**TL-VP1T-UIM**
Edition 1
October 2021

# QX Connect Series

# User Manual

Save These Instructions

Ingersoll Rand

EN

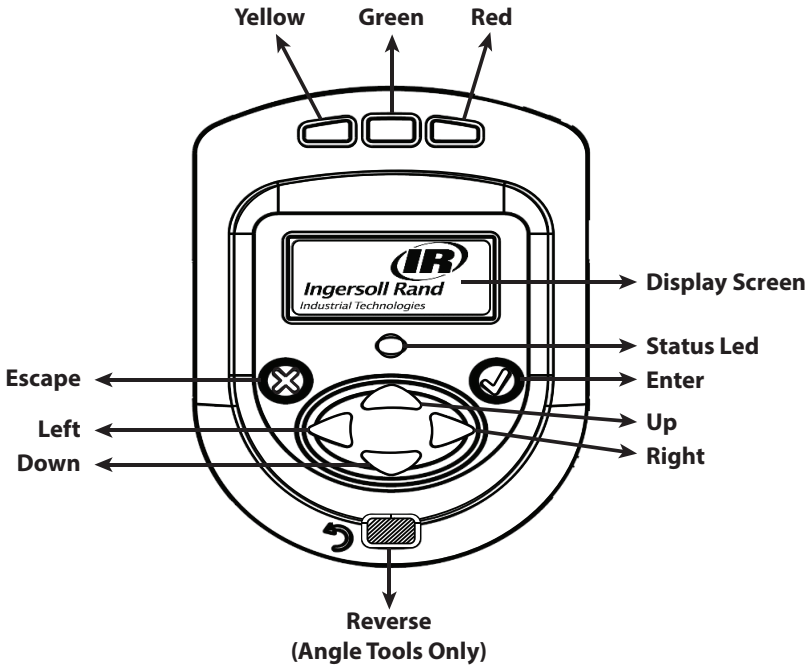
## Intended Use:

This manual provides instruction for programming the parameters of QX Connect Series handheld tools.

**How to Program**

- Program via ICS Software: A Windows-based tool that can be installed on a computer, with supplied USB cable.
- Program via Back Cap Tool Display: The information contained in this document is a guide for how to program the handheld tool.

**Back Cap Identification**




| Symbol | Function |
|---|---|
| | Escape / Exit |
| | Enter / Edit |
| | UP |
| | DOWN |
| | RIGHT |
| | LEFT |

**Table (Status LEDs - Blink rate 1/4 seconds per box except paired indication once per 12 seconds)**

| | |
|---|---|
| O | Paired with INSIGHTqcx or Multi-Tool Controller (MTC) |
| B | Paired with INSIGHT Connect App |
| O P P P | Paired with MTC or INSIGHTqcx and ETS Mode |
| B P P P | Paired with INSIGHT Connect App and ETS Mode |
| P | Ergonomic Tightening System (ETS) Mode |
| O B O B | Preventive Maintenance (PM) Alarms |
| O | Firmware Uploading |
| B | Firmware Upgrading (Do not power off) |

