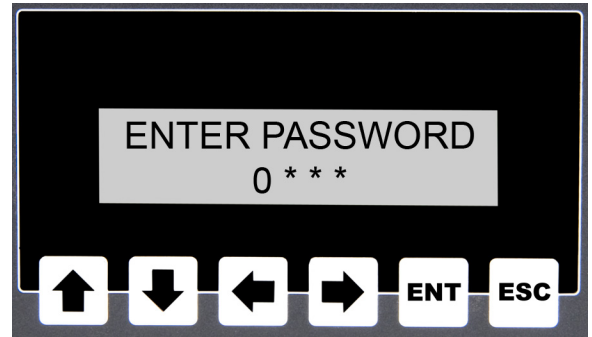
Ethernet IP Programming Menu Overview

The Ethernet IP communication and card functions are programmed from the programming menu. The menu is structured with a top level (last graphic on previous page) that allows movement among the various sub-menus.

Each sub-menu provides the ability to program a specific function, specification or requirement.

The submenus includes those required to program IP addresses, gateway and subnet configurations.

It also includes data input and data output menus that allow the user to select which data bytes to send or receive, and also where those bytes will be located in the input and output strings.

The data mask sub-menu allows users to choose different popular data masks that include different input and output data.

The password can be edited, and the connection status of the unit can also be monitored.

The method of programming each of the options is explained on the following pages. To access the sub-menus from the main menu, press the ENT button.

For all programming items the values are stored in non-volatile memory. This assures retention of the value even when power to the unit is disabled.

To move among the submenus when in the main menu, use the Up and Down buttons.

Hierarchy
Programming
    Network Settings
        IP Address
        Subnet Mask
        Gateway
        Connection Type
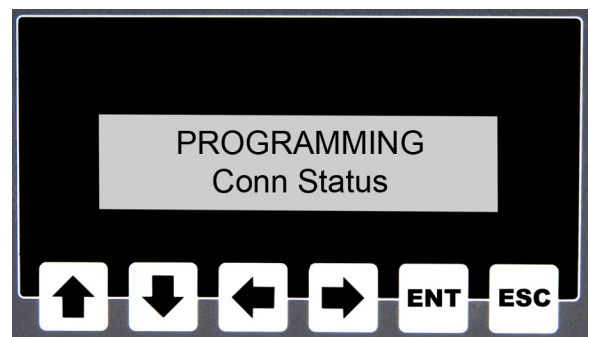   Data Output
        Multiple Output Values
    Data Input
        Multiple Input Values
    Data Masks
    Password
    Connection Status
        Static or Dynamic

PROGRAMMING
Data Output

PROGRAMMING
Data Input

PROGRAMMING
Data Masks

PROGRAMMING
Password

PROGRAMMING
Conn Status
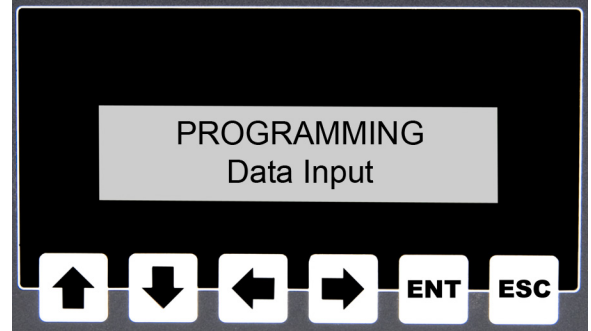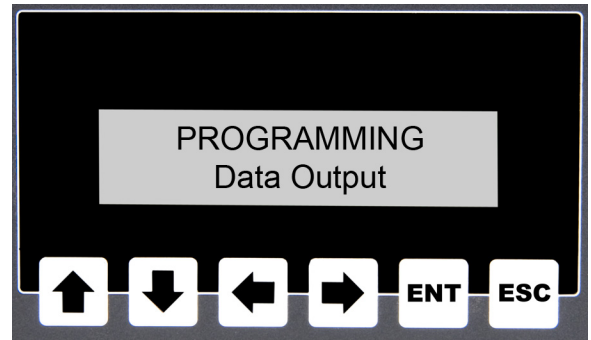
## Programming the Unit IP Address (Static Connection)

It is imperative that each device on the network have a unique IP address assigned to it. The IP Address sub-menu allows the user to address this function.

From the main programming menu (Page 78), use the Up and Down menu buttons to navigate to the IP Address sub-menu shown here. Press the ENT button if you wish to change the address.

The current IP address will appear on the display. A flashing cursor will appear under the first digit. The flashing cursor will always indicate the active digit.

To change the address use the Left and Right arrows to scroll among the digits. Use the Up arrow to increase the value of the active digit by one, the Down arrow to decrease the active digit by one.

When the desired IP address is displayed, press the ENT button to save that address to the unit memory. To exit this function without saving a new IP address, press the ESC button.

PROGRAM NETWORK
IP Address

EDIT IP ADDRESS
192.168.001.069
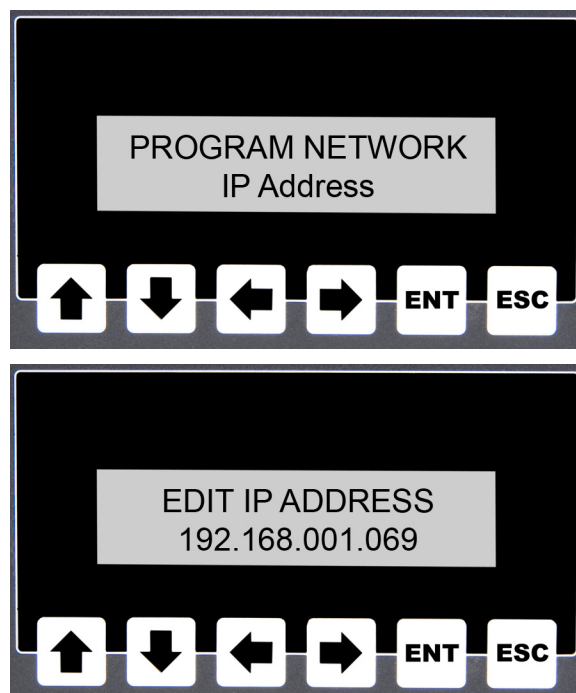
Programming the Subnet Mask

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

To edit the netmask, select Subnet Mask from the main menu and press the ENT button.

The current mask value will appear on the display. A flashing cursor will appear under the first digit. The flashing cursor will always indicate the active digit.

To change the mask value use the Left and Right arrows to scroll among the digits. Use the Up arrow to increase the value of the active digit by one, the Down arrow to decrease the active digit by one.

When the desired mask value is displayed, press the ENT button to save that address to the unit memory. To exit this function without saving a new IP address, press the ESC button.

PROGRAMMING
Subnet Mask

EDIT SUBNET MASK
255.255.255.000
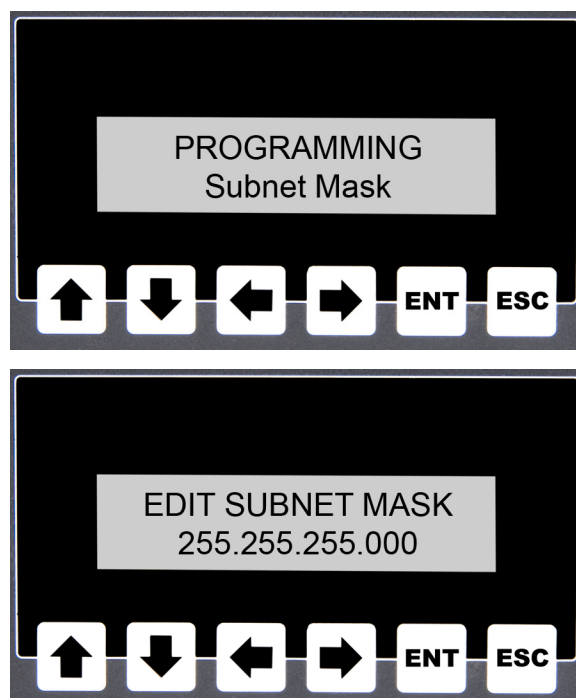
Programming the Gateway

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

To edit the value, select Gateway from the main menu and press the ENT button.

The current gateway value will appear on the display. A flashing cursor will appear under the first digit. The flashing cursor will always indicate the active digit.

To change the value use the Left and Right arrows to scroll among the digits. Use the Up arrow to increase the value of the active digit by one, the Down arrow to decrease the active digit by one.

When the desired gateway value is displayed, press the ENT button to save that address to the unit memory. To exit this function without saving a new IP address, press the ESC button.

Programming the Connection Type

Two types of Ethernet IP connection may be made; Static or Dynamic. A static connection is one where the unit has a fixed IP address that is programmed into the unit. A Dynamic connection is one where the Ethernet system assigns an address to the unit.

The current setting will be displayed using "S" for Static and "D" for Dynamic. If the connection type must be changed, press the ENT button to enter this menu item.

Use the Up or Down arrow to toggle to the other display type. When the correct connection type appears on the display, press the ENT button to save the setting. There will be a pause while the new setting is saved, then "Saved" will appear on the second line of the display. When that occurs, press the ENT button to exit the function. The ESC button may be pressed at any time before the new setting is saved; this will exit the function without saving a new setting.
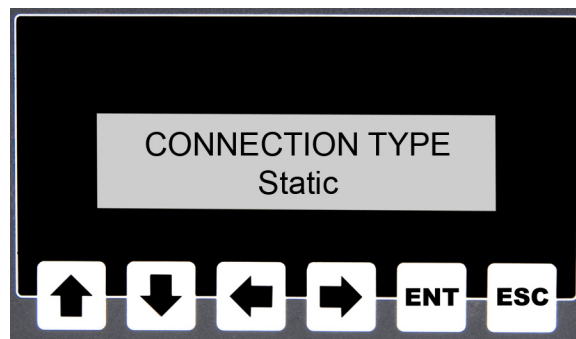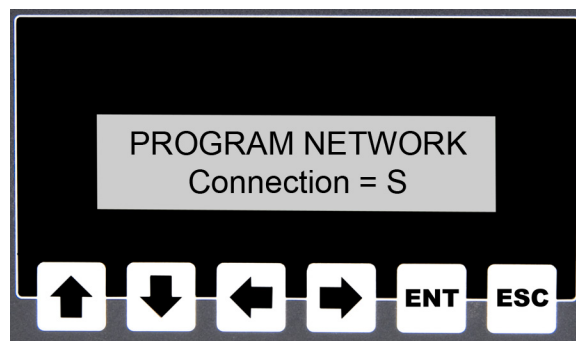
Data Output - Character String and Characteristics

This unit is capable of transmitting up to 103 output bytes in the data string. The user can select what information type (characteristic value) is actually transmitted. The table below gives the number of bytes that are used in the transmission for each characteristic, and the default location within the data string, for each characteristic included in the transmission.

Output Data/Characteristic	Number of Bytes	Default Location
Parameter	1	0
Tool Type	3	1
Tool Name	8	4
OK/NOK	1	12
Result	1	13
Count	1	14
Batch	1	15
Rolling Count	2	16
Total	2	18
Time	6	20
Date	6	26
EE Write Time	6	32
EE Write Date	6	38
Torque	6	44
Min Torque	6	50
Max Torque	6	56
Units	1	62
Angle	5	63
Min Angle	5	68
Max Angle	5	73
Tool Type A	3	78
Tool Type B	3	81
Tool Type C	3	84
Tool Type D	3	87
Tool Type E	3	90
Tool Type F	3	93
Tool Type G	3	96
Tool Type H	3	99

The table on the following page provides a description of the content of the data in each section of the output string.

The output string is sent for each tightening. The specification, tool, and result is for the specification group or parameter that is sent in the first characteristic "Parameter" is the data transmitted.