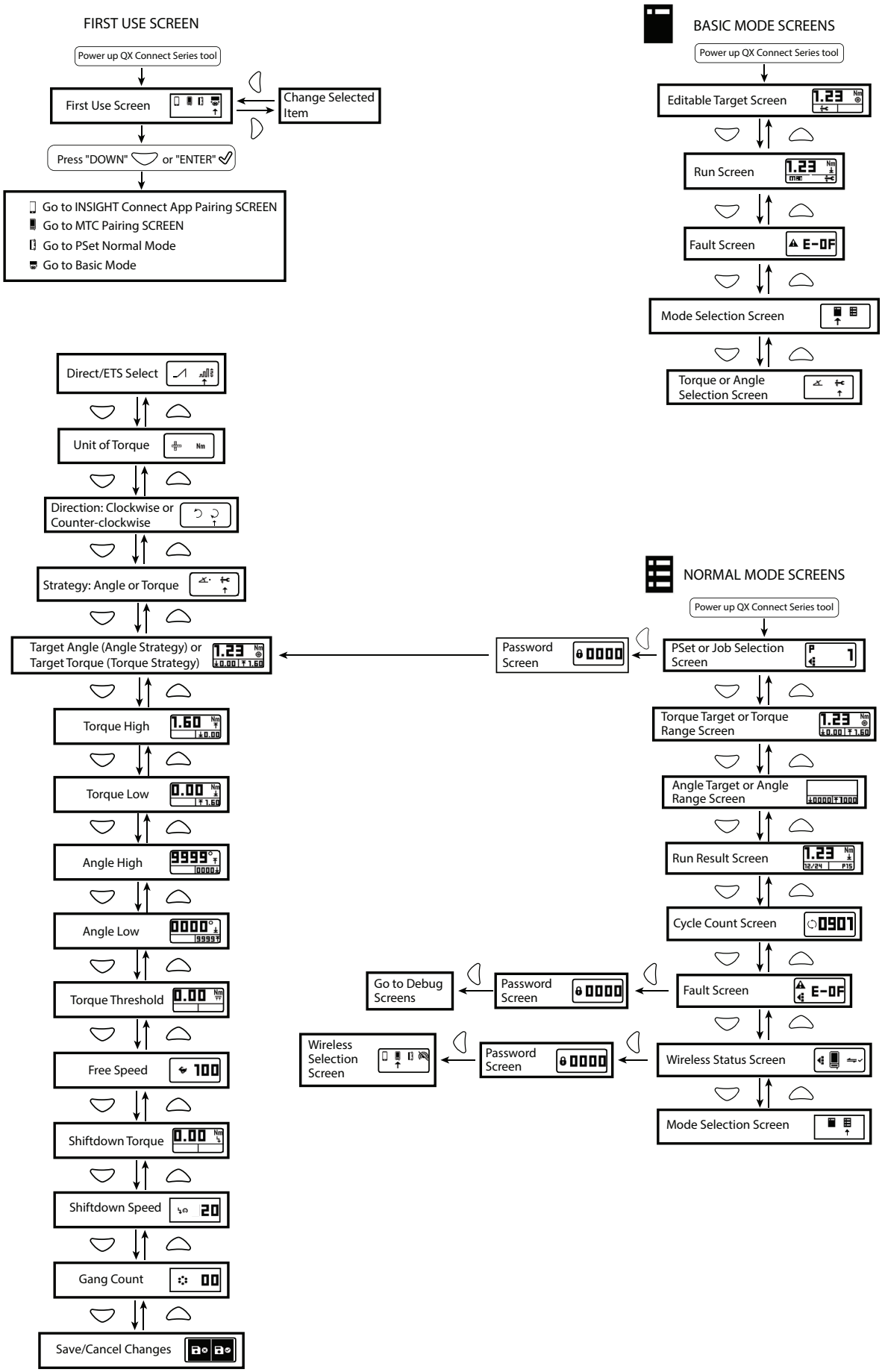
## Status LEDs

The tool contains 4 Status LED's on the display module. Three located above and one below the screen.

| | | |
|---|---|---|
| Orange (O) | -- | See Table. |
| Blue (B) | -- | See Table. |
| Purple (P) | -- | See Table. |
| Green | -- | The last tightening cycle ended between the high and low limits. |
| Yellow | -- | The last tightening cycle ended below the low limit. |
| Red | -- | The last tightening cycle ended above the high limit. |

Note: Red and Yellow functionality may be swapped using Invert LEDs setting in INSIGHT Connect App, INSIGHTqcx and ICS.

# 1. Overview of Menu Screens

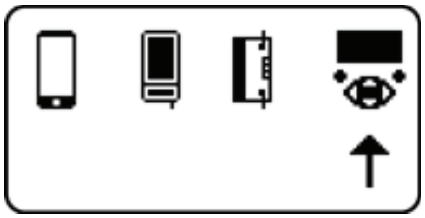


## 2. Getting Started

### 2.1 Initial Screen

Note: Displayed at the time of initial setup or after a factory reset.

Select how to interface with the tool. The options are the INSIGHT Connect App via Bluetooth, INSIGHTqcx controller via wireless, PCM or Standalone (normal mode), or Standalone (basic mode). Press the ◁ and ▷ arrow buttons to make the selection and then the ✓ button.



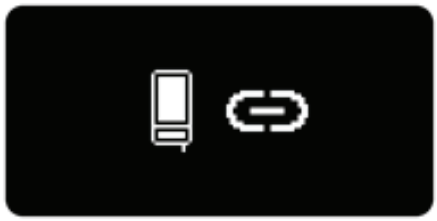
#### 2.1.1 INSIGHT Connect App

Enable Bluetooth pairing on the INSIGHT Connect App to connect to the tool and follow the directions on the App.

When the 6 digit code appears, confirm it matches with code displayed on the mobile device and press ✓ button.

#### 2.1.2 INSIGHTqcx

Set the INSIGHTqcx controller into pairing mode to pair with the tool.



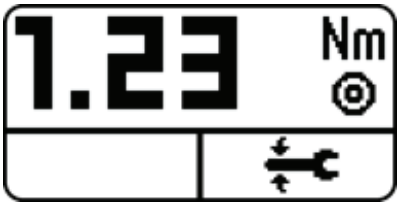
#### 2.1.3 PCM/Standalone

Normal Mode - Full Menu Access

- Use ICS to configure the tool wireless settings while communicating with a PCM.
- Use ICS or the tool navigation to setup the fastening settings while using as a standalone tool.

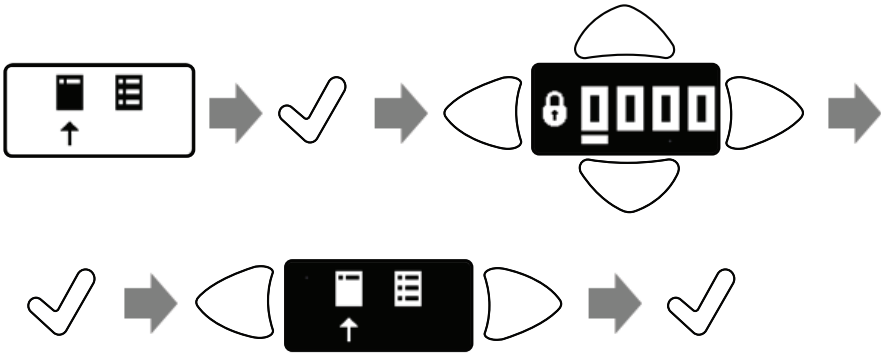
### 2.1.4 Standalone

Basic Mode - Limited menu for quick setting of torque or angle targets. To enable advance settings, switch to normal mode.