Output Data	Description
Parameter	ASCII Character representing current parameter. Possible values "A" (0x41) through "H" (0x48)
Tool Type	Three ASCII characters describing the tool type. Possible values include "DIG", "CLK", "AIR" and/or "BAT".
Tool Name	Up to 8 alpha-numeric ASCII characters that represent a user-defined tool name.
OK/NOK	Single character giving status of last fastening. "O" (0x4F) for okay or "N" (0x4E) for not okay.
Result	Single character giving status of last fastening. "C" (0x43) for cycle, "B" (0x42) for batch and "R" (0x52) for reject.
Count	Number of fasteners completed towards the batch. Possible values 0x00 through 0xFF.
Batch	Value representing the number of fasteners in a batch. Possible values 0x00 through 0xFF.
Rolling Count	Integer (2 bytes) holding a rolling count. The count will increase with each new result. Possible values 0x0000 through 0xFFFF.
Total	Integer (2 bytes) representing number of batches completed in a given parameter or specification group. Possible values 0x0000 through 0xFFFF.
Time	6 ASCII bytes; the time the last event occurred in HHMMSS format.
Date	6 ASCII bytes; the date the last event occurred in MMDDYY format.
EE Write Time	6 ASCII bytes; the last time the EEPROM was written to in HHMMSS format.
EE Write Date	6 ASCII bytes; the last date the EEPROM was written to in MMDDYY format.
Torque	6 ASCII numbers and/or decimal point; the torque value from the last fastening (if available)
Min Torque	6 ASCII numbers and/or decimal point; the minimum torque specification from the last fastening (if available)
Max Torque	6 ASCII numbers and/or decimal point; the maximum torque specification from the last fastening (if available)
Units	Single character providing torque unit of measure during last fastening: "I" for InLb, "N" for NM, "F" for FtLb, "K" for Kg•Cm or "m" for Kg•m
Angle	5 ASCII numerals; angle measured during last tightening.
Min Angle	5 ACSII numerals; minimum angle specification
Max Angle	5 ASCII numerals; maximum angle specification
Tool Type A	Three ASCII characters for the tool type in specification group/parameter A.
Tool Type B	Three ASCII characters for the tool type in specification group/parameter B.
Tool Type C	Three ASCII characters for the tool type in specification group/parameter C.
Tool Type D	Three ASCII characters for the tool type in specification group/parameter D.
Tool Type E	Three ASCII characters for the tool type in specification group/parameter E.
Tool Type F	Three ASCII characters for the tool type in specification group/parameter F.
Tool Type G	Three ASCII characters for the tool type in specification group/parameter G.
Tool Type H	Three ASCII characters for the tool type in specification group/parameter H.

Programming Data Output

The total number of bytes per transmission is user-programmable. Also programmable are which output data items or specifications are to be included in each transmission.

To program the total number of output bytes per transmission, start at the Programming Data Output screen. Press the ENT button to be taken to the submenu that provides access to this option.

PROGRAMMING
Data Output

⬆ ⬇ ⬅ ➡ ENT ESC

Use the Up and Down buttons to navigate among the submenu items until you get to the screen shown to the right. Press the ENT button to enter this submenu item.

PROGRAM OUTPUT
Num Output Bytes

⬆ ⬇ ⬅ ➡ ENT ESC

At the NUM OUTPUT BYTES screen, use the Up and Down buttons to increase or decrease the total number of bytes sent with each transmission. The count will change by one with each push of the button.

When the total number of bytes you wish to have sent in each transmission is displayed, press the ENT button to save the new value. The ESC button may be pressed at any time to leave this submenu item without saving a new value.

NUM OUTPUT BYTES
Bytes = 102

⬆ ⬇ ⬅ ➡ ENT ESC

The PROGRAM OUTPUT submenu provides access to all of the Output Items/Specifications shown in the preceding table. Use the Up and Down buttons to navigate among these items. At any of the items you can press the ENT button to see the current value of that item. You can then use the arrow buttons to alter the address of that item within the transmission, or to select the DO NOT SEND option for the item.

When the desired value for any item is displayed, press the ENT button to store the new value and return to the submenu. The ESC button may be pressed at any time to leave the submenu item without saving a new value.
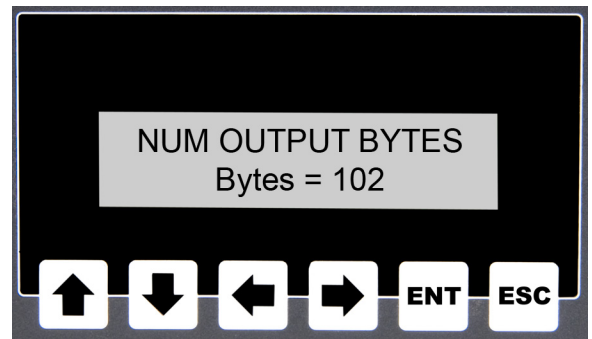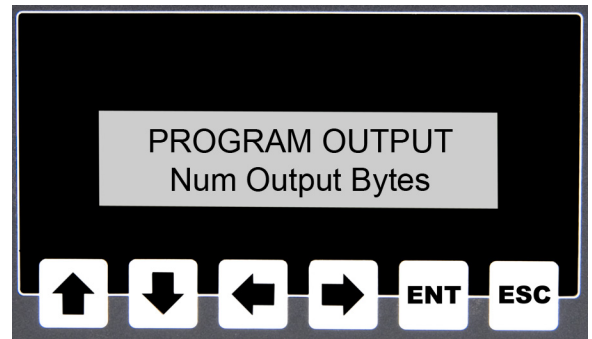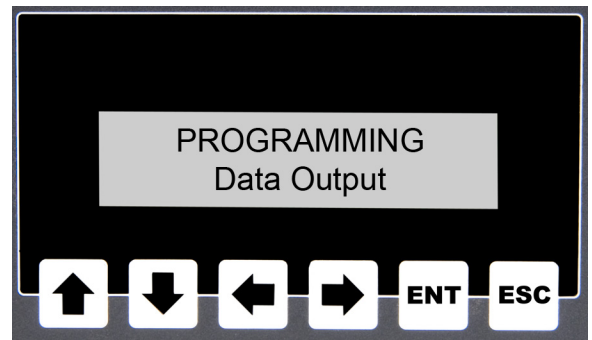
Data Input

This unit is capable of receiving up to 40 input bytes containing some or all of the 11 input data/characteristic information in the tables below.

Input Data/Characteristic	Number of Bytes	Default Location
Parameter	1	0
Batch Reset	1	1
Suspend	1	2
Batch Value	1	3
Time	6	4
Date	6	10
Torque Min	6	16
Torque Max	6	22
Angle Min	5	28
Angle Max	5	33
Units	1	38

Input Data	Description
Parameter	Use this byte to change the active parameter (specification group) setting. Possible values are those "0" through "7", 0 through 7, and "A" through "H".
Batch Reset	Set this byte to a non-zero value to reset the batch count.
Suspend	Set this byte to a non-zero value to suspend operation of the unit. Set byte back to zero to remove the unit from suspension of operation.
Batch Value	Set this value to change the batch count value of the active parameter from the current setting to the value set. Send value 0 to retain current batch count value (no action taken).
Time	Send this value in the HHMMSS format to reset the current time in the unit.*
Date	Send this value in the MMDDYY format to reset the current date.*
Torque Min	Send this value to change the minimum torque specification setting for the current parameter from the value in memory to the value sent.**
Torque Max	Send this value to change the maximum torque specification setting for the current parameter from the value in memory to the value sent.**
Angle Min	Send this value to change the minimum angle specification setting for the current parameter from the value in memory to the value sent.**
Angle Max	Send this value to change the maximum angle specification setting for the current parameter from the value in memory to the value sent.**
Units	These bytes change the torque unit of measure from the current unit of measure to that set by the transmission. 'I' = in. lb., 'F' = ft. lb., 'K' = kg•cm and 'm' = kg•m.**

* These values must both be in legal (correct) format for the values to be written to memory.
** These values must be in legal (correct) format for the values to be written to memory.

Programming Data Input

Programming Data Input is a submenu with twelve values that can be set individually. These twelve values are the message address (byte number) for the eleven in the table on the preceding page, plus the total number of bytes in the input message.

Note that there is an often-used data mask available in the Programming Data Masks menu. If that data mask fills your needs, there is no need to program the submenu items here; you can simply apply the mask. If that data mask does not fill your needs, the total bytes and addresses in this submenu allow the programming required to achieve your requirements.

The first submenu item is the total number of input bytes. To set the total number of data input bytes, press the ENT button at the Data Input submenu. The display will change to show Num Input Bytes on the second line of the display.

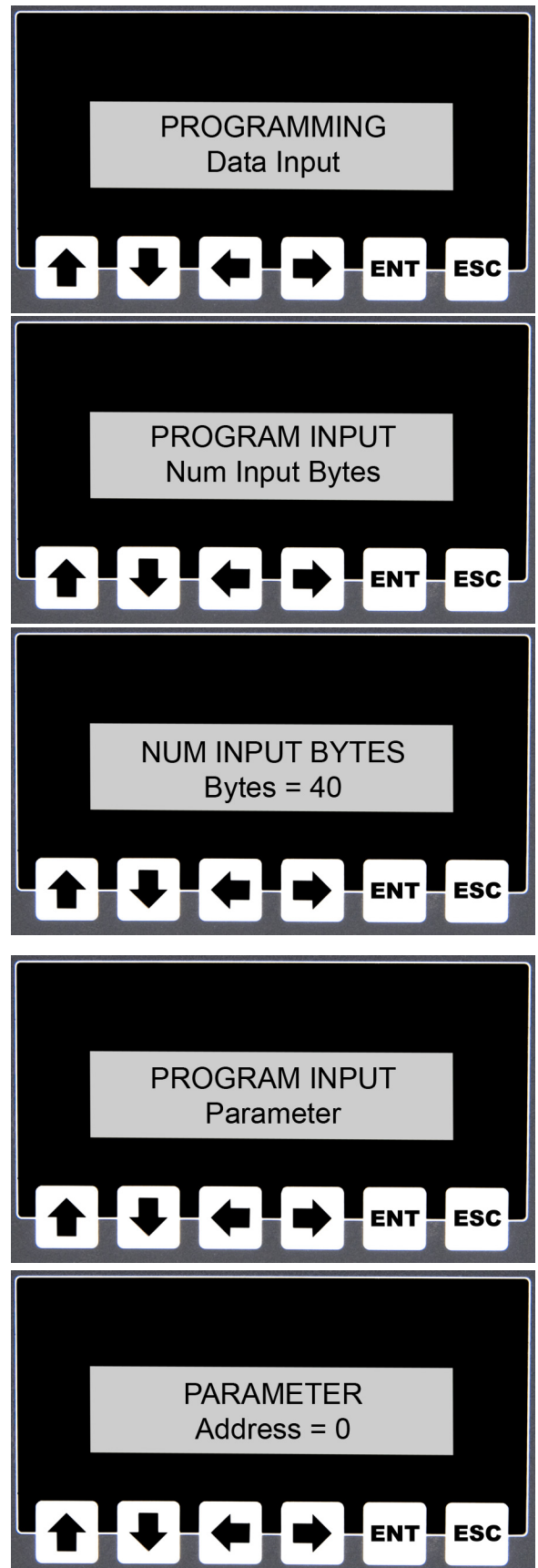Press the ENT button to gain access to this function.

The current total number of bytes in the input message will be displayed. To change this value press the Up or Down buttons to increment or decrement by a count of 1. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the new value is saved. Once the value has been saved, press the Up arrow to move to the next submenu item.

The ESC button can be pressed at any time prior to saving a new value without changing the value in memory.

Press the Up button to be taken to the next submenu item - Parameter.

At the Parameter input screen, press the ENT button to see the current input byte address. The screen will change to display the current input message byte address for the Parameter byte as shown on the last image on this page. This is the screen where the address can be changed.

If this address is the one to be used, press the ESC button to exit the editing function. To change the input message byte address, use the Up button to increment to the desired value, then press the ENT button. The new value will be saved. When that is complete, press the Up button to move to the next function.

PROGRAMMING
Data Input

PROGRAM INPUT
Num Input Bytes

NUM INPUT BYTES
Bytes = 40

PROGRAM INPUT
Parameter

PARAMETER
Address = 0

The Batch Reset input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Batch Reset byte.
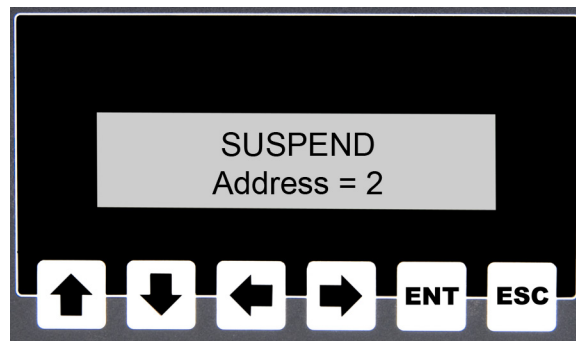
To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

PROGRAM INPUT
Batch Reset

BATCH RESET
Address = 1

The Suspend function is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

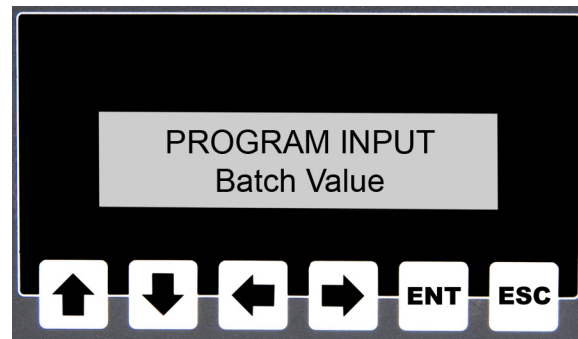The screen message will change to display the current byte address for the Suspend byte.

To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

PROGRAM INPUT
Suspend

SUSPEND
Address = 2

The Batch Value input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Batch Value byte.
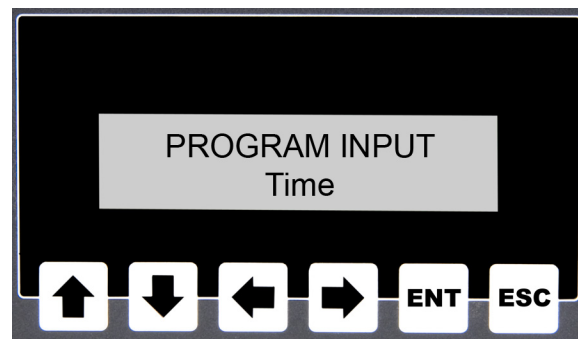
To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

```
          PROGRAM INPUT
            Batch Value

  ↑   ↓   ←   →   ENT   ESC
```

```
           BATCH VALUE
           Address = 3

  ↑   ↓   ←   →   ENT   ESC
```

The Time input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Time bytes.

To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

```
          PROGRAM INPUT
               Time

  ↑   ↓   ←   →   ENT   ESC
```

```
              TIME
           Address = 4

  ↑   ↓   ←   →   ENT   ESC
```
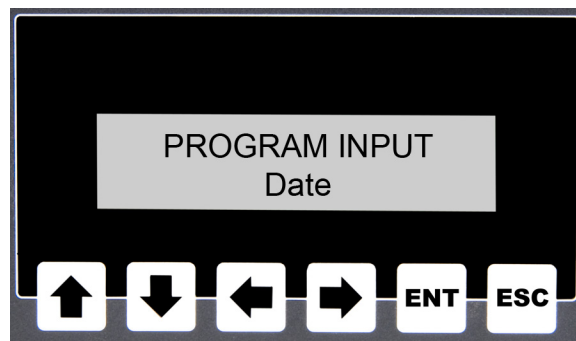
The Date input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Date bytes.
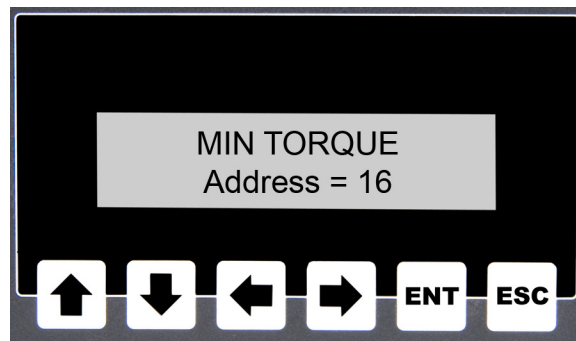
To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

PROGRAM INPUT
Date

↑ ↓ ← → ENT ESC

DATE
Address = 10

↑ ↓ ← → ENT ESC

The Torque Min input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Torque Min bytes.

To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

PROGRAM INPUT
Min Torque

↑ ↓ ← → ENT ESC

MIN TORQUE
Address = 16

↑ ↓ ← → ENT ESC

The Torque Max input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Torque Max bytes.

To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

PROGRAM INPUT
Max Torque

↑ ↓ ← → ENT ESC

MAX TORQUE
Address = 22

↑ ↓ ← → ENT ESC

The Angle Min input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Angle Min bytes.

To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.
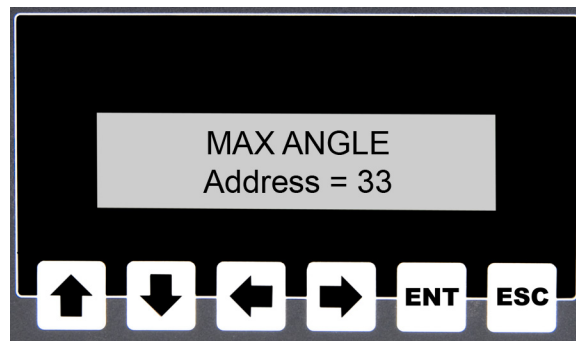
PROGRAM INPUT
Min Angle

↑ ↓ ← → ENT ESC

MIN ANGLE
Address = 28

↑ ↓ ← → ENT ESC

The Angle Max input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Angle Max bytes.

To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.

The Units input message byte address is the next item in the submenu. If the address for this item is to be changed, press the ENT button when the screen to the right appears.

The screen message will change to display the current byte address for the Units byte.

To change the address, use the Up button to increment or Down button to decrement the value. Each push of the button will increment or decrement the value by one. When the desired value is displayed, press the ENT button to save the new value. There will be a pause while the value is saved. Once the new value has been saved, press the Up button to go to the next submenu function. The ESC button can be used to exit this function without saving any changes at any time before the new value has been saved.
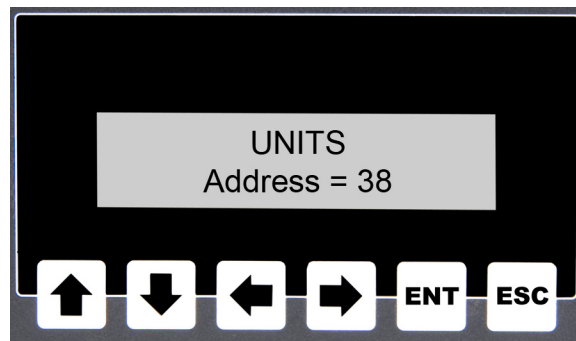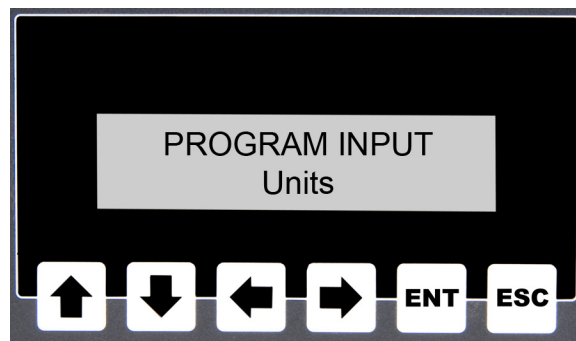
Changing the Password

A password protection feature is included on the unit to prevent unauthorized changes to settings. The factory default password of "0 1 0 4" may be changed by use of this menu function.

To change the password, press the ENT button when this menu item is active.

The screen to the right and below will appear on the display. Use the Left and Right buttons to navigate among the four digits. Use the Up and down arrows to increment or decrement the active digit until the desired value appears, then use the Left or Right button to move to the next digit.

Once all four of the desired values have been selected, press the ENT button to save the new password. There will be a pause while the new value is saved.

Press the ESC button at any time before saving the new password to exit this function without changing the password.
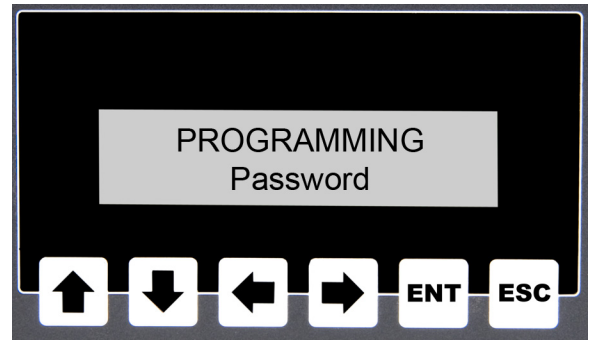
Connection Status

The status of the network card and the network can be displayed by this unit as a means of detecting and analyzing communication problems.

To view the status of these items, navigate to the Conn Status screen on the main menu, then press the ENT button to enter this function.

If the module status is red, there is a problem with the Ethernet IP module in the unit. If the module status is green, the Ethernet IP interface is functioning properly.

If the network status is red, no network is connected to the unit. If the network status is flashing green, the network status is physically connected but is not communicating with the unit. If the network status is solid green the device is connected to the network and communicating with the network.
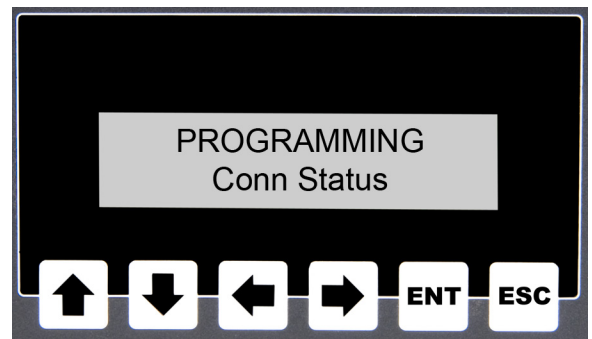
Network Card and Ethernet Communications - PFCS

Ethernet-capable PFCS-compliant Global 8 units have two additional items not appearing on the standard Global 8 units. These are a network card with two connectors and a Human-Machine Interface (HMI).

The two additional connectors are on the left side of the unit and are shown in an image on Page 8 of this manual. The HMI is used to track communications with and program communications settings for the Global 8 that will be connected to your PFCS system. Note that the Ethernet system to which the Global 8 will be connected must be using the PFCS for the unit and tools to be integrated.

Network Card Connectors - Network Connector RJ45
This is the primary connector to be used when connecting the Global 8 - Ethernet to your internal Ethernet system. If this port is enabled through the user interface, this device will transmit TCP/IP messages directly to PFCS each time the Global 8 witnesses a completed cycle.

For this connector, the diagram is at right and the pin data is:

    Pin 1   TX+
    Pin 2   TX-
    Pin 3   RX+
    Pin 6   RX-
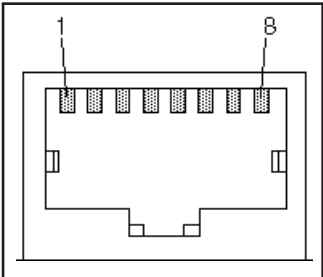
Network Card Connectors - RS-232 25 Pin DSUB Connector
This is a second means by which the Global 8 - Ethernet may be connected to your internal Ethernet system. This port is used for communicating with the PFCS if RS-232 communications are required. This port can be turned on and off through the Human-Machine Interface.

Pin	Function
2	TX
3	RX
4	RTS
5	CTS
6	DSR
7	GND
8	DCD
9	DTR
22	RNG
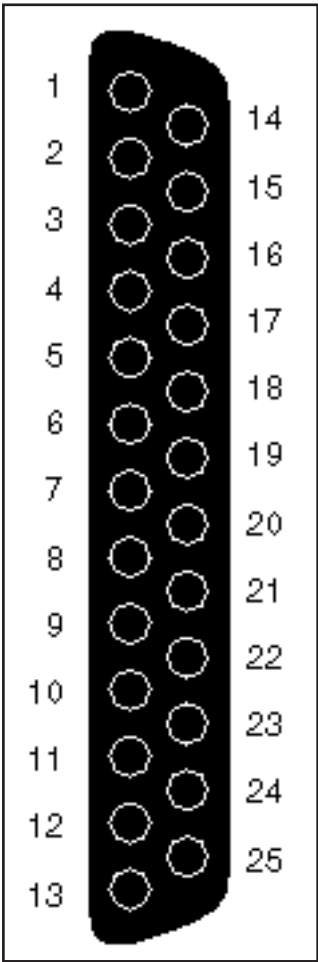
Human-Machine Interface
These units have a Human-Machine Interface (HMI) located below the main face of the unit. The HMI consists of a 2-line by 16-character backlit LCD display and a 6-button keypad. During initialization when the power is enabled the HMI will display the firmware version contained in the microprocessor's memory.

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

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

Operating Mode
Once the unit has been connected to the network and the unit has the power enabled, the display briefly shows the firmware version information then enters the operating mode.