### 2.2 Switching between Basic and Normal Modes

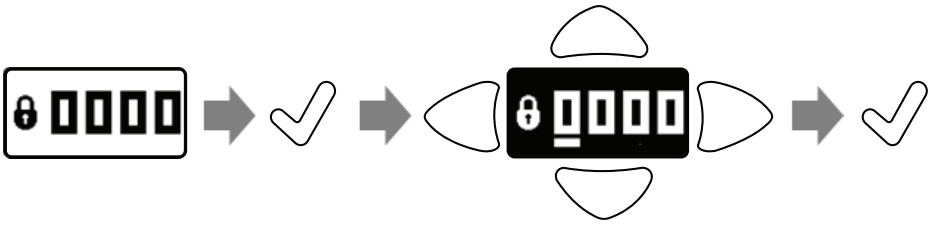
To switch between Basic and Normal Mode, press ✓ button to edit. Enter the password (default password is 0000). Press ◁ arrow button to get to edit screen and then ◁ or ▷ arrow button. Press ✓ button to select mode.




### 2.3 Password

The default password set at the factory is 0000. To enable the password, connect to the INSIGHT Connect App, INSIGHTqcx, or ICS to change password.

To enter password from Back Cap, press ✓ button to edit and use arrow buttons to change the values. Press ✓ button to accept.



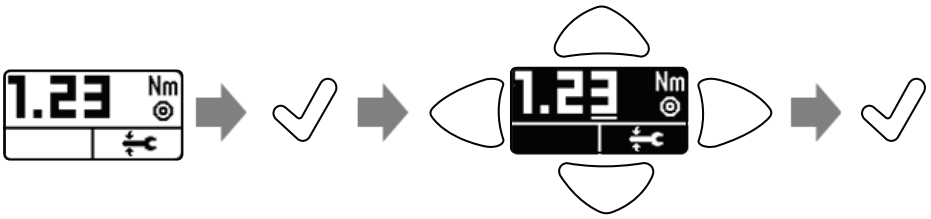

### 2.4 Setting the Clock

The tool has a clock that will retain the date/time during battery swaps. For initial setup, connect to the INSIGHT Connect App, INSIGHTqcx, or ICS. The date/time will be set automatically on connection.

## 3. Basic Mode

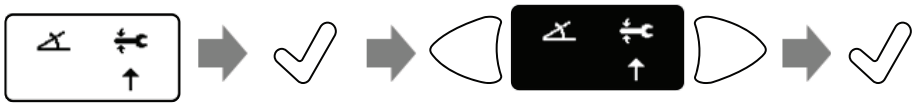
### 3.1 Setting the Target

Press ✓ button to enter Edit mode. Move left or right to underline the digit. Press △ or ▽ arrow button to change the value. Press ✓ button to save the changes.



### 3.2 Torque or Angle Mode

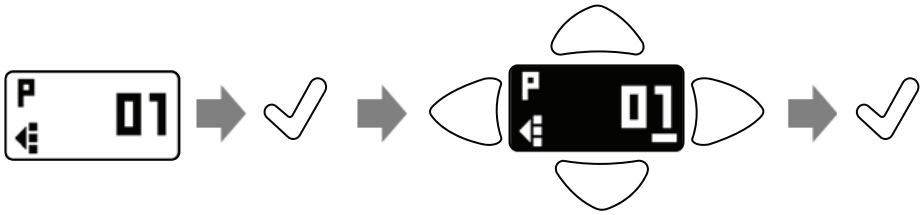
Press ✓ button to enter Edit mode. Move ◁ or ▷ arrow button to move the arrow. Press ✓ button to save the changes.



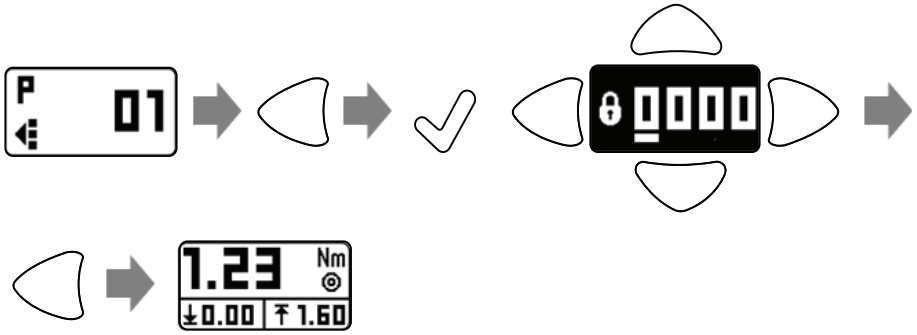
## 4. Normal Mode

### 4.1 PSet

Press ✓ button to enter Edit mode. Press △ or ▽ arrow button to change the PSet selection and press ✓ button to save the change. 32 unique programmable PSets are available.