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

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

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

Once the Machine Name is displayed, the unit has successfully negotiated a connection with the network.
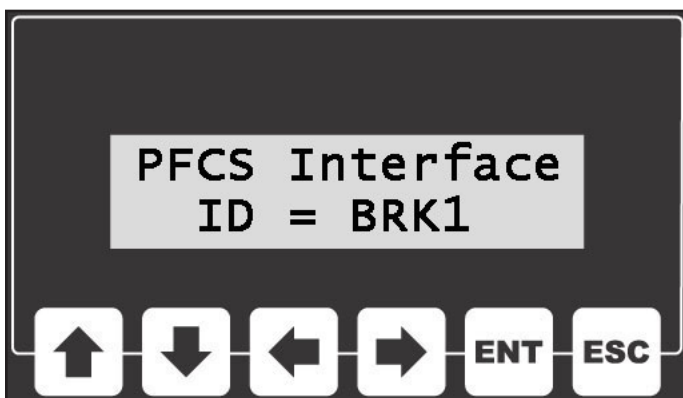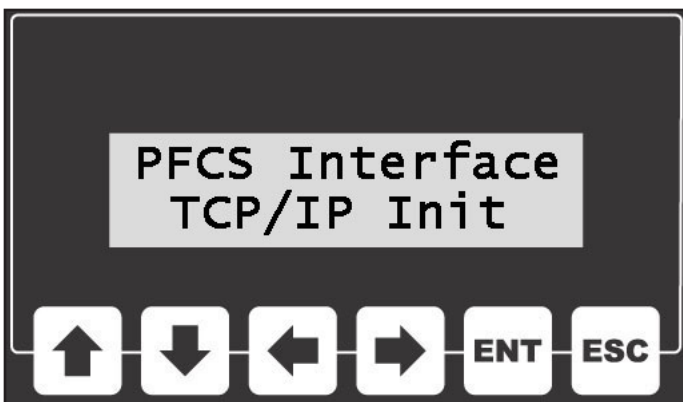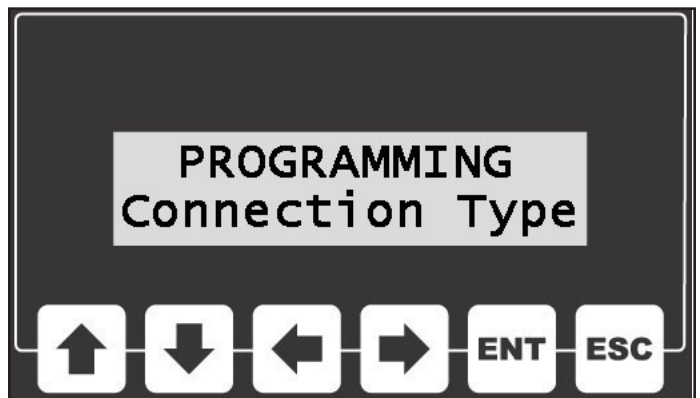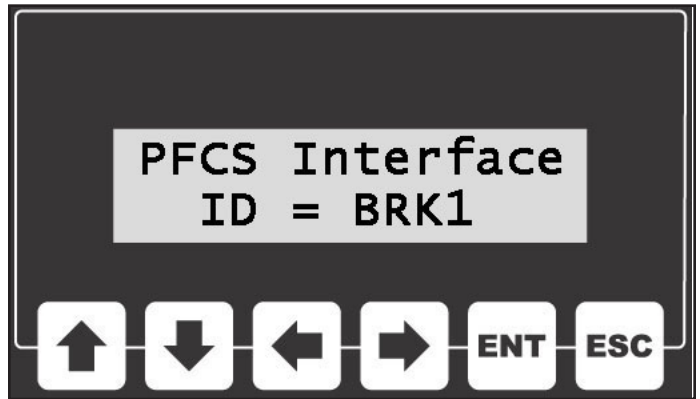
Program Mode
There are multiple items that are user-configurable
through the programming menu. To reach this
menu from the main display, press the Enter (ENT)
button.

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

When typing the password, the left and right arrow
buttons will move the cursor left and right among
the digits. The up and down arrow buttons will raise
and lower the value of the digit that the cursor is
highlighting.

The Escape button (ESC) will send the program
back to the main screen without attempting to read
the displayed password. It the ENT button is
pressed, the unit will compare the displayed value
for the password to the password that is stored in
the unit's non-volatile memory. If these values
match, access to the programming items will be
granted and the unit will continue into the
programming menu. If they do not match, access to
the programming menu will be denied.

Programming the Connection Type
The Global 8 unit can connect with the PFCS in one of two different ways. It can either send messages over the RS-232 port or the Ethernet port. This option is programmable.

To edit this item, the user needs to navigate to the PFCS Connection Type option on the programming menu by using the Up and Down arrow buttons and then pressing the ENT button. After the Enter button is pressed, the unit will display the current connection type ("RS-232" or "Ethernet"). If any of the arrow buttons are pressed, the display will toggle to show the other connection type.

Once the desired connection type is displayed, the ENT button can be pressed to save that value. All programmable values are stored in non-volatile memory to allow retention even when the unit is turned off and unplugged.

Press the ESC button at any point during the Edit process to return to the program menu.
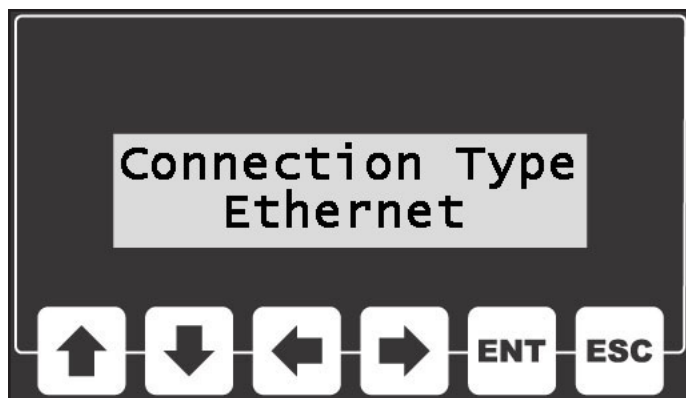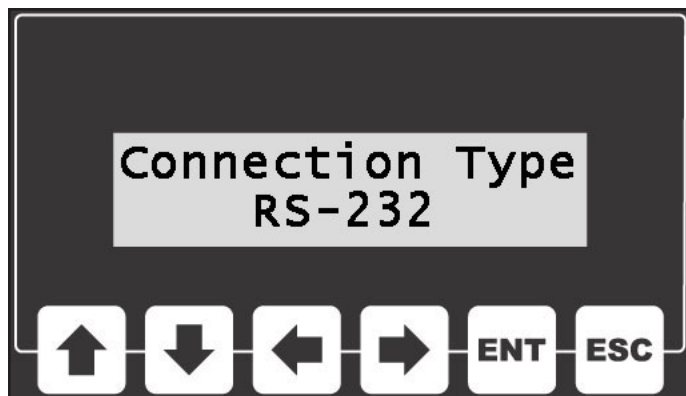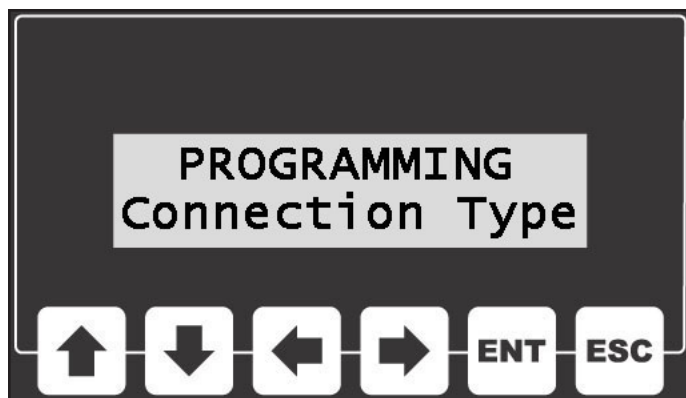
Programming the Unit's IP Address
To use the Ethernet communications with the PFCS, the unit will need an IP address which must be programmed.

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

It is important that each device on the network has it's own unique IP address. To edit this unit's IP address, use the arrow buttons to navigate to "IP Address" in the main programming menu, then press the ENT button.

The current IP address will be displayed. To change the address use the Left and Right buttons to navigate to any digit in the address. Then use the Up and Down buttons to alter that digit's value.

Press the ENT button to save the displayed IP address.

Press the ESC button to return to the main programming menu at any time without saving a new value.
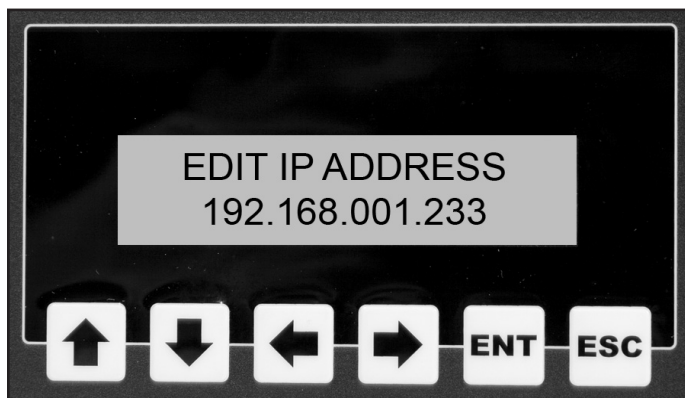
Programming the Subnet Mask
The Subnet Mask is used to identify which part of the IP address is the network ID and which part is the host ID. This is accomplished by a logical bitwise ANDing of the IP address and the netmask.

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

To edit the netmask, use the arrow buttons to navigate to "Subnet Mask" in the main programming menu, then press the ENT button.

The current mask value will be displayed at this point. To change the Mask's value, use the Left and Right buttons to navigate among the digits and the Up and Down buttons to alter the digit's value.

Once the desired value is displayed, press the ENT button to save it to memory. Press the ESC button at any time to exit this program item without saving the new value.
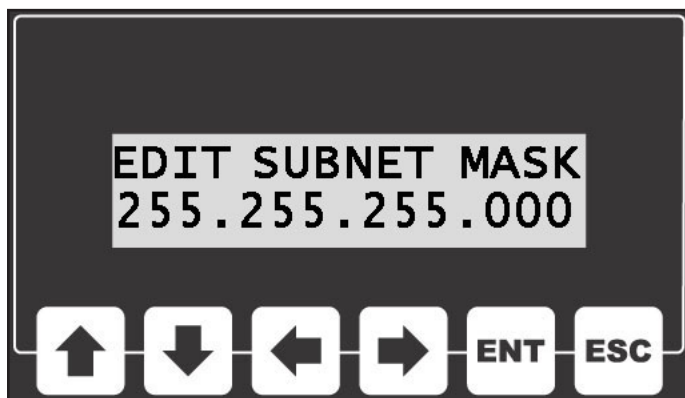
Programming the Gateway
Gateways perform routing functions. This gateway value identifies the router that connects a LAN to other networks. Some gateways also perform protocol conversions.

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

To edit this gateway's IP address, navigate to the Gateway menu item in the programming menu and press the ENT button.

The current gateway address will be displayed. To change the address, use the Left and Right buttons to navigate among the digits, and the Up and Down buttons to change the value of the active digit.

Press the ENT button to save the displayed gateway address once the desired address is displayed. Press the ESC button at any time to exit this program item without saving the new value.

```
PROGRAMMING
Gateway
↑ ↓ ← → ENT ESC
```

```
EDIT GATEWAY
192.168.001.212
↑ ↓ ← → ENT ESC
```

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

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

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

To edit the local port, navigate to the Edit Local Port menu item in the programming menu and press the ENT button.

The current local port address will be displayed. To change the value, use the Left and Right buttons to navigate among the digits, and the Up and Down buttons to change the value of the active digit.

Press the ENT button to save the displayed local port value once the desired value is displayed. Press the ESC button at any time to exit this program item without saving the new value.

```
PROGRAMMING
Local Port
↑ ↓ ← → ENT ESC
```

```
EDIT LOCAL PORT
16101
↑ ↓ ← → ENT ESC
```

Programming the Remote Port

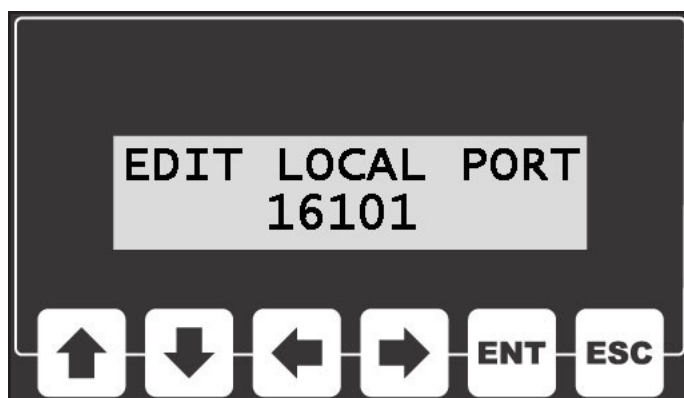The Remote Port specifies the port value of the PFCS server.

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

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

To edit the remote port, navigate to the Edit Remote Port menu item in the programming menu and press the ENT button.

The current remote port address will be displayed. To change the value, use the Left and Right buttons to navigate among the digits, and the Up and Down buttons to change the value of the active digit.

Press the ENT button to save the displayed remote port value once the desired value is displayed. Press the ESC button at any time to exit this program item without saving the new value.

```
        PROGRAMMING
        Remote Port

   ↑  ↓  ←  →  ENT  ESC
```

```
     EDIT REMOTE PORT
          16102

   ↑  ↓  ←  →  ENT  ESC
```
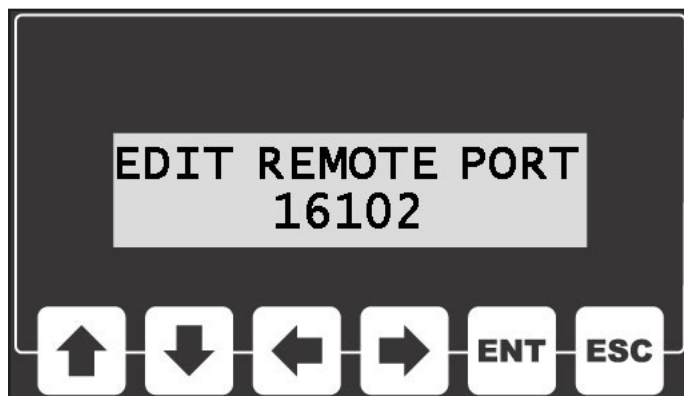
Programming the Server Address

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

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

To edit the server's address, navigate to the Edit Server Address menu item in the programming menu and press the ENT button.

The current server IP address will be displayed. To change the value, use the Left and Right buttons to navigate among the digits, and the Up and Down buttons to change the value of the active digit.

Press the ENT button to save the displayed server IP address once the desired address is displayed. Press the ESC button at any time to exit this program item without saving the new value.
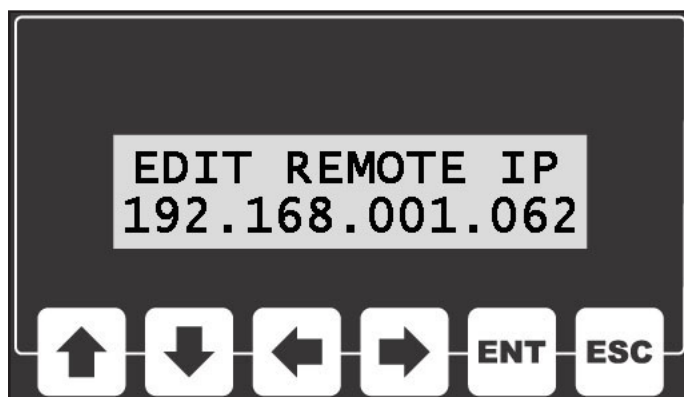
```
        PROGRAMMING
        Server Address

   ↑  ↓  ←  →  ENT  ESC
```

```
      EDIT REMOTE IP
     192.168.001.062

   ↑  ↓  ←  →  ENT  ESC
```

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

The Global 8 has the ability to manage up to eight different tools with its' eight specification groups. Therefore eight machine names can be defined so that results for each tool will be unique to the PFCS.

To edit the Machine Name, navigate to Edit Machine name menu item in the programming menu and press the ENT button. The display will read "Edit Name A", where "A" is the specification group. Use the Up and Down buttons to navigate among the specification groups (A through H).

To edit the name for a given group, press the ENT button to access the editing function for the tool name for that group. All specification groups have default tool names of four characters, which is the maximum number of characters for a tool name in the system.

The current machine name will appear on the display. Use the Left and Right buttons to move among the characters and the Up and Down buttons to select the character for each position.

Once the desired name is displayed, press the ENT button to save the name for that specification group. The ESC button may be used at any time to exit without saving any changes.

Programming the ACK Timeout

Each time the unit send a message to the PFCS system, it expects a response message in return. The amount of time that the unit will wait for this response before taking some action is programmable. This time interval is called the Acknowledge (ACK) Timeout. The ACK timeout can be set to a value between 5 and 30 seconds.

To program the ACK Timeout, navigate to this menu item and press the ENT button. The current timeout value (in seconds) will be displayed. To change the value use the arrow buttons. The effect of each button is:

    Up............Adds 1 second
    Down.......Subtracts 1 second
    Right........Adds 10 seconds
    Left..........Subtracts 10 seconds

When the desired value (number of seconds) is displayed, press the ENT button to store the value. Press the ESC button at any time to exit this item without changing the value.

Programming the Retry Limit

When the unit sends a message to the system and an acknowledgement message is not received within the ACK Timeout time, the unit will resent the message. The number of times the unit will resend a message is defined by the Retry Limit.

The retry limit is programmable for between 1 and 30 retries.

To program the retry limit,navigate to this item in the programming menu, then press the ENT button.

The current value (number of attempts) will be displayed. Use the Up and Down buttons to change the value. The effect of each button is:

    Up............Adds 1 second
    Down.......Subtracts 1 second

When the desired value (number of retries) is displayed, press the ENT button to store the value and a second time to return to the main programming menu. Press the ESC button at any time to exit this item without changing the value.
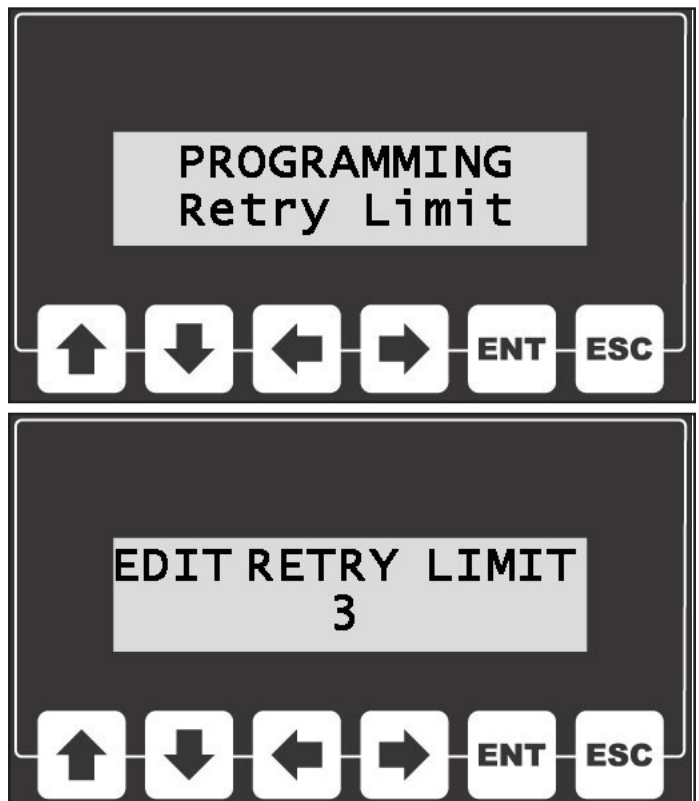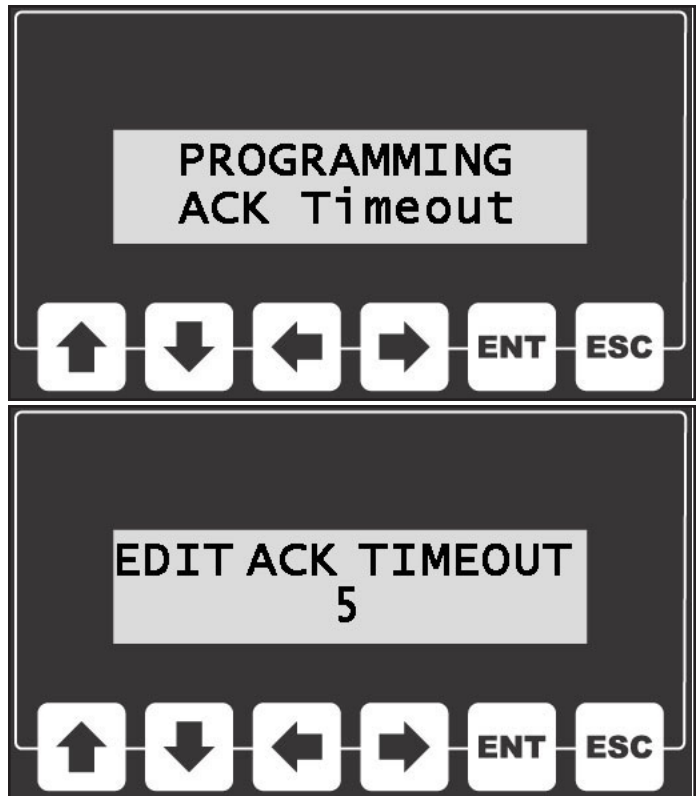
Programming the Keep Alive Timer
PFCS expects to receive messages from PFD's (Plant Floor Devices) at a regular interval. The Keep Alive value defines the amount of time that this unit will wait to send a "keep alive" message if there is no other information (such as torque results) to transmit.

The keep alive time is in whole seconds and can be any number between 30 and 240 seconds.

To program the keep alive timer, navigate to this menu item and press the ENT button.

The current value will be displayed. To change the value use the arrow buttons. The effect of each button is:

    Up........... Adds 1 second
    Down ...... Subtracts 1 second
    Right....... Adds 10 seconds
    Left .... Subtracts 10 seconds

When the desired value (number of seconds) is displayed, press the ENT button to store the value.
Press the ESC button at any time to exit this item without changing the value.
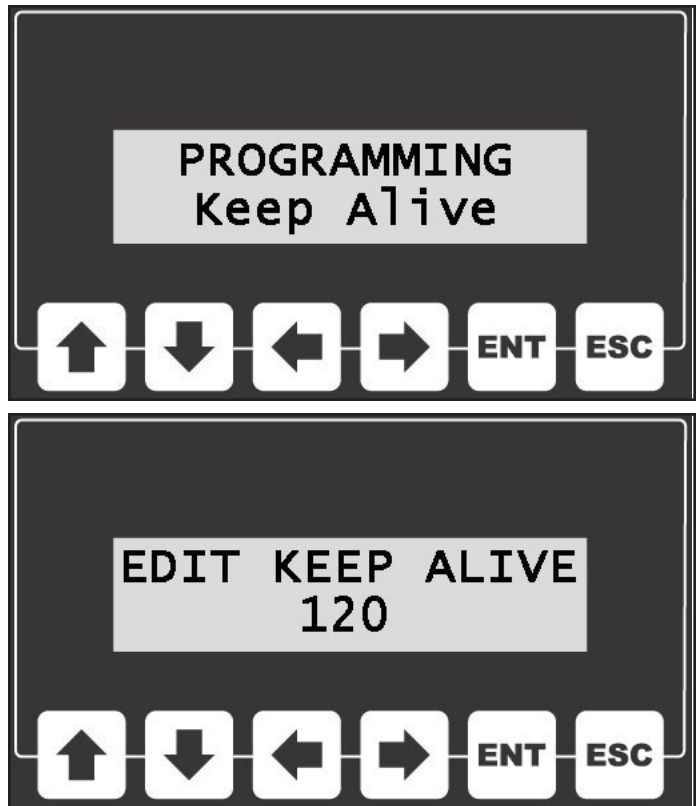
Activating and Deactivating PFCS Communications
When programming a unit it may be advantageous for the unit not to be communicating with the PFCS. Activation (On) and Deactivation (Off) is a program selection. When set to Off, no messages will be generated or sent to the PFCS.

To set this communication value, navigate to the PFCS COMM On/Off menu item then press the ENT button.

The display will show the current setting. To change the setting press any of the arrow buttons. Each press of a button will toggle from the current selection to the other selection.

When the desired value is displayed, press the ENT button to store the value. Press the ESC button at any time to exit this item without changing the value.
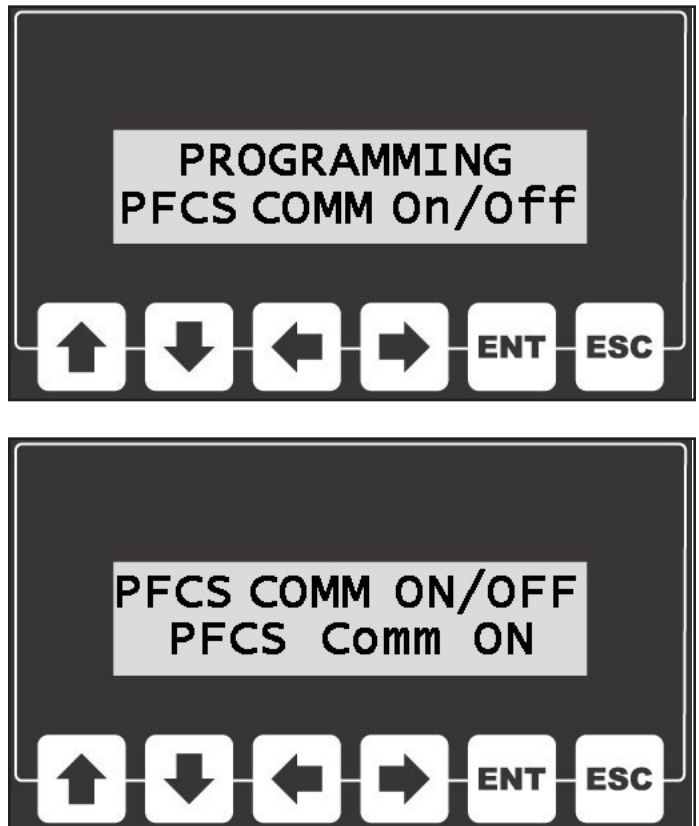
Changing the Password
The password is the control method used to preclude unauthorized changes to the PFCS settings. The user must enter the four-digit code to gain access to the programming menus.