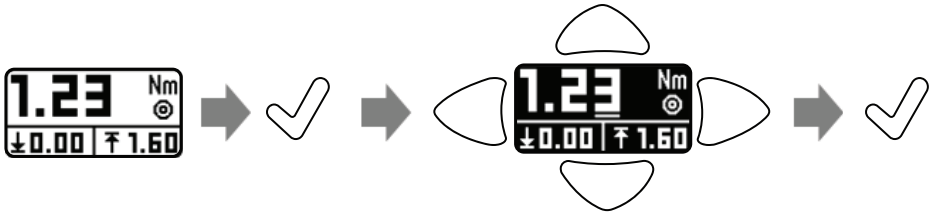



To edit the selected PSet, press ◁ arrow button to access the password screen. Enter the password and press ◁ arrow button or just press ◁ arrow button if the password is not set.



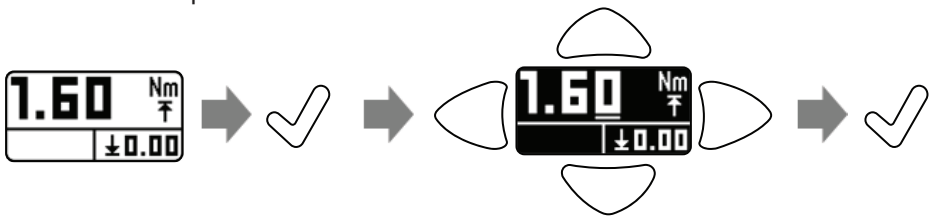

#### 4.1.1 Target

To edit the Target, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



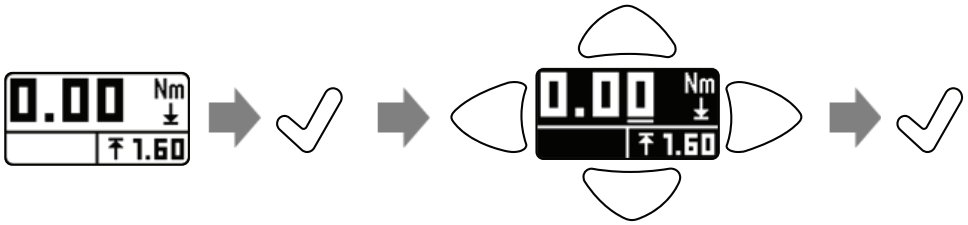

#### 4.1.2 Torque High Limit

To edit the Torque High Limit, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



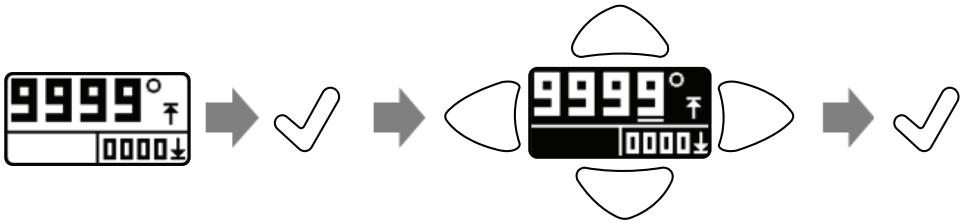
### 4.1.3 Torque Low Limit

To edit the Torque Low Limit press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



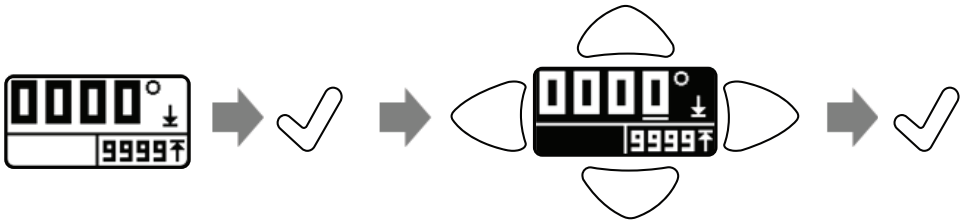

### 4.1.4 Angle High Limit

To edit the Angle High Limit, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



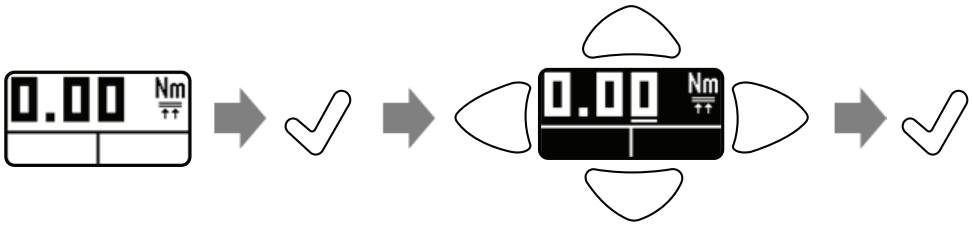

### 4.1.5 Angle Low Limit

To edit the Angle Low Limit press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