The default password code may be changed to a value that is more easily recalled by the user.

To edit the password, navigate to the Edit Password menu item then press the ENT button.

At the password edit screen, use the Left and Right buttons to navigate among the characters and the Up and Down arrows to navigate among the values.

When the desired value is displayed, press the ENT button to store the value. Press the ESC button at any time to exit this item without changing the value.

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

To edit the setting, navigate to the XMIT Rejects menu item then press the ENT button.

The display will show the current setting as either "Send All NOKs" or "Send No NOK's". Press any of the arrow buttons to toggle from the current setting to the alternate.

When the desired value is displayed, press the ENT button to store the value. Press the ESC button at any time to exit this item without changing the value.
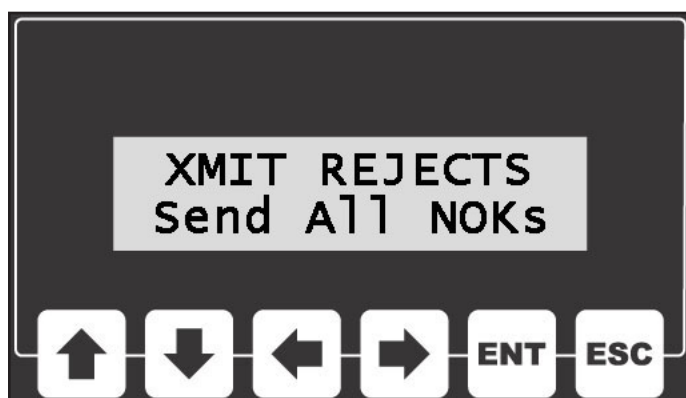
Supported Messages
There are two message types supported by this unit. One is a Test Result Data Message and the other is a Keep Alive Message.

The Test Result Data Message is sent when the unit receives data from one of the tools associated with the unit. The PFCS considers this a "Type 0002" message.

If the time set by the Keep Alive Timer elapses before a torque event is witnessed by the unit, the unit will send out a Keep Alive Message to the PFCS.

Test Result Data Message (type 0002) Structure

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

Keep Alive Message (type 9999)

The Keep Alive Message is sent out at regular intervals to let the PFCS know that the unit is still connected and functioning properly, but no torque or torque attribute data has occurred. The Keep Alive message has several required fields (Machine ID, vendor ID, etc.) and it has an area where the unit can add some additional information. In this area, bytes 65 through 120 contain the machine ID's for all eight specification groups and the tool type each represents. The tool type codes are as follows:

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

Keep Alive Message (type 9999) Structure

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

Network Card and Ethernet Communications - ToolsNet

Global 8 - Ethernet (ToolsNet) units have two additional items not appearing on the standard Global 8 units. These are a network card with multiple connectors and a Human-Machine Interface (HMI).

The four connectors on the left side of the unit are shown in the image below. The HMI is used to track communications with and program communications settings for the Global 8 that will be connected to your Ethernet system. Note that the Ethernet system to which the Global 8 will be connected must be using the ToolsNet protocol for the Global 8 - Ethernet (ToolsNet) to work with the system.

Network Card and Connections
The Global 8 - Ethernet ToolsNet has a communications card with four connections. These are located on the left side of the unit and are as shown in the image to the right.

    USB Port
    The USB connector is designed to permit the use of a computer to store additional protocols and to perform additional functions provided in the AQ software.

    Ethernet Connector - RJ45
    The Ethernet port is for connecting your Ethernet system to the unit.

    Bar Code Reader - Male DSUB9 Connector
    This is the connector to be used when a bar code reader is to be connected to the Global 8 - Ethernet. See the section on Creating Bar Codes for details on using a bar code reader with the unit. This unit was developed using a Symbol LS2208 bar code reader and uses CODE 39 bar codes.

DSUB9 Pin Use
2 - RX (Receive)
3 - TX (Transmit)
5 - GND (Ground)

    Network Card Connectors - Female DSUB9 Connector
    This connector provides the serial output required for a serial printer. Connecting the printer to this port will result in a print event each time a torque event occurs. Note: This port can be used to communicate the results to HyperTerminal or other terminal program. The pin use configuration for this port is the same as that for the bar code reader.

HMI Use - Operating Mode
When power to the Global 8 unit is enabled, the network card undergoes a starting routine. The display will briefly show the firmware version of the interface card software before the unit enters the operating mode.

When the unit enters the operating mode the display will change to show the unit's status. This status will change as the unit logs into the Protocol Interface Module (PIM).

When the unit successfully logs into the PIM, the system is told the IP address and port number for the ToolsNet server.

The unit will log out of the PIM and then log into the ToolsNet server. Once this process is complete, the display will change to that shown here.
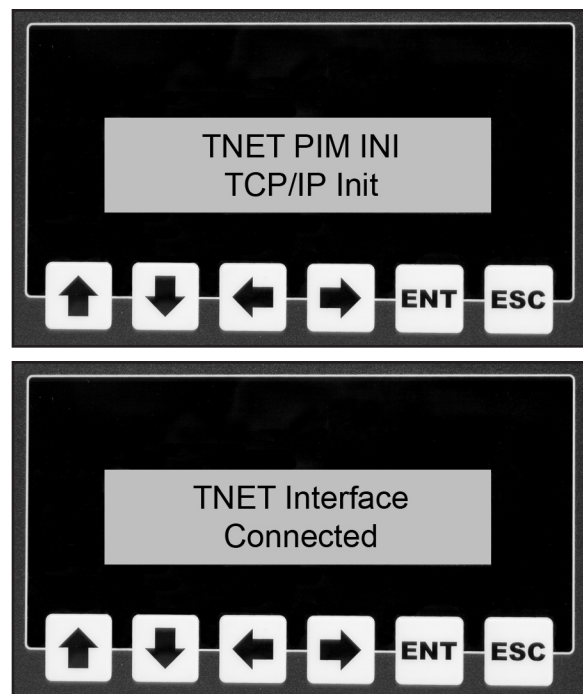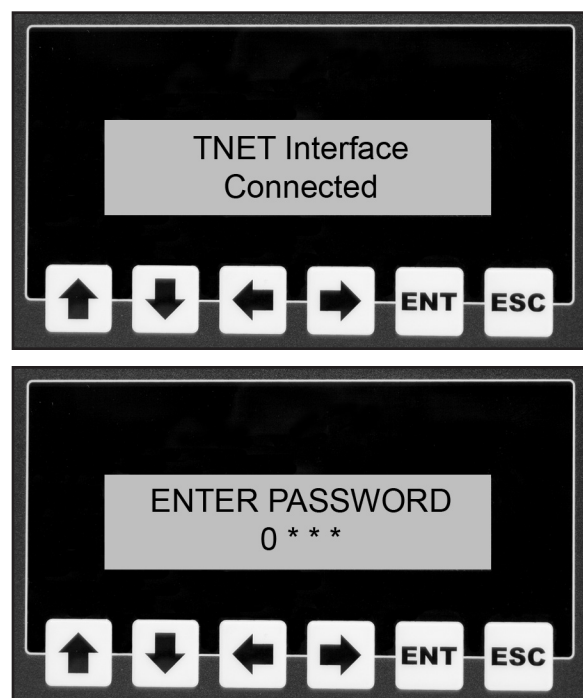
HMI Use - Program Mode
The Programming Mode is used to set up communication with the network (ToolsNet protocol), change or manage the password, set up the bar code reader and other functions. Each function has a screen that is used to identify the active function, and the subordinate screens necessary to program the item or items in that function.

The four buttons below the screen are used to navigate and to Enter (ENT) a function or selection or to Escape (ESC) the item or function without saving any changes.

To switch from Operating to Programming mode, press the Enter button at the main operating screen.

The screen will change to prompt the entry of the password. Use the Right and Left arrow buttons to navigate among the characters. The active character will be highlighted. Use the Up (increment by one) and Down (decrement by one) arrow buttons to select from among the available values for each character. The default password is "0104". When the correct password values have been selected, press the Enter button to Enter the password. Press the Escape button to exit without submitting the password.

The submitted password will be compared to the password stored in memory. If they match the unit will enter the Programming Mode. The Up and Down buttons are used to scroll among the program functions, the Enter button to Enter a function, and the Escape button to escape from a function (return to main programming menu) without changing information.
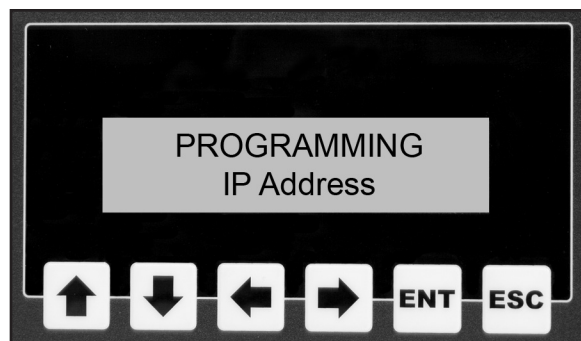
HMI Use - Programming the Unit's IP Address

Each device on the network must have its' own unique IP address. To create the IP address for the Global 8 unit, navigate to Programming IP Address in the main programming menu, then press the Enter button.

The current IP address will be displayed. To change the IP Address, use the Left and Right arrow buttons to navigate among the characters in the address, and the Up and Down buttons to change the value of the active character. The active character will always be highlighted.

When the desired IP address is displayed, press the Enter button to save and use that address. The Escape button can be pressed at any time before the Enter button is pressed to escape the programming function without changing the address.

All programmable values are stored in non-volatile memory. This allows the unit to retain these values even when the unit is turned off or unplugged from power.

HMI Use - Programming the Unit's Subnet Mask

The Subnet Mask identifies which part of the IP address is the network ID and which part is the host ID (identification). This is accomplished by a logical bitwise AND function applied to the IP address and the netmask.

To edit the netmask, navigate to Subnet Mask in the main menu and press the Enter button.

The current Subnet Mask value will be displayed on the Edit Subnet Mask screen, and the value for the first character will be highlighted. To edit this value, use the Left and Right arrow buttons to navigate among the characters, and the Up and Down buttons to increase or decrease the value of the active character.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

HMI Use - Programming the Gateway
Gateways perform routing functions. The gateway value identifies the router that connects a LAN to other networks. Some gateways also perform protocol conversions.

To edit the gateways IP address, navigate to the Programming Gateway function in the main programming menu, then press the Enter button.

The current Gateway value will be displayed on the Edit Gateway screen, and the value for the first character will be highlighted. To edit this value, use the Left and Right arrow buttons to navigate among the characters, and the Up and Down buttons to increase or decrease the value of the active character.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.
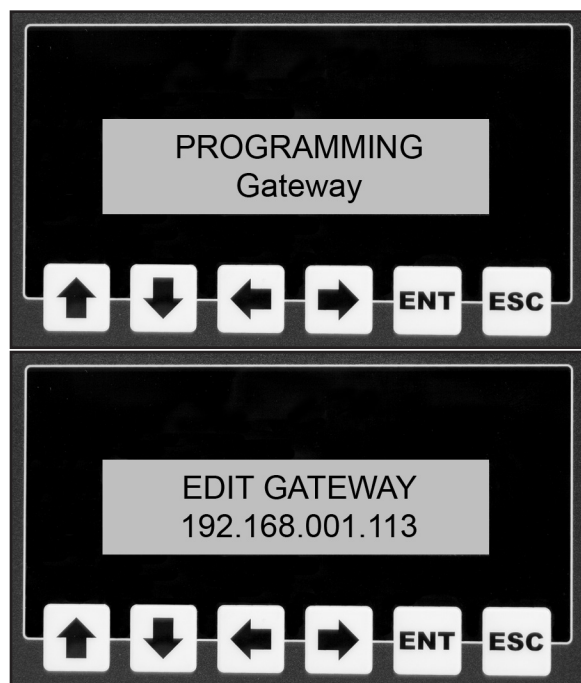
HMI Use - Programming the Port Number
The Port Number sets the service port value that is used to connect to the PIM system.

This system allows a "local" port and a "remote" port to be programmed. In most cases both ports can be set to the same value.

This value is programmable to any number between 0 and 32000. Typically the port value of 6575 is used for the PIM.

To edit the port value, navigate to the Programming Port Number function in the main programming menu, then press the Enter button.