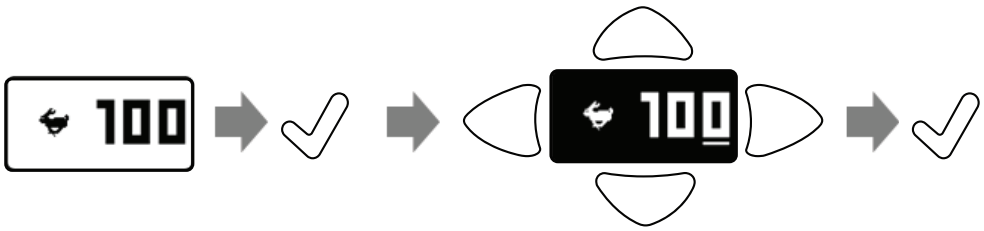

### 4.1.6 Torque Threshold for Counting Angle

To edit the Torque Threshold for Counting Angle, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



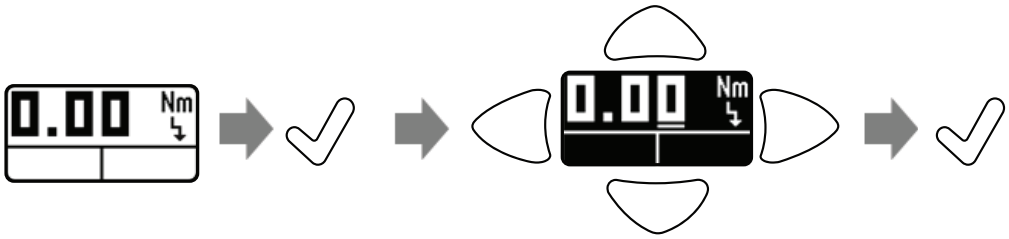

### 4.1.7 Free Speed

Programmed Speed is a percentage of the tool's maximum speed. To edit Free Speed, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



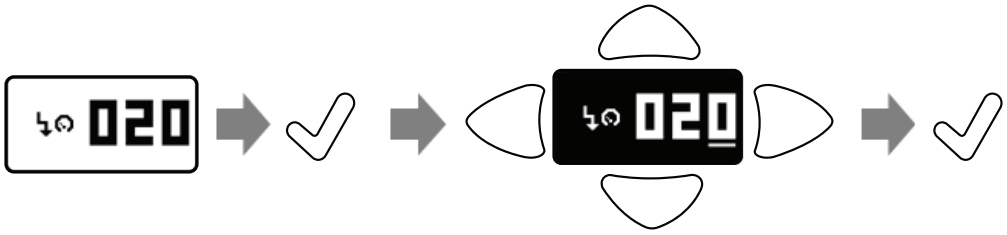
### 4.1.8 Shift Down Torque

To edit Shift Down Torque, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.



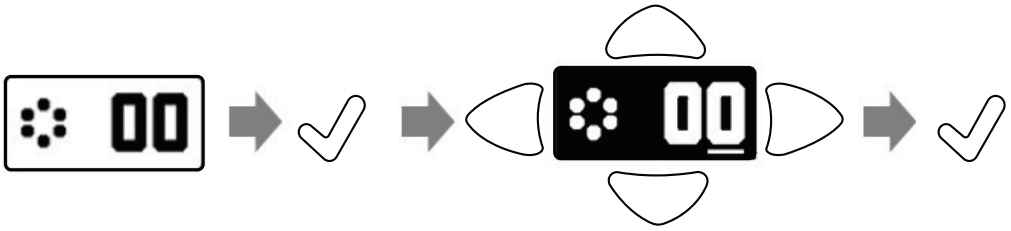

### 4.1.9 Shift Down Speed

Programmed Speed is a percentage of the tool's maximum speed. To edit Shift Down Speed, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.




### 4.1.10 Batch Count

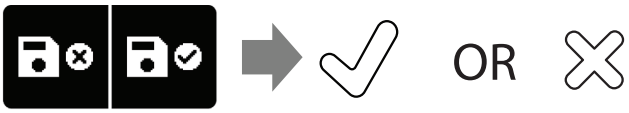
Batch count is the number of items to be fastened per group, gang, or set. To edit the Batch Count, press ✓ button to enter Edit mode and use the arrow buttons to change the values. Press ✓ button to accept.




### 4.1.11 Save

Press ✓ button to save or ✕ button to abort.

Shortcut: Press ✕ button from any setup menu page to jump to the save page then press ✓ button to save or ✕ button to abort changes.

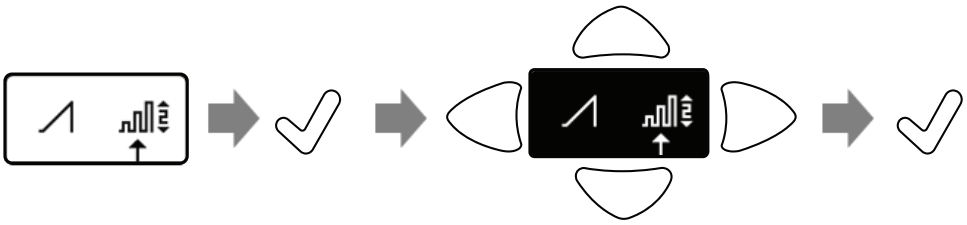



### 4.1.12 Drive Mode

Tool supports direct drive and 3 ETS tightening modes (ETS optional). ETS enable QX Connect Series handheld tools are equipped with a feature to reduce reaction during fastening cycles. The energy required for a specific fastening cycle is analyzed and transferred into a series of pulses. Refer to General Settings in ICS, INSIGHTqcx, or INSIGHT Connect App to ENABLE/DISABLE ETS functionality.

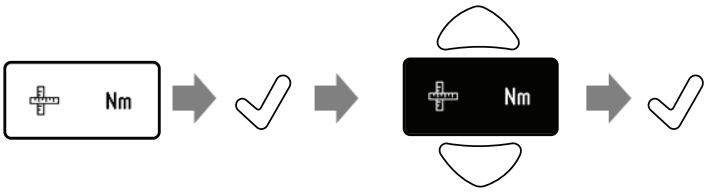
1. **Ergonomic Mode:** The softest and slowest mode with the most number of pulses. Ideal for hard joints or when arm, wrist and/or tool angles are most difficult.
2. **Performance Mode:** Best all-purpose setting, provides an average number of pulses. Start in Performance Mode and adjust accordingly.
3. **Productivity Mode:** The fastest mode with the least number of pulses. Ideal for soft joints or high production rates.

To change between direct drive and the ETS modes, press ✓ button to enter Edit mode and use ◁ and ▷ arrow buttons. To change ETS mode, move pointer to ETS position and use △ and ▽ arrow buttons to change the ETS Mode. Press ✓ button to accept.



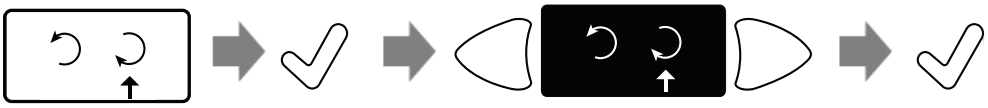
### 4.1.13 Torque Units

To edit the torque units, press ✓ button to enter Edit mode and use the △ and ▽ arrow buttons to change the value. Press ✓ button to accept.




### 4.1.14 Fastening Direction

To change between clockwise and counterclockwise, press ✓ button to enter Edit mode and use the ▷ and ◁ arrow buttons to change the value. Press ✓ button to accept.



### 4.1.15 Control method – Torque / Angle

To change between torque control and angle control, press ✓ button to enter Edit mode and use the ▷ and ◁ arrow buttons to change the value. Press ✓ button to accept.

## 4.2 Target

The top section is the target value.

The lower left section is the primary low limit.

The lower right section is the primary high limit.

The target and limits will be torque values when using torque control or angle values when using angle control.

### 4.3 Secondary Limits

The lower left section is the secondary low limit.

The lower right section is the secondary high limit.

The secondary limits will be torque values when using angle control or angle values when using torque control.

### 4.4 Run Screen

The top section is the result of the last fastening. The value will be either a torque or an angle.

The lower left section provides the Batch Count information in the format CURRENT COUNT/TOTAL BATCH.

The lower right section is current selected PSet.

### 4.5 Cycle Count

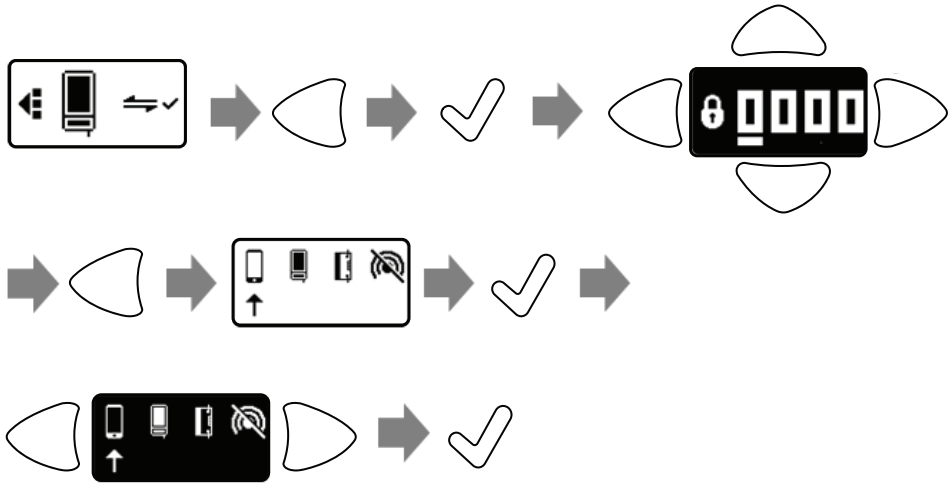
Displays the cycle count since the last reset.

### 4.6 Fault / Diagnostics

Displays the last fault logged.