The current port number value will be displayed on the Edit Local Port screen, and the value for the first character will be highlighted. To edit this value, use the Left and Right arrow buttons to navigate among the characters, and the Up and Down buttons to increase or decrease the value of the active character.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.
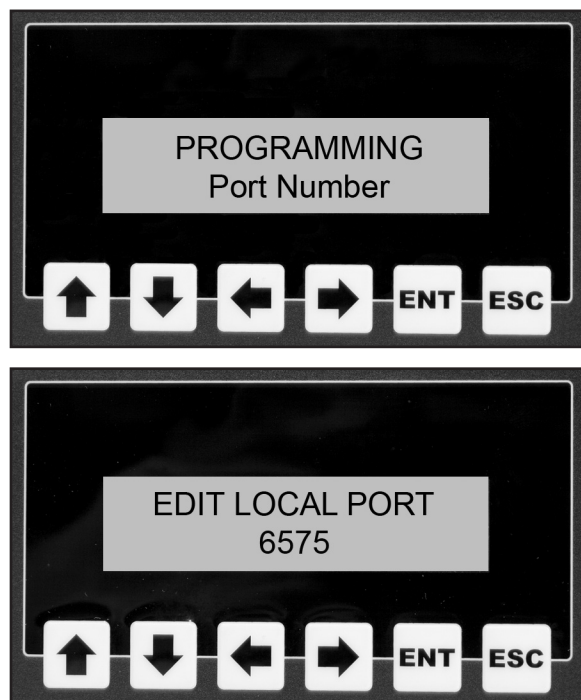
HMI Use - Programming the Server IP Address

Logging onto the ToolsNet server is a two-step process. First the unit must log into the PIM server and get the address and port number for the ToolsNet server.

The IP address for the PIM server can be edited by navigating to the Programming Server Address function in the main programming menu, then pressing the Enter button.

The current PIM IP address value will be displayed on the Edit PIM IP Address screen, and the value for the first character will be highlighted. To edit this value, use the Left and Right arrow buttons to navigate among the characters, and the Up and Down buttons to increase or decrease the value of the active character.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.
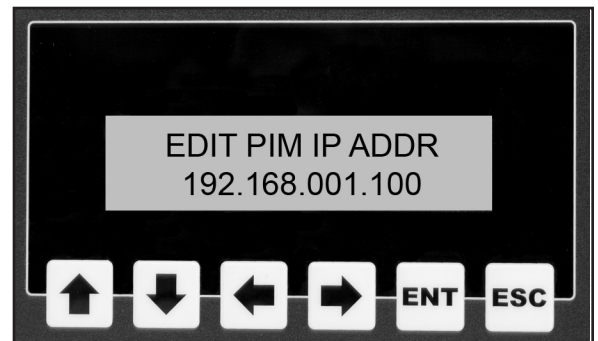
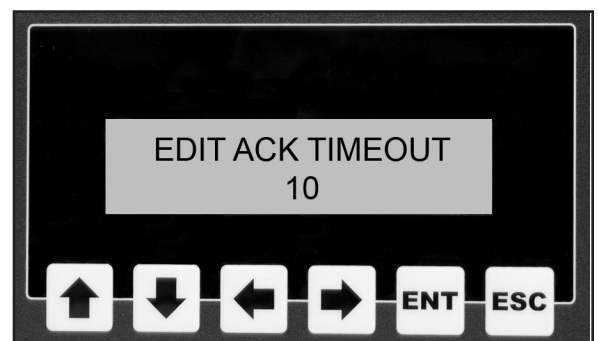**HMI Use - Programming the Message Timeout**

When the Global 8 unit send a message to a client, the client is expected to send an acknowledgement of receipt of the message back to the unit.

The Message Timeout setting is the amount of time that the unit will wait for the acknowledgement to arrive before re-sending the message or closing the socket.

The Message timeout can be set to any whole second value between 5 and 30 seconds.

To program this function, navigate to the Programming ACK Timeout function in the main programming menu, then pressing the Enter button.

The current ACK Timeout value (in seconds) will be displayed on the Edit ACK Timeout screen, and the value for the first (or only) character will be highlighted. To edit this value, use the Left and Right arrow buttons to navigate among the characters, and the Up and Down buttons to increase or decrease the value of the active character.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

HMI Use - Programming the Resend Attempts

When a message is sent on the ToolsNet system and an acknowledgement is not received in the time defined by the ACK Timeout setting, the unit will resend the message. The number of times the unit will resend the message without receiving an acknowledgement is defined by the Retry Limit.

If the Retry Limit is reached without receiving an appropriate response, the socket is closed. The Retry Limit is programmable for between 1 and 10 attempts.

To program the Retry Limit, navigate to Resend Attempts in the main programming menu and press the Enter button.

The current retry limit value will be displayed on the Edit Retry Limit screen, and the value for the first (or only) character will be highlighted. To edit this value, use the Up and Down buttons to increase or decrease the value.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

HMI Use - Programming the Keep Alive

If fastening activity has not occurred for a while, the unit is expected to send a Keep Alive message to the server. The Keep Alive informs the server the unit is still connected and that the connection is working.

The keep alive value is set in whole seconds with an acceptable value range between 5 and 240 seconds.

To program the keep alive value, navigate to this function in the main programming menu and press the Enter button.

The current keep alive value will be displayed on the Edit Keep Alive screen, and the value for the first (or only) character will be highlighted. To edit this value, use the Left and Right buttons to increment and decrement the value by 10. Use the Up and Down buttons to increment or decrement the value by 1.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

HMI Use - Activating and Deactivating Network Connectivity

Circumstances may arise where it is desirable to have power to the unit enabled while disabling network communication with the unit. To accommodate this possibility the unit has a function that disables the network communication capabilities of the unit.

To use this capability, navigate to the NTWK Comm On/Off function in the main programming menu, then press the Enter button.

At the new screen, use the arrow buttons to toggle between the On and Off setting for network communications. When the desired state is displayed, press the Enter button to make that state active. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

HMI Use - Programming a New Password

To gain access to the programming menu, the user must enter a password. The password is a four-digit numeric code.

All units ship with a default password of "0104". This default password may be changed to one more easily remembered by the user.

To change the password, navigate to the Programming Edit Password function in the main programming menu, then press the Enter button.

A set of four asterisks will be displayed on the Edit New P-Word screen, and the value for the first character will be highlighted. To edit this value, use the Left and Right arrow buttons to navigate among the characters, and the Up and Down buttons to increase or decrease the value of the active character.

Once the desired value is displayed, press the Enter button to save that value. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

HMI Use - Send or Ignore Rejects

In some assembly systems information on both good and bad fastenings is needed, in others only the verification of a good fastening is required. To accommodate both system approaches a function of the Global 8 permits selection among them.

To select the desired option, navigate to the Programming XMIT Rejects function in the main programming menu, then press the Enter button.

The current setting, either "Send All NOK's" (transmit information on all fastenings) or "Send No NOK's" (transmit only when fastening is good) will appear.

Use the arrow buttons to toggle between the two selections. When the desired selection appears, press the Enter button to make that selection active. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

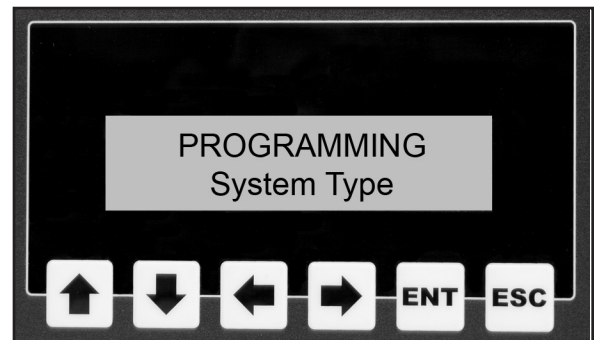## HMI Use - Programming System Type

When the Global 8 unit logs into ToolsNet it identifies itself using the System Type, System Number and Station Number settings.

The System Type setting describes to the system the company that is the manufacturer of the controller.

Using the wrong value for this setting can keep the unit from logging in to ToolsNet. Using a setting of "3" tells the system that the Station Type is undefined. This will allow the system to work, but the OEM information will not be available to ToolsNet. Note: ToolsNet versions vary in their assignment of system type. Consult ToolsNet for information on your version and the system type applicable to the Global 8.

To edit the system type value, navigate to the System Type option in the main programming menu and press the Enter button.

The currently active digit will be highlighted. Use the Left and Right buttons to navigate among the digits, and the Up and Down buttons to increment or decrement to the correct value for the system type. When the desired value appears, press the Enter button to make that selection active. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.
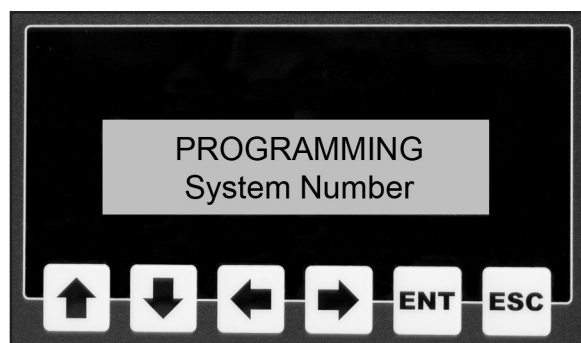
HMI Use - Programming System Number

The System Number is one of two arbitrary numbers that can be assigned to a Global 8 unit to make the ToolsNet results more readable.

The unit will identify itself on the system using this value and the Station Number value. Each torque message also contains these values.

Any number between 1 and NNNN may be used.

To edit this value, navigate to the Programming System Number function in the main programming menu, then press the Enter button.

The currently-active digit will be highlighted. Use the Left and Right buttons to navigate among the digits and the Up and Down buttons to increment or decrement the value of the active digit. When the desired value appears, press the Enter button to make that selection active. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

PROGRAMMING
System Number

EDIT SYSTEM NUMBER
00001

HMI Use - Programming Station Number

The Station Number is the second of two arbitrary numbers that can be assigned to a Global 8 unit to make the ToolsNet results more readable.

The system will identify itself on the system using this value and the System Number value. Each torque message also contains these values.

Any number between 1 and NNNN may be used.

To edit this value, navigate to the Programming Station Number function in the main programming menu, then press the Enter button.

The currently-active digit will be highlighted. Use the Left and Right buttons to navigate among the digits and the Up and Down buttons to increment or decrement the value of the active digit. When the desired value appears, press the Enter button to make that selection active. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.

PROGRAMMING
Station Number

EDIT STATION NUMBER
0042

HMI Use - Programming Controller Name
The controller can be assigned an alpha-numeric name that contains up to 25 characters. This name will be associated with torque results and will also be reported to the system when the unit logs on to the server.

To edit this name, navigate to the Programming Controller Name function in the main programming window, then press the Enter button.

The current controller name will appear on the screen. Use the Left and Right buttons to navigate among the characters, and the Up and Down buttons to change the value of each character.

All numeric characters, alphabetic characters, and a number of special characters are available for use via this method.

When the desired name is displayed, press the Enter button to make that selection active. The Escape button may be pressed at any time during the process to return to the main programming menu without saving any changes.
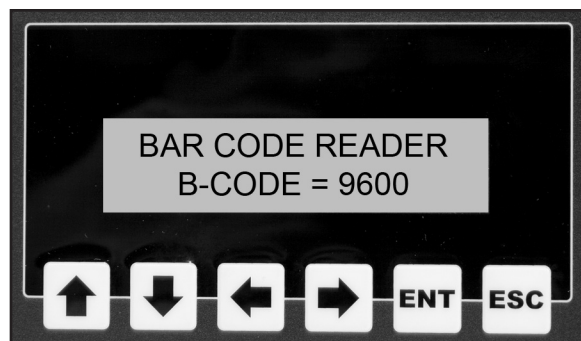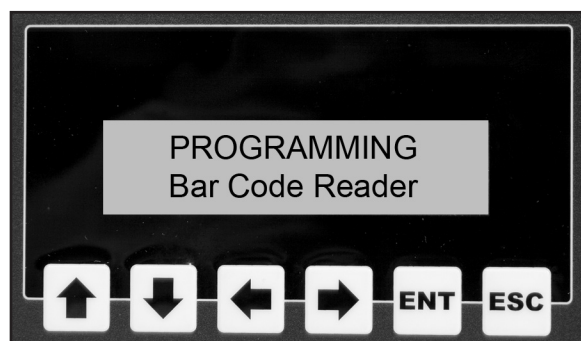
HMI Use - Programming Bar Code Reader
A bar code reader can be used to program items immediately during assembly operations. To enable this flexibility, the bar code function must be enabled through the programming menu.

The bar code reader will be connected to the male 9-pin DSUB port on the side of the Global 8 unit.

This port is configured to receive 8/N/1 transmission; 8 data bits, no parity, 1 stop bit. The available baud rates are 9600, 19200, 38400, 57600, 115200.

To program bar code reader communications, navigate to the to the Programming Bar Code Reader programming screen, then press the Enter (ENT) button.

At the new display, use the UP or DOWN buttons to scroll among the available baud rates. When the baud rate matching that of the bar code reader is displayed, press the Enter (ENT) button to save that rate.

To exit this function without saving a change, press the Escape (ESC) button.