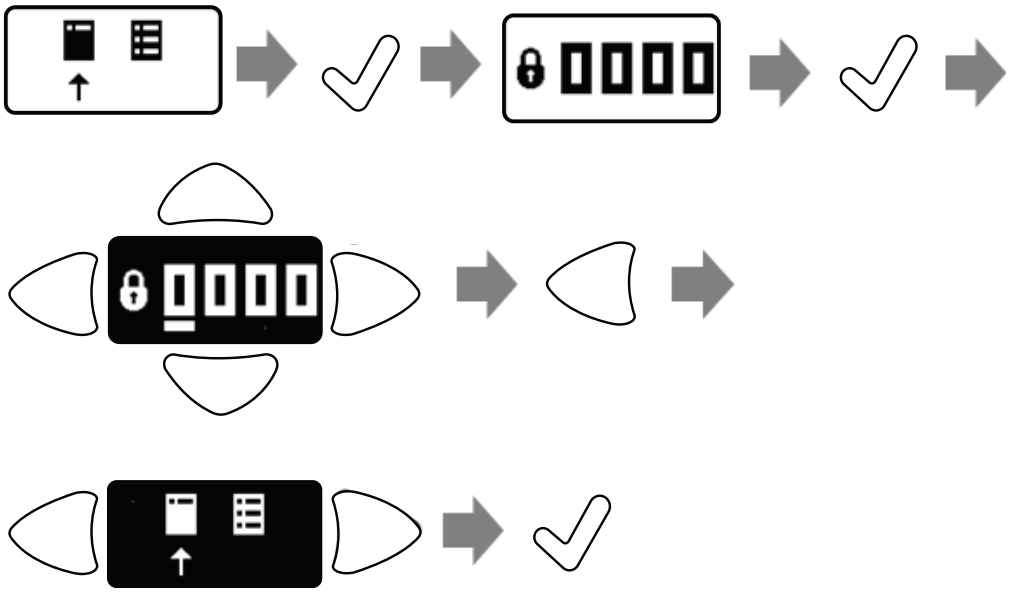
### 4.7 Communications

To edit communications, press ◁ arrow button, enter password, make selection by pressing ◁ or ▷ arrow button to select using INSIGHT Connect App via Bluetooth, INSIGHTqcx controller via wireless, PCM, or Standalone then press ✓ button. For wireless modes, the tool will enter pairing mode. Standalone will unpair from connected device. Unpairing from INSIGHTqcx will automatically reset to the default settings and PSET. Programming to your application will be required.



### 4.8 Basic / Normal Mode

To switch between Basic and Normal Mode, press ✓ button to edit. Enter the password (default password is 0000). Press ◁ arrow button to get to edit screen and then ◁ or ▷ arrow button. Press ✓ button to select mode.



## Tool Fault Codes/Troubleshooting

Tool fault codes can be found in tool display or event log.

| Fault Code | Category | Notes | Actions/Solutions |
|---|---|---|---|
| A-10 | Motor Controller Timeout | Display did not communicate with the Motor Controller in the last 10 seconds. | Insert battery and pull trigger to power-up the Motor Controller.<br>If alarm does not go away then there is a possibility of damaged electronics. Contact nearest Ingersoll Rand Service Center. |
| B-06 | Communication | Tool locked due to full communication buffer. | Check the communication between the tool and controller. |
| B-80 | RF Network Error | Tool failed to communicate with the PCM in the last 20 seconds. | Disable Wireless interface if PCM is not present. |
| B-D0 | Communication | Wireless stack problem. | Reload Wireless stack. |
| C-1A | Configuration | Variables out of range in QXM 2 speed tool. | Edit PSet. |
| C-20 | Configuration | Unprogrammed PSet selected. | Select a programmed PSet or go to edit PSet. |
| C-99 | Configuration | No valid Factory Data. | Put the tool on AW to reprogram the tool. |
| E-01 | Motor Controller Fault | Invalid Hall State. | Faulty HALL cable. Contact nearest Ingersoll Rand Service Center.<br>Check wireless settings using ICS to ensure that tool's RF settings match with PCM. Also confirm that the tool's ID is in the PCM's list. |
| E-02 | Motor Controller Fault | I2T Fault. | Too much current being drawn over an extended amount of time. Add a 10 second delay between cycles to try and remedy. If it is a very soft joint, try raising the shift down point so that the majority of the cycle is run at high speed. |
| E-03 | Motor Controller Fault | Motor Stall. | Possible damaged electronics hardware. Contact nearest Ingersoll Rand Service Center. |
| E-04 | Motor Controller Fault | Motor Current. | Possible damaged electronics hardware. Contact nearest Ingersoll Rand Service Center. |
| E-05 | Motor Controller Fault | Over Temperature. | Add a delay between cycles to allow time for the tool to cool. |
| E-06 | Motor Controller Fault | Current Offset. | Possible damaged electronics hardware. Contact nearest Ingersoll Rand Service Center. |
| E-07 | Motor Controller Fault | Shunt Calibration. | Faulty transducer or transducer wire. Contact nearest Ingersoll Rand Service Center. |
| E-08 | Motor Controller Fault | Torque Offset Fault. | Faulty transducer or transducer wire. Contact nearest Ingersoll Rand Service Center. |
| E-09 | Motor Controller Fault | Transducer Fault. | Faulty transducer or transducer wire. Contact nearest Ingersoll Rand Service Center. |
| E-0A | Motor Controller Fault | Step Execution Timeout. | Check the joint for stripped threads. If the joint is a soft joint, extend the step timeout parameter for the fastening configuration being run. |