Frequently Asked Questions

What brands of pneumatic tools work with the Global 8?
Automatic shutoff pneumatic tools, whether pulse-type or clutch-type, having a port for air pressure measurement during use, will work with the Global 8 once the tool has a PST-1000 connected to it. Not every brand has been tested with the Global 8 unit, but the principles of operation are the same for all such products.

For torque wrenches, only the Sturtevant Richmont Exacta 1100-series and Sturtevant Richmont preset clicker-type 2.4 GHz (SLTC-FM) tools will work with the Global 8. Use of the unit with these tools was designed in from the start.

Will the Global 8 and products used with it communicate further than fifty feet (16m)?
The radio transmissions from the 2.4 GHz radios used by the system travel further than the 30' (10m) minimum distance usually used and the 50' (16m) distance often attained. How far the tools are located from the Global 8 unit has more to do with the nature of transmission in factory environments and practical use by human beings than the pure distance measure does.

Factories are electronically "noisy" environments. Many of the tools and machines in factories emit radio frequency energy that can interfere with reliable communications. Further, radios using frequency modulation for control tend to work best when there is a clear "line of sight" between the transmitter and the receiver. Long distances without obstruction are rare in factories since the factory needs to get the most equipment usage possible out of the square footage available on the plant floor.

Also acting as a constraint is the need for the operator to clearly see the user interface display, and occasionally to use it. The size of the display limits the distance it can be mounted from the work location for the tools without the operator losing the ability to read the display. For this reason we recommend the unit be installed as close to the location where the operator uses the associated tools as is practicable.

How do we disassociate or "unlearn" tools from the unit when moving the unit or replacing it?
There may arise situations where a tool associated with or "learned by" one Global 8 unit will need to be removed from the association or "unlearned" from the unit. The procedure for each tool type is slightly different.

FM Switch Wrench
To disassociate a switch wrench from a unit, click the switch wrench and hold it in the "clicked" position until the light emitting diode (LED) on the switch wrench emits a solid and steady red color. Release the wrench from the "clicked"position, then cycle the wrench again. This erases the memory of the radio on the Global 8 unit from the tool. Disable power to the unit the tool was just "unlearned" from. Prepare the new Global 8 unit for "learning" the wrench (see Section 5 - Radio Communications), and follow the standard procedure for establishing communications with the tool. The group for the old unit will have to be changed to work with a different tool. On the old unit, follow the same procedure to "learn" the new tool as was initially used.

1100-Series Exacta 2 Digital Torque Wrenches
The Exacta series tools look for a Global 8 unit to work with each time they are energized. If an Exacta 1100 tool has been learned by one unit and you desire to transfer the tool to a different unit:

1. De-energize (turn off) the initial Global 8 unit, the one that the tool is to be disassociated from.
2. Energize the new Global 8 unit, the one the tool is to be associated with in the future.
3. Follow the procedure for establishing radio communications (Section 5 of this manual) to establish the radio link between the tool and the new unit.
4. Energize the Global 8 unit the tool was associated with and change the Group setting for the tool.
5. **Check the Head Length setting for each group the tool is to be used with.**

PST 1000
The PST 1000 has a specific procedure that puts it in "learn" mode. Review that portion of the procedure before following these steps. The procedure is contained in the instruction sheet for the PST 1000.

1. De-energize (turn off) the initial Global 8 unit, the one that the tool is to be disassociated from.
2. Energize the new Global 8 unit, the one the tool is to be associated with in the future.
3. Follow the procedure for establishing radio communications (Section 5 of this manual) to establish the radio link between the tool and the new unit.
4. Energize the Global 8 unit the tool was associated with and change the Group setting for the tool.

As an alternate method to those above, you can use the "EDIT RADIO" function to change the settings on the Global 8 unit back to the factory defaults. The defaults are found on Page 23 of this manual, and the EDIT RADIO function instructions on Page 44.

Can the relays for the Global 8 be energized without an external 24VDC power source?
Yes, but we strongly encourage our customers to use an external power source. The procedure for supplying 24VDC power internally to the relays requires a highly-qualified technician follow exact steps to avoid potentially dangerous problems.

If you <u>must</u> use a power source internal to the unit, contact Sturtevant Richmont for instructions before proceeding.

1100-Series Exacta 2 Head and Extension Use
The 1100-Series Exacta digital torque wrenches having version 5 and later software resident on them permit the use of extensions even when the tool was calibrated without an extension. This means that an extension to the tool can be added later, but **it is absolutely imperative that the correct and exact extension length be put into the appropriate location in the parameters for the group**.

<u>Failure to input the correct extension length **will** result in the incorrect torque being applied, displayed and communicated to the Global 8 unit.</u>

The default setting in the Global 8 for the 1100-Series Exacta 2 head length is 0.000mm, so entry of the head length is mandatory, whether the tool is used with an extension or simply with a head.. If a head extension is to be used with the tool, the length from the top of the dovetail on the tool to the center of the drive of the head must be measured and must be input into the "Head Len" section of the data for that tool on each parameter set the tool is used on. Errors in head length measurement and/or in the data on the Global 8 **will** cause the torque to be measured incorrectly. If the extension is changed or removed, the "Head Len" data must be changed to reflect the new head length accurately, or the torque **will** be measured incorrectly.

The ability to use head extensions and to change them as needed without the delay required to have the tool recalibrated with the actual head and extension to be used in production is an asset, but it is an asset that opens up several possibilities for operator error and some decline in measured torque accuracy.

Unless this ability to make changes to the head length very quickly is absolutely essential, we recommend that the 1100-Series Exacta 2 tools be calibrated with the heads and extensions with which they will be used in assembly operations.
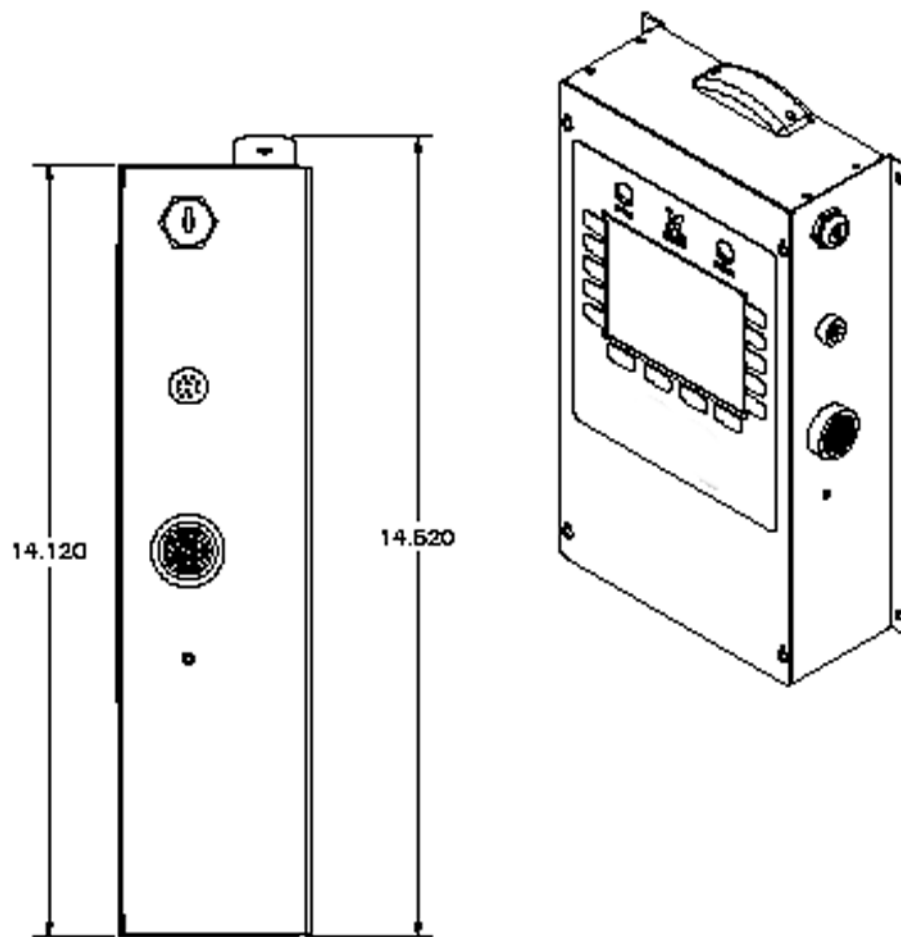
The accuracy of the lever length of the tool is an essential element in the accuracy of the torque measurement. It is imperative that the user pay close and careful attention to this element during calibration and during use.

Appendix

Product dimensions are as appear here.

ø9/32 THRU — 4 HOLES

© 13.000

© .512

© 8.572

9.072

3.500

.202
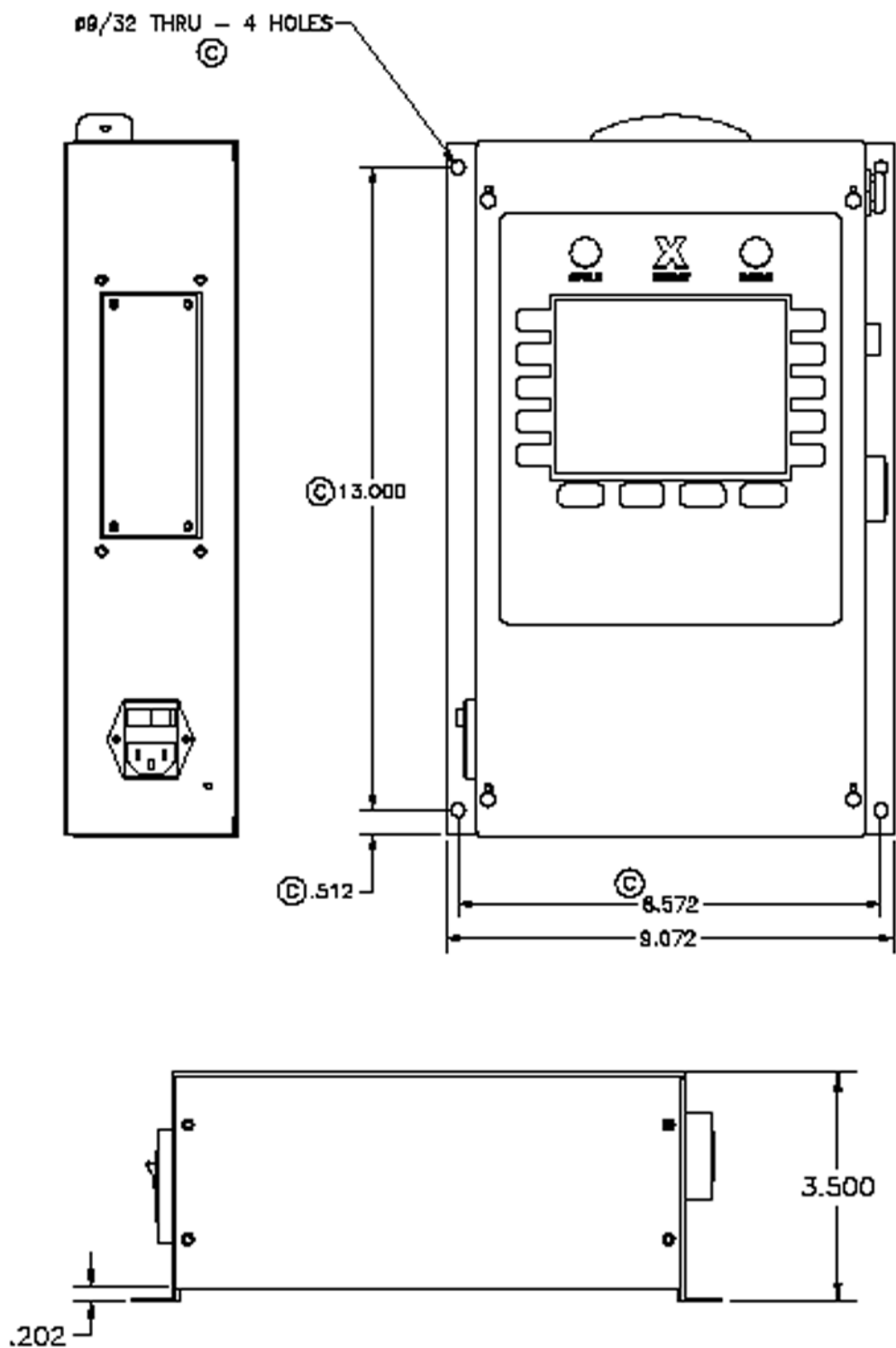
Bar Code Reader DSUB9 Connector Pin Configuration
    Pin 2 = RX
    Pin 3 = TX
    Pin 5 = GND

Serial Printer DSUB9 Connector Pin Configuration
    Pin 2 = RX
    Pin 3 = TX
    Pin 5 = GND

FINAL PAGE