| Fault Code | Category | Notes | Actions/Solutions |
|---|---|---|---|
| E-0B, E-15 | Motor Controller Fault | Communication message timeouts. | Try pulling the trigger again. |
| E-0C | Motor Controller Fault | Over Torque limit. | Torque high limit is too low or the joint is too hard for the fastening settings. For a hard joint, try lowering the free speed to 70% and/ or lowering the shift down torque. |
| E-0D | Motor Controller Fault | Over Angle Limit. | Check the joint for stripped threads. Angle limit is too low or the joint is too soft for the fastening settings. |
| E-0E | Motor Controller Fault | Current Plausibility High. | Current Plausibility High failure. |
| E-0F | Motor Controller Fault | Under Torque. | Torque low limit is too high or the user released the trigger before the cycle was complete. The user should keep the trigger engaged until the cycle is complete. |
| E-10 | Motor Controller Fault | Under Angle. | Angle low limit is too high or the user released the trigger before the cycle was complete. The user should keep the trigger engaged until the cycle is complete. |
| E-11 | Motor Controller Fault | Current Plausibility Low. | Current Plausibility Low failure. |
| E-12 | Motor Controller Fault | Early Trigger Release. | The trigger was released before the cycle completed. |
| E-13 | Motor Controller Fault | Motor Controller Watchdog Reset. | Motor Controller Watchdog Reset. |
| E-14 | Motor Controller Fault | Motor Controller Stop Timeout. | Motor Controller Stop Timeout. |
| E-18 | Motor Controller Fault | Multi-step configuration did not complete due to early trigger release. | Cycle failed during one of the early stages of a prevailing torque strategy. Retry or check the joint for problems. |
| E-1B | Motor Controller Fault | Battery Cell Fault detected by Motor Controller. | Tool did not run all the steps. |
| E-1C | Motor Controller Fault | Low Battery Fault. | The tool will still operate properly. This is a warning that the battery voltage is almost drained. Replace or charge the battery. |
| E-1D | Motor Controller Fault | Critical Battery Fault detected by Motor Controller. | Battery voltage critically low. |
| E-1E | Motor Controller Fault | Motor controller is going to sleep due to idle timeout (Fault is only displayed if the tool is connected via USB). | Pull trigger to power-up tool. |
| E-1F | Motor Controller Fault | Wakeup Code received but not expected. | Tool wakeup. |
| E-81 | Motor Controller Fault | The configuration ID in the Motor Controller's EOR did not match the currently selected configuration. | Configuration data in EOR does not match currently selected configuration. |

| Fault Code | Category | Notes | Actions/Solutions |
|---|---|---|---|
| 2-xx | PM Alarm Cycle Fault | User configured alarm that occurs after the tool runs the number of configured cycles, where xx = 01 to 05. | Reset alarm's cycle count configuration. |
| 3-xx | PM Alarm Cycle Fault | User configured alarm that occurs after a specific time and date, where xx = 01 to 05. | Reset alarm's time/date occurrence. |
| 6-F1 | Firmware Upgrade | Invalid Firmware image size. | Check if it is right firmware image. |
| 6-F2 | Firmware Upgrade | Invalid Firmware CRC. | Check the connection and retry. |
| 6-F3 | Firmware Upgrade | Invalid Image ID. | Check if it is right firmware image. |
| 6-01 | Firmware Upgrade | No communications with MCE or failed to clear backup memory. | Put Battery on and Pull the trigger to wake up MCE board and try to do FW upgrade again or check the connection between MCE board and Backcap. |
| 6-02 | Firmware Upgrade | Fail to get Image Data from EEPROM. | The MCE image on EEROM may be lost, and try to reload the FW Image. |
| 6-03 | Firmware Upgrade | Fail to write Image Data to MCE. | Check the communication between MCE board and Backcap. |
| 6-04 | Firmware Upgrade | Fail to do checksum in MCE. | Check the communication between MCE board and Backcap or MCE flash memory issue. |
| 6-05 | Firmware Upgrade | Fail to read the MCE Image checksum from MCE board. | Check the communication between MCE board and Backcap or MCE flash memory issue. |
| 6-06 | Firmware Upgrade | Fail to verify the MCE Image checksum. | Check the communication between MCE board and Backcap or MCE flash memory issue. |
| 6-07 | Firmware Upgrade | Fail to clear MCE Image checksum. | Check the communication between MCE board and Backcap or MCE flash memory issue. |
| 🔒 - XX | Tool Locked | 🔒 - 01 Tool Enable Lock<br>🔒 - 02 PSet Lock<br>🔒 - 04 Job Lock<br>🔒 - 08 Smart Socket Lock<br>🔒 - 10 PM Alarm Lock<br>🔒 - 20 Fail Cycle Lock<br>🔒 - 40 Barcode Lock | Tool locked as part of enabled process control with controller. If tool is inadvertently locked, it can be cleared by performing a Factory Rest (FAC1). |
| D-XX | Internal and System | | Contact nearest Ingersoll Rand Service Center. |

## Parts and Maintenance

Tool repair and maintenance should only be carried out by an authorized Service Center.
Refer all communications to the nearest **Ingersoll Rand** office or distributor.

**Notes:**

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